



## Municipality of Central Elgin

### Engineer's Report McCredie Municipal Drain 2021

**GMBP File: 519056**

**July 2021**





July 8, 2021  
Our File: 519056

Mayor and Members of Council  
The Municipality of Central Elgin

Re: McCredie Municipal Drain 2021

Dear Mayor Martyn and Members of Council:

We are pleased to present our report on the "McCredie Municipal Drain 2021" serving Parts of Lots 11 and 12 Concession 7 in the Municipality of Central Elgin and Parts of Lots 10, 11 and parts of Plan 11M216 in the City of St. Thomas, County of Elgin.

Authority to prepare this report was obtained by a resolution of Central Elgin Council as stated in its November 4<sup>th</sup>, 2019 letter to appoint GM BluePlan Engineering Limited (GMBP) to prepare an Engineer's Report.

In accordance with your instructions pursuant to a request received by Council under Section 78 of the Drainage Act, R.S.O. 1990, for the request for drainage works improvements, GM BluePlan has held an on-site meeting, undertaken a field survey and prepared for Council's consideration the following Drainage Report, Plan, Profiles and Specifications for this work to be completed on the McCredie Municipal Drain.

We trust that the information contained within will be satisfactory. If there are any questions or concerns, please do not hesitate to contact us.

Yours truly,

GM BLUEPLAN ENGINEERING LIMITED  
Per:

A handwritten signature in blue ink, appearing to read 'Brad Bunke'.

Brad Bunke, P.Eng.  
Encl.

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**MCCREDIE MUNICIPAL DRAIN 2021**  
**THE MUNICIPALITY OF CENTRAL ELGIN**  
**JULY 2021**  
**GMBP FILE: 519056**

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## 1. INTRODUCTION

At the request of property owners, the Council of the Municipality of Central Elgin have appointed GM BluePlan Engineering under Section 78 of the Drainage Act to investigate improvements to be made to the McCredie Municipal Drain. Property owners have petitioned under section 78 of the Drainage Act for improvements to be made to the McCredie Municipal Drain (McCredie). Branches of the McCredie Municipal Drain to be improved under this request are the Main Drain and Branch No.1. The existing Main Drain consists of approximately 480m of covered tile that outlets into the Mills Municipal Drain. The existing Branch No.1 Drain consists of approximately 894m of covered tile that outlets into the McCredie Main Drain.

The owner and properties represented on the petition are:

Doug Terry Limited

Part of Lot 10 (Harvest  
Run Subdivision)

Concession 7

Based on site observations and previous drainage reports, twenty eight properties have been determined as within the drainage area of the McCredie which includes S Pt. Lot 11, N Pt. Lot 11, S Pt. Lot 12 Concession 7 in the Municipality of Central Elgin and Plan 11M216 BLK 113, 114, 115, 116, 118, 119, 120, 121, Pt. BLK 106, S Pt. Lot 10 in the City of St. Thomas. This also includes Centennial Road (County Road No. 28).

## 2. HISTORY

The Municipality of Central Elgin has provided background municipal drain maps and reports.

Reports available indicate the McCredie Municipal Drain was previously reconstructed under the Drainage Act through a report prepared by Fred A. Bell, through a report dated February 20<sup>th</sup>, 1962.

The most recent reconstruction of the McCredie Drain occurred through a report prepared by J.R. Spriet, P.Eng. dated March 24<sup>th</sup>, 1986. This report consists of the installation of approximately 793m (2602ft) of 350mm (14") to 450mm (18") diameter concrete field tile, 519m (1703ft) of 150mm (6") clay tile, 60m (197ft) of 450mm (18") sewer pipe and 18m (60ft) of 400mm (16") to 600mm (24") corrugated metal pipe. The report also incorporated 456m of then existing 150mm (6") to 200mm (8") clay tile into the Municipal Drain. The McCredie Municipal Drain served N Pt. Lot 9 and 10, S Pt. Lot 9 to 11, Pt. Lot 10 and 11 and NW Pt. Lot 12 Concession 7 in the Township of Yarmouth.

The October 2020 stormwater management report prepared by CJDLE Engineering states that the Harvest Run subdivision (formerly the Axford Farm subdivision) is to include two stormwater management facilities within the development, a north pond and a south pond. The south pond, termed Stormwater Management Facility No.1 (SWMF No.1), will utilize the McCredie Municipal Drain as its outlet. This facility is designed to service Phase 3 of the Harvest Run development as well as major (rejected) flows from the southerly portion of Phase 2B.



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### 3. PROCEEDINGS UNDER THE DRAINAGE ACT

The Drainage Act is a vehicle by which a drainage scheme can be constructed and the cost raised by local special assessment. That is, the cost is assessed in varying proportions to lands within the watershed, as a one-time charge over and above any taxes paid. Maintenance of the drain is likewise charged to the watershed, often in the same proportions as the original construction.

The Act has evolved over many years and attempts have been made to balance the rights of the individual against the benefits of the construction of drains that involve more than one property. The Act recognizes that perfect agreement is not possible in every case and provides a number of proceedings that give owners and others the opportunity to influence the outcome.

This Report is one of those proceedings. To aid in the understanding of the process listed below in chronological order are all normal proceedings with the notation "Completed" beside those which have been completed. This listing is a summary of many but not all parts of the Drainage Act and applies to the ordinary course of events. Further proceedings are available, and for these the Drainage Act should be consulted directly.

1. Submission of a Request. *Completed.*
2. Notification of the Project to the Catfish Creek Conservation Authority (CCCA). *Completed.*
3. Engineer appointed. *Completed.*
4. On-site meeting. *Completed.*
5. Preparation of Report. *Completed.*
6. Report considered by Council and a By-Law is adopted.
7. Court of Revision convened to consider and deal with appeals on assessment if necessary.
8. Appeal is available from the decisions of the Court of Revision and on other matters to the Ontario Drainage Tribunal.
9. Disposition of appeals by the Tribunal, or if none, final passage of the By-Law, which establishes the drain in law and authorizes construction.
10. Construction of Municipal Drain Improvements.
11. Levying and collecting of assessments.

### 4. ON-SITE MEETING

In accordance with Section 9(1) of the Drainage Act, R.S.O. 1990 an on-site meeting was held on November 28<sup>th</sup>, 2019. The meeting was scheduled to take place at 9:00 am at the Municipal Office in the County of Elgin Training Room located at 450 Sunset Drive, St. Thomas, ON, N5R 5V1. Persons in attendance were:

Brad Bunke, P.Eng.	GM BluePlan Engineering Limited (GMBP)
Tanner Shapton	GM BluePlan Engineering Limited (GMBP)
Sean Waterman	Municipality of Central Elgin, Drainage Superintendent
Lloyd Perrin	Municipality of Central Elgin, Director of Asset Management
Morgan Van Wyk	Representing N PT. LOT 11 (602-000)
Tim McGregor representing Jeff McGregor	Representing N PT. LOT 11 (603-000)

Deren Lyle, P.Eng. representing Doug  
Tarry Limited & Adele Ashford

Martha Paluch

CJDL Engineering (CJDL), Design Engineer

Doug Tarry Limited, Associate Planner

A handout was distributed which described the procedures under the Drainage Act, steps already taken by Council in appointing an Engineer, a map of the pertinent part of the watershed, and preliminary results of the investigation to date.

Landowners provided the following comments and observations:

Mr. McGregor stated that he has no concerns with the drainage and that there are no blowouts or ponding. He also stated that he has no concerns with the open portion of the Mills Drain. Mr. McGregor mentioned that there is some tree growth in the existing drain alignment and that the watermain goes through his property.

Ms. Van Wyk stated that she has no drainage concerns with minimal ponding. She also stated that 775 trees were recently planted in the back acre closest to the rear of the property and that area is typically wet.

Mr. Lyle filed on behalf of Doug Tarry Limited and also represents the owners of the Adele Ashford development. Mr. Lyle noted that AECOM has completed a Class EA for St. Thomas and that the Harvest Run Watershed Study shows flows to the McCredie Drain. Mr. Lyle stated that the preliminary stormwater report by CJDL has outflow volumes, and these will be close to those in the final report, noting that the final report will not be completed for several months. Mr. Lyle also stated that Regional Water owns the two watermain within the project area.

Mr. Perrin mentioned that he has used sacrificial tile in the past and would have sacrificial tiles on both sides if the main drain is not water-tight. Mr. Perrin stated that there are water issues on N Pt. Lot 11 (Roll No. 601-801) where the property requires three sump pumps. He also stated that the area has been re-graded to deal with these issues. Mr. Perrin also stated that the water table is high around Centennial Road.

Ms. Paluch had no additional comments.

Mr. Waterman had no additional comments.

Mr. Lyle and Mr. Perrin stated that Bill Walters rents much of the land where the McCredie Drain is located for agricultural purposes.

## 5. BASIS FOR DESIGN

Tile drains are typically designed to have capacity to remove between 13 and 38mm of water from the watershed per day, and this rate of removal is called the drainage coefficient. 13mm is generally adequate when there is little surface water but the watershed is under-drained. When surface water is to be accommodated, 25mm to 38mm per day is typically used for the basis of design. It is important to understand that the Municipal Drain in itself does not remove this amount of water. It serves as the conduit to convey water brought to it by under drainage, and for surface water finding its way or guided to the inlet structures.

Under current conditions the McCredie Municipal Drain watershed is largely comprised of agricultural land and typically a 38mm drainage coefficient would be selected. However, CJDL Engineering, on behalf of Doug Tarry Limited, has requested that the drain be sized to accommodate the 100-year outflow from the Harvest Run subdivision SWMF No.1 to support the development. Therefore GMBP has proceeded with the 100-year flow rate of 0.82m<sup>3</sup>/s from the Harvest Run subdivision as per the October 2020 CJDL Stormwater Management Report for SWMF No. 1 (South Pond).

As described further in the sections below, part of the work proposed includes reinstatement of the existing outlet for lands downstream of the Harvest Run subdivision. In this case a typical 38mm per 24 hour drainage coefficient for these lands in the watershed was used.

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## 6. ENVIRONMENTAL CONSIDERATIONS

This Drain will be subject to the review of the Catfish Creek Conservation Authority (CCCA), the Department of Fisheries and Oceans (DFO), and consideration under the Species-at-Risk Act (SARA).

GMBP has reviewed the available DFO mapping tools for aquatic species listed under the SARA. Based on this mapping, there is no indication of extirpated, endangered, threatened or special concern species or associated critical habitat in the project area.

GMBP has reviewed the available natural heritage mapping tool for species listed under the Ontario Endangered Species Act (ESA). Based on this mapping, there is no indication of extirpated, endangered, threatened or special concern species or associated critical habitat in the project area.

The Mills Drain south of Elm Line, outlet to the McCredie Drain is Unclassified under DFO's drain classification system. The Mills Drain north of Elm Line is a Class 'C' drain under DFO's drain classification system and is within the impact zone of the McCredie Drain outlet. No in-water work shall therefore occur between March 15<sup>th</sup> and July 15<sup>th</sup> (inclusive) of any year.

Once GMBP completes the initial design of the drainage improvements, a copy will be submitted to the CCCA with a view to obtaining approval for construction.

Although the exact views of these agencies cannot be known in advance, the environmental impacts are thought to be slight. This project is anticipated to have no permanent adverse impact on any species.

## 7. FINDINGS

Based on the information obtained at the on-site meeting and review of the current and proposed conditions, it was confirmed that the existing McCredie Drain does not provide sufficient capacity to convey the required runoff flows. Improvements to the existing drainage system have been proposed, with capacity to accommodate current drainage standards and provide outlet for SWMF No.1 of the Harvest Run subdivision.

Through further analysis and consideration of inlet/outlet elevations, existing infrastructure and geometric constraints, it was confirmed that flows generated from the stormwater management facility and lands east of Centennial Road cannot be reasonably accommodated together within a single closed pipe system. It is therefore proposed that flows originating from SWMF No.1 will be conveyed through a new piped system devoted to the Harvest Run subdivision. Flows generated from lands outside of the development will be accommodated separately and maintaining capacity as exists today.

## 8. RECOMMENDATIONS FOR THE MCCREDIE MUNICIPAL DRAIN

It is our recommendation that:

1. The existing McCredie Drain Main Drain and Branch No.1 from approximate Sta. 0+000 to Sta. 0+714 remain in-place to serve as an outlet for drainage of lands within the watershed located north of the existing drain line.
2. A new closed drain be constructed south of and generally in the same running line as the existing Main Drain and Branch No.1 from Sta. 0+000 to Sta. 0+731 as shown on Drawing No.1. This new closed system will be constructed using "water-tight" HDPE pipe and be devoted entirely to flows generated from SWMF No.1 of the Harvest Run subdivision.
3. As construction of the new water-tight HDPE pipe will cut-off drainage from lands located south of the existing McCredie Drain line, a new closed concrete tile is to be constructed south of the new HDPE pipe to reinstate outlet to lands within the southern portion of the watershed. This is shown on Drawing No.1.

For terminology purposes within this report these three pipes will be referred to as;

- The existing McCredie Drain

- The Harvest Run Pipe
- The South Outlet Pipe

Together these three pipes form the overall McCredie Drain drainage system. Further details of recommended new construction are provided below.

#### Closed Pipe System for the Harvest Run subdivision (the Harvest Run Pipe)

1. The new closed drain consist of approximately 160m of twin 750mm diameter HDPE pipe, 497m of 900mm diameter HDPE pipe and 17m of 525mm diameter HDPE pipe.
2. New catch basins be installed at Sta. 0+070, 0+160 to act as maintenance access along the drain.
3. Crossing of the existing 750mm diameter and 900mm diameter Regional Watermains from Sta. 0+432 to Sta. 0+461 be made with twin 600mm diameter PVC pipe, complete with and upstream junction box and downstream catch basin. The catch basin shall be complete with rip rap on geotextile.
4. The Centennial Road crossing at Sta. 0+686 to Sta. 0+714 be made with 600mm diameter HDPE pipe, complete with new catch basins on both sides. The catch basins shall be complete with rip rap on geotextile.
5. The outlet control structure from the Harvest Run subdivision SWMF No.1 be connected to the upstream extent of the drain at Sta. 0+731.
6. The drain be designed with an allocated capacity of 0.82m<sup>3</sup>/s to provide outlet for the Harvest Run subdivision storm water management facility.

#### Closed Pipe System to Reinstate Outlet for South lands (the South Outlet Pipe)

7. The new closed drain consist of approximately 6m of 375mm diameter HDPE outlet pipe, 426m of 350mm diameter concrete field tile and 225m of 250mm diameter concrete field tile.
8. A new catch basin be installed at Sta. 0+686 on the east side of Centennial Road to act as maintenance access.
9. Crossing of the existing 750mm diameter and 900mm diameter Regional Watermains from Sta. 0+432 to Sta. 0+461 be made with 29m of 350mm diameter PVC pipe, complete with catch basins upstream and downstream. The catch basins shall be complete with rip rap on geotextile to control erosion.
10. The drainage coefficient standard used for this drain shall be 38mm of rainfall per 24 hours.

The drawings included with the report show the extent of the work, land affected, profile of the drain and other details of the work. The plan shown on Drawing No. 1 – McCredie Municipal Drain Overall Plan gives the area considered to be in the drainage area of the work proposed.

## **9. EMERGENCY OVERFLOW AND BACK-UP SYSTEM**

The new Harvest Run Pipe is a closed system devoted to flows generated from SWMF No.1, up to the 100-year outflow event. The October 2020 stormwater management report prepared by CJDLE Engineering includes construction of an emergency overflow that will direct SWMF No.1 flows exceeding the 100-year event over Centennial Road to the east and generally follow the existing McCredie Drain line to the Mills Drain as occurs under existing conditions.

As flows are intended to be conveyed underground through the Harvest Run Pipe, a similar overland back-up system is needed. Should flows become temporarily inhibited or blocked entirely within the pipe, they are anticipated to surcharge the catch basins and flow overland along the existing McCredie Drain line to the Mills Drain similar to the intended path of the emergency overflow from SWMF No.1 and as occurs under existing conditions. Through separate letter CJDLE has provided confirmation that these flow volumes will be less than existing conditions.

## 10. WORKING AREA

The working area for construction purposes shall be common for the pipes making up the overall McCredie Drain drainage system as all new construction is intended to be within a common trench.

The working area for construction shall be as follows;

Sta. 0+000 to Sta. 0+160 = 25m  
Sta. 0+160 to Sta. 0+432 = 20m  
Sta. 0+432 to Sta. 0+461 = 25m  
Sta. 0+461 to Sta. 0+686 = 20m  
Sta. 0+686 to Sta. 0+714 = 20m  
Sta. 0+714 to Sta. 0+731 = 20m

For future maintenance on the McCredie Drain drainage system, the working area shall be as follows;

Sta. 0+000 to Sta. 0+160 = 15m  
Sta. 0+160 to Sta. 0+432 = 10m  
Sta. 0+432 to Sta. 0+461 = 15m  
Sta. 0+461 to Sta. 0+686 = 10m  
Sta. 0+686 to Sta. 0+714 = 10m  
Sta. 0+714 to Sta. 0+731 = 10m

These working areas for both construction and maintenance shall be centered on the trench.

Each landowner on whose property the drainage work is to be constructed shall designate access to and from the working area at the time of construction or upon failure to do so, the Engineer or Drainage Superintendent, as the case may be, shall designate access.

## 11. WATERSHED CHARACTERISTICS

The current Drainage Area comprises approximately 84.74 hectares. Land use within the watershed is primarily agricultural under existing conditions.

Current specific land uses within the watershed are as follows:

Agricultural	- 64.85 ha
Residential	- 1.25 ha
Roadway	- 2.17 ha
Bush	- 13.10 ha
Park	- 3.37 ha

Under the proposed development of the Harvest Run subdivision the primary land use within the watershed will transition to residential.

## 12. ALLOWANCES

Various allowances are considered part of a Municipal Drain. The Drainage Act provides in Sections 29 to 33 that the Engineer is to allow in money for the value of several items, as follows:

### a) Section 29 – Right-of-Way

The Drainage Engineer is to provide for an allowance to be paid to the landowner whose land is proposed to be used for construction of the drain. While the lands used for the drain are still legally owned by the landowner on title, they are no longer usable for the landowner. While the lands used for the drain are still legally owned by the landowner on title, the Drainage Act creates a “Statutory Easement” which allows for

future access for maintenance and repair purposes. The Act requires the landowner to be compensated for the value of the land.

Allowances for Right-of-Way are calculated based on 25% of a land value of \$32,110.00 / hectare (\$13,000 / acre) for the width of the Right-of-Way.

It is understood that a 10m Right-of-Way is present on the existing McCredie Municipal Drain. Additional Right-of-Way 5m in width is therefore required along two separate sections of the drainage system - from Sta. 0+000 to Sta. 0+160 and Sta. 0+432 to Sta. 0+461.

The alignment proposed for the new construction of the Harvest Run Pipe and the South Outlet Pipe from Sta. 0+461 to Sta. 0+686 has been shifted south of the existing McCredie Drain line. The existing 10m Right-of-Way shall remain with the existing drain with no additional compensation. A new and additional 10m Right-of-Way over the line of the new pipe construction shall be made to the landowner.

#### b) Section 30 - Damages

The Drainage Engineer is to provide for an allowance to be paid to the landowner of land that may be damaged during construction. Typically, this section refers to agricultural crops, however, it also applies to lawns, ornamental trees and fences.

Damage from installing the drain is valued at \$1,420.00 / hectare (\$570 / acre), and is based on average width of 20m or 25m, depending on the working area location. The allowance is calculated on a 5 year declining balance basis, with 100% of the allowance paid for the first year, as total destruction of crop is anticipated. In the following 4 years, a declining allowance is paid based on a 5m width of disturbed ground, with 80% of the allowance paid in year 2, 60% in year 3, 40% in year 4, and 20% in year 5. This is done to reflect the decreased crop yields in the area where the subsoil was disturbed for drain installation.

For example, a parcel of cropland 350m in length that is disturbed for drain installation would be given a damage allowance calculated as follows:

Year 1: 350m x 20m = 0.7 ha x \$1,420	= \$994
Year 2: 350m x 5m = 0.175 ha x \$1,420 x 80%	= \$199
Year 3: 350m x 5m = 0.175 ha x \$1,420 x 60%	= \$149
Year 4: 350m x 5m = 0.175 ha x \$1,420 x 40%	= \$99
Year 5: 350m x 5m = 0.175 ha x \$1,420 x 20%	= \$50
Total Damage Allowance Paid in Report	= <b>\$1,491</b>

Allowances are paid regardless of what crop is grown or whether or not it is harvested in advance of construction. Crop value is calculated using a 2 year average of the "Area, Yield, Production and Farm Value of Specified Field Crops, Ontario" as published annually by the Ontario Ministry of Agricultural, Food and Rural Affairs.

#### c) Section 31 – Allowance for Existing Drains

No existing private drains are involved in this project.

#### d) Section 32 – Allowance for Damage Due to Insufficient Outlet

As sufficient outlet has been confirmed, there is no allowance for insufficient outlet.

#### e) Section 33 – Allowance for loss of Access

No access crossings are involved in this project.

The allowances are generally less than the assessment to the properties and the property owner is billed the difference when the project is complete.

GMBP determines the amounts to be paid in allowances to owners as shown in the following Schedule of Allowances. The allowances shall become due and payable according to Section 62 of the Drainage Act.



