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Volume 3 – Class EA Evaluation

Appendix 3A

Archaeological Screening Process Checklist

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Public Works

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March 7, 2024

Ministry of the Environment, Conservation
and Parks
Central Region, Project Review Unit
Environmental Assessment Branch
1st Floor
135 St. Clair Avenue West
Toronto
ON, M4V 1P5

RE: NOTICE OF PROJECT SCREENING

Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station

Background

Further to our Notice of Commencement and Project Information Form (June 22, 2023) for the Bolton Water and Wastewater Capacity Improvements Class 'C' EA, the Region has identified a new water booster pumping station (WBPS) to support the existing and future servicing needs for the Town of Bolton. This project is subject to the new Archaeological Screening Process, to determine potential exemption from the requirements of the *Environmental Assessment Act*. Eligibility for screening under Appendix 1 – Table B of the amended MCEA process is noted below:

> "*5d Construct a new pumping station where the facility is not located in or adjacent to an environmentally sensitive natural area, residential or other sensitive land use, or on land with cultural heritage or archaeological potential*."

Following a review and evaluation of site options as depicted in Figure 1, the Region has selected a preferred location and has completed the Achaeological Screening. The Region concludes that the new Bolton Zone 7 Water Booster Pumping Station and the proposed preferred site—Site 3 at King Street and Coleraine Drive—meets the criteria to be exempt from the *Environmental Assessment Act*.

As per the Freedom of Information and Protection of Privacy Act, 1990, all comments, with the exception of personal information and confidential information from Indigenous Peoples, will become part of the public record of the study. The study is being conducted according to the requirements of the Municipal Class Environmental Assessment, which is a planning process approved under Ontario's Environmental Assessment Act.

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Proposed Preferred Project Site: King Street and Coleraine Drive



The proposed project site is in the Town of Bolton located in Caledon, within the Region of Peel. The area is generally situated along Coleraine Drive from approximately 250 metres northwest of King Street West to approximately 100 metres southeast of Holland Drive (**Figure attached**).

Minimizing Potential Impacts

A shortlist of potential sites (seven total) were evaluated. Through the MCEA process, this evaluation considered five key criteria—natural environment, social-cultural heritage, jurisdictional, financial, and technical considerations to select the best site, while minimizing impacts to Indigenous Rights Holders, the community and the environment.

Site #3 at King Street and Coleraine Drive was recommended for having the least natural environment and social-cultural heritage impacts, while being technically feasible.

The following highlights its candidacy for exemption

- Proposed site previously screened through a Stage 1 Archeaological Assessment for the Coleraine Drive Grade Separation project (PIF P243-0349-2017 filed with the MTCS and entered into the registry April 27, 2018). The stage 1 results of this report highlighted no further archaelological assessment required. A copy of this report is attached for your reference.

As per the Freedom of Information and Protection of Privacy Act, 1990, all comments, with the exception of personal information and confidential information from Indigenous Peoples, will become part of the public record of the study. The study is being conducted according to the requirements of the Municipal Class Environmental Assessment, which is a planning process approved under Ontario's Environmental Assessment Act.

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- Avoids significant natural environmental features (i.e. creeks, rivers, wetlands).
- Located in a central-urban area that has previously been, and currently functions as a former road right-of-way.
- Has not been identified as a sensitive land use, and is adjacent to planned road improvements including grade separation and roundabouts.
- Located in an optimal technical location for connecting to existing infrastructure and for extending new watermain infrastructure within the existing road right-of-way, without requiring disturbance of additional land outside of the road right-of-way.
- The Region of Peel completed the Archaeological Screening Process with engagement with Indigenous Rights Holders and Interest Holders. Supplementary to the engagement and consultation undertaken through the broader Class EA Study the Region undertook further communication to request for any information, including potential impacts to Inherent, Aboriginal and Treaty rights, known archaeological resources, or areas and/or species of cultural significance, that should be considered and/or incorporated, as appropriate, into the assessment of potential impacts for the screened site.
- Engagement and consultation with the Indigenous communities is summarized in the attached Communications Tracking Table and included the sharing of the Stage 1 Archeaological Assessment for the Coleraine Drive Grade Separation project which concluded that no further archaelological assessments were required for the proposed pumping station site.

Supporting Documentation

In support of the Notice of Project Screening the following documentation is attached:

1. Figure 1 Shortlist of Site Locations and Preferred Location for the New Zone 7 Water Booster Pumping Station
2. Completed Criteria for Evaluating Archaeological Potential Form (Ministry of Tourism, Culture and Sport) – 0478 E (2015/11)
3. Stage 1 Archeaological Assessment for the Coleraine Drive Grade Separation PIF #: P243-0349-2017
4. Review and Entry into the Ontario Public Register of Archaeological Reports: PIF #: P243-0349-2017, MTCS File Number 0008386
5. Indigenous Communities Engagement and Consultation Summary

Having completed the Screening Process and concluding that the New Bolton Zone 7 Water Booster Pumping Station and its recommended location is exempt from the *Environmental Assessment Act*, the Region plans to move forward with the implentation of the project included detailed design, supplementary environmental investigation and relevant permits approvals under the Planning Act.

As per the Freedom of Information and Protection of Privacy Act, 1990, all comments, with the exception of personal information and confidential information from Indigenous Peoples, will become part of the public record of the study. The study is being conducted according to the requirements of the Municipal Class Environmental Assessment, which is a planning process approved under Ontario's Environmental Assessment Act.

Region of Peel
working with you

Should the Ministry require any further information please don't hesitate to contact the undersigned directly.

Sincerely,



Italia Ponce, P.Eng., Project Manager
Region of Peel
10 Peel Centre Drive, Suite A, 4th Floor
Brampton, ON, L6T 4B9
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Email: italia.ponce@peelregion.ca

For more information on this study, please visit the Region's website at: www.peelregion.ca/public-works/environmental-assessments/#current (Caledon)

The Region of Peel is committed to ensure that all regional services, programs, and facilities are inclusive and accessible. Please contact the Project Manager if you need any accommodations to provide comments and/or feedback for this study.

Public Works

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Figure 1: Shortlist of Site Locations for the New Zone 7 Water Booster Pumping Station

Notice of Archaeological Screening New Bolton Zone 7 Water Booster Pumping Station

Attachments

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2

TOWN OF BOLTON

WATER AND WASTEWATER CAPACITY IMPROVEMENTS CLASS 'C' EA

ATTACHMENT 2

Archaeological Screening Process Checklist

Ontario

Ministry of Tourism, Culture and Sport

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

Criteria for Evaluating Archaeological Potential

A Checklist for the Non-Specialist

The **purpose of the checklist** is to determine:

- if a property(ies) or project area may contain archaeological resources i.e., have archaeological potential
- it includes all areas that may be impacted by project activities, including – but not limited to:
  - the main project area
  - temporary storage
  - staging and working areas
  - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Archaeological assessment

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a licensed consultant archaeologist (see page 4 for definitions) to undertake an archaeological assessment.

The assessment will help you:

- identify, evaluate and protect archaeological resources on your property or project area
- reduce potential delays and risks to your project

Note: By law, archaeological assessments **must** be done by a licensed consultant archaeologist. Only a licensed archaeologist can assess – or alter – an archaeological site.

What to do if you:

- **find an archaeological resource**

  If you find something you think may be of archaeological value during project work, you must – by law – stop all activities immediately and contact a licensed consultant archaeologist

  The archaeologist will carry out the fieldwork in compliance with the *Ontario Heritage Act* [s.48(1)].

- **unearth a burial site**

  If you find a burial site containing human remains, you must immediately notify the appropriate authorities (i.e., police, coroner's office, and/or Registrar of Cemeteries) and comply with the *Funeral, Burial and Cremation Services Act*.

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – separate checklist
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages when completing this form.

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Project or Property Name

New Bolton Pressure Zone 7 Booster Pumping Station

Project or Property Location (upper and lower or single tier municipality)

Region of Peel, Town of Caledon

Proponent Name

Region of Peel

Proponent Contact Information

Italia Ponce P. Eng; italia.ponce@peelregion.ca (905-791-7800 ext 4583)

Screening Questions

	Yes	No
1. Is there a pre-approved screening checklist, methodology or process in place?	☑	☐

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

	Yes	No
2. Has an archaeological assessment been prepared for the property (or project area) and been accepted by MTCS?	☑	☐

If Yes, do **not** complete the rest of the checklist. You are expected to follow the recommendations in the archaeological assessment report(s).

The proponent, property owner and/or approval authority will:

- summarize the previous assessment
- add this checklist to the project file, with the appropriate documents that demonstrate an archaeological assessment was undertaken e.g., MTCS letter stating acceptance of archaeological assessment report

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g., environmental assessment document
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

	Yes	No
3. Are there known archaeological sites on or within 300 metres of the property (or the project area)?	☐	☐
4. Is there Aboriginal or local knowledge of archaeological sites on or within 300 metres of the property (or project area)?	☐	☐
5. Is there Aboriginal knowledge or historically documented evidence of past Aboriginal use on or within 300 metres of the property (or project area)?	☐	☐
6. Is there a known burial site or cemetery on the property or adjacent to the property (or project area)?	☐	☐
7. Has the property (or project area) been recognized for its cultural heritage value?	☐	☐

If Yes to any of the above questions (3 to 7), do **not** complete the checklist. Instead, you need to hire a licensed consultant archaeologist to undertake an archaeological assessment of your property or project area.

If No, continue to question 8.

	Yes	No
8. Has the entire property (or project area) been subjected to recent, extensive and intensive disturbance?	☐	☐

If Yes to the preceding question, do **not** complete the checklist. Instead, please keep and maintain a summary of documentation that provides evidence of the recent disturbance.

An archaeological assessment is not required.

If No, continue to question 9.

	Yes	No
9. Are there present or past water sources within 300 metres of the property (or project area)?	☐	☐

If Yes, an archaeological assessment is required.

If No, continue to question 10.

	Yes	No
10. Is there evidence of two or more of the following on the property (or project area)?	☐	☐

- elevated topography
- pockets of well-drained sandy soil
- distinctive land formations
- resource extraction areas
- early historic settlement
- early historic transportation routes

If Yes, an archaeological assessment is required.

If No, there is low potential for archaeological resources at the property (or project area).

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g., under the *Environmental Assessment Act, Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions below:

- a clear map showing the location and boundary of the property or project area
  - large scale and small scale showing nearby township names for context purposes
- the municipal addresses of all properties within the project area
- the lot(s), concession(s), and parcel number(s) of all properties within a project area

In this context, the following definitions apply:

- **consultant archaeologist** means, as defined in Ontario regulation as an archaeologist who enters into an agreement with a client to carry out or supervise archaeological fieldwork on behalf of the client, produce reports for or on behalf of the client and provide technical advice to the client. In Ontario, these people also are required to hold a valid professional archaeological licence issued by the Ministry of Tourism, Culture and Sport.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may be already in place for identifying archaeological potential, including:

- one prepared and adopted by the municipality e.g., archaeological management plan
- an environmental assessment process e.g., screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport under the Ontario government's Standards & Guidelines for Conservation of Provincial Heritage Properties [s. B.2.]

2. Has an archaeological assessment been prepared for the property (or project area) and been accepted by MTCS?

Respond 'yes' to this question, if all of the following are true:

- an archaeological assessment report has been prepared and is in compliance with MTCS requirements
  - a letter has been sent by MTCS to the licensed archaeologist confirming that MTCS has added the report to the Ontario Public Register of Archaeological Reports (Register)
- the report states that there are no concerns regarding impacts to archaeological sites

Otherwise, if an assessment has been completed and deemed compliant by the MTCS, and the ministry recommends further archaeological assessment work, this work will need to be completed.

For more information about archaeological assessments, contact:

- approval authority
- proponent
- consultant archaeologist
- Ministry of Tourism, Culture and Sport at archaeology@ontario.ca

3. Are there known archaeological sites on or within 300 metres of the property (or project area)?

MTCS maintains a database of archaeological sites reported to the ministry.

For more information, contact MTCS Archaeological Data Coordinator at archaeology@ontario.ca.

4. Is there Aboriginal or local knowledge of archaeological sites on or within 300 metres of the property?

Check with:

- Aboriginal communities in your area
- local municipal staff

They may have information about archaeological sites that are not included in MTCS' database.

Other sources of local knowledge may include:

- property owner
- local heritage organizations and historical societies
- local museums
- municipal heritage committee
- published local histories

5. Is there Aboriginal knowledge or historically documented evidence of past Aboriginal use on or within 300 metres of the property (or property area)?

Check with:

- Aboriginal communities in your area
- local municipal staff

Other sources of local knowledge may include:

- property owner
- local heritage organizations and historical societies
- local museums
- municipal heritage committee
- published local histories

6. Is there a known burial site or cemetery on the property or adjacent to the property (or project area)?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulation Unit, Ontario Ministry of Consumer Services – for database of registered cemeteries
- Ontario Genealogical Society (OGS) – to locate records of Ontario cemeteries, both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to locate early cemeteries

In this context, 'adjacent' means 'contiguous', or as otherwise defined in a municipal official plan.

7. Has the property (or project area) been recognized for its cultural heritage value?

There is a strong chance there may be archaeological resources on your property (or immediate area) if it has been listed, designated or otherwise identified as being of cultural heritage value by:

- your municipality
- Ontario government
- Canadian government

This includes a property that is:

- designated under *Ontario Heritage Act* (the OHA), including:
  - individual designation (Part IV)
  - part of a heritage conservation district (Part V)
  - an archaeological site (Part VI)
- subject to:
  - an agreement, covenant or easement entered into under the OHA (Parts II or IV)
  - a notice of intention to designate (Part IV)
  - a heritage conservation district study area by-law (Part V) of the OHA
- listed on:
  - a municipal register or inventory of heritage properties
  - Ontario government's list of provincial heritage properties
  - Federal government's list of federal heritage buildings
- part of a:
  - National Historic Site
  - UNESCO World Heritage Site
- designated under:
  - *Heritage Railway Station Protection Act*
  - *Heritage Lighthouse Protection Act*
- subject of a municipal, provincial or federal commemorative or interpretive plaque.

To determine if your property or project area is covered by any of the above, see:

- Part A of the MTCS Criteria for Evaluating Potential for Built Heritage and Cultural Heritage Landscapes

Part VI – Archaeological Sites

Includes five sites designated by the Minister under Regulation 875 of the Revised Regulation of Ontario, 1990 (Archaeological Sites) and 3 marine archaeological sites prescribed under Ontario Regulation 11/06.

For more information, check Regulation 875 and Ontario Regulation 11/06.

8. Has the entire property (or project area) been subjected to recent extensive and intensive ground disturbance?

Recent: after-1960

Extensive: over all or most of the area

Intensive: thorough or complete disturbance

Examples of ground disturbance include:

- quarrying
- major landscaping – involving grading below topsoil
- building footprints and associated construction area
  - where the building has deep foundations or a basement
- infrastructure development such as:
  - sewer lines
  - gas lines
  - underground hydro lines
  - roads
  - any associated trenches, ditches, interchanges. **Note**: this applies only to the excavated part of the right-of-way; the remainder of the right-of-way or corridor may not have been impacted.

A ground disturbance does **not** include:

- agricultural cultivation
- gardening
- landscaping

Site visits

You can typically get this information from a site visit. In that case, please document your visit in the process (e.g., report) with:

- photographs
- maps
- detailed descriptions

If a disturbance isn't clear from a site visit or other research, you need to hire a licensed consultant archaeologist to undertake an archaeological assessment.

9. Are there present or past water bodies within 300 metres of the property (or project area)?

Water bodies are associated with past human occupations and use of the land. About 80-90% of archaeological sites are found within 300 metres of water bodies.

Present

- Water bodies:
  - primary - lakes, rivers, streams, creeks
  - secondary - springs, marshes, swamps and intermittent streams and creeks
- accessible or inaccessible shoreline, for example:
  - high bluffs
  - swamps
  - marsh fields by the edge of a lake
  - sandbars stretching into marsh

Water bodies not included:

- man-made water bodies, for example:
  - temporary channels for surface drainage
  - rock chutes and spillways
  - temporarily ponded areas that are normally farmed
  - dugout ponds
- artificial bodies of water intended for storage, treatment or recirculation of:
  - runoff from farm animal yards
  - manure storage facilities
  - sites and outdoor confinement areas

Past

Features indicating past water bodies:

- raised sand or gravel beach ridges – can indicate glacial lake shorelines
- clear dip in the land – can indicate an old river or stream
- shorelines of drained lakes or marshes
- cobble beaches

You can get information about water bodies through:

- a site visit
- aerial photographs
- 1:10,000 scale Ontario Base Maps - or equally detailed and scaled maps.

10. Is there evidence of two or more of the following on the property (or project area)?

- elevated topography
- pockets of well-drained sandy soil
- distinctive land formations
- resource extraction areas
- early historic settlement
- early historic transportation routes

- **Elevated topography**

  Higher ground and elevated positions - surrounded by low or level topography - often indicate past settlement and land use.

  Features such as eskers, drumlins, sizeable knolls, plateaus next to lowlands, or other such features are a strong indication of archaeological potential.

  Find out if your property or project area has elevated topography, through:

  - site inspection
  - aerial photographs
  - topographical maps

- **Pockets of well-drained sandy soil, especially within areas of heavy soil or rocky ground**

  Sandy, well-drained soil - in areas characterized by heavy soil or rocky ground - may indicate archaeological potential

  Find out if your property or project area has sandy soil through:

  - site inspection
  - soil survey reports

- **Distinctive land formations** include – but are not limited to:
  - waterfalls
  - rock outcrops
  - rock faces
  - caverns
  - mounds, etc.

  They were often important to past inhabitants as special or sacred places. The following sites may be present – or close to – these formations:
  - burials
  - structures
  - offerings
  - rock paintings or carvings

  Find out if your property or project areas has a distinctive land formation through:
  - a site visit
  - aerial photographs
  - 1:10,000 scale Ontario Base Maps - or equally detailed and scaled maps.
- **Resource extraction areas**

  The following resources were collected in these extraction areas:
  - food or medicinal plants e.g., migratory routes, spawning areas, prairie
  - scarce raw materials e.g., quartz, copper, ochre or outcrops of chert
  - resources associated with early historic industry e.g., fur trade, logging, prospecting, mining

  Aboriginal communities may hold traditional knowledge about their past use or resources in the area.
- **Early historic settlement**

  Early Euro-Canadian settlement include – but are not limited to:
  - early military or pioneer settlement e.g., pioneer homesteads, isolated cabins, farmstead complexes
  - early wharf or dock complexes
  - pioneers churches and early cemeteries

  For more information, see below – under the early historic transportation routes.
- **Early historic transportation routes** - such as trails, passes, roads, railways, portage routes, canals.

  For more information, see:
  - historical maps and/or historical atlases
    - for information on early settlement patterns such as trails (including Aboriginal trails), monuments, structures, fences, mills, historic roads, rail corridors, canals, etc.
    - Archives of Ontario holds a large collection of historical maps and historical atlases
    - digital versions of historic atlases are available on the Canadian County Atlas Digital Project
  - commemorative markers or plaques such as local, provincial or federal agencies
  - municipal heritage committee or other local heritage organizations
    - for information on early historic settlements or landscape features (e.g., fences, mill races, etc.)
    - for information on commemorative markers or plaques

3

TOWN OF BOLTON

WATER AND WASTEWATER CAPACITY IMPROVEMENTS CLASS 'C' EA

ATTACHMENT 3

Stage 1 Archaeological Assessment – Coleraine Drive Grade Separation

ORIGINAL REPORT

September 12, 20179
UPDATED October 2, 2019

STAGE 1 ARCHAEOLOGICAL ASSESSMENT

Coleraine Drive Grade Separation
Part of Lots 7, 8, and 9, Concession 5, and Lots 7, 8, and 9, Concession 6
Former Geographic Township of Albion, Now Town of Caledon, Regional Municipality of Peel, Ontario

Submitted to:
CIMA+
3027 Harvester Road, Suite 400
Burlington, Ontario
L7N 3G7

Licensee: Carla Parslow, Ph.D. (P243)

PIF #: P243-0349-2017

Report Number: 1665649-4000- R011

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Golder Associates

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Acknowledgments

Prime Consultant	Stephen Keen, M.Sc., P.Eng, Associate Partner CIMA+

Executive Summary

A Stage 1 archaeological assessment was conducted on behalf of CIMA+ by Golder Associates Ltd. ("Golder") for road/rail grade separation on Coleraine Drive, south of Old Ellwood Drive, encompassed within a Study Corridor situated along Coleraine Drive from approximately 250 metres northwest of King Street West to approximately 100 metres southeast of Holland Drive, in Caledon, Ontario. Legally, the Study Corridor is located on part of Lots 7, 8, and 9, Concession 5, and Lots 7, 8, and 9, Concession 6, in the former geographic Township of Albion, now Town of Caledon, Regional Municipality of Peel, Ontario. The Study Corridor is a rectangular corridor encompassing approximately 42.6 hectares (Map 1). This Stage 1 assessment was conducted to meet the standard requirements of the *Planning Act,* R.S.O 1990, c.P.14 (Government of Ontario 1990) as required by the Town of Caledon prior to land disturbance.

The objectives of a Stage 1 assessment, as outlined by the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), are to evaluate the study area's archaeological potential through an examination of its geography, history, previous archaeological fieldwork and current land conditions, and to recommend appropriate strategies for Stage 2 assessment for all or parts of the property, if required.

In conjunction with a property inspection, Golder applied criteria commonly used by the Ministry of Tourism, Culture and Sport (MTCS) to determine the presence of archaeological potential within the study area. Through this process it was determined that the study area did have archaeological potential for both pre-contact Aboriginal and historical Euro-Canadian sites, but that this potential has been removed for most parts of the study area due to deep and extensive disturbances resulting from urban and industrial development. However, several sections of manicured lawn, overgrown fields, and bushlot within the Study Corridor still retain archaeological potential (Maps 7 and 8).

Given the results of the Stage 1 archaeological assessment, and following the *Standards and Guidelines for Consultant Archaeologists* (Section 2.2, Guideline 4; Government of Ontario 2011), the following recommendations have been made:

- Stage 2 property survey is recommended for the area identified in Map 7. Stage 2 property survey is to be completed through test pit survey at five metre intervals;
- The Shore-Wakely House property, discussed in Section 1.3.2 and illustrated in Map 8 is designated and retains cultural heritage value or interest. Additionally, it is recommended for further archaeological assessment as per reports referenced in this document, as follows:
  - *Prior to allowing construction in the area, no-go instructions must be issued by the Canadian Tire Corporation (CTC) to all personnel so that the area of avoidance is not accidentally impacted. The area to be avoided will be shown on all contract drawings, when applicable. If accidental impacts to the archaeological site are observed at any time during construction a licensed archaeologist will be notified immediately. After completion of grading and other soil disturbing activities a licensed archaeologist will be contracted to inspect and report to the MTCS on the effectiveness of the strategy in ensuring that the areas to be avoided remain intact. If CTC determines at a later date that grading impacts will be extended into the remainder of the archaeological site, a licensed archaeologist will be contracted to carry out the Stage 4 mitigation by excavation of the remainder of the site.*

- *It is recommended that when soil disturbance and grading activities are occurring within 20 metres of the area to be avoided a licensed archaeologist be contracted to monitor the activities and prevent impacts to the remainder of the archaeological site. Should an undisturbed part of the site be impacted the archaeologist is empowered to stop construction in the area until further Stage 4 mitigation by excavation is concluded. The results of the construction monitoring will be reported on to the MTCS.*
- *Once all subsequent development has been completed the temporary fence will be removed and replaced by a permanent barrier that will permanently delineate the area of the Shore Site (AlGw-163) that will be avoided and protected. The permanent fence should be placed two metres in from the temporary fence, to ensure it is installed in a part of the site that has already been excavated. CTC will ensure that the lands containing the protected areas remain passive and will prohibit soil disturbance with the exception of traditional farming and minor property maintenance.*

- The remainder of the study area outside of the identified areas has been subject to deep disturbance, and as such no further archaeological assessment is recommended for this portion of the study area (Map 7).

The MTCS is asked to review the results and recommendations presented herein, accept this report into the Provincial Register of archaeological reports and issue a standard letter of compliance with the Ministry's 2011 *Standards and Guidelines for Consultant Archaeologists* and the terms and conditions for archaeological licencing.

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1.0 PROJECT CONTEXT

1.1 Development Context

Golder Associates Ltd. ("Golder Associates") was retained by CIMA+ to carry out a limited Phase I Environmental Site Assessment ("Phase I ESA") of a portion of Coleraine Drive between Holland Drive and Harvest Moon Drive in Caledon, Ontario. It is Golder Associates' understanding that the Phase I ESA is required as part of the Schedule "C" Municipal Class Environmental Assessment ('EA') for the proposed grade separation of Coleraine Drive south of Old Ellwood Drive. For the purpose of the Phase I ESA, the study area includes the existing Coleraine Drive Right-of-Way ("ROW") from Holland Drive to Harvest Moon Drive, and the adjacent properties within 250 metres from the both sides of the ROW. The approximate total length of the section of Coleraine Drive included in this study is one kilometre.

As part of this Phase I ESA, a Stage 1 archaeological assessment was conducted on behalf of CIMA+ by Golder Associates Ltd. ("Golder") for road/rail grade separation on Coleraine Drive, south of Old Ellwood Drive. Legally, the Study Corridor is located on part of Lots 7, 8, and 9, Concession 5, and Lots 7, 8, and 9, Concession 6, in the former geographic Township of Albion, now Town of Caledon, Regional Municipality of Peel, Ontario. The Study Corridor is a rectangular corridor encompassing approximately 45.5 hectares (Map 1).

This Stage 1 was conducted to meet the standard requirements of a Municipal Class EA Study, as per Section II.2 of the *Environmental Assessment Act, R.S.O. 1990, C. E.18* (Government of Ontario 1990a).

1.1.1 Objectives

The goal of the Stage 1 Archaeological Overview/Background Study was to compile all available information about the known and potential cultural heritage resources within the Project Area, and to provide specific direction for the protection, management and/or recovery of these resources. In compliance with the provincial standards and guidelines set out in the Ministry of Tourism, Culture and Sport's (MTCS) *Standards and Guidelines for Consultant Archaeologists* (MTCS 2011), the objectives of the Stage 1 Archaeological Overview/Background Study were as follows:

- To provide information about the Study Corridor's geography, history, previous archaeological fieldwork and current land conditions;
- To evaluate in detail the Study Corridor's archaeological potential; and
- To recommend appropriate strategies for Stage 2 assessment for all or parts of the property, if required.

To meet these objectives Golder archaeologists employed the following research strategies:

- A review of the archaeological, historic and environmental literature pertaining to the Study Corridor;
- An examination of the Ontario Archaeological Sites Database (OASD) to determine the presence of known archaeological sites in and around the Study Corridor;
- A review of the land use history, including pertinent historic maps; and
- A property inspection.

In addition to the consultation of records kept by the MTCS, the background study was conducted online and in Golder's corporate library.

The Stage 1 Archaeological Assessment was conducted under professional archaeological licence P243, issued to Carla Parslow of Golder by the MTCS (PIF# P243-0349-2017). Permission to access the Study Corridor was not required because all of the land is publically accessible.

1.2 Historical Context

The Study Corridor is situated in an area of Ontario that exhibits evidence of an extended period of human settlement dating back at least 11,000 years. To provide context to the following sections of this report, the nature of this settlement is summarized below beginning with the pre-contact Aboriginal period as it relates to the Peel County area in general. This is followed by a summary of the historical Euro-Canadian period for Albion Township in general and the Study Corridor specifically.

1.2.1 Pre-contact Aboriginal Documentation

Previous archaeological assessments and research surveys have demonstrated that the Caledon area was intensively occupied by pre-contact Aboriginal people. The cultural chronology of the Caledon area is briefly summarized in Table 1. The following subsections outline the cultural or temporal periods recognized for southern Ontario more generally.

Table 1: Cultural Chronology for the Caledon Area, based on chapters in Ellis and Ferris (eds.) (1990)

Period	Characteristics	Time Period	Comments
Early Paleo-Indian	Fluted Projectiles	9000 - 8400 B.C.	spruce parkland/caribou hunters
Late Paleo-Indian	Hi-Lo Projectiles	8400 - 8000 B.C.	smaller but more numerous sites
Early Archaic	Kirk and Bifurcate Base Points	8000 - 6000 B.C.	slow population growth
Middle Archaic	Brewerton-like points	6000 - 2500 B.C.	environment similar to present
Late Archaic	Lamoka (Narrow Points)	2000 - 1800 B.C.	increasing site size
	Broad Points	1800 - 1500 B.C.	large chipped lithic tools
	Small Points	1500 - 950 B.C.	introduction of bow hunting, emergence of true cemeteries
Early Woodland	Meadowood Points	950 - 400 B.C.	introduction of pottery
Middle Woodland	Dentate Stamp and Pseudo-Scallop Shell Impressed pottery	400 B.C. - A.D. 500/800	increased sedentism
Late Woodland	Princess Point Complex	A.D. 500 - 1050	introduction of corn
	Early Ontario Iroquoian	A.D. 900/1000 – 1300	emergence of agricultural villages
	Middle Ontario Iroquoian	A.D. 1300 - 1400	long longhouses (100m +)
	Late Ontario Iroquoian	A.D. 1400 - 1650	tribal warfare and displacement
Contact Aboriginal	Seneca, Mississaugas, Six Nations	A.D. 1650 - present	early written records and treaties
Late Historic	Euro-Canadian	A.D. 1785 - present	European settlement

1.2.1.1 Paleo Period

The first human occupation of southern Ontario began just after the end of the Wisconsin Glacial period. Although there was a complex series of ice retreats and advances which played a large role in shaping the local topography, southwestern Ontario was finally ice free by 12,500 years ago.

The first human settlement can be traced back 11,000 years, when this area was settled by Native groups that had been living south of the Great Lakes. These early Native inhabitants have been called "Paleo-Indians", which literally means old or ancient Indians (Ellis and Deller 1990:37).

Our current understanding of Early Paleo period settlement patterns suggest that small bands, consisting of probably no more than 25-35 individuals, followed a pattern of seasonal mobility extending over large territories (Ellis and Deller 1990:54). One of the most thoroughly studied of these groups followed a seasonal round that extended from as far south as Chatham to the Horseshoe Valley north of Barrie. Early Paleo sites tend to be located in elevated locations on well-drained loamy soils.

Many of the known sites were located on former beach ridges associated with Lake Algonquin, the post-glacial lake occupying the Lake Huron/Georgian Bay basin. There are a few extremely large Early Paleo sites, such as one located close to Parkhill, Ontario, which covered as much as six hectares (Ellis and Deller 1990:51).

It appears that these sites were formed when the same general locations were occupied for short periods of time over the course of many years. Given their placement in locations conducive to the interception of migratory mammals such as caribou, it has been suggested that they may represent communal hunting camps (Ellis and Deller 1990:51). There are also smaller Early Paleo camps scattered throughout the interior of southwestern Ontario, usually situated adjacent to wetlands. The most recent research suggests that population densities were very low during the Early Paleo period (Ellis and Deller 1990:54). Because this is the case, Early Paleo sites are exceedingly rare.

While the Late Paleo period (8400-8000 B.C.) is more recent, it has been less well researched, and is consequently more poorly understood. By this time the environment of southwestern Ontario was coming to be dominated by closed coniferous forests with some minor deciduous trees (Ellis and Deller 1990:60). It seems that many of the large game species that had been hunted in the early part of the Paleo period had either moved further north, or as in the case of the mastodons and mammoths, become extinct (Ellis and Deller 1990).

As in the early Paleo period, late Paleo period peoples covered large territories as they moved about in response to seasonal resource fluctuations. On a province wide basis Late Paleo-Indian projectile points are far more common than Early Paleo materials, suggesting a relative increase in population (Ellis and Deller 1990:62).

The end of the Paleo period was heralded by numerous technological and cultural innovations which may be best explained in relation to the dynamic nature of the post-glacial environment and region-wide population increases.

1.2.1.2 Archaic Period

During the Early Archaic period (8000-6000 B.C.), the jack and red pine forests that characterized the Late Paleo-Indian environment were replaced by forests dominated by white pine with some associated deciduous trees (Ellis et al. 1990:68-69). One of the more notable changes in the Early Archaic period is the appearance of side and corner-notched projectile points.

Other significant innovations include the introduction of ground stone tools such as celts and axes, suggesting the beginnings of a simple woodworking industry (Ellis and Deller 1990:65). The presence of these often large and not easily portable tools suggests there may have been some reduction in the degree of seasonal movement, although it is still suspected that population densities were quite low, and band territories large.

During the Middle Archaic period (6000-2500 B.C.) the trend to more diverse toolkits continued, as the presence of netsinkers suggest that fishing was becoming an important aspect of the subsistence economy. It was also at this time that "bannerstones" were first manufactured (Ellis et al. 1990:65). Bannerstones are carefully crafted ground stone devices that served as a counterbalance for "atlatls" or spear-throwers. Another characteristic of the Middle Archaic is an increased reliance on local, often poor quality chert resources for the manufacturing of projectile points. It seems that during earlier periods, when groups occupied large territories, it was possible for them to visit a primary outcrop of high quality chert at least once during their seasonal round. However, during the Middle Archaic, groups inhabited smaller territories that often did not encompass a source of high quality raw material. In these instances lower quality materials which had been deposited by the glaciers in the local till and river gravels were utilized.

This reduction in territory size was probably the result of gradual region-wide population growth which led to the infilling of the landscape (Ellis et al. 1990:67). This process resulted in a reorganization of Native subsistence practices, as more people had to be supported from the resources of a smaller area.

During the latter part of Middle Archaic, technological innovations such as fish weirs have been documented as well as stone tools especially designed for the preparation of wild plant foods. It is also during the latter part of the Middle Archaic period that long distance trade routes began to develop, spanning the northeastern part of the continent. In particular, native copper tools manufactured from a source located northwest of Lake Superior were being widely traded (Ellis et al. 1990:66). By 3500 B.C. the local environment had stabilized in a near modern form (Ellis et al. 1990:69).

During the Late Archaic (2500-900 B.C.) the trend towards decreased territory size and a broadening subsistence base continued. Late Archaic sites are far more numerous than either Early or Middle Archaic sites, and it seems that the local population had definitely expanded. It is during the Late Archaic that the first true cemeteries appear (Ellis et al. 1990:66). Before this time individuals were interred close to the location where they died. During the Late Archaic, if an individual died while his or her group happened to be at some distance from their group cemetery, the bones would be kept until they could be placed in the cemetery. Consequently, it is not unusual to find disarticulated skeletons, or even skeletons lacking minor elements such as fingers, toes or ribs, in Late Archaic burial pits.

The appearance of cemeteries during the Late Archaic has been interpreted as a response to increased population densities and competition between local groups for access to resources. It is argued that cemeteries would have provided strong symbolic claims over a local territory and its resources. These cemeteries are often located on heights of well-drained sandy/gravel soils adjacent to major watercourses (Ellis et al. 1990:66-67, 106, 117).

This suggestion of increased territoriality is also consistent with the regionalized variation present in Late Archaic projectile point styles. It was during the Late Archaic that distinct local styles of projectile points appear. Also during the Late Archaic the trade networks which had been established during the Middle Archaic continued to flourish. Native copper from northern Ontario and marine shell artifacts from as far away as the Mid-Atlantic coast are frequently encountered as grave goods (Ellis et al. 1990:117; Ellis et al. 2009:824-825). Other artifacts such as

polished stone pipes and banded slate gorgets also appear on Late Archaic sites. One of the more unusual and interesting of the Late Archaic artifacts is the "birdstone" (Ellis et al. 1990:111). Birdstones are small, bird-like effigies usually manufactured from green banded slate.

1.2.1.3 Woodland Period

The Early Woodland period (950 - 400 B.C.) is distinguished from the Late Archaic period primarily by the addition of ceramic technology. While the introduction of pottery provides a useful demarcation point for archaeologists, it may have made less difference in the lives of the Early Woodland peoples. The first pots were very crudely constructed, thick walled and friable. It has been suggested that they were used in the processing of nut oils by boiling crushed nut fragments in water and skimming off the oil (Spence et al. 1990:137). These vessels were not easily portable, and individual pots must not have enjoyed a long use life. There have also been numerous Early Woodland sites located at which no pottery was found, suggesting that these poorly constructed, undecorated vessels had yet to assume a central position in the day-to-day lives of Early Woodland peoples.

Other than the introduction of this rather limited ceramic technology, the life-ways of Early Woodland peoples show a great deal of continuity with the preceding Late Archaic period. For instance, birdstones continue to be manufactured, although the Early Woodland varieties have "pop-eyes" which protrude from the sides of their heads (Spence et al. 1990:129).

Likewise, the thin, well-made projectile points which were produced during the terminal part of the Archaic period continue in use. However, the Early Woodland variants were side-notched rather than corner-notched, giving them a slightly altered and distinctive appearance.

The trade networks which were established in the Middle and Late Archaic also continued to function, although there does not appear to have been as much traffic in marine shell during the Early Woodland period (Spence et al. 1990:129). During the last 200 years of the Early Woodland period, projectile points manufactured from high quality raw materials from the American Midwest begin to appear in southern Ontario (Spence et al. 1990:138).

In terms of settlement and subsistence patterns, the Middle Woodland (400 B.C. - A.D. 500/800) provides a major point of departure from the Archaic and Early Woodland periods. While Middle Woodland peoples still relied on hunting and gathering to meet their subsistence requirements, fish were becoming an even more important part of the diet (Spence et al. 1990:151). Some Middle Woodland sites have produced literally thousands of bones from spring spawning species such as walleye and sucker. Nuts such as acorns were also being collected and consumed (Spence et al. 1990:134). In addition, Middle Woodland peoples relied much more extensively on ceramic technology. Middle Woodland vessels are often decorated with hastily impressed designs covering the entire exterior surface and upper portion of the vessel interior. Consequently, even very small fragments of Middle Woodland vessels are easily identifiable.

It is also at the beginning of the Middle Woodland period that rich, densely occupied sites appear on the valley floor of major rivers. Middle Woodland sites are significantly different in that the same location was occupied off and on for as long as several hundred years. Because this is the case, rich deposits of artifacts often accumulated.

Unlike earlier seasonally utilized locations, these Middle Woodland sites appear to have functioned as base camps, occupied off and on over the course of the year.

There are also numerous small upland Middle Woodland sites, many of which can be interpreted as special purpose camps from which localized resource patches were exploited. This shift towards a greater degree of

sedentism continues the trend witnessed from at least Middle Archaic times, and provides a prelude to the developments that follow during the Late Woodland period.

The Late Woodland period began with a shift in settlement and subsistence patterns involving an increasing reliance on corn horticulture (Fox 1990:185; Smith 1990; Williamson 1990:312). Corn may have been introduced into southwestern Ontario from the American Midwest as early as 600 A.D. (Fox 1990:174; Williamson 1990:312). However, it did not become a dietary staple until at least three to four hundred years later.

The first agricultural villages in southwestern Ontario date to the 10th century A.D. (Williamson 1990:291). Unlike the riverine base camps of the Middle Woodland period, these sites are located in the uplands, on well-drained sandy soils.

Categorized as "Early Ontario Iroquoian" (900-1300 A.D.), many archaeologists believe that it is possible to trace a direct line from the Iroquoian groups which inhabited southwestern Ontario at the time of first European contact, to these early villagers.

Village sites dating between 900 and 1300 A.D., share many attributes with the historically reported Iroquoian sites, including the presence of longhouses and sometimes palisades. However, these early longhouses were actually not all that large, averaging only 12.4 m in length (Dodd et al. 1990:349; Williamson 1990:304-305). It is also quite common to find the outlines of overlapping house structures, suggesting that these villages were occupied long enough to necessitate re-building. The Jesuits reported that the Huron moved their villages once every 10-15 years, when the nearby soils had been depleted by farming and conveniently collected firewood grew scarce (Pearce 2010). It seems likely that Early Ontario Iroquoians occupied their villages for considerably longer, as they relied less heavily on corn than did later groups, and their villages were much smaller, placing less demand on nearby resources.

Judging by the presence of carbonized corn kernels and cob fragments recovered from sub-floor storage pits, agriculture was becoming a vital part of the Early Ontario Iroquoian economy. However, it had not reached the level of importance it would in the Middle and Late Ontario Iroquoian periods. There is ample evidence to suggest that more traditional resources continued to be exploited, and comprised a large part of the subsistence economy. Seasonally occupied special purpose sites relating to deer procurement, nut collection, and fishing activities, have all been identified (Williamson 1990:317). While beans are known to have been cultivated later in the Late Woodland period, they have yet to be identified on Early Ontario Iroquoian sites (Williamson 1990:291).

The Middle Ontario Iroquoian period (1300-1400 A.D.) witnessed several interesting developments in terms of settlement patterns and artifact assemblages. Changes in ceramic styles have been carefully documented, allowing the placement of sites in the first or second half of this 100-year period. Moreover, villages, which averaged approximately 0.6 hectares in extent during the Early Ontario Iroquoian period, now consistently range between one and two hectares.

House lengths also change dramatically, more than doubling to an average of 30 m, while houses of up to 45 m have been documented. This radical increase in longhouse length has been variously interpreted. The simplest possibility is that increased house length is the result of a gradual, natural increase in population (Dodd et al. 1990:323, 350, 357; Smith 1990). However, this does not account for the sudden shift in longhouse lengths around 1300 A.D. Other possible explanations involve changes in economic and socio-political organization (Dodd et al. 1990:357). One suggestion is that during the Middle Ontario Iroquoian period small villages were amalgamating

to form larger communities for mutual defence (Dodd et al. 1990:357). If this was the case, the more successful military leaders may have been able to absorb some of the smaller family groups into their households, thereby requiring longer structures.

This hypothesis draws support from the fact that some sites had up to seven rows of palisades, indicating at least an occasional need for strong defensive measures. There are, however, other Middle Ontario Iroquoian villages which had no palisades present (Dodd et al. 1990:358). More research is required to evaluate these competing interpretations.

The lay-out of houses within villages also changes dramatically by 1300 A.D. During the Early Ontario Iroquoian period villages were haphazardly planned at best, with houses oriented in various directions. During the Middle Ontario Iroquoian period villages are organized into two or more discrete groups of tightly spaced, parallel aligned, longhouses.

It has been suggested that this change in village organization may indicate the initial development of the clans which were a characteristic of the historically known Iroquoian peoples (Dodd et al. 1990:358).

Initially at least, the Late Ontario Iroquoian period (1400-1650 A.D.) continues many of the trends which have been documented for the proceeding century. For instance, between 1400 and 1450 A.D. house lengths continue to grow, reaching an average length of 62 m.

One longhouse excavated on a site southwest of Kitchener stretched an incredible 123 m (Lennox and Fitzgerald 1990:444-445). After 1450 A.D., house lengths begin to decrease, with houses dating between 1500-1580 A.D. averaging only 30 m in length. Why house lengths decrease after 1450 A.D. is poorly understood, although it is believed that the even shorter houses witnessed on historic period sites can be at least partially attributed to the population reductions associated with the introduction of European diseases such as smallpox (Lennox and Fitzgerald 1990:405, 410).

Village size also continues to expand throughout the Late Ontario Iroquoian period, with many of the larger villages showing signs of periodic expansions. The Late Middle Ontario Iroquoian period and the first century of the Late Ontario Iroquoian period was a time of village amalgamation.

One large village situated in London expanded one-fifth of its size (Anderson 2009) and one village north of Toronto have been shown to have expanded on no fewer than five occasions (Ramsden 1990:374-375). These large villages were often heavily defended with numerous rows of wooden palisades, suggesting that defence may have been one of the rationales for smaller groups banding together.

After 1525 A.D. communities of pre-contact Aboriginals of the Late Ontario Iroquoian period who had formerly lived throughout southwestern Ontario as far west as the Chatham area moved further east to the Hamilton area. During the late 1600s and early 1700s, the French explorers and missionaries reported a large population of Iroquoian peoples clustered around the western end of Lake Ontario. They called these people the "Neutral", because they were not involved in the on-going wars between the Huron and the League Iroquois located in upper New York State. It has been satisfactorily demonstrated that the Late Ontario Iroquoian communities which were located in southwestern Ontario as far west as the Chatham area were ancestral to at least some of the Neutral Nation groups (Lennox and Fitzgerald 1990; Smith 1990:283). For this reason the Late Ontario Iroquoian groups which occupied southwestern Ontario prior to the arrival of the French are often identified as "Prehistoric Neutral".

They occupied a large area extending along the Grand River and throughout the Niagara Peninsula as far east as Fort Erie and Niagara Falls (Lennox and Fitzgerald 1990:448).

1.2.2 Post-Contact Aboriginal Period

The post-contact Aboriginal occupation of southern Ontario was heavily influenced by the dispersal of various Iroquoian-speaking peoples by the New York State Iroquois and the subsequent arrival of Algonkian-speaking groups from northern Ontario at the end of the 17th century and beginning of the 18th century (Schmalz 1991).

The nature of their settlement size, population distribution, and material culture shifted as European settlers encroached upon their territory. However, despite this shift, "written accounts of material life and livelihood, the correlation of historically recorded villages to their archaeological manifestations, and the similarities of those sites to more ancient sites have revealed an antiquity to documented cultural expressions that confirms a deep historical continuity to Iroquoian systems of ideology and thought" (Ferris 2009:114). As a result, First Nations peoples of southern Ontario have left behind archaeologically significant resources throughout southern Ontario which show continuity with past peoples, even if they have not been recorded in historical Euro-Canadian documentation.

1.2.3 Historical Euro-Canadian Period

The study area is situated within the former Geographical Township of Albion, now Town of Caledon, Regional Municipality of Peel, Ontario. The area first enters the Euro-Canadian historical record as part of Treaty Number 13A made between the Mississaugas and the Crown on August 2, 1805. Treaty 13 and 13A was many years in the making, with the original treaty being drafted in 1787, however:

> *it has been ascertained that the Instrument was defective and imperfect, and nothing was done about carrying it out until the first day of August, 1805, an Indenture was made, at the River Credit at Lake Ontario, between William Claus, Esquire, Deputy Superintendent General and Deputy Inspector General of Indians and of their Affairs, for and in behalf of Our Sovereign Lord the King and the Principal Chiefs, Warriors and people of the Mississa[uga] Nation of Indians. This purchase ..., is known as the Toronto Purchase and described as follows: "Commencing at the east bank of the south outlet of the River Etobicoke; thence up the same following the several windings and turnings of the said river to a maple tree, blazed on 4 sides at a distance of three quarters in a straight line from the mouth of the said river; thence north twenty-two degrees west twenty-four miles and one quarter; thence north sixty-eight degrees east fourteen miles; thence south twenty-two degrees east twenty-eight miles more or less to Lake Ontario; then westerly along the water's edge of Lake Ontario, to the eastern bank of the south outlet of the River Etobicoke, being the place of beginning, together with all the woods and waters thereon." This last described parcel is only a small portion of the parcel, supposed to have been conveyed by the Indians, September 23rd, 1787, and the consideration demanded by the Indians was only ten shillings.*
>
> Morris 1943: 21-22

Iroquoian-speaking and Algonkian-speaking peoples occupied parts of southern Ontario around the Lower Great Lakes, including the lands recognized as Waterloo Region. These groups interacted with one another and Euro-Canadian settlers from the 18th through to the 20th Centuries.

Albion Township

Following the Toronto Purchase of 1787, today's southern Ontario was within the old Province of Quebec and divided into four political districts: Lunenburg, Mechlenburg, Nassau, and Hesse. These became part of the Province of Upper Canada in 1791, and renamed the Eastern, Midland, Home, and Western Districts, respectively. The Study Corridor is within the former Nassau District, then later the Home District, which originally included all lands between an arbitrary line on the west running north from Long Point on Lake Erie to Georgian Bay, and a line on the east running north from Presqu'ile Point on Lake Ontario to the Ottawa River. Each district was further subdivided into counties and townships, with the Study Corridor originally falling within west riding of York County and Albion Township, one of three 'new' sections (the other two being Chinguacousy and Caledon) ceded by the Mississauga people through treaty on October 28, 1818. York County was reorganized in 1851, with the west riding forming the County of Peel.

Albion Township derives its name from the ancient name for England (Armstrong 1930:4). The Crown survey of the township was undertaken between 1818 and 1819 by surveyor James G. Chewett. Mr. Chewett decided to employ the double-front survey system, a survey that established concession numbers running west to east and lot numbers running south to north. In the double-front system only the concession roads were surveyed and their width specified at 66 feet (20 m) wide. Between these and side roads were five lots of 200 acres (80 ha.), each 30 chains wide and 66.7 chains deep. These lots were then divided in half to provide land grants of 100 acres, all of which had road access (Schott 1981; Gentilcore 1969).

Settlers began arriving in Albion Township shortly after the survey was complete. The first individuals to take up land in the township included William Downey, Joseph Hudson, William Roadhouse Sr., and William Roadhouse Jr. (Walker & Miles 1877). The population of the township in 1821 numbered only 110, but in twenty years this number had increased to 2,154 and included concentrations of settlement in the village of Bolton and the post office communities of Columbia, Tullamore, Sand Hill, and Caledon East (Smith 1846; Walker & Miles 1877). By 1846 it was reported that 41,829 acres had been taken up in the township, of which 10,000 had been cleared and was under cultivation (Walker & Miles 1877). The township could also boast four grist mills, two saw mills, and two distilleries. At mid-century, all the lands in Albion Township had been settled and the population had grown to 3,567. A decade later, the population had grown again, reaching 5,078 in 1861. During the late 19th century, a general shift away from agricultural production toward industrial and commercial enterprises in urban centres, such as the Village of Bolton, caused the growth of Albion Township to plateau, with populations declining to 3,172 by 1880 (Ontario Agricultural Commission 1881).

At the opening of the 20th century economic development of Albion Township, like that of adjacent counties and townships, relied on the prosperity of nearby Toronto and exports to the United States and Britain. Following World War II, the widespread use of motor vehicles brought changes to urban and rural development. As vehicular traffic increased, the network of roadways throughout the region improved, providing Albion Township and its communities with better connections to the growing metropolis of Toronto.

Significant new growth and development has occurred in the past four decades. In 1974, Albion Township was amalgamated with the Township of Caledon, the northern half of the Township of Chinguacousy, and the Villages of Bolton and Caledon East to form the Town of Caledon in the new Regional Municipality of Peel. In 2006, the population of the Town of Caledon numbered 57,050, while in 2011 it had grown to 59,460 (Statistics Canada 2006, 2011).

Toronto Grey and Bruce Railway (now Canadian Pacific Railway)

The Study Corridor for the present project crosses over the tracks of the former Toronto Grey and Bruce Railway, now Canadian Pacific Railway. Incorporated in 1868, the Toronto Grey and Bruce Railway constructed a rail line from Toronto to Owen Sound via Orangeville between 1869 and 1873, adding a branch line from present-day Fraxa to Teeswater roughly a year later (Kennedy 2013). In order to save money on building costs, the rail line was originally constructed as a narrow-gauge track with the rails placed only 3'6" apart. As the volume of rail traffic increased throughout Peel, Grey, and Bruce Counties in the years that followed, the narrow-gauge track eventually became obsolete and had to be replaced by a standard-gauge line between 1881 and 1883. In 1883, the line was leased to the Ontario and Quebec Railway, and was ultimately absorbed by the Canadian Pacific Railway the following year.

Study Corridor Specific Historical Context

Prior to its amalgamation into the Town of Caledon in 1974, the Study Corridor for the present project fell along the early historical transportation route of Concession Road 5 in the Township of Albion, bordering Lots 7 to 9 of Concessions 5 and 6. Chewett's 1819 survey map of Albion Township indicates that all of the lots bordering the Study Corridor had yet to be settled. Tremaine's *Map of the County of Peel* indicates that by 1859 all six lots bordering the Study Corridor had been purchased, though no structures are depicted in the immediate area (Map 2). Walker & Miles' 1877 *Illustrated Historical Atlas of Peel County* indicates an increase in the residential and agricultural development of the lots in the area, with at least six houses depicted in close proximity to the Study Corridor. The structures located on the east-central edge of Lot 7, Concession 5, and the west-central edge of Lot 7, Concession 6 appear to be located in the same approximate position as the houses that presently stand at 13304 Coleraine Drive, and 13303 Coleraine Drive, respectively (Map 3).

The house located at 13304 Coleraine Drive, also known as the Shore-Wakely Stone House, is a one and half storey field stone structure built circa 1848 that is designated under Part IV of the *Ontario Heritage Act* (Town of Caledon By-Law 94-55) for its architectural and historical value. John Shore is known to have purchased the property on which the stone house stands from Edmund Boyle in 1835 (Zelinka Priamo Ltd. 2012:4-5). John Shore was born in Kilkenny, Ireland in 1794. He married Catherine Boyle circa 1810 and the couple had at least five children together, including: Edmund, Jane, Rebecca, Eliza, and John Boyle. Both the 1851 and 1861 Censuses for Albion Township list the Shore family as residing in a stone house on Lot 7, Concession 5, indicating that it had been built prior to 1851. The house was believed to have been constructed by William Curliss, a stone mason and later proprietor of the Masonic Arms Hotel in Bolton. It is believed that John Shore did not have enough money to pay for the construction of his house, so he offered Curliss his daughter Jane's hand in marriage. The couple were married in the St. James Anglican Cathedral in Toronto in 1848; therefore, it is believed that the house must have been completed prior to the marriage. John Shore died in 1870 and left the east half of Lot 7, Concession 5, in addition to the west half of Lot 7, Concession 6 to his son, Edmund, who subsequently leased the property to John Gray in 1876 for $700 per year. Edmund eventually sold the property to James Goodfellow in 1879 for $5,800. Seven years later, the property was purchased by Jabez Wakely for $7,000. Ownership of the property remained with members of the Wakely family up to at least 1993.

The house located at 13303 Coleraine Drive is a High Victorian Gothic red and buff brick farmhouse, built between 1875 and 1899. It is listed on Caledon's Built Heritage Resources Inventory (BHRI) of pre-1946 structures, but is not designated under the *Ontario Heritage Act*. According to the information presented above for 13304 Coleraine Drive, the western half of Lot 7, Concession 6 was originally owned by John Shore until his death in 1870, at which

point it was left to his son, Edmund. The 1877 map of Albion Township contained in the *Illustrated Historical Atlas of Peel County* indicates that Edmund was a non-resident owner of the lot at this time. The house depicted on the property is set back from the concession road in the same approximate position as the extant house, suggesting that it was likely built prior to 1877, and may or may not be associated with the Shore family. It is unclear who would have owned the property beyond the late 19th century.

By the early 20th century, a topographical map of the area (Department of Militia & Defence 1919) begins to support a general shift away from agricultural production, with only two houses (13304 and 13303 Coleraine Drive) depicted within the limits of the Study Corridor and an increase in size beyond the historical limits observable in the nearby Village of Bolton. The 1919 topographical map also depicts a tributary of the Humber River flowing through the northern half of the Study Corridor, just south of King Street West/Harvest Moon Drive (Map 4). The Humber River was designated to the Canadian Heritage River System in 1999 due to its outstanding cultural and recreational values. As part of the Humber River System the tributary may contribute to the heritage value of the Study Corridor.

At least one additional structure is visible on a second topographical map of the area from 1929 (Department of Militia & Defence 1929), located in close proximity to the northern boundary of the Study Corridor (Map 5). This structure is most likely the Edwardian farmhouse presently located at 49 Wakely Boulevard, which has been identified as a property of interest by the Town of Caledon's Heritage Officer, Sally Drummond. The property is reportedly associated with the Wakely family and was recently incorporated into the surrounding subdivision.

The Village of Bolton continued to grow throughout the 20th century, with aerial photography from the present day showing the construction of residential subdivisions and industrial developments along either side of the Study Corridor.

1.3 Archaeological Context

1.3.1 The Natural Environment

The Study Corridor is situated within the South Slope physiographic region, which;

> *… is the southern slope of the Oak Ridges Moraine but … includes the strip south of the Peel plain. … [I]t rises 300 to 400 feet in an average width of 6 or 7 miles. Extending from the Niagara Escarpment to the Trent River it covers approximately 940 square miles. The central portion is drumlinized… . The streams flow directly down the slope; being rapid they have cut sharp valleys in the till. …Bare grey slopes, where soil is actively eroding are common in this area.*
>
> Chapman and Putnam 1984

Soil texture can be an important determinant of past settlement, usually in combination with other factors, such as topography. Soils within the Study Corridor are comprised of King clay loam, Monaghan clay loam, and Peel clay, which provide good to imperfect drainage (Hoffman and Richards 1953). These soils would have been well suited to growing common field crops, as well as forage crops and pasture.

The bedrock deposits in the vicinity date to the Upper Ordovician Period and consist of the Georgian Bay Formation (Hewitt 1972).

The Study Corridor lies within the Mixed-wood Plains ecozone of Ontario (The Canadian Atlas Online 2015). Although largely altered by recent human activity, this ecozone once supported a wide variety of deciduous trees,

such as various species of ash, birch, chestnut, hickory, oak, and walnut, as well as a variety of birds and small to large land mammals, such as raccoon, red fox, white tailed deer, and black bear.

The Study Corridor is located within the Humber River watershed, which itself is part of the Lake Ontario watershed. Ultimately, the Humber River watershed drains into Lake Ontario to the south. The watershed covers an area of approximately 911 km^2 (TRCA 2013). An unnamed tributary of the Humber River used to run through the northwestern portion of the Study Corridor, however it has been turned into a storm water management pond (Map 1).

1.3.2 Previous Archaeological Research

A search of the OASD (MTCS 2017) indicated that there are 26 archaeological sites located within one kilometre of the Study Corridor, and that there are six sites within 300 m; three pre-contact Aboriginal sites, and three historical Euro-Canadian sites. Table 2 provides a summary of these sites.

Table 2: Archaeological Sites within 1 km of the Study Corridor

Borden Number	Site Name	Affiliation
AlGw-4	Goodfellow	Archaic
AlGw-5	French	Archaic
AlGw-6		Archaic, Late, Woodland, Early
AlGw-12	Grogan	Archaic, Late
AlGw-39		Pre-Contact
AlGw-42		Post-Contact
AlGw-45	Fleming Shaw	Post-Contact, Pre-Contact
AlGw-46	Disanto	Pre-Contact
AlGw-47	French	Archaic, Late
AlGw-48	Humberview	Pre-Contact
AlGw-51	Samuel Walford House	Post-Contact
AlGw-56	Jetron	Archaic, Middle
AlGw-59		Pre-Contact
AlGw-60	Moore	Post-Contact
AlGw-62		Pre-Contact
AlGw-63		Post-Contact
AlGw-67	-	Archaic, Late
AlGw-123	Albion Presbyterian cemetery	Post-Contact
AlGw-143		Pre-Contact
AlGw-144		Pre-Contact
AlGw-145		Pre-Contact
AlGw-146		Pre-Contact
AlGw-147		Pre-Contact
AlGw-163	Shore Site	Post-Contact

Borden Number	Site Name	Affiliation
AlGw-171	GoodFELLOW Site	Post-Contact
AlGw-180		Post-Contact

Of the sites located within 300 m of the Study Corridor, three are pre-contact Aboriginal sites; AlGw-56, AlGw-62, and AlGw-67. AlGw-56 also known as the Jetron Site, was a findspot for a Middle Archaic side-notched projectile point fragment determined to be of the Laurentian tradition. It was located during pedestrian survey in 1996. AlGw-62 was discovered in 1998; surface materials were collected, however no diagnostic material was recovered. Finally, AiGw-67 was an isolated Late Archaic projectile point discovered during pedestrian survey in 2000.

The other three sites located within 300 m of the Study Corridor are historical Euro-Canadian sites; AlGw-42, AlGw-63, and AlGw-163. AlGw-42 was discovered during Stage 2 archaeological assessment in 1989 and consisted of a scatter of 42 historical Euro-Canadian artifacts over a 60 x 40 metre area. The artifact assemblage included 35 pieces of ceramic tableware, including 35 vitrified white earthenware sherds, coarse earthenware, bottle glass, one nail, and one ceramic insulator. AlGw-63 was discovered in 1998 during a Stage 1-2 and was subject to a Stage 3 including a CSP and excavation of five 1 x 1 metre square test units over a 50 x 50 metre area. Two hundred sixty artifacts were recovered, while the ceramics found at the site dated from 1840 to 1870.

Finally, AlGw-163, also known as the Shore Site, was discovered during Stage 2 archaeological assessment which took place in 2010 and 2011 conducted by Golder Associates Ltd. A portion of the property surveyed during this assessment overlaps with the current Study Corridor at the south corner of Coleraine Drive and Holland Drive. This Stage 1-2 assessment also located two other locations; one scatter of nineteenth Century material and one isolated non-diagnostic pre-contact Aboriginal artifact. Neither one of these locations was recommended for further work (Golder 2013). None of three locations are located within the current Study Corridor.

Golder undertook the Stage 3 of the AlGw-163 (the Shore Site) in 2012, which determined the site to be from the early- to mid-nineteenth Century and recommended Stage 4 (PIF 243-217-2011). Golder also undertook the Stage 4 in 2013, which consisted of block excavation, mechanical topsoil stripping, and avoidance and protection for the portion of the site located beyond the grading limits located within the Heritage Designation Area surrounding the Shore-Wakely House as stipulated by the Town of Caledon. Block excavation consisted of the hand excavation of 50 one-metre square units, while mechanical topsoil removal extended a minimum of 10 m beyond all cultural features. Nine features and six postmoulds were discovered. A total of 10,437 artifacts were recovered from the Stage 4 partial excavation of AlGw-163 (the Shore Site) dating from the early to the late nineteenth Century. The site was interpreted as representing part of the domestic homestead of the Shore family after purchasing a portion of the lot in 1835. This homestead would have been demolished or abandoned with the completion of the stone house, now known as the Shore-Wakely House, though the area likely continued to be used for refuse deposit or burning through the late nineteenth Century. In the twentieth Century, the eastern portion of the site was used as an agricultural field. Recommendations from this report were as follows (Golder 2013):

> *Prior to allowing construction in the area, no-go instructions must be issued by the Canadian Tire Corporation (CTC) to all personnel so that the area of avoidance is not accidentally impacted. The area to be avoided will be shown on all contract drawings, when applicable. If accidental impacts to the archaeological site are observed at any time during construction a licensed archaeologist will be notified immediately. After completion of grading and other soil*

disturbing activities a licensed archaeologist will be contracted to inspect and report to the MTCS on the effectiveness of the strategy in ensuring that the areas to be avoided remain intact. If CTC determines at a later date that grading impacts will be extended into the remainder of the archaeological site, a licensed archaeologist will be contracted to carry out the Stage 4 mitigation by excavation of the remainder of the site.

It is recommended that when soil disturbance and grading activities are occurring within 20 metres of the area to be avoided a licensed archaeologist be contracted to monitor the activities and prevent impacts to the remainder of the archaeological site. Should an undisturbed part of the site be impacted the archaeologist is empowered to stop construction in the area until further Stage 4 mitigation by excavation is concluded. The results of the construction monitoring will be reported on to the MTCS.

Once all subsequent development has been completed the temporary fence will be removed and replaced by a permanent barrier that will permanently delineate the area of the Shore Site (AlGw-163) that will be avoided and protected. The permanent fence should be placed two metres in from the temporary fence, to ensure it is installed in a part of the site that has already been excavated. CTC will ensure that the lands containing the protected areas remain passive and will prohibit soil disturbance with the exception of traditional farming and minor property maintenance.

Because the exact limits of Shore Site (AlGw-163) are not known, the entire property surrounding the Shore-Wakely House retains cultural heritage value or interest.

To the best of our knowledge, no additional archaeological assessments have been conducted within 50 m of the current study area.

Information concerning specific site locations is protected by provincial policy, and is not fully subject to the Freedom of Information Act. The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to all media capable of conveying location, including maps, drawings, or textual descriptions of a site location. For this reason maps and data that provide information on archaeological site locations are provided as supplementary documentation and do not form part of this public report.

The Ministry of Tourism, Culture and Sport will provide information concerning site location to the party or an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.

2.0 FIELD METHODS

2.1 Stage 1 Property Inspection

The Stage 1 property inspection of the Study Corridor was conducted on March 29, 2017 under Professional Archaeological Licence Number P243, issued to Carla Parslow. Sarah News (R485) of Golder acted as the licensed archaeologist for the inspection and she had the duly delegated responsibility as per Section 12 of the

MTCS 2013 *Terms and Conditions for Archaeological Licences*, issued in accordance with clause 48(4)(d) of the *Ontario Heritage Act*.

The inspection was undertaken to gain first-hand knowledge of the Study Corridor, determine if there were any areas of disturbance that would affect archaeological potential, and to determine what survey strategies would be appropriate for a Stage 2 assessment, should it be required.

The entire Study Corridor and its periphery were systematically inspected to confirm if features of archaeological potential were present and if there were any areas of deep and extensive disturbance which would have removed archaeological potential. As stated in Section 1.4.2 of the *Standards and Guidelines for Consultant Archaeologists* (MTCS 2011:22), a property may only be exempt from Stage 2 assessment once deep and extensive ground disturbance has been confirmed through a property inspection.

The weather on the day of the inspection was cool, approximately 4° Celsius with sun and clouds, permitting good visibility of land features and contributing to no reduction in the chance of observing features of archaeological potential. Field notes and photographs of the Study Corridor were taken during the inspection. The photograph locations and directions can be seen on Map 6.

Table 3 provides an inventory of the documentary record generated in the field.

Table 3: Inventory of Documentary Record

Document Type	Current Location of Document	Additional Comments
Field Notes	Golder Office in Mississauga	Total of 4 pages from original field book. Hard copies stored in project folder and digitally in project file.
Hand Drawn Maps	Golder Office in Mississauga	Two in total from original field book. Hard copy stored in project folder and digitally in project file.
Maps provided by Client	Golder Office in Mississauga	One map in total stored in project folder and stored digitally in project file.
Digital Photographs	Golder Office in Mississauga	A total of 129 photos stored in project folder and stored digitally in project file.

3.0 ANALYSIS AND CONCLUSIONS

3.1 Archaeological Potential

3.1.1 Pre-Contact Aboriginal Archaeological Resources

Archaeological potential is established by determining the likelihood that archaeological resources may be present within a Study Corridor. Archaeological potential can be affected by several variables, including: distance to various types of water sources, soil texture and drainage, glacial geomorphology, and the general topographic variability of the area.

Distance to modern or ancient water sources is generally accepted as the most important determinant of past human settlement patterns and, considered alone, may result in a determination of archaeological potential. However, any combination of two or more other criteria, such as well-drained soils or topographic variability, may also indicate archaeological potential.

In archaeological potential modeling, a distance to water criterion of 300 m is generally employed for all primary and secondary water courses including lakeshores, rivers, large creeks, swamps and small creeks. As indicated above, the closest water sources is an unnamed tributary of the Humber River in the northwestern portion of the Study Corridor, immediately south of King Street West. This tributary appears on historical mapping, however it has subsequently been turned into a storm water management pond (Map 1).

Soil texture can be an important determinant of past settlement, usually in combination with other factors, such as topography. Soils within the Study Corridor are comprised of King clay loam, Monaghan clay loam, and Peel clay, which provide good to imperfect drainage (Hoffman and Richards 1953). These soils would have been well suited to growing common field crops, as well as forage crops and pasture. These soils would have been acceptable for pre-contact Aboriginal agricultural practices.

The Ministry of Tourism, Culture and Sport also views the presence of previously identified archaeological sites as an indicator of archaeological potential; as indicated above, there are 18 previously identified pre-contact Aboriginal sites located within one kilometre of the Study Corridor, including three located within 300 m.

Given the archaeological potential criteria noted above, the Study Corridor is determined to have archaeological potential for pre-contact Aboriginal sites.

3.1.2 Historical Euro-Canadian Resources

The criteria used by the Ontario Ministry of Tourism, Culture and Sport to determine potential for historical Euro-Canadian archaeological sites includes the presence of: particular, resource-specific features that would have attracted past subsistence or extractive uses; areas of initial, non-Aboriginal settlement; early historical transportation routes; and properties designated under the *Ontario Heritage Act*.

Research of the historical context of the study corridor (see Section 1.2.3) indicated that the Study Corridor fell along the early historical transportation route of Concession 5 in the Township of Albion and that by 1859, all lots encompassed in the Study Corridor had been purchased. By the publication of the 1877 *Historical Atlas of Peel County*, there had been a noticeable increase in residential and agricultural development in the lots in and surrounding the Study Corridor. In addition, the Study Corridor contains several heritage properties (see Section 1.2.3) and lies near the historical Village of Bolton, which has been a growing community in Albion Township since the mid-nineteenth Century.

The Ministry of Tourism, Culture and Sport also views the presence of previously identified archaeological sites as an indicator of archaeological potential. Specifically, there are nine previously identified sites with a historical Euro-Canadian component located within one kilometre of the Study Corridor; including three within 300 m of the Study Corridor.

Given the archaeological potential criteria noted above, the Study Corridor is determined to have archaeological potential for historical Euro-Canadian sites.

3.1.3 Archaeological Integrity

A negative indicator of archaeological potential is extensive land disturbance. This includes widespread earth movement activities that would have eradicated or relocated any cultural material to such a degree that the information potential and cultural heritage value or interest has been lost.

Section 1.3.2 of the MTCS's 2011 *Standards and Guidelines for Consultant Archaeologists* states that:

> *Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to extensive and deep land alterations that have severely damaged the integrity of any archaeological resources.*
>
> Government of Ontario 2011:18

The types of disturbance referred to above includes, but is not restricted to, quarrying, sewage and infrastructure development, building footprints and major landscaping involving grading below topsoil.

3.2 Conclusions

The Stage 1 archaeological assessment determined that there was potential for pre-contact Aboriginal archaeological resources, given the proximity of the study area to an unnamed tributary of the Humber River, and a combination of agriculturally suitable physiography and soils. Similarly, historical Euro-Canadian archaeological potential was deemed to be present, given the time depth of occupation of the study area and the location of the study area along the historical transportation route of Concession 5, the presence of several heritage properties within the Study Corridor, and its location near the historical Village of Bolton. The Stage 1 property inspection confirmed that the study area is a long-settled urban and industrial area of which a significant portion has been previously disturbed by paved roads, sidewalks, landscaping, and buildings and their respective utilities, or sloped areas (Image 1: to Image 15). As this disturbance is not immediately apparent in some places from the ground today, several areas must be discussed.

The first is the open lot at the west corner of Coleraine Drive and Harvest Moon Drive. Today, this lot sits empty as an overgrown open field (Image 2), however Google Earth aerial imagery from 2004 shows that a house used to occupy this lot, along with its associated driveway. In addition, construction disturbance from the construction connecting Harvest Moon Drive to Coleraine Drive is evident. The house is no longer present in 2005 imagery, indicating that it was demolished between 2004 and 2005.

Another area of interest is the north corner of Coleraine Drive and King Street West, which is currently an overgrown grassy lot (Image 3). Aerial imagery from Google Earth shows that King Street West used to curve and merge onto Coleraine Drive heading north and that a house used to stand south of this curve, where the north corner of Coleraine Drive and King Street West is today. Between 2009 and 2013, King Street West was re-

aligned, forming four-way intersection with Coleraine Drive and Harvest Moon Drive. The old curve of the road is still visible in aerial imagery today.

A third area sits on the south side of Wakely Boulevard, across from the Ellwood Drive West intersection. This area appears as an open field today, however Google Earth aerial imagery from 2004 shows that this whole area was subject to disturbance during the construction of Aida Court.

The final area was not able to be accessed due to controlled access from Coleraine Drive. This open grassy area lies between industrial lots on the north side of Coleraine Drive between Holland Drive and the railroad crossing. Along Coleraine Drive, this area shows signs of disturbance in the form of several large berms (Image11). Aerial imagery from Google Earth shows that this area has been heavily disturbed from industrial construction as far back as at least 2004.

Several portions of the study area consisting of manicured lawn and overgrown fields appear to be relatively undisturbed and still retain archaeological potential (Image 16; Maps 7 and 8). The northern portion of the property upon which the Shore-Wakely House (see Section 1.2.3) sits lies within the current Study Corridor. The Shore Site (AlGw-163) was discovered to the southeast of the Shore-Wakely House in 2011 and subject to Stage 3 and partial Stage 4 excavation in 2012 (see Section 1.3.2). The Shore Site extends onto the property of the Shore-Wakely House, which is a designated heritage property under Part IV of the *Ontario Heritage Act* (Town of Caledon By-Law 94-55) and is protected from development and was thus subject to Stage 4 avoidance and protection in 2012. Because the exact limits of the Shore Site (AlGw-163) are not known, the entire Shore-Wakely House property retains cultural heritage value or interest and is still subject to the recommendations laid out in the Stage 4 report (see Section 1.3.2; Golder 2013).

In conjunction with a property inspection, Golder applied criteria commonly used by the MTCS to determine the presence of archaeological potential within the study area. Through this process it was determined that the study area did have archaeological potential for both pre-contact Aboriginal and historical Euro-Canadian sites, but that this potential has been removed for most parts of the study area due to deep and extensive disturbances resulting from urban and industrial development, or sloped areas. However, several sections of manicured lawn and overgrown fields within the Study Corridor still retain archaeological potential (Maps 7 and 8).

4.0 RECOMMENDATIONS

Given the results of the Stage 1 archaeological assessment, and following the *Standards and Guidelines for Consultant Archaeologists* (Section 2.2, Guideline 4; Government of Ontario 2011),the following recommendations have been made:

- Stage 2 property survey is recommended for the area identified in Map 7. Stage 2 property survey is to be completed through test pit survey at five metre intervals;
- The Shore-Wakely House property, discussed in Section 1.3.2 and illustrated in Map 8 is designated and retains cultural heritage value or interest. Additionally, it is recommended for further archaeological assessment as per reports referenced in this document, as follows:
  - *Prior to allowing construction in the area, no-go instructions must be issued by CTC to all personnel so that the area of avoidance is not accidentally impacted. The area to be avoided will be shown on all contract drawings, when applicable. If accidental impacts to the archaeological site are observed at any time during construction a licensed archaeologist will be notified immediately. After completion of grading and other soil disturbing activities a licensed archaeologist will be contracted to inspect and report to the MTCS on the effectiveness of the strategy in ensuring that the areas to be avoided remain intact. If CTC determines at a later date that grading impacts will be extended into the remainder of the archaeological site, a licensed archaeologist will be contracted to carry out the Stage 4 mitigation by excavation of the remainder of the site.*
  - *It is recommended that when soil disturbance and grading activities are occurring within 20 metres of the area to be avoided a licensed archaeologist be contracted to monitor the activities and prevent impacts to the remainder of the archaeological site. Should an undisturbed part of the site be impacted the archaeologist is empowered to stop construction in the area until further Stage 4 mitigation by excavation is concluded. The results of the construction monitoring will be reported on to the MTCS.*
  - *Once all subsequent development has been completed the temporary fence will be removed and replaced by a permanent barrier that will permanently delineate the area of the Shore Site (AlGw-163) that will be avoided and protected. The permanent fence should be placed two metres in from the temporary fence, to ensure it is installed in a part of the site that has already been excavated. CTC will ensure that the lands containing the protected areas remain passive and will prohibit soil disturbance with the exception of traditional farming and minor property maintenance.*
- The remainder of the study area outside of the identified areas has been subject to deep disturbance, and as such no further archaeological assessment is recommended for this portion of the study area (Map 7).

The MTCS is asked to review the results and recommendations presented herein, accept this report into the Provincial Register of archaeological reports and issue a standard letter of compliance with the Ministry's 2011 *Standards and Guidelines for Consultant Archaeologists* and the terms and conditions for archaeological licencing.

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

This report is submitted to the Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18 (Government of Ontario 1990b). The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism, Culture and Sport, a letter will be issued by the ministry stating that there are no further concerns with regards to alterations to archaeological sites by the proposed development.

It is an offence under Section 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alterations to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological reports referred to in Section 65.1 of the *Ontario Heritage Act* (Government of Ontario 1990b).

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990b).

The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33, requires that any person discovering or having knowledge of a burial site shall immediately notify the police or coroner. It is recommended that the Registrar of Cemeteries at the Ministry of Consumer Services is also immediately notified.

Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48(1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence (Government of Ontario 1990b).

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7.0 IMAGES



Image 1: Study Corridor; Frank Johnston Road; Representative example of urban disturbance facing northwest, taken March 30, 2017



Image 2: Study Corridor; West corner of Coleraine Drive and Harvest Moon Drive; facing north, taken March 30, 2017



Image 3: Study Corridor; North corner of Coleraine Drive and King Street West, as is today after King Street West realignment; facing northwest, taken March 30, 2017



Image 4: Study Corridor; Unnamed tributary of the Humber River showing sloped areas and disturbance from road construction; facing southeast, taken March 30, 2017



Image 5: Study Corridor; Grapevine Road; Representative example of urban disturbance; facing west, taken March 30, 2017



Image 6: Study Corridor; Coleraine Drive; Representative example of urban disturbance facing northwest, taken March 30, 2017



Image 7: Study Corridor; Aida Court; Representative example of urban disturbance; facing east, taken March 30, 2017



Image 8: Study Corridor; Coleraine Drive; Representative example of urban disturbance facing southeast, taken March 30, 2017



Image 9: Study Corridor; Coleraine Drive; Representative example of industrial disturbance facing east, taken March 30, 2017



Image 10: Study Corridor; Coleraine Drive; Representative example of industrial disturbance facing northwest, taken March 30, 2017



Image11: Study Corridor; Coleraine Drive; Representative example of industrial disturbance facing southeast, taken March 30, 2017



Image 12: Study Corridor; Coleraine Drive; Representative example of industrial disturbance facing southeast, taken March 30, 2017



Image 13: Study Corridor; Coleraine Drive; Representative example of industrial disturbance facing north, taken March 30, 2017



Image 14: Study Corridor; Coleraine Drive; Representative example of industrial disturbance facing southwest, taken March 30, 2017



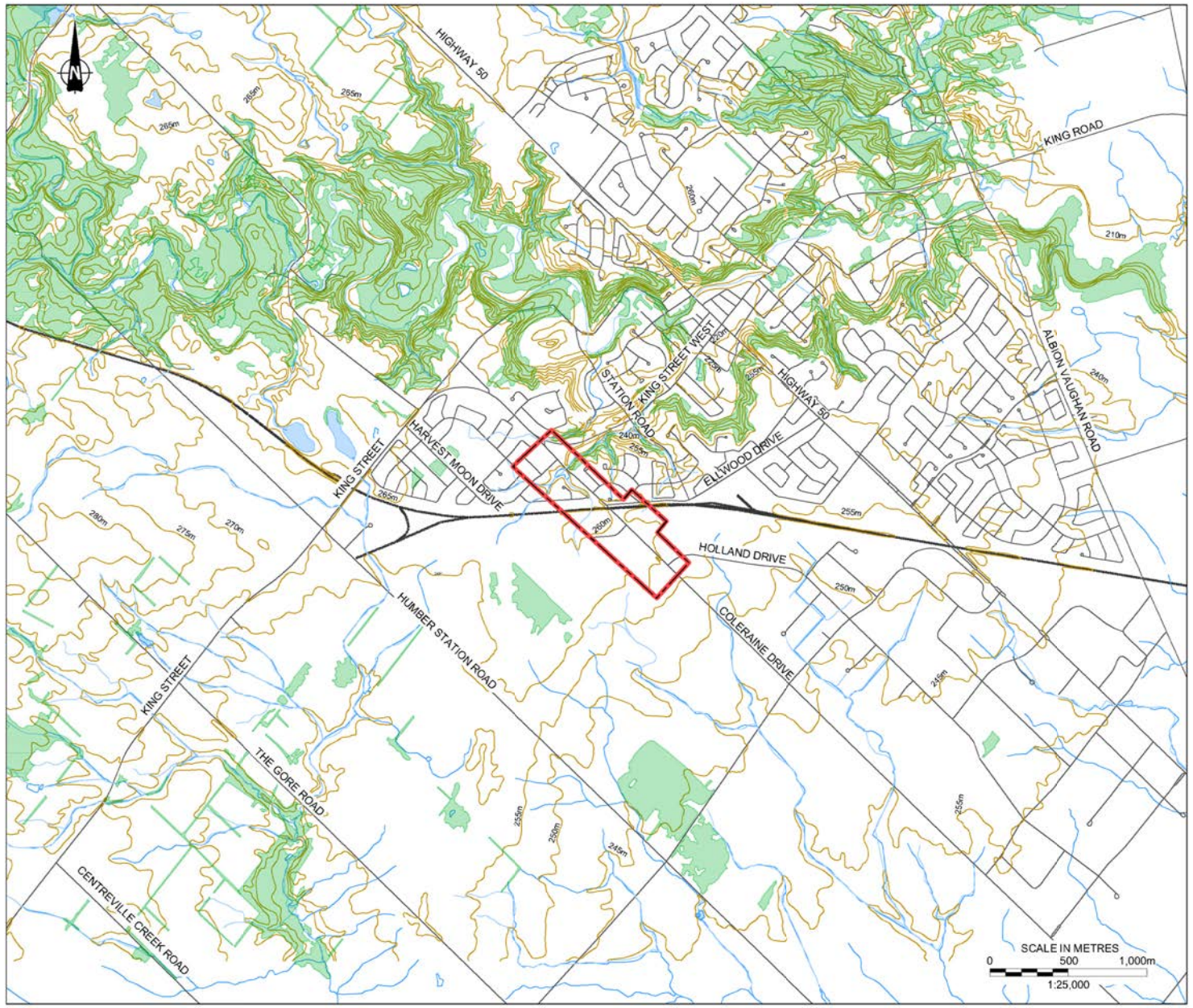
Image 15: Study Corridor; Coleraine Drive; Representative example of industrial disturbance facing west, taken March 30, 2017

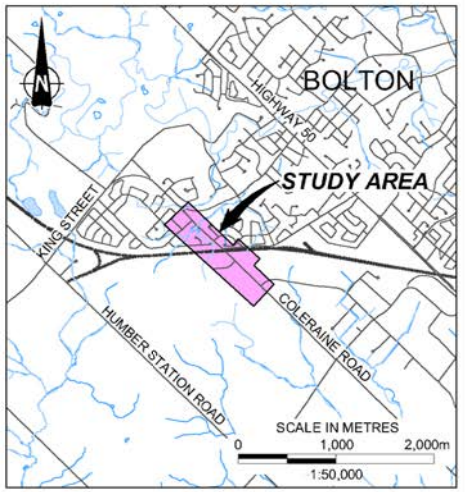


Image 16: Study Corridor; Holland Drive; Area retaining archaeological potential; facing south, taken March 30, 2017

8.0 MAPS

All maps follow on the succeeding pages.





REGIONAL MAP

LEGEND

APPROXIMATE LOCATION OF STUDY AREA

REFERENCE

DRAWING BASED ON MNR LIO, OBTAINED 2017
PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2012;
AND CANMAP STREETFILES V2008.4.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

PROJECT

STAGE 1 ARCHAEOLOGICAL ASSESSMENT
COLERAINE DRIVE GRADE SEPERATION
TOWN OF CALEDON, ONTARIO

TITLE

LOCATION OF STUDY AREA

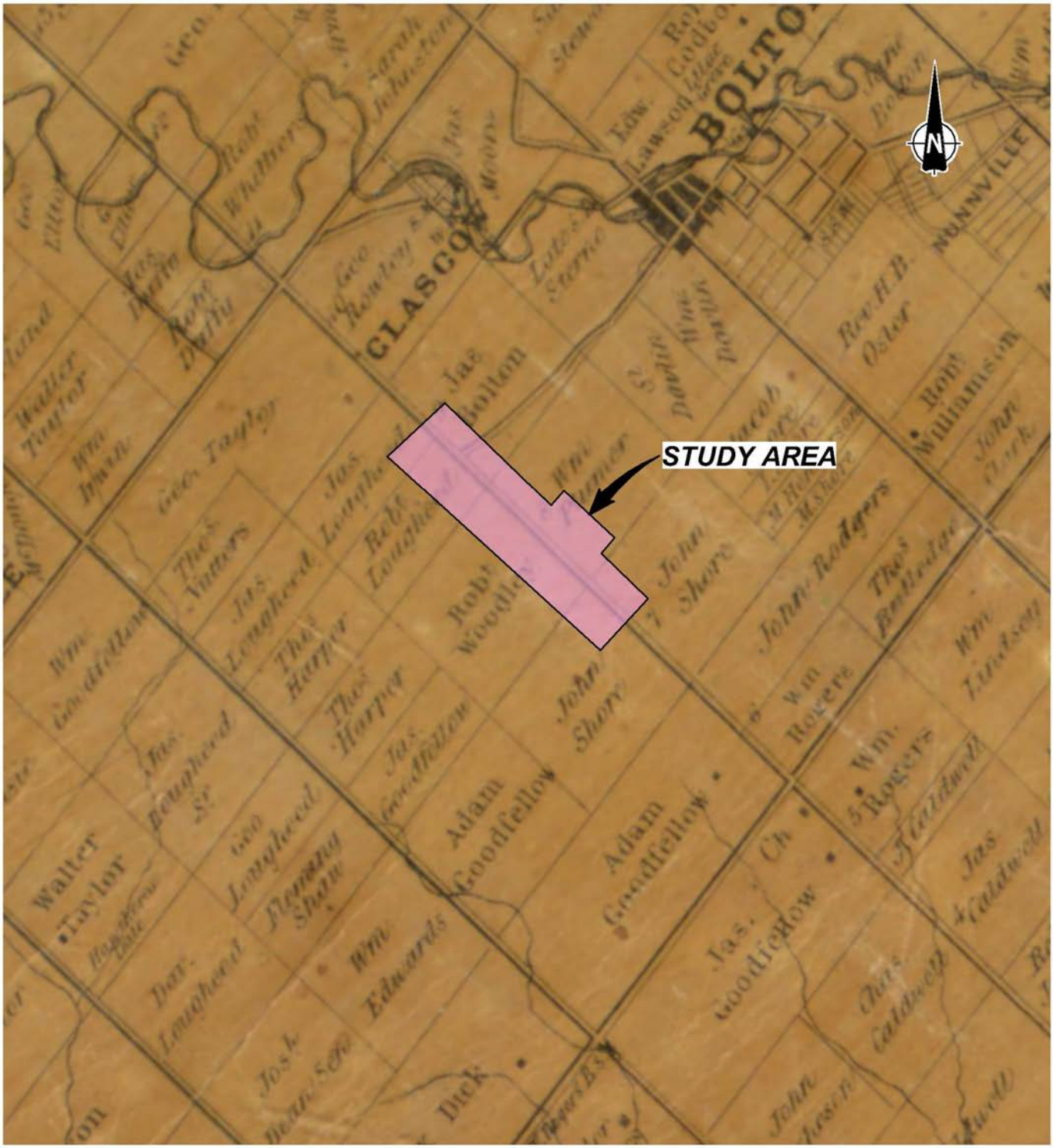
Golder Associates

PROJECT No.			1665649
CADD	ZJB/DCH	Sept. 12/17	
CHECK			

FILE No. 1665649-4000-R01001
SCALE AS SHOWN REV.

MAP 1

Drawing file: 1665649-4000-R01001.dwg Sep 12, 2017 - 2:52pm



LEGEND

APPROXIMATE LOCATION OF STUDY AREA

REFERENCE

TREMAINE GEORGE, 1858, MAP OF THE COUNTY OF PEEL.

NOTES

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ALL LOCATIONS ARE APPROXIMATE ONLY.

PROJECT

STAGE 1 ARCHAEOLOGICAL ASSESSMENT
COLERAINE DRIVE GRADE SEPARATION
TOWN OF CALEDON, ONTARIO

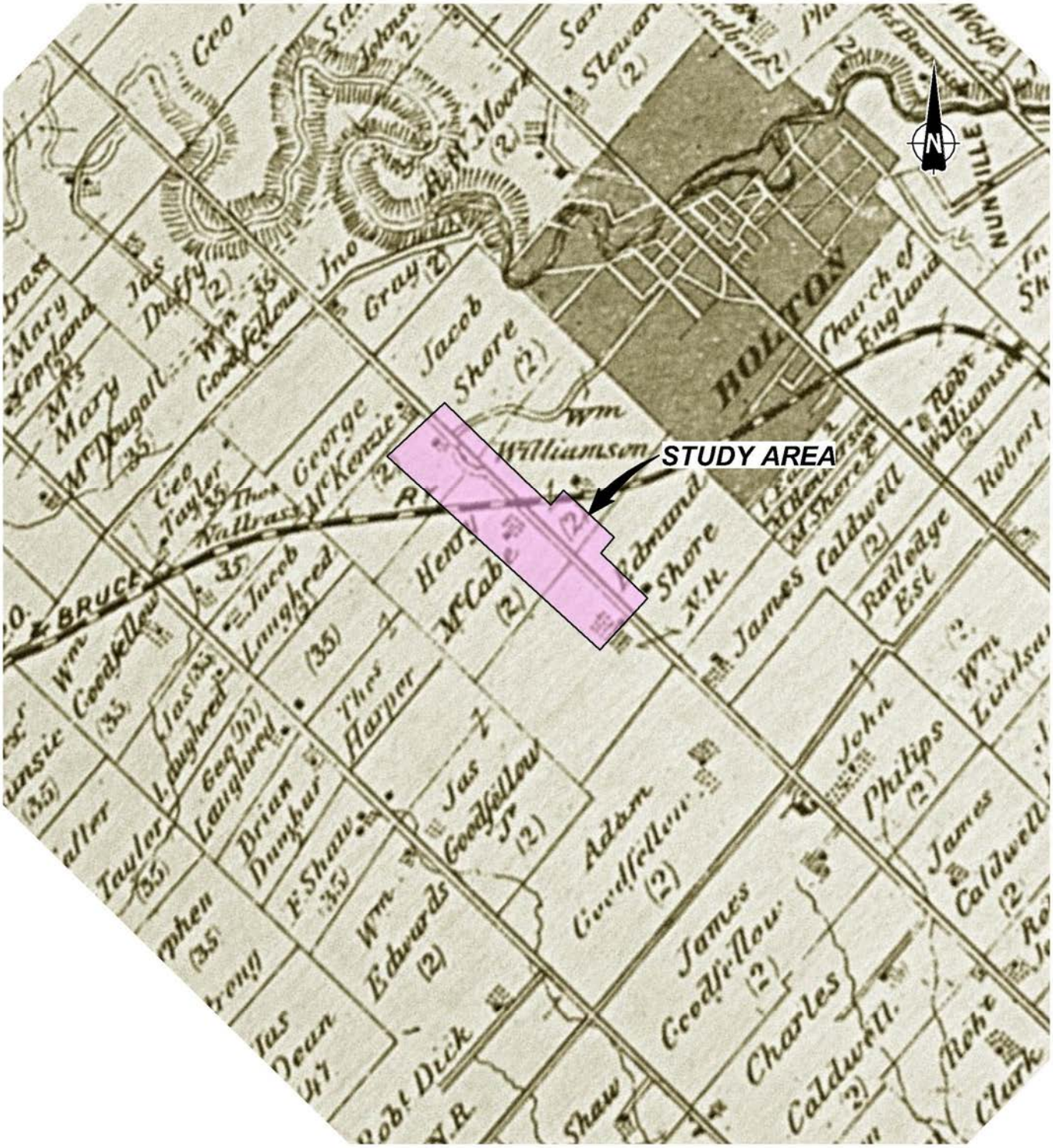
TITLE

A PORTION OF TREMAINE'S 1858 MAP OF THE COUNTY OF PEEL

Golder Associates

PROJECT No.		1665649	FILE No. 1665649-4000-R01002	
			SCALE N.T.S.	REV.
CADD	ZJB	Apr 4/17	MAP 2	
CHECK				

Drawing file: 1665649-4000-R01002.dwg Apr 04, 2017 - 10:05am



LEGEND

APPROXIMATE LOCATION OF STUDY AREA

REFERENCE

WALKER AND MILES, 1877, ILLUSTRATED HISTORICAL ATLAS OF THE COUNTY OF PEEL, ONTARIO. ED. ROSS CUMMINGS. 1872 REPRINT.

NOTES

THIS DRAWING IS SCHEMATIC ONLY AND IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

ALL LOCATIONS ARE APPROXIMATE ONLY.

PROJECT

STAGE 1 ARCHAEOLOGICAL ASSESSMENT
COLERAINE DRIVE GRADE SEPARATION
TOWN OF CALEDON, ONTARIO

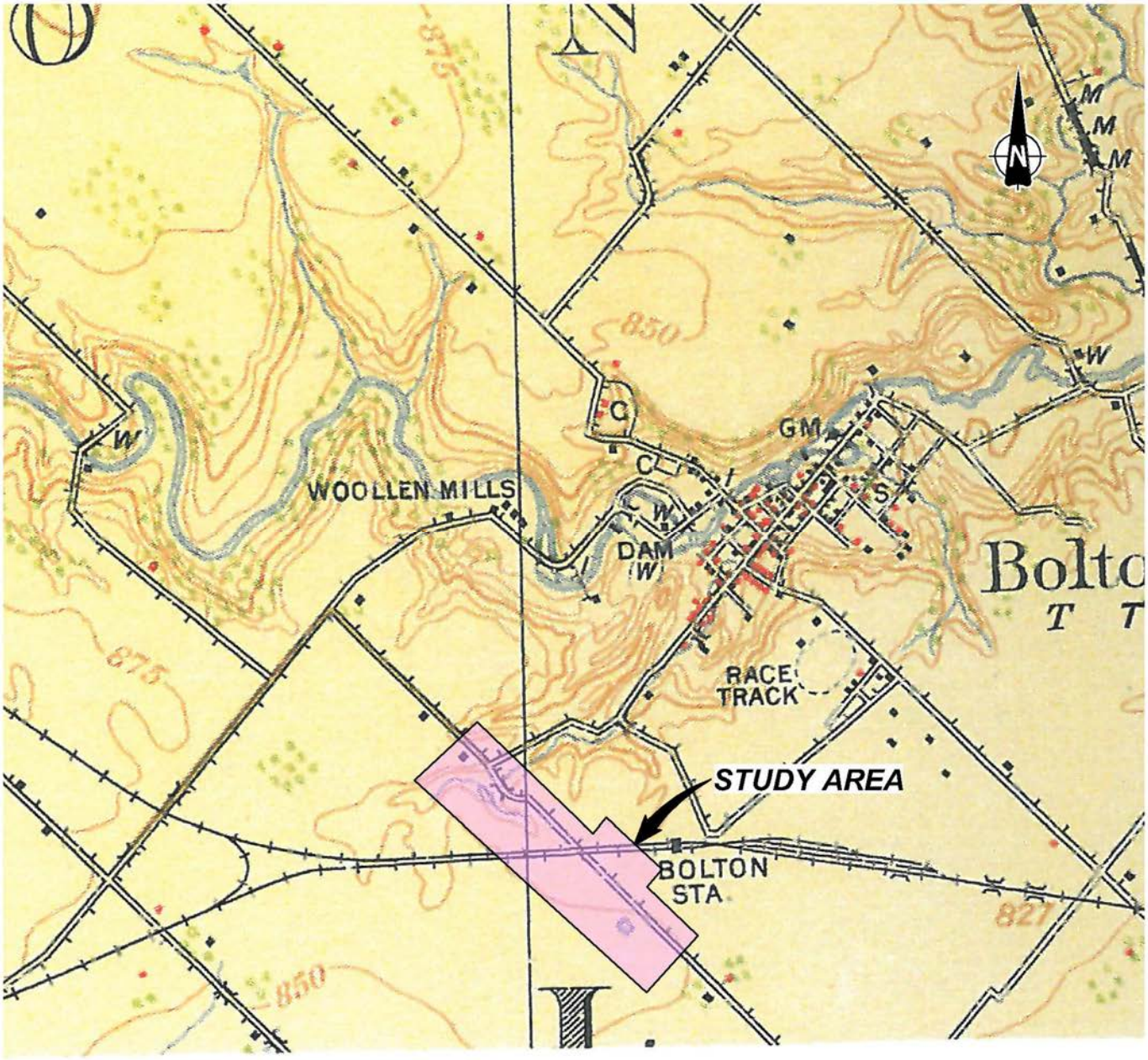
TITLE

A PORTION OF THE 1877 HISTORICAL ATLAS OF PEEL COUNTY

Golder Associates

PROJECT No.		1665649	FILE No. 1665649-4000-R01002
			SCALE N.T.S. REV.
CADD	ZJB	Apr 4/17	MAP 3
CHECK			

Drawing file: 1665649-4000-R01002.dwg Apr 04, 2017 - 10:04am



LEGEND

APPROXIMATE LOCATION OF STUDY AREA

REFERENCE

DEPARTMENT OF MILITIA & DEFENSE, 1919, BOLTON, SHEET 30 M/13. NTS 1:63,360

NOTES

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ALL LOCATIONS ARE APPROXIMATE ONLY.

PROJECT

STAGE 1 ARCHAEOLOGICAL ASSESSMENT
COLERAINE DRIVE GRADE SEPARATION
TOWN OF CALEDON, ONTARIO

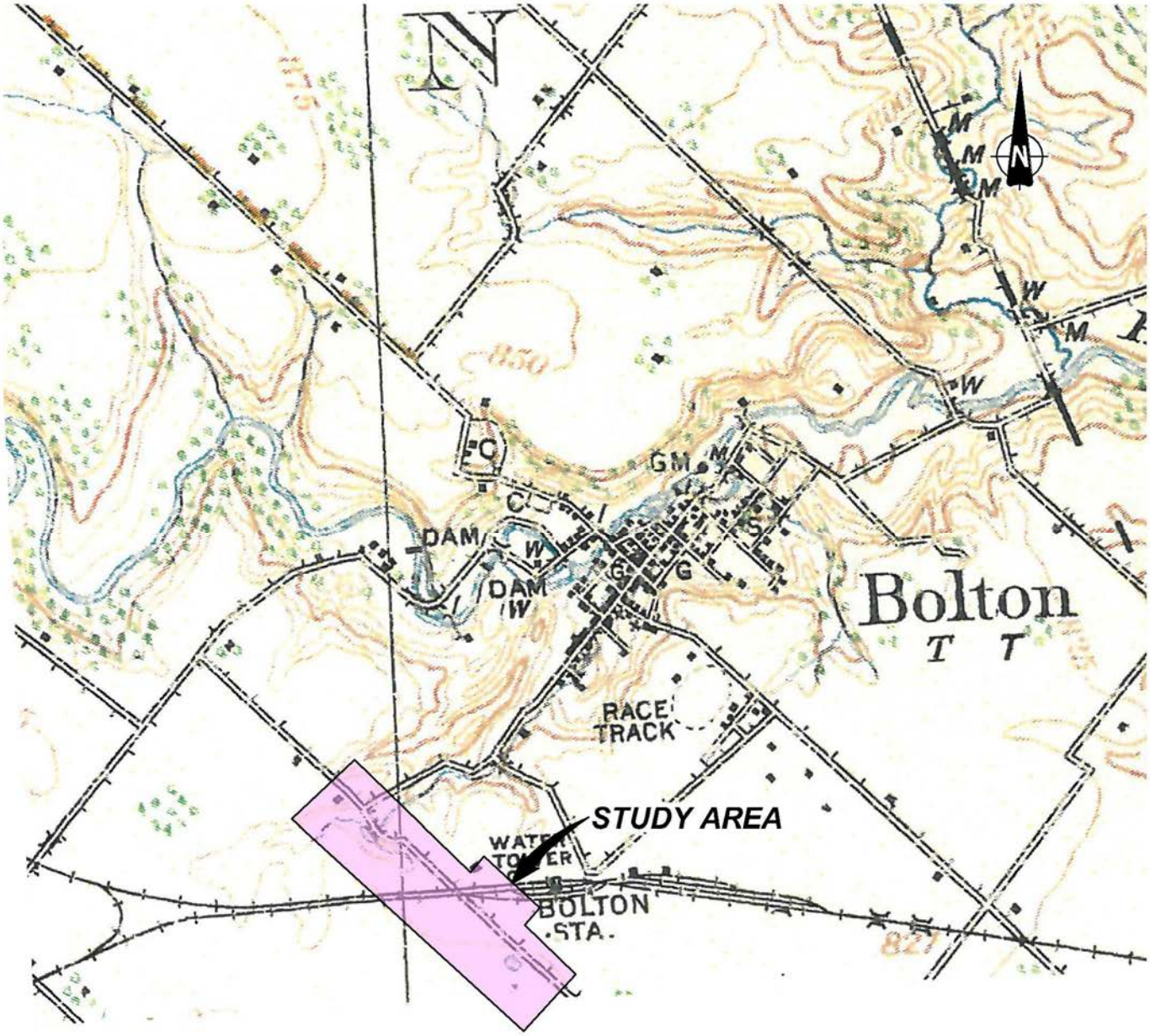
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A PORTION OF THE 1919 TOPOGRAPHICAL MAP OF ALBION TOWNSHIP

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PROJECT No.		1665649	FILE No. 1665649-4000-R01002
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CADD	ZJB	Apr 4/17	
CHECK			MAP 4

Drawing file: 1665649-4000-R01002.dwg Apr 04, 2017 - 10:04am



LEGEND

APPROXIMATE LOCATION OF STUDY AREA

REFERENCE

DEPARTMENT OF MILITIA & DEFENSE, 1929, BOLTON, SHEET 30 M/13. NTS 1:63,360

NOTES

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PROJECT

STAGE 1 ARCHAEOLOGICAL ASSESSMENT
COLERAINE DRIVE GRADE SEPARATION
TOWN OF CALEDON, ONTARIO

TITLE

A PORTION OF THE 1929 TOPOGRAPHICAL MAP OF ALBION TOWNSHIP

Golder Associates

PROJECT No.		1665649	FILE No. 1665649-4000-R01002	
			SCALE N.T.S.	REV.
CADD	ZJB	Apr 4/17	MAP 5	
CHECK				

Drawing file: 1665649-4000-R01002.dwg Apr 04, 2017 - 10:04am



LEGEND

APPROXIMATE LOCATION OF STUDY AREA

PHOTOGRAPH LOCATION, VIEWING DIRECTION, AND PLATE NUMBER

REFERENCE

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PROJECT

STAGE 1 ARCHAEOLOGICAL ASSESSMENT
COLERAINE DRIVE GRADE SEPERATION
TOWN OF CALEDON, ONTARIO

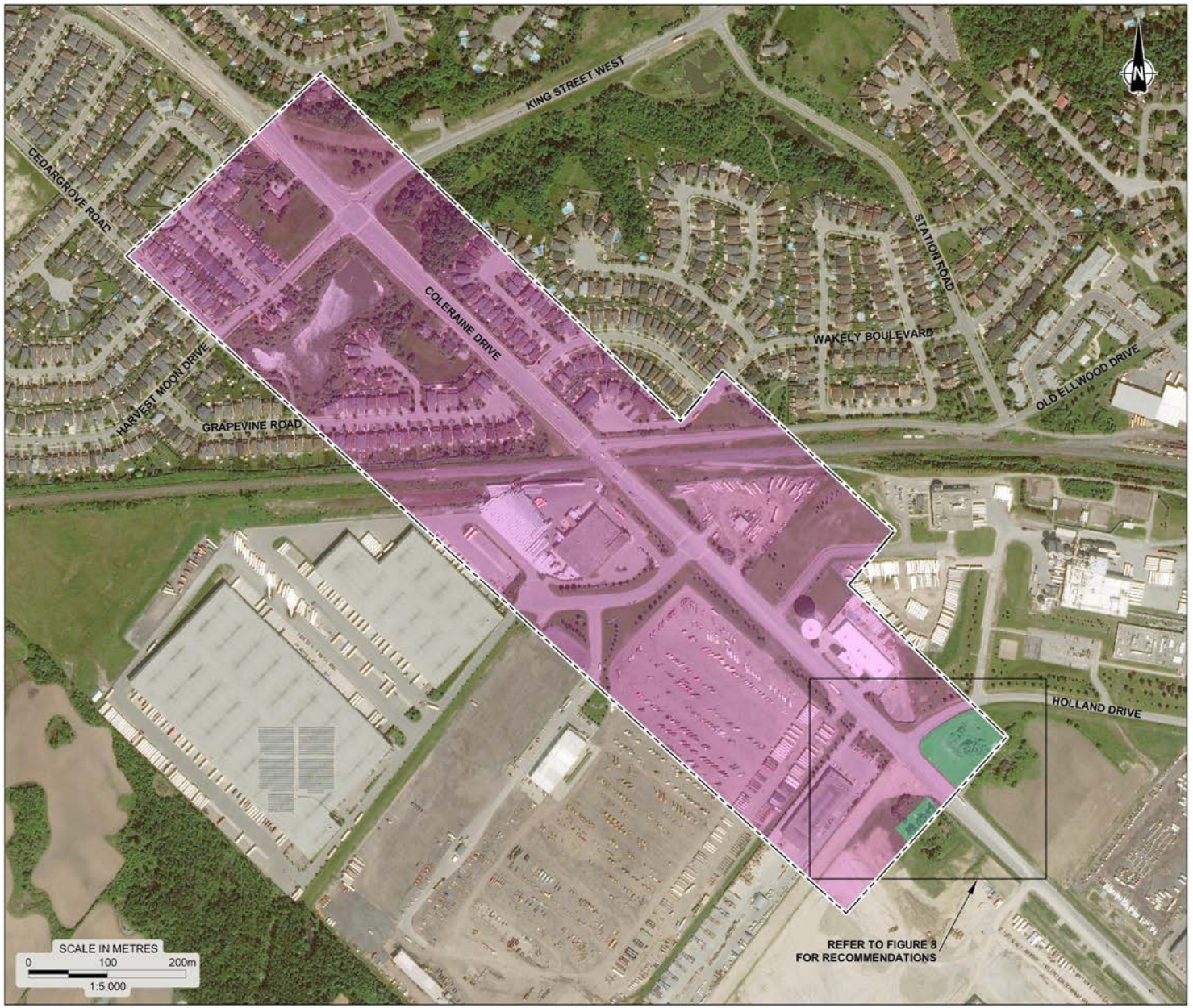
TITLE

STAGE 1 METHODS

Golder Associates

PROJECT No.			1665649	FILE No. 1665649-4000-R01006
				SCALE AS SHOWN REV.
CADD	ZJB	Apr 4/17		
CHECK				MAP 6

Drawing file: 1665649-4000-R01006.dwg Apr 04, 2017 - 10:05am



LEGEND

- APPROXIMATE LOCATION OF STUDY AREA
- AREA RECOMMENDED FOR FURTHER ARCHAEOLOGICAL ASSESSMENT
- NO FURTHER ARCHAEOLOGICAL ASSESSMENT REQUIRED

REFERENCE

DRAWING BASED ON BING IMAGERY AS OF MARCH 31, 2017 (IMAGE DATE UNKNOWN); AND CANMAP STREETFILES V2008.4.

NOTES

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PROJECT

STAGE 1 ARCHAEOLOGICAL ASSESSMENT
COLERAINE DRIVE GRADE SEPERATION
TOWN OF CALEDON, ONTARIO

TITLE

STAGE 1 RESULTS

Golder Associates

PROJECT No.			1665649	FILE No. 1665649-4000-R01006
				SCALE AS SHOWN REV.
CADD	ZJB	Apr 4/17		MAP 7
CHECK				

Drawing file: 1665649-4000-R01006.dwg Apr 04, 2017 - 10:05am



LEGEND

- APPROXIMATE LOCATION OF STUDY AREA
- STAGE 2 TEST PIT AT 5m INTERVAL
- DESIGNATED HERITAGE SITE; FURTHER CULTURAL HERITAGE VALUE OR INTEREST

REFERENCE

DRAWING BASED ON BING IMAGERY AS OF MARCH 31, 2017 (IMAGE DATE UNKNOWN); AND CANMAP STREETFILES V2008.4.

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PROJECT

STAGE 1 ARCHAEOLOGICAL ASSESSMENT
COLERAINE DRIVE GRADE SEPERATION
TOWN OF CALEDON, ONTARIO

TITLE

STAGE 1 RECOMMENDATIONS

Golder Associates

PROJECT No.			1685649
CADD	ZJB	Apr 4/17	
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FILE No. 1685649-4000-R01006
SCALE AS SHOWN REV.

MAP 8

Drawing file: 1685649-4000-R01006.dwg Apr 04, 2017 - 10:06am

9.0 IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Golder has prepared this report in a manner consistent with the level of care and skill ordinarily exercised by members of the archaeological profession currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without Golder's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, Golder may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client cannot rely upon the electronic media versions of Golder's report or other work products.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project.

Special risks occur whenever archaeological investigations are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain archaeological resources. The sampling strategies incorporated in this study comply with those identified in the Ministry of Tourism and Culture's *Standards and Guidelines for Consultants Archaeologists* (Government of Ontario 2011).

10.0 CLOSURE

We trust that this report meets your current needs. If you have any questions, or if we may be of further assistance, please contact the undersigned.

GOLDER ASSOCIATES LTD.





Lafe Meicenheimer, M.A.
Staff Archaeologist

Carla Parslow, Ph.D.
Associate, Senior Archaeologist

LCM/CP/ll/MT/ly

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Golder Associates

4

TOWN OF BOLTON

WATER AND WASTEWATER CAPACITY IMPROVEMENTS CLASS 'C' EA

ATTACHMENT 4

Stage 1 Archaeological Assessment – Review and Entry

Ministry of Tourism, Culture and Sport

Archaeology Programs Unit
Programs and Services Branch
Culture Division
401 Bay Street, Suite 1700
Toronto ON M7A 0A7
Tel.: (416) 212-8442
Email: John.Dunlop@ontario.ca

Ministère du Tourisme, de la Culture et du Sport

Unité des programmes d'archéologie
Direction des programmes et des services
Division de culture
401, rue Bay, bureau 1700
Toronto ON M7A 0A7
Tél. : (416) 212-8442
Email: John.Dunlop@ontario.ca

Ontario

Apr 27, 2018

Carla Parslow (P243)
Golder Associates Ltd.
100 - 6925 Century Mississauga ON L5N 7K2

RE: Review and Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "Stage 1 Archaeological Assessment: Coleraine Drive Grade Separation, Part of Lots 7, 8, and 9, Concession 5, and Lots 7, 8, and 9, Concession 6, Former Geographic Township of Albion, Now Town of Caledon, Regional Municipality of Peel, Ontario ", Dated Sep 12, 2017, Filed with MTCS Toronto Office on Feb 26, 2018, MTCS Project Information Form Number P243-0349-2017, MTCS File Number 0008386

Dear Dr. Parslow:

This office has reviewed the above-mentioned report, which has been submitted to this ministry as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18.[1] This review has been carried out in order to determine whether the licensed professional consultant archaeologist has met the terms and conditions of their licence, that the licensee assessed the property and documented archaeological resources using a process that accords with the 2011 Standards and Guidelines for Consultant Archaeologists set by the ministry, and that the archaeological fieldwork and report recommendations are consistent with the conservation, protection and preservation of the cultural heritage of Ontario.

The report documents the assessment of the study area as depicted in Map 7 of the above titled report and recommends the following:

Given the results of the Stage 1 archaeological assessment, and following the Standards and Guidelines for Consultant Archaeologists (Section 2.2, Guideline 4; Government of Ontario 2011),the following recommendations have been made:

(1) Stage 2 property survey is recommended for the area identified in Map 7. Stage 2 property survey is to be completed through test pit survey at five metre intervals;

(a) The Shore-Wakely House property, discussed in Section 1.3.2 and illustrated in Map 8 is designated and retains cultural heritage value or interest. Additionally, it is recommended for further archaeological assessment as per reports referenced in this document, as follows:

(b) Prior to allowing construction in the area, no-go instructions must be issued by CTC to all personnel so that the area of avoidance is not accidentally impacted. The area to be avoided will be shown on all

contract drawings, when applicable. If accidental impacts to the archaeological site are observed at any time during construction a licensed archaeologist will be notified immediately. After completion of grading and other soil disturbing activities a licensed archaeologist will be contracted to inspect and report to the MTCS on the effectiveness of the strategy in ensuring that the areas to be avoided remain intact. If CTC determines at a later date that grading impacts will be extended into the remainder of the archaeological site, a licensed archaeologist will be contracted to carry out the Stage 4 mitigation by excavation of the remainder of the site.

(c) It is recommended that when soil disturbance and grading activities are occurring within 20 metres of the area to be avoided a licensed archaeologist be contracted to monitor the activities and prevent impacts to the remainder of the archaeological site. Should an undisturbed part of the site be impacted the archaeologist is empowered to stop construction in the area until further Stage 4 mitigation by excavation is concluded. The results of the construction monitoring will be reported on to the MTCS.

2. Once all subsequent development has been completed the temporary fence will be removed and replaced by a permanent barrier that will permanently delineate the area of the Shore Site (AlGw-163) that will be avoided and protected. The permanent fence should be placed two metres in from the temporary fence, to ensure it is installed in a part of the site that has already been excavated. CTC will ensure that the lands containing the protected areas remain passive and will prohibit soil disturbance with the exception of traditional farming and minor property maintenance.

The remainder of the study area outside of the identified areas has been subject to deep disturbance, and as such no further archaeological assessment is recommended for this portion of the study area (Map 7).

Based on the information contained in the report, the ministry is satisfied that the fieldwork and reporting for the archaeological assessment are consistent with the ministry's 2011 Standards and Guidelines for Consultant Archaeologists and the terms and conditions for archaeological licences. This report has been entered into the Ontario Public Register of Archaeological Reports. Please note that the ministry makes no representation or warranty as to the completeness, accuracy or quality of reports in the register.

Should you require any further information regarding this matter, please feel free to contact me.

Sincerely,

John Dunlop
Archaeology Review Officer

cc. Archaeology Licensing Officer
Gino Dela Cruz,Transportation Division, Public Works, Region of Peel
Trevor Bell,MOECC

[1]In no way will the ministry be liable for any harm, damages, costs, expenses, losses, claims or actions that may result: (a) if the Report(s) or its recommendations are discovered to be inaccurate, incomplete, misleading or fraudulent; or (b) from the issuance of this letter. Further measures may need to be taken in the event that additional artifacts or archaeological sites are identified or the Report(s) is otherwise found to be inaccurate, incomplete, misleading or fraudulent.

5

TOWN OF BOLTON

WATER AND WASTEWATER CAPACITY IMPROVEMENTS CLASS 'C' EA

ATTACHMENT 5

Indigenous Consultation and Engagement

Notice of Archaeological Screening New Bolton Zone 7 Water Booster Pumping Station

Indigenous Engagement & Consultation Summary

Prepared by: GM BluePlan Engineering
Contact Person: Chris Campbell – Vice President
E: chris.campbell@gmblueplan.ca
Royal Centre, 3300 Highway No. 7
Suite 402, Vaughan, Ontario, L4K 4M3
P: 416 703 0667

TABLE OF CONTENTS

1 Background 1
2 Indigenous and First Nations Engagement 1
3 Indigenous Consultation and Engagement Summary 2

APPENDICES

Appendix A Indigenous and First Nations Engagement Documentation

1 Background

The Region has completed an Archaeological Screening Process for a new Bolton Zone 7 Water Booster Pumping Station at the proposed site of King Street and Coleraine Drive in the Town of Bolton. Integral to this process was consultation and engagement with Indigenous communities with the objective of outlining the process, its preliminary results, sharing information and seeking their input. The consultation and engagement efforts supplement those that have been completed under the Bolton Water and Wastewater Capacity Improvements Class C Environmental Assessment and were specific to the Archaeological Screening process for the proposed pumping station.

2 Indigenous and First Nations Engagement

Indigenous and First Nation communities have a deep and unique understanding of the natural environment given their long-standing relationship with their lands, practices, and way of life. As such, they provide valuable information to help identify solutions and measures to mitigate impacts to natural, archaeological, and cultural resources. **Table 1** below provides a summary of key engagement points with First Nations. Detailed correspondences are provided in **Appendix A**.

The following First Nations were engaged through the Class EA process and the Archaeological Screening Process:

- Williams Treaties First Nations
  - Chippewas of Beausoleil First Nation
  - Chippewas of Georgina Island
  - Chippewas of Rama First Nation
- Huron-Wendat Nation
- Mississaugas of the Credit First Nations (MCFN)
- Six Nations of the Grand River (SNGR)

3 Indigenous Consultation and Engagement Summary

.

Contact Date (MM-DD-YYYY)	Contact Name / Organization	Comment Summary	Response / Action
07-27-2023	Indigenous Communities	Notice Study Commencement for the Town of Bolton Water and Wastewater improvements Class 'C' EA to the following Indigenous communities: Williams Treaties First Nations o Chippewas of Beausoleil First Nation o Chippewas of Georgina Island o Chippewas of Rama First Nation Huron-Wendat Nation Mississaugas of the Credit First Nations (MCFN) Six Nations of the Grand River (SNGR)	Chippewas of Rama: acknowledged Notice on August 17, 2023, request for Stage 1 Archeology report, advised referring to each nation specifically
11-03-2023	Indigenous Communities	Notice of PIC No. 1 sent to the following Indigenous communities: Williams Treaties First Nations o Chippewas of Beausoleil First Nation o Chippewas of Georgina Island o Chippewas of Rama First Nation Huron-Wendat Nation Mississaugas of the Credit First Nations (MCFN) Six Nations of the Grand River (SNGR)	Huron-Wendat: acknowledged email on November 7, 2023, no questions/concerns, continue to update as project progresses or if any archaeological studies are done.
01-30-2024	Indigenous Communities	Archaeological Screening Process Request for Engagement sent to the following communities: Williams Treaties First Nations o Chippewas of Beausoleil First Nation o Chippewas of Georgina Island o Chippewas of Rama First Nation Huron-Wendat Nation Mississaugas of the Credit First Nations (MCFN) Six Nations of the Grand River (SNGR)	Six Nations of the Grand River (SNGR) email received on January 30, 2024 from the Archaeological Supervisor requesting supporting documentation Region shared Archaeological background with SNGR February 16, 2024 as per below.
02-01-2024	Indigenous Communities	Copy of Stage 1 Archaeological Assessment for the Coleraine Drive Grade Separation PIF #: P243-0349-2017 Copy of Review and Entry into the Ontario Public Register of Archaeological Reports: PIF #: P243-0349-2017, MTCS File Number 0008386 Shared with the following communities: Williams Treaties First Nations	MCFN: acknowledged email on February 2, 2024, no comments/concerns, inquired if there are any environmental studies occurring, request for environmental work. Region emailed reply to MCFN on February 16, 2024, providing further process details and anticipated next steps

Contact Date (MM-DD-YYYY)	Contact Name / Organization	Comment Summary	Response / Action
		o Chippewas of Beausoleil First Nation o Chippewas of Georgina Island o Chippewas of Rama First Nation Huron-Wendat Nation Mississaugas of the Credit First Nations (MCFN) Six Nations of the Grand River (SNGR)	Huron-Wendat: acknowledged email on February 20, 2024, no questions/concerns, continue to update as project progresses or if any archaeological studies are done.

A

TOWN OF BOLTON

WATER AND WASTEWATER CAPACITY IMPROVEMENTS CLASS 'C' EA

APPENDIX A

Indigenous and First Nation - Archaeological Screening Process

TOWN OF BOLTON

WATER AND WASTEWATER CAPACITY IMPROVEMENTS CLASS 'C' EA

Chippewas of Beausoleil First Nation

Julia Rojas-Contento - GM BluePlan

From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Tuesday, January 30, 2024 1:54 PM
To: alewis@chimnissing.ca; lands@chimnissing.ca
Cc: bfnchief@chimnissing.ca; executiveassistant@chimnissing.ca; bfnconsultation@chimnissing.ca; Chris Campbell - GM BluePlan; Julia Rojas-Contento - GM BluePlan
Subject: [EXT] Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Chippewas of Beausoleil First Nation
Attachments: BoltonWBPSArchScreeningLetter_Beausoleil.pdf

EXTERNAL EMAIL

Hello Anthony,

Further to our Project Notification Letter (June 21, 2023) for the Bolton Water and Wastewater Capacity Improvements Class 'C' EA, the Region has identified a new water booster pumping station (WBPS) to support the existing and future servicing needs for the Town of Bolton.

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Further information is available in the letter attached.

We look forward to hearing from you.

Thank you,

Italia Ponce, P.Eng.
Program Manager
Infrastructure Planning-GIS & Data
Region of Peel
10 Peel Centre Dr. Suite A – 4th Floor
Brampton ON L6T 4B9
Office: 905-791-7800 ext.4583
Cell: 647-248-3785

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peelregion.ca

January 30, 2024

Anthony Lewis
Lands Manager
Beausoleil First Nation
11 O'Gemaa Miikaan
Christian Island, ON L9M 0A9

RE: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station - Bolton Water and Wastewater Capacity Improvements Schedule 'C' Class Environmental Assessment (EA)

Background

Further to our Project Notification Letter (June 21, 2023) for the Bolton Water and Wastewater Capacity Improvements Class 'C' EA, the Region has identified a new water booster pumping station (WBPS) to support the existing and future servicing needs for the Town of Bolton. This new project is subject to the new Archaeological Screening Process, to determine potential exemption from the requirements of the *Environmental Assessment Act*. Eligibility for screening under Appendix 1 – Table B of the amended MCEA process is noted below:

> "*5d Construct a new pumping station where the facility is not located in or adjacent to an environmentally sensitive natural area, residential or other sensitive land use, or on land with cultural heritage or archaeological potential.*"

The Region of Peel understands the importance of the Humber River and West Humber Watershed, as well as archaeological resources, to the Indigenous Peoples, in particular, the Mississaugas of the Credit First Nation and the Michi Saagiig Nation. In light of these important features, the Region is seeking feedback as part of the Archaeological Screening Process.

Proposed Preferred Project Site: King Street and Coleraine Drive

The proposed project site is in the Town of Bolton located in Caledon, within the Region of Peel. The area is generally situated along Coleraine Drive from approximately 250 metres northwest of King Street West to approximately 100 metres southeast of Holland Drive (**Figure attached**). The majority of the study area is located within the West Humber Watershed, and its various stream corridors.



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Minimizing Potential Impacts

A shortlist of potential sites (seven total) were evaluated. Through the MCEA process, this evaluation considered five key criteria—natural environment, social-cultural heritage, jurisdictional, financial, and technical considerations to select the best site, while minimizing impacts to Indigenous Rights Holders, the community and the environment. This includes impacts to watercourses, sensitive natural features, drinking water, wildlife habitat, endangered species, archaeological resources, and climate change. The following principles are driving the evaluation:

- Avoid natural areas of significance,
- Avoid areas where archaeological resources have been identified,
- Select routes/sites for water infrastructure within or adjacent to the road right-of-way, and,
- Minimize impacts to drinking water by avoiding wellhead protection areas (WHPAs) where possible, or otherwise recommend the development of a risk management plan.

Based on information available, Site #3 at King Street and Coleraine Drive is recommended for having the least natural environment and social-cultural heritage impacts, while being technically feasible. The following highlights its candidacy for exemption:

- Previously screened through a Stage 1 Archeaological Assessment for the Coleraine Drive Grade Separation project (PIF P243-0349-2017 filed with the MTCS and entered into the registry April 27, 2018). The stage 1 results of this report highlighted no further archaelological assessment required. A copy of this report is attacched for your reference.
- Avoids significant natural environmental features (i.e. creeks, rivers, wetlands).
- Located in a central-urban area that has previously been, and currently functions mainly as a former road right-of-way.
- Has not been identified as a sensitive land use, and is adjacent to planned road improvements including grade separation and roundabouts.

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- Located in an optimal technical location for connecting to existing infrastructure and for extending new watermain infrastructure within the existing road right-of-way, without requiring disturbance of additional land outside of the road right-of-way.

Based on the new Archaeological Screening Process as per the amended MCEA process, the Region believes in principle that the new Bolton Zone 7 Water Booster Pumping Station and the proposed preferred site—Site 3 at King Street and Coleraine Drive—meets the criteria to be exempt from the *Environmental Assessment Act*.

Please let us know of any fees and/or contracts and any other logistics required to be completed for your participation. Should you have any questions about the project, please do not hesitate to contact us.

Sincerely,



Italia Ponce, P.Eng., Project Manager
Region of Peel
10 Peel Centre Drive, Suite A, 4th Floor
Brampton, ON, L6T 4B9
Tel: 905-791-7800 ext. 4583
Email: italia.ponce@peelregion.ca

For more information on this study, please visit the Region's website at: www.peelregion.ca/public-works/environmental-assessments/#current (Caledon)

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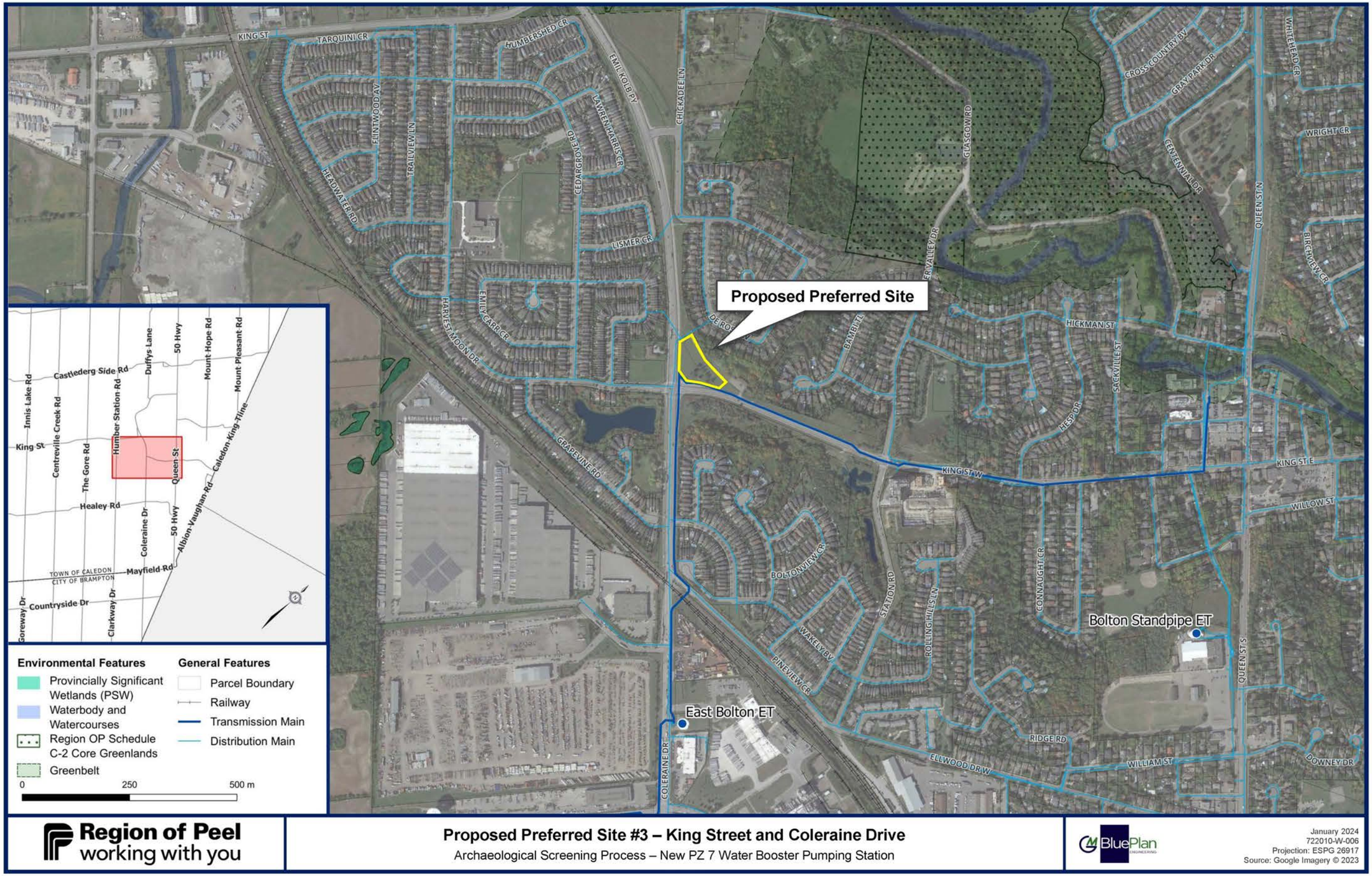


Figure 1: Proposed Preferred Site Location for the New Zone 7 Water Booster Pumping Station

Julia Rojas-Contento - GM BluePlan

From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Thursday, February 01, 2024 1:05 PM
To: alewis@chimnissing.ca; lands@chimnissing.ca
Cc: bfnchief@chimnissing.ca; executiveassistant@chimnissing.ca; bfnconsultation@chimnissing.ca; Chris Campbell - GM BluePlan; Julia Rojas-Contento - GM BluePlan
Subject: [EXT] RE: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Chippewas of Beausoleil First Nation

EXTERNAL EMAIL

Hello Anthony
Further to my previous email sent January 30th regarding the request for feedback as part of the archeological screening process for the new water booster stations in the Town of Bolton, attached is the link to the archeological report which includes our preliminary proposed site. Archeological Screening_Bolton Booster

The report was approved by the Ministry in April 2018 and entered into the Ontario Public Register of Archaeological Reports. As we mentioned, we are seeking feedback or any information including potential impacts to Inherent, Aboriginal and Treaty rights, known archaeological resources, or areas and/or species of cultural significance, that could be considered and/or incorporated, as appropriate, into the assessment of potential impacts.

We would kindly request that feedback be submitted by February 22, 2024; however if additional time is required please let us know. Also if there are no additional comments or feedback, we kindly ask you to let us know. We appreciate your contribution to this project at any level you can provide.

Thank you for your ongoing support and understanding.

Thanks,

Italia Ponce, P.Eng.
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http://www.peelregion.ca/corpserv/10pcd-expansion/map.htm

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Sent: Tuesday, January 30, 2024 1:54 PM
To: alewis@chimnissing.ca; lands@chimnissing.ca
Cc: bfnchief@chimnissing.ca; executiveassistant@chimnissing.ca; bfnconsultation@chimnissing.ca; chris.campbell@gmblueplan.ca; julia.rojas-contento@gmblueplan.ca
Subject: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Chippewas of Beausoleil First Nation

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TOWN OF BOLTON

WATER AND WASTEWATER CAPACITY IMPROVEMENTS CLASS 'C' EA

Chippewas of Georgina Island First Nation (CGIFN)

Julia Rojas-Contento - GM BluePlan

From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Tuesday, January 30, 2024 1:54 PM
To: sylvia.mccue@georginaisland.com
Cc: jil.porte@georginaisland.com; Chris Campbell - GM BluePlan; Julia Rojas-Contento - GM BluePlan
Subject: [EXT] Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Chippewas of Georgina
Attachments: BoltonWBPSArchScreeningLetter_Chippewas of Georgina.pdf

EXTERNAL EMAIL

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January 30, 2024

Sylvia McCue
Lands Manager
Chippewas of Georgina Island First Nation
R.R. #2 Box N-13
Sutton West, ON L0E 1R0

RE: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station - Bolton Water and Wastewater Capacity Improvements Schedule 'C' Class Environmental Assessment (EA)

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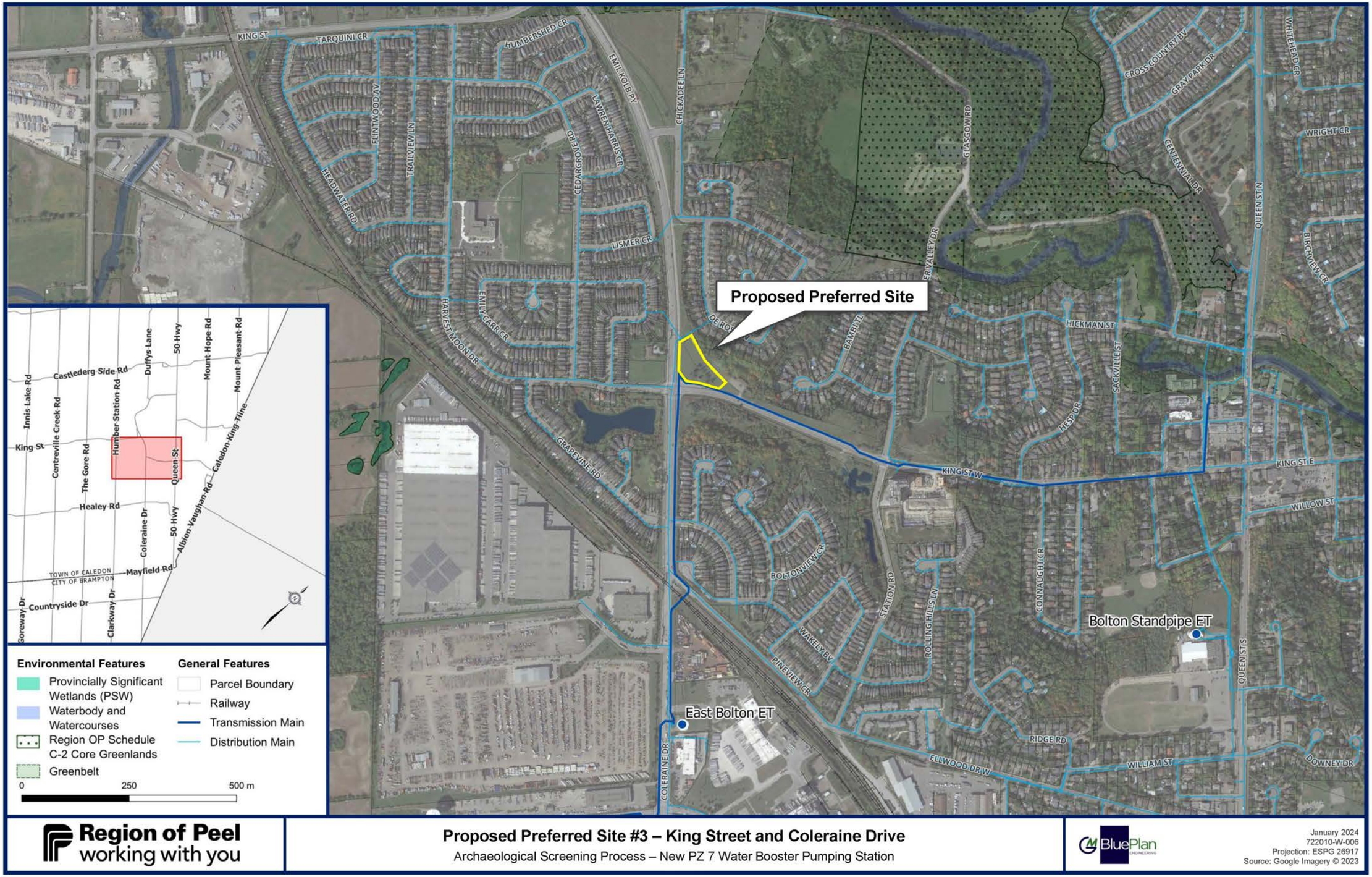


Figure 1: Proposed Preferred Site Location for the New Zone 7 Water Booster Pumping Station

Julia Rojas-Contento - GM BluePlan

From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Thursday, February 01, 2024 1:09 PM
To: sylvia.mccue@georginaisland.com
Cc: jil.porte@georginaisland.com; Chris Campbell - GM BluePlan; Julia Rojas-Contento - GM BluePlan
Subject: [EXT] RE: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Chippewas of Georgina

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http://www.peelregion.ca/corpserv/10pcd-expansion/map.htm

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To: sylvia.mccue@georginaisland.com
Cc: jil.porte@georginaisland.com; chris.campbell@gmblueplan.ca; Julia Rojas-Contento - GM BluePlan <julia.rojas-contento@gmblueplan.ca>
Subject: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Chippewas of Georgina

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TOWN OF BOLTON

WATER AND WASTEWATER CAPACITY IMPROVEMENTS CLASS 'C' EA

Chippewas of Rama First Nation

Julia Rojas-Contento - GM BluePlan

From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Tuesday, January 30, 2024 1:55 PM
To: evelynb@ramafirstnation.ca
Cc: barbs@ramafirstnation.ca; lands@ramafirstnation.ca; communications@ramafirstnation.ca; Chris Campbell - GM BluePlan; Julia Rojas-Contento - GM BluePlan
Subject: [EXT] Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Chippewas of Rama
Attachments: BoltonWBPSArchScreeningLetter_Chippewas of Rama.pdf

EXTERNAL EMAIL

Hello Evelyn,

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January 30, 2024

Evelyn Bell
Chief Administrative Officer
Chippewas of Rama First Nation
5886 Rama Road, Suite 200
Rama, ON L3V 6H6

RE: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station - Bolton Water and Wastewater Capacity Improvements Schedule 'C' Class Environmental Assessment (EA)

Background

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A shortlist of potential sites (seven total) were evaluated. Through the MCEA process, this evaluation considered five key criteria—natural environment, social-cultural heritage, jurisdictional, financial, and technical considerations to select the best site, while minimizing impacts to Indigenous Rights Holders, the community and the environment. This includes impacts to watercourses, sensitive natural features, drinking water, wildlife habitat, endangered species, archaeological resources, and climate change. The following principles are driving the evaluation:

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- Avoids significant natural environmental features (i.e. creeks, rivers, wetlands).
- Located in a central-urban area that has previously been, and currently functions mainly as a former road right-of-way.
- Has not been identified as a sensitive land use, and is adjacent to planned road improvements including grade separation and roundabouts.

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L6T 4B9
tel: 905-791-7800

peelregion.ca

- Located in an optimal technical location for connecting to existing infrastructure and for extending new watermain infrastructure within the existing road right-of-way, without requiring disturbance of additional land outside of the road right-of-way.

Based on the new Archaeological Screening Process as per the amended MCEA process, the Region believes in principle that the new Bolton Zone 7 Water Booster Pumping Station and the proposed preferred site—Site 3 at King Street and Coleraine Drive—meets the criteria to be exempt from the *Environmental Assessment Act*.

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Region of Peel
10 Peel Centre Drive, Suite A, 4th Floor
Brampton, ON, L6T 4B9
Tel: 905-791-7800 ext. 4583
Email: italia.ponce@peelregion.ca

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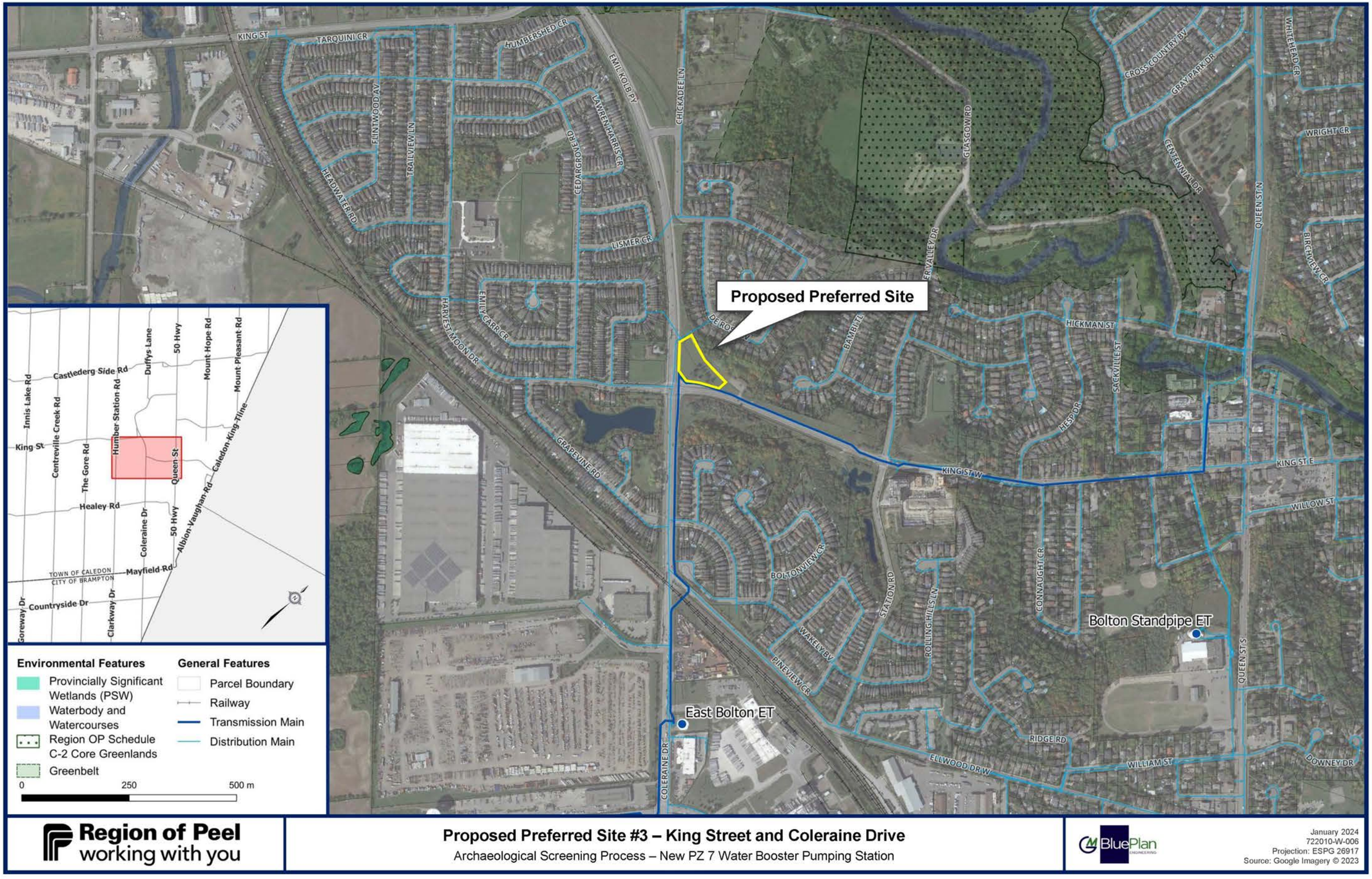


Figure 1: Proposed Preferred Site Location for the New Zone 7 Water Booster Pumping Station

Julia Rojas-Contento - GM BluePlan

From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Thursday, February 01, 2024 1:12 PM
To: evelynb@ramafirstnation.ca
Cc: barbs@ramafirstnation.ca; lands@ramafirstnation.ca; communications@ramafirstnation.ca; Chris Campbell - GM BluePlan; Julia Rojas-Contento - GM BluePlan
Subject: [EXT] RE: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Chippewas of Rama

EXTERNAL EMAIL

Hello Evelyn,
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Subject: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Chippewas of Rama

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TOWN OF BOLTON

WATER AND WASTEWATER CAPACITY IMPROVEMENTS CLASS 'C' EA

Huron-Wendat First Nation

Julia Rojas-Contento - GM BluePlan

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Sent: Tuesday, January 30, 2024 1:55 PM
To: Dominic Ste-Marie
Cc: lori-jeanne.bolduc@wendake.ca; louis.lesage@wendake.ca; tina.durand@cnhw.qc.ca; mario.groslouis@wendake.ca; Chris Campbell - GM BluePlan; Julia Rojas-Contento - GM BluePlan
Subject: [EXT] Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Huron Wendat
Attachments: BoltonWBPSArchScreeningLetter_Huron-Wendat.pdf

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January 30, 2024

Dominic Ste-Marie
Huron-Wendat Nation
255, place Chef Michel Laveau
Wendake, QC G0A 4V0

RE: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station - Bolton Water and Wastewater Capacity Improvements Schedule 'C' Class Environmental Assessment (EA)

Background

Further to our Project Notification Letter (June 21, 2023) for the Bolton Water and Wastewater Capacity Improvements Class 'C' EA, the Region has identified a new water booster pumping station (WBPS) to support the existing and future servicing needs for the Town of Bolton. This new project is subject to the new Archaeological Screening Process, to determine potential exemption from the requirements of the *Environmental Assessment Act*. Eligibility for screening under Appendix 1 – Table B of the amended MCEA process is noted below:

> "*5d Construct a new pumping station where the facility is not located in or adjacent to an environmentally sensitive natural area, residential or other sensitive land use, or on land with cultural heritage or archaeological potential.*"

The Region of Peel understands the importance of the Humber River and West Humber Watershed, as well as archaeological resources, to the Indigenous Peoples, in particular, the Mississaugas of the Credit First Nation and the Michi Saagiig Nation. In light of these important features, the Region is seeking feedback as part of the Archaeological Screening Process.

Proposed Preferred Project Site: King Street and Coleraine Drive

The proposed project site is in the Town of Bolton located in Caledon, within the Region of Peel. The area is generally situated along Coleraine Drive from approximately 250 metres northwest of King Street West to approximately 100 metres southeast of Holland Drive (**Figure attached**). The majority of the study area is located within the West Humber Watershed, and its various stream corridors.



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We Value Your Knowledge

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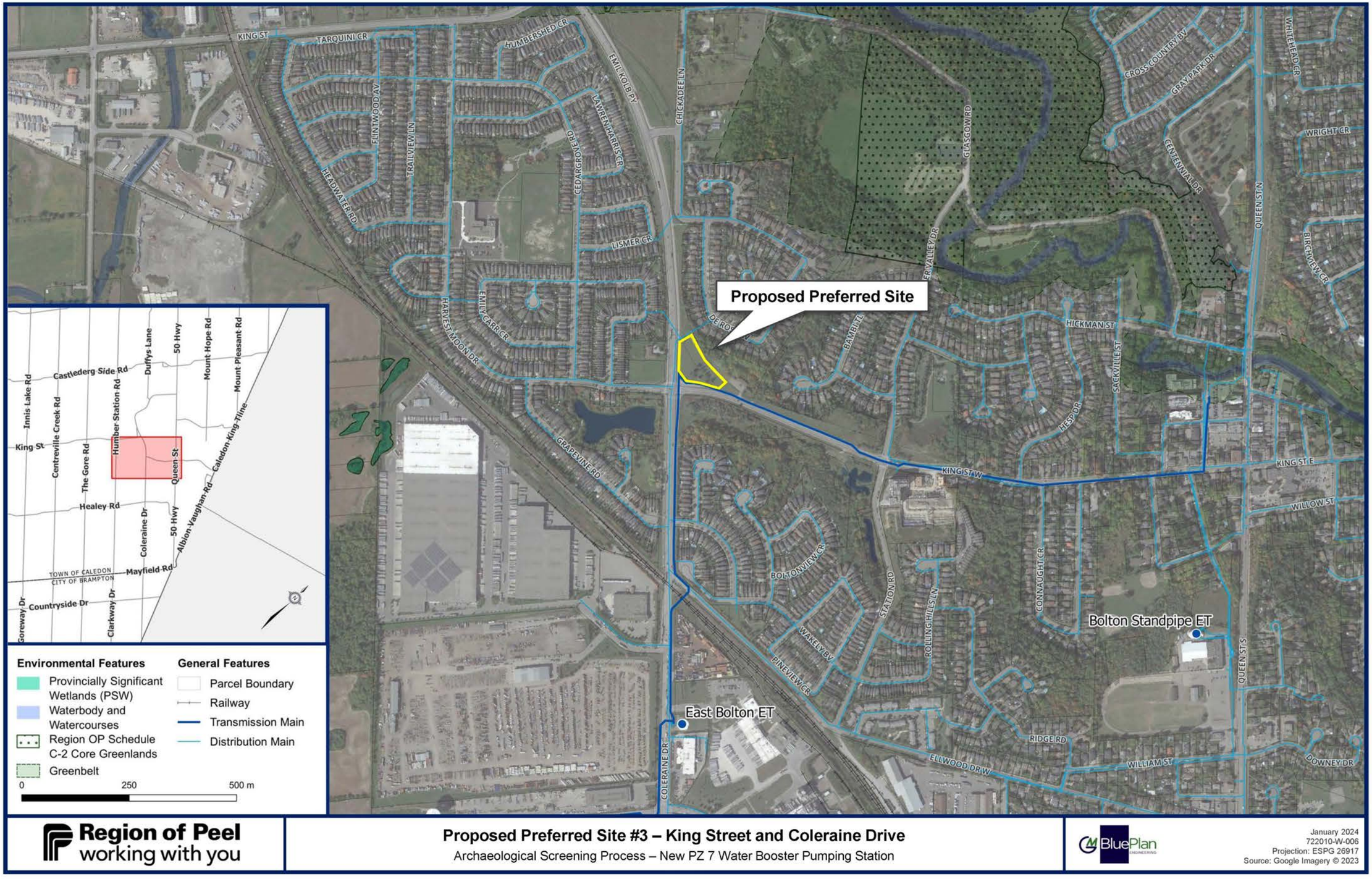


Figure 1: Proposed Preferred Site Location for the New Zone 7 Water Booster Pumping Station

Julia Rojas-Contento - GM BluePlan

From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Thursday, February 01, 2024 1:14 PM
To: Dominic Ste-Marie
Cc: lori-jeanne.bolduc@wendake.ca; louis.lesage@wendake.ca; tina.durand@cnhw.qc.ca; mario.groslouis@wendake.ca; Chris Campbell - GM BluePlan; Julia Rojas-Contento - GM BluePlan
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From: Dominic Ste-Marie <Dominic.Sainte-Marie@wendake.ca>
Sent: Tuesday, February 20, 2024 8:49 AM
To: Ponce Vanelli, Italia
Cc: Lori-Jeanne Bolduc; Mario Gros Louis; Chris Campbell - GM BluePlan; Julia Rojas-Contento - GM BluePlan; Dominique Lesage
Subject: [EXT] RE: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Huron Wendat

EXTERNAL EMAIL

Kwe Italia,

Thank you for your email. We don't have any comments at this point. Please keep us updated about any new project or archaeological studies and fieldwork.

Tiawenhk chia' önenh
Dominic Ste-Marie
NATION HURONNE-WENDAT
Bureau du Nionwentsïo

Dominic Ste-Marie
Conseiller en Gestion du Territoire

255, place Chef Michel Laveau
Wendake (QC) G0A 4V0
T : 418 843-3767
@ : dominic.ste-marie @wendake.ca
WENDAKE.CA

De : Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Envoyé : 1 février 2024 13:14
À : Dominic Ste-Marie <Dominic.Sainte-Marie@wendake.ca>
Cc : Lori-Jeanne Bolduc <Lori-Jeanne.Bolduc@wendake.ca>; Louis Lesage <Louis.Lesage@wendake.ca>; Tina Durand <Tina.Durand@wendake.ca>; Mario Gros Louis <Mario.GrosLouis@wendake.ca>; chris.campbell@gmblueplan.ca; Julia Rojas-Contento - GM BluePlan <julia.rojas-contento@gmblueplan.ca>
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TOWN OF BOLTON

WATER AND WASTEWATER CAPACITY IMPROVEMENTS CLASS 'C' EA

Mississaugas of the Credit First Nation (MCFN)

Julia Rojas-Contento - GM BluePlan

From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Tuesday, January 30, 2024 1:54 PM
To: Mark.laforme@mncfn.ca
Cc: abby.laforme@mncfn.ca; adam.laforme@mncfn.ca; MCFN.consultation@mncfn.ca; Chris Campbell - GM BluePlan; Julia Rojas-Contento - GM BluePlan
Subject: [EXT] Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_MCFN
Attachments: BoltonWBPSArchScreeningLetter_MCFN.pdf

EXTERNAL EMAIL

Hello Mark,

Further to our Project Notification Letter (June 21, 2023) for the Bolton Water and Wastewater Capacity Improvements Class 'C' EA, the Region has identified a new water booster pumping station (WBPS) to support the existing and future servicing needs for the Town of Bolton.

The Region is seeking feedback as part of the Archaeological Screening Process. We kindly request for any information, including potential impacts to Inherent, Aboriginal and Treaty rights, known archaeological resources, or areas and/or species of cultural significance, that could be considered and/or incorporated, as appropriate, into the assessment of potential impacts.

Further information is available in the letter attached.

We look forward to hearing from you.

Thank you,

Italia Ponce, P.Eng.
Program Manager
Infrastructure Planning-GIS & Data
Region of Peel
10 Peel Centre Dr. Suite A – 4th Floor
Brampton ON L6T 4B9
Office: 905-791-7800 ext.4583
Cell: 647-248-3785

Region of Peel
working with you

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Public Works

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L6T 4B9
tel: 905-791-7800

peelregion.ca

January 30, 2024

Mark LaForme
Mississaugas of the Credit First Nation
4065 Hwy 6
Hagersville, ON N0A 1H0

RE: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station - Bolton Water and Wastewater Capacity Improvements Schedule 'C' Class Environmental Assessment (EA)

Background

Further to our Project Notification Letter (June 21, 2023) for the Bolton Water and Wastewater Capacity Improvements Class 'C' EA, the Region has identified a new water booster pumping station (WBPS) to support the existing and future servicing needs for the Town of Bolton. This new project is subject to the new Archaeological Screening Process, to determine potential exemption from the requirements of the *Environmental Assessment Act*. Eligibility for screening under Appendix 1 – Table B of the amended MCEA process is noted below:

> "*5d Construct a new pumping station where the facility is not located in or adjacent to an environmentally sensitive natural area, residential or other sensitive land use, or on land with cultural heritage or archaeological potential.*"

The Region of Peel understands the importance of the Humber River and West Humber Watershed, as well as archaeological resources, to the Indigenous Peoples, in particular, the Mississaugas of the Credit First Nation and the Michi Saagiig Nation. In light of these important features, the Region is seeking feedback as part of the Archaeological Screening Process.

Proposed Preferred Project Site: King Street and Coleraine Drive

The proposed project site is in the Town of Bolton located in Caledon, within the Region of Peel. The area is generally situated along Coleraine Drive from approximately 250 metres northwest of King Street West to approximately 100 metres southeast of Holland Drive (**Figure attached**). The majority of the study area is located within the West Humber Watershed, and its various stream corridors.



As per the Freedom of Information and Protection of Privacy Act, 1990, all comments, with the exception of personal information and confidential information from Indigenous Peoples, will become part of the public record of the study. The study is being conducted according to the requirements of the Municipal Class Environmental Assessment, which is a planning process approved under Ontario's Environmental Assessment Act.

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We Value Your Knowledge

The Region of Peel recognizes it does not have the adequate or complete knowledge to properly complete the Archaeological Screening Process without appropriate engagement with Indigenous Rights Holders and Interest Holders. In relation to the proposed project, we kindly request for any information, including potential impacts to Inherent, Aboriginal and Treaty rights, known archaeological resources, or areas and/or species of cultural significance, that could be considered and/or incorporated, as appropriate, into the assessment of potential impacts.

Minimizing Potential Impacts

A shortlist of potential sites (seven total) were evaluated. Through the MCEA process, this evaluation considered five key criteria—natural environment, social-cultural heritage, jurisdictional, financial, and technical considerations to select the best site, while minimizing impacts to Indigenous Rights Holders, the community and the environment. This includes impacts to watercourses, sensitive natural features, drinking water, wildlife habitat, endangered species, archaeological resources, and climate change. The following principles are driving the evaluation:

- Avoid natural areas of significance,
- Avoid areas where archaeological resources have been identified,
- Select routes/sites for water infrastructure within or adjacent to the road right-of-way, and,
- Minimize impacts to drinking water by avoiding wellhead protection areas (WHPAs) where possible, or otherwise recommend the development of a risk management plan.

Based on information available, Site #3 at King Street and Coleraine Drive is recommended for having the least natural environment and social-cultural heritage impacts, while being technically feasible. The following highlights its candidacy for exemption:

- Previously screened through a Stage 1 Archeaological Assessment for the Coleraine Drive Grade Separation project (PIF P243-0349-2017 filed with the MTCS and entered into the registry April 27, 2018). The stage 1 results of this report highlighted no further archaelological assessment required. A copy of this report is attacched for your reference.
- Avoids significant natural environmental features (i.e. creeks, rivers, wetlands).
- Located in a central-urban area that has previously been, and currently functions mainly as a former road right-of-way.
- Has not been identified as a sensitive land use, and is adjacent to planned road improvements including grade separation and roundabouts.

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- Located in an optimal technical location for connecting to existing infrastructure and for extending new watermain infrastructure within the existing road right-of-way, without requiring disturbance of additional land outside of the road right-of-way.

Based on the new Archaeological Screening Process as per the amended MCEA process, the Region believes in principle that the new Bolton Zone 7 Water Booster Pumping Station and the proposed preferred site—Site 3 at King Street and Coleraine Drive—meets the criteria to be exempt from the *Environmental Assessment Act*.

Please let us know of any fees and/or contracts and any other logistics required to be completed for your participation. Should you have any questions about the project, please do not hesitate to contact us.

Sincerely,

Italia Ponce, P.Eng., Project Manager
Region of Peel
10 Peel Centre Drive, Suite A, 4th Floor
Brampton, ON, L6T 4B9
Tel: 905-791-7800 ext. 4583
Email: italia.ponce@peelregion.ca

For more information on this study, please visit the Region's website at: www.peelregion.ca/public-works/environmental-assessments/#current (Caledon)

The Region of Peel is committed to ensure that all regional services, programs, and facilities are inclusive and accessible. Please contact the Project Manager if you need any accommodations to provide comments and/or feedback for this study.

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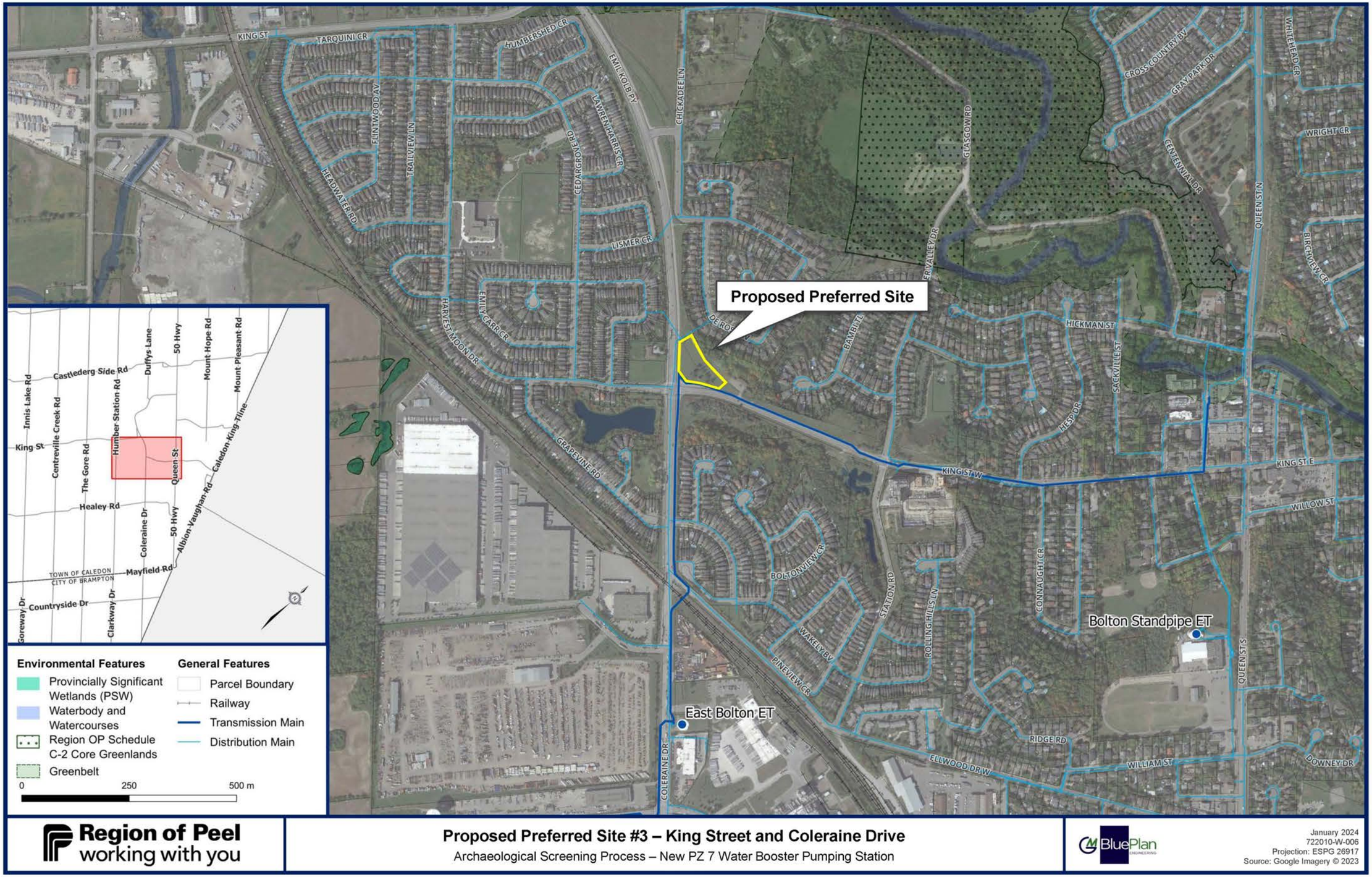


Figure 1: Proposed Preferred Site Location for the New Zone 7 Water Booster Pumping Station

Julia Rojas-Contento - GM BluePlan

From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Thursday, February 01, 2024 1:15 PM
To: Mark.laforme@mncfn.ca
Cc: abby.laforme@mncfn.ca; adam.laforme@mncfn.ca; MCFN.consultation@mncfn.ca; Chris Campbell - GM BluePlan; Julia Rojas-Contento - GM BluePlan
Subject: [EXT] RE: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_MCFN

EXTERNAL EMAIL

Hello Mark,

Further to our previous email sent January 30th regarding the request for feedback as part of the archeological screening process for the new water booster stations in the Town of Bolton, attached is the link to the archeological report which includes our preliminary proposed site. Archeological Screening_Bolton Booster

The report was approved by the Ministry in April 2018 and entered into the Ontario Public Register of Archaeological Reports. As we mentioned, we are seeking feedback or any information including potential impacts to Inherent, Aboriginal and Treaty rights, known archaeological resources, or areas and/or species of cultural significance, that could be considered and/or incorporated, as appropriate, into the assessment of potential impacts.