**Table 1: Schedule of Allowances**

Concession	Lot	Owner and Roll No.		Station		Additional Right-of-Way (Section 29)		Damages (Section 30)		Total
				Start	End	Cost (\$)	Width (m)	Cost (\$)	Width (m)	
7	N Pt. Lot 12	David & Catherine Knight	603-400	0+000	0+070	\$280	5	\$340	25	\$620
7	N Pt. Lot 11	1423052 Ontario Inc.	603-000	0+070 0+160	0+160 0+432	\$360 \$0	5 0	\$440 \$1,140	25 20	\$1,940
7	N Pt. Lot 11	1967055 Ontario Inc.	601-802	0+432 0+461	0+461 0+686	\$120 \$1,810	5 10	\$140 \$950	25 20	\$3,020
7	Plan 11M216 BLK 119, Pt. BLK 106	Doug Tarry Ltd.	522-624	0+714	0+731	\$0	0	\$70	20	\$70
			<b>Total</b>			<b>\$2,570</b>		<b>\$3,080</b>		<b>\$5,650</b>

### 13. ASSESSMENTS

Section 21 of the Drainage Act requires that the Engineer “*shall assess for benefit, outlet liability and injuring liability, and shall insert in an assessment schedule, in separate columns, the sums assessed for each opposite each parcel of land and road liable therefore.*” On this project Outlet liability and Section 26 assessments are involved.

**Assessment for Benefit** is described in **Section 22** of the Act, which states “*Lands, roads, buildings, utilities or other structures that are increased in value or are more easily maintained as a result of the construction, improvement, maintenance or repair of a drainage works may be assessed for benefit.*” As defined in the Act, Benefits to landowners can include higher market value for the property, improved appearance or better control of surface or subsurface water, or any other advantages relating to the betterment of lands, roads, buildings or structures.

No assessments for benefit have been made on this project.

**Assessment for Outlet Liability** is described in **Section 23(1)** of the Act which states “*Lands and roads that use a drainage works as an outlet, or for which, when the drainage works is constructed or improved, an improved outlet is provided either directly or indirectly through the medium of any other drainage works or of a swale, ravine, creek or watercourse, may be assessed for outlet liability.*” Outlet liability is the part of the cost of the works that is required to provide such outlet or improved outlet.

The Section 78 request was made to provide a sufficient outlet for the SWMF No.1 of the Harvest Run subdivision. Assessments were therefore made on an outlet basis for these development lands which contribute to SWMF No.1 and ultimately to the McCredie Drain drainage system.

The South Outlet Pipe is being constructed to reinstate outlet for the lands located south of the existing McCredie Drain line. Construction of this closed pipe does not change the current level of service available for these lands and is only required due to the construction of the adjacent Harvest Run Pipe. Assessments for construction of the South Outlet Pipe have therefore been made an outlet basis against the development lands within the Harvest Run subdivision.

**Assessment for Special Benefit** is described in **Section 24** of the Act and is defined as any additional work or feature included in the construction, repair or improvement of a drainage works that has no effect on the functioning of the drainage works.

No assessments for special benefit have been made on this project.

**Section 26** of the Act specifies that *“the public utility or road authority shall be assessed for and shall pay all the increase of cost of such drainage works caused by the existence of the works of the public utility or road authority.”* This means that any costs which are required solely because of the existence of Centennial Road will be fully assessed to the County of Elgin. The Section 26 assessment consists of the actual cost of the road crossing pipe, the catch basins and connections to the drain, minus the normal installation cost of the drain should the road not exist.

The County of Elgin shall have the option of either performing the work of installing the road crossing and catch basins or may elect to have the work done by the general contractor. If done by the County at its expense, the construction portion of the Section 26 assessment shall not apply. However done, the future maintenance, reconstruction, replacement or alteration of the Centennial Road crossing and catch basins, including any incidental costs shall be the responsibility of the County of Elgin.

Regional Water Supply shall have the option of either performing the work of exposure prior to construction, temporary support of the watermain, installing the watermain crossing and structures or may elect to have the work done by the general contractor. If done by Regional Water Supply at its expense, the construction portion of the Section 26 assessment shall not apply. However done, the future maintenance, reconstruction, replacement or alteration of the Regional Water Supply watermain crossing and structures, including any incidental costs shall be the responsibility of Regional Water Supply.

Regional Water Supply has been assessed for the increase in construction costs caused by the existence of the Regional Water Supply watermains. These costs are associated with installation to construct the new portions of the McCredie system at a greater depth below grade downstream of the two watermains.

The Municipality of Central Elgin shall have the option of either performing the work of exposure prior to construction, temporary support of the watermain and construction of the drain adjacent to the watermain or may elect to have the work done by the general contractor. If done by The Municipality of Central Elgin at its expense, the construction portion of the Section 26 assessment shall not apply. However done, the future maintenance, reconstruction, replacement or alteration of works related to the watermain including any incidental costs shall be the responsibility of the Municipality of Central Elgin.

The Municipality of Central Elgin has been assessed for the increase in construction costs caused by the existence of the watermain at Centennial Road. These costs are associated with installation to construct the new portions of the McCredie system at a greater depth below grade downstream of the watermain at Centennial Road. These costs are shared equally with Enbridge as the existence of both utilities causes this increase in construction costs.

Enbridge shall have the option of either performing the work of exposure prior to construction, temporary support of the gas line, pipe wrapping and construction of the drain adjacent to the gas line or may elect to have the work done by the general contractor. If done by Enbridge at its expense, the construction portion of the Section 26 assessment shall not apply. However done, the future maintenance, reconstruction, replacement or alteration of works related to the gas line including any incidental costs shall be the responsibility of Enbridge.

Enbridge has been assessed for the increase in construction costs caused by the existence of the gas line at Centennial Road. These costs are associated with installation to construct the new McCredie system at a greater depth below grade downstream of the gas line at Centennial Road. These costs are shared equally with Municipality of Central Elgin as the existence of both utilities causes this increase in construction costs.

Bell and Rogers shall have the option of either performing their respective work of exposure prior to construction, temporary support of the utility lines and construction of the drain adjacent to the utility lines or may elect to have



the work done by the general contractor. If done by Bell/Rogers at its expense, the construction portion of the Section 26 assessment shall not apply. However done, the future maintenance, reconstruction, replacement or alteration of works related to these respective utility lines including any incidental costs shall be the responsibility of the utility owner, whether Bell or Rogers.

Assessments were determined using a modified "Todgham" method, a method of assessment that is recognized to be a fair and equitable way of dividing costs between the contributing landowners. This methodology involves assigning Equivalent Area Factors to various types of property which reflect their runoff potential, using Agricultural lands as a base. An adjusted Equivalent Area Factor was incorporated into the assessments to account for runoff from proposed higher density development areas within the proposed Harvest Run subdivision as well the contribution of major (rejected) flows from the southerly portion of Phase 2B only.

The new Harvest Run Pipe closed system devoted entirely to flows generated from SWMF No.1 of the Harvest Run subdivision is to be constructed "water-tight" and not permit surface or sub-surface flows from entering the system from east of Centennial Road. These downstream lands outside of the development area have therefore not been assessed for this work. Additionally, construction of the adjacent South Outlet Pipe is intended to reinstate existing outlet of land east of Centennial Road, south of the existing McCredie Drain line. Construction of this pipe is only required to reinstate that outlet. These downstream lands outside of the Harvest Run subdivision development area have therefore not been assessed for this work.

Should the project not proceed by reason of withdrawal from the improvement request, costs to date are payable by the petitioners prorated to the assessments contained herein.

## 14. COST ESTIMATE

The cost of this Municipal Drain Improvement is estimated as **\$646,510** and is raised by assessment from properties within the watershed. A Schedule of Estimated Assessments can be found in **Appendix A**.

GM BluePlan estimates the cost of the McCredie Municipal Drain as follows:

<b>COST ESTIMATE - McCredie Municipal Drain Main Drain Central Elgin</b>		
<b>Allowances</b>	<b>\$</b>	<b>5,650</b>
<b>McCredie Drain Construction - Harvest Run Pipe</b>		
Supply, install, maintain and remove sediment and erosion control - Sta. 0+000	\$	500
Supply and install 40m <sup>2</sup> rip rap on geotextile filter material at outlet - Sta. 0+000	\$	2,700
Clearing, grubbing and disposal of trees, shrubs and stumps, complete	\$	4,500
Supply 320m of 750mm diameter HDPE pipe c/w two outlet pipes and rodent grates	\$	52,700
Install 160m of twin 750mm diameter HDPE pipe c/w twin outlet pipes complete with rodent grates - Sta. 0+000 - Sta. 0+160	\$	16,000
Supply and install granular 'B' bedding and backfill for twin 750mm diameter HDPE pipe - Sta. 0+000 to Sta. 0+160 (Approx. 1200 tonnes)	\$	23,900
Supply 272m of 900mm diameter HDPE pipe	\$	64,200
Install 272m of 900mm diameter HDPE pipe - Sta. 0+160 to Sta. 0+432	\$	16,500
Supply and install granular 'B' bedding and backfill for 900mm diameter HDPE pipe - Sta. 0+160 to Sta. 0+432 (Approx. 1150 tonnes)	\$	23,000

Supply 225m of 900mm diameter HDPE pipe	\$ 54,000	
Install 225m of 900mm diameter HDPE pipe- Sta. 0+461 to Sta. 0+686	\$ 13,500	
Supply and install granular 'B' bedding and backfill for 900mm diameter HDPE pipe - Sta. 0+461 to Sta. 0+686 (Approx. 1150 tonnes)	\$ 23,000	
Supply 17m of 525mm diameter HDPE pipe	\$ 1,300	
Install 17m of 525mm diameter HDPE pipe - Sta. 0+714 to Sta. 0+731	\$ 1,000	
Supply and install granular 'B' bedding and backfill for 525mm diameter HDPE pipe - Sta. 0+714 to Sta. 0+731 (Approx. 50 tonnes)	\$ 1,000	
Supply and install 3 - 1200mm x 2400mm catch basins complete with birdcage grate - Sta. 0+070, Sta. 0+160, Sta. 0+432	\$ 18,000	
Supply and install rip rap (10m <sup>2</sup> ) at each catch basins - Sta. 0+070, Sta. 0+160, Sta. 0+432	\$ 2,400	
Supply and install approved fill to maintain proper cover Sta. 0+000 to Sta. 0+080 (Approx. 100 tonnes) (provisional)	\$ 1,200	
Allowance for clear stone bedding (provisional)	\$ 3,600	
Contingency Fund at approx. 10% of construction	\$ 32,000	
<b>Total Estimated Main Drain Construction Cost</b>	<b>\$ 355,000</b>	
<b>McCredie Drain Construction - South Outlet Pipe</b>		
Expose existing McCredie Drain Branch No.2 outlet prior to construction	\$ 400	
Supply 6m of 375mm diameter HDPE pipe c/w rodent grate	\$ 400	
Install 6m of 375mm diameter HDPE pipe c/w rodent grate Sta. 0+000 to 0+006	\$ 500	
Supply 426m of 350mm diameter concrete field tile	\$ 9,700	
Install 426m of 350mm diameter concrete field tile Sta. 0+006 to 0+432	\$ 10,500	
Supply approx. 5m of 350mm diameter concrete field tile	\$ 200	
Install approx. 5m of 350mm diameter concrete field tile by excavator - Offset Sta. 0+432 - McCredie Drain Branch No.2	\$ 300	
Supply and install granular 'B' bedding and backfill for 350mm diameter concrete field tile - Offset Sta. 0+432 - McCredie Drain Branch No.2(Approx. 5 tonnes)	\$ 100	
Supply 225m of 250mm diameter concrete field tile	\$ 3,400	
Install 225m of 250mm diameter concrete field tile Sta. 0+461 to 0+686	\$ 4,500	
Supply and install 2 - 600mm x 600mm catch basins complete with bird cage grate - Sta. 0+432, Sta.0+686	\$ 4,000	
Supply and install rip-rap (10m <sup>2</sup> ) at each catch basin - Sta. 0+432, Sta. 0+686	\$ 1,600	
Allowance for clear stone bedding (provisional)	\$ 2,400	
Allowance for tile connections (provisional)	\$ 1,500	
Contingency Fund at approx. 10% of construction	\$ 3,500	
<b>Total Estimated Concrete Tile/PVC Section Construction Cost</b>	<b>\$ 43,000</b>	

<b>Construction - Work to Support Regional Water Supply</b>		
Exposure of Regional Watermains during design stage (Daylighting)	\$ 3,800	
Exposure of Regional Watermains prior to construction	\$ 1,500	
Supply 58m of 600mm diameter PVC pipe	\$ 11,500	
Install 29m of twin 600mm diameter PVC pipe - Sta. 0+432 to Sta. 0+461	\$ 4,700	
Supply and install granular 'A' bedding and backfill for twin 600mm diameter PVC pipe - Sta. 0+432 to Sta. 0+461 (Approx. 130 tonnes)	\$ 2,600	
Supply 29m of 350mm diameter PVC pipe	\$ 1,500	
Install 29m of 350mm diameter PVC pipe Sta. 0+432 to 0+461	\$ 3,000	
Supply and install un-shrinkable fill backfill to springline of 750mm diameter watermain	\$ 1,800	
Supply and install - 1200mm x 2400mm junction box - Sta. 0+461	\$ 5,500	
Supply and install 600mm x 600mm catch basin complete with bird grate - Sta. 0+461	\$ 2,000	
Supply and install rip-rap (5m <sup>2</sup> ) at each catch basin - Sta. 0+461	\$ 300	
Temporary Support System for Existing Watermain during construction, including drawings stamped a professional engineer licensed in the Province of Ontario	\$ 15,000	
Non-construction - Coordination, on-site survey, design, support drawings	\$9,500	
Contingency Fund at approx. 10% of construction	\$5,300	
<b>Total Estimated Work to Support Regional Watermain Construction Cost</b>	<b>\$</b>	<b>68,000</b>
<b>Construction - Work to be done on Centennial Road</b>		
Supply 28m of 600mm diameter HDPE pipe	\$ 3,300	
Install 28m of 600mm diameter HDPE pipe - Sta. 0+686 - Sta. 0+714	\$ 1,600	
Supply and install - 900mm x 1800mm catch basin complete with birdcage grate - Sta. 0+686	\$ 4,000	
Supply and install - 900mm x 1200mm catch basin complete with birdcage grate - Sta. 0+714	\$ 3,200	
Supply and install rip rap (10m <sup>2</sup> ) at catch basin - Sta. 0+686	\$ 1,600	
Supply and install rip rap (10m <sup>2</sup> ) at catch basin - Sta. 0+714	\$ 1,600	
Remove, salvage and reinstall existing 525mm diameter CSP pipe	\$ 500	
Supply and install Granular 'A' base and backfill (approx. 160 tonnes)	\$ 3,500	
Supply and install Granular 'B' base and backfill (approx. 720 tonnes)	\$ 14,500	
Supply and placement of HL4 hot mix asphalt including sawcut (90mm depth or match existing, whichever is greater - placed in two lifts)	\$ 4,400	
Contingency Fund at approx. 10% of construction	\$ 3,800	
<b>Total Estimated Centennial Road Crossing Construction Cost</b>	<b>\$</b>	<b>42,000</b>

<b>Construction - Work to Support 150 Dia Watermain at Centennial Road</b>		
Exposure of watermain during design stage (Daylighting)	\$1,520	
Exposure of watermain at time of construction	\$750	
Temporary Support of watermain	\$600	
Non-construction - Coordination, on-site survey during exposure of watermain, protection design/specifications	\$4,000	
Contingency Fund at approx. 10% of construction	\$300	
<b>Total Esitimated Work to Support Municipality of Central Elgin Cost</b>	<b>\$</b>	<b>7,170</b>
<b>Construction - Work to Support Enbridge Line at Centennial Road</b>		
Exposure of gas line during design stage (Daylighting)	\$1,520	
Exposure of gas line at time of construction	\$750	
Temporary Support of gas line	\$600	
Supply and install protective wrapping (as specified by Enbridge)	\$500	
Non-construction - Coordination, on-site survey during exposure of gas lines, protection design/specifications	\$4,000	
Contingency Fund at approx. 10% of construction	\$300	
<b>Total Esitimated Work to Support Enbridge Cost</b>	<b>\$</b>	<b>7,670</b>
<b>Construction - Work to Support Bell Line at Centennial Road</b>		
Exposure of Bell line during design stage (Daylighting)	\$ 760	
Exposure of Bell line at time of construction	\$ 350	
Temporary Support of Bell line	\$ 500	
Non-Construction - Coordination, construction design/specifications	\$ 2,000	
Contingency Fund at approx. 10% of construction	\$ 200	
<b>Total Esitimated Work to Support Bell Cost</b>	<b>\$</b>	<b>3,810</b>
<b>Construction - Work to Support Rogers Line at Centennial Road</b>		
Exposure of Rogers line at time of construction	\$ 350	
Temporary Support of Rogers line	\$ 500	
Non-Construction - Coordination, construction design/specifications	\$ 2,000	
Contingency Fund at approx. 10% of construction	\$ 200	
<b>Total Esitimated Work to Support Rogers Cost</b>	<b>\$</b>	<b>3,050</b>
<b>Non-Construction Costs</b>		
On Site Meeting, Survey, Plan, Profile, and Report	\$ 89,500	
CCTV Inspection work	\$ 600	
Geotechnical Investigation and Report	\$ 1,380	
Tendering, Construction Review, and Contract Administration	\$ 8,500	
Net HST (1.76%)	\$ 11,180	
<b>Total Non-Construction Costs</b>	<b>\$</b>	<b>111,160</b>
<b>TOTAL ESTIMATED COST</b>	<b>\$</b>	<b>646,510</b>

\*The above costs are estimates only. The final costs of engineering and administration cannot be determined until construction is completed. The above costs also do not include costs to defend the drainage report should appeals be filed with the Court of Revision, Drainage Tribunal and/or Drainage Referee as the extent of the work required cannot be determined. Should additional costs be incurred, unless directed otherwise, the costs would be assessed in pro rata fashion as per the Schedule of Assessments.

## 15. MAINTENANCE

As per section 74 of the Act, after construction of the improvements the McCredie Municipal Drain as described in this Report shall be maintained by Central Elgin at the expense of the upstream lands and roads assessed, in the proportions set out in the By-Law which adopts this report. Any future maintenance or repair costs shall be distributed pro rata in accordance with **Appendix B**, the Schedule of Assessments for Future Maintenance. The Schedule of Assessments for Future Maintenance is based on the equivalent contributing areas for all properties.

Upon development of the Harvest Run subdivision, many land uses, property boundaries and land ownership within the current watershed will have changed. This will result in a change in the equivalent contributing areas to the drain for these lands. For efficiencies in future maintenance it is recommended that the Municipality complete a Section 65 Change in Assessment or a Section 76 Varying Original Assessments for Maintenance under the Drainage Act in the future to appropriately adjust the Maintenance Schedule for the McCredie Drain.

Recognizing this future planned development, GM BluePlan has prepared updated maintenance schedules for this interim period following construction of the drain that includes three individual assessment tables;

- 1) Maintenance assessment for the existing McCredie Drain;
- 2) Maintenance assessment for the new Harvest Run Pipe; and
- 3) Maintenance assessment for the new South Outlet Pipe

Future costs for maintenance of the Centennial Road crossing are to be fully assessed to the County of Elgin. Future costs for maintenance due to the existence of Regional Water Supply watermains, local Central Elgin watermain, Enbridge lines, Bell lines and Rogers lines shall be fully assessed to Regional Water Supply, the Municipality of Central Elgin, Enbridge, Bell and Rogers, respectively. As road authority, the County of Elgin has the right under Section 69 (1) to undertake any maintenance or repair to their crossings as they deem necessary. As public utilities, Regional Water Supply, the Municipality of Central Elgin, Enbridge, Bell, and Rogers have the right to maintain or repair the drain upon, along, adjoining, under or across the Regional Water Supply watermains, local watermain, gas lines, Bell lines and Rogers lines, respectively. The Drainage Superintendent should be advised of any works being undertaken.

Any additional costs for future drain maintenance required for and due to the removal of vegetation, fencing or any other obstruction within the Right-Of-Way shall be assessed to the landowner.

Landowners should take note that there is responsibility for landowners to not damage or block flow in the Municipal Drain. Section 80(1) of the Drainage Act states;

*"When a drainage works becomes obstructed by a dam, low bridge, fence, washing out of a private drain, or other obstruction, for which the owner or occupant of the land adjoining the drainage works is responsible, so that the free flow of the water is impeded thereby, the persons owning or occupying the land shall, upon reasonable notice sent by the council of the local municipality whose duty it is to maintain and repair the drainage works or by a drainage superintendent appointed by the council, remove such obstruction and, if it is not so removed within the time specified in the notice, the council or the drainage superintendent shall forthwith cause it to be removed, and the cost thereof is payable to the municipality by the owner or occupant of the land."*

Any landowners, who have questions as to their rights and responsibilities under the Drainage Act, should contact the Central Elgin Drainage Superintendent who can provide additional information and answer any questions that landowners may have.

Regular inspection of the drainage course should be undertaken by the Central Elgin Drainage Superintendent. Landowners can assist with the inspection by making regular inspections of the drain as it crosses their property, clearing debris from the drain, catch basins and culverts if possible, and reporting any problems or concerns to the Drainage Superintendent who can inspect and take any necessary actions.

All of which is respectfully submitted.

Yours truly,

GM BLUEPLAN ENGINEERING LIMITED

Per:

A handwritten signature in blue ink, appearing to read 'Brad Bunke'.

Brad Bunke, P.Eng.



**Disclaimer:** This report is intended for the sole use of The Municipality of Central Elgin for the purposes as expressed in the report. Any use of or reliance upon this report by third parties is at the expressed responsibility of the third party. GM BluePlan Engineering is not responsible for any damages suffered by any third party as a result of decisions or actions made based upon the information contained in this report.

Appendix A  
Schedule of Estimated Assessments for Construction

Schedule of Estimated Assessments Prepared by GM BluePlan Engineering Limited July 2021 McCredie Municipal Drain Main Drain													
Roll No.	Conc	Lot	Owner	Affected Area		Adjusted Area		Benefit (sect. 22)	Outlet (sect. 23)	Section 24/26	TOTAL ASSESSMENT	Allowances	NET ASSESSMENT
				ac.	ha.	ac.	ha.						
Lands													
418-000	7	S.Pt. Lot 11	Dallas H & Marjorie D Axford	23.96	9.70	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
520-000	7	S.Pt. Lot 10	Adele Ashford	47.07	19.05	205.46	83.15	\$ -	\$ 226,100	\$ -	\$ 226,100	\$ -	\$ 226,100
522-618	7	Plan 11M216 BLK 113	Doug Tarry LTD.	5.29	2.14	7.51	3.04	\$ -	\$ 8,260	\$ -	\$ 8,260	\$ -	\$ 8,260
522-619	7	Plan 11M216 BLK 114	Doug Tarry LTD.	8.65	3.50	12.28	4.97	\$ -	\$ 13,510	\$ -	\$ 13,510	\$ -	\$ 13,510
522-620	7	Plan 11M216 BLK 115	Doug Tarry LTD.	3.24	1.31	3.88	1.57	\$ -	\$ 4,270	\$ -	\$ 4,270	\$ -	\$ 4,270
522-621	7	Plan 11M216 BLK 116	Doug Tarry LTD.	1.26	0.51	1.75	0.71	\$ -	\$ 1,930	\$ -	\$ 1,930	\$ -	\$ 1,930
522-623	7	Plan 11M216 BLK 118	Doug Tarry LTD.	13.57	5.49	30.29	12.26	\$ -	\$ 33,350	\$ -	\$ 33,350	\$ -	\$ 33,350
522-624	7	Plan 11M216 BLK 119 Pt BLK 106	Doug Tarry LTD.	12.40	5.02	38.05	15.40	\$ -	\$ 41,870	\$ -	\$ 41,870	\$ (70)	\$ 41,800
522-625	7	Plan 11M216 BLK 120	Doug Tarry LTD.	30.07	12.17	119.47	48.35	\$ -	\$ 131,480	\$ -	\$ 131,480	\$ -	\$ 131,480
522-626	7	Plan 11M216 BLK 121	Doug Tarry LTD.	3.61	1.46	15.37	6.22	\$ -	\$ 16,910	\$ -	\$ 16,910	\$ -	\$ 16,910
601-700	7	N.Pt. Lot 11	Christopher A Fernandes	0.51	0.21	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
601-800	7	N.Pt. Lot 11	Troy J Tyshenko	0.25	0.10	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
601-801	7	N.Pt. Lot 11	David & Mary McDougall	0.79	0.32	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
601-802	7	N.Pt. Lot 11	1967055 Ontario Inc.	11.61	4.70	-	-	\$ -	\$ -	\$ -	\$ -	\$ (3,020)	\$ (3,020)
601-804	7	N.Pt. Lot 11	Christopher A Fernandes	0.36	0.15	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
601-900	7	N.Pt. Lot 11	Jonathan D Gunning	0.39	0.16	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
602-000	7	N.Pt. Lot 11	Jonathan A Van Wyk	2.40	0.97	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
602-010	7	N.Pt. Lot 11	Brent B & Pamela G Matatall	0.07	0.03	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
602-106	7	N.Pt. Lot 11	Fatime Sherifi	2.64	1.07	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
603-000	7	N.Pt. Lot 11	1423052 Ontario Inc	23.21	9.39	-	-	\$ -	\$ -	\$ -	\$ -	\$ (1,940)	\$ (1,940)
002	7	Proposed Road	Doug Tarry LTD.	3.90	1.58	14.28	5.78	\$ -	\$ 15,710	\$ -	\$ 15,710	\$ -	\$ 15,710
603-400	7	N Pt. Lot 12	David & Catherine Knight	0.35	0.14	-	-	\$ -	\$ -	\$ -	\$ -	\$ (620)	\$ (620)
890-000-000	7	Pt. Lot 9	City of St. Thomas	4.72	1.91	6.70	2.71	\$ -	\$ 7,380	\$ -	\$ 7,380	\$ -	\$ 7,380
895-000-000	7	Pt. Lot 9	City of St. Thomas	3.39	1.37	4.82	1.95	\$ -	\$ 5,290	\$ -	\$ 5,290	\$ -	\$ 5,290
543-200-000	7	Pt. Lot 9	City of St. Thomas	0.05	0.02	0.07	0.03	\$ -	\$ 80	\$ -	\$ 80	\$ -	\$ 80
889-700-000	7	Pt. Lot 9	City of St. Thomas	0.17	0.07	0.25	0.10	\$ -	\$ 270	\$ -	\$ 270	\$ -	\$ 270
845-400-000	7	Pt. Lot 9	City of St. Thomas	0.12	0.05	0.52	0.21	\$ -	\$ 580	\$ -	\$ 580	\$ -	\$ 580
Total Estimated Assessment - Lands				119.07	82.57	460.72	186.45	-	506,990.00	-	506,990.00	(5,650.00)	\$ 501,340
Roads													
000-001	7	Centennial Road	Elgin County	5.36	2.17	-	-	\$ -	\$ -	\$ 53,260	\$ 53,260	\$ -	\$ 53,260
			Regional Water Supply	-	-	-	-	\$ -	\$ -	\$ 54,620	\$ 54,620	\$ -	\$ 54,620
			Municipality of Central Elgin	-	-	-	-	\$ -	\$ -	\$ 12,340	\$ 12,340	\$ -	\$ 12,340
			Enbridge	-	-	-	-	\$ -	\$ -	\$ 12,840	\$ 12,840	\$ -	\$ 12,840
			Bell	-	-	-	-	\$ -	\$ -	\$ 3,660	\$ 3,660	\$ -	\$ 3,660
			Rogers	-	-	-	-	\$ -	\$ -	\$ 2,800	\$ 2,800	\$ -	\$ 2,800
Total Estimated Assessment - Roads				5.36	2.17	0.00	0	\$ -	\$ -	\$ 139,520.00	\$ 139,520.00	\$ -	\$ 139,520.00
TOTAL ESTIMATED ASSESSMENTS				124.43	84.74	460.72	186.45	-	506,990.00	139,520.00	646,510.00	(5,650.00)	640,860.00
¹Agricultural lands may be eligible for a one third provincial grant. Neither the availability nor the amount of the grant can be determined in advance													



Appendix B  
Schedule of Assessments for Future Maintenance

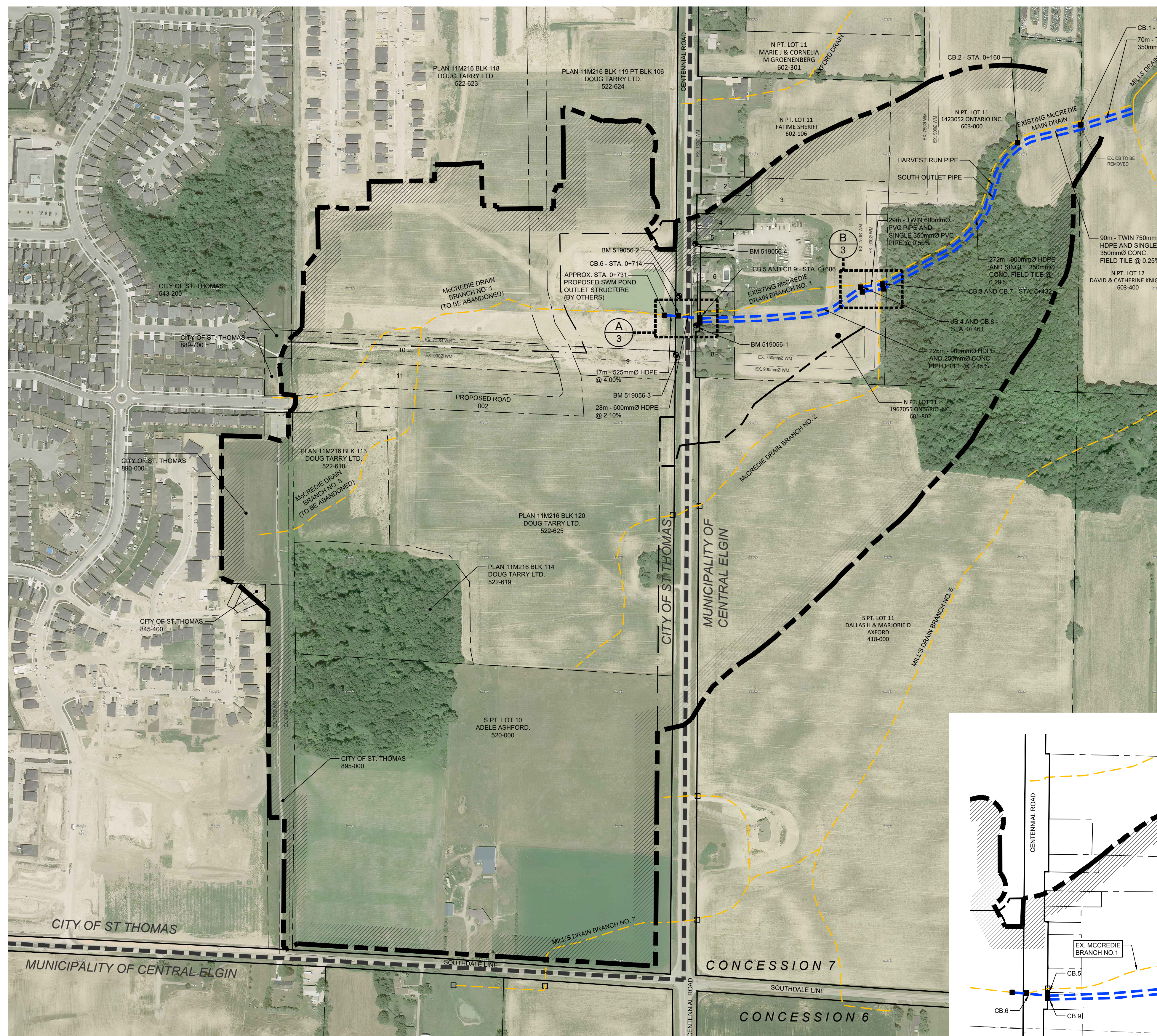
Schedule of Maintenance Assessments Prepared by GM BluePlan Engineering Limited July 2021 McCredie Municipal Drain Main Drain - Existing McCredie Drain								
Roll No.	Conc	Lot	Owner	Affected Area		Adjusted Area		Maintenance
				ac.	ha.	ac.	ha.	
Lands								
418-000	7	S.Pt. Lot 11	Dallas H & Marjorie D Axford	23.96	9.70	-	-	0.00%
520-000	7	S.Pt. Lot 10	Adele Ashford	47.07	19.05	-	-	0.00%
522-618	7	Plan 11M216 BLK 113	Doug Tarry LTD.	5.29	2.14	-	-	0.00%
522-619	7	Plan 11M216 BLK 114	Doug Tarry LTD.	8.65	3.50	-	-	0.00%
522-620	7	Plan 11M216 BLK 115	Doug Tarry LTD.	2.17	0.88	-	-	0.00%
522-621	7	Plan 11M216 BLK 116	Doug Tarry LTD.	1.21	0.49	-	-	0.00%
522-623	7	Plan 11M216 BLK 118	Doug Tarry LTD.	-	-	-	-	0.00%
522-624	7	Plan 11M216 BLK 119 Pt BLK 106	Doug Tarry LTD.	5.93	2.40	-	-	0.00%
522-625	7	Plan 11M216 BLK 120	Doug Tarry LTD.	30.07	12.17	-	-	0.00%
522-626	7	Plan 11M216 BLK 121	Doug Tarry LTD.	3.61	1.46	-	-	0.00%
601-700	7	N.Pt. Lot 11	Christopher A Fernandes	0.51	0.21	0.77	0.31	2.49%
601-800	7	N.Pt. Lot 11	Troy J Tyshenko	0.25	0.10	0.37	0.15	1.20%
601-801	7	N.Pt. Lot 11	David & Mary McDougall	0.79	0.32	-	-	0.00%
601-802	7	N.Pt. Lot 11	1967055 Ontario Inc.	8.10	3.28	14.08	5.70	45.77%
601-804	7	N.Pt. Lot 11	Christopher A Fernandes	0.36	0.15	0.54	0.22	1.77%
601-900	7	N.Pt. Lot 11	Jonathan D Gunning	0.39	0.16	0.58	0.23	1.88%
602-000	7	N.Pt. Lot 11	Jonathan A Van Wyk	2.40	0.97	2.40	0.97	7.79%
602-010	7	N.Pt. Lot 11	Brent B & Pamela G Matatall	0.07	0.03	0.10	0.04	0.32%
602-106	7	N.Pt. Lot 11	Fatime Sherifi	2.64	1.07	2.64	1.07	8.57%
603-000	7	N.Pt. Lot 11	1423052 Ontario Inc	10.72	4.34	9.23	3.74	29.99%
002	7	Proposed Road	Doug Tarry LTD.	2.74	1.11	-	-	0.00%
603-400	7	N Pt. Lot 12	David & Catherine Knight	0.20	0.08	0.07	0.03	0.22%
890-000-000	7	Pt. Lot 9	City of St. Thomas	-	-	-	-	0.00%
895-000-000	7	Pt. Lot 9	City of St. Thomas	-	-	-	-	0.00%
543-200-000	7	Pt. Lot 9	City of St. Thomas	-	-	-	-	0.00%
889-700-000	7	Pt. Lot 9	City of St. Thomas	-	-	-	-	0.00%
845-400-000	7	Pt. Lot 9	City of St. Thomas	-	-	-	-	0.00%
Total Estimated Assessment - Lands				72.16	63.59	30.77	12.45	100.00%
Roads								
000-001	7	Centennial Road	Elgin County	5.36	2.17	-	-	0.00%
			Regional Water Supply	-	-	-	-	0.00%
			Municipality of Central Elgin	-	-	-	-	0.00%
			Enbridge	-	-	-	-	0.00%
			Bell	-	-	-	-	0.00%
			Rogers	-	-	-	-	0.00%
Total Estimated Assessment - Roads				5.36	2.17	0.00	0	0.00%
TOTAL ESTIMATED ASSESSMENTS				77.52	65.76	30.77	12.45	100.00%

Schedule of Maintenance Assessments Prepared by GM BluePlan Engineering Limited July 2021 McCredie Municipal Drain Main Drain - Harvest Run Pipe								
Roll No.	Conc	Lot	Owner	Affected Area		Adjusted Area		Maintenance
				ac.	ha.	ac.	ha.	
Lands								
418-000	7	S.Pt. Lot 11	Dallas H & Marjorie D Axford	23.96	9.70	-	-	0.00%
520-000	7	S.Pt. Lot 10	Adele Ashford	47.07	19.05	205.45	83.15	44.60%
522-618	7	Plan 11M216 BLK 113	Doug Tarry LTD.	5.29	2.14	7.51	3.04	1.63%
522-619	7	Plan 11M216 BLK 114	Doug Tarry LTD.	8.65	3.50	12.28	4.97	2.67%
522-620	7	Plan 11M216 BLK 115	Doug Tarry LTD.	3.24	1.31	3.88	1.57	0.84%
522-621	7	Plan 11M216 BLK 116	Doug Tarry LTD.	1.26	0.51	1.76	0.71	0.38%
522-623	7	Plan 11M216 BLK 118	Doug Tarry LTD.	13.57	5.49	30.30	12.26	6.58%
522-624	7	Plan 11M216 BLK 119 Pt BLK 106	Doug Tarry LTD.	12.40	5.02	38.04	15.40	8.26%
522-625	7	Plan 11M216 BLK 120	Doug Tarry LTD.	30.07	12.17	119.47	48.35	25.93%
522-626	7	Plan 11M216 BLK 121	Doug Tarry LTD.	3.61	1.46	15.37	6.22	3.34%
601-700	7	N.Pt. Lot 11	Christopher A Fernandes	0.51	0.21	-	-	0.00%
601-800	7	N.Pt. Lot 11	Troy J Tyshenko	0.25	0.10	-	-	0.00%
601-801	7	N.Pt. Lot 11	David & Mary McDougall	0.79	0.32	-	-	0.00%
601-802	7	N.Pt. Lot 11	1967055 Ontario Inc.	11.61	4.70	-	-	0.00%
601-804	7	N.Pt. Lot 11	Christopher A Fernandes	0.36	0.15	-	-	0.00%
601-900	7	N.Pt. Lot 11	Jonathan D Gunning	0.39	0.16	-	-	0.00%
602-000	7	N.Pt. Lot 11	Jonathan A Van Wyk	2.40	0.97	-	-	0.00%
602-010	7	N.Pt. Lot 11	Brent B & Pamela G Matatall	0.07	0.03	-	-	0.00%
602-106	7	N.Pt. Lot 11	Fatime Sherifi	2.64	1.07	-	-	0.00%
603-000	7	N.Pt. Lot 11	1423052 Ontario Inc	23.21	9.39	-	-	0.00%
002	7	Proposed Road	Doug Tarry LTD.	3.90	1.58	14.28	5.78	3.10%
603-400	7	N Pt. Lot 12	David & Catherine Knight	0.35	0.14	-	-	0.00%
890-000-000	7	Pt. Lot 9	City of St. Thomas	4.72	1.91	6.70	2.71	1.45%
895-000-000	7	Pt. Lot 9	City of St. Thomas	3.39	1.37	4.81	1.95	1.04%
543-200-000	7	Pt. Lot 9	City of St. Thomas	0.05	0.02	0.07	0.03	0.02%
889-700-000	7	Pt. Lot 9	City of St. Thomas	0.17	0.07	0.25	0.10	0.05%
845-400-000	7	Pt. Lot 9	City of St. Thomas	0.12	0.05	0.53	0.21	0.11%
Total Estimated Assessment - Lands				119.07	82.57	460.70	186.44	100.00%
Roads								
000-001	7	Centennial Road	Elgin County	5.36	2.17	-	-	0.00%
			Regional Water Supply	-	-	-	-	0.00%
			Municipality of Central Elgin	-	-	-	-	0.00%
			Enbridge	-	-	-	-	0.00%
			Bell	-	-	-	-	0.00%
			Rogers	-	-	-	-	0.00%
Total Estimated Assessment - Roads				5.36	2.17	0.00	0	0.00%
TOTAL ESTIMATED ASSESSMENTS				124.43	84.74	460.70	186.44	100.00%

Schedule of Maintenance Assessments Prepared by GM BluePlan Engineering Limited July 2021 McCredie Municipal Drain Main Drain - South Outlet Pipe								
Roll No.	Conc	Lot	Owner	Affected Area		Adjusted Area		Maintenance
				ac.	ha.	ac.	ha.	
Lands								
418-000	7	S.Pt. Lot 11	Dallas H & Marjorie D Axford	23.96	9.70	22.84	9.24	62.27%
520-000	7	S.Pt. Lot 10	Adele Ashford	47.07	19.05	-	-	0.00%
522-618	7	Plan 11M216 BLK 113	Doug Tarry LTD.	5.29	2.14	-	-	0.00%
522-619	7	Plan 11M216 BLK 114	Doug Tarry LTD.	8.65	3.50	-	-	0.00%
522-620	7	Plan 11M216 BLK 115	Doug Tarry LTD.	2.17	0.88	-	-	0.00%
522-621	7	Plan 11M216 BLK 116	Doug Tarry LTD.	1.21	0.49	-	-	0.00%
522-623	7	Plan 11M216 BLK 118	Doug Tarry LTD.	-	-	-	-	0.00%
522-624	7	Plan 11M216 BLK 119 Pt BLK 106	Doug Tarry LTD.	5.93	2.40	-	-	0.00%
522-625	7	Plan 11M216 BLK 120	Doug Tarry LTD.	30.07	12.17	-	-	0.00%
522-626	7	Plan 11M216 BLK 121	Doug Tarry LTD.	3.61	1.46	-	-	0.00%
601-700	7	N.Pt. Lot 11	Christopher A Fernandes	0.51	0.21	-	-	0.00%
601-800	7	N.Pt. Lot 11	Troy J Tyshenko	0.25	0.10	-	-	0.00%
601-801	7	N.Pt. Lot 11	David & Mary McDougall	0.79	0.32	1.18	0.48	3.22%
601-802	7	N.Pt. Lot 11	1967055 Ontario Inc.	6.75	2.73	5.11	2.07	13.95%
601-804	7	N.Pt. Lot 11	Christopher A Fernandes	0.36	0.15	-	-	0.00%
601-900	7	N.Pt. Lot 11	Jonathan D Gunning	0.39	0.16	-	-	0.00%
602-000	7	N.Pt. Lot 11	Jonathan A Van Wyk	2.40	0.97	-	-	0.00%
602-010	7	N.Pt. Lot 11	Brent B & Pamela G Matatall	0.07	0.03	-	-	0.00%
602-106	7	N.Pt. Lot 11	Fatime Sherifi	2.64	1.07	-	-	0.00%
603-000	7	N.Pt. Lot 11	1423052 Ontario Inc	13.34	5.40	7.49	3.03	20.42%
002	7	Proposed Road	Doug Tarry LTD.	2.74	1.11	-	-	0.00%
603-400	7	N Pt. Lot 12	David & Catherine Knight	0.15	0.06	0.05	0.02	0.14%
890-000-000	7	Pt. Lot 9	City of St. Thomas	-	-	-	-	0.00%
895-000-000	7	Pt. Lot 9	City of St. Thomas	-	-	-	-	0.00%
543-200-000	7	Pt. Lot 9	City of St. Thomas	-	-	-	-	0.00%
889-700-000	7	Pt. Lot 9	City of St. Thomas	-	-	-	-	0.00%
845-400-000	7	Pt. Lot 9	City of St. Thomas	-	-	-	-	0.00%
Total Estimated Assessment - Lands				73.37	64.08	36.67	14.84	100.00%
Roads								
000-001	7	Centennial Road	Elgin County	5.36	2.17	-	-	0.00%
			Regional Water Supply	-	-	-	-	0.00%
			Municipality of Central Elgin	-	-	-	-	0.00%
			Enbridge	-	-	-	-	0.00%
			Bell	-	-	-	-	0.00%
			Rogers	-	-	-	-	0.00%
Total Estimated Assessment - Roads				5.36	2.17	0.00	0	0.00%
TOTAL ESTIMATED ASSESSMENTS				78.73	66.25	36.67	14.84	100.00%

## Appendix C Drawings


















NUMBER	LOT	CONC.	LANDOWNER	ROLL NUMBER
1	N PT. LOT 11	7	DIANNA L WOODFORD	602-100
2	N PT. LOT 11	7	BRENT B & PAMELA G MATATALL	602-010
3	N PT. LOT 11	7	JONATHAN A VAN WYK	602-000
4	N PT. LOT 11	7	JONATHAN D GUNNING	601-900
5	N PT. LOT 11	7	TROY J TYSHENKO	601-800
6	N PT. LOT 11	7	CHRISTOPHER A FERNANDES	601-700
7	N PT. LOT 11	7	CHRISTOPHER A FERNANDES	601-804
8	N PT. LOT 11	7	DAVID & MARY McDUGALL	601-801
9	PLAN 11M216 BLK 116	7	DOUG TARRY LTD.	522-621
10	PLAN 11M216 BLK 115	7	DOUG TARRY LTD.	522-620
11	PLAN 11M216 BLK 121	7	DOUG TARRY LTD.	522-626

NOTES :

1. CONTRACTOR IS TO OBTAIN UTILITY LOCATES PRIOR TO CONSTRUCTION.
2. CONTRACTOR IS TO CONNECT EXISTING TILES DURING CONSTRUCTION.