We would kindly request that feedback be submitted by February 22, 2024; however, if additional time is required please let us know. Also if there are no additional comments or feedback, we kindly ask you to let us know. We appreciate your contribution to this project at any level you can provide.

Thank you for your ongoing support and understanding.

Thanks,

Italia Ponce, P.Eng.
Program Manager
Infrastructure Planning-GIS & Data
Region of Peel
10 Peel Centre Dr. Suite A – 4th Floor
Brampton ON L6T 4B9
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http://www.peelregion.ca/corpserv/10pcd-expansion/map.htm

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To: Mark.laforme@mncfn.ca
Cc: abby.laforme@mncfn.ca; adam.laforme@mncfn.ca; MCFN.consultation@mncfn.ca; chris.campbell@gmblueplan.ca; julia.rojas-contento@gmblueplan.ca
Subject: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_MCFN

Hello Mark,

Further to our Project Notification Letter (June 21, 2023) for the Bolton Water and Wastewater Capacity Improvements Class 'C' EA, the Region has identified a new water booster pumping station (WBPS) to support the existing and future servicing needs for the Town of Bolton.

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Further information is available in the letter attached.

We look forward to hearing from you.

Thank you,

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Julia Rojas-Contento - GM BluePlan

From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Friday, February 16, 2024 1:11 PM
To: Abby LaForme
Cc: Adam LaForme; Chris Campbell - GM BluePlan; Julia Rojas-Contento - GM BluePlan
Subject: [EXT] FW: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_MCFN

EXTERNAL EMAIL

Good Day Abby

Thank you for your email regarding the New Bolton Zone 7 Water Booster Pumping Station. The screening process outlined in our earlier correspondence is relatively new and thus I have provided a link to the new guidance below and trust the following is further helpful supplementary information . The Archaeological Screening Process was recently added to the Municipal Engineers Association Municipal Class Environmental Assessment procedural manual published in March 2023. The March 2023 edition incorporated all approved amendments to the Municipal Class Environment and superseded previous editions published in 2000, 2007, 2011 and 2015. Based on input from Indigenous communities and the Ministry of Citizenship and Multiculturalism, the Ministry of the Environment, Conservation and Parks incorporated a new archaeological screening process that proponents such as the Region of Peel can complete to determine if a low-risk project is exempt from the Environmental Assessment Act.

Class EA for Municipal Infrastructure Projects | ontario.ca

As per Appendix 1, Table B Municipal Class Environmental Assessment 2023: Municipal Water and Wastewater Project Description, the proposed new Bolton Zone 7 water Booster Pumping Station and site selection aligns with Project Description 5d described as "*Construct a new pumping station where the facility is not located in or adjacent to an environmentally sensitive natural area, residential or other sensitive land use, or on land with cultural heritage or archaeological potential*".

Subject to gathering and considering further information from Indigenous Communities and stakeholders the Region believes that the project meets the eligibility for exemption based on the following available information as outlined in the letter of the 30th January, 2024:

Site #3 at King Street and Coleraine Drive is a candidacy for exemption because the site:

- Was previously screened through a Stage 1 Archeaological Assessment for the Coleraine Drive Grade Separation project (PIF P243-0349-2017 filed with the MTCS and entered into the registry April 27, 2018). The stage 1 results of this report highlighted no further archaelological assessment required. A copy of this report was previously provided.
- Avoids significant natural environmental features (i.e. creeks, rivers, wetlands). Site is a former road right-of-way now grassed area with several streetscape trees
- Located in a central-urban area that has previously been, and currently functions mainly as a former road right-of-way.

- Has not been identified as a sensitive land use, and is adjacent to planned road improvements including grade separation and roundabouts.

If no further information is submitted, the Region will request to the Ministry of the Environment, Conservation and Parks their approval for exemption. Upon the Ministries approval the Region will move ahead with detailed design and relevant Planning Act approvals but would be exempt from the Environmental Assessment Act.

In response to your question regarding environmental studies, based on the steps outlined above, the avoidance of significant environmental features and subject to being exempt from the EAA it is expected that the detailed design and approvals stage would include geotechnical and hydrological investigations, supplementary contamination testing as required, a review of impact and mitigation plan for any streetscape trees impacted and any other requirements as determined to meet planning approvals under the Planning Act.

Should you have further questions are wish to discuss the process I would be happy to give you a call or set up a meeting.

Thanks,

Italia Ponce, P.Eng.
Program Manager
Infrastructure Planning-GIS & Data
Region of Peel
10 Peel Centre Dr. Suite A – 4th Floor
Brampton ON L6T 4B9
Office: 905-791-7800 ext.4583
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http://www.peelregion.ca/corpserv/10pcd-expansion/map.htm

From: Abby LaForme <Abby.LaForme@mncfn.ca>
Sent: Friday, February 2, 2024 9:22 AM
To: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>; Mark LaForme <Mark.LaForme@mncfn.ca>
Cc: Adam LaForme <Adam.LaForme@mncfn.ca>; chris.campbell@gmblueplan.ca; Julia Rojas-Contento - GM BluePlan <julia.rojas-contento@gmblueplan.ca>
Subject: RE: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_MCFN

CAUTION: EXTERNAL MAIL. DO NOT CLICK ON LINKS OR OPEN ATTACHMENTS YOU DO NOT TRUST.

Good Morning Italia,

Thank you for providing the information regarding the Archaeological report. MCFN DOCA Archaeological Operations Supervisor has no comments or concerns regarding the archaeological studies that took place.
I do have a question regarding if there are any environmental studies taking place for this project?

If you could forward any information regarding any environmental work, that would be very helpful.

Thank you

Abby (LaForme) Lee
Acting Consultation Coordinator

Mississaugas of the Credit First Nation (MCFN)
Department of Consultation & Accommodation (DOCA)
4065 Highway 6, Hagersville, ON N0A 1H0
Ph: (905) 768 – 4260
Email: Abby.LaForme@mncfn.ca

Please Note- If a digital copy of your notification has been sent, please be environmentally conscious and do not send a physical, copy. Thank you!

From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Thursday, February 1, 2024 1:15 PM
To: Mark LaForme <Mark.LaForme@mncfn.ca>
Cc: Abby LaForme <Abby.LaForme@mncfn.ca>; Adam LaForme <Adam.LaForme@mncfn.ca>; MCFN.Consultation <MCFN.Consultation@mncfn.ca>; chris.campbell@gmblueplan.ca; Julia Rojas-Contento - GM BluePlan <julia.rojas-contento@gmblueplan.ca>
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Subject: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_MCFN

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TOWN OF BOLTON

WATER AND WASTEWATER CAPACITY IMPROVEMENTS CLASS 'C' EA

Six Nations of the Grand River (SNGR)

Julia Rojas-Contento - GM BluePlan

From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Tuesday, January 30, 2024 1:54 PM
To: lonnybomberry@sixnations.ca
Cc: LRCS@sixnations.ca; lrluo2@sixnations.ca; dlaforme@sixnations.ca; dawnrussell@sixnations.ca; Chris Campbell - GM BluePlan; Julia Rojas-Contento - GM BluePlan
Subject: [EXT] Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Six Nations
Attachments: BoltonWBPSArchScreeningLetter_Six Nations.pdf

EXTERNAL EMAIL

Hello Lonny,

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January 30, 2024

Lonny Bomberry
Lands and Resources Director
Six Nations of the Grand River
1695 Chiefswood Road., P.O. Box 5000
Ohsweken, ON N0A 1M0

RE: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station - Bolton Water and Wastewater Capacity Improvements Schedule 'C' Class Environmental Assessment (EA)

Background

Further to our Project Notification Letter (June 21, 2023) for the Bolton Water and Wastewater Capacity Improvements Class 'C' EA, the Region has identified a new water booster pumping station (WBPS) to support the existing and future servicing needs for the Town of Bolton. This new project is subject to the new Archaeological Screening Process, to determine potential exemption from the requirements of the *Environmental Assessment Act*. Eligibility for screening under Appendix 1 – Table B of the amended MCEA process is noted below:

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The Region of Peel understands the importance of the Humber River and West Humber Watershed, as well as archaeological resources, to the Indigenous Peoples, in particular, the Mississaugas of the Credit First Nation and the Michi Saagiig Nation. In light of these important features, the Region is seeking feedback as part of the Archaeological Screening Process.

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The proposed project site is in the Town of Bolton located in Caledon, within the Region of Peel. The area is generally situated along Coleraine Drive from approximately 250 metres northwest of King Street West to approximately 100 metres southeast of Holland Drive (**Figure attached**). The majority of the study area is located within the West Humber Watershed, and its various stream corridors.



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- Avoid natural areas of significance,
- Avoid areas where archaeological resources have been identified,
- Select routes/sites for water infrastructure within or adjacent to the road right-of-way, and,
- Minimize impacts to drinking water by avoiding wellhead protection areas (WHPAs) where possible, or otherwise recommend the development of a risk management plan.

Based on information available, Site #3 at King Street and Coleraine Drive is recommended for having the least natural environment and social-cultural heritage impacts, while being technically feasible. The following highlights its candidacy for exemption:

- Previously screened through a Stage 1 Archeaological Assessment for the Coleraine Drive Grade Separation project (PIF P243-0349-2017 filed with the MTCS and entered into the registry April 27, 2018). The stage 1 results of this report highlighted no further archaelological assessment required. A copy of this report is attacched for your reference.
- Avoids significant natural environmental features (i.e. creeks, rivers, wetlands).
- Located in a central-urban area that has previously been, and currently functions mainly as a former road right-of-way.
- Has not been identified as a sensitive land use, and is adjacent to planned road improvements including grade separation and roundabouts.

As per the Freedom of Information and Protection of Privacy Act, 1990, all comments, with the exception of personal information and confidential information from Indigenous Peoples, will become part of the public record of the study. The study is being conducted according to the requirements of the Municipal Class Environmental Assessment, which is a planning process approved under Ontario's Environmental Assessment Act.

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Public Works

10 Peel Centre Dr.
Suite A
Brampton, ON
L6T 4B9
tel: 905-791-7800

peelregion.ca

- Located in an optimal technical location for connecting to existing infrastructure and for extending new watermain infrastructure within the existing road right-of-way, without requiring disturbance of additional land outside of the road right-of-way.

Based on the new Archaeological Screening Process as per the amended MCEA process, the Region believes in principle that the new Bolton Zone 7 Water Booster Pumping Station and the proposed preferred site—Site 3 at King Street and Coleraine Drive—meets the criteria to be exempt from the *Environmental Assessment Act*.

Please let us know of any fees and/or contracts and any other logistics required to be completed for your participation. Should you have any questions about the project, please do not hesitate to contact us.

Sincerely,

Italia Ponce, P.Eng., Project Manager
Region of Peel
10 Peel Centre Drive, Suite A, 4th Floor
Brampton, ON, L6T 4B9
Tel: 905-791-7800 ext. 4583
Email: italia.ponce@peelregion.ca

For more information on this study, please visit the Region's website at: www.peelregion.ca/public-works/environmental-assessments/#current (Caledon)

The Region of Peel is committed to ensure that all regional services, programs, and facilities are inclusive and accessible. Please contact the Project Manager if you need any accommodations to provide comments and/or feedback for this study.

As per the Freedom of Information and Protection of Privacy Act, 1990, all comments, with the exception of personal information and confidential information from Indigenous Peoples, will become part of the public record of the study. The study is being conducted according to the requirements of the Municipal Class Environmental Assessment, which is a planning process approved under Ontario's Environmental Assessment Act.

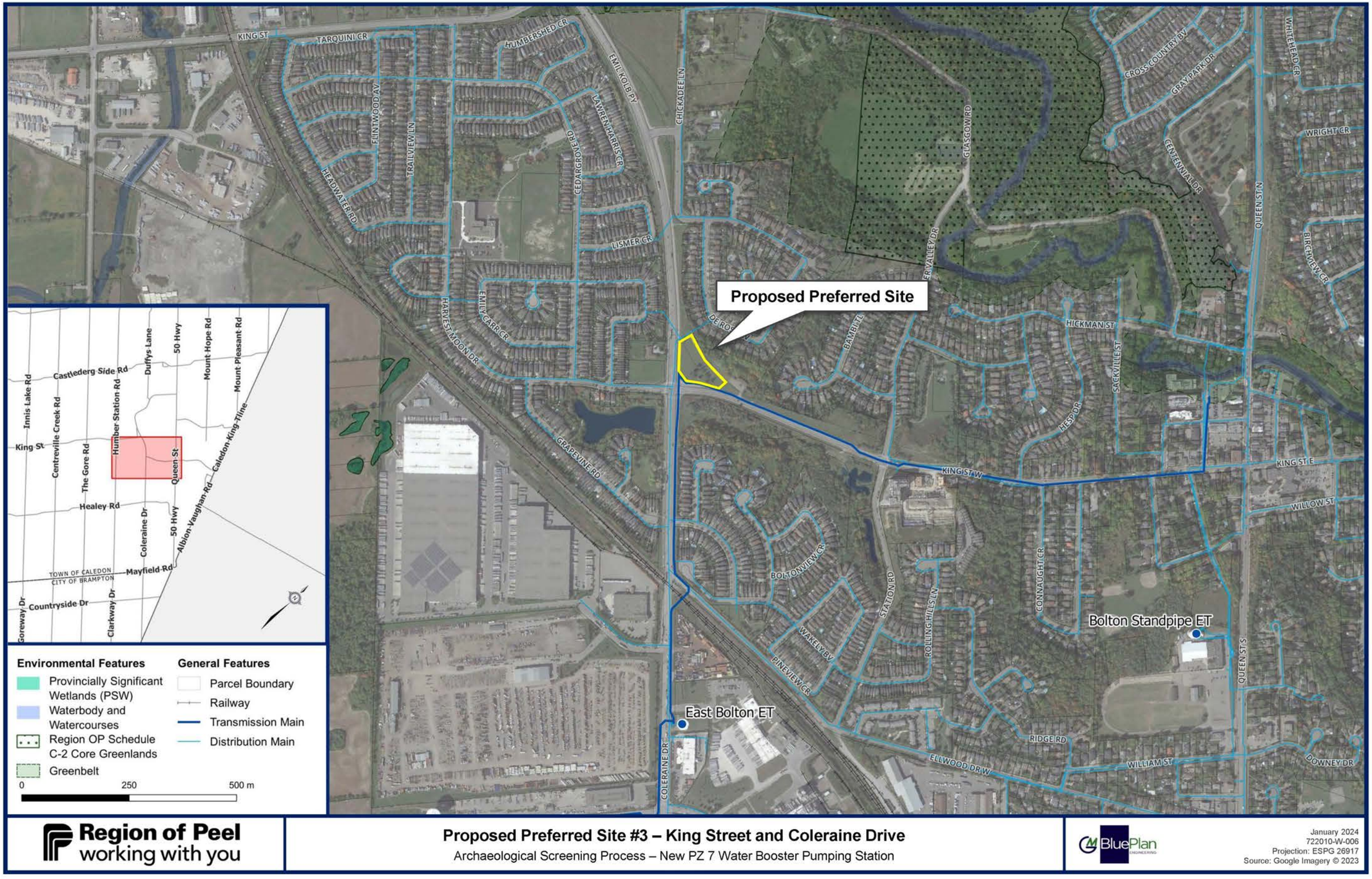


Figure 1: Proposed Preferred Site Location for the New Zone 7 Water Booster Pumping Station

Julia Rojas-Contento - GM BluePlan

From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Thursday, February 01, 2024 1:23 PM
To: Tanya Hill-Montour
Cc: Julia Rojas-Contento - GM BluePlan; Chris Campbell - GM BluePlan; dawnrussell@sixnations.ca
Subject: [EXT] RE: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Six Nations

EXTERNAL EMAIL

Hello Tanya,
Thank you for your response, attached is the link to the archeological report which includes our preliminary proposed site. Archeological Screening_Bolton Booster

The report was approved by the Ministry in April 2018 and entered into the Ontario Public Register of Archaeological Reports. As we mentioned, we are seeking feedback or any information including potential impacts to Inherent, Aboriginal and Treaty rights, known archaeological resources, or areas and/or species of cultural significance, that could be considered and/or incorporated, as appropriate, into the assessment of potential impacts.

We would kindly request that feedback be submitted by February 22, 2024; however if additional time is required please let us know. Also if there are no additional comments or feedback, we kindly ask you to let us know. We appreciate your contribution to this project at any level you can provide.

Thank you for your ongoing support and understanding.

Italia Ponce, P.Eng.
Program Manager
Infrastructure Planning-GIS & Data
Region of Peel
10 Peel Centre Dr. Suite A – 4th Floor
Brampton ON L6T 4B9
Office: 905-791-7800 ext.4583
Cell: 647-248-3785

Region of Peel
working with you

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http://www.peelregion.ca/corpserv/10pcd-expansion/map.htm

From: Tanya Hill-Montour <tanyahill-montour@sixnations.ca>
Sent: Tuesday, January 30, 2024 3:29 PM
To: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Subject: FW: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Six Nations

CAUTION: EXTERNAL MAIL. DO NOT CLICK ON LINKS OR OPEN ATTACHMENTS YOU DO NOT TRUST.

Good afternoon

SNGREC expresses interest in the following project. Can you please forward any documentation pertaining

Nia':wen ko:wa (thankyou)

Tanya Hill-Montour
SNGR Archaeological Supervisor
226.388.0665

From: Dawn Russell <dawnrussell@sixnations.ca>
Sent: Tuesday, January 30, 2024 3:27 PM
To: Tanya Hill-Montour <tanyahill-montour@sixnations.ca>
Subject: FW: Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Six Nations

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From: Ponce Vanelli, Italia <italia.ponce@peelregion.ca>
Sent: Tuesday, January 30, 2024 1:54 PM
To: Lonny Bomberry <lonnybomberry@sixnations.ca>
Cc: Peter Graham <LRCS@sixnations.ca>; Daylon Gee <lrluo2@sixnations.ca>; Dawn LaForme <dlaforme@sixnations.ca>; Dawn Russell <dawnrussell@sixnations.ca>; chris.campbell@gmblueplan.ca; Julia Rojas-Contento - GM BluePlan <julia.rojas-contento@gmblueplan.ca>
Subject: [External] Request for Engagement in the Archaeological Screening Process for a New Bolton Zone 7 Water Booster Pumping Station -Bolton EA_Six Nations

Hello Lonny,

Further to our Project Notification Letter (June 21, 2023) for the Bolton Water and Wastewater Capacity Improvements Class 'C' EA, the Region has identified a new water booster pumping station (WBPS) to support the existing and future servicing needs for the Town of Bolton.

The Region is seeking feedback as part of the Archaeological Screening Process. We kindly request for any information, including potential impacts to Inherent, Aboriginal and Treaty rights, known archaeological resources, or areas and/or

species of cultural significance, that could be considered and/or incorporated, as appropriate, into the assessment of potential impacts.

Further information is available in the letter attached.

We look forward to hearing from you.

Thank you,

Italia Ponce, P.Eng.
Program Manager
Infrastructure Planning-GIS & Data
Region of Peel
10 Peel Centre Dr. Suite A – 4th Floor
Brampton ON L6T 4B9
Office: 905-791-7800 ext.4583
Cell: 647-248-3785



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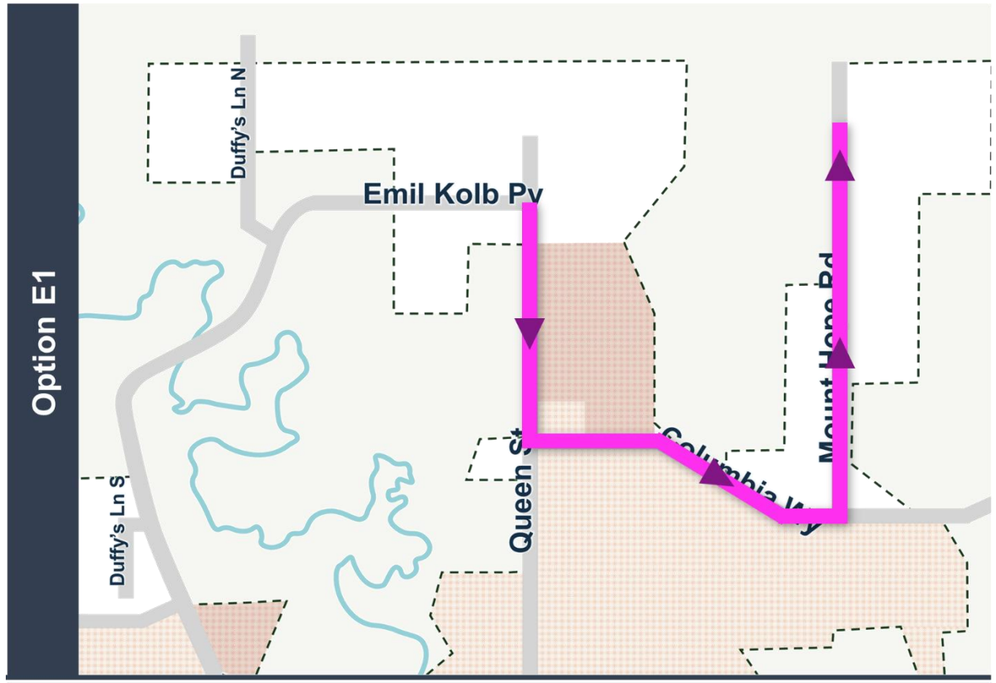
http://www.peelregion.ca/corpserv/10pcd-expansion/map.htm

Appendix 3B

Phase 2 Water & Wastewater Alternatives Evaluation Matrix

Peel Region
Bolton Water and Wastewater Capacity Improvements
Schedule 'C' Class Environmental Assessment

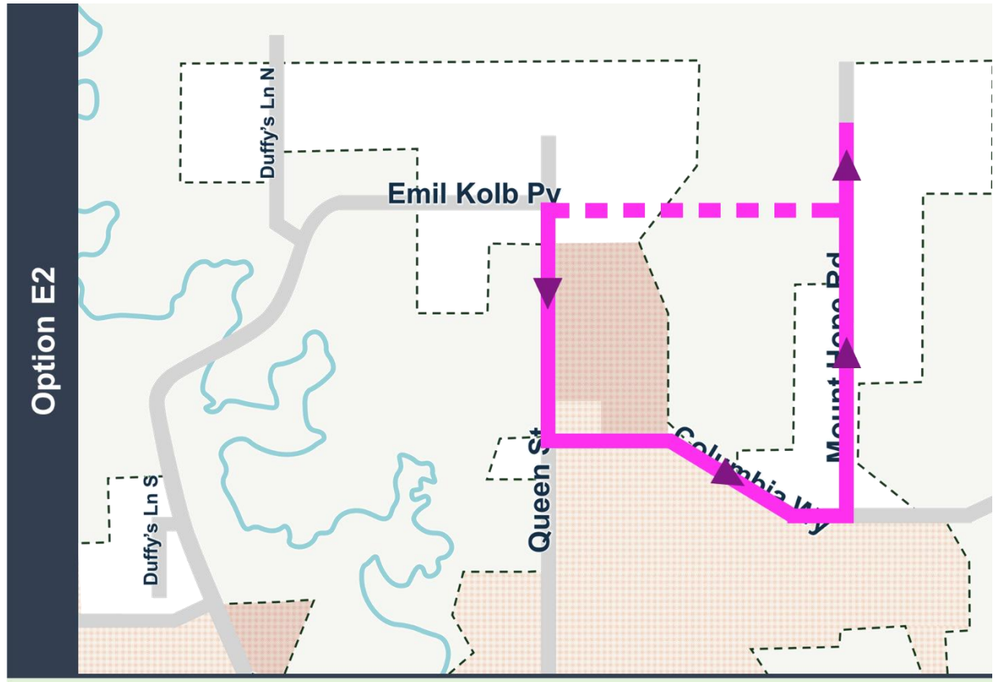
Detailed Evaluation
Water Alternatives – East Lands



Single Feed via Road Right-of-Ways (ROW)

Technical and operational challenges associated with single feed to new service area. Water quality issues and increased service risk. Strategy supports connections to existing watermains on Columbia Way and supports promotion within existing pressure zone to optimize service. Alternative minimizes risks through construction in ROW only.

Screened Out.



Looped System via Road ROW and new easement

Improved technical and operational strategy associated with looped feed to new service area. Minimizes water quality issues and reduces service risk, increasing system resiliency. Strategy supports connections to existing watermains on Columbia Way and supports promotion within existing pressure zone to optimize service. Alternative requires construction outside of existing ROW, opportunity to minimize risk and impact through construction methodology (i.e tunnelling). Opportunity to bundle construction with the wastewater infrastructure. Opportunity to align with future road construction. Strategy requires a new easement, selection requires further study to refine location, define potential impacts and mitigation measures.

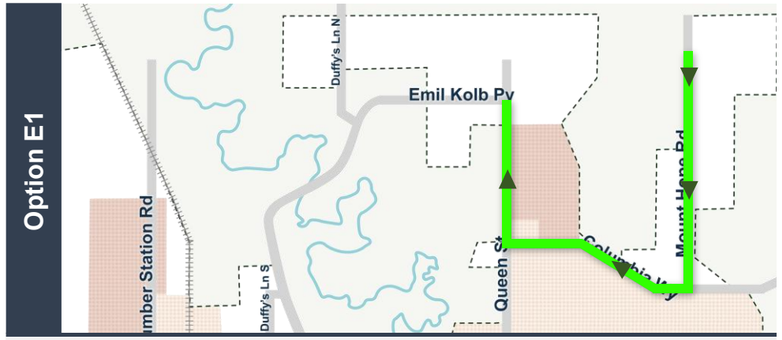
Carried Forward – selected as preliminary preferred strategy.

Detailed Evaluation Table
Water Alternatives – East Lands

Evaluation Criteria	Description	E1	E2
Technical Considerations	Ease of construction. Compatibility with existing/planned infrastructure. Minimize environmental and infrastructure crossings. Minimize conflicts with existing utilities. Ability to meet existing/future servicing standards. Available servicing capacity to support future growth. Ease of access for maintenance. Operation and maintenance considerations. Flexibility of system operations and operational security.	• Simpler linear construction configuration; however, provides only a single feed to the future pressure zone resulting in reduced operational flexibility and resiliency. • Limited ability to maintain service during outages, maintenance, or emergency events. • Reduced hydraulic redundancy and lower fire flow reliability for future growth areas. • Does not maximize use of existing/planned watermain connections within the broader network.	• Provides looped configuration improving hydraulic redundancy, operational flexibility, and system resiliency. • Supports security of supply during maintenance and emergency conditions. • Improves water quality through circulation and turnover within the future pressure zone. • Enhances pressure performance and fire flow availability for existing and future serviced areas. • Maximizes integration with existing/planned infrastructure and future network expansion.
Environmental Impacts	Climate change. Environmental crossing considerations. Minimize impacts to environmental features, protected areas, species at risks, water features/resources, air quality, natural features, and trees. Geology, hydrogeology, and contamination considerations.	• Reduced overall alignment length and disturbance footprint.	• Slightly greater overall alignment length; however, provides flexibility to route portions through future utility corridor and utilize trenchless construction where appropriate to minimize impacts to sensitive environmental features. • Opportunity to bundle with wastewater infrastructure reduces overall cumulative disturbance.
Social and Cultural Impacts	Community (residents and local businesses) and traffic considerations. Public accessibility during construction and operation. Noise, vibration, dust, and odour considerations. Cultural heritage resources. Archaeological resources.	• Construction primarily within existing road ROW may increase disruption to traffic, adjacent residents, and road users during installation.	• Construction primarily within existing road ROW may increase disruption to traffic, adjacent residents, and road users during installation. • Portions of the alignment along the future utility corridor anticipated to have minimal impact to existing residents and businesses.
Site Suitability	Land use, land size, availability, and location. Permit requirements. Ownership, legal, and jurisdictional considerations. Compliance with applicable planning and special land use policies.	• Located entirely within existing ROW, reducing need for additional easements/third-party lands.	• Requires coordination with future utility corridor/easement lands in addition to ROW. • Alignment remains compatible with Greenbelt/planning policy framework as infrastructure supports approved growth and is adjacent to settlement areas.
Economic Considerations	Capital needs costs. Operation and maintenance costs. Lifecycle cost considerations. Consideration of potential financial risk during construction.	• Lower initial capital cost due to shorter alignment and reduced infrastructure quantity. However, increased long-term operational risk and reduced resiliency may result in higher lifecycle/service risk costs. • Potential future duplication/upgrades may be required if redundancy becomes necessary.	• Higher initial capital cost due to additional watermain length/looping requirements. • Lower lifecycle/service risk through improved resiliency, redundancy, and water quality performance. • Represents a more complete long-term servicing solution, reducing likelihood of future retrofit/duplication costs.
Result		Screened Out	**Preferred – Carried Forward**

Result: Option E2 was preferred as it provides a looped water servicing configuration that improves security of supply, water quality, hydraulic performance, and emergency fire flow while supporting integrated delivery with future wastewater infrastructure and long-term servicing of approved growth lands.

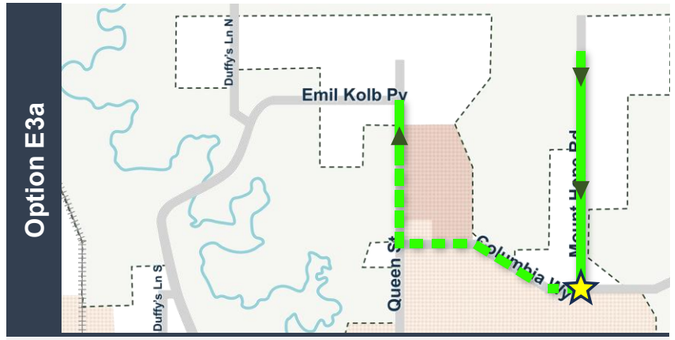
Detailed Evaluation Overview
Wastewater Alternatives – East Lands



All Gravity Solution via Road Right-of-Ways (ROW)

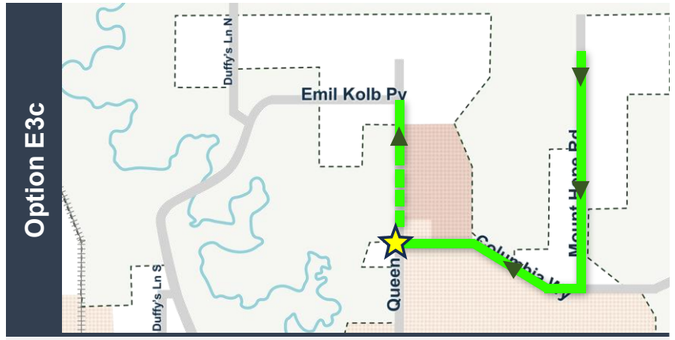
Gravity solution avoiding need for a new SPS, reducing operation / maintenance costs. Does not require emergency overflow associated with SPS reducing environmental risk. Increased construction complexity and shaft compounds required for deep sewer but minimizes surface disturbance during construction. Minimizes jurisdictional risk by maximizing construction within ROW.

Carried Forward – Second Choice.



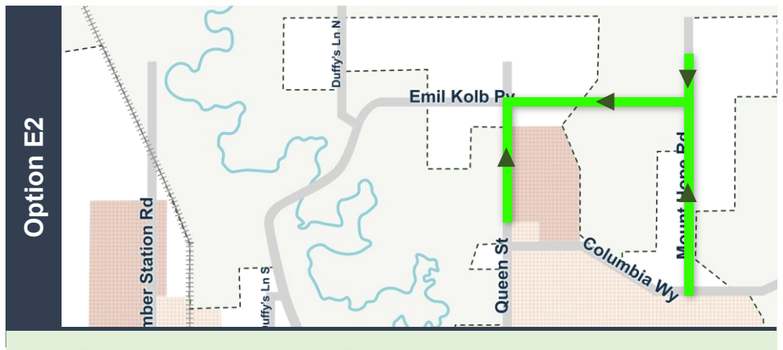
New SPS at Mount Hope and Columbia

Land acquisition required for new SPS. Increased construction challenges and operational and maintenance costs associated with SPS. Increased potential impact to the natural environment associated with overflow facility required for SPS. Increased open cut construction with increased community and traffic impacts. (Similar impacts to E3b and E3c). **Screened Out.**



New SPS at Hwy 50 and Columbia

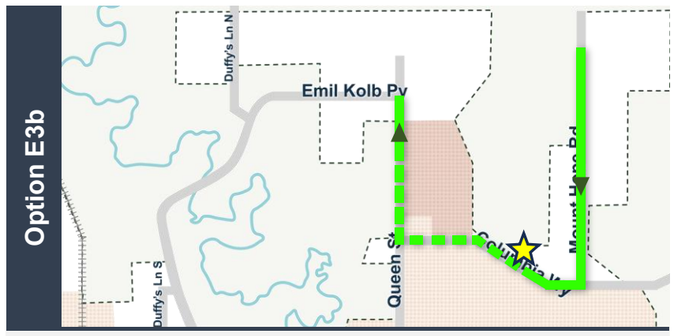
Land acquisition required for new SPS. Increased construction challenges and operational and maintenance costs associated with SPS. Increased potential impact to the natural environment associated with overflow facility required for SPS. Increased open cut construction with increased community and traffic impacts. (Similar impacts to E3a and E3b). **Screened Out.**



All Gravity Solution via ROW and new easement

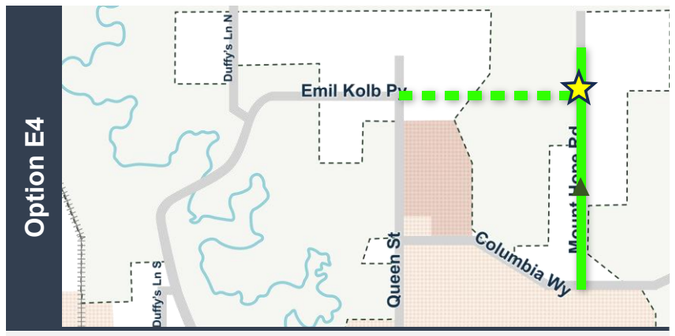
Gravity solution avoiding need for a new SPS reducing operation/maintenance costs. Does not require emergency overflow associated with SPS reducing environmental risk. Opportunity to bundle water and wastewater construction across future easement. Opportunity to align with future road. Sewer construction tunneled minimizing community impact, local traffic disruption, surface disturbance.

Carried Forward – Selected as preferred strategy.



New SPS at Humber River Tributary

Land acquisition required for new SPS. Increased construction challenges and operational and maintenance costs associated with SPS. Increased potential impact to the natural environment associated with overflow facility required for SPS. Increased open cut construction with increased community and traffic impacts. (Similar impacts to E3a and E3c). **Screened Out.**



New SPS at Mount Hope and new easement

Land acquisition required for new SPS. Increased construction challenges and operational and maintenance costs associated with SPS. Increased potential impact to the natural environment associated with overflow facility required for SPS. Opportunity to bundle construction with watermain along new easement and to service low elevation lands.

Screened Out.

Detailed Evaluation Table
Wastewater Alternatives – East Lands

Evaluation Criteria	Description	E1	E2	E3a	E3b	E3c	E4
Technical Considerations	Ease of construction. Compatibility with existing/planned infrastructure. Minimize conflicts with existing utilities. Ability to meet existing/future servicing standards. Available servicing capacity to support future growth. Ease of access for maintenance. Operation and maintenance considerations. Flexibility of system operation and operational security.	• Gravity-only solution, avoiding the need for a new SPS and associated long-term pumping operations. • More constrained alignment along existing roads, including curved sections near Columbia Way, increases shaft requirements and reduces construction efficiency. • Provides some opportunity for future system interconnections south of Columbia Way. • Constructed primarily within existing ROW, minimizing the need for easements or off-road access. • Deep gravity sewer reduces long-term operational burden relative to SPS options, but future maintenance access remains more challenging than for shallower sewer systems.	• Gravity-only solution, avoiding the need for a new SPS and associated long-term pumping operations. • Straighter alignment minimizes shaft requirements and improves constructability relative to E1. • Utility corridor and open space provide greater flexibility for shaft site selection and construction staging, with fewer conflicts with existing utilities. • Can be coordinated with the proposed watermain construction within the easement, providing construction and scheduling efficiencies. • Provides the best overall balance of constructability, phasing flexibility, and long-term servicing efficiency among the east land options.	• Requires a new SPS, introducing long-term operation and maintenance complexity relative to gravity options. • A shorter length of deep sewer required compared to E3b and E3c. Shallower sewer construction reduces deep tunnelling requirements compared to gravity options and improves maintainability of the sewer system. • Facility construction adds complexity, schedule risk, and the need for an emergency overflow. • Provides opportunity for future interconnections south of Columbia Way. • Technically feasible, but less preferred than gravity options due to added facility requirements and lifecycle operational burden.	• Requires a new SPS, introducing long-term operation and maintenance complexity relative to gravity options. • The required length of deep sewer is greater than Option E3a but less than E3c. • Facility construction adds complexity, schedule risk, and the need for an emergency overflow. • Provides opportunity for future interconnections south of Columbia Way. • Technically feasible, but less preferred than gravity options due to added pumping infrastructure and operational burden.	• Requires a new SPS, introducing long-term operation and maintenance complexity relative to gravity options. • Deepest SPS option, with increased constructability challenges. • Facility construction adds complexity, schedule risk, and the need for an emergency overflow. • Provides opportunity for future interconnections south of Columbia Way. • Technically feasible, but among the least favourable SPS options due to depth, complexity, and long-term operational requirements.	• Requires a new SPS, introducing long-term operation and maintenance complexity relative to gravity options. • Benefits from straighter alignment, shallower incoming sewers, and fewer shafts than other SPS options. • Can be coordinated with the proposed watermain within the easement, providing construction and scheduling efficiencies. • Limited opportunity for future interconnections south of Columbia Way. • Technically stronger than other SPS options, but still less preferred than gravity solutions due to the need for new pumping infrastructure.
Environmental Impacts	Climate change. Environmental crossing considerations. Minimize impacts to environmental features, protected areas, species at risk, water features/resources, air quality, natural features, and trees. Geology, hydrogeology, and contamination considerations.	• Construction primarily within existing ROW, avoiding lands within the Greenbelt. • Watercourse crossings to be completed using trenchless/tunnelling methods where appropriate to minimize disturbance. • Gravity system avoids long-term environmental risks associated with pumping station overflows and reduces energy use and associated GHG emissions.	• Portions of the alignment extend into Greenbelt lands; however, tunnelling will be used for the alignment along the proposed utility corridor to minimize vegetation removal and surface disturbance. • Additional watercourse crossings relative to E1; however, trenchless/tunnelling methods will be implemented where appropriate to avoid impacts to water features and habitat.	• Construction primarily within existing ROW, avoiding lands within the Greenbelt. • Watercourse crossings to be completed using trenchless/tunnelling methods where appropriate to minimize impacts. • Introduction of SPS results in long-term environmental risks due to potential emergency overflows to nearby watercourses.	• Construction primarily within existing ROW, avoiding lands within the Greenbelt. • Watercourse crossings to be completed using trenchless/tunnelling methods where appropriate to minimize impacts. • Introduction of SPS results in long-term environmental risks due to potential emergency overflows to nearby watercourses.	• Construction primarily within existing ROW, avoiding lands within the Greenbelt. • Watercourse crossings to be completed using trenchless/tunnelling methods where appropriate to minimize impacts. • Introduction of SPS results in long-term environmental risks due to potential emergency overflows to nearby watercourses.	• Portions of the alignment extend into Greenbelt lands; however, tunnelling will be used for the alignment along the proposed utility corridor to minimize vegetation removal and surface disturbance. • Watercourse crossings to be completed using trenchless/tunnelling methods where appropriate to minimize impacts.

Evaluation Criteria	Description	E1	E2	E3a	E3b	E3c	E4
			• Opportunity to bundle water and wastewater infrastructure reduces overall cumulative environmental disturbance. • Gravity system avoids long-term environmental risks associated with pumping station overflows and reduces energy use and associated GHG emissions.	• Increased energy use and associated GHG emissions compared to gravity options.	• Increased energy use and associated GHG emissions compared to gravity options.	• Increased energy use and associated GHG emissions compared to gravity options.	• Introduction of SPS results in long-term environmental risk due to potential emergency overflows to nearby watercourses. • Increased energy use and associated GHG emissions compared to gravity options.
Social and Cultural Impacts	Community (residents and local businesses) and traffic considerations. Public accessibility during construction and operation. Noise, vibration, dust, and odour considerations. Cultural heritage resources. Archaeological resources.	• Moderate disturbance to residents, businesses, and traffic along Columbia Way and Highway 50 due to construction within urban ROW. • Temporary dust, noise, and vibration impacts during construction, requiring mitigation, particularly near residential areas, commercial uses, and St. Michael Catholic Secondary School. • Temporary disruption to access and traffic flow along key corridors during construction. • No anticipated impacts to cultural heritage or archaeological resources beyond those identified and mitigated through standard measures.	• Reduced disturbance to residents, businesses, and traffic, as the alignment avoids Columbia Way and is primarily located within rural areas and the future utility corridor. • Reduced impacts to St. Michael Catholic Secondary School due to the absence of sewer construction along Columbia Way. • Temporary construction-related impacts (dust, noise, vibration) are generally lower than E1 and SPS options and can be effectively mitigated. • Reduced disruption to public access and traffic compared to options with construction along Columbia Way. • No additional impacts to cultural heritage or archaeological resources beyond those identified through existing assessments and mitigation measures.	• Increased disturbance to residents, businesses, and traffic along Columbia Way due to construction within urban ROW and a new SPS facility. • Greater construction-related impacts (dust, noise, vibration) compared to gravity options, with longer duration and larger construction footprint. • Additional disruption associated with SPS construction and potential for ongoing nuisance effects (e.g., noise, odour) associated with long-term operation of the SPS. • No additional impacts to cultural heritage or archaeological resources beyond those identified through existing assessments and mitigation measures.	• Increased disturbance to residents, businesses, and traffic along Columbia Way due to construction within urban ROW and a new SPS facility. • Greater construction-related impacts (dust, noise, vibration) compared to gravity options, with longer duration and larger construction footprint. • Additional disruption associated with SPS construction and potential for ongoing nuisance effects (e.g., noise, odour) associated with long-term operation of the SPS. • No additional impacts to cultural heritage or archaeological resources beyond those identified through existing assessments and mitigation measures.	• Increased disturbance to residents, businesses, and traffic along Columbia Way due to construction within urban ROW and a new SPS facility. • Greater construction-related impacts (dust, noise, vibration) compared to gravity options, with longer duration and larger construction footprint. • Additional disruption associated with SPS construction and potential for ongoing nuisance effects (e.g., noise, odour) associated with long-term operation of the SPS. • No additional impacts to cultural heritage or archaeological resources beyond those identified through existing assessments and mitigation measures.	• Reduced disturbance to residents, businesses, and traffic along Columbia Way and Highway 50, as the alignment avoids Columbia Way and is primarily located within rural areas. • Reduced impacts to St. Michael Catholic Secondary School due to the absence of sewer construction along Columbia Way. • Moderate construction-related impacts (dust, noise, vibration), generally lower than E3 options but higher than E2 due to SPS construction. • Additional localized impacts associated with construction and operation of a new SPS facility. • No additional impacts to cultural heritage or archaeological resources beyond those identified through existing assessments and mitigation measures.

Evaluation Criteria	Description	E1	E2	E3a	E3b	E3c	E4
Site Suitability	Land use, land size, availability, and location. Permit requirements. Ownership, legal, and jurisdictional considerations. Compliance with applicable planning and special land use policies.	• Located entirely within existing road ROW, reducing the need for additional easements or third-party lands. • No land acquisition required. • Compatible with applicable planning policy framework.	• Requires coordination with future utility corridor and easement lands in addition to existing ROW. • Portions of the alignment extend into Greenbelt lands, introducing additional planning and coordination considerations. • Alignment remains compatible with the Greenbelt and broader planning policy framework, as infrastructure supports approved growth and is located adjacent to settlement areas. • No land acquisition required for major facilities (gravity system).	• Requires land acquisition for a new SPS facility, increasing complexity related to land ownership and site selection. • Linear infrastructure generally located within or adjacent to existing ROW; however, additional site-specific constraints apply for SPS siting. • Additional coordination required to confirm suitable SPS location (e.g., setbacks, floodplain considerations, access). • Compatible with applicable planning policy framework, subject to site-specific approvals.	• Requires land acquisition for a new SPS facility, increasing complexity related to land ownership and site selection. • Linear infrastructure generally located within or adjacent to existing ROW; however, additional site-specific constraints apply for SPS siting. • Additional coordination required to confirm suitable SPS location (e.g., setbacks, floodplain considerations, access). • Compatible with applicable planning policy framework, subject to site-specific approvals.	• Requires land acquisition for a new SPS facility, increasing complexity related to land ownership and site selection. • Linear infrastructure generally located within or adjacent to existing ROW; however, additional site-specific constraints apply for SPS siting. • Additional coordination required to confirm suitable SPS location (e.g., setbacks, floodplain considerations, access). • Compatible with applicable planning policy framework, subject to site-specific approvals.	• Requires coordination with easement lands and portions of the Greenbelt in addition to existing ROW. • Requires land acquisition for a new SPS facility. • Greater complexity due to combination of SPS siting and alignment through sensitive land use areas. • Alignment remains compatible with the Greenbelt and broader planning policy framework, subject to site-specific approvals.
Economic Considerations	Capital needs costs. Operation and maintenance costs. Lifecycle cost considerations. Consideration of potential financial risk during construction.	• Lower operation and maintenance costs compared to SPS solutions. • Some increases in operation and maintenance costs associated with deep sewers.	• Lower operation and maintenance costs compared to SPS solutions. • Some increases in operation and maintenance costs associated with deep sewers.	• Additional costs associated with land acquisition for the SPS. • Increased operation and maintenance costs associated with operating the SPS.	• Additional costs associated with land acquisition for the SPS. • Increased operation and maintenance costs associated with operating the SPS.	• Additional costs associated with land acquisition for the SPS. • Increased operation and maintenance costs associated with operating the SPS.	• Additional costs associated with land acquisition for the SPS. • Increased operation and maintenance costs associated with operating the SPS.
Result		Screened Out	**Preferred – Carried Forward**	Screened Out	Screened Out	Screened Out	Screened Out

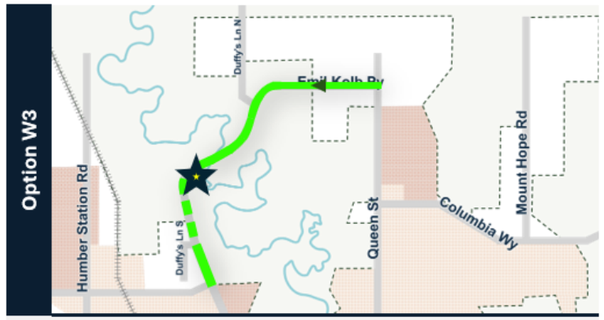
Result: Option E2 was preferred as it provides a gravity-based servicing solution that avoids the need for a new SPS, reducing long-term operation and maintenance requirements, eliminating emergency overflow risks, minimizing environmental and community impacts through tunnelled construction, and enabling coordinated delivery with future water and wastewater infrastructure within the new easement corridor.

Detailed Evaluation Overview
Wastewater Alternatives – West Lands



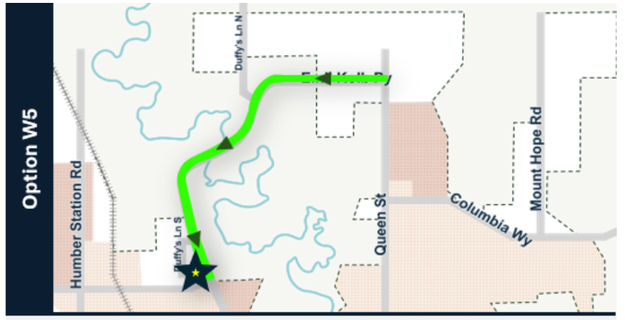
New SPS at Duffy's Lane North

Requires a separate SPS site and additional infrastructure near the Humber River crossing, reducing opportunities for construction and operational efficiencies compared to a combined-site solution. A very deep SPS, additional shaft compounds and access requirements increase construction and long-term maintenance complexity, while longer emergency overflow routing increases operational and environmental risk. Multiple-site construction also results in greater potential for localized access and social impacts.
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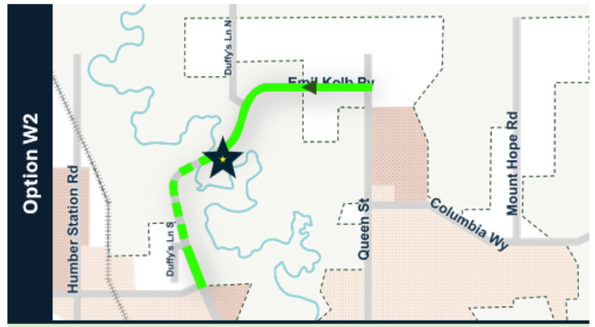
New SPS Southwest of Humber River

Requires a deep SPS west of the Humber River, with more constrained access and siting within sensitive valleylands. Additional shaft, access road and construction requirements on the southwest side increase disturbance and make it more challenging to locate infrastructure outside the Humber River Meander Belt, increasing potential impacts to critical habitat. Long-term maintenance access and trail access are also more constrained than for W2.
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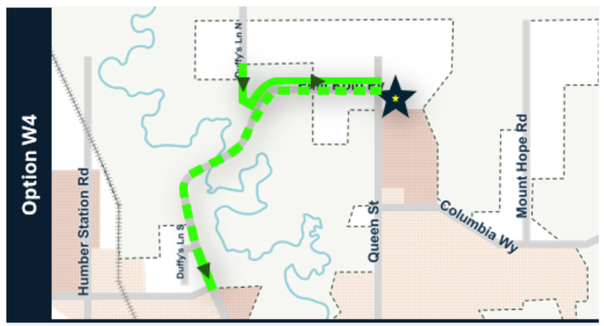
New SPS at Emil Kolb and King Street

Requires a separate, very deep SPS at a constrained site with limited land availability, increasing technical, construction and long-term maintenance complexity. Multiple site requirements reduce opportunities for construction and operational efficiencies, while deeper sewer infrastructure may increase long-term maintenance costs. The option also has greater interaction with surrounding existing and future land uses and would increase traffic disruption at Emil Kolb Parkway and King Street compared with W2.
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New SPS Southeast of Humber River

Provides a shared SPS location with supporting infrastructure, offering the best opportunity for construction and operation and maintenance efficiencies at one combined site. Sufficient land is available for the SPS, shaft compounds and tunnelling, with construction and long-term access primarily contained outside valleylands. Optimized sewer and forcemain lengths, shorter emergency overflow routing and single-site construction reduce environmental, community and access impacts relative to other options. Provides the best balance of constructability, access and operational efficiency. **Carried Forward – selected as preliminary preferred strategy.**



New SPS at Hwy 50 and Emil Kolb Pkwy

Requires a very deep SPS at a location with limited land availability, together with additional shaft compounds and construction access at the Humber River crossing. Greater sewer and SPS depth, a longer forcemain and longer emergency overflow routing increase technical, operational and capital considerations. The multi-site strategy also increases the overall footprint and potential environmental impact, while SPS construction would create greater traffic disruption at Highway 50 and Emil Kolb Parkway.
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Detailed Evaluation Table
Wastewater Alternatives – West Lands

Evaluation Criteria	Description	W1	W2	W3	W4	W5
Technical Considerations	Ease of construction. Compatibility with existing/planned infrastructure. Minimize environmental and infrastructure crossings. Minimize conflicts with existing utilities. Ability to meet existing/future servicing standards. Available servicing capacity to support future growth. Ease of access for maintenance. Operation and maintenance considerations. Flexibility of system operation and operational security. Consideration of relation to comprehensive water and wastewater servicing strategy.	• Strategy requires a separate SPS site and manhole/shaft near Humber River Crossing for the supporting infrastructure. • Comprehensive strategy requires extensive new supporting infrastructure in the Humber River Valley – sanitary forcemain crossing of the Humber River, manhole/shaft on the SE side of the Humber River (common to all), watermain crossing of the Humber River (common to all), new construction and permanent operation and maintenance access road from Emil Kolb to the Humber River Valley (common to all). • Decreased opportunities for economies of scale for construction and operation and maintenance due to multiple site requirements. • Requires a new very deep SPS. • Additional shaft compounds and construction access required at the Humber River crossing, increasing complexity. • Longer emergency overflow routing increases operational complexity and risk. • Additional long-term operation and maintenance challenges associated with deeper infrastructure. • Less preferred due to increased construction complexity, increased depth, and operational considerations.	• Strategy has a shared SPS location with the supporting infrastructure required for the comprehensive strategy. • Comprehensive strategy requires extensive new supporting infrastructure in the Humber River Valley – sanitary forcemain crossing of the Humber River, manhole/shaft on the SE side of the Humber River (common to all), watermain crossing of the Humber River (common to all), new construction and permanent operation and maintenance access road from Emil Kolb to the Humber River Valley (common to all). • Best opportunities for economies of scale for construction and operation and maintenance at the one combined site. • Requires a new deep SPS located east of the Humber River. • Additional shaft compounds and construction access required at the Humber River crossing, increasing complexity. • Sufficient land available for SPS, shaft compounds, and tunnelling operations. • Construction and long-term access primarily contained outside of valleylands, reducing constraints. • Optimized sewer alignment and forcemain length relative to other options. • Preferred option due to best balance of constructability, access, and operational efficiency.	• Strategy requires a separate SPS site and manhole/shaft near Humber River Crossing for the supporting infrastructure. • Comprehensive strategy requires extensive new supporting infrastructure in the Humber River Valley – watermain crossing of the Humber River (common to all), new construction and permanent operation and maintenance access road from Emil Kolb to the Humber River Valley (common to all). • Strategy requires additional manhole/shaft on the SW side of the Humber River Valley. • Strategy requires additional access road on the SW side of Humber River Valley for construction and permanent operation and maintenance. • Requires a new deep SPS west of the Humber River. Location has more constrained access and constructability. • Additional shaft compounds and construction access required at the Humber River crossing, increasing complexity. • More challenging siting outside floodplain and meander belt. • Long-term access for operation and maintenance is more constrained. • Less preferred due to access limitations and construction challenges. • Decreased opportunities for economies of scale for construction and operation and maintenance due to multiple site requirements.	• Strategy requires a separate SPS site and manhole/shaft near Humber River Crossing for the supporting infrastructure. • Comprehensive strategy requires extensive new supporting infrastructure in the Humber River Valley – sanitary forcemain crossing of the Humber River, manhole/shaft on the SE side of the Humber River, watermain crossing of the Humber River (common to all), new construction and permanent operation and maintenance access road from Emil Kolb to the Humber River Valley (common to all). • Requires a new very deep SPS at a location with limited land availability. • Additional shaft compounds and construction access required at the Humber River crossing, increasing complexity. • Greater depth of sewer and SPS increases technical and construction complexity. • Longer emergency overflow routing increases operational complexity and risk. • Additional long-term operation and maintenance challenges associated with deeper infrastructure. • Additional construction access and shaft compound requirements increase complexity. • Longer forcemain length compared to other options increases operation and capital considerations.	• Strategy requires a separate SPS site and manhole/shaft near Humber River Crossing for the supporting infrastructure. • Comprehensive strategy requires extensive new supporting infrastructure in the Humber River Valley – sanitary sewer crossing of the Humber River, manhole/shaft on the SE side of the Humber River (common to all), watermain crossing of the Humber River (common to all), new construction and permanent operation and maintenance access road from Emil Kolb to the Humber River Valley (common to all). • Decreased opportunities for economies of scale for construction and operation and maintenance due to multiple site requirements. • Requires a new very deep SPS in a location with limited land availability. • Additional shaft compounds and construction access required at the Humber River crossing, increasing complexity. • Greater depth of sewer and SPS increases technical and construction complexity. • Additional long-term operation and maintenance challenges associated with deeper infrastructure. • Least preferred due to increased depth, constraints, and operational challenges.

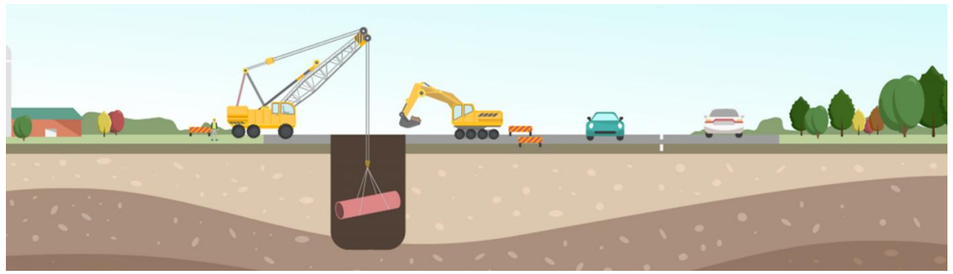
Evaluation Criteria	Description	W1	W2	W3	W4	W5
					• More complex integration with existing and future infrastructure and surrounding land use (sewer running east on Emil Kolb Parkway from development to the north). • Less preferred due to site availability constraints, increased depth, and increased system complexity. • Decreased opportunities for economies of scale for construction and operation and maintenance due to multiple site requirements.	
Environmental Impacts	Climate change. Environmental crossing considerations. Minimize impacts to environmental features, protected areas, species at risk, water features/resources, air quality, natural features, and trees. Geology, hydrogeology, and contamination considerations. Consideration of cumulative impact of comprehensive water and wastewater servicing strategy.	• SPS site in isolation located primarily outside of the Humber River valleylands, reducing potential for interaction with sensitive natural features. • SPS site within the Bolton Resource Management Tract Natural Environment and Primary Restoration designation and outside Nature Reserve. • All options have common ancillary water and sanitary infrastructure outlined above that require construction and permanent operation and maintenance access to facilities in the Humber River Valley. • Location of vertical ancillary water and sanitary services will be located 30 metres beyond the Humber River Meander Belt to avoid potential impact to critical habitat. • Majority of ancillary sites within former Road Right of Way and areas previously disturbed during construction of Emil Kolb Parkway and bridge.	• SPS site located near Humber River valleylands on the SE side, 30 metres beyond the Humber River Meander Belt, to avoid potential impacts to critical habitat. • Majority of combined site within former Road Right of Way and areas previously disturbed during construction of Emil Kolb Parkway and bridge. • SPS site within the Bolton Resource Management Tract Natural Environment designation and outside Nature Reserve. • Partial area of the combined facility is within the Nature Reserve, resulting in a higher potential need for mitigation and restoration. • All options have common ancillary water and sanitary infrastructure outlined above that require construction and permanent operation and maintenance access to facilities in the Humber River Valley. • Location of vertical ancillary water and sanitary services will be located 30 metres beyond the Humber River Meander Belt to avoid potential impact to critical habitat.	• SPS located near Humber River valleylands on the SW side; the site is constrained and will be challenging to locate 30 metres beyond the Humber River Meander Belt, resulting in increased potential impacts to critical habitat compared to other options. • SPS site within the Bolton Resource Management Tract Natural Environment designation with potential need to be within Nature Reserve due to constrained site. • All options have common ancillary water and sanitary infrastructure outlined above that requires construction and permanent operation and maintenance access to facilities in the Humber River Valley. • Increased site constraints for the SW location of vertical ancillary water and sanitary services, with a higher potential to be within the Meander Belt and a higher potential impact to critical habitat. • Construction access and staging within valleylands on SE and SW sides increases potential impact.	• Main SPS located outside of Humber River Valley on future development land. • SPS site outside the Bolton Resource Management Tract. • All options have common ancillary water and sanitary infrastructure outlined above that require construction and permanent operation and maintenance access to facilities in the Humber River Valley. • Location of vertical ancillary water and sanitary services will be located 30 metres beyond the Humber River Meander Belt to avoid potential impact to critical habitat. • Option requires a second local SPS and emergency overflow on Duffy's Lane, increasing the potential for environmental impact, with the combined water and wastewater servicing solution requiring three separate sites compared to Option W2. • Longer emergency overflow routing compared to W2 increases potential environmental risk. • Larger overall footprint associated with extended alignment compared to W2.	• SPS site located outside of Humber River Valley within natural environment area. • SPS site within the Bolton Resource Management Tract Natural Environment/Primary Restoration designation and outside Nature Reserve. • All options have common ancillary water and sanitary infrastructure outlined above that requires construction and permanent operation and maintenance access to facilities in the Humber River Valley. • Location of vertical ancillary water and sanitary services will be located 30 metres beyond the Humber River Meander Belt to avoid potential impact to critical habitat. • Overall comparable or potentially reduced environmental interaction for the SPS site in isolation but increased overall potential for impact due to the need for multiple sites for the combined water and wastewater strategy relative to W2.

Evaluation Criteria	Description	W1	W2	W3	W4	W5
		• All options require linear water and wastewater infrastructure crossings of the Humber River. Construction will be facilitated through trenchless construction methodology at adequate depth and setbacks to minimize potential impacts. • Longer emergency overflow routing compared to W2 and W3 increasing potential environmental risk. • Overall moderate environmental impact, with reduced interaction with valleylands but increased operational risk relative to W2.	• Construction managed from the east side of the Humber River, reducing overall disturbance compared to W3. • Shorter emergency overflow routing reduces potential environmental risk relative to other options. • Single-site provides a balanced approach to environmental protection and constructability.	• Less preferred due to increased disturbance within sensitive environmental areas.	• Alignment and SPS location result in greater overall interaction with natural areas and watercourses compared to W2. • Less preferred due to increased extent of environmental interaction and system footprint relative to W2.	
Social and Cultural Impacts	Community (residents and local businesses) and traffic considerations. Public accessibility during construction and operation. Noise, vibration, dust, and odour considerations. Cultural heritage resources. Archaeological resources.	• New access road required for common ancillary water and sanitary strategy components from Emil Kolb to Humber River Valley area avoids impact to existing trails. • Multiple-site construction increases the potential for impacts compared to the single-site W2 option. • SPS construction activities may impact access to nearby trails and associated parking areas. • Localized disruption to pedestrian access during construction. • Limited impacts to traffic and surrounding land uses due to rural setting. • Overall moderate social impact, with localized access disruptions compared to W2.	• New access road required for common ancillary water and sanitary strategy components from Emil Kolb to Humber River Valley area avoids impact to existing trails. • SPS construction activities will not impact access to nearby trails and associated parking. • SPS construction primarily located within rural and valleyland areas, limiting broader community and traffic disruption. • Reduced impact to key access points and road networks compared to W1, W4 and W5. • Single-site construction reducing potential for impact compared to other options. • Provides a balanced approach to managing temporary social impacts.	• New access road required for common ancillary water and sanitary strategy components from Emil Kolb to Humber River Valley area avoids impact to existing trails. • Greater disruption to trail access due to construction activities within Humber River valleylands on SW side compared to all other options. • Increased constraints for maintaining public access during SPS construction. • Limited traffic impacts due to rural setting. • Multiple-site construction increases the potential for impacts compared to the single-site W2 option. • Less preferred due to increased disruption to recreational use and access compared to W2.	• New access road required for common ancillary water and sanitary strategy components from Emil Kolb to Humber River Valley area avoids impact to existing trails. • Increased traffic disruption at the Highway 50 and Emil Kolb Parkway intersection due to SPS construction. • Greater interaction with surrounding existing and future land uses compared to other options. • Multiple-site construction increases the potential for impacts compared to the single-site W2 option. • Less preferred due to increased traffic and access disruptions compared to W2.	• New access road required for common ancillary water and sanitary strategy components from Emil Kolb to Humber River Valley area avoids impact to existing trails. • Increased traffic disruption at Emil Kolb Parkway and King Street intersection due to SPS construction. • Limited traffic and community disruption due to predominantly rural setting. • Multiple-site construction increases the potential for impacts compared to the single-site W2 option. • Greater interaction with surrounding existing and future land uses compared to other options.
Site Suitability	Land use, land size, availability, and location. Permit requirements. Ownership, legal, and jurisdictional considerations. Compliance with applicable planning and special land use policies.	• Sufficient site size to accommodate SPS and associated infrastructure. • Located on TRCA-owned lands, requiring coordination for land use and access. • Ancillary strategy located on TRCA-owned lands, requiring coordination for land use and access.	• Sufficient site size to accommodate SPS and associated infrastructure. • Located on TRCA-owned lands, requiring coordination for land use and access. • Ancillary strategy located on TRCA-owned lands, requiring coordination for land use and access.	• Limited site availability due to environmental constraints for SPS siting within valleylands. • Located on TRCA-owned lands, requiring coordination and additional constraints on development. • Ancillary strategy located on TRCA-owned lands, requiring coordination for land use and access.	• Requires land acquisition from private landowners for 2 pumping stations. • Potential for site constraints due to future land use. • Ancillary strategy located on TRCA-owned lands, requiring coordination for land use and access.	• Requires land acquisition from private landowners. • Limited available space for SPS siting within existing land use constraints. • Greater siting challenges relative to W2 due to constrained location.

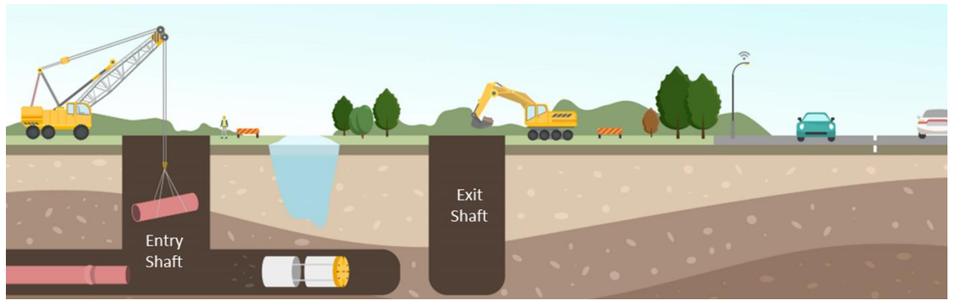
Evaluation Criteria	Description	W1	W2	W3	W4	W5
			• Site is feasible for SPS development with manageable siting constraints.	• Greater siting constraints due to location within sensitive areas compared to W2.		• Ancillary strategy located on TRCA-owned lands, requiring coordination for land use and access.
Economic Considerations	Capital needs costs. Operation and maintenance costs. Lifecycle cost considerations. Consideration of potential financial risk during construction.	• Increased capital costs associated with multi-site strategy. • Increased operation and maintenance costs associated with multi-site strategy. • Increased capital cost associated with longer emergency overflow requirements. • Land acquisition required through TRCA coordination.	• Decreased operation and maintenance costs associated with single-site strategy. • Decreased operation and maintenance costs associated with avoiding a multi-site strategy. • Land acquisition required through TRCA coordination.	• Increased capital costs associated with multi-site strategy. • Increased operation and maintenance costs associated with multi-site strategy. • Land acquisition required through TRCA coordination.	• Increased capital costs associated with multi-site strategy. • Increased operation and maintenance costs associated with multi-site strategy. • Potential for increased capital cost associated with longer emergency overflow requirements. • Land acquisition required from private landowners.	• Increased capital costs associated with multi-site strategy. • Increased operation and maintenance costs associated with multi-site strategy. • Potential for increased long-term maintenance costs due to deeper sewer infrastructure compared to other options. • Land acquisition required from private landowners.
Result		Screened Out	**Preferred – Carried Forward**	Screened Out	Screened Out	Screened Out

Result: Option W2 was preferred as it represents the optimal technical, construction, and operational solution, with sufficient land availability for tunnelling compounds, minimized surface disturbance, and a compact facility and forcemain alignment primarily contained east of the Humber River.

Detailed Evaluation
Construction Methodology – Humber River Crossing



Open-Cut Construction Methodology



Tunnelling Construction Methodology under a Watercourse



Suspended Construction Methodology from a Bridge

Evaluation Criteria	Description	Open Cut	Tunnelling	Suspended – Connect to Existing Bridge	Suspended – New Dual-Purpose Bridge
Technical Considerations	Ease of construction. Compatibility with existing/planned infrastructure. Minimize environmental and infrastructure crossings. Minimize conflicts with existing utilities. Ability to meet existing/future servicing standards. Available servicing capacity to support future growth. Ease of access for maintenance. Operation and maintenance considerations. Flexibility of system operations and operational security.	• Not Viable – Need for tunnelling to cross under the water feature.	• Increase ease of access by using separate and isolated access for construction equipment from Emil Kolb Parkway which can be repurposed as the future site access to the station. • Minimal construction disturbance. • Reduces dependency on third-party bridge structure design, approvals, and future structural coordination. • Most efficient construction timing. • Meets project phasing timeline. • Minimal impact on existing infrastructure and utilities. Shaft locations can be coordinated with pumping station site on the East and the construction shaft on the West lands. • Provides independent infrastructure crossing which is not tied to future bridge rehabilitation/replacement cycles.	• Not viable – limited space available to connect multiple pipes to existing bridge.	• Potential for increased construction efforts and need for tunneling depending on the final deck span required to house pipe diameter plus insulation. • Requires structural design to accommodate utility loading, thermal expansion, insulation, and maintenance access. • Delayed phasing due to bridge design and construction. • Delayed timing/phasing for TRCA permits of new dual-purpose bridge. • Allows for shallower SPS – eliminates the need to cross under the creek. • Introduces long-term dependency between bridge structural asset and utility asset. • Reduced operational flexibility and future maintenance of the sewer main. • Reduced flexibility to meet increased flows in future as any required size upgrades will have impacts on the bridge.
Environmental Impacts	Climate change. Environmental crossing considerations. Minimize impacts to environmental features, protected areas, species at risks, water features/resources, air quality, natural features, and trees. Geology, hydrogeology, and contamination considerations.	• N/A due to not technically viable solution.	• Design crossing to mitigate major environmental impacts to the river. • Highest avoidance of natural features. • Minimizes disturbance to floodplain and river valley corridor by avoiding permanent above-grade structure. • Avoids in-water works and direct alteration of channel/bank features.	• N/A due to not technically viable solution.	• Surface disturbances to construct a new bridge on TRCA lands. • Bridge crossing over Humber River may cause flood plain impacts. • Introduces permanent infrastructure within the river valley/floodplain corridor. • Potential impacts to valleyland character and natural heritage connectivity. • Reduced adaptability climate change – Increase in flow in future or sewer upgrades will have impacts on the bridge.
Social and Cultural Impacts	Community (residents and local businesses) and traffic considerations. Public accessibility during construction and operation. Noise, vibration, dust, and odour considerations. Cultural heritage resources. Archaeological resources.	• N/A due to not technically viable solution.	• Minimal impact to public access and use of TRCA trails and lands. • Visual impact during construction only, no permanent visual impact. Maintains existing recreational/aesthetic character of valleylands post-construction.	• N/A due to not technically viable solution.	• Extensive construction will impact public access and use to surrounding area and trail. • New bridge will have permanent visual impact. • Depending on the location and alignment, the new bridge may be utilized as a pedestrian bridge.

Evaluation Criteria	Description	Open Cut	Tunnelling	Suspended – Connect to Existing Bridge	Suspended – New Dual-Purpose Bridge
Site Suitability	Land use, land size, availability, and location. Permit requirements. Ownership, legal, and jurisdictional considerations. Compliance with applicable planning and special land use policies.	• N/A due to not technically viable solution.	• TRCA approvals and permit to use land required, however impacts are reduced compared to other alternatives. • Minimizes permanent land requirements within TRCA-regulated lands. • Temporary shaft compounds can be located to optimize constructability and minimize environmental effects.	• N/A due to not technically viable solution.	• TRCA required approvals, permits, and use of land. Greatest impacts compared to other alternatives. Requires permanent footprint/abutments within TRCA-regulated lands. • Potential challenges securing approvals for new permanent bridge structure in regulated valley corridor. • Requires TRCA trail and land access.
Economic Considerations	Capital needs costs. Operation and maintenance costs. Lifecycle cost considerations. Consideration of potential financial risk during construction.	• N/A due to not technically viable solution.	• Generally, more expensive than open cut construction, but less expensive to construct and maintain the new bridge option. • Potentially lower long-term lifecycle risk due to reduced exposure to weathering and structural deterioration.	• N/A due to not technically viable solution.	• More expensive of all solutions due to new bridge construction. • Higher potential for additional O&M costs associated with maintaining the new bridge. • Higher lifecycle costs associated with bridge inspection, rehabilitation, and eventual replacement.
Result		Screened Out	**Preferred – Carried Forward**	Screened Out	Screened Out

Result: Tunnelling was preferred as it provides the most technically robust and operationally independent crossing solution while minimizing permanent impacts to the Humber River valley corridor, reducing regulatory complexity, and avoiding long-term structural and maintenance dependencies associated with a bridge-supported crossing.

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Appendix 3C

Focus Area 2 Supporting Documents

HYDRAULICS TECHNICAL MEMORANDUM NO. 1 (HTM1)

Date: 04 March 2025

Revision: Version 2 (Draft)

To: Jeff Langlois and Rhys Cavill (R. J. Burnside)

From: Johnathan D. Nault and Djordje Radulj (HydraTek & Associates)

Subject: System Curve and Hydraulic Analysis
Macville BPS and Bolton Watermains, Region of Peel

HydraTek File No.: 22103

1. INTRODUCTION

HydraTek & Associates (HydraTek), A Division of FP&P HydraTek Inc., has been retained by R. J. Burnside & Associates Ltd. (Burnside) on behalf of Caledon Community Partners Inc. (CCP) to undertake water system hydraulic and hydraulic transient analyses of proposed upgrades to the Regional Municipality of Peel's (Region's) existing Bolton Pressure Zone 6 (PZ6) and future Bolton Pressure Zone 7 (PZ7) water system. The proposed upgrades comprise: (i) Macville (PZ6-to-PZ7) Booster Pumping Station (BPS), (ii) the 1050 mm Emil Kolb PZ6 watermain, 900/600 mm Emil Kolb PZ7 watermain, and 600 mm King Street PZ7 watermain, and (iii) realignment of some existing PZ6 lands into the future PZ7 system to improve servicing pressures. The aforementioned upgrades, along with others, will extend the Region's water system further north from the current extent in North Bolton, thereby providing water servicing for future developments. This report, Hydraulics Technical Memorandum No. 1 (HTM1), presents the water system hydraulic analysis for detailed design. Overall, the key objectives of HTM1 are listed below:

- Confirm design flows for Macville BPS under different system states and design years;
- Develop Macville BPS system (resistance) curves to identify design points for pump sizing;
- Characterize Bolton PZ7 system pressures and fire flow capacities with the proposed the North Bolton water servicing strategy and zone realignment; and
- Provide additional recommendations for system improvements and design considerations.

2. REFERENCE INFORMATION

The following information was relied upon to complete the hydraulic analysis:

- 600 mm King Street PZ7 watermain 50% design drawings by Burnside, dated 24 February 2025.
- 900 mm Emil Kolb PZ7 watermain 50% design drawings by Burnside, dated 21 February 2025.
- Macville BPS 90% design drawings by Burnside, dated 14 February 2025.
- "Macville BPS Final Preliminary Design Report" by Burnside, dated 31 October 2024.

- System map of future water infrastructure from the Region's draft 2024 Development Charges update study, received from the Region on 11 October 2024.
- Region's InfoWater Pro extended period simulation (EPS) hydraulic model dated 26 July 2024, received from the Region on 18 September 2024.
- "New (900 mm Zone 7) Watermain on Emil Kolb Parkway in Bolton, 30% Design Report Draft" by Burnside, dated 05 June 2024.
- "New (600 mm Zone 7) Watermain on King Street in Bolton, 30% Design Report Draft" by Burnside, dated 05 June 2024.
- Initial Bolton Zone 6 and Zone 7 realignment concept presentation by the Region, received 26 April 2024.
- "Zone 7 Demands" technical memorandum by Burnside, dated 04 January 2024.
- "Bolton Water and Wastewater Feasibility Study" master report by GM BluePlan (now GEI), dated February 2023.
- "Bolton Water and Wastewater Capacity Improvements Feasibility Study" technical memorandum by GM BluePlan (now GEI), dated January 2023.

3. BACKGROUND

3.1 Existing System Description

Figure 1 presents a map of the existing Bolton water system and surrounding zones. Details of pumping stations and storage facilities that are relevant for this analysis are respectively provided in Table 1 and Table 2. The existing Bolton water system comprises three interconnected zones, which are outlined below:

- Pressure Zone 6: PZ6 is a large open pressure system that services the north end of Brampton, south end of Caledon, and most of Bolton. Water is supplied by West Brampton High Lift (PZ6) Pumping Station (HLPS), Alloa (PZ6) Low Lift Pumping Station (LLPS), East Brampton (PZ6) HLPS, North Brampton (PZ6) LLPS, and Tullamore (PZ6) HLPS. Another station, Sandhill (PZ6) PS, is planned for the future. The system presently has floating storage at Bolton West Elevated Tank (ET), Bolton East ET, and Snelgrove ET, each with a top water level (TWL) of 297 m. Snelgrove ET is soon to be replaced by the proposed Victoria Reservoir. There is also the Bolton North BPS, a small station that draws from Pressure Zone 5B (PZ5B) and supplements supply to the local PZ6 system at the northeast end of Bolton (mainly for emergencies).
- Pressure Zone 5.5: PZ5.5 is a small sub-zone within Bolton that is supplied by PZ6 through the Deer Valley Pressure Reducing Valve (PRV). The Deer Valley PRV maintains a supply HGL of 283 m.
- Pressure Zone 5B: PZ5B is an open pressure system that services part of central Bolton. Water is supplied by the Bolton South BPS fill valves, which act as an altitude valve to fill floating storage at the Bolton Standpipes (SPs) with a TWL of 273 m.

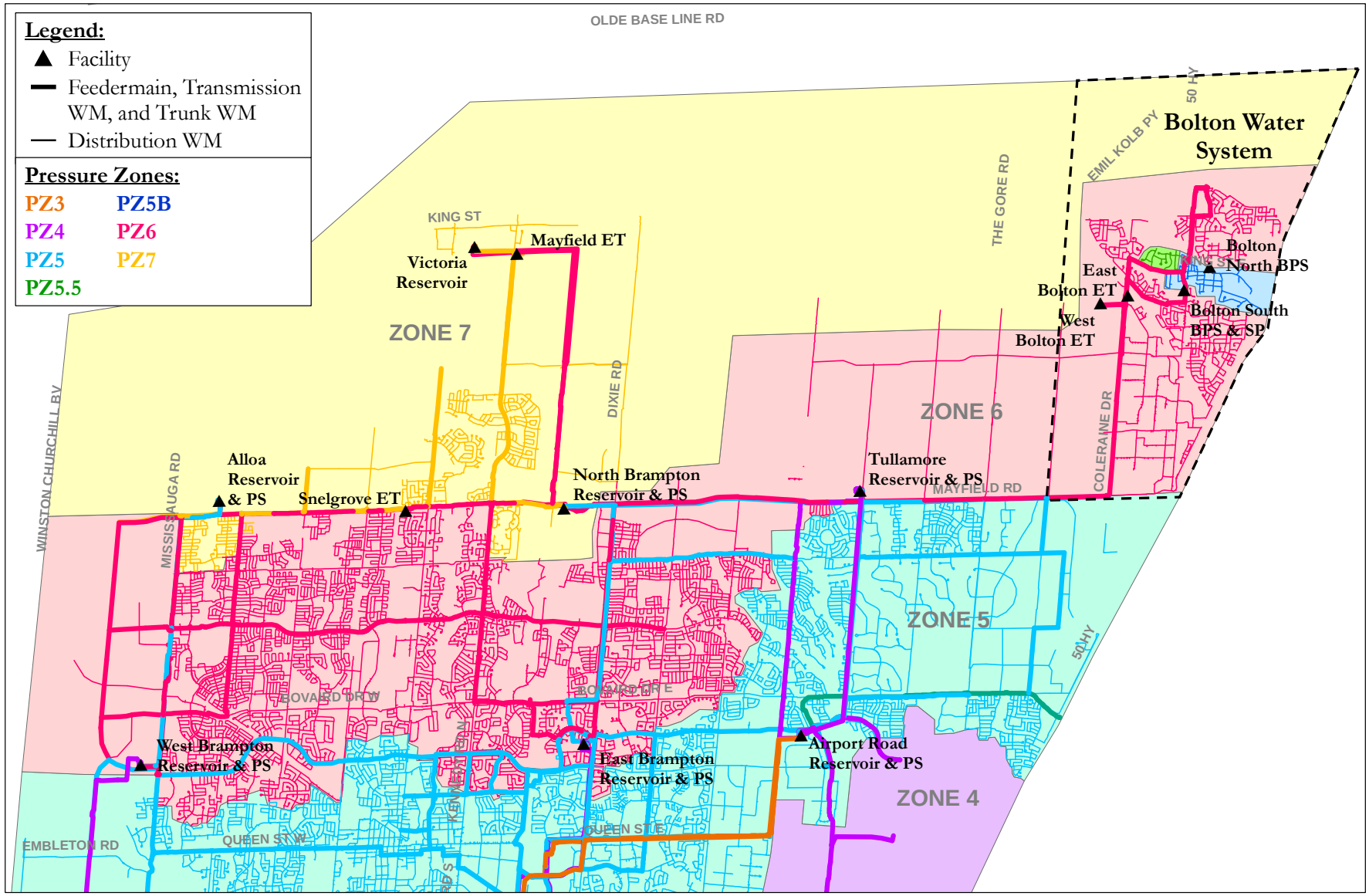


Figure 1: Background – map of existing PZ6, PZ5.5, PZ5B, and PZ7 water systems

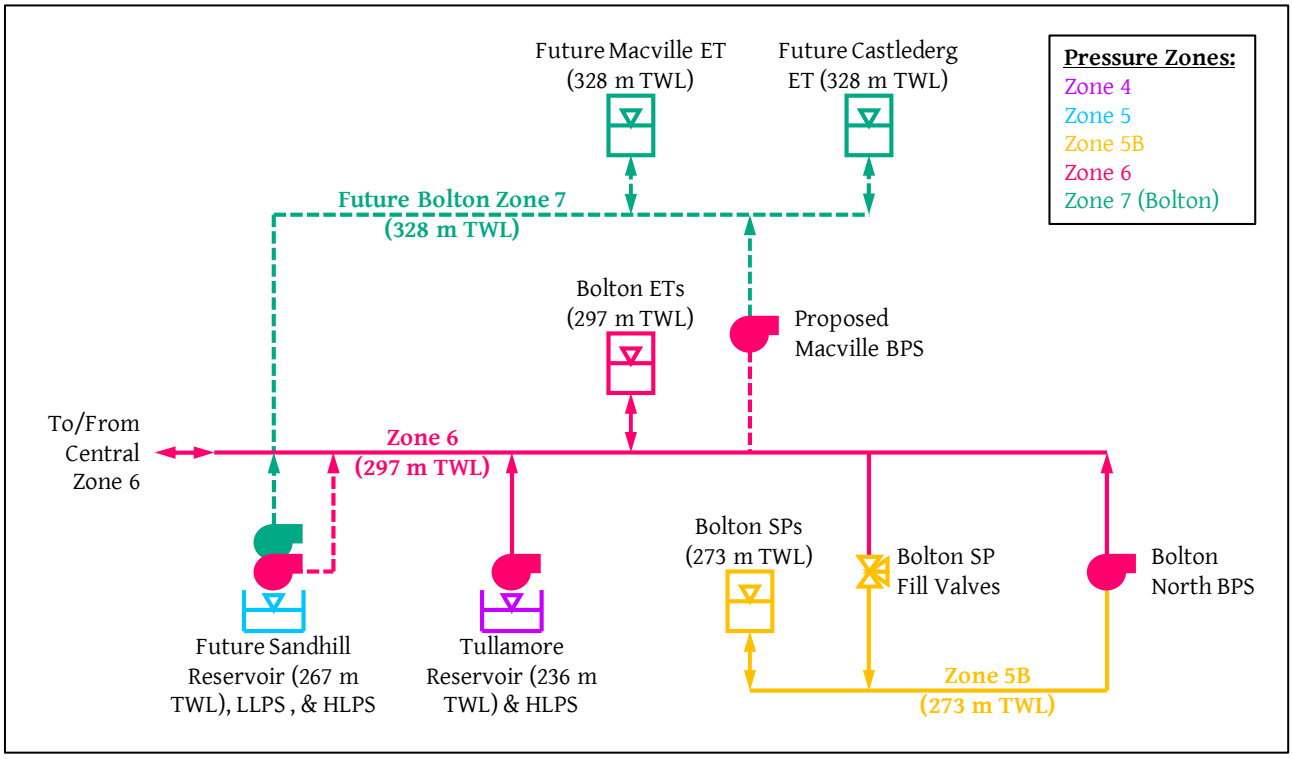


Figure 2: Background – schematic of the Region's existing PZ6 system and proposed Bolton PZ7 system

Table 1: Background – list of relevant pumping stations

Pressure Zone	Station Name	Status	Suction Supply	No. Existing Pumps	Nominal Firm Capacity (ML/d)
PZ6	Tullamore (PZ6) HLPS	Existing	Tullamore Reservoir	4	120
	Bolton South BPS	Existing	Bolton SP	-	-
	Bolton North BPS	Existing	PZ5B	3	9
	Sandhill (PZ6) PS	Future	Sandhill Reservoir	Future	Future
Bolton PZ7	Macville BPS	Proposed	PZ6	4	TBD
	Sandhill (PZ7) PS	Future	Sandhill Reservoir	Future	17.3*

* From the Region's current InfoWater Pro EPS hydraulic model.

Table 2: Background – list of relevant storage facilities

Pressure Zone	Facility Name	Status	Storage Depth (m)	Top Water Level (m)	Volume (ML)
PZ4	Tullamore Reservoir	Existing	6.0	236.2	40
PZ5	Sandhill Reservoir	Future	4.1	266.8	Future
PZ5B	Bolton SP #1	Existing	8.9	273.2	1.6
	Bolton SP #2	Existing	8.9	273.8	1.6
PZ6	West Bolton ET	Existing	13.5*	297.2	9.1
	East Bolton ET	Existing	12.0*	297.2	4.5
Bolton PZ7	Macville ET	Future	Future	327.7	Future
	Castlederg ET	Future	Future	327.7	Future

* These values represent the actual overall ET depths. Typical operating storage depths are 7.2 m for the Bolton ETs.

3.2 North Bolton Water Servicing

Presently, North Bolton water servicing extends to King St. and to Columbia Way (Figure 4). Beyond the existing water system, a number of lands are slated for development, and a water servicing feasibility study was completed by GEI in 2023 to explore different alternatives. Figure 5 illustrates the future system state with the preferred water servicing strategy, including the subject development districts. The preferred strategy comprises:

(i) the formation of a new Bolton PZ7 water system that will service the north end of Bolton and adjacent lands in the south part of Caledon;

(ii) water supply from a single new PZ7 pumping station (Macville BPS) for the interim period, including accompanying suction- and discharge-side watermains,

(iii) a local zone realignment of some high elevation PZ6 lands into Bolton PZ7 to mitigate low system pressures, and

(iv) future provision of floating storage and additional supply from another new Bolton PZ7 pumping station and/or interconnection with the Region's existing central PZ7 water system.

Central to the current hydraulic analysis are items i, ii, and iii. Bolton PZ7 is planned with a future TWL of 327.7 m, matching that of the Region's existing Central PZ7 water system. For the interim period until floating storage is provided, Bolton PZ7 will operate as a closed pressure system with a supply HGL of 327.7 m, and system pressures will be controlled by Macville BPS. For the future period, Bolton PZ7 will operate as an open system with floating storage. The Region's draft 2024 Development Charges (DC) study has identified two Bolton PZ7 storage facilities relevant to the current analysis[1]: Macville Elevated Tank (ET) to the west, and Castlederg ET to the east (Figure 5). A separate study is ongoing by others to confirm planning-level design details of these facilities, including their location and sizing. Further details are presented in the following subsections regarding Macville BPS, the proposed watermains, development lands, and other system upgrades.

3.3 Macville BPS and Proposed Watermains

Figure 5 shows the location of Macville BPS. Figure 3 illustrates a schematic of the proposed Macville BPS layout based on the 50% design drawings. Macville BPS will draw directly from PZ6 (297.2 m TWL) via the proposed 1050 mm PZ6 watermain along Emil Kolb Pkwy., and it will supply the future Bolton PZ7 (327.7 m HGL/TWL) through a proposed 900 mm PZ7 watermain along Emil Kolb Pkwy. and various other watermains. Macville BPS design details are outlined below:

- Interim design flow: 2031 peak hour demand (PHD) and 2031 maximum day demand (MDD) plus fire flow for a design fire demand of 19.0 ML/d (220 L/s).
- Buildout design flow: 2051 MDD without considering additional supply capacity from the future Sandhill PZ7 PS.
- Pumps: Four same-sized pumps will be installed. The pumps will be sized for 2051 MDD, and each pump will have a variable frequency drive (VFD) to provide pressure control under interim closed system conditions. For interim closed system conditions, design flows will be supplied by two duty pumps and two standby pumps, which meets MECP (2023) design guidelines for systems with a single supply and inadequate (or no) floating storage. For future open system conditions, design flows will be supplied by three duty pumps and one standby pump.

[1] A third Bolton PZ7 storage facility, South Albion ET, has also been identified by the Region's draft 2024 DC study. The South Albion ET is planned to be built later than the Macville ET and Castlederg ET, and the South Albion ET will be situated further west of the North Bolton water system. Accordingly, the South Albion ET is not considered in this analysis.

- Pressure control: Under interim closed system conditions, Macville BPS will provide system pressure control using a combination of pump VFDs and two relief/recirculation valves (RRVs; also called back pressure valves).
- Bypass check valve: The Macville BPS design includes a bypass check valve from the suction header (PZ6) to the discharge header (PZ7) for emergency backup supply in case pumping is lost.

The current design scope also includes a number of PZ6 and PZ7 watermains. The proposed watermains are listed below, and they are shown in Figure 6 and Figure 7 along with other future watermains:

- 1050 mm PZ6 watermain along Emil Kolb Pkwy. from the existing 1050 mm PZ6 subtransmission main at King St. W. to Macville BPS.
- 900 mm PZ7 watermain along Emil Kolb Pkwy. from Macville BPS to King St.
- 600 mm PZ7 watermain along King St. from Emil Kolb Pkwy. to west of Humber Station Rd.
- 600 mm PZ7 watermain along Emil Kolb Pkwy. from King St. to Highway 50

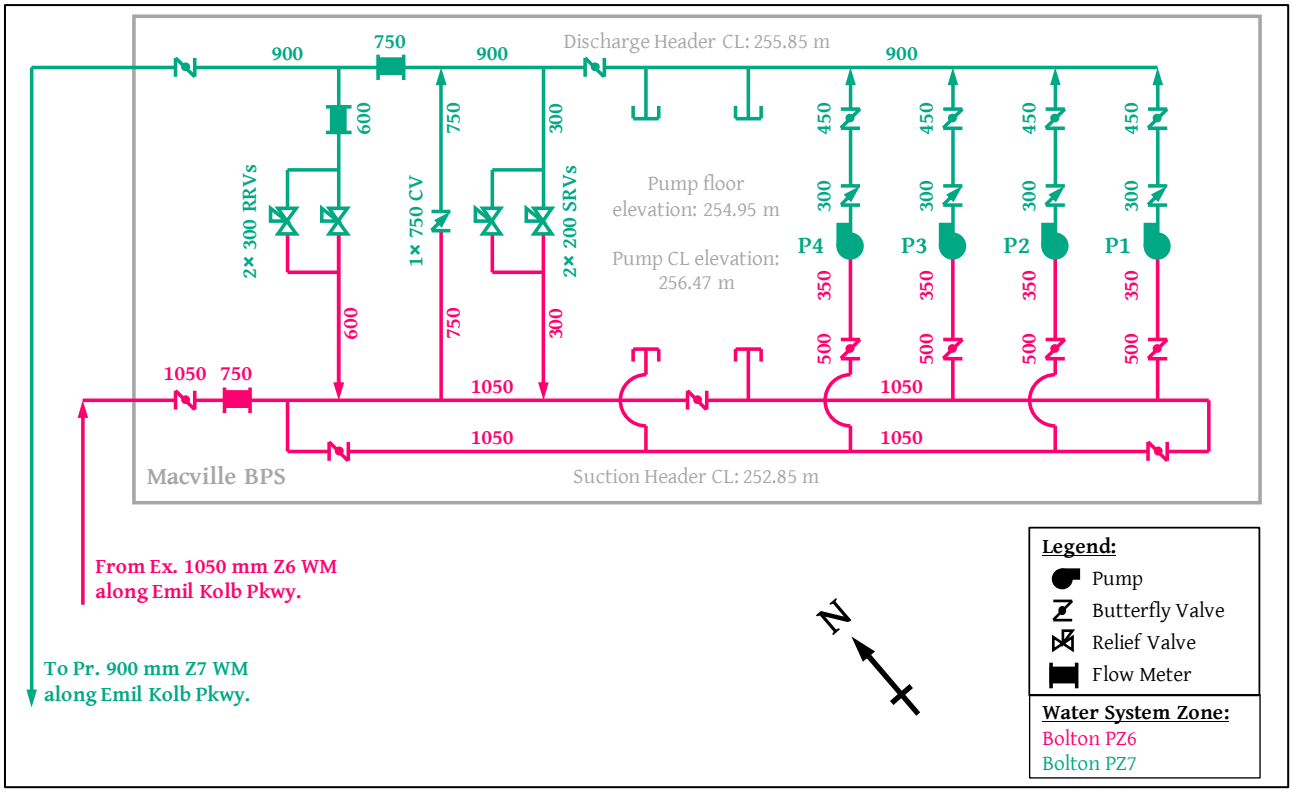


Figure 3: Background – schematic of proposed Macville BPS

3.4 Other Future System Upgrades

Table 4 presents a detailed list of proposed Bolton water system upgrades based on the Region's InfoWater model and the Region's draft 2024 DC Updates study. Figure 6 illustrates a map of the PZ6 water system upgrades, and Figure 7 shows the PZ7 water system upgrades.

4. ZONE REALIGNMENT

The Region's initial zone realignment concept was used as a starting point for the current study. It was analyzed and updated, beginning with an assessment of servicing elevations. Table 3 lists estimated servicing elevations for the existing PZ6 and future (open) PZ7 water systems. From these, Table 3 identifies an elevation of 260 m as the ideal target zone boundary to best achieve the Region's 40 to 100 psi operating pressure range. Figure 8 and Figure 9 illustrate maps of the existing and proposed future zone boundaries, respectively, which consider the target ideal elevation delineation of 260 m. Indeed, the zone realignment boundary is interrelated with the hydraulic analysis and system design. Accordingly, these were considered jointly and iteratively, and Figure 9 reflects the preferred zone boundaries. Further discussions are presented in the 'results and discussion' main section alongside the hydraulic modeling analysis.

Table 3: Zone realignment – servicing elevations

Pressure Zone	Storage Properties				System Head Loss* (m)	System Pumping Gain* (m)	Servicing Elev. (m)	
	Facility	Depth (m)	TWL (m)	Level Range*			Lower (100 psi)	Upper (40 psi)
PZ6	West and East Bolton ETs	7.2+	297.2	50-95%	4	2	229	261
PZ7	Macville ET & Castlederg ET	10.0	327.7	40-95%	4	2	259	290

* Hydraulic modeling results were used to determine suitable parameters for typical storage level ranges (minimum and maximum), system head losses (relative to minimum storage HGLs), and system pumping HGL gains (relative to maximum storage HGLs).

\+ A storage depth of 7.2 m is considered for the West and East Bolton ETs based on their typical operating depths.

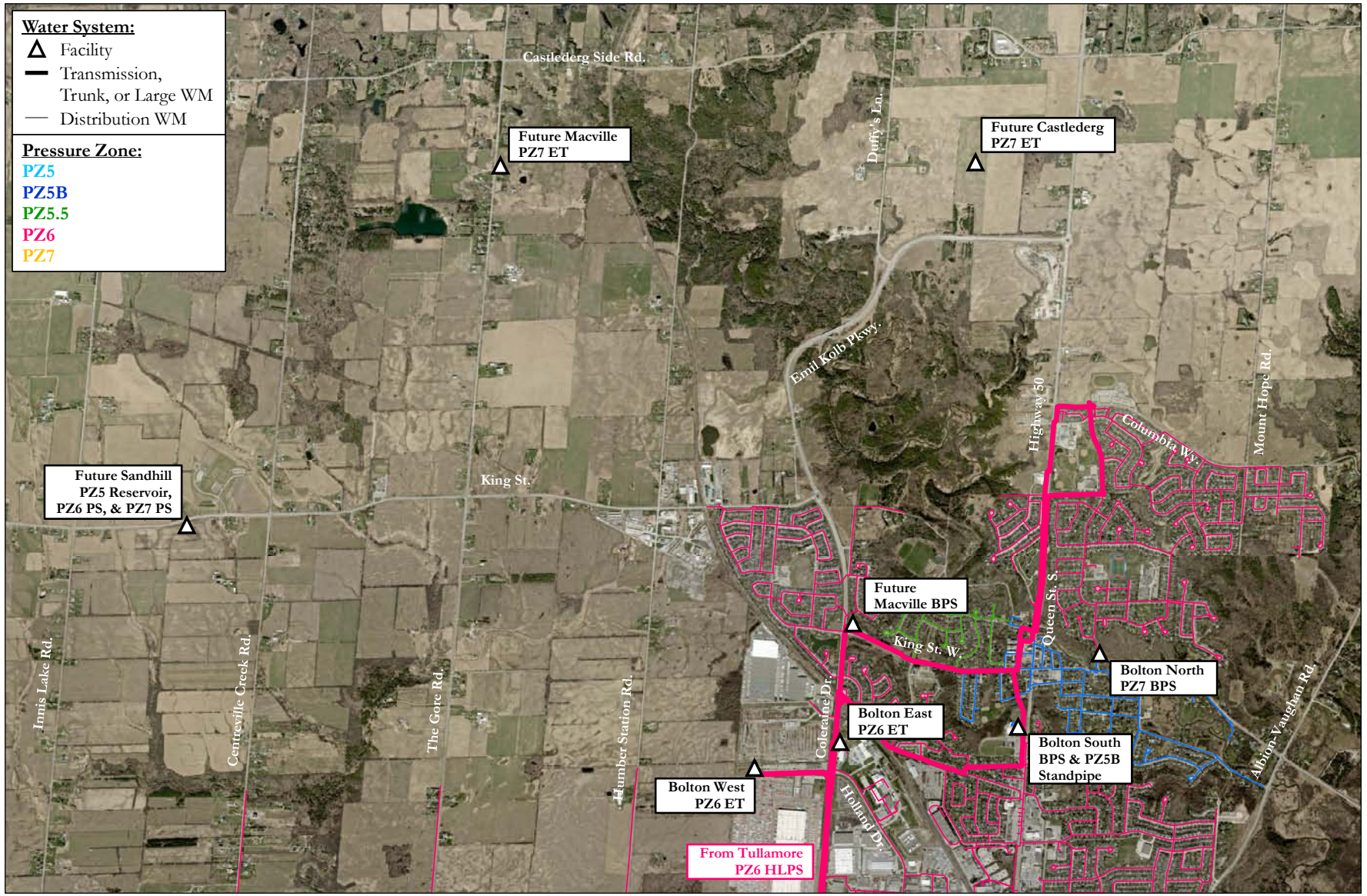


Figure 4: Background – Bolton water system with existing zone boundaries and watermains

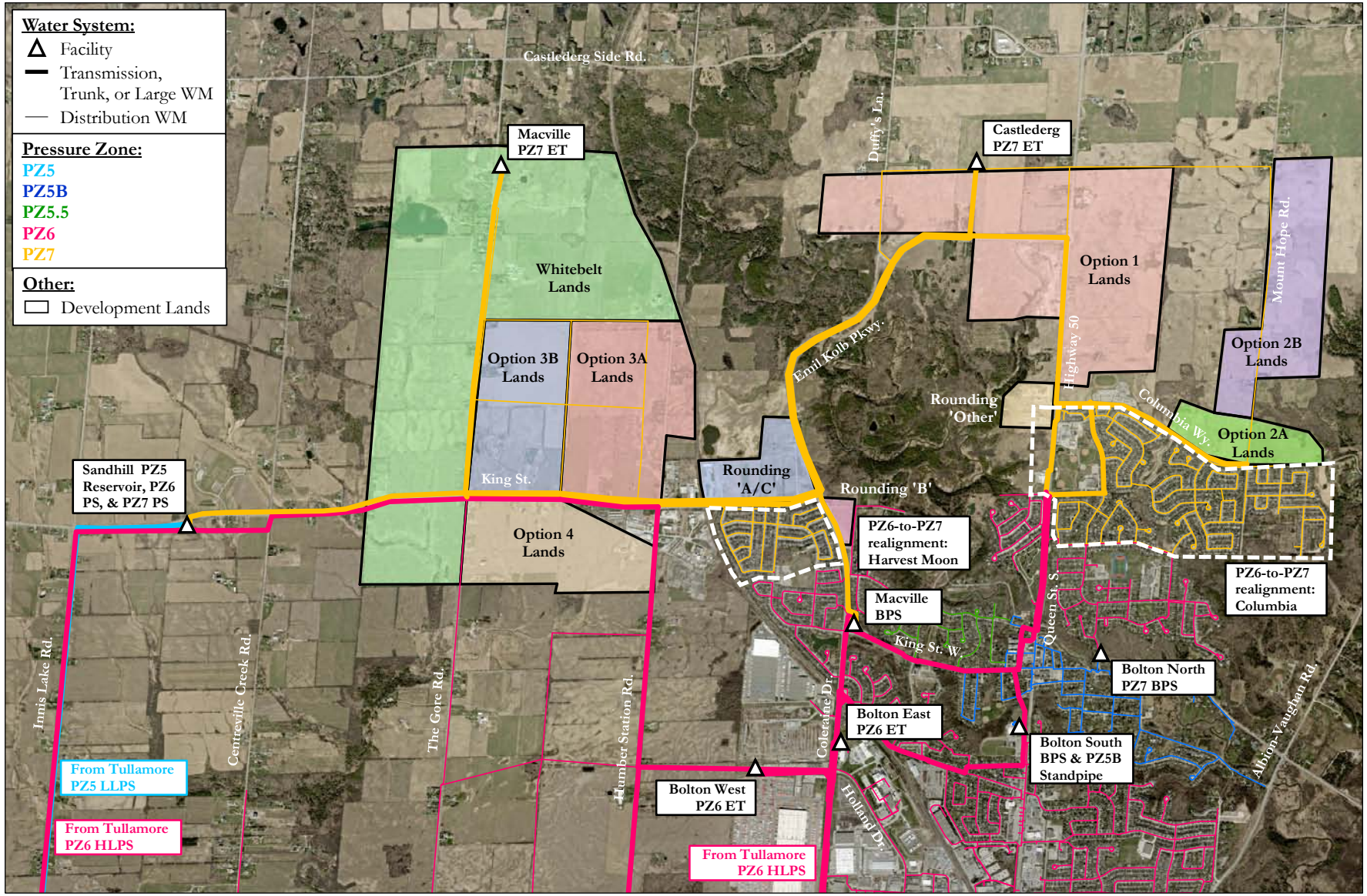


Figure 5: Background – Bolton water system with future zone boundaries, watermains, and development areas (districts)

Table 4: Background – list of Bolton water system upgrades from Region DC study

Pressure Zone	Description	Location	Region DC Study IDs		Year Active		
			Component	Project	Region DC Study	As-Received Model	Analysis
6	Tullamore LLPS Expansion	Tullamore LLPS	56933	27-1964	2029	n/a	n/a
	Sandhill PZ6 PS	King between Innis Lake/Centreville Creek	38090	29-1999	2031	2037	2036
	600 mm Humber Station PZ6 watermain	Humber Station (Healey to King)	32592 32594	24-1194 27-1191	2026 2029	2028	2026 2029
	600 mm West Bolton PZ6 watermain	The Gore to West Bolton ET	32590	24-1194	2026	2026	2026
	750 mm Healey PZ6 watermain	Healey (Humber Station to Coleraine)	32588	24-1267	2024	2026	2026
	900 mm Healey PZ6 watermain	Healey (Innis Lake to Humber Station)	37579	24-1268	2026	2031	2031
	1200 mm Innis Lake PZ6 watermain	Innis Lake (Tullamore PS to Healey)	30976	24-1269	2026	2031	2031
	750 mm King-Humber Station PZ6 watermain	King and Humber Station (The Gore to south of King)	56914	29-1199	2034	n/a	2036
	600 mm King PZ6 watermain	King (Sandhill PZ6 PS to The Gore)	Unk.	Unk.	2034	2037	2036
	600 mm Innis Lake PZ6 watermain	Innis Lake and King from Healey to Sandhill PZ6 PS	n/a	n/a	n/a	2037	2041
7	Macville BPS	Emil Kolb/King	n/a	n/a	2026	2027	2031
	Sandhill PZ7 PS	King between Innis Lake/ Centreville Creek	38090	29-1999	2031	2037	2036
	Macville ET	The Gore south of Castlederg	32010	29-1999	2032	n/a	2032
	Castlederg ET	Between Highway 50, Castlederg, Duffys	35616	25-1599 29-1999	2035	n/a	2036
	South Albion ET	Innis Lake/Castlederg Side	35758	29-1599 29-1999	2037	9999	n/a
	900 mm Emil Kolb PZ7 watermain	Emil Kolb (Macville BPS to King)	53990	24-1266	2026	2027	2031
	600 mm Emil Kolb PZ7 watermain	Emil Kolb (King to Highway 50)	54019	24-1191, 27-1199	2026	2027	2031

Pressure Zone	Description	Location	Region DC Study IDs		Year Active		
			Component	Project	Region DC Study	As-Received Model	Analysis
	600 mm King PZ7 watermain	King (Emil Kolb to west of Humber Station)	53992	24-1190	2026	2027	2031
	400 mm Highway 50 PZ7 watermain	Highway 50 (Emil Kolb to Columbia _	54021	24-1191	2026	2027	2031
	400 mm Columbia PZ7 watermain	Columbia (Highway 50 to Mount Hope)	56947	24-1191	2026	2027	2031
	900 mm King PZ7 watermain	King (The Gore to west of Humber Station)	31439	29-1299	2032	n/a	2032
	900 mm Macville PZ7 watermain	King and The Gore (Sandhill PS to Macville ET)	31439	29-1299	2032	n/a	2032
	750 mm Castlederg PZ7 watermain	King, Emil Kolb, and new road (Humber Station to Castlederg ET)	31817	29-1299	2035	n/a	2036
	400 mm Mount Hope PZ7 watermain	Mount Hope (Columbia to Option 2B lands)	n/a	n/a	n/a	2041	2041
	400/300 mm Northeast PZ7 watermains	Various around Option 1 and Option 2B lands	n/a	n/a	n/a	2041	2051

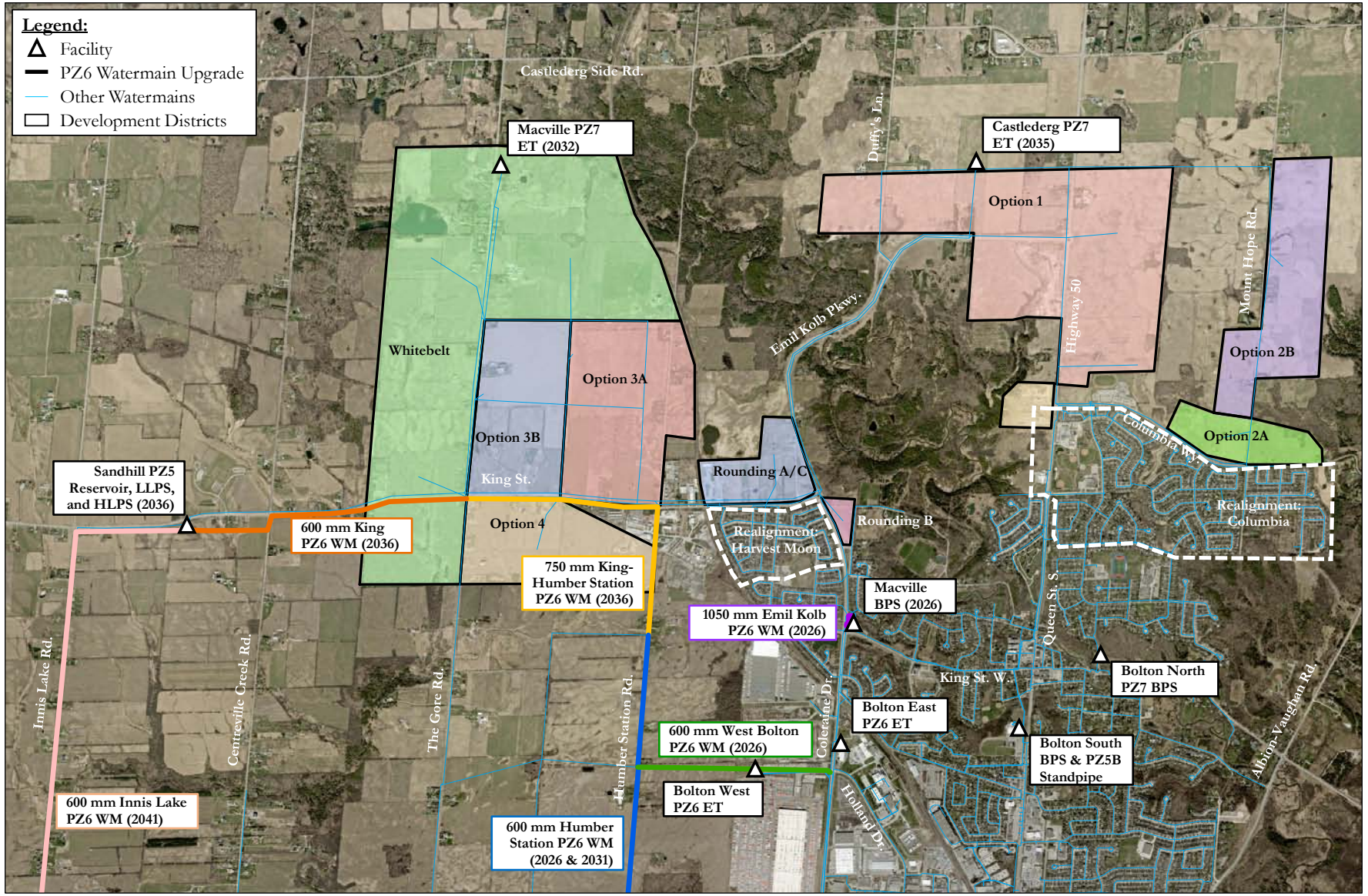


Figure 6: Background – map of Bolton PZ6 water system upgrades from Region DC study

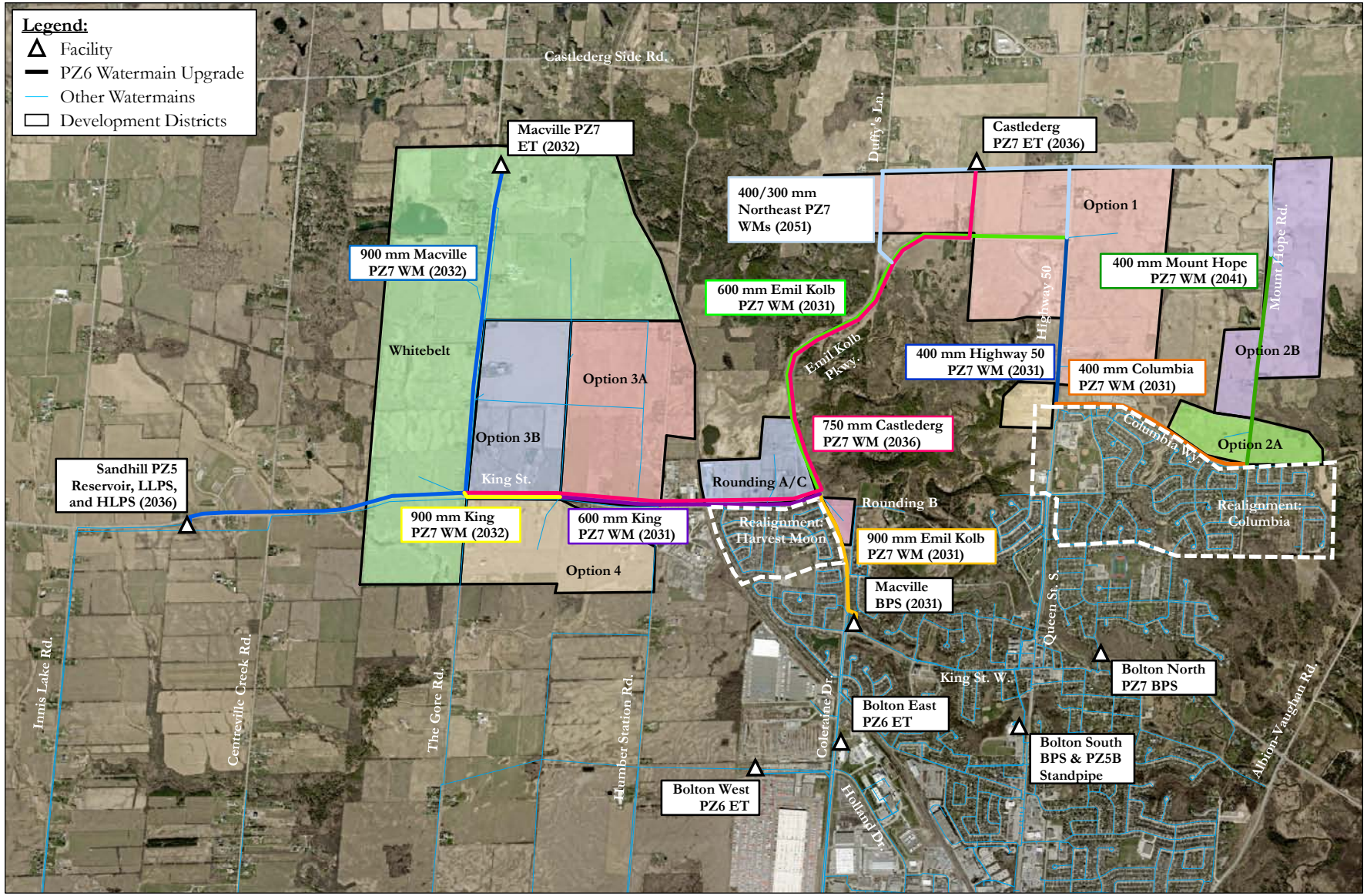


Figure 7: Background – map of Bolton PZ7 water system upgrades from Region DC study

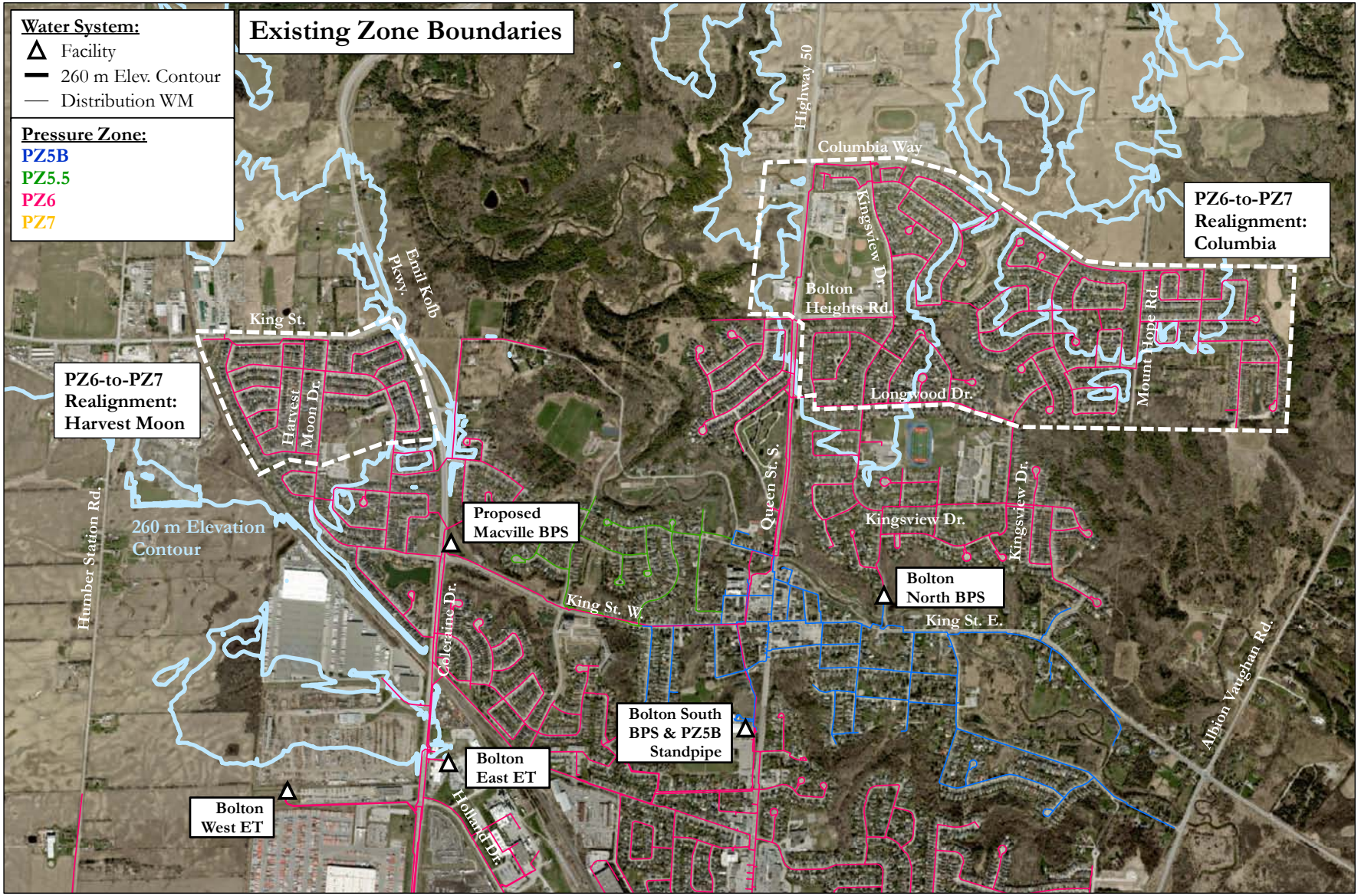


Figure 8: Zone realignment – target zone boundary contour with existing zone boundaries

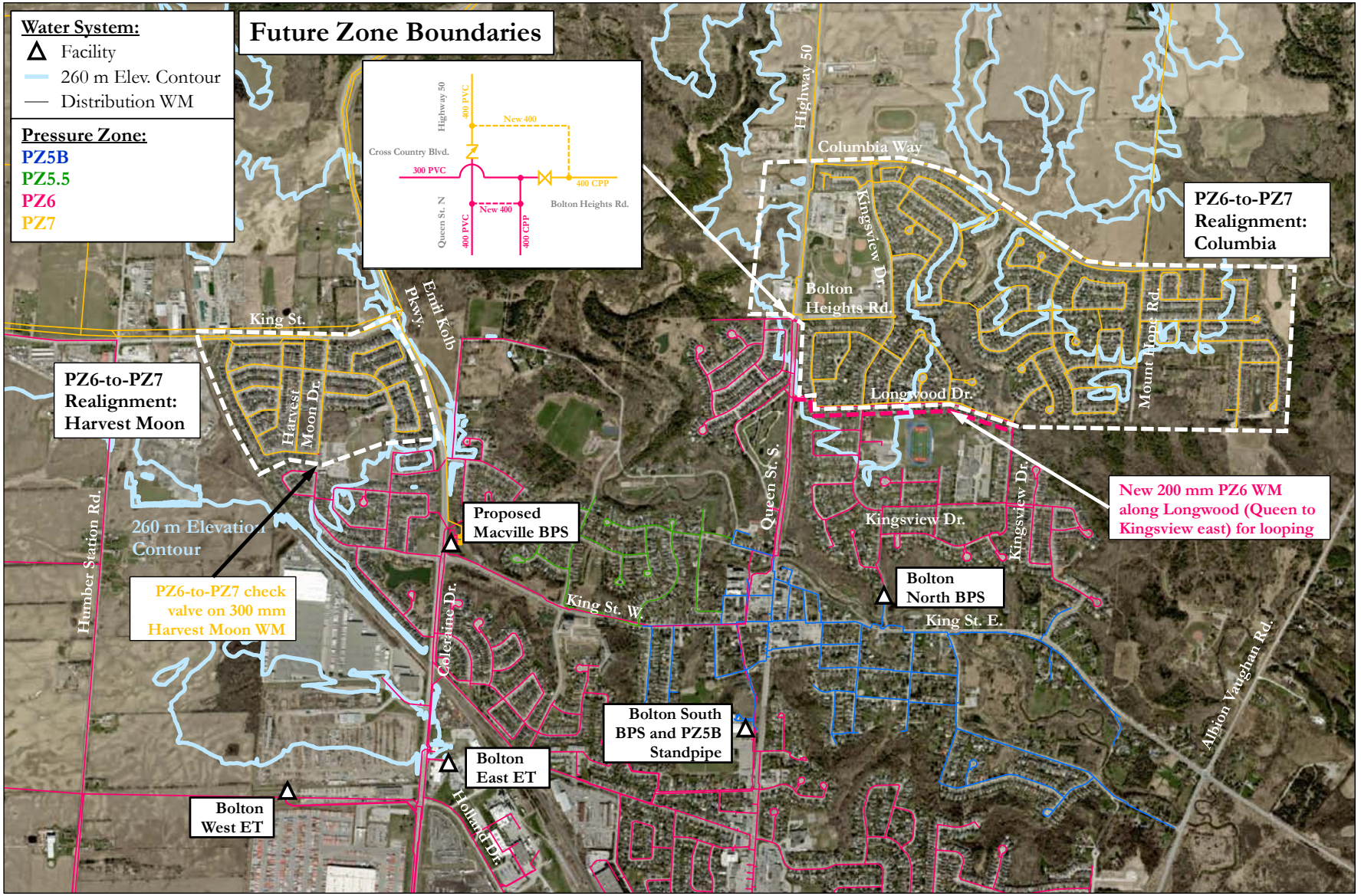


Figure 9: Zone realignment – target zone boundary contour with future zone boundaries

5. METHODOLOGY

A hydraulic modeling analysis was completed for Macville BPS, the proposed watermains, and the zone realignment. The Region's InfoWater EPS model was used as a basis, and it was updated according to the design drawings, future developments, and planned future infrastructure (Table 4, Figure 6, and Figure 7). Using the updated model, a range of conditions were tested to analyze the proposed system upgrades, including system (resistance) curves, station operating hydraulics, system pressures, and fire flow capacities. Details of the methodology, analysis, and assumptions are outlined below:

- Model years: 2026, 2031A (closed system), 2031B (open system), 2036, 2041, and 2051. Table 5 lists the corresponding infrastructure statuses.
- Analysis approach: Table 6 outlines the analysis approach. The first two analysis groups focus on Macville BPS (system curves and station operating hydraulics), while the latter two analysis groups test the system performance (e.g., system pressures, fire flow capacities), including for the existing system (pre-zone realignment) and future conditions (post-zone realignment).
- Development water demands: Table 7 lists the development district water demands for average day demand (ADD), MDD, and PHD. The demands were provided by Burnside (2024), and they are based on the Region's design criteria. Table 7 includes alternate PHDs, which were estimated based on Burnside's MDD values and the Region's InfoWater model diurnal demand pattern multiplier. The latter PHD values are slightly higher and thus more conservative, so they were used for the analysis.
- System demand: The analysis considers minimum hour demand (MHD), ADD, MDD, PHD, and MDD plus fire flow. Time-varying demands are considered for ADD EPSs and MDD EPSs, whereby the former intrinsically includes MHD and the latter includes PHD. Table 8 lists the updated Bolton PZ7 system water demands, which incorporate the development district water demands and zone realignment demands.
- System pumping: System pumping was modeled according to scenario-specific analysis objectives or using EPS controls. For interim closed system EPS scenarios, Macville BPS was modeled with VFD controls to maintain a target discharge HGL of 323 m (mid-way between the future 327.7 m TWL and the minimum required closed system HGL). For future open system conditions, Macville BPS and Sandhill PZ7 PS were configured to maintain target storage levels of 50-90% for Bolton PZ7 storage.
- Storage levels: For system curve scenarios, the following were considered: low water level (LWL) of 40%, average water level (AWL) of 70%, high water level (HWL) of 95%. The aforementioned LWL, AWL, and HWL values are based on discussions with the Region and a review of the Region's InfoWater model. For EPS scenarios, time-varying levels were modeled.
- Future Bolton PZ7 storage volume: The future Macville ET and Castlederg ET were each modeled with an assumed typical ET storage volume of 7 ML. The ETs are likely to have larger volumes in order to provide adequate floating storage according to MECP (2023; on the order of 10-15 ML each), so the smaller volume considered here is more conservative. Additionally, this only affects the pump-storage cycling period for EPS scenarios and not pumping capacity.
- Macville BPS:
    - Design flows: Table 9 outlines the Macville BPS design flows for different demand conditions and model years. The key design flows are summarized below:
        - Interim closed system, 2031 PHD: 290 L/s (25.0 ML/d).

        - Interim closed system, 2031 MDD plus fire: 408 L/s (35.2 ML/d) based on a 220 L/s design fire demand.
        - Future open system, 2051 MDD: 741 L/s (64.1 ML/d) with no Sandhill PZ7 PS, and 541 L/s (46.8 ML/d) with Sandhill PZ7 PS.
    - Pumps: Macville BPS was modeled with four 21.4 ML/d pumps based on the 2051 MDD design flow (64.1 ML/d) and three duty pumps.
    - Local losses: Table 10 lists the internal station local loss coefficients modeled for Macville BPS based on the 50% design drawings (Figure 3).
    - System curves: Macville BPS system curves were modeled for closed system conditions (i.e., with no floating storage) and open system conditions. For the former, the system curve results represent the minimum required TDH to maintain system pressures above 40 psi for up to PHD, while the fire flow system curves considers a minimum system pressure of 20 psi at the design MDD plus fire flow state. From a review of the interim Bolton PZ7 system, minimum pressures are generally controlled by a high point at the Option 3A lands with a local ground elevation of 276.5 m.
    - Closed system pressure control: Conditions were modeled using VFDs and/or RRVs for discharge pressure control under interim closed system conditions.
    - RRVs: The proposed RRVs were modeled as inactive for system curve scenarios and open system scenarios. For all other scenarios, the RRVs were modeled as active with an HGL set point of 327.7 m to match the proposed future Bolton PZ7 TWL.
- Fire flows: Fire flows were analyzed using available fire flow (AFF) simulations. For a given location, the AFF represents the maximum flow that can be withdrawn under MDD conditions subject to (i) maintaining local and broader system pressures above 20 psi (140 kPa; 14.3 m) and (ii) conservatively limiting velocities to less than 5 m/s. The latter criterion, while not required per the Region's standards, yields more conservative results, and it is considered here as a reasonable limit for practical purposes.
- Hazen-Williams roughness (C-factors): From the MECP design criteria (2023), any new watermains were modeled with C = 100, 110, 120, and 130 for diameters of 150 mm or less, 200 mm, 300-600 mm, and above 600 mm, respectively. Existing system watermains were modeled with C-factors according to the Region's as-received InfoWater model.
- Other assumptions:
    - A skeleton network of 300 mm watermains was modeled for the Option 3A and 3B lands (Figure 5). The actual local network design has yet to be determined, and it will likely have more watermains with greater local capacity. Accordingly, the current approach is expected to provide a conservative representation.
    - For development districts with a completion time frame of 2051 (Table 7; e.g., Option 1B, Whitebelt), 2036 demands were allocated assuming 25% buildout, and 2041 demands were allocated assuming 50% buildout.
    - Sandhill PZ7 PS was modeled with a single 17.3 ML/d (200 L/s) pump based on the Region's as-received InfoWater model. Conditions are tested without and with this station.

Table 5: Methodology – model years and infrastructure statuses

Model Year	Pumping Stations		PZ7 Storage		Zone Boundaries	Active Development Districts
	Macville BPS	Sandhill PZ7 PS	Macville ET	Castlederg ET		
2026	Not Built	Not Built	Not Built	Not Built	Existing	None
2031A	Active	Not Built	Not Built	Not Built	Realigned	1A, 3A, Rounding 'B'
2031B	Active	Not Built	Active	Not Built	Realigned	1A, 3A, Rounding 'B'
2036	Active	Active	Active	Active	Realigned	All
2041	Active	Active	Active	Active	Realigned	All
2051	Active	Active	Active	Active	Realigned	All

Table 6: Methodology – analysis groups

No.	Group Description	Planning Years	Demands	Pumping	Storage Levels	Simulation Type
1	Macville BPS system curves for interim closed system and future open system	2031A, 2031B, 2051	Up to MDD+Fire	Scenario-Specific	Fixed	System Curve
2	Macville BPS operating hydraulics (flows, velocities, pressures, HGLs, NPSHa)	2031A, 2031B, 2051	Up to MDD+Fire	-	-	-
3	EPS of typical operating conditions for system pressures	2026, 2031A, 2031B, 2036, 2041, 2051	ADD EPS, MDD EPS	EPS Controls	Variable	EPS
4	Fire flow analysis of system available fire flows	2026, 2031A, 2031B, 2036, 2041, 2051	MDD	Scenario-Specific	LWL	AFF

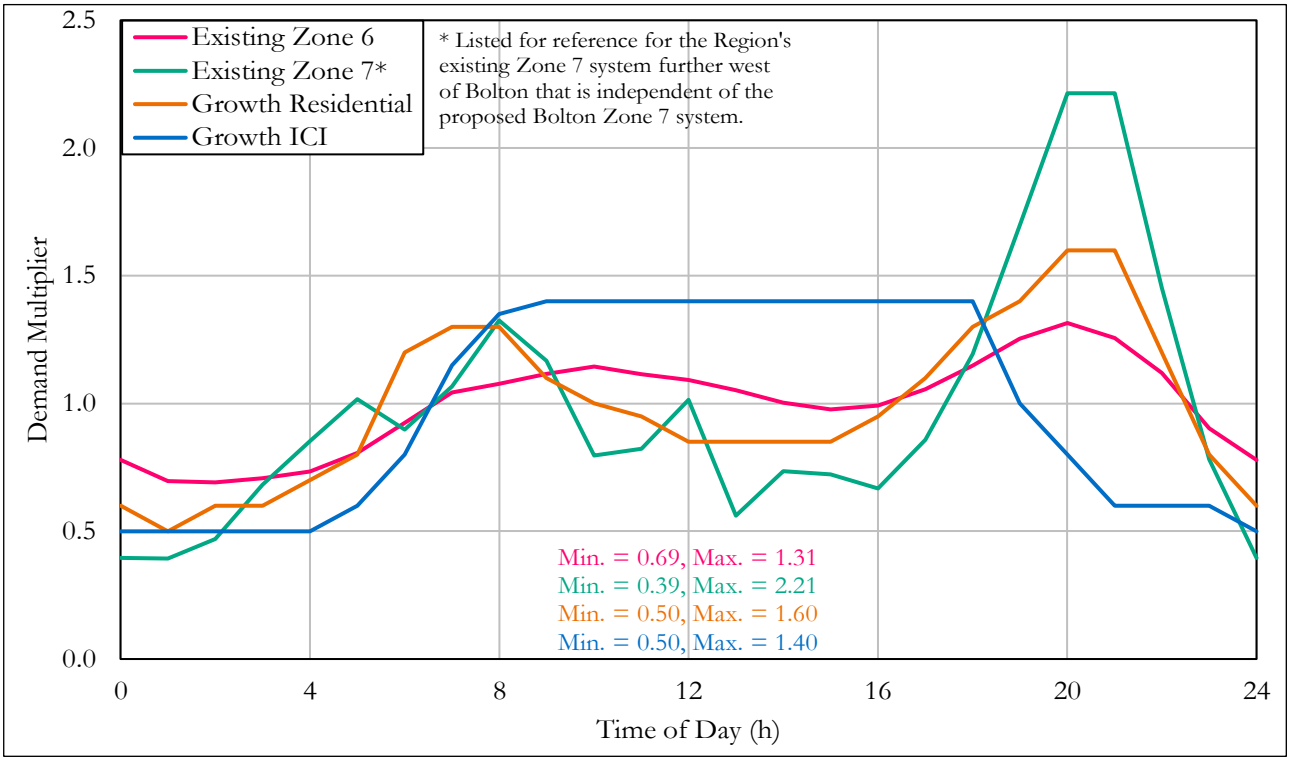


Figure 10: Methodology – InfoWater model, EPS diurnal demand patterns

Table 7: Methodology – development statistics and water demand estimates

Development Land	Time Frame	Area (ha)	Population	Demand (L/s)				Elevation Range (m)	
				ADD[1]	MDD[1]	PHD[1]	PHD[2]	Min.	Max.
Option 1A	2031	32.1	2,960	9.6	19.2	28.8	30.7	258	269
Option 1B	2051	146.5	12,700	41.5	81.1	125	130	246	277
Option 1 Total	-	178.6	15,700	51.1	100	153	160	246	277
Option 2A	2051	23.8	3,310	10.7	21.4	32.1	34.3	238	263
Option 2B	2051	71.3	9,920	32.1	64.3	96.4	103	235	265
Option 2 Total	2051	95.0	13,200	42.8	85.7	129	137	235	265
Option 3A	2031	77.5	19,100	62.2	122	187	196	261	277
Option 3B	2051	104.9	11,500	37.6	73.3	113	117	261	281
Option 3 Total	-	182.4	30,700	99.8	196	299	313	261	281
Option 4	2051	28.0	3,950	12.8	25.6	38.4	41.0	255	266
Rounding 'A/C'	2051	20.7	2,920	9.4	18.9	28.3	30.2	248	266
Rounding 'B'	2031	8.5	1,200	3.9	7.8	11.7	12.5	247	263
Rounding Total	-	29.2	4,120	13.3	26.7	40.0	42.7	247	266
Whitebelt	2051	290.0	40,900	133	265	398	424	250	299
Total 2031	**-**	**118.1**	**23,300**	**75.7**	**149**	**227**	**239**	**-**	**-**
Total 2051	**-**	**803.2**	**108,500**	**352**	**699**	**1057**	**1118**	**-**	**-**

1 Demand estimates were provided by Burnside and are based on the Region's design criteria.
2 Based on (i) MDD estimates provided by Burnside and (ii) a diurnal demand pattern hourly peaking factor of 1.60 from the Region's InfoWater model.

Table 8: Methodology – Bolton PZ7 system water demands

Model Year	Bolton PZ7 System Demand by Demand Condition							
	(L/s)				(ML/d)			
	MHD	ADD	MDD	PHD	MHD	ADD	MDD	PHD
2026*	16.0	23.4	36.9	48.4	1.39	2.03	3.18	4.18
2031	54.9	101	188	290	4.74	8.72	16.2	25.0
2036	90.7	173	331	518	7.84	14.9	28.6	44.7
2041	125	240	465	733	10.8	20.8	40.2	63.3
2051	194	379	741	1174	16.8	32.8	64.1	101

* 2026 demands represent the existing Harvest Moon and Columbia areas that will be realigned to PZ7.

Table 9: System curves – Macville BPS design flows

Bolton PZ7 Storage	Model Year	System Demand Condition	Design Flow		Notes
			(L/s)	(ML/d)	
None	2031	PHD	290	25.0	
	2031	MDD+Fire	408	35.2	
Macville ET and/or Castlederg ET	2031	MDD	188	16.2	
	2036	MDD	326	28.2	
	2041	MDD	465	40.2	
	2051	MDD	741	64.1	With no Sandhill PZ7 PS
	2051	MDD	541	46.8	With Sandhill PZ7 PS

Table 10: Methodology – Macville BPS local loss coefficients

Section	Local Loss Sizes and Descriptions	Model Pipe Diameter (mm)	Total Resistance* (s^2/m^5)	Equivalent Local Loss Coeff.
Pump suction pipe	1050 mm tee branch, 1050×500 mm reducer, 500 mm bend, 500 mm BFV	500	2.26	1.7
	500×350 mm reducer, 350×300 mm reducer	350	1.10	0.2
Pump discharge pipe	300 mm check valve, 300×450 mm expansion	300	43.3	4.2
	450 mm BFV, 450×900 mm expansion, 900 mm tee branch	450	5.15	2.6
RRV (back pressure) line, upstream (PZ7)	600 mm tee branch, bends, BFV	600	3.30	5.2
	300 mm bend, BFV, tee branch	300	29.1	2.9
RRV (back pressure) line, downstream (PZ6)	300 mm bend, BFV, tee branch	300	29.1	2.9
	600 mm tee branch, bends, BFV	600	1.96	3.1
SRV line, upstream (PZ7)	900 mm tee branch, 900×300 mm reducer, 300 mm BFV, 300 mm tee branch	300	26.1	2.6
	200 mm bend, BFV	200	81.4	1.6
SRV line, downstream (PZ6)	200 mm bend, BFV	200	81.4	1.6
	300 mm tee branch, 300 mm BFV, 300 mm bend, 300×1050 mm expansion, 1050 mm tee branch	300	30.0	2.9
Station suction header, common	1050 mm BFV, 1050×750 reducers	1050	0.12	1.7
Station suction header, north	1050 mm tee lines and BFV	1050	0.20	3.0
Station suction header, south	1050 mm tee branch, tee lines, bend, BFVs	1050	0.35	5.1
Station discharge header	900 mm tee lines and BFVs, 900×750 reducers	900	0.69	5.5

* Based on local loss coefficients from "Advanced water distribution modeling and management" by Haestad Methods et al. (2003), Haestad Press.

6. RESULTS AND DISCUSSION

6.1 Macville BPS System Curves

Macville BPS system curves were modeled for various conditions to assess the design bases and overall range. Table 11 lists the system curve analysis scenarios, which consider different system states, demands, storage levels, and pumping conditions. For interim closed system conditions, Scenarios 1A to 1E test the minimum required Macville BPS TDH to maintain adequate minimum Bolton PZ7 system pressures (40 psi for non-emergency, and 20 psi for MDD plus fire). The remaining scenarios represent the Macville BPS TDH as it varies with total station flow for the given scenario system conditions. Scenarios used for design bases are marked as such in Table 11. System curve results are presented in Table 12 (design points) and Figure 11 to Figure 15 (system curve plots), and below are summary discussions of the results:

- System curve range: Figure 11 shows a relatively narrow band of system curves for the interim closed system state. This is because there is no discharge-side storage, and thus no discharge side storage level variations. Consequently, suction-side hydraulics are the key factors affecting the band of TDHs, namely, PZ6 storage levels and demands. Comparatively, Figure 14 and Figure 15 illustrate a wider band of system curves for Bolton PZ7 open system conditions.
- Design points: Table 12 lists the station and pump design points for different design bases. For interim closed system conditions, Table 12 includes design points based on maintaining adequate minimum system pressures (i.e., 40 psi for non-emergency conditions and 20 psi for MDD plus fire) and based on a station discharge HGL of 327.7 m to match the future Bolton PZ7 TWL. The governing design point is 2051 MDD (64.1 ML/d at 37.4 m pump TDH).
- Design-type pump curves: To characterize the operating ranges, the system curve plots include design-type pump curves based on the governing 2051 MDD design point. Design-type pump curves are a fictitious model representation derived from a given operating point, and they are intended to provide an approximation of what pumps may be installed. Indeed, since the pumps are proposed to be sized for 2051 MDD, the pumps are rather large for the interim period, particularly closed system conditions. Moderate to high flows will thus likely need to be recirculated using the RRVs in order to avoid high discharge pressures, and this is discussed more in the following subsection.
- Closed system discharge HGL: Figure 12 and Figure 13 plot the required Macville BPS discharge HGLs curves for the closed system state. These represent the minimum required discharge HGLs to maintain adequate minimum system pressures at different demands, that is, 40 psi for non-emergency conditions and 20 psi for MDD plus fire conditions. From these, the minimum required Macville BPS discharge HGLs are: (i) 315.1 m for 2031 PHD (25.0 ML/d) and (ii) 319.7 m for 2031 MDD plus fire (35.2 ML/d). Both of these are below the proposed Bolton PZ7 operating HGL of 327.7 m, thus indicating that an operating HGL range of 319.7-327.7 m HGL should maintain adequate minimum system pressures under PHD and MDD plus fire conditions.
- Station losses: Results from the system curve analysis indicate internal station head losses on the order of 2.4-4.1 m. For interim conditions, the station head loss corresponds to 6-11% of the design pump TDH, and this is fairly typical.

Table 11: System curves – list of analysis scenarios

Model Year	ID	Description	System Demand	No. Pumps On		Bolton SP Status	PZ7 Storage	Storage Levels*	
				Tullamore PZ6 PS	Sandhill PZ7 PS			PZ6	PZ7
2031 Closed System	1A	Typical	ADD	2	n/a	Draining	None	AWL	None
	1B	Typical	ADD	2	n/a	Filling	None	AWL	None
	1C	Lower	ADD	3	n/a	Draining	None	HWL	None
	1D	Upper	PHD	1	n/a	Filling	None	LWL	None
	1E	Fire	MDD+FF^	2	n/a	Filling	None	LWL	None
2031 Open System	2A	Typical	ADD	2	n/a	Filling	Macville	AWL	AWL
	2B	Lower	PHD	3	n/a	Draining	Macville	HWL	LWL
	2C	Upper	ADD	1	n/a	Filling	Macville	LWL	HWL
	2D	Design	MDD	2	n/a	Filling	Macville	AWL	AWL
	2E	Design	MDD	2	n/a	Filling	Castlederg	AWL	AWL
2051	3A	Typical	ADD	2	0	Filling	Both	AWL	AWL
	3B	Lower	PHD	3	0	Draining	Both	HWL	LWL
	3C	Upper	ADD	1	1	Filling	Both	LWL	HWL
	3D	Design	MDD	2	0	Filling	Both	AWL	AWL
	3E	Design	MDD	2	1	Filling	Both	AWL	AWL

* LWL = 40%, AWL = 70%, and HWL = 95% based on typical operating ranges.
^ Including a Bolton PZ7 fire flow demand of 220 L/s at the Option 3A lands high point.

Table 12: System curves – summary of design points

Design Conditions	Scenario	System Demand	No. Pumps On	Design Flow (ML/d)		TDH (m)	
				Station	Avg. Pump	Station	Avg. Pump
2031 Closed, Min. Required Pressures	1A	ADD	1	8.72	8.72	10.3	12.7
	1D	PHD	2	25.0	8.34	22.8	25.3
	1E	MDD+FF	2	35.2	11.8	27.3	29.9
2031 Closed, 327.7 m PZ7 HGL	1A	ADD	1	8.72	8.72	32.0	34.5
	1D	PHD	2	25.0	8.34	35.4	37.9
	1E	MDD+FF	2	35.2	11.8	35.3	37.9
2031 Open, Macville ET	2D	MDD	2	16.2	5.41	30.3	33.9
2031 Open, Castlederg ET	2E	MDD	2	16.2	5.41	29.9	33.5
2051, No Sandhill PZ7 PS	3D	MDD	3	64.1	16.0	33.3	37.4
2051, With Sandhill PZ7 PS	3E	MDD	3	46.8	11.7	31.7	35.6

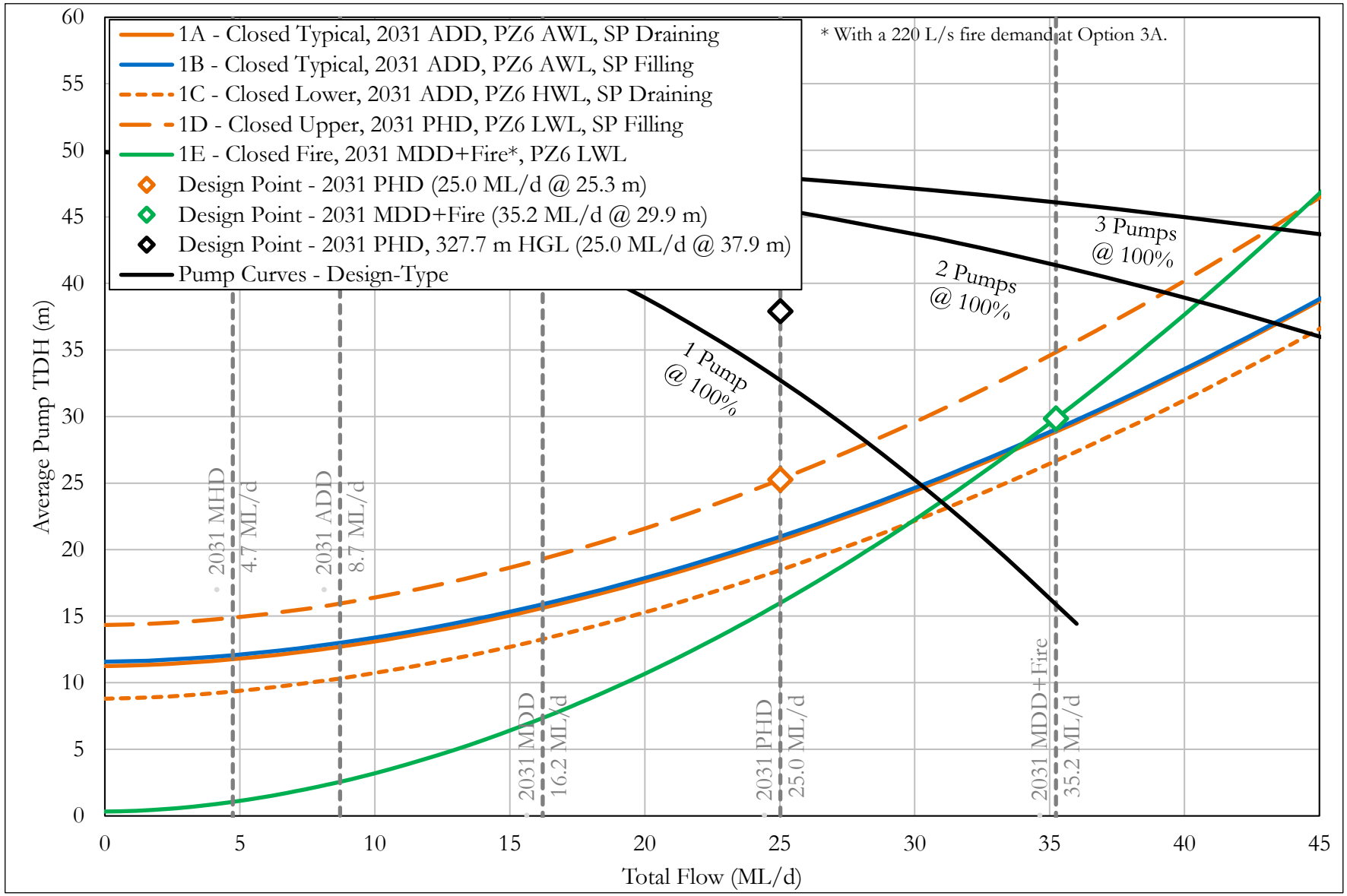


Figure 11: System curve results – 2031 closed system, pump TDH

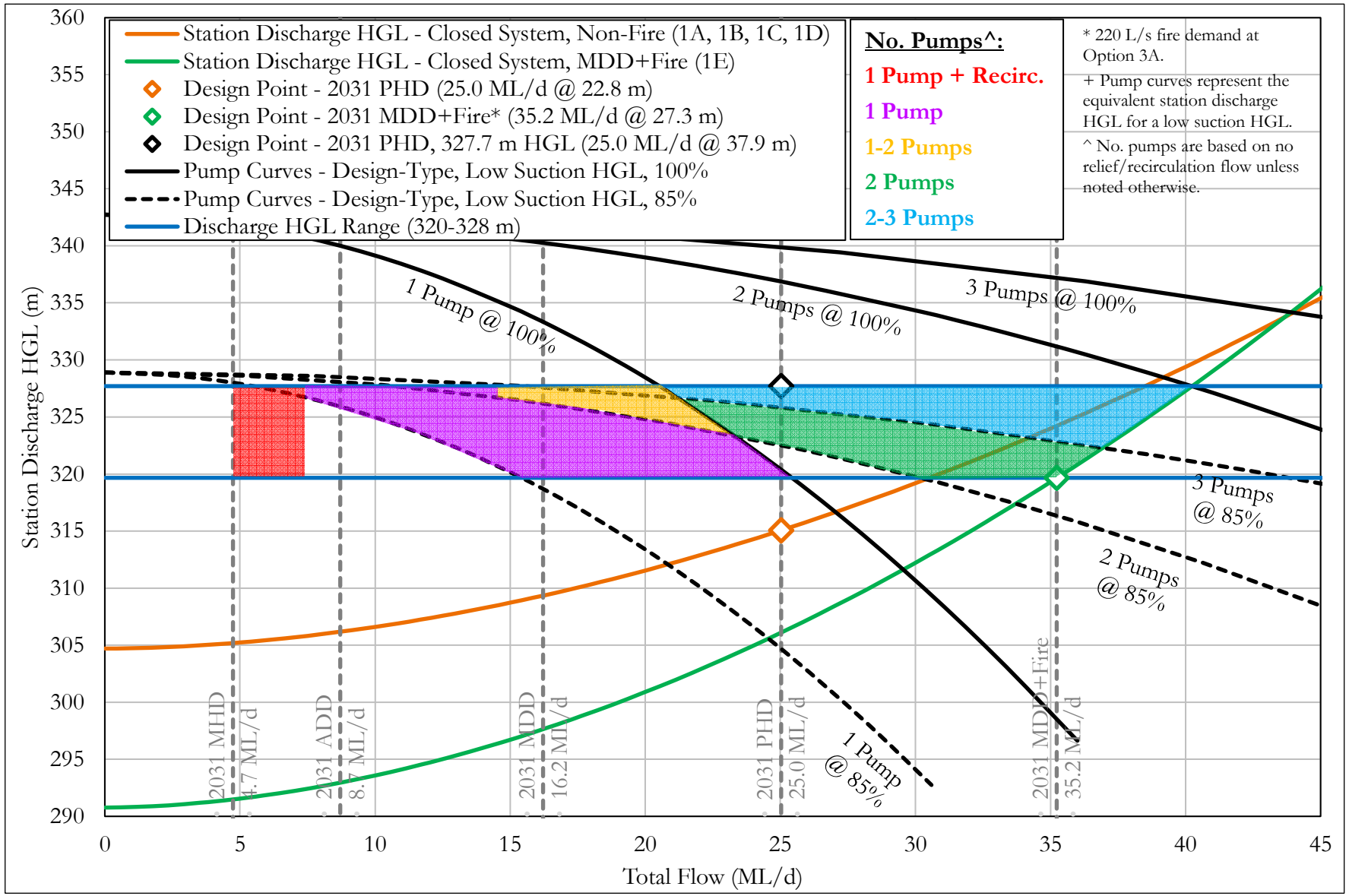


Figure 12: System curve results – 2031 closed system, Macville BPS discharge HGL for low suction HGL

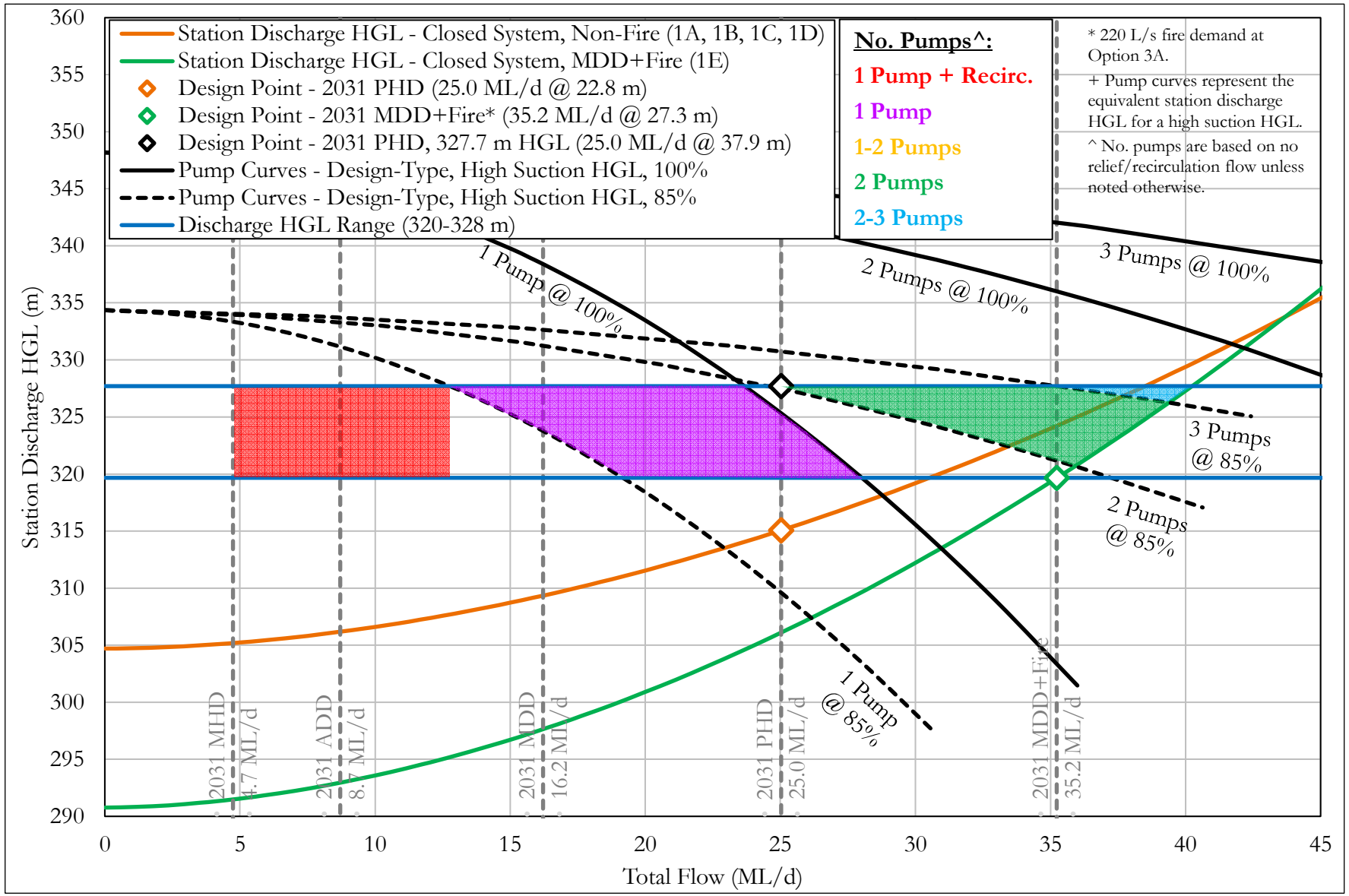


Figure 13: System curve results – 2031 closed system, Macville BPS discharge HGL for high suction HGL

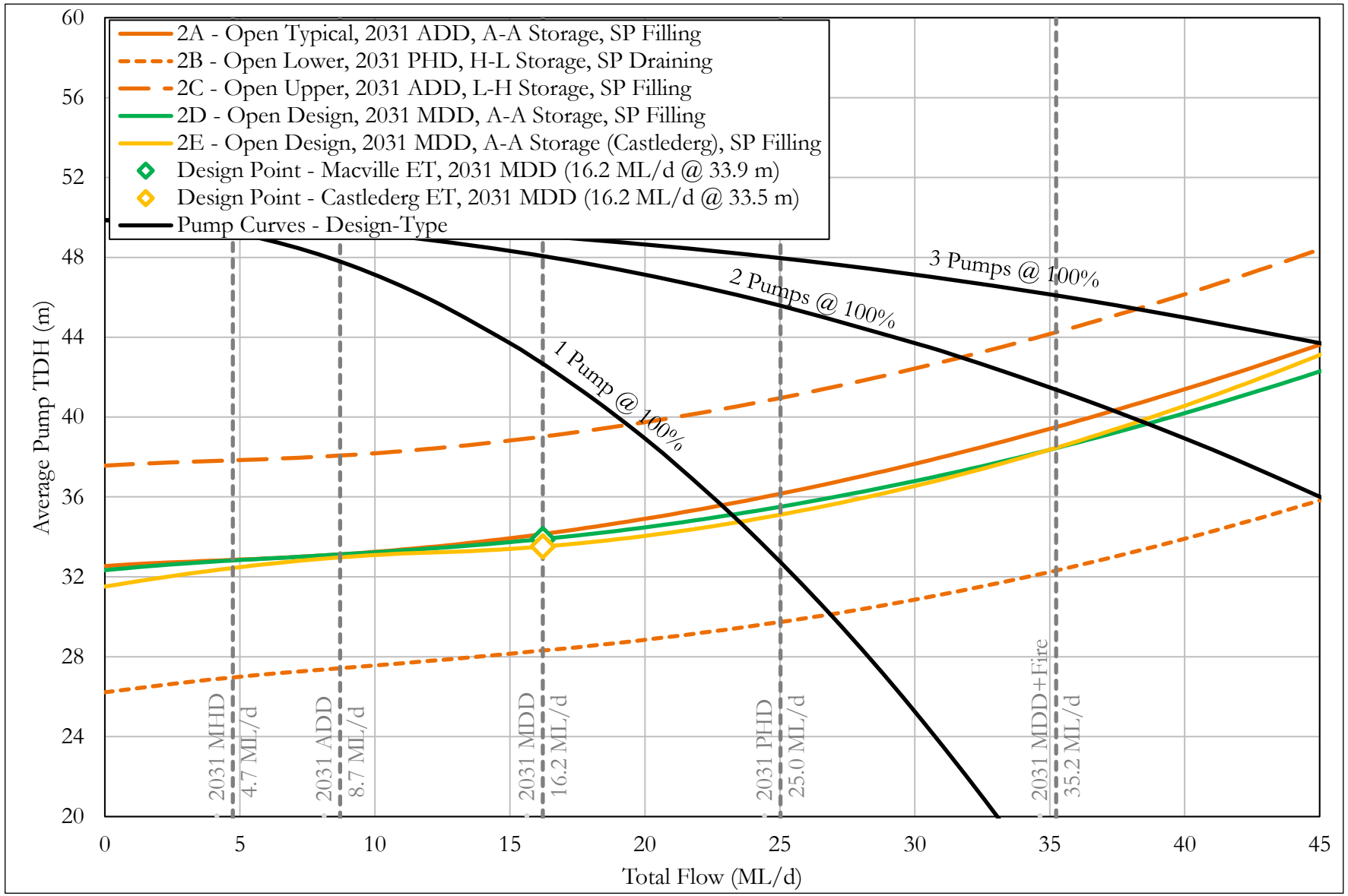


Figure 14: System curve results – 2031 open system, pump TDH

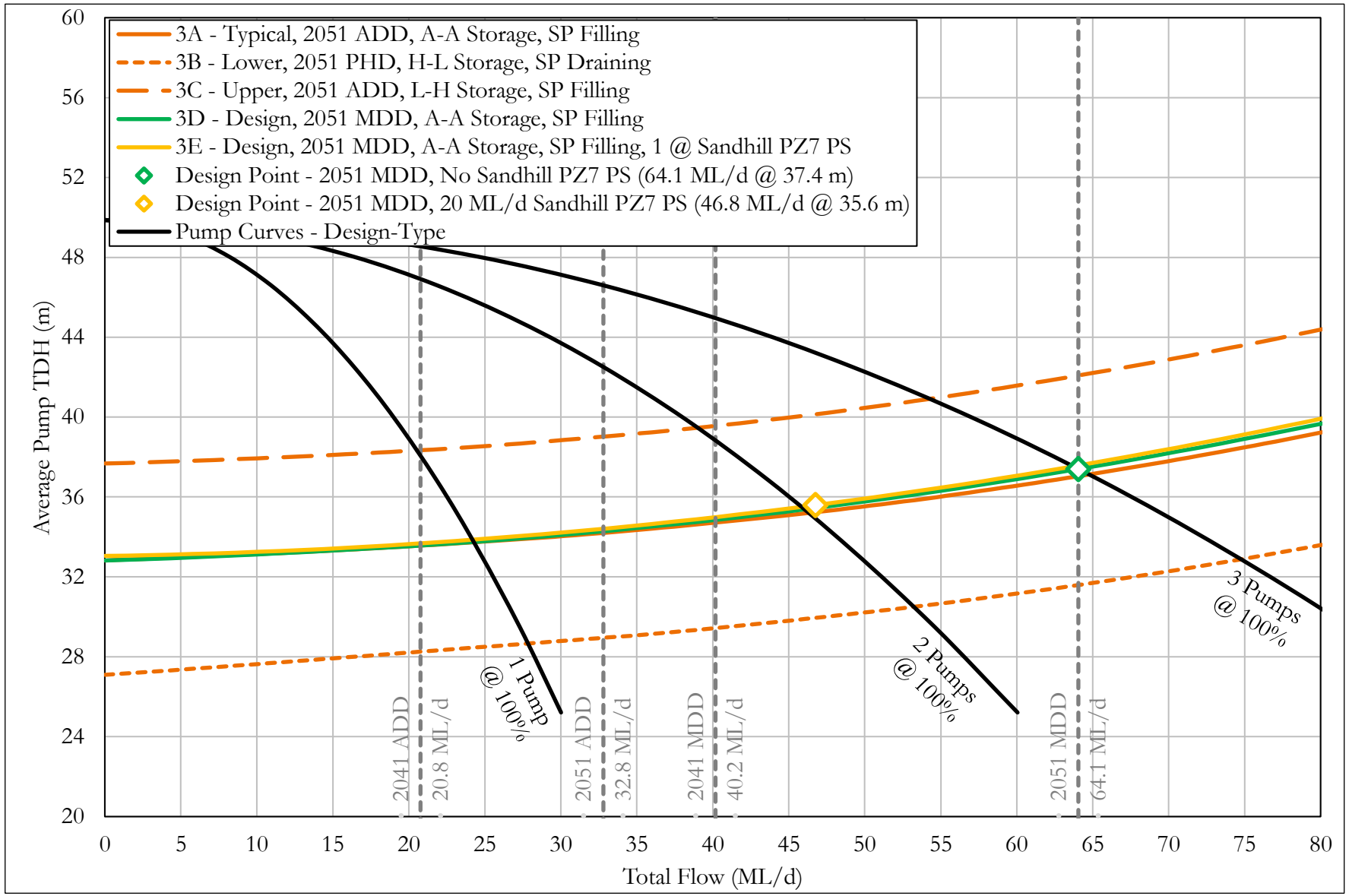


Figure 15: System curve results – 2051 open system, pump TDH

6.2 Macville BPS Operating Conditions

Macville BPS operating conditions were reviewed based on the system curve results and design-type pump curves. Regarding the latter, design-type pump curves were considered based on a station firm capacity of 64.1 ML/d (i.e., without Sandhill PZ7 PS). Table 13 lists the estimated total pump flow, individual pump flow, and pump TDH ranges, while Table 14 summarizes the Macville BPS hydraulics for select closed system operating conditions. Within Table 14, the station hydraulics are based on maintaining a discharge HGL of 327.7 m via a combination of VFDs and RRVs. Lastly, Table 15 and Table 16 summarize the estimated velocity and operating HGL (pressure) ranges, respectively. Below is a discussion of the station operating hydraulics:

- Overall operating ranges: Minimum and maximum values in Table 13 are based on the system curve bounds. The bounds and thus estimates are somewhat conservative, and typical minimum and maximum operating ranges are likely to be less extreme. Table 13 also indicates a narrower range of operating conditions for the closed system state compared to the future open system conditions with Bolton PZ7 floating storage. This is a result of the narrower system curves for the closed system state, which, in turn, are caused by the lack of discharge side storage level variations.
- Closed system pump flow ranges: From Figure 12 to Figure 15, the following is a summary of the estimated pump combinations for different potential flow ranges based on (i) maintaining a discharge HGL range of 320-328 m and (ii) typical VFD speed ranges of 85-100%:
    - One pump: 7.4 ML/d* to 28.0 ML/d (85% to 100% VFD speed).
    - Two pumps: 14.8 ML/d* to 42.1 ML/d (85% to 100% VFD speed).
    - Three pumps: Three pumps can provide greater flows, but this is not practical under closed system conditions due to: (i) low individual pump flows, (ii) marginal increase in capacity due to the system curve governing over the target discharge HGL, and (iii) pump flows greatly exceeding system demands, meaning much of the pump flow would have to be recirculated within the station to avoid over-pressurizing the system.
    - *Minimum pump flow: The minimum flow ranges are based on a minimum flow of 7.4 ML/d per pump. This corresponds to a minimum check valve velocity of 4 ft/s (1.2 m/s), which is necessary to avoid check valve flutter (and thus accelerated wear) for the Region's preferred type of check valve. Minimum acceptable pump flows may also be dictated by the pump-specific preferred operating range and minimum continuous flow.
- RRV flows: Functionally, the RRVs will recirculate water from the discharge header to the suction header[2] equal to the difference between the total pump flow and the system demand. Consequently, the relief/recirculation flow decreases as the pump VFD speeds decrease, but this also leads to lower pump flows, which is characterized by the 'relative pump flow' column in Table 14. Pump operation far from the pump rated flow is undesirable, since this can lead to lower pump efficiency, greater pump wear, and potentially premature pump failure. Suitable pump selection can help limit the impact of this. Moreover, low pump check valve velocities below 4 ft/s (1.2 m/s) may cause accelerated check valve wear as discussed in the preceding point.
- Closed system low demand periods: Minimum flows can be met through a combination of running a single pump at lower VFD speed and recirculating excess flows. During low demand periods such and MHD, some flows will need to be recirculated in order to (i) maintain the design discharge

[2] Recirculation/relief flows to the suction header may slightly increase the station suction pressure (HGL), but only marginally so due to the presence of nearby PZ6 storage at the Bolton ETs.

HGL below 327.7 m and (ii) prevent individual pumps from operating at too low pump flows[3]. Lower VFD speeds may be possible with even lower recirculation flows; though, as discussed in the preceding bullets, this can affect pump and check valve deterioration. .

- Closed system high demands: Peak demands (PHD and MDD plus fire) will be supplied by firm capacity pumping at Macville BPS with two duty pumps on. From the system curve results for interim closed system conditions (Figure 12 and Figure 13), two duty pumps can provide an estimated PHD firm capacity of 39 ML/d and MDD plus fire firm capacity of 40 ML/d based on the design-type pump curves. These exceed the respective design flows (25.0 ML/d for PHD, and 35.2 ML/d for MDD plus fire).
- Station velocities: Table 15 indicates generally adequate station velocities that are at/below 2.0 m/s. There are, however, some exceptions. High velocities are predicted at the 350 mm pump suction pipes (up to 3.4 m/s) and 300 mm pump discharge pipes (up to 4.6 m/s), although each of these is a relatively short section of pipe (less than 2 m) that is necessary to connect to the pump flanges. High maximum velocities are also predicted for the RRVs (up to 3.4 m/s). Though, such conditions will only arise if too many pumps and/or too high of pump VFD speeds are run during non-peak demand conditions, thus requiring excess flows to be recirculated.

Table 13: Operating conditions – estimated ranges for station flow, pump flow, and pump TDH

System State	No. Pumps On	VFD Speed	Station Flow (ML/d)			Individual Pump Flow (ML/d)			Average Pump TDH (m)		
			Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.
2031 Closed*+	1	85%	7.4	13.2	19.0	7.4	13.2	19.0	28.4	33.8	38.4
		90%	12.0	17.1	22.1	12.0	17.1	22.1			
		95%	16.7	21.0	25.2	16.7	21.0	25.2			
		100%	20.5	24.3	28.0	20.5	24.3	28.0			
	2	85%	14.8	25.4	36.0	7.4	12.7	18.0	37.7	38.3	38.9
		90%	23.7	30.9	38.0	11.9	15.4	19.0			
		95%	32.6	36.3	40.0	16.3	18.2	20.0			
		100%	40.1	41.1	42.1	20.1	20.6	21.1			
2031 Open+ (Macville ET)	1	100%	19.3	22.9	26.9	19.3	22.9	26.9	30.1	35.5	39.7
	2	100%	31.5	37.2	45.3	15.8	18.6	22.7	35.8	40.4	43.1
	3	100%	38.2	45.0	55.4	12.7	15.0	18.5	40.5	43.7	45.4
2051 Open+	1	100%	20.6	24.2	28.0	20.6	24.2	28.0	28.4	33.4	38.2
	2	100%	39.0	46.1	53.0	19.5	23.1	26.5	30.6	35.3	39.4
	3	100%	54.5	65.0	75.0	18.2	21.7	25.0	32.7	36.6	40.8

* Station flows, pump flows, and average pump TDHs are for a Macville BPS discharge HGL of 320-328 m under conditions with no relief/recirculation flow.

\+ Values for minimum station flow, minimum pump flow, and maximum pump TDH are based on the upper system curve bounds (i.e., low suction-side storage levels, high discharge-side storage levels, and low demands). Conversely, values for maximum station flow, maximum pump flow, and minimum pump TDH reflect the lower system curve bounds (i.e., high suction-side storage levels, low discharge-side storage levels, and high demands).

^ Based on design-type pump curves.

[3] Different-sized pumps can help meet low flows. Though, this is not preferred, since: (i) four same-sized pumps are operationally simpler; (ii) flow recirculation is still likely required; and (iii) there is less redundancy for either design low flows or firm capacity flows if any pump (small or large) is offline.

Table 14: Operating conditions – station, pump, and RRV flows for interim closed system

System Conditions			Macville BPS					
Year and Demand Condition	Demand (ML/d)	Zone 6 Storage	No. Pumps On	VFD Speed	Total Flow* (ML/d)	Individual Pump Flow (ML/d)	Relative Pump Flow+	RRV Flow (ML/d)
2031 MHD	4.74	HWL	1	100%	23.8	23.8	11%	19.1
				95%	20.5	20.5	1%	15.8
				90%	17.0	17.0	-12%	12.3
				85%	12.8	12.8	-29%	8.1
				80%	7.4	7.4	-57%	2.7
2031 ADD	8.72	HWL	1	100%	23.8	23.8	11%	15.1
				95%	20.5	20.5	1%	11.8
				90%	17.0	17.0	-12%	8.3
				85%	12.8	12.8	-29%	4.1
2031 MDD	16.2	LWL	2	100%	40.2	20.1	-6%	24.0
				95%	32.6	16.3	-20%	16.4
				90%	23.5	11.8	-39%	7.3
				89%	16.2	8.1	-57%	0
2031 PHD	25.0	LWL	2	100%	40.2	20.1	-6%	15.2
				95%	32.6	16.3	-20%	7.6
				91%	25.0	12.5	-36%	0
			3	100%	58.0	19.3	-9%	33.0
				95%	47.5	15.8	-22%	22.5
				90%	34.1	11.4	-41%	9.1
				87%	25.0	8.3	-55%	0
2031 MDD+Fire	35.2	LWL	2	100%	40.2	20.1	-6%	5.0
				97%	35.2	17.6	-15%	0
			3	100%	58.0	19.3	-9%	22.8
				95%	47.5	15.8	-22%	12.3
				90%	35.2	11.7	-39%	0

* Estimated total Macville BPS pump flow based on maintaining a discharge HGL of 327.7 m.

^ Pump operating flow relative to pump design point flow at the corresponding speed. Most pumps have a preferred operating range of around -30% to +20% of their best efficient point (BEP) flow, which is typically (but not always) the design flow. Prolonged operation outside of the preferred range can lead to accelerated pump deterioration.

Table 15: Operating conditions – maximum estimated station velocities

System State	Year and Demand Condition	No. Pumps On	Maximum Velocity* (m/s)							
			Suction Side			Discharge Side				Two 300 mm RRVs
			1050 mm Header	750 mm Flow Meter	350 mm Pump+	300 mm Pump+	900 mm Header	750 mm Flow Meter	600 mm RRV Line	
2031 Closed	MHD	1	0.1	0.1	2.9	3.9	0.4	0.6	0.8	1.6
	ADD	1	0.1	0.2	2.9	3.9	0.4	0.6	0.6	1.2
		2	0.1	0.2	2.8	3.8	0.8	1.2	1.5	3.1
	MDD	1	0.2	0.4	2.9	3.9	0.4	0.6	0.3	0.6
		2	0.2	0.4	2.8	3.8	0.8	1.2	1.2	2.4
	PHD	2	0.3	0.7	2.8	3.8	0.8	1.2	0.9	1.7
		3	0.3	0.7	2.7	3.7	1.2	1.8	1.7	3.4
	MDD+ Fire	2	0.5	0.9	2.8	3.8	0.8	1.2	0.4	0.9
		3	0.5	0.9	2.7	3.7	1.2	1.8	1.3	2.6
2031 Open	Any	1	0.4	0.7	3.2	4.4	0.5	0.7	-	-
		2	0.6	1.2	2.7	3.7	0.8	1.2	-	-
		3	0.7	1.5	2.2	3.0	1.0	1.5	-	-
2051 Open	Any	1	0.4	0.7	3.4	4.6	0.5	0.7	-	-
		2	0.7	1.4	3.2	4.3	1.0	1.4	-	-
		3	1.0	2.0	3.0	4.1	1.4	2.0	-	-

* Velocities are reported for maximum anticipated flow conditions for the corresponding station pipe sections. Under closed system conditions, the proposed RRVs are assumed to limit the station discharge HGL to 327.7 m, and excess flows are recirculated. Green = adequate velocity (< 2 m/s), orange = moderately high velocity (2-3 m/s), and red = high velocity (> 3 m/s).

\+ The proposed pumps will have 500/350 mm suction pipes and 300/450 mm discharge pipes. Velocity results are presented for the short sections of smaller diameter pipes that connect directly to the pumps.

Table 16: Operating conditions – estimated ranges for station HGLs and pressures

Location	Pipe Centreline Elevation (m)	HGL* (m)		Operating Pressure (psi)	
		Min.	Max.	Min.	Max.
Suction Header	252.85	291.9	298.3	56	65
Pump Suction Pipe	256.08	291.6	298.3	51	60
Pump at Suction	256.47	291.3	298.3	50	60
Pump at Discharge	256.47	319.6	339.2	90	118
Pump Discharge Pipe	256.08	319.6	336.7	90	115
Discharge Header	255.85	319.6	334.1	91	111

* Minimum and maximum values are based on the overall range for 2031 closed system conditions, 2031 open system conditions, and 2051 open system conditions.

6.3 EPS of Typical Conditions

Table 17 lists the EPS analysis scenarios. Each scenario is based on a 48-hour EPS, which explores time varying flows, demands, and storage levels. Table 18, Table 19, and Table 20 summarize the analysis results for flows, watermain velocities, and system pressures, respectively, while Appendix A (Figure 16 to Figure 27) contains maps of minimum and maximum system pressures. Results from the EPS analysis are discussed below:

- System pressures:
  - 2026 existing conditions: Table 20 shows low Bolton PZ6 minimum pressures below 40 psi (as low as 37 psi). These low pressures occur under peak demand conditions in the two proposed realignment areas: around Highway 50/Columbia Way and around King St./ Trailview Ln. Both areas have high local elevations relative to typical PZ6 HGLs and are hydraulically distant from pumping and storage, which exacerbate low pressures.
  - 2031 interim closed system: Minimum local system pressures are improved and maintained above 40 psi with the recommended zone realignment. System pressures are predicted to increase by roughly 40 psi in the zone realignment areas. Overall, Bolton PZ7 system pressures are higher with maxima slightly above 100 psi (51-102 psi) for 2031 closed system conditions, and this is based on an average supply HGL of 323 m (mid-way between the future 327.7 m TWL and the minimum required closed system HGL). Actual PZ7 system pressures may vary from these values by up to ±7 psi depending on how Macville BPS is operated. Regarding high pressures above 100 psi, these are expected in low lying parts of the zone realignment, namely, the south end of the Columbia realignment area along Hathaway Ct. Indeed, there is a trade-off here: provide low pressures below 40 psi with PZ6 servicing, or provide high pressures above 100 psi with PZ7 servicing.
  - Future open system conditions (2036 to 2051): Bolton PZ7 system pressures are expected to vary more widely (42-108 psi) once floating storage is provided. This is due to the resulting variation in pumping at Macville BPS and, eventually, Sandhill PZ7 PS to cycle storage, which in turn leads to varying system HGLs and pressures. Some Bolton PZ7 areas are likely to experience high pressures of up to 108 psi. As noted in the preceding point, high pressures are predicted to occur in low-lying realigned areas from the existing PZ6 system.
- System flows:
  - Macville BPS: Table 18 shows a range of Macville BPS flows depending on the system state (open or closed), system demand, and status of Sandhill PZ7 PS. For interim closed system conditions, Macville BPS flows will vary significantly from MHD up to PHD and MDD plus fire, since the station flows will be dictated by the system demand. Station flows will shift once Macville ET is built, as system demands increase, and as Sandhill PZ7 PS begins supplying Bolton PZ7.
  - Bolton PZ7 supply capacity: With the proposed Macville BPS pumps sized for 2051 MDD, the system curve results and EPS results indicate that Macville BPS alone is expected to be capable of supplying foreseeable Bolton PZ7 demands, including 2031 PHD, 2031 MDD plus fire, and 2051 MDD. Together with Sandhill PZ7 PS at a nominal firm capacity of 17 ML/d, the combined Bolton PZ7 supply capacity (around 80 ML/d) greatly exceeds estimated system demands.
- Watermain velocities: From Table 20, average velocities in the subject proposed watermains are predicted to range from 0.1 to 1.2 m/s. Maximum velocities are below 1.3 m/s, suggesting that the proposed watermain diameters are suitable.

Table 17: EPS of typical conditions – list of analysis scenarios

Scenario	Model Year	Demand Condition	System Conditions			
			Zone Boundaries	PZ7 Storage		Sandhill PZ7 PS
				Macville ET	Castlederg ET	
4A	2026	ADD	Existing	Not Built	Not Built	Not Built
4B	2026	MDD	Existing	Not Built	Not Built	Not Built
5A	2031A	ADD	Realigned	Not Built	Not Built	Not Built
5B	2031A	MDD	Realigned	Not Built	Not Built	Not Built
6A	2031B	ADD	Realigned	Active	Not Built	Not Built
6B	2031B	MDD	Realigned	Active	Not Built	Not Built
7A	2036	ADD	Realigned	Active	Active	Active
7B	2036	MDD	Realigned	Active	Active	Active
8A	2041	ADD	Realigned	Active	Active	Active
8B	2041	MDD	Realigned	Active	Active	Active
9A	2051	ADD	Realigned	Active	Active	Active
9B	2051	MDD	Realigned	Active	Active	Active

Table 18: EPS of typical conditions – summary of facility and watermain flows

Scenario	Year and Demand	Flow (ML/d)							
		Macville BPS*		Sandhill PZ7 PS		600 mm Emil Kolb PZ7 WM		600 mm King PZ7 WM	
		Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.
5A	2031A ADD	8.6	13.2	-	-	2.3	3.2	5.3	9.5
5B	2031A MDD	16.2	25.0	-	-	3.9	5.7	10.4	18.2
6A	2031B ADD	8.8	21.5	-	-	2.3	3.2	6.9	19.7
6B	2031B MDD	16.4	22.6	-	-	3.9	5.7	10.6	18.8
7A	2036 ADD	13.0	33.3	3.1	19.4	2.6	7.8	2.5	4.9
7B	2036 MDD	18.0	33.3	12.0	20.0	4.7	11.9	2.8	5.9
8A	2041 ADD	14.3	31.8	5.5	19.8	3.4	9.3	2.7	4.9
8B	2041 MDD	23.4	33.3	15.9	20.0	6.5	17.4	3.7	8.0
9A	2051 ADD	29.2	49.1	5.0	19.8	5.3	13.0	6.0	10.2
9B	2051 MDD	50.6	67.6	13.7	19.9	9.6	24.8	10.2	17.4

* These flows (Macville BPS) are the same for the proposed 1050 mm Emil Kolb PZ6 watermain and 900 mm Emil Kolb PZ7 watermain.

Table 19: EPS of typical conditions – summary of watermain velocities

Scenario	Year and Demand	Velocity (m/s)							
		1050 mm Emil Kolb PZ6 WM		900 mm Emil Kolb PZ7 WM		600 mm Emil Kolb PZ7 WM		600 mm King PZ7 WM	
		Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.
5A	2031A ADD	0.12	0.18	0.16	0.24	0.09	0.13	0.22	0.39
5B	2031A MDD	0.22	0.33	0.29	0.46	0.16	0.23	0.43	0.75
6A	2031B ADD	0.12	0.29	0.16	0.39	0.09	0.13	0.28	0.81
6B	2031B MDD	0.22	0.30	0.30	0.41	0.16	0.23	0.43	0.77
7A	2036 ADD	0.17	0.45	0.24	0.61	0.10	0.32	0.10	0.20
7B	2036 MDD	0.24	0.44	0.33	0.61	0.19	0.49	0.11	0.24
8A	2041 ADD	0.19	0.43	0.26	0.58	0.14	0.38	0.11	0.20
8B	2041 MDD	0.31	0.45	0.43	0.61	0.27	0.71	0.15	0.33
9A	2051 ADD	0.39	0.66	0.53	0.89	0.22	0.53	0.25	0.42
9B	2051 MDD	0.68	0.90	0.92	1.23	0.39	1.02	0.42	0.71
Max.:		**0.68**	**0.90**	**0.92**	**1.23**	**0.39**	**1.02**	**0.43**	**0.81**

Table 20: EPS of typical conditions – summary of system pressures

Scenario	EPS System Pressures* (psi)											
	Bolton PZ6+				Bolton PZ7				Z6-to-Z7 Realignment			
	Min.		Max.		Min.		Max.		Min.		Max.	
	Min.	P5	P95	Max.	Min.	P5	P95	Max.	Min.	P5	P95	Max.
4A	41	44	70	83	-	-	-	-	41	43	59	64
4B	37	41	70	83	-	-	-	-	37	39	59	64
5A	43	47	70	82	62	78	96	102	80	82	97	102
5B	45	49	71	83	51	77	95	101	79	81	96	101
6A	45	48	71	83	60	76	102	108	81	83	103	108
6B	43	47	71	82	52	74	102	108	80	82	102	108
7A	45	48	71	83	47	65	101	106	80	82	101	106
7B	44	48	71	83	47	65	101	106	79	81	100	106
8A	44	48	71	83	47	65	101	106	79	82	101	106
8B	44	47	71	83	45	65	101	104	75	77	99	104
9A	44	48	71	83	46	65	102	107	79	82	101	107
9B	42	47	71	83	42	64	103	105	75	77	100	105

* Results are presented for the overall range (min. and max.) and select percentiles (e.g., P5 for minimum pressures represents the 5th percentile of minimum EPS pressures).
\+ For the Bolton PZ6 system north of Healey Rd./Queensgate Blvd.

6.4 Fire Flows

Table 21 lists the AFF analysis scenarios. AFFs were modeled for all of Bolton PZ7 and the PZ6 area north of Healey Rd./Queensgate Blvd. The scenarios consider different time periods (2026 to 2051), and each scenario is based on MDD with PZ6 and PZ7 storage at LWLs of 40%. Table 22 presents a summary of the results by area, while fire flow results maps are presented in Appendix B (Figure 28 to Figure 33). Results from the AFF scenarios show fire flow capacities that are generally above 100 L/s across the study area. This is largely due to a high degree of watermain looping. Some local areas have lower capacities, and these are mostly at small dead-ended older watermains with no looping and low capacity. Regarding the zone realignment, Table 22 and Appendix B (Figure 28 and Figure 29) indicate an immediate increase in AFFs by an aggregate of at least 50% for the PZ6-to-PZ7 realignment areas following the zone realignment, which is a benefit of higher static pressures with PZ7 servicing. Adjacent existing PZ6 lands are not materially affected. Over time, some areas experience a slight progressive drop in AFF capacity, and this is caused by increased system demand. However, some other areas experience an increase in AFF capacity as new infrastructure comes online, including the future Macville ET, Castlederg ET, and Sandhill PZ7 PS. Altogether, the fire flow results suggest that the proposed servicing strategy will improve the overall level of service for AFFs. For areas with low capacity concerns, modeling results can be compared against historical hydrant flow test data to verify risks.

Table 21: Fire flows – list of analysis scenarios

Scenario*	Model Year	System Conditions			
		Zone Boundaries	PZ7 Storage		Sandhill PZ7 PS
			Macville ET	Castlederg ET	
10A	2026	Existing	Not Built	Not Built	Not Built
10B	2031A	Realigned	Not Built	Not Built	Not Built
10C	2031B	Realigned	Active	Not Built	Not Built
10D	2036	Realigned	Active	Active	Active
10E	2041	Realigned	Active	Active	Active
10F	2051	Realigned	Active	Active	Active

* Fire flow analysis scenarios consider MDD, firm capacity pumping at Macville BPS and Sandhill PZ7 PS, one pump on at North Bolton BPS, and storage at LWLs of 40%.

Table 22: Fire flows – results summary

Scenario	AFF Results Summary*+ (L/s)											
	Bolton PZ6				Bolton PZ7				Z6-to-Z7 Realignment			
	Min.	P1%	P50%	P90%	Min.	P1%	P50%	P90%	Min.	P1%	P50%	P90%
10A	41	60	190	487	-	-	-	-	41	53	173	321
10B	54	61	200	580	70	88	285	582	70	88	272	570
10C	54	61	199	578	67	86	302	680	67	85	283	616
10D	54	62	202	606	66	86	327	796	66	85	285	649
10E	54	62	202	606	66	86	316	785	66	84	283	640
10F	52	60	192	586	63	85	361	806	63	82	287	629

* AFF results are presented for the minimum, maximum, and select percentiles for the corresponding noted areas. For example, a value of P1% = 88 L/s denotes the 1st percentile AFF result, whereby 1% of junctions have an AFF result less than 88 L/s and 99% of junctions have an AFF result greater than 88 L/s.

\+ For a given location, the AFF represents the maximum flow that can be withdrawn under MDD conditions subject to (i) maintaining local and broader system pressures above 20 psi (140 kPa; 14.3 m) and (ii) conservatively limiting velocities to less than 5 m/s. The latter criterion, while not required per the Region's standards, yields more conservative results, and it is considered here as a reasonable limit for practical purposes.

7. CONCLUSIONS AND RECOMMENDATIONS

A hydraulic modeling analysis was completed to support the detailed design of the proposed Macville BPS, various PZ7 watermains, and a local zone realignment. The Region's InfoWater Pro EPS model was used as a basis for the analysis, and updates were made according to design drawings, the North Bolton water servicing strategy, and the Region's draft 2024 DC update study. Key objectives for the analysis comprised: developing system (resistance) curves for Macville BPS over a range of conditions, identifying station design points, exploring station operating conditions, and assessing the Bolton PZ7 water system performance for system pressures and fire flows. Based on the analysis results, the following concluding remarks and recommendations are provided to support the design of the proposed water system upgrades:

7.1 Macville BPS:

1. Updated design flows: Below is a summary of updated design flows for Macville BPS based on the Region's InfoWater model and estimated development water demands:
    a. 2031 PHD: 25.0 ML/d (290 L/s)
    b. 2031 MDD plus fire: 35.2 ML/d (408 L/s) based on a 220 L/s fire demand.
    c. 2051 MDD without Sandhill PZ7 PS: 64.1 ML/d (741 L/s).
    d. 2051 MDD with Sandhill PZ7 PS: 46.8 ML/d (541 L/s) based on a nominal 17.3 ML/d (200 L/s) capacity for Sandhill PZ7 PS.

2. Pump design points: Design points are listed below for the proposed four pumps:
    a. Pump capacity for 2051 MDD [required]: 21.4 ML/d at 37.4 m pump TDH based on a station firm capacity of 64.1 ML/d for 2051 PHD, four pumps (three duty and one standby), no Sandhill PZ7 PS, and PZ6 storage at AWLs.
    b. Pump typical operating point #1 [optional]: 24.3 ML/d at 33.8 m pump TDH – this point is not a strict design requirement, rather, the selected pump should operate efficiently (and without any cavitation) around this point when run on its own under interim closed system conditions at full (100%) VFD speed with a station discharge HGL between 319.7 to 327.7 m.
    c. Pump typical operating point #2 [optional]: 22.9 ML/d at 35.6 m pump TDH – this point is not a strict design requirement, rather, the selected pump should operate efficiently (and without any cavitation) around this point when run on its own under future open system conditions at full (100%) VFD speed.
    d. Estimated overall pump flow range: 7.4 to 28.0 ML/d based on interim closed and future open system conditions and a VFD speed range of 85-100%.
    e. Estimated typical pump TDH range: 28.4 to 45.4 m based on interim closed and future open system conditions and a VFD speed range of 85-100%.
    f. Design minimum NPSHa: 40.9 m absolute, including a safety factor for the greater of 10% and 1.5 m according to HI standards.

3. Station velocities: Maximum Macville BPS velocities are generally at/or less than 2.0 m/s for interim and future system conditions with the proposed pipe diameters and station layout. There are two exceptions to this:

a. 350 mm pump suction and 300 mm pump discharge pipes: Maximum velocities are predicted to reach (i) 3.4 m/s at the 350 mm pump suction pipes and (ii) 4.6 m/s at the 300 mm pump discharge pipes. It is understood, however, that the corresponding sections of pipe are relatively short (less than 2 m), and the smaller diameters are necessary to connect to the pump flanges. If feasible, these pipe sections should be upsized to 400 mm to reduce peak velocities to less than 3 m/s.

b. 750 mm suction header flow meter: Maximum velocities are predicted to reach up to 2.0 m/s under future conditions at the buildout firm capacity of 64.1 ML/d. Accordingly, the suction side flow meter may need to be upsized in the future, and this can be reviewed when Bolton PZ7 is converted to an open system and routine higher Macville BPS flows are possible.

4. Relief/recirculation valves: Two relief/recirculation valves are proposed for Macville BPS for secondary discharge pressure control to the proposed VFDs under interim closed system conditions. Recommendations are listed below for the relief/recirculation valve.

   a. Valve sizes: One 250 mm reduced-port globe-style valve and one 200 mm reduced-port globe-style valve[4]. The smaller valve can function as the lead valve with greater control at low flows, while the larger valve can function as the lag valve to provide additional recirculation capacity and redundancy. Together, these valves would have an estimated recirculation capacity of around 49 ML/d, which is more than sufficient for anticipated potential recirculation flows. The aforementioned should be checked and reviewed by a valve manufacturer.

   b. Line sizes: The proposed 600 mm main line and 300 mm RRV line sizes are adequate.

   c. HGL/pressure set points: 327.7 m for the smaller lead valve and 329.1 m for the larger lag valve. The corresponding pressure set points can be determined once the valve elevations are finalized and once the VFD control logic is optimized.

   d. Flow meter: A flow meter should be installed on the relief/recirculation main line in order to monitor station operating conditions and to calculate the total pump flow in conjunction with the station discharge flow meter.

5. Bypass check valve: A bypass (PZ6 suction-to-PZ7 discharge) check valve should be included in the Macville BPS station design for emergency backup supply in the event of a loss of pumping. The current design drawings show a 750 mm bypass check valve, and this is adequate for bypass purposes.

6. Pressure control mode for interim closed system: The proposed Macville BPS VFDs should be used for primary pressure control with Bolton PZ7 as a closed system. The relief/recirculation valves can provide secondary control, whereby they will activate if required to prevent otherwise higher discharge pressures. The above are preliminary recommendations that need to be finalized as part of the process control design.

7. Discharge HGL for interim closed system: The pressure controls should be configured with a target station discharge HGL band of 319.7 m to 327.7 m (8 m band) to avoid VFD speed cycling and to minimize pump start-stop operations. The lower HGL limit (320 m) is based on servicing

[4] The current design drawings feature two 300 mm RRVs. Although larger RRVs have greater capacity, they can be slower to respond to hydraulic changes, and they provide less pressure control at low flows. Accordingly, a 200 mm RRV and a 150 mm RRV are recommended in order provide sufficient pressure control and flow capacity.

a maximum Bolton PZ7 elevation of 276.5 m. Moreover, if desired, a narrower operating HGL band can be considered, and the RRV set points should be reviewed and updated accordingly.

7.2 Proposed Watermains:

8. Watermain velocities and diameters: Maximum velocities are predicted to be below 1.3 m/s for the proposed PZ6 and PZ7 watermains. Accordingly, the proposed watermain diameters are suitable.

9. Watermain design pressures: Design operating and total (transient) pressures should be analyzed and confirmed as a part of the planned hydraulic transient analysis.

10. Additional watermain connections: Below are recommendations for proposed watermain connections in addition to the start and end points:
    a. 1050 mm Emil Kolb PZ6 watermain: None.
    b. 900 mm Emil Kolb PZ7 watermain: The design should consider providing a connection stub at Emil Kolb Pkwy./King St. for potential interconnection with the future 750 mm Castlederg PZ7 feedermain.
    c. 600 mm Emil Kolb PZ7 watermain: The design should consider providing a connection stub around Emil Kolb Pkwy./Duffy's Lane for potential interconnection with the future 750 mm Castlederg PZ7 feedermain.
    d. 600 mm King Street PZ7 watermain: Two connections should be provided to the existing local PZ6 (future PZ7) distribution system at the south side of King St. with one 300 mm connection at Trailview Ln. and a 300 mm connection at Headwater Rd.

7.3 Zone Realignment:

11. Watermain upgrades for zone realignment: The following water system upgrades are required for the zone realignment to maintain adequate supply, looping for redundancy, and water quality circulation after the zone realignment:
    a. Whitehead-Longwood watermain: 940 m of 200 mm watermain along Whitehead Cres. and Longwood Dr. from the existing 400 mm PZ6 watermain along Queen St. N. to the existing 200 mm PZ6 watermain along Kingsview Dr. (east intersection).
    b. Highway 50/Bolton Heights interconnection: 400 mm interconnection between the two existing 400 mm watermains along Queen St. N. This interconnection should be designed south of the Highway 50 check valve and PZ7 bypass mentioned below.
    c. Highway 50/Bolton Heights bypass: 40 m of 400 mm PZ7 bypass watermain at the northeast corner of Highway 50/Bolton Heights Rd. from the existing 400 mm watermain along Highway 50 (north of Bolton Heights Rd.) to the existing 400 mm watermain along Bolton Heights Rd. (east of Highway 50/Queen St. N.).

12. PZ6-to-PZ7 check valves: Check valves are recommended at the following distribution system locations to provide local emergency backup supply in the event of a loss of pumping at Macville BPS under interim closed system conditions:
    a. Highway 50 check valve: Along the existing 400 mm Highway 50 watermain to be located south of the proposed 400 mm Highway 50/Bolton Heights bypass discussed above. The

purpose of this check valve is to provide emergency backup supply to the realigned PZ6-to-PZ7 area.

b. Harvest Moon check valve: Along the existing 300 mm Harvest Moon watermain at Ironhorse Cres. The purpose of this check valve is to provide emergency backup supply to the realigned PZ6-to-PZ7 area.

7.4 Additional Considerations:

13. Changes to station design flow, layout, and pipes: If the proposed Macville BPS station design flow(s), layout, and/or pipe diameters change, the system curve results and design points should be updated accordingly to accurately consider system and station local losses.

14. Hydraulic transient analysis: A hydraulic transient analysis should be completed during late detailed design of the proposed Macville BPS and subject watermains to determine design pressures, identify surge protection requirements, and assess potential risks to the Region's existing PZ6 and future PZ7 water systems. Hydraulic transient risks are often lower for closed pressure systems due to having typically lower flows and a lack of a storage reflection point, but, given the long-term plan to have floating storage in Bolton PZ7, a hydraulic transient analysis is warranted. The hydraulic transient analysis can also explore the system response to routine pump start-stop operations, including assessing the sequencing and control logic for the proposed BPS pumps.

APPENDIX A: EPS SYSTEM PRESSURE RESULTS MAPS

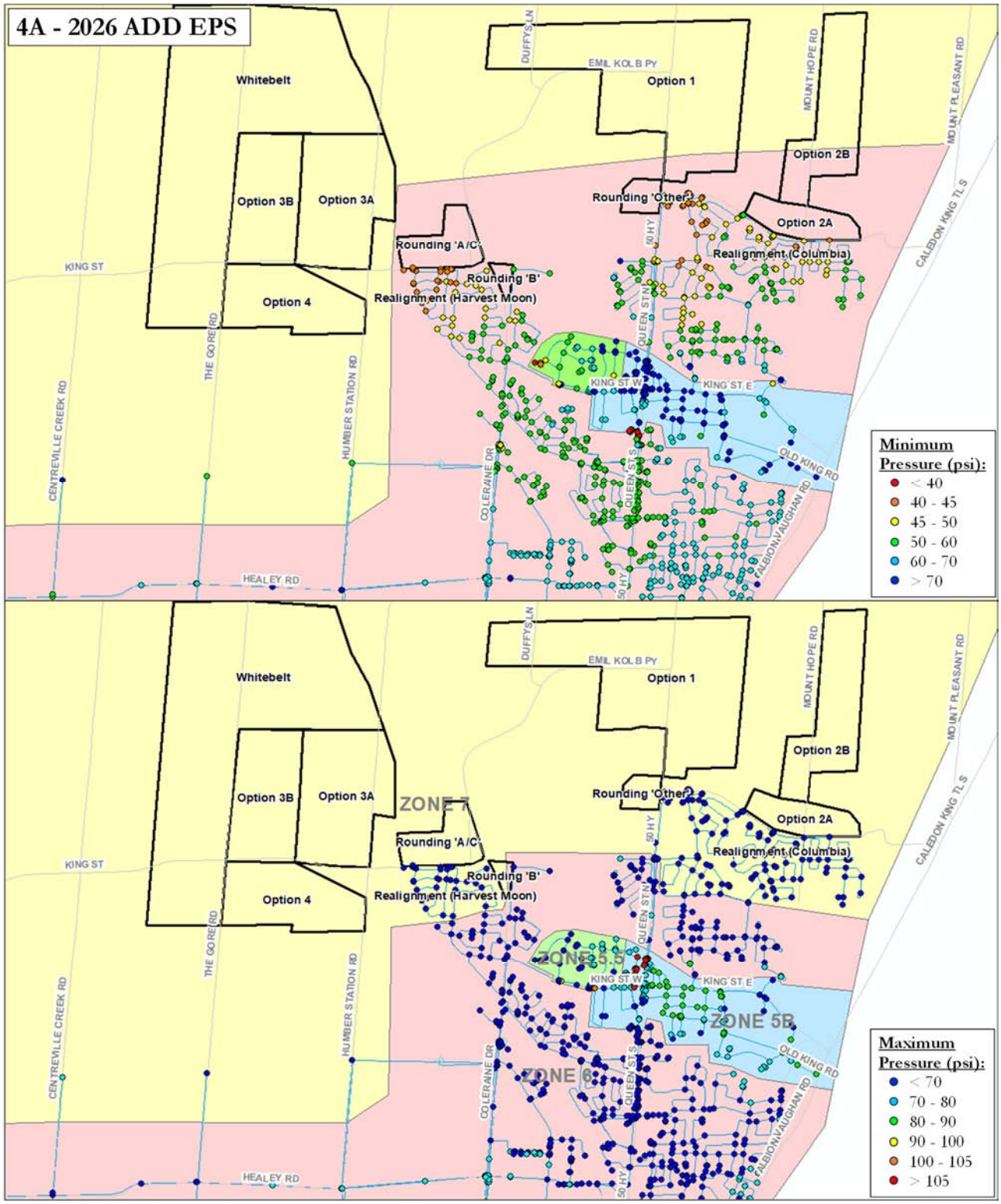


Figure 16: System pressures – Scenario 4A (2026 ADD EPS, existing zones)

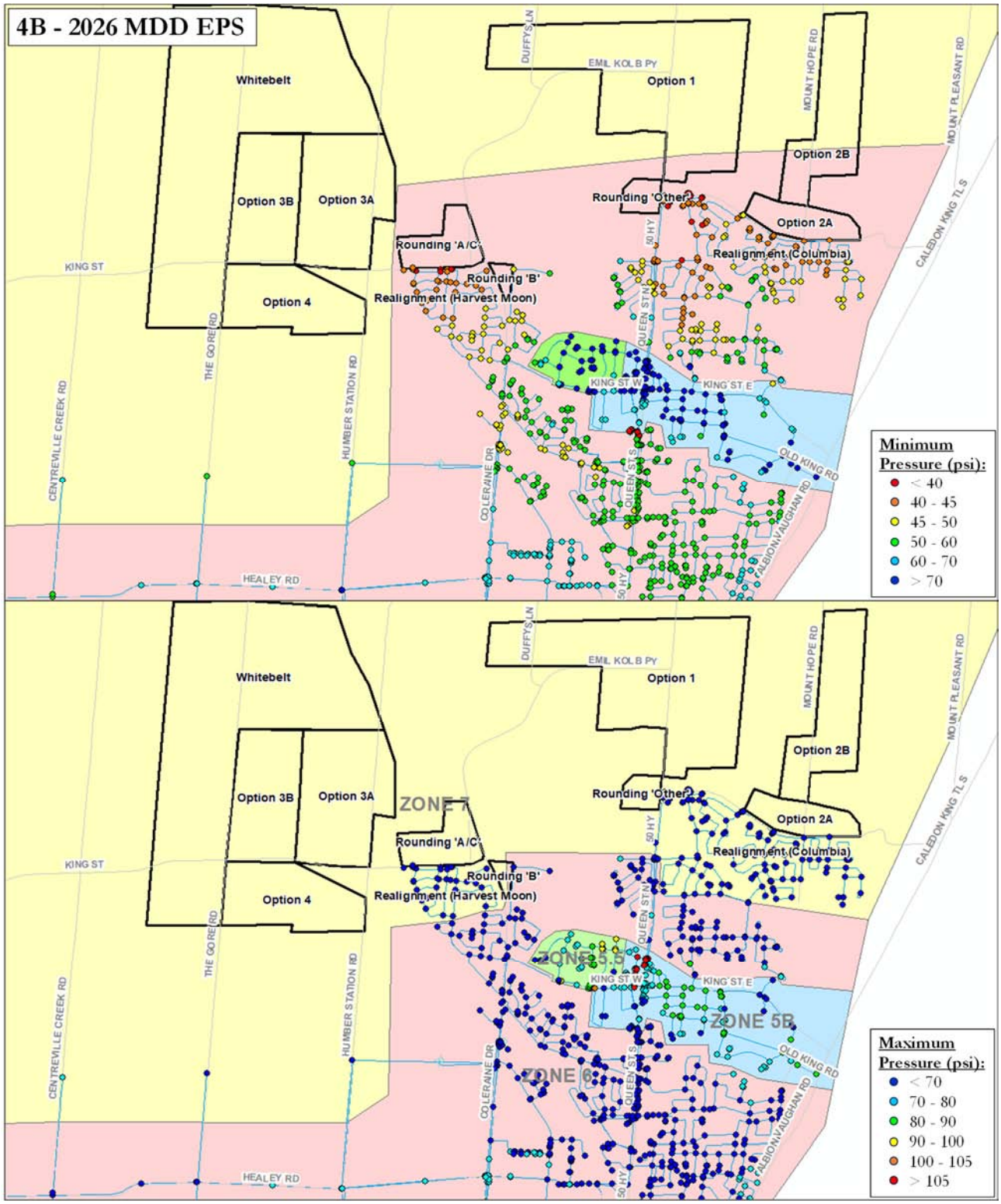


Figure 17: System pressures – Scenario 4B (2026 MDD EPS, existing zones)

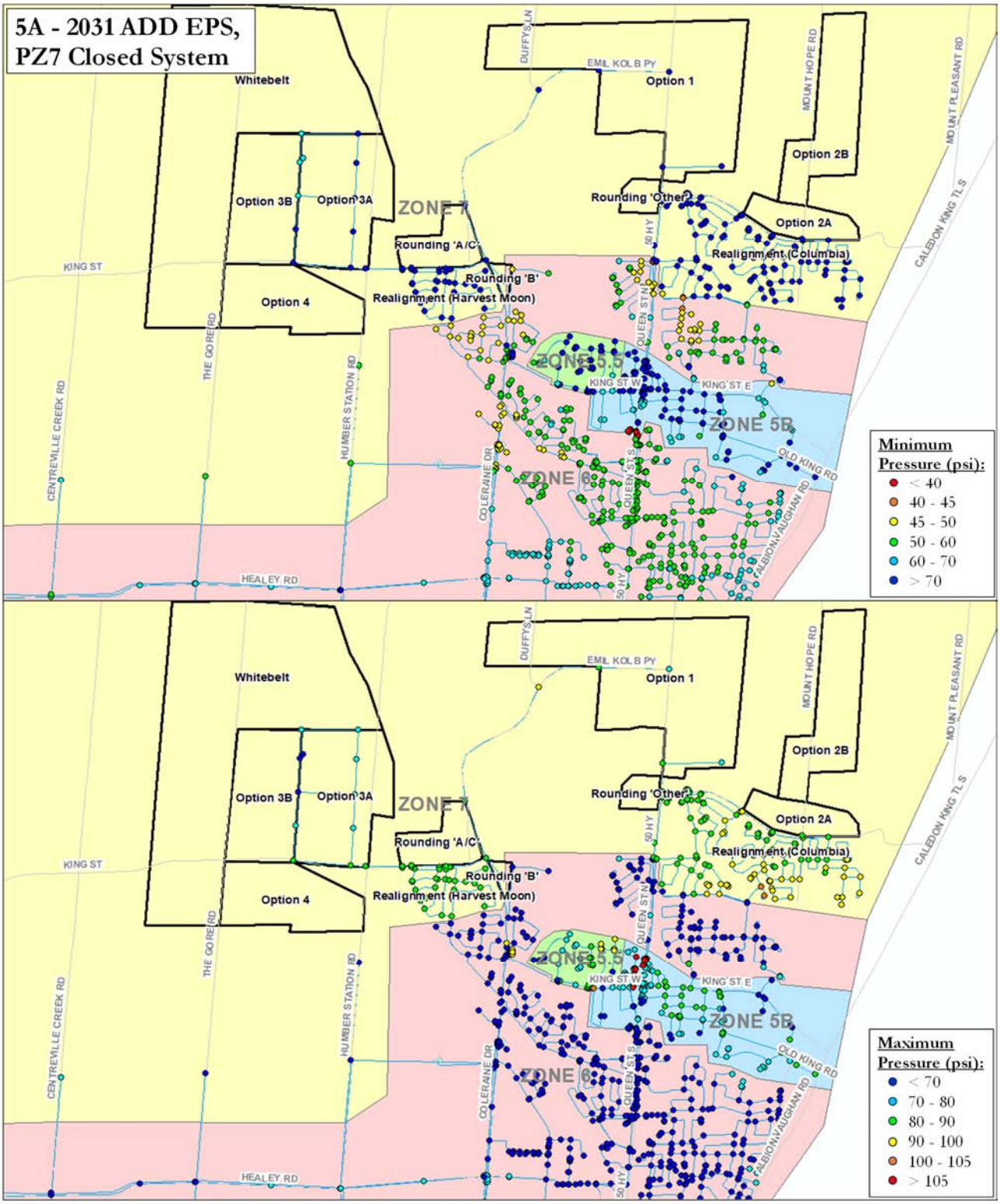


Figure 18: System pressures – Scenario 5A (2031 ADD EPS, PZ7 closed system)

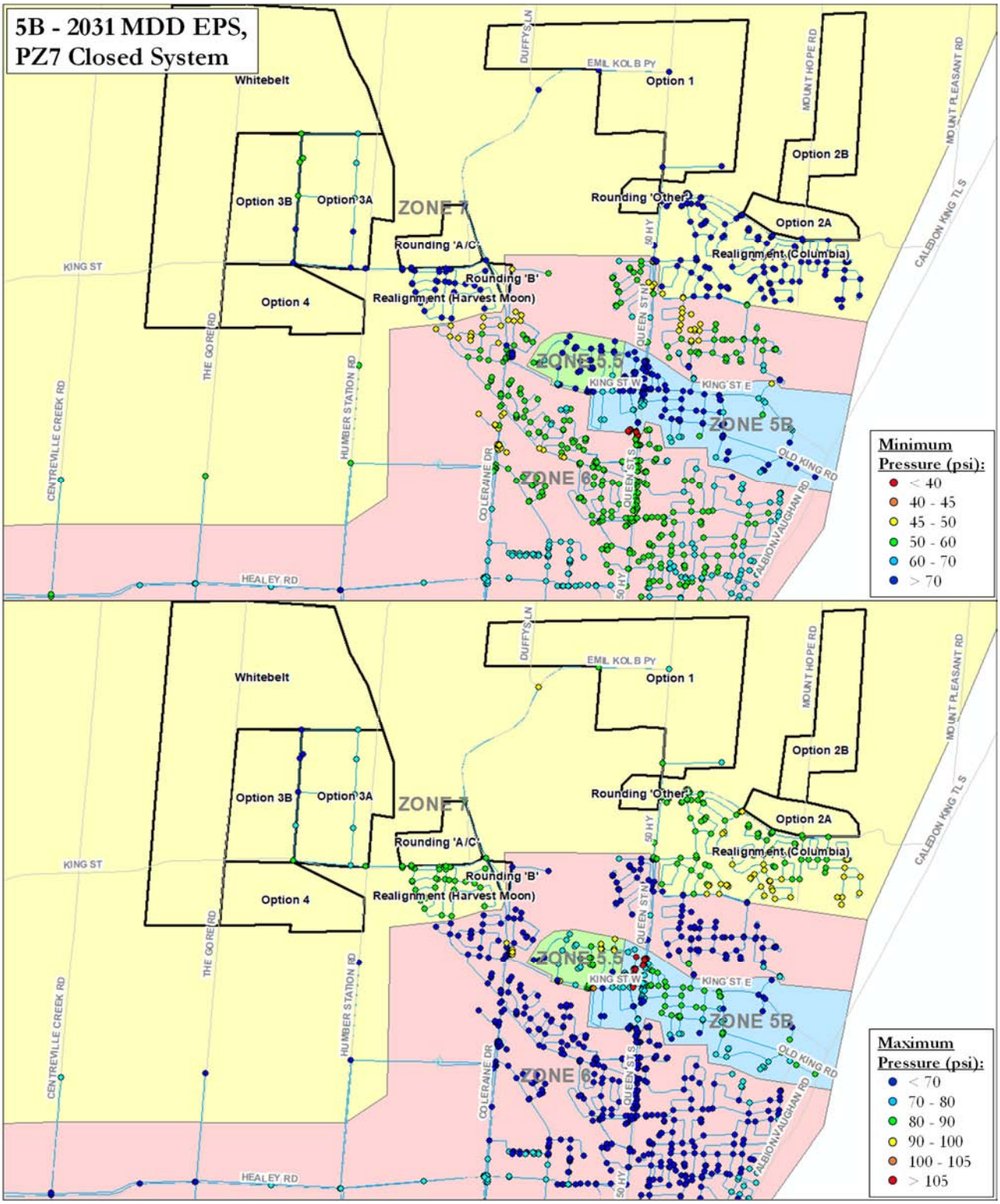


Figure 19: System pressures – Scenario 5B (2031 MDD EPS, PZ7 closed system)

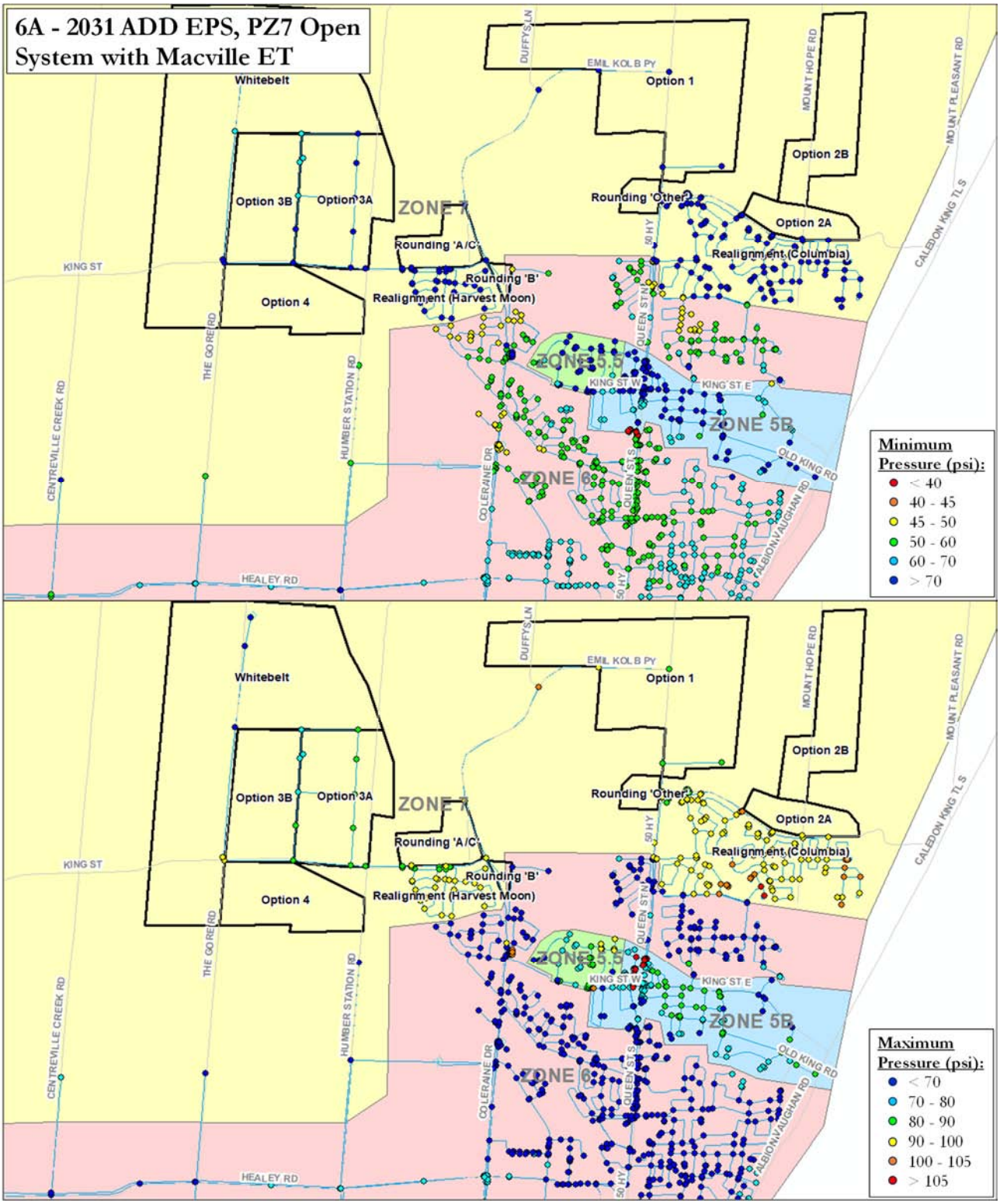


Figure 20: System pressures – Scenario 6A (2031 ADD EPS, PZ7 open system with Macville ET)

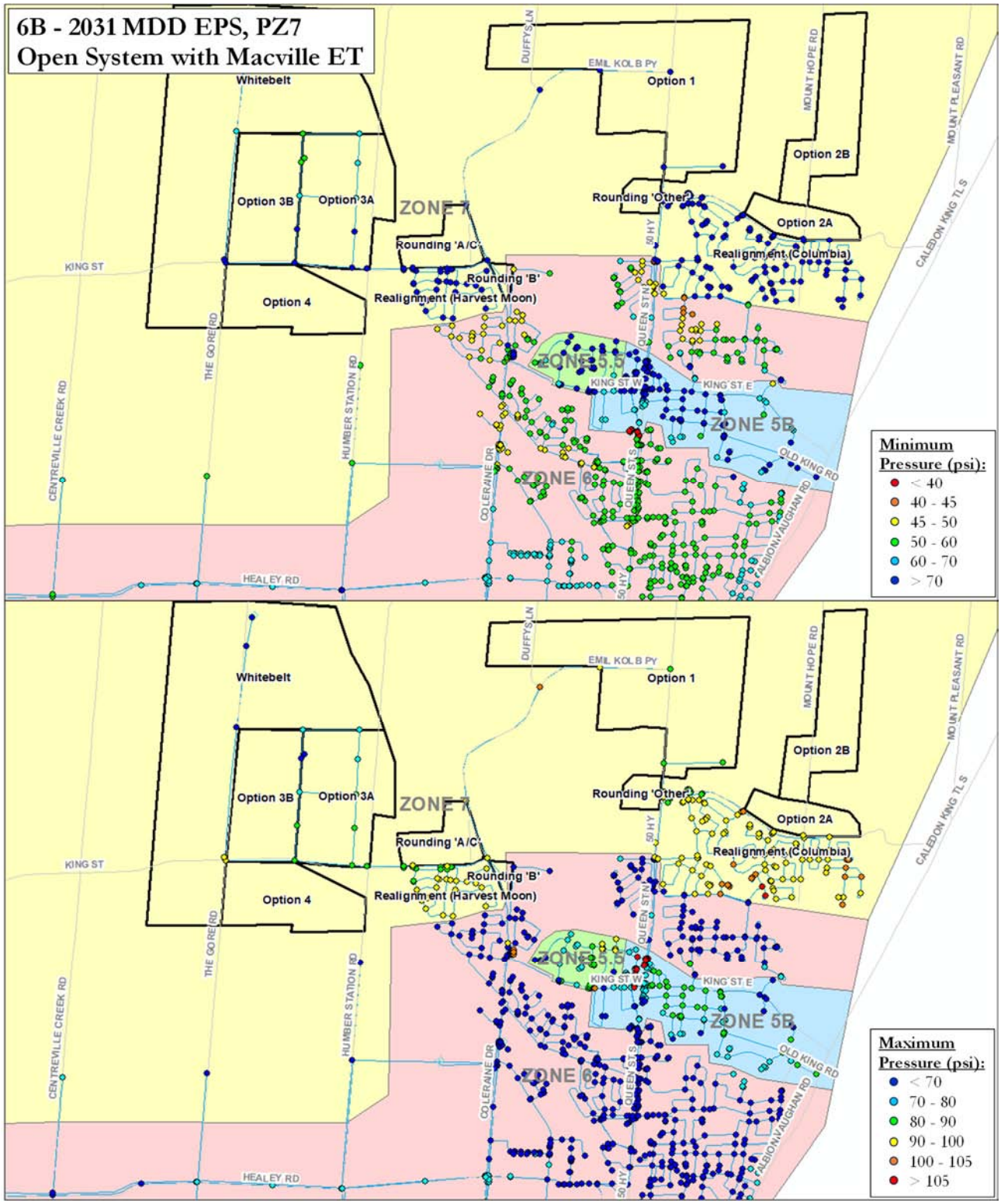


Figure 21: System pressures – Scenario 6B (2031 MDD EPS, PZ7 open system with Macville ET)

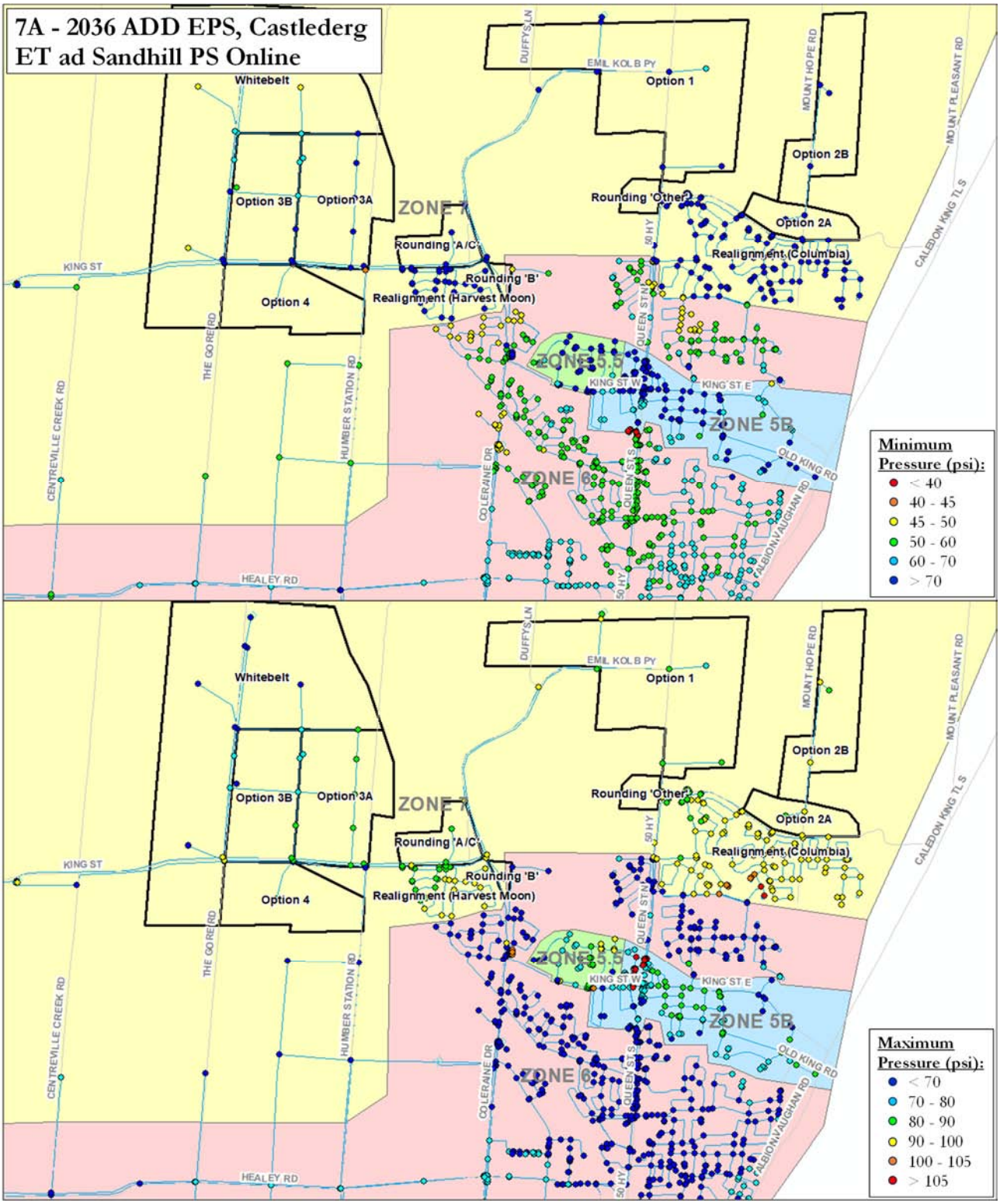


Figure 22: System pressures – Scenario 7A (2036 ADD EPS, with Castlederg ET & Sandhill PZ7 PS)

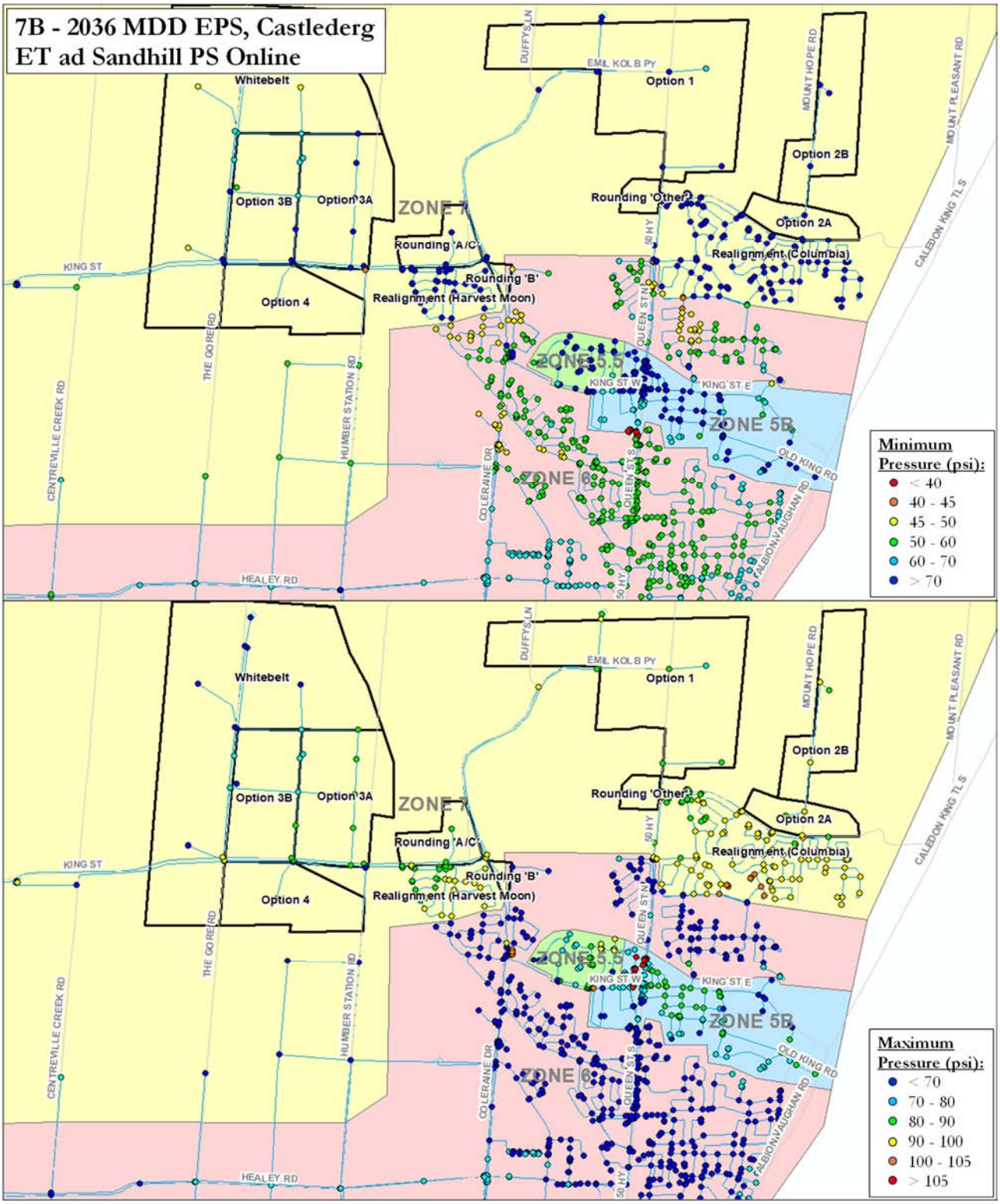


Figure 23: System pressures – Scenario 7B (2036 MDD EPS, with Castlederg ET & Sandhill PZ7 PS)

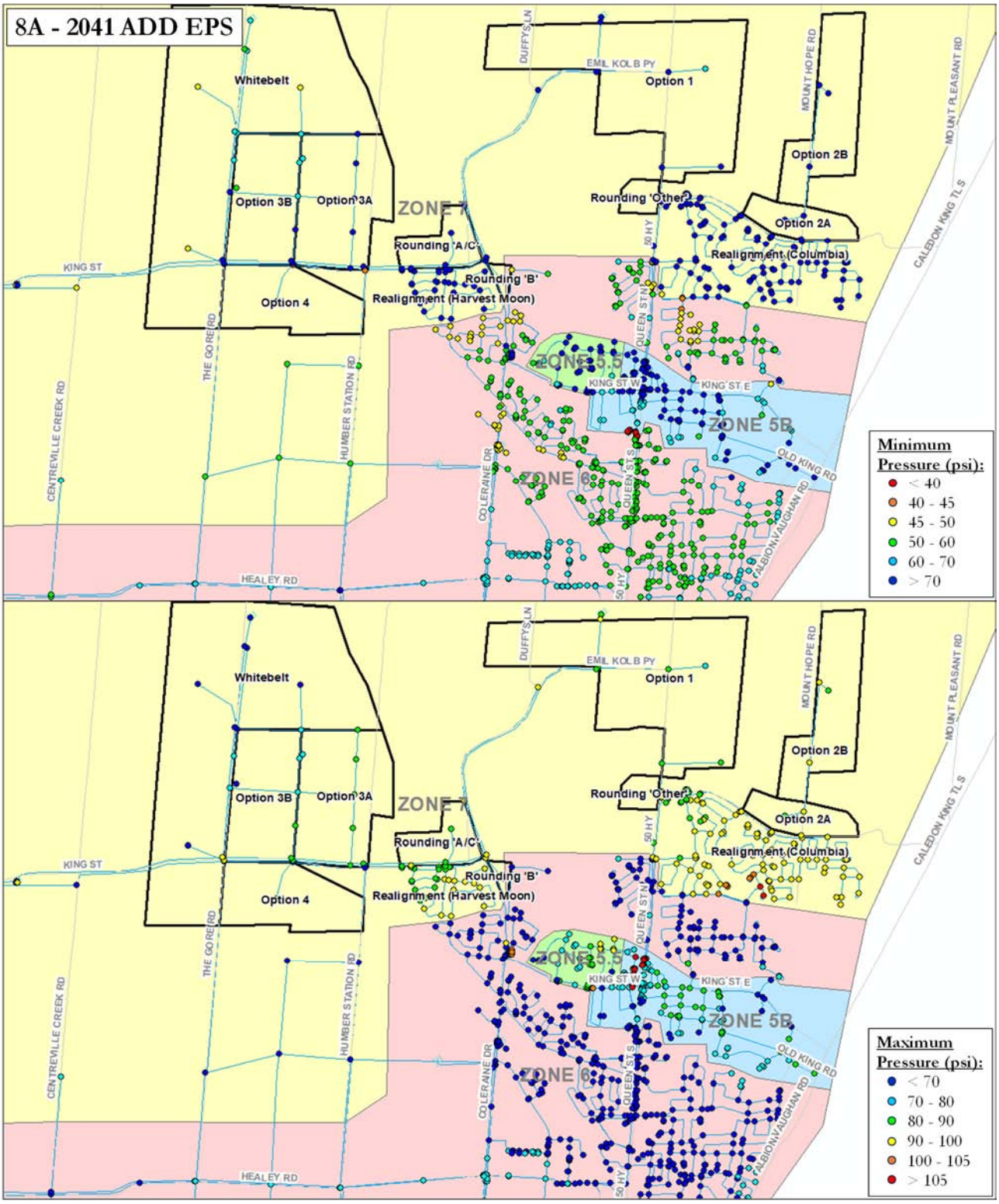


Figure 24: System pressures – Scenario 8A (2041 ADD EPS)

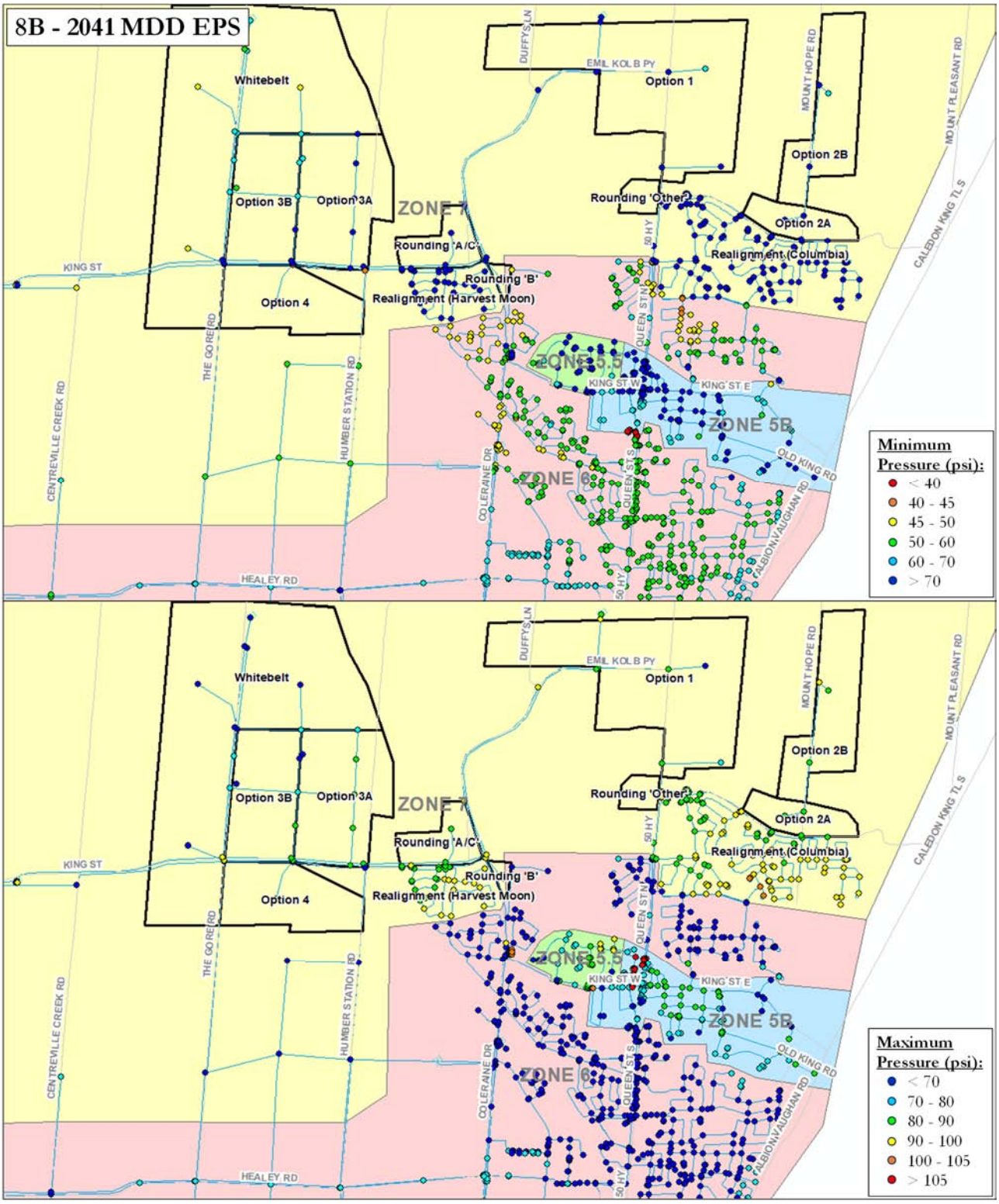


Figure 25: System pressures – Scenario 8B (2041 MDD EPS)

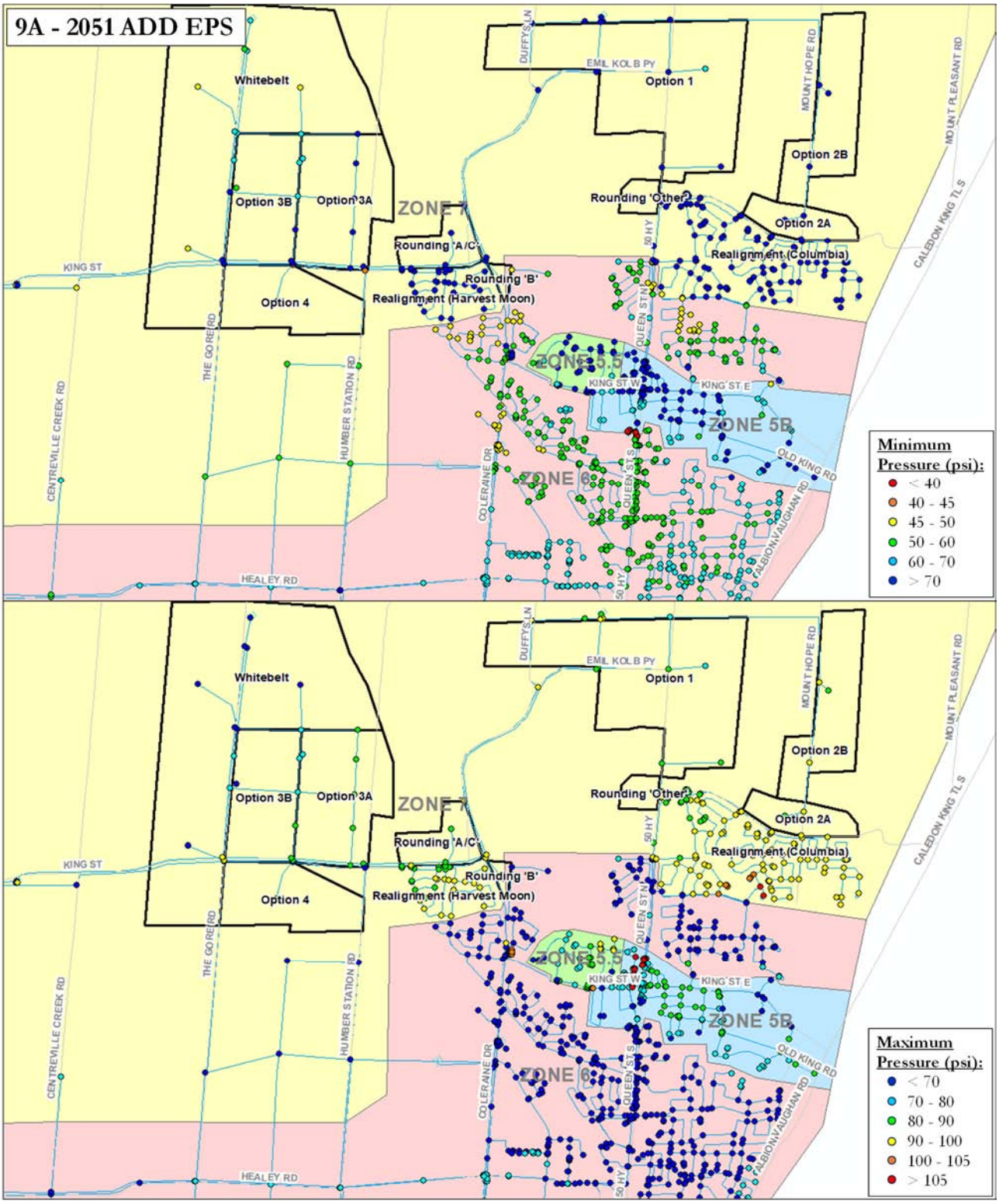


Figure 26: System pressures – Scenario 9A (2051 ADD EPS, future Macville BPS pumps)

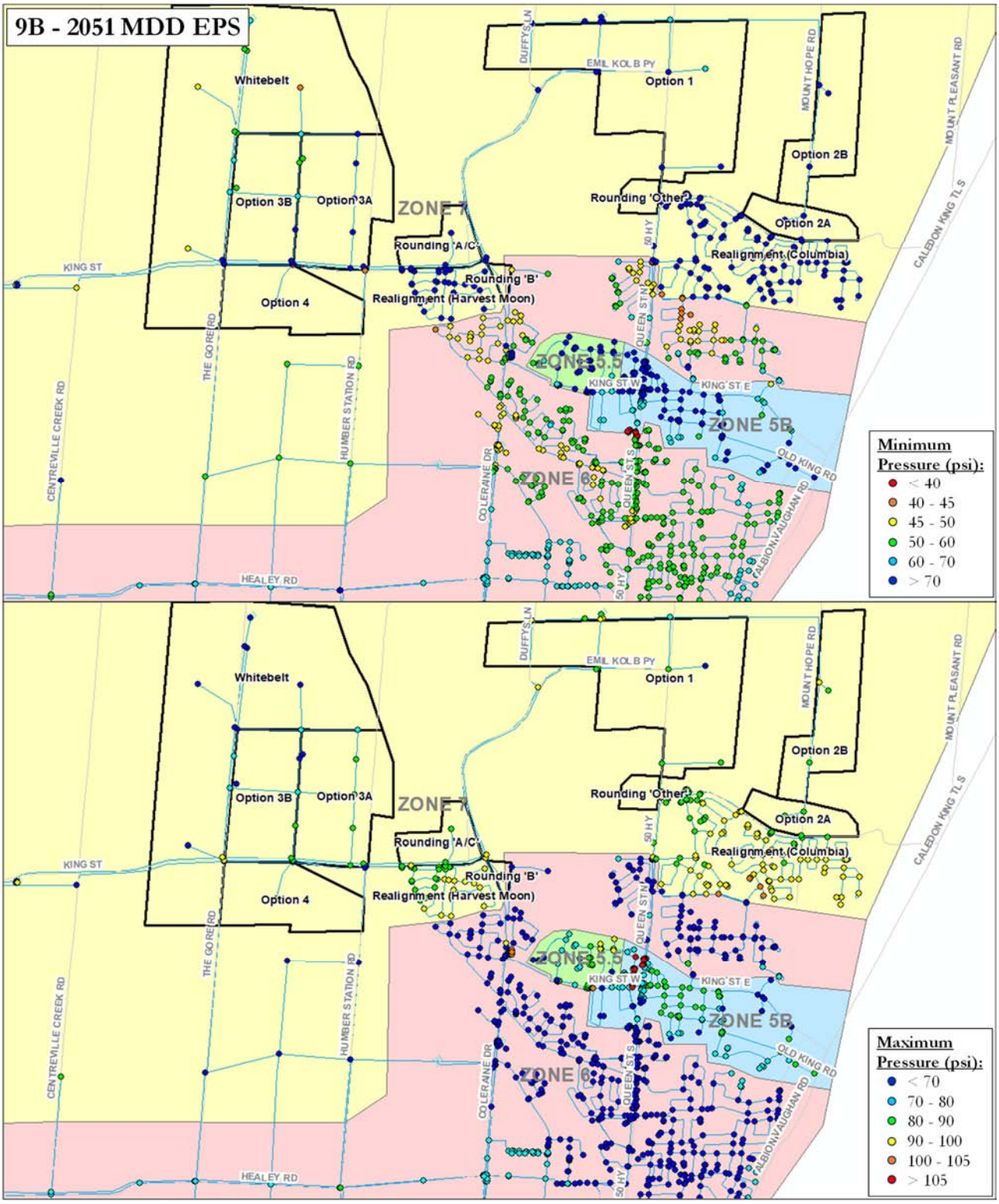


Figure 27: System pressures – Scenario 9B (2051 MDD EPS, future Macville BPS pumps)

APPENDIX B: AVAILABLE FIRE FLOW RESULTS MAPS

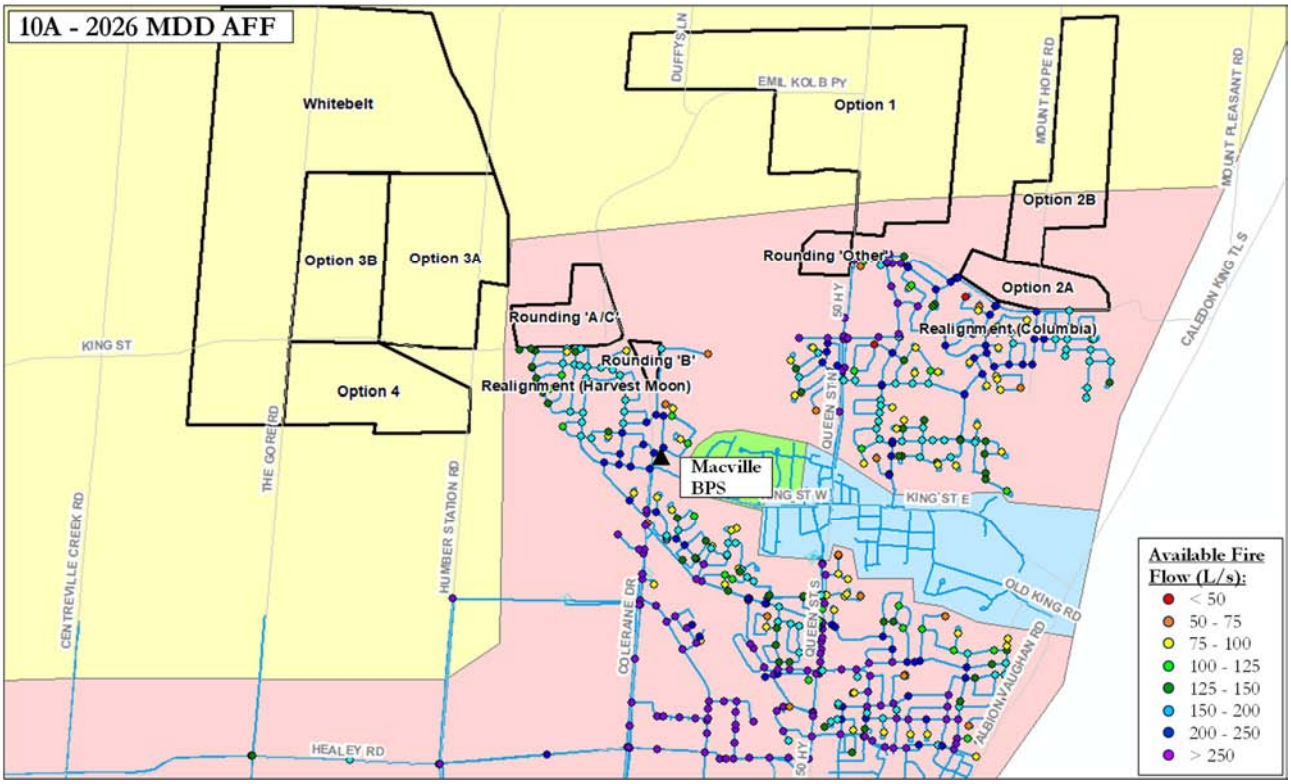


Figure 28: Available fire flows – Scenario 10A (2026 MDD, existing zones)

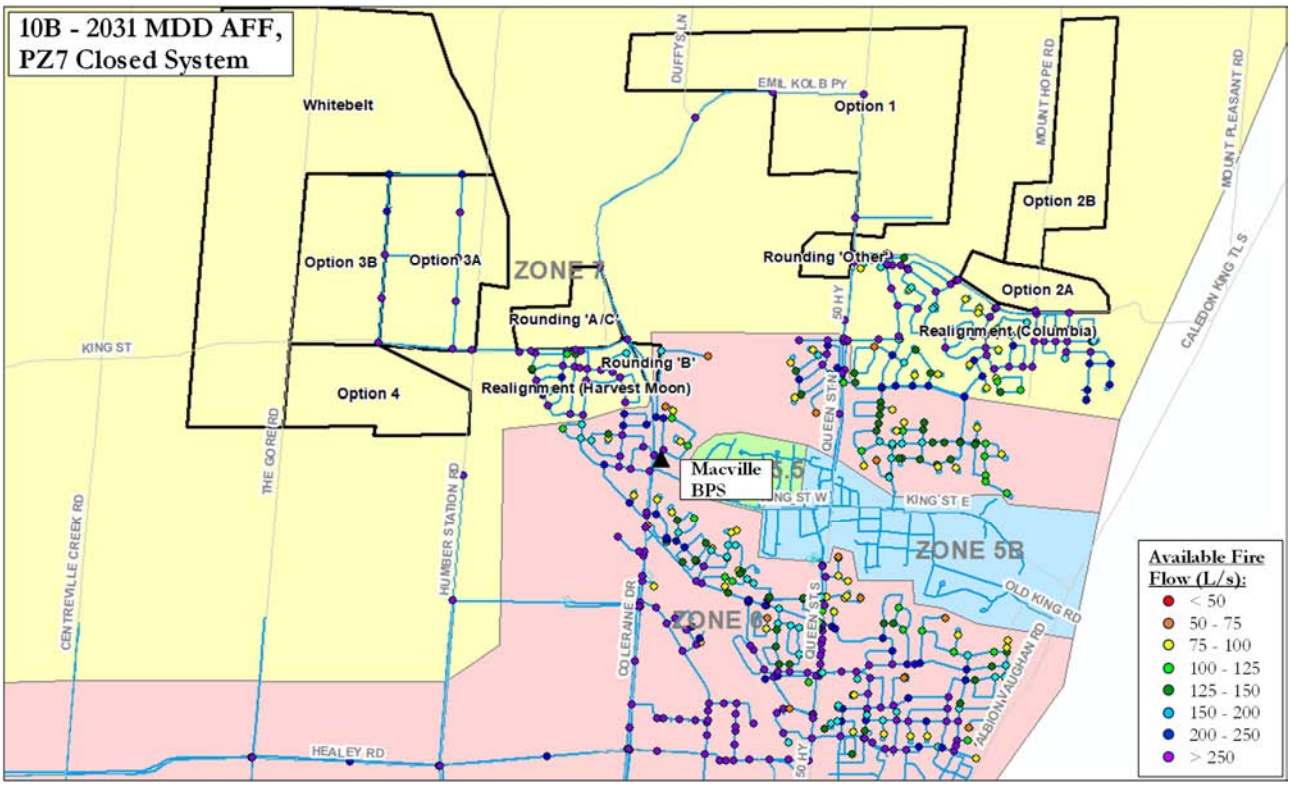


Figure 29: Available fire flows – Scenario 10B (2031 MDD, PZ7 closed system)

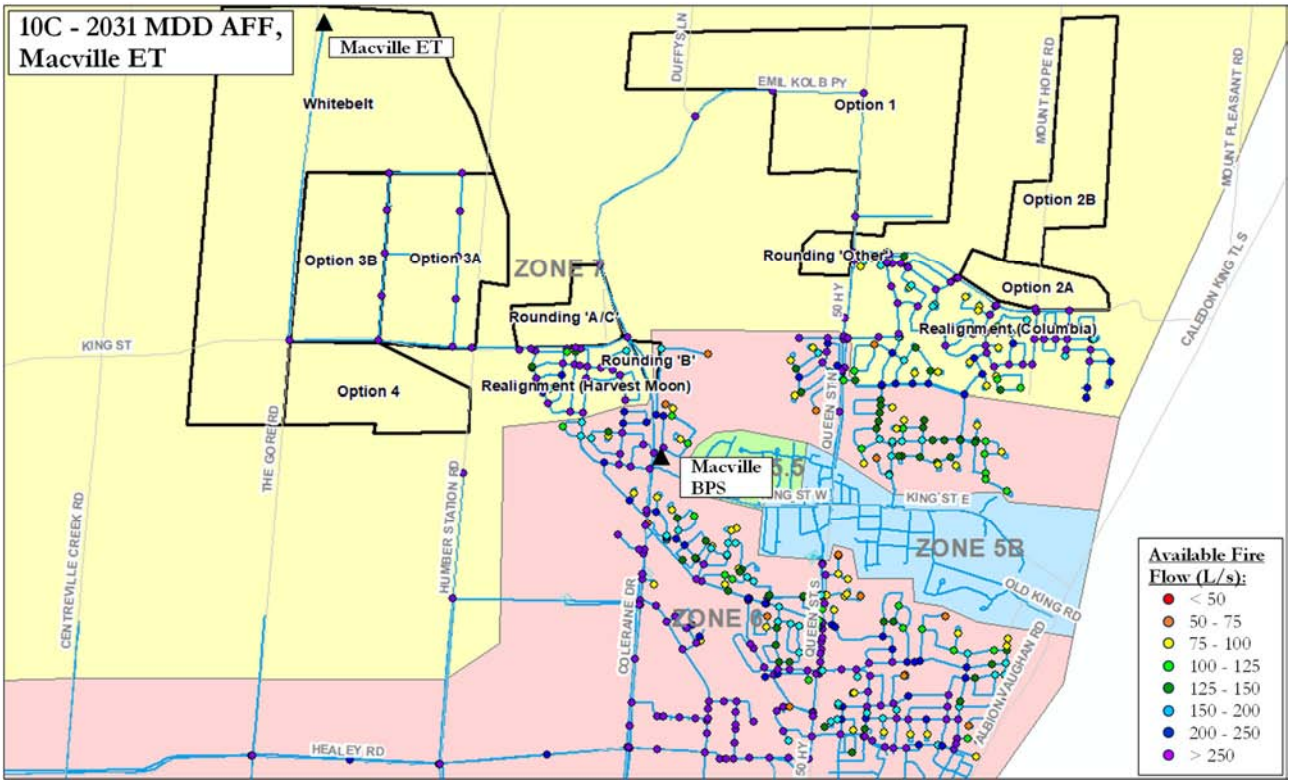


Figure 30: Available fire flows – Scenario 10C (2031 MDD, PZ7 open system with Macville ET)

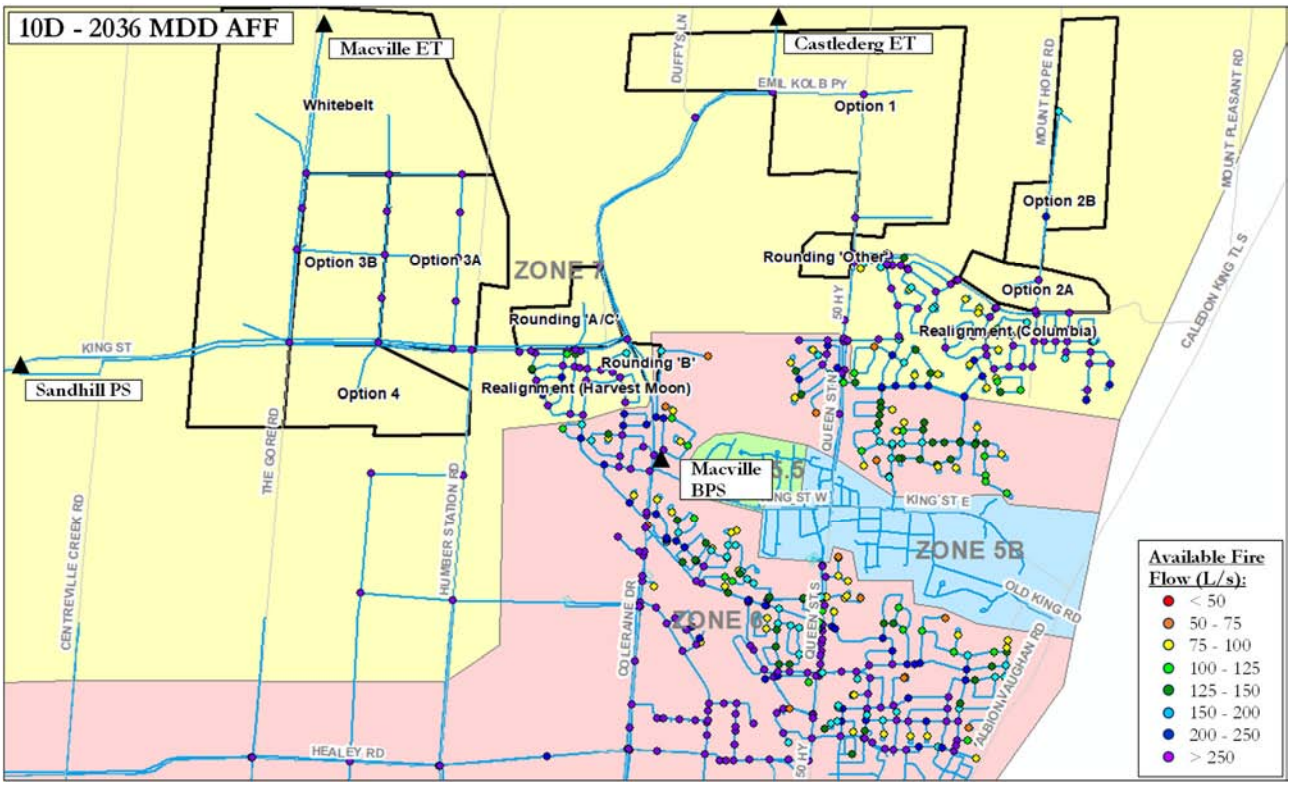


Figure 31: Available fire flows – Scenario 10D (2036 MDD, with Sandhill PZ7 PS & Castlederg ET)

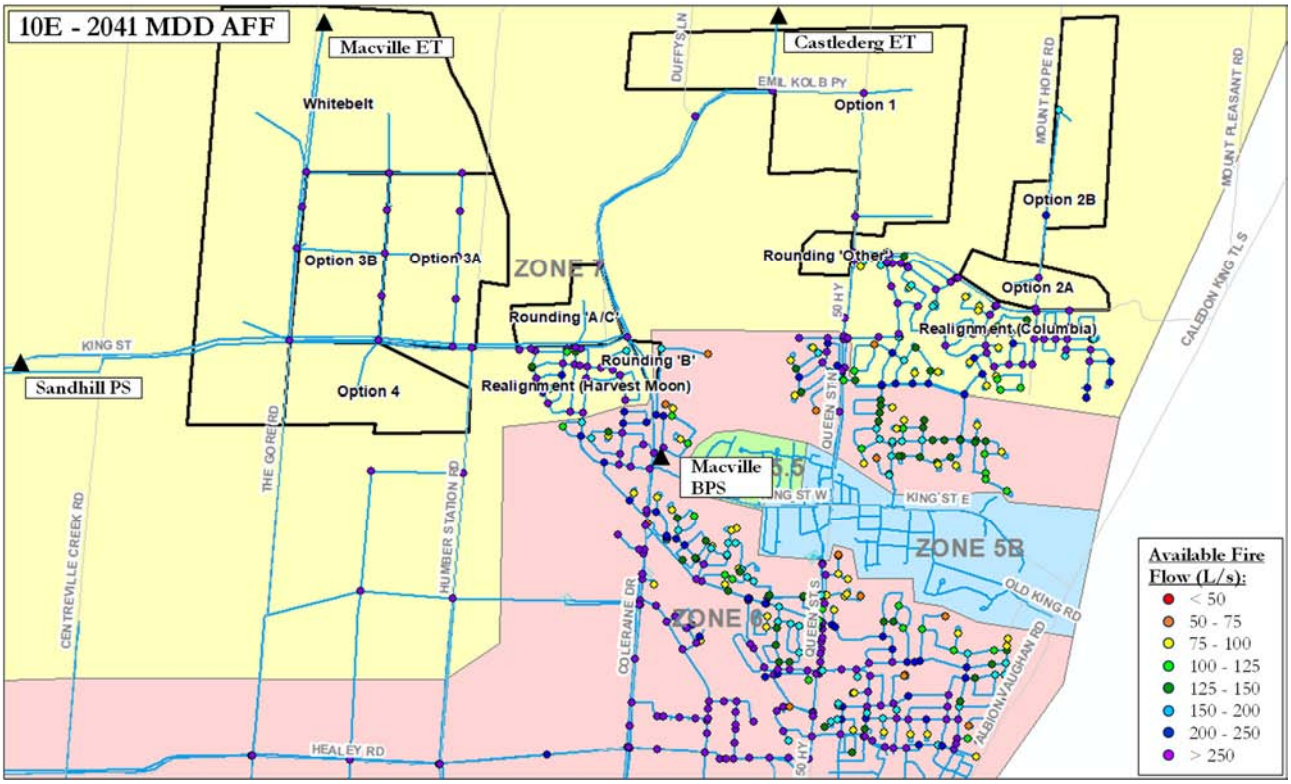


Figure 32: Available fire flows – Scenario 10E (2041 MDD, with Sandhill PZ7 PS & Castlederg ET)

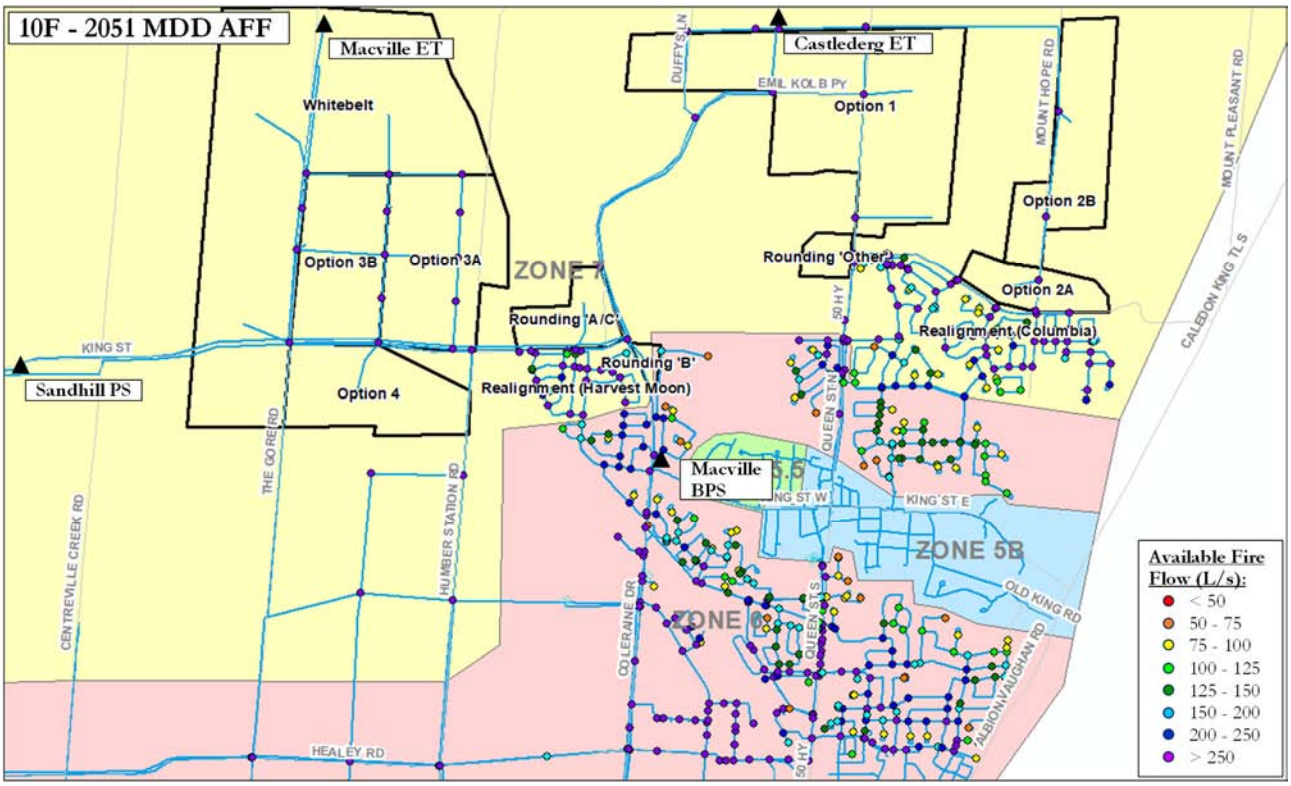


Figure 33: Available fire flows – Scenario 10F (2041 MDD, future Macville BPS pumps)

Technical Memorandum

GEI: Vaughan ● 3300 Highway No.7, Suite 402 ● Vaughan, Ontario L4K4M3

Via Email: Italia.ponce@peelregion.ca
To: Italia Ponce, P.Eng. – Advisor, Infrastructure Planning
From: Mark Zamojc, P.Eng. – Vice President, Infrastructure Planning
Date: October 22, 2025
Re: Bolton Sewage Pumping Station Forcemain Route Analysis Technical Memorandum
Bolton Water and Wastewater Capacity Improvements Schedule C Class EA
Project No.: 2402167

1. Introduction

Peel Region (Region) retained GEI Consultants Canada Ltd. (GEI) (formerly GM BluePlan Engineering) to complete the *Bolton Water and Wastewater Capacity Improvements Schedule C Class Environmental Assessment*. This study will review the water and wastewater servicing needs in Bolton to 2051, investigate alternative servicing strategies, and identify the optimal servicing strategies to meet short-term and long-term growth. As a component of this study, the Region has identified the need to review the current and future forcemain routing associated with the Bolton Sewage Pumping Station (SPS). The current forcemain routing includes several aging forcemains within constrained easements that would benefit from an optimization review.

This technical memorandum (TM) will investigate the existing conditions associated with the Bolton SPS and its current forcemain configuration, the future population growth and sewage flows anticipated for the Bolton SPS catchment, alternative forcemain configurations and routes, and identify a preferred forcemain strategy.

2. Background

2.1. Bolton SPS and Historical Upgrades

The Bolton SPS was constructed in 1984 by modifying an existing headworks facility associated with the decommissioned Bolton Wastewater Treatment Plant. The pumping station consisted of an inlet channel, split wet well, and three dry pit pumps with a rated firm capacity of 215 L/s. The station conveyed wastewater through two 350mmø HDPE forcemains to the Coleraine Drive trunk sewer (previously known as the Bolton-Brampton trunk sewer) via sewers on Strawberry Hill Court, south of Allan Drive, in the soccer field of the Allan Drive Public School.

In 1997, a peak inflow of 380 L/s was recorded at the station which was the largest peak inflow on record to date. Resulting from this event, capital upgrades were completed in 2000 to increase the station's capacity to 380 L/s. These upgrades included the installation of new pumps and electrical systems, various structural and process modifications, and a new 450mmø HDPE forcemain along the same route

as the existing twin 350mmø HDPE forcemains. A transient analysis of the three forcemains was completed prior to the expansion which resulted in an air valve chamber between constructed at the top of the steep forcemain rise out of the valley lands at 58 & 60 Strawberry Hill Court.

Since 2000, additional capital works have been performed at the station including the replacement of all three dry pit pumps in 2003, 2009, and 2012.

In 2013, a pumping station condition assessment was conducted which included field inspections to evaluate the visual condition of the assets, a compliance review with current standards, codes and regulations, an optimization analysis including a review of historical performance data, pump flow testing, and a recommended list of priority upgrades. The report concluded that if the three forcemains and Pump 1 were restored to their original condition, the calculated firm capacity of the station could approach 390 L/s.

In 2016, the Region completed a SCADA Instrumentation Control Panel upgrades project such that the Bolton SPS would be compliant with the latest PAID standards. Performance testing was completed in 2017 which noted an observed firm capacity of 378 L/s and a maximum station capacity of 504 L/s (all three pumps operating through all three forcemains).

In 2018, a forcemain condition assessment and TSSA upgrades were conducted. In 2019, a state of good repair project was completed which included process, instrumentation, and health and safety upgrades.

In 2019, a Preliminary Design Report (PDR) was completed which recommended several wastewater projects in the Town of Caledon including a sanitary sewer extension on Albion-Vaughan (A-V) Road and Nunnville Road and the installation of a fourth forcemain along Old King Road from the Bolton SPS to the Nunnville Road sewer extension. The recommended wastewater projects allowed a re-direction of flows from the Bolton SPS sewershed to the A-V sewershed and provided the Region an option of pumping to the A-V trunk sewer via the new 525mmø forcemain instead of strictly discharging to the Coleraine trunk sewer via the Strawberry Hill Court outlet. Several piping modifications to the Bolton SPS were required to facilitate operation of the new 525mmø forcemain including a 300mmø forcemain complete with a motorized plug valve, a magnetic flow meter, and a drain valve. Per discussion with the Region, the wastewater projects recommended in this PDR are anticipated to be completed in the near-term and are assumed to be complete for the purposes of this analysis.

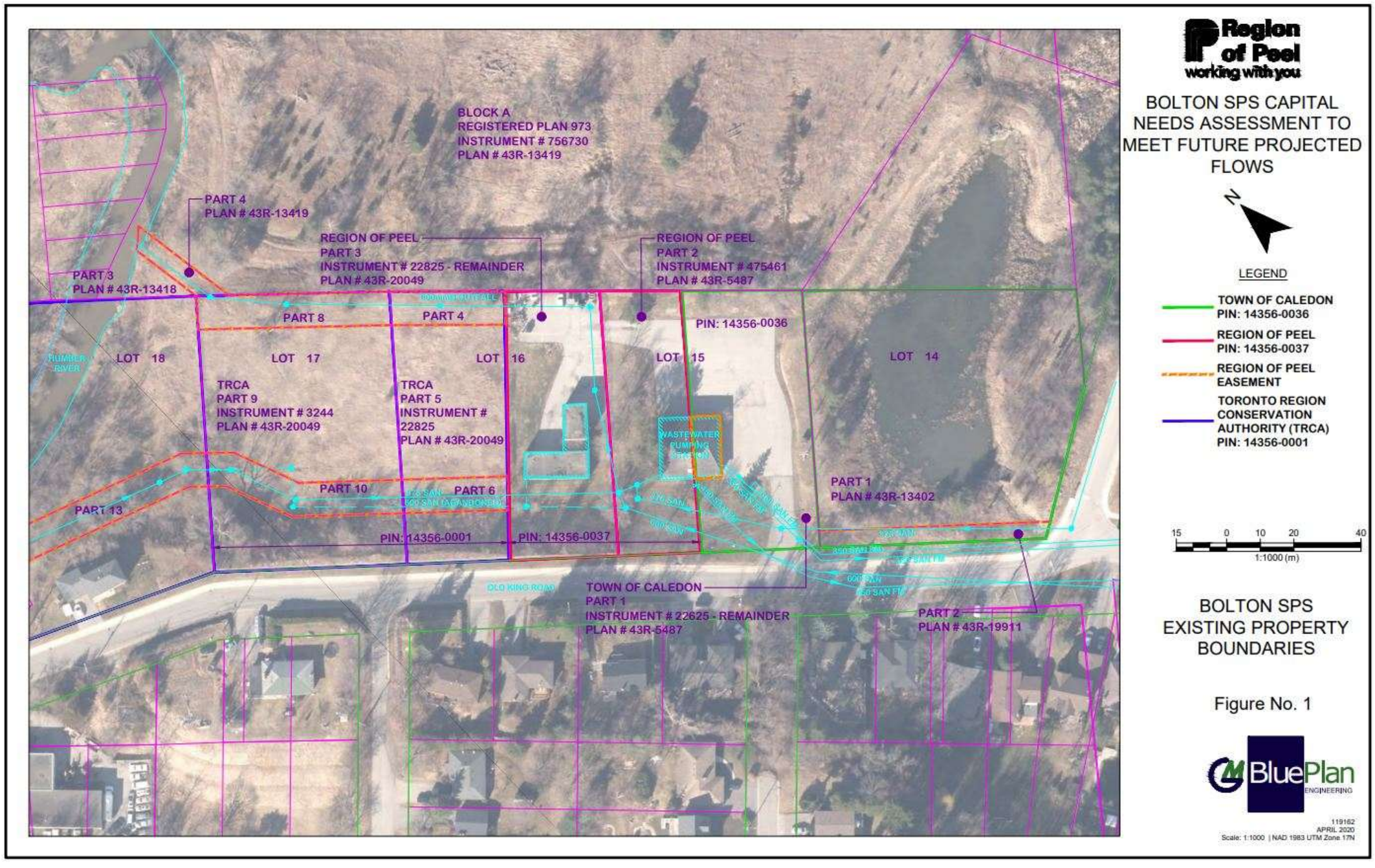
3. Existing Conditions

3.1. Bolton SPS

3.1.1. Property Ownership

The Bolton SPS is located at 95 Old King Road in Bolton, Ontario. **Figure 3-1** is an excerpt from the 'Bolton WWPS Capital Needs Assessment to Meet Future Projected Needs' report completed by GM BluePlan in June 2020, which illustrates the property ownership surrounding the pump station.

Figure 3-1: Bolton Sewage Pumping Station



The western portion of the site and the pumping station building are located on a property owned by the Region while the eastern portion of the building is located on an easement within property owned by the Town of Caledon. The pumping station site entrance and a portion of the eastern inlet sewers (375mmø & 600mmø) and forcemains are located on property owned by the Town with no registered easements. The western inlet sewer (675mmø) and overflow pipe (600mmø) are located on property owned by the Toronto Region Conservation Authority (TRCA) within an easement registered to the Region. A review of property ownership and easement requirements may be required based on the final recommendations.

3.1.2. Pumps

The station is equipped with three (3) 250 horsepower Flygt CT-3213/735 dry pit submersible pumps with a capacity of 239 L/s each at 49 metres of Total Dynamic Head (TDH). As detailed in the 2020 GM BluePlan report, performance testing was conducted in 2017 (prior to construction of the 525mmø FM currently being constructed on Old King Road) which indicated that Pump 1 had depreciated and the station had an observed firm capacity of 378 L/s (Pump 1 & 2 in service, all 3 forcemains in service). With improvements made to Pump 1, the station would be expected to achieve a firm capacity of 390 L/s. The observed maximum station capacity was 504 L/s at 57 m TDM (all pumps in operation and all forcemains in service).

3.1.3. Emergency Storage & Overflow Pipe

The station's existing wet well provides approximately 90 m^3 of emergency storage between the high-level float alarm (207.25 masl) and the invert of the emergency overflow pipe (210.54 masl). A peak inflow rate of 491 L/s was identified in 2019 which would amount to approximately 3 minutes of storage capacity prior to activation of the 600mmø emergency overflow pipe. Region of Peel standards are to provide ideally 2 hours of peak flow storage capacity.

The 600mmø emergency overflow pipe is a 220m length concrete pipe at 0.4% slope which discharges to the Humber River and has a theoretical capacity of 405 L/s.

3.2. Forcemains & Receiving Trunk Sewers

3.2.1. Triple Forcemain System to Strawberry Hill Court & Coleraine trunk sewer

As detailed in the 'Technical Memorandum #5 – A-V Road Sanitary Trunk Sewer Phase 2' (Chisholm, Fleming, and Associates, April 2020), the three forcemains; two 350mmø (FM1 & FM2) and one 450mmø (FM3), have a combined capacity of 430 L/s and discharge to a 600mmø trunk sewer, south of Strawberry Hill Court & Allan Drive. Flows are conveyed through trunk sewers located on Fountainbridge Drive and Landsbridge Street to the intersection of Queensgate Boulevard and Landsbridge Street where a flow splitting control manhole (MH#309358) is located (refer to **Figure 3-2**). The flow splitting manhole allows the Region the flexibility to convey flows to either the 750mmø Coleraine trunk sewer or the 900mmø A-V trunk sewer. As shown in **Figure 3-2**, flows are conveyed to the A-V sewer, just north of the CPR rail line, via sewers located on Landsbridge Street, the CPR rail line, and Waterbury Street. Flows are

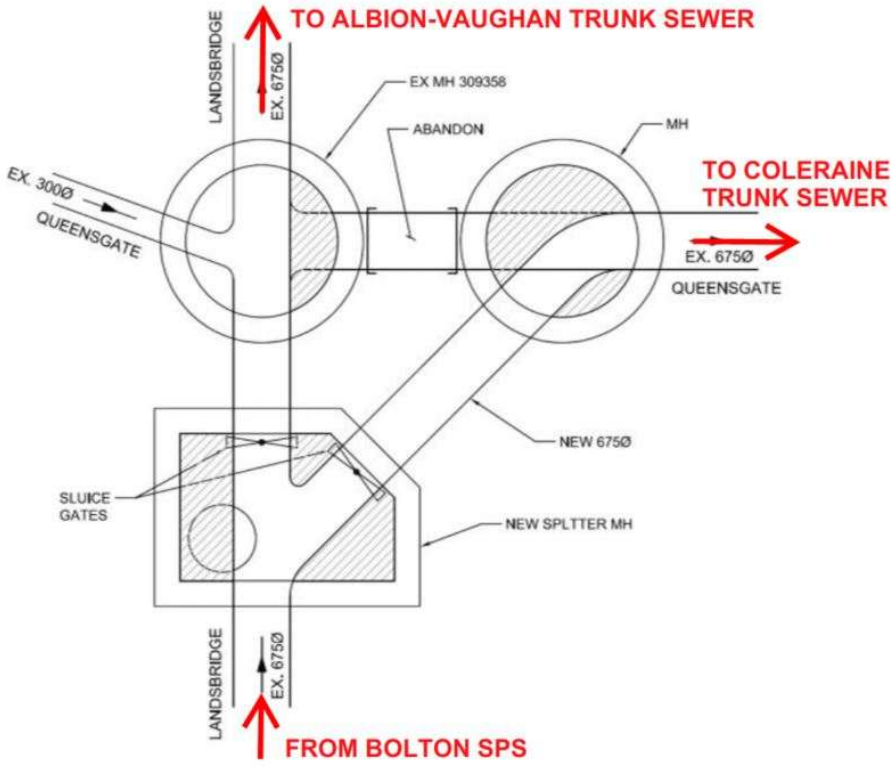
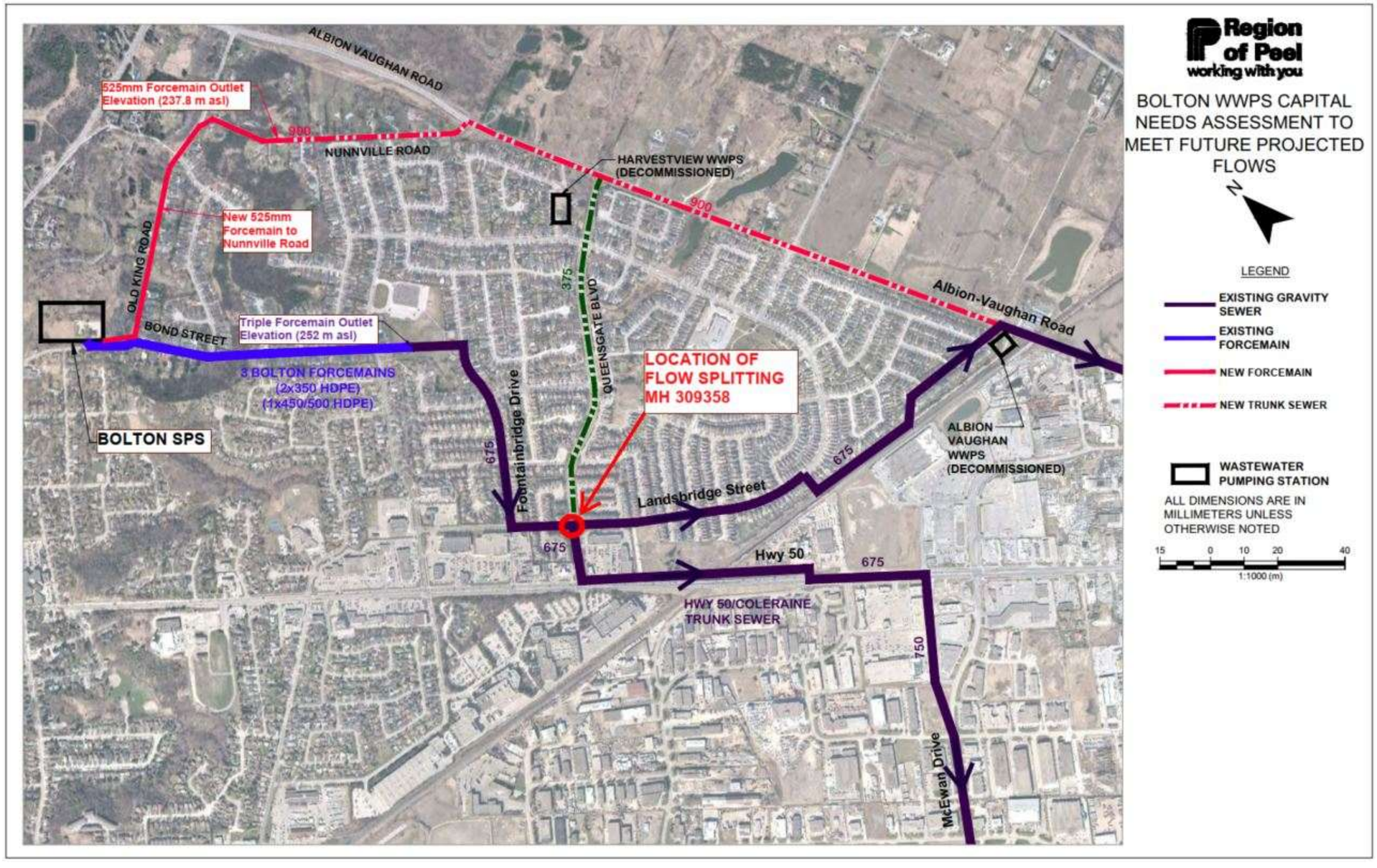


Figure 3-2: Flow splitting Control MH-309358

conveyed to the Coleraine trunk sewer, north of George Bolton Parkway, via sewers located on Queensgate Boulevard, Highway 50, McEwan Drive, and various easements.

A map of the existing triple forcemain system and downstream trunk sewers is provided on **Figure 3-3**. The location of the new 525mm forcemain, along with the extension of the Albion-Vaughan trunk sewer, as described in Section 3.2.2, is also shown in **Figure 3-3**.

Figure 3-3: Existing Forcemain System to A-V & Coleraine Trunk Sewers



3.2.2. 525mmø Forcemain to Nunnville Road & A-V trunk sewer

As described in the PDR (Chisholm, Fleming, & Associates, 2019), a new 525mmø HDPE DR11 forcemain was constructed from the Bolton SPS to a new extension of the A-V trunk sewer on Nunnville Road. The forcemain connects to a 660mmø sewer extension on Nunnville Road with a capacity of 855 L/s which subsequently connects to the 900mmø A-V trunk sewer. The 525mmø forcemain provides the Region the flexibility to direct sewage flows to either the Coleraine trunk sewer or the A-V trunk sewer. It was identified (and confirmed within this modelling exercise) that the 900mmø A-V sewer has a capacity of 1,071 L/s from its north terminus on Nunnville Road to Mayfield Road; however south of Mayfield Road its capacity reduces to 863 L/s.

3.3. Station and Forcemain Operation

As detailed in the 2020 GM BluePlan report, there are a variety of pump operation conditions associated with the Bolton SPS. As noted, the station has three (3) submersible pumps with a capacity of 239 L/s each and 49 metres of TDH. These pumps can be used with a combination of forcemains to maximize flow capacity while remaining within the MECP's preferred forcemain velocity range of 0.8 m/s to 2.5 m/s. The elevation of the two discharge locations is significantly different with the outlet on Nunnville Road to the A-V sewer being at 237.75 masl, while the outlet within Allan Drive Public School to the Coleraine sewer is at 252 masl. This difference in outlet elevation means pump operation must be carefully managed. As part of the 2020 GM BluePlan report, system curves for various forcemain and pump operation combinations were analyzed in AFT Fathom. A summary table of the recommended pump and forcemain operation combinations is provided in **Table 3-1**.

Table 3-1: Preferred Pump and Forcemain Operation

Number of Pumps Operating	Forcemain 1 (350mmø) Velocity (m/s)	Forcemain 2 (350mmø) Velocity (m/s)	Forcemain 3 (450mmø) Velocity (m/s)	Forcemain 4 (525mm) Velocity (m/s)	**Total Flow Capacity (L/s)**
Coleraine Trunk Sewer Outlet					
2 Pumps	**1.3**	**1.4**	**1.4**	**-**	**368**
A-V Trunk Sewer Outlet					
2 Pumps	-	-	-	**2.0**	**452**
Coleraine & A-V Trunk Sewer Outlets					
2 Pumps (1 pump to FM1/FM2, 1 pump to FM4)	**1.2**	**1.3**	-	**0.9**	**381**
3 Pumps (1 pump to FM2/FM3, 2 pumps to FM4)	**1.3**	**1.3**	**1.4**	**0.9**	**563**

As shown in **Table 3-1**, currently the Bolton SPS can pump 368 L/s to the Coleraine trunk sewer, 452 L/s to the A-V trunk sewer, or 563 L/s to a combination of the two trunk sewers, within MECP's acceptable velocity range. Due to the elevation head difference, FM 4 must be physically isolated from FM1, FM2, and FM3 through isolation valves on the common discharge header.

3.4. Sewersheds

Throughout Bolton, there are several sewage catchment areas that drain to separate trunk sewers. These catchment areas are referred to as sewersheds within this report and the sections below describe the sewersheds that are relevant to the Bolton SPS Forcemain Route Analysis. All of the relevant sewersheds and trunk sewers drain to the McVean SPS which is the downstream hydraulic modelling boundary condition. The sewersheds described below are shown in **Figure 3-4**.

3.4.1. Bolton SPS Sewershed

The Bolton SPS sewershed is an area of lower elevation within downtown Bolton associated with its proximity to the Humber River. This area includes local gravity sewers that convey sewage flows to the Bolton SPS for pumping to nearby trunk sewers. As described in Section 3.2, the Bolton SPS has the capacity to pump to either the Coleraine trunk sewer or the A-V sewer. The hydraulic modelling completed for this TM will investigate which trunk sewer has the capacity available to convey flows from the Bolton SPS sewershed and thereby inform the evaluation of the various potential future forcemain alignments for the Bolton SPS. This sewershed is identified as Area 1 on **Figure 3-4**.

3.4.2. Local Sewershed Upstream of Split Manhole

This sewershed is located upstream of the flow splitting control manhole (MH#309358) identified in **Figure 3-2**. Sewage from this sewershed flows by gravity via local sewers to MH#309358 and can be directed to the Coleraine trunk sewer or A-V trunk sewer via the sewers described in Section 3.2.1. As previously stated, this modelling exercise will investigate the available capacity of the Coleraine and A-V trunk sewers and recommend the downstream outlet for sewage flows from this sewershed. This sewershed is identified as Area 2 on **Figure 3-4**.

3.4.3. Albion-Vaughan Sewershed

The Albion-Vaughan (A-V) sewershed includes a large area west of A-V Road that flows by gravity via local sewers to the 900mmø A-V trunk sewer. This sewershed was expanded recently by the extension of the A-V 900mmø trunk sewer to Nunnville Road, along with 900mmø sewer extensions on Nunnville Road & Riverwood Terrace, the decommissioning of the Harvestview SPS, and other local sewer extensions in the area. This sewershed will drain to the A-V trunk sewer throughout the planning period which the hydraulic modelling will reflect. This sewershed is identified as Area 3 on **Figure 3-4**.

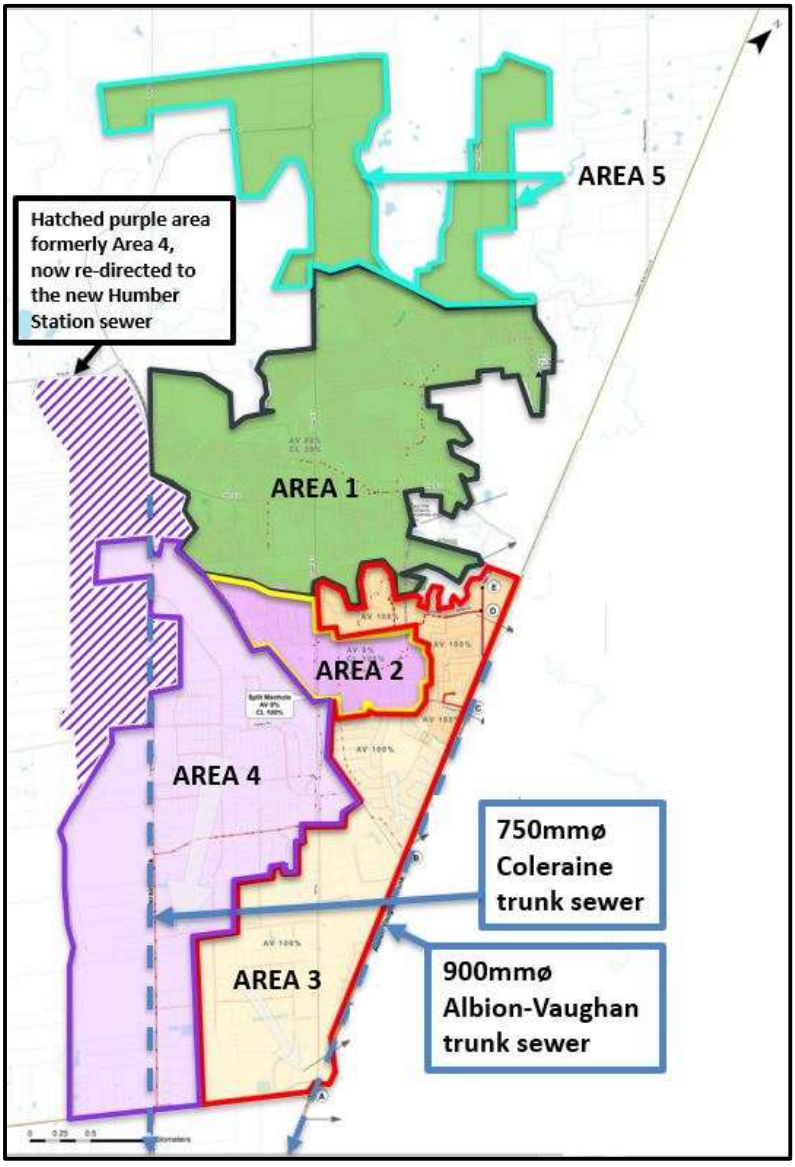
3.4.4. Coleraine Sewershed

The Coleraine sewershed includes a significant portion of western Bolton, generally bound by Mayfield Road to the south, CN railway to the north, and industrial neighborhoods east and west of Coleraine Drive. This sewershed is identified as Area 4 on **Figure 3-4**. As shown, a portion of the Coleraine sewershed north of Healey Road was re-directed to the newly constructed Humber Station sewer. The remaining portion identified as Area 4 will drain to the Coleraine trunk sewer throughout the planning period which the hydraulic modelling will reflect.

3.4.5. Lands North of Columbia Way

There are two growth areas north of Columbia Way that do not currently have access to lake-based wastewater servicing. Growth is anticipated for these areas within the planning period and as identified in the Region's Post-2041 study (GM BluePlan, 2022), it is anticipated that sewage will be collected by local sewers and conveyed to a local sewage pumping station on Emil Kolb Parkway, near the crossing of the Humber River. Sewage will then be pumped to the existing Coleraine trunk sewer or the future Humber Station trunk sewer (if available). Once the Humber Station sewer is constructed, sewage from these areas will either be split between the Coleraine sewer and the Humber Station sewer or sent entirely to the Humber Station sewer, depending on the available capacity of these trunk sewers. As the construction of the Humber Station trunk sewer is currently underway and growth within these areas is anticipated to occur later in the planning period, it is assumed that sewage flows from these areas will be entirely directed to the Humber Station trunk sewer for the purposes of this modelling exercise. This sewershed is identified as Area 5 on **Figure 3-4**.

Figure 3-4: Relevant Sewersheds within Bolton



4. Future Conditions

A priority for the evaluation of various servicing strategies for the Bolton SPS is the available capacity of downstream trunk sewers to convey wastewater flow to the McVean SPS. As previously stated, all of the sewersheds and trunk sewers identified in **Section 3.4** drain to the McVean SPS thereby it is the downstream hydraulic modelling boundary. However, the available conveyance capacity of the trunk sewers conveying flows from the sewersheds to the McVean SPS is an important factor in the evaluation as key criteria are maximizing the use of existing infrastructure as well as minimizing capital costs and disturbance to residents. By identifying spare capacity in the Coleraine and A-V trunk sewers, the various forcemain alignments can be effectively ranked within the evaluation.

4.1. Population and Employment Growth to 2051

In order to estimate the wastewater flows within the Coleraine and A-V trunk sewers, projected population and employment growth estimates were extracted from the Region's Small Geographic Unit (SGU) for the sewersheds identified in Section 3.4. A summary of the SGU data is provided in **Table 4-1**.

Table 4-1: Summary of Growth Projections to 2051

	Sewersheds				
	Area 1	**Area 2**	**Area 3**	**Area 4**	**Area 5**
Ultimate Population	*21,757*	*4,767*	*18,535*	*19,539*	*10,478*

4.2. Sewage Flows to 2051

The Region's hydraulic wastewater model (InfoWorks ICM software) was used to estimate the ultimate wastewater flows from each of the sewersheds relevant to the capacity assessment of the Coleraine and A-V trunk sewers. Per Regional standards, hydraulic modelling for pipes exceeding 600mmø is to be completed using the AES design storm which is a lower intensity, longer duration storm applicable to trunk sewers. Hydraulic modelling for pipes less than 600mmø is to be completed using the SCS design storm which is a higher intensity, smaller duration storm applicable to local sewers. Refer to **Table 4-2** for a summary of the appliable design storm modelling details per Region standards.

Table 4-2: Applicable Design Storms for Hydraulic Analysis

Table 4 – Design storms and capacity update triggers.

Diameter	Design Storm	Capacity Upgrade Trigger
> 600-mm	5-year AES 12 hr 30%	d/D ≥ 0.85
	25-year AES 12 hr 30%*	Water depth ≤ 1.8 m below ground
≤ 600-mm	5-year SCS Type II	d/D ≥ 0.85
	25-year SCS Type II*	Water depth ≤ 1.8 m below ground

**Model results for 25-year storms alone will not be the only basis for upgrade trigger.*

While this analysis focuses on the 750mmø Coleraine trunk sewer and 900mmø A-V sewer which would typically be analyzed using the AES design storm, the SCS design storm will be used to analyze the catchment areas to maintain consistency with previous studies. The SCS design storm generally produces

higher peak flows within sewers therefore it is considered a more conservative estimating method for capacity assessment.

Table 4-3: Summary of Peak Flows from Sewersheds

Sewershed	Catchment Area (Approx.) (ha)	Peak Flow (L/s)	Outlet
Area 1	827	413 (surcharging in sewers upstream of station)[1] 476 (no surcharging)[1]	A-V sewer or Coleraine sewer
Area 2	207	172	A-V sewer or Coleraine sewer
Area 3	797	506	A-V sewer
Area 4	1,020	348	Coleraine sewer
Area 5	200	350	Humber Station sewer

Note 1: 413 L/s generated from Area 1 for Scenarios 4-6 due to the pump curve, forcemain arrangement, and outlet elevation associated with pumping to the Strawberry Hill Court outlet, as shown within the hydraulic model. 476 L/s generated from Area 1 for Scenarios 1-3 due to the pump curve, forcemain arrangement, and outlet elevation associated with pumping to the Nunnville Road outlet, as shown within the hydraulic model. Refer to Section 4.3.1.

4.3. Trunk Sewer Capacity Assessment

A trunk sewer capacity assessment was conducted on the A-V and Coleraine trunk sewers, incorporating the peak flows generated from each of the sewersheds identified in **Table 4-3**. As noted, wastewater flows from Areas 3, 4, & 5 will flow to the outlets identified in **Table 4-3** throughout the planning period; therefore, their flows will be reflected in the applicable trunk sewer however the six (6) servicing scenarios will focus on Areas 1 & 2 as the sewersheds with outlet re-routing options. The scenarios are outlined in Section 4.3.1.

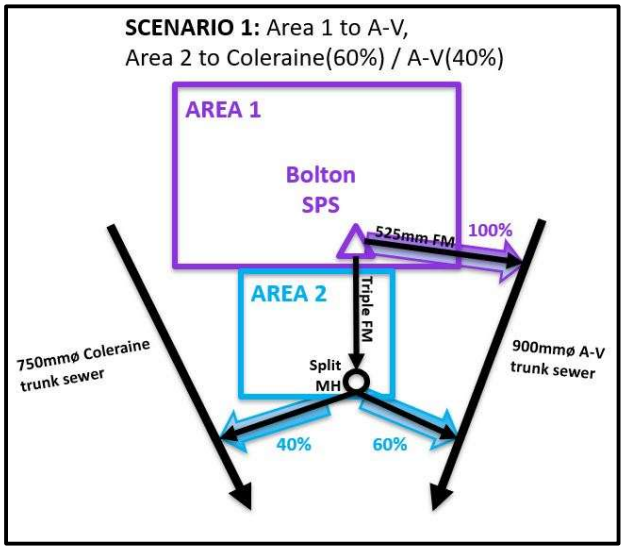
4.3.1. Servicing Scenarios

The following servicing scenarios for Areas 1 & 2 are outlined below. These servicing scenarios were modelled in InfoWorks to identify available capacity within the A-V and Coleraine trunk sewers when the flows from Areas 1 & 2 were routed through the various identified existing infrastructure routes. These servicing scenarios will inform the evaluation of servicing strategies for the Bolton SPS forcemain as it will identify where spare capacity in the downstream trunk sewers is available.

4.3.1.1. Servicing Scenario 1

This servicing scenario involves flows from Area 1 being pumped from the Bolton SPS to the 900mmø A-V trunk sewer via the new 525mmø forcemain on Old King Road. Area 2 drains via gravity to the flow splitting control manhole (#309358) where 40% of flows are directed to the 750mmø Coleraine trunk sewer and 60% of flows are directed to the 900mmø A-V trunk sewer. A schematic of this scenario is provided in **Figure 4-1**.

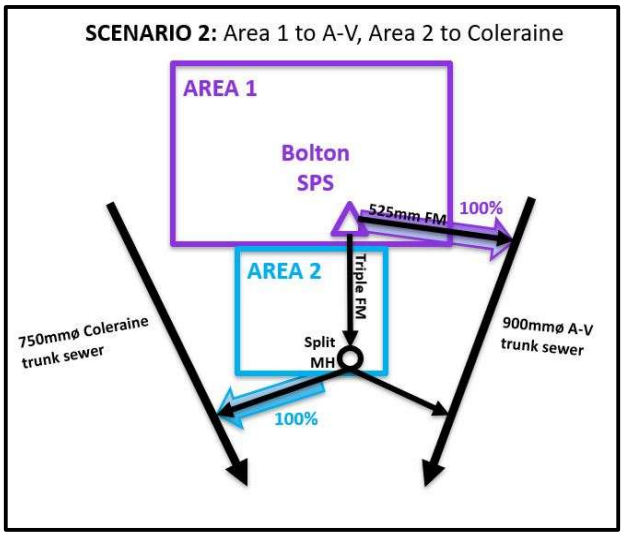
Figure 4-1: Servicing Scenario 1



4.3.1.2. Servicing Scenario 2

This servicing scenario involves flows from Area 1 being pumped from the Bolton SPS to the 900mmø A-V trunk sewer via the new 525mmø forcemain on Old King Road. Area 2 drains via gravity to the flow splitting control manhole (#309358) where 100% of flows are directed to the 750mmø Coleraine trunk sewer. A schematic of this scenario is provided in **Figure 4-2**.

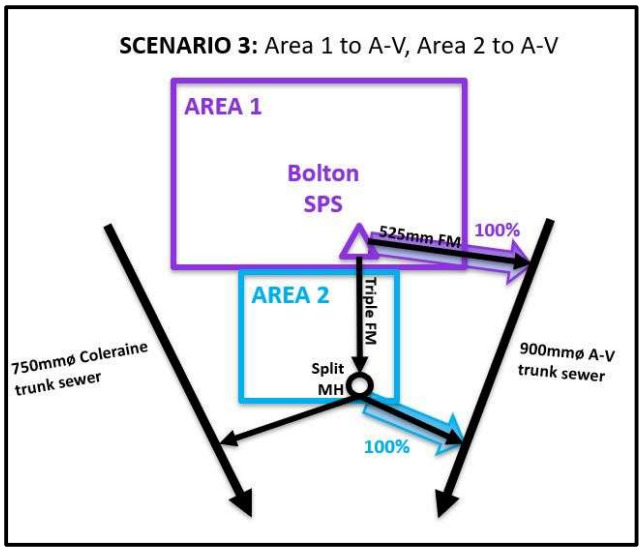
Figure 4-2: Servicing Scenario 2



4.3.1.3. Servicing Scenario 3

This servicing scenario involves flows from Area 1 being pumped from the Bolton SPS to the 900mmø A-V trunk sewer via the new 525mmø forcemain on Old King Road. Area 2 drains via gravity to the flow splitting control manhole (#309358) where 100% of flows are directed to the 900mmø A-V trunk sewer. A schematic of this scenario is provided in **Figure 4-3**.

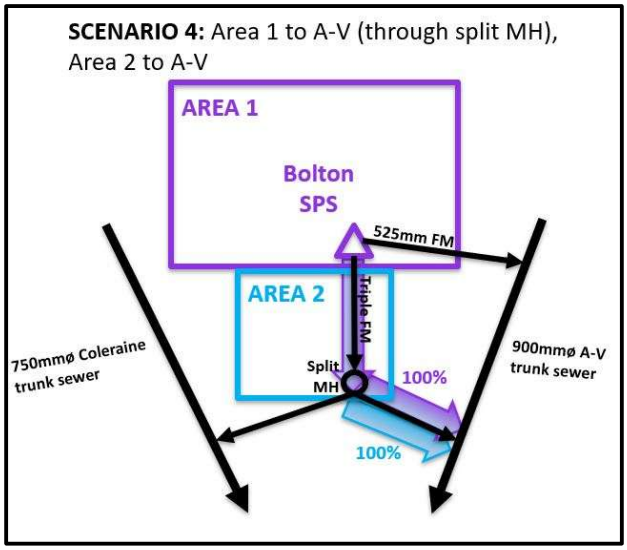
Figure 4-3: Servicing Scenario 3



4.3.1.4. Servicing Scenario 4

This servicing scenario involves flows from Area 1 being pumped from the Bolton SPS to the 600mmø sewer in Allan Drive Middle School, and ultimately to the split manhole, via the triple forcemain system on Strawberry Hill Court. Area 1 flows are then directed to the A-V trunk sewer via the split manhole. Area 2 drains via gravity to the flow splitting control manhole (#309358) where 100% of flows are directed to the 900mmø A-V trunk sewer. A schematic of this scenario is provided in **Figure 4-4.**

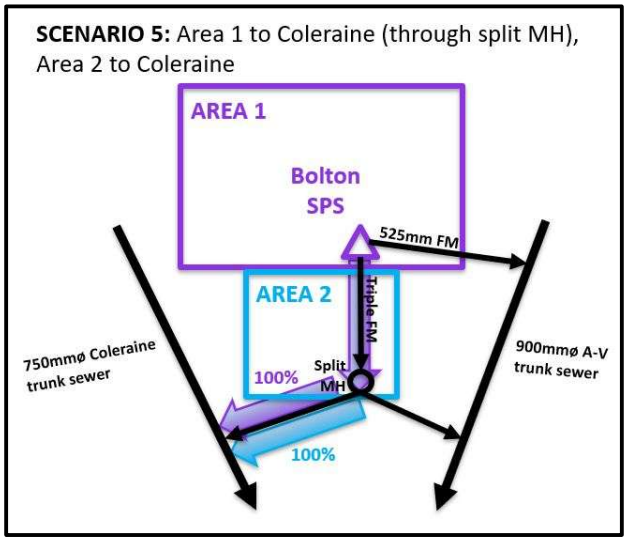
Figure 4-4: Servicing Scenario 4



4.3.1.5. Servicing Scenario 5

This servicing scenario involves flows from Area 1 being pumped from the Bolton SPS to the 600mmø sewer in Allan Drive Middle School, and ultimately to the split manhole, via the triple forcemain system on Strawberry Hill Court. Area 1 flows are then directed to the Coleraine trunk sewer via the split manhole. Area 2 drains via gravity to the flow splitting control manhole (#309358) where 100% of flows are directed to the 750mmø Coleraine trunk sewer. A schematic of this scenario is provided in **Figure 4-5.**

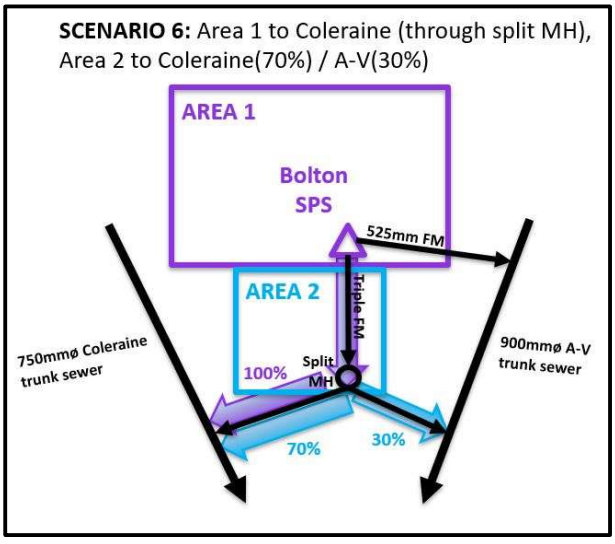
Figure 4-5: Servicing Scenario 5



4.3.1.6. Servicing Scenario 6

This servicing scenario involves flows from Area 1 being pumped from the Bolton SPS to the 600mmø sewer in Allan Drive Middle School, and ultimately to the split manhole, via the triple forcemain system. Area 1 flows are then directed to the Coleraine trunk sewer via the split manhole. Area 2 drains via gravity to the flow splitting control manhole (#309358) where flows are split 70% and 30% to the Coleraine & A-V trunk sewers, respectively. A schematic of this scenario is provided in **Figure 4-6**.

Figure 4-6: Servicing Scenario 6



4.3.2. Results

A summary of the modelling results of the capacity analysis of the downstream trunk sewers (Coleraine & A-V) during Scenarios 1-6 are outlined in **Table 4-4**.

Table 4-4: Capacity Analysis of the Downstream Trunk Sewers

	Coleraine trunk sewer (Capacity = 501 L/s)		Albion-Vaughan trunk sewer (Capacity = 863 L/s)	
	Flow (L/s)	Spare Capacity (L/s)	Flow (L/s)	Spare Capacity (L/s)
Scenario 1[1]	388	113	913[2]	0[2]
Scenario 2[1]	465	36	820	43
Scenario 3[1]	348	153	977[3]	0[3]
Scenario 4[7]	348	153	883[4]	0[4]
Scenario 5[7]	678[5]	0[5]	390	473
Scenario 6[7]	619[6]	0[6]	550	313

Note 1: Scenario involves Bolton SPS pumping flow to the A-V sewer via 525mm forcemain on Old King Road. The flow pumped by the station in this scenario is 476 L/s (refer to **Table 4-3**).
Note 2: Modelled flow rate exceeds hydraulic capacity at two locations of A-V trunk sewer however neither locations involve surcharging (d/D = 96% for 1st section (SMH-1066913) and d/D = 84% (no surcharging) for 2nd section (SMH-1067111)).
Note 3: Modelled flow rate exceeds hydraulic capacity at one location of A-V trunk sewer however it does not involve surcharging (d/D = 100% (SMH-1066913)).
Note 4: Modelled flows generate surcharging in approximately 750 metres of existing 675mmø sewer between the split manhole and the downstream connection to the A-V trunk sewer (SMH-309009 to SMH-6563862).
Note 5: Modelled flows generate surcharging in approximately 1,182 metres of the existing 675mmø sewer between the split manhole and the downstream connection to the Coleraine trunk sewer and 2,500 metres of the Coleraine trunk sewer.
Note 6: Modelled flows generate surcharging in the existing 675mmø sewer between the split manhole and the downstream connection to the Coleraine trunk sewer and 1,150 metres of the Coleraine trunk sewer.
Note 7: Scenario involves Bolton SPS pumping flow to the split manhole within the Allan Drive Middle School property via the triple forcemain system on Strawberry Hill Court. The flow pumped by the Bolton SPS in this scenario is 413 L/s and the modelling indicates surcharging in the sewers upstream of Bolton SPS (refer to **Table 4-3**).

The modelling provided the following guidance for evaluation of the Bolton SPS alternative forcemain servicing strategies:

- Scenarios that convey flow from Area 1 (Bolton SPS) through the existing triple forcemain system and downstream through the split manhole to either the Coleraine or A-V trunk sewers (Scenarios 4, 5, & 6) initiate surcharging in a significant portion of the existing sewers between the split manhole and the trunk sewers.
- The A-V trunk sewer has the capacity to convey the entirety of the flows from Area 1 (Scenarios 1, 2, & 3) and a portion of the flows from Area 2 with capacity exceedances identified in the A-V trunk sewer albeit without any surcharging.
- The Coleraine trunk sewer does not have the capacity to convey the entirety of the flows from Area 1 (Scenarios 5 & 6) without significant surcharging.

5. Development and Evaluation of Servicing Strategies

5.1. Development of Alternative Forcemain Routes

A review of the existing right-of-ways and easements in proximity to the Bolton SPS and the Coleraine & A-V trunk sewers was conducted to identify potential alternative forcemain alignments for conveying flows from the Bolton SPS to the downstream trunk infrastructure. This review was conducted using the Region's External Peel Asset Locator (EPAL) and available as-builts to identify potential servicing routes while considering certain constraints such as limited ROW width, constrained servicing corridors, and environmental areas. Eight (8) alternative forcemain routes were identified from the Bolton SPS to the A-V trunk sewer or the current outlet location for the triple forcemain system which allows flows to be conveyed to either the Coleraine trunk sewer or the A-V trunk sewer (MH-308518). Forcemain routes connecting the Bolton SPS directly to the Coleraine trunk sewer were not considered based on the hydraulic modelling results presented in Section 4.3.2, the excessive length of required forcemain, and the construction impact on residents. The alternative forcemain routes are identified in **Appendix A**.

5.2. Screening of Alternatives

Based on the high-level review conducted using EPAL and the as-builts, eight (8) routes were identified as potentially feasible; each with inherent advantages and disadvantages. These advantages and disadvantages, along with the hydraulic modelling results, were used to screen out alternatives that posed significant challenges such as limited available downstream conveyance capacity, excessive constructability complexity, anticipated land/easement acquisition, and/or access challenges. The eight options, along with their advantages and disadvantages, are outlined in **Appendix B**. Alternatives 1, 4, 5, 6, & 8 were screened out based on the reasons outlined in **Appendix B** with Alternative 2, 3, & 7 advanced to the detailed evaluation stage.

5.3. Evaluation Criteria

The approach to evaluating the alternative forcemain routes that were carried forward to the evaluation stage involved identifying evaluation criteria based on technical constructability, technical flexibility, environmental considerations, socio/cultural factors, financial considerations, and legal concerns. The evaluation criteria are outlined in **Appendix C**.

5.4. Evaluation

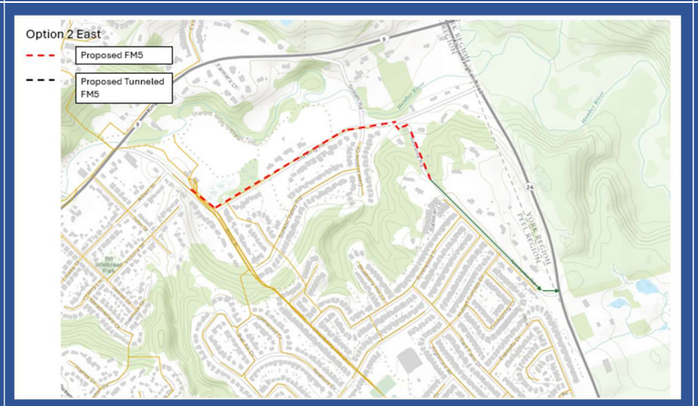
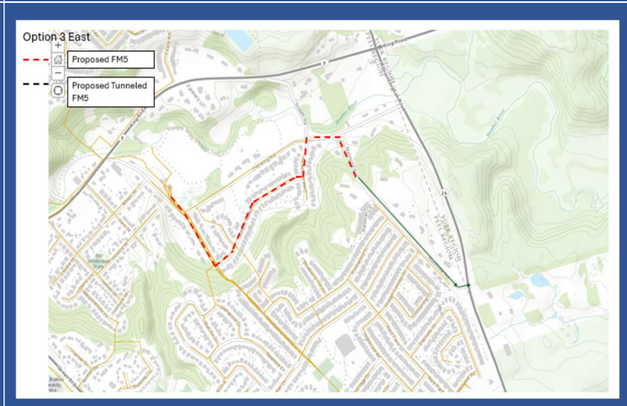
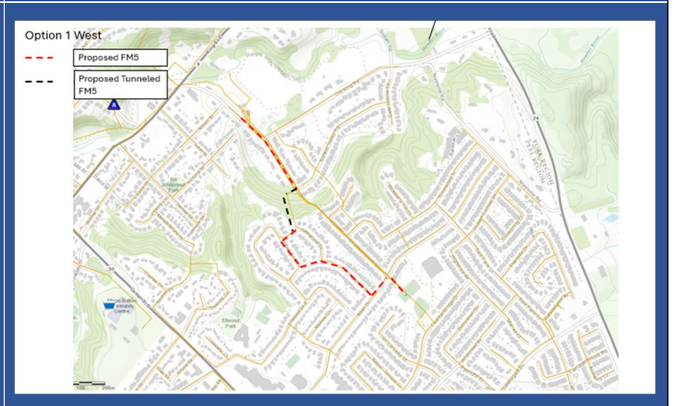
Alternatives 2, 3, & 7 were evaluated using the six (6) criteria categories identified in Section 5.3. For each evaluation criteria, the alternatives were scored using the system outlined in **Table 5-1**. The basis of this approach is to qualitatively evaluate the relative advantages, disadvantages, and impacts of each alternative against the established criteria. This process was intended to highlight why the preferred alternative was chosen through an evaluation of technical, environmental, socio/cultural, financial, and legal criteria.

Table 5-1: Evaluation Scoring System

Score	Description
✓✓	Alternative demonstrates significant advantages and minimal disadvantages in relation to the evaluation criteria.
✓	Alternative demonstrates a mixture of advantages and disadvantages in relation to the evaluation criteria.
⊗	Alternative demonstrate significant disadvantages and minimal advantages in relation to the evaluation criteria.

Upon completion of the evaluation of each criteria category, a preferred alternative (shown in green), less preferred alternative (yellow), and least preferred alternative (shown in red) was identified for each criteria category. As shown in **Table 5-2**, some alternatives demonstrated similar advantages or disadvantages for a category and were therefore scored as a tie. The scoring of each criteria category was then summed to identify the overall ranking of the evaluated alternatives. As shown in **Table 5-2**, Alternative 2 was ranked as the Preferred Alternative, with Alternatives 3 and 7 ranking as the next preferred alternatives in that order.

Table 5-2: Alternative Forcemain Route Evaluation

CATEGORY	Alternative Alignment 2	Alternative Alignment 3	Alternative Alignment 7
			
Technical Constructability	Proposed alignment includes: • Old King Road (20 m width right-of-way (ROW)) with existing 250mm local sanitary sewer, 150mm local watermain, and 525mm forcemain. (Medium constraint) • Nunnville Trail (20 m width ROW) with existing 525mm forcemain and gas main. (Medium-Low constraint) ✓✓ Alternative includes the shortest alignment (~1,030 metres) with the same width ROWs as the other alternatives while including a lower amount of large diameter existing infrastructure. Alternative minimizes potential conflicts with existing infrastructure & utilities. ✓✓ Alternative does not include major environmental, railway, and highway crossings. ✓✓ Alternative minimizes potential schedule risks as the Region has conducted construction along this route recently and are aware of the site-specific conditions. ✓ Alternative has reasonable access along Old King Road, while access challenges exist with constructing within the Nunnville Trail which has significant vegetation within the ROW.	Proposed alignment includes: • Old King Road (20 m width ROW) with existing twin 350mm forcemains, 450mm forcemain, 450mm sanitary sewer, and 150mm watermain. (High Constraint) • Sunkist Valley Road & Deer Hollow Court (both 20 m width ROWs) with existing 250mm local sewer & 150mm watermain (Medium-Low constraint) • Nunnville Trail (20 m width ROW) with existing 525mm forcemain and gas main. (Medium-Low constraint) ✓ Alternative includes the longest alignment (~1,340 metres) with the same width ROWs as the other alternatives while including similarly sized existing infrastructure as Alternative 1. Alternative partially minimizes potential conflicts with existing infrastructure. ✓✓ Alternative does not include major environmental, railway, and highway crossings. ✓ Alternative has reduced potential schedule risks as the Region has conducted construction along portions of this route recently and is aware of some of the site-specific conditions. Increased potential for schedule risks with constructing through the existing neighbourhood along Sunkist Valley Road & Deer Hollow Court. ✓ Alternative has reasonable access along all of the ROWs with the exception of the Nunnville Trail.	Proposed alignment includes: • Old King Road & Bond Street (both 20 m width ROWs) with existing twin 350mm forcemains, 450mm forcemain, 450mm sanitary sewer, and 150mm watermain. (High Constraint) • Easement through wooded area with existing 300mm local sanitary sewer (High Constraint) • Glenwood Crescent Bel Air Drive, Newlove Drive, Allan Drive (all 20 m width ROWs) with existing 250mm local sanitary sewers & 150mm watermain (Medium-Low Constraint) • Easement (approx. 6 metre width) into Allan Drive Middle School with existing twin 350mm forcemains & 450mm forcemain. (High Constraint) ⊗ Alternative includes the second longest alignment (~1,210 metres) with two potentially constraining ROW widths (easements) while including an increased number of large diameter existing infrastructure. Alternative has potential constraints related to constructability given the amount of existing infrastructure. ✓ Alternative does include a minor environmental crossing. ⊗ There are environmentally constrained areas, existing neighbourhoods, and potential easement complications to factor into the schedule. ⊗ Alternative has reasonable access along the majority of the side streets however access within the wooded area southwest of Bond Street could be a constraint.