NOMENCLATURE:	
APPROX.	APPROXIMATE
chw	COMPLETE WITH
CB	CATCHBASIN
CONC.	CONCRETE
Ø	CENTER LINE
CSP	CORRUGATED STEEL PIPE
Ø	DIAMETER
DICB	DITCH INLET CATCHBASIN
ELEV.	ELEVATION
EX	EXISTING
INV.	INVERT
min.	MINIMUM
PL	PROPERTY LINE
R	RADIUS
STA.	STATION
TYP.	TYPICAL
US	UPSTREAM

**LEGEND:**

	WATERSHED BOUNDARY
	PROPOSED CLOSED DRAIN
	EX. CLOSED DRAIN
	EX. OPEN DRAIN
	R.O.W. LIMIT
	PROPERTY LINE
	MUNICIPAL BOUNDARY
	DEVELOPMENT WATERSHED BOUNDARY
	SUB WATERSHED BOUNDARY
	EX. WATERMAIN (SIZE VARIES)
	EX. CATCHBASIN
	BENCHMARK LOCATION
	PROPOSED CATCHBASIN

**BENCH MARKS:**

**BM 150506-1 - ELEV = 244.053m**  
TJNT OF HYDRANT, EAST OF CENTENNIAL ROAD, SOUTH OF  
EXISTING DRAIN

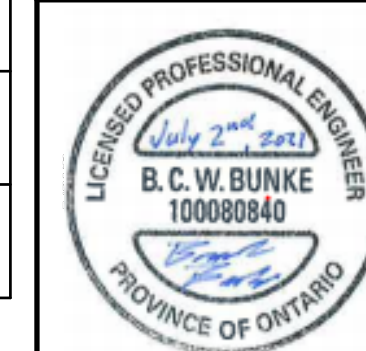
**BM 150506-2 - ELEV = 244.277m**  
NAIL IN EAST FACE OF HYDROPILE, WEST OF CENTENNIAL ROAD,  
EAST OF S.W.M. POND, NORTH OF EXISTING DRAIN

**BM 150506-3 - ELEV = 244.164m**  
N.W. CORNER OF CONCRETE PLATFORM, WEST OF  
CENTENNIAL ROAD, SOUTH OF EXISTING DRAIN

**BM 150506-4 - ELEV = 246.013m**  
TJNT OF HYDRANT, EAST OF CENTENNIAL ROAD, NORTH OF ACCESS  
LANE TO N.P. LOT, 111 (A) WATERWAY

THE POSITION OF POLE LINES, CONDUITS, UTILITIES, SEWERS AND OTHER  
UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY  
SHOWN ON THE CONTRACT DRAWINGS, AND, WHEN SHOWN, THE ACCURACY OF  
THE LOCATION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIS/HERSELF OF THE  
EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL  
ASSUME ALL LIABILITY THEREON.



4	07/02/2021	ENGINEER'S REPORT	B.B.
3	07/10/2020	SUBMISSION TO MUNICIPALITY	B.B.
2	07/08/2020	SUBMISSION TO REGIONAL WATER SUPPLY	B.B.
1	11/28/2019	ON-SITE MEETING	B.B.
NO.	DATE	REVISION DESCRIPTION	CHKD



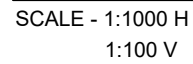
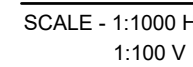
McCREDIE MUNICIPAL DRAIN

MUNICIPALITY OF CENTRAL ELGIN

## OVERALL PLAN

DRAWN BY : T.S.	APPROVED BY : B.B.	PROJECT NO. : 519056	DRAWING NO. :  <b>1</b>
DESIGNED BY : T.S.	DATE : DECEMBER 2020	SCALE : 1:3000	

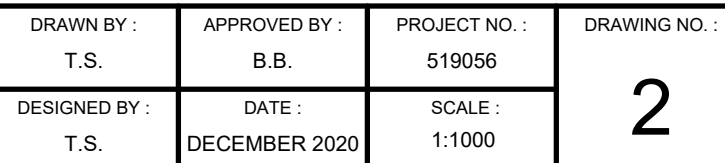




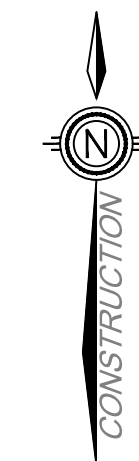
STRUCTURE DETAIL SCHEDULE - MCCREIDIE DRAIN - SOUTH OUTLET PIPE				
ITEM NO.	STA.	STRUCTURE DESCRIPTION	LENGTH	
S1	STA. 0+000	375mm HDPE OUTLET PIPE c/w BIRDCAGE GRATE	6m	
S2	STA. 0+006 - STA. 0+432	350mm CONC. FIELD TILE (GRADE VARIES - SEE ABOVE)	426m	
S3	STA. 0+432	CB J 600mm x 900mm CB c/w BIRDCAGE GRATE		
S4	STA. 0+432 - OFFSET	350mm CONC. FIELD TILE (GRADE VARIES - SEE ABOVE)	5m (APPROX.)	
S5	STA. 0+432 - STA. 0+461	350mm PVC PIPE (C) @ 0.5%	20m	
S6	STA. 0+461	CB R 600mm x 900mm CB c/w BIRDCAGE GRATE		
S7	STA. 0+461 - STA. 0+686	350mm CONC. FIELD TILE (GRADE VARIES - SEE ABOVE)	225m	
S8	STA. 0+686	CB R 600mm x 900mm CB c/w BIRDCAGE GRATE		

NOTE: CBs ABOVE TO HAVE T/CONC.  
APPROX. 50mm ABOVE EX. GRADE  
UNLESS OTHERWISE NOTED.

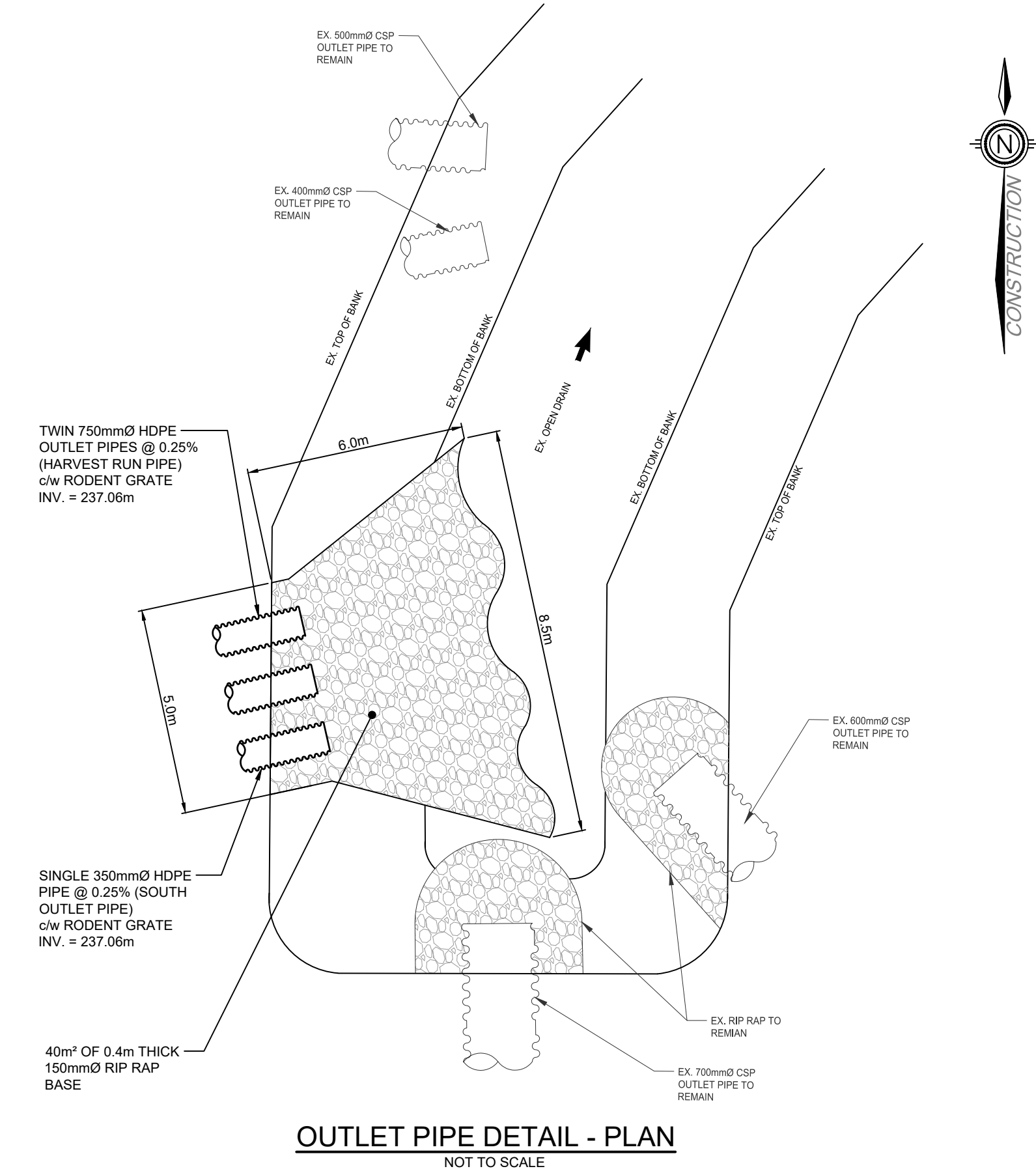
- |     |            |                                     |      |  |
|-----|------------|-------------------------------------|------|--|
|     |            |                                     |      |  |
| 4   | 07/02/2021 | ENGINEER'S REPORT                   | B.B. |  |
| 3   | 07/10/2020 | SUBMISSION TO MUNICIPALITY          | B.B. |  |
| 2   | 07/08/2020 | SUBMISSION TO REGIONAL WATER SUPPLY | B.B. |  |
| 1   | 11/28/2019 | ON-SITE MEETING                     | B.B. |  |
| NO. | DATE       | REVISION DESCRIPTION                | CHKD |  |



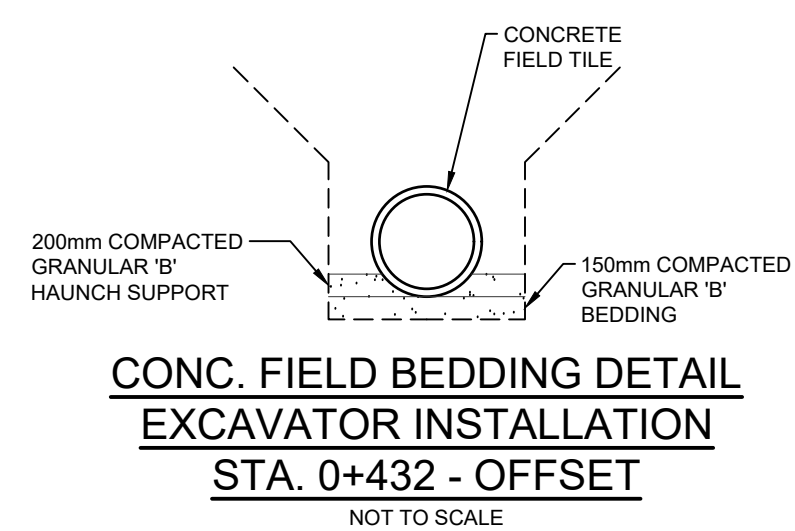




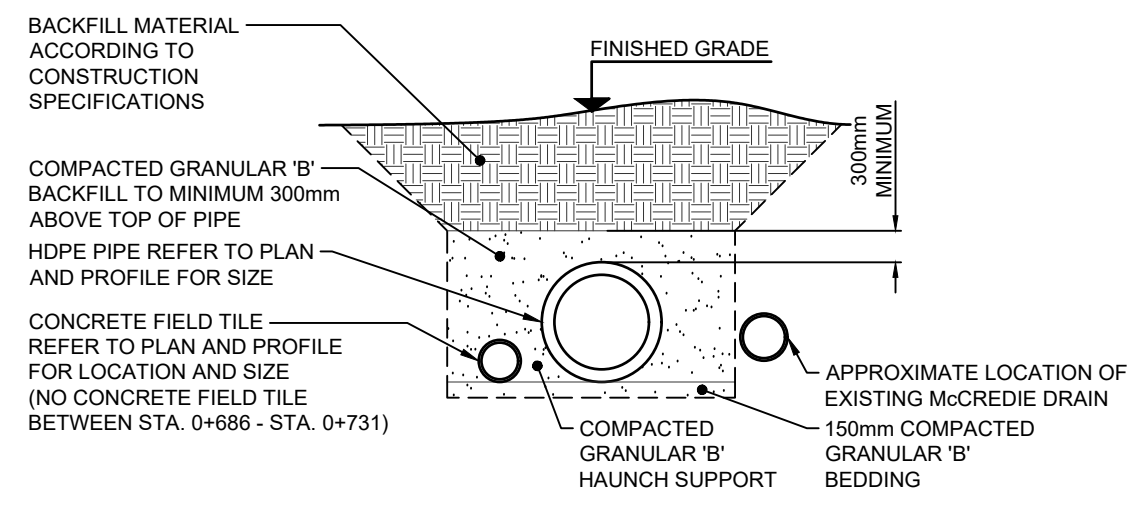




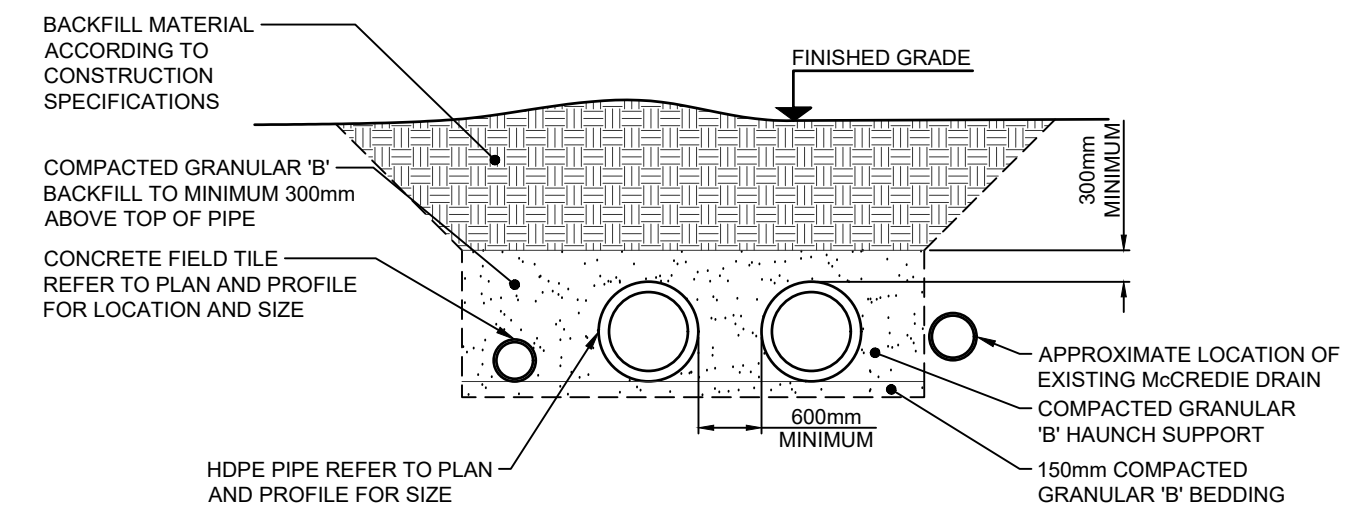
OUTLET PIPE DETAIL - PLAN  
NOT TO SCALE



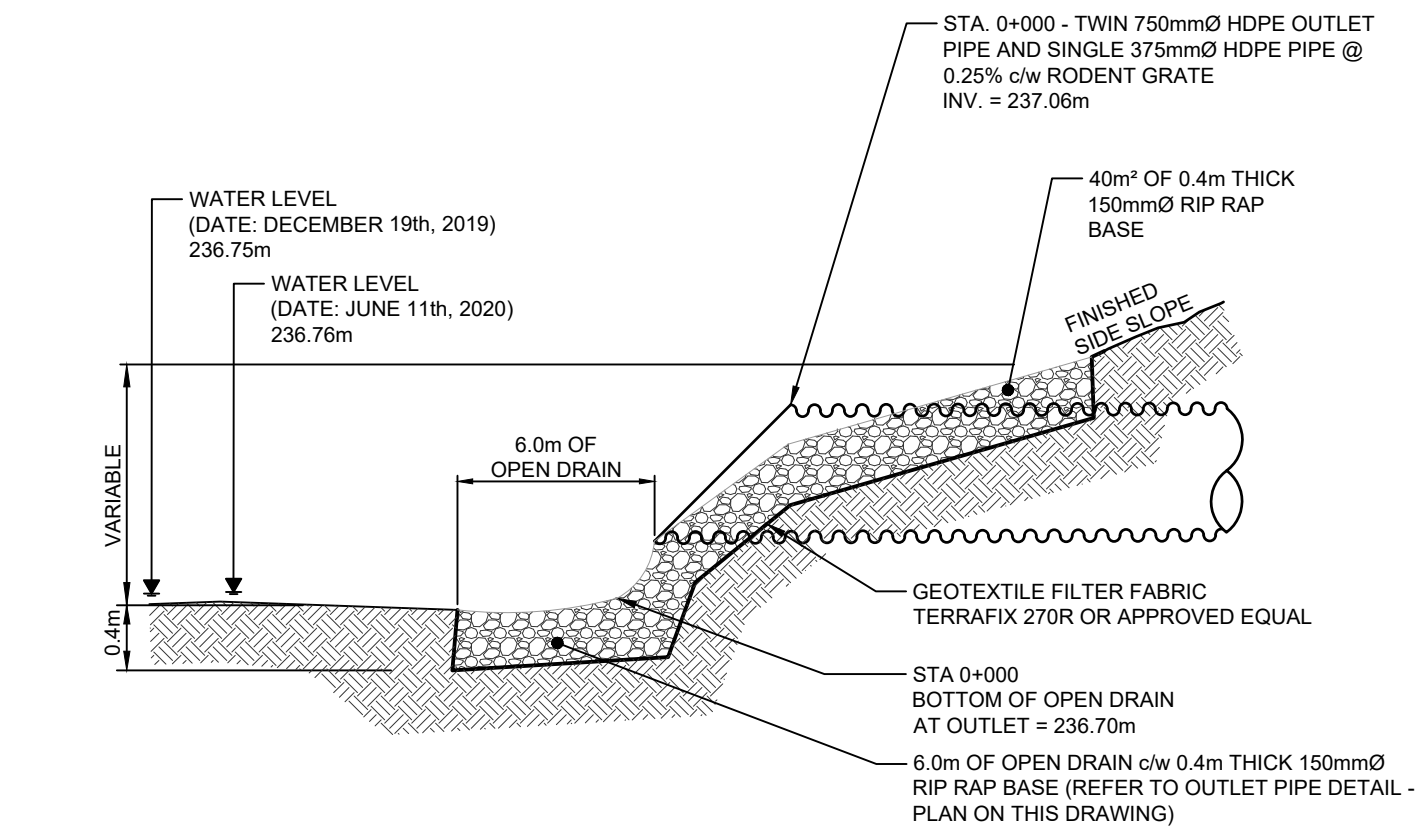
CONC. FIELD BEDDING DETAIL  
EXCAVATOR INSTALLATION  
STA. 0+432 - OFFSET  
NOT TO SCALE