Technical Flexibility		✓✓ Increased ability to maximize use of existing infrastructure (A-V trunk sewer) as all of the Bolton SPS flows can be directed through the new FM to the A-V trunk sewer. ✓✓ Minimizes capital upgrades downstream as A-V trunk sewer has sufficient capacity to convey Bolton SPS flows. ⊗ Alternative does not include the potential to coordinate with any known planned infrastructure improvements. ✓✓ Alternative is able to meet future servicing and operational needs for growth to 2051. Capacity assessment shows that the entirety of the Bolton SPS flows can outlet to the A-V trunk sewer thereby freeing up capacity on the west side of Bolton for future development needs. ✓ Alternative includes a reasonable ease of access to maintain and operate the infrastructure throughout its service life.		✓✓ Increased ability to maximize use of existing infrastructure (A-V trunk sewer) as all of the Bolton SPS flows can be directed through the new FM to the A-V trunk sewer. ✓✓ Minimizes capital upgrades downstream as A-V trunk sewer has sufficient capacity to convey Bolton SPS flows. ⊗ Alternative does not include the potential to coordinate with any known planned infrastructure improvements. ✓✓ Alternative is able to meet future servicing and operational needs for growth to 2051. Capacity assessment shows that the entirety of the Bolton SPS flows can outlet to the A-V trunk sewer thereby freeing up capacity on the west side of Bolton for future development needs. ✓ Alternative includes a reasonable ease of access to maintain and operate the infrastructure throughout its service life.		⊗ Does not have the ability to maximize use of existing infrastructure (A-V trunk sewer) as routing the entire Bolton SPS flows through the existing infrastructure downstream of the split manhole to the A-V trunk sewer involves capacity constraints in the existing sewers. ⊗ Capital upgrades required downstream of the connection point at MH 308518 to convey entirety of Bolton SPS flows to A-V trunk sewer. ⊗ Alternative does not include the potential to coordinate with any known planned infrastructure improvements. ✓ Alignment is able to meet future servicing and operational needs for growth to 2051, albeit with additional upgrades to existing infrastructure between the split manhole and the A-V trunk sewer. Alternatively, some of the Bolton SPS flows could be directed to the Coleraine trunk sewer however this would lower the available capacity in the Coleraine trunk sewer for future growth on the west side of Bolton. ⊗ Alternative includes several access issues throughout its alignment that could pose ongoing challenges for operation and maintenance equipment.
Environmental		✓✓ Alternative minimizes proximity to environmentally sensitive features and does not include any major environmental crossings. ✓✓ Alternative minimizes short-term and long-term impacts on surface water features and source water protection areas. ✓✓ Alternative avoids impacts to valley lands, floodplains, and meander belts. ✓ Alternative is located near the Humber River and may require dewatering operations which have the potential to impact the groundwater conditions in the area. As surrounding properties are connected to municipal water, it is not anticipated to impact water wells. ✓✓ Alternative minimizes potential environmental risk by construction being within existing ROWs thereby avoiding sensitive areas. The Region has also constructed along this alignment recently and is familiar with site-specific constraints.		✓✓ Alternative minimizes proximity to environmentally sensitive features and does not include any major environmental crossings. ✓✓ Alternative minimizes short-term and long-term impacts on surface water features and source water protection areas. ✓✓ Alternative avoids impacts to valley lands, floodplains, and meander belts. ✓ Alternative is located near the Humber River and may require dewatering operations which have the potential to impact the groundwater conditions in the area. As surrounding properties are connected to municipal water, it is not anticipated to impact water wells. ✓✓ Alternative minimizes potential environmental risk by construction being within existing ROWs thereby avoiding sensitive areas.		✓ Alternative partially minimizes proximity to environmentally sensitive features as it does include a minor crossing through a wooded area. ✓✓ Alternative minimizes short-term and long-term impacts on surface water features and source water protection areas. ✓✓ Alternative avoids impacts to valley lands, floodplains, and meander belts. ✓✓ Alternative is primarily located at a higher elevation above the Humber River and the requirement for dewatering operations is lower in probability. ✓ Alternative does include a portion of the alignment crossing through a wooded area thereby minimizing environmental risk but not entirely avoiding it.
Social / Cultural		Proposed alignment is along the direct frontage of 37 existing properties. ✓✓ Alternative minimizes local residents' real or perceived negative impacts on the community and neighbourhood. As there was recent construction along Old King Road, it is likely that these residents will experience the largest impact however it is still the alternative impacting the least number of residents amongst the 3 alternatives. ✓✓ Alternative limits impacts to property access by minimizing the length of the alignment and frontage of private property. ✓ Alternative limits access to Nunnville Trail (public space). ✓ Alternative limits impacts to roadways by a reduced alignment length albeit on a busier road than the other alternatives. ⊗ Alternative does not include the potential to coordinate with any known planned road work improvements. ✓✓ Alternative ranks the highest in terms of limiting traffic impacts due to its reduced alignment length, lowest number of fronting properties, and the Region's recent experience in working along Old King Road.		Proposed alignment is along the direct frontage of 97 properties. ✓ Alternative partially minimizes local residents' real or perceived negative impacts on the community and neighbourhood by minimizing construction on Old King Road which is a larger		Proposed alignment is along the direct frontage of 93 properties. ✓ Alternative partially minimizes local residents' real or perceived negative impacts on the community and neighbourhood by not constructing on Old King Road and localizing construction on smaller side streets like Bond Street, Glenwood Crescent, Bel Air Drive, and

				volume road then the adjoining side streets. However, a greater number of residents are impacted relative to Alternative 2. ✓ Alternative partially limits impacts to property access. The alignment length and frontage of private property is increased relative to Alternative 2. ✓ Alternative limits access to Nunnville Trail (public space). ✓ Alternative limits impacts to roadways by being primarily located on side streets (lower volume roads) albeit with a longer alignment length than the other alternatives. ⊗ Alternative does not include the potential to coordinate with any known planned road work improvements. ✓ Alternative ranks the second highest in terms of limiting traffic impacts due to its location along side streets and it only impacting one neighbourhood. However, the alignment does include a substantial number of fronting properties.		Newlove Drive. However, a greater number of residents are impacted relative to Alternative 2. ✓ Alternative partially limits impacts to property access. The alignment length and frontage of private property in increased relative to Alternative 2. ✓ Alternative may limit access to bike trail connecting Bond Street and Strawberry Hill Court (public space). ✓ Alternative limits impacts to roadways by being primarily located on side streets (lower volume roads) albeit with a longer alignment length than Alternative 2. ⊗ Alternative does not include the potential to coordinate with any known planned road work improvements. ⊗ Alternative ranks the lowest in terms of limiting traffic impacts due to its construction impacting multiple neighbourhoods and the alignment including a substantial number of fronting properties.
Financial		✓✓ Alternative minimizes total life cycle cost by a reduced forcemain length and simplifying operations at the Bolton SPS by only pumping to one outlet (reduced complexity and additional equipment needed at station). ✓✓ It is not anticipated that the alternative will require any property acquisitions. ✓✓ Operation and maintenance costs for this alternative are anticipated to be reduced based on the ease of access to the FM and reduced operational complexity. ✓✓ Alternative minimizes potential financial risk during construction as the Region has constructed along this alignment recently and is aware of site-specific constraints.		✓ Alternative has increased total life cycle cost by an increased length of forcemain relative to Alternative 2. Operations at the Bolton SPS will be simplified by only pumping to one outlet (reduced complexity and additional equipment needed at station). ✓✓ It is not anticipated that the alternative will require any property acquisitions. ✓✓ Operation and maintenance costs for this alternative are anticipated to be reduced based on the ease of access to the FM and reduced operational complexity. ✓ Alternative has reduced potential financial risk during construction as the Region has constructed along portions of this alignment recently and is aware of some of the site-specific constraints.		⊗ Alternative has increased total life cycle cost by an increased length of forcemain and increased operational complexity by pumping to two outlets (increased complexity and additional equipment needed at station). ⊗ Alternative may require property acquisition on Hemlock Street and an increased easement width near the Allan Drive Middle School. ✓ Operation and maintenance costs for this alternative are anticipated to be increased based on the crossing through the wooded area. ⊗ Alternative has several areas that could involve increased potential financial risk (wooded area crossing, limited ROW width on Hemlock Street, limited easement width near Allan Drive Middle School).
Legal		✓✓ Alternative minimizes the potential for land requirement issues and agency concerns due to the project being located entirely within existing ROWs and another similar project being recently completed along the same alignment. ✓✓ Alternative has increased ability to minimize complexity relating to availability of land, current designated land use, current ownership and property acquisition due to a Regional forcemain project being recently completed along the same alignment.		✓ Alternative partially minimizes the potential for land requirement issues and agency concerns due to the project being located entirely within existing ROWs ✓Alternative demonstrates less ability than that of Alternative 2 to minimize complexity relating to availability of land, current designated land use, current ownership and property acquisition due to unknowns and required site investigation for newly proposed alignment on Sunkist Valley Road.		⊗ Alternative is likely to require land acquisition and/or easements to facilitate the alignment. This has the potential to increase agency concerns related to required site investigations and construction through an easement in a constrained area. ✓ Alternative has less ability than that of Alternative 2 to minimize complexity relating to availability of land, current designated land use, current ownership and property acquisition due to required site investigation and construction through an easement for the newly proposed alignment.
OVERALL RANKING		**PREFERRED ALTERNATIVE**		**LESS PREFERRED ALTERNATIVE**		**LEAST PREFERRED ALTERNATIVE**

6. Preferred Servicing Strategy

As identified in **Table 5-2**, three alternative forcemain alignments were evaluated with Alternative 2 identified as the Preferred Servicing Strategy. Alternative 2 consists of the following recommendations:

- Construct a forcemain (approximate length of 1,030 metres) along Old King Road from the Bolton SPS to the 900mmø trunk sewer on Nunnville Road (via the 660mmø sanitary main on Nunnville Road). Sizing of the forcemain to be confirmed at the design stage.
- Per **Table 3-1**, the Bolton SPS can pump up to 452 L/s of flow at a velocity of 2.0 m/s via the existing 525mmø FM on Old King Road to the Nunnville Road sewer extension. The existing pump curves should be reviewed at detailed design to ensure that sufficient capacity (476 L/s to 2051) and appropriate velocities (0.8 – 2.5 m/s per MECP, 1.0 – 3.0 per Peel Region) can be maintained within the two forcemains on Old King Road.
- Bolton SPS to be modified as required to accommodate the additional forcemain (piping modifications, etc.). Pump operations to be modified to outlet solely to the A-V trunk sewer (approximately elevation of 237.8 m asl). Per Section 3.1.1, a review of property ownership and easement requirements adjacent to the Bolton SPS may be required at the design stage to facilitate construction of the forcemain.
- Maintain the existing triple forcemain system on Strawberry Hill Court after commissioning the new forcemain.
- Maintain the existing servicing strategy for Area 2 (outlet flows to either Coleraine or A-V trunk sewer via flow splitting manhole (#309358)) with the Region to monitor flows to maximize use of existing infrastructure). If required, the Region should consider implementing weirs/gates at MH-309358 to control the flows directed to each downstream trunk sewer.

A conceptual alignment of the proposed forcemain is shown on **Figure 6-1**, **Figure 6-2**, and **Figure 6-3** with the specific layout to be confirmed at the design stage.

6.1. Capital Cost

The approximate capital cost for the preferred servicing strategy was derived based on the tendered construction cost of the recently constructed 525mmø FM on Old King Road which would have a similar design & construction scope as the proposed FM. The capital cost was inflated to 2024 dollars and approximated at $2.3M. A 15% contingency was deemed appropriate therefore the total capital cost is $2.65M.

BOLTON SPS

525mm FM (660mm O.D.)

TWIN 350mm FM

450mm FM

STORMWATER MANAGEMENT POND

1340 x 2100mm STORM SEWER

250mm SANITARY MAIN

1.4 m

1.4 m

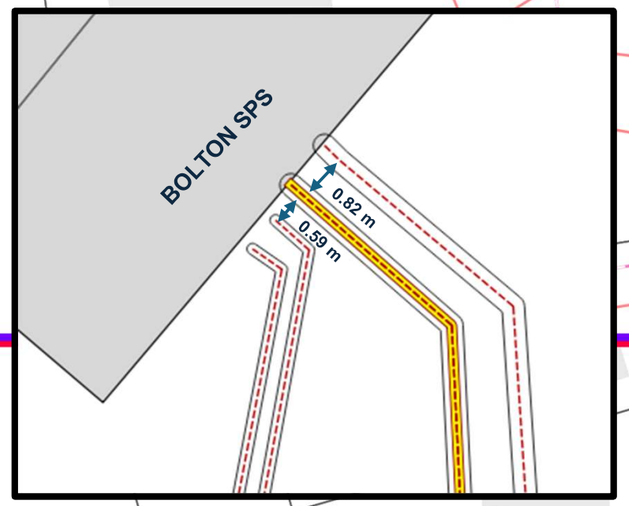
600mm SANITARY MAIN

300mm STORM MAIN

150mm WM

Old King Rd

Bond St



TWIN 350mm FM

450mm FM

1340 x 2100mm STORM SEWER

STORMWATER MANAGEMENT POND

2.1 m

3.5 m

525mm FM (660mm O.D.)

250mm SANITARY MAIN

150mm WM

Old King Rd

Existing Infrastructure

- Stormwater Catch Basin
- Stormwater Maintenance Hole
- Wastewater Maintenance Hole
- Sanitary Gravity Main
- Sanitary Forcemain
- Stormwater Pipe
- Water Distribution Pipe
- Gas Line (Approximate)
- Hydro Line (Approximate)
- Bell Infrastructure (Approximate)

General Features

- Building Footprint
- Parcel
- Wooded Area
- Waterbody

Proposed Infrastructure

- Sanitary Forcemain

Reference(s)

1. Projection EPSG:26917
2. Base Data: MNRF LIO, 2023; Region of Peel, 2023;

20 40 60 80 m

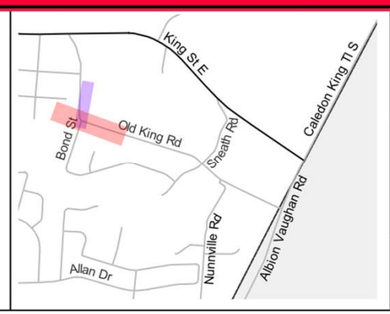


Figure 6-1

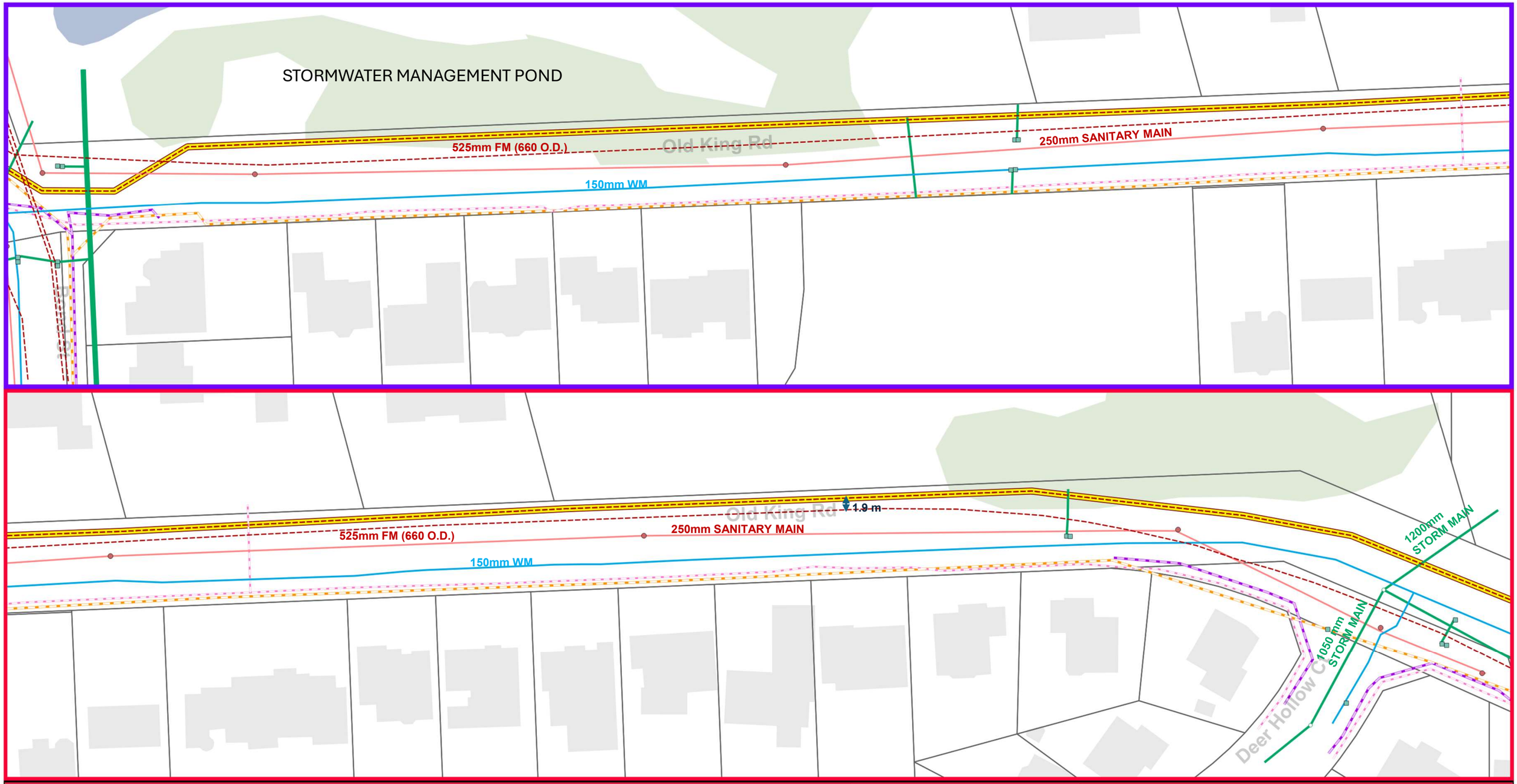
Map Title: Preferred Servicing Strategy (1 of 3)

Project Name:
Bolton SPS Forcemain Route Analysis

Client Name:
Region of Peel
(Ontario, Canada)

GEI Consultants

Last Updated: August 2024
Document ID: 722010-001



Existing Infrastructure

- Stormwater Catch Basin
- Stormwater Maintenance Hole
- Wastewater Maintenance Hole
- Sanitary Gravity Main
- Sanitary Forcemain
- Stormwater Pipe
- Water Distribution Pipe
- Gas Line (Approximate)
- Hydro Line (Approximate)
- Bell Infrastructure (Approximate)

General Features

- Building Footprint
- Parcel
- Wooded Area
- Waterbody

Proposed Infrastructure

- Sanitary Forcemain

Reference(s)

1. Projection EPSG:26917
2. Base Data: MNRF LIO, 2023; Region of Peel, 2023;

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Figure 6-2

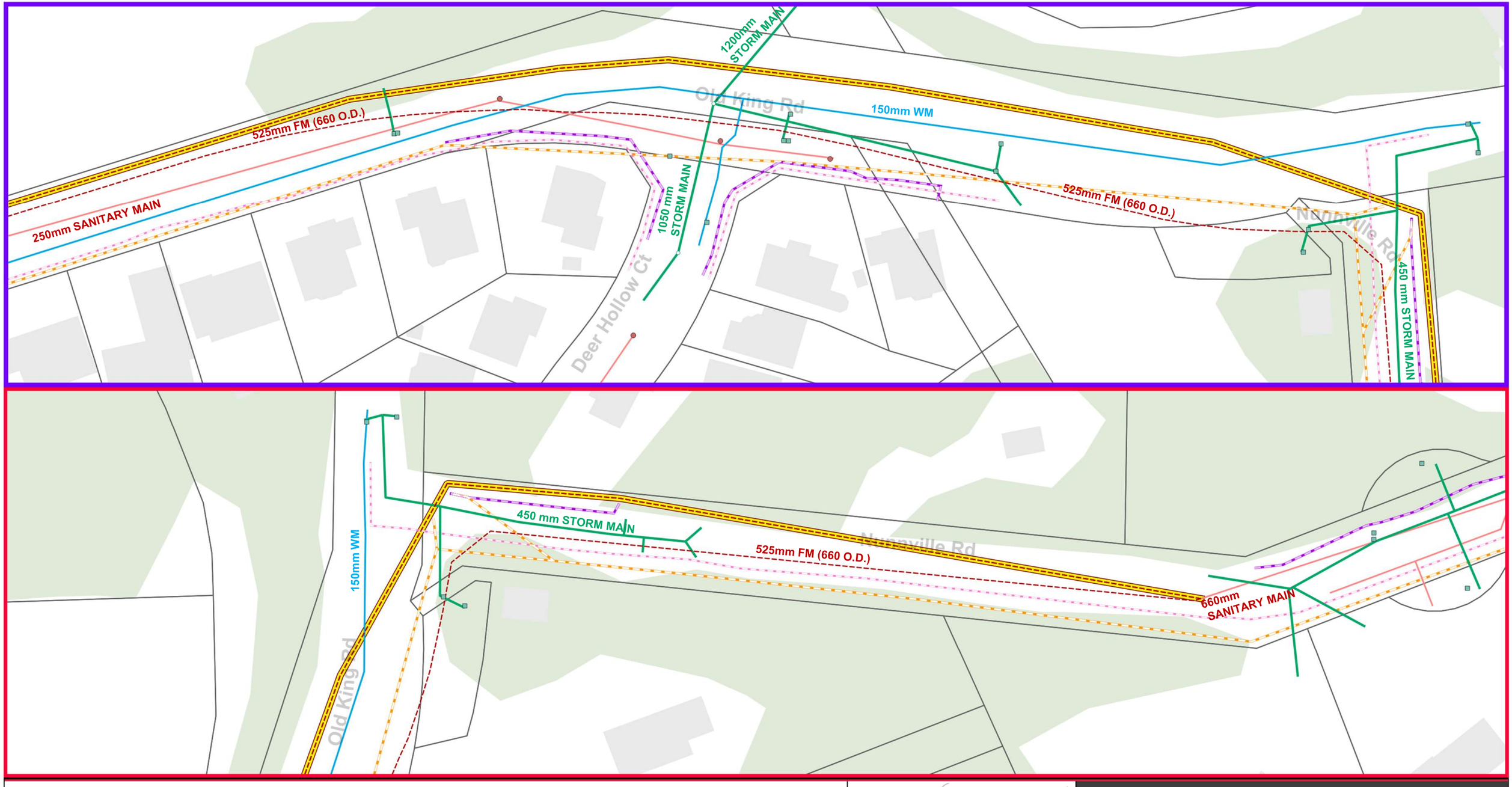
Map Title: Preferred Servicing Strategy (2 of 3)

Project Name:
Bolton SPS Forcemain Route Analysis

Client Name:
Region of Peel
(Ontario, Canada)

GEI Consultants

Last Updated: August 2024
Document ID: 722010-001



Existing Infrastructure

- Stormwater Catch Basin
- Stormwater Maintenance Hole
- Wastewater Maintenance Hole
- Sanitary Gravity Main
- Sanitary Forcemain
- Stormwater Pipe
- Water Distribution Pipe
- Gas Line (Approximate)
- Hydro Line (Approximate)
- Bell Infrastructure (Approximate)

General Features

- Building Footprint
- Parcel
- Wooded Area
- Waterbody

Proposed Infrastructure

- Sanitary Forcemain

Reference(s)

1. Projection EPSG:26917
2. Base Data: MNRF LIO, 2023; Region of Peel, 2023;

20 40 60 80 m



Figure 6-3

Map Title: Preferred Servicing Strategy (3 of 3)

Project Name:
Bolton SPS Forcemain Route Analysis

Client Name:
Region of Peel
(Ontario, Canada)

GEI Consultants

Last Updated: August 2024
Document ID: 722010-001

7. Conclusions

The goal of this study was to investigate the existing conditions associated with the Bolton SPS and its current forcemain configuration, analyze the impact of future population growth on the trunk sewers servicing Bolton, specifically the Bolton SPS, evaluate alternative forcemain alignments, and identify a preferred servicing strategy.

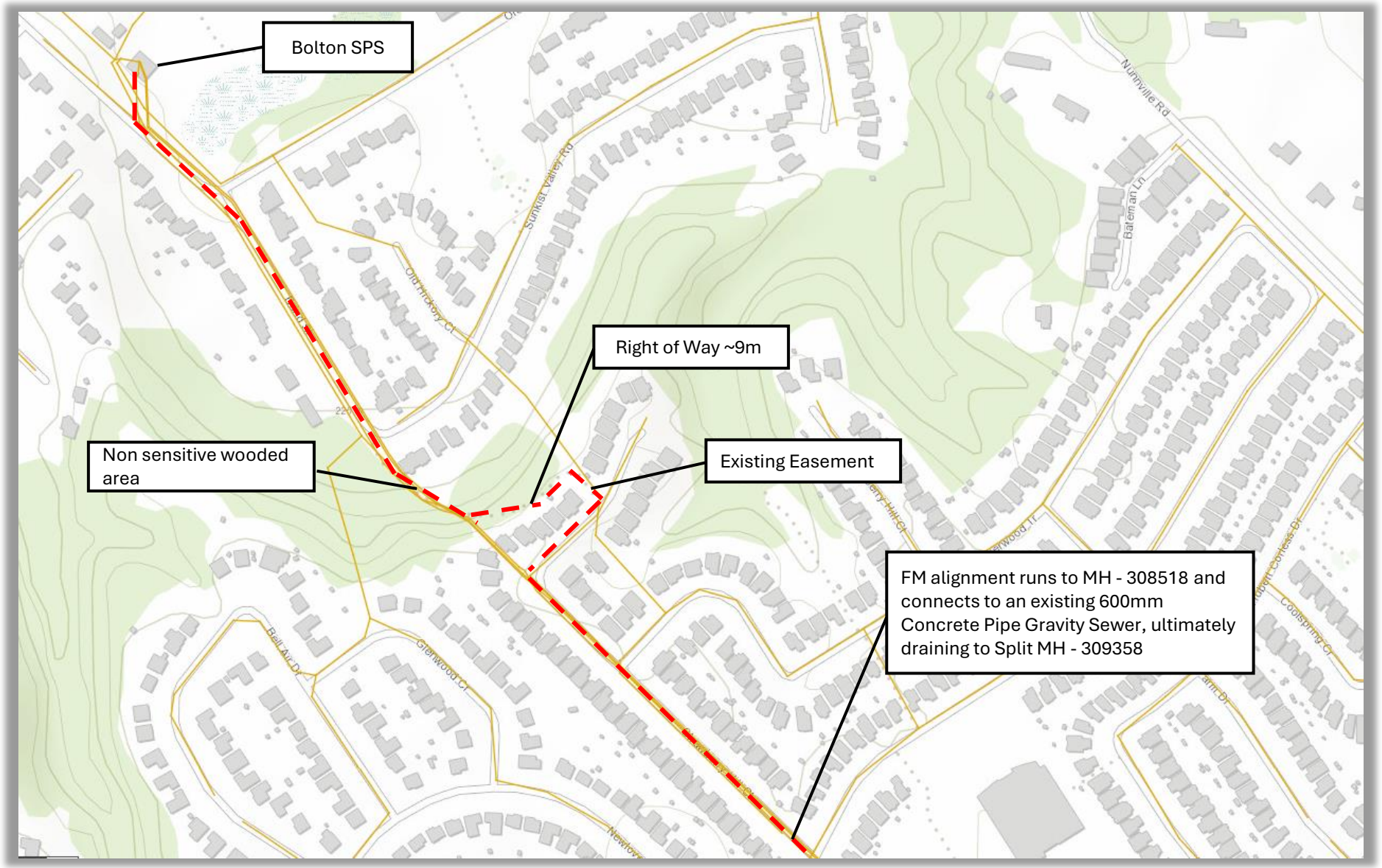
Eight (8) alternative forcemain routes for the Bolton SPS were identified in this TM. Through the completion of hydraulic analysis using the Region's wastewater model, capacity constraints were identified in the downstream trunk sewer infrastructure and the A-V trunk sewer was identified as the preferred option for flow conveyance. Relative advantages and disadvantages, along with the hydraulic analysis results, informed the screening of the alternatives down to three (3) alternatives. An evaluation of the three alternatives using technical, environmental, socio/cultural, financial, and legal criteria identified a preferred alternative for conveying flows from the Bolton SPS to the downstream trunk infrastructure. The preferred alternative was based on the following key advantages:

- **Maximizing the use of existing infrastructure.** As demonstrated through the hydraulic modelling, the preferred operational strategy would be to direct all flows from Area 1 (Bolton SPS catchment) to the A-V trunk sewer, while maintaining the current split manhole arrangement for Area 2. Flows from Area 2 could be sent to either the A-V or Coleraine trunk sewer depending on the spare capacity in order to maximize the use of both trunk sewers.
- **Simplify operations at Bolton SPS.** As outlined in **Table 3-1**, currently the Bolton SPS can pump 368 L/s to the Coleraine trunk sewer, 452 L/s to the A-V trunk sewer, or 563 L/s to a combination of the two trunk sewers, within MECP's acceptable velocity range. Due to the outlet elevation head difference, the existing 525mmø FM on Old King Road must be physically isolated from the triple FM system on Strawberry Hill Court through isolation valves on the common discharge header. As outlined in **Table 4-3**, the hydraulic modelling suggests that the ultimate Area 1 flows will be approximately 476 L/s. By constructing a 2nd parallel forcemain to the existing 525mmø forcemain on Old King Road, the 2051 Area 1 flows can be pumped to the A-V sewer within the MECP's acceptable velocity range with simplified operations at the Bolton SPS as it will only include one outlet elevation.
- **Opportunity to decommission triple forcemain system.** The twin 350mmø HDPE forcemains were constructed in 1984 (40 year old), while the 450mmø HDPE forcemain was constructed in 1997 (27 years old). The approximate service life of HDPE forcemains is 100 years so these assets do have remaining service life. However, by constructing a FM on Old King Road and solely outletting Area 1 flows to the A-V sewer, it provides the opportunity to decommission the aging triple FM system; either by grouting in-situ/abandoning or by removing the existing forcemains and re-instating the ROWs/easements. Removal and reinstatement would have the added benefit of freeing up space within the Old King Road, Bond Street, and Strawberry Hill Court right-of-ways and potentially negating the need for the servicing easements between 54 & 56 Strawberry Hill Court and 226 & 228 Allan Drive. The Region can consider this opportunity if needed in the future.

Appendix A

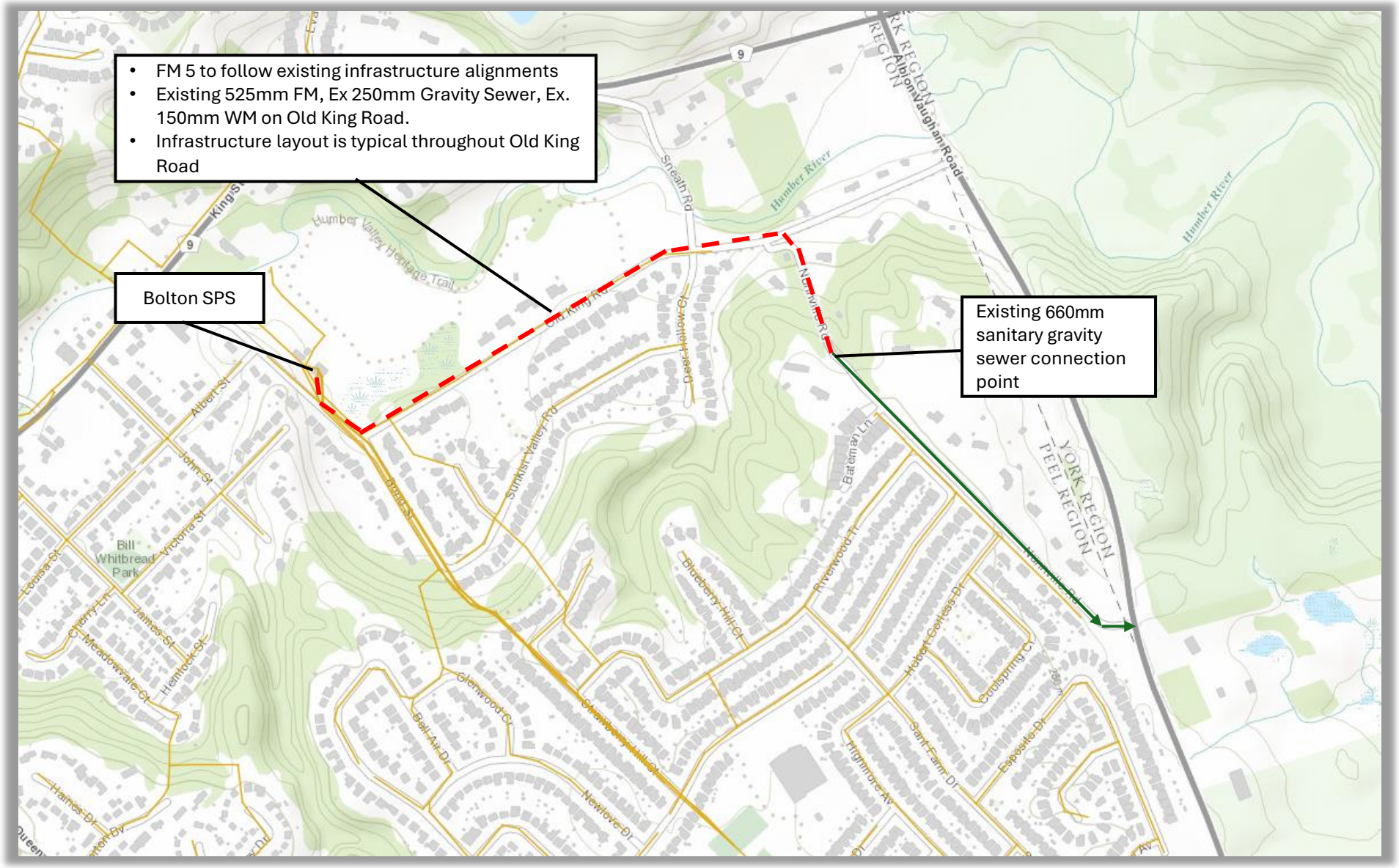
Forcemain Alignment Alternatives

Option 1 East

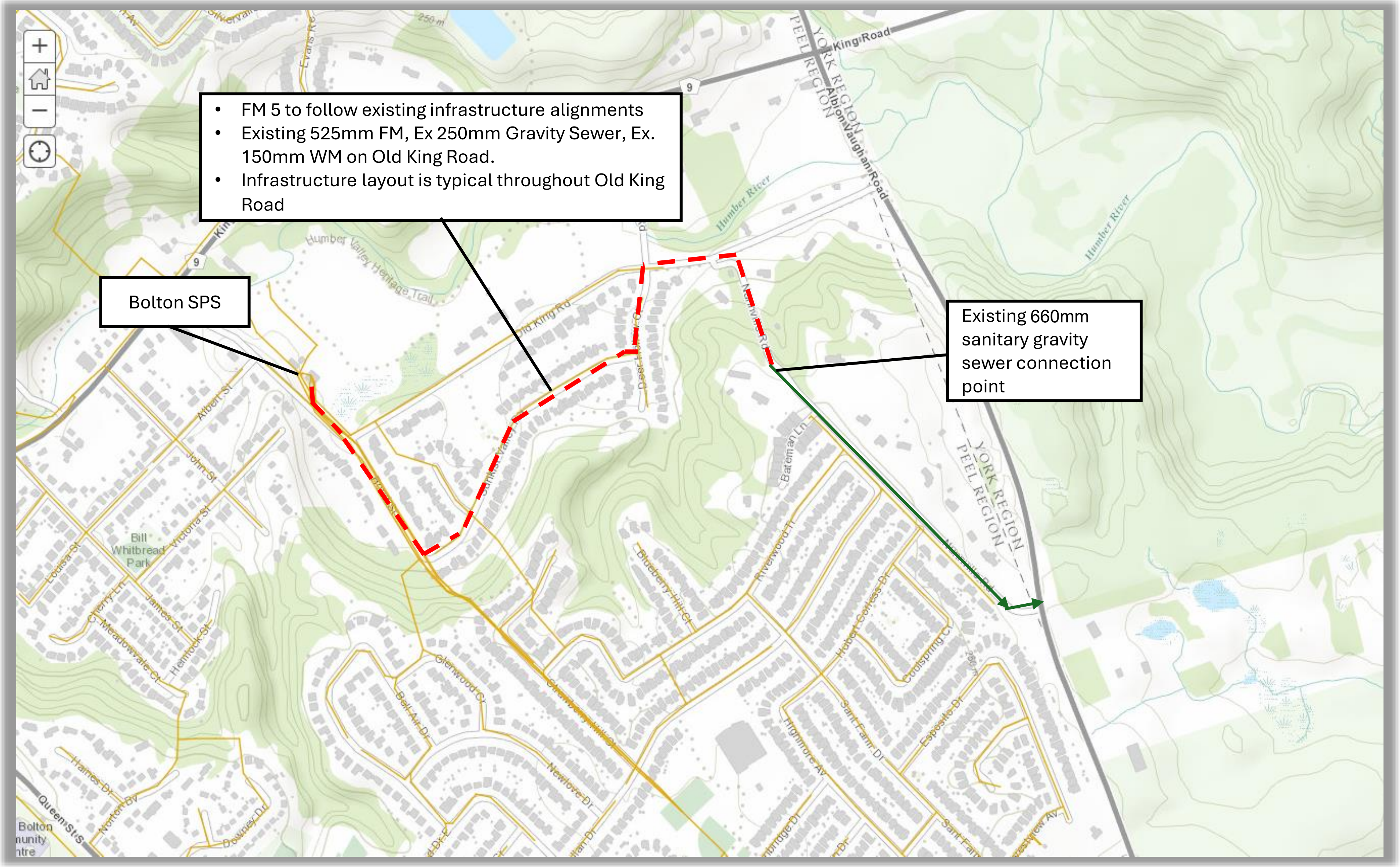


Proposed FM5

Option 2 East



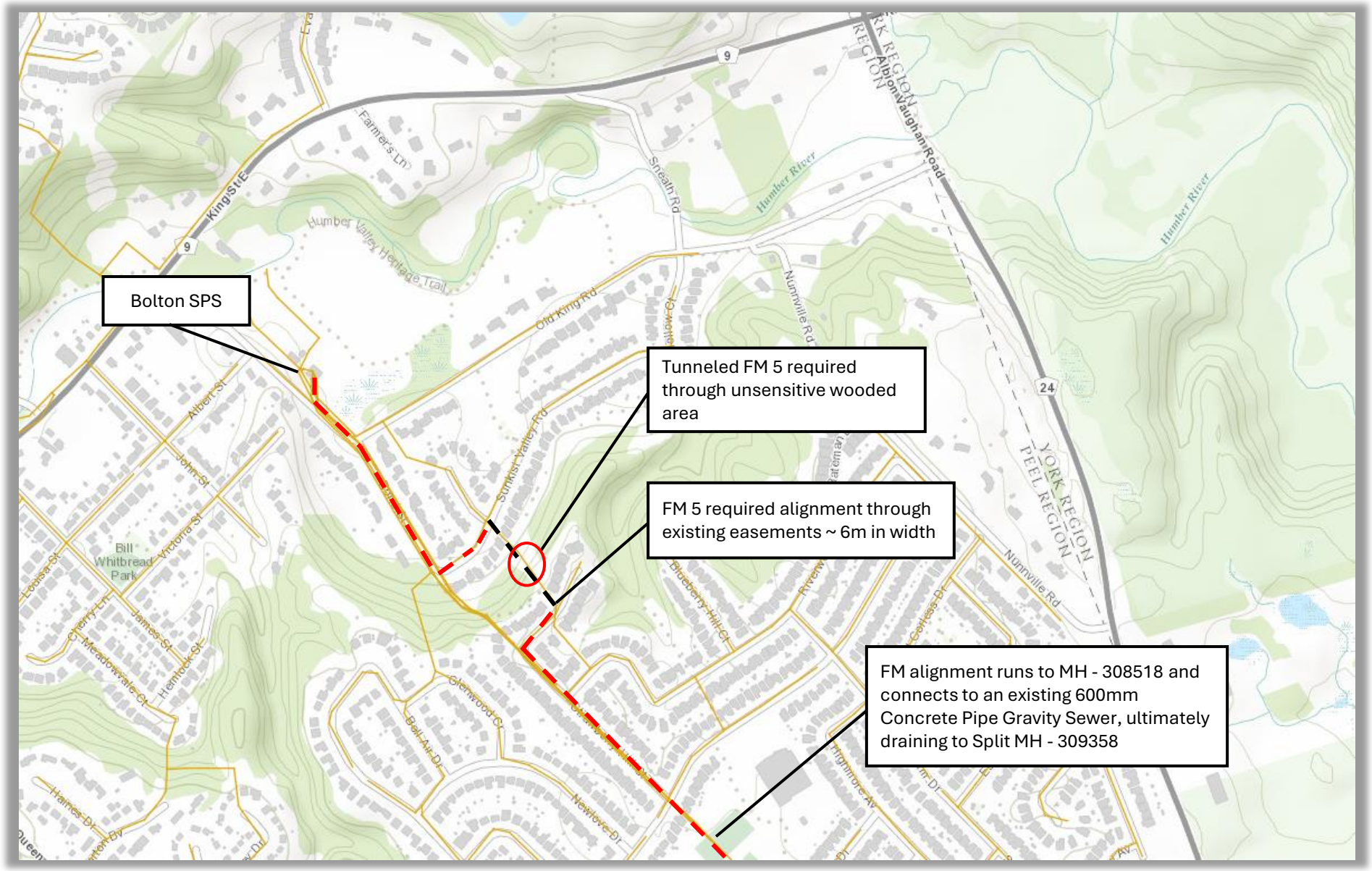
Option 3 East



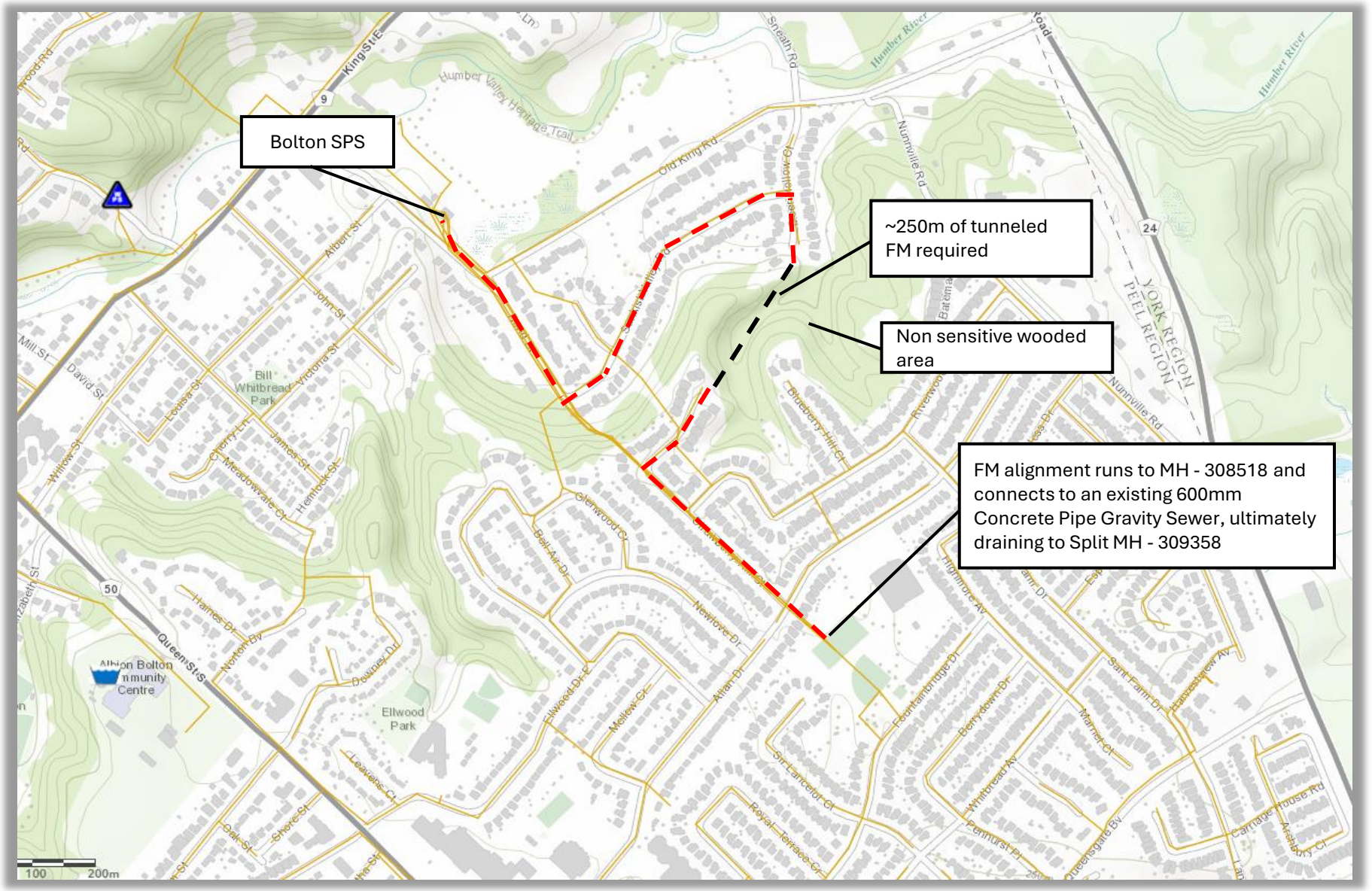
Proposed FM5

Existing 900mm Sanitary Gravity Sewer

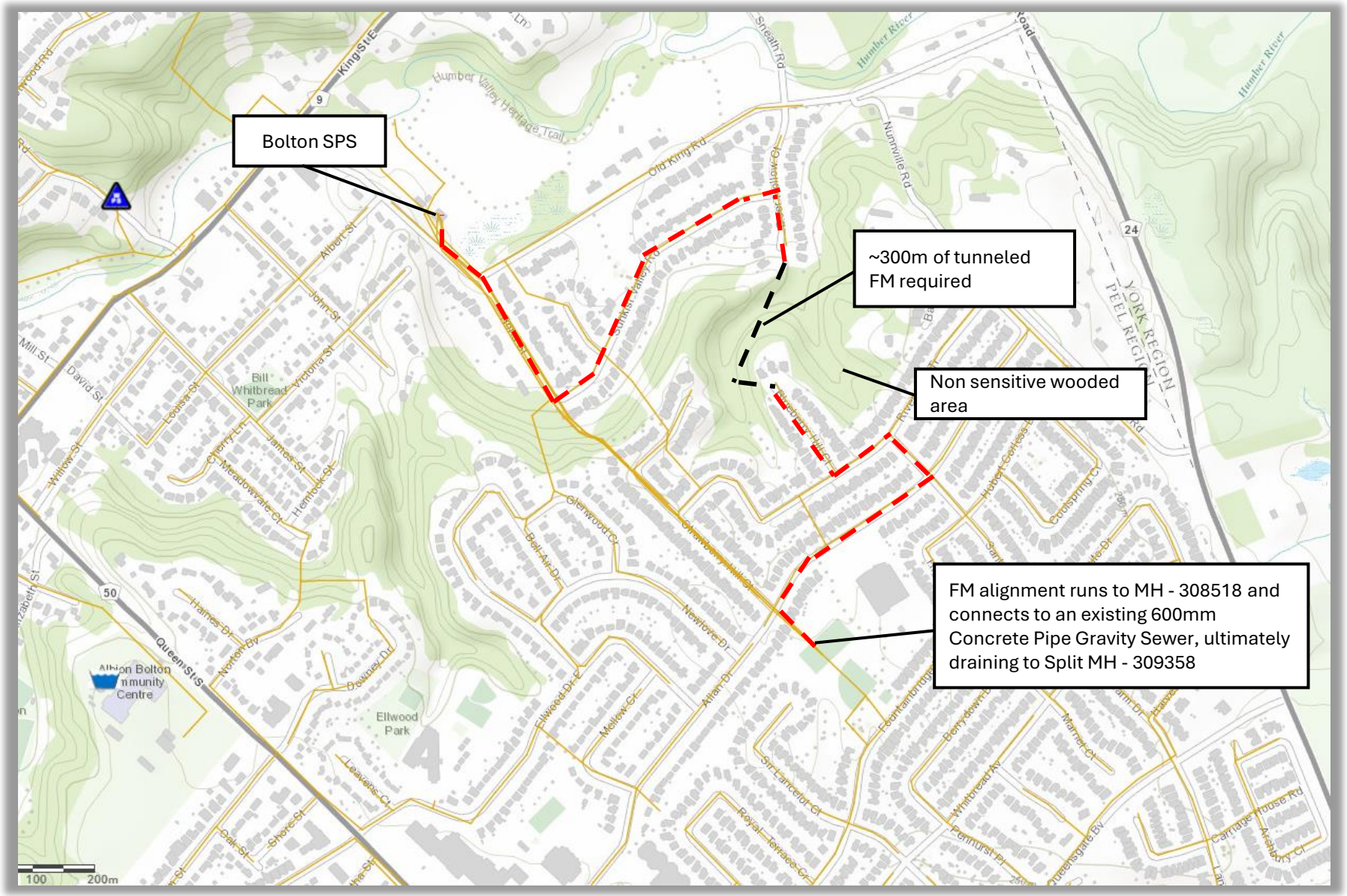
Option 4 East



Option 5 East



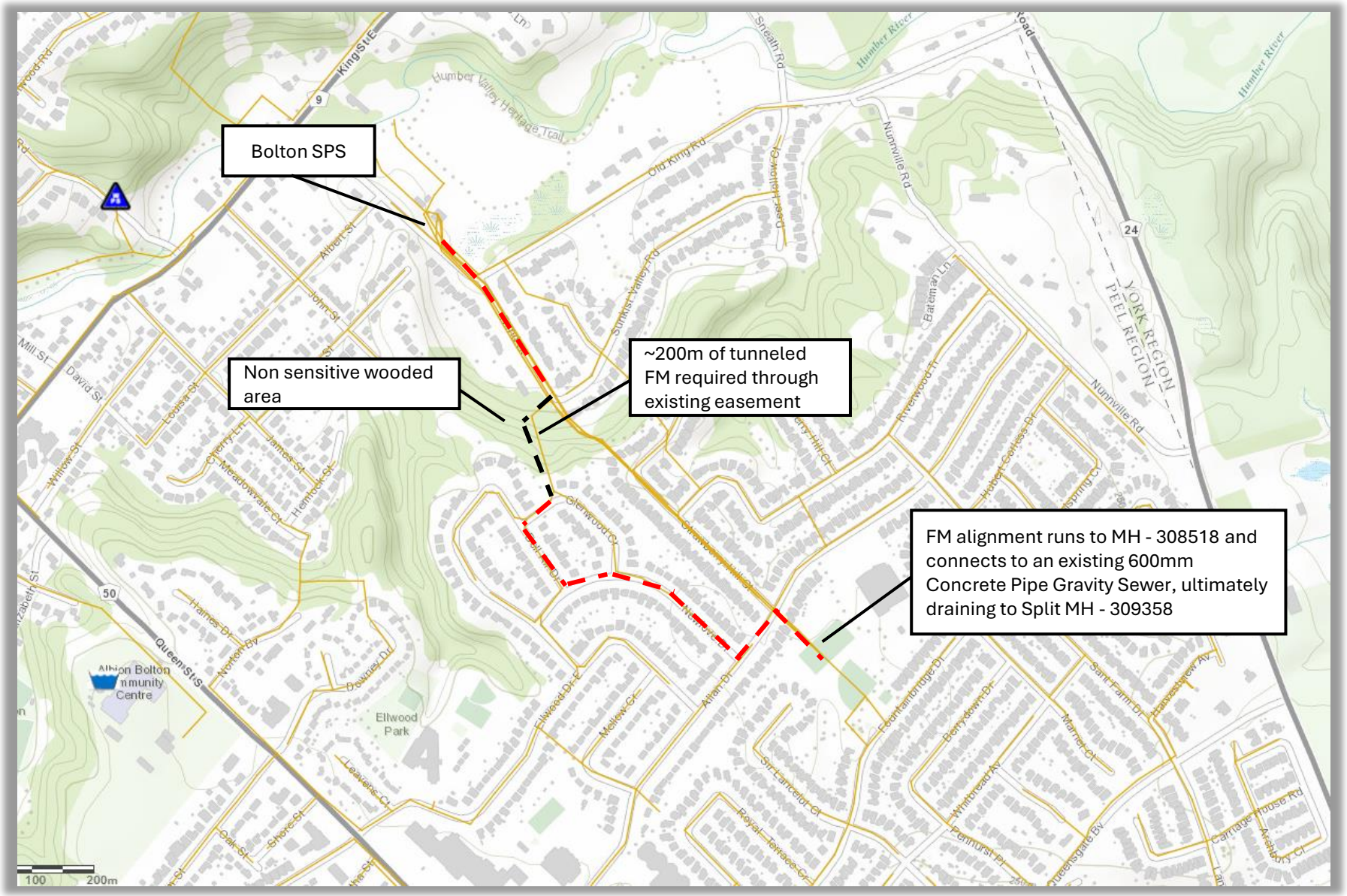
Option 6 East



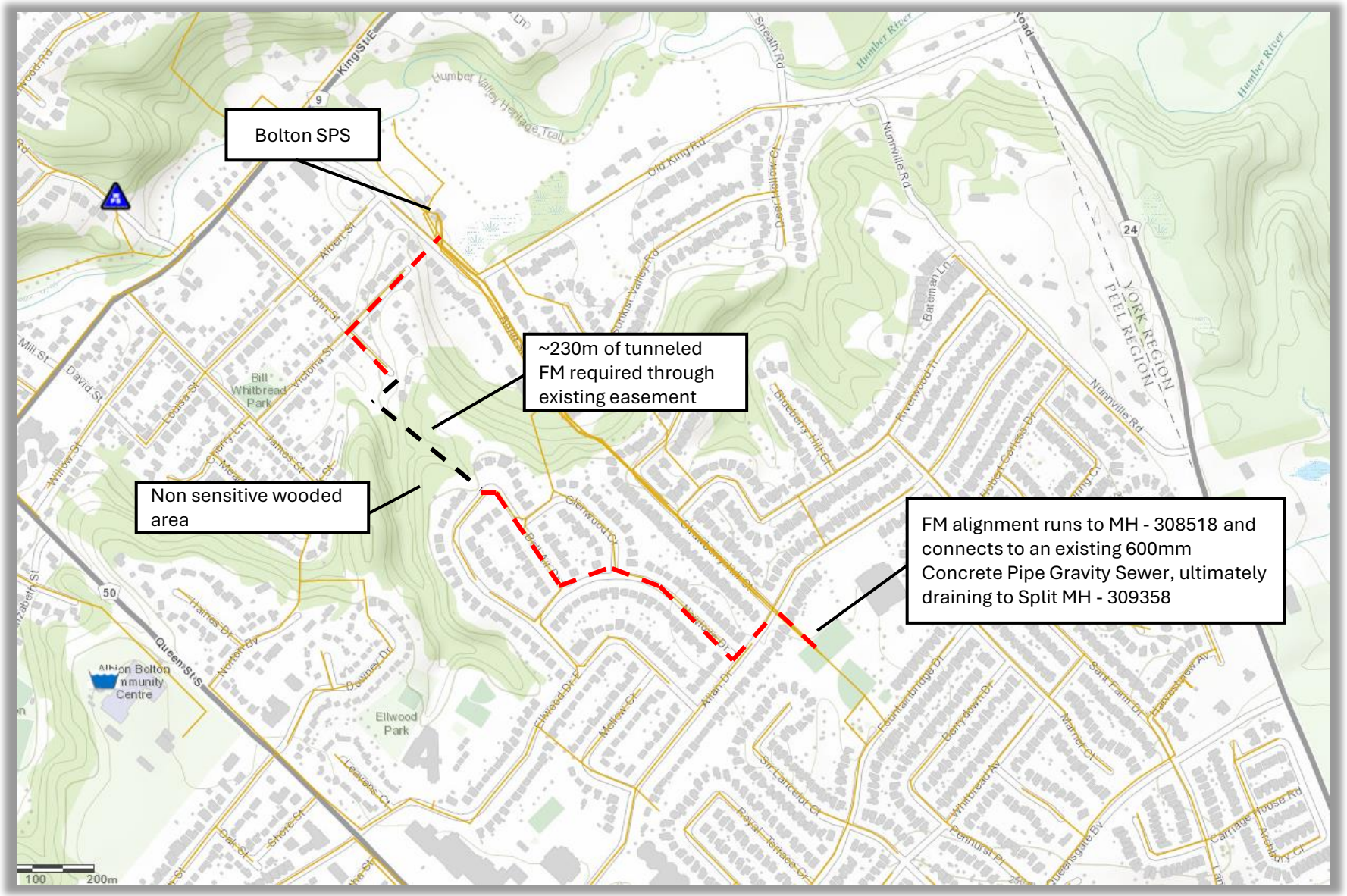
Proposed FM5

Proposed Tunneled FM 5

Option 1 West



Option 2 West



Appendix B

Screening of Alternatives

Alternative Alignment No.	Concept Name	Concept Description	Advantages	Disadvantages	Carried Forward for Evaluation / Screened Out
1	Option 1 East	New forcemain (FM) to follow existing triple FM alignment from Bolton SPS south along Bond Street until route diverts through existing easement north of 56-64 Strawberry Hill Court. New FM proposed to be installed between private residences at 64 & 66 Strawberry Hill Court adjacent to an existing sewer. New FM will then be installed west and south on Strawberry Hill Court to the existing 600mm sewer on Strawberry Hill Court, ultimately draining to the split manhole (MH) #309358.	• Provides some flexibility to balance flows between east and west systems as flows ultimately drain to split MH 309358. Coleraine trunk sewer does not have capacity to convey entirety of Bolton SPS catchment flows. •	• Alignment requires new FM to be constructed within an easement and limited width Town ROW which both have limited working area and are in close proximity to residents. • Alignment does not provide option to fully utilize existing infrastructure (A-V sewer) as capacity constraint identified between split manhole & A-V sewer. • Capacity constraint identified between split manhole & Coleraine trunk sewer. • Portion of alignment follows existing triple forcemain alignment through narrow existing easement so sufficient clearance for an additional forcemain is a concern.	**Screened Out**
2	Option 2 East	New FM to following alignment of recently constructed FM east on Old King RD, south on Nunnville Rd, connecting to the existing 660mmø sanitary sewer on Nunnville Road and ultimately to the 900mmø A-V trunk sewer.	• Increases Bolton SPS redundancy and minimizes operational complexity by having only one outlet. • Due to recently constructed FM completed along Old King Road, unforeseen construction complications would be minimized. • Maximizes use of existing infrastructure (A-V trunk sewer). • Minimizes flows on Coleraine to increase capacity for future development on the west side of Bolton. • Unlikely to require permanent easements.	• Old King Road near the Bolton SPS has existing infrastructure which would make the alignment challenging to construct. • Existing properties along Old King Road would be disturbed by the construction (limited properties relative to other alignments) • Potential for significant groundwater dewatering needed due to proximity to Humber River.	**Carried Forward**
3	Option 3 East	New FM from Bolton SPS south on Bond Street, east on Sunkist Valley Rd, north on Deer Hollow Ct, east on Old King Road and south of Nunnville Road, connecting to the existing 660mmø sanitary sewer on Nunnville Road and ultimately to the 900mmø A-V trunk sewer.	• Increases Bolton SPS redundancy and minimizes operational complexity by having only one outlet. • Due to recently constructed FM completed along Old King Road, unforeseen construction complications would be minimized. • Maximizes use of existing infrastructure (A-V trunk sewer). • Minimizes flows on Coleraine to increase capacity for future development on the west side of Bolton. • Unlikely to require permanent easements.	• Significant number of residential properties along FM alignment which would increase impacts to local residents. • Increased project length and potential for site-specific construction challenges relative to Option 2.	**Carried Forward**
4	Option 4 East	New FM from Bolton SPS south on Bond Street, east on Sunkist Valley Rd, south through existing easement (6m width) located between 12 & 14 Sunkist Valley Road and south on Strawberry Hill Court to connection point at MH 308518.	• Provides some flexibility to balance flows between east and west systems as flows ultimately drain to split MH 309358. Coleraine trunk sewer does not have capacity to convey entirety of Bolton SPS catchment flows.	• Proposed alignment requires new FM to be constructed within a narrow easement with existing infrastructure which increases construction challenges and potentially residential concerns. • Downstream constraints from split manhole to Coleraine & A-V trunk sewers limits viability of pumping flows from the Boltons SPS through the split manhole.	**Screened Out**

Alternative Alignment No.	Concept Name	Concept Description	Advantages	Disadvantages	Carried Forward for Evaluation / Screened Out
5	Option 5 East	New FM from Bolton SPS south on Bond Street, east on Sunkist Valley Rd, south on Deer Hollow Ct, southwest tunneled ~270 metres through wooded area to Strawberry Hill Court, south to connection point at MH 308518.	• Provides some flexibility to balance flows between east and west systems as flows ultimately drain to split MH 309358. Coleraine trunk sewer does not have capacity to convey entirety of Bolton SPS catchment flows.	• Increased construction complexity due to required tunneling through wooded area. • Downstream constraints from split manhole to Coleraine & A-V trunk sewers limits viability of pumping flows from the Bolton SPS through the split manhole. • Proposed alignment requires either a new easement or land acquisition within wooded area. • Long-term access for operation and maintenance may be limited due to installation through wooded area.	**Screened Out**
6	Option 6 East	New FM from Bolton SPS south on Bond Street, east on Sunkist Valley Rd, south on Deer Hollow Ct, southwest tunneled ~280 metres through wooded area to Blueberry Hill Court, east on Riverwood Terrace, south on Sant Farm Drive and west on Allan Drive to connection point at MH 308518.	• Provides some flexibility to balance flows between east and west systems as flows ultimately drain to split MH 309358. Coleraine trunk sewer does not have capacity to convey entirety of Bolton SPS catchment flows.	• Increased construction complexity due to required tunneling through wooded area. • Downstream constraints from split manhole to Coleraine & A-V trunk sewers limits viability of pumping flows from the Bolton SPS through the split manhole. • Proposed alignment requires either a new easement or land acquisition within wooded area. • Long-term access for operation and maintenance may be limited due to installation through wooded area. • FM alignment is extensive in length which increases cost & complexity.	**Screened Out**
7	Option 1 West	New FM from Bolton SPS south on Bond Street, southwest through existing easement along existing 300mm sewer alignment, west on Glenwood Ct, south on Bell Air Drive, south on Newlove Dr, and east on Allan Drive to connection point at MH 308518.	• Provides some flexibility to balance flows between east and west systems as flows ultimately drain to split MH 309358. Coleraine trunk sewer does not have capacity to convey entirety of Bolton SPS catchment flows. • Unlikely to require permanent easement or property acquisition. • Expected complexity of site investigations decreased through wooded area due to the existing 300mm sewer along the proposed alignment.	• Increased construction complexity due to required tunneling through wooded area. • Downstream constraints from split manhole to Coleraine & A-V trunk sewers limits viability of pumping flows from the Bolton SPS through the split manhole. • Long-term access for operation and maintenance may be limited due to installation through wooded area. • Proposed alignment involves construction within an existing easement which could cause potential utility conflicts and residential pushback.	**Carried Forward**
8	Option 2 West	New FM from Bolton SPS west along Victoria Street, south on John Street, through existing easement (ownership & width unknown) and tunneled ~220 metres through wooded area south to Bel Air Drive, south on Bel Air Drive, south on New Love Dr, and east on Allan Drive to connection point at MH 308518.	• Provides some flexibility to balance flows between east and west systems as flows ultimately drain to split MH 309358. Coleraine trunk sewer does not have capacity to convey entirety of Bolton SPS catchment flows.	• Increased construction complexity due to required tunneling through wooded area. • Downstream constraints from split manhole to Coleraine & A-V trunk sewers limits viability of pumping flows from the Bolton SPS through the split manhole. • Long-term access for operation and maintenance may be limited due to installation through wooded area. • Proposed alignment involves construction within an existing easement which could cause potential utility conflicts and residential pushback. • Proposed alignment may require either a new easement or an expanded easement.	**Screened Out**

Appendix C

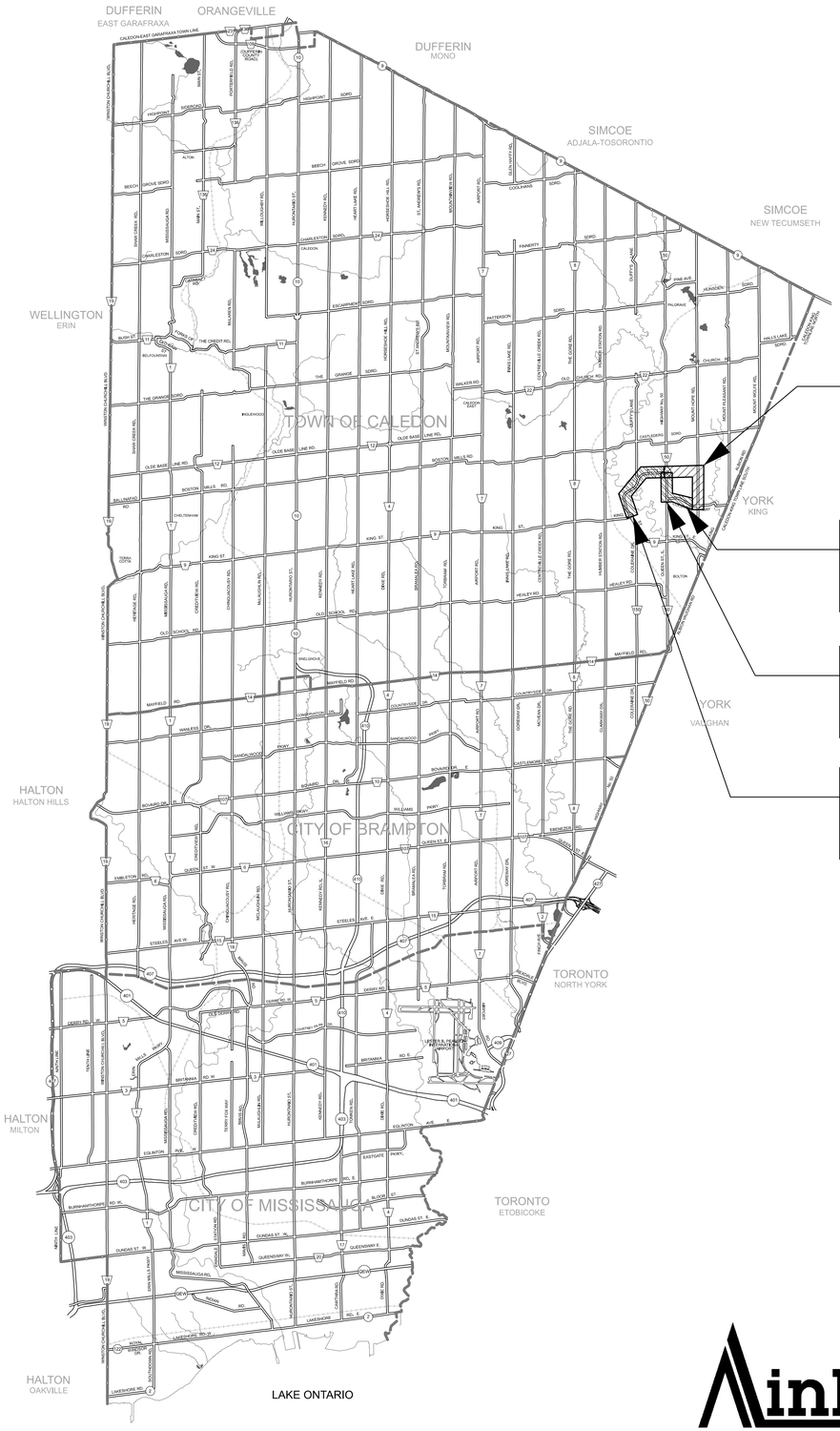
Evaluation Criteria

Factor	Evaluation Criteria	Rationale / Indicators
Technical Constructability	Existing / Planned Infrastructure	• Ability of proposed alignment to minimize conflicts with existing infrastructure
	Existing Utilities	• Ability of proposed alignment to avoid existing utilities and utility easements
	Crossings	• Ability of proposed alignment to minimize major environmental, railway and highway crossings and address any applicable mitigation actions
	Constructability Risk	• Ability of proposed alignment to minimize "unreasonable" construction challenges • Ability of proposed alignment to minimize potential schedule/timing risk during construction
	Accessibility	• Ability of proposed alignment to minimize construction in areas with limited access • Ability of proposed alignment to have sufficient area for trenchless construction and availability for tunnel shaft sites • Ability of proposed alignment to maximize routes along road right of way and/or easements
Technical Flexibility	Compatibility with Existing and Future Infrastructure	• Ability of proposed alignment to maximize use of existing infrastructure • Ability of proposed alignment to minimize required capital upgrades of existing infrastructure • Ability of proposed alignment to coordinate with planned infrastructure improvements
	Capacity for Future Growth	• Ability of proposed alignment to meet future servicing and operational needs for new growth
	Operation & Maintenance	• Ability of proposed alignment to maximize ease of access for operation and maintenance
Environment	Environmentally Sensitive Features	• Ability of proposed alignment to minimize proximity to environmentally sensitive features (e.g. wetlands, ESAs, woodlots, designated natural areas and CVC regulated areas)
	Crossings	• Ability of proposed alignment to minimize requirements for major environmental crossings
	Water Features / Resources	• Ability of proposed alignment to minimize short- or long-term impacts on surface water features and source water protection areas • Ability of proposed alignment to avoid impacts to valley lands, including floodplains and meander belts (e.g. potential flooding and erosion risk)

		• Ability of proposed alignment to minimize potential impacts on water quality, including nearby water wells
	Environmental Risk	• Ability of proposed alignment to minimize potential environmental risk during construction and operation
Socio/ Cultural	Community Impact (Residents and Local Businesses)	• Ability of proposed alignment to minimize resident's real or perceived negative impact on community and neighbourhoods • Ability of proposed alignment to impact access to property or public spaces
	Existing Road Infrastructure	• Ability of proposed alignment to minimize adverse effects on roadways • Ability of proposed alignment to coordinate with planned road work improvements
	Traffic Impact	• Ability of proposed alignment to minimize length of construction time, impact to travel time, detour options and impacts to public transit traffic
Financial	Life Cycle Cost (Overall Servicing Strategy)	• Ability of proposed alignment to minimize total life cycle cost (combination of capital, property acquisition, O&M, etc.)
	Financial Risk	• Ability of proposed alignment to minimize potential financial risk during construction (cost increase / uncertainty
Legal	Property Acquisition	• Ability of proposed alignment to minimize land requirement issues and agency concerns that may arise related to project routes, siting and land acquisition • Ability of proposed alignment to minimize complexity relating to availability of land, current designated land use, current ownership and property acquisition

Appendix 3D

Preliminary Design Drawings



PROJECT No. XX-XXXX
BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

GEI WORK AREA

CP#7 WORK AREA
(AINLEY 50% DESIGN)

CP#6 WORK AREA
(AINLEY 50% DESIGN)

CP#4 WORK AREA
(AINLEY 50% DESIGN)

Ainley CONSULTING ENGINEERS PLANNERS

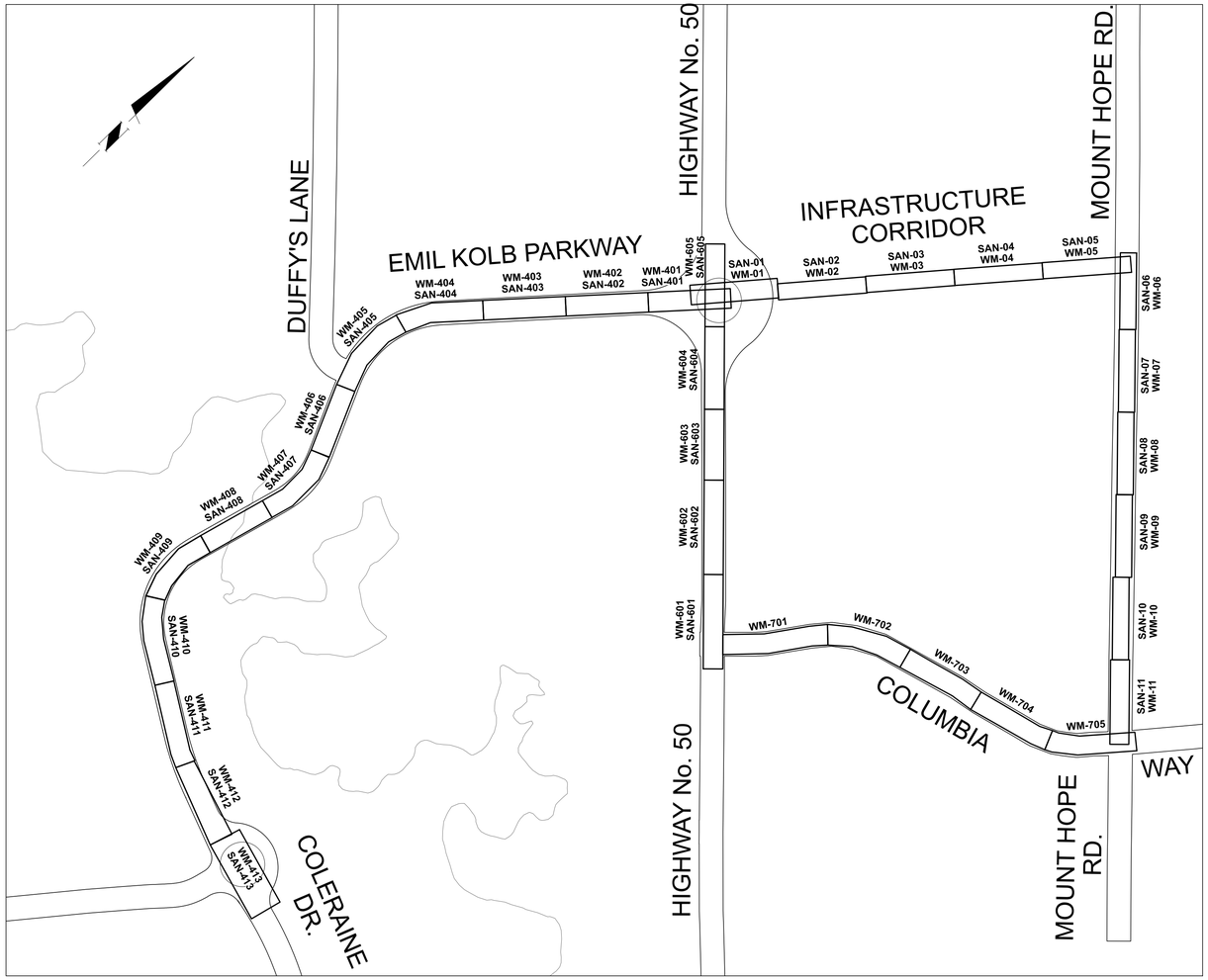
GEI Consultants Canada

Region of Peel working with you

Document XXXX-XXXT

DRAWING LIST			
SHEET No.	DRAWING No.	DRAWING DESCRIPTION 1	DRAWING DESCRIPTION 2
		GENERAL	
	-	COVER SHEET	
1	GEN-01	INDEX AND KEY MAP	-
2	GEN-02	GENERAL NOTES AND LEGEND	-
		SANITARY SEWER AND FORCEMAIN PLANS AND PROFILES	
		EMIL KOLB PARKWAY (FROM KING STREET TO HIGHWAY 50)	
3	SAN-413	PROP. 750mm SANITARY SEWER	STA. 8+240 TO STA. 8+400
4	SAN-412	PROP. 750mm SANITARY SEWER	STA. 7+960 TO STA. 8+240
5	SAN-411	PROP. TWIN 450mm SANITARY FORCEMAIN PROP. 750mm SANITARY SEWER	STA. 7+680 TO STA. 7+960
6	SAN-410	PROP. TWIN 450mm SANITARY FORCEMAIN	STA. 7+400 TO STA. 7+680
7	SAN-409	PROP. TWIN 400/450mm SANITARY FORCEMAIN	STA. 7+160 TO STA. 7+400
8	SAN-408	PROP. TWIN 400mm SANITARY FORCEMAIN	STA. 6+920 TO STA. 7+160
9	SAN-407	PROP. 1200mm SANITARY SEWER PROP. TWIN 400mm SANITARY FORCEMAIN	STA. 6+640 TO STA.6+920
10	SAN-406	PROP. 1200mm SANITARY SEWER	STA. 6+400 TO STA. 6+640
11	SAN-405	PROP. 1200mm SANITARY SEWER	STA. 6+120 TO STA. 6+400
12	SAN-404	PROP. 1200mm SANITARY SEWER	STA. 5+840 TO STA. 6+120
13	SAN-403	PROP. 1200mm SANITARY SEWER	STA. 5+560 TO STA. 5+840
14	SAN-402	PROP. 1200mm SANITARY SEWER	STA. 5+280 TO STA. 5+560
15	SAN-401	PROP. 1200mm SANITARY SEWER	STA. 5+000 TO STA. 5+280
		INFRASTRUCTURE CORRIDOR (FROM HIGHWAY 50 TO MOUNT HOPE)	
16	SAN-01	PROP. 1200mm SANITARY SEWER	STA. 4+830 TO STA. 5+100
17	SAN-02	PROP. 1200mm SANITARY SEWER	STA. 4+530 TO STA. 4+830
18	SAN-03	PROP. 1200mm SANITARY SEWER	STA. 4+230 TO STA. 4+530
19	SAN-04	PROP. 1200mm SANITARY SEWER	STA. 3+930 TO STA. 4+230
20	SAN-05	PROP. 1200mm SANITARY SEWER	STA. 3+633 TO STA. 3+930
		MOUNT HOPE ROAD (FROM INFRASTRUCTURE CORRIDOR TO COLUMBIA WAY)	
21	SAN-06	PROP. 1200mm SANITARY SEWER	STA. 0+960 TO STA. 1+220
22	SAN-07	PROP. 1200mm SANITARY SEWER	STA. 1+220 TO STA. 1+500
23	SAN-08	PROP. 1200mm SANITARY SEWER	STA. 1+500 TO STA. 1+780
24	SAN-09	PROP. 1200mm SANITARY SEWER	STA. 1+780 TO STA. 2+060
25	SAN-10	PROP. 1200mm SANITARY SEWER	STA. 2+060 TO STA. 2+320
26	SAN-11	PROP. 1200mm SANITARY SEWER	STA. 2+320 TO STA. 2+620
		HIGHWAY 50 (FROM EMIL KOLB PARKWAY TO COLUMBIA WAY)	
27	SAN-605	PROP. 1200mm SANITARY SEWER	STA. 4+120 TO STA. 4+280
28	SAN-604	PROP. 1200mm SANITARY SEWER	STA. 3+840 TO STA. 4+120
29	SAN-603	PROP. 1200mm SANITARY SEWER	STA. 3+560 TO STA. 3+840
30	SAN-602	PROP. 1200mm SANITARY SEWER	STA. 3+280 TO STA. 3+560
31	SAN-601	PROP. 1200mm SANITARY SEWER	STA. 2+990 TO STA. 3+280
		WATERMAIN PLANS AND PROFILES	
		EMIL KOLB PARKWAY (FROM KING STREET TO HIGHWAY 50)	
32	WM-413	PROP. 600mm WATERMAIN	STA. 8+240 TO STA. 8+400
33	WM-412	PROP. 600mm WATERMAIN	STA. 7+960 TO STA. 8+240
34	WM-411	PROP. 600mm WATERMAIN	STA. 7+680 TO STA. 7+960
35	WM-410	PROP. 600mm WATERMAIN	STA. 7+400 TO STA. 7+680
36	WM-409	PROP. 600mm WATERMAIN	STA. 7+160 TO STA. 7+400
37	WM-408	PROP. 600mm WATERMAIN	STA. 6+920 TO STA. 7+160
38	WM-407	PROP. 600mm WATERMAIN	STA. 6+640 TO STA.6+920
39	WM-406	PROP. 600mm WATERMAIN	STA. 6+400 TO STA. 6+640
40	WM-405	PROP. 600mm WATERMAIN	STA. 6+120 TO STA. 6+400
41	WM-404	PROP. 600mm WATERMAIN	STA. 5+840 TO STA. 6+120
42	WM-403	PROP. 600mm WATERMAIN	STA. 5+560 TO STA. 5+840
43	WM-402	PROP. 600mm WATERMAIN	STA. 5+280 TO STA. 5+560
44	WM-401	PROP. 600mm WATERMAIN	STA. 5+000 TO STA. 5+280
		INFRASTRUCTURE CORRIDOR (FROM HIGHWAY 50 TO MOUNT HOPE)	
45	WM-01	PROP. 400mm WATERMAIN	STA. 4+830 TO STA. 5+090
46	WM-02	PROP. 400mm WATERMAIN	STA. 4+530 TO STA. 4+830
47	WM-03	PROP. 400mm WATERMAIN	STA. 4+230 TO STA. 4+530
48	WM-04	PROP. 400mm WATERMAIN	STA. 3+930 TO STA. 4+230
49	WM-05	PROP. 400mm WATERMAIN	STA. 3+633 TO STA. 3+930
		MOUNT HOPE ROAD (FROM INFRASTRUCTURE CORRIDOR TO COLUMBIA WAY)	
50	WM-06	PROP. 400mm WATERMAIN	STA. 0+940 TO STA. 1+220
51	WM-07	PROP. 400mm WATERMAIN	STA. 1+220 TO STA. 1+500
52	WM-08	PROP. 400mm WATERMAIN	STA. 1+500 TO STA. 1+780
53	WM-09	PROP. 400mm WATERMAIN	STA. 1+780 TO STA. 2+060
54	WM-10	PROP. 400mm WATERMAIN	STA. 2+060 TO STA. 2+320
55	WM-11	PROP. 400mm WATERMAIN	STA. 2+340 TO STA. 2+630
		HIGHWAY 50 (FROM EMIL KOLB PARKWAY TO COLUMBIA WAY)	
56	WM-605	PROP. 400mm WATERMAIN	STA. 4+120 TO STA. 4+280
57	WM-604	PROP. 400mm WATERMAIN	STA. 3+840 TO STA. 4+120
58	WM-603	PROP. 400mm WATERMAIN	STA. 3+560 TO STA. 3+840
59	WM-602	PROP. 400mm WATERMAIN	STA. 3+280 TO STA. 3+560
60	WM-601	PROP. 400mm WATERMAIN	STA. 2+990 TO STA. 3+280
		COLUMBIA WAY (FROM KINGSVIEW DRIVE TO MOUNT HOPE ROAD)	
61	WM-701	PROP. 400mm WATERMAIN	STA. 1+120 TO STA. 1+400
62	WM-702	PROP. 400mm WATERMAIN	STA. 1+400 TO STA. 1+680
63	WM-703	PROP. 400mm WATERMAIN	STA. 1+680 TO STA. 1+960
64	WM-704	PROP. 400mm WATERMAIN	STA. 1+960 TO STA. 2+240
65	WM-705	PROP. 400mm WATERMAIN	STA. 2+240 TO STA. 2+500

		COMPOUND PLANS	
		EMIL KOLB PARKWAY (FROM KING STREET TO EMIL KOLB PARKWAY)	
66	CP-405	MICROTUNNEL SHAFT COMPOUND NO.4	-
67	CP-404	MICROTUNNEL SHAFT COMPOUND NO.3	-
68	CP-403	MICROTUNNEL SHAFT COMPOUND NO. 2	-
69	CP-402	AUGER-BORE COMPOUND	-
70	CP-401	MICROTUNNEL SHAFT COMPOUND NO.1	-
		MOUNT HOPE ROAD (FROM INFRASTRUCTURE CORRIDOR TO COLUMBIA WAY)	
71	CP-01	MICROTUNNEL SHAFT COMPOUND NO.7 (MH17A)	-
72	CP-02	MICROTUNNEL SHAFT COMPOUND NO.8 (MH18A)	-
73	CP-03	MICROTUNNEL SHAFT COMPOUND NO.9 (MH19A)	-
74	CP-04	MICROTUNNEL SHAFT COMPOUND NO.10 (MH20A)	-
75	CP-05	MICROTUNNEL SHAFT COMPOUND NO.11 (MH21A)	-
		HIGHWAY 50 (FROM EMIL KOLB PARKWAY TO COLUMBIA WAY)	
76	CP-602	MICROTUNNEL SHAFT COMPOUND NO.6	-
77	CP-601	MICROTUNNEL SHAFT COMPOUND NO.5	-
		PRELIMINARY SITE PLANS	
		EMIL KOLB PARKWAY (FROM KING STREET TO EMIL KOLB PARKWAY)	
78	SP-01	PRELIMINARY SITE PLAN - HUMBER SEWAGE PUMPING STATION	-
		INFRASTRUCTURE CORRIDOR (FROM HIGHWAY 50 TO MOUNT HOPE ROAD)	
79	SP-02	PRELIMINARY SITE PLAN - HWY 50 ACCESS ROAD	-
80	SP-03	PRELIMINARY SITE PLAN - INFRASTRUCTURE CORRIDOR - 14475 HWY 50 (GEI)	-
81	SP-04	PRELIMINARY SITE PLAN - INFRASTRUCTURE CORRIDOR - 14530 HWY 50 (GEI)	-
		HIGHWAY 50	
82	SP-05	PRELIMINARY SITE PLAN - 14245 HIGHWAY 50	-
83	SP-06	PRELIMINARY SITE PLAN - 14437 HIGHWAY 50	



REVISIONS		
DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	E.M.

GEI Consultants Canada

Approved by

SCALE: 1:500

Region of Peel
working with you

INDEX AND KEYMAP

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB. 2026	Sheet	1 of 83	Plan No.	GEN-01

GENERAL NOTES

1. ALL WORKS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST REGION OF PEEL AND/OR CITY OF MISSISSAUGA STANDARDS.
2. ALL EXISTING INFORMATION HAS BEEN SHOWN IN ACCORDANCE WITH THE BEST AVAILABLE RECORDS. THE CONTRACTOR SHALL VERIFY LOCATION OF EXISTING UTILITIES IN THE FIELD PRIOR TO COMMENCING OF ANY WORK.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PROTECTION AND TEMPORARY RELOCATION OF UNDERGROUND AND ABOVEGROUND UTILITIES PRIOR TO AND DURING CONSTRUCTION.
4. CONTRACTOR SHALL NOT REMOVE OR DAMAGE ANY TREES UNLESS THEY ARE INDICATED AS REMOVAL ITEMS ON THE DRAWING.
5. CONTRACTOR SHALL MAINTAIN FLOW IN ALL EXISTING WATER/WASTEWATER SERVICES DURING CONSTRUCTION.
6. ALL BACKFILL ON TRAVELLED PORTION OF THE RIGHT OF WAY TO BE UNSHRINKABLE FILL, UNLESS OTHERWISE NOTED ON THE DRAWINGS.
7. MINIMUM PAVED ROAD RESTORATION SHALL BE 50mm HL3, 100mm HL8, 150mm GRANULAR "A" AND 300mm GRANULAR "B" TYPE II AS PER CITY OF MISSISSAUGA STD DWG 2220.030.
8. DISTURBED ASPHALT DRIVEWAYS SHALL BE RESTORED WITH HL3A ASPHALT TO MATCH THE DEPTH OF EXISTING ASPHALT (OR 50mm MIN.).
9. ALL AREAS DAMAGED OR DISTURBED BY THE CONTRACTOR SHALL BE RESTORED TO THE RESTORATION REQUIREMENTS AS SPECIFIED OR OTHERWISE TO THE ORIGINAL CONDITION.
10. THE CONTRACTOR SHALL SUPPLY AND INSTALL ALL EROSION AND SEDIMENT CONTROLS AS PER CONTRACT SPECIFICATIONS AND AT LOCATIONS AS DIRECTED BY THE ENGINEER.

UTILITY NOTES

** UTILIY LOCATES MUST BE DONE PRIOR TO CONSTRUCTION **

1. HAND DIG WITHIN 1m OF (OR WHEN CROSSING) CABLE TV, BELL, GAS OR HYDRO PLANT.

2. MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO GAS MAINS.

3. MAINTAIN A MINIMUM OF 0.3m VERTICAL CLEARANCE TO GAS MAINS OR HYDRO PLANT.

4. TESTHOLES REQUIRED PRIOR TO CONSTRUCTION TO DETERMINE ACTUAL DEPTH OF GAS MAINS.

5. MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO BELL PLANT, MAINTAIN A MINIMUM OF 1.3m HORIZONTAL CLEARANCE FROM BELL PLANT TO PROPOSED HYDRANTS.

6. PROPOSED HYDRANT OFFSET TO BE DETERMINED IN THE FIELD (MIN. 1.5m OFFSET TO BELL OF HYDRO POLES).

7. MAINTAIN A MINIMUM OF 1.0m HORIZONTAL CLEARANCE AND 0.6m VERTICAL CLEARANCE FROM VITAL GAS MAINS.

8. A REPRESENTATIVE FROM ENBRIDGE GAS DISTRIBUTION MUST BE CONTACTED (PLEASE CALL 1-866-922-3622) 3 DAYS PRIOR TO COMMENCEMENT OF WORK WITHIN THE VICINITY OF A VITAL GAS MAIN.

9. MAINTAIN 1.0m HORIZONTAL SEPARATION FROM ANY GAS MAIN FOR BORING.

10. MAINTAIN 600mm VERTICAL CLEARANCE FROM ANY HYDRO PLANT.

11. SUPPORT, PROTECT AND MAINTAIN EXISTING FENCE DURING WATER SERVICES INSTALLATIONS USING VACTOR EXCAVATIONS AS REQUIRED.

12. PROTECT AND AND SUPPORT EXISTING LIGHT STANDARDS, TS POLES USING CITY APPROVED VENDOR AS REQUIRED FOR WATERMAIN AND WATER SERVICES INSTALLATIONS.

13. VIBRATION MONITORING IS REQUIRED FOR ALL WORK WITHIN 6m OF TNPI FUEL PIPELINES.

ROGERS COMMUNICATIONS

1. CONTRACTOR TO USE VACTRUCK, EXPOSE DUCTS AND MAINTAIN 0.6m MIN. VERTICAL AND HORIZONTAL CLEARANCE BETWEEN PROP. WM / SAN AND EX. ROGERS CABLE DURING CONSTRUCTION; HAND DIG IF CROSSING OR WITHIN 1m. FOR ROGERS LOCATES, CALL 1-800-738-7893.

BELL CANADA

1. CONTRACTOR TO MAINTAIN 0.6m MIN. VERTICAL AND HORIZONTAL CLEARANCE BETWEEN PROP. WM / SAN AND EX. BELL DURING CONSTRUCTION AND MAINTAIN 1.5m MIN. VERTICAL AND HORIZONTAL CLEARANCE BETWEEN PROP. HYDRANT AND EX. BELL DURING CONSTRUCTION; HAND DIG IF CROSSING OR WITHIN 1m
2. CONTRACTOR TO MAINTAIN 1.5m MIN. VERTICAL AND HORIZONTAL CLEARANCE BETWEEN PROP. HYDRANT AND EX. BELL DURING CONSTRUCTION
3. HAND DIG IF CROSSING OR WITHIN 1m
4. FOR BELL LOCATES, CALL 1-800-400-2255

ENBRIDGE GAS

1. CONTRACTOR TO MAINTAIN 0.6m MIN. HORIZONTAL AND 0.3m MIN. VERTICAL CLEARANCE BETWEEN PROP. WM / SAN AND EX. GAS MAIN DURING CONSTRUCTION.
2. VERTICAL CLEARANCE MUST BE INCREASED TO 0.6m FOR GAS MAINS NPS 12 AND LARGER.
3. FOR BORING, 1.0m HORIZONTAL AND VERTICAL CLEARANCE IS REQUIRED.
4. HAND DIG IF CROSSING OR WITHIN 1m.
5. A MINIMUM OF 0.15m OF SAND BACKFILL PADDING IS TO BE PLACED AROUND GAS MAINS / SERVICES BEFORE BACKFILLING WITH UNSHRINKABLE FILL
6. FOR GAS LOCATES, CALL 1-800-400-2255

WORK AREA NOTES

1. ONLY TEMPORARY CONSTRUCTION WORK AREAS SHOWN ON THE CONTRACT DRAWINGS ARE AVAILABLE FOR THE CONTRACTOR'S USE.
2. SITE PREPARATION SHALL BE PERFORMED IN ACCORDANCE WITH OPSS 503, CONSTRUCTION SPECIFICATION FOR SITE PREPARATION FOR PIPELINES, UTILITIES, AND ASSOCIATED STRUCTURES.
3. TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE IMPLEMENTED IN ACCORDANCE WITH OPSS 577, CONSTRUCTION SPECIFICATION FOR TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES.
4. TREE PROTECTION DURING CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH THE CONTRACT DRAWINGS.
5. CONSTRUCTION AREAS SHALL BE CLEARED OF GRASS AND WEEDS TO A DEPTH OF AT LEAST 6 INCHES AND CLEARED OF STRUCTURES, PAVEMENT, SIDEWALKS, CONCRETE OR MASONRY DEBRIS, TREES, LOGS, UPTURNED STUMPS, LOOSE BOULDERS, AND ANY OTHER OBJECTIONABLE MATERIAL OF ANY KIND WHICH WOULD INTERFERE WITH THE PERFORMANCE OR COMPLETION OF THE WORK, CREATE A HAZARD TO SAFETY, IMPAIR THE SUBSEQUENT USEFULNESS OF THE WORK, OR OBSTRUCT ITS OPERATION.
6. CONTRACTOR SHALL DEVELOP ANY NECESSARY ACCESS RESTRICTIONS TO THE WORK AREAS, INCLUDING ACCESS BARRIERS TO PROHIBIT ENTRY OF UNAUTHORIZED PERSONS.
7. WHERE EXISTING UTILITIES INTERFERE WITH THE WORK, CONTRACTOR SHALL NOTIFY THE UTILITY OWNER AND ENGINEER BEFORE PROCEEDING IN ACCORDANCE WITH THE GENERAL CONDITIONS.
8. ALL AREAS INCLUDING LANDSCAPING/GRADING DISTURBED BY CONSTRUCTION OPERATIONS SHALL BE RESTORED TO THE ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE ENGINEER.
9. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE SEDIMENT AND EROSION CONTROL IN ALL WORK AREAS WHERE SOIL LOSS IS POSSIBLE.
10. ALL HYDRO UTILITY POLES AND OVERHEAD HYDRO UTILITY LINES TO BE PROTECTED AND ALL WORK ADJACENT TO HYDRO UTILITY ABOVE GROUND INFRASTRUCTURE SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE CANADIAN STANDARDS, ASSOCIATION STANDARDS AND ONTARIO'S OCCUPATIONAL HEALTH AND SAFETY ACT REGULATIONS.
11. ALL OVERLAND/STORM FLOW SHALL BE MAINTAINED WITHIN EXISTING DRAINAGE DITCHES AND CULVERTS DURING CONSTRUCTION. DITCH INLET CATCH BASINS SHALL BE PROTECTED OR RELOCATED.
12. SOLID BOARD HOARDING (2.4m HIGH) WITH SILT FILTER CLOTH AROUND WORK AREA TO PROVIDE SECURITY AND SAFETY. REMOVE HOARDING UPON COMPLETION OF WORK (SEE DETAIL "SOLID BOARD HOARDING" ON THIS SHEET). ACOUSTIC BARRIER TO BE INSTALLED AS SHOWN ON THE CONTRACT DRAWINGS.
13. CONTRACTOR SHALL DEVELOP A TRAFFIC CONTROL PLAN FOR ACCESS AND EGRESS FROM THE WORK AREAS FOR REVIEW AND APPROVAL. LOCKABLE ACCESS GATES AND MUD MATS SHALL BE REQUIRED AT ALL WORK AREA ACCESS/EGRESS LOCATIONS.
14. INSTALL CONCRETE JERSEY BARRIERS AROUND HYDRO POLES WITHIN WORK AREA FOR PROTECTION.
15. THE PERIMETER OF TEMPORARY WORK AREAS ADJACENT TO ROADS WILL REQUIRE INSTALLATION OF CONCRETE BARRIERS AND FAST FENCE INSTEAD OF SOLID BOARD HOARDING.
16. CONTRACTOR SHALL PROTECT ALL UTILITIES AND APPURTENANCES WITHIN THE WORK AREA AND FACILITATE ACCESS FOR REGION AND ANY OTHER AUTHORIZED PERSONNEL FOR ANY EMERGENCY AND MAINTENANCE REQUIREMENT.
17. THE CONTRACTOR SHALL REMOVE, SALVAGE OR RELOCATE, AND REINSTATE, TO CITY OF MISSISSAUGA STANDARD, REGULATORY STREET SIGNS WHICH ARE IN THE WAY OF THE CONSTRUCTION.
18. THERE SHALL BE NO STOCKPILING OF EXCAVATED MATERIAL WITHIN THE WORK AREA.

WATERMAIN NOTES

1. ALL COPPER (LESS THAN 25mm), GALVANIZED & LEAD WATER SERVICE ARE TO BE REPLACED WITH 25mm TYPE 'K' COPPER FROM THE NEW WATERMAIN TO THE STREET LINE COMPLETE WITH A NEW SERVICE BOX AT STREET LINE. ALL W/S'S MUST HAVE A MIN. OF 1.7m COVER ON CURB AND GUTTER ROADS AND A MINIMUM OF 2.1m COVER ON UNIMPROVED ROADS, AS INDICATED ON THE DRAWINGS. IF W/S CONFLICTS WITH SEWERS AND/OR EXISTING WATERMAIN W/S HAS TO BE INSTALLED UNDER SEWER AND/OR WATERMAIN WITH A MINIMUM OF 300mm CLEARANCE. REMOVE & DISPOSE OF EXISTING WATER SERVICE BOXES.

2. PLUG THE ENDS OF THE ABANDONED WATERMAIN WITH CONCRETE OR MECHANICAL PLUG.

3. 50mm TEMP. BLOW-OFF AND/OR RISER PIPE FOR SWABBING OF THE WATERMAIN IS/ARE TO BE LOCATED IN THE BOULEVARD.

4. INSTALL TEMP. PLUG & B.O. AT END OF EACH PIPE FOR TESTING.

5. THRUST RESTRAINTS AT VERTICAL AND HORIZONTAL BENDS AND HORIZONTAL BLOCKING FOR PLUGS, CAPS AND TEES ON CONNECTIONS TO EXISTING WATERMAIN SYSTEM AS PER STD. DWGS 1-5-4, 1-5-5, 1-5-6 AND 1-5-7.

6. RESTRAINED JOINT LOCATIONS FOR NEW WATERMAIN INSTALLATION SHALL CONFORM TO CONTRACT DRAWINGS AND STD. DWG.1-5-9.

7. MAINTAIN ALL SEWER & WATERMAIN CROSSING AT MINIMUM 500mm BELOW PIPE INVERT AND/OR MINIMUM 300mm ABOVE PIPE OBVERT.

8. HYDRANTS SHALL CONFORM TO STD. DWG 1-6-1.

9. WATER SERVICES SHALL CONFORM TO STD DWG 1-7-1.

10. WATERMAIN UP TO AND INCLUDING 300mm DIAMETER SHALL BE PVC DR18/AWWA C900 OR PVC AWWA C909 AS INDICATED.

11. INSTALL W/S BY BORING UNDER PAVEMENT, TREES AND SHRUBS, UNLESS OTHERWISE NOTED.

12. TESTING AND COMMISSIONING SHALL BE UNDERTAKEN PER THE REGION'S STANDARD SPECIFICATIONS FOR WATERMAIN VOL. 2-2.

13. 12 GAUGE TWU STRANDED COPPER, LIGHT COLOURED PLASTIC COATED TRACER WIRE MUST BE INSTALLED WITH AND ALONG THE PIPE AND BROUGHT TO THE SURFACE AT EACH VALVE BOX/CHAMBER AND HYDRANT (AROUND PORT). TRACER WIRE IS TO BE ATTACHED TO THE PIPE BY MEANS OF TAPE.

14. THE WATERMAIN ALIGNMENT MAY BE ALTERED IN THE FIELD TO ENSURE MINIMUM 500mm SEPARATION FROM SEWERS.

15. LOCATIONS OF UTILITIES SHOWN ON THE PLAN AND PROFILE DRAWINGS ARE APPROXIMATE. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE LOCATIONS OF UTILITIES IN THE FIELD.

16. CATCH BASINS TO BE MAINTAINED DURING CONSTRUCTION UNLESS OTHERWISE SPECIFIED.

17. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PROTECTION AND TEMPORARY RELOCATION OF UNDERGROUND AND ABOVEGROUND UTILITIES PRIOR TO AND DURING CONSTRUCTION.

18. CONTRACTOR SHALL MAINTAIN FLOW IN ALL EXISTING WATER SERVICES DURING CONSTRUCTION.

19. ALL BACKFILL ON TRAVELLED PORTION OF THE RIGHT OF WAY TO BE GRAN. "B" BACKFILL AND BE COMPACTED TO MIN. 100% STD. PROCTOR DENSITY.

20. ALL AREAS DAMAGED OR DISTURBED BY THE CONTRACTOR SHALL BE RESTORED TO THE RESTORATION REQUIREMENTS AS SPECIFIED OR OTHERWISE TO THE ORIGINAL CONDITIONS.

21. CONTRACTOR TO VERIFY DEGREE OF BEND REQUIRED FOR WATERMAIN DURING CONSTRUCTION LAYOUT AND TO SHOW REVISIONS ON SHOP DRAWINGS.

22. NEW WATERMAINS TO BE CHLORINATED, PRESSURE TESTED AND BACTERIOLOGICALLY TESTED PRIOR TO CONNECTING TO THE EXISTING SYSTEM. CONTRACTOR IS TO PROVIDE ALL THE NECESSARY VALVES, FITTINGS, BLOW-OFF, PLUGS, ETC. EITHER TEMPORARY OR PERMANENTLY, REQUIRED TO UNDERTAKE THIS WORK. FLUSHING CHLORINATING AND SAMPLING OF THE WATERMAIN WILL BE PERFORMED BY THE REGION. ALL OTHER TESTING SHALL BE CARRIED OUT BY A COMPANY SPECIALIZED IN THE FIELD AND APPROVED BY THE REGION.

23. BOREHOLE LOG INFORMATION AS SHOWN ON DRAWINGS IS FOR INFORMATION PURPOSES ONLY. REFER TO THE GEOTECHNICAL INVESTIGATION REPORT FOR DETAILED GEOTECHNICAL INFORMATION.

24. ANY JOINT DEFLECTION SHALL BE 50 PERCENT OF THE PIPE MANUFACTURER'S SPECIFICATIONS. PIPE BARREL DEFLECTION IS PROHIBITED WHEN USING PVC PIPE.

SANITARY SEWER NOTES

1. ALL SANITARY MAINTENANCE HOLES FOR SEWERS LESS THAN 600mm DIA. TO BE PRECAST MAINTENANCE HOLES 1200mm, 1500mm OR 1800mm DIA. AS PER REGULAR STANDARD DRAWINGS 2-5-1, 2-5-2, 2-5-3, COMPLETE WITH HEAVY DUTY MAINTENANCE HOLE FRAME AND COVER AS PER REGULAR STANDARD DRAWING 2-6-3 UNLESS OTHERWISE NOTED. FOR SANITARY SEWERS 600mm DIA. OR GREATER, ALL MAINTENANCE HOLES TO BE CONCRETE PRESSURE PIPE (C30X) AS PER STANDARD DRAWINGS 2-7-2, 2-7-3, 2-7-4, 2-7-5, 2-7-6, COMPLETE WITH HEAVY DUTY MAINTENANCE HOLE FRAME AND COVER AS PER STANDARD DRAWING 2-6-3 UNLESS OTHERWISE NOTED.
2. BOREHOLE LOG INFORMATION AS SHOWN ON DRAWINGS FOR INFORMATION PURPOSES ONLY. REFER TO GEOTECHNICAL INVESTIGATION REPORT FOR DETAILED GEOTECHNICAL INFORMATION.
3. CONTRACTOR TO ENSURE THAT ALL ABANDONED SEWERS AND MAINTENANCE HOLES, INCLUDING ABANDONED OPENINGS INTO ACTIVE MAINTENANCE HOLES, ARE WATERTIGHT AND INHIBIT INFLOW AND INFILTRATION.

ABBREVIATIONS

ABD	**ABANDONED**	**M.O.E.**	**MINISTRY OF ENVIRONMENT**
ARCH	**ARCHITECTURAL**	**MIN**	**MINIMUM**
AV	**AIR VALVE**	**MAX**	**MAXIMUM**
B	**BELL**	**MB**	**MAIL BOX**
BH	**BORE HOLE**	**MH**	**MAINTENANCE HOLE**
BOL	**BOLLARD**	**NO.**	**NUMBER**
BV	**BUTTERFLY VALVE**	**PB**	**POWER BOX**
C.E.	**COVER ELEVATION**	**PE**	**POLYETHYLENE**
C.I.	**CAST IRON**	**PLYRSN**	**POLY RESIN**
C/L	**CENTERLINE**	**PROP**	**PROPERTY**
CLR	**CLEARANCE**	**PVC**	**POLYVINYL CHLORIDE**
CLF	**CHAIN LINK FENCE**	**RCPP**	**REINFORCED CONCRETE PRESSURE PIPE**
CB	**CATCH BASIN**	**RCCP**	**REINFORCED CONCRETE CYLINDER PIPE**
CONC	**CONCRETE**	**SAN**	**SANITARY SEWER**
COP	**COPPER**	**SL**	**STREET LIGHT**
CPP	**CONCRETE PRESSURE PIPE**	**ST**	**STEEL**
CSP	**CORRUGATED STEEL PIPE**	**STA**	**STATION**
CVC	**CREDIT VALLEY CONSERVATION**	**STM**	**STORM SEWER**
C/W	**COMPLETE WITH**	**TL**	**TRAFFIC LIGHT**
D.I.	**DUCTILE IRON**	**TMH**	**TELECOMMUNICATIONS MANHOLE**
DIA	**DIAMETER**	**TPZ**	**TREE PROTECTION ZONE**
DV	**DRAIN VALVE**	**TV**	**TELEVISION**
EX	**EXISTING**	**V. DEFL**	**VERTICAL DEFLECTION**
FH	**FIRE HYDRANT**	**VB**	**VALVE BOX**
FM	**FORCE MAIN**	**VC**	**VALVE CHAMBER**
FOC	**FIBRE OPTIC CABLE**	**VIT**	**VITREOUS CLAY**
H	**HYDRO**	**WM**	**WATER MAIN**
H. DEFL.	**HORIZONTAL DEFLECTION**	**WV**	**WATER VALVE**
HP	**HYDRO POLE**	**WK**	**WATER KEY**
G	**GAS MAIN**	**WS**	**WATER SERVICES**
GV	**GATE VALVE**	**BM**	**BENCHMARK**
IB	**IRON BAR**		
I.E.	**INVERT ELEVATION**		
LS	**LIGHT STANDARD**		
LSHP	**LIGHT STANDARD HYDRO POLE**		

LEGEND

- S.I.B. — STANDARD IRON BAR
- I.B. — IRON BAR
- RIB — ROUND IRON BAR
- SURVEY MONUMENT
- HORIZONTAL CONTROL MONUMENT
- MONUMENT BENCHMARK
- SSM — SUBSURFACE SETTLEMENT MARKER
- SSP — SUBSURFACE SETTLEMENT POINT
- BH.3 — BOREHOLE
- THXX — TEST PIT
- SLOPE
- WVC — EXISTING WATER VALVE CHAMBER
- HYD — EXISTING HYDRANT
- WV — EXISTING WATER VALVE
- WS — EXISTING WATER SERVICE CURB STOP
- PROPOSED WATERMAIN VALVE (PROFILE)
- PROPOSED HYDRANT AND VALVE
- PROPOSED WATER VALVE
- WS — PROPOSED WATER SERVICE CURB STOP
- PROPOSED WATER TEE
- PROPOSED WATERMAIN TEE (PROFILE)
- PROPOSED WATERMAIN BEND (PROFILE)
- HYD — EX. HYDRANT TO BE REMOVED AND RETURNED TO REGION YARD IN MISSISSAUGA. 3515 WOLFDALE RD.
- EX. VALVE AND BOX TO BE REMOVED AND DISPOSED OF OFF SITE
- EX. VALVE CHAMBER TO BE DECOMMISSIONED AND DISPOSED OF OFF SITE
- MH — EXISTING SANITARY MAINTENANCE HOLE
- PROP. MH — PROPOSED SANITARY MAINTENANCE HOLE
- MH — EXISTING STORM MAINTENANCE HOLE
- CB — EXISTING CATCH BASIN
- DCB — DOUBLE CATCH BASIN
- DICB — DITCH INLET CATCH BASIN
- HP — HYDRO POLE
- HP — EXISTING HYDRO POLE AND GUY WIRE
- HLP — HYDRO LIGHT POLE
- HH / HW — ELECTRICAL HAND WELL
- JB — ELECTRICAL JUNCTION BOX
- LS — EXISTING LIGHT STANDARD
- BM — BELL MANHOLE
- BELL PED — BELL PEDESTAL
- TV PED — CABLE TV PEDESTAL
- G — GAS MARKER
- TV — TV MARKER
- BOL — EXISTING BOLLARD
- EXISTING MAN DOOR
- SN — EXISTING SIGN
- R.R. SIGN — RAILWAY SIGNALS
- SS — STOP SIGN
- TL — TRAFFIC LIGHT
- TS — TRAFFIC SIGN - OTHER
- YIELD — YIELD SIGN
- FP — FLAG POLE
- FENCE GATE
- HANDICAP
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- POTENTIAL TREE REMOVAL

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	E.M.

- DITCH LINE
- 356.00 — EXISTING TOPOGRAPHICAL CONTOUR (M.A.S.L.)
- STM 250 — EXISTING STORM PIPE
- SAN 250 — EXISTING SANITARY PIPE
- WM 300 — EXISTING WATER PIPELINE
- H — EXISTING UNDERGROUND HYDRO
- H — EXISTING OVERHEAD HYDRO
- B — EXISTING BELL
- TV — EXISTING TV
- G — EXISTING GAS
- X X X — EXISTING FENCE
- ROW PROPERTY LINE
- PROPERTY LINE
- PROPOSED WATER PIPELINE
- PROPOSED SANITARY SEWER

General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS25 Proposed Water Service, Size In mm

B.M. No. Elev.
Description
Location

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

GEI Consultants

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NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

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CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
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ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

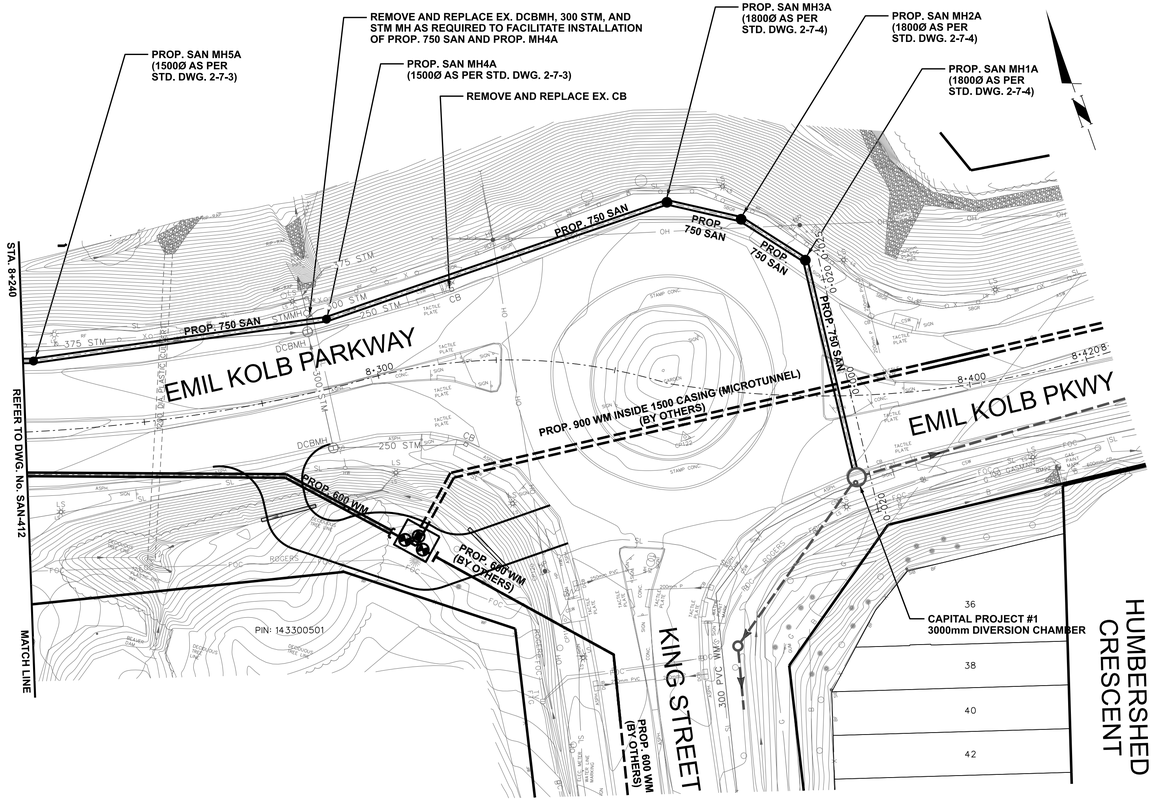
Region of Peel
working with you

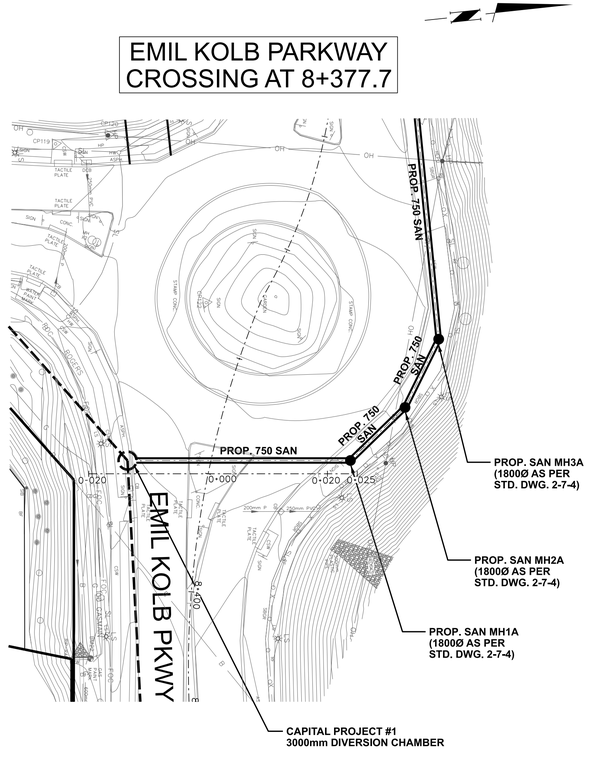
GENERAL NOTES AND LEGEND

CAD Area	X-XX	Area	X-XX
Checked by	E.M.	Drawn by	P.M.
Date	FEB. 2026	Sheet	2 of 83

Project No. XX-XXXX

Plan No. **GEN-02**



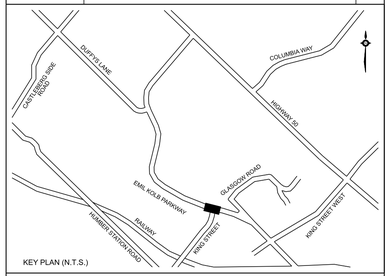


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. DET-001 TO DET-018

THIS DRAWING TO BE USED FOR SANITARY SEWER CONSTRUCTION ONLY

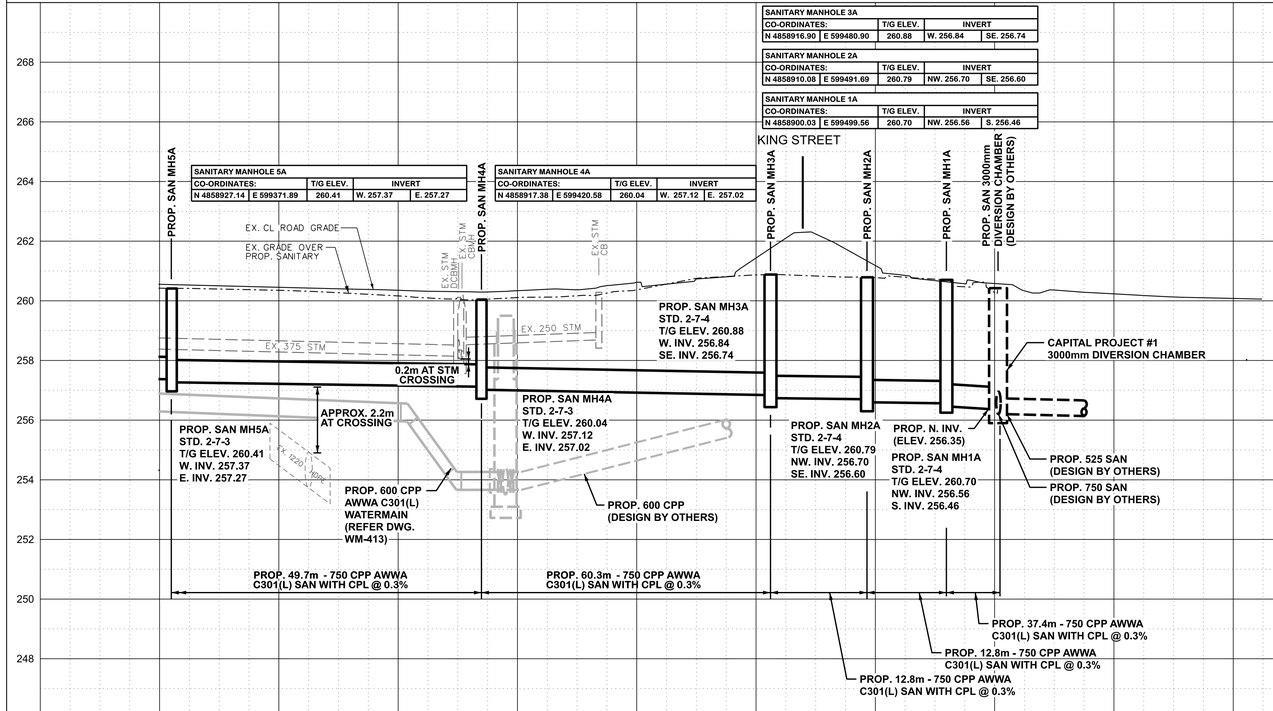
SANITARY MANHOLE 3A				
CO-ORDINATES:		T/G ELEV.	INVERT	
N 4858916.90	E 599480.90	260.88	W. 256.84	SE. 256.74

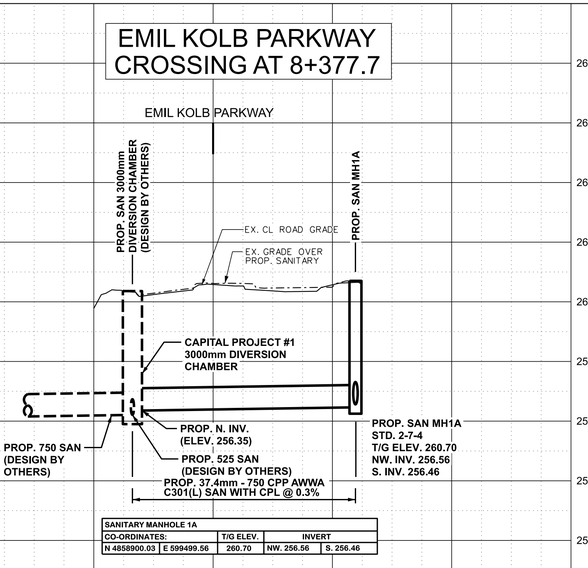
SANITARY MANHOLE 2A				
CO-ORDINATES:		T/G ELEV.	INVERT	
N 4858910.08	E 599491.69	260.79	NW. 256.70	SE. 256.60

SANITARY MANHOLE 1A				
CO-ORDINATES:		T/G ELEV.	INVERT	
N 4858900.03	E 599499.56	260.70	NW. 256.56	S. 256.46

SANITARY MANHOLE 5A				
CO-ORDINATES:		T/G ELEV.	INVERT	
N 4858927.14	E 599371.89	260.41	W. 257.37	E. 257.27

SANITARY MANHOLE 4A				
CO-ORDINATES:		T/G ELEV.	INVERT	
N 4858917.38	E 599420.58	260.04	W. 257.12	E. 257.02





SANITARY MANHOLE 1A				
CO-ORDINATES:		T/G ELEV.	INVERT	
N 4858900.03	E 599499.56	260.70	NW. 256.56	S. 256.46

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Agency: Ontario Ministry of Natural Resources and Forestry
B.M. No. 10519980004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

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CABLE TELEVISION/FIBREOPTIC PROVIDERS:
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PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6 — VERTICAL SCALE 1:100

Region of Peel working with you

EMIL KOLB PARKWAY

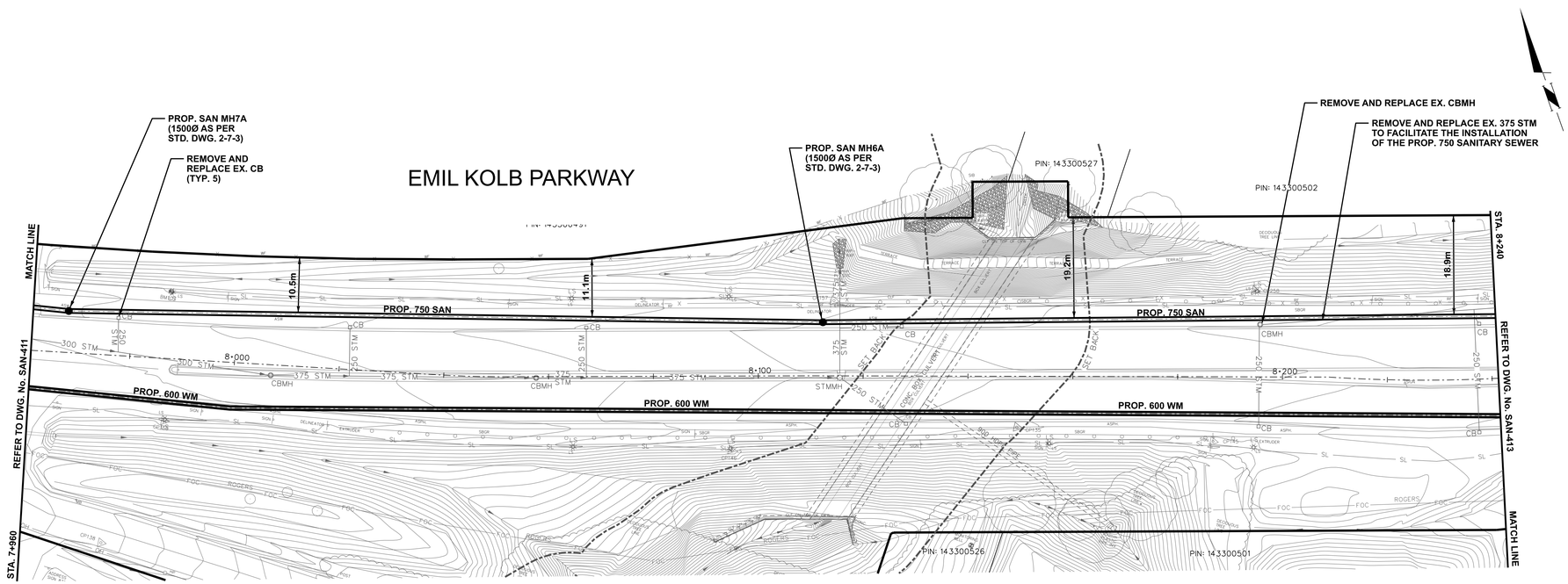
(FROM HIGHWAY 50 TO KING STREET)

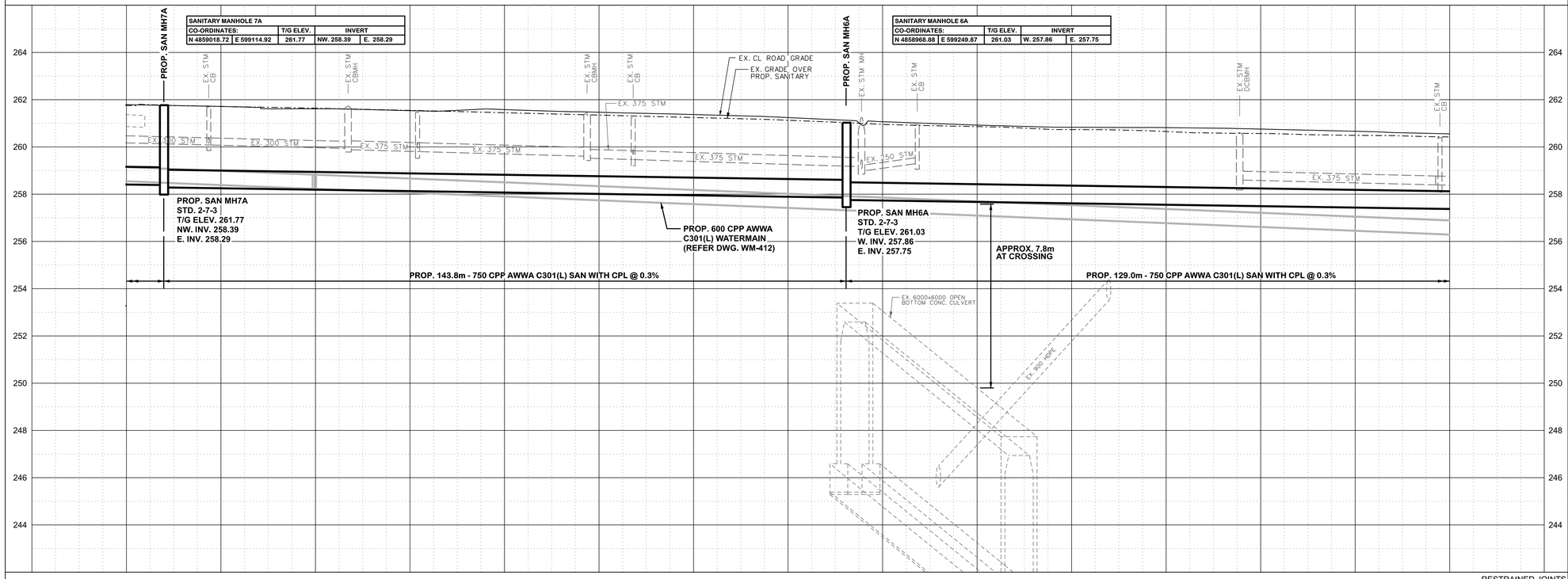
PROP. 750mm SANITARY SEWER

STA. 8+240 TO STA. 8+400

RESTRAINED JOINTS													
BOT.EL. OF SAN.													
260.55	260.45	260.35	260.34	260.62	261.44	261.18	260.58	260.23		259.78	260.58	260.57	EX. ROAD ELEV.
8+240	8+260	8+280	8+300	8+320	8+340	8+360	8+380	8+400		0-020	0+000	0+020	ROAD CHAINAGE

CAD Area	X-XX	Area	C-12/C-13	Project No.	XX-XXXX
Checked by	G.J.	Drawn by	M.L.		
Date	FEB. 2026	Sheet	3 of 83	Plan No.	SAN-413





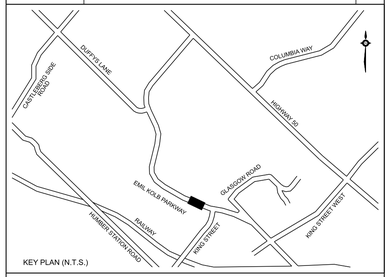
RESTRAINED JOINTS																
BOT.EL. OF SAN																
EX. ROAD ELEV.	261.79	261.72	261.62	261.54	261.58	261.47	261.37	261.24	261.07	260.92	260.83	260.82	260.75	260.66	260.55	
ROAD CHAINAGE	7+960	7+980	8+000	8+020	8+040	8+060	8+080	8+100	8+120	8+140	8+160	8+180	8+200	8+220	8+240	

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WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

NOTES:

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TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6 — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

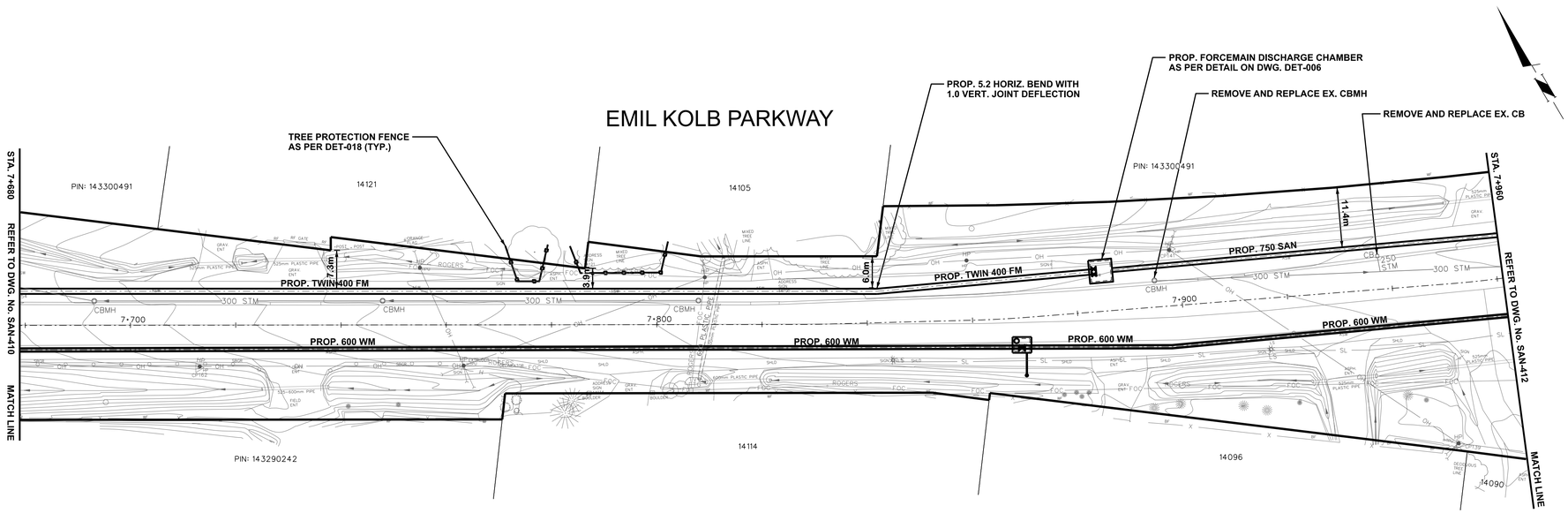
PROP. 750mm SANITARY SEWER

STA. 7+960 TO STA. 8+240

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	4 of 83

Project No. XX-XXXX

Plan No. **SAN-412**



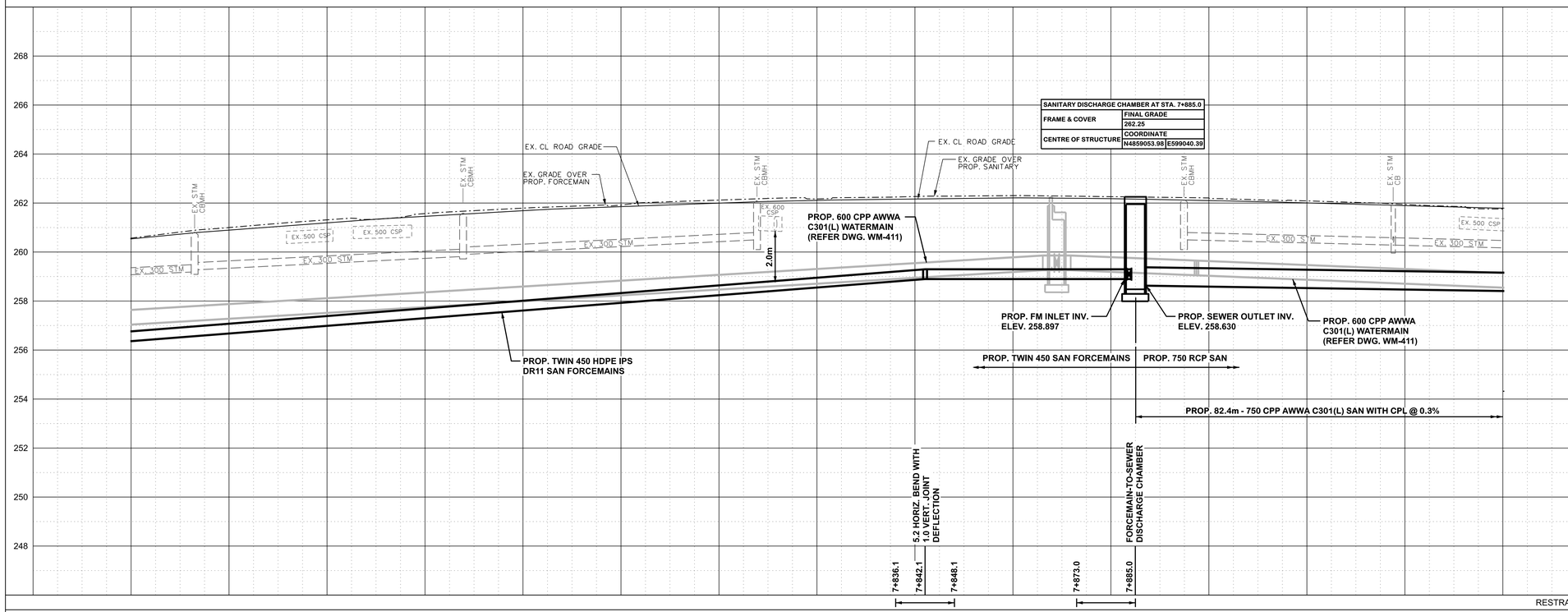
SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS		
DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	

NOTES:

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THIS DRAWING TO BE USED FOR SANITARY SEWER CONSTRUCTION ONLY



SANITARY DISCHARGE CHAMBER AT STA. 7+885.0		
FRAME & COVER	FINAL GRADE	
	262.25	
CENTRE OF STRUCTURE	COORDINATE	
	N4859053.98	E599040.39

RESTRAINED JOINTS																
BOT.EL. OF SAN.																
260.54	260.89	261.19	261.46	261.69	261.86	262.00	261.11	262.18	262.21	262.18	262.10	262.01	261.89	261.79	EX. ROAD ELEV.	
7+680	7+700	7+720	7+740	7+760	7+780	7+800	7+820	7+840	7+860	7+880	7+900	7+920	7+940	7+960	ROAD CHAINAGE	

General Notes

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Agency: Ontario Ministry of Natural Resources and Forestry
B.M. No. 1051998004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

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CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6 — VERTICAL SCALE 1:100

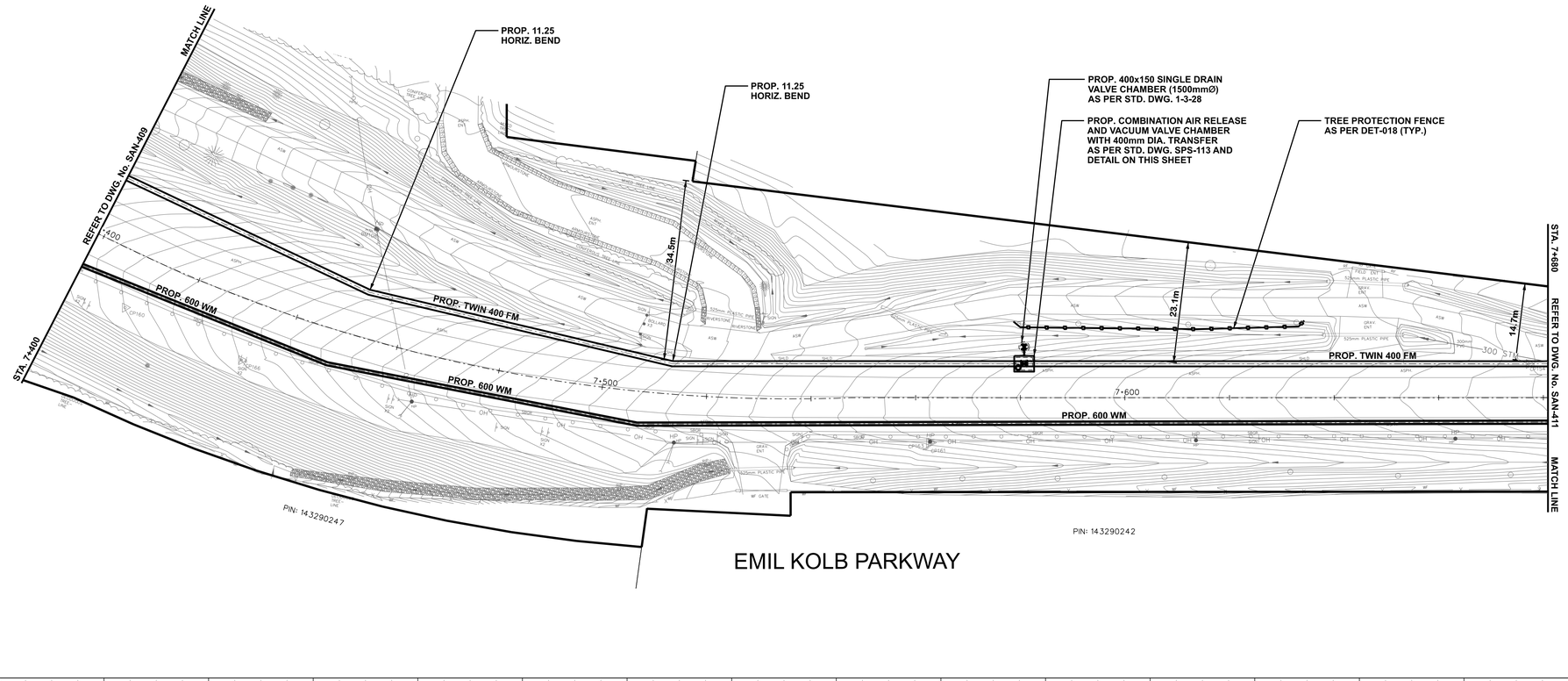
Region of Peel
working with you

EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

PROP. TWIN 450mm SANITARY FORCEMAIN
PROP. 750mm SANITARY SEWER
STA. 7+680 TO STA. 7+960

CAD Area	X-XX	Area	C-12/C-13	Project No.	XX-XXXX
Checked by	G.J.	Drawn by	M.L.		
Date	FEB. 2026	Sheet	5 of 83	Plan No.	SAN-411

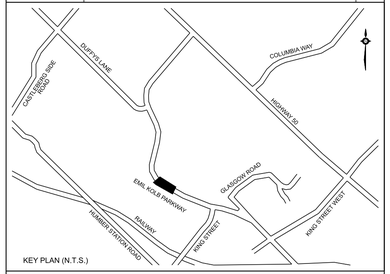


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	

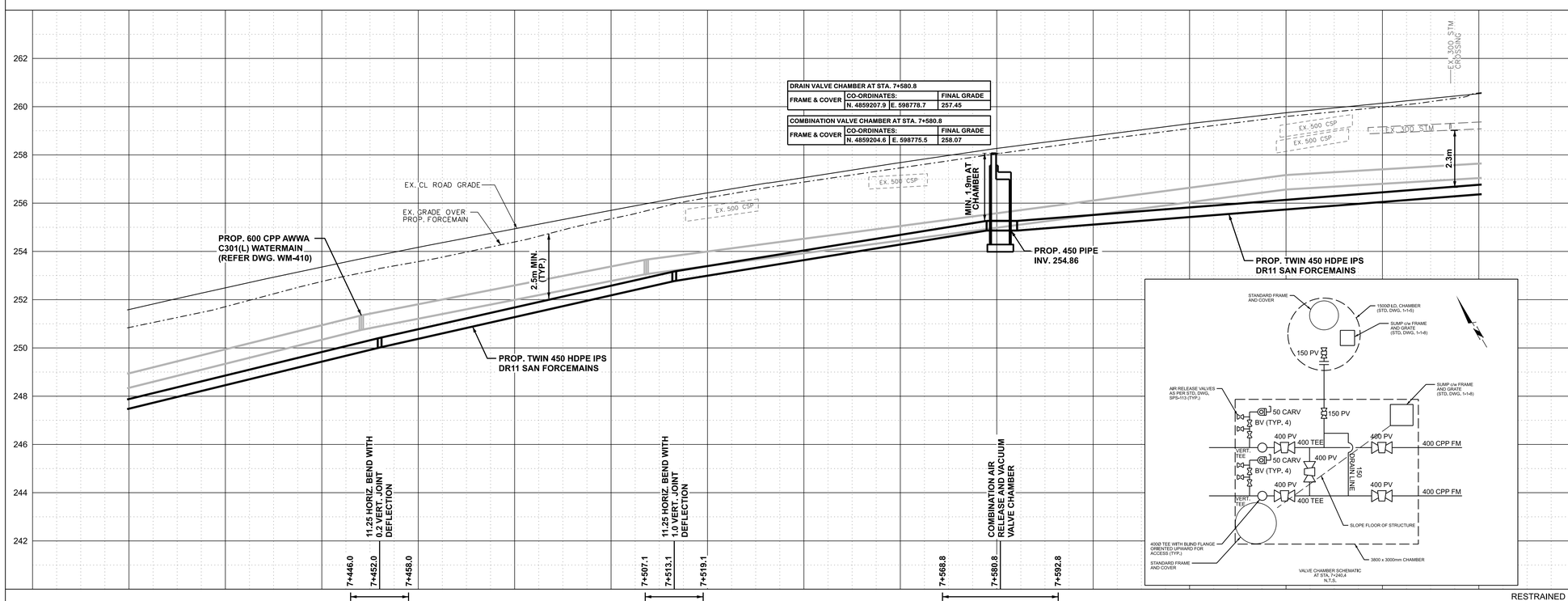


KEY PLAN (N.T.S.)

NOTES:

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General Notes

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Agency: Ontario Ministry of Natural Resources and Forestry
B.M. No. 10519980004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

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CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6 — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

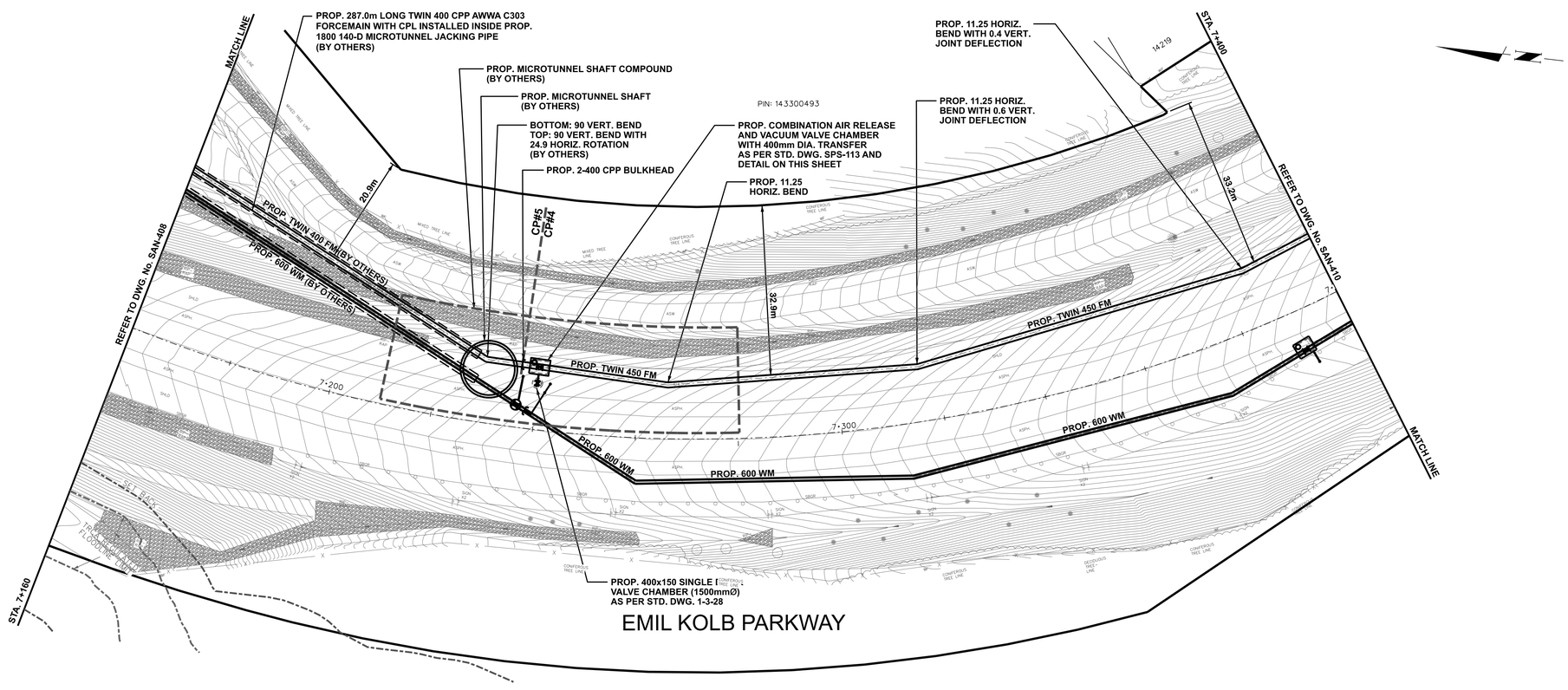
PROP. TWIN 450mm SANITARY FORCEMAIN

STA. 7+400 TO STA. 7+680

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	6 of 83

Project No. XX-XXXX

Plan No. **SAN-410**

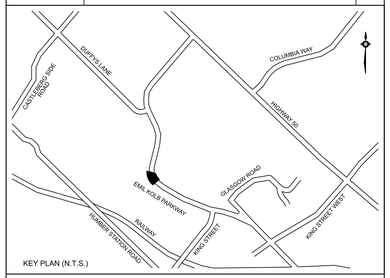


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

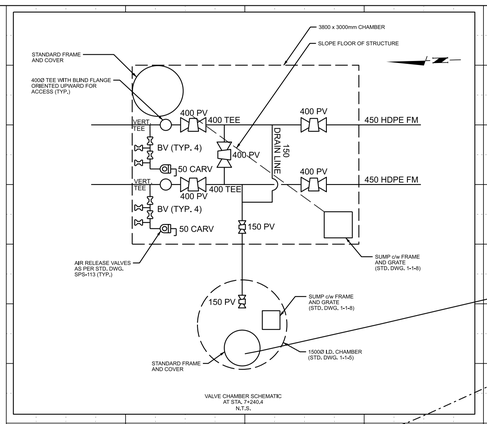
DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



NOTES:

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DRAIN VALVE CHAMBER AT STA. 7+240.4		
FRAME & COVER	CO-ORDINATES:	FINAL GRADE
	N. 4859466.2 E. 598609.1	242.59

COMBINATION VALVE CHAMBER AT STA. 7+240.4		
FRAME & COVER	CO-ORDINATES:	FINAL GRADE
	N. 4859467.5 E. 598604.7	243.20

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Approved by

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PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6 — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

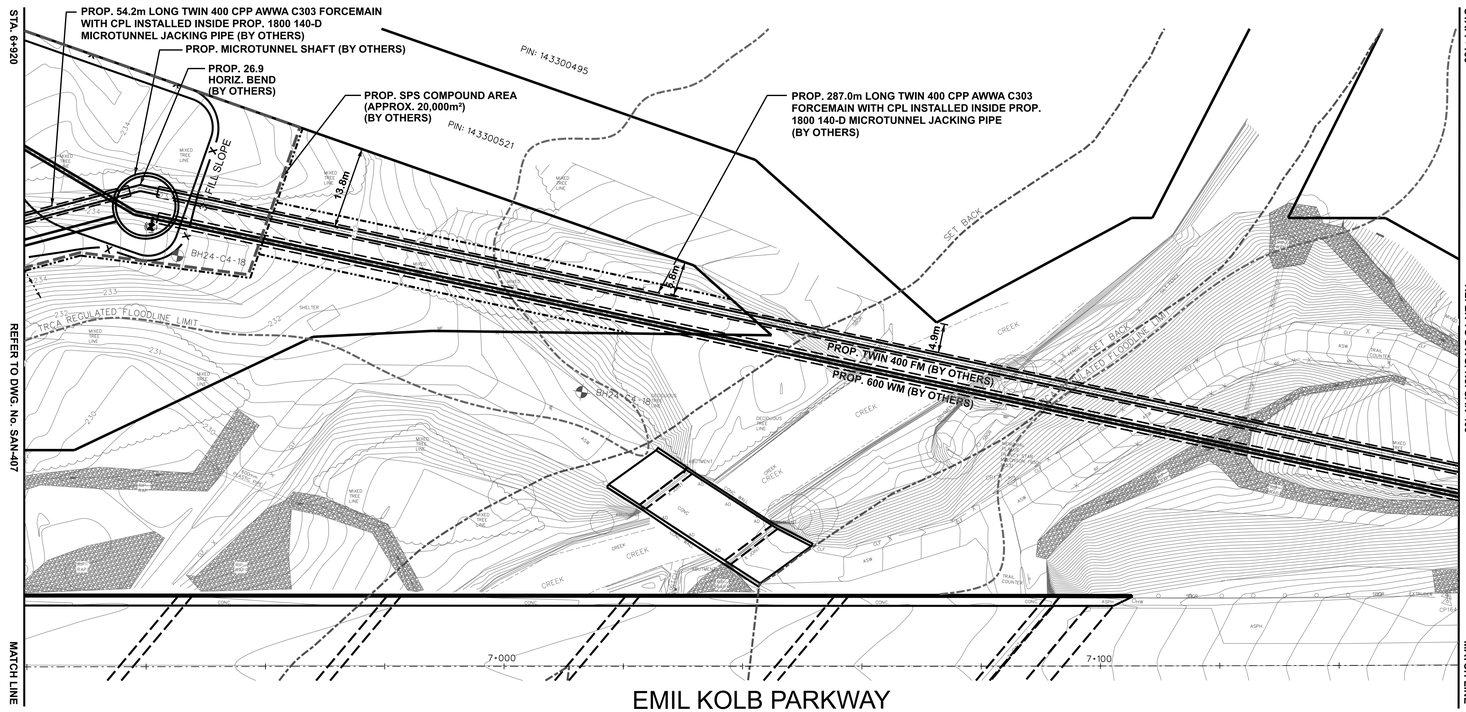
(FROM HIGHWAY 50 TO KING STREET)

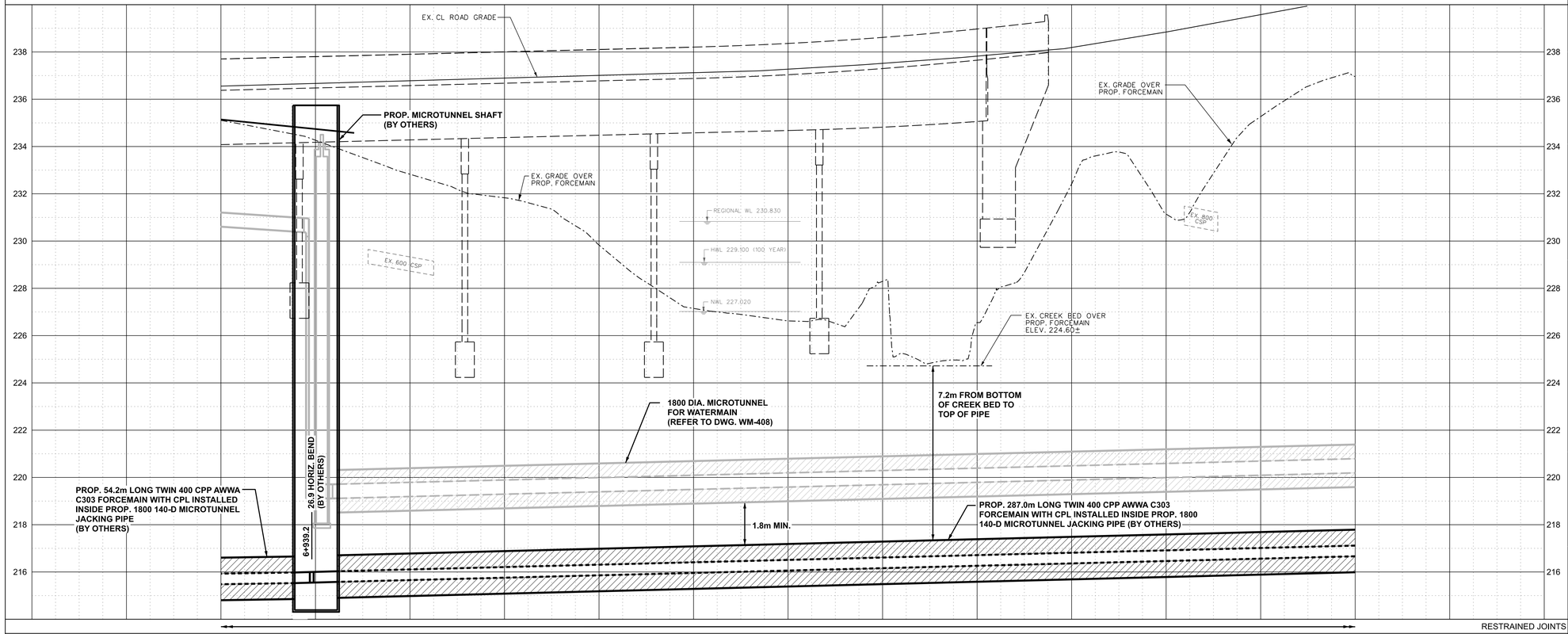
PROP. TWIN 400/450mm SANITARY FORCEMAIN

STA. 7+160 TO STA. 7+400

RESTRAINED JOINTS														
BOT.EL. OF SAN.														
EX. ROAD ELEV.	240.75	241.66	242.13	243.06	244.02	244.98	245.93	246.88	247.81	249.23	249.71	250.65	251.59	
ROAD CHAINAGE	7+160	7+180	7+200	7+220	7+240	7+260	7+280	7+300	7+320	7+340	7+360	7+380	7+400	

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	7 of 83
Project No.	XX-XXXX		
Plan No.	**SAN-409**		





RESTRAINED JOINTS

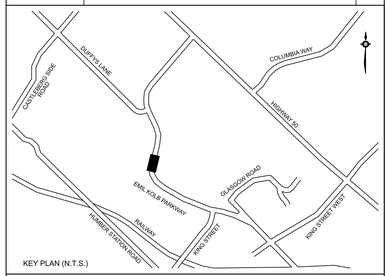
BOT.EL. OF SAN.														
EX. ROAD ELEV.	236.55	236.66	236.78	236.91	237.01	237.12	237.27	237.52	237.82	238.19	238.84	239.57	240.75	
ROAD CHAINAGE	6+920	6+940	6+960	6+980	7+000	7+020	7+040	7+060	7+080	7+100	7+120	7+140	7+160	

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X.X.	GAS MAINS	FEB, 00, 2023	X.X.
STORM SEWERS	FEB, 00, 2023	X.X.	BELL U/G CABLE	FEB, 00, 2023	X.X.
WATERMAINS	FEB, 00, 2023	X.X.	HYDRO U/G CABLE	FEB, 00, 2023	X.X.
TRANSIT	FEB, 00, 2023	X.X.	HYDRO ONE	FEB, 00, 2023	X.X.
PARKS & REC.	FEB, 00, 2023	X.X.	CTV	FEB, 00, 2023	X.X.
ONT. CLEAN WATER	FEB, 00, 2023	X.X.	COMMUNIC. CABLES	FEB, 00, 2023	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

NOTES:

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ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6 — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

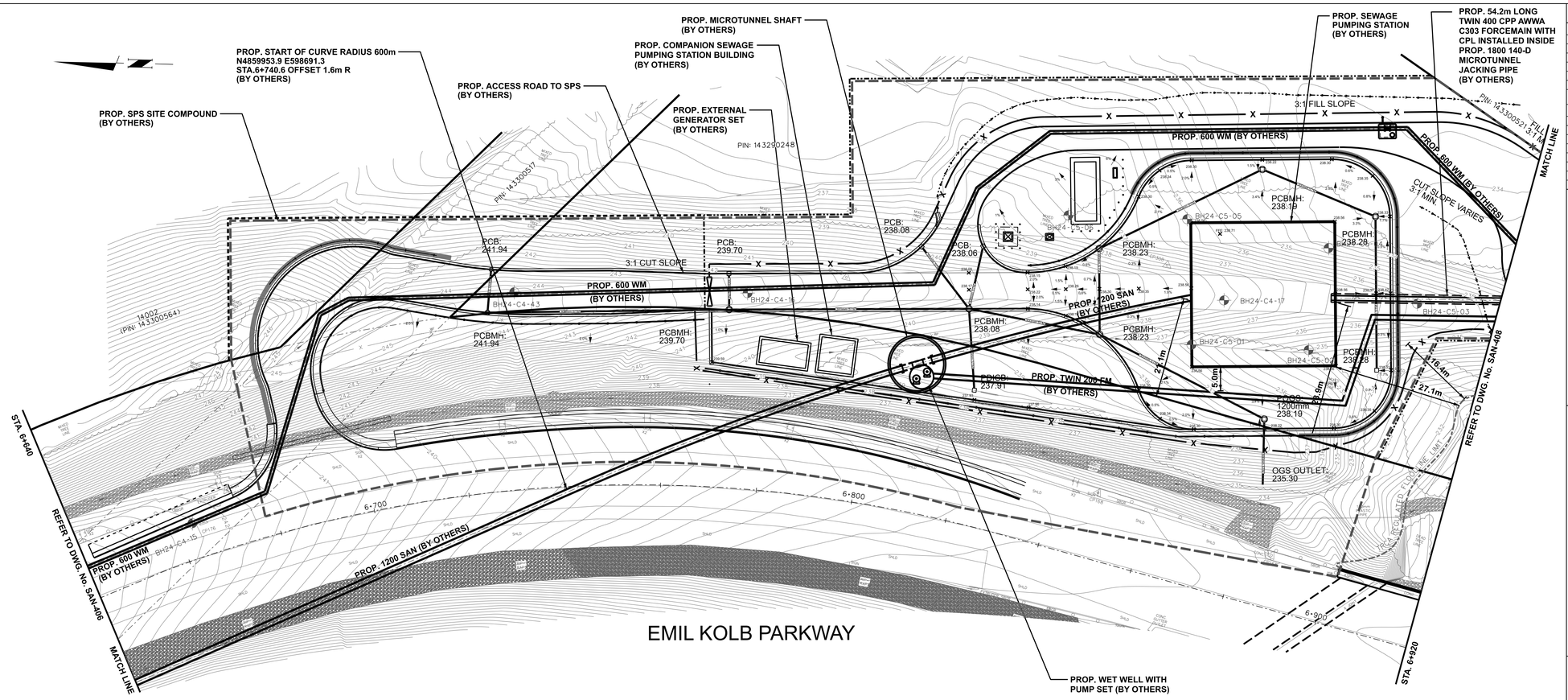
PROP. TWIN 400mm SANITARY FORCEMAIN

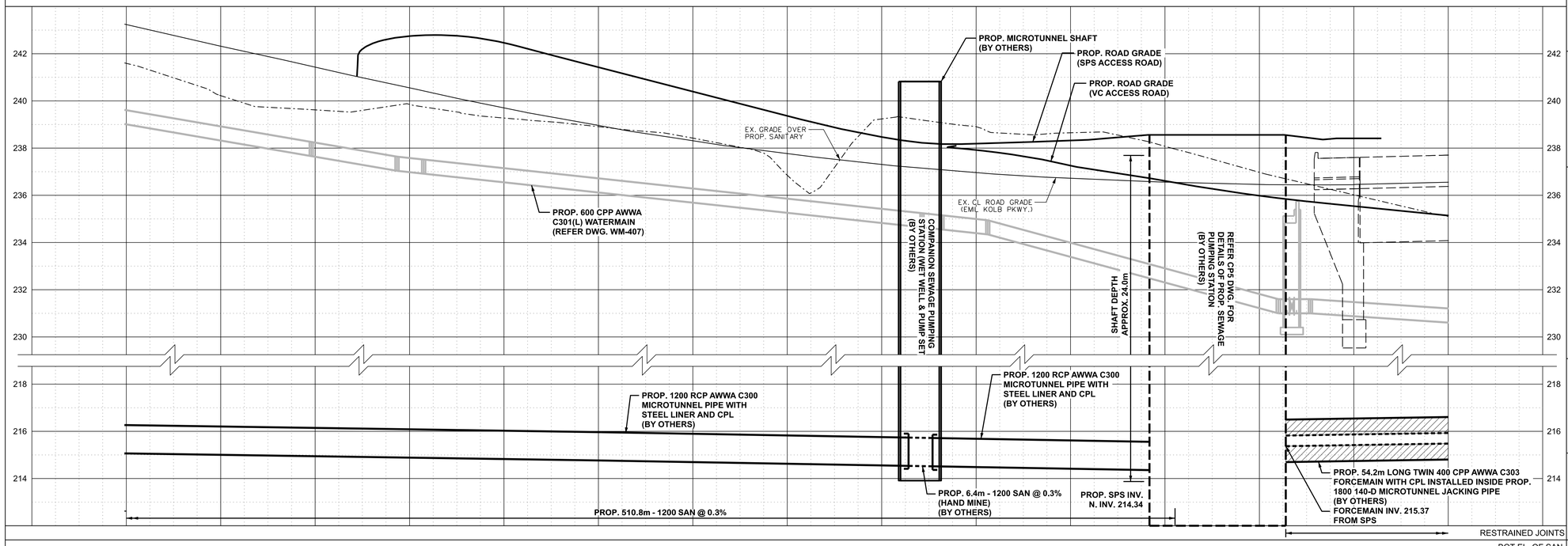
STA. 6+920 TO STA. 7+160

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	8 of 83

Project No. XX-XXXX

Plan No. **SAN-408**





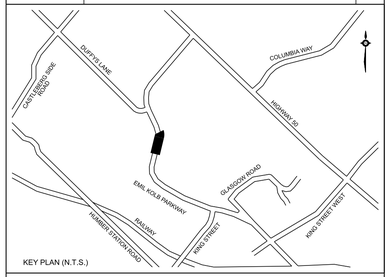
														BOT.EL. OF SAN.	RESTRAINED JOINTS
243.24	242.32	241.43	240.55	239.71	238.96	238.31	237.77	237.31	236.97	236.72	236.56	236.46	236.45	236.55	EX. ROAD ELEV.
6+640	6+660	6+680	6+700	6+720	6+740	6+760	6+780	6+800	6+820	6+840	6+860	6+880	6+900	6+920	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
STORM SEWERS	FEB, 00, 2023	X,X,	BELL U/G CABLE	FEB, 00, 2023	X,X,
WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



NOTES:

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B.M. No. 10519980004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

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ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
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FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6 — VERTICAL SCALE 1:100

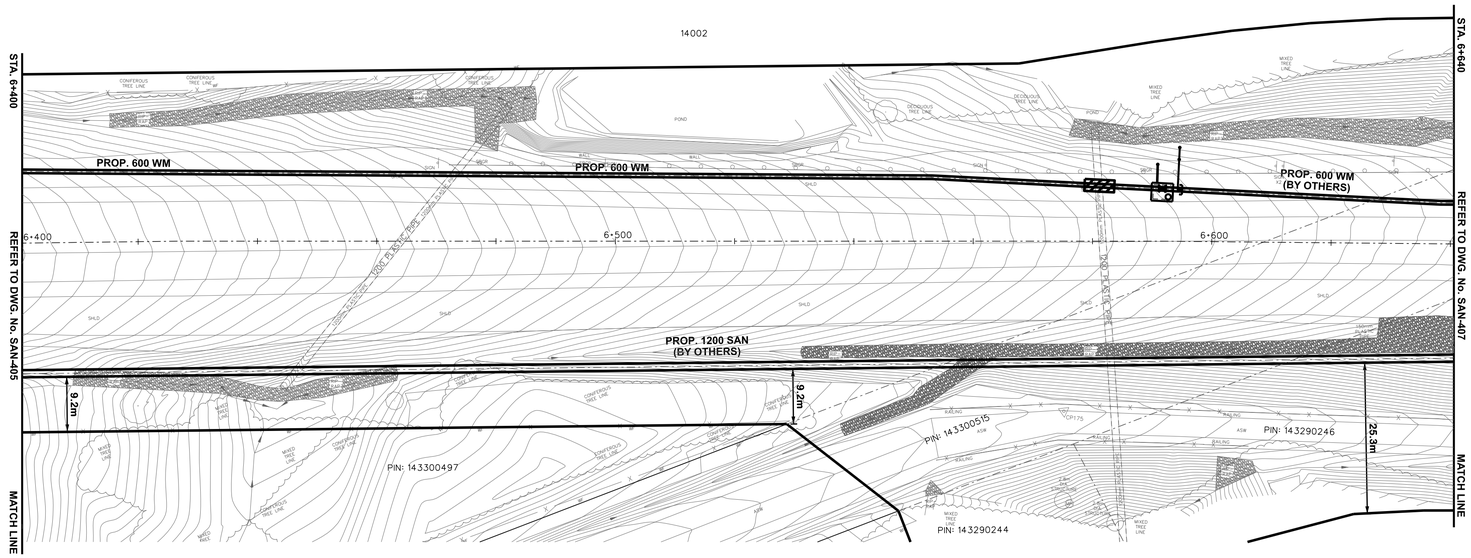
Region of Peel
working with you

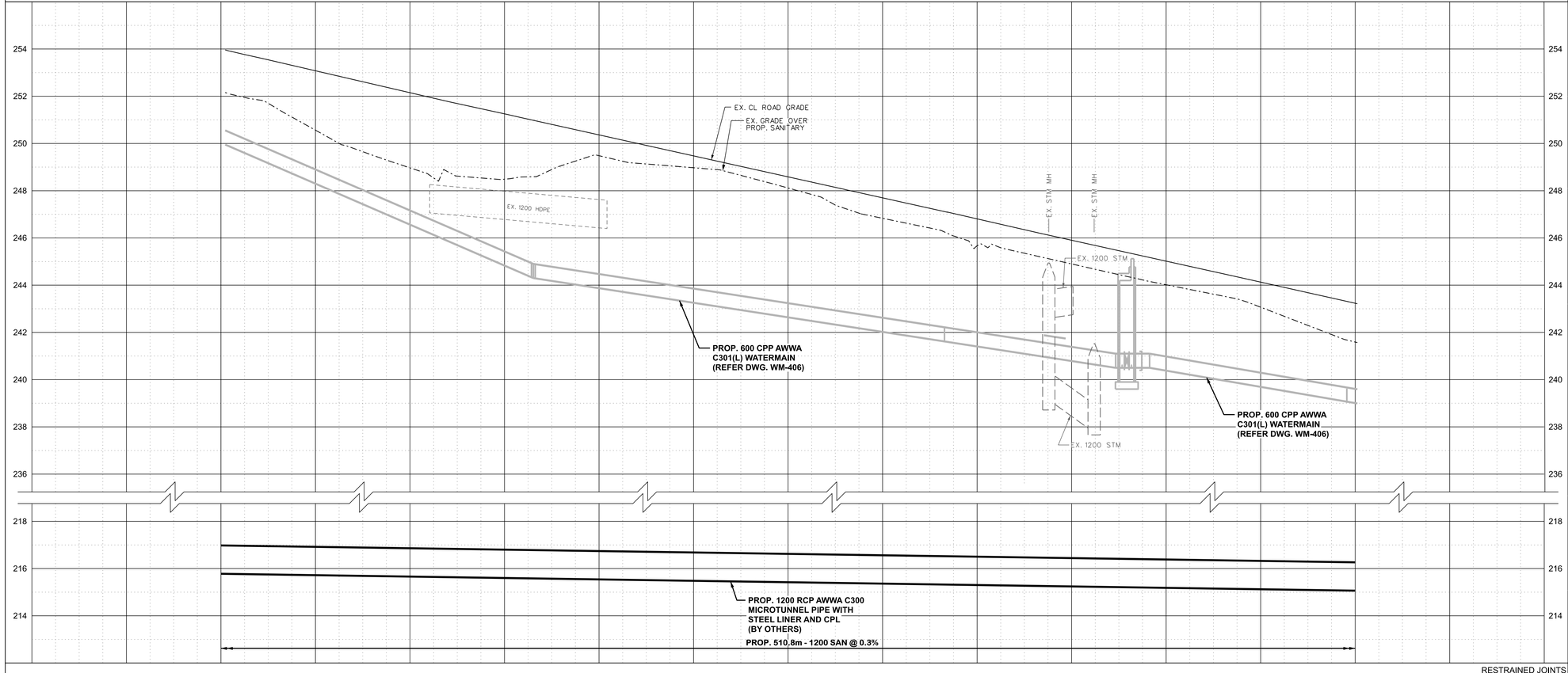
EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)
PROP. 1200mm SANITARY SEWER
PROP. TWIN 400mm SANITARY FORCEMAIN
STA. 6+640 TO STA. 6+920

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	9 of 83

Project No. XX-XXXX
Plan No. **SAN-407**





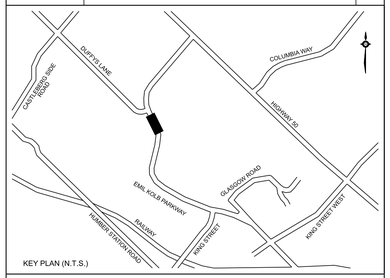
RESTRAINED JOINTS													
BOT.EL. OF SAN.													
EX. ROAD ELEV.	254.00	253.07	252.15	251.25	250.37	249.49	248.61	247.71	246.81	245.90	245.02	244.13	243.24
ROAD CHAINAGE	6+400	6+420	6+440	6+460	6+480	6+500	6+520	6+540	6+560	6+580	6+600	6+620	6+640

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
STORM SEWERS	FEB, 00, 2023	X,X,	BELL U/G CABLE	FEB, 00, 2023	X,X,
WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



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B.M. No. 1051998O004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

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CABLE TELEVISION/FIBREOPTIC PROVIDERS:
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ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

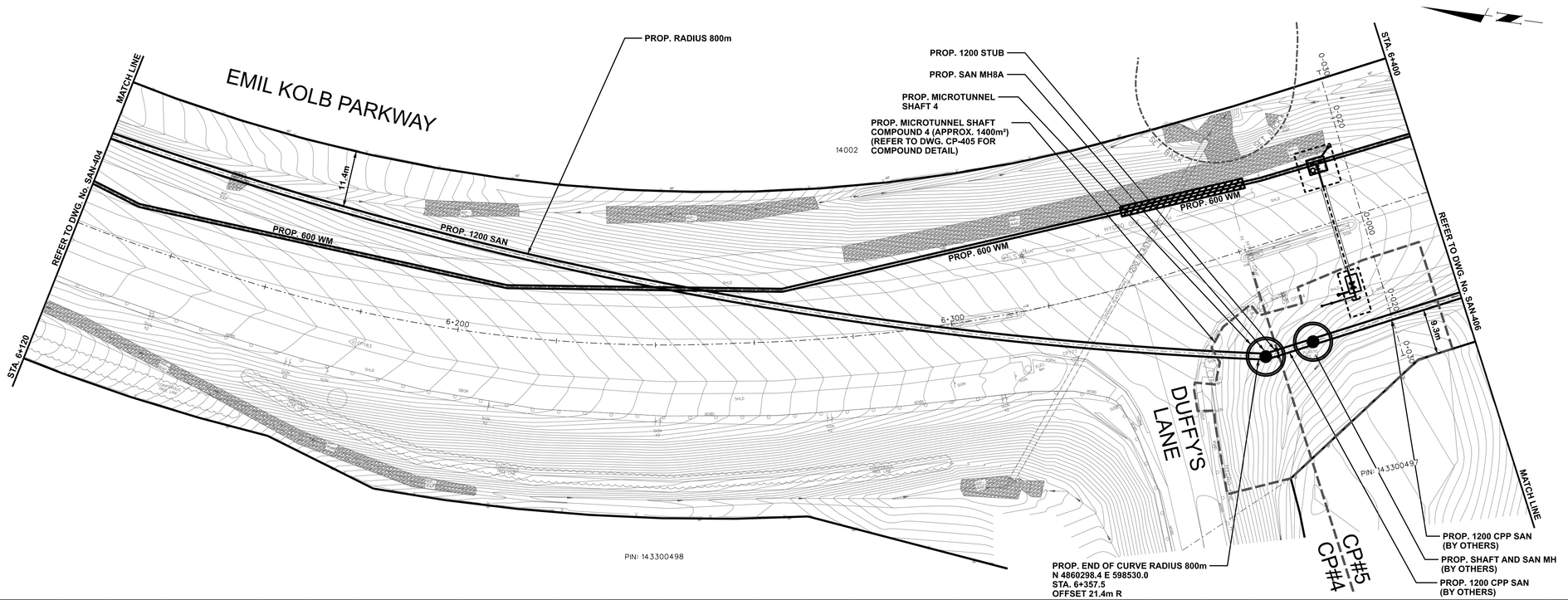
PROP. 1200mm SANITARY SEWER

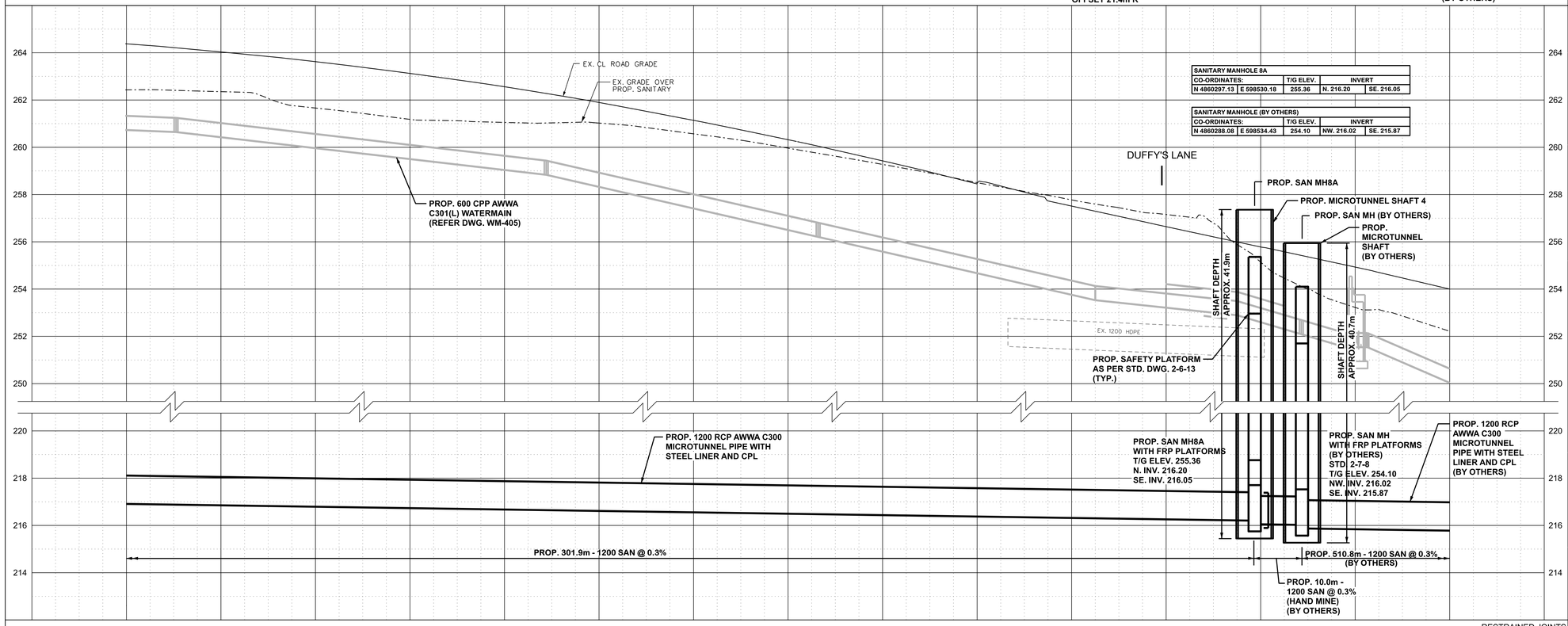
STA. 6+400 TO STA. 6+640

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	10 of 83

Project No. XX-XXXX

Plan No. **SAN-406**





RESTRAINED JOINTS

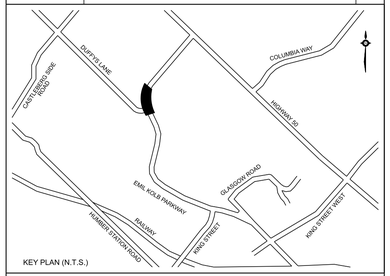
BOT.EL. OF SAN.																
264.38	264.03	263.62	263.12	262.56	261.90	261.14	260.32	259.43	258.47	257.52	256.64	255.78	254.93	254.00	EX. ROAD ELEV.	
6+120	6+140	6+160	6+180	6+200	6+220	6+240	6+260	6+280	6+300	6+320	6+340	6+360	6+380	6+400	ROAD CHAINAGE	

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
STORM SEWERS	FEB, 00, 2023	X,X,	BELL U/G CABLE	FEB, 00, 2023	X,X,
WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

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B.M. No. 1051980004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

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Approved by

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TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

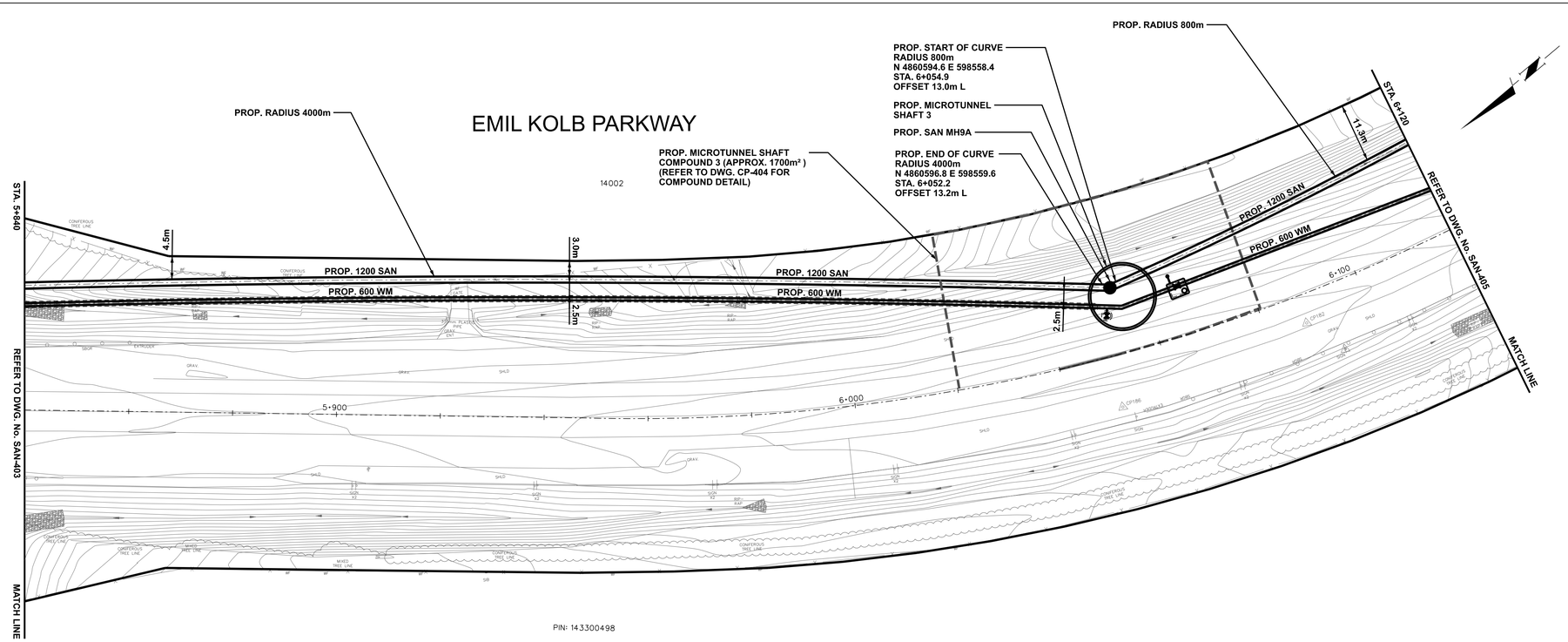
EMIL KOLB PARKWAY

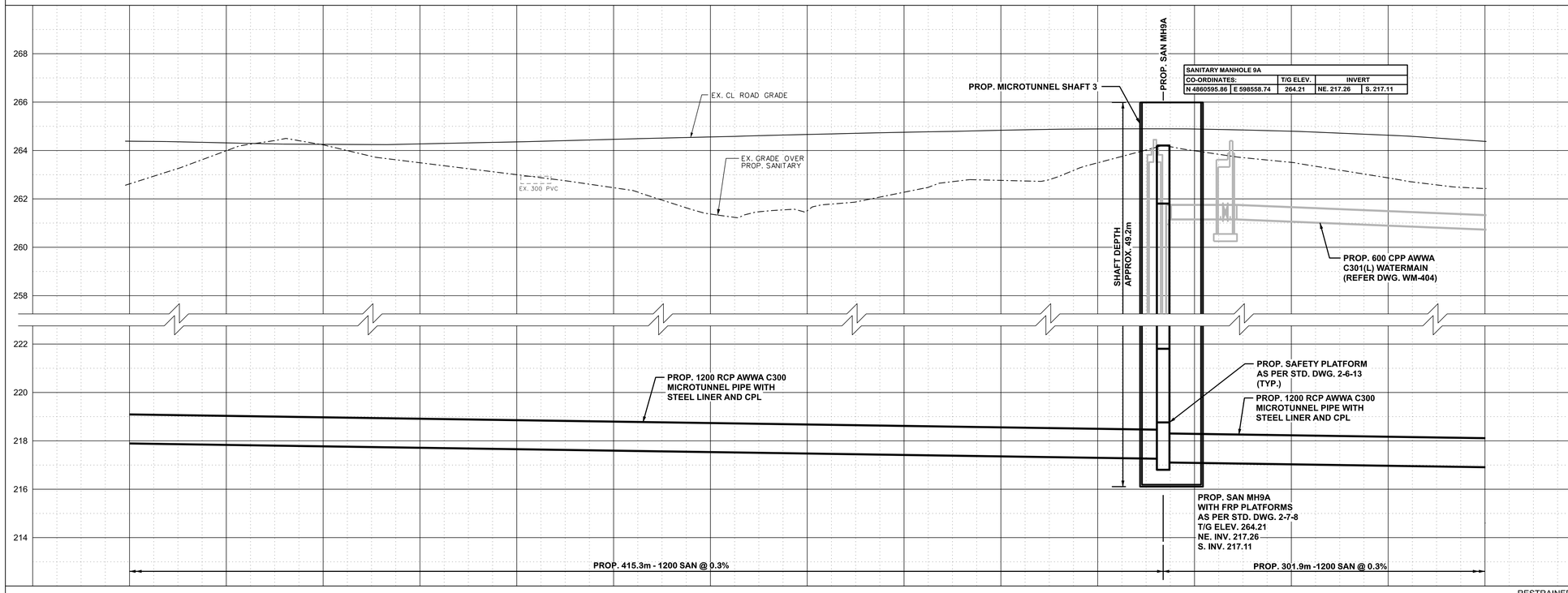
(FROM HIGHWAY 50 TO KING STREET)

PROP. 1200mm SANITARY SEWER

STA. 6+120 TO STA. 6+400

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	11 of 83
Project No.	XX-XXXX		
Plan No.	**SAN-405**		





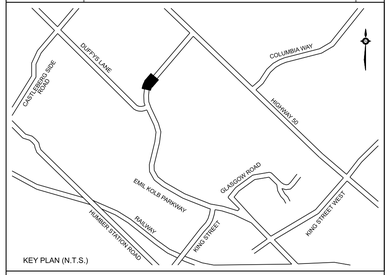
RESTRAINED JOINTS																
BOT.EL. OF SAN.																
264.38	264.32	264.26	264.31	264.36	264.46	264.56	264.66	264.75	264.84	264.89	264.89	264.80	264.63	264.38	EX. ROAD ELEV.	
5+840	5+860	5+880	5+900	5+920	5+940	5+960	5+980	6+000	6+020	6+040	6+060	6+080	6+100	6+120	ROAD CHAINAGE	

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
STORM SEWERS	FEB, 00, 2023	X,X,	BELL U/G CABLE	FEB, 00, 2023	X,X,
WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

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Agency: Ontario Ministry of Natural Resources and Forestry
B.M. No. 1051998004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

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TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

PROP. 1200mm SANITARY SEWER

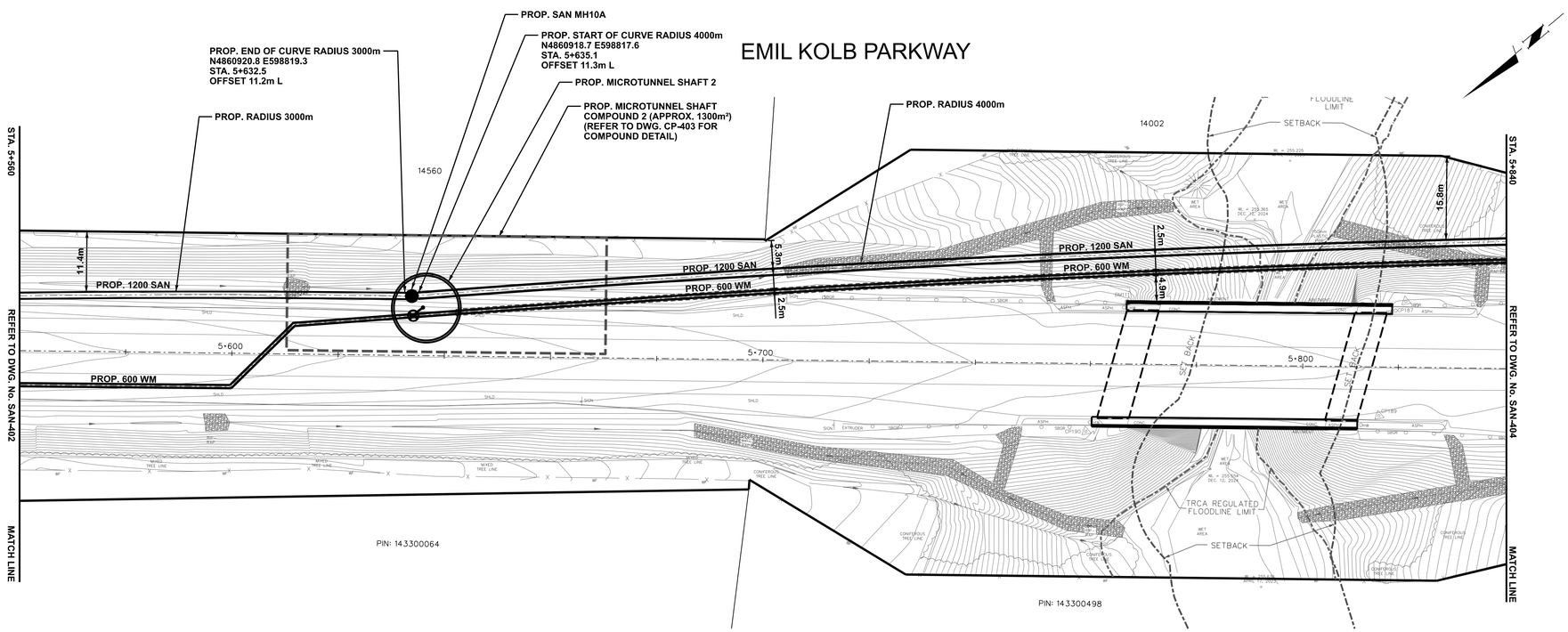
STA. 5+840 TO STA. 6+120

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	12 of 83

Project No. XX-XXXX

Plan No. **SAN-404**

EMIL KOLB PARKWAY

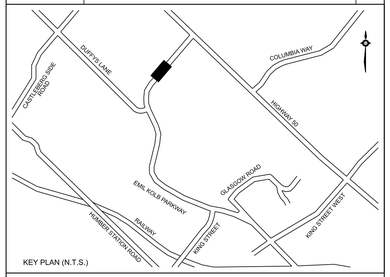


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
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WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

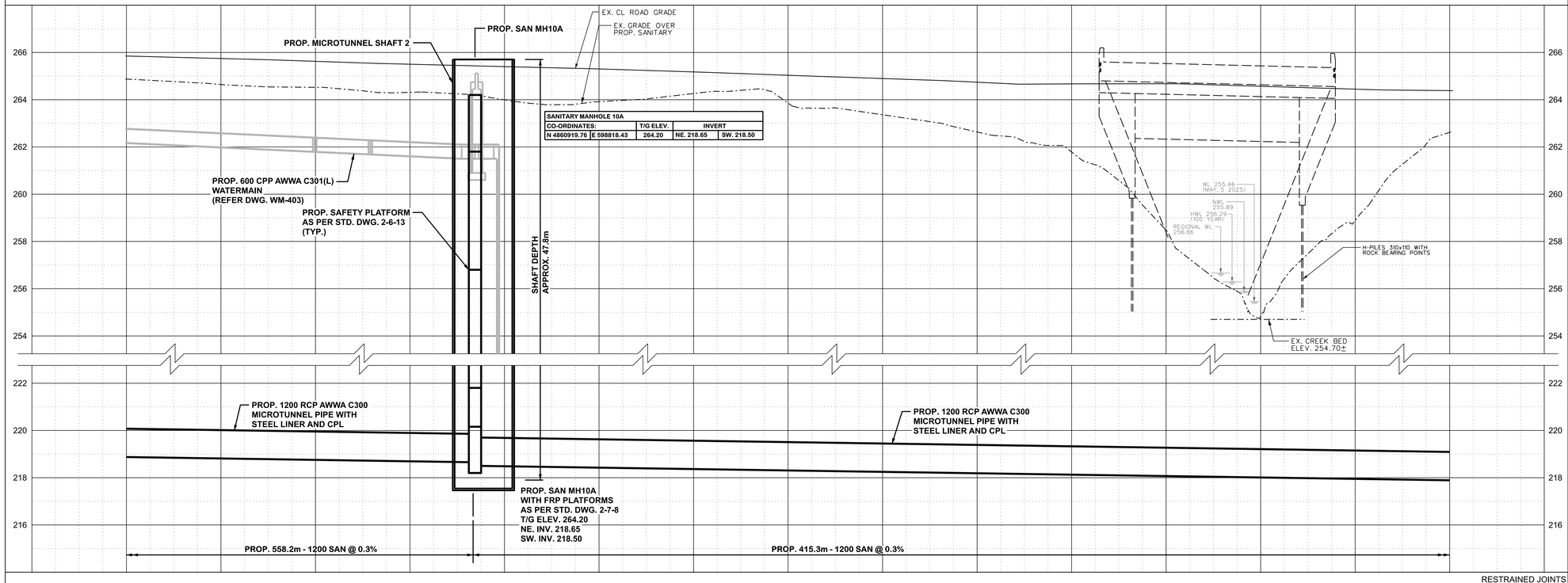
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RESTRAINED JOINTS																
BOT.EL. OF SAN.																
265.85	265.74	265.62	265.50	265.40	265.30	265.18	265.03	264.90	264.74	264.67	264.67	264.58	264.45	264.38	EX. ROAD ELEV.	
5+560	5+580	5+600	5+620	5+640	5+660	5+680	5+700	5+720	5+740	5+760	5+780	5+800	5+820	5+840	ROAD CHAINAGE	

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2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

PROP. 1200mm SANITARY SEWER

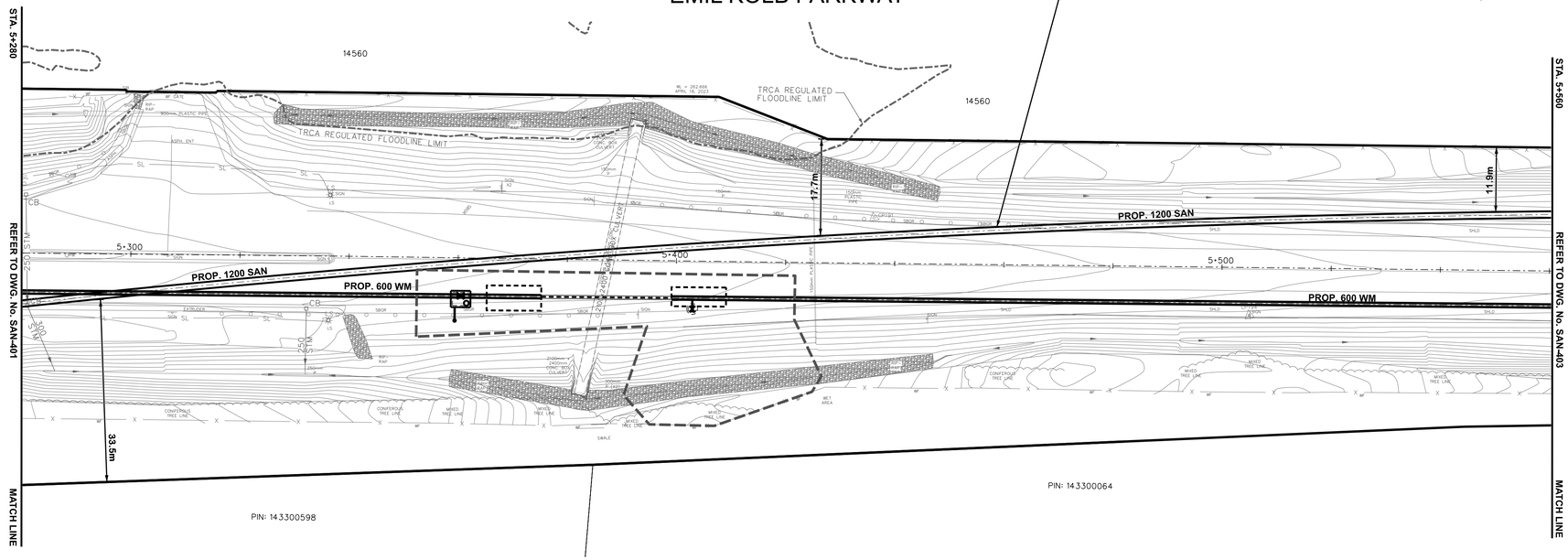
STA. 5+560 TO STA. 5+840

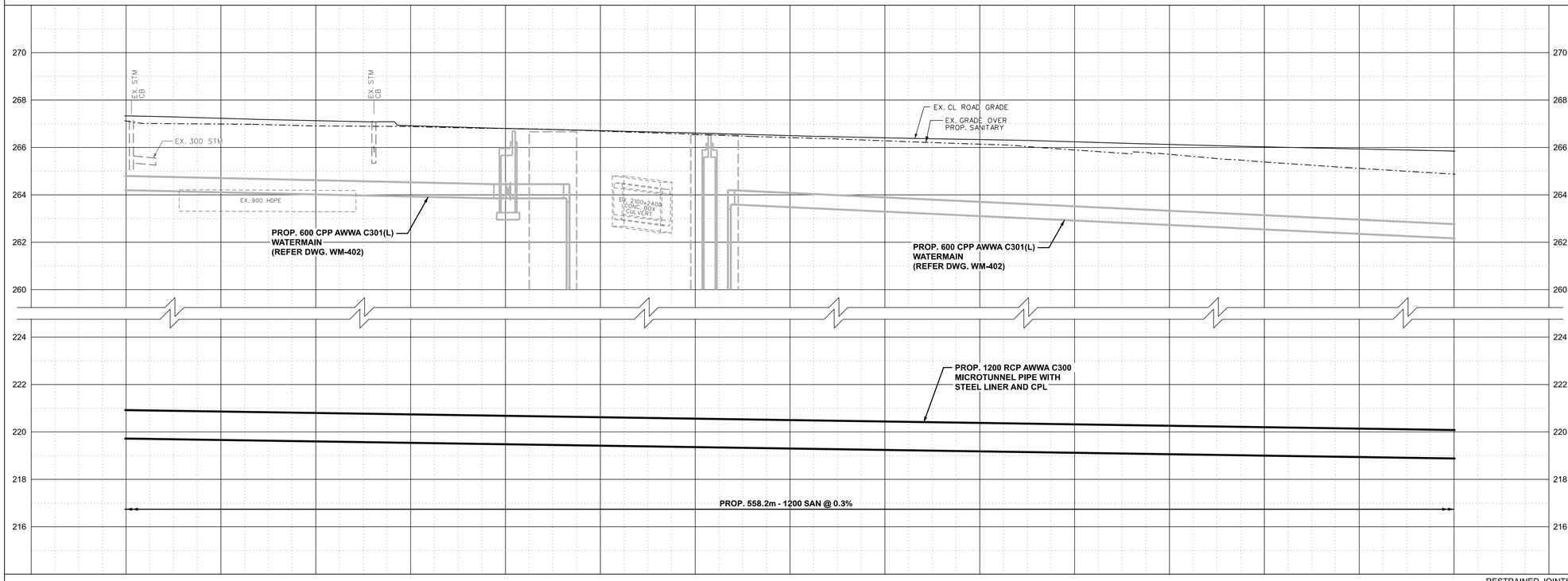
CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	13 of 83

Project No. XX-XXXX

Plan No. **SAN-403**

EMIL KOLB PARKWAY





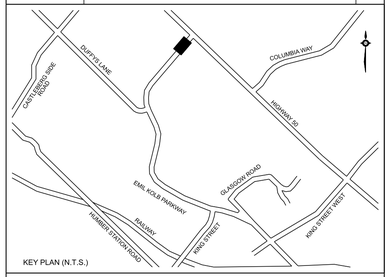
RESTRAINED JOINTS																
BOT.EL. OF SAN.																
267.33	267.23	267.13	266.92	266.80	266.71	266.61	266.50	266.41	266.33	266.24	266.13	266.03	265.95	265.85	EX. ROAD ELEV.	
5+280	5+300	5+320	5+340	5+360	5+380	5+400	5+420	5+440	5+460	5+480	5+500	5+520	5+540	5+560	ROAD CHAINAGE	

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
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WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

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10m 0 10 20 30m — HORIZONTAL SCALE 1:500

2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

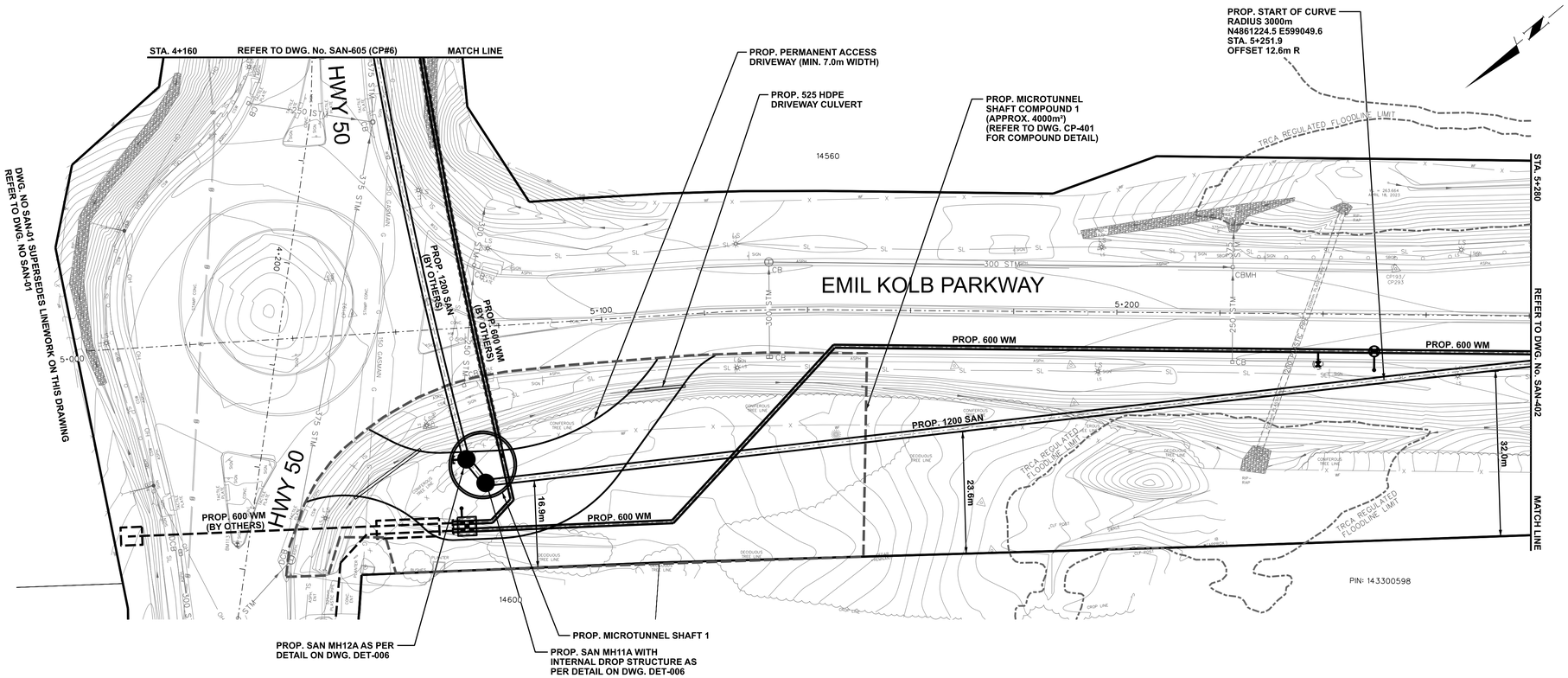
EMIL KOLB PARKWAY

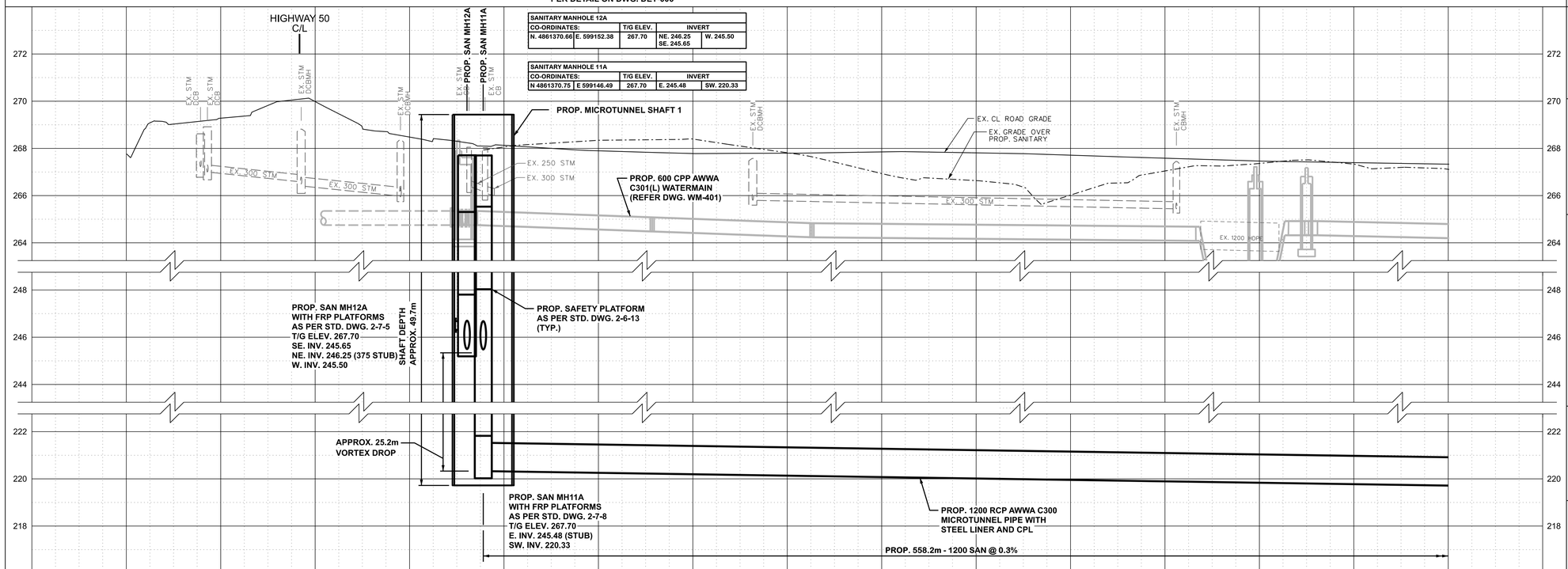
(FROM HIGHWAY 50 TO KING STREET)

PROP. 1200mm SANITARY SEWER

STA. 5+280 TO STA. 5+560

CAD Area	X-XX	Area	C-12/C-13	Project No.	XX-XXXX
Checked by	G.J.	Drawn by	M.L.		
Date	FEB. 2026	Sheet	14 of 83	Plan No.	SAN-402





SANITARY MANHOLE 12A

CO-ORDINATES:		T/G ELEV.	INVERT	
N. 4861370.66	E. 599152.38	267.70	NE. 246.25 SE. 245.65	W. 245.50

SANITARY MANHOLE 11A

CO-ORDINATES:		T/G ELEV.	INVERT	
N 4861370.75	E 599146.49	267.70	E. 245.48	SW. 220.33

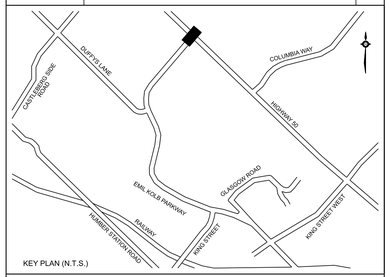
RESTRAINED JOINTS																
BOT.EL. OF SAN.																
267.78	269.28	269.98	268.48	268.13	267.90	267.78	267.80	267.85	267.81	267.71	267.59	267.48	267.41	267.33	EX. ROAD ELEV.	
5+000	5+020	5+040	5+060	5+080	5+100	5+120	5+140	5+160	5+180	5+200	5+220	5+240	5+260	5+280	ROAD CHAINAGE	

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
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WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
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All Measurements Are In Meters(m) Unless Otherwise Noted
All Driveways Are ASPHALT Unless Otherwise Noted
All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
All Horizontal And Vertical Bends Are In Degrees

Agency: Ontario Ministry of Natural Resources and Forestry
B.M. No. 10519980004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only. To Be Verified In Field By Contractor.

GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

PROP. 1200mm SANITARY SEWER

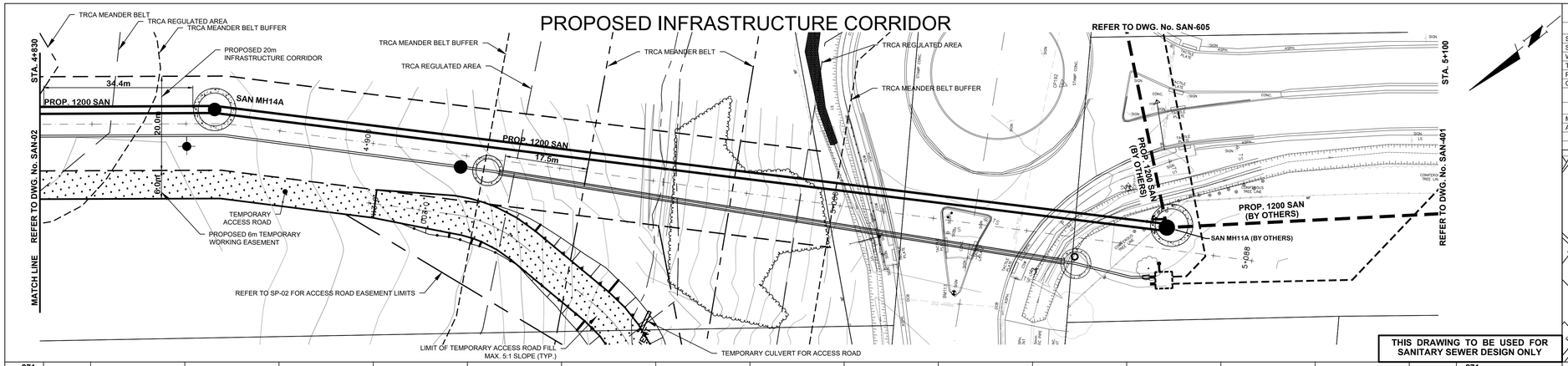
STA. 5+000 TO STA. 5+280

CAD Area	X-XX	Area	C-12/C-13
Checked by		Drawn by	
Date	FEB. 2026	Sheet	15 of 83

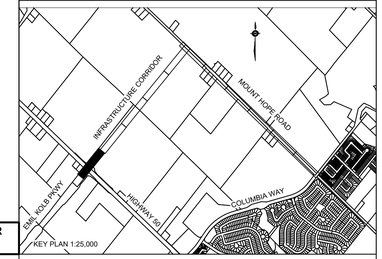
Project No. XX-XXXX

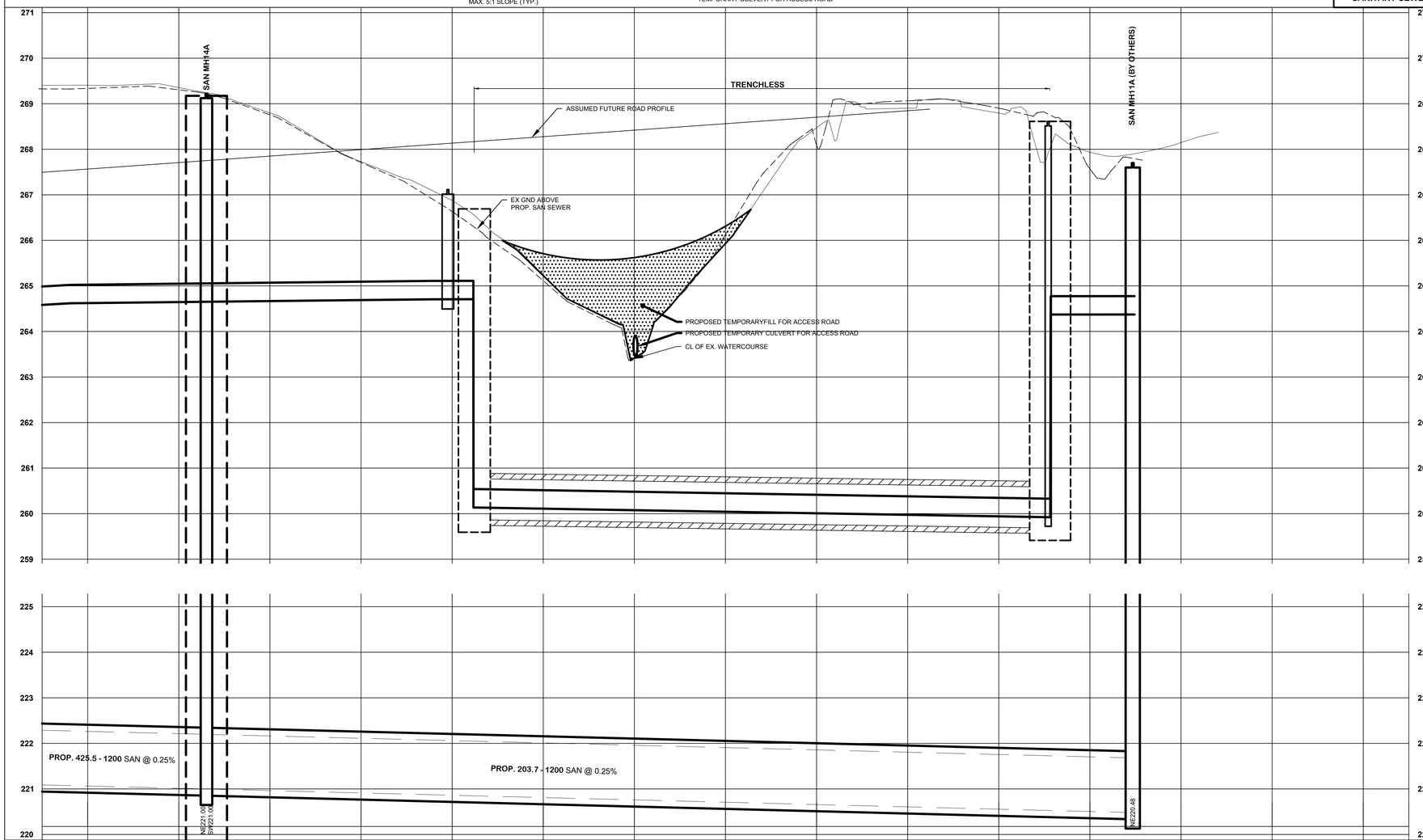
Plan No. **SAN-401**

PROPOSED INFRASTRUCTURE CORRIDOR



THIS DRAWING TO BE USED FOR SANITARY SEWER DESIGN ONLY





269.41	269.35	268.80	267.73	266.88	265.25	263.41	265.93	268.47	268.90	268.79	267.93	268.15					EX. ROAD ELEV.
4+840	4+860	4+880	4+900	4+920	4+940	4+960	4+980	5+000	5+020	5+040	5+060	5+080	5+100	5+120	5+130		ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.

NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

LEGEND:

SINGLE SANITARY LATERAL

DOUBLE SANITARY LATERAL

General Notes

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All Horizontal And Vertical Bends Are In Degrees

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

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NOTICE TO CONTRACTOR

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ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

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HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

Region of Peel
working with you

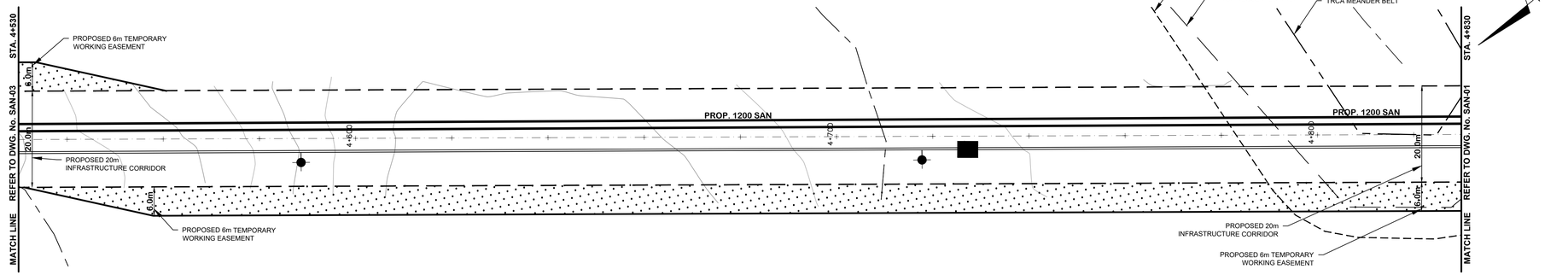
BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

INFRASTRUCTURE CORRIDOR
PROPOSED TRUNK SANITARY SEWER
STA.4+830 TO STA.5+100

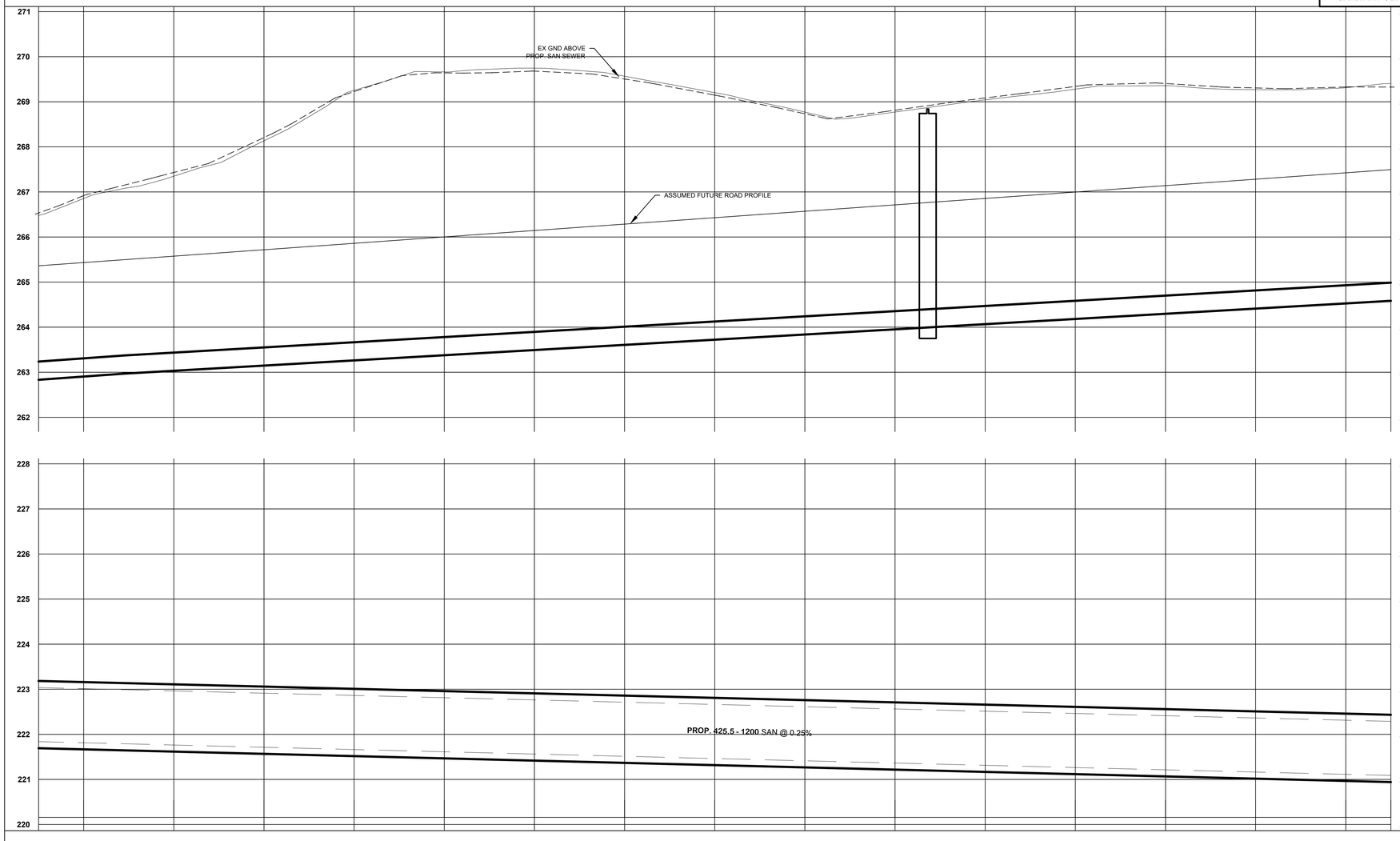
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB 2026	Sheet	16 OF 83	Plan No.	SAN-01

PROPOSED INFRASTRUCTURE CORRIDOR



THIS DRAWING TO BE USED FOR SANITARY SEWER DESIGN ONLY

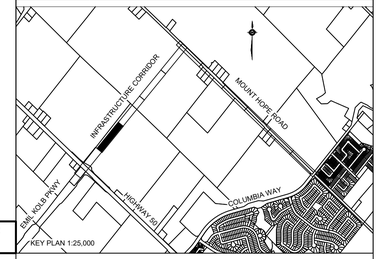


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

LEGEND:

SINGLE SANITARY LATERAL

DOUBLE SANITARY LATERAL

General Notes

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Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

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ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

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FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

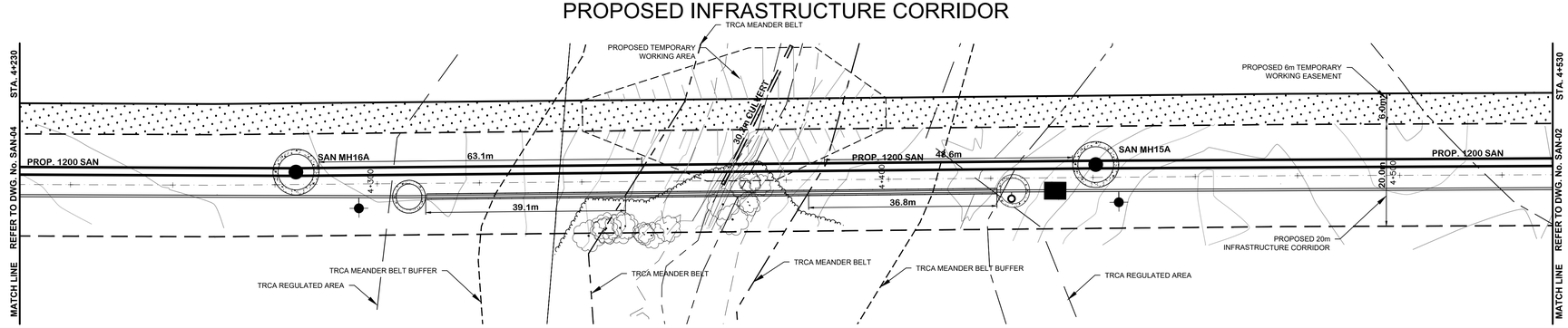
Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

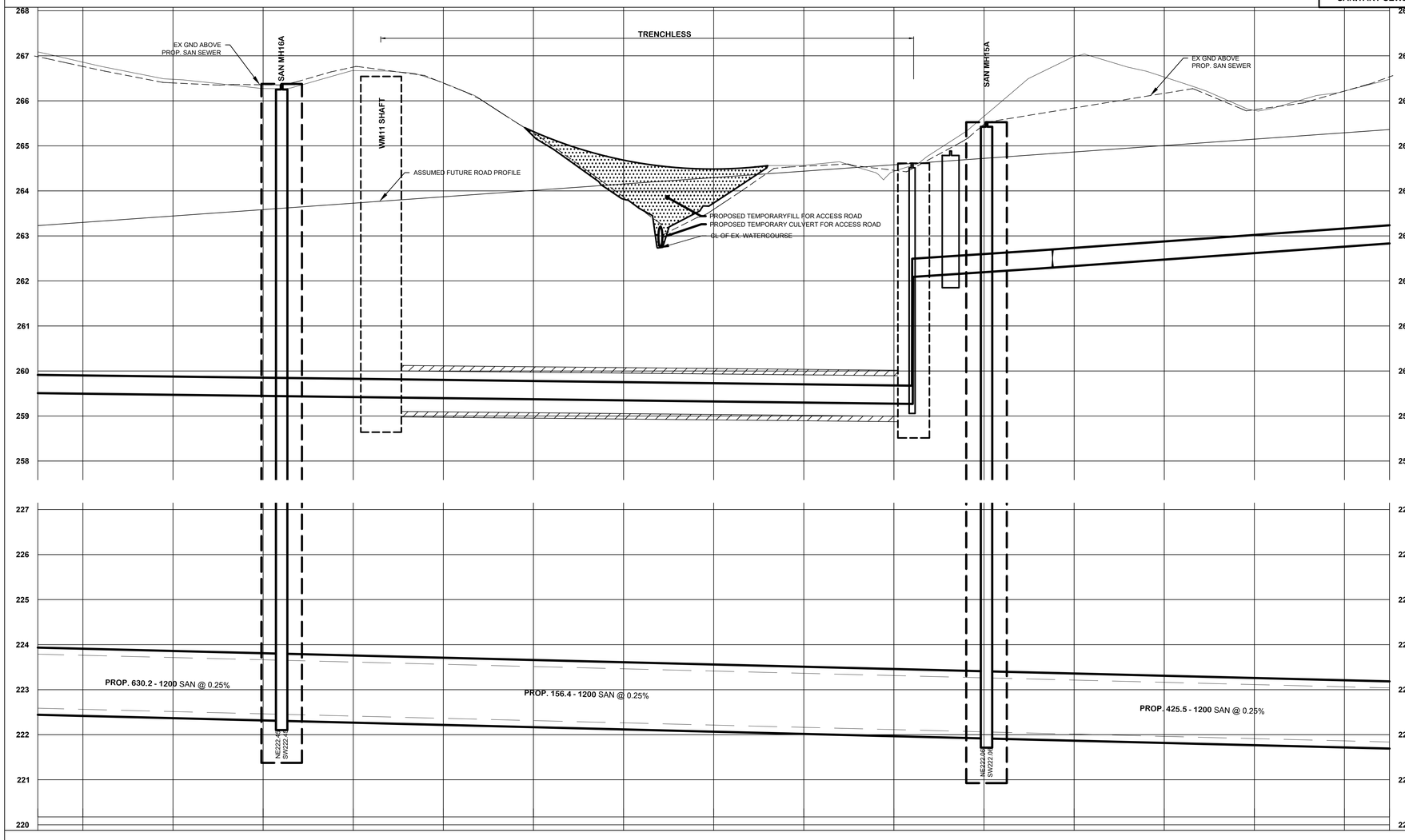
INFRASTRUCTURE CORRIDOR
PROPOSED TRUNK SANITARY SEWER
STA.4+530 TO STA.4+830
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB 2026	Sheet	17 OF 83	Plan No.	SAN-02

PROPOSED INFRASTRUCTURE CORRIDOR



THIS DRAWING TO BE USED FOR SANITARY SEWER DESIGN ONLY



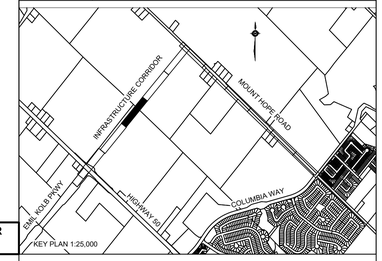
266.86	266.48	266.27	266.67	266.40	265.21	263.82	263.73	264.57	264.43	265.66	266.99	266.53	265.79	266.22		EX. ROAD ELEV.
4+240	4+260	4+280	4+300	4+320	4+340	4+360	4+380	4+400	4+420	4+440	4+460	4+480	4+500	4+520	4+530	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

LEGEND:

SINGLE SANITARY LATERAL

DOUBLE SANITARY LATERAL

General Notes

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Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

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ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
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ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
working with you

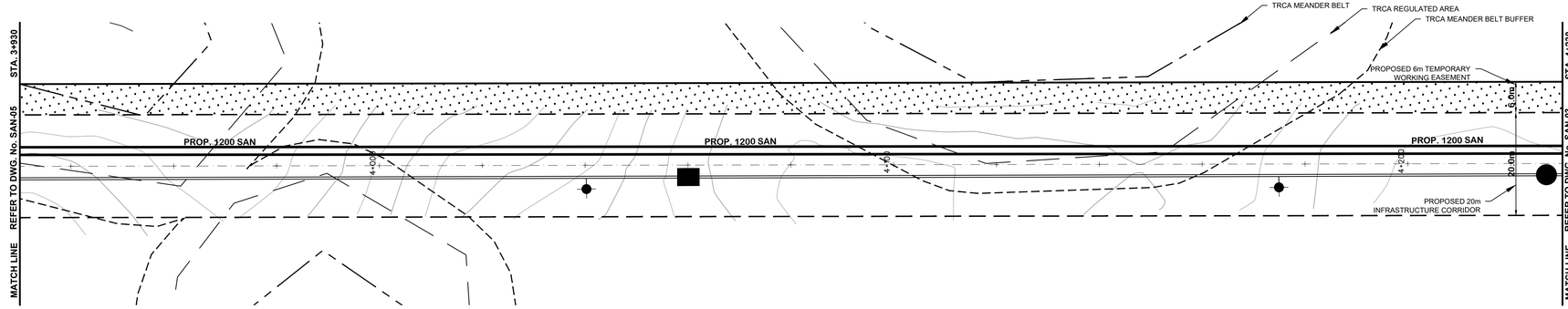
BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

INFRASTRUCTURE CORRIDOR
PROPOSED TRUNK SANITARY SEWER
STA.4+230 TO STA.4+530

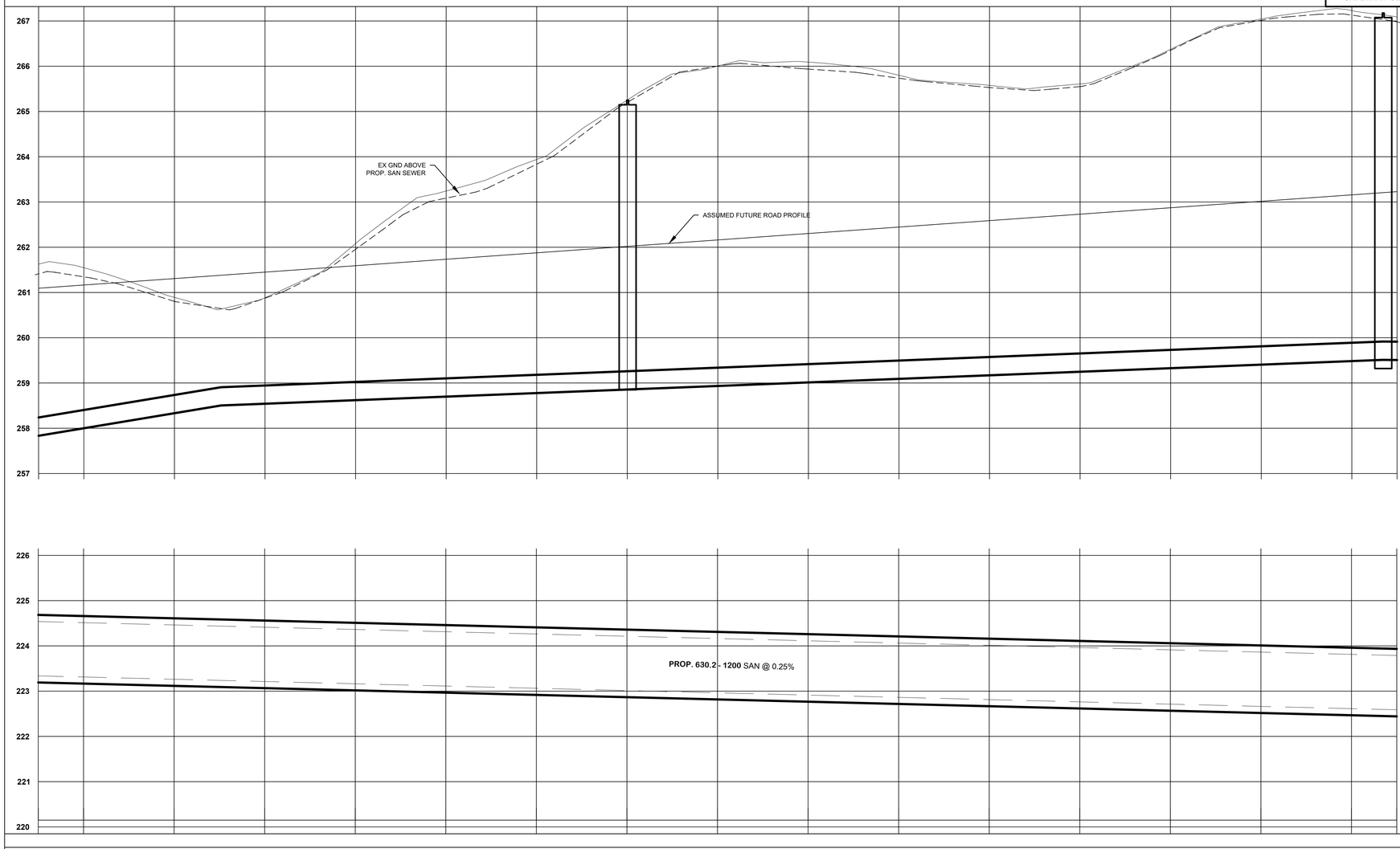
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB 2026	Sheet	18 OF 83	Plan No.	SAN-03

PROPOSED INFRASTRUCTURE CORRIDOR



THIS DRAWING TO BE USED FOR SANITARY SEWER DESIGN ONLY



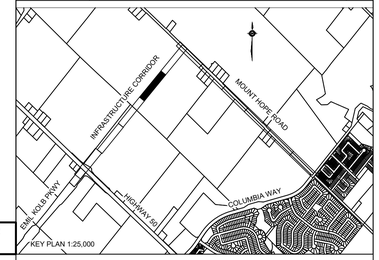
261.55	260.89	260.88	262.08	263.24	263.94	265.25	266.01	266.09	265.80	265.58	265.61	266.38	267.04	267.23		EX. ROAD ELEV.
3+940	3+960	3+980	4+000	4+020	4+040	4+060	4+080	4+100	4+120	4+140	4+160	4+180	4+200	4+220	4+230	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

LEGEND:

SINGLE SANITARY LATERAL

DOUBLE SANITARY LATERAL

General Notes

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Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
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10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

INFRASTRUCTURE CORRIDOR
PROPOSED TRUNK SANITARY SEWER
STA.3+930 TO STA.4+230

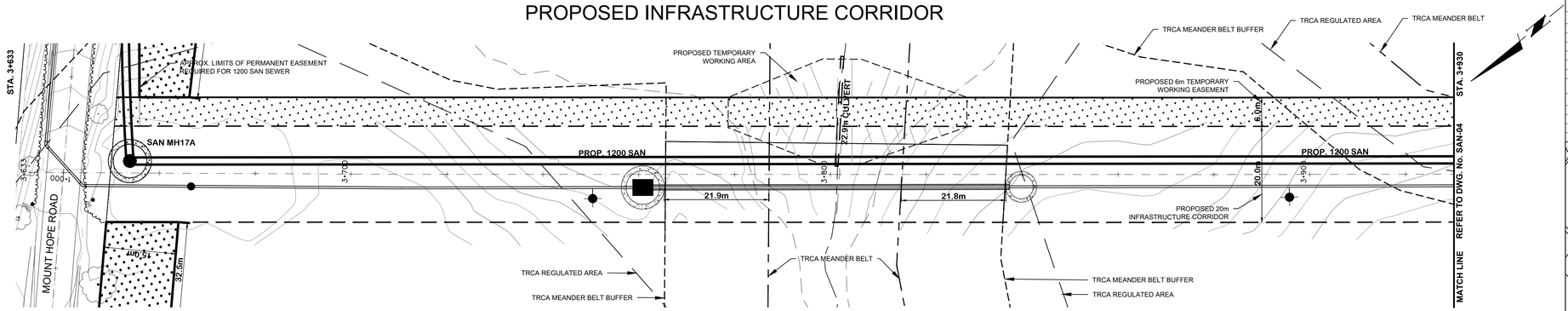
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX
Checked by	E.M.	Drawn by	P.M.
Date	FEB 2026	Sheet	19 OF 83

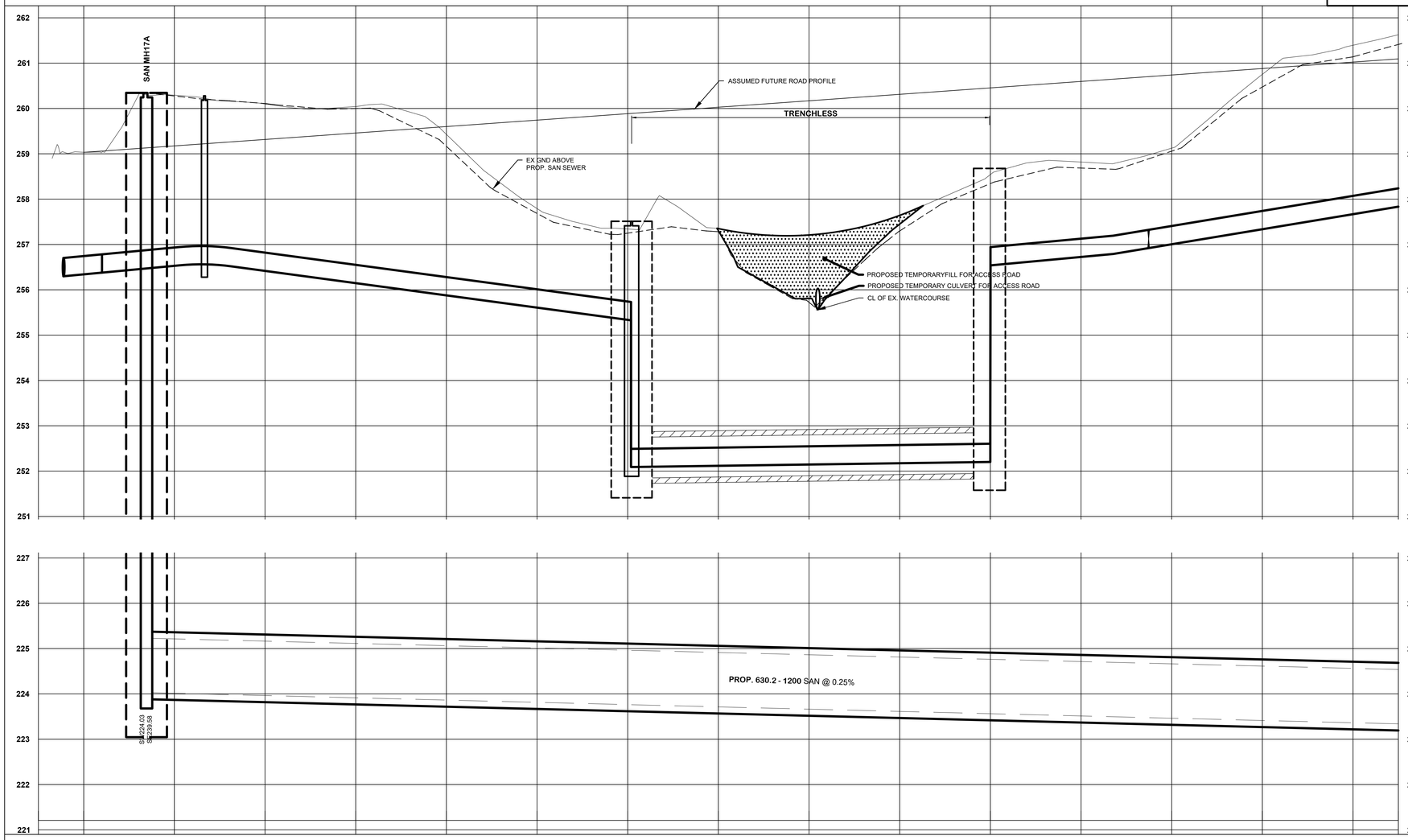
Project No. XX-XXXX

Plan No. **SAN-04**

PROPOSED INFRASTRUCTURE CORRIDOR



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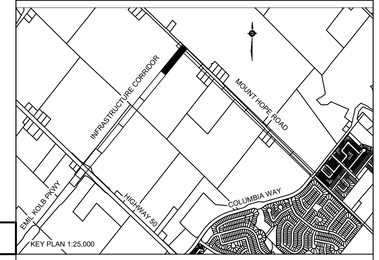
259.03	260.29	260.10	260.04	259.43	257.79	257.34	257.30	255.81	257.45	258.54	258.82	259.13	260.75	261.40		EX. ROAD ELEV.
3+640	3+660	3+680	3+700	3+720	3+740	3+760	3+780	3+800	3+820	3+840	3+860	3+880	3+900	3+920	3+930	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

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DOUBLE SANITARY LATERAL

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Agency:
B.M. No.
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1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
working with you

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INFRASTRUCTURE CORRIDOR
PROPOSED TRUNK SANITARY SEWER
STA.3+633 TO STA.3+930

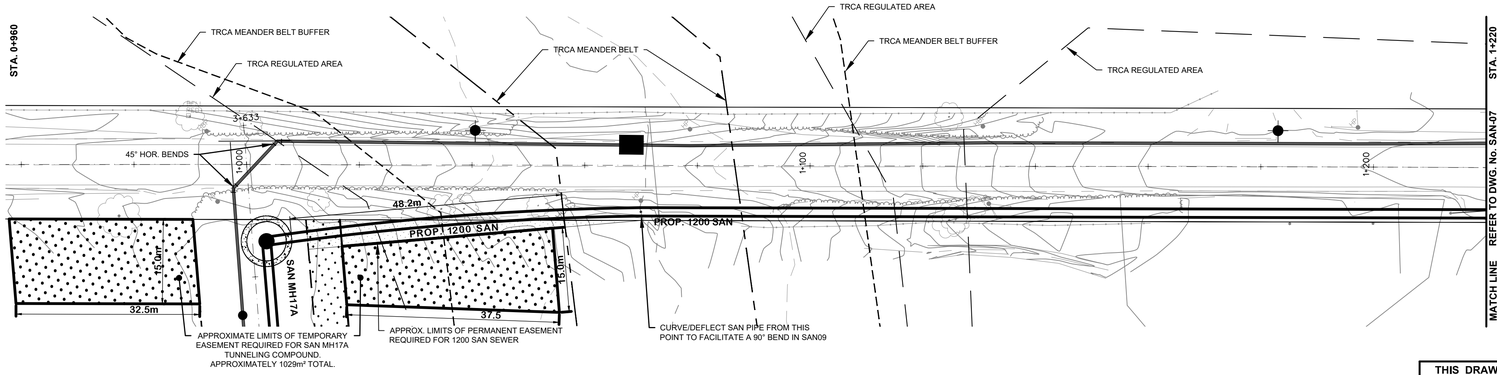
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX
Checked by	E.M.	Drawn by	P.M.
Date	FEB 2026	Sheet	20 OF 83

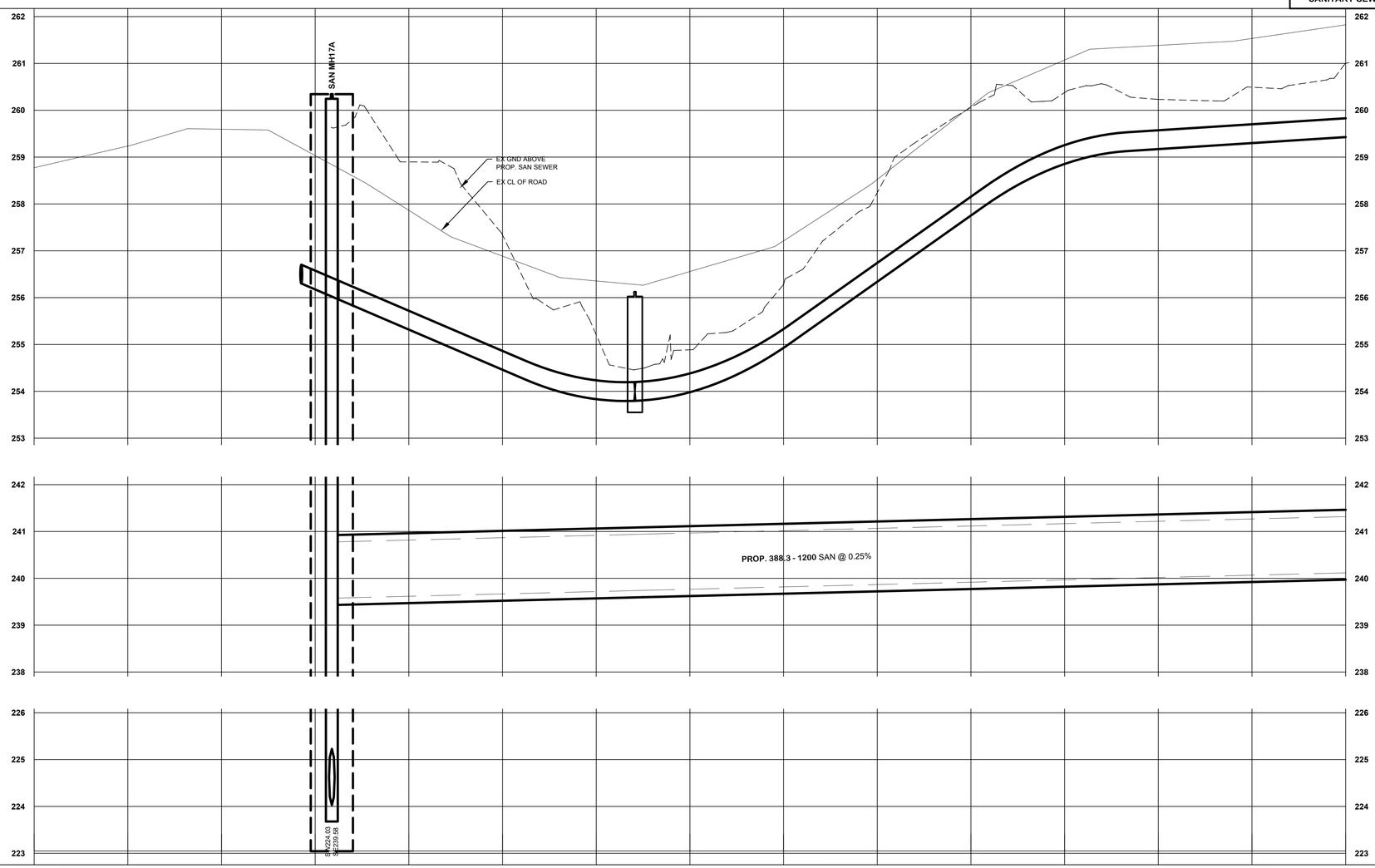
Project No. XX-XXXX

Plan No. **SAN-05**

MOUNT HOPE ROAD



THIS DRAWING TO BE USED FOR SANITARY SEWER DESIGN ONLY

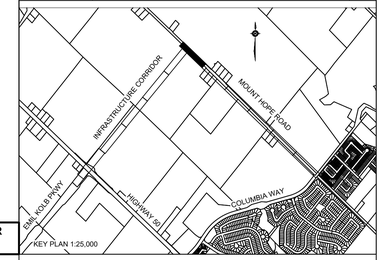


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

LEGEND:

SINGLE SANITARY LATERAL

DOUBLE SANITARY LATERAL

General Notes

All Measurements Are In Meters(m) Unless Otherwise Noted
All Driveways Are ASPHALT Unless Otherwise Noted
All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
All Horizontal And Vertical Bends Are In Degrees

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD PROPOSED TRUNK SANITARY SEWER STA.0+960 TO STA.1+220

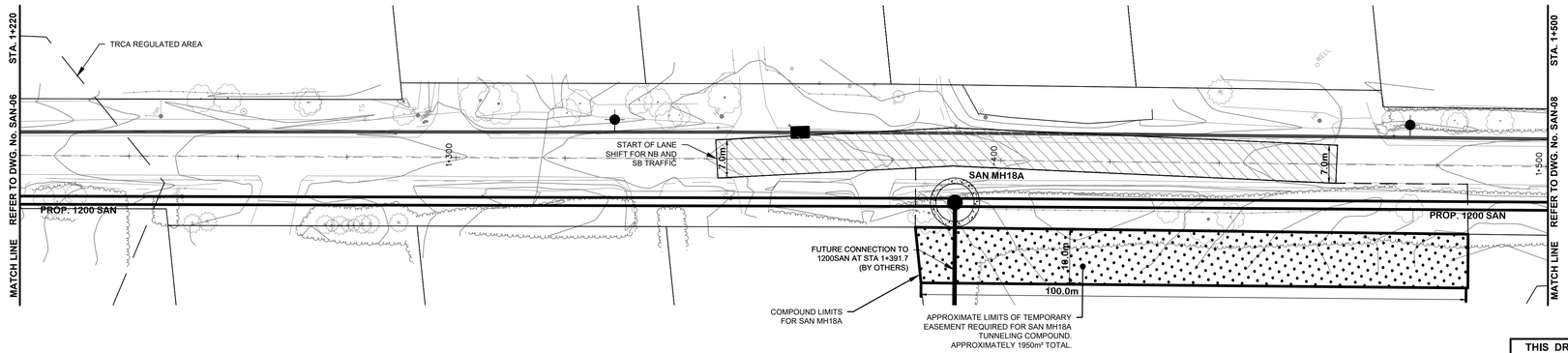
(FROM PROPOSED INFRASTRUCTURE CORRIDOR TO COLUMBIA WAY)

CAD Area	X-XX	Area	X-XX
Checked by	E.M.	Drawn by	P.M.
Date	FEB 2026	Sheet	21 OF 83

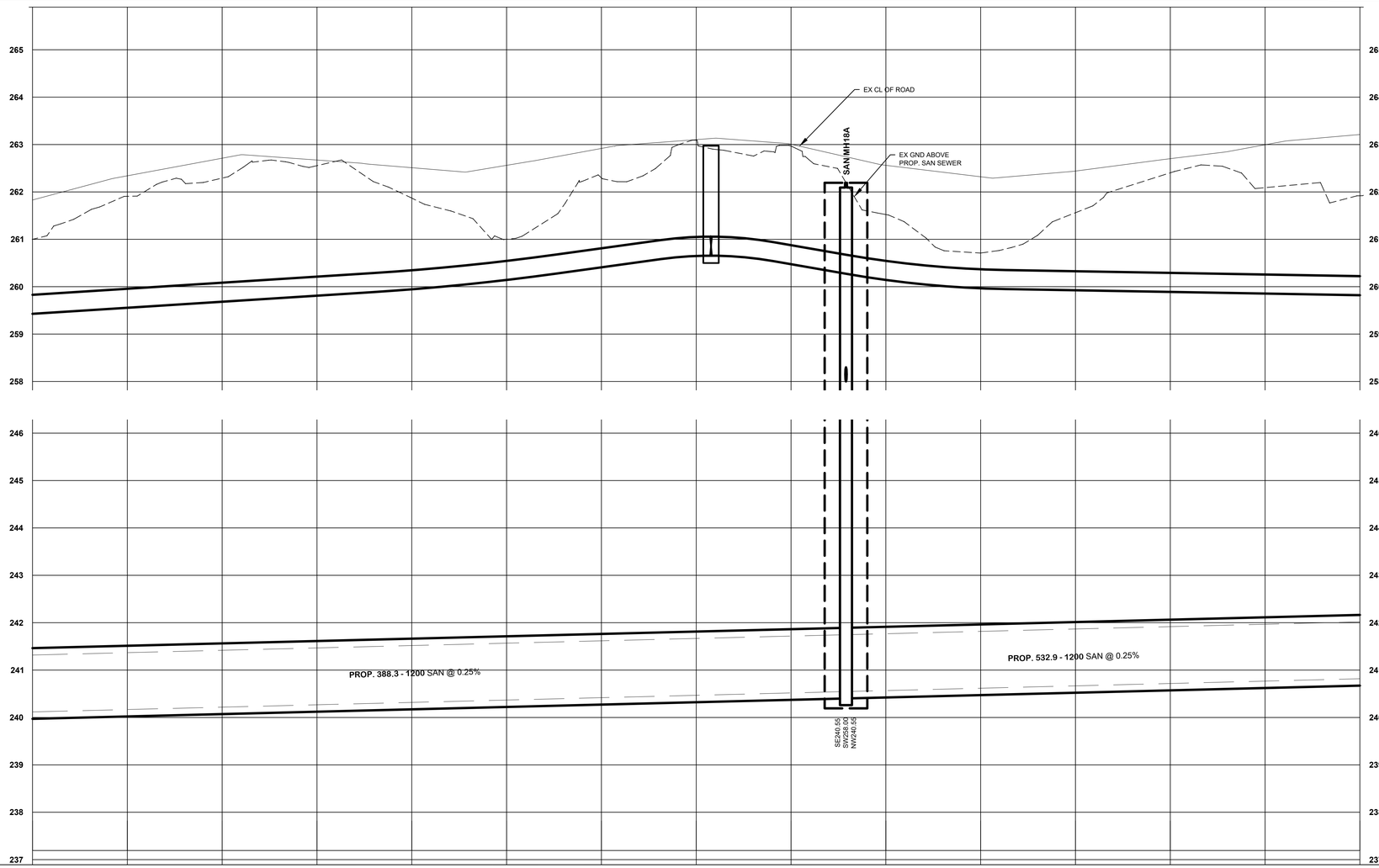
Project No. XX-XXXX

Plan No. **SAN-06**

MOUNT HOPE ROAD



THIS DRAWING TO BE USED FOR SANITARY SEWER DESIGN ONLY

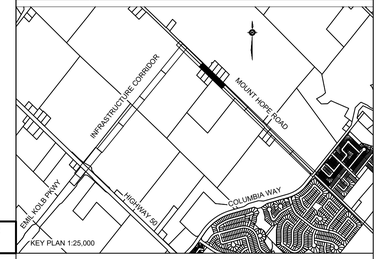


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

LEGEND:

SINGLE SANITARY LATERAL

DOUBLE SANITARY LATERAL

General Notes

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All Driveways Are ASPHALT Unless Otherwise Noted
All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
All Horizontal And Vertical Bends Are In Degrees

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

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ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
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ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE
1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD PROPOSED TRUNK SANITARY SEWER STA.1+220 TO STA.1+500

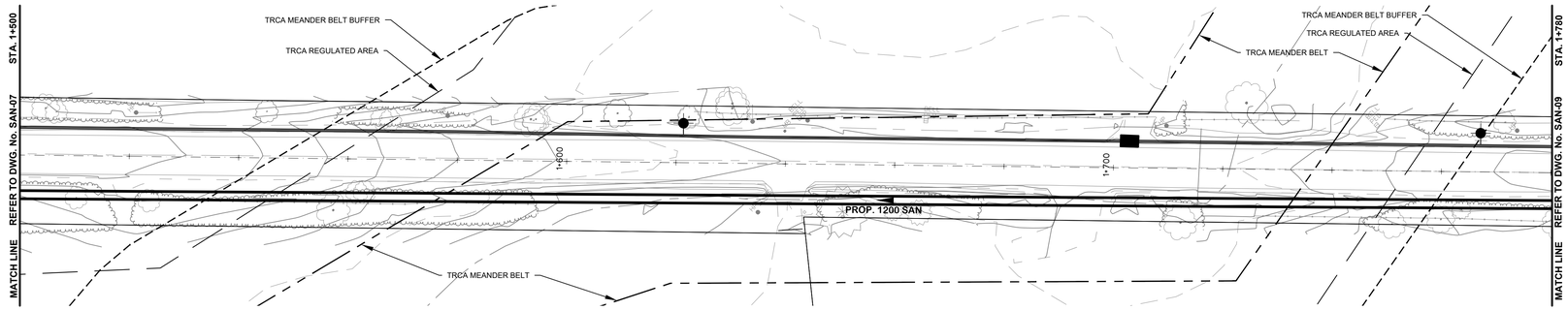
(FROM PROPOSED INFRASTRUCTURE CORRIDOR TO COLUMBIA WAY)

CAD Area	X-XX	Area	X-XX
Checked by	E.M.	Drawn by	P.M.
Date	FEB 2026	Sheet	22 OF 83

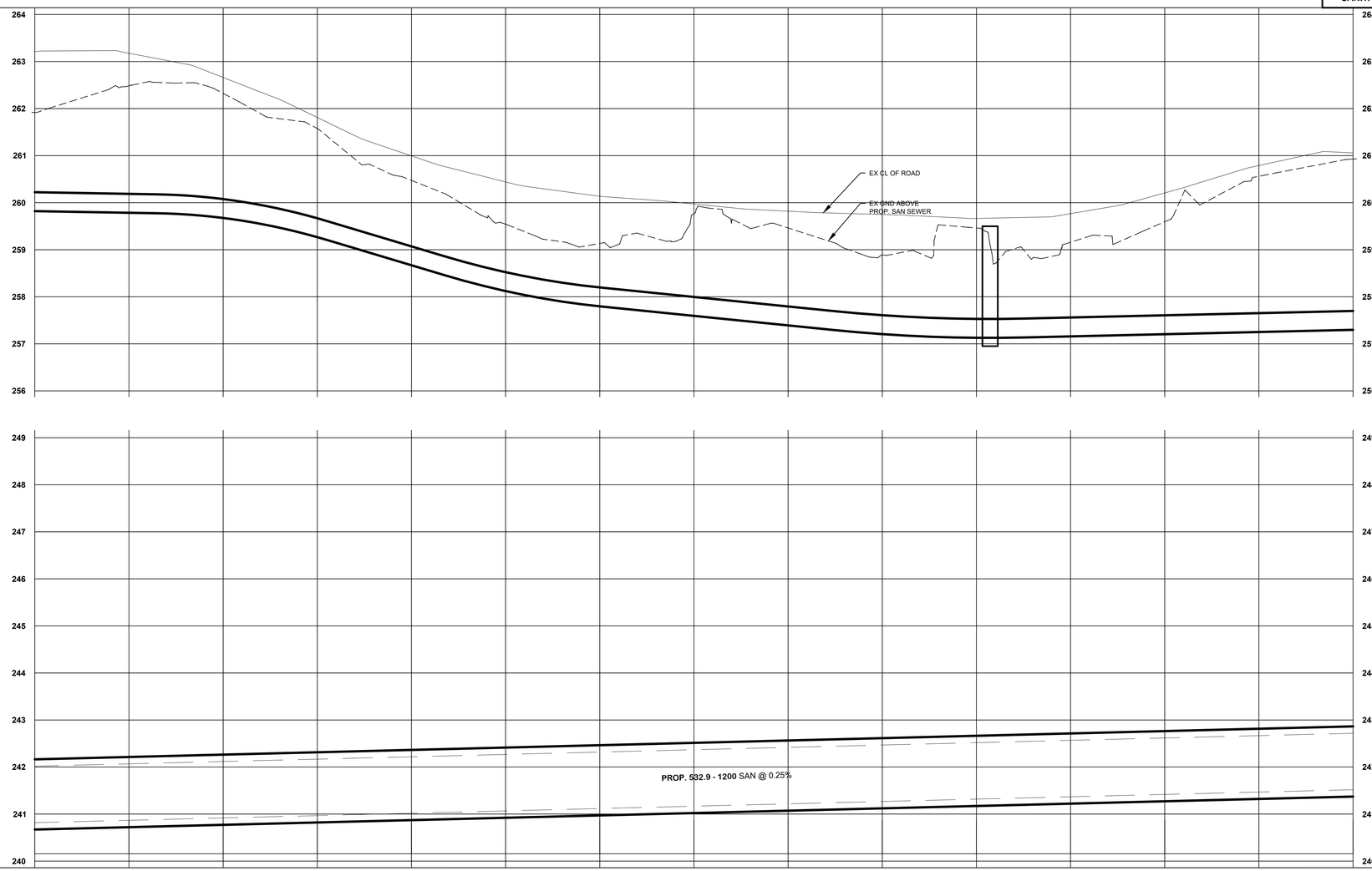
Project No. XX-XXXX

Plan No. **SAN-07**

MOUNT HOPE ROAD



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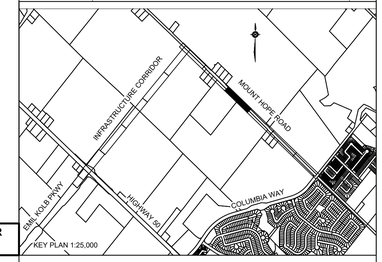
	263.18	262.66	261.81	261.00	260.44	260.14	259.97	259.82	259.75	259.66	259.77	260.21	260.79		EX. ROAD ELEV.
	1+520	1+540	1+560	1+580	1+600	1+620	1+640	1+660	1+680	1+700	1+720	1+740	1+760	1+780	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

LEGEND:

SINGLE SANITARY LATERAL

DOUBLE SANITARY LATERAL

General Notes

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All Horizontal And Vertical Bends Are In Degrees

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

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HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

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HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD PROPOSED TRUNK SANITARY SEWER STA.1+500 TO STA.1+780

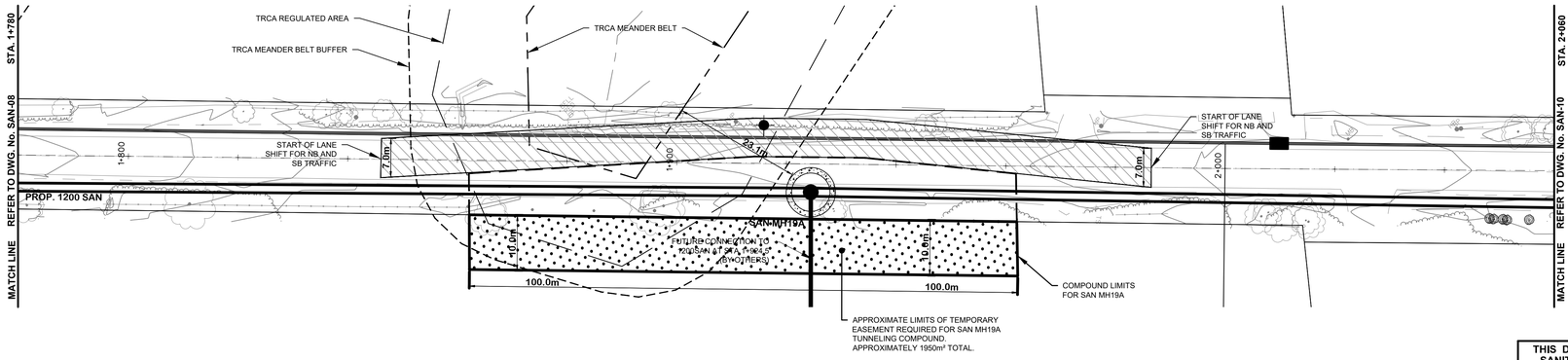
(FROM PROPOSED INFRASTRUCTURE CORRIDOR TO COLUMBIA WAY)

CAD Area	X-XX	Area	X-XX
Checked by	E.M.	Drawn by	P.M.
Date	FEB 2026	Sheet	23 OF 83

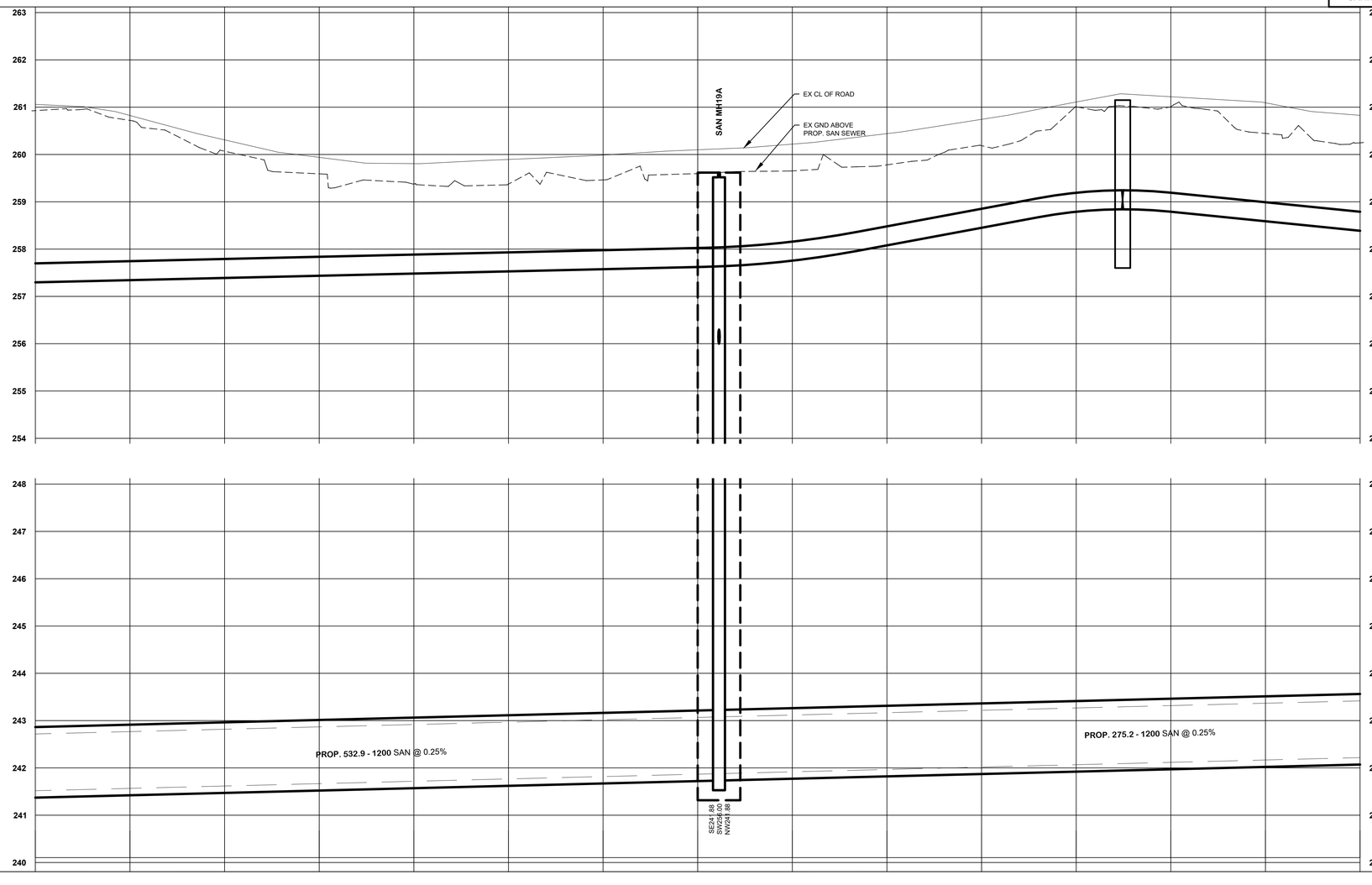
Project No. XX-XXXX

Plan No. **SAN-08**

MOUNT HOPE ROAD



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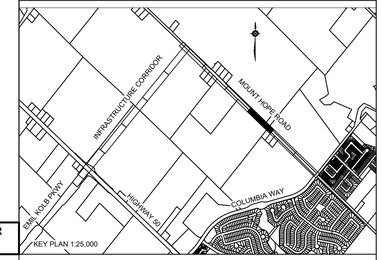
	260.82	260.31	259.94	259.81	259.90	259.99	260.10	260.22	260.44	260.74	261.11	261.22	261.09		EX. ROAD ELEV.
	1+800	1+820	1+840	1+860	1+880	1+900	1+920	1+940	1+960	1+980	2+000	2+020	2+040	2+060	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

LEGEND:

SINGLE SANITARY LATERAL

DOUBLE SANITARY LATERAL

General Notes

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All Horizontal And Vertical Bends Are In Degrees

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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Approved by

NOTICE TO CONTRACTOR

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HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
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ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
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FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD PROPOSED TRUNK SANITARY SEWER STA.1+780 TO STA.2+060

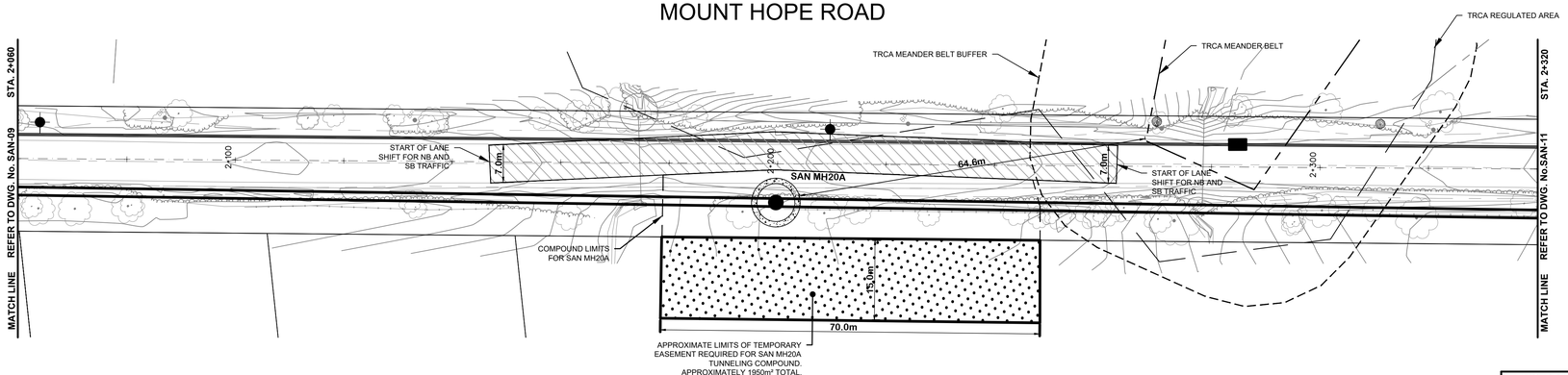
(FROM PROPOSED INFRASTRUCTURE CORRIDOR TO COLUMBIA WAY)

CAD Area	X-XX	Area	X-XX
Checked by	E.M.	Drawn by	P.M.
Date	FEB 2026	Sheet	24 OF 83

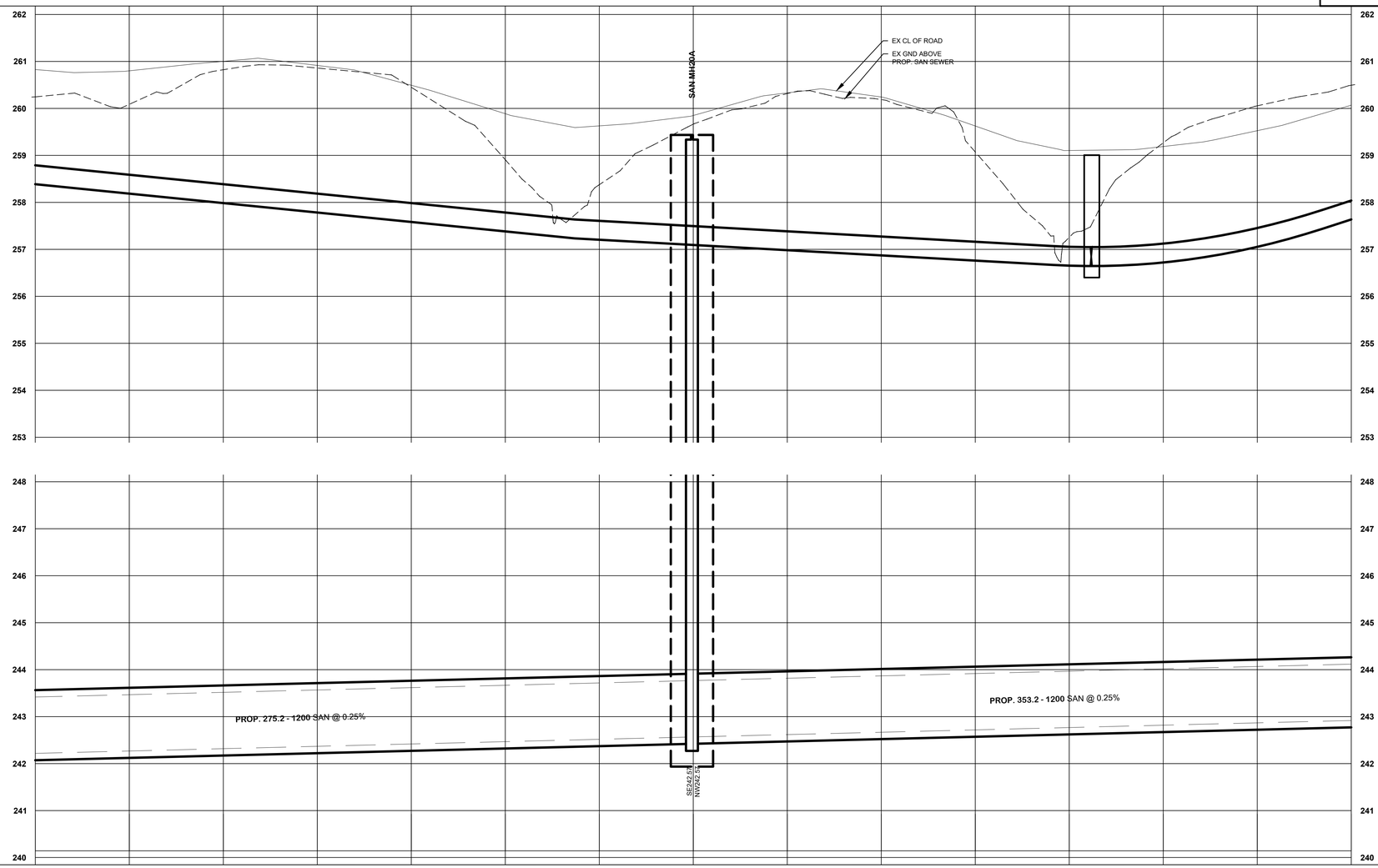
Project No. XX-XXXX

Plan No. **SAN-09**

MOUNT HOPE ROAD



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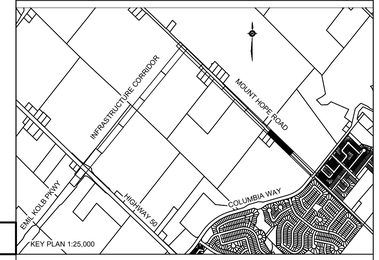
	260.80	261.00	260.92	260.49	259.89	259.63	259.85	260.33	260.24	259.63	259.10	259.19	259.53		EX. ROAD ELEV.
	2+080	2+100	2+120	2+140	2+160	2+180	2+200	2+220	2+240	2+260	2+280	2+300	2+320	2+340	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

LEGEND:

SINGLE SANITARY LATERAL

DOUBLE SANITARY LATERAL

General Notes

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Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
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HYDRO ONE NETWORKS
ALECTRA UTILITIES
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ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/3IG NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD PROPOSED TRUNK SANITARY SEWER STA.2+060 TO STA.2+320

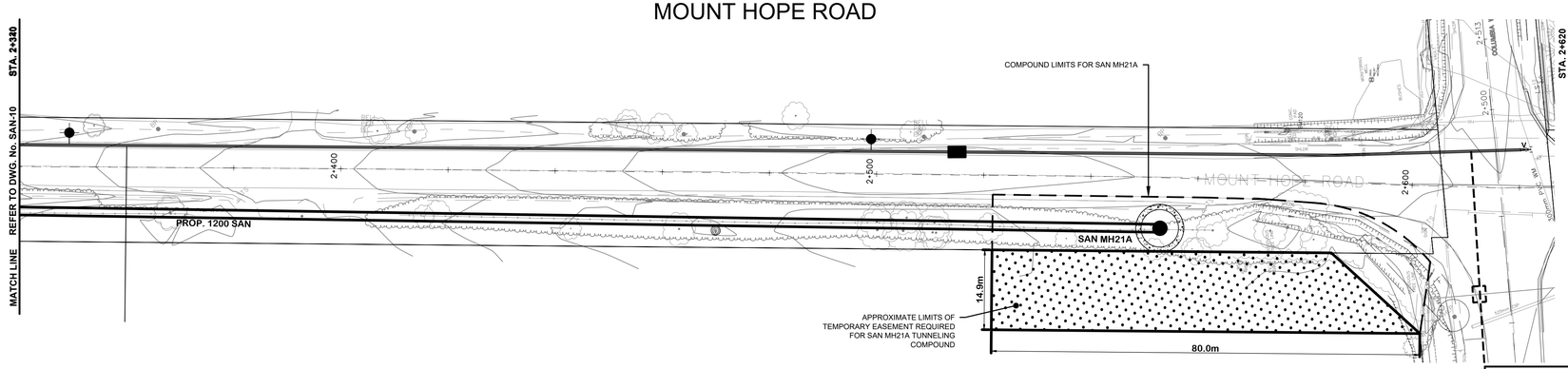
(FROM PROPOSED INFRASTRUCTURE CORRIDOR TO COLUMBIA WAY)

CAD Area	X-XX	Area	X-XX
Checked by	E.M.	Drawn by	P.M.
Date	FEB 2026	Sheet	25 OF 83

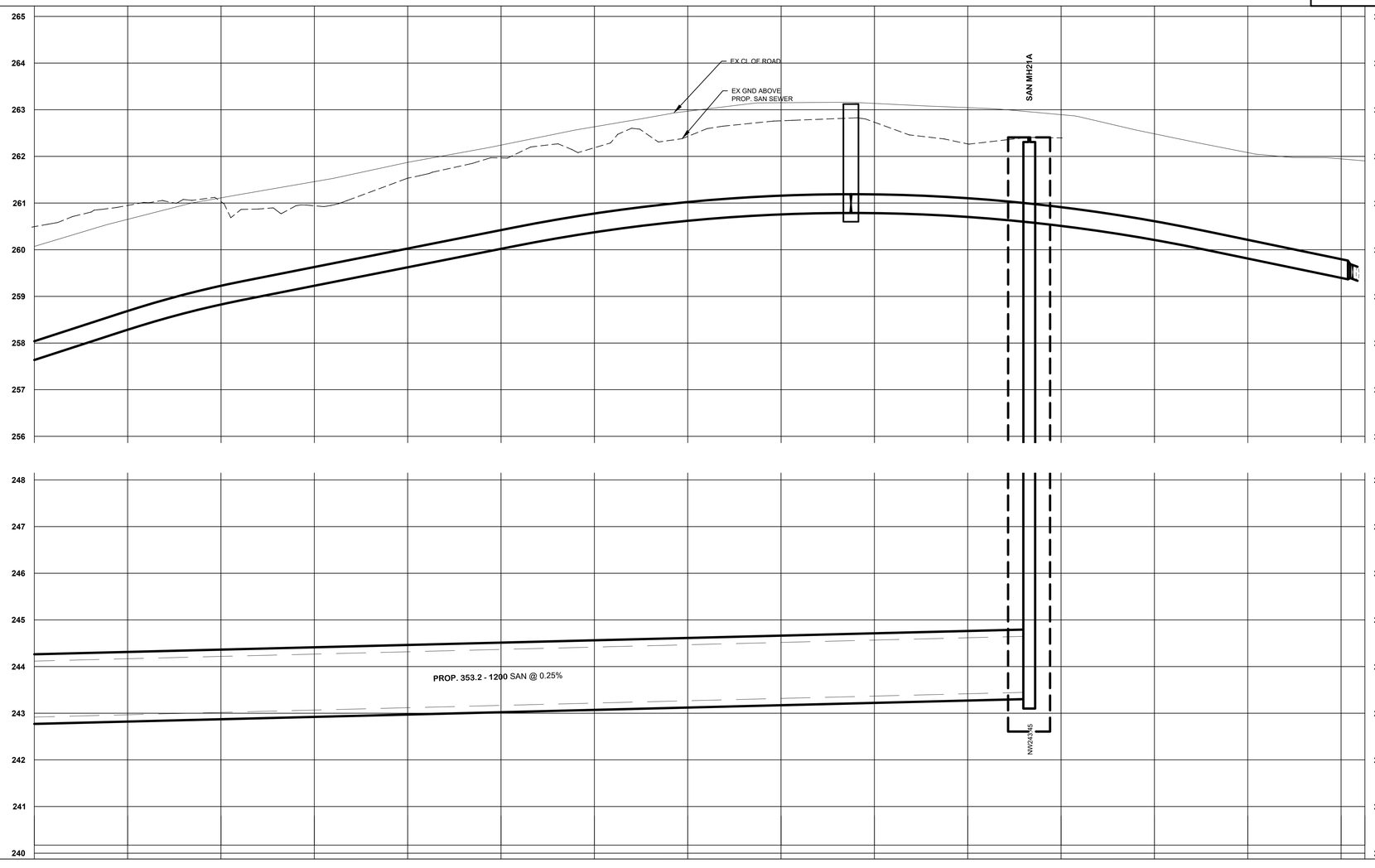
Project No. XX-XXXX

Plan No. **SAN-10**

MOUNT HOPE ROAD



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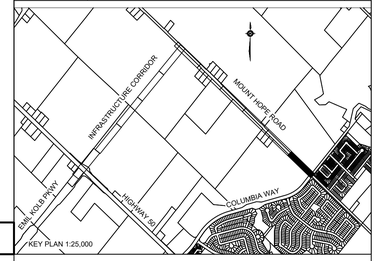


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

LEGEND:

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DOUBLE SANITARY LATERAL

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All Horizontal And Vertical Bends Are In Degrees

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
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CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
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HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

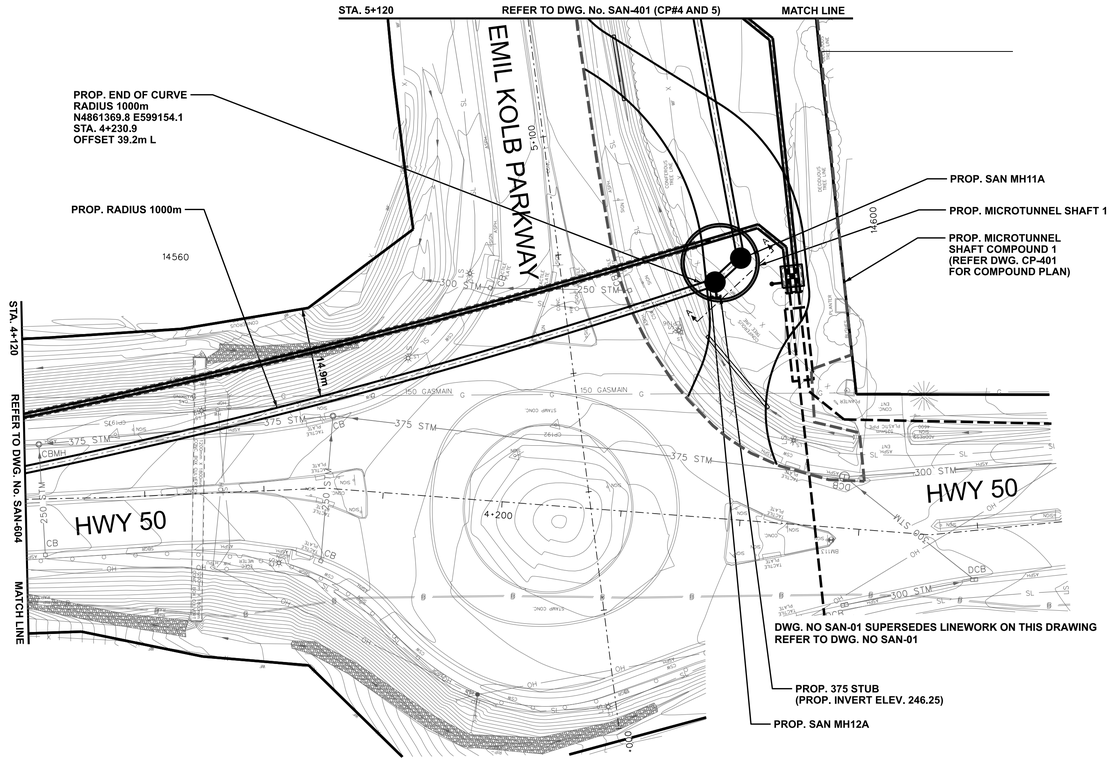
Region of Peel
working with you

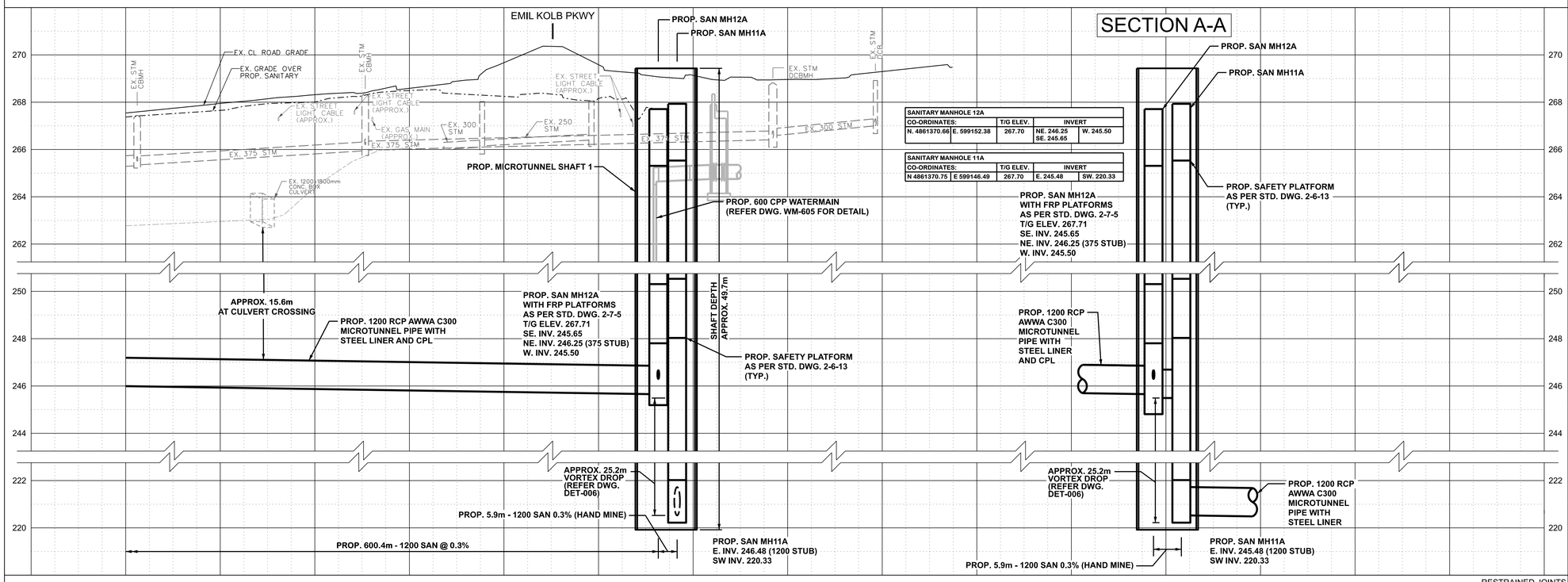
BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD PROPOSED TRUNK SANITARY SEWER STA.2+320 TO STA.2+620

(FROM PROPOSED INFRASTRUCTURE CORRIDOR TO COLUMBIA WAY)

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB 2026	Sheet	26 OF 83	Plan No.	SAN-11





SANITARY MANHOLE 12A					
CO-ORDINATES:		T/G ELEV.	INVERT		
N. 4861370.66	E. 599152.38	267.70	NE. 246.25 SE. 245.65	W. 245.50	

SANITARY MANHOLE 11A				
CO-ORDINATES:		T/G ELEV.	INVERT	
N 4861370.75	E 599146.49	267.70	E. 245.48	SW. 220.33

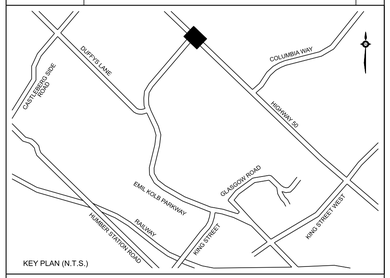
RESTRAINED JOINTS								
BOT.EL. OF WM.								
267.54	267.95	268.32	268.59	269.67	269.58	269.13	268.96	269.29
EX. ROAD ELEV.								
4+120	4+140	4+160	4+180	4+200	4+220	4+240	4+260	4+280
ROAD CHAINAGE								

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



NOTES:

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GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

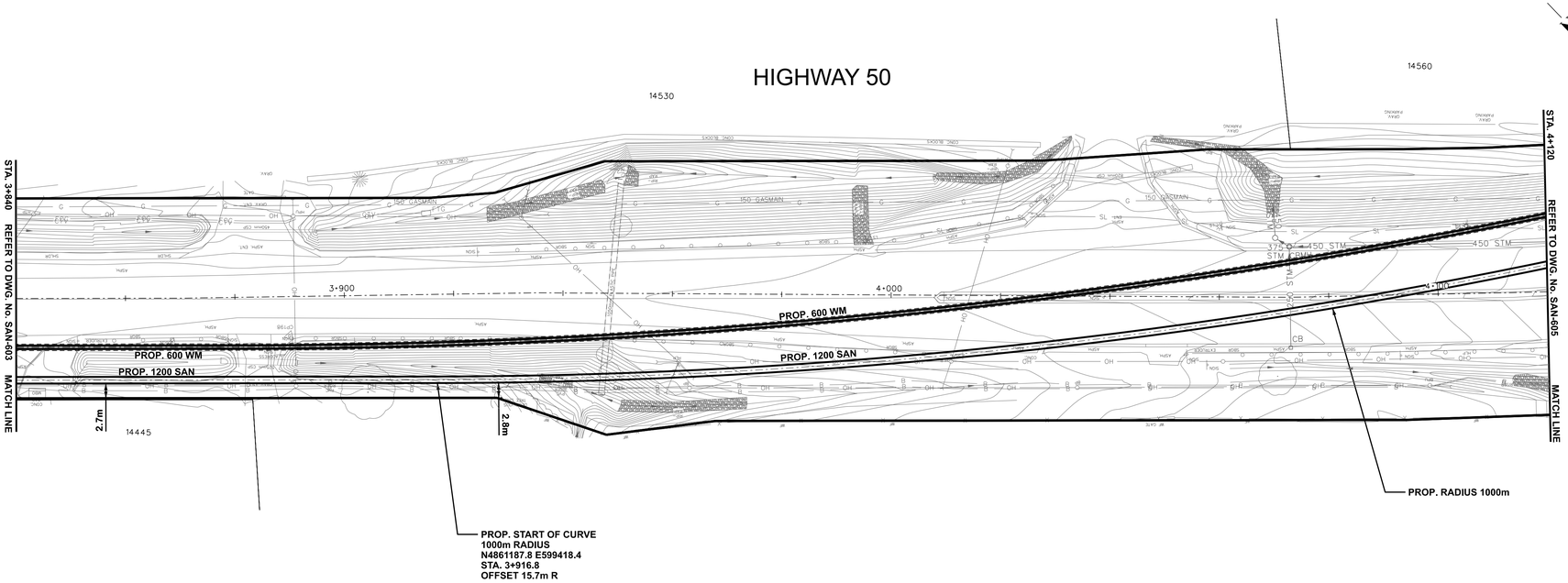
HIGHWAY 50

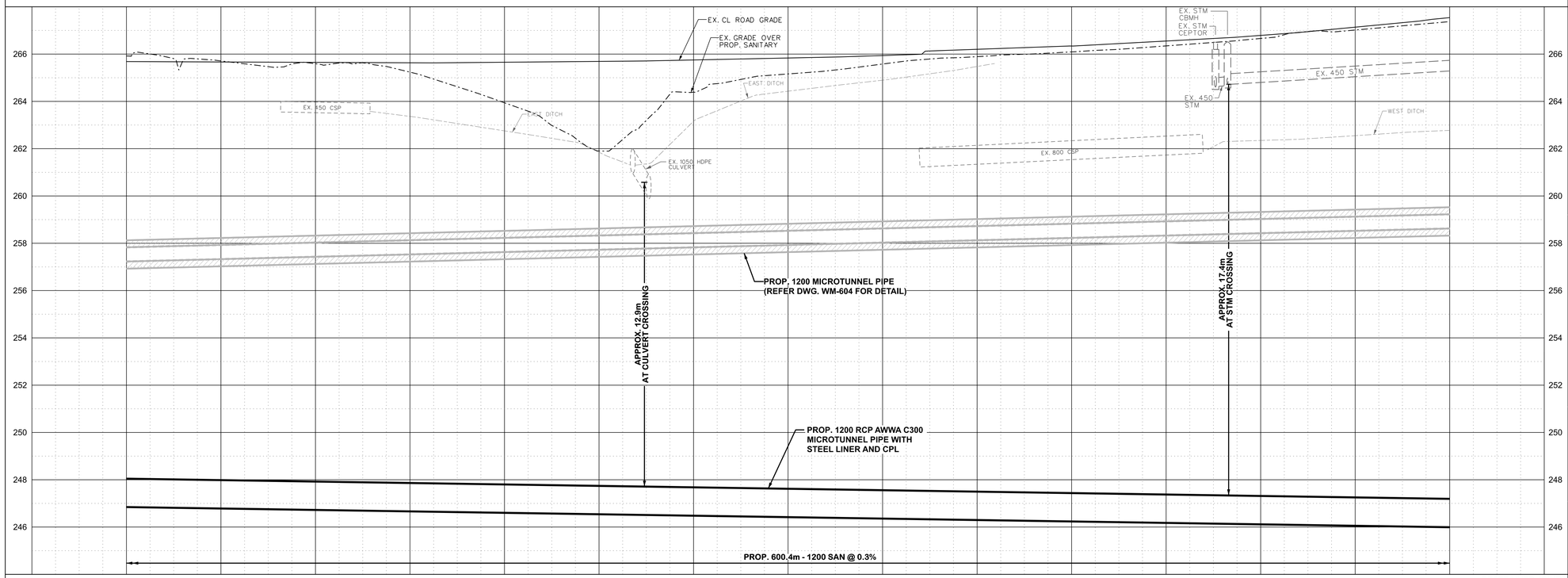
(FROM EMIL KOLB PARKWAY TO COLUMBIA WAY)

PROP. 1200mm SANITARY SEWER

STA. 4+120 TO STA. 4+280

CAD Area	X-XX	Area	C-12/C-13
Checked by		Drawn by	
Date	FEB. 2026	Sheet	27 of 83
		Project No.	XX-XXXX
		Plan No.	**SAN-605**





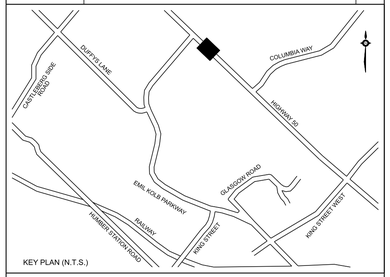
RESTRAINED JOINTS																
BOT.EL. OF WM.																
EX. ROAD ELEV.	265.68	265.66	265.64	265.63	265.64	265.68	265.75	265.83	265.94	266.20	266.34	266.56	266.79	267.14	267.54	
ROAD CHAINAGE	3+840	3+860	3+880	3+900	3+920	3+940	3+960	3+980	4+000	4+020	4+040	4+060	4+080	4+100	4+120	

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
STORM SEWERS	FEB, 00, 2023	X,X,	BELL U/G CABLE	FEB, 00, 2023	X,X,
WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



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10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

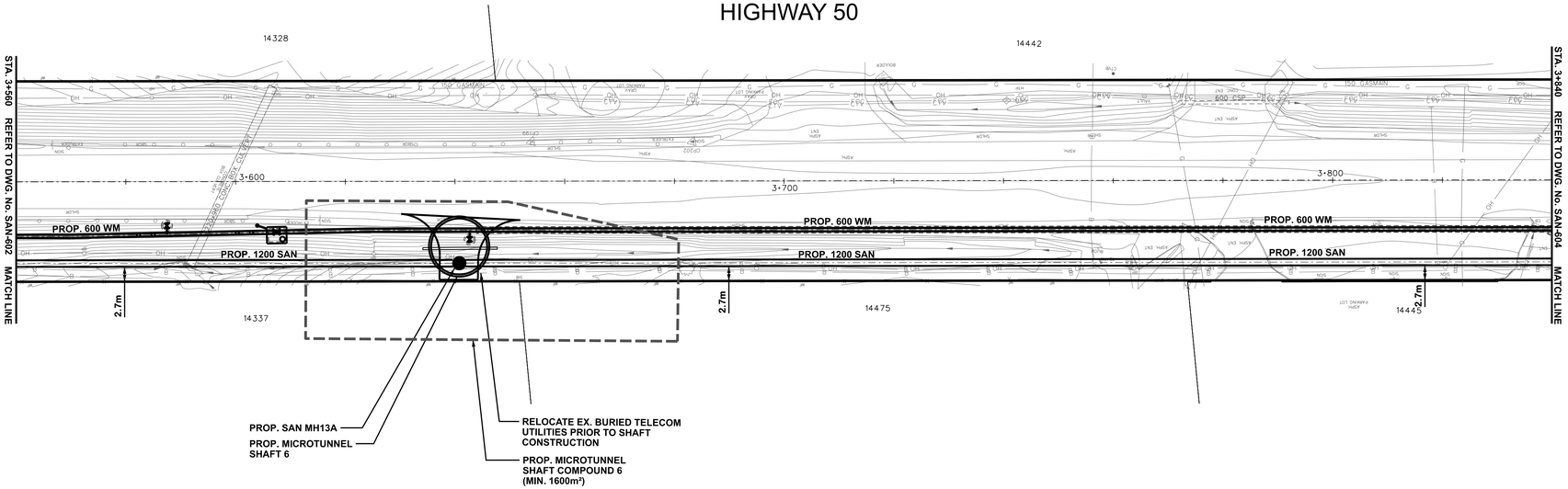
HIGHWAY 50

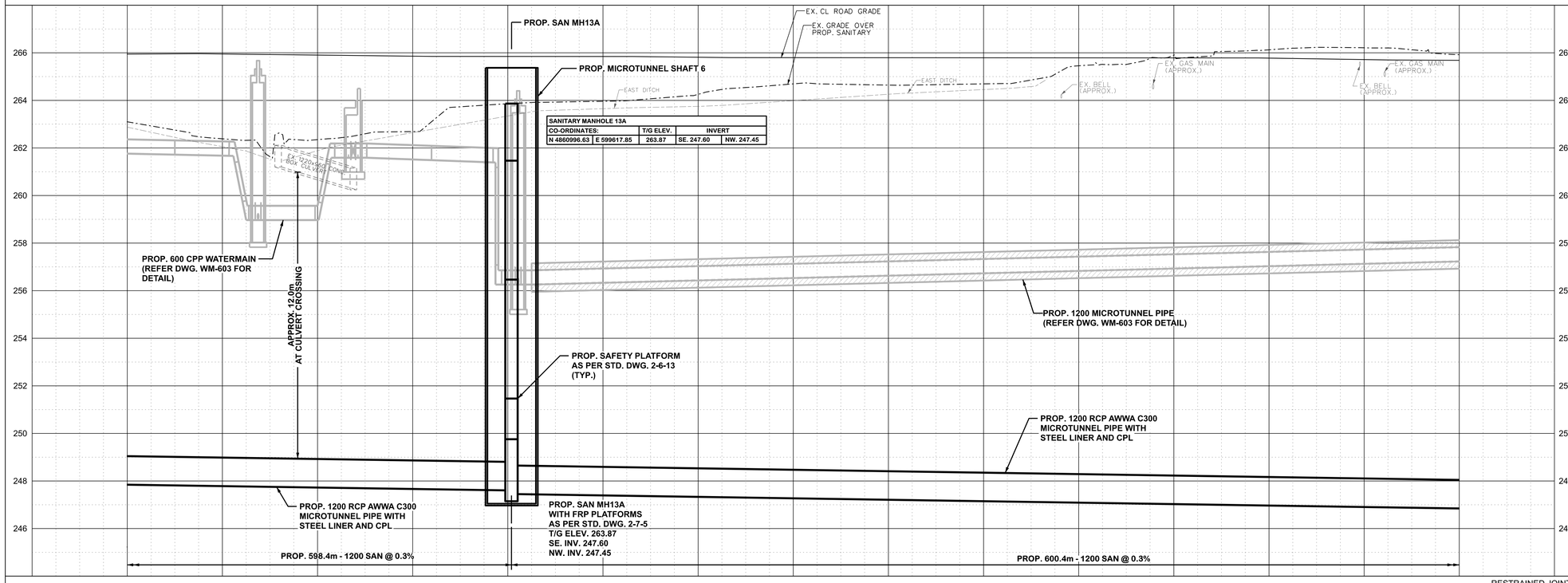
(FROM EMIL KOLB PARKWAY TO COLUMBIA WAY)

PROP. 1200mm SANITARY SEWER

STA. 3+840 TO STA. 4+120

CAD Area	X-XX	Area	C-12/C-13	Project No.	XX-XXXX
Checked by	G.J.	Drawn by	M.L.		
Date	FEB. 2026	Sheet	28 of 83	Plan No.	SAN-604





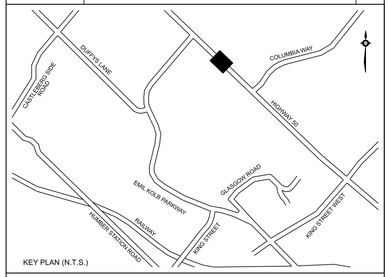
RESTRAINED JOINTS																
BOT.EL. OF WM.																
265.95	265.95	265.89	265.86	265.85	265.85	265.81	265.79	265.79	265.79	265.80	265.81	265.78	265.72	265.68	EX. ROAD ELEV.	
3+560	3+580	3+600	3+620	3+640	3+660	3+680	3+700	3+720	3+740	3+760	3+780	3+800	3+820	3+840	ROAD CHAINAGE	

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
STORM SEWERS	FEB, 00, 2023	X,X,	BELL U/G CABLE	FEB, 00, 2023	X,X,
WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

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10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

HIGHWAY 50

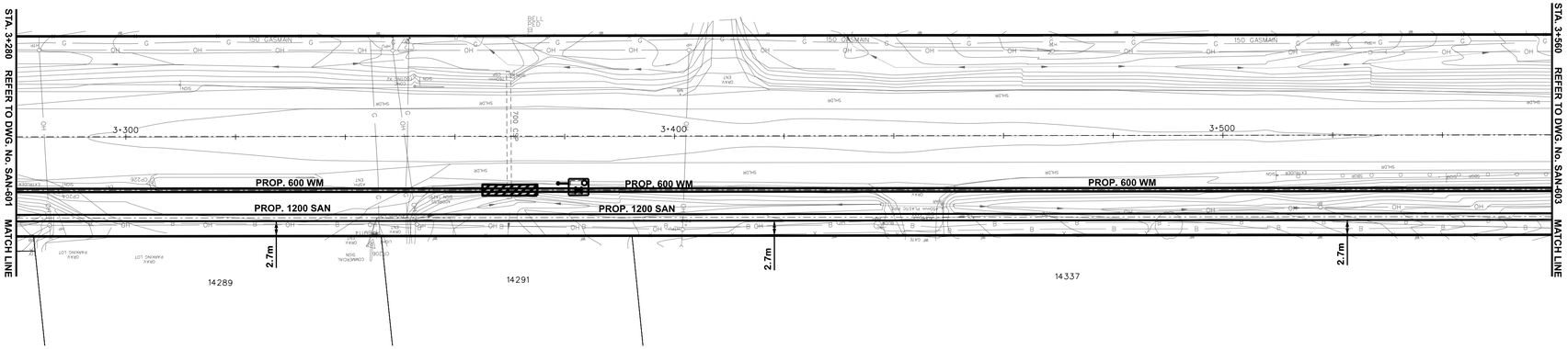
(FROM EMIL KOLB PARKWAY TO COLUMBIA WAY)

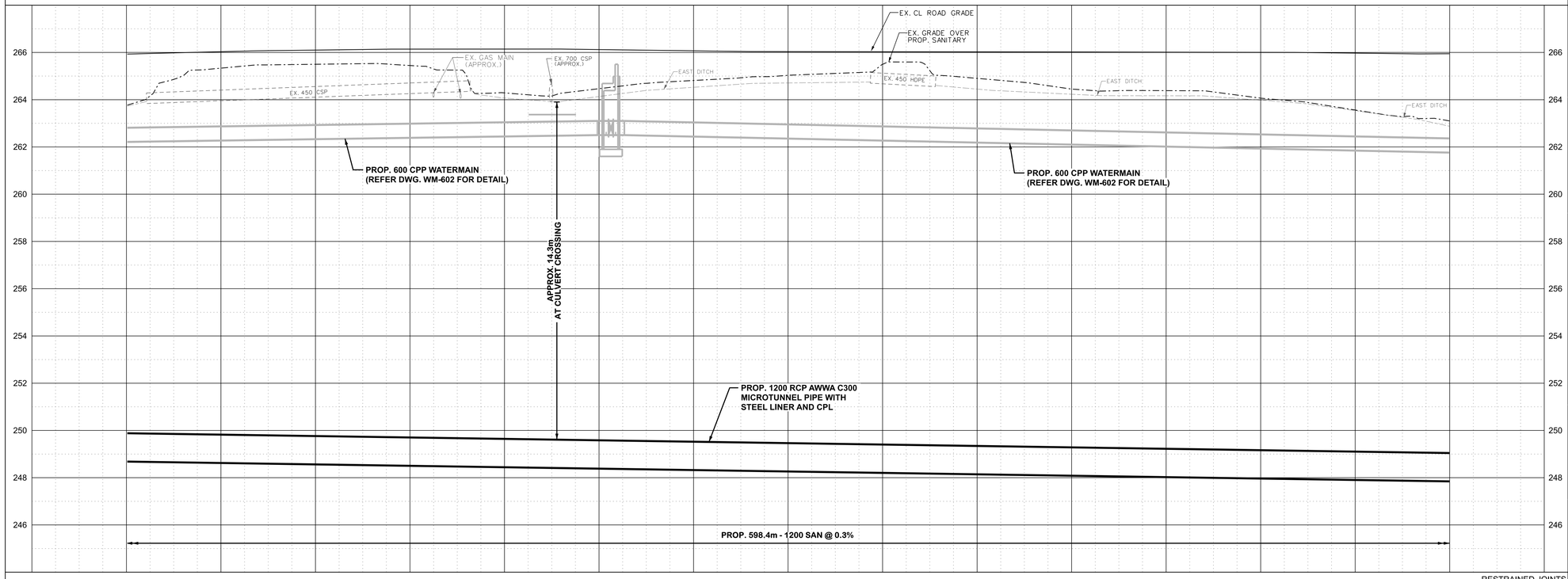
PROP. 1200mm SANITARY SEWER

STA. 3+560 TO STA. 3+840

CAD Area	X-XX	Area	C-12/C-13	Project No.	XX-XXXX
Checked by	G.J.	Drawn by	M.L.		
Date	FEB. 2026	Sheet	29 of 83	Plan No.	SAN-603

HIGHWAY 50





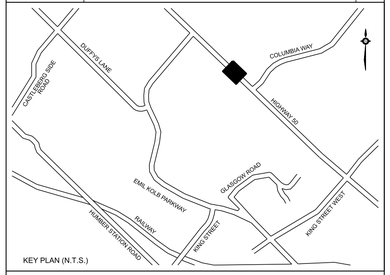
RESTRAINED JOINTS																
BOT.EL. OF WM.																
265.93	266.03	266.10	266.14	266.15	266.12	266.06	266.05	266.08	266.05	266.03	266.02	266.01	265.97	265.95	EX. ROAD ELEV.	
3+280	3+300	3+320	3+340	3+360	3+380	3+400	3+420	3+440	3+460	3+480	3+500	3+520	3+540	3+560	ROAD CHAINAGE	

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



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Region of Peel
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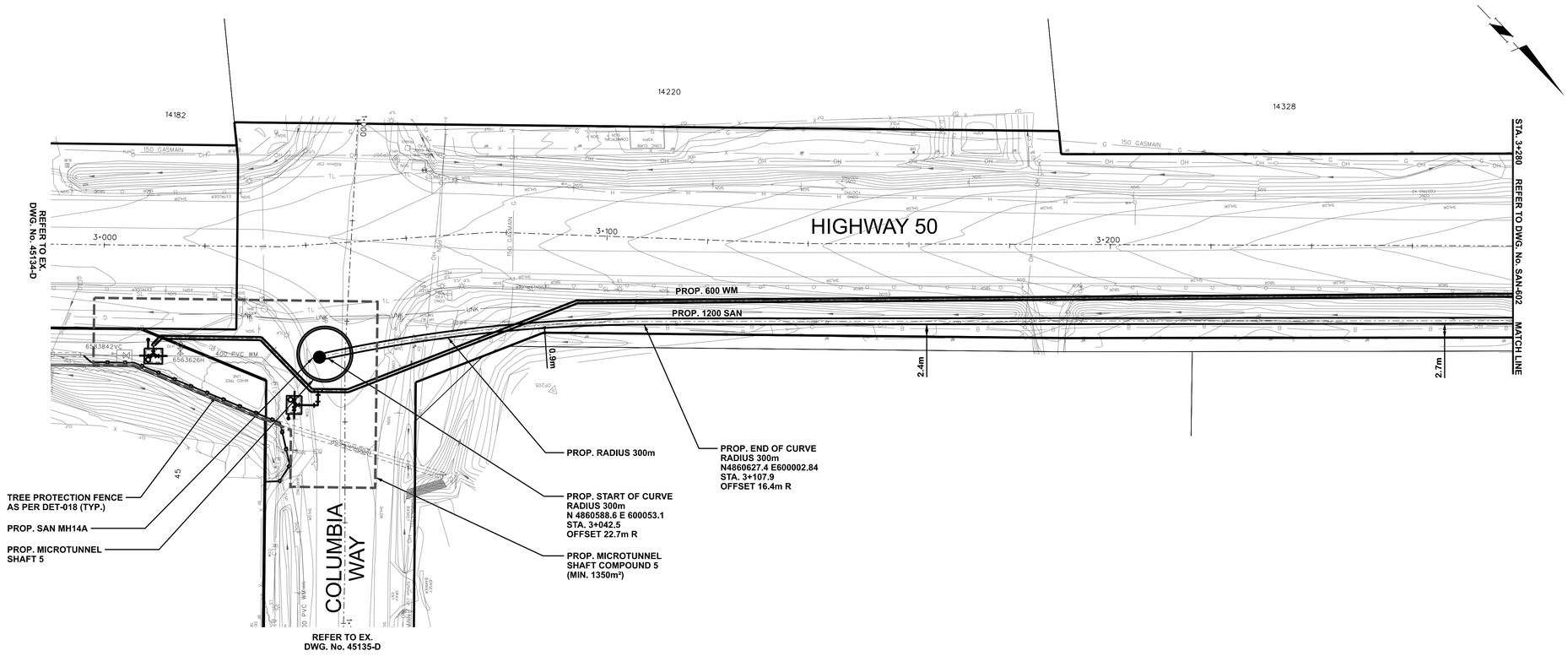
HIGHWAY 50

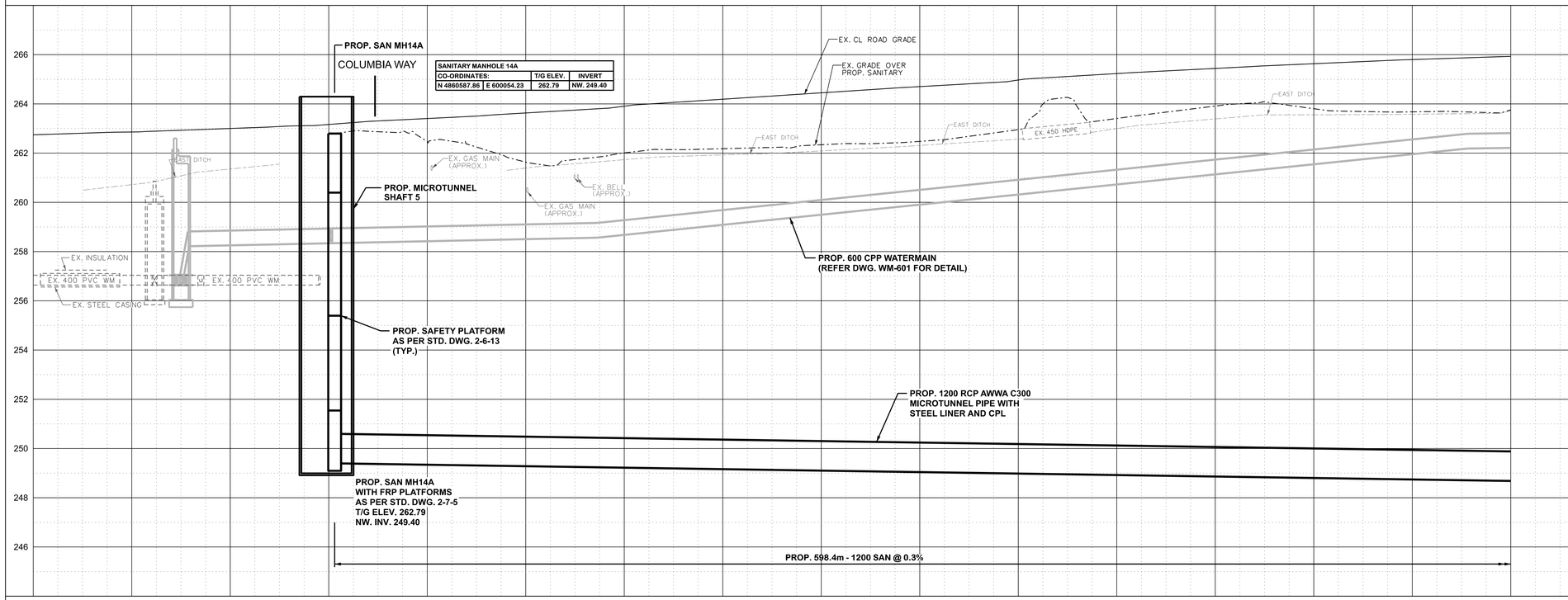
(FROM EMIL KOLB PARKWAY TO COLUMBIA WAY)

PROP. 1200mm SANITARY SEWER

STA. 3+280 TO STA. 3+560

CAD Area	X-XX	Area	C-12/C-13	Project No.	XX-XXXX
Checked by	G.J.	Drawn by	M.L.		
Date	FEB. 2026	Sheet	30 of 83	Plan No.	SAN-602





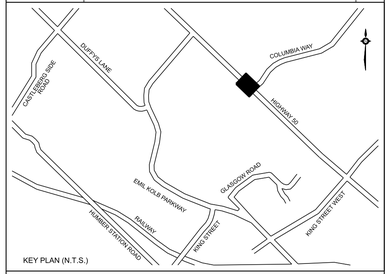
RESTRAINED JOINTS																
BOT.EL. OF WM.																
262.86	263.00	263.16	263.40	263.63	263.91	264.19	264.45	264.70	264.97	265.23	265.44	265.63	265.80	265.93	EX. ROAD ELEV.	
3+000	3+020	3+040	3+060	3+080	3+100	3+120	3+140	3+160	3+180	3+200	3+220	3+240	3+260	3+280	ROAD CHAINAGE	

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
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TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

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(FROM EMIL KOLB PARKWAY TO COLUMBIA WAY)

PROP. 1200mm SANITARY SEWER

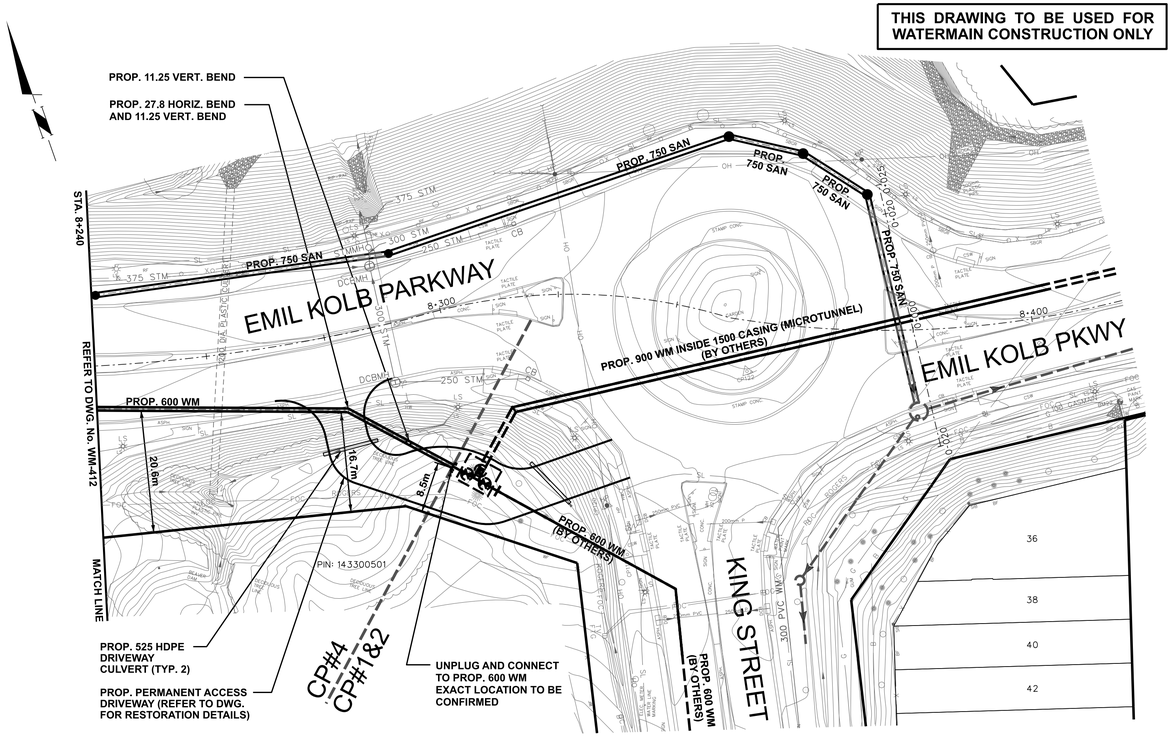
STA. 2+990 TO STA. 3+280

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	31 of 83

Project No. XX-XXXX

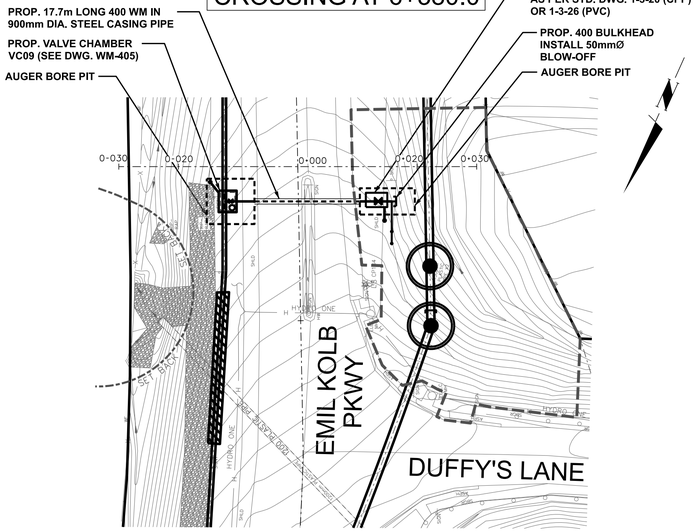
Plan No. **SAN-601**

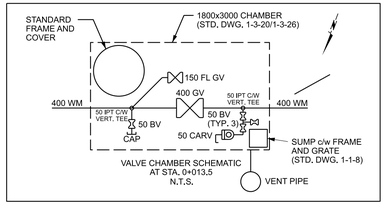
THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

EMIL KOLB PARKWAY CROSSING AT 6+380.0





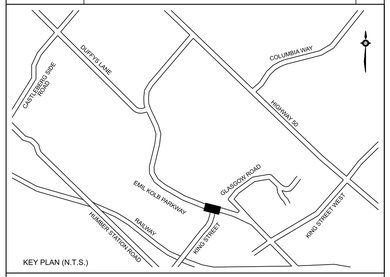
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TEST PRESSURE: 150 kPa

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SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



NOTES:

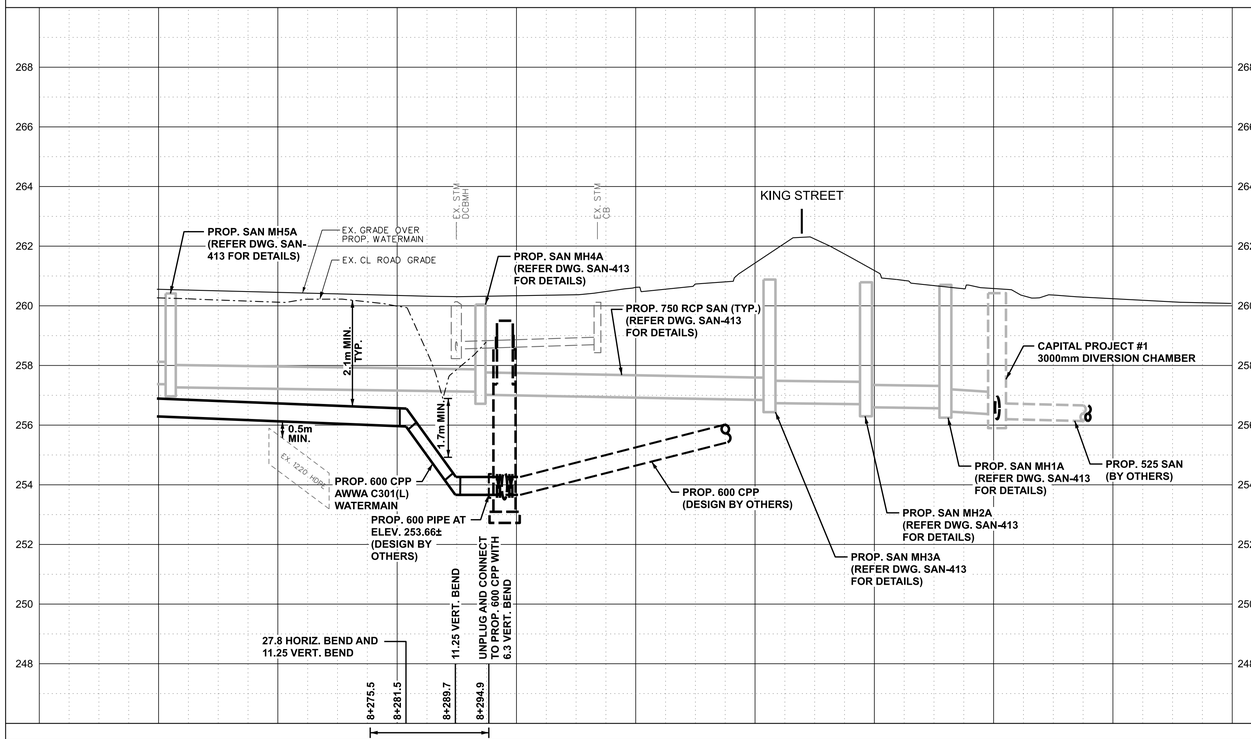
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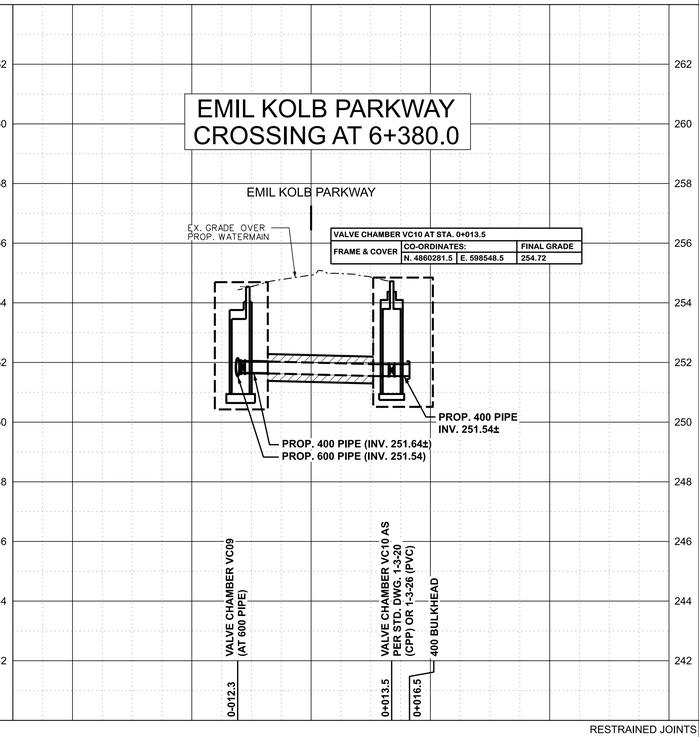
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3) MAINTAIN A MINIMUM OF 0.3m VERTICAL CLEARANCE TO GASMAINS OR HYDRO PLANT
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5) MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO BELL PLANT, MAINTAIN A MINIMUM OF 1.5m HORIZONTAL CLEARANCE FROM BELL PLANT TO PROPOSED HYDRANTS
6) PROPOSED HYDRANT OFFSET TO BE DETERMINED IN THE FIELD (MIN. 1.5m OFFSET TO BELL OR HYDRO POLES)

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RESTRAINED JOINTS												
BOT.EL. OF WM.												
260.55	260.45	260.35	260.34	260.62	261.44	261.18	260.58	260.23				EX. ROAD ELEV.
8+240	8+260	8+280	8+300	8+320	8+340	8+360	8+380	8+400	0-020	0+000	0+020	ROAD CHAINAGE

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Agency: Ontario Ministry of Natural Resources and Forestry
B.M. No. 10519980004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

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ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6 — VERTICAL SCALE 1:100

Region of Peel working with you

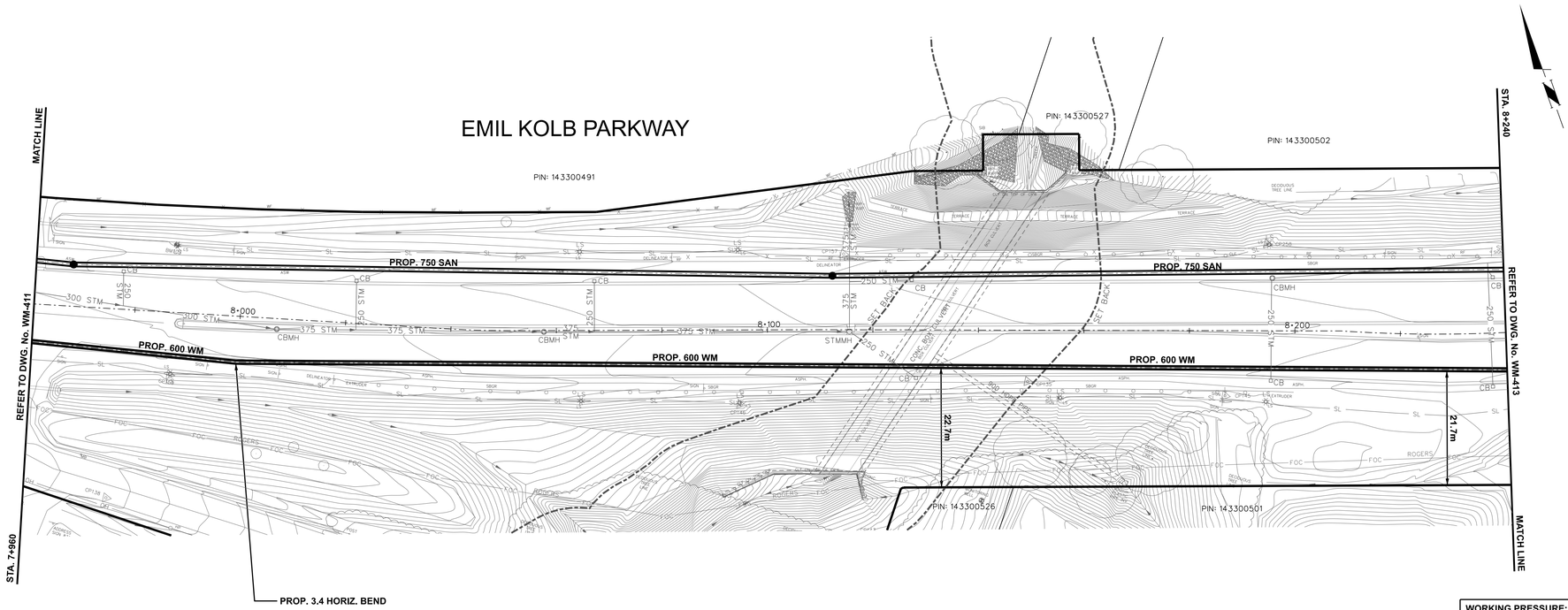
EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

PROP. 600mm WATERMAIN

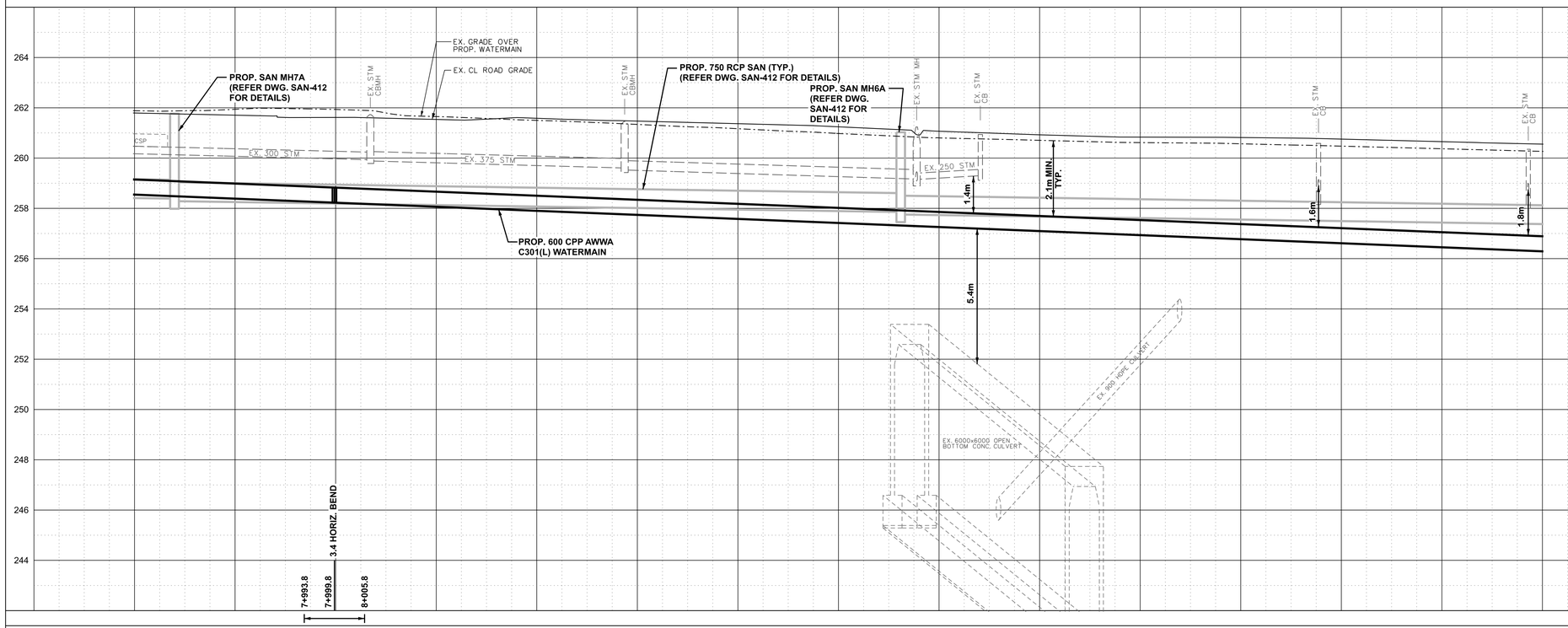
STA. 8+240 TO STA. 8+400

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	32 of 83
Project No.	XX-XXXX		
Plan No.	**WM-413**		



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY



RESTRAINED JOINTS

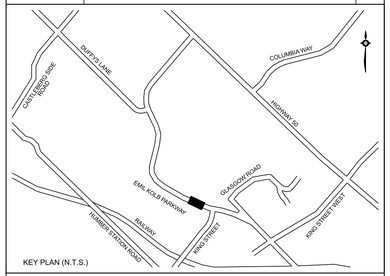
BOT.EL. OF WM.																
261.79	261.72	261.62	261.54	261.58	261.47	261.37	261.24	261.07	260.92	260.83	260.82	260.75	260.66	260.55	EX. ROAD ELEV.	
7+960	7+980	8+000	8+020	8+040	8+060	8+080	8+100	8+120	8+140	8+160	8+180	8+200	8+220	8+240	ROAD CHAINAGE	

SERVICE DATA

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TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



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B.M. No. 10519980004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

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Approved by

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10m 0 10 20 30m — HORIZONTAL SCALE 1:500
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Region of Peel
working with you

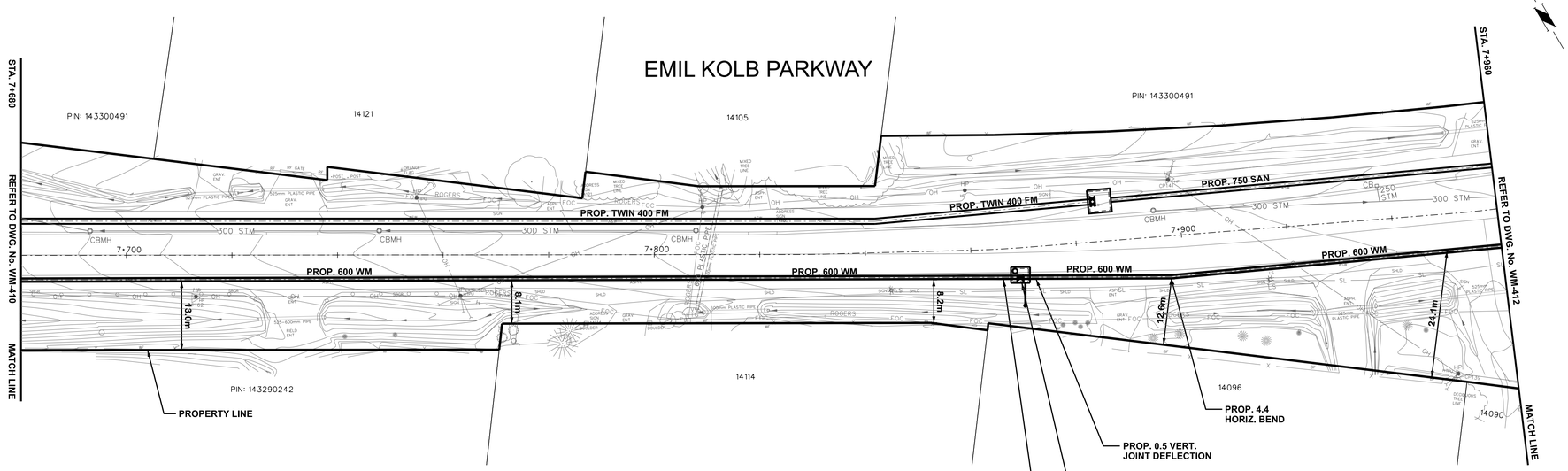
EMIL KOLB PARKWAY
(FROM HIGHWAY 50 TO KING STREET)
PROP. 600mm WATERMAIN

STA. 7+960 TO STA. 8+240

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	33 of 83

Project No. XX-XXXX
Plan No. **WM-412**

EMIL KOLB PARKWAY



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

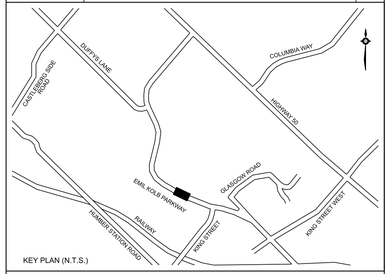
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TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
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KEY PLAN (N.T.S.)