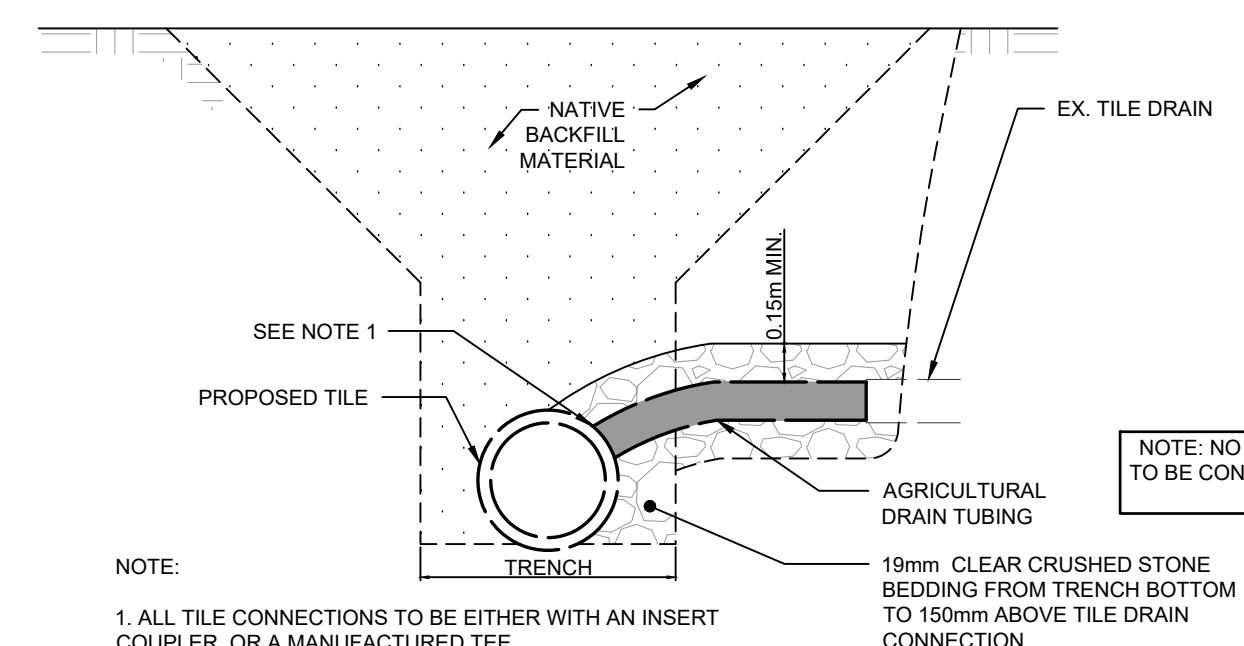
TYPICAL SINGLE HDPE PIPE BEDDING DETAIL  
STA. 0+160 - STA. 0+432  
STA. 0+461 - STA. 0+686  
STA. 0+714 - STA. 0+731  
NOT TO SCALE



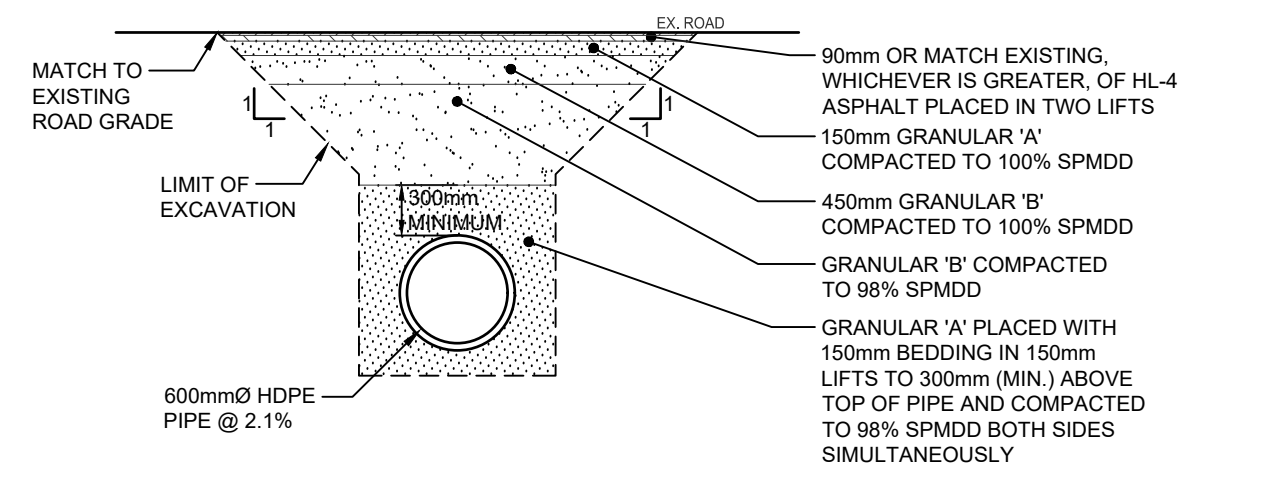
TYPICAL TWIN PIPE BEDDING DETAIL  
STA. 0+000 - STA. 0+160  
NOT TO SCALE



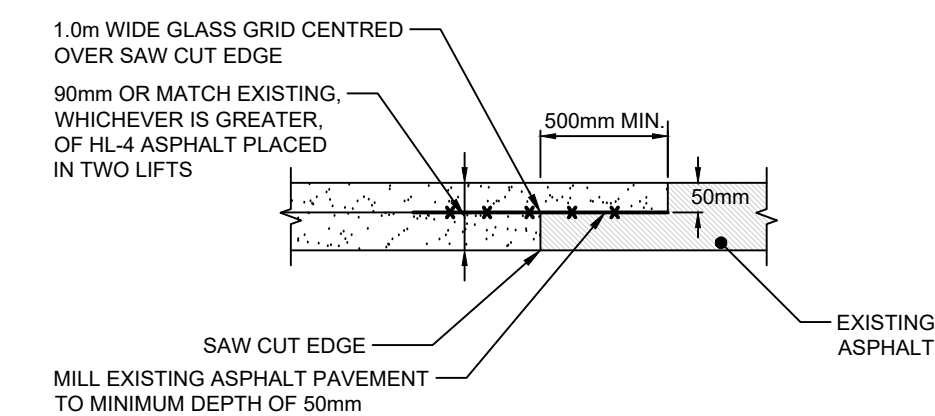
McCREDIE DRAIN OUTLET PIPE DETAIL - PROFILE  
NOT TO SCALE



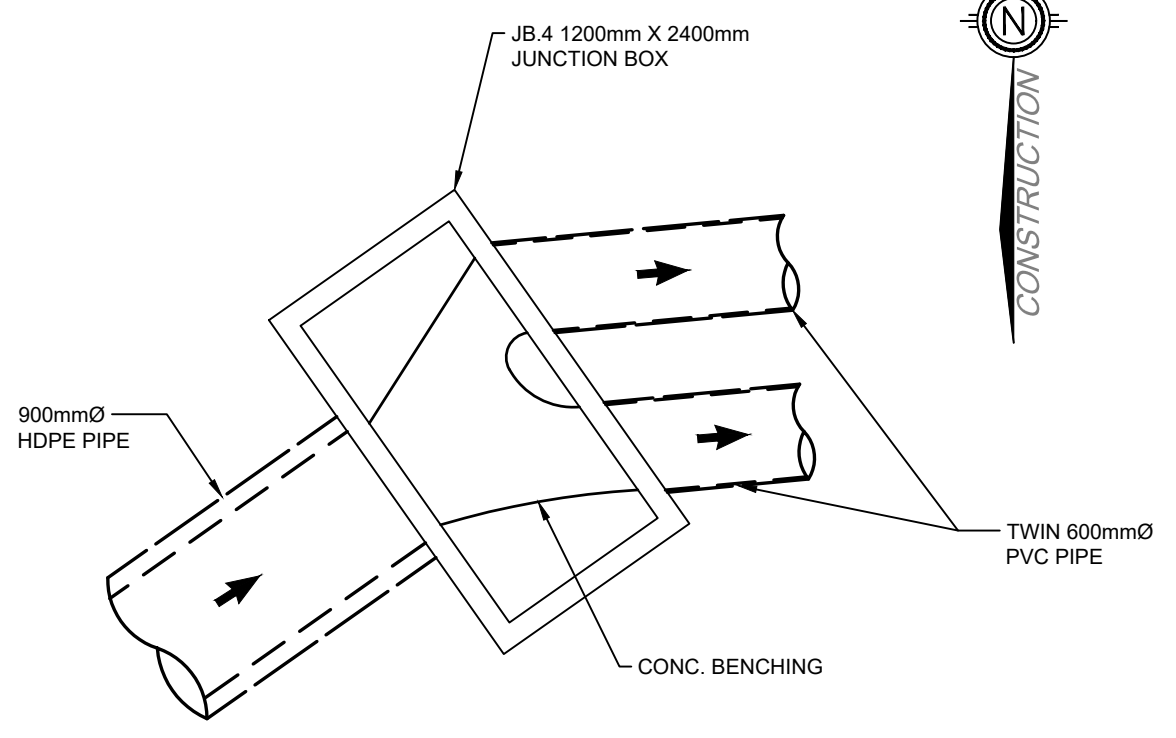
TYPICAL TILE CONNECTION DETAIL - SECTION  
NOT TO SCALE



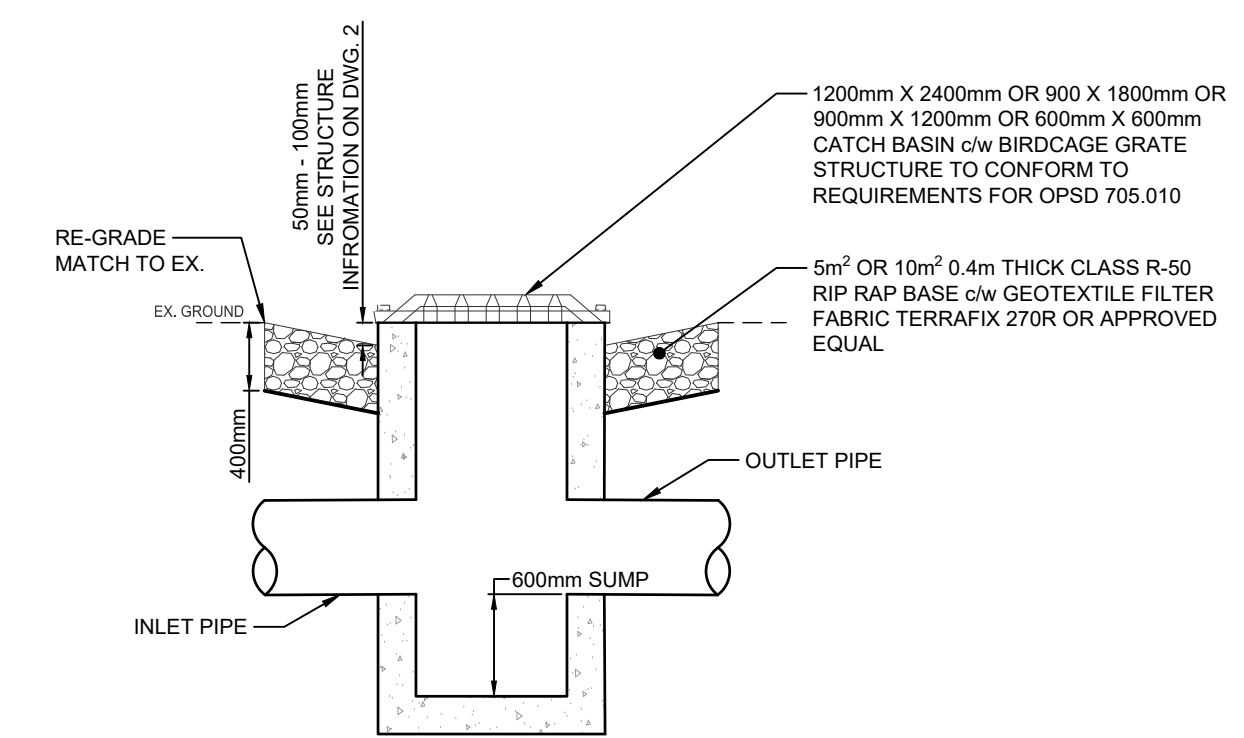
CENTENNIAL ROAD CROSSING  
STA. 0+686 - STA. 0+714  
NOT TO SCALE



TYPICAL ASPHALT JOINT  
RESTORATION DETAIL  
NOT TO SCALE



JB.4 BENCHING DETAIL - STA. 0+461  
SCALE 1:50



TYPICAL CATCHBASIN DETAIL  
NOT TO SCALE

ENVIRONMENTAL PROTECTION NOTES :

1. ALL MATERIAL AND EQUIPMENT USED FOR THE PURPOSE OF SITE PREPARATION AND PROJECT COMPLETION SHOULD BE OPERATED AND STORED IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE, (EG. PETROLEUM PRODUCTS, SILT, DEBRIS, ETC.) FROM ENTERING THE WATER.
2. VEHICLE AND EQUIPMENT RE-FUELING AND MAINTENANCE SHALL BE CONDUCTED AWAY FROM THE WATERCOURSE.
3. THE CONTRACTOR IS TO CONTROL THE PLACEMENT OF STABILIZATION WORKS TO MINIMIZE EROSION AND SEDIMENT TRAVEL IMPACTS DOWNSTREAM.
4. GEOTEXTILE FABRIC SHALL BE INDUSTRIAL POLYPROPYLENE.
5. ONLY APPROVED WORK IS PERMITTED IN THE WATERCOURSE AND NO MATERIAL SHALL BE RELEASED INTO THE WATERCOURSE.
6. PERFORM WORK IN NO/FLOW CONDITIONS TO MINIMIZE SEDIMENT MOVEMENT AND EROSION.
7. ALL WORK SHOULD BE HALTED IF A FORECAST OF SIGNIFICANT RAINFALL IS EXPECTED.
8. PLAN IN-WATER WORKS, UNDERTAKINGS AND ACTIVITIES TO RESPECT TIMING WINDOWS TO PROTECT FISH, INCLUDING THEIR EGGS, JUVENILES, SPAWNING ADULTS AND/OR THE ORGANISMS UPON WHICH THEY FEED.
9. PLACE BRUSH, DEBRIS AND SEDIMENT IN SUCH A LOCATION AS TO MINIMIZE ENTRY INTO THE CHANNEL.
10. LIMIT SOIL MOVEMENT AND EROSION; USE APPROPRIATE CONTROL MEASURES BEFORE WORK BEGINS AND INSPECT AND MAINTAIN THOSE MEASURES REGULARLY UNTIL ALL DISTURBED AREAS ARE STABILIZED.
11. ANY AREAS OF DISTURBED OR BARE SOIL AROUND THE DRAIN SHOULD BE SEEDED WITH NATIVE, NON-INVASIVE HERBACEOUS MATERIAL WHILE THE GROUND IS MOIST AND CONDITIONS ARE APPROPRIATE FOR GERMINATION.

NOTES :	
1. CONTRACTOR IS TO OBTAIN UTILITY LOCATES PRIOR TO CONSTRUCTION.	
2. CONTRACTOR IS TO CONNECT EXISTING TILES DURING CONSTRUCTION.	
NOMENCLATURE:	
APPROX. COMPLETE WITH	APPROXIMATE COMPLETE WITH
CW CATCHBASIN	CATCHBASIN
CONC. CONCRETE	CONCRETE
Ø CENTER LINE	CENTER LINE
CSP CORRUGATED STEEL PIPE	CORRUGATED STEEL PIPE
Ø DIAMETER	DIAMETER
DICB DITCH INLET CATCHBASIN	DITCH INLET CATCHBASIN
ELEV. ELEVATION	ELEVATION
EX. EXISTING	EXISTING
INV. INVERT	INVERT
MIN. MINIMUM	MINIMUM
PL. PROPERTY LINE	PROPERTY LINE
R. RADIUS	RADIUS
STA. STATION	STATION
TYP. TYPICAL	TYPICAL
US. UPSTREAM	UPSTREAM

LEGEND:	
---	EX. GROUND
---	PROPOSED GROUND
---	EX. CSP OUTLET PIPE
---	HDPE OUTLET PIPE

BENCH MARKS :	
BM 519056-1 - ELEV. = 244.053m	TINUT OF HYDRANT, EAST OF CENTENNIAL ROAD, SOUTH OF EXISTING DRAIN
BM 519056-2 - ELEV. = 244.277m	NAIL IN EAST FACE OF HYDROPOLE, WEST OF CENTENNIAL ROAD, EAST OF S.W.M. POND, NORTH OF EXISTING DRAIN
BM 519056-3 - ELEV. = 244.164m	N.W. CORNER OF CONCRETE PLATFORM, WEST OF CENTENNIAL ROAD, SOUTH OF EXISTING DRAIN
BM 519056-4 - ELEV. = 246.013m	TINUT OF HYDRANT, EAST OF CENTENNIAL ROAD, NORTH OF ACCESS LANE TO N PT. LOT 11 (AUTO YARD)

THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSURE ALL LIABILITY FOR ANY DAMAGE TO THEM.



NO.	DATE	REVISION DESCRIPTION	CHKD
4	07/02/2021	ENGINEER'S REPORT	B.B.
3	07/10/2020	SUBMISSION TO MUNICIPALITY	B.B.
2	07/08/2020	SUBMISSION TO REGIONAL WATER SUPPLY	B.B.
1	11/28/2019	ON-SITE MEETING	B.B.

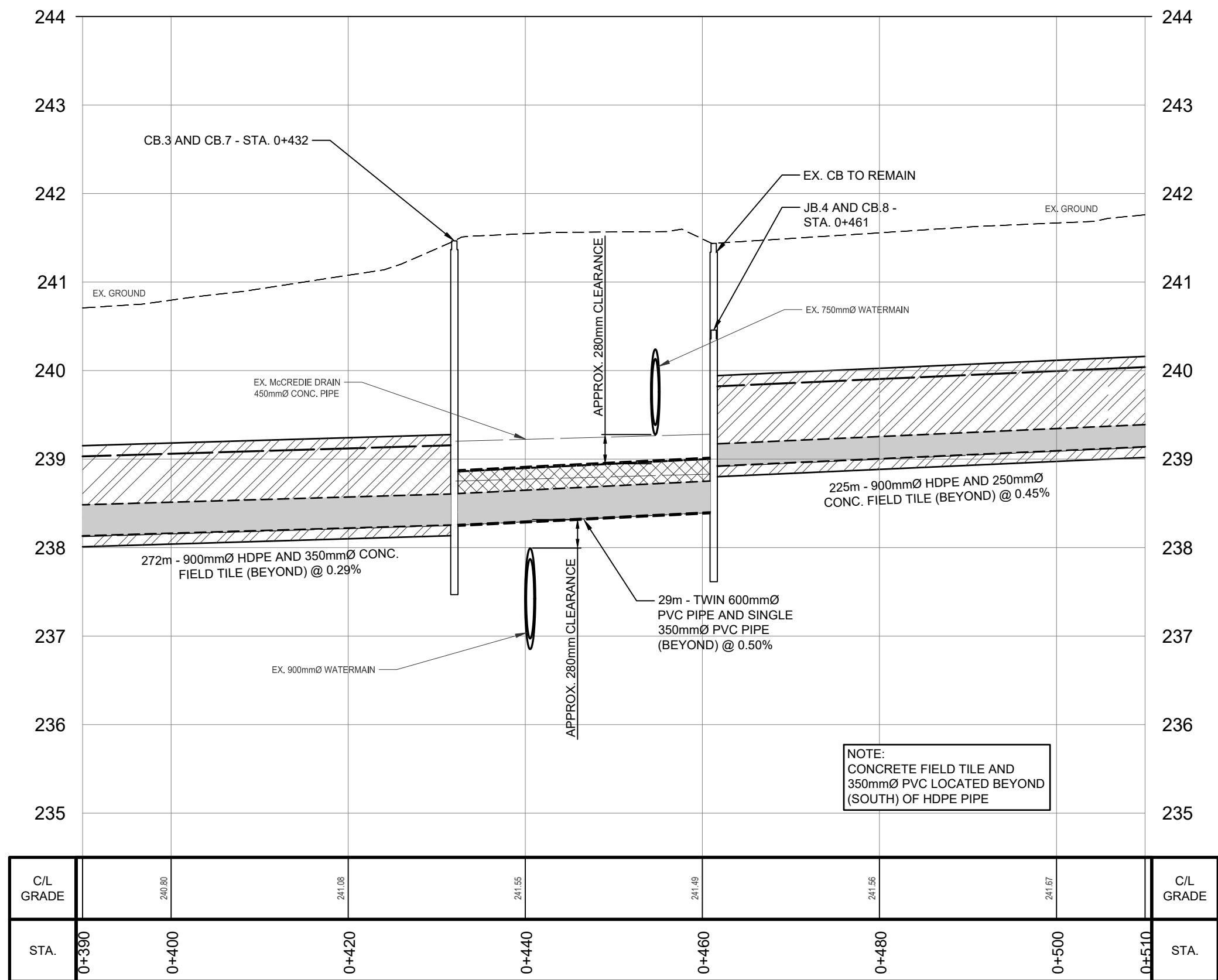
GUELPH | OWEN SOUND | LESTOWN | WITCHENER | LONDON | HAMILTON | GTA  
235 NORTH CENTRE ROAD, UNIT 103, LONDON, ON N5X 4E7  
TEL. 519-872-9403 www.groutplan.ca