NOTES:

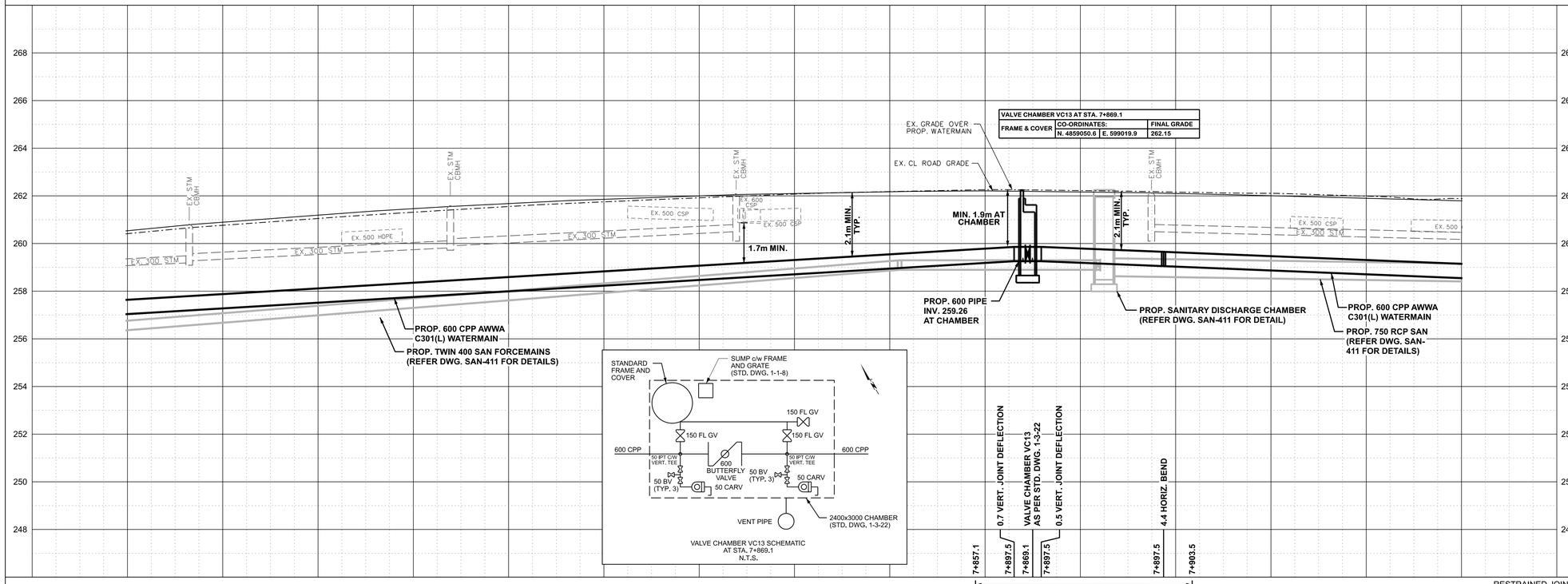
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VALVE CHAMBER VC13 AT STA. 7+869.1			
FRAME & COVER	CO-ORDINATES:		FINAL GRADE
	N. 4859050.6	E. 599019.9	262.15

VALVE CHAMBER VC13 SCHEMATIC AT STA. 7+869.1 N.T.S.

																RESTRAINED JOINTS
									7+857.1	7+897.5 0.7 VERT. JOINT DEFLECTION	7+869.1 VALVE CHAMBER VC13 AS PER STD. DWG. 1-3-22	7+897.5 0.5 VERT. JOINT DEFLECTION		7+897.5 4.4 HORIZ. BEND	7+903.5	
260.54	261.04	261.19	261.46	261.69	261.86	262.00	262.15	262.18	262.21	262.18	262.10	262.01	261.89	261.79		BOT.EL. OF WM.
7+680	7+700	7+720	7+740	7+760	7+780	7+800	7+820	7+840	7+860	7+880	7+900	7+920	7+940	7+960		EX. ROAD ELEV. / ROAD CHAINAGE

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GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6 — VERTICAL SCALE 1:100

Region of Peel
working with you

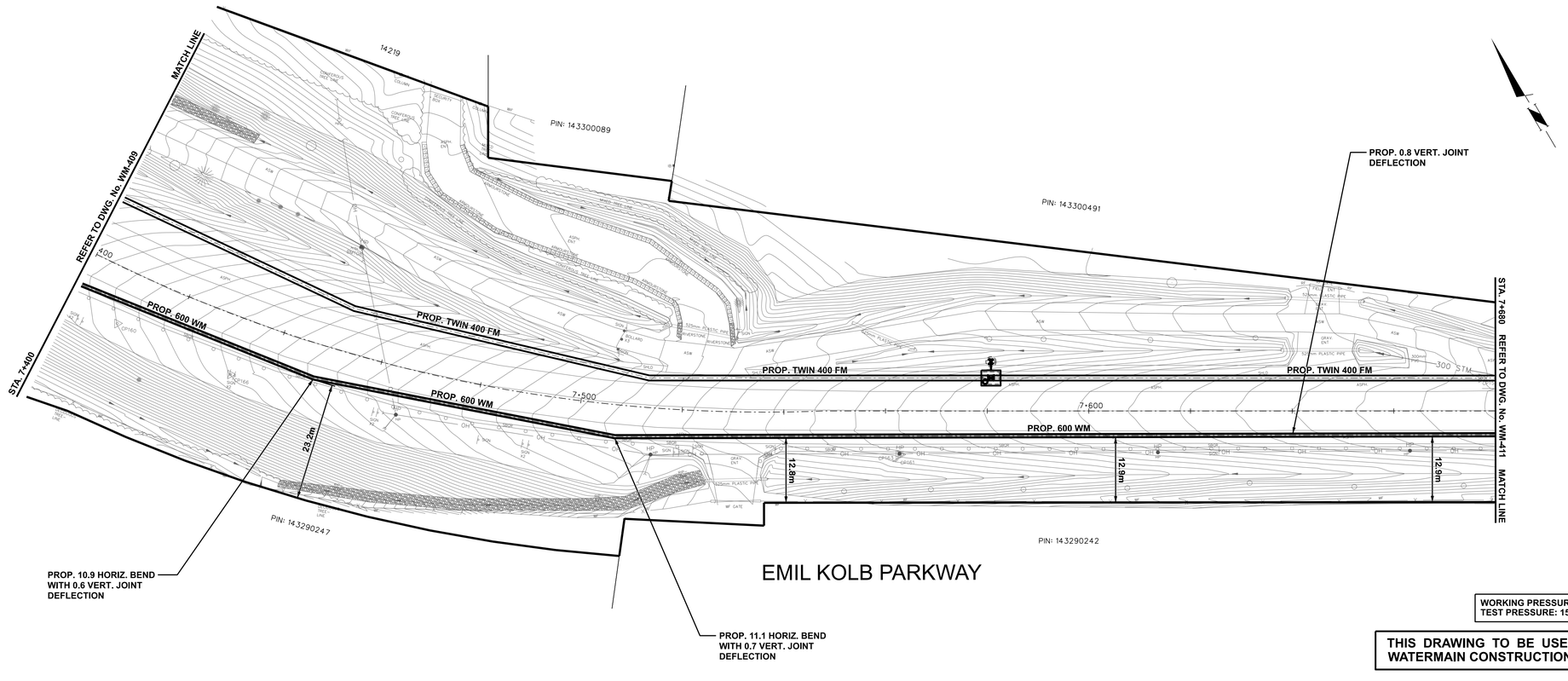
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(FROM HIGHWAY 50 TO KING STREET)

PROP. 600mm WATERMAIN

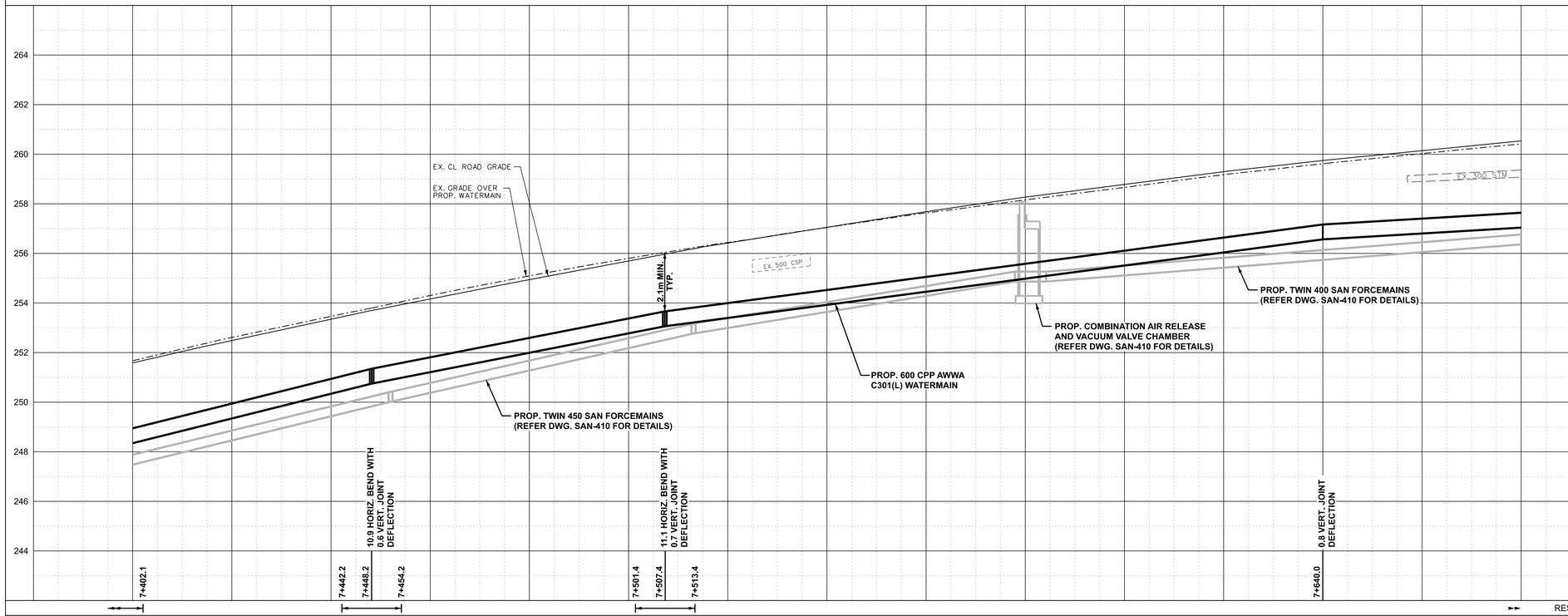
STA. 7+680 TO STA. 7+960

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	34 of 83
		Project No.	XX-XXXX
		Plan No.	**WM-411**



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

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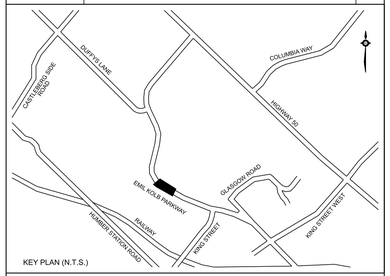
BOT.EL. OF WM.																
251.59	252.49	253.36	254.17	254.94	255.70	256.42	257.06	257.68	258.27	258.81	259.30	259.75	260.15	260.54	EX. ROAD ELEV.
7+400	7+420	7+440	7+460	7+480	7+500	7+520	7+540	7+560	7+580	7+600	7+620	7+640	7+660	7+680	ROAD CHAINAGE

SERVICE DATA

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5) **MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO BELL PLANT, MAINTAIN A MINIMUM OF 1.5m HORIZONTAL CLEARANCE FROM BELL PLANT TO PROPOSED HYDRANTS**
6) **PROPOSED HYDRANT OFFSET TO BE DETERMINED IN THE FIELD (MIN. 1.5m OFFSET TO BELL OR HYDRO POLES)**

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All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
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Agency: Ontario Ministry of Natural Resources and Forestry
B.M. No. 10519980004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

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HYDRO ONE NETWORKS
ALECTRA UTILITIES
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UNION GAS

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ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6 — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

PROP. 600mm WATERMAIN

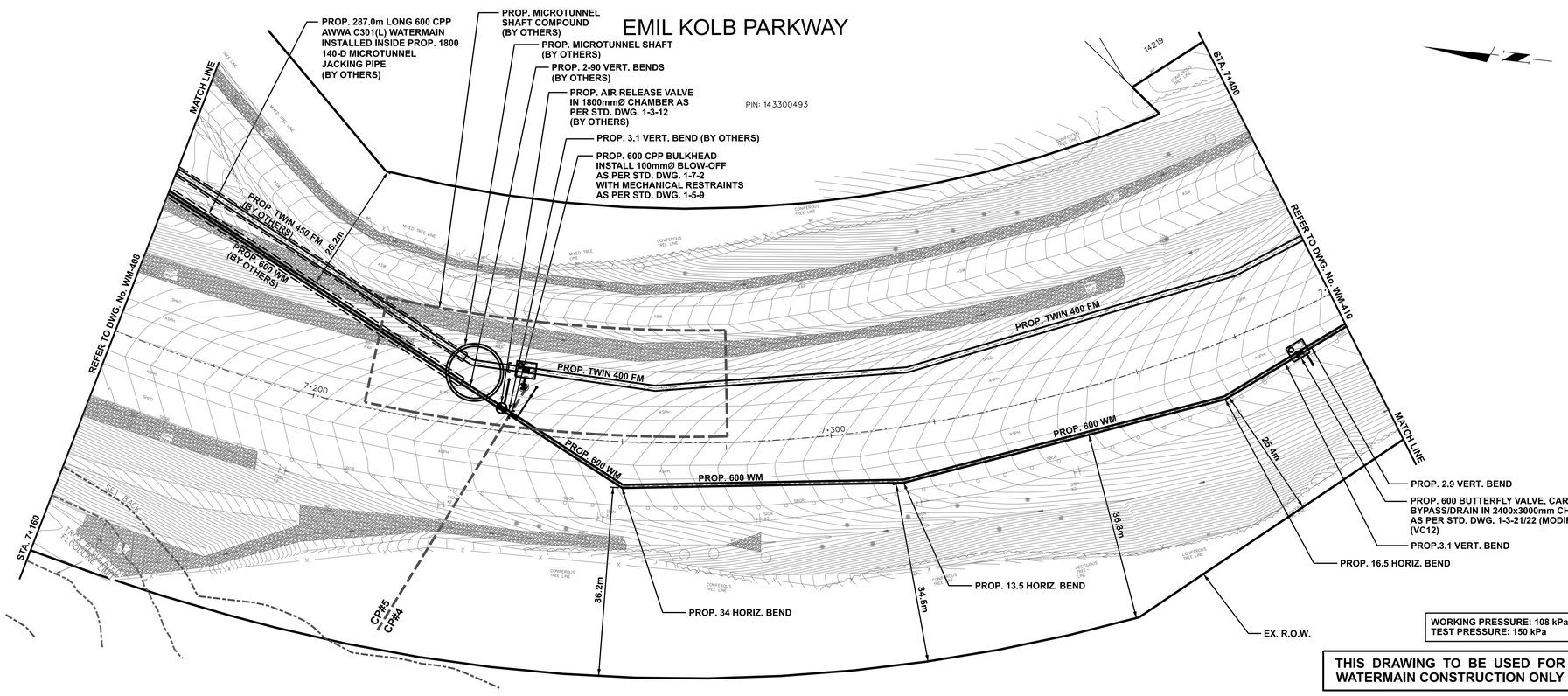
STA. 7+400 TO STA. 7+680

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	35 of 83

Project No. XX-XXXX

Plan No. **WM-410**

EMIL KOLB PARKWAY



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

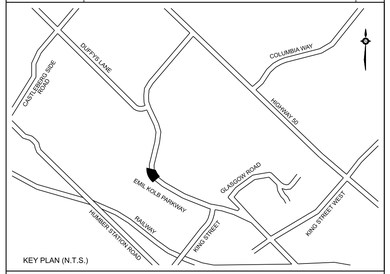
THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
STORM SEWERS	FEB, 00, 2023	X,X,	BELL U/G CABLE	FEB, 00, 2023	X,X,
WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

NOTES:

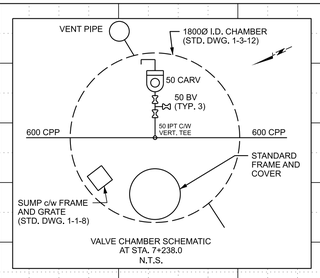
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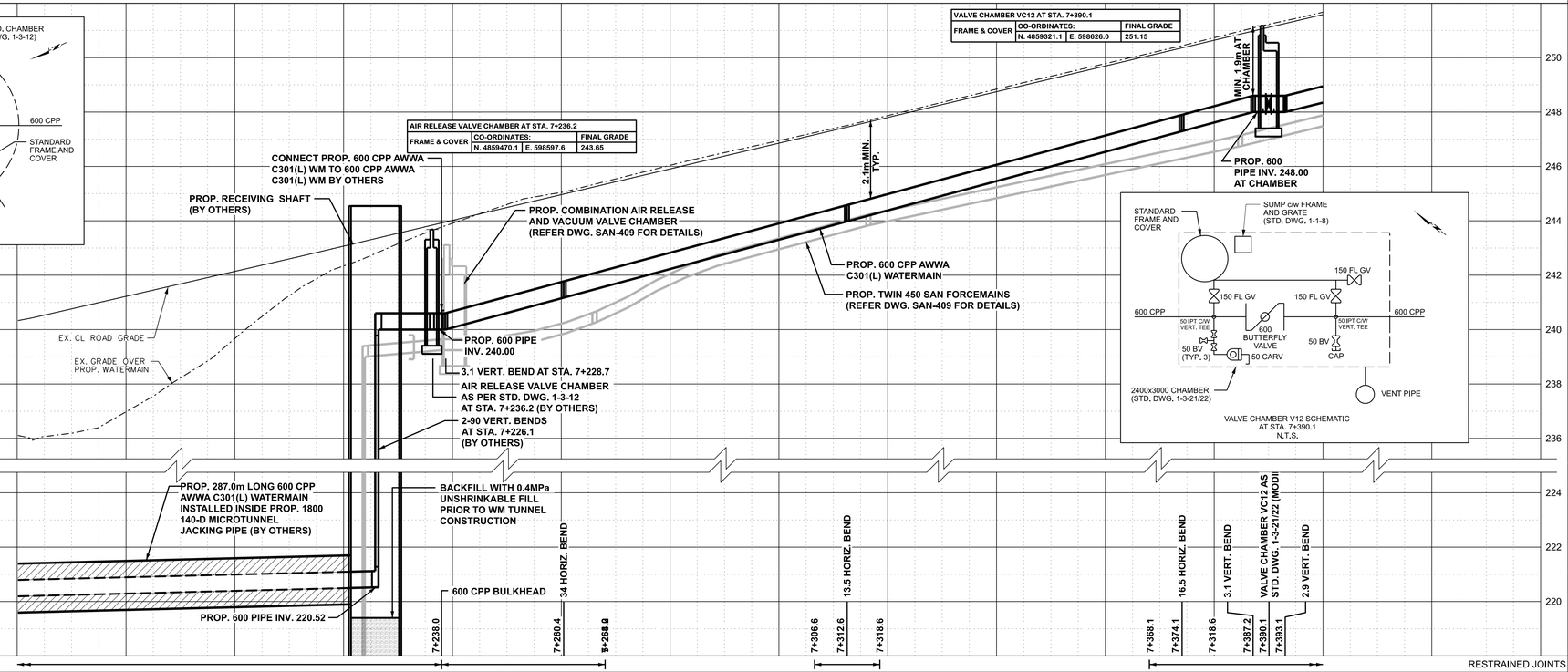
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VALVE CHAMBER SCHEMATIC AT STA. 7+238.0 N.T.S.

AIR RELEASE VALVE CHAMBER AT STA. 7+236.2			
FRAME & COVER	CO-ORDINATES:		FINAL GRADE
	N. 4859470.1	E. 598597.6	243.65

VALVE CHAMBER VC12 AT STA. 7+390.1			
FRAME & COVER	CO-ORDINATES:		FINAL GRADE
	N. 4859321.1	E. 598626.0	251.15



VALVE CHAMBER V12 SCHEMATIC AT STA. 7+390.1 N.T.S.

RESTRAINED JOINTS

BOT.EL. OF WM.														
EX. ROAD ELEV.	240.75	241.66	242.13	243.06	244.02	244.98	245.93	246.88	247.81	249.23	249.71	250.65	251.59	
ROAD CHAINAGE	7+160	7+180	7+200	7+220	7+240	7+260	7+280	7+300	7+320	7+340	7+360	7+380	7+400	

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Elev. 203.xxx (Ellipsoidal)
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Approved by

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TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6 — VERTICAL SCALE 1:100

Region of Peel
working with you

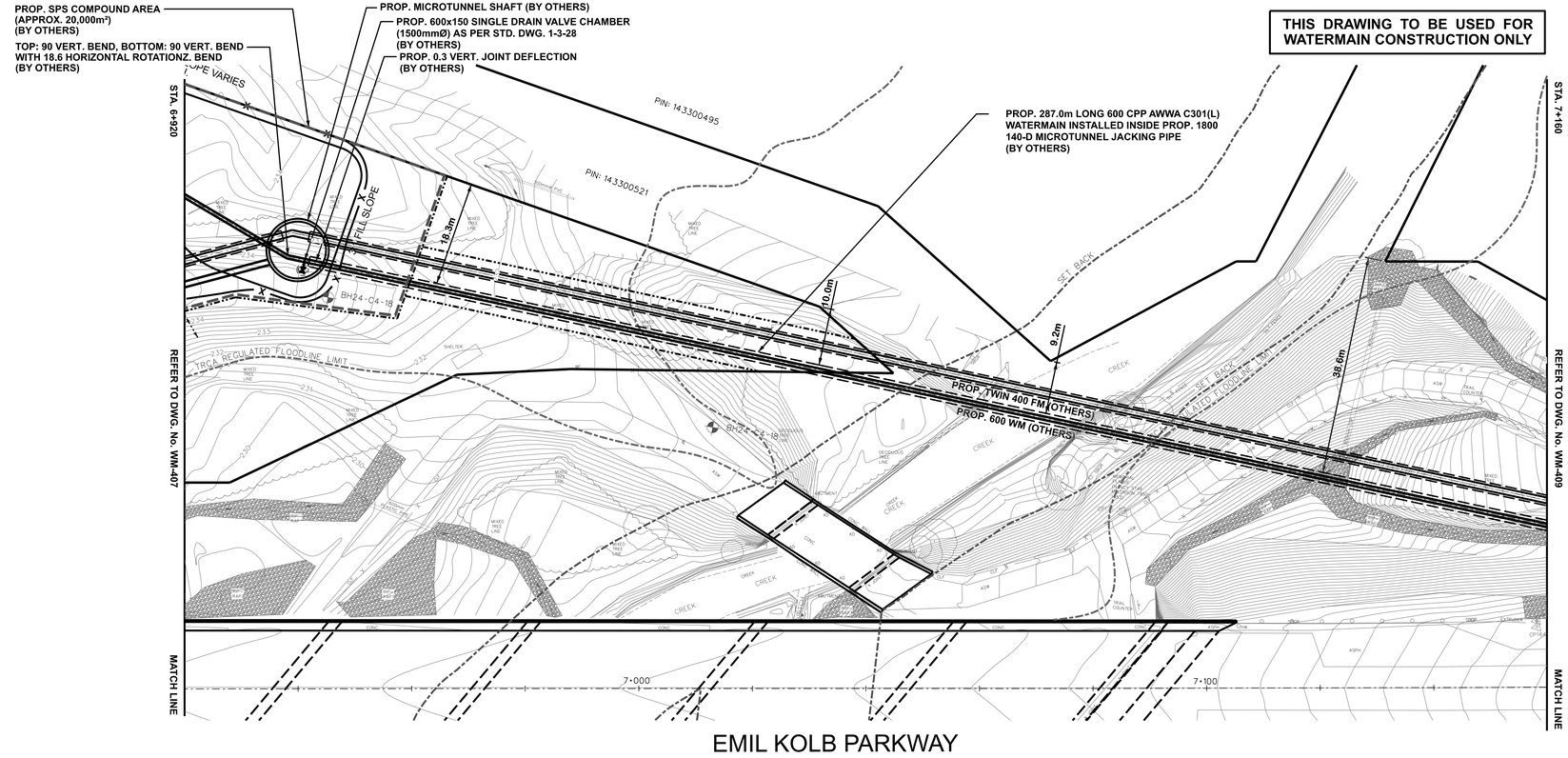
EMIL KOLB PARKWAY

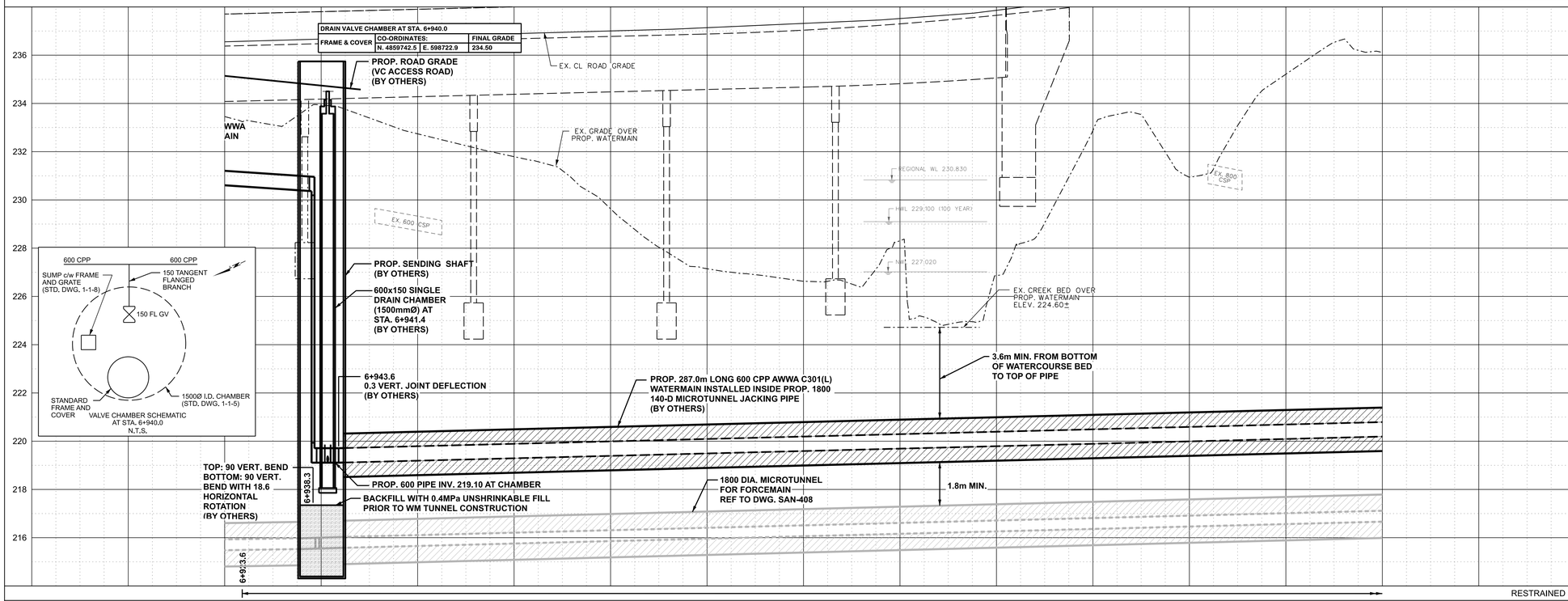
(FROM HIGHWAY 50 TO KING STREET)

PROP. 600mm WATERMAIN

STA. 7+160 TO STA. 7+400

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	36 of 83
Project No.	XX-XXXX		
Plan No.	**WM-409**		



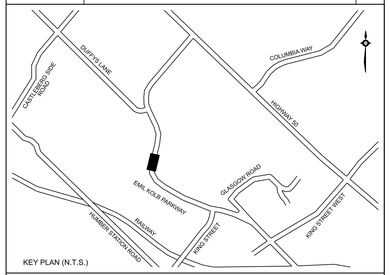


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TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

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10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6 — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

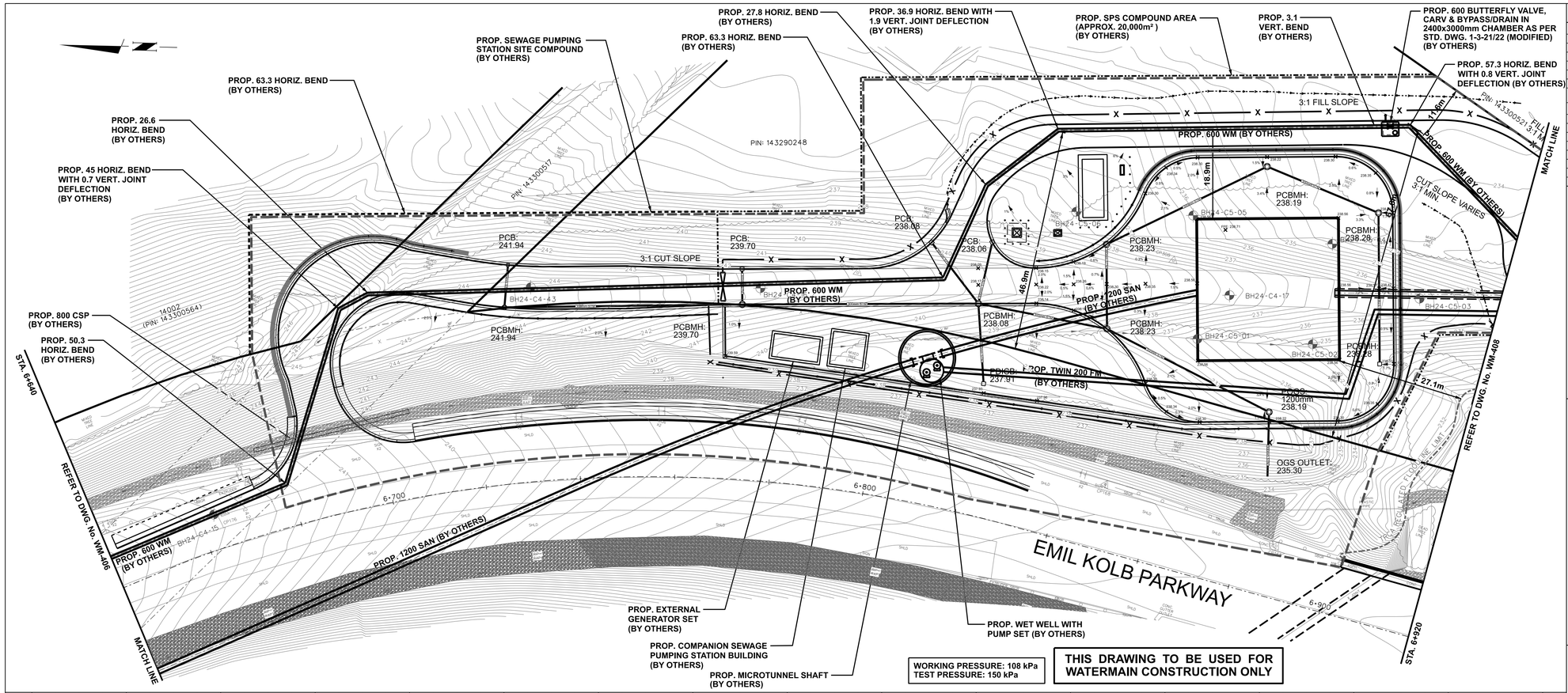
PROP. 600mm WATERMAIN

STA. 6+920 TO STA. 7+160

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	37 of 83

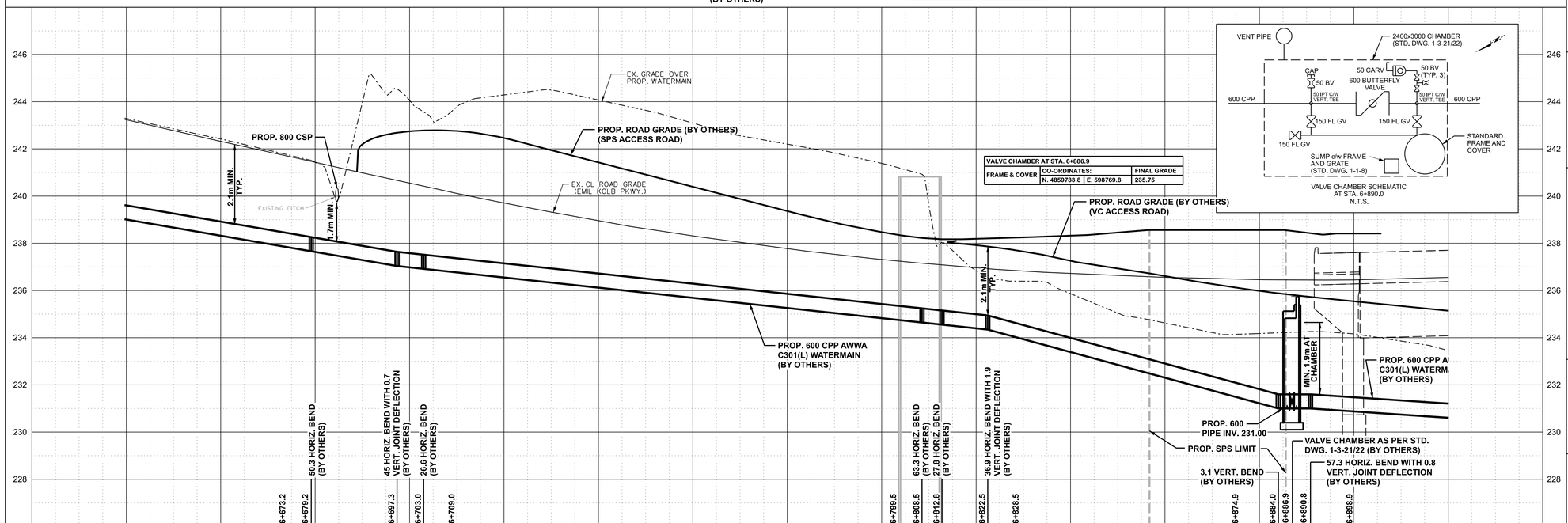
Project No. XX-XXXX

Plan No. **WM-408**



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY



VALVE CHAMBER AT STA. 6+886.9			
FRAME & COVER	CO-ORDINATES:		FINAL GRADE
	N. 4859783.8	E. 598769.8	235.75

VALVE CHAMBER SCHEMATIC
AT STA. 6+890.0
N.T.S.

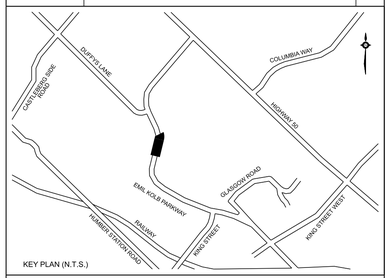
RESTRAINED JOINTS																
BOT.EL. OF WM.																
243.24	242.32	241.43	240.55	239.71	238.96	238.31	237.77	237.31	236.97	236.72	236.56	236.46	236.45	236.55	EX. ROAD ELEV.	
6+640	6+660	6+680	6+700	6+720	6+740	6+760	6+780	6+800	6+820	6+840	6+860	6+880	6+900	6+920	ROAD CHAINAGE	

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
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WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

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DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



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Agency: Ontario Ministry of Natural Resources and Forestry
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10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6 — VERTICAL SCALE 1:100

Region of Peel
working with you

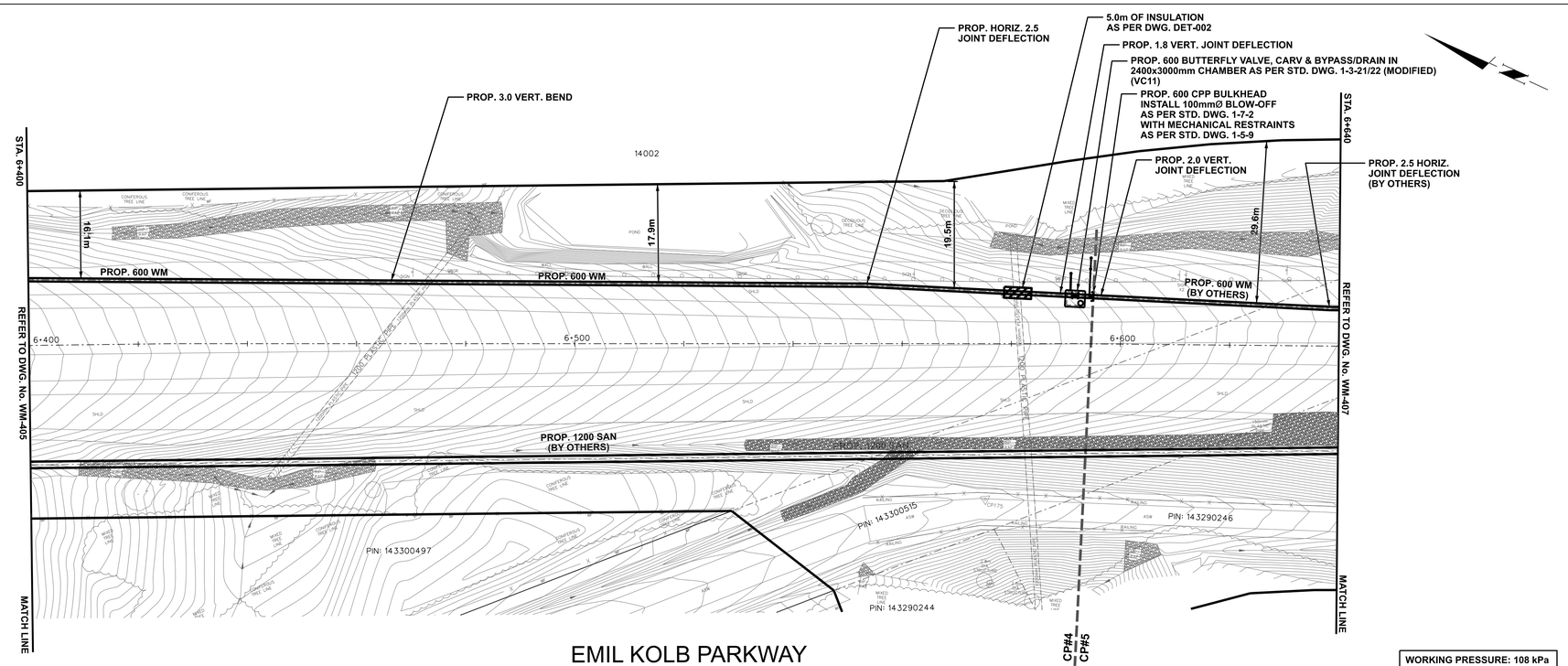
EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

PROP. 600mm WATERMAIN

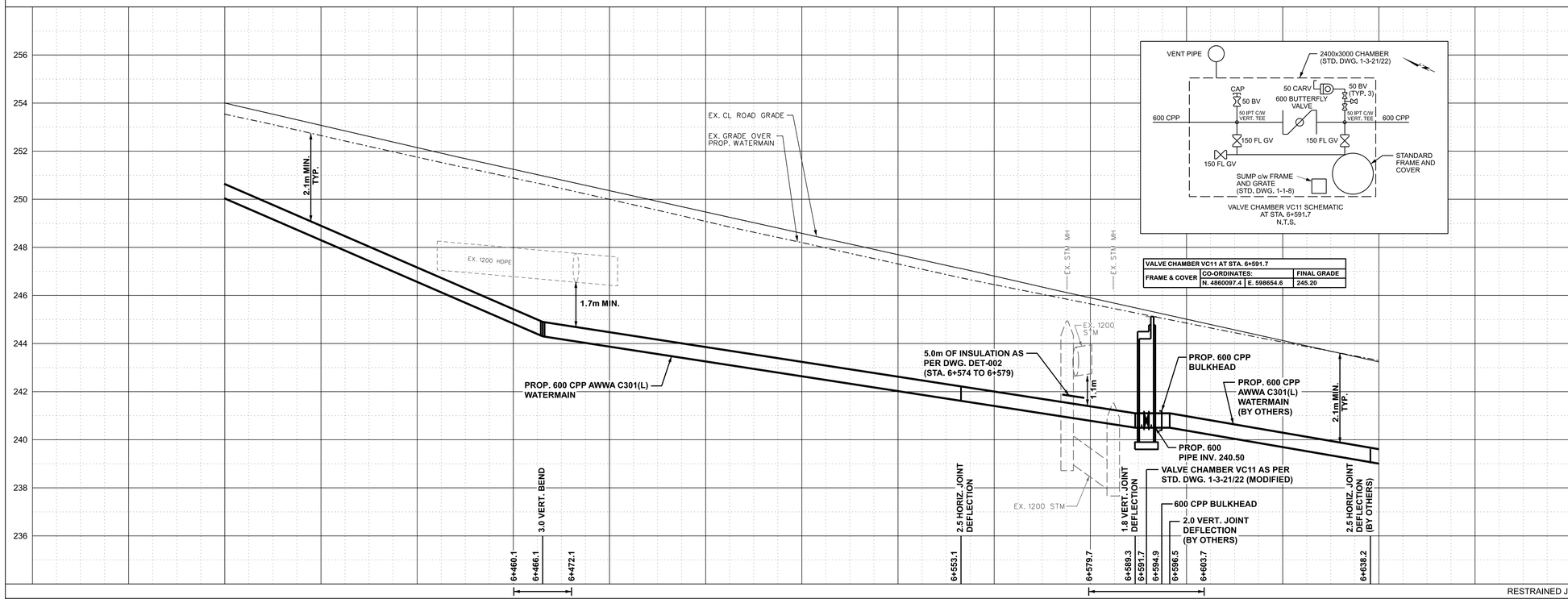
STA. 6+640 TO STA. 6+920

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	38 of 83
		Project No.	XX-XXXX
		Plan No.	**WM-407**



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY



VALVE CHAMBER VC11 SCHEMATIC AT STA. 6+591.7
N.T.S.

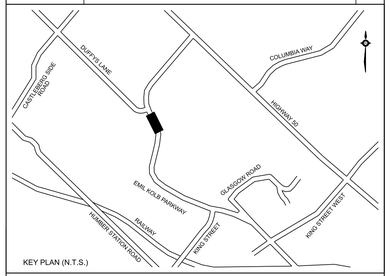
VALVE CHAMBER VC11 AT STA. 6+591.7			
FRAME & COVER	CO-ORDINATES:		FINAL GRADE
	N. 4860097.4	E. 598654.6	245.20

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
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WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

NOTES:

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B.M. No. 10519980004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

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ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

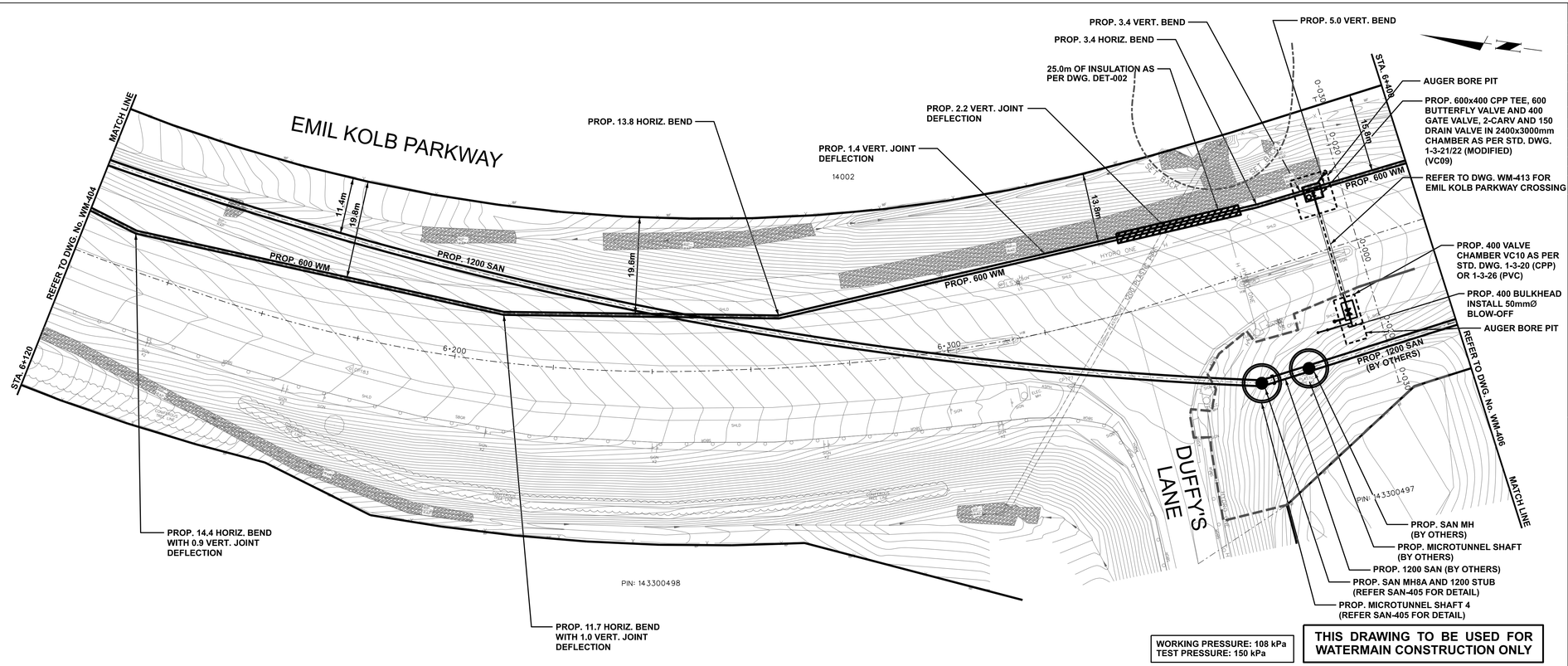
PROP. 600mm WATERMAIN

STA. 6+400 TO STA. 6+640

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	39 of 83

Project No. XX-XXXX

Plan No. **WM-406**

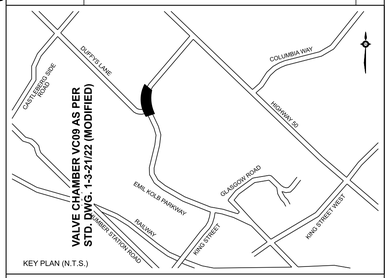


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PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
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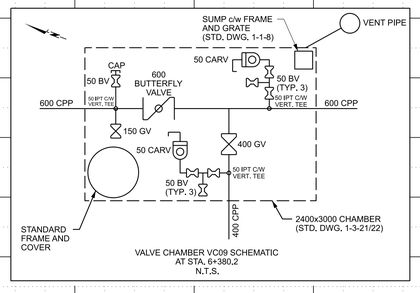
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VALVE CHAMBER VC09 SCHEMATIC AT STA. 6+380.2 N.T.S.

VALVE CHAMBER VC09 AT STA. 6+380.2			
FRAME & COVER	CO-ORDINATES:		FINAL GRADE
	N. 4860292.7	E. 598568.7	254.54

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2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

PROP. 600mm WATERMAIN

STA. 6+120 TO STA. 6+400

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	40 of 83
Project No.	XX-XXXX		
Plan No.	**WM-405**		

EMIL KOLB PARKWAY

14002

STA. 5+840

REFER TO DWG. No. WM-403

MATCH LINE

STA. 6+120

REFER TO DWG. No. WM-405

MATCH LINE

PROP. 1200 SAN

PROP. 600 WM

8.2m

3.0m

2.5m

20.0m

5+900

6+000

6+100

PIN: 143300498

PROP. 0.5 VERT. JOINT DEFLECTION

PROP. 600 BUTTERFLY VALVE, 2-CARV & BY-PASS/DRAIN IN 2400x3000mm CHAMBER AS PER STD. DWG. 1-3-22 (VC08)

PROP. MICROTUNNEL SHAFT COMPOUND 3 (APPROX. 1700m²) (REFER TO DWG. CP-404 FOR COMPOUND DETAIL)

PROP. MICROTUNNEL SHAFT 3

PROP. 90 VERT. BEND AND 90 VERT. BEND WITH 22.5 ROTATION

PROP. DRAIN VALVE CHAMBER VC07 AS PER STD. DWG. 1-3-28 (VC07)

PROP. 0.1 VERT. JOINT DEFLECTION

PROP. 600 CPP AWWA C301(L) WATERMAIN TO BE INSTALLED IN PROP. 1200 140-D MICROTUNNEL JACKING PIPE (APPROX. LENGTH 404.1m, RADIUS 4000m)

WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

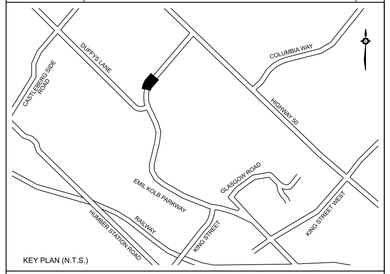
THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY

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ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

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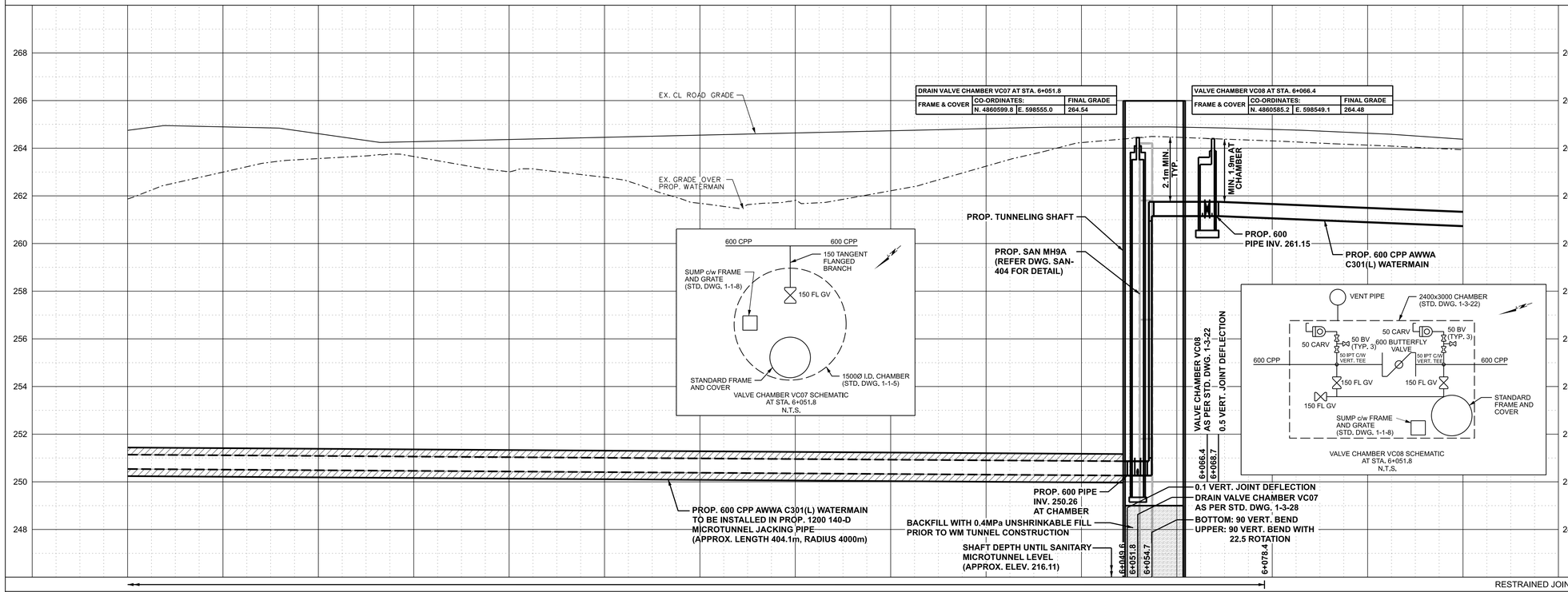
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BOT.EL. OF WM.	264.38	264.32	264.26	264.31	264.36	264.46	264.56	264.66	264.75	264.84	264.89	264.89	264.80	264.63	264.38	EX. ROAD ELEV.
ROAD CHAINAGE	5+840	5+860	5+880	5+900	5+920	5+940	5+960	5+980	6+000	6+020	6+040	6+060	6+080	6+100	6+120	

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TELUS COMMUNICATION

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working with you

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(FROM HIGHWAY 50 TO KING STREET)

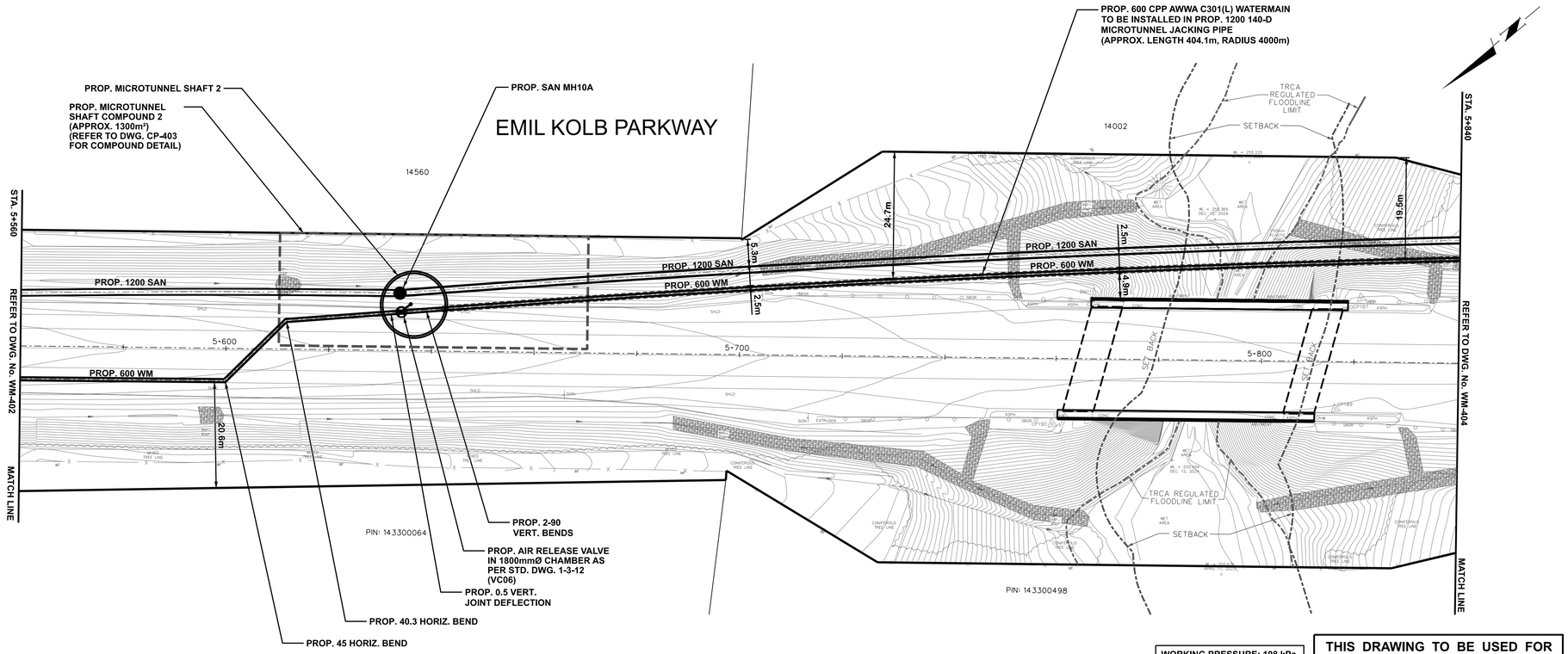
PROP. 600mm WATERMAIN

STA. 5+840 TO STA. 6+120

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	41 of 83

Project No. XX-XXXX

Plan No. **WM-404**



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

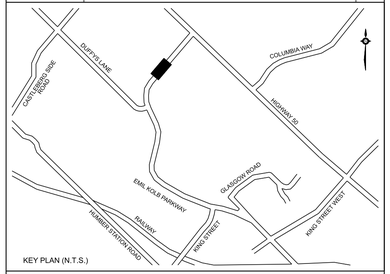
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ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

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KEY PLAN (N.T.S.)

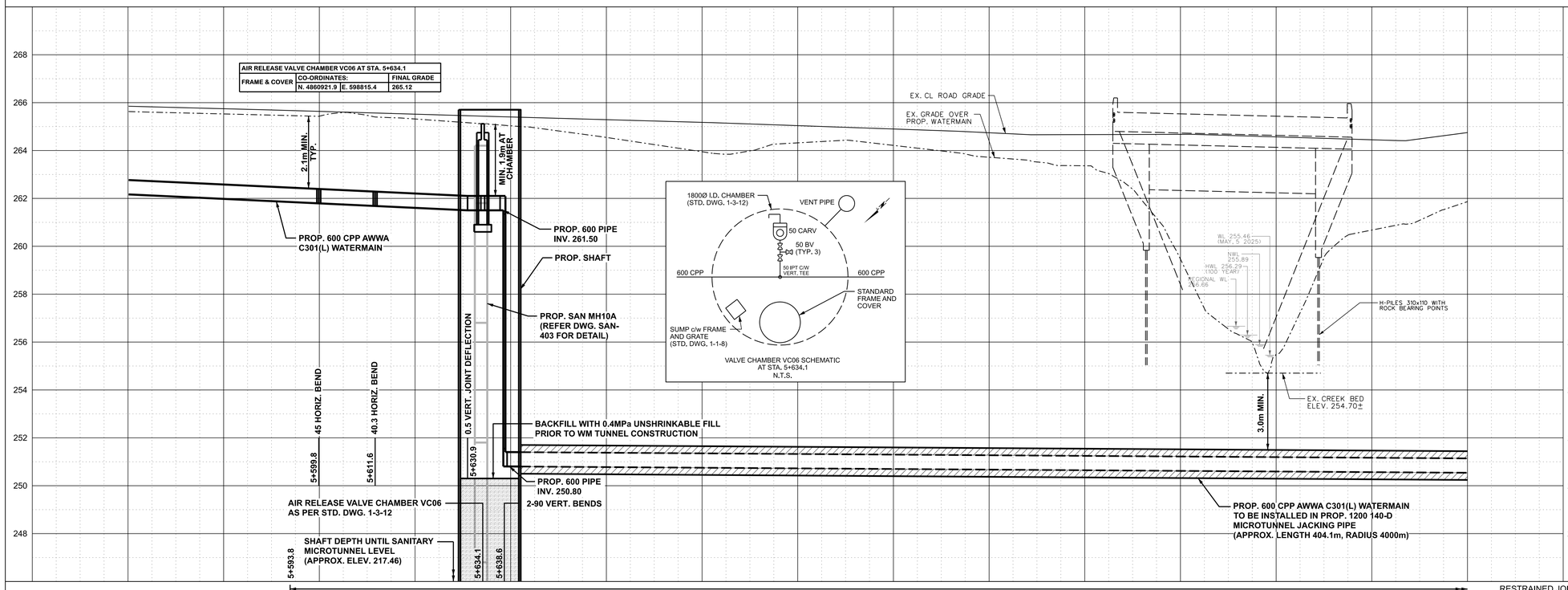
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BOT.EL. OF WM.																
265.85	265.74	265.62	265.50	265.40	265.30	265.18	265.03	264.90	264.74	264.67	264.67	264.58	264.45	264.38	EX. ROAD ELEV.	
5+560	5+580	5+600	5+620	5+640	5+660	5+680	5+700	5+720	5+740	5+760	5+780	5+800	5+820	5+840	ROAD CHAINAGE	

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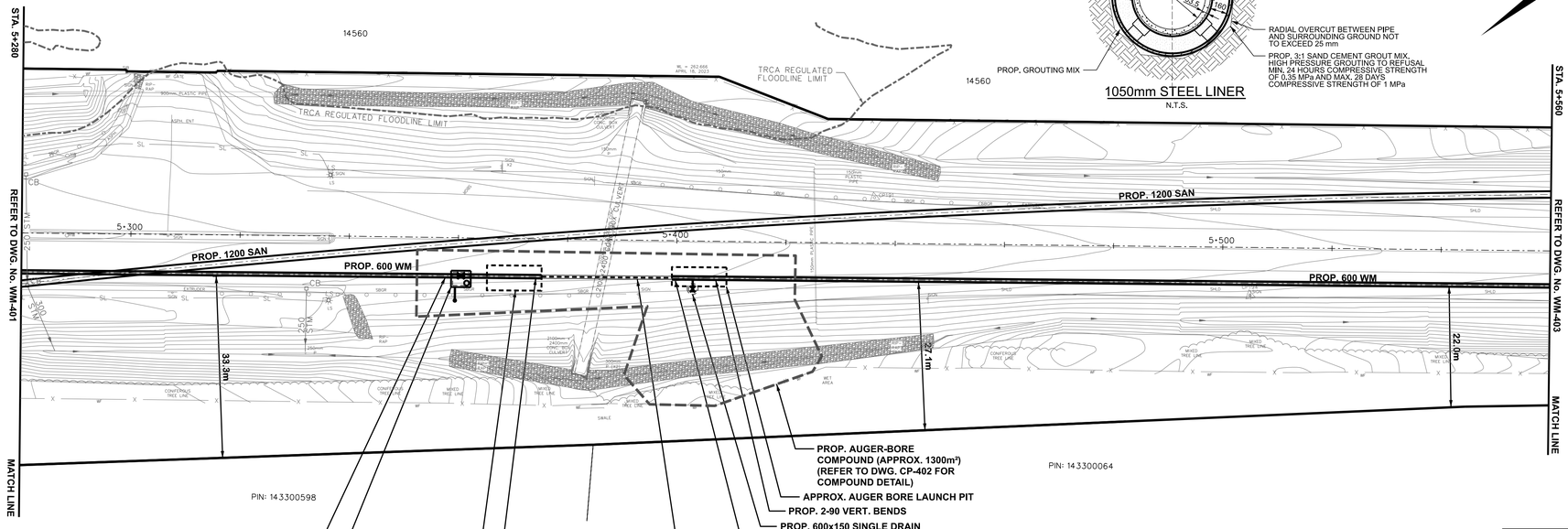
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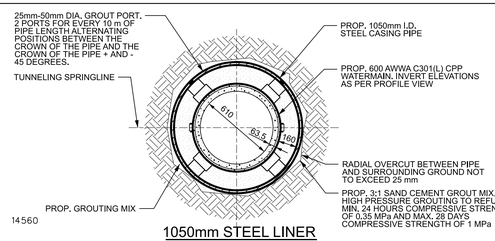
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STA. 5+560 TO STA. 5+840

CAD Area	X-XX	Area	C-12/C-13	Project No.	XX-XXXX
Checked by	G.J.	Drawn by	M.L.		
Date	FEB. 2026	Sheet	42 of 83	Plan No.	**WM-403**

EMIL KOLB PARKWAY





1050mm STEEL LINER
N.T.S.

WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

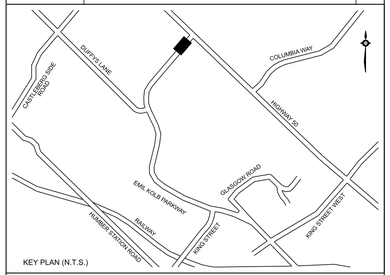
THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

NOTES:

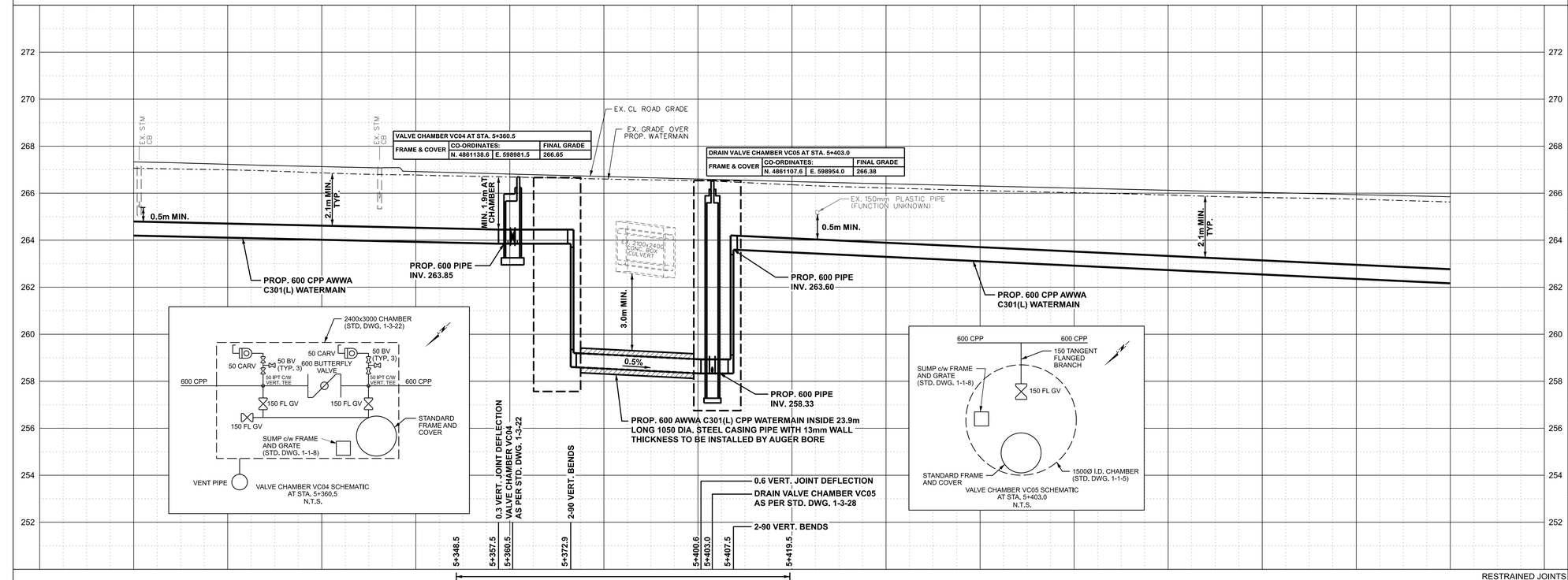
1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG, DET-001 TO DET-018
2. HYDRANTS AND VALVES ARE NOT SHOWN TO SCALE ON DRAWINGS. ALL HYDRANTS AND VALVES ARE AMPLIFIED FOR VISUAL REPRESENTATION.

UTILITY NOTES:
1) **HAND DIG WITHIN 1m OF (OR WHEN CROSSING) CABLE TV, BELL, GAS OR HYDRO PLANT**
2) **MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO GASMAINS**
3) **MAINTAIN A MINIMUM OF 0.3m VERTICAL CLEARANCE TO GASMAINS OR HYDRO PLANT**
4) **TESTHOLES REQUIRED PRIOR TO CONSTRUCTION TO DETERMINE ACTUAL DEPTHS OF GASMAINS**
5) **MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO BELL PLANT, MAINTAIN A MINIMUM OF 1.5m HORIZONTAL CLEARANCE FROM BELL PLANT TO PROPOSED HYDRANTS**
6) **PROPOSED HYDRANT OFFSET TO BE DETERMINED IN THE FIELD (MIN. 1.5m OFFSET TO BELL OR HYDRO POLES)**

CONTRACT DRAWINGS

Contractor must verify all dimensions and be responsible for same, Any discrepancies must be reported to the Engineer before commencing work, Drawings are not to be scaled, Drawings may not be used for any purpose other than that stipulated in the contract agreement between the owner/client and the Engineer without the express written consent of Ainley & Associates Limited. Use of these drawings by any party for any other purpose is subject to the following caution.

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General Notes

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All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm

20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency: Ontario Ministry of Natural Resources and Forestry
B.M. No. 10519980004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

GEI Consultants Canada

Approved by _____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

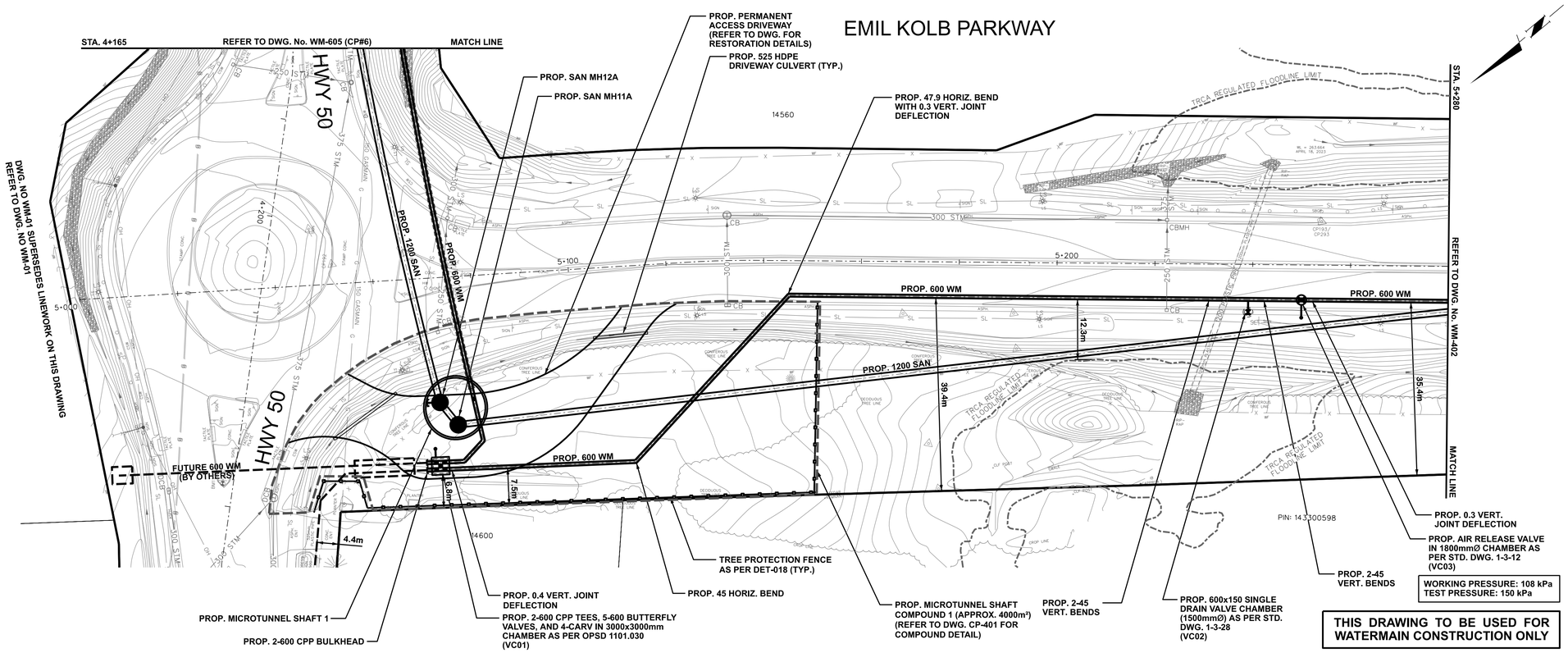
(FROM HIGHWAY 50 TO KING STREET)

PROP. 600mm WATERMAIN

STA. 5+280 TO STA. 5+560

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	43 of 83
Project No.	XX-XXXX		
Plan No.	**WM-402**		

EMIL KOLB PARKWAY

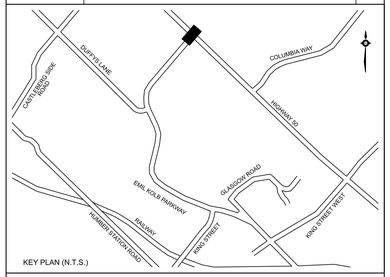


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB. 00, 2023	X.X.	GAS MAINS	FEB. 00, 2023	X.X.
STORM SEWERS	FEB. 00, 2023	X.X.	BELL U/G CABLE	FEB. 00, 2023	X.X.
WATERMAINS	FEB. 00, 2023	X.X.	HYDRO U/G CABLE	FEB. 00, 2023	X.X.
TRANSIT	FEB. 00, 2023	X.X.	HYDRO ONE	FEB. 00, 2023	X.X.
PARKS & REC.	FEB. 00, 2023	X.X.	CTV	FEB. 00, 2023	X.X.
ONT. CLEAN WATER	FEB. 00, 2023	X.X.	COMMUNIC. CABLES	FEB. 00, 2023	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



NOTES:

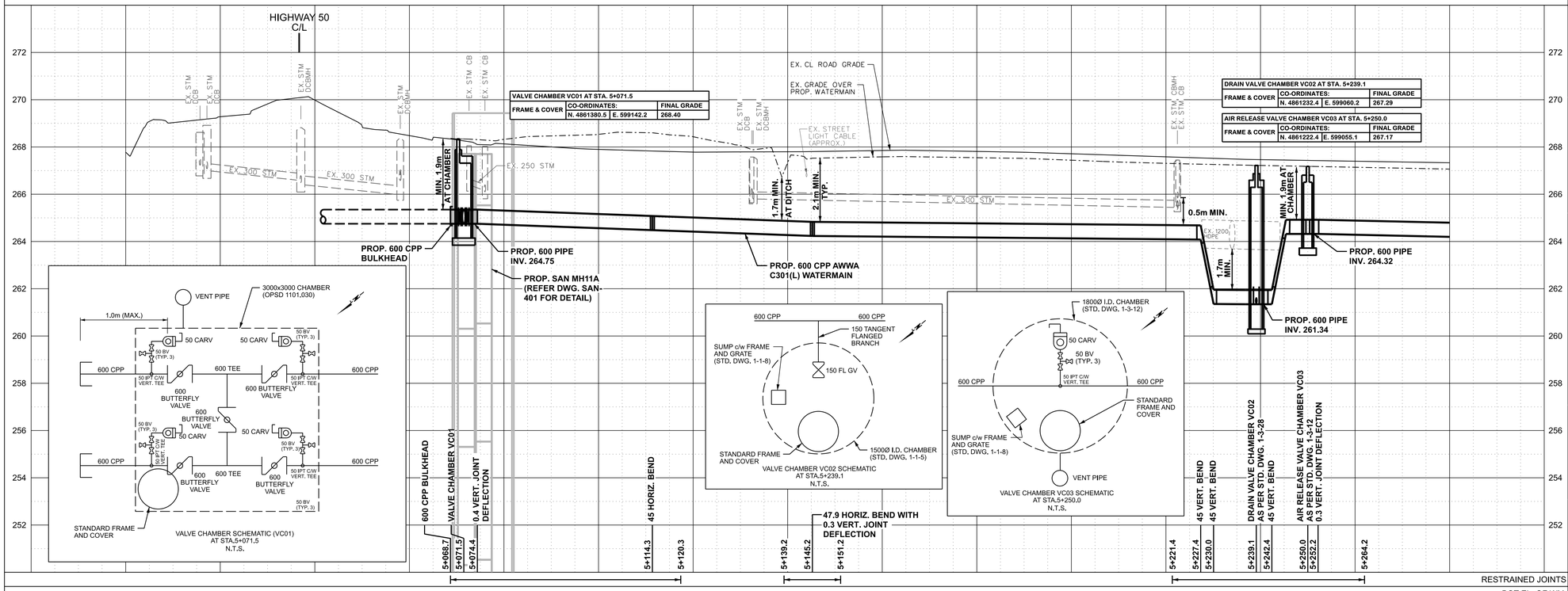
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267.78	269.28	269.98	268.48	268.13	267.90	267.78	267.80	267.85	267.81	267.71	267.59	267.48	267.41	267.33	BOT.EL. OF WM.
267.78	269.28	269.98	268.48	268.13	267.90	267.78	267.80	267.85	267.81	267.71	267.59	267.48	267.41	267.33	EX. ROAD ELEV.
5+000	5+020	5+040	5+060	5+080	5+100	5+120	5+140	5+160	5+180	5+200	5+220	5+240	5+260	5+280	ROAD CHAINAGE

General Notes

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All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
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Agency: Ontario Ministry of Natural Resources and Forestry
B.M. No. 10519980004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

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ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

EMIL KOLB PARKWAY

(FROM HIGHWAY 50 TO KING STREET)

PROP. 600mm WATERMAIN

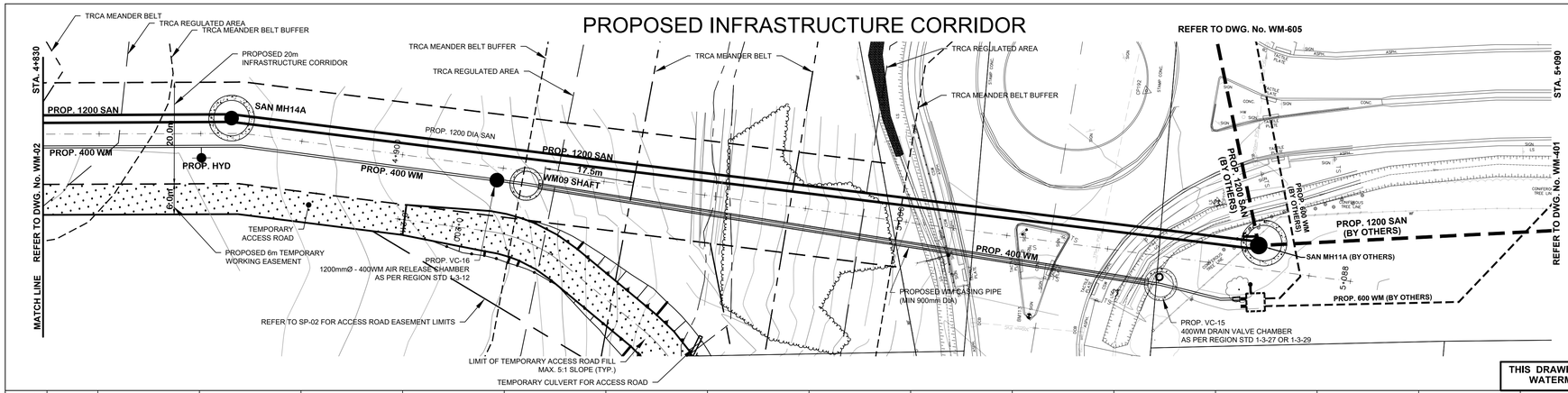
STA. 5+000 TO STA. 5+280

CAD Area	X-XX	Area	C-12/C-13
Checked by		Drawn by	
Date	FEB. 2026	Sheet	44 of 83

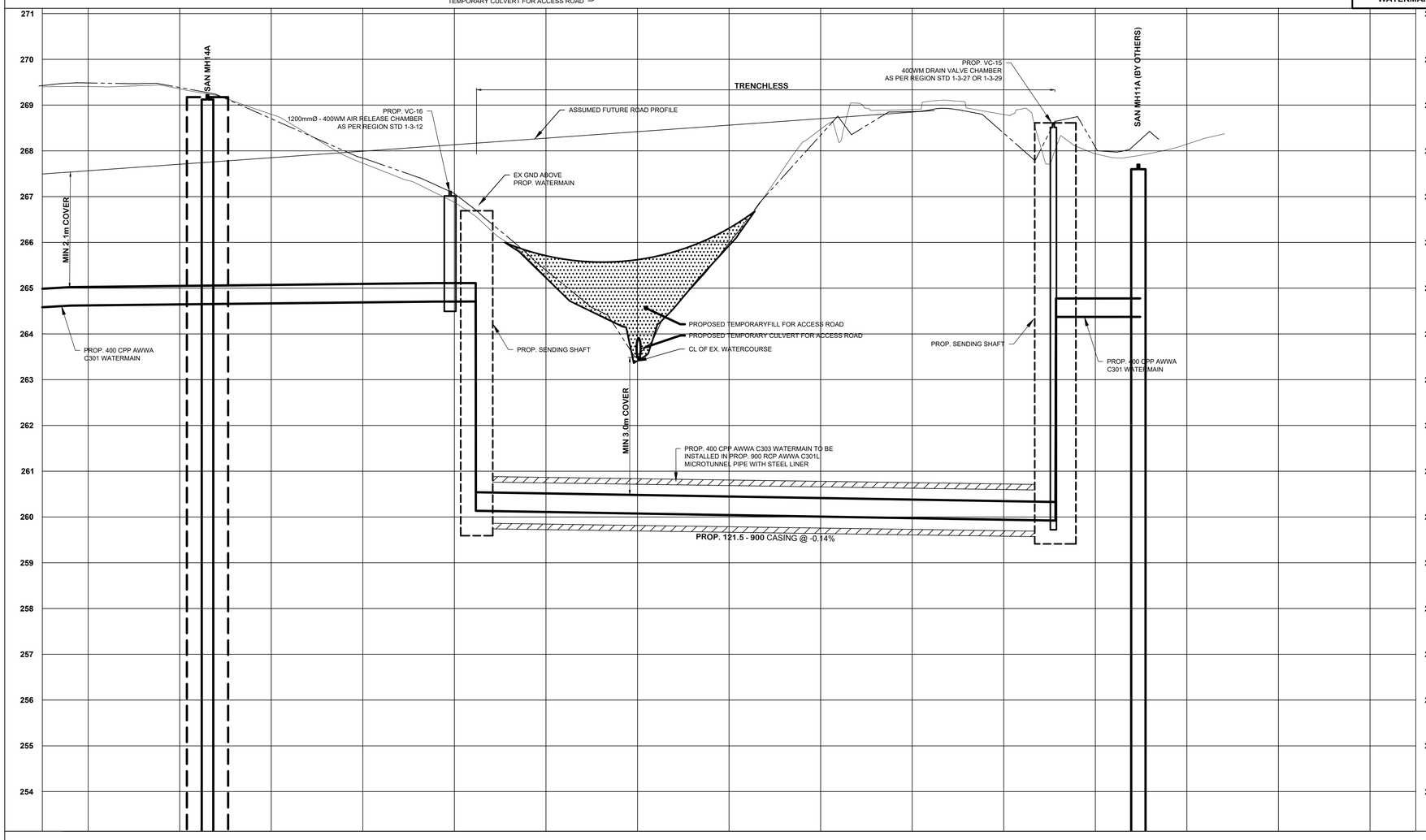
Project No. XX-XXXX

Plan No. **WM-401**

PROPOSED INFRASTRUCTURE CORRIDOR



THIS DRAWING TO BE USED FOR WATERMAIN DESIGN ONLY



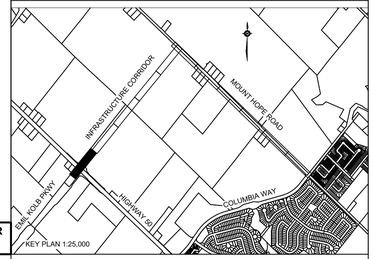
RESTRAINED JOINTS																	
264.62	264.65	264.67	264.69	264.71	260.11	260.08	260.04	260.01	259.97	259.94	264.37						BOT.EL. OF WM.
269.41	269.35	268.80	267.73	266.88	265.25	263.41	265.93	268.47	268.90	268.79	267.93	268.15					EX. ROAD ELEV.
4+840	4+860	4+880	4+900	4+920	4+940	4+960	4+980	5+000	5+020	5+040	5+060	5+080	5+100	5+120	5+130		ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

General Notes

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All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

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HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

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HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/3G NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE
1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

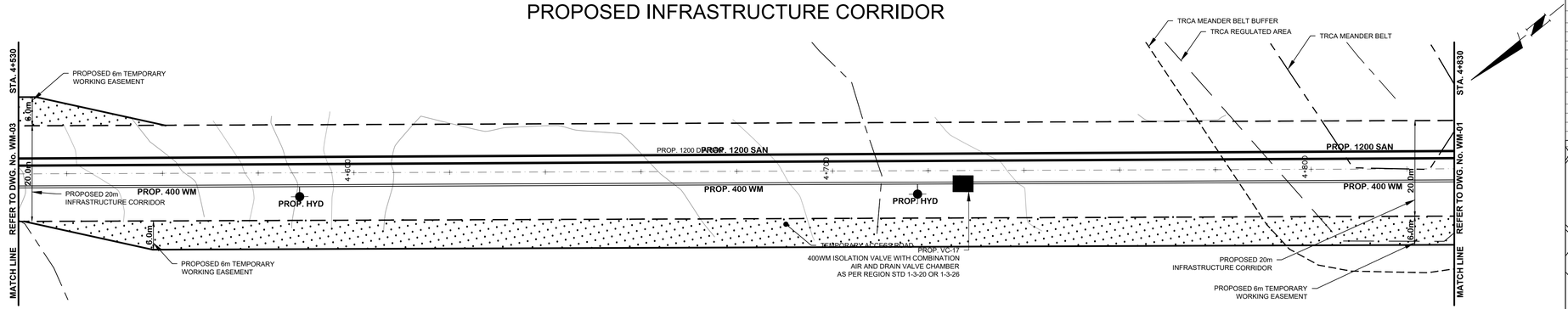
INFRASTRUCTURE CORRIDOR PROPOSED 400mm WATERMAIN STA.4+830 TO STA.5+090

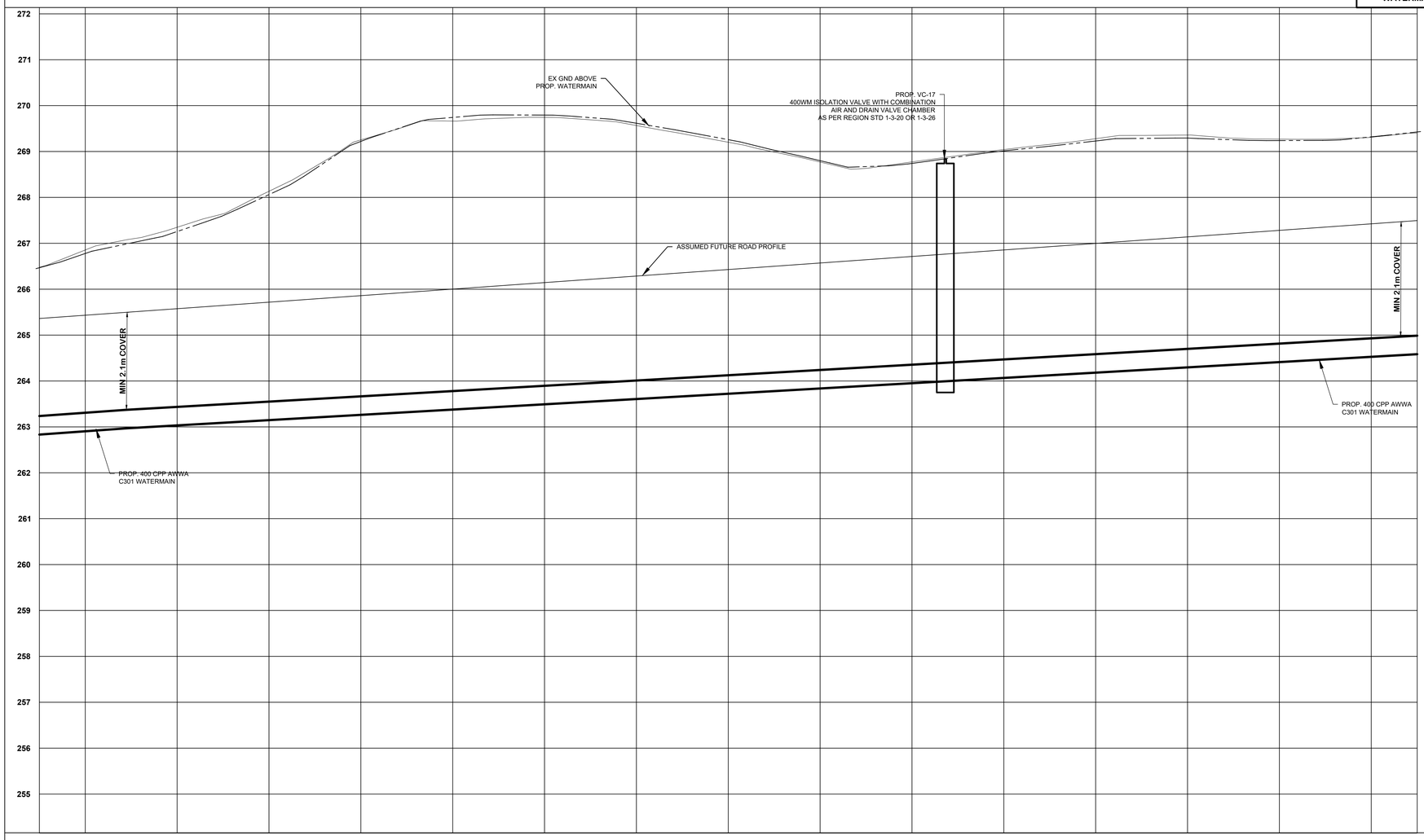
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX
Checked by	E.M.	Drawn by	P.M.
Date	FEB 2026	Sheet	45 OF 83

Project No. XX-XXXX
Plan No. **WM-01**

PROPOSED INFRASTRUCTURE CORRIDOR





RESTRAINED JOINTS																	
262.83	262.90	263.03	263.15	263.26	263.38	263.49	263.61	263.72	263.84	263.95	264.07	264.18	264.30	264.41	264.53	264.58	BOT.EL. OF WM.
	266.85	267.35	268.13	269.25	269.66	269.74	269.57	269.20	268.77	268.77	269.04	269.28	269.36	269.27	269.31		EX. ROAD ELEV.
	4+540	4+560	4+580	4+600	4+620	4+640	4+660	4+680	4+700	4+720	4+740	4+760	4+780	4+800	4+820	4+830	ROAD CHAINAGE

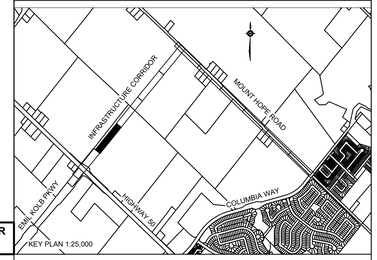
THIS DRAWING TO BE USED FOR WATERMAIN DESIGN ONLY

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

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All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
200 Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

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FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE
1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
working with you

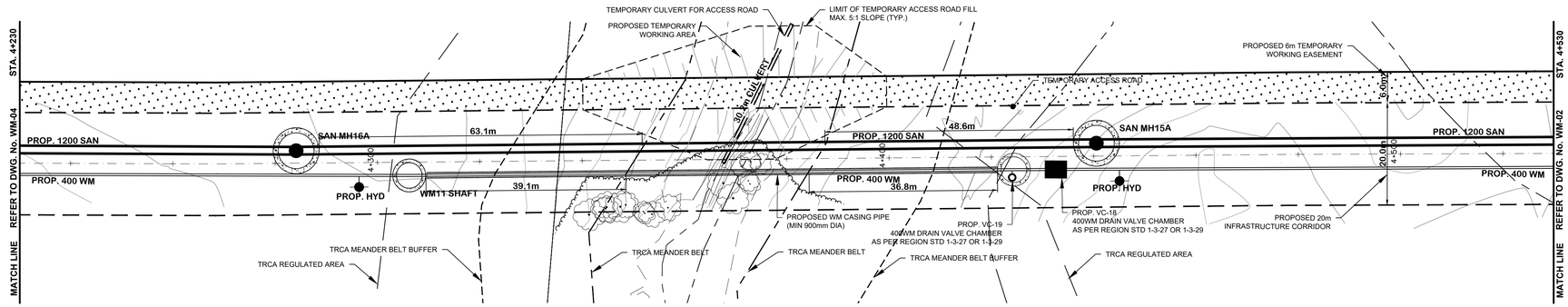
BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

INFRASTRUCTURE CORRIDOR PROPOSED 400mm WATERMAIN STA.4+530 TO STA.4+830

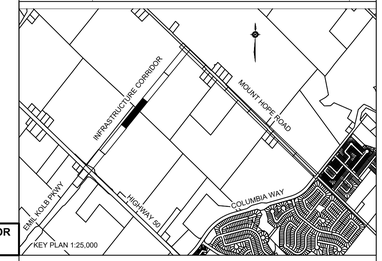
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

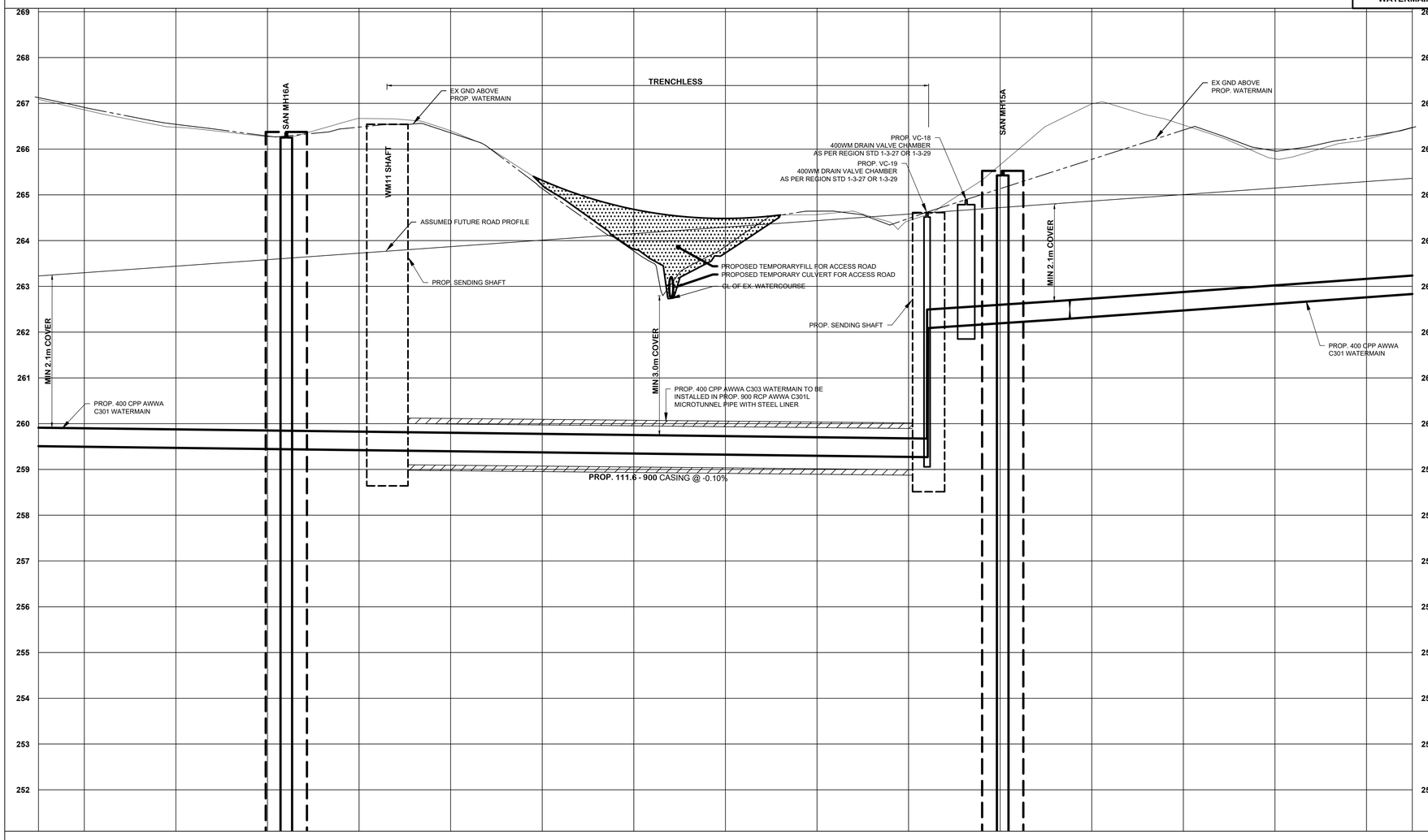
CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB 2026	Sheet	46 OF 83	Plan No.	WM-02

PROPOSED INFRASTRUCTURE CORRIDOR



THIS DRAWING TO BE USED FOR WATERMAIN DESIGN ONLY





RESTRAINED JOINTS																		
259.51	259.50	259.47	259.45	259.42	259.40	259.37	259.35	259.32	259.30	259.27	262.19	262.33	262.47	262.62	262.76	262.83	BOT.EL. OF WM.
	266.86	266.48	266.27	266.67	266.40	265.21	263.82	263.73	264.57	264.43	265.66	266.99	266.53	265.79	266.22		EX. ROAD ELEV.
	4+240	4+260	4+280	4+300	4+320	4+340	4+360	4+380	4+400	4+420	4+440	4+460	4+480	4+500	4+520	4+530	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.

NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

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All Pipes Size In mm
200 Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

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TOWN OF CALEDON WORKS DEPT.
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ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m HORIZONTAL SCALE
1m 0 1 2 3m VERTICAL SCALE

Region of Peel
working with you

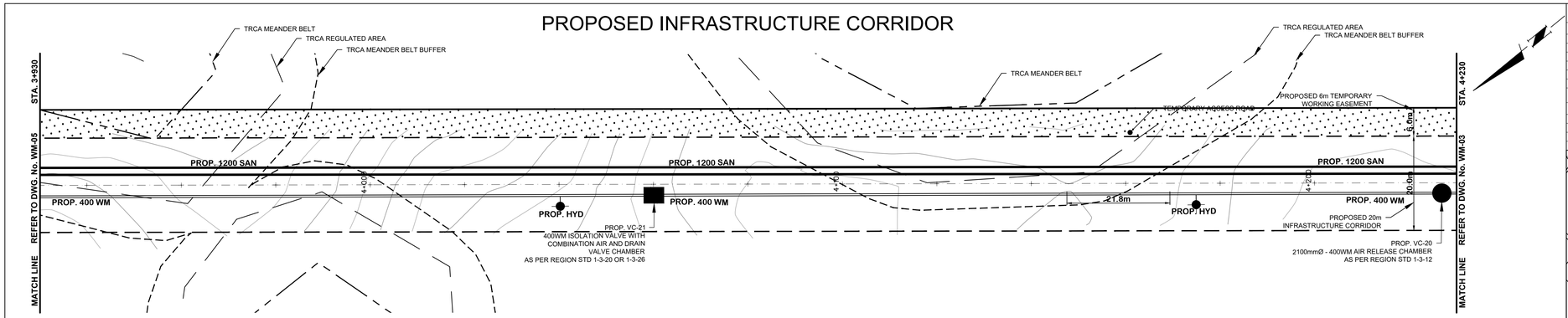
BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

INFRASTRUCTURE CORRIDOR PROPOSED 400mm WATERMAIN STA.4+230 TO STA.4+530

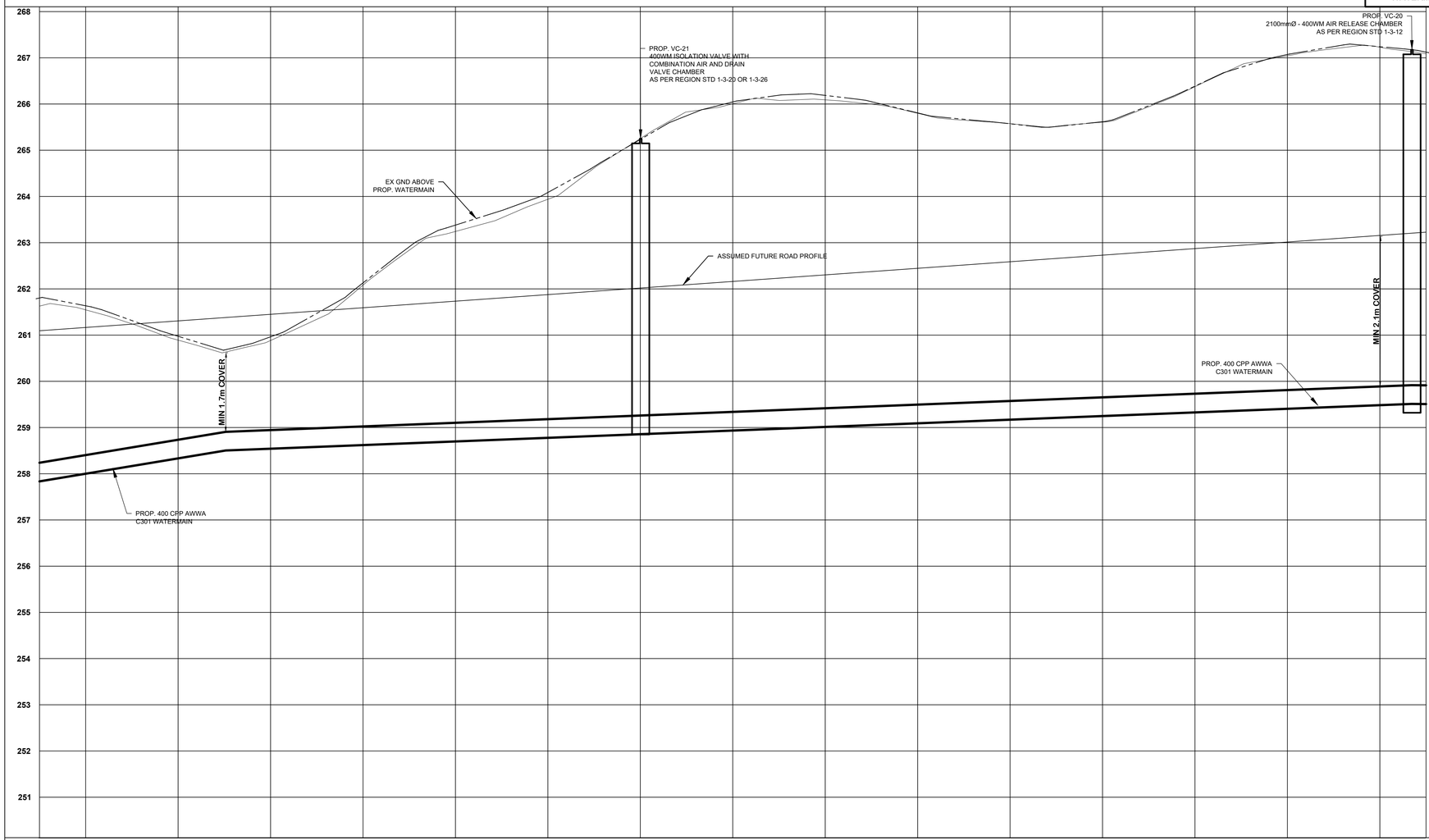
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB 2026	Sheet	47 OF 83	Plan No.	WM-03

PROPOSED INFRASTRUCTURE CORRIDOR



THIS DRAWING TO BE USED FOR WATERMAIN DESIGN ONLY



257.83	258.00	258.33	258.54	258.62	258.70	258.78	258.86	258.93	259.01	259.09	259.17	259.25	259.33	259.41	259.48	259.51	BOT.EL. OF WM.
	261.55	260.89	260.88	262.08	263.24	263.94	265.25	266.01	266.09	265.80	265.58	265.61	266.38	267.04	267.23		EX. ROAD ELEV.
	3+940	3+960	3+980	4+000	4+020	4+040	4+060	4+080	4+100	4+120	4+140	4+160	4+180	4+200	4+220	4+230	ROAD CHAINAGE

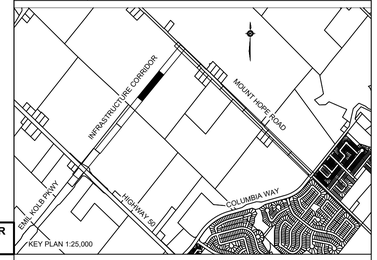
RESTRAINED JOINTS

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

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All Pipes Size In mm
200 Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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HYDRO ONE NETWORKS
ALECTRA UTILITIES
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ROGERS CABLE
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PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

Region of Peel
working with you

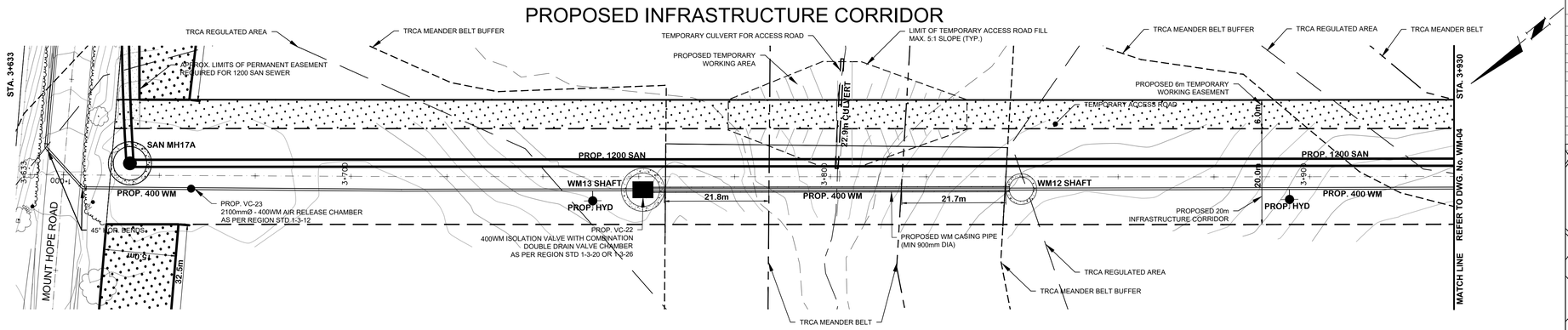
BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

INFRASTRUCTURE CORRIDOR
PROPOSED 400mm WATERMAIN
STA.3+930 TO STA.4+230

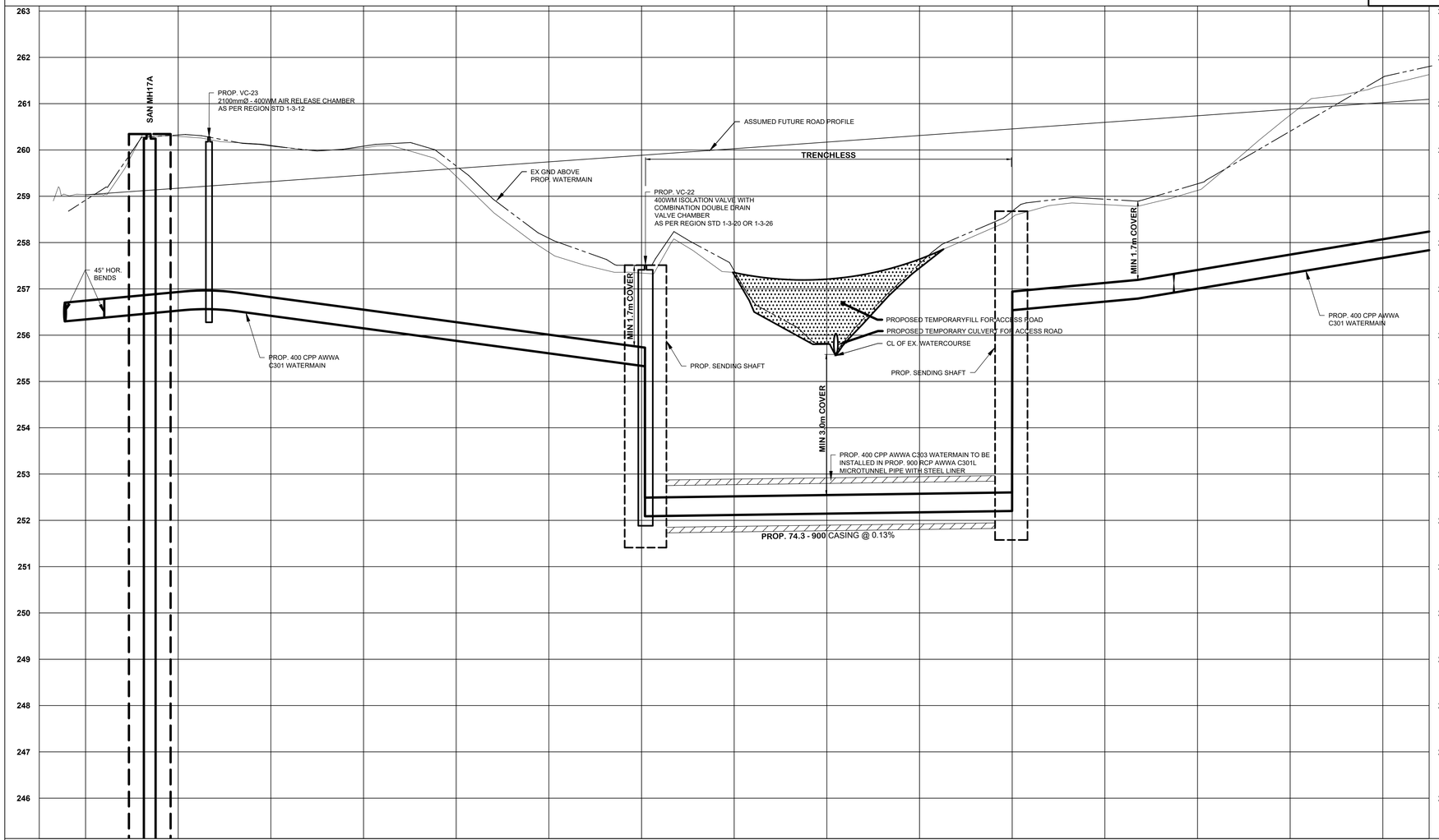
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.	Plan No.	WM-04
Date	FEB 2026	Sheet	48 OF 83		

PROPOSED INFRASTRUCTURE CORRIDOR



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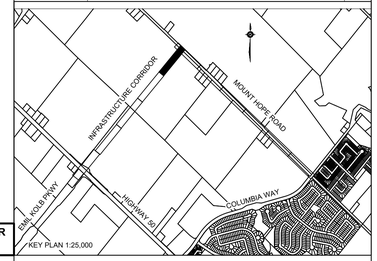
RESTRAINED JOINTS																	
256.34	256.53	256.42	256.15	255.88	255.61	255.34	252.12	252.15	252.17	254.37	256.72	257.00	257.34	257.67	257.83	BOT.EL. OF WM.
259.03	260.29	260.10	260.04	259.43	257.79	257.34	257.30	255.81	257.45	258.54	258.82	259.13	260.75	261.40		EX. ROAD ELEV.
3+640	3+660	3+680	3+700	3+720	3+740	3+760	3+780	3+800	3+820	3+840	3+860	3+880	3+900	3+920	3+930	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

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AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



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All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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Approved by

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GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE
1m 0 1 2 3m — VERTICAL SCALE

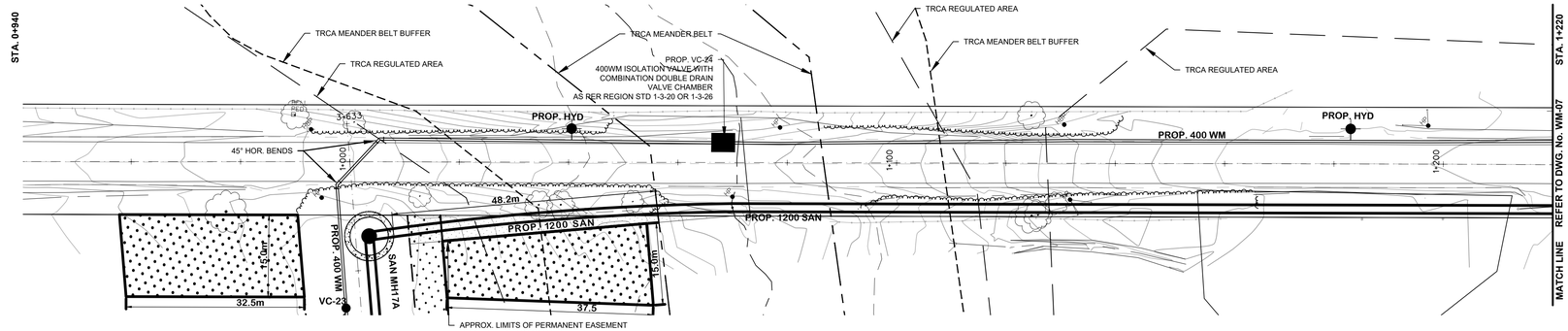
Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

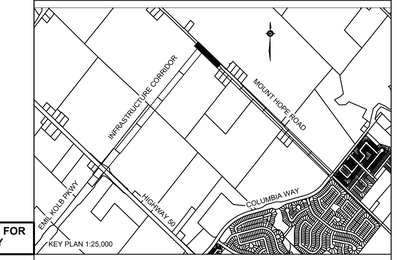
INFRASTRUCTURE CORRIDOR
PROPOSED 400mm WATERMAIN
STA.3+633 TO STA.3+930
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

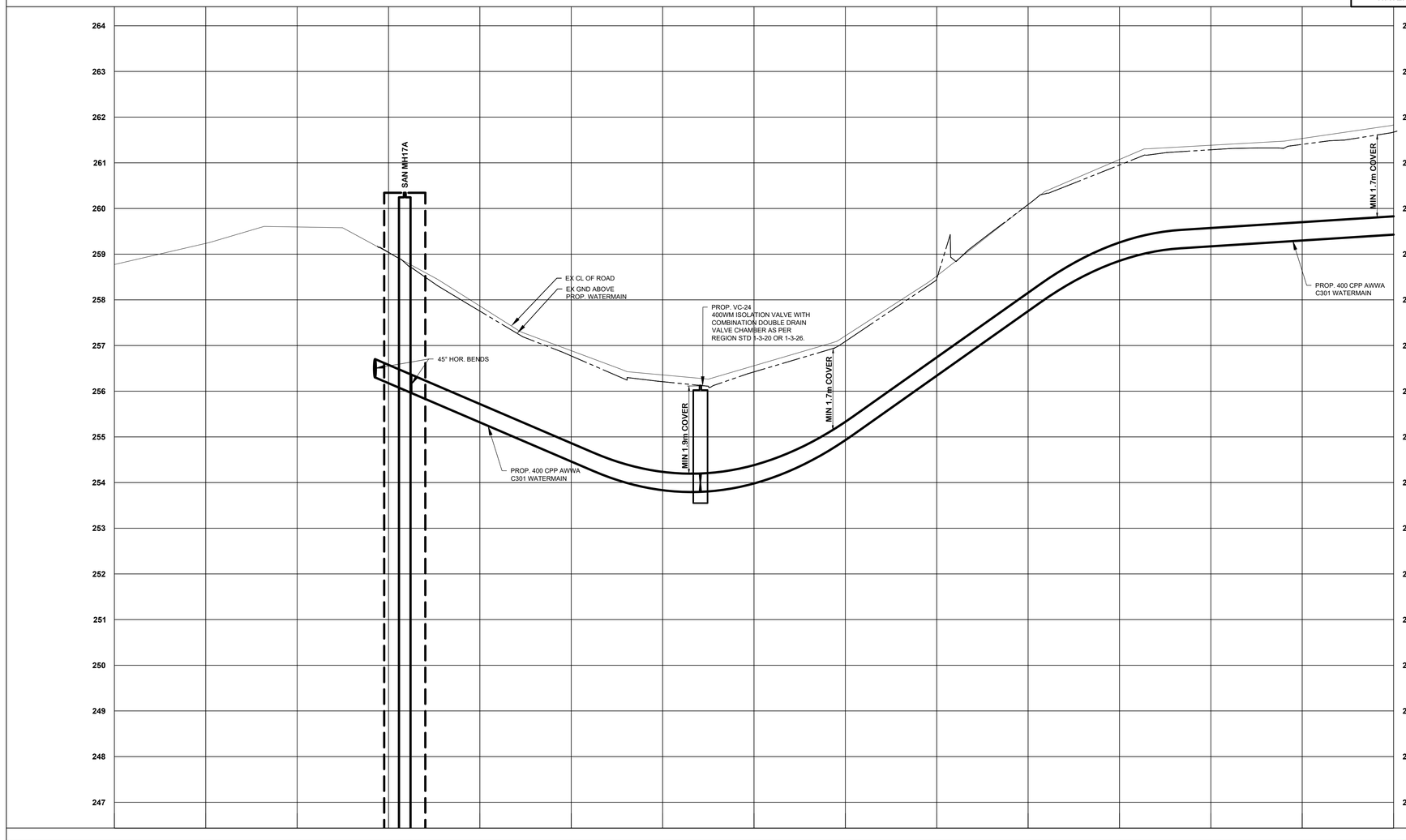
CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB 2026	Sheet	49 OF 83	Plan No.	WM-05

MOUNT HOPE ROAD



THIS DRAWING TO BE USED FOR WATERMAIN DESIGN ONLY





RESTRAINED JOINTS														
BOT.EL. OF WM.	259.43	259.30	259.17	258.85	258.34	256.93	253.98	253.83	254.46	255.32	256.18			
EX. ROAD ELEV.	261.53	261.38	261.07	260.09	258.52	257.21	256.56	256.36	256.89	257.86				
ROAD CHAINAGE	1+220	1+200	1+180	1+160	1+140	1+120	1+100	1+080	1+060	1+040	1+020	1+000	0+980	0+960

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

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WS25(S) Proposed Short Water Service, Size In mm
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Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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Region of Peel
working with you

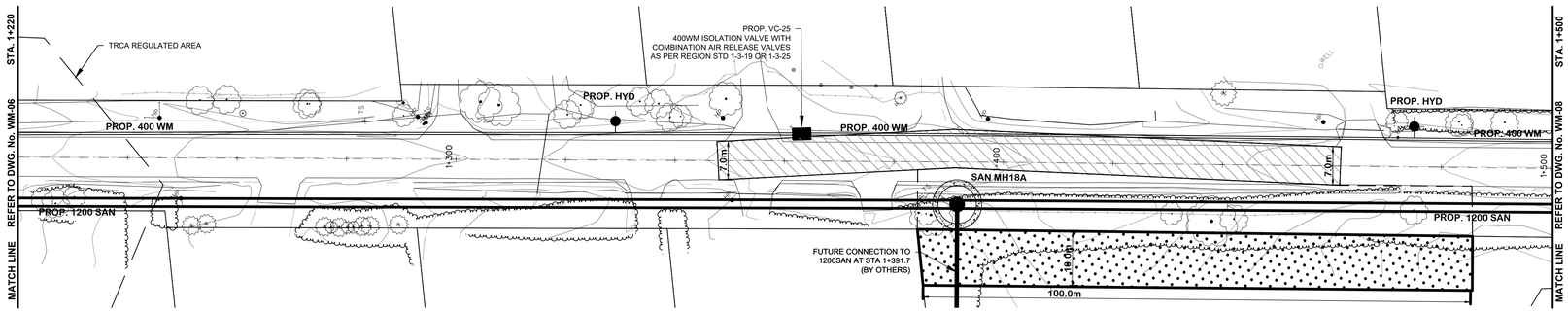
BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD PROPOSED 400mm WATERMAIN STA.0+940 TO STA.1+220

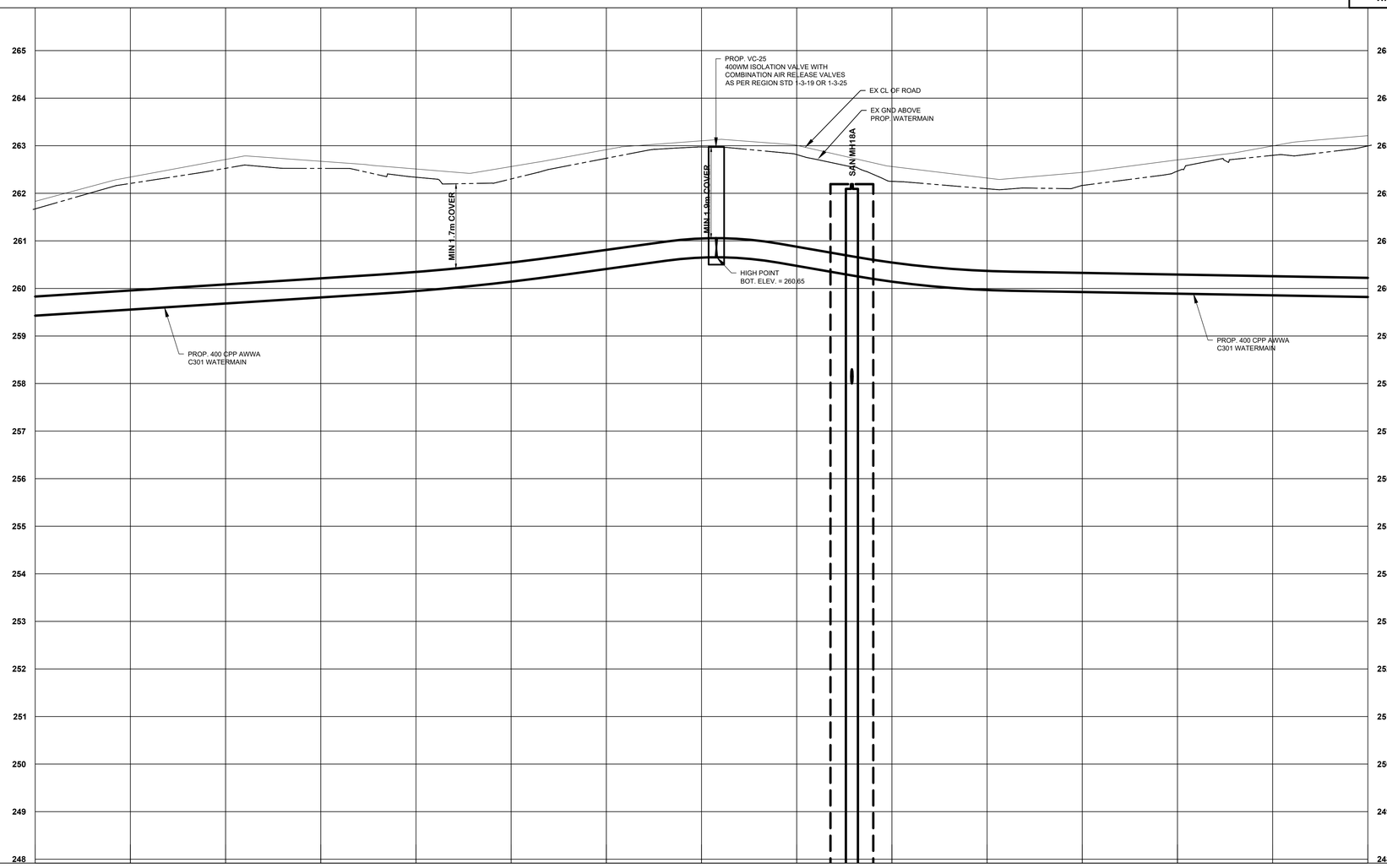
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB 2026	Sheet	50 OF 83	Plan No.	WM-06

MOUNT HOPE ROAD



THIS DRAWING TO BE USED FOR WATERMAIN DESIGN ONLY



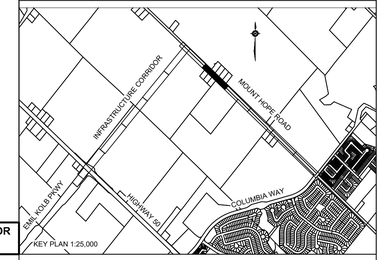
															RESTRAINED JOINTS
259.43	259.55	259.68	259.81	259.94	260.14	260.41	260.65	260.47	260.14	259.97	259.92	259.89	259.85	259.82	BOT.EL. OF WM.
	262.34	262.71	262.67	262.51	262.56	262.92	263.10	263.01	262.56	262.32	262.44	262.70	263.00		EX. ROAD ELEV.
	1+240	1+260	1+280	1+300	1+320	1+340	1+360	1+380	1+400	1+420	1+440	1+460	1+480	1+500	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

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Agency:
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10m 0 10 20 30m HORIZONTAL SCALE
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Region of Peel
working with you

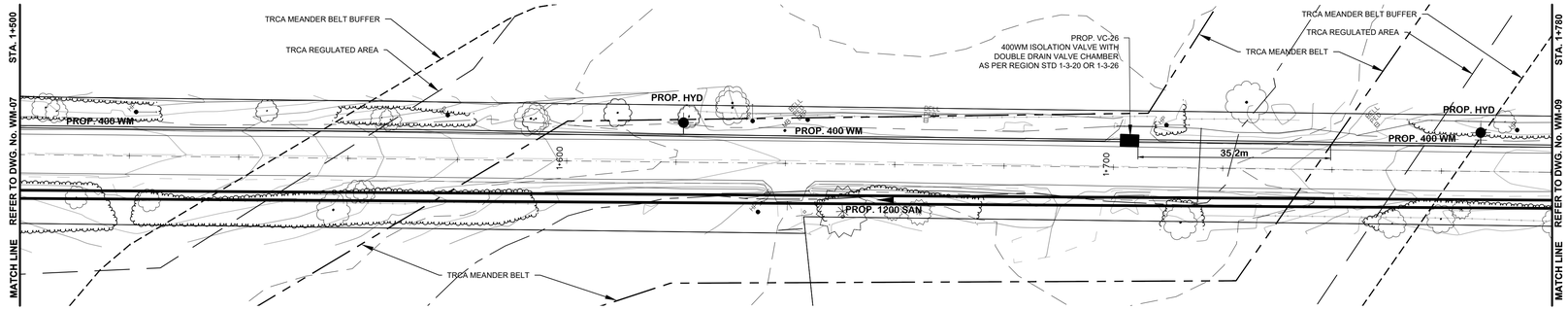
BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD PROPOSED 400mm WATERMAIN STA.1+220 TO STA.1+500

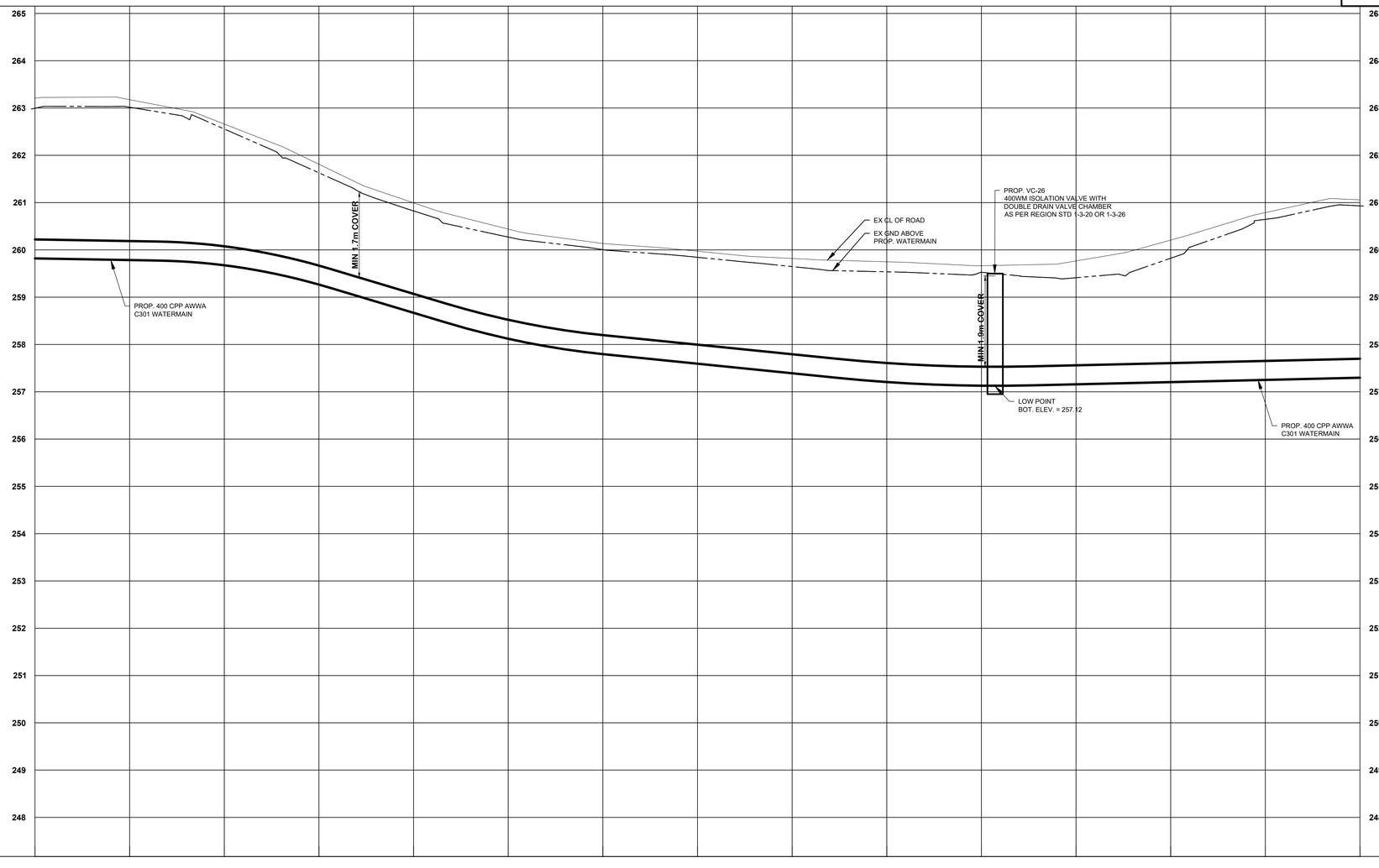
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB 2026	Sheet	51 OF 83	Plan No.	WM-07

MOUNT HOPE ROAD



THIS DRAWING TO BE USED FOR WATERMAIN DESIGN ONLY



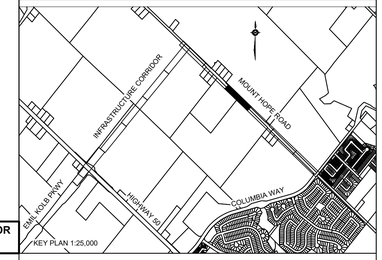
RESTRAINED JOINTS															
259.82	259.79	259.68	259.27	258.67	258.12	257.80	257.59	257.39	257.21	257.13	257.16	257.20	257.25	257.30	BOT.EL. OF WM.
	263.18	262.66	261.81	261.00	260.44	260.14	259.97	259.82	259.75	259.66	259.77	260.21	260.79		EX. ROAD ELEV.
	1+520	1+540	1+560	1+580	1+600	1+620	1+640	1+660	1+680	1+700	1+720	1+740	1+760	1+780	ROAD CHAINAGE

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TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

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All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE
1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
working with you

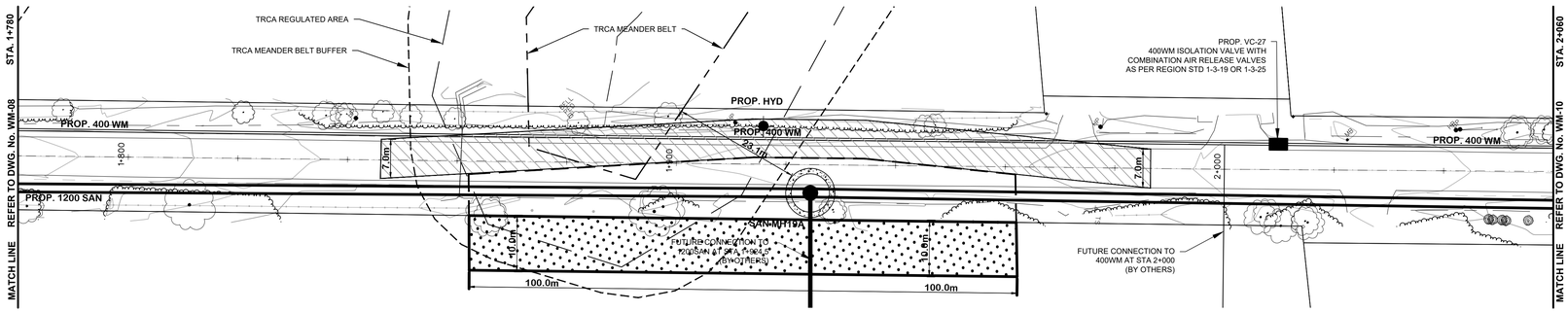
BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD PROPOSED 400mm WATERMAIN STA.1+500 TO STA.1+780

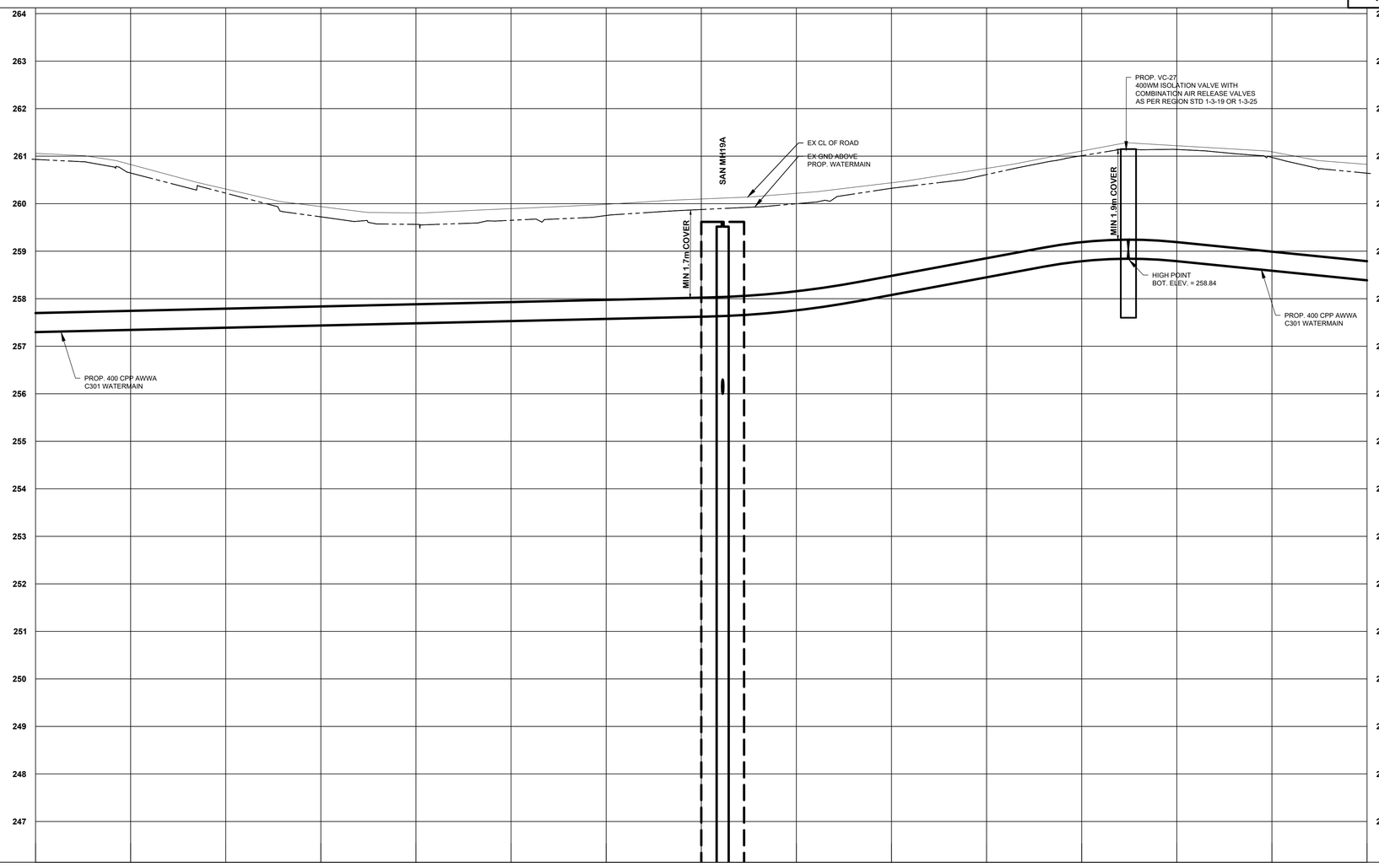
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB 2026	Sheet	52 OF 83	Plan No.	WM-08

MOUNT HOPE ROAD



THIS DRAWING TO BE USED FOR WATERMAIN DESIGN ONLY



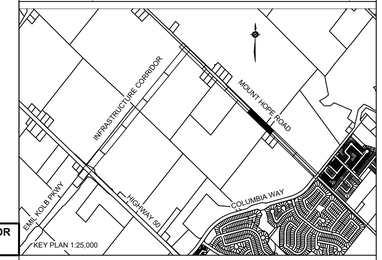
															RESTRAINED JOINTS
257.30	257.34	257.39	257.44	257.48	257.53	257.58	257.62	257.76	258.08	258.45	258.79	258.79	258.59	258.39	BOT.EL. OF WM.
	260.82	260.31	259.94	259.81	259.90	259.99	260.10	260.22	260.44	260.74	261.11	261.22	261.09		EX. ROAD ELEV.
	1+800	1+820	1+840	1+860	1+880	1+900	1+920	1+940	1+960	1+980	2+000	2+020	2+040	2+060	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. XXXXX-D

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10m 0 10 20 30m HORIZONTAL SCALE
1m 0 1 2 3m VERTICAL SCALE

Region of Peel
working with you

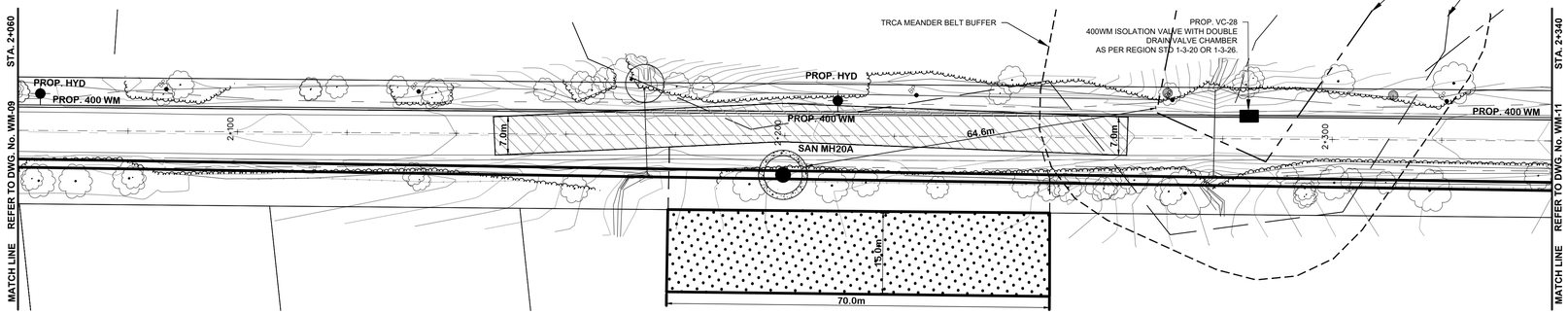
BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD PROPOSED 400mm WATERMAIN STA.1+780 TO STA.2+060

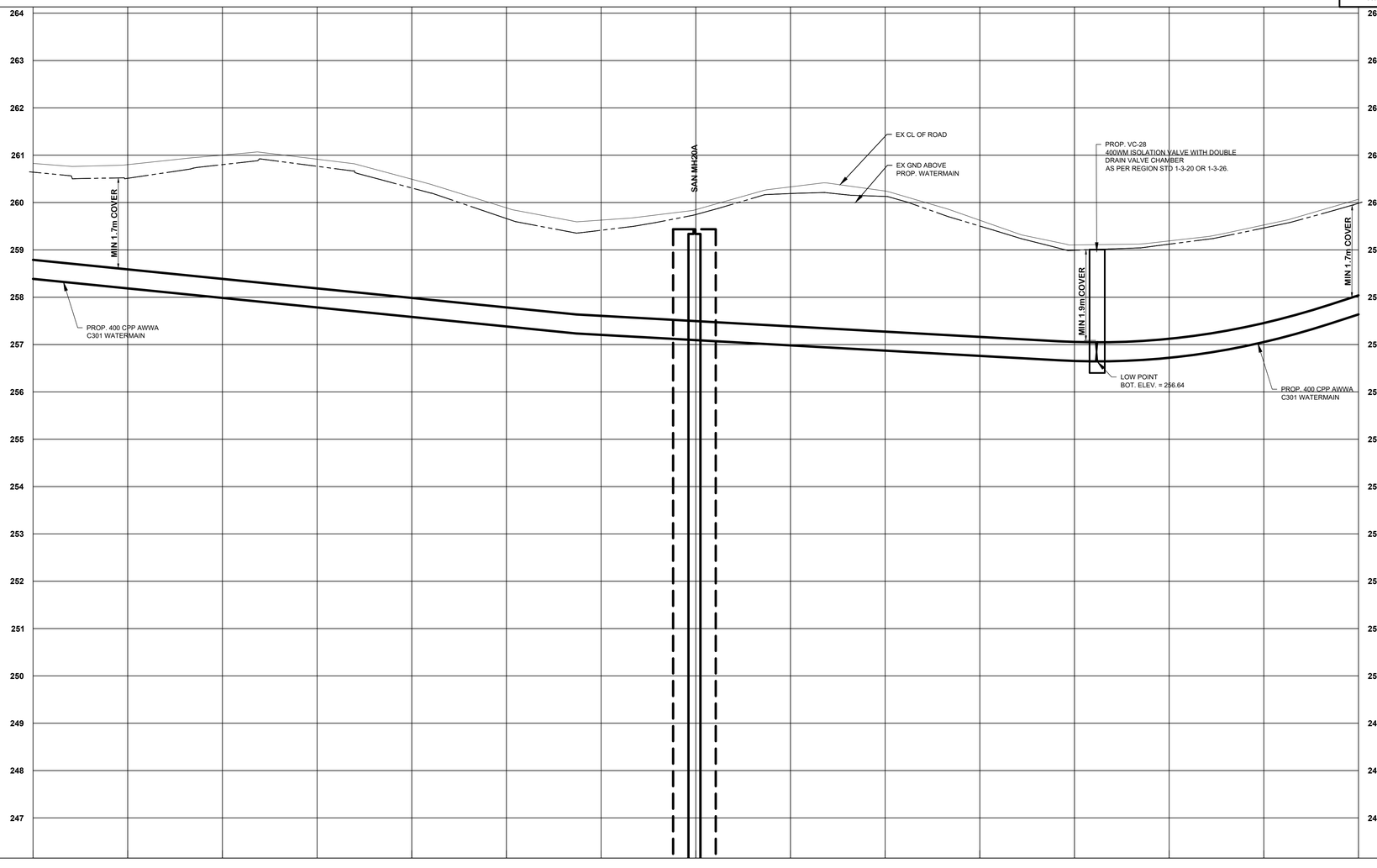
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.	Plan No.	WM-09
Date	FEB 2026	Sheet	53 OF 83		

MOUNT HOPE ROAD



THIS DRAWING TO BE USED FOR WATERMAIN DESIGN ONLY



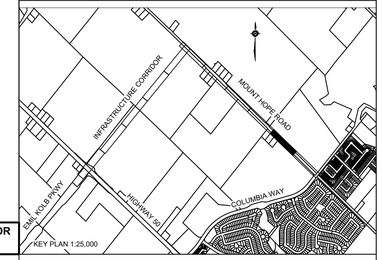
															RESTRAINED JOINTS
258.39	258.19	257.99	257.78	257.58	257.38	257.21	257.09	256.98	256.87	256.76	256.65	256.72	257.05	257.64	BOT.EL. OF WM.
	260.80	261.00	260.92	260.49	259.89	259.63	259.85	260.33	260.24	259.63	259.10	259.19	259.53		EX. ROAD ELEV.
	2+080	2+100	2+120	2+140	2+160	2+180	2+200	2+220	2+240	2+260	2+280	2+300	2+320	2+340	ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

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Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE
1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
working with you

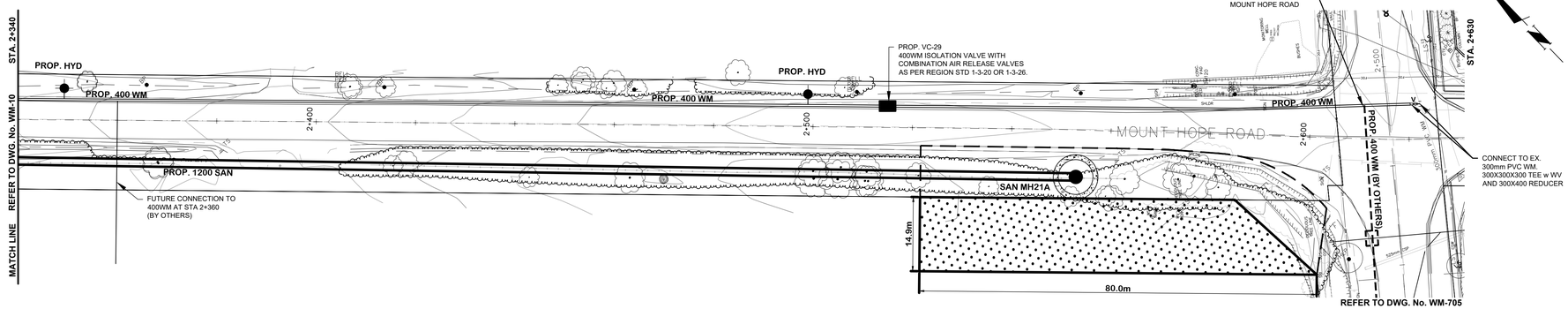
BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD PROPOSED 400mm WATERMAIN STA.2+060 TO STA.2+340

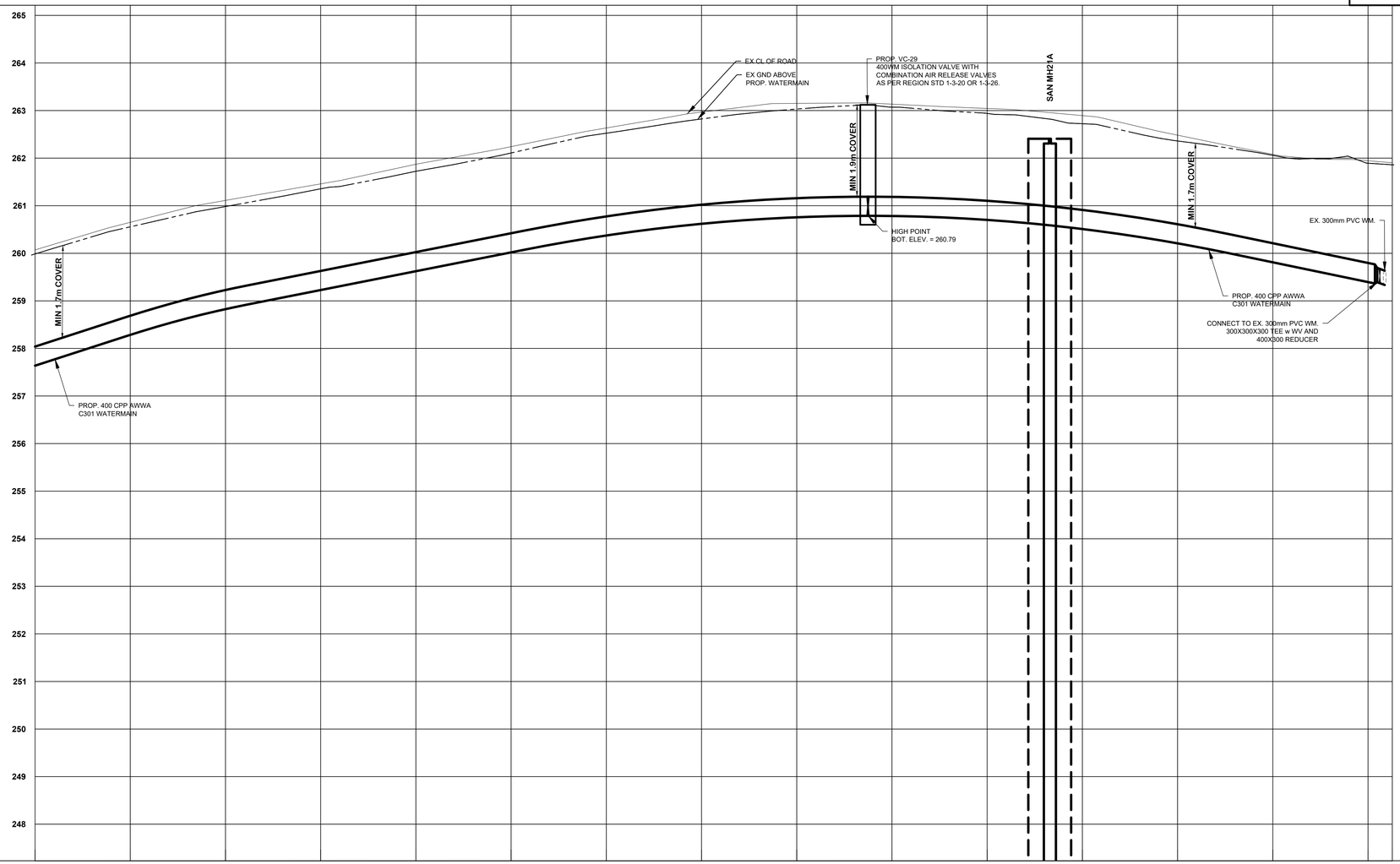
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB 2026	Sheet	54 OF 83	Plan No.	WM-10

MOUNT HOPE ROAD



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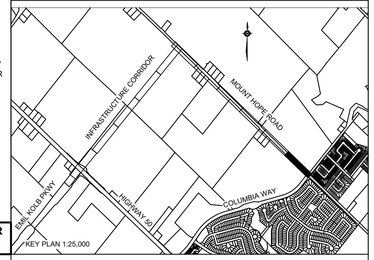
															RESTRAINED JOINTS
257.64	258.29	258.83	259.23	259.62	260.02	260.37	260.62	260.76	260.78	260.70	260.51	260.21	259.81	259.40	BOT.EL. OF WM.
	260.65	261.11	261.46	261.87	262.24	262.63	262.97	263.15	263.13	263.04	262.89	262.48	262.08	261.95	EX. ROAD ELEV.
	2+360	2+380	2+400	2+420	2+440	2+460	2+480	2+500	2+520	2+540	2+560	2+580	2+600	2+620	2+625 ROAD CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	X.X.	X.X.	GAS MAINS	X.X.	X.X.
STORM SEWERS	X.X.	X.X.	BELL U/G CABLE	X.X.	X.X.
WATERMAINS	X.X.	X.X.	HYDRO U/G CABLE	X.X.	X.X.
TRANSIT	X.X.	X.X.	HYDRO ONE	X.X.	X.X.
PARKS & REC.	X.X.	X.X.	CTV	X.X.	X.X.
ONT. CLEAN WATER	X.X.	X.X.	COMMUNIC. CABLES	X.X.	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11,2026	ISSUED FOR ESR	E.M.
AUG 4, 2026	ISSUED FOR ESR - REV. 1	E.M.