McCREDIE MUNICIPAL DRAIN

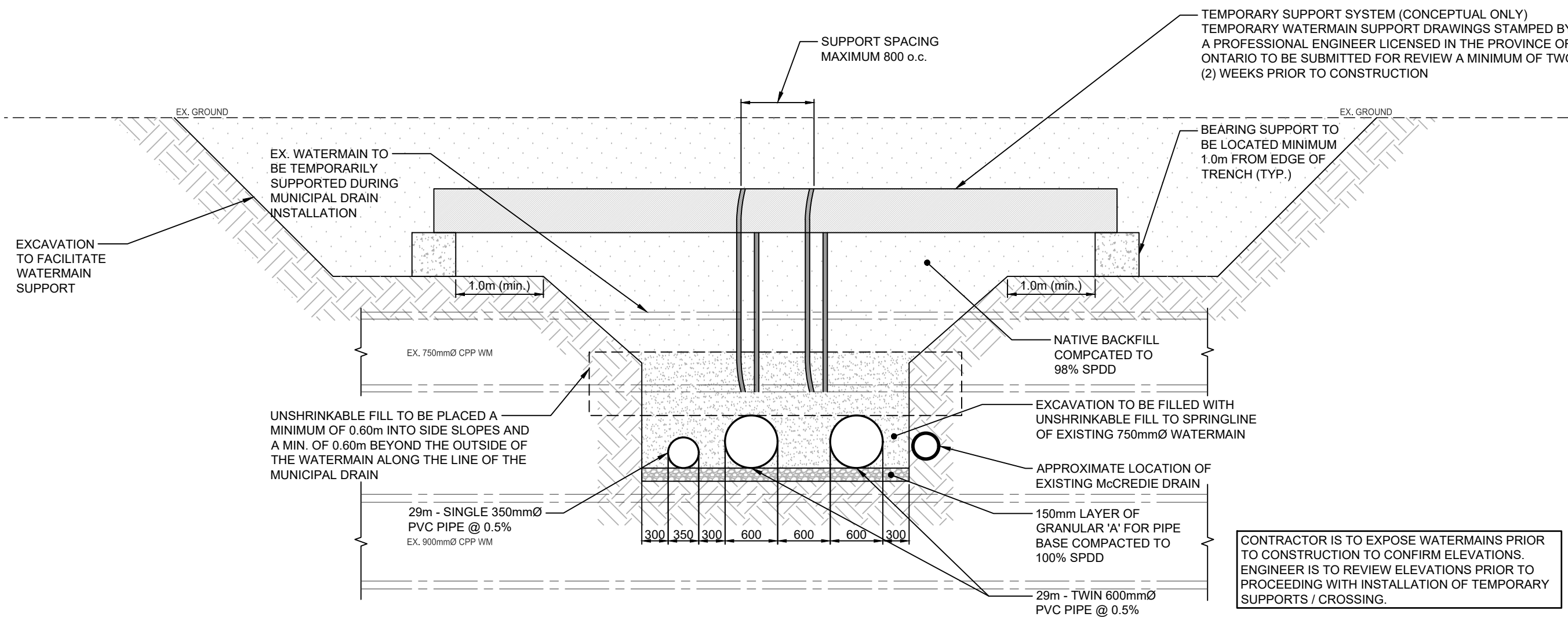
MUNICIPALITY OF CENTRAL ELGIN

DETAILS			
DRAWN BY : T.S.	APPROVED BY : B.B.	PROJECT NO. : 519056	DRAWING NO. : 4
DESIGNED BY : T.S.	DATE : DECEMBER 2020	SCALE : AS NOTED	





PROFILE - REGIONAL WATERMAIN CROSSING - TWIN 600mmØ PVC PIPE PLUS 350mmØ PVC PIPE  
SCALE - 1:500 H  
1:50 V



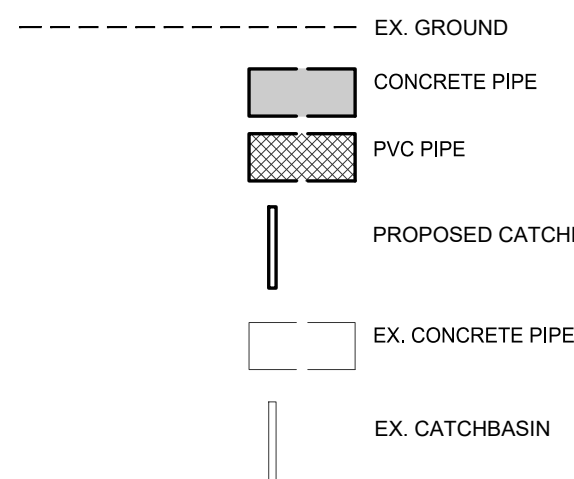
CONCEPTUAL WATERMAIN SUPPORT - ELEVATION  
SCALE: 1:50

- NOTES :
- CONTRACTOR IS TO OBTAIN UTILITY LOCATES PRIOR TO CONSTRUCTION.
  - CONTRACTOR IS TO CONNECT EXISTING TILES DURING CONSTRUCTION.

NOMENCLATURE:

APPROX.	APPROXIMATE
CW	COMPLETE WITH
CB	CATCHBASIN
CONC.	CONCRETE
C	CENTER LINE
CSP	CORRUGATED STEEL PIPE
Ø	DIAMETER
DICB	DITCH INLET CATCHBASIN
ELEV.	ELEVATION
EX.	EXISTING
INV.	INVERT
min.	MINIMUM
PL	PROPERTY LINE
R	RADIUS
STA	STATION
TYP	TYPICAL
US	UPSTREAM

LEGEND:



BENCH MARKS :

BM 519056-1 - ELEV. = 244.053m  
T/NUT OF HYDRANT, EAST OF CENTENNIAL ROAD, SOUTH OF EXISTING DRAIN

BM 519056-2 - ELEV. = 244.277m  
NAIL IN EAST FACE OF HYDROPOLE, WEST OF CENTENNIAL ROAD, EAST OF S.W.M. POND, NORTH OF EXISTING DRAIN

BM 519056-3 - ELEV. = 244.164m  
N.W. CORNER OF CONCRETE PLATFORM, WEST OF CENTENNIAL ROAD, SOUTH OF EXISTING DRAIN

BM 519056-4 - ELEV. = 246.013m  
T/NUT OF HYDRANT, EAST OF CENTENNIAL ROAD, NORTH OF ACCESS LANE TO N PT. LOT 11 (AUTO YARD)

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR ANY DAMAGE TO THEM.



TEMPORARY WATERMAIN SUPPORT NOTES

GENERAL

- CONTRACTOR TO DESIGN AND INSTALL A TEMPORARY SUPPORT SYSTEM FOR THE EXISTING 750mmØ CONCRETE WATERMAIN AT THE McCREDIE DRAIN CROSSING TO FACILITATE THE MUNICIPAL DRAIN INSTALLATION.
- THE WATERMAIN SHALL BE FULLY SUPPORTED OVER ITS ENTIRE LENGTH WHERE EXPOSED.
- TRENCHLESS INSTALLATION OF THE MUNICIPAL DRAIN AT THE REGIONAL WATERMAIN CROSSING WILL NOT BE PERMITTED.
- THE EXISTING WATERMAIN CAN BE LOCATED THROUGH ONTARIO ONE CALL. HAND DIGGING IS REQUIRED WITHIN 1.0m OF THE LOCATE AS PER REGIONAL WATER SUPPLY STANDARDS.
- A REPRESENTATIVE FROM REGIONAL WATER SUPPLY OR THEIR DESIGNATED OPERATORS SHALL BE NOTIFIED AND BE PRESENT ON SITE DURING THE WATERMAIN CROSSING WORK.
- EXCAVATION TO BE FILLED WITH UNSHRINKABLE FILL UP TO SPRINGLINE OF THE EXISTING WATERMAIN.
- UNSHRINKABLE FILL INSTALLATION AND MATERIALS TO COMPLY WITH OPSS 1359. MATERIAL TO HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 10 MPa.
- UNSHRINKABLE FILL TO BE CURED A MINIMUM OF 24 HOURS PRIOR TO REMOVING THE TEMPORARY WATERMAIN SUPPORT SYSTEM.
- WATERMAIN TO BE FULLY SUPPORTED BY THE REINSTATED UNSHRINKABLE FILL BEDDING PRIOR TO REMOVING THE TEMPORARY WATERMAIN SUPPORT SYSTEM.
- UNDER NO CIRCUMSTANCES WILL THE WORK BE ALLOWED TO PROCEED UNDER ADVERSE WEATHER CONDITIONS.

REQUIRED CONTRACTOR SUBMISSIONS

- CONTRACTOR IS TO SUBMIT TEMPORARY WATERMAIN SUPPORT DRAWINGS STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO FOR REVIEW A MINIMUM OF TWO (2) WEEKS PRIOR TO CONSTRUCTION.
- A MINIMUM OF TWO (2) WEEKS PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL SUBMIT A WORK PLAN WHICH INCLUDES THE FOLLOWING:
  - IDENTIFICATION OF MAJOR ACTIVITIES TO BE CARRIED OUT IN ASSOCIATION WITH THE WATERMAIN CROSSING.
  - A SCHEDULE OF THESE WORKS.
  - MONITORING OF SUPPORT SYSTEM FOR DEFLECTION.

4	07/02/2021	ENGINEER'S REPORT	B.B.
3	07/10/2020	SUBMISSION TO MUNICIPALITY	B.B.
2	07/08/2020	SUBMISSION TO REGIONAL WATER SUPPLY	B.B.
1	11/28/2019	ON-SITE MEETING	B.B.
NO.	DATE	REVISION DESCRIPTION	CHKD



McCREDIE MUNICIPAL DRAIN

MUNICIPALITY OF CENTRAL ELGIN

REGIONAL WATERMAIN CROSSING

DRAWN BY :	APPROVED BY :	PROJECT NO. :	DRAWING NO. :
T.S.	B.B.	519056	5
DESIGNED BY :	DATE :	SCALE :	
T.S.	DECEMBER 2020	AS NOTED	

## Appendix D

### Special Provisions

**Special Provisions (Non-Tender Items)  
For The Construction Of The  
McCredie Municipal Drain 2021  
The Municipality of Central Elgin**

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**1. STANDARD SPECIFICATIONS**

Where reference is made to OPSS or OPSD, the Contractor shall refer to the latest revision of the Ontario Provincial Standard Specifications and the Ontario Provincial Standard Drawings. Where reference is made to OPSS, it shall be assumed to refer to OPSS.MUNI wherever equivalent municipal specifications exist. These specifications and drawings may not be bound within this document. They are available on-line from the Ontario Ministry of Transportation.

All work to be undertaken shall comply with the latest version of OPSS and OPSD, unless superceded by the Special Provisions included herein.

Where in the Specifications the word "Corporation", "Municipality" or "Owner" occurs it shall mean the "Corporation of the Municipality of Central Elgin".

Where in the Specifications the word "Engineer" occurs it shall mean "GM BluePlan Engineering Limited".

**2. SALES TAXES**

**Harmonized Sales Tax (H.S.T.)**

The Total Tender Price shall include an allowance for H.S.T., calculated as 13% of the cost of the works as itemized in the Schedule of Unit Prices in the Form of Tender.

This allowance is simply an estimate of the amount of H.S.T. to be paid to the Contractor.

The Engineer will determine the appropriate amount of H.S.T. to be paid on each progress payment and on the final payment, and this amount may be more or less than the "allowance" included in the Total Tender Price.

**3. LASER ALIGNMENT**

The Contractor shall use a laser beam or equivalent line and grade control methods for laying all drain tile to maintain the on grade and alignment shown on the plans. Batter boards or any other means will not be acceptable. Tile drains shall be laid to a grade not more than +/- 25mm from the alignment as shown on the plans. Tile drains with a vertical variation of greater than 25mm may be rejected by the Engineer, and in that event the Contractor will be required to take up and re-lay those sections of tile drain at their expense.

**4. TRENCHES TO BE CLOSED**

No trench may be left open at the end of each day unless authorized by the Engineer. Any trench that is to be left open shall be completely fenced off with steel construction fencing. All fencing shall be at the Contractor's expense. If the Contractor neglects to fence a trench, the Engineer shall have the right to have this work done by others and charged to the Contractor.

**5. ROAD SIGNS**

The Contractor, at his/her own expense, shall carefully remove and satisfactorily replace Municipal Road Signs which must be removed in order to carry out the contract. Where traffic control signs, such as Stop Signs, have to be temporarily or permanently relocated, they shall be immediately reset either temporarily or permanently, as conditions dictate. All temporarily relocated signs shall be permanently reset as soon as site conditions permit. Where replacements are necessary, new signs shall conform to Central Elgin Development Standards.

## **6. DAMAGE TO TREES**

A penalty of \$1,000.00 will be levied against the Contractor to be deducted from monies payable under this Contract for each and every tree destroyed or damaged due to the Contractor's carelessness or negligence and which is not designated in the Contract for removal. As to what constitutes the carelessness or negligence on the part of the Contractor, the Engineer's decision shall be final.

## **7. COORDINATION MEETINGS**

The Contractor shall attend such meetings with the Owner, Engineer, landowners and Utility Company Authorities (as necessary) as may be required by the Engineer to co-ordinate services affected by this Contract.

## **8. DISPOSAL OF SURPLUS OR UNSUITABLE EXCAVATED MATERIAL**

All earth material excavated in carrying out the work of the various tender items included in this Contract and which is unsuitable for, or which is surplus to, the requirements for backfill shall be disposed of off-site. Excess material excavated from this site is anticipated not to meet MECP Table 1 criteria. The excess material may be disposed of at a site arranged by the contractor upon receipt of a sign-off by the property owner. The property owner must be aware and must acknowledge that the fill might not pass MECP Table 1 criteria.

All concrete, large boulders and other "solid" materials are to be loaded and hauled separately from the other earth and granular materials and disposed of at an MECP approved site obtained by the Contractor at no cost to the Owner.

The Contractor shall be responsible for complying with O.Reg. 406/19 including, but not limited to, information provided to truck drivers carrying excess soil and planning for environmentally safe transportation. All excess soil and earth material shall be managed, handled and disposed of in accordance with O.Reg. 406/19.

## **9. COMPACTION**

This Contract contains no separate tender item for compaction equipment as may be required to compact the earth or granular materials whether used for embankment construction, base courses, bedding, or backfill.

The Contract prices for the materials to be placed or the work to be carried out shall include full compensation for supplying and operating such compaction equipment as the Contractor may require and for compacting the materials to the specified density.

When it is impractical with the larger types of compaction equipment to obtain the required degree of compaction in areas where working space is limited, the Contractor shall provide and use mechanical hand compaction equipment in order to achieve the specified density.

Granular materials used as bedding shall be compacted to a density of 98% of the maximum dry density, granular backfill or base courses shall be compacted to a density of 100% of the maximum dry density. All other earth materials shall be compacted to a density of 95% of the maximum dry density.

When field tests indicate that the required degree of compaction cannot be obtained with the equipment in use or the procedure being followed, the Contractor's operations shall be halted until the Engineer is satisfied that the Contractor has made such modifications, in his/her equipment and procedure, which will produce the required results.

## **10. NATURAL GAS CONSTRUCTION SPECIFICATIONS**

Where the Contractor is working near natural gas mains the work shall be carried out in accordance with the requirements and specifications of the Gas Company having control over such mains.

## **11. OTHER CONTRACTORS WITHIN OR ADJACENT TO THE LIMITS OF THE WORK**

The Contractor is advised that other work may be in progress within and adjacent to the limits of this Contract and that he/she shall co-operate with other Contractors, Utility Companies, and the Corporation and they shall be allowed free access to their work at all times.

The Engineer reserves the right to alter the method of operation on this Contract to avoid interference with other work.

## **12. UTILITY POLE LINES**

Where utility poles may have to be supported, the Contractor shall make arrangements with the hydro authority to do this work. There shall be no charge to the Contractor for this work.

## **13. UTILITIES AND PIPE CROSSINGS**

The location and depth of underground utilities shown on the Contract Drawings are based on information received by the Engineer. The position of all pole lines, conduits, watermains, sewers and other underground and over ground utilities and structures is not necessarily shown on the Contract Drawings and where shown, the accuracy of the position of such utilities and structures is not guaranteed. It is the Contractor's responsibility before starting any work to contact the Municipal Authorities or Utility Companies for further information in regard to the exact location of these utilities and to take such other precautions as necessary to safeguard the utilities from damage.

Where pipes and other utilities are encountered in the excavation, these shall be maintained and supported by the Contractor to minimize damage done to them. Prior to backfilling, the Contractor shall submit to the Engineer, for his/her approval, details of the proposed method of support of such pipes and utilities and no backfilling may take place prior to the Engineer's review of such details. Approval by the Engineer of any such details will in no way relieve the Contractor from his/her responsibility to avoid any damage where possible.

## **14. DAMAGE BY VEHICLES AND OTHER EQUIPMENT**

If at any time, in the opinion of the Engineer, damage is being or is likely to be done to any highway or any improvement thereon, other than such portions as are part of the work, by the Contractor's vehicles or other equipment, whether licensed or unlicensed, the Contractor shall, on the direction of the Engineer and at the Contractor's own expense make changes in or substitutions for such vehicles or other equipment or shall alter loading or shall in some other manner remove the cause of such damage to the satisfaction of the Engineer. Where such damage has occurred, the Contractor shall make repairs satisfactory to the Owner or, where the Owner has found it necessary to make the repairs, make payment to the Owner of the cost of repairs carried out by the Owner.

## **15. SURVEY BARS AND MONUMENTS**

The Contractor shall be responsible for replacing all survey bars which are bent, moved, removed, due to carelessness but will not be responsible for survey bars that have to be removed for construction. The contractor shall provide a list of all damaged and removed survey bars to the Engineer.

## **16. MAINTENANCE OF ROAD**

The Contractor shall at all times and at his/her own expense, maintain safely and adequately, all private entrance facilities throughout the length of the Contract.

## **17. IMPERIAL CONVERSION OF METRIC SPECIFICATIONS**

The Standard Specifications governing this work are in metric units. For the purpose of this Contract it is assumed that the metric units shall be hard converted to Imperial units, wherever necessary.

**18. ACCESS TO PRIVATE PROPERTIES**

If a traffic lane is closed temporarily to allow asphalt paving or road grading (including patch work), local access shall be maintained as much as possible and notifications shall be made 24 hours in advance.

**19. CONSTRUCTION HOURS**

The Contractor will be allowed to work from 7:00 a.m. to 7:00 p.m., Monday to Friday. Additional hours may be permitted under certain circumstances if approved by the Engineer.

**20. MAINTENANCE OF FLOWS**

The contractor shall be responsible to maintain all drainage flows during construction. No extra payment will be made for pumping, hauling or disposing of any drainage flow or removing any granular material that enters the drainage system through manhole or catch basin frame adjustments. The contractor will be responsible for maintaining and directing storm water flows during construction so that flooding of private property and silt migration or washouts do not occur. The contractor shall be responsible to pay for any damages caused by storm water flooding due to, or as a result of, construction activities during the duration of this project.

**Special Provisions  
For The Construction Of The  
McCredie Municipal Drain 2021  
The Municipality of Central Elgin**

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**SPECIFICATIONS**

The Special Provisions, along with the "*Specifications for the Construction of Municipal Drainage Works*" attached hereto, shall apply to and govern the construction of the "*McCredie Municipal Drain*".

**PLAN AND REPORT**

The Plan and Profile and the Engineer's Report on the proposed Drainage Works shall be a part of this Specification.

**EXTENT OF WORK**

**General**

1. All standard Detailed Drawings are attached to these Specifications.
2. The Contractor shall notify the Owners and the Engineer forty-eight (48) hours prior to construction.
3. The Contractor shall verify the location of the new tile drains with the Engineer and the landowners prior to construction.
4. The working area shall be 20m or 25m, as noted within this report, centered on the excavation trench. Each landowner on whose property the drainage works is to be constructed shall designate access to and from the working area.
5. All utilities shall be located and uncovered in the affected areas by the Contractor prior to construction.
6. The Contractor shall supply all materials unless otherwise stated at the time of tendering.
7. All standard catch basins shall be precast concrete catch basins as per OPSD. Knockouts shall be provided in the catch basins.
8. The catch basin grate elevations shall be set to the satisfaction of the Engineer.
9. Stone rip-rap protection and geo-textile material (Terrafix 270R or approved equivalent) shall be placed around all catch basins as part of this contract.
10. All catch basin grates shall be fastened to the new catch basins.
11. The Contractor shall supply all necessary materials to complete the connections of any existing drains to the new drain.
12. All CSP pipe shall be minimum 2.0mm (14 gauge) with a 68mm x 13mm corrugation profile, and galvanized.
13. All HDPE pipe shall be CSA rated 320kPa with bell and spigot gasket joints. Pipe shall be double wall smooth interior, Boss2000 or approved equivalent.
14. All clear stone shall be 19mm Type I as per OPSS.MUNI 1004.
15. All Rip Rap stone shall be R50 quarry stone unless otherwise specified, as per OPSS.MUNI 1004.