NOTES:

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Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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Approved by

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TELUS COMMUNICATION

10m 0 10 20 30m HORIZONTAL SCALE
1m 0 1 2 3m VERTICAL SCALE

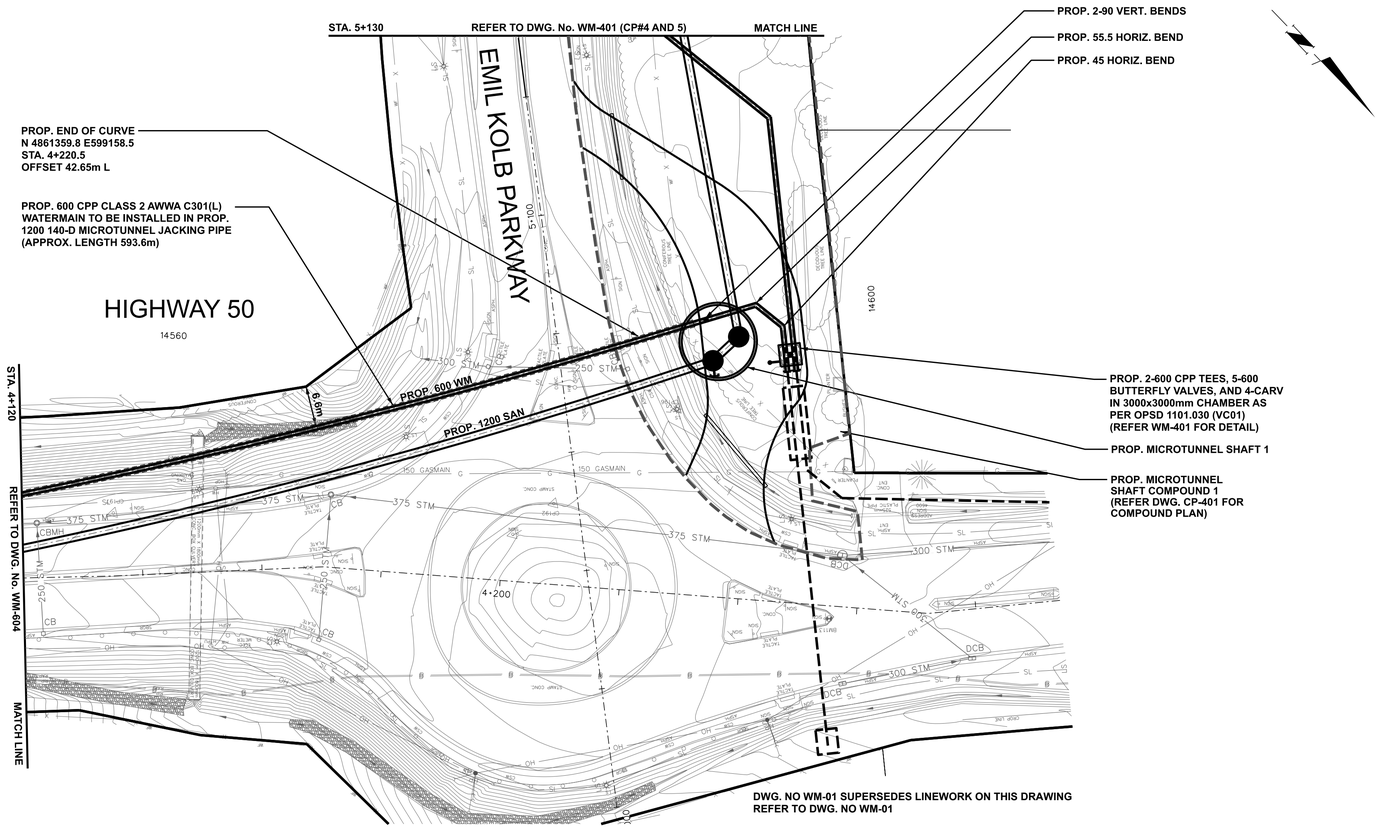
Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD PROPOSED 400mm WATERMAIN STA.2+340 TO STA.2+630

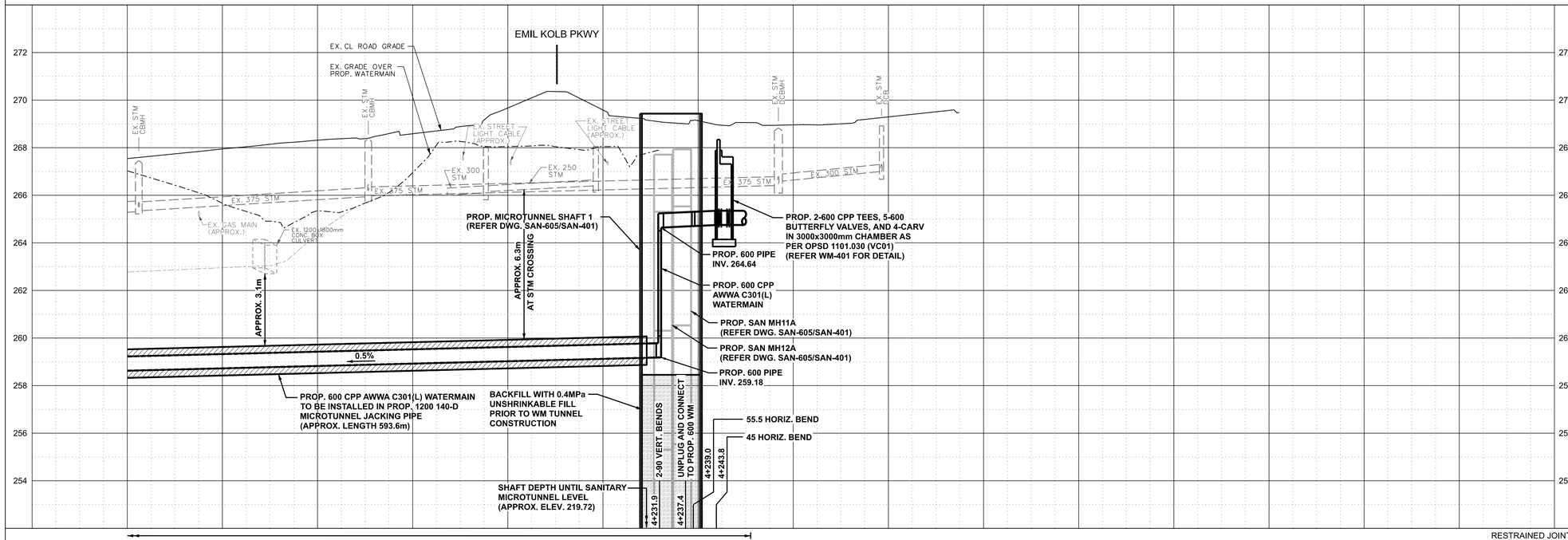
(FROM EMIL KOLB PARKWAY TO MOUNT HOPE ROAD)

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB 2026	Sheet	55 OF 83	Plan No.	WM-11



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY



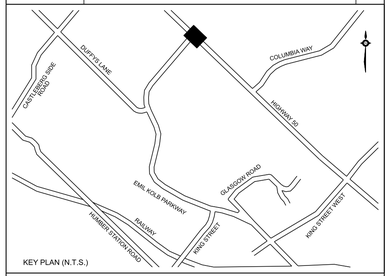
RESTRAINED JOINTS									
BOT.EL. OF WM.	267.54	267.95	268.32	268.59	269.67	269.58	269.13	268.96	269.29
EX. ROAD ELEV.									
ROAD CHAINAGE	4+120	4+140	4+160	4+180	4+200	4+220	4+240	4+260	4+280

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
STORM SEWERS	FEB, 00, 2023	X,X,	BELL U/G CABLE	FEB, 00, 2023	X,X,
WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG, DET-001 TO DET-018
2. HYDRANTS AND VALVES ARE NOT SHOWN TO SCALE ON DRAWINGS, ALL HYDRANTS AND VALVES ARE AMPLIFIED FOR VISUAL REPRESENTATION.

UTILITY NOTES:
1) **HAND DIG WITHIN 1m OF (OR WHEN CROSSING) CABLE TV, BELL, GAS OR HYDRO PLANT**
2) **MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO GASMAINS**
3) **MAINTAIN A MINIMUM OF 0.3m VERTICAL CLEARANCE TO GASMAINS OR HYDRO PLANT**
4) **TESTHOLES REQUIRED PRIOR TO CONSTRUCTION TO DETERMINE ACTUAL DEPTHS OF GASMAINS**
5) **MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO BELL PLANT, MAINTAIN A MINIMUM OF 1.5m HORIZONTAL CLEARANCE FROM BELL PLANT TO PROPOSED HYDRANTS**
6) **PROPOSED HYDRANT OFFSET TO BE DETERMINED IN THE FIELD (MIN. 1.5m OFFSET TO BELL OR HYDRO POLES)**

CONTRACT DRAWINGS

Contractor must verify all dimensions and be responsible for same. Any discrepancies must be reported to the Engineer before commencing work. Drawings are not to be scaled. Drawings may not be used for any purpose other than that stipulated in the contract agreement between the owner/client and the Engineer without the express written consent of Ainley & Associates Limited. Use of these drawings by any party for any other purpose is subject to the following caution.

CAUTION:
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FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

HIGHWAY 50

(FROM EMIL KOLB PARKWAY TO COLUMBIA WAY)

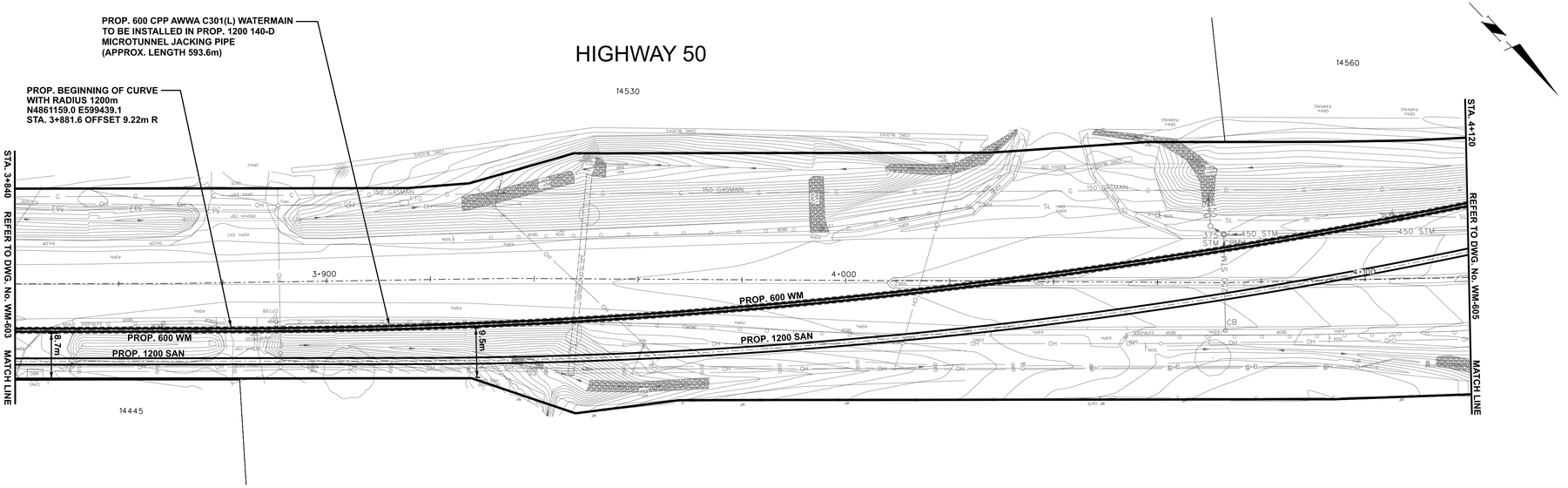
PROP. 600mm WATERMAIN

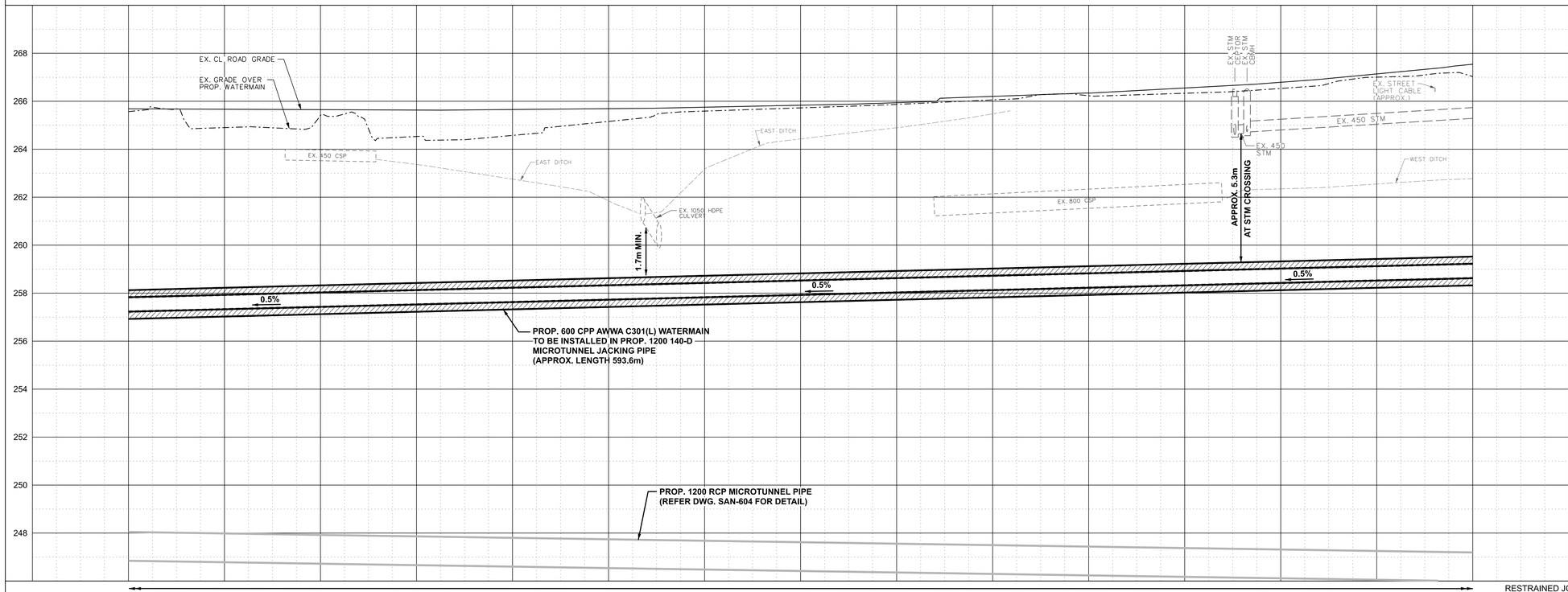
STA. 4+120 TO STA. 4+280

CAD Area	X-XX	Area	C-12/C-13
Checked by		Drawn by	
Date	FEB. 2026	Sheet	56 of 83

Project No. XX-XXXX

Plan No. **WM-605**





BOT.EL. OF WM.	265.68	265.66	265.64	265.63	265.64	265.68	265.75	265.83	265.94	266.20	266.34	266.56	266.79	267.14	267.54
EX. ROAD ELEV.															
ROAD CHAINAGE	3+840	3+860	3+880	3+900	3+920	3+940	3+960	3+980	4+000	4+020	4+040	4+060	4+080	4+100	4+120

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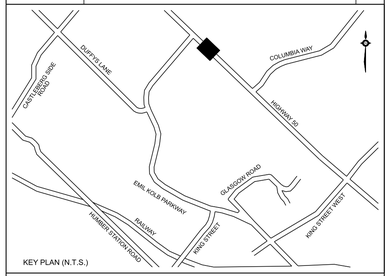
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SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



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5) **MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO BELL PLANT, MAINTAIN A MINIMUM OF 1.5m HORIZONTAL CLEARANCE FROM BELL PLANT TO PROPOSED HYDRANTS**
6) **PROPOSED HYDRANT OFFSET TO BE DETERMINED IN THE FIELD (MIN. 1.5m OFFSET TO BELL OR HYDRO POLES)**

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All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
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Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

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TOWN OF CALEDON WORKS DEPT.
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ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

HIGHWAY 50

(FROM EMIL KOLB PARKWAY TO COLUMBIA WAY)

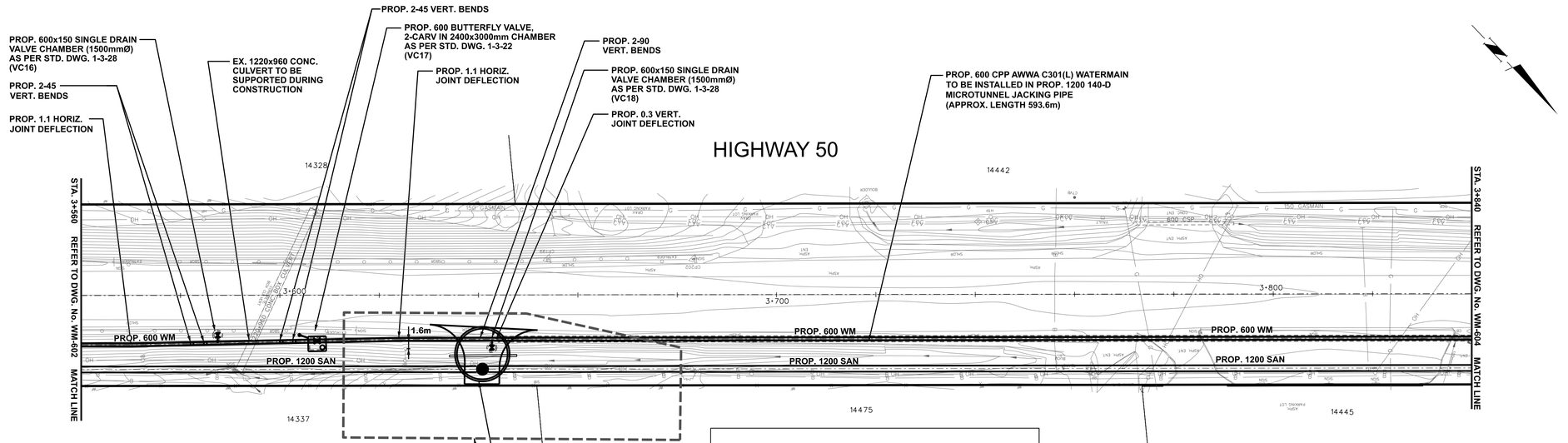
PROP. 600mm WATERMAIN

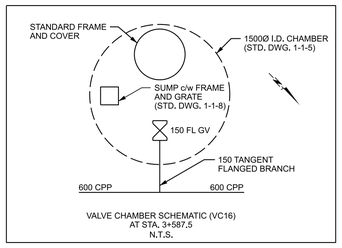
STA. 3+840 TO STA. 4+120

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	57 of 83

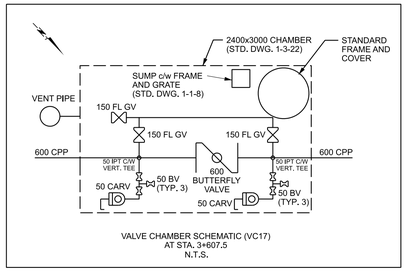
Project No. XX-XXXX

Plan No. **WM-604**

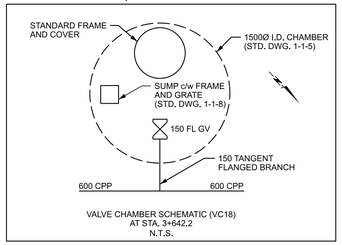




VALVE CHAMBER SCHEMATIC (VC16)
AT STA. 3+587.5
N.T.S.



VALVE CHAMBER SCHEMATIC (VC17)
AT STA. 3+607.5
N.T.S.



VALVE CHAMBER SCHEMATIC (VC18)
AT STA. 3+642.2
N.T.S.

WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

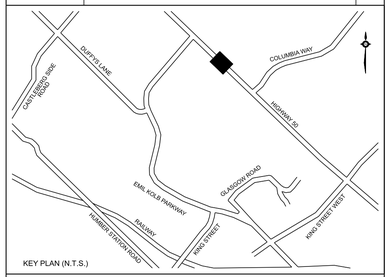
THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY

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STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

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CONTRACT DRAWINGS

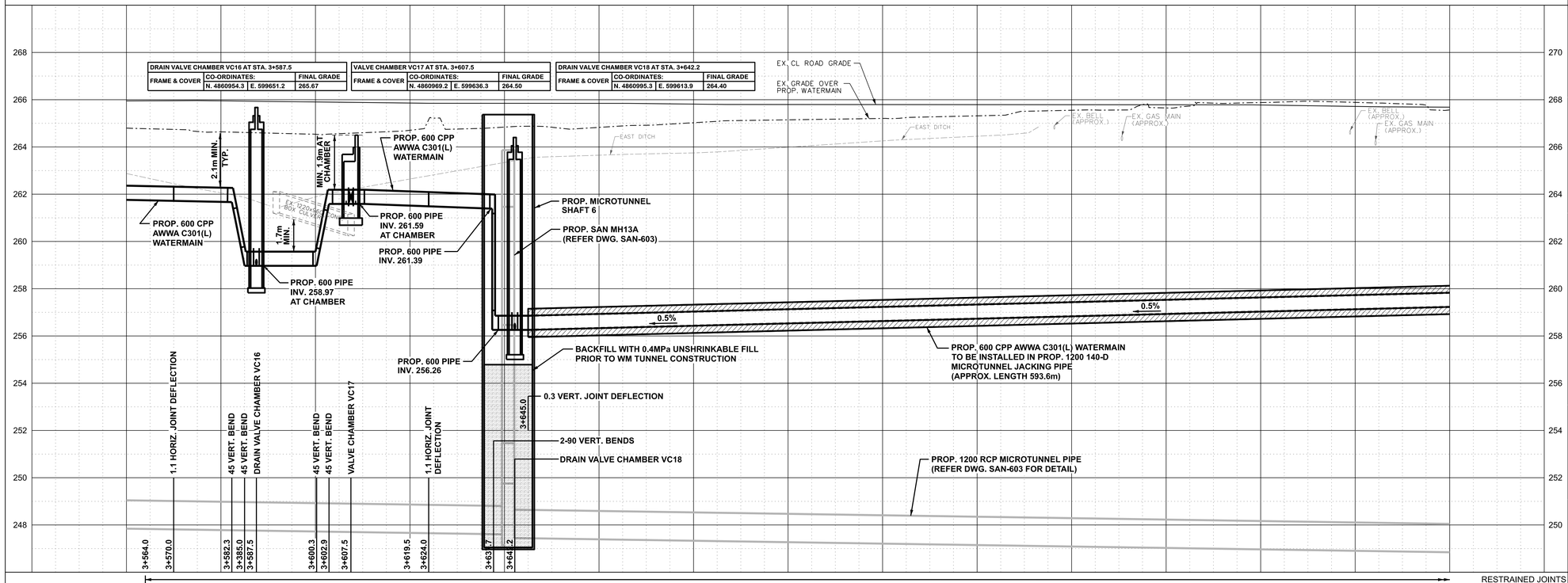
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DRAIN VALVE CHAMBER VC16 AT STA. 3+587.5			
FRAME & COVER	CO-ORDINATES:		FINAL GRADE
	N. 4860954.3	E. 599651.2	265.67

VALVE CHAMBER VC17 AT STA. 3+607.5			
FRAME & COVER	CO-ORDINATES:		FINAL GRADE
	N. 4860969.2	E. 599636.3	264.50

DRAIN VALVE CHAMBER VC18 AT STA. 3+642.2			
FRAME & COVER	CO-ORDINATES:		FINAL GRADE
	N. 4860995.3	E. 599613.9	264.40



BOT.EL. OF WM.																
265.95	265.95	265.89	265.86	265.85	265.85	265.81	265.79	265.79	265.79	265.80	265.81	265.78	265.72	265.68	EX. ROAD ELEV.	
3+560	3+580	3+600	3+620	3+640	3+660	3+680	3+700	3+720	3+740	3+760	3+780	3+800	3+820	3+840	ROAD CHAINAGE	

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Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
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TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

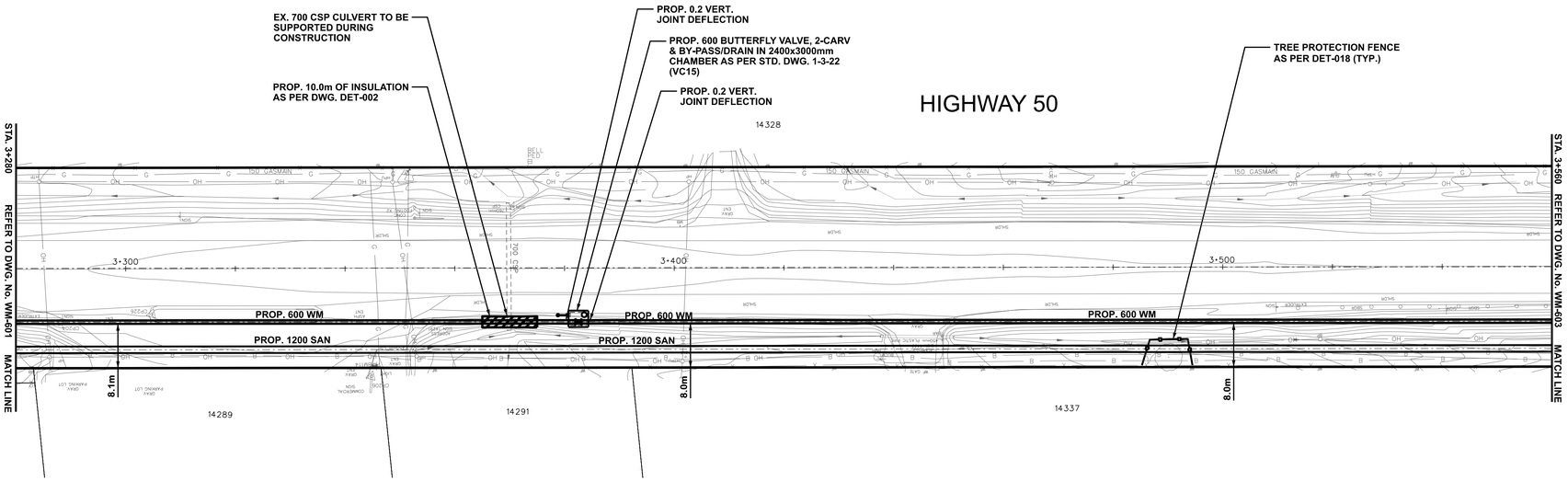
HIGHWAY 50

(FROM EMIL KOLB PARKWAY TO COLUMBIA WAY)

PROP. 600mm WATERMAIN

STA. 3+560 TO STA. 3+840

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	58 of 83
Project No.	XX-XXXX		
Plan No.	**WM-603**		



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

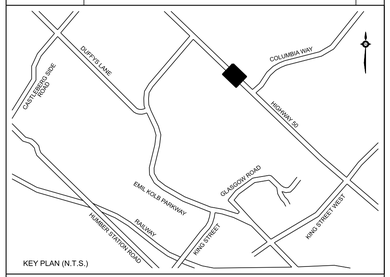
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SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
STORM SEWERS	FEB, 00, 2023	X,X,	BELL U/G CABLE	FEB, 00, 2023	X,X,
WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



NOTES:

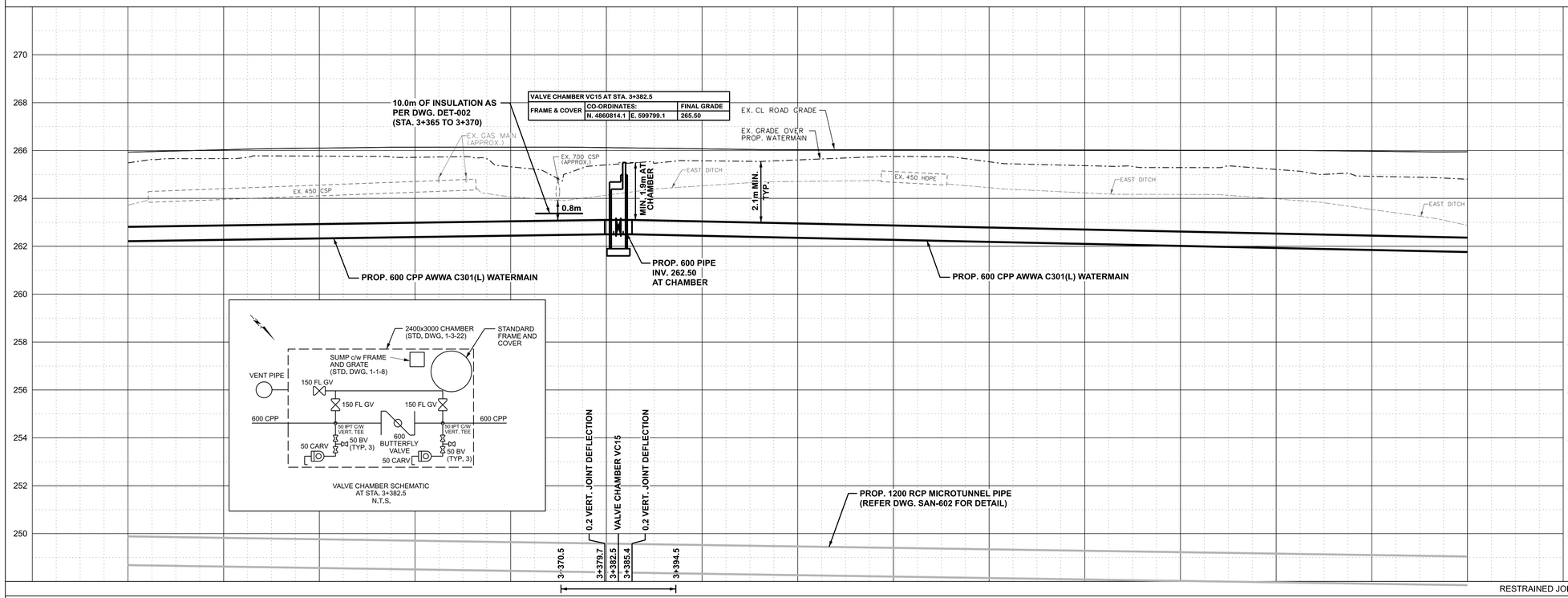
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265.93	266.03	266.10	266.14	266.15	266.12	266.06	266.05	266.08	266.05	266.03	266.02	266.01	265.97	265.95	EX. ROAD ELEV.
3+280	3+300	3+320	3+340	3+360	3+380	3+400	3+420	3+440	3+460	3+480	3+500	3+520	3+540	3+560	ROAD CHAINAGE

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Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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Approved by

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PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
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10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

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(FROM EMIL KOLB PARKWAY TO COLUMBIA WAY)

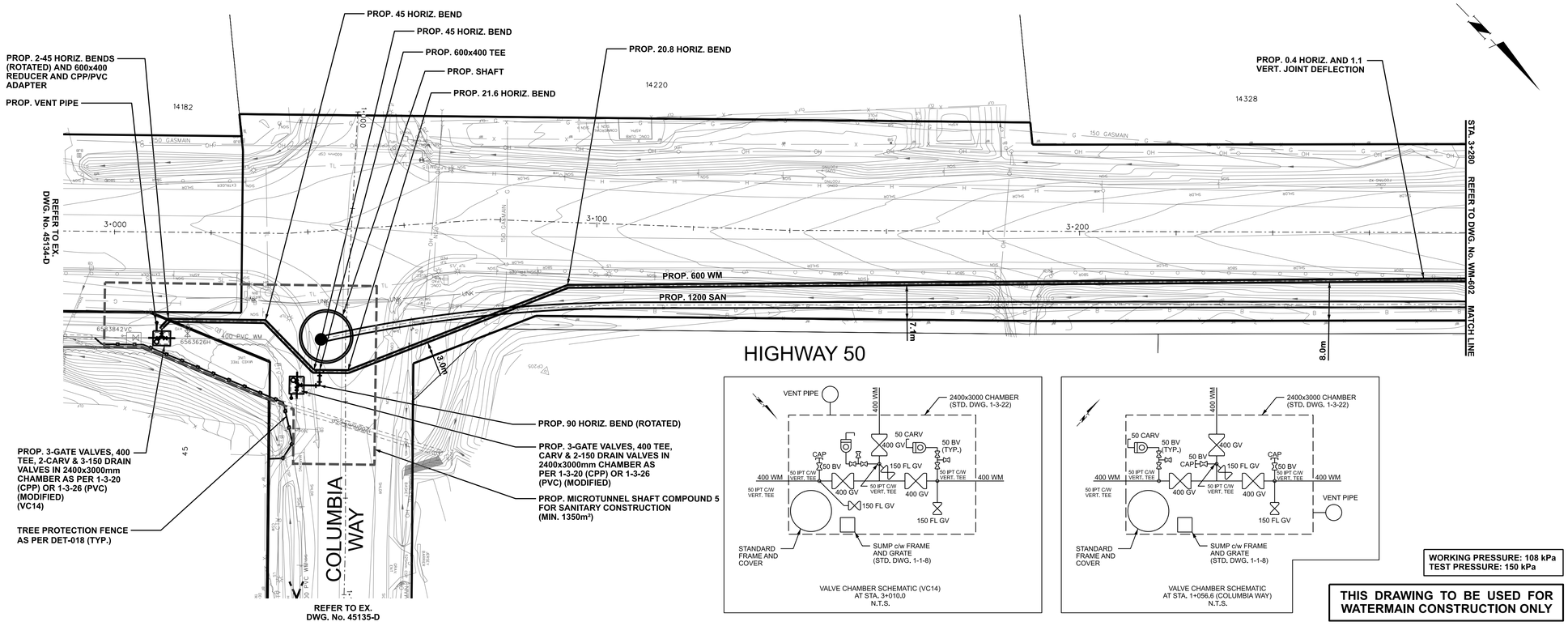
PROP. 600mm WATERMAIN

STA. 3+280 TO STA. 3+560

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	59 of 83

Project No. XX-XXXX

Plan No. **WM-602**

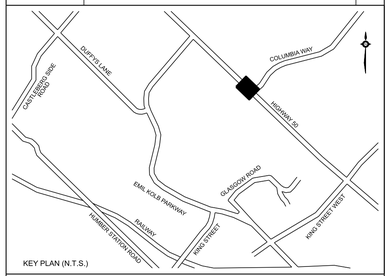


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STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

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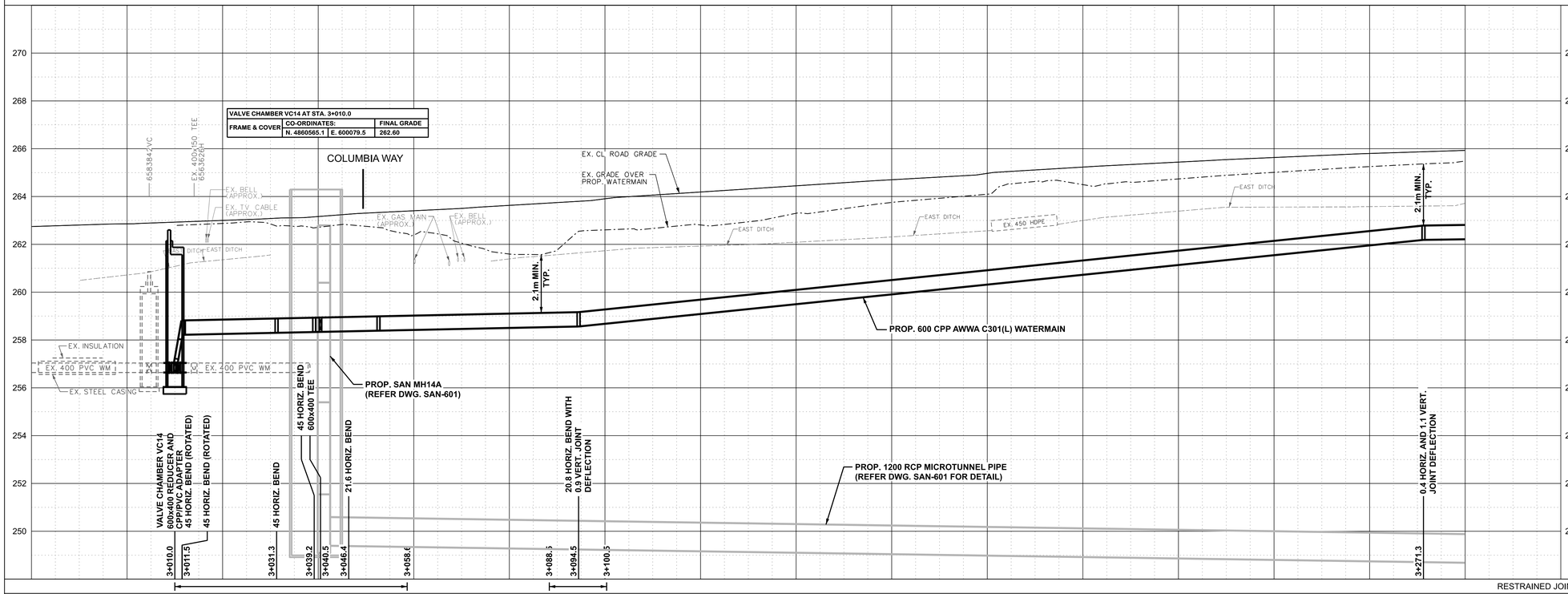
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WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

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RESTRAINED JOINTS																	
BOT.EL. OF WM.																	
262.86	263.00	263.16	263.40	263.63	263.91	264.19	264.45	264.70	264.97	265.23	265.44	265.63	265.80	265.93	EX. ROAD ELEV.		
3+000	3+020	3+040	3+060	3+080	3+100	3+120	3+140	3+160	3+180	3+200	3+220	3+240	3+260	3+280	ROAD CHAINAGE		

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UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

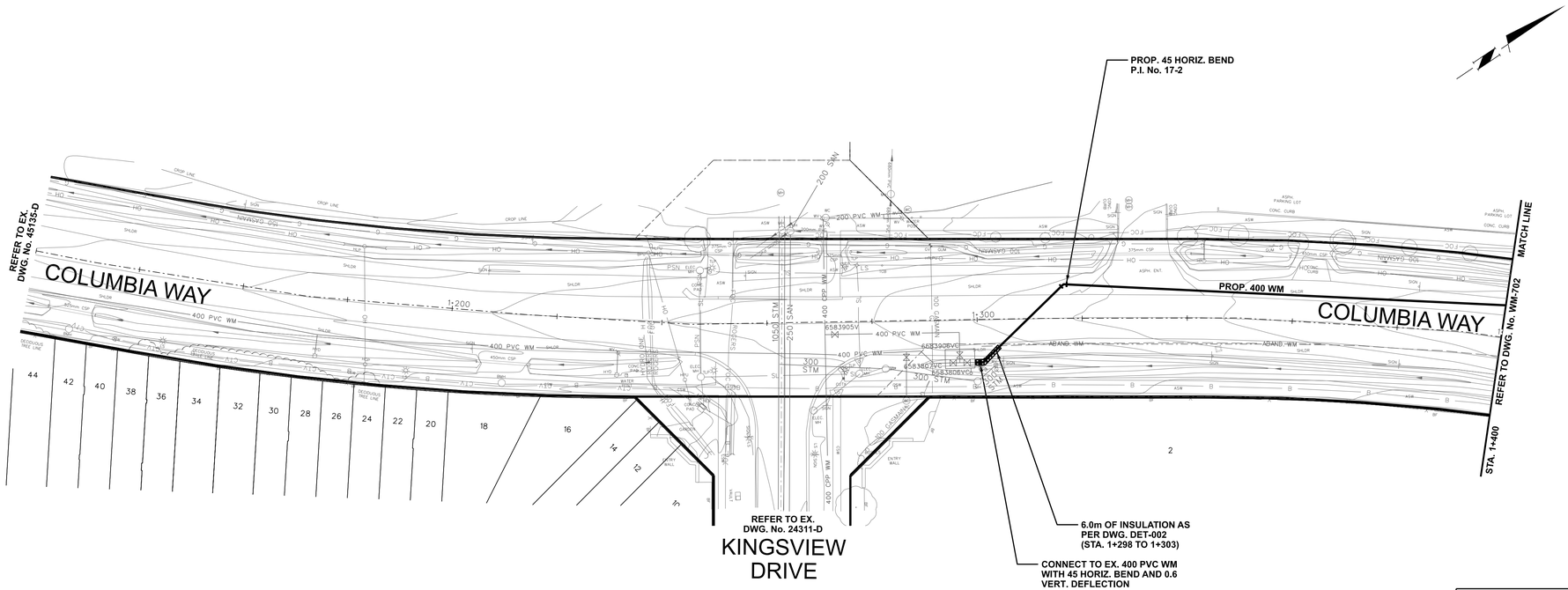
HIGHWAY 50

(FROM EMIL KOLB PARKWAY TO COLUMBIA WAY)

PROP. 600mm WATERMAIN

STA. 2+990 TO STA. 3+280

CAD Area	X-XX	Area	C-12/C-13	Project No.	XX-XXXX
Checked by	G.J.	Drawn by	M.L.		
Date	FEB. 2026	Sheet	60 of 83	Plan No.	**WM-601**



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

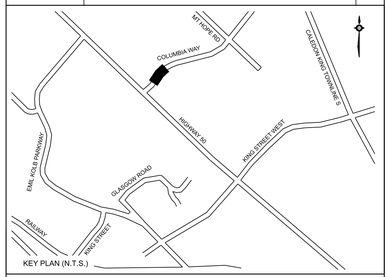
THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
STORM SEWERS	FEB, 00, 2023	X,X,	BELL U/G CABLE	FEB, 00, 2023	X,X,
WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG, DET-001 TO DET-014
2. HYDRANTS AND VALVES ARE NOT SHOWN TO SCALE ON DRAWINGS, ALL HYDRANTS AND VALVES ARE AMPLIFIED FOR VISUAL REPRESENTATION.

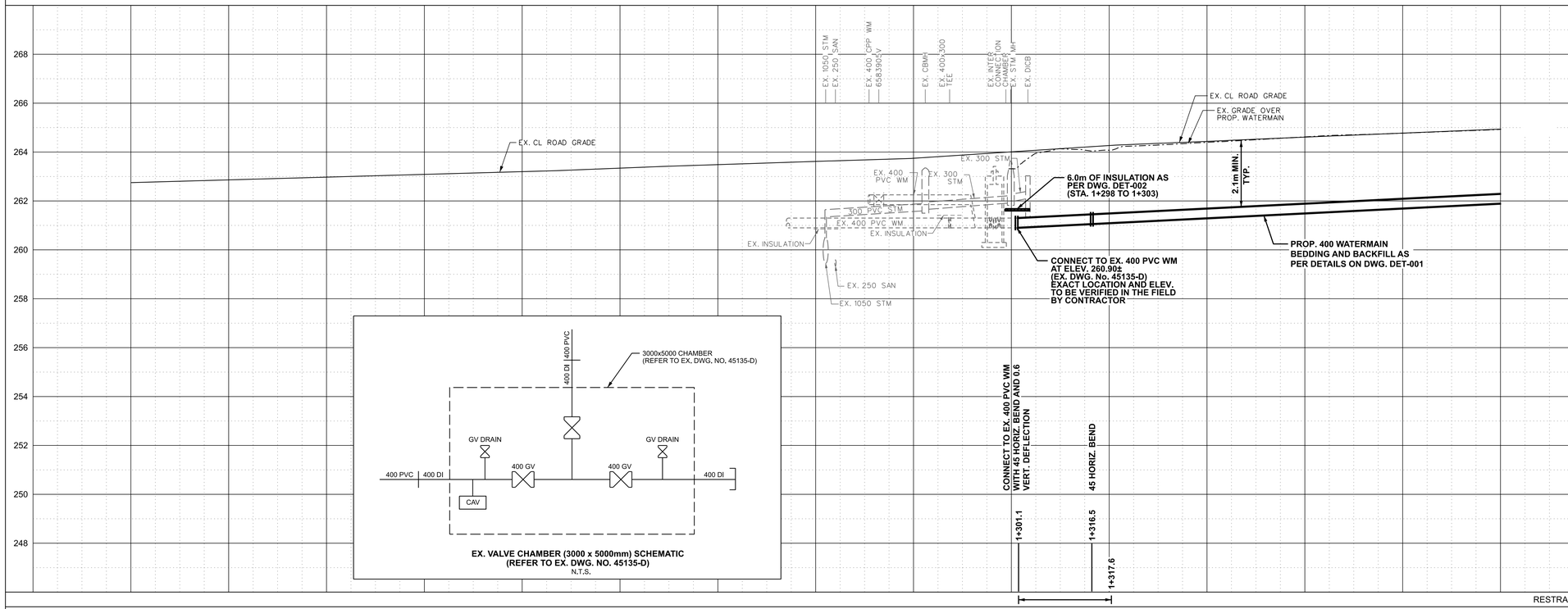
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2) MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO GASMAINS
3) MAINTAIN A MINIMUM OF 0.3m VERTICAL CLEARANCE TO GASMAINS OR HYDRO PLANT
4) TESTHOLES REQUIRED PRIOR TO CONSTRUCTION TO DETERMINE ACTUAL DEPTHS OF GASMAINS
5) MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO BELL PLANT, MAINTAIN A MINIMUM OF 1.5m HORIZONTAL CLEARANCE FROM BELL PLANT TO PROPOSED HYDRANTS
6) PROPOSED HYDRANT OFFSET TO BE DETERMINED IN THE FIELD (MIN. 1.5m OFFSET TO BELL OR HYDRO POLES)

CONTRACT DRAWINGS

Contractor must verify all dimensions and be responsible for same, Any discrepancies must be reported to the Engineer before commencing work, Drawings are not to be scaled, Drawings may not be used for any purpose other than that stipulated in the contract agreement between the owner/client and the Engineer without the express written consent of Ainley & Associates Limited. Use of these drawings by any party for any other purpose is subject to the following caution.

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EX. VALVE CHAMBER (3000 x 5000mm) SCHEMATIC (REFER TO EX. DWG. NO. 45135-D)
N.T.S.

General Notes

All Measurements Are In Meters(m) Unless Otherwise Noted
All Driveways Are ASPHALT Unless Otherwise Noted
All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

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HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

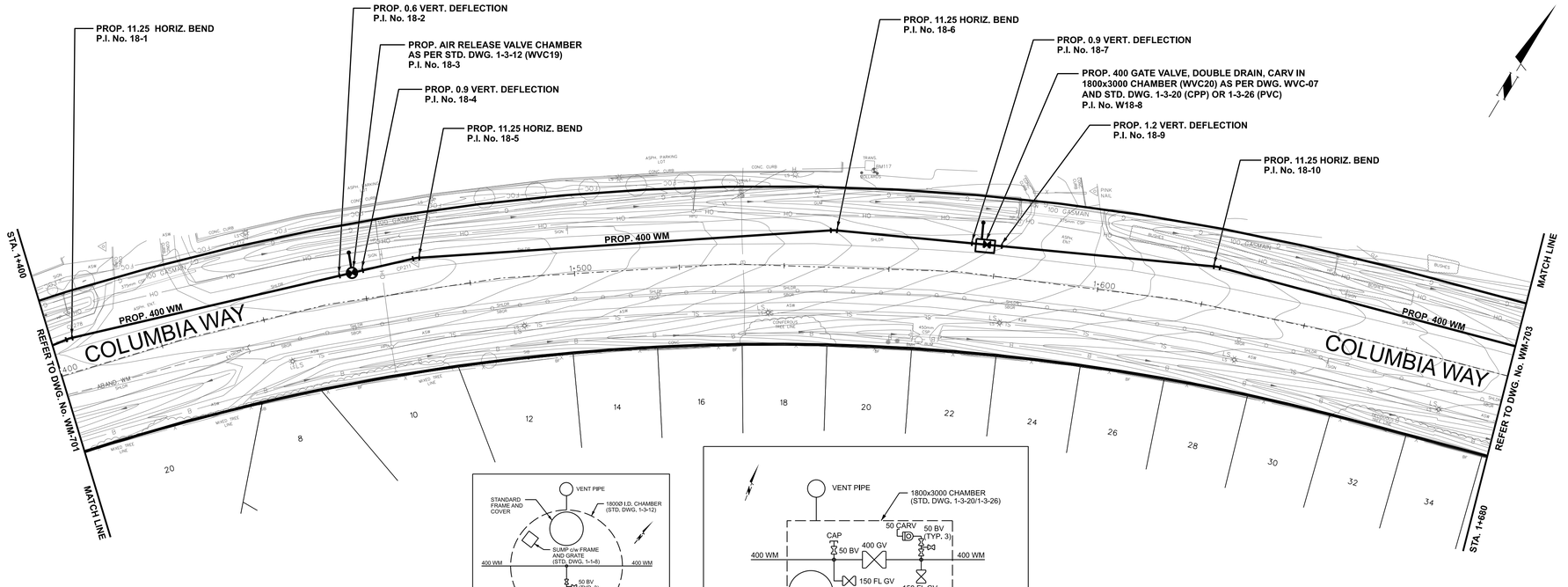
Region of Peel
working with you

COLUMBIA WAY

(FROM KINGSVIEW DR TO 315m WEST OF WESTCHESTER BLVD)
PROP. 400mm WATERMAIN
STA. 1+120 TO STA. 1+400

																	RESTRAINED JOINTS
																	BOT.EL. OF WM.
262.75	262.87	262.99	263.11	263.20	263.35	263.49	263.62	263.75	264.01	264.27	264.44	264.61	264.78	264.94			EX. ROAD ELEV.
1+120	1+140	1+160	1+180	1+200	1+220	1+240	1+260	1+280	1+300	1+320	1+340	1+360	1+380	1+400			ROAD CHAINAGE

Project No.	XX-XXXX				
CAD Area	X-XX	Area	C-12/C-13	Plan No.	**WM-701**
Checked by	G.J.	Drawn by	M.L.		
Date	FEB. 2026	Sheet	61 of 83		



VALVE CHAMBER SCHEMATIC (WVC19)
AT STA. 1+458.0 (CENTRE OF CHAMBER)
N.T.S.

VALVE CHAMBER SCHEMATIC (WVC20)
AT STA. 1+577.7 (CENTRE OF CHAMBER)
N.T.S.

WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

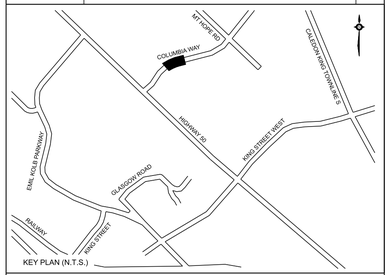
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SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



NOTES:

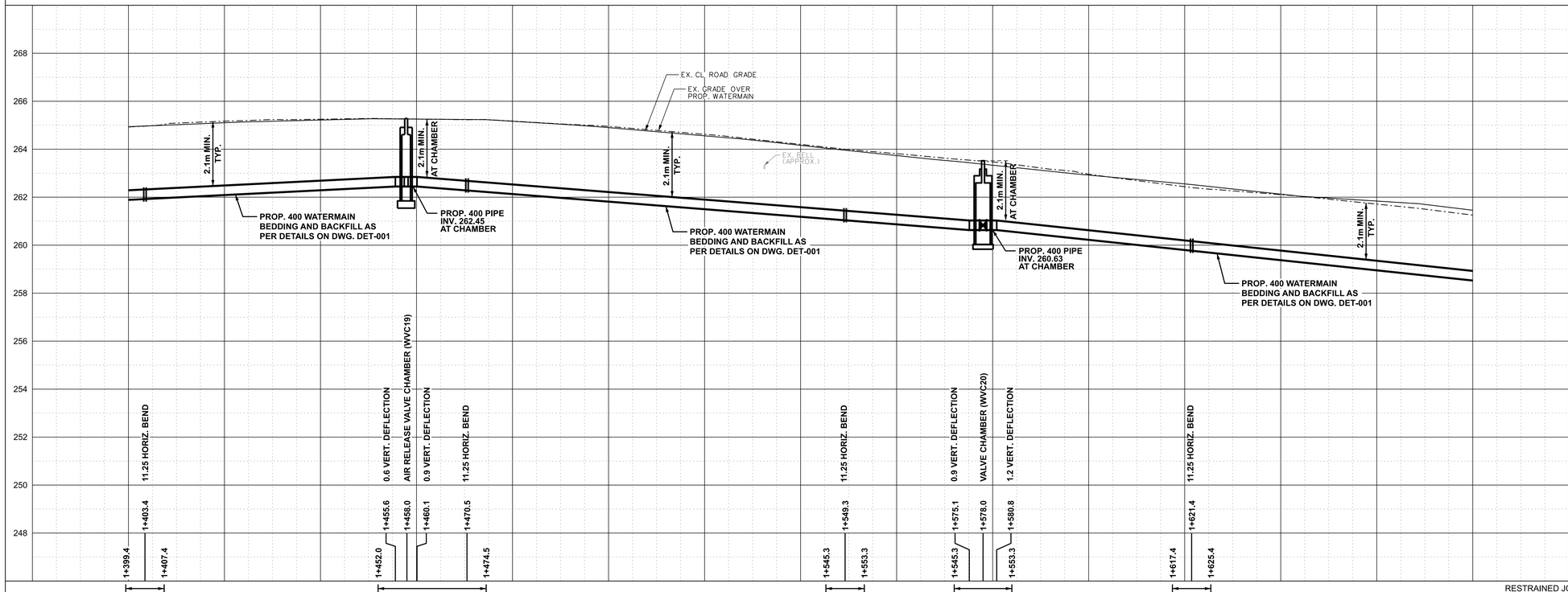
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5) **MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO BELL PLANT, MAINTAIN A MINIMUM OF 1.5m HORIZONTAL CLEARANCE FROM BELL PLANT TO PROPOSED HYDRANTS**
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All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

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TOWN OF CALEDON WORKS DEPT.
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ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

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HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

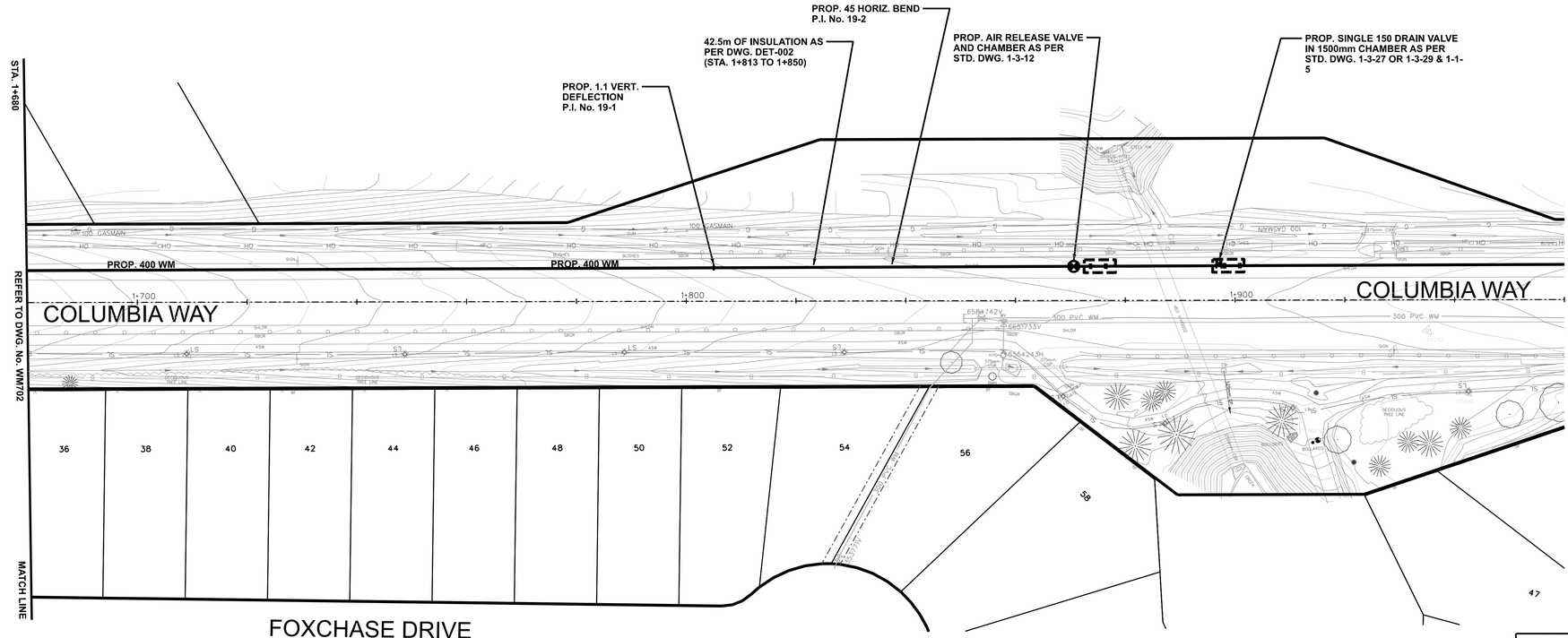
Region of Peel
working with you

COLUMBIA WAY

(FROM KINGSVIEW DR TO 315m WEST OF WESTCHESTER BLVD)
PROP. 400mm WATERMAIN
STA. 1+400 TO STA. 1+680

RESTRAINED JOINTS																	
BOT.EL. OF WM.																	
264.94	265.10	265.22	265.26	265.17	264.90	264.56	264.16	263.74	263.34	262.92	262.55	262.13	261.84	261.46	EX. ROAD ELEV.		
1+400	1+420	1+440	1+460	1+480	1+500	1+520	1+540	1+560	1+580	1+600	1+620	1+640	1+660	1+680	ROAD CHAINAGE		

Project No.	XX-XXXX			
CAD Area	X-XX	Area	C-12/C-13	Plan No. **WM-702**
Checked by	G.J.	Drawn by	M.L.	
Date	FEB. 2026	Sheet	62 of 83	



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

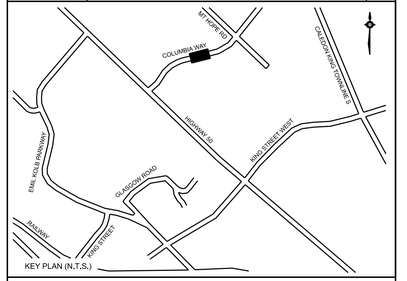
NOT FOR CONSTRUCTION

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB. 00, 2023	X.X.	GAS MAINS	FEB. 00, 2023	X.X.
STORM SEWERS	FEB. 00, 2023	X.X.	BELL U/G CABLE	FEB. 00, 2023	X.X.
WATERMAINS	FEB. 00, 2023	X.X.	HYDRO U/G CABLE	FEB. 00, 2023	X.X.
TRANSIT	FEB. 00, 2023	X.X.	HYDRO ONE	FEB. 00, 2023	X.X.
PARKS & REC.	FEB. 00, 2023	X.X.	CTV	FEB. 00, 2023	X.X.
ONT. CLEAN WATER	FEB. 00, 2023	X.X.	COMMUNIC. CABLES	FEB. 00, 2023	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



NOTES:

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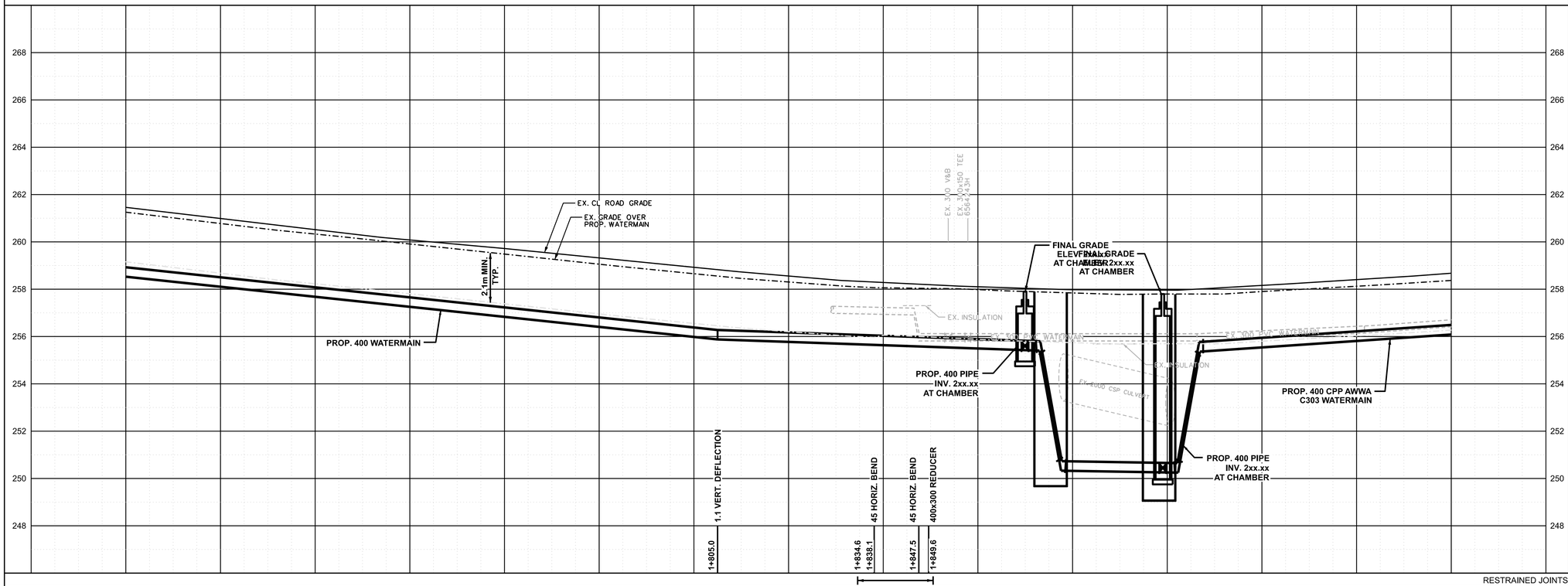
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3) **MAINTAIN A MINIMUM OF 0.3m VERTICAL CLEARANCE TO GASMAINS OR HYDRO PLANT**
4) **TESTHOLES REQUIRED PRIOR TO CONSTRUCTION TO DETERMINE ACTUAL DEPTHS OF GASMAINS**
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All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

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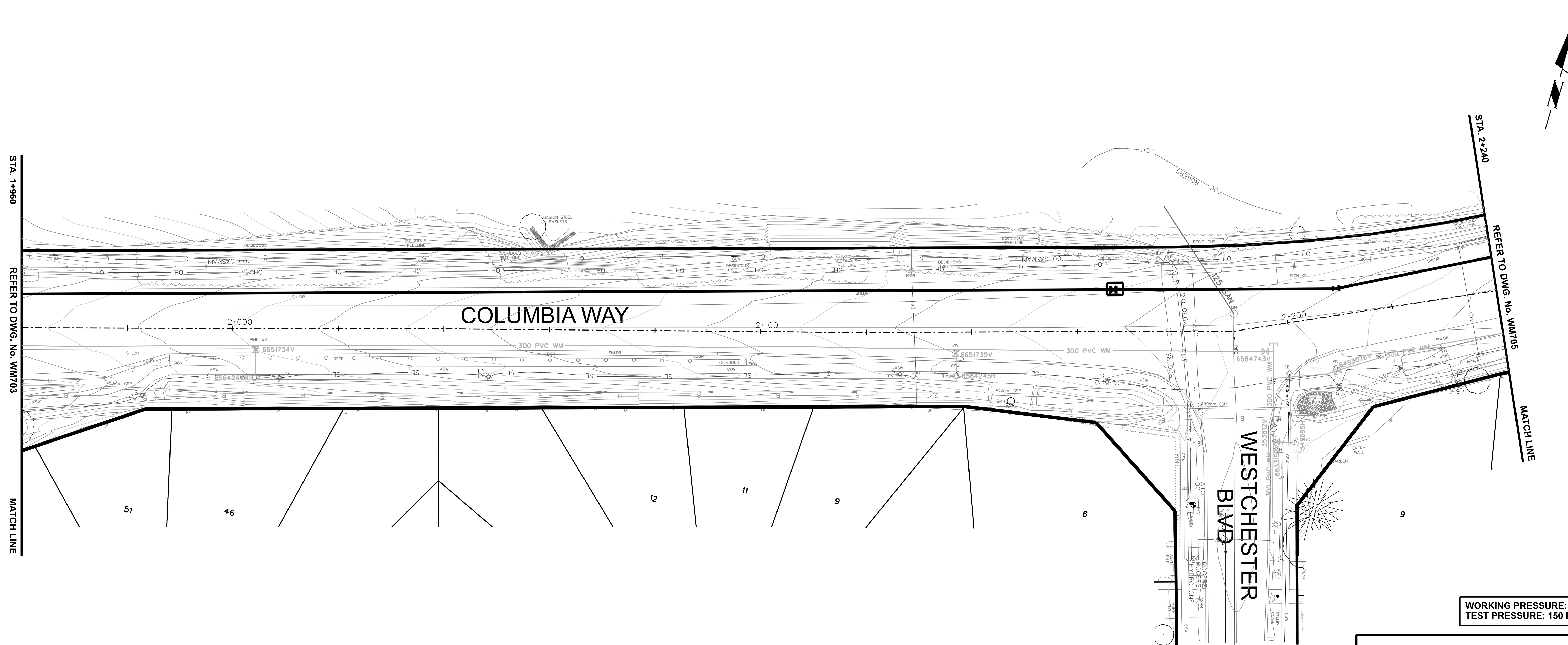
Region of Peel
working with you

COLUMBIA WAY

(FROM KINGSVIEW DR TO 315m WEST OF WESTCHESTER BLVD)
PROP. 400mm WATERMAIN
STA. 1+680 TO STA. 1+960

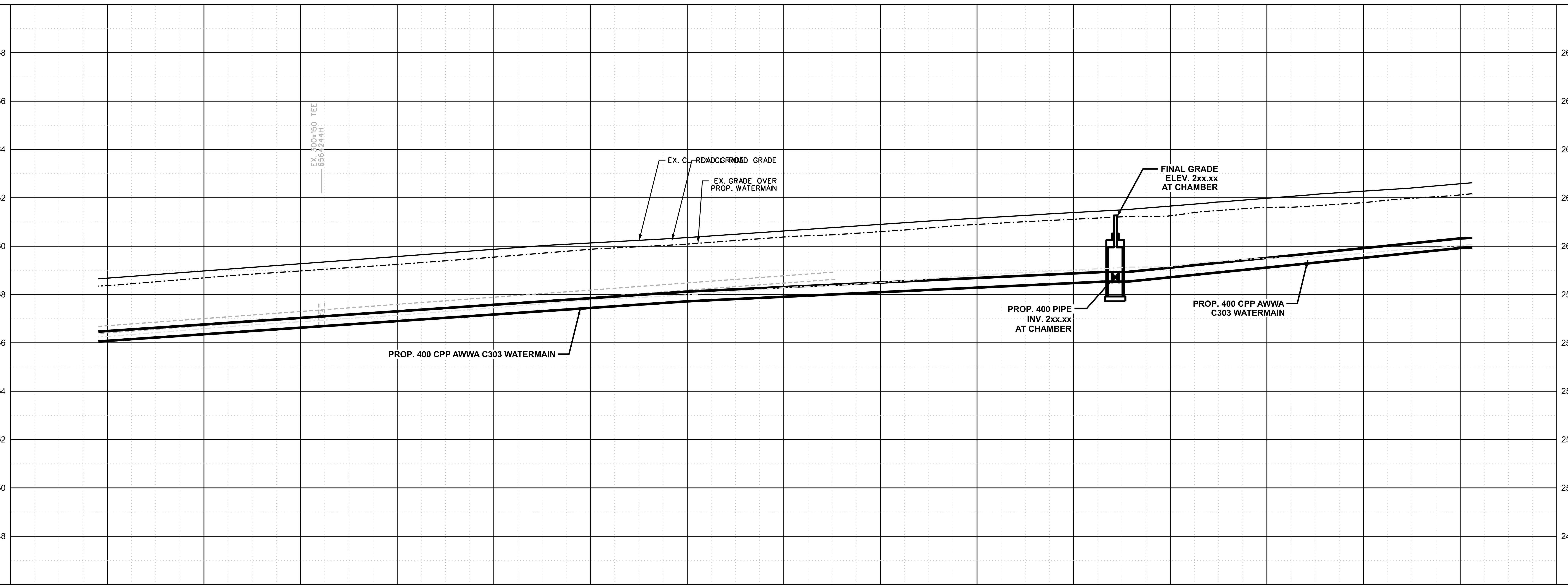
RESTRAINED JOINTS																
BOT.EL. OF WM.																
261.46	260.98	260.51	260.08	259.72	259.31	258.92	258.56	258.28	258.10	257.98	257.96	258.16	258.40	258.67	EX. ROAD ELEV.	
1+680	1+700	1+720	1+740	1+760	1+780	1+800	1+820	1+840	1+860	1+880	1+900	1+920	1+940	1+960	ROAD CHAINAGE	

Project No.	XX-XXXX				
CAD Area	X-XX	Area	C-12/C-13	Plan No.	**WM-703**
Checked by	G.J.	Drawn by	M.L.		
Date	FEB. 2026	Sheet	63 of 83		



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

NOT FOR CONSTRUCTION



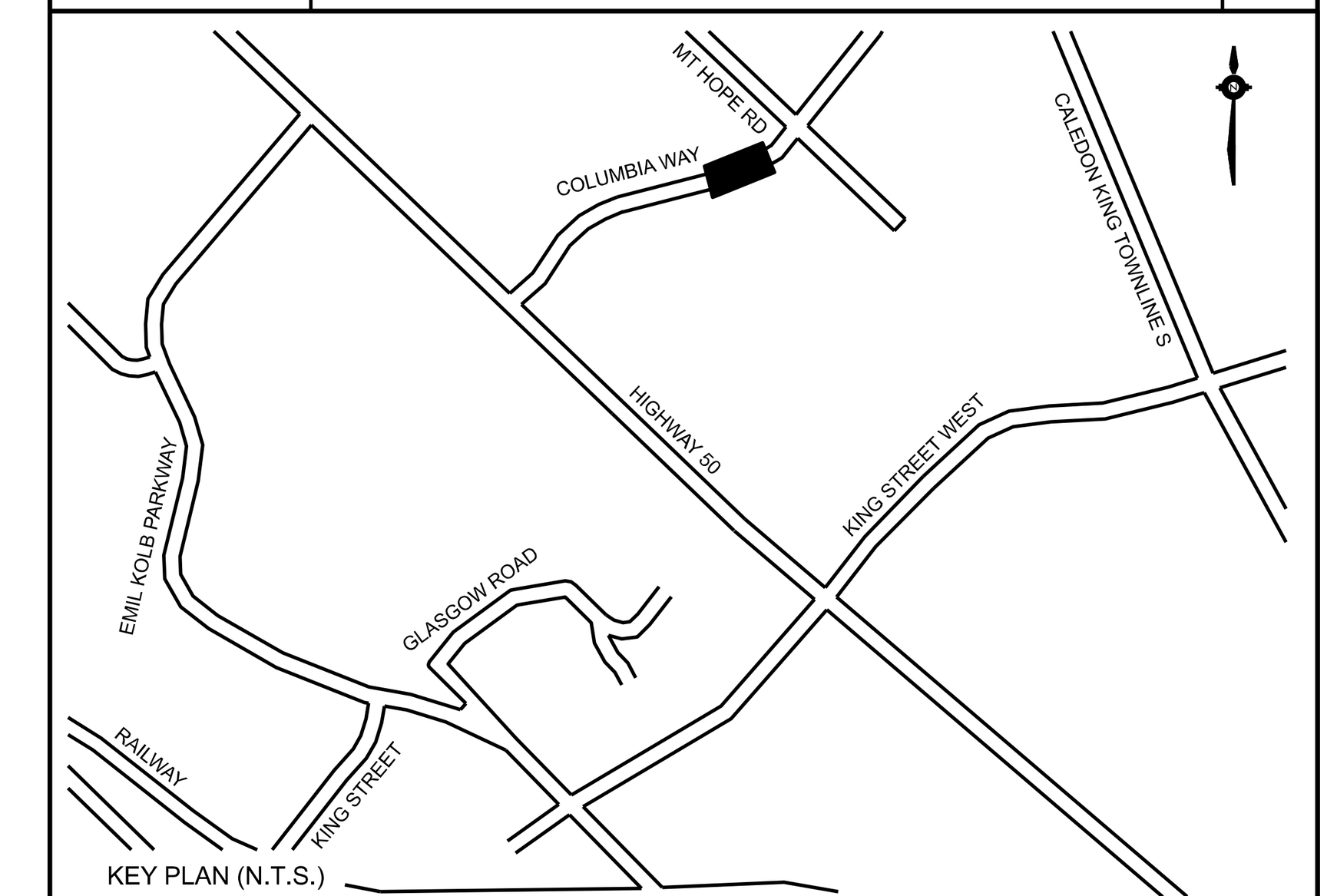
RESTRAINED JOINTS															
BOT.EL. OF WM.															
EX. ROAD ELEV.	258.67	258.97	259.26	259.55	259.86	260.13	260.35	260.62	260.90	261.16	261.39	261.66	261.98	262.28	262.58
ROAD CHAINAGE	1+960	1+980	2+000	2+020	2+040	2+060	2+080	2+100	2+120	2+140	2+160	2+180	2+200	2+220	2+240

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB. 00, 2023	X.X.	GAS MAINS	FEB. 00, 2023	X.X.
STORM SEWERS	FEB. 00, 2023	X.X.	BELL U/G CABLE	FEB. 00, 2023	X.X.
WATERMAINS	FEB. 00, 2023	X.X.	HYDRO U/G CABLE	FEB. 00, 2023	X.X.
TRANSIT	FEB. 00, 2023	X.X.	HYDRO ONE	FEB. 00, 2023	X.X.
PARKS & REC.	FEB. 00, 2023	X.X.	CTV	FEB. 00, 2023	X.X.
ONT. CLEAN WATER	FEB. 00, 2023	X.X.	COMMUNIC. CABLES	FEB. 00, 2023	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

NOTES:

1. FOR GENERAL NOTES, DETAILS AND LEGEND SEE DWG. DET-001 TO DET-018
2. HYDRANTS AND VALVES ARE NOT SHOWN TO SCALE ON DRAWINGS. ALL HYDRANTS AND VALVES ARE AMPLIFIED FOR VISUAL REPRESENTATION.

UTILITY NOTES:

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WS25(S) Proposed Short Water Service, Size In mm
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Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m HORIZONTAL SCALE 1:500

2m 0 2 4 6m VERTICAL SCALE 1:100

Region of Peel
working with you

COLUMBIA WAY

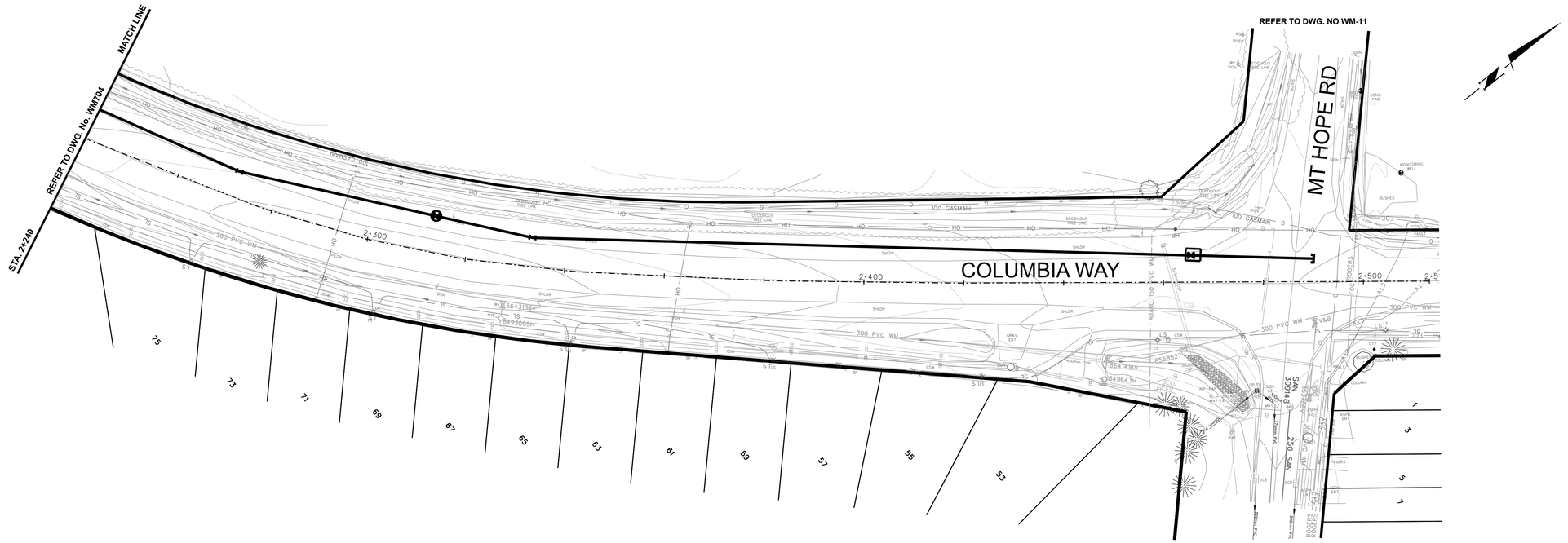
(FROM 315 m WEST OF WESTCHESTER BLVD TO MT HOPE RD)

PROP. 400mm WATERMAIN

STA. 1+960 TO STA. 2+240

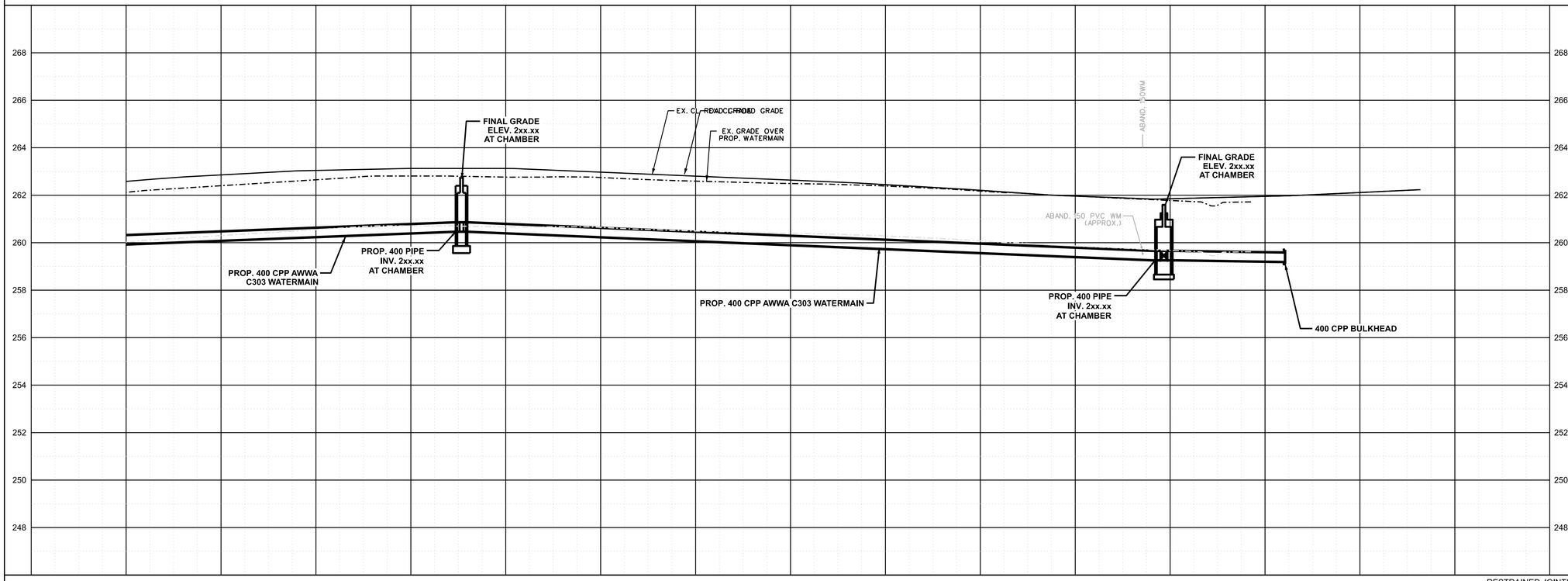
Project No.	XX-XXXX		
CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	64 of 83

Plan No. **WM-704**



WORKING PRESSURE: 108 kPa
TEST PRESSURE: 150 kPa

NOT FOR CONSTRUCTION

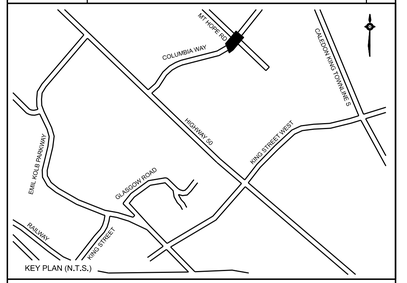


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB. 00, 2023	X.X.	GAS MAINS	FEB. 00, 2023	X.X.
STORM SEWERS	FEB. 00, 2023	X.X.	BELL U/G CABLE	FEB. 00, 2023	X.X.
WATERMAINS	FEB. 00, 2023	X.X.	HYDRO U/G CABLE	FEB. 00, 2023	X.X.
TRANSIT	FEB. 00, 2023	X.X.	HYDRO ONE	FEB. 00, 2023	X.X.
PARKS & REC.	FEB. 00, 2023	X.X.	CTV	FEB. 00, 2023	X.X.
ONT. CLEAN WATER	FEB. 00, 2023	X.X.	COMMUNIC. CABLES	FEB. 00, 2023	X.X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

NOTES:

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2. HYDRANTS AND VALVES ARE NOT SHOWN TO SCALE ON DRAWINGS. ALL HYDRANTS AND VALVES ARE AMPLIFIED FOR VISUAL REPRESENTATION.

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2) **MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO GASMAINS**
3) **MAINTAIN A MINIMUM OF 0.3m VERTICAL CLEARANCE TO GASMAINS OR HYDRO PLANT**
4) **TESTHOLES REQUIRED PRIOR TO CONSTRUCTION TO DETERMINE ACTUAL DEPTHS OF GASMAINS**
5) **MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO BELL PLANT, MAINTAIN A MINIMUM OF 1.5m HORIZONTAL CLEARANCE FROM BELL PLANT TO PROPOSED HYDRANTS**
6) **PROPOSED HYDRANT OFFSET TO BE DETERMINED IN THE FIELD (MIN. 1.5m OFFSET TO BELL OR HYDRO POLES)**

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All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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Approved by

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ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
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ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

10m 0 10 20 30m — HORIZONTAL SCALE 1:500
2m 0 2 4 6m — VERTICAL SCALE 1:100

Region of Peel
working with you

COLUMBIA WAY

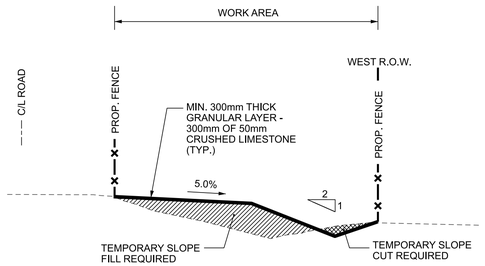
(FROM 315 m WEST OF WESTCHESTER BLVD TO MT HOPE RD)
PROP. 400mm WATERMAIN
STA. 2+240 TO STA. 2+513

															RESTRAINED JOINTS	
															BOT.EL. OF WM.	
262.58	262.85	263.04	263.13	263.13	262.98	262.80	262.64	262.44	262.20	261.96	261.85	261.95	262.12		EX. ROAD ELEV.	
2+240	2+260	2+280	2+300	2+320	2+340	2+360	2+380	2+400	2+420	2+440	2+460	2+480	2+500	2+520	ROAD CHAINAGE	

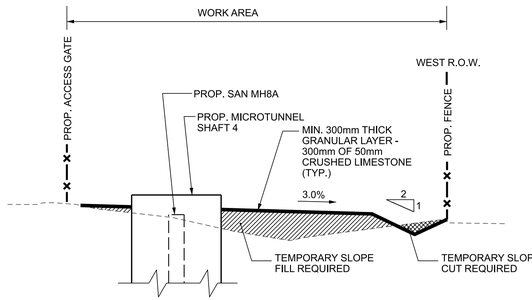
Project No.	XX-XXXX			
CAD Area	X-XX	Area	C-12/C-13	Plan No. **WM-705**
Checked by		Drawn by		
Date	FEB. 2026	Sheet	65 of 83	

LEGEND:

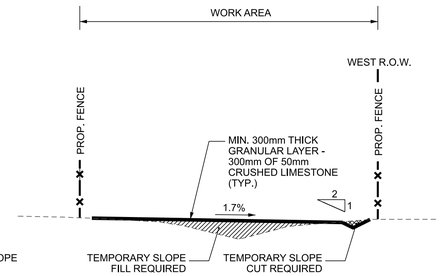
- EX. FENCE REMOVAL
- WORK AREA
- WORK AREA WITH TEMPORARY FILL AND GRANULAR SURFACE
- WORK AREA WITH TEMPORARY CUT AND GRANULAR SURFACE
- PROPOSED CONSTRUCTION HOARDING
- PROPOSED HEAVY-DUTY SILT FENCE BARRIER (OPSD 219.130)
- PROP. JERSEY BARRIERS
- SEDIMENT CONTROL AT EX. CATCH BASIN



SECTION A-A
N. T. S



SECTION B-B
N. T. S

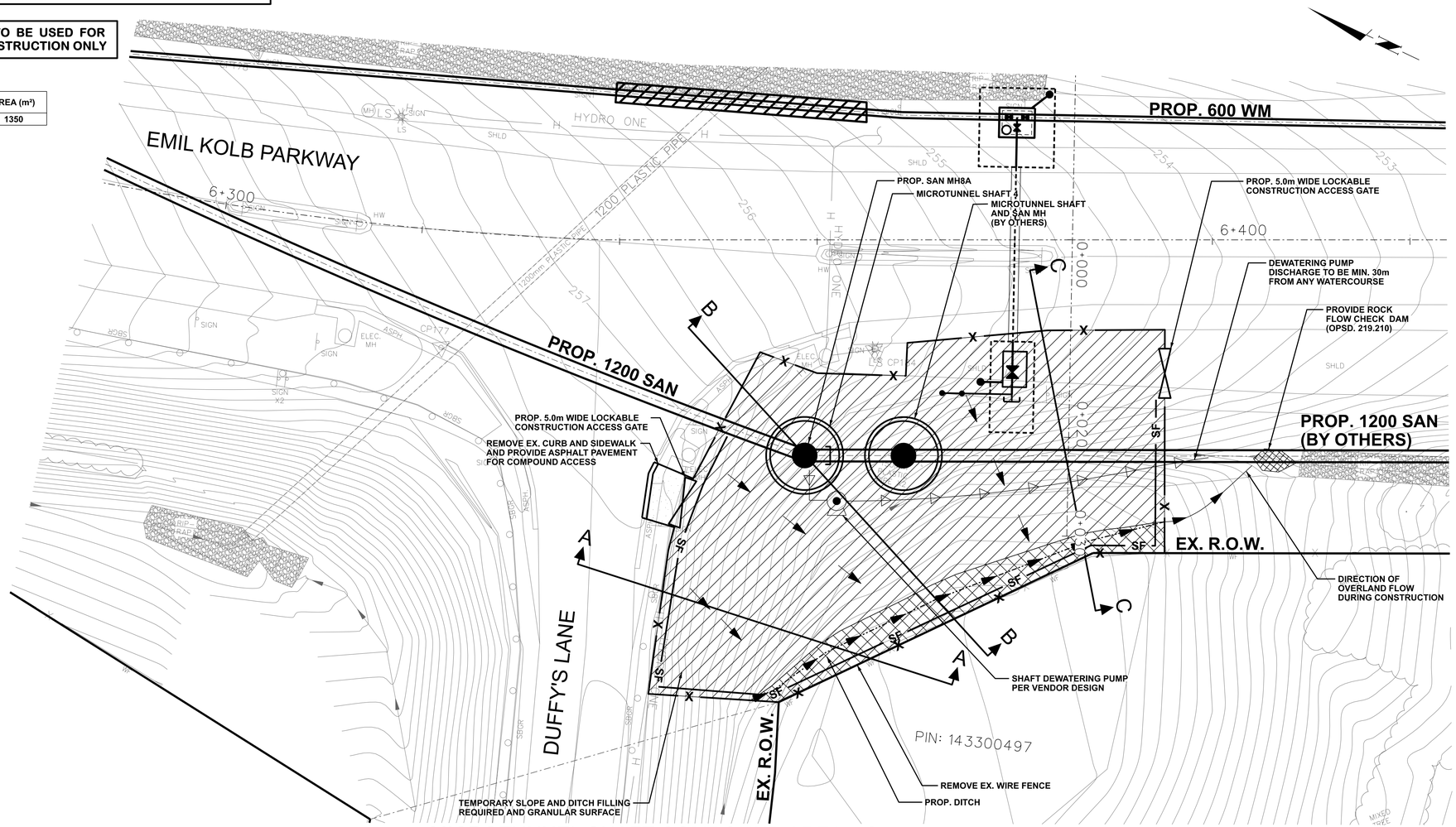


SECTION C-C
N. T. S

NOTE: EXISTING FIELD AREA SHOWN FOR USE AS CONSTRUCTION EQUIPMENT STORAGE, MATERIALS STOCKPILE, TUNNELLING EQUIPMENT/DE-WATERING SHALL ONLY BE USED FOR WORKS SPECIFICALLY RELATED TO TUNNEL SHAFT CONSTRUCTION. THESE AREAS SHALL NOT BE UTILIZED FOR OTHER STAGING OR STORAGE REQUIREMENTS RELATED TO THE REMAINING WATERMAIN PORTION OF THE PROJECT. CONSTRUCTION SHALL NOT EXTEND BEYOND THE LIMITS SHOWN FOR MULTI-BARRIER SEDIMENT CONTROL.

THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY

MICROTUNNEL SHAFT COMPOUND	AREA (m²)
4	1350



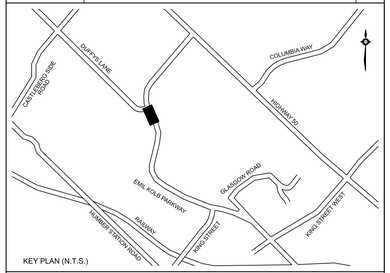
MICROTUNNEL SHAFT COMPOUND AREA NO. 4
(EMIL KOLB PARKWAY STA. 6+340 TO 6+400)

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
STORM SEWERS	FEB, 00, 2023	X,X,	BELL U/G CABLE	FEB, 00, 2023	X,X,
WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

NOTES:

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All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency.
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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Approved by

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- ONTARIO MINISTRY OF TRANSPORTATION
- ONTARIO CLEAN WATER AGENCY
- HYDRO ONE NETWORKS
- ALECTRA UTILITIES
- TRANS NORTHERN PIPELINE
- PEARSON INTERNATIONAL FUEL FACILITIES CORP.
- UNION GAS
- CABLE TELEVISION/FIBREOPTIC PROVIDERS:
- BELL CANADA
- ENERSOURCE TELECOM
- HYDRO ONE TELECOM
- ROGERS CABLE
- ALLSTREAM (ZAYO)
- PSN (PUBLIC SECTOR NETWORK)
- FUTUREWAY (FCI BROADBAND)
- GT FIBER/360 NETWORK INC.
- TELUS COMMUNICATION

5m 0 5 10 15m
HORIZONTAL SCALE 1:250

Region of Peel
working with you

EMIL KOLB PARKWAY

COMPOUND PLAN

MICROTUNNEL SHAFT COMPOUND NO. 4

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	66 of 83
Project No.	XX-XXXX		
Plan No.	**CP-405**		

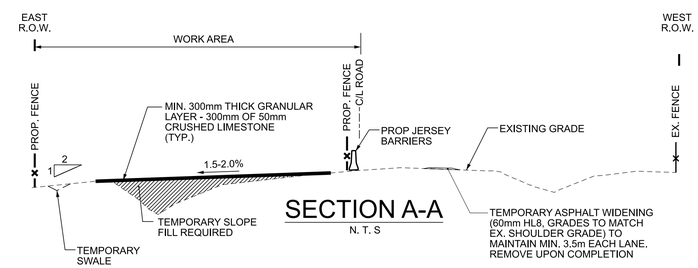
LEGEND:

- EX. FENCE REMOVAL
- WORK AREA
- WORK AREA WITH TEMPORARY FILL AND GRANULAR SURFACE
- x — x — PROPOSED CONSTRUCTION HOARDING
- SF — SF — PROPOSED HEAVY-DUTY SILT FENCE BARRIER (OPSD 219.130)
- PROP. JERSEY BARRIERS

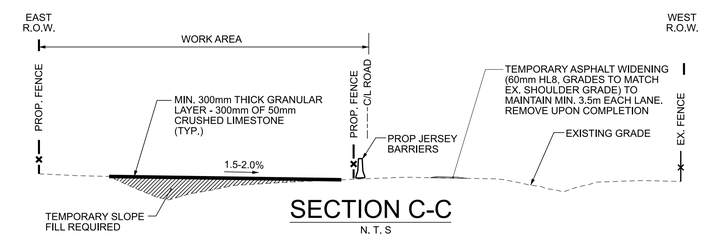
NOTE: EXISTING FIELD AREA SHOWN FOR USE AS CONSTRUCTION EQUIPMENT STORAGE, MATERIALS STOCKPILE, TUNNELLING EQUIPMENT/DE-WATERING SHALL ONLY BE USED FOR WORKS SPECIFICALLY RELATED TO TUNNEL SHAFT CONSTRUCTION. THESE AREAS SHALL NOT BE UTILIZED FOR OTHER STAGING OR STORAGE REQUIREMENTS RELATED TO THE REMAINING WATERMAIN PORTION OF THE PROJECT. CONSTRUCTION SHALL NOT EXTEND BEYOND THE LIMITS SHOWN FOR MULTI-BARRIER SEDIMENT CONTROL.

THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY

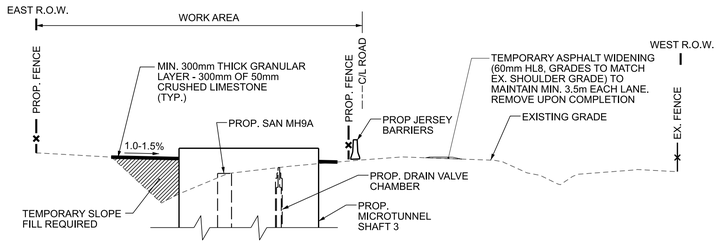
MICROTUNNEL SHAFT COMPOUND	AREA (m²)
3	1750



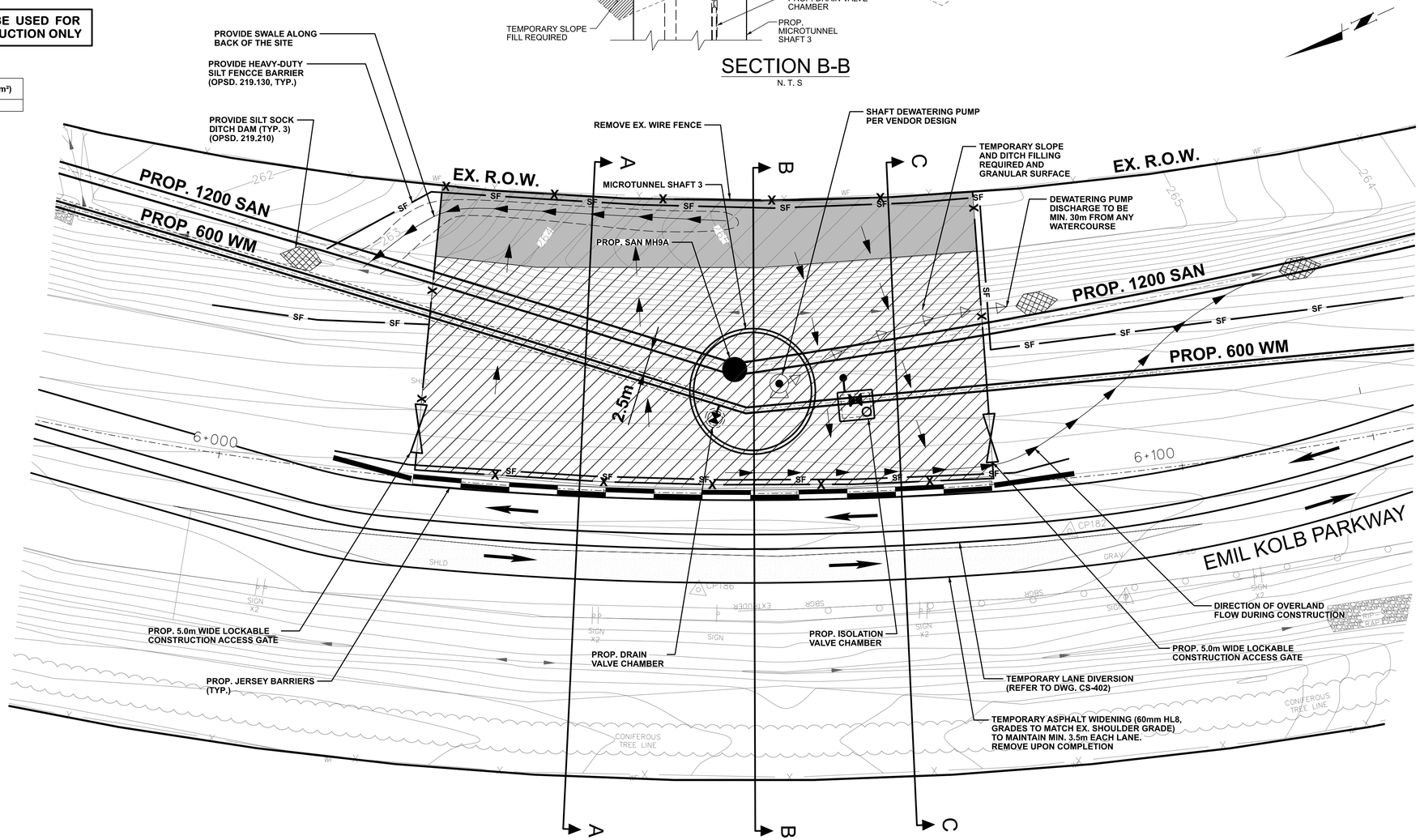
SECTION A-A
N. T. S



SECTION C-C
N. T. S



SECTION B-B
N. T. S



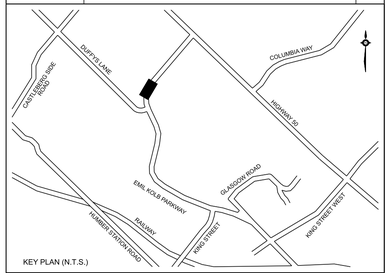
MICROTUNNEL SHAFT COMPOUND AREA NO. 3
(EMIL KOLB PARKWAY STA. 6+020 TO 6+080)

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
STORM SEWERS	FEB, 00, 2023	X,X,	BELL U/G CABLE	FEB, 00, 2023	X,X,
WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



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All Pipes Size In mm
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WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
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ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

5m 0 5 10 15m
HORIZONTAL SCALE 1:250

Region of Peel
working with you

EMIL KOLB PARKWAY

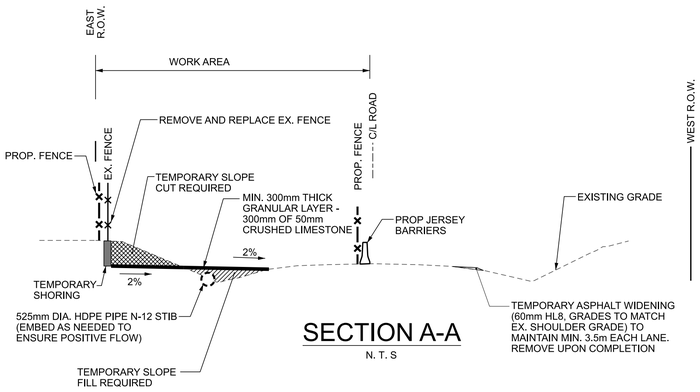
COMPOUND PLAN

MICROTUNNEL SHAFT COMPOUND NO. 3

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	67 of 83
Project No.	XX-XXXX		
Plan No.	**CP-404**		

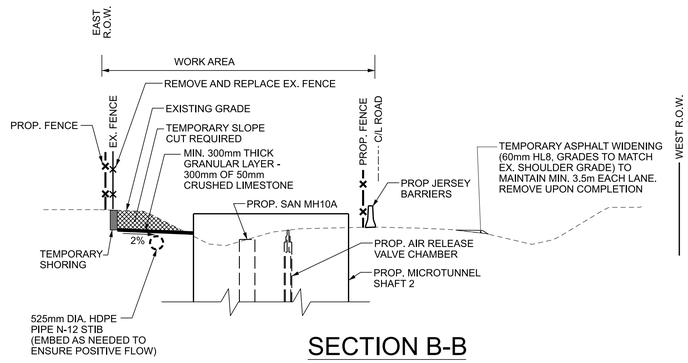
LEGEND:

- EX. FENCE REMOVAL
- WORK AREA
- WORK AREA WITH TEMPORARY FILL AND GRANULAR SURFACE
- WORK AREA WITH TEMPORARY CUT AND GRANULAR SURFACE
- PROPOSED CONSTRUCTION HOARDING
- PROPOSED HEAVY-DUTY SILT FENCE BARRIER (OPSD 219.130)
- PROP. JERSEY BARRIERS
- SEDIMENT CONTROL AT EX. CATCH BASIN



SECTION A-A

N. T. S



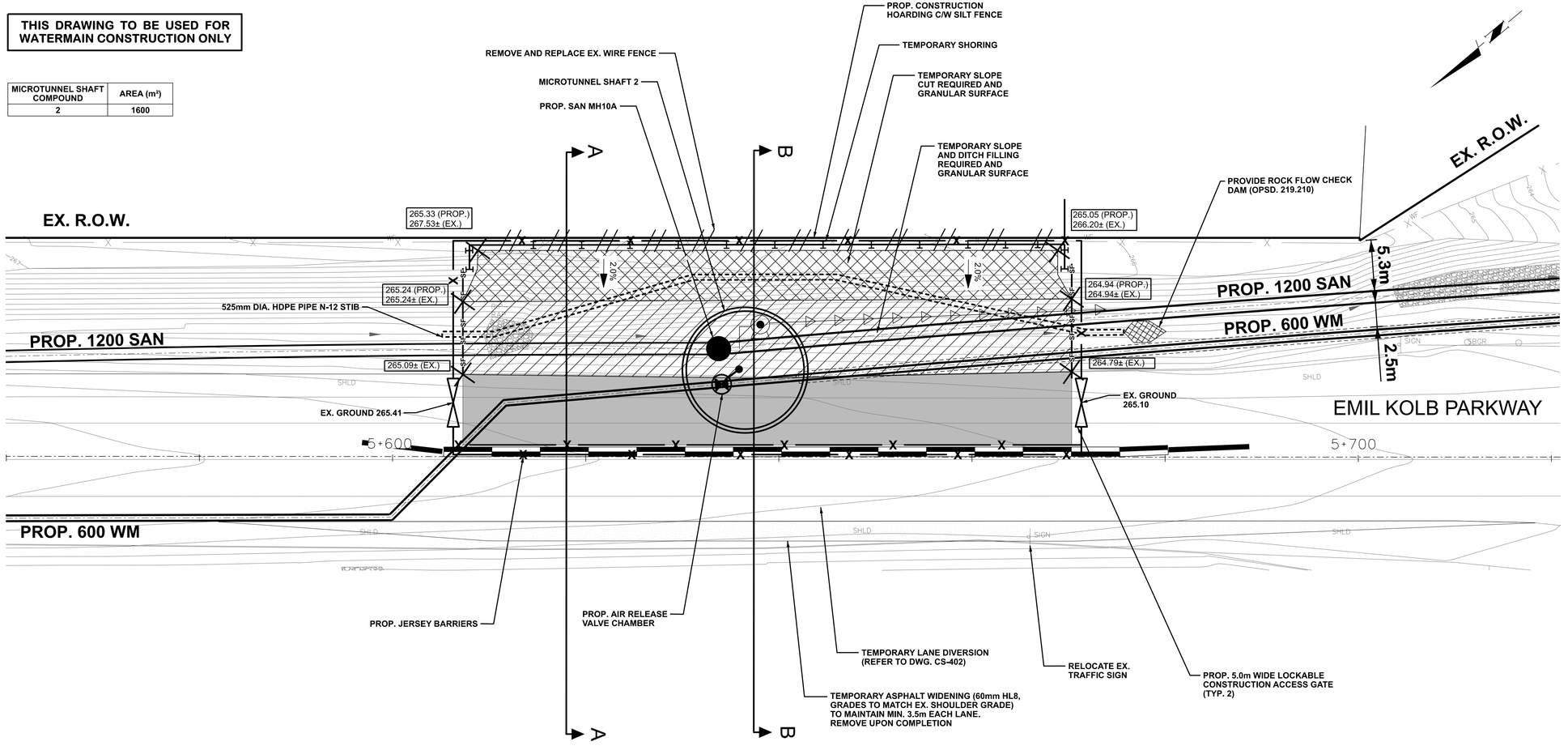
SECTION B-B

N. T. S

NOTE: EXISTING FIELD AREA SHOWN FOR USE AS CONSTRUCTION EQUIPMENT STORAGE, MATERIALS STOCKPILE, TUNNELLING EQUIPMENT/DE-WATERING SHALL ONLY BE USED FOR WORKS SPECIFICALLY RELATED TO TUNNEL SHAFT CONSTRUCTION. THESE AREAS SHALL NOT BE UTILIZED FOR OTHER STAGING OR STORAGE REQUIREMENTS RELATED TO THE REMAINING WATERMAIN PORTION OF THE PROJECT. CONSTRUCTION SHALL NOT EXTEND BEYOND THE LIMITS SHOWN FOR MULTI-BARRIER SEDIMENT CONTROL.

THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY

MICROTUNNEL SHAFT COMPOUND	AREA (m²)
2	1600



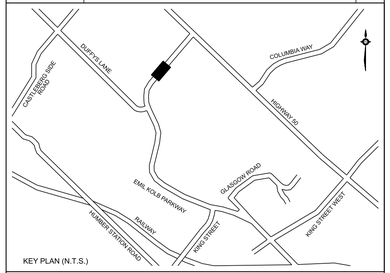
MICROTUNNEL SHAFT COMPOUND AREA NO. 2
(EMIL KOLB PARKWAY STA. 5+610 TO 5+670)

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X,	GAS MAINS	FEB, 00, 2023	X,X,
STORM SEWERS	FEB, 00, 2023	X,X,	BELL U/G CABLE	FEB, 00, 2023	X,X,
WATERMAINS	FEB, 00, 2023	X,X,	HYDRO U/G CABLE	FEB, 00, 2023	X,X,
TRANSIT	FEB, 00, 2023	X,X,	HYDRO ONE	FEB, 00, 2023	X,X,
PARKS & REC.	FEB, 00, 2023	X,X,	CTV	FEB, 00, 2023	X,X,
ONT. CLEAN WATER	FEB, 00, 2023	X,X,	COMMUNIC. CABLES	FEB, 00, 2023	X,X,

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

NOTES:

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4) **TESTHOLES REQUIRED PRIOR TO CONSTRUCTION TO DETERMINE ACTUAL DEPTHS OF GASMAINS**
5) **MAINTAIN A MINIMUM OF 0,6m HORIZONTAL CLEARANCE TO BELL PLANT, MAINTAIN A MINIMUM OF 1.5m HORIZONTAL CLEARANCE FROM BELL PLANT TO PROPOSED HYDRANTS**
6) **PROPOSED HYDRANT OFFSET TO BE DETERMINED IN THE FIELD (MIN. 1,5m OFFSET TO BELL OR HYDRO POLES)**

CONTRACT DRAWINGS

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General Notes

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All Driveways Are ASPHALT Unless Otherwise Noted
All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

5m 0 5 10 15m HORIZONTAL SCALE 1:250

Region of Peel working with you

EMIL KOLB PARKWAY

COMPOUND PLAN

MICROTUNNEL SHAFT COMPOUND NO. 2

CAD Area	X-XX	Area	C-12/C-13
Checked by	G.J.	Drawn by	M.L.
Date	FEB. 2026	Sheet	68 of 83

Project No. XX-XXXX

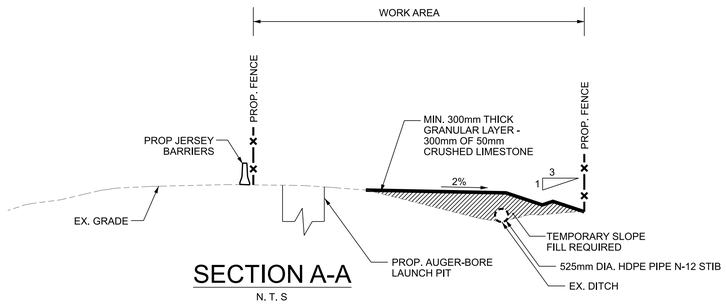
Plan No. **CP-403**

LEGEND:

- EX. GUARD RAIL REMOVAL
- WORK AREA
- WORK AREA WITH TEMPORARY FILL AND GRANULAR SURFACE
- x — x — PROPOSED CONSTRUCTION HOARDING
- SF — SF — PROPOSED HEAVY-DUTY SILT FENCE BARRIER (OPSD 219.130)
- PROP. JERSEY BARRIERS
- CB — SEDIMENT CONTROL AT EX. CATCH BASIN

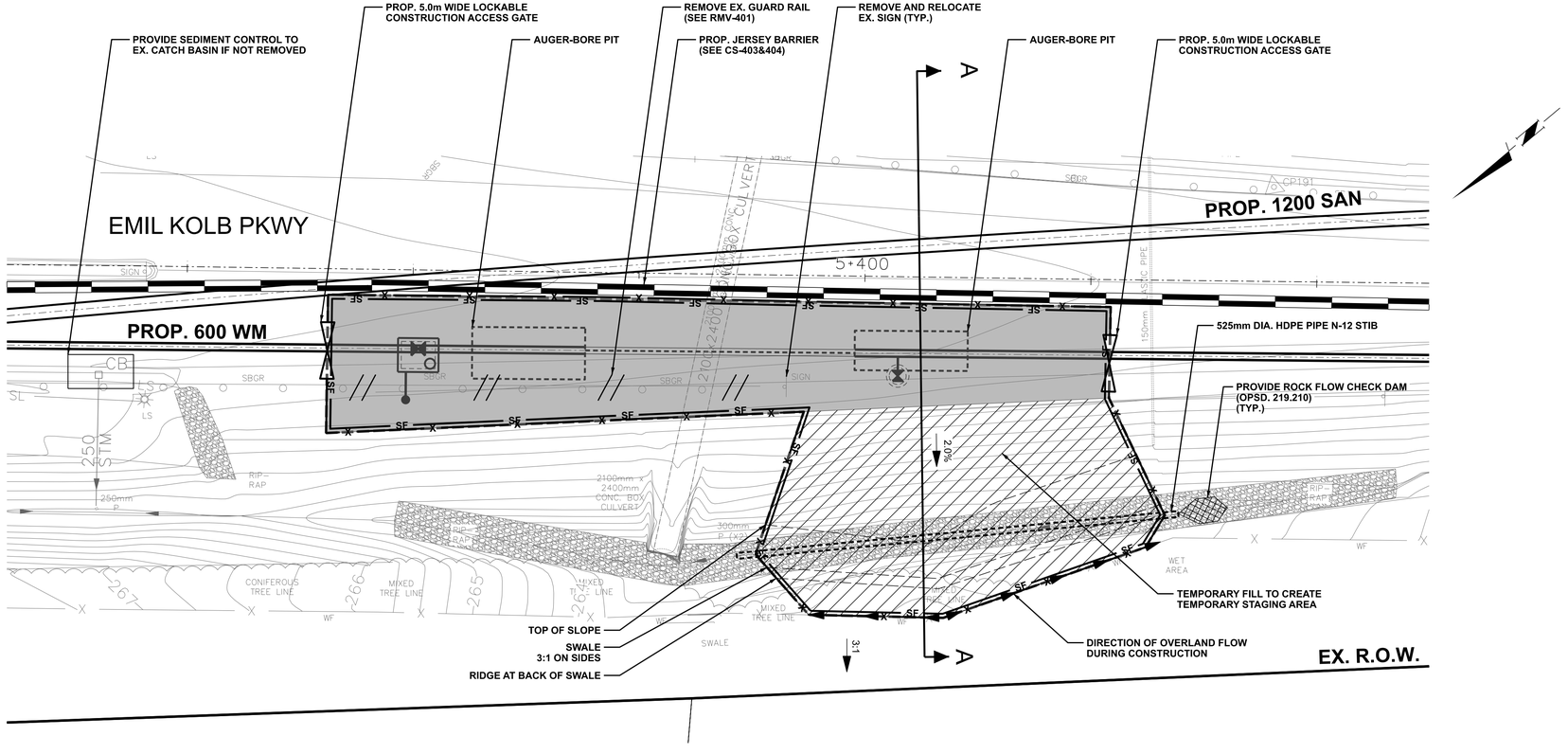
NOTE: EXISTING FIELD AREA SHOWN FOR USE AS CONSTRUCTION EQUIPMENT STORAGE, MATERIALS STOCKPILE, TUNNELLING EQUIPMENT/DE-WATERING SHALL ONLY BE USED FOR WORKS SPECIFICALLY RELATED TO TUNNEL SHAFT CONSTRUCTION. THESE AREAS SHALL NOT BE UTILIZED FOR OTHER STAGING OR STORAGE REQUIREMENTS RELATED TO THE REMAINING WATERMAIN PORTION OF THE PROJECT. CONSTRUCTION SHALL NOT EXTEND BEYOND THE LIMITS SHOWN FOR MULTI-BARRIER SEDIMENT CONTROL.

THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY



SECTION A-A

N. T. S



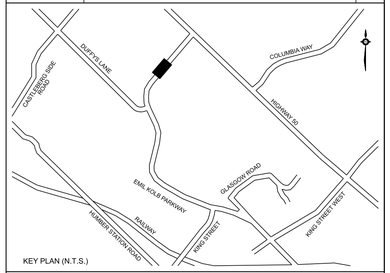
AUGER-BORE COMPOUND
(EMIL KOLB PARKWAY STA. 5+350 TO 5+430)

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

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All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

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- ONTARIO CLEAN WATER AGENCY
- HYDRO ONE NETWORKS
- ALECTRA UTILITIES
- TRANS NORTHERN PIPELINE
- PEARSON INTERNATIONAL FUEL FACILITIES CORP.
- UNION GAS
- CABLE TELEVISION/FIBREOPTIC PROVIDERS:
- BELL CANADA
- ENERSOURCE TELECOM
- HYDRO ONE TELECOM
- ROGERS CABLE
- ALLSTREAM (ZAYO)
- PSN (PUBLIC SECTOR NETWORK)
- FUTUREWAY (FCI BROADBAND)
- GT FIBER/360 NETWORK INC.
- TELUS COMMUNICATION

5m 0 5 10 15m
HORIZONTAL SCALE 1:250

Region of Peel
working with you

EMIL KOLB PARKWAY

COMPOUND PLAN

AUGER-BORE COMPOUND

CAD Area	X-XX	Area	C-12/C-13	Project No.	XX-XXXX
Checked by	G.J.	Drawn by	V.A.K.		
Date	FEB. 2026	Sheet	69 of 83	Plan No.	**CP-402**

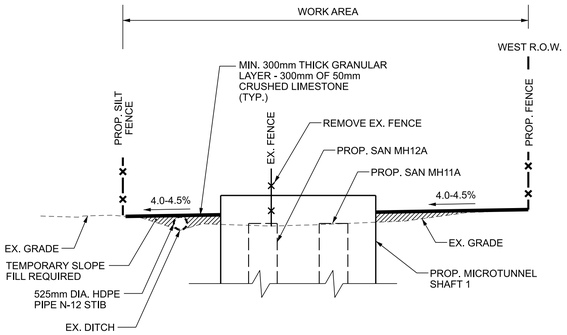
LEGEND:

- EX. FENCE REMOVAL
- WORK AREA
- WORK AREA WITH TEMPORARY FILL AND GRANULAR SURFACE
- PROPOSED CONSTRUCTION HOARDING
- PROPOSED HEAVY-DUTY SILT FENCE BARRIER (OPSD 219.130)
- PROP. JERSEY BARRIERS
- SEDIMENT CONTROL AT EX. CATCH BASIN

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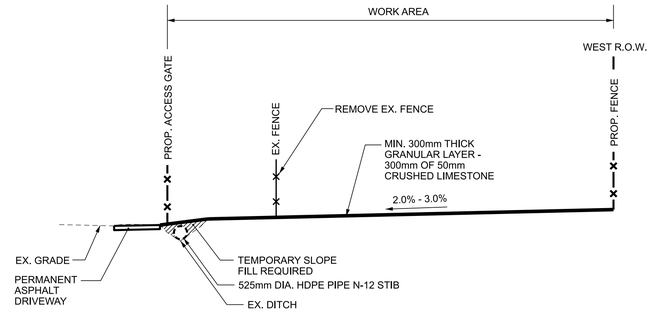
THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY

MICROTUNNEL SHAFT COMPOUND	AREA (m²)
1	4000



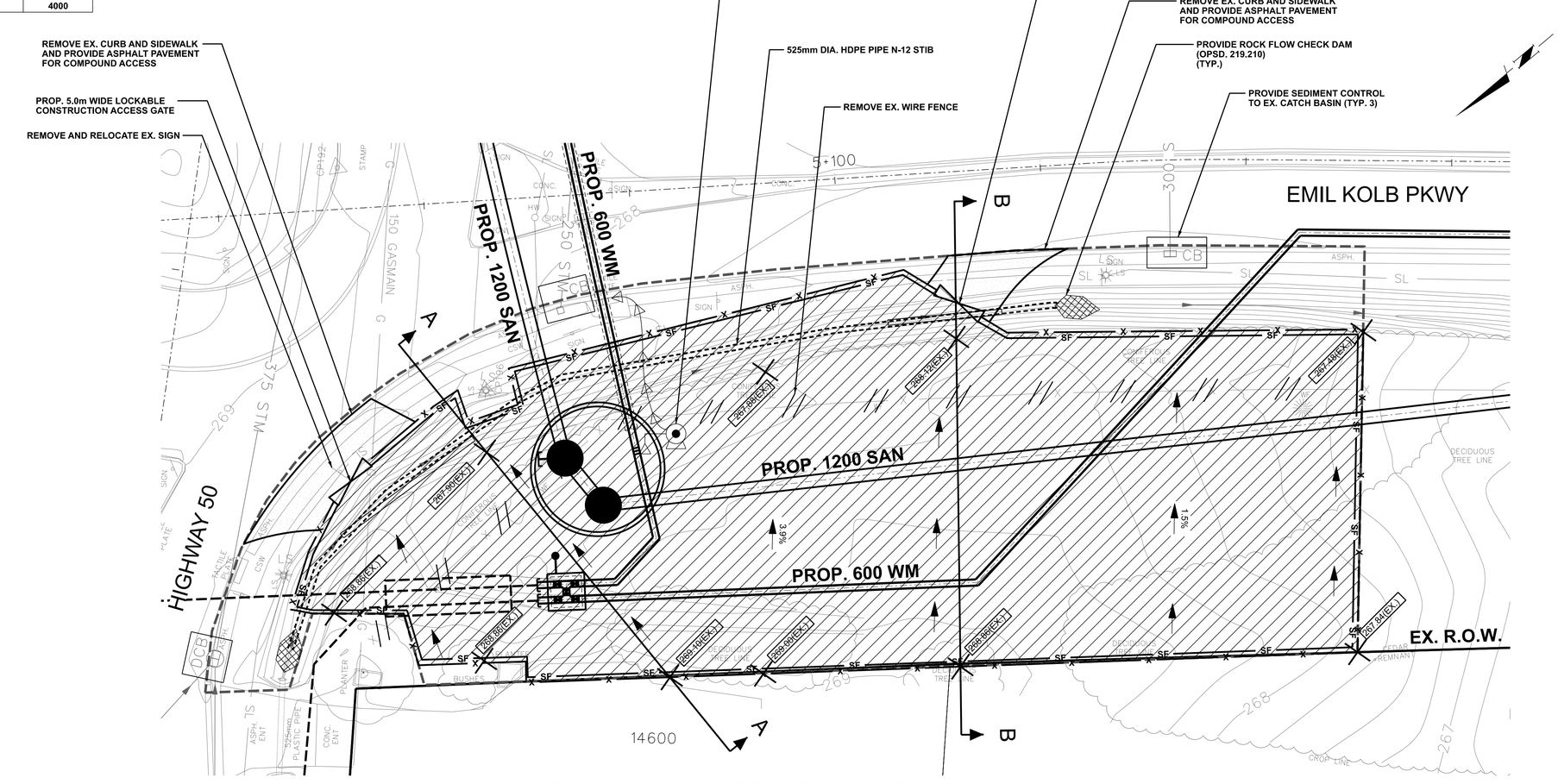
SECTION A-A

N. T. S



SECTION B-B

N. T. S



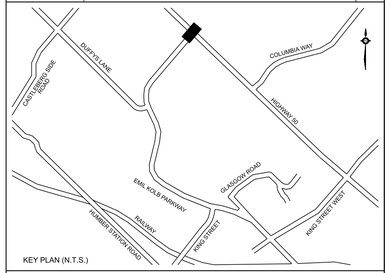
MICROTUNNEL SHAFT COMPOUND AREA NO. 1
(EMIL KOLB PARKWAY STA. 5+040 TO 5+150)

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS	FEB, 00, 2023	X,X.	GAS MAINS	FEB, 00, 2023	X,X.
STORM SEWERS	FEB, 00, 2023	X,X.	BELL U/G CABLE	FEB, 00, 2023	X,X.
WATERMAINS	FEB, 00, 2023	X,X.	HYDRO U/G CABLE	FEB, 00, 2023	X,X.
TRANSIT	FEB, 00, 2023	X,X.	HYDRO ONE	FEB, 00, 2023	X,X.
PARKS & REC.	FEB, 00, 2023	X,X.	CTV	FEB, 00, 2023	X,X.
ONT. CLEAN WATER	FEB, 00, 2023	X,X.	COMMUNIC. CABLES	FEB, 00, 2023	X,X.

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

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All Pipes Size In mm

20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency:
B.M. No.
Elev. XXX.XXX (Geodetic)
Coordinate System: UTM NAD83 (Original)

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GEI Consultants Canada

Approved by

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HYDRO ONE NETWORKS
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TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

5m 0 5 10 15m HORIZONTAL SCALE 1:250

Region of Peel working with you

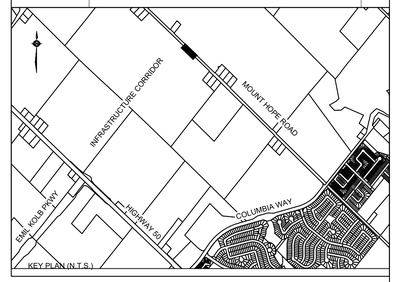
EMIL KOLB PARKWAY

COMPOUND PLAN

MICROTUNNEL SHAFT COMPOUND NO. 1

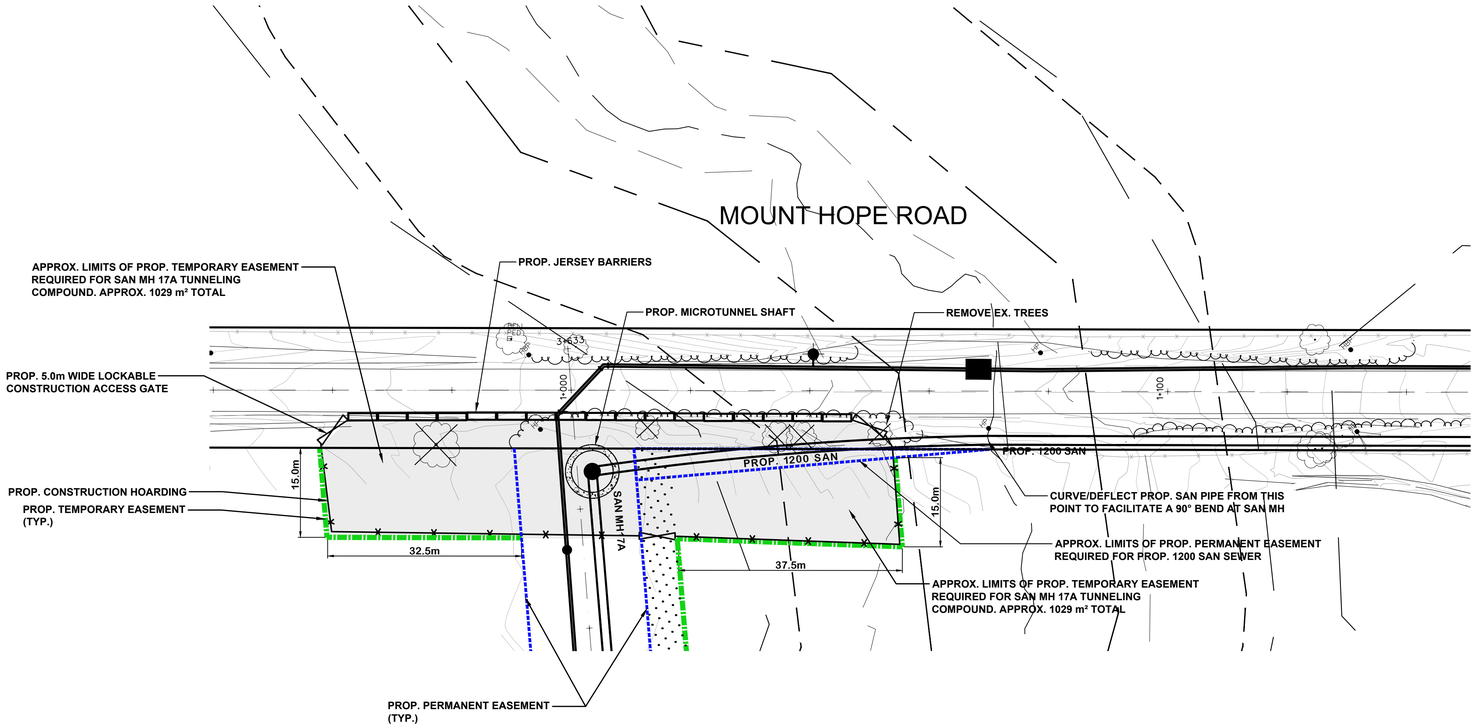
CAD Area	X-XX	Area	C-12/C-13	Project No.	XX-XXXX
Checked by	G.J.	Drawn by	M.L.		
Date	FEB. 2026	Sheet	70 of 83	Plan No.	CP-401

REVISIONS		
DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	E.M.



NOTES:

1. EXISTING FIELD AREA SHOWN FOR USE AS CONSTRUCTION EQUIPMENT STORAGE, MATERIALS STOCKPILE, TUNNELING EQUIPMENT/DE-WATERING SHALL ONLY BE USED FOR WORKS SPECIFICALLY RELATED TO TUNNEL SHAFT CONSTRUCTION. THESE AREAS SHALL NOT BE UTILIZED FOR OTHER STAGING OR STORAGE REQUIREMENTS RELATED TO THE REMAINING WATERMAIN PORTION OF THE PROJECT. CONSTRUCTION SHALL NOT EXTEND BEYOND THE LIMITS SHOWN FOR THE MULTI-BARRIER SEDIMENT CONTROL.



LEGEND:

- EXISTING FENCE TO BE REMOVED
- WORK AREA
- WORK AREA WITH TEMPORARY GRADING AND GRANULAR SURFACE
- TEMPORARY CONSTRUCTION DOUBLE SWING GATE
- CONSTRUCTION HOARDING
- JERSEY BARRIER
- SEDIMENT CONTROL AT EXISTING CATCH BASIN
- TEMPORARY EASEMENT
- PERMANENT EASEMENT
- EXISTING RIGHT OF WAY (R.O.W.)

GEI Consultants Canada

Approved by

SCALE = 1:500

10m 0 10 20 30m

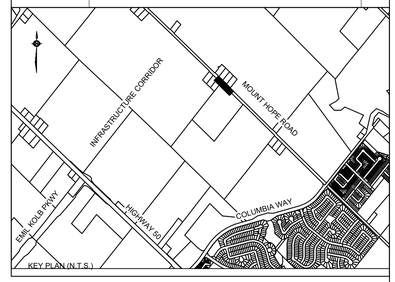
Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD
MICROTUNNEL SHAFT No.7 COMPOUND PLAN

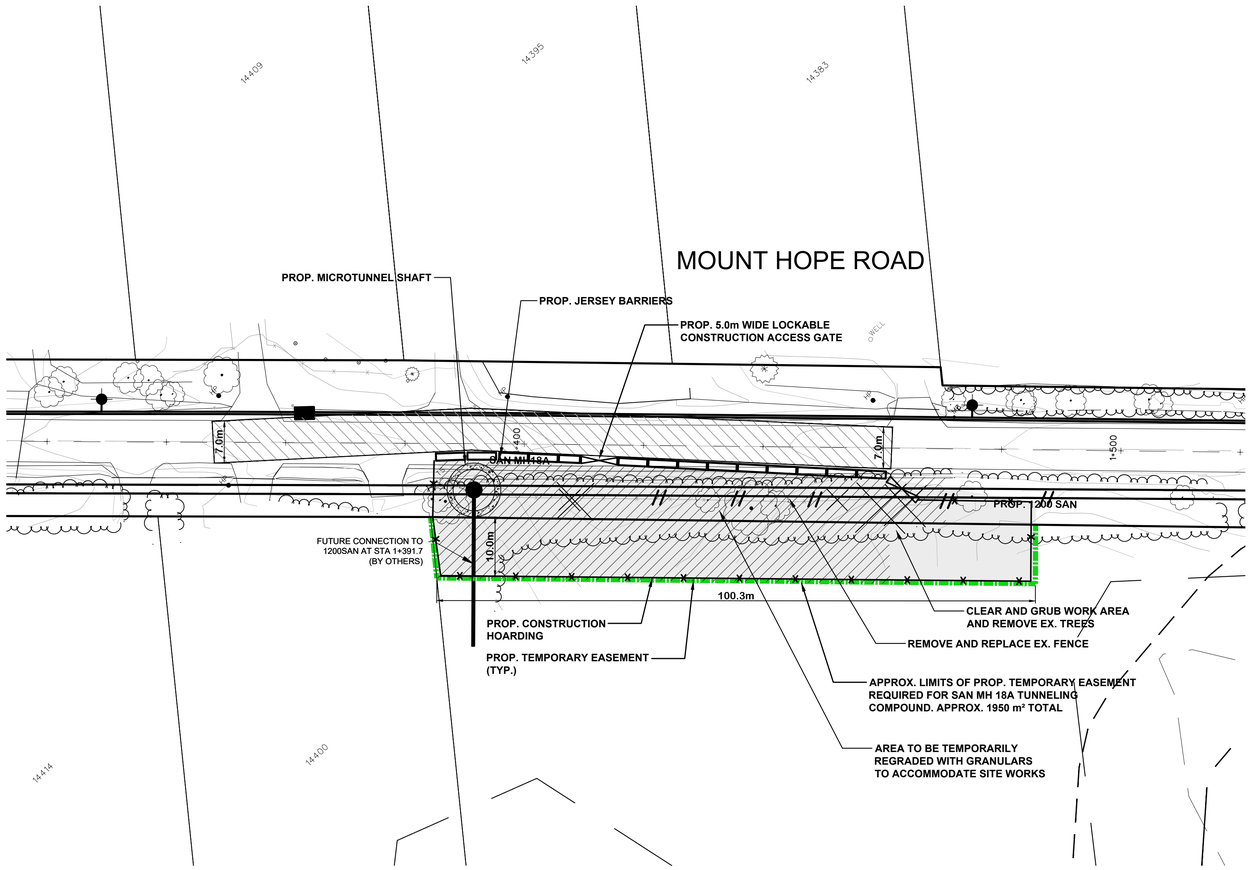
CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB. 2026	Sheet	71 of 83	Plan No.	**CP-01**

REVISIONS		
DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	E.M.



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GEI Consultants Canada

Approved by

SCALE = 1:500

10m 0 10 20 30m

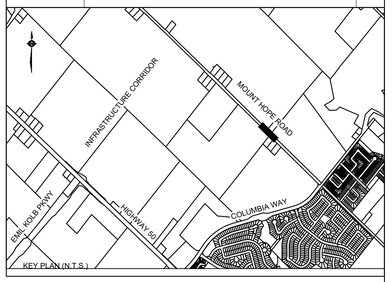
Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD
MICROTUNNEL SHAFT No.8 COMPOUND PLAN

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB. 2026	Sheet	72 of 83	Plan No.	**CP-02**

REVISIONS		
DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	E.M.



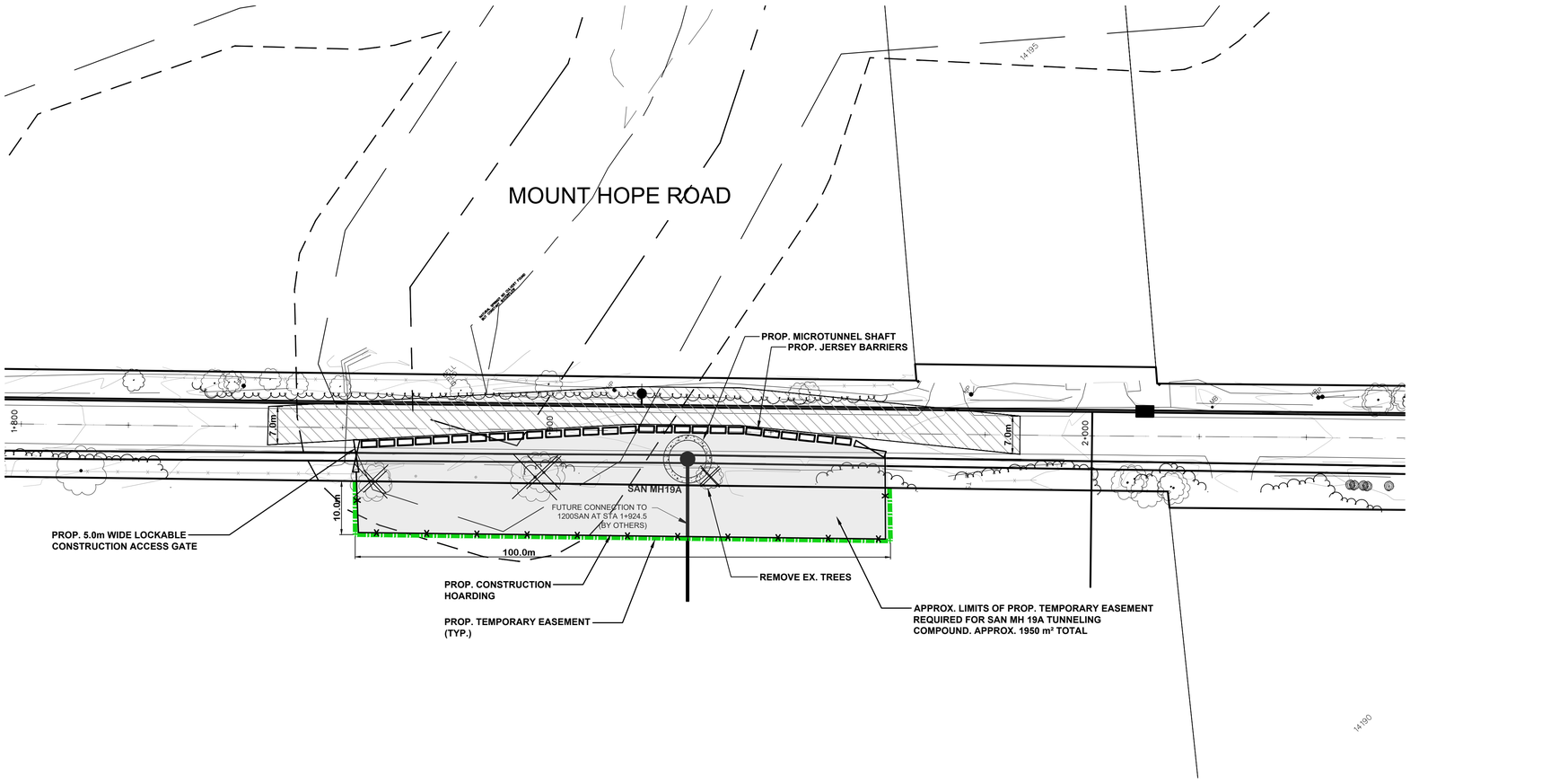
KEY PLAN (N.T.S.)

NOTES:

1. EXISTING FIELD AREA SHOWN FOR USE AS CONSTRUCTION EQUIPMENT STORAGE, MATERIALS STOCKPILE, TUNNELING EQUIPMENT/DE-WATERING SHALL ONLY BE USED FOR WORKS SPECIFICALLY RELATED TO TUNNEL SHAFT CONSTRUCTION. THESE AREAS SHALL NOT BE UTILIZED FOR OTHER STAGING OR STORAGE REQUIREMENTS RELATED TO THE REMAINING WATERMAIN PORTION OF THE PROJECT. CONSTRUCTION SHALL NOT EXTEND BEYOND THE LIMITS SHOWN FOR THE MULTI-BARRIER SEDIMENT CONTROL.

LEGEND:

- EXISTING FENCE TO BE REMOVED
- WORK AREA
- WORK AREA WITH TEMPORARY GRADING AND GRANULAR SURFACE
- TEMPORARY CONSTRUCTION DOUBLE SWING GATE
- CONSTRUCTION HOARDING
- JERSEY BARRIER
- SEDIMENT CONTROL AT EXISTING CATCH BASIN
- TEMPORARY EASEMENT
- PERMANENT EASEMENT
- EXISTING RIGHT OF WAY (R.O.W.)



GEI Consultants Canada

Approved by

SCALE = 1:500

10m 0 10 20 30m

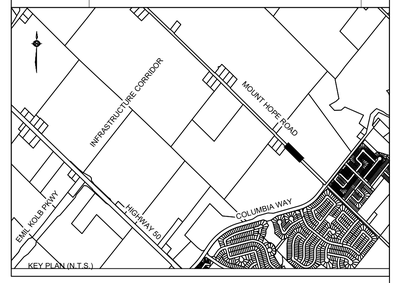
Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD
MICROTUNNEL SHAFT No.9 COMPOUND PLAN

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB. 2026	Sheet	73 of 83	Plan No.	**CP-03**

REVISIONS		
DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	E.M.

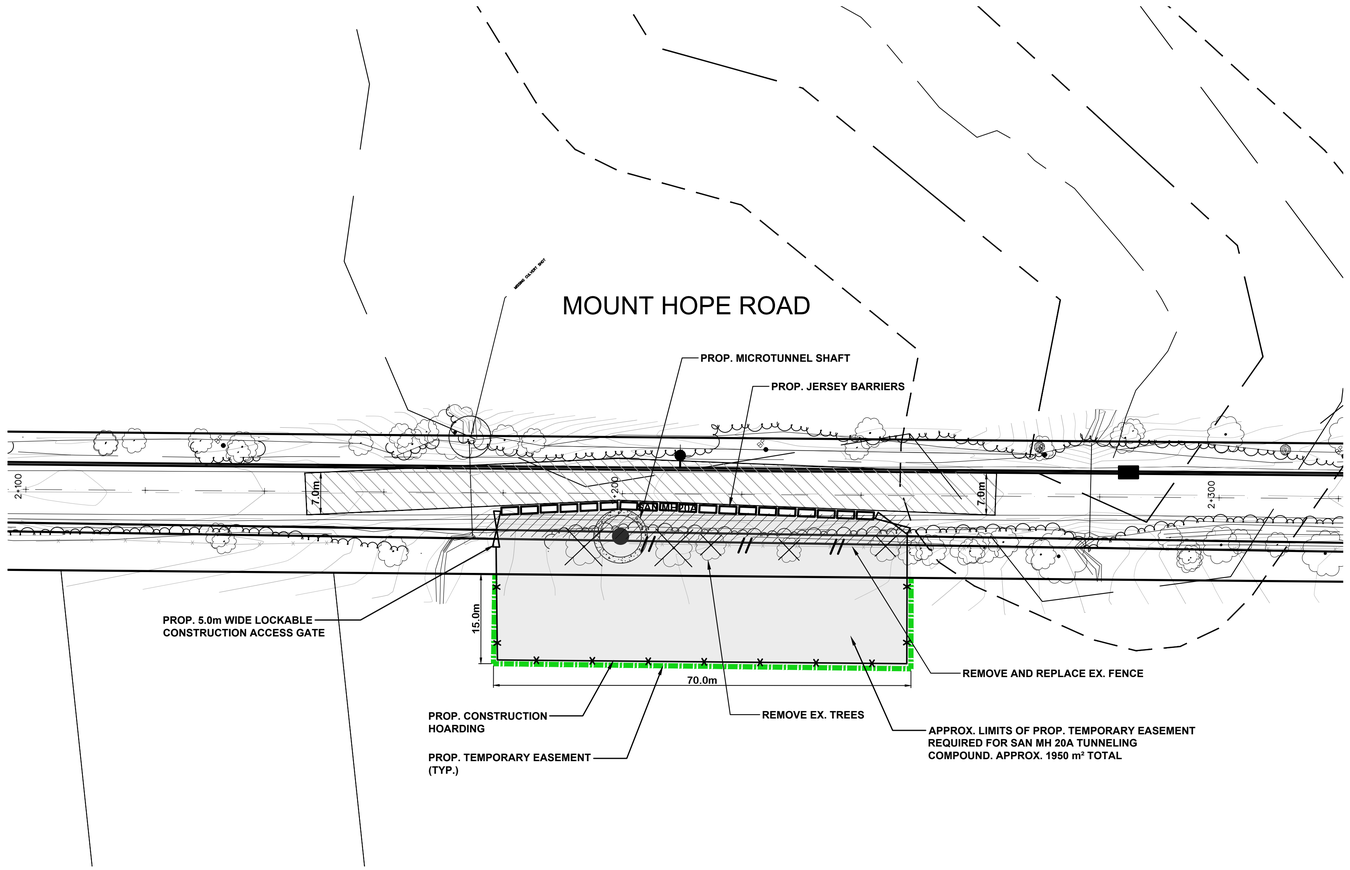


NOTES:

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LEGEND:

- EXISTING FENCE TO BE REMOVED
- WORK AREA
- WORK AREA WITH TEMPORARY GRADING AND GRANULAR SURFACE
- TEMPORARY CONSTRUCTION DOUBLE SWING GATE
- CONSTRUCTION HOARDING
- JERSEY BARRIER
- SEDIMENT CONTROL AT EXISTING CATCH BASIN
- TEMPORARY EASEMENT
- PERMANENT EASEMENT
- EXISTING RIGHT OF WAY (R.O.W.)



GEI Consultants Canada

Approved by

SCALE = 1:500

10m 0 10 20 30m

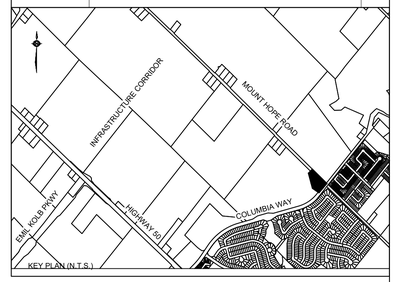
Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD
MICROTUNNEL SHAFT No.10 COMPOUND PLAN

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB. 2026	Sheet	74 of 83	Plan No.	**CP-04**

REVISIONS		
DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	E.M.

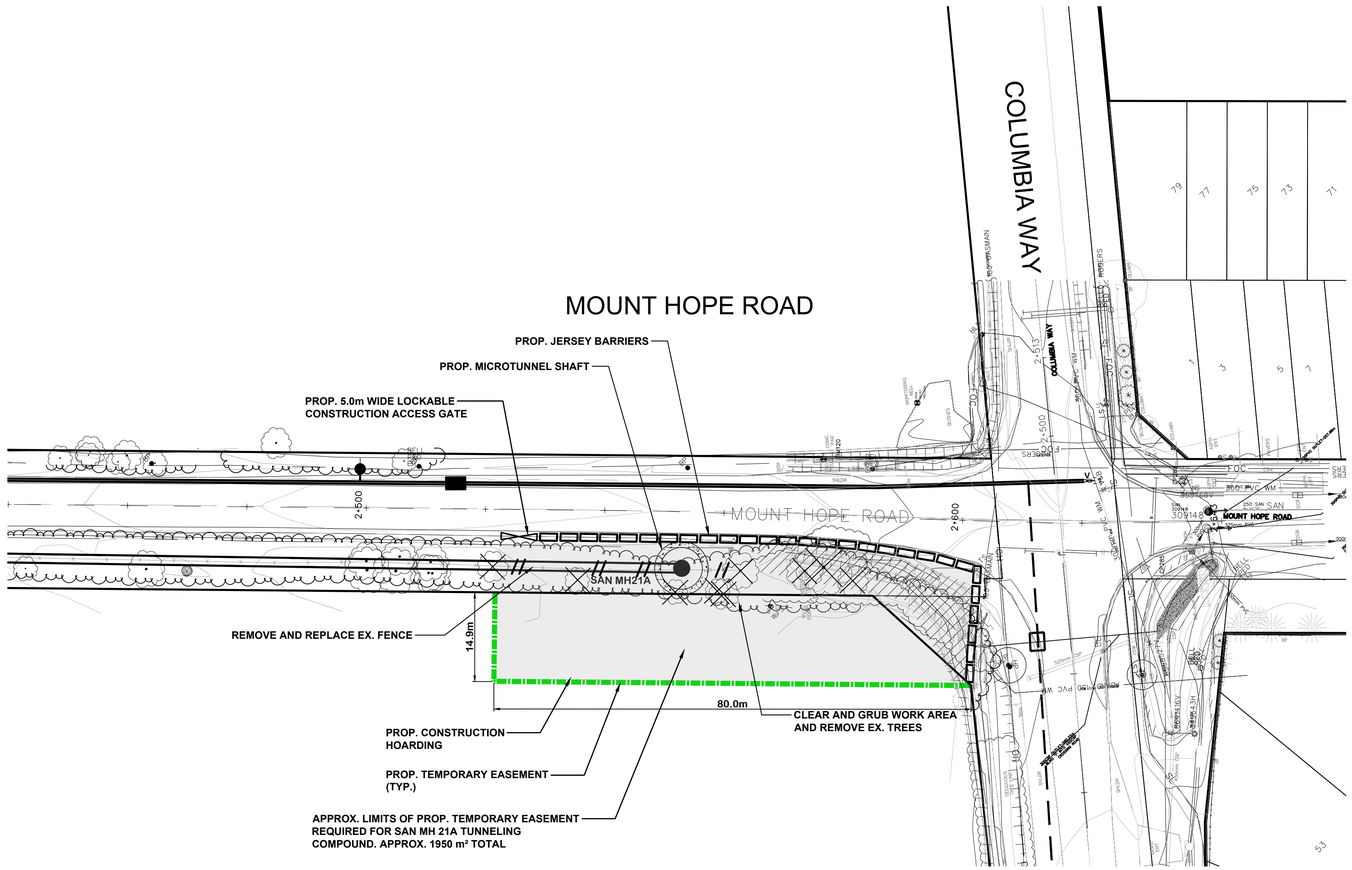


NOTES:

1. EXISTING FIELD AREA SHOWN FOR USE AS CONSTRUCTION EQUIPMENT STORAGE, MATERIALS STOCKPILE, TUNNELING EQUIPMENT/DE-WATERING SHALL ONLY BE USED FOR WORKS SPECIFICALLY RELATED TO TUNNEL SHAFT CONSTRUCTION. THESE AREAS SHALL NOT BE UTILIZED FOR OTHER STAGING OR STORAGE REQUIREMENTS RELATED TO THE REMAINING WATERMAIN PORTION OF THE PROJECT. CONSTRUCTION SHALL NOT EXTEND BEYOND THE LIMITS SHOWN FOR THE MULTI-BARRIER SEDIMENT CONTROL.

LEGEND:

- EXISTING FENCE TO BE REMOVED
- WORK AREA
- WORK AREA WITH TEMPORARY GRADING AND GRANULAR SURFACE
- TEMPORARY CONSTRUCTION DOUBLE SWING GATE
- CONSTRUCTION HOARDING
- JERSEY BARRIER
- SEDIMENT CONTROL AT EXISTING CATCH BASIN
- TEMPORARY EASEMENT
- PERMANENT EASEMENT
- EXISTING RIGHT OF WAY (R.O.W.)



GEI Consultants Canada

Approved by

SCALE = 1:500

10m 0 10 20 30m

Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

MOUNT HOPE ROAD
MICROTUNNEL SHAFT No.11 COMPOUND PLAN

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB. 2026	Sheet	75 of 83	Plan No.	**CP-05**

LEGEND:

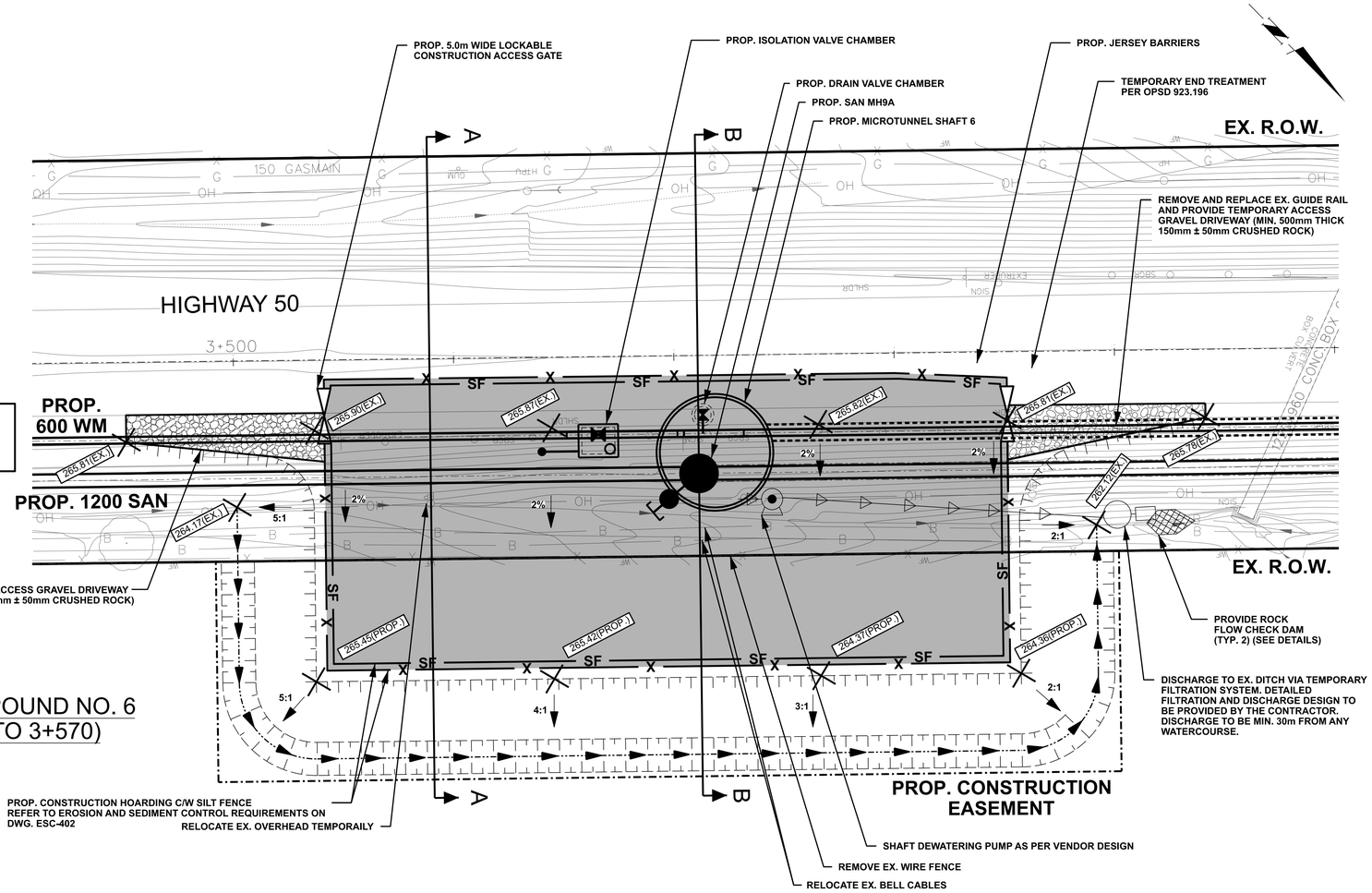
- EX. FENCE REMOVAL
- WORK AREA
- WORK AREA WITH TEMPORARY FILL AND GRANULAR SURFACE
- TEMPORARY GRAVEL DRIVEWAY (MIN. 500mm THICK 150mm ± 50mm CRUSHED ROCK)
- PROPOSED CONSTRUCTION HOARDING
- PROPOSED HEAVY-DUTY SILT FENCE BARRIER (GN-002)
- PROP. JERSEY BARRIERS

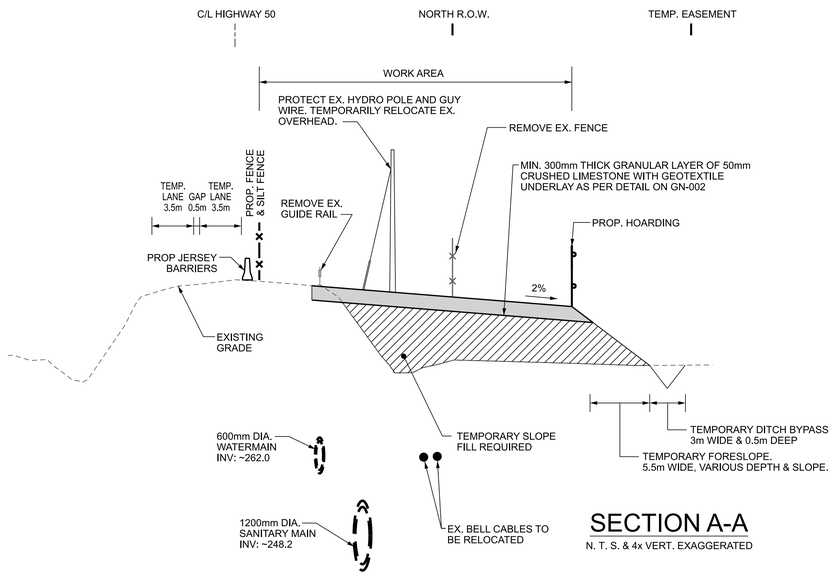
NOTE: WORK AREA SHOWN INCLUDES SPACE TO ACCOMMODATE SITE TRAILERS, GENERAL SITE STORAGE AND PROJECT STAGING IN ADDITION TO WORKS AND STORAGE SPECIFICALLY RELATED TO TUNNEL SHAFT CONSTRUCTION AND TUNNELING. CONSTRUCTION SHALL NOT EXTEND BEYOND THE LIMITS SHOWN FOR MULTI-BARRIER SEDIMENT CONTROL.

THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY

MICROTUNNEL SHAFT COMPOUND	AREA (m²)
6	1600

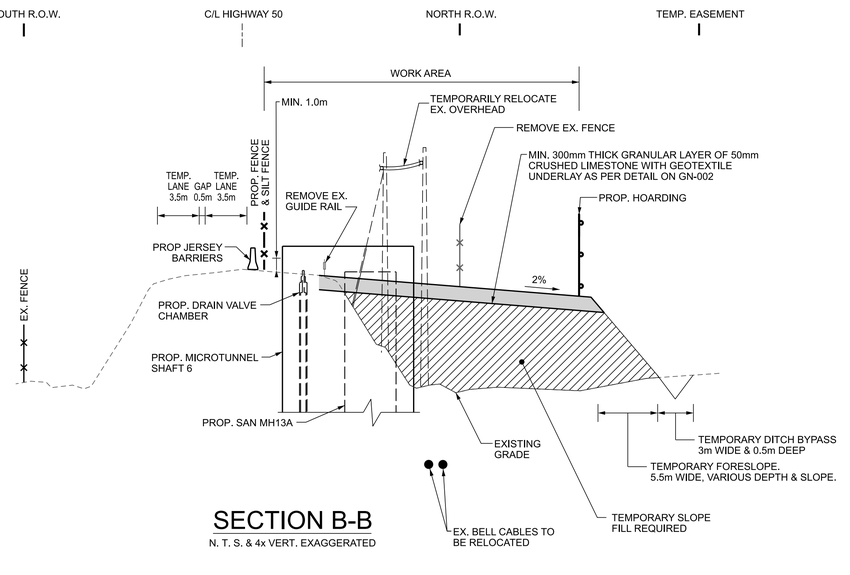
MICROTUNNEL SHAFT COMPOUND NO. 6
(HIGHWAY 50 STA. 3+510 TO 3+570)





SECTION A-A

N. T. S. & 4x VERT. EXAGGERATED



SECTION B-B

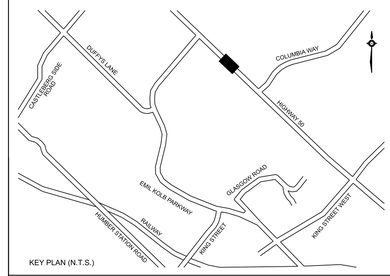
N. T. S. & 4x VERT. EXAGGERATED

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

NOTES:

1. FOR GENERAL NOTES AND DETAILS SEE DWG GN-001
2. FOR EROSION AND SEDIMENT CONTROL NOTES, TREE PROTECTION NOTES, WORK AREA NOTES AND UTILITY NOTES SEE DWGS GN-002 AND GN-003
3. REPLACE EXCAVATED TOPSOIL/SOD WITH GEOTEXTILE AND 300mm THICK OF 50mm CRUSHER RUN LIMESTONE
4. FOR DETAILS OF TEMPORARY CONSTRUCTION BARRIER AND TEMPORARY ASPHALT REFER TO TRAFFIC MANAGEMENT PLANS
5. FOR TREE REMOVALS/PROTECTION REFER TO DWGS RMV-401 TO RMV-703 & ESC-401 TO ESC-703
6. FOR REMOVAL PLANS REFER TO DWGS RMV-401 TO RMV-702
7. FOR RESTORATION PLANS REFER TO RST-401 TO RST-702
8. ALL ABOVE-GROUND FEATURES IN THE VICINITY OF THE WORK, SUCH AS HYDRANT, POLES, PEDESTALS, ETC. MUST BE PROTECTED DURING CONSTRUCTION.
9. HYDRANTS AND VALVES ARE NOT SHOWN TO SCALE ON DRAWINGS. ALL HYDRANTS AND VALVES ARE AMPLIFIED FOR VISUAL REPRESENTATION.

UTILITY NOTES:

1) HAND DIG WITHIN 1m OF (OR WHEN CROSSING) CABLE TV, BELL, GAS OR HYDRO PLANT
2) MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO GASMAINS
3) MAINTAIN A MINIMUM OF 0.3m VERTICAL CLEARANCE TO GASMAINS OR HYDRO PLANT
4) TESTHOLES REQUIRED PRIOR TO CONSTRUCTION TO DETERMINE ACTUAL DEPTHS OF GASMAINS
5) MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO BELL PLANT. MAINTAIN A MINIMUM OF 1.5m HORIZONTAL CLEARANCE FROM BELL PLANT TO PROPOSED HYDRANTS
6) PROPOSED HYDRANT OFFSET TO BE DETERMINED IN THE FIELD (MIN. 1.5m OFFSET TO BELL OR HYDRO POLES)

CONTRACT DRAWINGS

Contractor must verify all dimensions and be responsible for same. Any discrepancies must be reported to the Engineer before commencing work. Drawings are not to be scaled. Drawings may not be used for any purpose other than that stipulated in the contract agreement between the owner/client and the Engineer without the express written consent of Ainley & Associates Limited. Use of these drawings by any party for any other purpose is subject to the following caution.