16. The Contractor shall be responsible for all trench settlement.
17. The Contractor shall supply and install catch basin markers beside all catch basins.
18. All concrete tile shall meet the requirements of ASTM C412-15. Minimum three-edge bearing crushing strength for all tile to meet or exceed 2000D unless otherwise noted.
19. The Contractor shall strip the topsoil centered on the drain before installing the tile drain. The width of topsoil stripping shall be at the Contractor's discretion, but all operations shall be constrained to the working width as previously denoted in the report. In locations where they may be deep cuts or excessive soil generation, the Contractor may apply to the Engineer to strip wider than the working width. The Engineer shall have the right to permit or deny this request. Topsoil shall be kept separate from subsoil as much as possible. The topsoil shall be later spread over the backfilled trench.
20. The Contractor shall, where directed, remove either by excavation or by crushing, any existing tile drains, inlets and/or catch basins encountered that are no longer required for the drainage system. Removal of existing tile drains and associated drainage works shall be considered part of the work and there will be no extra payment for removal of existing drainage infrastructure.
21. The Contractor shall grade the road ditches to the new catch basins. The disturbed areas within the road Right-Of-Way shall be top soiled and seeded.
22. The Contractor shall clean up the site and leave it in a neat and tidy condition.
23. The tender shall be based upon unit prices and shall be as detailed on the tender form.
24. Nothing in these Specifications shall be construed as requiring less than a complete and satisfactory job in accordance with the obvious intent of the Drawings and Specifications.
25. All work shall be done to the satisfaction of the Engineer.
26. In accordance with Section A.25 of the General Specifications, the Contractor shall be responsible for all faulty materials or workmanship which appears within a one year period from the date of the Engineer's final Payment Certificate. An amount equal to 3% of the final contract price shall be retained for the maintenance period. Any part of the money retained may be used to make good any deficiencies after five (5) working days' notice being given to the Contractor. This notice may be either in writing or by telephone.

## **CLOSED WORK**

### **C-1    *Expose Confluence of Main Drain and Branch No.2***

Prior to construction the Contractor is to expose the confluence of the existing McCredie Main Drain and Branch No.2 at approximately Sta. 0+432 and confirm elevations. The Contractor is to supply the information to the Engineer and confirm invert elevation on the proposed CB.7 prior to ordering the catch basin.

### **C-2    *Outlet Pipe***

Supply and install the first 6m section of 375mm diameter HDPE pipe complete with rodent grate from Sta. 0+000 to Sta. 0+006. Connect the successive 350mm diameter concrete field tile by sealing all around with 150mm of concrete or wrapping with a 600mm wide strip of Terrafix 270R filter cloth, or approved equivalent.

### **C-3    *Rip Rap Outlet Protection***

Place approximately 40m<sup>2</sup> of rip rap at the outlet in accordance with the detail shown on Drawing No.4.

Rip rap shall be field or quarry stone, of 150mm to 300mm diameter (R50) or as approved by the Engineer on a filter mat base (Terrafix 270R or approved equivalent), machine placed to produce a smooth locked surfaced.

All rip rap and geotextile shall be installed as shown on the drawings accompanying the Report, and in accordance with OPSD 810.010 Type B.

**C-4 *Clearing, Grubbing and Disposal of Trees, Shrubs and Stumps, Complete***

The Contractor is to clear, grub and dispose of trees, shrubs and stumps along the proposed drain line to facilitate the excavation and installation of the drain, as shown on the drawings. This item shall apply only to those trees, shrubs, brush, bushes, stumps and windfalls designated for removal as required for the excavation and installation of the drain. This item shall include disposal of trees on-site at a location designated by the Engineer and landowner.

The proposed drain line travels through a vegetated area between approximate Sta. 0+160 and Sta. 0+432 which will be required to be completely cleared and grubbed with vegetation removal as described above. Localized clearing and grubbing will be required at the outlet into the Mills Drain (Sta. 0+000) and along the property line between N. Pt. Lot 11 and N. Pt. Lot 12, Concession 7 (Sta. 0+070).

This work shall be in accordance with Section A.6 of the Construction Specifications. This includes removing all tree stumps in the cleared area as close as practically possible to the ground and chemically treated to prevent regrowth.

**C-5 *Concrete Field Tile by Excavator***

**Concrete tile shall be a minimum of 2000D (Class IV) as per ASTM C76.**

Contractor is to obtain utility locates prior to construction.

Supply and install 431m of 350mm (14") diameter concrete field tile and 225m of 250mm (10") diameter by excavator.

Aside from the 5m length of 350mm (14") diameter concrete field tile to be installed as an offset at approximate Sta. 0+432, the concrete field tile is to be installed in the same trench as the HDPE/PVC pipes (Harvest Run Pipe) as detailed on the drawings.

Pipe installed in a field (Sta. 0+000 – Sta. 0+160, Sta. 0+160 – Sta. 0+432, and Sta. 0+461 – Sta. 0+686) shall be installed as follows:

- Bedding – Shall be Granular 'B' with a minimum thickness of 150mm placed in maximum 150mm lifts and compacted to 98% SPMDD. The Contractor shall ensure that bedding is properly placed and compacted under the haunches of the pipe.
- Haunching – From bedding to the springline of the pipe shall be Granular 'B' placed in maximum 150mm lifts and compacted simultaneously both sides of the pipe to 98% SPMDD. This may require hand work to "blind" the pipe and place material under the haunches of the pipe.
- Initial backfill – From the springline of the pipe to a minimum of 300mm above the top of the pipe shall be Granular 'B' placed in maximum 150mm lifts and compacted simultaneously both sides of the pipe to 98% SPMDD.
- Final Backfill – From initial backfill to topsoil shall be approved granular material (native if available) free of any large stones, clumps, etc. placed in maximum 300mm lifts and compacted uniformly to 95% SPMDD. Final backfill shall be placed, graded and leveled in a manner to not damage or displace the pipe.

Refer to drawings for Pipe Bedding Detail.

The Contractor is responsible for any breakage of pipe in the ground however it occurs.

Extra will not be paid for stoney conditions unless boulders are encountered, larger than can be lifted by the excavator.

Payment under this item shall be per metre and includes all labour, equipment and materials necessary to supply the pipe, excavate and shape the trench, lay and wrap the pipe, backfill the trench, and includes topsoil stripping,

replacement and restoration. Supply, placement, grading and compaction of the Granular 'B' shall be as per Item C-23 below.

This item shall include the wrapping of tile joints. The Contractor shall supply and wrap all concrete tile joints with geotextile filter material as part of this contract.

- a. 300mm wide for tile sizes 150mm diameter to 350mm diameter
- b. 400mm wide for tile sizes 400mm diameter to 750mm diameter
- c. 500mm wide for tile sizes larger than 750mm diameter

The filter material shall completely cover the tile join and shall have a minimum overlap of 300mm. The type of filter material shall be Terrafix 270R or approved equal.

No additional payment will be made for wrapping of tile.

#### **C-6 HDPE Pipe by Excavator**

Contractor is to obtain utility locates prior to construction.

Supply and install 160m of twin 750mm (30") diameter, 497m of 900mm (36") diameter, and 17m of 525mm (21") diameter HDPE pipe by excavator. Pipe shall be Boss2000 non-perforated dual wall smooth interior HDPE pipe, with bell and gasket joints, as supplied by Armtec or approved equivalent. The excavation shall be as per OPSD 802.030. The pipe shall be installed to the specifications indicated in the drawings accompanying the report, and shall include all site restoration. The twin 750mm (30") diameter HDPE outlet pipes shall be complete with rodent grates.

Pipe installed in a field (Sta. 0+000 – Sta. 0+160, Sta. 0+160 – Sta. 0+432, Sta. 0+461 – Sta. 0+686 and Sta. 0+714 – Sta. 0+731) shall be installed as follows:

- Bedding – Shall be Granular 'B' with a minimum thickness of 150mm placed in maximum 150mm lifts and compacted to 98% SPMDD. The Contractor shall ensure that bedding is properly placed and compacted under the haunches of the pipe.
- Haunching – From bedding to the springline of the pipe shall be Granular 'B' placed in maximum 150mm lifts and compacted simultaneously both sides of the pipe to 98% SPMDD. This may require hand work to "blind" the pipe and place material under the haunches of the pipe.
- Initial backfill – From the springline of the pipe to a minimum of 300mm above the top of the pipe shall be Granular 'B' placed in maximum 150mm lifts and compacted simultaneously both sides of the pipe to 98% SPMDD.
- Final Backfill – From initial backfill to topsoil shall be approved granular material (native if available) free of any large stones, clumps, etc. placed in maximum 300mm lifts and compacted uniformly to 95% SPMDD. Final backfill shall be placed, graded and leveled in a manner to not damage or displace the pipe.

Refer to drawings for Pipe Bedding Detail.

Extra will not be paid for stoney conditions while installing the HDPE pipe unless boulders are encountered larger than can be lifted by the excavator.

Payment under this item shall be per metre and includes all labour, equipment and materials necessary to supply the HDPE pipe, excavate and shape the trench, lay and wrap the pipe, backfill the trench, and includes topsoil stripping, replacement and restoration. The supply, placement, grading and compaction of the Granular 'B' required for the pipe shall be as per Item C-23 below.

Material change across pipe connections shall be connected by sealing all around with 150mm of concrete or wrapping with a 600mm wide strip of Terrafix 270R filter cloth, or approved equivalent.

#### **C-7 Exposure of Regional Watermain**

Contractor is to obtain utility locates prior to construction.

Payment under this item includes all labour, equipment, and materials necessary to expose each of the two Regional Watermains prior to construction.

The Regional Watermains shall be exposed by hydrovac excavation or approved equivalent. Contractor is to confirm elevations of the Regional Watermains and supply the information to the Engineer for review prior to proceeding with the installation of temporary support.

Contractor is to notify the Engineer and Lake Huron & Elgin Area Water Supply prior to completing the work. The Lake Huron & Elgin Area Water Supply contact is;

Dave Scott, A.Sc.T.  
Capital Projects Coordinator  
Telephone: 519-930-3505 ext. 5899  
Email: [davescott@london.ca](mailto:davescott@london.ca)

**C-8 Temporary Support for Regional Watermain (750mm diameter)**

Contractor shall design, supply and install temporary support as required to protect and support the existing 750mm diameter watermain during the installation of the drain. Contractor shall remove and dispose of temporary support upon completion. Shop drawings for the temporary watermain support shall be stamped by a Professional Engineer licensed in the Province of Ontario and shall be submitted to the Engineer for review a minimum of two (2) weeks prior to construction. A work plan for the temporary watermain support shall also be submitted to the Engineer for review a minimum of two (2) weeks prior to construction. The work plan shall include: identification of major activities to be carried out in association with the watermain crossing; a schedule of these works; and monitoring of support system for deflection.

Payment under this item includes all labour, equipment and materials necessary to supply, install, maintain, remove and dispose of the temporary support system for the existing watermain. Payment under this item also includes all costs related to the temporary watermain support drawings and work plan.

Contractor is to notify the Engineer and Lake Huron & Elgin Area Water Supply prior to completing the work. The Lake Huron & Elgin Area Water Supply contact is;

Dave Scott, A.Sc.T.  
Capital Projects Coordinator  
Telephone: 519-930-3505 ext. 5899  
Email: [davescott@london.ca](mailto:davescott@london.ca)

**C-9 Regional Watermain Crossing**

Contractor is to obtain utility locates prior to construction.

Supply and install 29m of twin lengths of 600mm (24") and a 29m length of 350mm (14") of PVC pipe.

Pipe shall be installed by open cut method, and shall include all bedding, backfill and site restoration. The excavation shall be as per OPSD 802.030. The pipes shall be installed with 150mm of bedding consisting of Granular 'A' compacted to 100% SPDD. The pipes shall be installed with backfill to the springline of the existing 750mm diameter watermain consisting of unshrinkable fill. The remaining backfill shall be consist of native backfil compacted to 98% SPDD. The pipes shall be installed with a temporary support system for the existing watermain as described in Item C-8.

Hand digging is required within 1.0m of the existing watermains.

**C-10 Exposure of Watermain at Centennial Road**

Contractor is to obtain utility locates prior to construction.

Payment under this item includes all labour, equipment, and materials necessary to expose the 150mm diameter watermain within the Centennial Road Right-of-Way prior to construction.

The watermain shall be exposed by hydrovac excavation or approved equivalent. Contractor is to confirm elevations of the watermain and supply the information to the Engineer for review prior to proceeding with the installation of the Centennial Road crossing and/or drain.

**C-11 Exposure of Gas Line at Centennial Road**

Contractor is to obtain utility locates prior to construction.

The Contractor shall expose the gas line by hydrovac excavation or approved equivalent prior to construction. Contractor is to confirm elevations of the gas line and supply the information to the Engineer for review prior to proceeding with the installation of the Centennial Road crossing and/or drain.

All work shall be completed to the satisfaction of Enbridge. The work completed under this item shall operate under a Crossing Agreement between Enbridge and the Contractor, an example of which is provided in Appendix F. Payment under this item shall be lump sum and include all labour, equipment and materials necessary to expose the existing gas line.

**C-12 Exposure of Bell Line at Centennial Road**

Contractor is to obtain utility locates prior to construction.

The Contractor will be responsible to expose the Bell line by hydrovac excavation or approved equivalent prior to construction. Contractor is to confirm elevations of the Bell line and supply the information to the Engineer for review prior to proceeding with the installation of the Centennial Road crossing and/or drain.

All work shall be completed to the satisfaction of Bell. Payment shall be lump sum and include all labour, equipment and materials necessary to expose the existing Bell line.

**C-13 Exposure of Rogers Line at Centennial Road**

Contractor is to obtain utility locates prior to construction.

The Contractor will be responsible to expose the Rogers line by hydrovac excavation or approved equivalent prior to construction. Contractor is to confirm elevations of the Rogers line and supply the information to the Engineer for review prior to proceeding with the installation of the Centennial Road crossing and/or drain.

All work shall be completed to the satisfaction of Rogers. Payment shall be lump sum and include all labour, equipment and materials necessary to expose the existing Rogers line.

**C-14 Temporary Support of Watermain**

Contractor shall supply and install temporary support as required to support the existing 150mm diameter watermain along Centennial Road during the installation of the road crossing and/or drain. The Contractor shall remove and dispose of temporary support upon completion.

The Contractor shall be responsible to protect the watermain and any other utility lines or cables during construction. Any damages incurred to a utility during construction shall be repaired at the Contractor's expense.

**C-15 Temporary Support of Gas Line**

Contractor shall supply and install temporary support as required to support the existing gas along Centennial Road during the installation of the road crossing and/or drain. The Contractor shall remove and dispose of temporary support upon completion.

The Contractor shall be responsible to protect the gas line and any other utility lines or cables during construction. Any damages incurred to a utility during construction shall be repaired at the Contractor's expense.

All work shall be completed to the satisfaction of Enbridge. The work completed under this item shall operate under a Crossing Agreement between Enbridge and the Contractor, an example of which is provided in Appendix F. Payment shall be lump sum and include all labour, equipment and materials necessary to supply, install, remove and dispose of a temporary support system for the existing gas line.

**C-16 *Supply and Install Protective Wrapping on Gas Line***

All pipe which crosses the natural gas line is to be installed via open trench. A durable, non-conductive protective wrap shall be placed between the natural gas line (including tracer wire) and the installed drain or catch basins, as specified by Enbridge.

All work shall be completed to the satisfaction of Enbridge. The work completed under this item shall operate under a Crossing Agreement between Enbridge and the Contractor, an example of which is provided in Appendix F. Payment shall be per each protective wrap installed and include all labour, equipment and materials necessary to supply and install the protective wrap.

**C-17 *Temporary Support of Bell Line***

Contractor shall supply and install temporary support as required to support the existing Bell line along Centennial Road during the installation of the road crossing and/or drain. The Contractor shall remove and dispose of temporary support upon completion.

The Contractor shall be responsible to protect the Bell line and any other utility lines or cables during construction. Any damages incurred to a utility during construction shall be repaired at the Contractor's expense.

All work shall be completed to the satisfaction of Bell. Payment shall be lump sum and include all labour, equipment and materials necessary to supply, install, remove and dispose of a temporary support system for the existing Bell line.

**C-18 *Temporary Support of Rogers Line***

Contractor shall supply and install temporary support as required to support the existing Rogers line along Centennial Road during the installation of the road crossing and/or drain. The Contractor shall remove and dispose of temporary support upon completion.

The Contractor shall be responsible to protect the Rogers line and any other utility lines or cables during construction. Any damages incurred to a utility during construction shall be repaired at the Contractor's expense.

All work shall be completed to the satisfaction of Rogers. Payment shall be lump sum and include all labour, equipment and materials necessary to supply, install, remove and dispose of a temporary support system for the existing Rogers line.

**C-19 *Centennial Road Crossing***

Contractor is to obtain utility locates prior to construction.

Supply and install 28m of 600mm (24") diameter HDPE pipe. The excavation shall be as per OPSD 802.030. The pipe shall be installed to the specifications indicated in the drawings accompanying the report and shall include all road and site restoration. The pipe shall be installed as follows:

- Bedding – Shall be Granular 'A' with a minimum thickness of 150mm placed in maximum 150mm lifts and compacted to 98% SPMDD. The Contractor shall ensure that bedding is properly placed and compacted under the haunches of the pipe.

- Haunching – From bedding to the springline of the pipe shall be Granular 'A' placed in maximum 150mm lifts and compacted simultaneously both sides of the pipe to 98% SPMDD.
- Initial backfill – From the springline of the pipe to a minimum of 300mm above the top of the pipe shall be Granular 'A' placed in maximum 150mm lifts and compacted simultaneously both sides of the pipe to 98% SPMDD.
- Final backfill – From initial backfill to underside of road base shall be Granular 'B' placed in maximum 150mm lifts and compacted uniformly to 98% SPMDD. Final backfill shall be placed, graded and leveled in a manner to not damage or displace the pipe.
- Road restoration – see below.

The price shall include removal, salvage and reinstallation of the existing CSP surface culvert matching existing grade and location at Centennial Road.

Road restoration shall consist of 450mm of Granular 'B' base and 150mm of Granular 'A' base compacted to 100% SPMDD in 150mm lifts. Road restoration shall also consist of 90mm or match existing, whichever is greater, of HL4 hot mix asphalt placed in two lifts including sawcut. Supply, placement, grading and compaction of the Granular 'A' for bedding, cover, and road restoration shall be as per Item C-22 below. Supply, placement, grading and compaction of the Granular 'B' for backfill shall be as per Item C-23 below. Supply, placement and sawcutting of the asphalt shall be as per Item C-24 below.

Refer to A.17 of the Construction Specifications for installation requirements

Payment under this item shall be per metre and includes all labour, equipment and materials necessary to supply and install the HDPE pipe, excavate and shape the trench, lay and connect the pipe, backfill the trench and restoration. The supply, placement, grading and compaction of the granular materials required to construct the road shall be as per Items C-22 and C-23 below.

## **C-20 Catch Basins**

Contractor is to obtain utility locates prior to construction.

Supply and install three (3) – 2400mm x 1200mm catch basins complete with birdcage grate and 600mm sump. Catch basins shall have a flat top and heavy duty galvanized steel grate (minimum bar diameter 15mm, maximum spacing 75mm) of the "birdcage" type set so that the top of the concrete is approximately 100mm above the surrounding ground.

Supply and install one (1) – 1800mm x 900mm catch basin complete with birdcage grate and 600mm sump. Catch basins shall have a flat top and heavy duty galvanized steel grate (minimum bar diameter 15mm, maximum spacing 75mm) of the "birdcage" type set so that the top of the concrete is approximately 100mm above the surrounding ground.

Supply and install one (1) – 1200mm x 900mm catch basin complete with birdcage grate and 600mm sump. Catch basins shall have a flat top and heavy duty galvanized steel grate (minimum bar diameter 15mm, maximum spacing 75mm) of the "birdcage" type set so that the top of the concrete is approximately 100mm above the surrounding ground.

Supply and install three (3) – 600mm x 600mm catch basins complete with birdcage grate and 600mm sump. Catch basins shall have a flat top and heavy duty galvanized steel grate (minimum bar diameter 15mm, maximum spacing 75mm) of the "birdcage" type set so that the top of the concrete is approximately 50mm above the surrounding ground.

All catch basins shall be set on a 200mm thick layer of compacted Granular 'A' or 19mm clear stone. Granular 'A' or 19mm clear stone shall be included in the price of the catch basin and there shall be no extra payment for supply and placement.

For the purposes of this report, top of concrete shall be equivalent to the lowest point that surface water can enter the structure.



All catch basins and junction boxes connected to the "Harvest Run Pipe" devoted to the Harvest Run subdivision (CB.1, CB.2, CB.3, JB.4, CB.5 and CB.6) are not intended to accept surface water. Top of concrete therefore has been set at 100mm above surrounding grade and no grading or contouring work to direct surface water to these structures is necessary. The approximate top of concrete elevation has been shown on the drawings; however the Contractor shall confirm the surface elevations prior to ordering or placing any catch basins and shall ensure that the top extends 100mm above the ground surface. All catch basins shall include at least one 150mm riser section.

All catch basins connected to the "South Outlet Pipe" (CB.7, CB.8 and CB.9) are required to accept surface water. Top of concrete therefore has been set at 50mm above surrounding grade and all necessary minor grading and contouring to convey water to the catch basin is included under this item. The approximate top of concrete elevation has been shown on the drawings; however the Contractor shall confirm the surface elevations prior to ordering or placing any catch basins and shall ensure that the top extends 50mm above the ground surface. All catch basins shall include at least one 150mm riser section.

Payment under this item shall be per each catch basin and includes all labour, equipment and materials necessary to supply and install the catch basin with birdcage grate, excavate and shape the trench, supply and place the Granular 'A' or clear stone, backfill the trench, connect pipe to catch basin, minor grading and contouring, and includes topsoil stripping and replacement, and restoration.

Securely fasten the grate to the structure with two galvanized bolts. All pipes connected to the catch basin shall be suitably grouted with concrete to be "water-tight", and all grouted connections shall be completely wrapped with geotextile. Further, geotextile shall be placed over all the joints between sections of the box for the entire perimeter of the box.