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General Notes

All Measurements Are In Meters(m) Unless Otherwise Noted
All Driveways Are ASPHALT Unless Otherwise Noted
All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
200 Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency: COSINE
B.M. No. 10519980004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Original)

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction, Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

GEI Consultants Canada

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

- THE REGIONAL MUNICIPALITY OF PEEL
- CITY OF MISSISSAUGA WORKS DEPT.
- CITY OF BRAMPTON WORKS DEPT.
- TOWN OF CALEDON WORKS DEPT.
- ENBRIDGE INCORPORATED-GAS DISTRIBUTION
- ONTARIO MINISTRY OF TRANSPORTATION
- ONTARIO CLEAN WATER AGENCY
- HYDRO ONE NETWORKS
- ALECTRA UTILITIES
- TRANS NORTHERN PIPELINE
- PEARSON INTERNATIONAL FUEL FACILITIES CORP.
- UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:

- BELL CANADA
- ENERSOURCE TELECOM
- HYDRO ONE TELECOM
- ROGERS CABLE
- ALLSTREAM (ZAYO)
- PSN (PUBLIC SECTOR NETWORK)
- FUTUREWAY (FCI BROADBAND)
- GT FIBER/360 NETWORK INC.
- TELUS COMMUNICATION

5m 0 5 10 15m

HORIZONTAL SCALE 1:250

Peel Region working with you

HIGHWAY 50

COMPOUND PLAN

MICROTUNNEL SHAFT COMPOUND NO. 6

Project No.	XX-XXXX		
CAD Area		Area	C-22/C-23
Checked by	G.J.	Drawn by	V.K.
Date	FEB. 2026	Sheet	76 of 83
		Plan No.	**CP-602**

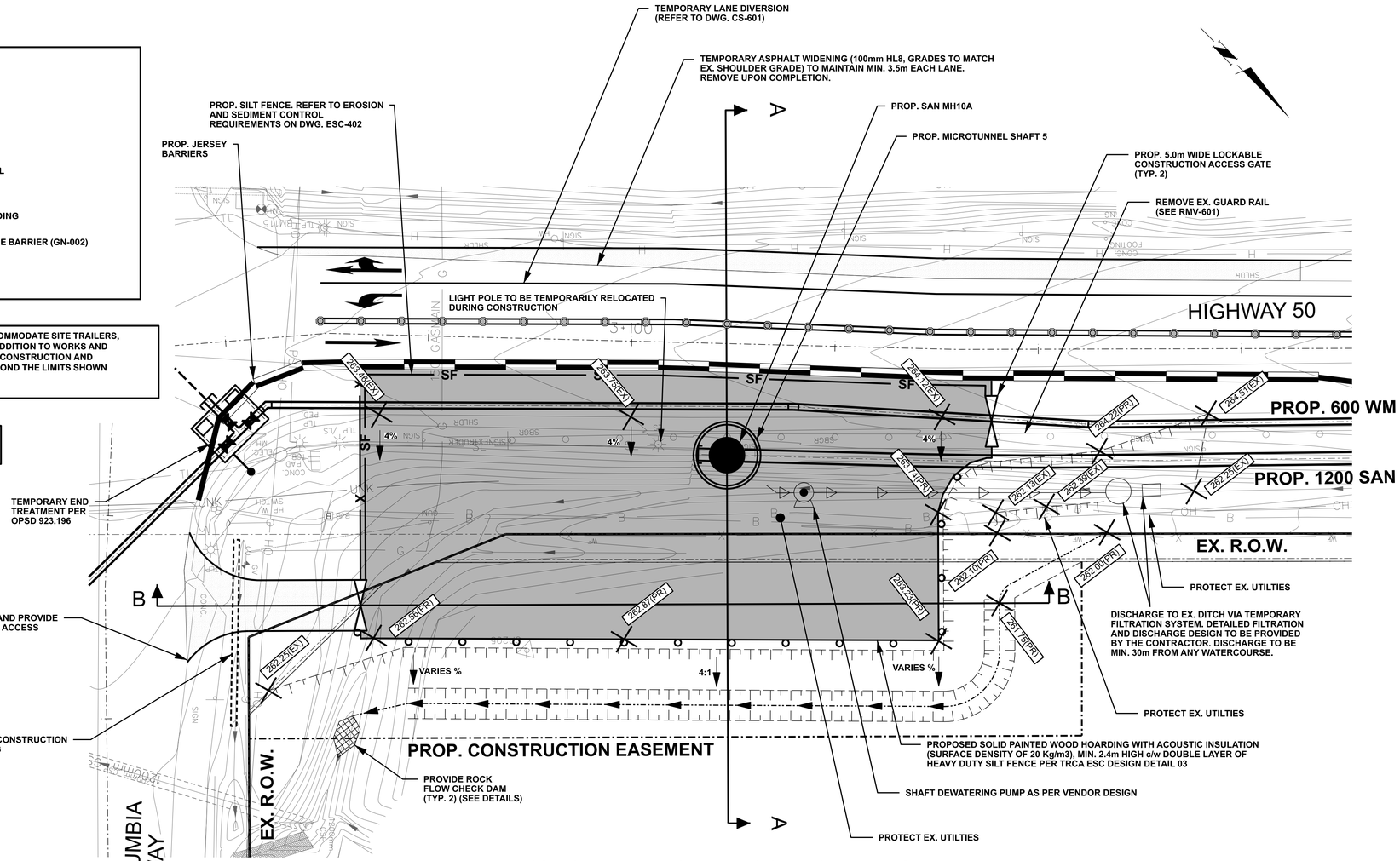
LEGEND:

- EX. FENCE REMOVAL
- WORK AREA
- WORK AREA WITH TEMPORARY FILL AND GRANULAR SURFACE
- PROPOSED CONSTRUCTION HOARDING
- PROPOSED HEAVY-DUTY SILT FENCE BARRIER (GN-002)
- PROP. JERSEY BARRIERS

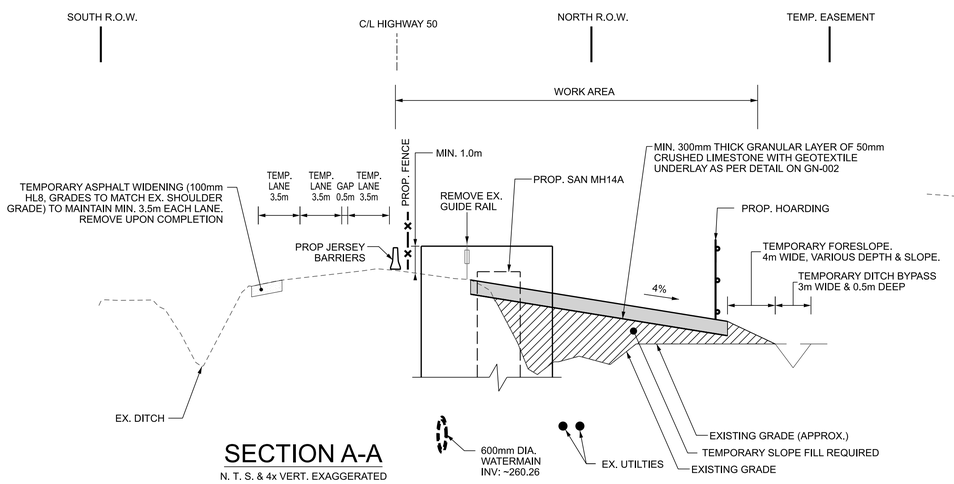
NOTE: WORK AREA SHOWN INCLUDES SPACE TO ACCOMMODATE SITE TRAILERS, GENERAL SITE STORAGE AND PROJECT STAGING IN ADDITION TO WORKS AND STORAGE SPECIFICALLY RELATED TO TUNNEL SHAFT CONSTRUCTION AND TUNNELING. CONSTRUCTION SHALL NOT EXTEND BEYOND THE LIMITS SHOWN FOR MULTI-BARRIER SEDIMENT CONTROL.

THIS DRAWING TO BE USED FOR WATERMAIN CONSTRUCTION ONLY

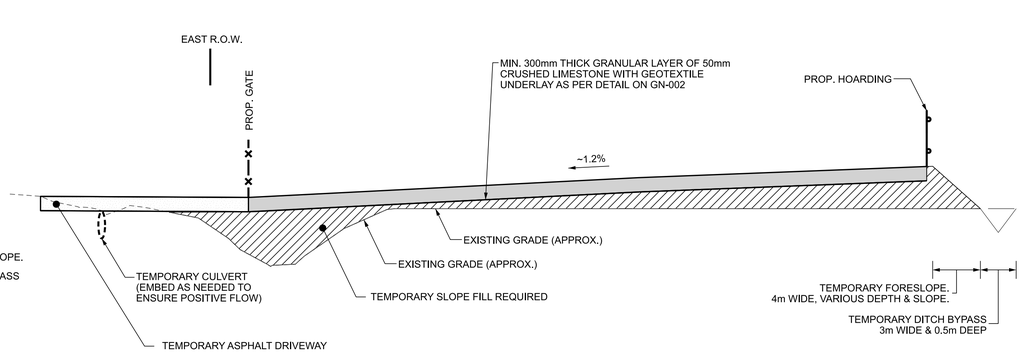
MICROTUNNEL SHAFT COMPOUND	AREA (m²)
5	1530



MICROTUNNEL SHAFT COMPOUND NO. 5
(HIGHWAY 50 STA. 3+060 TO 3+140)



SECTION A-A
N. T. S. & 4x VERT. EXAGGERATED



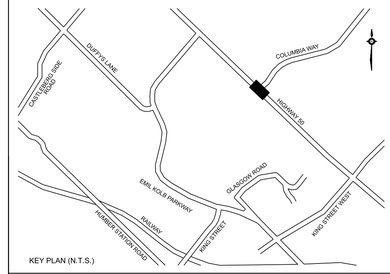
SECTION B-B
N. T. S. & 4x VERT. EXAGGERATED

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	



KEY PLAN (N.T.S.)

NOTES:

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UTILITY NOTES:
1) **HAND DIG WITHIN 1m OF (OR WHEN CROSSING) CABLE TV, BELL, GAS OR HYDRO PLANT**
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4) **TESTHOLES REQUIRED PRIOR TO CONSTRUCTION TO DETERMINE ACTUAL DEPTHS OF GASMAINS**
5) **MAINTAIN A MINIMUM OF 0.6m HORIZONTAL CLEARANCE TO BELL PLANT. MAINTAIN A MINIMUM OF 1.5m HORIZONTAL CLEARANCE FROM BELL PLANT TO PROPOSED HYDRANTS**
6) **PROPOSED HYDRANT OFFSET TO BE DETERMINED IN THE FIELD (MIN. 1.5m OFFSET TO BELL OR HYDRO POLES)**

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General Notes

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All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
20C Existing Water Service, Size In mm
WS25(S) Proposed Short Water Service, Size In mm
WS25(L) Proposed Long Water Service, Size In mm

Agency: COSINE
B.M. No. 10519980004
Elev. 203.xxx (Ellipsoidal)
Coordinate System: UTM NAD83 (Orlginal)

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction, Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

GEI Consultants Canada

Approved by _____ _____ _____

NOTICE TO CONTRACTOR
48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ALECTRA UTILITIES
TRANS NORTHERN PIPELINE
PEARSON INTERNATIONAL FUEL FACILITIES CORP.
UNION GAS

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM (ZAYO)
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)
GT FIBER/360 NETWORK INC.
TELUS COMMUNICATION

5m 0 5 10 15m
HORIZONTAL SCALE 1:250

Peel Region
working with you

HIGHWAY 50
COMPOUND PLAN
MICROTUNNEL SHAFT COMPOUND NO. 5

Project No.	XX-XXXX		
CAD Area		Area	C-22/C-23
Checked by	G.J.	Drawn by	V.K.
Date	FEB. 2026	Sheet	77 of 83

Plan No. **CP-601**

EMIL KOLB PARKWAY

PROP. TEMPORARY EASEMENT (TYP.)

PROP. CONSTRUCTION HOARDING

PROP. FEE PROPERTY ACQUISITION (TYP.)

APPROX. LIMITS OF PROP. TEMPORARY EASEMENT REQUIRED FOR SANITARY PUMPING STATION AND TUNNELING COMPOUND. APPROX. 24730 m² TOTAL

PROP. FEE PROPERTY ACQUISITION (TYP.)

PROP. SEWAGE PUMPING STATION

PROP. MICROTUNNEL SHAFT

REMOVE EX. WOOD FENCE

PROP. 5.0m WIDE LOCKABLE CONSTRUCTION ACCESS GATE

PROP. JERSEY BARRIERS

PROP. MICROTUNNEL SHAFT

PROP. FEE PROPERTY ACQUISITION (TYP.)

PROP. PERMANENT EASEMENT (TYP.)

PROP. FEE PROPERTY ACQUISITION (TYP.)

PROP. CONSTRUCTION HOARDING

PROP. TEMPORARY EASEMENT (TYP.)

PIN: 143290248

PIN: 143300521

PIN: 143300495

PIN: 143290247

BH24-C4-43

BH24-C4-16

BH24-C4-15

BH24-C4-17

BH24-C4-18

BH24-C5-01

BH24-C5-02

BH24-C5-04

BH24-C5-05

BH24-C5-06

6+700

6+800

6+900

7+000

CREEK

10m 0 10 20 30m

KEY PLAN (N.T.S.)

EMIL KOLB PARKWAY

COLUMBIA WAY

MAYFIELD RD

CALEDON-KING TOWNLINE S

HIGHWAY 50

KING STREET WEST

GLASGOW ROAD

RAILWAY

KING STREET

NOTES:

1. EXISTING FIELD AREA SHOWN FOR USE AS CONSTRUCTION EQUIPMENT STORAGE, MATERIALS STOCKPILE, TUNNELING EQUIPMENT/DE-WATERING SHALL ONLY BE USED FOR WORKS SPECIFICALLY RELATED TO TUNNEL SHAFT CONSTRUCTION. THESE AREAS SHALL NOT BE UTILIZED FOR OTHER STAGING OR STORAGE REQUIREMENTS RELATED TO THE REMAINING WATERMAIN PORTION OF THE PROJECT. CONSTRUCTION SHALL NOT EXTEND BEYOND THE LIMITS SHOWN FOR THE MULTI-BARRIER SEDIMENT CONTROL.
2. REFER TO PROPERTY IMPACT PLANS FOR EXACT PARCEL, EASEMENT AND PROPERTY ACQUISITION DIMENSIONS.

LEGEND:

- EXISTING FENCE TO BE REMOVED
- WORK AREA
- WORK AREA WITH TEMPORARY GRADING AND GRANULAR SURFACE
- TEMPORARY CONSTRUCTION DOUBLE SWING GATE
- CONSTRUCTION HOARDING
- JERSEY BARRIER
- SEDIMENT CONTROL AT EXISTING CATCH BASIN
- TEMPORARY EASEMENT
- PERMANENT EASEMENT
- FEE PROPERTY ACQUISITION
- EXISTING RIGHT OF WAY (R.O.W.)

REVISIONS

DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	E.M.

GEI Consultants Canada

Approved by

SCALE = CUSTOM (SCALED TO FIT) 10m 0 10 20

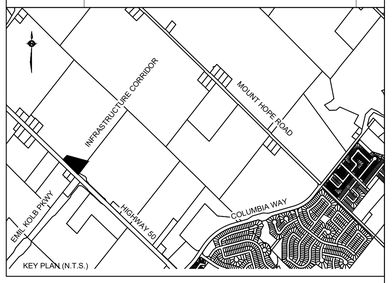
Region of Peel working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

PRELIMINARY SITE PLAN
HUMBER SEWAGE PUMPING STATION

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB. 2026	Sheet	78 of 83	Plan No.	SP-01

REVISIONS		
DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	E.M.

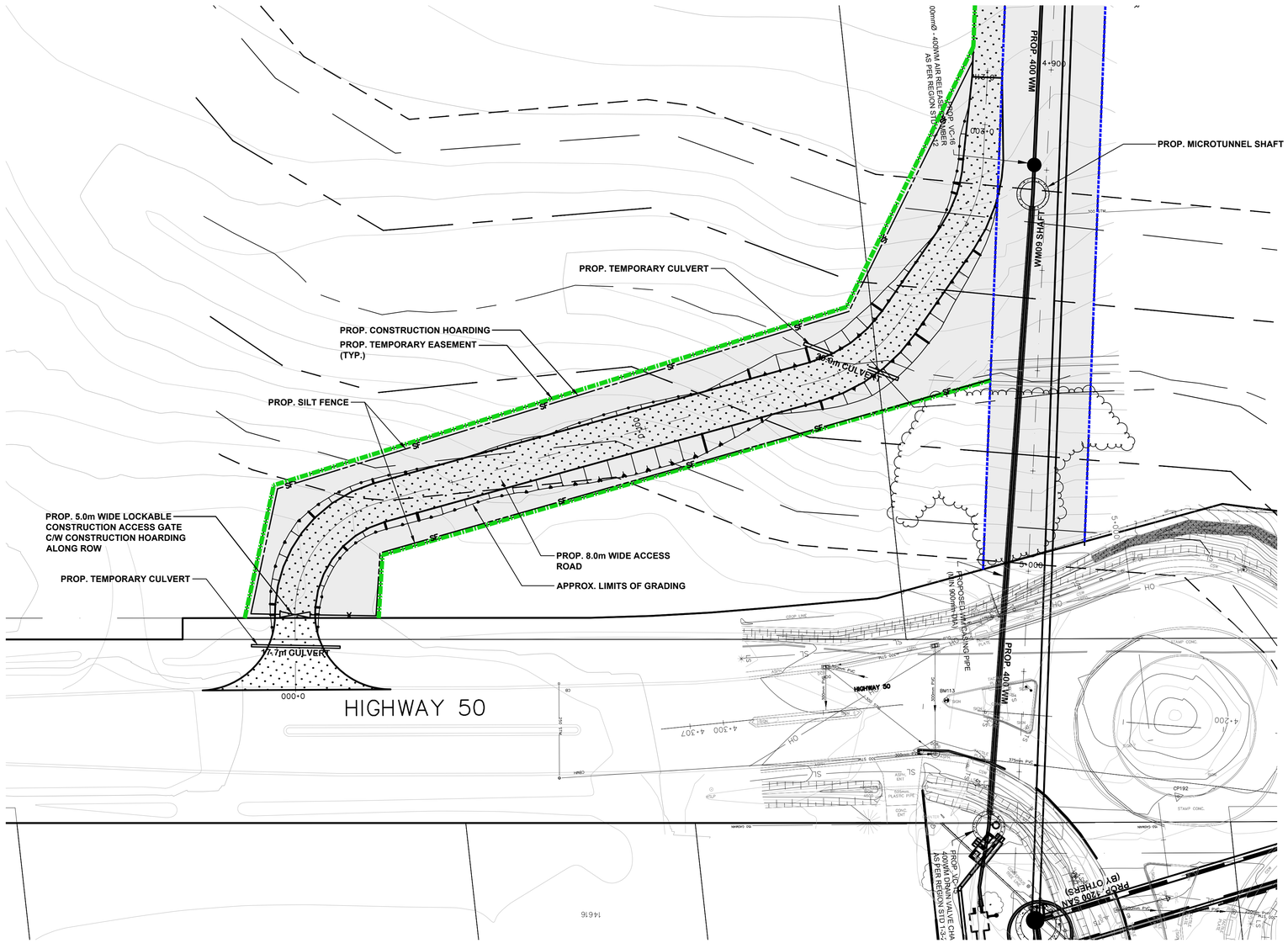


NOTES:

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LEGEND:

- EXISTING FENCE TO BE REMOVED
- WORK AREA
- WORK AREA WITH TEMPORARY GRADING AND GRANULAR SURFACE
- TEMPORARY CONSTRUCTION DOUBLE SWING GATE
- CONSTRUCTION HOARDING
- SF — CONSTRUCTION HOARDING
- JERSEY BARRIER
- SEDIMENT CONTROL AT EXISTING CATCH BASIN
- TEMPORARY EASEMENT
- PERMANENT EASEMENT
- EXISTING RIGHT OF WAY (R.O.W.)



GEI Consultants Canada

Approved by

SCALE = 1:500

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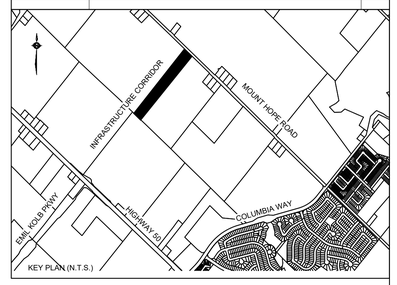
Region of Peel
working with you

BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

PRELIMINARY SITE PLAN
HIGHWAY 50 ACCESS ROAD

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB. 2026	Sheet	79 of 83	Plan No.	SP-02

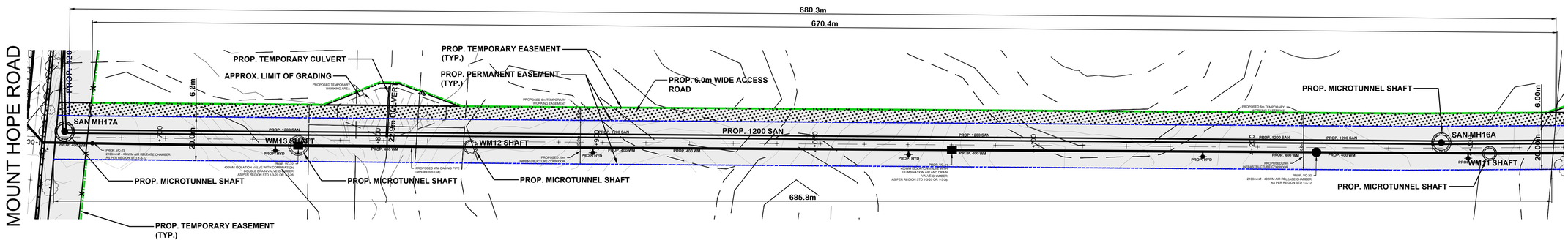
REVISIONS		
DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	E.M.



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INFRASTRUCTURE CORRIDOR



LEGEND:

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- PERMANENT EASEMENT
- EXISTING RIGHT OF WAY (R.O.W.)

GEI Consultants Canada

Approved by

SCALE = 1:1000

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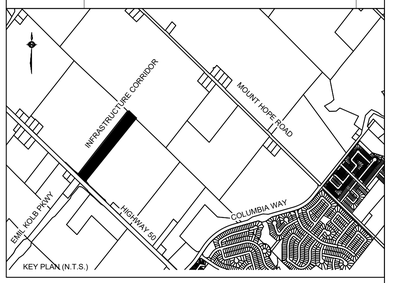
Region of Peel
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BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

PRELIMINARY SITE PLAN
INFRASTRUCTURE CORRIDOR 14530 HWY 50 (GEI)

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB. 2026	Sheet	80 of 83	Plan No.	**SP-03**

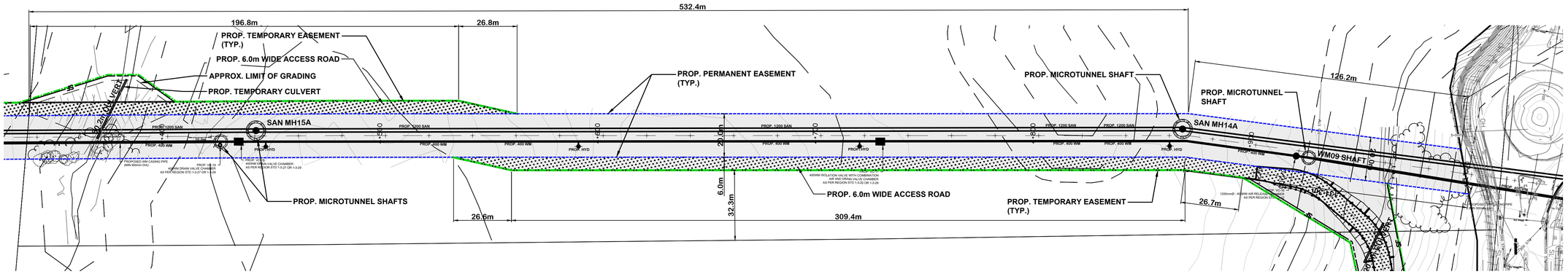
REVISIONS		
DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	E.M.



NOTES:

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INFRASTRUCTURE CORRIDOR



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- PERMANENT EASEMENT
- EXISTING RIGHT OF WAY (R.O.W.)

GEI Consultants Canada

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SCALE = 1:1000

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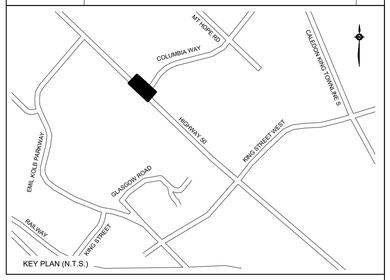
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BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

PRELIMINARY SITE PLAN
INFRASTRUCTURE CORRIDOR 14475 HWY 50 (GEI)

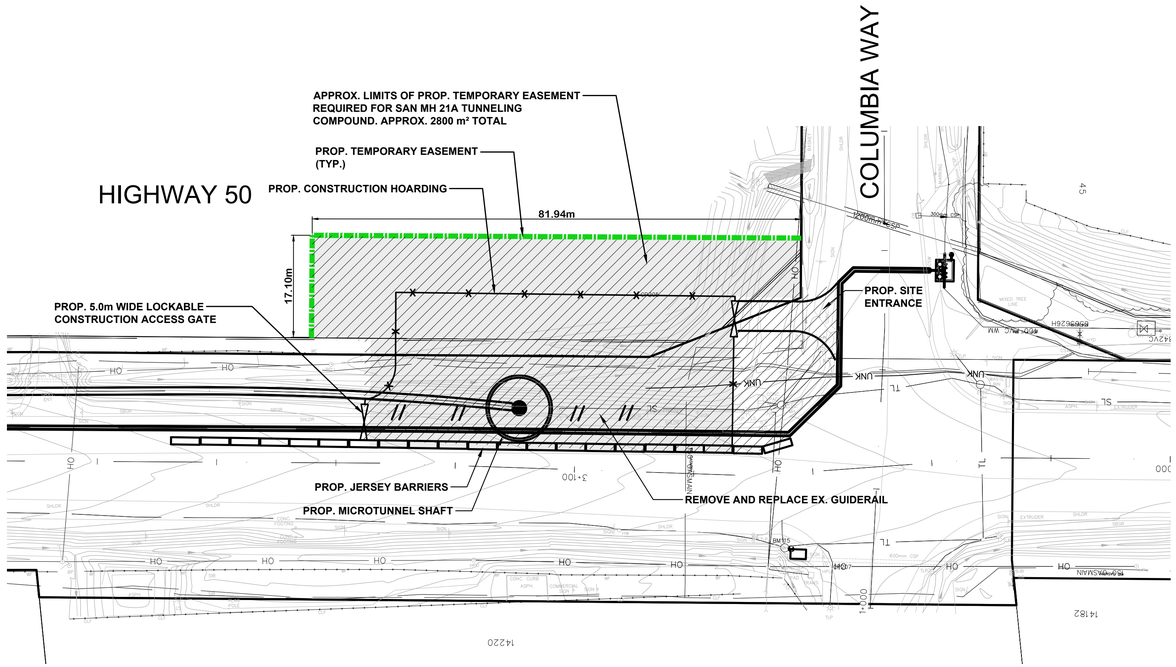
CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB. 2026	Sheet	81 of 83	Plan No.	**SP-04**

REVISIONS		
DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	E.M.



NOTES:

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- CONSTRUCTION HOARDING
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- SEDIMENT CONTROL AT EXISTING CATCH BASIN
- TEMPORARY EASEMENT
- PERMANENT EASEMENT
- EXISTING RIGHT OF WAY (R.O.W.)

GEI Consultants Canada

Approved by

SCALE = 1:500

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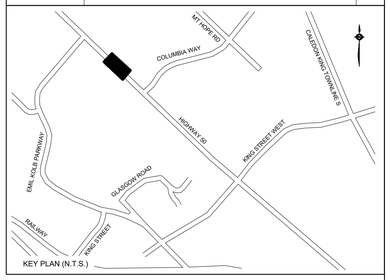
Region of Peel
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BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

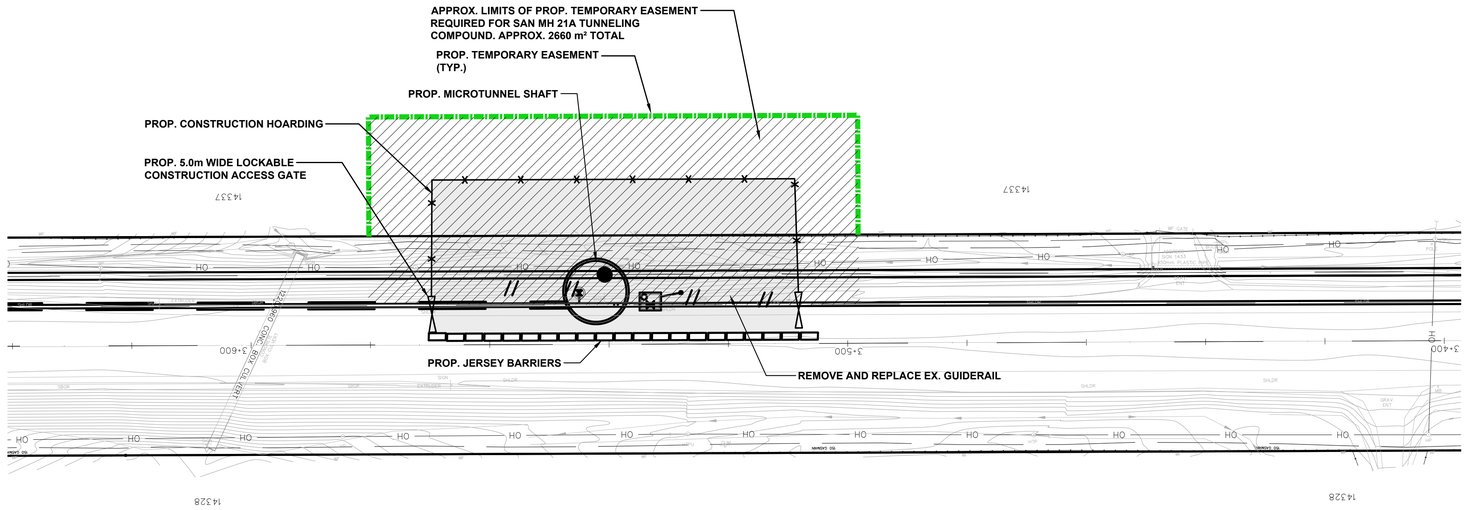
PRELIMINARY SITE PLAN
14245 HIGHWAY 50

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB. 2026	Sheet	82 of 83	Plan No.	**SP-05**

REVISIONS		
DATE	DETAILS	INIT.
MAR 11, 2026	ISSUED FOR ESR	E.M.



HIGHWAY 50



NOTES:

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GEI Consultants Canada

Approved by

SCALE = 1:500

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Region of Peel
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BOLTON WATER AND WASTEWATER CAPACITY IMPROVEMENTS

PRELIMINARY SITE PLAN
14437 HIGHWAY 50

CAD Area	X-XX	Area	X-XX	Project No.	XX-XXXX
Checked by	E.M.	Drawn by	P.M.		
Date	FEB. 2026	Sheet	83 of 83	Plan No.	**SP-06**

Appendix 3E

Cost Estimates

MOUNT HOPE AND EASEMENT COSTING

Description	2025$		
	Base $	Add-on % (% is Back Calculated from Detailed Costing Sheets)	Add-on $ (Calculated within Detailed Costing Sheets)
Installation Cost WM	$ 14,190,244		
Installation Cost WW	$ 62,013,273		
General		9%	$ 6,858,317
Provisional		6%	$ 4,572,211
Construction Contingency		10%	$ 7,620,352
Construction Costs (Hard)	$ 95,254,396		
Design Costs (Soft)		19%	$ 18,420,265
Project Contingency		20%	$ 22,734,932
Total Project Costs WM	$ 26,181,000		
Total Project Costs WW	$ 110,228,593		
Total Project Cost	$ 136,409,593	64%	$ 60,206,076
Total Base Construction	$ 76,203,517		

CP 4/CP5 EMIL KOLB PARKWAY PROJECTS

Description	2025$		
	Base $	Add-on % (% is Back Calculated from Detailed Costing Sheets)	Add-on $ (Calculated within Detailed Costing Sheets)
Installation Cost WM	$ 18,897,950		
Installation Cost WW	$ 70,026,960		
General		9%	$ 8,003,242
Provisional		6%	$ 5,335,495
Construction Contingency		10%	$ 8,892,491
Construction Costs (Hard)	$ 111,156,137		
Design Costs (Soft)		19%	$ 21,626,895
Project Contingency		20%	$ 26,556,606
Total Project Costs WM	$ 34,866,717		
Total Project Costs WW	$ 124,472,921		
Total Project Cost	$ 159,339,639	64%	$ 70,414,729
Total Base Construction	$ 88,924,910		

CP6 Costing (HIGHWAY 50 WATERMAIN AND SANITARY TUNNELING)

Description	2025$		
	Base $	Add-on % (% is Back Calculated from Detailed Costing Sheets)	Add-on $ (Calculated within Detailed Costing Sheets)
Installation Cost WM	$ 7,010,764.27		
Installation Cost WW	$ 13,964,994.09		
General		8%	$ 1,666,362.16
Provisional		6%	$ 1,328,653.14
Construction Contingency		11%	$ 2,307,898.76
Construction Costs (Hard)	$ 26,278,672.43		
Design Costs (Soft)		25%	$ 6,529,328.30
Project Contingency		20%	$ 6,561,600.15
Total Project Costs WM	$ 13,604,186.78		
Total Project Costs WW	$ 25,765,414.09		
Total Project Cost	$ 39,369,600.87	70%	$ 18,393,842.51
Total Base Construction	$ 20,975,758.36		

CP7 Costing (COLUMBIA WAY 400MM WATERMAIN)

Description	2025$		
	Base $	Add-on % (% is Back Calculated from Detailed Costing Sheets)	Add-on $ (Calculated within Detailed Costing Sheets)
Installation Cost WM	$ 3,219,010		
Installation Cost WW	$ -		
General		14%	$ 450,661
Provisional		9%	$ 289,711
Construction Contingency		15%	$ 482,852
Construction Costs (Hard)	$ 4,442,234		
Design Costs (Soft)		26%	$ 1,154,981
Project Contingency		10%	$ 559,722
Total Project Costs WM	$ 6,156,937		
Total Project Costs WW	$ -		
Total Project Cost	$ 6,156,937	74%	$ 2,937,926
Total Base Construction	$ 3,219,010		

Proposed SPS Costing

Description	2025$		
	Base $	Add-on %	Add-on $
Installation Cost SPS	$ 15,442,798		
General		9%	$ 1,389,852
Provisional		6%	$ 926,568
Construction Contigency		10%	$ 1,544,280
Construction Costs (Hard)	$ 19,303,498		
Design Costs (Soft)		23%	$ 4,439,804
Project Contingency		20%	$ 4,748,660
Total Project Costs SPS	$ 28,491,962		
Total	$ 28,491,962	68%	$ 13,049,164
Total Minus Additional Costs	$ 15,442,798		

Humber Station - Shaft Tender Analysis

All costs include Shaft, Shaft working compound, and MH					
	Depth	ID	Cost	Cost 25%	$/m/m
Shaft 1	16.8	7	$ 984,446.00	$ 1,230,557.50	$ 10,463.92
Shaft 2	18	6	$ 810,458.00	$ 1,013,072.50	$ 9,380.30
Shaft 3	16.5	7	$ 856,344.00	$ 1,070,430.00	$ 9,267.79
Shaft 4	15.5	9	$ 1,017,613.00	$ 1,272,016.25	$ 9,118.40
Shaft 5	15	9	$ 898,241.00	$ 1,122,801.25	$ 8,317.05
Shaft 6	15	9	$ 921,215.00	$ 1,151,518.75	$ 8,529.77
Shaft 7	14	10	$ 1,168,996.00	$ 1,461,245.00	$ 10,437.46
Shaft 8	12.5	6	$ 691,956.00	$ 864,945.00	$ 11,532.60
Shaft 9	11.5	7	$ 800,764.00	$ 1,000,955.00	$ 12,434.22
Shaft 10	8	7	$ 542,867.00	$ 678,583.75	$ 12,117.57
			Average	$	10,159.91

Total Project Cost

Description	Base 2025$
Installation Cost WM	$ 43,317,968
Installation Cost WW	$ 146,005,227
Installation Cost SPS	$ 15,442,798
General	$ 18,368,434
Provisional	$ 12,452,638
Construction Contingency	$ 20,847,873
Construction Costs (Hard)	$ 256,434,938
Design Costs (Soft)	$ 52,171,273
Project Contingency	$ 61,161,521
Total Project Costs WM	$ 80,808,840
Total Project Costs WW	$ 260,466,929
Total Project Costs SPS	$ 28,491,962
Total Project Cost	**$ 369,767,731**
Total Base Construction	$ 204,765,993

NW BOLTON - MOUNT HOPE WATERMAIN PROJECTS							
Date Edited	**Item No.**	**Description**	**Quantity/Length**	**UOM**	**Estimated Unit Price $2025/UOM**	**Total**	**Notes**
		PROPOSED INFRASTRUCTURE CORRIDOR					
		1 - CONSTRUCTION OF WATERMAIN BY OPEN CUT					
	1	a) 400 MM PVC OPEN CUT WATERMAIN FROM STA. 3+635 TO STA. 3+760, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	125	m	$ 2,485.45	$ 310,680.64	
		b) 400 MM AIR RELEASE VALVE CHAMBER #VC23 @ STA. 3+665	1	-	$ 202,117.95	$ 202,117.95	
		TOTAL INSTALLATION COST				**$ 512,798.59**	
		2 - CONSTRUCTION OF WATERMAIN BY MAJOR CREEK CROSSING (TUNELLING)					
	2	a) 400 MM CREEK WATERMAIN FROM STA. 3+760 TO STA. 3+840, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING INCLUDING	74.3	m	$ 4,170.63	$ 309,877.55	Watermain tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) SHAFT #13 WITH CHAMBER #VC22 @3+760 AT 6M DEPTH	1		$ 525,000.00	$ 525,000.00	
		c) SHAFT #12 @3+840 AT 7M DEPTH	1		$ 612,500.00	$ 612,500.00	
		TOTAL INSTALLATION COST				**$ 1,447,377.55**	
		3 - CONSTRUCTION OF WATERMAIN BY OPEN CUT					
	3	a) 400 MM PVC OPEN CUT WATERMAIN FROM STA. 3+840 TO STA. 4+305, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	465	-	$ 2,485.45	$ 1,155,731.98	
		b) 400 MM AIR RELEASE AND DRAIN VALVE CHAMBER #VC21 @ STA. 4+060	1	-	$ 202,117.95	$ 202,117.95	
		c) 400 MM AIR RELEASE VALVE CHAMBER #VC20 @ STA. 4+225	1	-	$ 202,117.95	$ 202,117.95	
		TOTAL INSTALLATION COST				**$ 1,559,967.88**	
		4 - CONSTRUCTION OF WATERMAIN BY MAJOR CREEK CROSSING (TUNELLING)					
	4	a) 400 MM CREEK CROSSING WATERMAIN FROM STA. 4+310 TO STA. 4+425 TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	115	m	$ 4,170.63	$ 479,622.05	Watermain tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) SHAFT #11 @ STA. 4+310 (WM 11)	1	-	$ 700,000.00	$ 700,000.00	7m shaft width 8m depth
		c) SHAFT AND VALVE CHAMBER VC#19 @ STA. 4+425 (WM 10)	1	-	$ 525,000.00	$ 525,000.00	7m shaft width 6m depth
		TOTAL INSTALLATION COST				**$ 1,704,622.05**	
		5 - CONSTRUCTION OF WATERMAIN BY OPEN CUT					
	5	a) 400 MM PVC OPEN CUT WATERMAIN FROM STA. 4+425 TO STA. 4+920, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	495	m	$ 2,485.45	$ 1,230,295.34	
		b) 400 MM DRAIN VALVE CHAMBER #VC18 @ STA. 4+435	1	-	$ 202,117.95	$ 202,117.95	
		c) 400 MM DRAIN VALVE CHAMBER #VC17 @ STA. 4+725	1	-	$ 202,117.95	$ 202,117.95	
		TOTAL INSTALLATION COST				**$ 1,634,531.24**	
		6 - CONSTRUCTION OF WATERMAIN BY MAJOR CREEK CROSSING (TUNELLING) AND OPEN CUT					
	6	a) 400 MM CREEK CROSSING WATERMAIN FROM STA. 4+920 TO STA. 5+050 TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	130	m	$ 4,170.63	$ 542,181.45	Watermain tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) 400 MM PVC OPEN CUT WATERMAIN FROM STA. 5+050 TO STA. 5+070, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	20	m	$ 2,485.45	$ 49,708.90	
		c) SHAFT #9 AND AIR VALVE CHAMBER #VC16 @ STA. 4+920 AT 7M DEPTH	1	-	$ 612,500.00	$ 612,500.00	7m width 7m depth
		d) SHAFT WITH DRAIN CHAMBER VC#15 @5+050 AT 10M DEPTH	1	-	$ 875,000.00	$ 875,000.00	7m width 10m depth
		TOTAL INSTALLATION COST				**$ 2,079,390.35**	
		MOUNT HOPE ROAD					
		7 - CONSTRUCTION OF WATERMAIN BY OPEN CUT					
	7	a) 400 MM PVC OPEN CUT WATERMAIN FROM STA. 1+000 TO STA. 1+705, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	705	m	$ 2,485.45	$ 1,752,238.81	
		b) 400 MM ISOLATION VALVE WITH DOUBLE DRAIN VALVE CHAMBER #VC24 @ STA. 1+065	1	-	$ 202,117.95	$ 202,117.95	
		c) 400 MM ISOLATION VALVE WITH AIR RELEASE VALVE CHAMBER #VC25 @ STA. 1+365	1	-	$ 202,117.95	$ 202,117.95	
		TOTAL INSTALLATION COST				**$ 2,156,474.71**	
		8 - CONSTRUCTION OF WATERMAIN BY OPENCUT					
	8	a) 400 MM PVC OPEN CUT WATERMAIN FROM STA. 1+705 TO STA. 2+625, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	920	m	$ 2,485.45	$ 2,286,609.51	
		b) 400 MM ISOLOATION VALVE WITH DOUBLE DRAIN VALVE CHAMBER #VC26 @ STA. 1+705	1	-	$ 202,117.95	$ 202,117.95	
		c) 400 MM ISOLOATION VALVE WITH AIR RELEASE VALVE CHAMBER #VC27 @ STA. 2+010	1	-	$ 202,117.95	$ 202,117.95	
		d) 400 MM ISOLOATION VALVE WITH DOUBLE DRAIN VALVE CHAMBER #VC28 @ STA. 2+285	1	-	$ 202,117.95	$ 202,117.95	
		e) 400 MM ISOLOATION VALVE WITH AIR RELEASE VALVE CHAMBER #VC29 @ STA. 2+515	1	-	$ 202,117.95	$ 202,117.95	
		TOTAL INSTALLATION COST				**$ 3,095,081.31**	
		Additional Costs					
		GENERAL ITEM COSTS AS PERCENTAGE OF INSTALLATION COST		>10,000,000	9%	$ 1,277,121.93	
		PROVISIONAL ITEM ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	6%	$ 851,414.62	
		CONTIGENCY ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	10%	$ 1,419,024.37	
		TOTAL CONSTRUCTION COST (HARD)				**$ 17,737,804.62**	
		GEOTECHNICAL/HYDROGEOLOGICAL		High Complexity	2.0%	$ 354,756.09	
		PROPERTY/EASEMENTS		High Complexity	2%	$ 354,756.09	
		ENGINEERING/DESIGN (INTERNAL)		$10,000,000 - $50,000,000	6%	$ 1,064,268.28	
		DESIGN/CONTRACT ADMINISTRAION (EXTERNAL)		$10,000,000 - $50,000,000	12%	$ 2,128,536.55	
		APPROVAL		$10,000,000 - $50,000,000	1%	$ 177,378.05	
		TOTAL DESIGN COSTS (SOFT)				**$ 4,079,695.06**	
		PROJECT COMPLEXITY	Class 3	High	20%	$ 4,363,499.94	
		TOTAL PROJECT COST				**$ 26,180,999.61**	
		SUMMARY					
		600MM WATERMAIN INSTALLATION COST				**$ 14,190,243.69**	
		600MM WATERMAIN CONSTRUCTION COST (HARD)				**$ 17,737,804.62**	
		600MM WATERMAIN DESIGN COSTS (SOFT)				**$ 4,079,695.06**	
		600MM TOTAL PROJECT COST				**$ 26,180,999.61**	
		600MM TOTAL PROJECT COST (HST INCL.)			1.76%	**$ 26,641,785.21**	

NW BOLTON - MOUNT HOPE WASTEWATER PROJECTS							
Date Edited	**Item No.**	**Description**	**Quantity/Length**	**UOM**	**Estimated Unit Price $2025/UOM**	**Total**	**Notes**
		PROPOSED INFRASTRUCTURE CORRIDOR					
		1 - MICROTUNELLING FOR 1200 MM SEWER					
	1	a) 1200 MM SEWER MICRO TUNELLING INCLUDING, PIPE SUPPLY, SOIL DISPOSAL (STA. 3+655 - 4+285)	630.2	m	$ 8,350.74	$ 5,262,634.01	Gravity tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) CONSTRUCTION OF SHAFT @3+655 @ 37M DEPTH INCLUDING SAN MH17A	1	-	$5,000,000.00	$ 5,000,000.00	9m Shaft Width at 37M Depth
		TOTAL INSTALLATION COST				**$ 10,262,634.01**	
		2 - MICROTUNELLING CREEK CROSSING FOR 1200 MM SEWER					
	2	a) 1200 MM SEWER MICRO TUNELLING , PIPE SUPPLY, SOIL DISPOSAL (STA. 4+285 - 4+440)	156.4	m	$ 8,350.74	$ 1,306,055.16	Gravity tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) CONSTRUCTION OF SHAFT @4+285 @45M DEPTH WITH SAN MH16A	1	-	$ 7,312,500.00	$ 7,312,500.00	9m Shaft Width at 45M Depth
		c) CONSTRUCTION OF SHAFT @4+440 @ 45M DEPTH WITH SAN MH15A	1	-	$ 7,312,500.00	$ 7,312,500.00	9m Shaft Width at 45M Depth
		TOTAL INSTALLATION COST				**$ 15,931,055.16**	
		3 - MICROTUNELLING FOR 1200 MM SEWER					
	3	a) 1200MM SEWER MICRO TUNELLING, PIPE SUPPLY, SOIL DISPOSAL (STA. 4+440 - 4+865)	425.5	m	$ 8,350.74	$ 3,553,238.29	Gravity tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		TOTAL INSTALLATION COST				**$ 3,553,238.29**	
		4 - MICROTUNELLING CREEK CROSSING FOR 1200 MM SEWER					
	4	a) 1200MM SEWER MICRO TUNELLING INCLUDING SHAFTS, PIPE SUPPLY, SOIL DISPOSAL (STA. 4+865 - 5+070)	203.7	m	$ 8,350.74	$ 1,701,044.98	Gravity tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) CONSTRUCTION OF SHAFT @4+870 @ 50M DEPTH WITH SAN MH14A	1	-	$ 8,125,000.00	$ 8,125,000.00	9m Shaft Width at 50M Depth
		TOTAL INSTALLATION COST				**$ 9,826,044.98**	
		MOUNT HOPE					
		5 - MICROTUNELLING FOR 1200 MM SEWER					
	5	a) 1200MM SEWER MICRO TUNELLING @20M DEPTH, PIPE SUPPLY, SOIL DISPOSAL (STA. 1+005 - 1+395)	388.3	m	$ 8,350.74	$ 3,242,590.90	Gravity tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) CONSTRUCTION OF SHAFT @ 1+395 @ 22M DEPTH WITH SAN MH18A	1	-	$ 2,500,000.00	$ 2,500,000.00	9m Shaft Width at 22M Depth
		TOTAL INSTALLATION COST				**$ 5,742,590.90**	
		6 - MICROTUNELLING FOR 1200 MM SEWER					
	6	a) 1200MM SEWER MICRO TUNELLING @20M DEPTH, PIPE SUPPLY, SOIL DISPOSAL (STA. 1+395 - 1+925)	532.9	m	$ 8,350.74	$ 4,450,107.37	Gravity tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) CONSTRUCTION OF SHAFT @ 1+925 @ 18.5M DEPTH WITH SAN MH19A	1	-	$ 2,500,000.00	$ 2,500,000.00	9m Shaft Width at 18.5M Depth
		TOTAL INSTALLATION COST				**$ 6,950,107.37**	
		7- MICROTUNELLING FOR 1200 MM SEWER					
	7	a) 1200MM SEWER MICRO TUNELLING @20M DEPTH, PIPE SUPPLY, SOIL DISPOSAL (STA. 1+925- 2+200)	275.2	m	$ 8,350.74	$ 2,298,122.63	Gravity tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) CONSTRUCTION OF SHAFT @ 2+200 @ 20M DEPTH WITH SAN MH20A	1	-	$ 2,000,000.00	$2,000,000.00	9m Shaft Width at 17.5M Depth
		c) 1200MM SEWER MICRO TUNELLING @20M DEPTH, PIPE SUPPLY, SOIL DISPOSAL (STA. 2+200- 2+555)	353.2	-	$ 8,350.74	$2,949,480.06	
		d) CONSTRUCTION OF SHAFT @ 2+555 @ 20M DEPTH WITH SAN MH21A	1	-	$ 2,500,000.00	$2,500,000.00	9m Shaft Width at 20M Depth
		TOTAL INSTALLATION COST				**$ 9,747,602.68**	
		Additional Costs					
		GENERAL ITEM COSTS AS PERCENTAGE OF INSTALLATION COST		>10,000,000	9%	$ 5,581,194.61	
		PROVISIONAL ITEM ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	6%	$ 3,720,796.40	
		CONTIGENCY ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	10%	$ 6,201,327.34	
		TOTAL CONSTRUCTION COST (HARD)				**$ 77,516,591.74**	
		GEOTECHNICAL/HYDROGEOLOGICAL		High Complexity	2.0%	$ 1,550,331.83	
		PROPERTY/EASEMENTS		High Complexity	2%	$ 1,550,331.83	
		ENGINEERING/DESIGN (INTERNAL)		>$50,000,000	4%	$ 3,100,663.67	
		DESIGN/CONTRACT ADMINISTRAION (EXTERNAL)		>$50,000,000	10%	$ 7,751,659.17	
		APPROVAL		>$50,000,000	1%	$ 387,582.96	
		TOTAL DESIGN COSTS (SOFT)				**$ 14,340,569.47**	
		PROJECT COMPLEXITY	Class 3	High	20%	$ 18,371,432.24	
		TOTAL PROJECT COST				**$ 110,228,593.45**	
		SUMMARY					
		1200MM SANITARY INSTALLATION COST				**$ 62,013,273.39**	
		1200MM SANITARY CONSTRUCTION COST (HARD)				**$ 77,516,591.74**	
		1200MM DESIGN COSTS (SOFT)				**$ 14,340,569.47**	
		1200MM SANITARY TOTAL PROJECT COSTS				**$ 110,228,593.45**	
		1200MM SANITARY TOTAL PROJECT COSTS (HST INCL.)			1.76%	**$ 112,168,616.69**	

NW Bolton CP4/CP5 (EMIL KOLB PARKWAY) Watermain Projects							
Date Edited	**Item No.**	**Description**	**Quantity/Length**	**UOM**	**Estimated Unit Price $2025/UOM**	**Total**	**Notes**
		1 - CONSTRUCTION OF WATERMAIN BY OPEN CUT					
		a) 600 MM PVC OPEN CUT WATERMAIN FROM STA. 5+057 TO STA. 5+370, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	313	m	$ 3,253.98	$ 1,018,494.88	
		b) 600 MM PVC OPEN CUT WATERMAIN FROM STA. 5+416 TO STA. 5+640, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	190	m	$ 3,253.98	$ 618,255.68	
	1	c) 600 MM PVC OPEN CUT WATERMAIN FROM STA. 6+050 TO STA. 6+590, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	540	m	$ 3,253.98	$ 1,757,147.72	
		d) 600 MM PVC OPEN CUT WATERMAIN FROM STA. 6+590 TO STA. 6+940, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	350	m	$ 3,253.98	$ 1,138,892.04	
		e) 600 MM PVC OPEN CUT WATERMAIN FROM STA. 7+228 TO STA. 8+300, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	1072	m	$ 3,253.98	$ 3,488,263.63	
		TOTAL INSTALLATION COST				**$ 8,021,053.97**	
		2- EMIL KOLB PARKWAY AUGER BORING CROSSING @STA. 6+380					
		a) 600 MM PVC WATERMAIN AUGER BORING EMIL KOLB CORSSING FROM STA. 6+380					
	2		30	m	$ 4,170.63	$ 125,118.80	Watermain tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
				m			
		TOTAL INSTALLATION COST				**$ 125,118.80**	
		3- TUNNEL ON EMIL KOLB PARKWAY @STA. 6+940 - 7+230					
		a) 600 MM PVC WATERMAIN MICRO TUNNELING FROM STA. 6+940 TO 7+230					MICROTUNNEL SHAFTS @ STA. 6+940 TO 7+230 COSTED IN SANITARY
	3		287	m	$ 5,736.57	$ 1,646,395.98	Watermain tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
				m			
		TOTAL INSTALLATION COST				**$ 1,646,395.98**	
		4- TUNNEL ON EMIL KOLB PARKWAY INCLUDING WATERMAIN					
		a) 600 MM PVC WATERMAIN MICRO TUNNELING FROM STA. 5+640 TO 6+050					MICROTUNNEL SHAFT #02 COSTED IN SANITARY
	4		404.1	m	$ 5,736.57	$ 2,318,148.48	Watermain tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) SUPPLY AND INSTALLATION OF 600 MM PVC WATERMAIN WITHIN TUNNEL SHAFT AT STA. 6+050	10.5	m	$2,138.54	$ 22,454.62	Cost is based on Linear watermain installation from 2025 MP minus Bedding/Backfill, Structures and Excavation
		TOTAL INSTALLATION COST				**$ 2,340,603.11**	
		5- AUGER BORING TUNELLING, LAUNCH/RECEIVING PITS 600MM WATERMAIN					
		a) 600 MM PVC WATERMAIN TUNNELING FROM STA. 5+370 TO 5+405					
	5		23.9	m	$ 5,736.57	$ 137,104.06	Watermain tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) CONSTRUCTION OF AUGER BORING RECEIVING PIT AT STA. 5+370	1		$ 910,848.82	$ 910,848.82	9m Depth Shaft
		c) CONSTRUCTION OF AUGER BORING LAUNCH PIT AT STA. 5+405	1		$ 1,275,188.34	$ 1,275,188.34	9m Depth Shaft
		TOTAL INSTALLATION COST				**$ 2,323,141.22**	
		6 - SUPPLY AND INSTALLATION OF MAIN LINE VALVES AND CHAMBERS					
		a) 600MM VALVE CHAMBER #VC01 AT STA. 5+070	1		$ 317,613.92	$ 317,613.92	
		b) 600MM VALVE CHAMBER #VC04 AT STA. 5+360	1		$ 317,613.92	$ 317,613.92	
		c) 600MM VALVE AND BYPASS/DRAIN CHAMBER #VC08 AT STA. 6+070	1		$ 317,613.92	$ 317,613.92	
		d) 600MM VALVE AND BYPASS/DRAIN CHAMBER #VC09 AT STA. 6+380	1		$ 317,613.92	$ 317,613.92	
		e) 400MM VALVE AND BYPASS/DRAIN CHAMBER #VC10	1		$ 202,117.95	$ 202,117.95	
		f) 600MM VALVE AND BYPASS/DRAIN CHAMBER #VC11 AT STA. 6+590	1		$ 317,613.92	$ 317,613.92	
		g) 600MM VALVE AND BYPASS/DRAIN CHAMBER AT STA. 6+885	1		$ 317,613.92	$ 317,613.92	Larger Chamber costs carried forward as these chambers are proposed to be rectangular
	6	h) 600MM VALVE AND BYPASS/DRAIN CHAMBER AT STA. 6+940	1		$ 317,613.92	$ 317,613.92	
		i) 600MM VALVE AND BYPASS/DRAIN CHAMBER AT STA. 7+235	1		$ 317,613.92	$ 317,613.92	
		j) 600MM VALVE AND BYPASS/DRAIN CHAMBER #VC12 AT STA. 7+390	1		$ 317,613.92	$ 317,613.92	
		k) 600MM VALVE AND BYPASS/DRAIN CHAMBER #VC13 AT STA. 7+870	1		$ 317,613.92	$ 317,613.92	
		l) Single Air Release Valve in 1800 mm Chamber #VC03 on Emil Kolb Parkway (Sta. 5+245) Std. Dwg. 1-3-12	1		$ 317,613.92	$ 317,613.92	
		m) Single Air Release Valve in 1800 mm Chamber #VC06 on Emil Kolb Parkway (Sta. 5+638) Std. Dwg. 1-3-12	1		$ 317,613.92	$ 317,613.92	
		n) Single Drain Valve in 1500 mm Chamber #VC02 on Emil Kolb Parkway (Sta. 5+240) Std. Dwg. 1-3-28	1		$ 142,717.21	$ 142,717.21	Peel Tender costs carried forward and inflated for 1500mm circular chambers
		p) Single Drain Valve in 1500 mm Chamber #VC05 on Emil Kolb Parkway (Sta. 5+403) Std. Dwg. 1-3-28	1		$ 142,717.21	$ 142,717.21	
		q) Single Drain Valve in 1500 mm Chamber #VC07 on Emil Kolb Parkway (Sta. 6+049) Std. Dwg. 1-3-28	1		$ 142,717.21	$ 142,717.21	
		TOTAL INSTALLATION COST				**$ 4,441,636.63**	
		Additional Costs					
		GENERAL ITEM COSTS AS PERCENTAGE OF INSTALLATION COST		>10,000,000	9%	$ 1,700,815.47	
		PROVISIONAL ITEM ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	6%	$ 1,133,876.98	
		CONTIGENCY ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	10%	$ 1,889,794.97	
		TOTAL CONSTRUCTION COST (HARD)				**$ 23,622,437.11**	
		GEOTECHNICAL/HYDROGEOLOGICAL		High Complexity	2.0%	$ 472,448.74	
		PROPERTY/EASEMENTS		High Complexity	2%	$ 472,448.74	
		ENGINEERING/DESIGN (INTERNAL)		$10,000,000 - $50,	6%	$ 1,417,346.23	
		DESIGN/CONTRACT ADMINISTRAION (EXTERNAL)		$10,000,000 - $50,	12%	$ 2,834,692.45	
		APPROVAL		$10,000,000 - $50,	1%	$ 236,224.37	
		TOTAL DESIGN COSTS (SOFT)				**$ 5,433,160.54**	
		PROJECT COMPLEXITY	Class 3	High	20%	$ 5,811,119.53	
		TOTAL PROJECT COST				**$ 34,866,717.18**	
		SUMMARY					
		600MM WATERMAIN INSTALLATION COST				**$ 18,897,949.69**	
		600MM WATERMAIN CONSTRUCTION COST (HARD)				**$ 23,622,437.11**	
		600MM WATERMAIN DESIGN COSTS (SOFT)				**$ 5,433,160.54**	
		600MM TOTAL PROJECT COST				**$ 34,866,717.18**	
		600MM TOTAL PROJECT COST (HST INCL.)			1.76%	**$ 35,480,371.40**	

NW Bolton CP4/CP5 (EMIL KOLB PARKWAY) Sanitary Projects							
Date Edited	**Item No.**	**Description**	**Quantity/Length**	**UOM**	**Estimated Unit Price $2025/UOM**	**Total**	**Notes**
		1 - MICROTUNELLING FOR 1200 MM Sewer					
	1	a) 1200 MM SEWER MICRO TUNELLING INCLUDING, PIPE SUPPLY, SOIL DISPOSAL (STA. 5+080 - 5+635)	558.2	m	$ 8,350.74	$ 4,661,381.00	Gravity tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) CONSTRUCTION OF SHAFT #1 @5+080 @ 49.2M DEPTH INCLUDING MH 11A	1	-	$8,125,000.00	$ 8,125,000.00	13 m Shaft Width at 49.2M Depth
		c) CONSTRUCTION OF MH 12A @STA. 5+070	1	-	$79,131.42	$79,131.42	
		TOTAL INSTALLATION COST				**$ 12,865,512.42**	
		2 - MICROTUNELLING FOR 1200 MM SEWER					
	2	a) 1200 MM SEWER MICRO TUNELLING INCLUDING SHAFTS, PIPE SUPPLY, SOIL DISPOSAL (STA. 5+635 - 6+055)	415.3	m	$ 8,350.74	$ 3,468,060.78	Gravity tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) CONSTRUCTION OF SHAFT #2 @5+633 @ 46.8M DEPTH INCLUDING MH10A	1	-	$ 7,312,500.00	$ 7,312,500.00	13.0m Shaft Width at 46.8M Depth
		TOTAL INSTALLATION COST				**$ 10,780,560.78**	
		3 - MICROTUNELLING FOR 1200 MM SEWER					
	3	a) 1200MM SEWER MICRO TUNELLING, PIPE SUPPLY, SOIL DISPOSAL (STA. 6+055 - 6+360)	301.9	m	$ 8,350.74	$ 2,521,087.29	Gravity tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) CONSTRUCTION OF SHAFT #3 @6+055 @ 50M DEPTH INCLUDING MH9A	1	-	$ 8,125,000.00	$ 8,125,000.00	13.0m Shaft Width at 50M Depth
		c) CONSTRUCTION OF SHAFT #4 @6+359 @ 41.9M DEPTH INCLUDING MH8A	1	-	$ 5,000,000.00	$ 5,000,000.00	10m Width 41.9m Depth
		d) 1200MM SEWER MICRO TUNELLING CP5 , PIPE SUPPLY, SOIL DISPOSAL (STA. 6+360 - 6+865)	510.8	-	$ 8,350.74	$ 4,265,556.10	Gravity tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		e) CONSTRUCTION OF SHAFT @6+370 @ 40M DEPTH INCLUDING MH	1	-	$ 5,000,000.00	$ 5,000,000.00	10m Width 40m Depth
		f) CONSTRUCTION OF SHAFT @6+810 @ 40M DEPTH INCLUDING WET WELL	1	-	$ 3,750,000.00	$ 3,750,000.00	10m Width 27m Depth
		g) PUMP SET @6+810	1	-	$ 1,410,346.00	$ 1,410,346.00	
		TOTAL INSTALLATION COST				**$ 30,071,989.38**	
		4 - TUNNELED TWIN 400 MM TWIN FORCEMAIN					
	4	a) TWIN 450MM FORCEMAIN TUNNEL, PIPE SUPPLY, SOIL DISPOSAL, (STA. 6+885 - 7+220)	341.2	m	$ 11,173.95	$ 3,812,552.82	Costed as A 900mm tunnled forcemain to account for twin 400mm pipes
		b) CONSTRUCTION OF SHAFT @6+940 @ 20M DEPTH INCLUDING MH	1	-	$ 2,500,000.00	$ 2,500,000.00	10m Width 20m Depth
		c) CONSTRUCTION OF SHAFT @7+220 @ 30M DEPTH INCLUDING MH	1	-	$ 3,750,000.00	$ 3,750,000.00	10m Width 30m Depth
		TOTAL INSTALLATION COST				**$ 10,062,552.82**	
		4 - OPEN CUT FOR 450 MM TWIN FORCEMAIN					
	4	a) TWIN 450MM FORCEMAIN OPEN CUT, PIPE SUPPLY, SOIL DISPOSAL, (STA. 7+230 - 7+885)	655	m	$ 3,421.02	$ 2,240,771.23	Costed as one 450mm Open Cut project with another 450mm pipe supply added
		b) 400X150 VALVE CHAMBER (1500MM DIA) WITH APPURTANCES @STA. 7+240	1	-	$ 1,010,589.75	$ 1,010,589.75	
		c) 400X150 VALVE CHAMBER (1500MM DIA) WITH APPURTANCES @STA. 7+580.8	1	-	$ 1,010,589.75	$ 1,010,589.75	
		TOTAL INSTALLATION COST				**$ 4,261,950.73**	
		5 - OPEN CUT FOR 750MM GRAVITY SEWER					
	5	a) 750MM OPEN CUT GRAVITY SEWER, WITH EXCAVATION, BEDDING, PIPE SUPPLY, CONNECTIONS/TESTING, RESTORATION FROM STA. 7+885 - 8+380	528.5	m	$ 3,172.77	$ 1,676,808.00	>5m Depth and structures costed separately
		b) PROPOSED DISCHARGE CHAMBER MH IN OPEN CUT (@ STA. 7+885)	1	-	$ 72,356.37	$ 72,356.37	1500mm Pipe MH costs carried forward as it correlates to 2400mm MH diameter.
		c) PROPOSED 1500MM MH IN OPEN CUT (MH 7A @ STA. 7+970)	1	-	$ 33,604.21	$33,604.21	
		d) PROPOSED 1500MM MH IN OPEN CUT (MH 6A @ STA. 8+115)	1	-	$ 33,604.21	$33,604.21	
		e) PROPOSED 1500MM MH IN OPEN CUT (MH 5A @ STA. 8+245)	1	-	$ 33,604.21	$33,604.21	
		f) PROPOSED 1500MM MH IN OPEN CUT (MH 4A @ STA. 8+295)	1	-	$ 33,604.21	$33,604.21	
		g) PROPOSED 1500MM MH IN OPEN CUT (MH 3A @ STA. 8+345)	1	-	$ 33,604.21	$33,604.21	
		h) PROPOSED 1500MM MH IN OPEN CUT (MH 2A @ STA. 8+357)	1	-	$ 33,604.21	$33,604.21	
		i) PROPOSED 1500MM MH IN OPEN CUT (MH 1A @ STA. 8+377)	1	-	$ 33,604.21	$33,604.21	
		TOTAL INSTALLATION COST				**$ 1,984,393.86**	
		Additional Costs					
		GENERAL ITEM COSTS AS PERCENTAGE OF INSTALLATION COST		>10,000,000	9%	$ 6,302,426.40	
		PROVISIONAL ITEM ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	6%	$ 4,201,617.60	
		CONTIGENCY ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	10%	$ 7,002,696.00	
		TOTAL CONSTRUCTION COST (HARD)				**$ 87,533,700.00**	
		GEOTECHNICAL/HYDROGEOLOGICAL		High Complexity	2.0%	$ 1,750,674.00	
		PROPERTY/EASEMENTS		High Complexity	2%	$ 1,750,674.00	
		ENGINEERING/DESIGN (INTERNAL)		>$50,000,000	4%	$ 3,501,348.00	
		DESIGN/CONTRACT ADMINISTRAION (EXTERNAL)		>$50,000,000	10%	$ 8,753,370.00	
		APPROVAL		>$50,000,000	1%	$ 437,668.50	
		TOTAL DESIGN COSTS (SOFT)				**$ 16,193,734.50**	
		PROJECT COMPLEXITY	Class 3	High	20%	$ 20,745,486.90	
		TOTAL PROJECT COST				**$ 124,472,921.40**	
		SUMMARY					
		SANITARY INSTALLATION COST				**$ 70,026,960.00**	
		SANITARY CONSTRUCTION COST (HARD)				**$ 87,533,700.00**	
		SANITARY DESIGN COSTS (SOFT)				**$ 16,193,734.50**	
		TOTAL SANITARY PROJECT COST				**$ 124,472,921.40**	
		TOTAL SANITARY PROJECT COST (HST INCL.)			1.76%	**$ 126,663,644.81**	

NW Bolton CP6 (HIGHWAY 50) Watermain Projects							
Date Edited	**Item No.**	**Description**	**Quantity/Length**	**UOM**	**Estimated Unit Price $2025/UOM**	**Total**	**Notes**
		1 - CONSTRUCTION OF WATERMAIN BY OPEN CUT					
	1	a) 600 MM PVC OPEN CUT WATERMAIN FROM STA. 3+010 TO STA. 3+380, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	370	m	$ 3,253.98	$ 1,203,971.59	
		b) 600 MM VALVE CHAMBER #VC14 @STA. 3+010	1	-	$ 317,613.92	$ 317,613.92	
		TOTAL INSTALLATION COST				**$ 1,521,585.51**	
		2 - CONSTRUCTION OF WATERMAIN BY OPEN CUT					
	2	a) 600 MM PVC OPEN CUT WATERMAIN FROM STA. 3+380 TO STA. 3+630, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	250	m	$ 3,253.98	$ 813,494.32	
		b) 600 MM VALVE CHAMBER #VC15 @STA. 3+385	1	-	$ 317,613.92	$ 317,613.92	
		c) 600 MM VALVE CHAMBER #VC16 @STA. 3+585	1	-	$ 317,613.92	$ 317,613.92	
		d) 600 MM VALVE CHAMBER #VC17 @STA. 3+610	1	-	$ 317,613.92	$ 317,613.92	
		TOTAL INSTALLATION COST				**$ 1,766,336.08**	
		3 - CONSTRUCTION OF WATERMAIN BY TUNELLING					
	3	a) 600 MM TUNNEL WATERMAIN FROM STA. 3+640 TO STA. 4+225, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING: 4-8m DEPTH	593.6	m	$ 5,736.57	$ 3,405,228.76	SHAFT #6 SHARED AND COSTED WITH SANITARY
		b) 600 MM VALVE CHAMBER VC18 @STA. 3+640	1	-	$ 317,613.92	$ 317,613.92	
		TOTAL INSTALLATION COST				**$ 3,722,842.68**	
		Additional Costs					
		GENERAL ITEM COSTS AS PERCENTAGE OF INSTALLATION COST		$8,000,000.00	11%	$ 409,512.69	
		PROVISIONAL ITEM ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		$8,000,000.00	7%	$ 490,753.50	
		CONTIGENCY ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		$8,000,000.00	13%	$ 911,399.36	
		TOTAL CONSTRUCTION COST (HARD)				**$ 8,822,429.82**	
		GEOTECHNICAL/HYDROGEOLOGICAL		High Complexity	2.0%	$ 176,448.60	
		PROPERTY/EASEMENTS		High Complexity	2%	$ 176,448.60	
		ENGINEERING/DESIGN (INTERNAL)		<$10,000,000	8%	$ 705,794.39	
		DESIGN/CONTRACT ADMINISTRAION (EXTERNAL)		<$10,000,000	15%	$ 1,323,364.47	
		APPROVAL		<$10,000,000	2%	$ 132,336.45	
		TOTAL DESIGN COSTS (SOFT)				**$ 2,514,392.50**	
		PROJECT COMPLEXITY	Class 3	High	20%	$ 2,267,364.46	
		TOTAL PROJECT COST				**$ 13,604,186.78**	

SUMMARY		
600MM WATERMAIN INSTALLATION COST		**$ 7,010,764.27**
600MM WATERMAIN CONSTRUCTION COST (HARD)		**$ 8,822,429.82**
600MM WATERMAIN DESIGN COSTS (SOFT)		**$ 2,514,392.50**
600MM TOTAL PROJECT COST		**$ 13,604,186.78**
600MM TOTAL PROJECT COST (HST INCL.)	1.76%	**$ 13,843,620.47**

NW Bolton CP6 (HIGHWAY 50) Sanitary Projects								
Date Edited	**Item No.**	**Description**	**Quantity/Length**	**UOM**	**Estimated Unit Price $2025/UOM**		**Total**	**Notes**
		1 - CONSTRUCTION OF 1200MM SANITARY BY MICRO TUNELLING						
	1	a) 1200 MM SEWER MICRO TUNELLING INCLUDING, PIPE SUPPLY, SOIL DISPOSAL (STA. 3+035 - STA. 3+640)	598.4	m	$ 8,350.74	$	4,997,080.59	Gravity tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) CONSTRUCTION OF SHAFT #5 @ STA. 3+035 @ 15M DEPTH INCLUDING MH 14A	1	-	$ 1,875,000.00	$	1,875,000.00	15m Depth Launch Shaft with MH 14A cost included
		TOTAL INSTALLATION COST				**$**	**6,872,080.59**	
		2 - CONSTRUCTION OF 1200MM SANITARY BY MICRO TUNELLING						
	2	a) 1200 MM SEWER MICRO TUNELLING INCLUDING, PIPE SUPPLY, SOIL DISPOSAL (STA. 3+640 - STA. 4+235)	600.4	m	$ 8,350.74	$	5,013,782.07	Gravity tunneling unit rates blend methods with and without steel casing; casing pipe is assumed included
		b) CONSTRUCTION OF SHAFT #6 @ STA. 3+640 @ 18M DEPTH INCLUDING MH 13A	1	-	$ 2,000,000.00	$	2,000,000.00	18m Depth Launch Shaft with MH 13A cost included
		c) CONSTRUCTION OF MH12A @ STA. 4+230	1	-	$ 79,131.42	$	79,131.42	Shaft Cost for Micro tunnelling Shaft #1 is carried forward to CP4 Costing (Emil Kolb Parkway)
		TOTAL INSTALLATION COST				**$**	**7,092,913.49**	
		Additional Costs						
		GENERAL ITEM COSTS AS PERCENTAGE OF INSTALLATION COST		>10,000,000	9%	$	1,256,849.47	
		PROVISIONAL ITEM ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	6%	$	837,899.65	
		CONTIGENCY ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	10%	$	1,396,499.41	
		TOTAL CONSTRUCTION COST (HARD)				**$**	**17,456,242.61**	
		GEOTECHNICAL/HYDROGEOLOGICAL		High Complexity	2.0%	$	349,124.85	
		PROPERTY/EASEMENTS		High Complexity	2%	$	349,124.85	
		ENGINEERING/DESIGN (INTERNAL)		$10,000,000 - $50,	6%	$	1,047,374.56	
		DESIGN/CONTRACT ADMINISTRAION (EXTERNAL)		$10,000,000 - $50,	12%	$	2,094,749.11	
		APPROVAL		$10,000,000 - $50,	1%	$	174,562.43	
		TOTAL DESIGN COSTS (SOFT)				**$**	**4,014,935.80**	
		PROJECT COMPLEXITY	Class 3	High	20%	$	4,294,235.68	
		TOTAL PROJECT COST				**$**	**25,765,414.09**	
		SUMMARY						
		SANITARY INSTALLATION COST				**$**	**13,964,994.09**	
		SANITARY CONSTRUCTION COST (HARD)				**$**	**17,456,242.61**	
		SANITARY DESIGN COSTS (SOFT)				**$**	**4,014,935.80**	
		TOTAL SANITARY PROJECT COST				**$**	**25,765,414.09**	
		TOTAL SANITARY PROJECT COST (HST INCL.)			1.76%	**$**	**26,218,885.38**	

NW Bolton CP7 (COLUMBIA WAY) Watermain Projects							
Date Edited	**Item No.**	**Description**	**Quantity/Length**	**UOM**	**Estimated Unit Price $2025/UOM**	**Total**	**Notes**
		1 - CONSTRUCTION OF WATERMAIN BY OPEN CUT					
	1	a) 400 MM PVC OPEN CUT WATERMAIN FROM STA. 1+301.1 TO STA. 1+870, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	568.9	m	$ 2,485.45	$ 1,413,969.73	
		b) 400MM VALVE AND CHAMBER ON COLUMBIA WAY (STA. 1+455)	1	-	$ 202,117.95	$ 202,117.95	
		c) 400MM VALVE AND CHAMBER ON COLUMBIA WAY (STA. 1+575)	1	-	$ 202,117.95	$ 202,117.95	
		TOTAL INSTALLATION COST				**$ 1,818,205.63**	
		2 - CONSTRUCTION OF WATERMAIN BY OPEN CUT WITH CSP CROSSING					
	2	a) 400 MM PVC OPEN CUT WATERMAIN FROM STA. 1+870 TO STA. 2+485, TO INCLUDE ALL FITTINGS, RESTORATION, CONNECTIONS/TESTING	157	m	$ 2,485.45	$ 390,214.88	
		b) 400MM AIR RELEASE VALVE AND CHAMBER ON COLUMBIA WAY (STA. 1+870)	1	-	$ 202,117.95	$ 202,117.95	
		c) 400MM DRAIN VALVE AND CHAMBER ON COLUMBIA WAY (STA. 1+900)	1	-	$ 202,117.95	$ 202,117.95	
		d) 400MM VALVE AND CHAMBER ON COLUMBIA WAY (STA. 2+170)	1	-	$ 202,117.95	$ 202,117.95	
		e) 400MM VALVE AND CHAMBER ON COLUMBIA WAY (STA. 2+310)	1	-	$ 202,117.95	$ 202,117.95	
		f) 400MM VALVE AND CHAMBER ON COLUMBIA WAY (STA. 2+458)	1	-	$ 202,117.95	$ 202,117.95	
		TOTAL INSTALLATION COST				**$ 1,400,804.64**	
		Additional Costs					
		GENERAL ITEM COSTS AS PERCENTAGE OF INSTALLATION COST		$4,000,000.00	14%	$ 450,661.44	
		PROVISIONAL ITEM ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		$4,000,000.00	9%	$ 289,710.92	
		CONTIGENCY ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		$4,000,000.00	15%	$ 482,851.54	
		TOTAL CONSTRUCTION COST (HARD)				**$ 4,442,234.17**	
		GEOTECHNICAL/HYDROGEOLOGICAL		Low Complexity	0.5%	$ 22,211.17	
		PROPERTY/EASEMENTS		Low Complexity	1%	$ 44,422.34	
		ENGINEERING/DESIGN (INTERNAL)		<$10,000,000	8%	$ 355,378.73	
		DESIGN/CONTRACT ADMINISTRAION (EXTERNAL)		<$10,000,000	15%	$ 666,335.12	
		APPROVAL		<$10,000,000	2%	$ 66,633.51	
		TOTAL DESIGN COSTS (SOFT)				**$ 1,154,980.88**	
		PROJECT COMPLEXITY	Class 3	Low	10%	$ 559,721.50	
		TOTAL PROJECT COST				**$ 6,156,936.55**	

SUMMARY		
400MM WATERMAIN INSTALLATION COST		**$ 3,219,010.27**
400MM WATERMAIN CONSTRUCTION COST (HARD)		**$ 4,442,234.17**
400MM WATERMAIN DESIGN COSTS (SOFT)		**$ 1,154,980.88**
400MM TOTAL PROJECT COST		**$ 6,156,936.55**
400MM TOTAL PROJECT COST (HST INCL.)	1.76%	**$ 6,265,298.64**

PROPOSED SPS COSTING							
Date Edited	**Item No.**	**Description**	**Quantity/Length**	**UOM**	**Estimated Unit Price $2025/UOM**	**Total**	**Notes**
		1 - Proposed SPS					
	1	a) PROPOSED SPS WITH A CAPACITY OF 325 L/S	325	l/S	-	$ 15,442,798.00	The North Hill SPS costs were developed using the Master Plan Methodology. Estimates for CP4, CP5, CP6, CP7, and Mou Hope are costed with far more detail. While SPS estimates may be on the low side, the Master Plan Methodology is a high level estimate and does not account for all divisions and unqiue site works to be costed.
		TOTAL INSTALLATION COST				**$ 15,442,798.00**	
		Additional Costs					
		GENERAL ITEM COSTS AS PERCENTAGE OF INSTALLATION COST		>10,000,000	9%	$ 1,389,851.82	
		PROVISIONAL ITEM ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	6%	$ 926,567.88	
		CONTIGENCY ALLOWANCE COST AS PERCENTAGE OF INSTALLATION COST		>10,000,000	10%	$ 1,544,279.80	
		TOTAL CONSTRUCTION COST (HARD)				**$ 19,303,497.50**	
		GEOTECHNICAL/HYDROGEOLOGICAL		Facility	2.0%	$ 386,069.95	
		PROPERTY/EASEMENTS		Facility	2%	$ 386,069.95	
		ENGINEERING/DESIGN (INTERNAL)		$10,000,000 - $50,(	6%	$ 1,158,209.85	
		DESIGN/CONTRACT ADMINISTRAION (EXTERNAL)		$10,000,000 - $50,(	12%	$ 2,316,419.70	
		APPROVAL		$10,000,000 - $50,(	1%	$ 193,034.98	
		TOTAL DESIGN COSTS (SOFT)				**$ 4,439,804.43**	
		PROJECT COMPLEXITY	Class 3	High	20%	$ 4,748,660.39	
		TOTAL PROJECT COST				**$ 28,491,962.31**	
		SUMMARY					
		PROPOSED SPS INSTALLATION COST				**$ 15,442,798.00**	
		PROPOSED SPS CONSTRUCTION COST (HARD)				**$ 19,303,497.50**	
		PROPOSED SPS DESIGN COSTS (SOFT)				**$ 4,439,804.43**	
		PROPOSED SPS TOTAL PROJECT COST				**$ 28,491,962.31**	
		PROPOSED SPS TOTAL PROJECT COST (HST INCL.)			1.76%	**$ 28,993,420.85**	

Linear Unit Rate Summary Tables

Diameter	Excavation	Bedding & Backfill	Pipe Supply & Install	Structures	Connections & Testing	Restoration	Total Unit Cost	Total Unit Cost Minus Structures	Total Unit Cost Minus Structures and Bedding / Backfill	Twin Forcemain
(mm)	($/m)	($/m)	($/m)	($/m)	($/m)	($/m)	($2025/m)	($2025/m)	($2025/m)	($2025/m)
400	$ 710	$ 218	$ 593	$ 588	$ 500	$ 465	**$ 3,074**	**$ 2,485**	**$ 2,268**	**$ 3,079**
450	$ 779	$ 238	$ 716	$ 263	$ 500	$ 471	**$ 2,968**	**$ 2,705**	**$ 2,467**	**$ 3,421**
500	$ 773	$ 242	$ 877	$ 296	$ 500	$ 477	**$ 3,165**	**$ 2,869**	**$ 2,627**	**$ 3,746**
600	$ 846	$ 269	$ 1,149	$ 362	$ 500	$ 490	**$ 3,616**	**$ 3,254**	**$ 2,985**	**$ 4,403**
750	$ 1,020	$ 325	$ 1,310	$ 560	$ 500	$ 508	**$ 4,222**	**$ 3,662**	**$ 3,338**	**$ 4,972**
900	$ 1,266	$ 396	$ 1,436	$ 593	$ 500	$ 526	**$ 4,717**	**$ 4,125**	**$ 3,728**	**$ 5,561**
1050	$ 1,379	$ 493	$ 1,843	$ 724	$ 500	$ 545	**$ 5,485**	**$ 4,760**	**$ 4,267**	**$ 6,604**
1200	$ 1,516	$ 553	$ 2,261	$ 922	$ 500	$ 563	**$ 6,314**	**$ 5,392**	**$ 4,840**	**$ 7,653**
1350	$ 1,678	$ 619	$ 2,865	$ 988	$ 500	$ 582	**$ 7,231**	**$ 6,244**	**$ 5,625**	**$ 9,109**
1500	$ 1,815	$ 681	$ 3,407	$ 1,152	$ 500	$ 600	**$ 8,156**	**$ 7,004**	**$ 6,322**	**$ 10,411**
1650	$ 1,991	$ 753	$ 4,042	$ 1,317	$ 500	$ 618	**$ 9,222**	**$ 7,905**	**$ 7,152**	**$ 11,947**
1800	$ 2,174	$ 828	$ 4,659	$ 1,481	$ 500	$ 637	**$ 10,280**	**$ 8,798**	**$ 7,970**	**$ 13,458**
2100	$ 2,517	$ 974	$ 5,191	$ 1,646	$ 500	$ 674	**$ 11,502**	**$ 9,856**	**$ 8,882**	**$ 15,047**

Watermain or Forcemain (Pressure Pipe) - Tunneled installation (Blended)

Diameter	Tunnelling	Shafts	Total Unit Cost
(mm)	($/m)	($/m)	($2025/m)
400	$ 4,171	$ 3,985	$ 8,156
450	$ 4,562	$ 3,985	$ 8,547
500	$ 4,954	$ 3,985	$ 8,939
600	$ 5,737	$ 3,985	$ 9,722
750	$ 7,334	$ 3,985	$ 11,319
900	$ 11,174	$ 3,985	$ 15,159
1050	$ 11,737	$ 3,985	$ 15,722
1200	$ 12,157	$ 3,985	$ 16,142
1350	$ 12,456	$ 3,985	$ 16,441
1500	$ 12,660	$ 3,985	$ 16,645
1650	$ 12,791	$ 4,554	$ 17,346
1800	$ 12,876	$ 4,554	$ 17,430
2100	$ 12,999	$ 5,124	$ 18,123

Watermain or Forcemain (Pressure Pipe) - Tunneled installation (Jack & Bore)

WM Pipe Diameter (mm)	casing pipe diameter for double pass installation (mm)	Jack and Bore ($/m)
150	500	$1,088
300	600	$1,968
400	700	$2,640
600	1100	$6,440
750	1300	$8,620
900	1400	$10,130
1050	1600	$12,310
1200	1800	$14,490
1350	2000	
1500	2100	
1650	2300	
1800	2500	
2100	2800	
2400	3100	

Diameter	Unit Cost	Major Creek / Road	Minor Road / Utilities Corridor	Minor Creek
		Length = 150m	Length = 60m	Length = 20m
(mm)	($2025/m)	($2025/m)	($2025/m)	($2025/m)
400	$ 8,156	$ 1,226,033	$ 496,073	$ 183,324
450	$ 8,547	$ 1,285,141	$ 520,524	$ 194,041
500	$ 8,939	$ 1,344,249	$ 544,976	$ 204,758
600	$ 9,722	$ 1,462,465	$ 593,879	$ 226,192
750	$ 11,319	$ 1,704,432	$ 695,517	$ 275,471
900	$ 15,159	$ 2,280,767	$ 926,859	$ 355,152
1050	$ 15,722	$ 2,366,822	$ 964,515	$ 377,970
1200	$ 16,142	$ 2,432,027	$ 995,448	$ 403,680
1350	$ 16,441	$ 2,477,696	$ 1,015,333	$ 415,441
1500	$ 16,645	$ 2,510,150	$ 1,032,357	$ 433,949
1650	$ 17,346	$ 2,617,253	$ 1,079,240	$ 462,410
1800	$ 17,430	$ 2,631,845	$ 1,089,119	$ 478,536
2100	$ 18,123	$ 2,737,643	$ 1,135,481	$ 506,822

*Note Chamber costs included

Chambers				
Unit Cost	V&C Unit Cost	Tender Info	Multiplier	2025 Chamber Unit Costs
400	$ 110,612	$ 224,347	2.03	$ 202,118
450	$ 126,413			$ 230,992
500	$ 142,215			$ 259,866
600	$ 173,818	$ 282,682	1.63	$ 317,614
750	$ 268,628			$ 490,858
900	$ 284,430			$ 519,732
1050	$ 347,636			$ 635,228
1200	$ 442,446			$ 808,472
1350	$ 474,050			$ 866,220
1500	$ 553,058			$ 1,010,590
1650	$ 632,066			$ 1,154,960
1800	$ 711,074			$ 1,299,330
2100	$ 790,083			$ 1,443,700
		Average	1.83	

# of chambers	**2**

	Length (m)
Major Creek / Road	150
Minor Road / Utilities Corridor	60
Minor Creek	20

Two chambers required per crossing (air & drain valve).

1. Escalated 2020 base costs to 2025 — The original 2020 Master Plan costs are multiplied by ~3.16× to get to 2025 dollars. This multiplier was derived by comparing actual Peel tender prices (from awarded contracts) against the 2020 estimates for 400mm and 600mm pipes.

2. Apply a chamber adjustment — That 2025 V&C cost is then multiplied by ~1.83× to get the final Chamber Unit Cost. This second factor accounts for the difference between V&C costs and full chamber costs, validating and calibrating using external neighbouring municipality tender data.

Air and Drain Chambers				
Description	Tender	Cost	$2025 Cost	2025 Cost AVG
1500mm MH drain chamber for 600mm CPP (STD. 1-3-28)	2023-088T	$ 112,467.00	$ 116,879.27	$ 142,717.21
1500mm MH drain chamber for 600mm CPP (STD. 1-3-28)	2022-292T	$ 149,862.00	$ 168,555.15	$ 142,717.21

Shaft Costs

	Launch Shaft			Receiving Shaft		
Diameter (mm	Diameter (mm	Depth (m)	Cost ($)	Diameter (mm)	Depth (m)	Cost ($)
600	7	8	$ 1,275,188	5	8	$ 910,849
600	7	9	$ 1,434,587	5	9	$ 1,024,705
600	7	10	$ 1,593,985	5	10	$ 1,138,561
600	7	11	$ 1,753,384	5	11	$ 1,252,417
600	7	12	$ 1,912,783	5	12	$ 1,366,273
600	7	13	$ 2,072,181	5	13	$ 1,480,129
600	7	14	$ 2,231,580	5	14	$ 1,593,985
600	7	15	$ 2,390,978	5	15	$ 1,707,842
600	7	16	$ 2,550,377	5	16	$ 1,821,698
600	7	17	$ 2,709,775	5	17	$ 1,935,554
600	7	18	$ 2,869,174	5	18	$ 2,049,410
600	7	19	$ 3,028,572	5	19	$ 2,163,266
600	7	20	$ 3,187,971	5	20	$ 2,277,122

Wastewater - Normal installation (depth up to 5 metres)

Diameter	Excavation	Bedding & Backfill	Pipe Supply & Install	Structures	Connections & Testing	Restoration	Total Unit Cost	Total Unit Cost Minus Structures	Total Unit Cost Minus Structures and Bedding / Backfill
(mm)	($/m)	($/m)	($/m)	($/m)	($/m)	($/m)	($2025/m)	($2025/m)	($2025/m)
300	$ 668	$ 198	$ 205	$ 166	$ 500	$ 453	**$ 2,189**	**$ 2,023**	**$ 1,825**
375	$ 722	$ 218	$ 236	$ 166	$ 500	$ 462	**$ 2,304**	**$ 2,138**	**$ 1,921**
450	$ 779	$ 238	$ 285	$ 166	$ 500	$ 471	**$ 2,439**	**$ 2,273**	**$ 2,035**
525	$ 837	$ 259	$ 330	$ 166	$ 500	$ 480	**$ 2,571**	**$ 2,406**	**$ 2,147**
600	$ 846	$ 269	$ 413	$ 166	$ 500	$ 490	**$ 2,683**	**$ 2,518**	**$ 2,248**
675	$ 958	$ 302	$ 617	$ 221	$ 500	$ 499	**$ 3,097**	**$ 2,876**	**$ 2,574**
750	$ 1,020	$ 325	$ 820	$ 221	$ 500	$ 508	**$ 3,394**	**$ 3,173**	**$ 2,848**
825	$ 1,084	$ 348	$ 1,060	$ 221	$ 500	$ 517	**$ 3,730**	**$ 3,509**	**$ 3,162**
900	$ 1,266	$ 396	$ 1,142	$ 270	$ 500	$ 526	**$ 4,101**	**$ 3,831**	**$ 3,434**
975	$ 1,305	$ 464	$ 1,310	$ 270	$ 500	$ 536	**$ 4,385**	**$ 4,115**	**$ 3,651**
1050	$ 1,379	$ 493	$ 1,505	$ 270	$ 500	$ 545	**$ 4,693**	**$ 4,422**	**$ 3,929**
1200	$ 1,516	$ 553	$ 1,886	$ 476	$ 500	$ 563	**$ 5,493**	**$ 5,017**	**$ 4,465**
1350	$ 1,678	$ 619	$ 2,422	$ 476	$ 500	$ 582	**$ 6,277**	**$ 5,801**	**$ 5,182**
1500	$ 1,815	$ 681	$ 2,960	$ 476	$ 500	$ 600	**$ 7,032**	**$ 6,556**	**$ 5,875**
1800	$ 2,174	$ 828	$ 4,289	$ 769	$ 500	$ 637	**$ 9,197**	**$ 8,428**	**$ 7,599**
2100	$ 2,517	$ 974	$ 5,700	$ 1,195	$ 500	$ 674	**$ 11,560**	**$ 10,365**	**$ 9,391**
2400	$ 2,901	$ 1,124	$ 7,590	$ 1,195	$ 500	$ 711	**$ 14,021**	**$ 12,826**	**$ 11,701**
3000	$ 3,701	$ 1,442	$ 11,642	$ 1,405	$ 500	$ 784	**$ 19,474**	**$ 18,069**	**$ 16,627**

Wastewater - Deep installation (depth from 5 to 7 metres)

Diameter	Excavation	Bedding & Backfill	Pipe Supply & Install	Structures	Connections & Testing	Restoration	Total Unit Cost	Total Unit Cost Minus Structures	Total Unit Cost Minus Structures and Bedding / Backfill
(mm)	($/m)	($/m)	($/m)	($/m)	($/m)	($/m)	($2025/m)	($2025/m)	($2025/m)
300	$ 1,827	$ 430	$ 205	$ 207	$ 500	$ 611	**$ 3,781**	**$ 3,573**	**$ 3,143**
375	$ 1,917	$ 463	$ 236	$ 207	$ 500	$ 624	**$ 3,848**	**$ 3,740**	**$ 3,277**
450	$ 2,010	$ 497	$ 285	$ 207	$ 500	$ 636	**$ 4,136**	**$ 3,928**	**$ 3,431**
525	$ 2,103	$ 532	$ 330	$ 207	$ 500	$ 648	**$ 4,320**	**$ 4,113**	**$ 3,581**
600	$ 2,119	$ 551	$ 413	$ 207	$ 500	$ 661	**$ 4,452**	**$ 4,244**	**$ 3,693**
675	$ 2,296	$ 603	$ 617	$ 266	$ 500	$ 673	**$ 4,956**	**$ 4,690**	**$ 4,087**
750	$ 2,394	$ 640	$ 820	$ 266	$ 500	$ 686	**$ 5,305**	**$ 5,040**	**$ 4,400**
825	$ 2,493	$ 677	$ 1,060	$ 266	$ 500	$ 698	**$ 5,695**	**$ 5,429**	**$ 4,752**
900	$ 2,763	$ 749	$ 1,142	$ 315	$ 500	$ 711	**$ 6,180**	**$ 5,865**	**$ 5,116**
975	$ 2,825	$ 879	$ 1,310	$ 315	$ 500	$ 723	**$ 6,552**	**$ 6,237**	**$ 5,359**
1050	$ 2,937	$ 928	$ 1,505	$ 315	$ 500	$ 735	**$ 6,920**	**$ 6,605**	**$ 5,678**
1200	$ 3,141	$ 1,027	$ 1,886	$ 521	$ 500	$ 760	**$ 7,835**	**$ 7,314**	**$ 6,287**
1350	$ 3,381	$ 1,136	$ 2,422	$ 521	$ 500	$ 785	**$ 8,745**	**$ 8,224**	**$ 7,088**
1500	$ 3,583	$ 1,241	$ 2,960	$ 521	$ 500	$ 810	**$ 9,614**	**$ 9,093**	**$ 7,853**
1800	$ 4,096	$ 1,481	$ 4,289	$ 814	$ 500	$ 860	**$ 12,039**	**$ 11,225**	**$ 9,744**
2100	$ 4,577	$ 1,718	$ 5,700	$ 1,500	$ 500	$ 910	**$ 14,905**	**$ 13,405**	**$ 11,687**
2400	$ 5,105	$ 1,957	$ 7,590	$ 1,500	$ 500	$ 959	**$ 17,611**	**$ 16,111**	**$ 14,154**
3000	$ 6,178	$ 2,461	$ 11,642	$ 1,753	$ 500	$ 1,059	**$ 23,593**	**$ 21,840**	**$ 19,379**

Wastewater (Gravity Sewer) - Tunneled installation

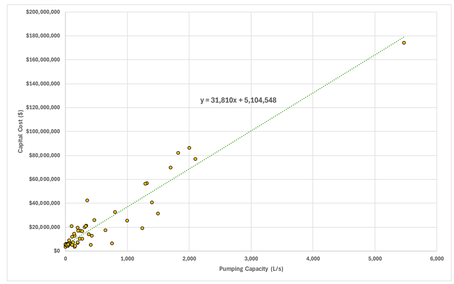
Diameter	Unit Cost	Major Creek / Road	Minor Road / Utilities Corridor	Minor Creek
		Length = 150m	Length = 60m	Length = 20m
(mm)	($2025/m)	($2025/m)	($2025/m)	($2025/m)
300	$ 10,967	$ 1,645,067	$ 658,027	$ 219,342
375	$ 11,310	$ 1,696,553	$ 678,621	$ 226,207
450	$ 11,628	$ 1,744,247	$ 697,699	$ 232,566
525	$ 11,923	$ 1,788,500	$ 715,400	$ 238,467
600	$ 12,198	$ 1,829,658	$ 731,863	$ 243,954
675	$ 12,454	$ 1,868,072	$ 747,229	$ 249,076
750	$ 12,694	$ 1,904,091	$ 761,637	$ 253,879
825	$ 12,920	$ 1,938,064	$ 775,226	$ 258,409
900	$ 13,136	$ 1,970,340	$ 788,136	$ 262,712
975	$ 13,342	$ 2,001,267	$ 800,507	$ 266,836
1050	$ 13,541	$ 2,031,196	$ 812,478	$ 270,826
1200	$ 13,930	$ 2,089,453	$ 835,781	$ 278,594
1350	$ 14,319	$ 2,147,903	$ 859,161	$ 286,387
1500	$ 14,729	$ 2,209,339	$ 883,735	$ 294,578
1800	$ 16,479	$ 2,471,888	$ 988,755	$ 329,585
2100	$ 18,533	$ 2,779,892	$ 1,111,957	$ 370,652
2400	$ 20,241	$ 3,036,145	$ 1,214,458	$ 404,819
3000	$ 26,406	$ 3,960,957	$ 1,584,383	$ 528,128

Wastewater (Gravity Sewer) - Tunneled installation

Diameter	Tunnelling	Shafts	Total Unit Cost
(mm)	($/m)	($/m)	($2025/m)
300	$ 5,388	$ 5,579	$ 10,967
375	$ 5,731	$ 5,579	$ 11,310
450	$ 6,049	$ 5,579	$ 11,628
525	$ 6,344	$ 5,579	$ 11,923
600	$ 6,619	$ 5,579	$ 12,198
675	$ 6,875	$ 5,579	$ 12,454
750	$ 7,115	$ 5,579	$ 12,694
825	$ 7,341	$ 5,579	$ 12,920
900	$ 7,557	$ 5,579	$ 13,136
975	$ 7,763	$ 5,579	$ 13,342
1050	$ 7,962	$ 5,579	$ 13,541
1200	$ 8,351	$ 5,579	$ 13,930
1350	$ 8,740	$ 5,579	$ 14,319
1500	$ 9,150	$ 5,579	$ 14,729
1800	$ 10,103	$ 6,376	$ 16,479
2100	$ 11,360	$ 7,173	$ 18,533
2400	$ 13,068	$ 7,173	$ 20,241
3000	$ 18,436	$ 7,970	$ 26,406

	2020 MP	2025 MP					
Pipe Diameter	Manhole Cost Per Meter		Manhole Cost		Spacing (m)	Spacing as %	Man Cost Per m	
(mm)	Up to 5m Depth	10m Depth	Up to 5m Depth	5 to 7m Depth			Up to 5m Depth	5 to 7 m Depth
300	$ 110	$ 200	$ 25,212	$ 31,520	190	152	$ 166	$ 207
375	$ 110	$ 200	$ 25,212	$ 31,520	190	152	$ 166	$ 207
450	$ 110	$ 200	$ 25,212	$ 31,520	190	152	$ 166	$ 207
525	$ 110	$ 200	$ 25,212	$ 31,520	190	152	$ 166	$ 207
600	$ 250	$ 350	$ 25,212	$ 31,520	190	152	$ 166	$ 207
675	$ 250	$ 350	$ 33,604	$ 40,377	190	152	$ 221	$ 266
750	$ 250	$ 350	$ 33,604	$ 40,377	190	152	$ 221	$ 266
825	$ 250	$ 350	$ 33,604	$ 40,377	190	152	$ 221	$ 266
900	$ 400	$ 600	$ 41,074	$ 47,847	190	152	$ 270	$ 315
975	$ 400	$ 600	$ 41,074	$ 47,847	190	152	$ 270	$ 315
1050	$ 400	$ 600	$ 41,074	$ 47,847	190	152	$ 270	$ 315
1200	$ 400	$ 600	$ 72,356	$ 79,131	190	152	$ 476	$ 521
1350	$ 333	$ 567	$ 72,356	$ 79,131	190	152	$ 476	$ 521
1500	$ 333	$ 567	$ 72,356	$ 79,131	190	152	$ 476	$ 521
1800	$ 333	$ 567	$ 116,935	$ 123,710	190	152	$ 769	$ 814
2100	$ 400	$ 733	$ 181,663	$ 227,978	190	152	$ 1,195	$ 1,500
2400	$ 400	$ 733	$ 181,663	$ 227,978	190	152	$ 1,195	$ 1,500
3000	$ 400	$ 733	$ 213,520	$ 266,443	190	152	$ 1,405	$ 1,753

HX Location	Site	Service type	Facility type	Facility Type	Facility Name	Capacity used in model	Units	Replacement Cost (Construction	Total Replacement Cost (Indexed to 2019	Total Replacement Cost (Indexed)	2019 PSAB Cost for recently constructed facilities	$ per L/s	
SEWAGE PUMPING STATION - EXTERNAL (YORK REGION)													
776		Wastewater		SEWAGE PUMPING STATION	Keswick Pumping Station	471	L/s	$ 10,865,355.15	$17,753,990	$26,067,496		$55,345	New SPS
859		Wastewater		SEWAGE PUMPING STATION	Sutton Woodriver Bend Pumping Station	46	L/s	$ 2,479,814.03	$4,052,016	$5,949,418		$129,335	Expanded SPS
901		Wastewater		SEWAGE PUMPING STATION	Sutton South River Road Pumping Station	5.4	L/s	$ 1,400,205.04	$2,440,557	$3,583,376		$663,588	New Pumps
1152		Wastewater		SEWAGE PUMPING STATION	Sutton High Street Pumping Station	151.4	L/s	$ 5,381,337.33	$8,793,105	$12,910,576		$85,275	New RTC
1180		Wastewater		SEWAGE PUMPING STATION	Vaughan Black Creek Pumping Station	1320	L/s	$ 23,952,154.71	$38,601,293	$56,676,783		$42,927	Remove & replace ex. SPS
1466		Wastewater		SEWAGE PUMPING STATION	Vaughan Humber Pumping Station	1700	L/s	$ 29,578,873.12	$47,669,312	$69,991,004		$41,171	New storage
1484		Wastewater		SEWAGE PUMPING STATION	Newmarket Bogart Creek Pumping Stations	312	L/s	$ 8,355,696.17	$13,653,159	$20,046,404		$64,251	
1489		Wastewater		SEWAGE PUMPING STATION	Newmarket Pumping Station	1200	L/s	$ 23,763,484.80	$38,297,232	$56,230,343		$43,569	
1491		Wastewater		SEWAGE PUMPING STATION	Aurora Sewage Pumping Station	1820	L/s	$ 34,705,221.96	$55,930,936	$82,121,227		$45,122	
2571		Wastewater		SEWAGE PUMPING STATION	Markham Leslie Pumping Station	5472	L/s	$ 74,463,543.87	$118,776,799	$174,395,373		$31,870	
5237		Wastewater		SEWAGE PUMPING STATION	Schomberg Dr. Kay Pumping Station	58.6	L/s	$ 2,736,686.15	$4,471,745	$6,565,690		$112,042	
1155		Wastewater		SEWAGE PUMPING STATION	Mount Albert Pumping Station	69	L/s	$ 3,169,776.40	$5,179,415	$7,604,734		$110,214	
19277		Wastewater		SEWAGE PUMPING STATION	Keswick Joe Dales Pumping Station	334	L/s	$ 8,839,917.29	$14,444,425	$21,208,190	$4,781,397	$63,498	
25373		Wastewater		SEWAGE PUMPING STATION	King City Sanitary Servicing Regional Pumping Station	240	L/s	$ 7,206,280.52	$11,775,062	$17,288,868		$72,037	
25385		Wastewater		SEWAGE PUMPING STATION	Vaughan Pine Valley Pumping Station	328	L/s	$ 8,625,358.04	$14,093,635	$20,693,432		$63,090	
25506		Wastewater		SEWAGE PUMPING STATION	Georgina Pumping Station No.4	210	L/s	$ 7,063,575.87	$11,541,883	$16,946,500		$80,698	
29224		Wastewater		SEWAGE PUMPING STATION	Nobleton Pumping Station	106	L/s	$ 4,978,399.83	$8,134,705	$11,943,873		$112,678	
30415		Wastewater		SEWAGE PUMPING STATION	Newmarket Greenlane Pumping Station	272	L/s	$ 6,888,410.02	$11,255,662	$16,526,253		$60,758	
4007001421		Wastewater		SEWAGE PUMPING STATION	Holland Landing Pumping Station	195	L/s	$ 8,203,903.73	$13,221,411	$19,412,486	$15,451,955	$99,551	
4007001431		Wastewater		SEWAGE PUMPING STATION	East Gwillimbury 2nd Concession Pumping Station	354	L/s	$ 17,857,156.80	$28,778,594	$42,254,495	$22,629,604	$119,363	
4007001441		Wastewater		SEWAGE PUMPING STATION	Queensville West Pumping Station	99	L/s	$ 8,827,330.69	$14,226,126	$20,887,670	$11,224,505	$210,987	
SEWAGE PUMPING STATION - EXTERNAL (HAMILTON)													
					Woodward SPS	20,000	L/s	$ 90,000,000		$117,641,278		$5,882	
					Twenty Road SPS	410	L/s	$ 3,600,000		$5,157,630		$12,580	
SEWAGE PUMPING STATION - EXTERNAL (NIAGARA)													
					Beaversdam SPS	40	L/s	$ 4,400,000		$4,572,619		$114,315	
SEWAGE PUMPING STATION - EXTERNAL (HALTON REGION)													
					Dundas East SPS	428	L/s	$ 9,688,000		$12,663,430		$29,587	
					Sixteen Mile Creek SPS	651	L/s	$ 9,963,339		$17,435,843		$26,783	
					Britannia SPS	1,000	L/s	$ 17,362,000		$25,491,952		$25,492	
					Halton Hills #3	151	L/s	$ 1,925,386		$3,369,426		$22,314	
					Drumquin SPS	1,240	L/s	$ 19,290,200.00		$19,290,200		$15,564	
SEWAGE PUMPING STATION - PEEL REGION													
					Facility Name	**Capacity used in model**	**Units**	**Greenfield Cost (2015$)**		**Total Replacement Cost (Indexed)**		**$ per L/s**	
					Albion-Vaughan WWPS	15	L/s	$ 3,601,306		$6,103,195		$406,879.67	
					Beach Street WWPS	756	L/s	$ 3,786,847		$6,417,635		$8,488.94	
					Ben Machree WWPS	28	L/s	$ 3,167,382		$5,367,783		$191,706.54	
					Bolton WWPS	380	L/s	$ 8,328,620		$14,114,656		$37,143.83	
					Bolton North Hill WWPS	22.4	L/s	$ 3,298,673		$5,590,318		$249,567.78	
					Caledon East	124	L/s	$ 4,271,163		$7,238,414		$58,374.30	
					Castlemore WWPS	20.6	L/s	$ 3,399,541		$5,761,262		$279,672.89	
					Clarkson WWPS	37.5	L/s	$ 3,484,294		$5,904,894		$157,463.83	
					Elmwood WWPS	195	L/s	$ 4,073,442		$6,903,332		$35,401.70	
					Fifeshire WWPS	9.6	L/s	$ 3,082,776		$5,224,433		$544,211.76	
					Front Street WWPS	276	L/s	$ 5,963,346		$10,106,186		$36,616.62	
					Gore Road WWPS	81	L/s	$ 3,500,427		$5,932,235		$73,237.47	
					Harvesview WWPS	31	L/s	$ 3,221,987		$5,460,357		$176,140.55	
					Hiawatha WWPS	39.6	L/s	$ 3,443,926		$5,836,480		$147,385.87	
					Indian Road WWPS	70	L/s	$ 3,663,856		$6,209,201		$88,702.87	
					Intermodal WWPS	160	L/s	$ 2,530,796		$4,288,915		$26,805.72	
					Jack Darling Park 1 WWPS (Large)	800	L/s	$ 19,400,808		$32,878,885		$41,098.61	
					Jack Darling Park 2 WWPS (Small)	107	L/s	$ 3,186,349		$5,399,960		$50,466.92	
					Lakelands WWPS	64	L/s	$ 5,265,457		$8,923,462		$139,429.09	
					Mayfield WWPS	15	L/s	$ 3,254,271		$5,515,070		$367,671.31	
					McVean WWPS	1400	L/s	$ 24,070,020		$40,791,879		$29,137.06	
					Mullett Creek WWPS	232	L/s	$ 6,123,358		$10,377,361		$44,730.01	
					O'Neil Court WWPS	3.9	L/s	$ 3,298,673		$5,590,318		$1,433,414.91	
					Pinetree WWPS	26.5	L/s	$ 2,693,374		$4,564,508		$172,245.59	
					Richard's Memorial WWPS	195	L/s	$ 4,275,196		$7,245,249		$37,155.12	
					Rosemere WWPS	24.2	L/s	$ 3,341,032		$5,662,104		$233,971.25	
					Shardawn Mews WWPS	3	L/s	$ 3,056,550		$5,179,988		$1,726,662.74	
					Silverbirch Trail SPS	48	L/s	$ 3,466,135		$5,874,120		$122,377.49	
					Stonehaven WWPS	5.5	L/s	$ 3,224,012		$5,463,790		$993,416.29	
					Watersedge WWPS	18.2	L/s	$ 3,147,344		$5,333,858		$293,069.13	
					Finch Avenue WWPS	41	L/s	$ 3,409,634		$5,778,365		$140,935.73	
					Beechwood SPS	1500	L/s	$ 18,600,000		$31,521,741		$21,014.49	

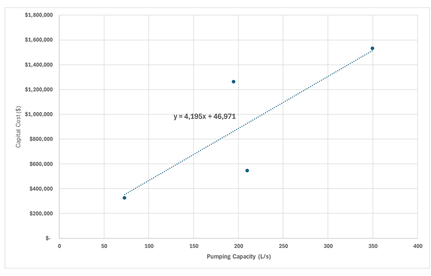


PROPOSED SPS Estimate

m	31810
b	5104548
x	325 L/s
y	$ 15,442,798.00

		Master Plan ID	Project No.	Project Name	Project Description	Year in Service (Revised)	Project Type	Size/Capacity	Class Estimate Type	Project Complexity	Area Condition	Total Estimate Cost 2019$	OPC Estimate		Total Estimate Cost 2022$	Lump Sum ($)	Total Estimate Cost ($2024)	$ per L/s	
				McLaughlin Road Sewage Pumping Station	Construction of Type III Station with a rated capacity of 140 L/s on McLaughlin Road servicing Mayfield West. Price from 30% design submission.	2031	SPS	140	Class 3								$ 14,500,000.00	$ 103,571.43	
				Jack Darling SPS - Phase 1	Phase 1: Firm capacity of 200 L/s, Wet Well Volume of 19,000 m3. Building built to ultimate (Phase 3) which consists of firm capacity of 2,000 L/s, same wet well volume. **$72M + $1.5M + Phase 3 ($10M ~assumed) for 2,000 L/s facility**	-	SPS	2000	Class 3 (2023)				$ 82,958,258				$ 86,212,846.99	$ 43,106.42	
				McVean SPS	As the bypass needed for upgrades to McVean SPS was cost-prohibitive, a new SPS was designed on-site. **Costed as construction of a new SPS.** New SPS includes oil/grease capture, firm capacity of 2,100 L/s, 12 ML concrete emergency chambers providing 90 min of emergency storage, above-grade structure w/ odour control, electrical room, office, washroom, and proposed 1200mm FM from new SPS to trunk sewer on Goreway Drive.	-	SPS	2100	(2023)	-	-		$ 74,205,600				$ 77,116,807.81	$ 36,722	
				Fifeshire SPS	Remove and replace ex. SPS with new SPS w/ firm capacity of 8 L/s, wet well storage of 7.5 m^3, emergency storage of 45.92 m^3 constructed, 11.7 m^3 existing inc. wet well volume. (16 min storage time in wet well, 1.6 hrs of emergency storage constructed, 2 hrs total available inc. wet well)	2022	SPS	8	Payment Certificate	-	-		$ 910,800.00	42%	$ 1,801,634.04	$ 4,295,200	$ 2,026,362.18	$ 253,295.27	
				Stonehaven SPS	Removal & replace ex. SPS with new SPS w/ firm capacity of 14 L/s, wet well storage of 11.6 m^3, emergency storage of 82.11 m^3 constructed, 18.71 m^3 existing inc. wet well volume. (16 min storage time in wet well, 1.6 hrs of emergency storage constructed, 2 hrs total available inc. wet well)	2022	SPS	14	Payment Certificate	-	-		$ 1,260,600.00	58%	$ 2,493,565.96		$ 2,804,602.73	$ 200,328.77	
				O'Neil SPS	Removal & replace ex. SPS with new SPS w/ firm capacity of 9 L/s, wet well storage of 9.1 m3, emergency storage of 50.8 m3 constructed, 14 m3 existing inc. wet well volume. (16 min storage time in wet well, 1.6 hrs of emergency storage constructed, 2 hrs total available inc. wet well)	2022	SPS	9	Payment Certificate	-	-		$ 556,600		$ 1,233,562	$ 3,700,687	$ 1,387,431.63	$ 154,159.07	
				Shardawn SPS	Removal & replace ex. SPS with new SPS w/ firm capacity of 8 L/s, wet well storage of 8.6 m3, emergency storage of 46 m3 constructed, 11.6 m3 existing inc. wet well volume. (16 min storage time in wet well, 1.6 hrs of emergency storage constructed, 2 hrs total available inc. wet well)	2022	SPS	8	Payment Certificate	-	-		$ 550,000		$ 1,233,562		$ 1,387,431.63	$ 173,428.95	
				Silver Birch SPS	Remove & replace with new SPS. New firm capacity = 48 L/s. Wet well volume = emergency storage volume = 345.6 m^3.	-	SPS	48		-	-				$ 7,773,649		$ 8,743,300.78	$ 182,152.10	
				Britannia LPS	No description available; Peel advised to split O'Neil, Shardawn, & Britannia costs evenly	2022	LPS		Payment Certificate	-	-				$ 1,233,562		$ 1,387,431.63		

		Master Plan ID	Project No.	Project Name	Project Description	Year in Service (Revised)	Project Type	Size/Capacity	Class Estimate Type	Project Complexity	Area Condition	Total Estimate Cost 2020	OPC Estimate		Total Estimate Cost 2022$	Lump Sum ($)	Total Estimate Cost ($2024)	$ per L/s	
PUMPS - PEEL REGION																			
				Jack Darling SPS - Phase 2	Phase 2: Firm capacity of 550 L/s, Wet Well Volume of 19,000 m3. Building built to ultimate (Phase 3) which consists of firm capacity of 2,000 L/s, same wet well volume. **$1.5M cost should just be applied to upgrading pumps.**	-	SPS	350	Class 3 (2023)				$ 1,471,927				$ 1,529,673	$ 4,370	
				McVean SPS pump replacement	Existing station has 3 pumps (2 duty/1 standby), each rated @ 700 L/s. One new pump (available pump slot) with same capacity as ex. pumps & refurbish ex. pump to be a spare. 53.75% of total	-	SPS	700	(2022)	-	-				$ 899,620.74		$ 1,011,835.59	$ 1,445.48	
				Indian Road SPS pump replacement	Existing station has 2 pumps (1 duty/1 standby), each rated @ 73 L/s. Replace one pump with same capacity + 1 refurb ex. pump to be spare. 17.25% of	-	SPS	73	(2022)	-	-				$ 288,715.49	$ 1,673,713	$ 324,728.63	$ 4,448.34	
				Front Street SPS pump replacement	Existing station has 4 pumps (3 duty/1 standby), each rated @ 105 L/s. Replace 2 pumps with same capacity, refurb 1 pump, dispose of other pump. 29.00% of total cost.	-	SPS	210	(2022)	-	-				$ 485,376.77		$ 545,920.60	$ 2,599.62	
				Lakelands SPS	Remove ex. pumps & install 3 (2 duty, 1 standby) each w/ a rated capacity of 36 L/s for a firm capacity of 72 L/s. Construct new flow meter chamber to house 2 flowmeters, 2 pressure transmitters, new sump pump, & bypass pumping connection to ex. PHs	-	SPS	72	(2020)				$ 2,428,000				$ 3,478,535.01	$ 48,312.99	
				Elmwood SPS	Pumps only retrofit. Included yard piping upgrades, a single pump replacement & pump rider process piping, short-term bypass operations, targeted valve replacements. No changes to building, wet well, electrical, instrumentation or controls.	-	SPS	195	2020			$ 880,000					$ 1,260,754.04	$ 6,465.41	



PROPOSED SPS Estimate

m	4195
b	46971
x	325 L/s
y	$ 1,410,346.00

	Master Plan ID	Project No.	Project Name	Project Description	Year in Service (Revised)	Project Type	Size/Capacity	Class Estimate Type	Project Complexity	Area Condition		OPC Estimate		Total Estimate Cost 2022$	Lump Sum ($)	Total Estimate Cost ($2024)	$ per L/s ($2024)
STORAGE - PEEL REGION																	
				Lakelands SPS	500 m^3 of off-site emergency storage			500	(2020)	-	-		$ 3,606,000				$ 5,166,226.21	$ 10,332.45

RTC Facility Estimate (Stantec, 2022)			
Control Facility	# of sites	Total Capital Cost ($2021)	Total Capital Cost ($2024)
East-West Diversion (EWD)	5	$ 5,073,000	$ 6,261,800
West-East Diversion (WED)	1	$ 871,000	$ 1,075,109
Upper West Trunk Sewer System & West Mississauga Trunk Sewer Diversions (WMTSD)	5	$ 4,237,000	$ 5,229,893
Lakeshore West LWT-W19.0	2	$ 58,000	$ 71,592
Queensway East Trunk	9	$ 2,521,000	$ 3,111,768
Central Mississauga Capacity Improvements (CMCI)		$ 5,388,000	$ 6,650,617
East Trunk Offline Storage (ETOS)	2	$ 957,000	$ 1,181,262
Etobicoke Creek Trunk Sewers (ECTS)	1	$ 793,000	$ 978,831
Haig and Dixie	1	$ 859,000	$ 1,060,297
Lower West Trunk Sewer Twinning	1	$ 859,000	$ 1,060,297
Capital Cost Sub-total	**27**	**$ 21,616,000**	$ 26,681,466
	%		
Property Acquisition	5%	$ 1,080,800	$ 1,334,073
Utilities	5%	$ 1,080,800	$ 1,334,073
Engineering	20%	$ 4,323,200	$ 5,336,293
Region Internal Costs	6%	$ 1,296,960	$ 1,600,888
Miscellaneous	5%	$ 1,080,800	$ 1,334,073
Overhead Markup	10%	$ 2,161,600	$ 2,668,147
Profit markup	10%	$ 2,161,600	$ 2,668,147
Mob/Demob	5%	$ 1,080,800	$ 1,334,073
Bond & Insurance	3%	$ 648,480	$ 800,444
Capital, Engineering, & Other Costs Sub-total		**$ 36,531,040**	$ 45,091,678
Contingency	40%	**$ 14,612,416**	$ 18,036,671
Total OPC with Contingency		**$ 51,143,456**	$ 63,128,349
Decision Support System (DSS) OPC			
Decision Support System (DSS)		$ 1,200,000	$ 1,481,206
Telemetry Sub-System Programming		$ 1,200,000	$ 1,481,206
Capital Cost Sub-total		**$ 2,400,000**	$ 2,962,413
	%		
Engineering	20%	$ 480,000	$ 592,483
Region Internal Costs	6%	$ 144,000	$ 177,745
Miscellaneous	5%	$ 120,000	$ 148,121
Ancillart Costs Sub-total		**$ 744,000**	$ 918,348
Contingency	40%	**$ 1,257,600**	$ 1,552,304
DSS Subscription Costs		**$ 2,620,000**	$ 3,233,968
Total Cost - DSS		**$ 7,021,600**	$ 8,667,033
Total Cost		**$ 58,165,056**	**$ 71,795,382**
Approx. Cost per RTC Facility		**$ 2,154,261**	**$ 2,659,088**

Standard Tunneling Rate — Double Pass / Single Pass

Gravity pipe

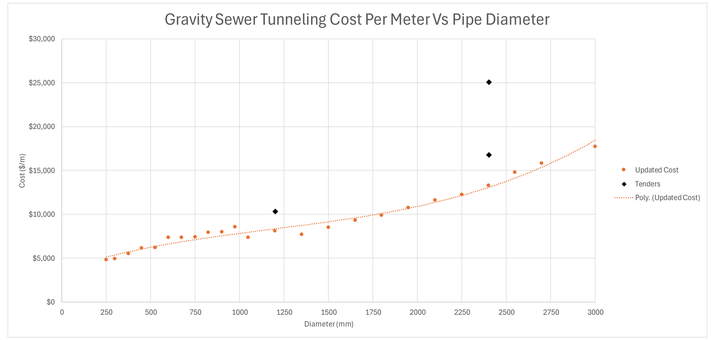
SAN or STM Pipe Diameter (mm)	Casing Pipe Diameter for Double Pass Installation (mm)	Jack and Bore ($/m)	Microtunnel ($/m)	Pipe Jacking ($/m)	TBM ($/m)	Blended Rate ($/m)	Blended Cost Curve ($/m)
250	600	$1,898	$7,748			$4,823	$5,144
300	600	$1,968	$7,818			$4,893	$5,388
375	700	$3,078	$7,923			$5,501	$5,731
450	800	$4,188	$8,028			$6,108	$6,049
525	900	$4,293	$8,133			$6,213	$6,344
600	1200	$6,408	$8,238			$7,323	$6,619
675	1300	$7,518	$7,155			$7,337	$6,875
750	1300	$7,623	$7,155			$7,389	$7,115
825	1400	$8,733	$7,155			$7,944	$7,341
900	1500	$8,838	$7,155			$7,997	$7,557
975	1600	$9,948	$7,155			$8,552	$7,763
1050	1600	$10,053	$7,155	$4,215	$8,000	$7,356	$7,962
1200	1800	$11,268	$7,155	$5,210	$8,667	$8,075	$8,351
1350	2000		$7,755	$6,304	$9,000	$7,687	$8,740
1500	2100		$8,355	$7,402	$9,667	$8,475	$9,150
1650	2300		$8,955	$8,528	$10,333	$9,272	$9,598
1800	2500		$9,555	$9,754	$10,333	$9,881	$10,103
1950	2700		$10,275	$10,943	$11,000	$10,740	$10,684
2100	2800		$11,355	$12,161	$11,333	$11,617	$11,360
2250	3000		$11,355	$13,414	$12,000	$12,257	$12,148
2400	3200		$12,355	$14,870	$12,667	$13,297	$13,068
2550	3400			$16,236	$13,333	$14,785	$14,138
2700	3600			$17,591	$14,000	$15,795	$15,377
3000	3900			$20,462	$15,000	$17,731	$18,436

Gravity Pipe Tunneling Cost Curve ($/m)

Cost ($/m) = A*(Dia. mm)^3 + B*(Dia. mm)^2 + C*(Dia. mm) + D	
A=	9.194E-07
B=	-0.003281216
C=	6.475908437
D=	3715.87458

Tenders

Diameter (mm)	Tender No.	Length (m)	Unit Rate ($/m)	Type	Cost ($)
1200	2022-292T	269	$ 10,359	MT	$ 2,786,522
2400	2020-029T	6288	$ 16,814	MT	$ 105,725,642
2400	2022-004T	5040	$ 25,070	MT	$ 126,354,611



Standard Tunneling Rate — Single Pass / Double Pass

Pressure pipe

WM Pipe Diameter (mm)	casing pipe diameter for double pass installation (mm)	Jack and Bore ($/m)	Microtunnel ($/m)	Pipe Jacking ($/m)	HDD ($/m)	TBM ($/m)	Blended Rate ($/m)	Blended Cost Curve ($/m)
150	500	$1,088	$7,608		$715		$3,137	$ 3,120
300	600	$1,968	$7,818		$1,240		$3,675	$ 3,630
400	700	$2,640	$7,820		$1,590		$4,017	$ 4,171
600	1100	$6,440	$8,940		$2,290		$5,890	$ 5,737
750	1300	$8,620	$10,380		$2,815		$7,272	$ 7,334
900	1400	$10,130	$11,820				$10,975	$ 11,174
1050	1600	$12,310	$13,260				$12,785	$ 11,737
1200	1800	$14,490	$14,700	$5,210			$11,467	$ 12,157
1350	2000		$16,260	$6,304			$11,282	$ 12,456
1500	2100		$18,180	$7,402			$12,791	$ 12,660
1650	2300		$19,020	$8,528			$13,774	$ 12,791
1800	2500		$20,860	$9,754		$10,333	$13,649	$ 12,876
2100	2800			$12,161		$11,333	$11,747	$ 12,999
2400	3100			$14,870		$12,333	$13,601	$ 13,223

Pressure Pipe Tunneling Cost Curve ($/m)

Diameter <=750mm

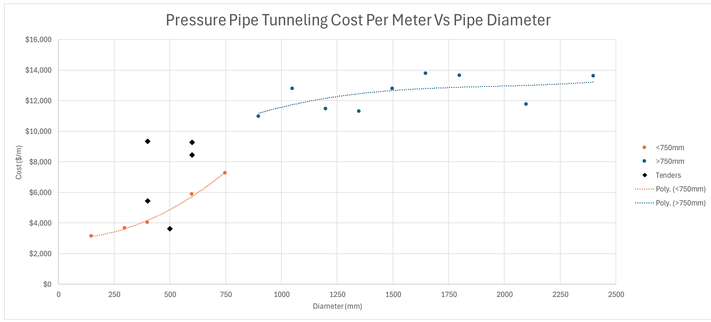
Cost ($/m) = A*(Dia. mm)^2 + B*(Dia. mm) + C	
A=	0.008061996
B=	-0.232271762
C=	2973.615924

Diameter >750mm

Cost ($/m) = A*(Dia. mm)^3 + B*(Dia. mm)^2 + C*(Dia. mm) + D	
A=	1.1936E-06
B=	-0.00696291 3
C=	13.92319616
D=	3412.901435

Tenders

Diameter (mm)	Tender No.	Length (m)	Unit Rate ($/m)	Type	Cost ($)
400	2023-586T	381	$ 9,345.00	MT	$ 3,560,445
400	2023-011T	63	$ 5,452.00	MT	$ 343,476
500	2023-083T	280	$ 3,639.00	HDD	$ 1,018,920
600	2023-088T	810	$ 8,458.00	MT	$ 6,850,980
600	2022-292T	353	$ 9,280.00	MT	$ 3,275,840



Shaft Costs

Micro Tunneling $ 12,500 $ / m inside shaft dia. / m depth to tunnel liner invert

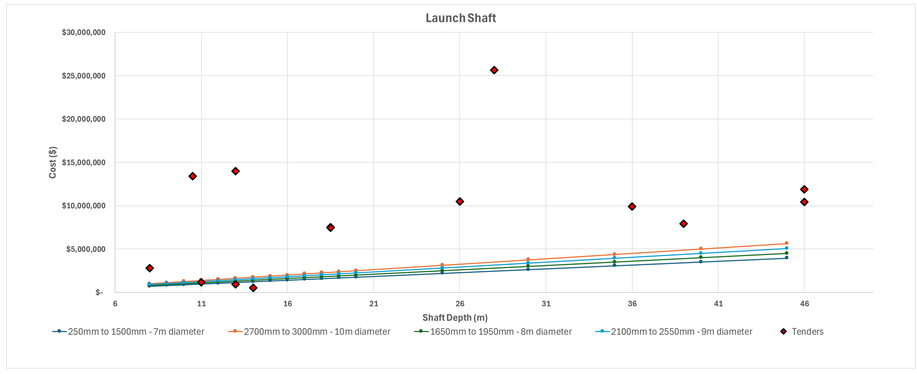
Pipe Diameter (mm)	Launch Shaft Diameter (mm)	Launch Shaft Depth (m)	Launch Shaft Cost ($)	Receiving Shaft Diameter (mm)	Receiving Shaft Depth (m)	Receiving Shaft Cost ($)
250	7	8	$ 700,000	5	8	$ 500,000
250	7	9	$ 787,500	5	9	$ 562,500
250	7	10	$ 875,000	5	10	$ 625,000
250	7	11	$ 962,500	5	11	$ 687,500
250	7	12	$ 1,050,000	5	12	$ 750,000
250	7	13	$ 1,137,500	5	13	$ 812,500
250	7	14	$ 1,225,000	5	14	$ 875,000
250	7	15	$ 1,312,500	5	15	$ 937,500
250	7	16	$ 1,400,000	5	16	$ 1,000,000
250	7	17	$ 1,487,500	5	17	$ 1,062,500
250	7	18	$ 1,575,000	5	18	$ 1,125,000
250	7	19	$ 1,662,500	5	19	$ 1,187,500
250	7	20	$ 1,750,000	5	20	$ 1,250,000
300	7	8	$ 700,000	5	8	$ 500,000
300	7	9	$ 787,500	5	9	$ 562,500
300	7	10	$ 875,000	5	10	$ 625,000
300	7	11	$ 962,500	5	11	$ 687,500
300	7	12	$ 1,050,000	5	12	$ 750,000
300	7	13	$ 1,137,500	5	13	$ 812,500
300	7	14	$ 1,225,000	5	14	$ 875,000
300	7	15	$ 1,312,500	5	15	$ 937,500
300	7	16	$ 1,400,000	5	16	$ 1,000,000
300	7	17	$ 1,487,500	5	17	$ 1,062,500
300	7	18	$ 1,575,000	5	18	$ 1,125,000
300	7	19	$ 1,662,500	5	19	$ 1,187,500
300	7	20	$ 1,750,000	5	20	$ 1,250,000
375	7	8	$ 700,000	5	8	$ 500,000
375	7	9	$ 787,500	5	9	$ 562,500
375	7	10	$ 875,000	5	10	$ 625,000
375	7	11	$ 962,500	5	11	$ 687,500
375	7	12	$ 1,050,000	5	12	$ 750,000
375	7	13	$ 1,137,500	5	13	$ 812,500
375	7	14	$ 1,225,000	5	14	$ 875,000
375	7	15	$ 1,312,500	5	15	$ 937,500
375	7	16	$ 1,400,000	5	16	$ 1,000,000
375	7	17	$ 1,487,500	5	17	$ 1,062,500
375	7	18	$ 1,575,000	5	18	$ 1,125,000
375	7	19	$ 1,662,500	5	19	$ 1,187,500
375	7	20	$ 1,750,000	5	20	$ 1,250,000
450	7	6	$ 525,000	5	8	$ 500,000
450	7	7	$ 612,500	5	9	$ 562,500
450	7	8	$ 700,000	5	10	$ 625,000
450	7	10	$ 875,000	5	11	$ 687,500
450	7	12	$ 1,050,000	5	12	$ 750,000
450	7	13	$ 1,137,500	5	13	$ 812,500
450	7	14	$ 1,225,000	5	14	$ 875,000
450	7	15	$ 1,312,500	5	15	$ 937,500
450	7	16	$ 1,400,000	5	16	$ 1,000,000
450	7	17	$ 1,487,500	5	17	$ 1,062,500
450	7	18	$ 1,575,000	5	18	$ 1,125,000
450	7	19	$ 1,662,500	5	19	$ 1,187,500
450	7	20	$ 1,750,000	5	20	$ 1,250,000
525	7	8	$ 700,000	5	8	$ 500,000
525	7	9	$ 787,500	5	9	$ 562,500
525	7	10	$ 875,000	5	10	$ 625,000
525	7	11	$ 962,500	5	11	$ 687,500
525	7	12	$ 1,050,000	5	12	$ 750,000
525	7	13	$ 1,137,500	5	13	$ 812,500
525	7	14	$ 1,225,000	5	14	$ 875,000
525	7	15	$ 1,312,500	5	15	$ 937,500
525	7	16	$ 1,400,000	5	16	$ 1,000,000
525	7	17	$ 1,487,500	5	17	$ 1,062,500
525	7	18	$ 1,575,000	5	18	$ 1,125,000
525	7	19	$ 1,662,500	5	19	$ 1,187,500
525	7	20	$ 1,750,000	5	20	$ 1,250,000
600	7	8	$ 700,000	5	8	$ 500,000
600	7	9	$ 787,500	5	9	$ 562,500
600	7	10	$ 875,000	5	10	$ 625,000
600	7	11	$ 962,500	5	11	$ 687,500
600	7	12	$ 1,050,000	5	12	$ 750,000
600	7	13	$ 1,137,500	5	13	$ 812,500
600	7	14	$ 1,225,000	5	14	$ 875,000
600	7	15	$ 1,312,500	5	15	$ 937,500
600	7	16	$ 1,400,000	5	16	$ 1,000,000
600	7	17	$ 1,487,500	5	17	$ 1,062,500
600	7	18	$ 1,575,000	5	18	$ 1,125,000
600	7	19	$ 1,662,500	5	19	$ 1,187,500
600	7	20	$ 1,750,000	5	20	$ 1,250,000
675	7	8	$ 700,000	5	8	$ 500,000
675	7	9	$ 787,500	5	9	$ 562,500
675	7	10	$ 875,000	5	10	$ 625,000
675	7	11	$ 962,500	5	11	$ 687,500
675	7	12	$ 1,050,000	5	12	$ 750,000
675	7	13	$ 1,137,500	5	13	$ 812,500
675	7	14	$ 1,225,000	5	14	$ 875,000
675	7	15	$ 1,312,500	5	15	$ 937,500
675	7	16	$ 1,400,000	5	16	$ 1,000,000
675	7	17	$ 1,487,500	5	17	$ 1,062,500
675	7	18	$ 1,575,000	5	18	$ 1,125,000
675	7	19	$ 1,662,500	5	19	$ 1,187,500
675	7	20	$ 1,750,000	5	20	$ 1,250,000
750	7	8	$ 700,000	5	8	$ 500,000
750	7	9	$ 787,500	5	9	$ 562,500
750	7	10	$ 875,000	5	10	$ 625,000
750	7	11	$ 962,500	5	11	$ 687,500
750	7	12	$ 1,050,000	5	12	$ 750,000
750	7	13	$ 1,137,500	5	13	$ 812,500
750	7	14	$ 1,225,000	5	14	$ 875,000
750	7	15	$ 1,312,500	5	15	$ 937,500
750	7	16	$ 1,400,000	5	16	$ 1,000,000
750	7	17	$ 1,487,500	5	17	$ 1,062,500
750	7	18	$ 1,575,000	5	18	$ 1,125,000
750	7	19	$ 1,662,500	5	19	$ 1,187,500
750	7	20	$ 1,750,000	5	20	$ 1,250,000
825	7	8	$ 700,000	5	8	$ 500,000
825	7	9	$ 787,500	5	9	$ 562,500
825	7	10	$ 875,000	5	10	$ 625,000
825	7	11	$ 962,500	5	11	$ 687,500
825	7	12	$ 1,050,000	5	12	$ 750,000
825	7	13	$ 1,137,500	5	13	$ 812,500
825	7	14	$ 1,225,000	5	14	$ 875,000
825	7	15	$ 1,312,500	5	15	$ 937,500
825	7	16	$ 1,400,000	5	16	$ 1,000,000
825	7	17	$ 1,487,500	5	17	$ 1,062,500
825	7	18	$ 1,575,000	5	18	$ 1,125,000
825	7	19	$ 1,662,500	5	19	$ 1,187,500
825	7	20	$ 1,750,000	5	20	$ 1,250,000
900	7	8	$ 700,000	5	8	$ 500,000
900	7	9	$ 787,500	5	9	$ 562,500
900	7	10	$ 875,000	5	10	$ 625,000
900	7	11	$ 962,500	5	11	$ 687,500
900	7	12	$ 1,050,000	5	12	$ 750,000
900	7	13	$ 1,137,500	5	13	$ 812,500
900	7	14	$ 1,225,000	5	14	$ 875,000
900	7	15	$ 1,312,500	5	15	$ 937,500
900	7	16	$ 1,400,000	5	16	$ 1,000,000
900	7	17	$ 1,487,500	5	17	$ 1,062,500
900	7	18	$ 1,575,000	5	18	$ 1,125,000
900	7	19	$ 1,662,500	5	19	$ 1,187,500
900	7	20	$ 1,750,000	5	20	$ 1,250,000
975	7	8	$ 700,000	5	8	$ 500,000
975	7	9	$ 787,500	5	9	$ 562,500
975	7	10	$ 875,000	5	10	$ 625,000
975	7	11	$ 962,500	5	11	$ 687,500
975	7	12	$ 1,050,000	5	12	$ 750,000
975	7	13	$ 1,137,500	5	13	$ 812,500
975	7	14	$ 1,225,000	5	14	$ 875,000
975	7	15	$ 1,312,500	5	15	$ 937,500
975	7	16	$ 1,400,000	5	16	$ 1,000,000
975	7	17	$ 1,487,500	5	17	$ 1,062,500
975	7	18	$ 1,575,000	5	18	$ 1,125,000
975	7	19	$ 1,662,500	5	19	$ 1,187,500
975	7	20	$ 1,750,000	5	20	$ 1,250,000
1050	7	8	$ 700,000	5	8	$ 500,000
1050	7	9	$ 787,500	5	9	$ 562,500
1050	7	10	$ 875,000	5	10	$ 625,000
1050	7	11	$ 962,500	5	11	$ 687,500
1050	7	12	$ 1,050,000	5	12	$ 750,000
1050	7	13	$ 1,137,500	5	13	$ 812,500
1050	7	14	$ 1,225,000	5	14	$ 875,000
1050	7	15	$ 1,312,500	5	15	$ 937,500
1050	7	16	$ 1,400,000	5	16	$ 1,000,000
1050	7	17	$ 1,487,500	5	17	$ 1,062,500
1050	7	18	$ 1,575,000	5	18	$ 1,125,000
1050	7	19	$ 1,662,500	5	19	$ 1,187,500
1050	7	20	$ 1,750,000	5	20	$ 1,250,000
1200	10	8	$ 1,000,000	5	8	$ 500,000
1200	10	9	$ 1,125,000	5	9	$ 562,500
1200	10	10	$ 1,250,000	5	10	$ 625,000
1200	10	11	$ 1,375,000	5	11	$ 687,500
1200	10	12	$ 1,500,000	5	12	$ 750,000
1200	10	13	$ 1,625,000	5	13	$ 812,500
1200	10	14	$ 1,750,000	5	14	$ 875,000
1200	10	15	$ 1,875,000	5	15	$ 937,500
1200	10	16	$ 2,000,000	5	16	$ 1,000,000
1200	10	20	$ 2,500,000	5	17	$ 1,062,500
1200	10	30	$ 3,750,000	5	18	$ 1,125,000
1200	10	40	$ 5,000,000			
1200	13	45	$ 7,312,500	5	19	$ 1,187,500
1200	13	50	$ 8,125,000	5	20	$ 1,250,000
1350	7	8	$ 700,000	5	8	$ 500,000
1350	7	9	$ 787,500	5	9	$ 562,500
1350	7	10	$ 875,000	5	10	$ 625,000
1350	7	11	$ 962,500	5	11	$ 687,500
1350	7	12	$ 1,050,000	5	12	$ 750,000
1350	7	13	$ 1,137,500	5	13	$ 812,500
1350	7	14	$ 1,225,000	5	14	$ 875,000
1350	7	15	$ 1,312,500	5	15	$ 937,500
1350	7	16	$ 1,400,000	5	16	$ 1,000,000
1350	7	17	$ 1,487,500	5	17	$ 1,062,500
1350	7	18	$ 1,575,000	5	18	$ 1,125,000
1350	7	19	$ 1,662,500	5	19	$ 1,187,500
1350	7	20	$ 1,750,000	5	20	$ 1,250,000
1500	7	8	$ 700,000	5	8	$ 500,000
1500	7	9	$ 787,500	5	9	$ 562,500
1500	7	10	$ 875,000	5	10	$ 625,000
1500	7	11	$ 962,500	5	11	$ 687,500
1500	7	12	$ 1,050,000	5	12	$ 750,000
1500	7	13	$ 1,137,500	5	13	$ 812,500
1500	7	14	$ 1,225,000	5	14	$ 875,000
1500	7	15	$ 1,312,500	5	15	$ 937,500

Gravity Sewer Shafts		
Summary Table Pipe Dia. (mm)	Launch Shaft Dia.	Receiving Shaft Dia.
250	7	5
300	7	5
375	7	5
450	7	5
525	7	5
600	7	5
675	7	5
750	7	5
825	7	5
900	7	5
975	7	5
1050	7	5
1200	7	5
1350	7	5
1500	7	5
1650	8	6
1800	8	6
1950	8	6
2100	9	7
2250	9	7
2400	9	7
2550	9	7
2700	10	8
3000	10	8

Watermain Shafts		
Summary Table Pipe Dia. (mm)	Launch Shaft Dia.	Receiving Shaft Dia.
100	7	5
150	7	5
200	7	5
250	7	5
300	7	5
350	7	5
400	7	5
450	7	5
500	7	5
600	7	5
750	7	5
900	7	5
1050	8	6
1200	8	6
1350	8	6
1500	9	7
1650	9	7
1800	10	8
1950	10	8
2100	10	8
2250	10	8

Tenders

Pipe Diameter (mm)	Tender No.	Length (m)	Unit Rates ($/m) Launch Shaft ($/m)	Unit Rates ($/m) Receiving Shaft ($/m)	Total Cost ($) Launch Shaft	Total Cost ($) Receiving Shaft	Assumed Shaft Depth (m)	Actual Shaft Diameter (mm)	Equivalent Diameter (m)	Actual Shaft Depth (m)	Shaft No.	
400mm	2023-586T	381	$ 2,450	$ 1,914	$ 933,450	$ 729,234	8	5 x 3	4.4	13		
400mm	2023-011T	63	$ 3,906	$ 1,916	$ 246,078	$ 120,708	8					
400mm	2023-173T	55.5	$ 8,170	$ 10,648	$ 453,435	$ 590,964	8					
600mm	2022-292T	353	$ 3,332	$ 1,548	$ 1,176,196	$ 546,444	-	13		11		$ 1,767,500.00
1200mm	2022-292T	269	$ -	$ 1,810	$ -	$ 486,890	-	2.6		14		$ 455,000.00
2400	2020-029T				$ 7,484,776	$ -	-	12		18.5	2A	$ 2,775,000.00
2400	2020-029T				$ 7,895,534	$ -	-	8		39	3	$ 3,900,000.00
2400	2020-029T				$ 11,849,923	$ -	-	11		46	4	$ 6,325,000.00
2400	2020-029T				$ 7,430,976	$ -	-	12		18.5	2B	$ 2,775,000.00
2400	2020-029T				$ 10,427,785	$ -	-	8		46	5	$ 4,600,000.00
2400	2022-004T				$ 13,412,705			13.3 x 15	15.9	10.5	1	$ 2,086,875.00
2400	2022-004T				$ 9,874,738			7		36	5A	$ 3,150,000.00
2400	2022-004T				$ 10,496,696			8		26	6	$ 2,600,000.00
2400	2022-004T				$ 13,997,966			10.5 x 16	14.6	13	6A	$ 2,372,500.00
2400	2022-004T				$ 25,621,689			17		28	7	$ 5,950,000.00
2400	2022-004T				$ 2,816,129			7.5		8	12	$ 750,000.00



	$ 16,319.06			Shaft Tenders		
					$ 933,450	13
0.66	$ 8,225.15				$ 1,176,196	11
1.07	$ 13,376.10				$ 486,890	14
2.70	$ 33,715.21				$ 7,484,776	18.5
2.02	$ 25,306.20				$ 7,895,534	39
1.87	$ 23,418.82				$ 11,849,923	46
2.68	$ 33,472.86				$ 7,430,976	18.5
2.27	$ 28,336.37	=	**$ 22,771**		$ 10,427,785	46
6.43	$ 80,339.65	box chamber			$ 13,412,705	10.5
3.13	$ 39,185.47	offline shaft			$ 9,874,738	36
4.04	$ 50,464.89	offline shaft			$ 10,496,696	26
5.90	$ 73,751.14	box chamber			$ 13,997,966	13
4.31	$ 53,827.08	large diameter, not sure why			$ 25,621,689	28
3.75	$ 46,935.48	shallow, in creek area			$ 2,816,129	8
3.55	$ 44,432.11					

1500	7	16	$ 1,400,000	5	16	$ 1,000,000
1500	7	17	$ 1,487,500	5	17	$ 1,062,500
1500	7	18	$ 1,575,000	5	18	$ 1,125,000
1500	7	19	$ 1,662,500	5	19	$ 1,187,500
1500	7	20	$ 1,750,000	5	20	$ 1,250,000
1500	7	25	$ 2,187,500	5	25	$ 1,562,500
1500	7	30	$ 2,625,000	5	30	$ 1,875,000
1500	7	35	$ 3,062,500	5	35	$ 2,187,500
1500	7	40	$ 3,500,000	5	40	$ 2,500,000
1500	7	45	$ 3,937,500	5	45	$ 2,812,500
1650	8	8	$ 800,000	6	8	$ 600,000
1650	8	9	$ 900,000	6	9	$ 675,000
1650	8	10	$ 1,000,000	6	10	$ 750,000
1650	8	11	$ 1,100,000	6	11	$ 825,000
1650	8	12	$ 1,200,000	6	12	$ 900,000
1650	8	13	$ 1,300,000	6	13	$ 975,000
1650	8	14	$ 1,400,000	6	14	$ 1,050,000
1650	8	15	$ 1,500,000	6	15	$ 1,125,000
1650	8	16	$ 1,600,000	6	16	$ 1,200,000
1650	8	17	$ 1,700,000	6	17	$ 1,275,000
1650	8	18	$ 1,800,000	6	18	$ 1,350,000
1650	8	19	$ 1,900,000	6	19	$ 1,425,000
1650	8	20	$ 2,000,000	6	20	$ 1,500,000
1800	8	8	$ 800,000	6	8	$ 600,000
1800	8	9	$ 900,000	6	9	$ 675,000
1800	8	10	$ 1,000,000	6	10	$ 750,000
1800	8	11	$ 1,100,000	6	11	$ 825,000
1800	8	12	$ 1,200,000	6	12	$ 900,000
1800	8	13	$ 1,300,000	6	13	$ 975,000
1800	8	14	$ 1,400,000	6	14	$ 1,050,000
1800	8	15	$ 1,500,000	6	15	$ 1,125,000
1800	8	16	$ 1,600,000	6	16	$ 1,200,000
1800	8	17	$ 1,700,000	6	17	$ 1,275,000
1800	8	18	$ 1,800,000	6	18	$ 1,350,000
1800	8	19	$ 1,900,000	6	19	$ 1,425,000
1800	8	20	$ 2,000,000	6	20	$ 1,500,000
1950	8	8	$ 800,000	6	8	$ 600,000
1950	8	9	$ 900,000	6	9	$ 675,000
1950	8	10	$ 1,000,000	6	10	$ 750,000
1950	8	11	$ 1,100,000	6	11	$ 825,000
1950	8	12	$ 1,200,000	6	12	$ 900,000
1950	8	13	$ 1,300,000	6	13	$ 975,000
1950	8	14	$ 1,400,000	6	14	$ 1,050,000
1950	8	15	$ 1,500,000	6	15	$ 1,125,000
1950	8	16	$ 1,600,000	6	16	$ 1,200,000
1950	8	17	$ 1,700,000	6	17	$ 1,275,000
1950	8	18	$ 1,800,000	6	18	$ 1,350,000
1950	8	19	$ 1,900,000	6	19	$ 1,425,000
1950	8	20	$ 2,000,000	6	20	$ 1,500,000
1950	8	25	$ 2,500,000	6	25	$ 1,875,000
1950	8	30	$ 3,000,000	6	30	$ 2,250,000
1950	8	35	$ 3,500,000	6	35	$ 2,625,000
1950	8	40	$ 4,000,000	6	40	$ 3,000,000
1950	8	45	$ 4,500,000	6	45	$ 3,375,000
2100	9	8	$ 900,000	7	8	$ 700,000
2100	9	9	$ 1,012,500	7	9	$ 787,500
2100	9	10	$ 1,125,000	7	10	$ 875,000
2100	9	11	$ 1,237,500	7	11	$ 962,500
2100	9	12	$ 1,350,000	7	12	$ 1,050,000
2100	9	13	$ 1,462,500	7	13	$ 1,137,500
2100	9	14	$ 1,575,000	7	14	$ 1,225,000
2100	9	15	$ 1,687,500	7	15	$ 1,312,500
2100	9	16	$ 1,800,000	7	16	$ 1,400,000
2100	9	17	$ 1,912,500	7	17	$ 1,487,500
2100	9	18	$ 2,025,000	7	18	$ 1,575,000
2100	9	19	$ 2,137,500	7	19	$ 1,662,500
2100	9	20	$ 2,250,000	7	20	$ 1,750,000
2250	9	8	$ 900,000	7	8	$ 700,000
2250	9	9	$ 1,012,500	7	9	$ 787,500
2250	9	10	$ 1,125,000	7	10	$ 875,000
2250	9	11	$ 1,237,500	7	11	$ 962,500
2250	9	12	$ 1,350,000	7	12	$ 1,050,000
2250	9	13	$ 1,462,500	7	13	$ 1,137,500
2250	9	14	$ 1,575,000	7	14	$ 1,225,000
2250	9	15	$ 1,687,500	7	15	$ 1,312,500
2250	9	16	$ 1,800,000	7	16	$ 1,400,000
2250	9	17	$ 1,912,500	7	17	$ 1,487,500
2250	9	18	$ 2,025,000	7	18	$ 1,575,000
2250	9	19	$ 2,137,500	7	19	$ 1,662,500
2250	9	20	$ 2,250,000	7	20	$ 1,750,000
2400	9	8	$ 900,000	7	8	$ 700,000
2400	9	9	$ 1,012,500	7	9	$ 787,500
2400	9	10	$ 1,125,000	7	10	$ 875,000
2400	9	11	$ 1,237,500	7	11	$ 962,500
2400	9	12	$ 1,350,000	7	12	$ 1,050,000
2400	9	13	$ 1,462,500	7	13	$ 1,137,500
2400	9	14	$ 1,575,000	7	14	$ 1,225,000
2400	9	15	$ 1,687,500	7	15	$ 1,312,500
2400	9	16	$ 1,800,000	7	16	$ 1,400,000
2400	9	17	$ 1,912,500	7	17	$ 1,487,500
2400	9	18	$ 2,025,000	7	18	$ 1,575,000
2400	9	19	$ 2,137,500	7	19	$ 1,662,500
2400	9	20	$ 2,250,000	7	20	$ 1,750,000
2550	9	8	$ 900,000	7	8	$ 700,000
2550	9	9	$ 1,012,500	7	9	$ 787,500
2550	9	10	$ 1,125,000	7	10	$ 875,000
2550	9	11	$ 1,237,500	7	11	$ 962,500
2550	9	12	$ 1,350,000	7	12	$ 1,050,000
2550	9	13	$ 1,462,500	7	13	$ 1,137,500
2550	9	14	$ 1,575,000	7	14	$ 1,225,000
2550	9	15	$ 1,687,500	7	15	$ 1,312,500
2550	9	16	$ 1,800,000	7	16	$ 1,400,000
2550	9	17	$ 1,912,500	7	17	$ 1,487,500
2550	9	18	$ 2,025,000	7	18	$ 1,575,000
2550	9	19	$ 2,137,500	7	19	$ 1,662,500
2550	9	20	$ 2,250,000	7	20	$ 1,750,000
2550	9	25	$ 2,812,500	7	25	$ 2,187,500
2550	9	30	$ 3,375,000	7	30	$ 2,625,000
2550	9	35	$ 3,937,500	7	35	$ 3,062,500
2550	9	40	$ 4,500,000	7	40	$ 3,500,000
2550	9	45	$ 5,062,500	7	45	$ 3,937,500
2700	10	8	$ 1,000,000	8	8	$ 800,000
2700	10	9	$ 1,125,000	8	9	$ 900,000
2700	10	10	$ 1,250,000	8	10	$ 1,000,000
2700	10	11	$ 1,375,000	8	11	$ 1,100,000
2700	10	12	$ 1,500,000	8	12	$ 1,200,000
2700	10	13	$ 1,625,000	8	13	$ 1,300,000
2700	10	14	$ 1,750,000	8	14	$ 1,400,000
2700	10	15	$ 1,875,000	8	15	$ 1,500,000
2700	10	16	$ 2,000,000	8	16	$ 1,600,000
2700	10	17	$ 2,125,000	8	17	$ 1,700,000
2700	10	18	$ 2,250,000	8	18	$ 1,800,000
2700	10	19	$ 2,375,000	8	19	$ 1,900,000
2700	10	20	$ 2,500,000	8	20	$ 2,000,000
3000	10	8	$ 1,000,000	8	8	$ 800,000
3000	10	9	$ 1,125,000	8	9	$ 900,000
3000	10	10	$ 1,250,000	8	10	$ 1,000,000
3000	10	11	$ 1,375,000	8	11	$ 1,100,000
3000	10	12	$ 1,500,000	8	12	$ 1,200,000
3000	10	13	$ 1,625,000	8	13	$ 1,300,000
3000	10	14	$ 1,750,000	8	14	$ 1,400,000
3000	10	15	$ 1,875,000	8	15	$ 1,500,000
3000	10	16	$ 2,000,000	8	16	$ 1,600,000
3000	10	17	$ 2,125,000	8	17	$ 1,700,000
3000	10	18	$ 2,250,000	8	18	$ 1,800,000
3000	10	19	$ 2,375,000	8	19	$ 1,900,000
3000	10	20	$ 2,500,000	8	20	$ 2,000,000
3000	10	25	$ 3,125,000	8	25	$ 2,500,000
3000	10	30	$ 3,750,000	8	30	$ 3,000,000
3000	10	35	$ 4,375,000	8	35	$ 3,500,000
3000	10	40	$ 5,000,000	8	40	$ 4,000,000
3000	10	45	$ 5,625,000	8	45	$ 4,500,000

Installation Cost	=	**Basic Cost to Install Linear Infrastructure**
Total Construction Cost	=	**Basic Cost + General + Provisional + Construction Contingency**
Total Design Cost	=	**Geotechnical + Property/Easement + Engineering/Design + Design/Contract Administration + Approvals**
Total Project Costs	=	**Total Design Costs + Project Contingency (Complexity) + Total Construction Costs**

General Items Cost as Percentage of Installation Cost

	Installation Cost ($)	Applicable Percentage (%) for General Items
Less Than	<$2,000,000	20%
	$2,000,000.00	17%
	$4,000,000.00	14%
	$6,000,000.00	12%
	$8,000,000.00	11%
	$10,000,000.00	10%
Greater Than	>10,000,000	9%

Provisional Items Allowance Cost as Percentage of Installation Cost

	Installation Cost ($)	Applicable Percentage (%) for Provisional Items Allowance
Less Than	<$2,000,000	12%
	$2,000,000.00	10%
	$4,000,000.00	9%
	$6,000,000.00	8%
	$8,000,000.00	7%
	$10,000,000.00	7%
Greater Than	>10,000,000	6%

Contingency Allowance Cost as Percentage of Installation Cost

	Installation Cost ($)	Applicable Percentage (%) for Construction Contingency Allowance
Less Than	<$2,000,000	20%
	$2,000,000.00	18%
	$4,000,000.00	15%
	$6,000,000.00	14%
	$8,000,000.00	13%
	$10,000,000.00	12%
Greater Than	>10,000,000	10%

Soft Costs

Geotechnical/Hydrogeological

Linear	
Low Complexity	0.50%
Medium Complexity	1.00%
High Complexity	2.00%
Facility	2.00%

Property/Easements

Linear	
Low Complexity	1.00%
Medium Complexity	1.50%
High Complexity	2.00%
Facility	2.00%

Engineering/Design (Internal)

Total Construction Cost	Percentage (%)
<$10,000,000	8%
$10,000,000 - $50,000,000	6%
>$50,000,000	4%

Design/Contract Administration

Total Construction Cost	Percentage (%)
<$10,000,000	15%
$10,000,000 - $50,000,000	12%
>$50,000,000	10%

Approvals

Total Construction Cost	Percentage (%)
<$10,000,000	1.50%
$10,000,000 - $50,000,000	1.00%
>$50,000,000	0.50%

Project Complexity

Estimate Class	Project Complexity		
	Low	Moderate	High
Class 4	10%	15%	25%
Class 3	10%	15%	20%
Class 2	10%	10%	15%
Class 1	10%	10%	10%

Class 4	
Low	10%
Moderate	15%
High	25%

Class 3	
Low	10%
Moderate	15%
High	20%

Building construction price indexes, by type of building

Type of Buildi Non-residential buildings

Table: 18-10-0135-01 (formerly CANSIM 327-0058)

Source: Statistics Canada
https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810027602&pickMembers%5B0%5D=2.7&pickMembers%5B1%5D=3.1&cubeTimeFrame.startMonth=10&cubeTimeFrame.startYear=2022&referencePeriods=20221001%2C20221001

Toronto Series

As of July 31, 2023

17 BASE YE/	2013		2014		2015		2016		2017		2018		2019		2020		2021		2022		2023		2024	
QUARTER	INDEX	YR/YR % CHNG	INDEX	YR/YR % CHNG	INDEX	YR/YR % CHNG	INDEX	YR/YR % CHNG	INDEX	YR/YR % CHNG	INDEX	YR/YR % CHNG	INDEX	YR/YR % CHNG	INDEX	YR/YR % CHNG	INDEX	YR/YR % CHNG	INDEX	YR/YR % CHNG	INDEX	YR/YR % CHNG	INDEX	YR/YR % CHNG
I	91.1		91.8	0.77%	93.7	2.07%	95.3	1.71%	98.9	3.78%	102.1	3.24%	107.4	5.20%	110.6	3.00%	114.2	3.30%	134.2	17.50%	150.6	12.20%	157.6	
II	91.2		92.4	1.32%	94.1	1.84%	96.9	2.98%	100.0	3.20%	104.1	4.10%	108.3	4.00%	111.1	2.60%	119.9	7.90%	140.9	17.50%	152.3	8.10%	159.6	
III	91.2		92.6	1.54%	94.3	1.84%	97.4	3.29%	100.4	3.08%	105.7	5.28%	109.2	3.30%	111.9	2.50%	125	11.70%	144.5	15.60%	155.3			
IV	91.3		93.0	1.86%	94.6	1.72%	98.1	3.70%	100.8	2.75%	106.6	5.75%	109.7	2.90%	112.1	2.20%	129.3	15.30%	148.1	14.50%	156.1			
Ann. Avg.	91.2		92.5	1.37%	94.2	1.87%	96.9	2.92%	100.0	3.20%	104.6	4.59%	108.7	3.80%	111.4	2.60%	122.1	9.60%	141.9	16.20%	153.6			
2023-2025	**3.9%**																							
2022 - 2023	**12.5%**																							
2019 - 2025	**46.8%**																							
2020 - 2025	**43.3%**																							

		Price Index	% Change	Price Index	% Change (4% CPI)
2015	2015 - Q1	93.7		93.7	
	2015 - Q2	94.1	0.4%	94.1	0.4%
	2015 - Q3	94.3	0.2%	94.3	0.2%
	2015 - Q4	94.6	0.3%	94.6	0.3%
2016	2016 - Q1	95.3	0.7%	95.3	0.7%
	2016 - Q2	96.9	1.7%	96.9	1.7%
	2016 - Q3	97.4	0.5%	97.4	0.5%
	2016 - Q4	98.1	0.7%	98.1	0.7%
2017	2017 - Q1	98.9	0.8%	98.9	0.8%
	2017 - Q2	100	1.1%	100	1.1%
	2017 - Q3	100.4	0.4%	100.4	0.4%
	2017 - Q4	100.8	0.4%	100.8	0.4%
2018	2018 - Q1	102.1	1.3%	102.1	1.3%
	2018 - Q2	104.1	2.0%	104.1	2.0%
	2018 - Q3	105.7	1.5%	105.7	1.5%
	2018 - Q4	106.6	0.9%	106.6	0.9%
2019	2019 - Q1	107.4	0.8%	107.4	0.8%
	2019 - Q2	108.3	0.8%	108.3	0.8%
	2019 - Q3	109.2	0.8%	109.2	0.8%
	2019 - Q4	109.7	0.5%	109.7	0.5%
2020	2020 - Q1	110.6	0.8%	110.8	1%
	2020 - Q2	111.1	0.5%	111.9	1%
	2020 - Q3	111.9	0.7%	113.0	1%
	2020 - Q4	112.1	0.2%	114.2	1%
2021	2021 - Q1	114.2	1.9%	115.3	1%
	2021 - Q2	119.9	5.0%	116.4	1%
	2021 - Q3	125	4.3%	117.6	1%
	2021 - Q4	129.3	3.4%	118.8	1%
2022	2022 - Q1	134.2	3.8%	120.0	1%
	2022 - Q2	140.9	5.0%	121.2	1%
	2022 - Q3	144.5	2.6%	122.4	1%
	2022 - Q4	148.1	2.5%	123.6	1%
2023	2023 - Q1	150.6	1.7%	124.8	1%
	2023 - Q2	152.3	1.1%	126.1	1%
	2023 - Q3	155.3	2.0%	127.4	1%
	2023 - Q4	156.1	0.5%	128.6	1%
2024	2024 - Q1	157.6	1.0%	129.9	1%
	2024 - Q2	159.6	1.3%	131.2	1%
	2024 - Q3				
	2024 - Q4				