Supply and install approximately 10m<sup>2</sup> of rip rap at each structure. Rip rap shall be field or quarry stone, of 150mm to 300mm diameter (R50) or as approved by the Engineer on a filter mat base (Terrafix 270R or approved equivalent), machine placed to produce a smooth locked surfaced. All rip rap and geotextile shall be installed as shown on the drawings accompanying the report, and in accordance with OPSD 810.010 Type B. Payment for rip-rap will be on an area basis for the actual quantity supplied and installed at the rate quoted in the tender.

## **C-21 Junction Box**

Contractor is to obtain utility locates prior to construction.

Supply and install one (1) – 2400mm x 1200mm junction box at Sta. 0+461. The junction box is to be complete with cast-in-place concrete benching and is to be connected to the 900mm (36") diameter HDPE pipe to the south-west and the twin 600mm (24") diameter PVC pipes to the east.

All junction boxes shall be set on a 200mm thick layer of compacted Granular 'A' or 19mm clear stone. Granular 'A' or 19mm clear stone shall be included in the price of the catch basin and there shall be no extra payment for supply and placement.

All junction boxes shall be supplied from a precast manufacturer. Dimensions for junction boxes shall conform to dimensions for catch basins. An approximate top of structure elevation has been shown on the drawings; however the Contractor shall confirm the surface and top of structure elevations prior to ordering or placing any junction boxes.

All pipes connected to the junction box shall be suitably grouted with concrete to be "water-tight", and all grouted connections shall be completely wrapped with the geotextile. Further, geotextile shall be placed over all the joints between sections of the box for the entire perimeter of the box.

Junction boxes shall come pre-benched to the spring line with no sump. All buried junction boxes will be covered with a solid concrete top, minimum 150mm thick.

**C-22 Granular 'A'**

Supply and install Granular 'A' for bedding, backfill or envelope. Where not already specified in the contract, location for installation shall be designated by the Engineer at the time of construction.

Payment for this item shall include all labour, equipment and material necessary to supply, place, grade, and compact all Granular 'A' at locations shown on the drawings or as directed by the Engineer.

Water / calcium for compaction and dust control shall also be included in this item.

Payment for this item shall be for each tonne of Granular 'A' delivered, placed on site, installed and compacted, confirmed by copies of aggregate supply tickets signed by the Contractor and obtained from the aggregate supplier.

**C-23 Granular 'B'**

Supply and install Granular 'B' for bedding, backfill or envelope. Where not already specified in the contract, location for installation shall be designated by the Engineer at the time of construction.

Payment for this item shall include all labour, equipment and material necessary to supply, place, grade, and compact all Granular 'B' at locations shown on the drawings or as directed by the Engineer.

Payment for this item shall be for each tonne of Granular 'B' delivered, placed on site, installed and compacted, confirmed by copies of aggregate supply tickets signed by the Contractor and obtained from the aggregate supplier.

**C-24 Supply and Install Asphalt**

Payment for this item shall include all labour, equipment and material necessary to supply and place all asphalt at locations shown on the drawings accompanying the report or as directed by the Engineer in writing, including all sawcutting as required.

Payment for this item shall be for each tonne of HL-4 hot mix asphalt delivered, supplied and placed.

The Contractor shall provide the Engineer with the mix designs a minimum 7 days prior to the start of construction. The Contractor shall utilize a laboratory that has current CCIL Type 'A' Certification or AMRL equivalent certification or another equivalent certified laboratory acceptable to the Engineer to conduct all mix designs, designate the mix proportions, and prepare the job-mix formulae. Asphalt cement for HL-4 shall be PG graded 58-28 as per current OPSS specifications.

Necessary precautions are to be taken to minimize the risk of tire marks in fresh asphalt caused by vehicles or construction equipment.

At each location where new asphalt meets existing asphalt, a 0.5m wide strip of existing asphalt shall be milled off to a depth of 50mm to provide overlap of the joint of the base asphalt. Payment for this work shall be included under this item including the installation of reinforcement tape and glass grid as required.

Asphalt courses are to be placed in a manner that will ensure no joint in the pavement will be located within 0.5m horizontally of another joint in an adjacent lift of asphalt to ensure a 0.5m separation of longitudinal asphalt joints within the pavement structure.

Surface course paving shall be done in a continuous manner as much as possible. The Contractor shall provide the Engineer with the method of surface asphalt handling to minimize asphalt segregation and cold longitudinal joints.

All base asphalt shall be swept and flushed immediately prior to placement of surface asphalt, and a tack coat applied to all adjacent surfaces.

The adjustment will be based on the asphalt cement price index published monthly in the MTO contract bulletin. Payment adjustment will apply when the asphalt cement price index increases or decreases by more than \$15.00/tonne for the month published at the time of the tendering opening. For mixes containing reclaimed asphalt pavement, the increase due the Contractor or the rebate due the owner will be calculated as if hot mix asphalt has been supplied. It is noted that tender prices shall be based on the May 2021 Price index for PGAC (PG Grade 58-28 or equivalent) of \$781.50. A payment adjustment per tonne of hot mix will be based on the following formula:

Example1 – AC Prices Increasing

$$PA = ((ACI1 - \$15.00) - ACI2) \times \text{percent of virgin AC}$$

Example2 – AC Prices Decreasing

$$PA = (ACI2 - (ACI1 + \$15.00)) \times \text{percent of virgin AC}$$

Where:

PA= Payment adjustment per tonne of hot mix

ACI1= Liquid asphalt price index for actual paving dates

ACI2= Liquid asphalt price index on tender opening

The intent of the price adjustment methodology is to reflect that as contained in the Ontario Hot Mix Producers Association updated document entitled, "Example Contract Language to Facilitate an increase/decrease in hot mix asphalt prices based on the Ministry of Transportation's Liquid Asphalt Price Index".

#### **C-25 Tile Connections (Provisional)**

All tile encountered shall be connected into the existing McCredie Drain or the new "South Outlet Pipe" 250mm/350mm concrete field tile closed system. Under no circumstances shall tile connections be made to the new HDPE/PVC pipes.

Tile connections may be made by using the same size of concrete field tile or one size larger of standard corrugated plastic drainage tubing. Connection at the main shall be "earth tight" to the satisfaction of the Engineer. All tile connections shall be done by core drilling the main drain or catch basin, and the connection shall be sealed by a method satisfactory to the Engineer.

The contractor will be paid as follows for the connection of tributary tile to the proposed works:

100mm Connections to	Total c/w Coring	150mm Connections to	Total c/w Coring	200mm Connections to	Total c/w Coring
250-675	\$ 80.00	300-675	\$ 95.00	250-675	\$ 125.00
750-900	\$ 120.00	750-900	\$ 130.00	750-900	\$ 165.00

The number of tributary tile connections required is unknown until construction commences.

The above prices include supply and install of up to a 3m length of tile, or tubing to make connections.

Connections in excess of 3m shall be paid for at the rate of \$15.00/m for 100mm and 150mm diameter tile, and \$25.00 for 200mm diameter tile.

#### **C-26 19mm Clear Stone (Provisional)**

Supply and install 19mm diameter clear crushed stone for bedding or envelope. Where not already specified in the contract, location for installation shall be designated by the Engineer at the time of construction. Payment will be for the actual quantity, in tonnes, installed.

## Appendix E

### Construction Specifications

**SPECIFICATIONS**  
for the  
**CONSTRUCTION**  
of  
**MUNICIPAL DRAINAGE WORKS**

Revised July 2020

# SPECIFICATIONS FOR THE CONSTRUCTION OF MUNICIPAL DRAINAGE WORKS

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# **SPECIFICATIONS FOR THE CONSTRUCTION OF MUNICIPAL DRAINAGE WORKS**

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## **SECTION A - GENERAL**

### **A.1 BENCH MARKS**

Bench Marks are set along the course of the work as shown on the accompanying Plan and Profile. Attention is drawn to Section 13 (2) of the Drainage Act regarding liability for interference with Bench Marks.

### **A.2 STAKES**

Where requested, stakes may be set throughout the course of the work and at all fences or as shown on the accompanying Plan and Profile. The Contractor shall be held liable for the cost of replacing any stakes destroyed during the course of construction and the drainage area shall be liable for the cost of replacing stakes destroyed before commencement of construction.

### **A.3 LINE**

Open drains shall run in straight lines throughout each course except that at intersections of courses it shall run on a curve of at least 15m radius. The centre line of existing open drain shall in general be the centre line of the finished work but the straight lines of the drain shall be staked by the Contractor at least one complete course ahead of the digging, and all sloping and widening necessary shall be done in such a manner as to make the finished work uniform.

The Contractor shall exercise care not to disturb any existing tile drain or drains which parallel the course of the new drain, particularly where the new and existing tile act together to provide the necessary capacity. Where any such existing drain is disturbed or damaged, the Contractor shall perform all necessary correction or repair at his expense. The Engineer will designate the general location of the tile drain, but the landowners may indicate the exact location if approval is given by the Engineer.

The Contractor shall verify the location of the new tile drain with the Engineer, Drainage Superintendent and the landowners before proceeding with the work.

### **A.4 PROFILE**

The drain is to be excavated to regular grade lines as shown on the Profile. These grade lines are governed entirely by the bench marks and show the bottom of the finished drain. In the case of tile drains, the grade line is that of the invert of the tile. The Profile shows, for the convenience of the Contractor and others, the approximate depths from the surface of the ground, but the bench marks must govern the construction. Open drains shall be brought to an even grade in the bottom so that water will not stand therein, except in special cases such as sediment traps.

The drain shall be constructed with a uniform grade in accordance with the Profile Drawing. A variation of 25mm from the proposed Profile shall be sufficient to require the Contractor to remedy this discrepancy.

### **A.5 ERRORS OR OMISSIONS**

The Contractor shall satisfy themselves before the commencement of any part of the work of the meaning of all stakes and marks, and any errors or omissions they may find in Plans, Profiles or Specifications shall not relieve the responsibility of completing the work in accordance with the evident intention of such Plans, Profiles and Specifications. The Contractor shall report any such errors or omissions to the Engineer for correction before the work is commenced.

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## A.6 CLEARING

### (a) General

Brush, timber, logs, stumps, stones or any obstruction in the course of the work, and any brush along the banks thereof shall be removed to a sufficient distance to be clear of the excavated material or to the width as shown on the Profile.

Where included, the Special Provisions and the Engineering Plans lay out the amount of the work of clearing through bush and treed areas for both open and closed drains.

All brush and trees removed from the drain and banks thereof must be piled to the satisfaction of the Engineer for burning or disposal by the Owner.

Any deviation during construction will require the written authorization of the Engineer or the Drainage Superintendent in charge of the work. Other deviation will only be by Special Specification applicable to and governing certain aspects of special situations.

The Contractor will be permitted to cut standing timber along the banks of the drain to the extent that may, in the opinion of the Engineer, be reasonably necessary for the operation of the excavation equipment.

The quality of workmanship shall be equal to the best in the industry and the Contractor shall be held liable for all damages incurred due to carelessness, negligence or failure to adhere to this Specification.

### (b) Open Work

Clearing shall be 15m on the spoil side as designated on the Profile unless specified otherwise in the Special Provisions. All overhanging limbs and any dead or dying trees liable to fall into the drain on the opposite side shall be cut and removed. Care shall be exercised to prevent the scraping or barking of trees outside of the clearing area.

All trees 150mm in diameter, 450mm above the ground, must be cut, trimmed and stacked in log lengths in a location accessible to the Owner. These trees shall be cut sufficiently close to the ground in the cleared area that the spoil can be leveled over them.

No brush or trees are to be left inside the slopes of the drain whether they come within the limits of the excavation or not.

Under no circumstances shall the cleared material be pushed or deposited in any way in the uncleared area so as to impede the passage through the bush or to do damage to the uncleared bush. All remaining trees, bush and trimmed limbs shall be cleared with suitable equipment and temporarily placed on the edge of the cleared area remote from the drain. After the spoil has been spread and leveled, the cleared material is to be placed in piles along the centre of the cleared area free from dirt for disposal by landowners or others. The piles of brush shall be a minimum of 60m apart. For the clearing of willows, the Contractor shall use the equipment necessary to uproot and stack the bush in piles free from dirt for disposal by others.

### (c) Closed Work

Clearing width shall be as provided for in the Special Provisions.

In the normal case where the course of the drain is to be included in cultivated lands in the near future, all stumps shall be removed, and the land leveled for the full width of the clearing.

Where the course of the drain is through low, wet or swampy land and clearing prior to tile installation is impractical, then with special written permission ONLY can the tile be laid before clearing. For drainage purposes, the clearing shall be postponed until ground and weather conditions permit working within the area adjacent to the tile.

Where the course of the drain is not to be included in cultivated lands, all stumps shall be removed and the land leveled for 6m on each side of the installed tile. All stumps in the remaining cleared area shall be cut as close as is practically possible to the ground and chemically treated to prevent regrowth.

After the tiles have been laid, heavy machinery shall not be driven over it if there is any possibility of disturbing or damaging the tile.

Care shall be taken to prevent the scraping or barking of trees outside the cleared area.

All trees 150mm in diameter, 450mm above the ground shall be cut, trimmed and stacked in log lengths, in a location accessible to the Owner.

The cleared material shall not be pushed or deposited in the uncleared area in any manner so as to impede the passage through the bush or to do damage to the uncleared bush. All trees, bush and trimmed limbs remaining shall be cleared with suitable equipment and placed in piles free from dirt at intervals of 60m for disposal by other methods.

Willows shall be cleared using the necessary equipment to uproot and stack the bush in piles free from dirt for disposal by others.

## **A.7 FENCES**

The Contractor will be permitted to remove fences to the extent necessary to enable the Contractor to construct the drain and dispose of any excess material. Any such fences must be carefully handled so as to cause no unnecessary damage and shall be replaced by the Contractor in as good condition as found. Fences shall be properly stretched and fastened. The Contractor shall supply all wire and/or material necessary to properly reconstruct any fences. The Contractor shall not leave any fence open when they are not at work in the immediate vicinity. Replacing of the fences shall be to the satisfaction of the Engineer, or the Drainage Superintendent appointed to be in charge of the work.

## **A.8 TRIBUTARY OUTLETS**

During the construction of an open drain, the Contractor shall guard against damaging outlets of any tributary drains and during the construction of a tile drain the Contractor shall connect all tributary tile drains to the main tile as work progresses and before backfilling the new drain. Attention is drawn to Article B.11 and Article C.5 of these Specifications. The Contractor will be held liable for damage caused by negligence or carelessness, on the part of their self, their workers or subcontractors.

## **A.9 ALTERATIONS**

The Engineer may make minor changes in the work as it progresses. An amount proportionate to the amount contained in the Tender or as Tendered in the Schedule of Unit Prices shall be added to or deducted from the contract price to cover such changes. No changes will be made unless ordered by the Engineer or the Drainage Superintendent in charge of the works.

## **A.10 SPECIAL CONDITIONS**

If the Contractor should encounter any unusual soil conditions of any sort which may not have been known to the Engineer, and where not provided for by these Plans and Specifications and which would make necessary

alternations to the Plans and Specifications in order that the work be completed in a satisfactory and workmanlike manner, the Contractor shall immediately notify the Engineer who will make the necessary alterations.

Failure of the Contractor to so notify the Engineer shall not relieve the Contractor of the responsibility of fully completing the work to the satisfaction of the Engineer and shall make the Contractor ineligible to receive any extra compensation made necessary by the alteration.

## **A.11 PERMITS, NOTICES, LAWS AND RULES**

The Contractor shall apply and pay for all permits, licenses or approvals required for performance of the work (but this shall not include the obtaining of permanent easement or rights of servitude). The Contractor shall give all necessary notices and pay all associated fees required by law and comply with all laws, rules and regulations relating to the work and to the preservation of the public's health and safety.

## **A.12 HIGHWAYS, RAILWAYS, UTILITIES**

The Contractor shall perform the work affecting any lands of any Road Authority, Railway, Telephone, Pipeline Company or Public Utility in accordance with the Specifications or permit requirements of such Authority, Company or Utility, as though said Specifications were hereto attached.

### **Notices Required**

#### **(a) Highways**

Before any construction may take place on the right-of-way of any highway, forty-eight (48) hours notice in writing, exclusive of Saturdays, Sundays and Holidays, must be given to the appropriate District Engineer of the Ministry of Transportation of Ontario, or the Road Superintendent of the local Road Authority as the case may be.

#### **(b) Railways**

Before any construction may take place on the property of any Railway, a minimum of forty-eight (48) hours notice in writing, exclusive of Saturdays, Sundays and Holidays, must be given to the Area Engineer of the Railway Company.

Where a pipe is to be installed under Railway tracks by open cutting, a minimum of seventy-two (72) hours notice in writing, exclusive of Saturdays, Sundays and Holidays, must be given to the Area Engineer of the Railway Company.

## **A.13 CONTRACTOR'S LIABILITY INSURANCE**

The Contractor shall protect their self and indemnify and save the Owner harmless from any and all claims which may arise from the Contractor's operations under the Contract where bodily injury, death, or property damage is caused and for this purpose shall, without restricting the generality of the foregoing, maintain an insurance acceptable to the Owner, and subject to the limits and conditions under the Articles of Agreement of the tender, per occurrence for bodily injury, death, and damage to property including loss of use thereof. The Contractor will be solely liable for all injuries and/or accidents to workers, and/or the public, and/or livestock, and/or property and for any expenses or damages created by fences being left open or improperly closed, insufficient guarding and lighting or bad workmanship at places where a drain runs along or across a road allowance or any negligence in completing the work.

The Contractor shall furnish evidence of compliance with all requirements of the Workplace Safety and Insurance Act including payments due there under.

Prior to the commencement of any work hereunder, the Contractor shall file with the Owner a copy of each insurance policy and certificate required. All such insurance shall be maintained until final completion of the work including the making good of faulty work or materials; except that coverage of completed operations liability in any event by maintained for one (1) year from the date of final payment certificate by the Engineer.

In addition to the above insurance requirements, the Contractor, at his/her own expense, shall carry and keep in full force effect the following Liability Insurance to meet the requirements of the Enbridge Crossing Agreement.

**(a) Comprehensive General Liability Insurance**

Comprehensive General Liability Insurance with an inclusive limit for personal injury and property damage of Five Million Dollars (\$5,000,000.00), and such limits may be made up of a combination of Primary and Excess Liability policy. Applicant must add Enbridge as an additional insured on this policy with respect to this agreement and have its insurers provide a waiver of subrogation in Enbridge's favour.

**(b) Automobile Liability Insurance**

Automobile liability Insurance ("Owned" and "Non-Owned") with an inclusive limit for bodily injury (including passengers) and property damage of One Million Dollars (\$1,000,000.00)

## **A.14 SUB-CONTRACTORS**

The Contractor shall not sublet the whole or part of this Contract without the written approval of the Engineer, which approval shall not be unreasonably withheld.

## **A.15 STANDING CROPS AND LIVESTOCK**

The Contractor shall not be held responsible for damages to standing crops within the "working space" as defined in the report or in the access to and from such "working areas" such access having been defined by the owner of the property if the Contractor notifies the owner thereof in writing at least two (2) days prior to commencement of the work on that portion. Similarly, the Contractor constructing a tile drain shall not be held responsible for damages or injury to livestock occasioned by leaving trenches open for inspection by the Engineer if they notify the owner in writing at least two (2) days prior to commencement of the work on that portion. But the Contractor will be held liable for such damages or injury if the backfilling of such trenches is delayed more than seven (7) days after acceptance by the Engineer.

When notified as outlined above, the owner of the property on which the drain is located shall be responsible for the protection of all livestock on said property during construction and shall also be liable for any damages caused by such livestock.

## **A.16 SURPLUS GRAVEL**

If as a result of any work, gravel or crushed stone is required and not all the gravel or crushed stone is used in the construction or the works, the Contractor shall haul away such surplus gravel or stone.

## **A.17 OPEN CUT ROAD CROSSINGS**

All road crossings may be made with an open cut unless otherwise specified. The exact location of the crossings shall be verified and approved by the Road Authority or the Engineer. A 150mm depth of Granular 'A', compacted to 98% SPD, shall be placed as a base for each pipe crossing. The pipe shall be backfilled with granular material for the width of the travelled portion plus 1,200mm on either side. The material shall be placed in lifts not exceeding 150mm in depth and shall be thoroughly compacted with an approved type mechanical vibrating compactor. The top 150mm of the roadway backfill shall consist of crushed granular material meeting the OPSS for Granular Base Course Class 'A' (Granular 'A') material.

The Contractor shall be responsible, however, for subsequent uneven joints in the pavement due to settling of the backfill. The Contractor shall arrange with the Road Authority to keep the crossing in repair if unable to do such personally. All road crossings shall meet the approval of the Road Authority. When doing work on or across any public road, care must be taken to protect the travelling public. The Contractor is required to erect and maintain, until the completion of the work, all signs, barricades, and lights necessary to indicate or warn the travelling public that the work is being undertaken, all in compliance with the Ontario Traffic Manual Book 7.

The excavated material from road right-of-way shall be removed and disposed of at an approval disposal site.

If the Engineer deems a gravel road to have been damaged by the construction of a drain either across or along the said road, the Engineer may direct the Contractor to supply and place sufficient crushed granular material on the roadway to restore it to a safe and passable condition at the Contractors expense.

## **A.18 LANEWAYS**

All pipes crossing laneways shall be backfilled with material that is clean, free of foreign material or frozen particles and readily tamped or compacted in place unless otherwise specified. Laneway culverts on open ditch projects shall be backfilled with material that also is not easily erodible. All backfill material shall be thoroughly compacted as directed by the Engineer.

All pipe culverts located under laneways shall be backfilled with granular material to a minimum of 900mm beyond each side of the culvert. 150mm of granular 'A' shall be placed under the culvert as a base. Granular material shall be placed simultaneously on each side of the culvert in 150 mm layers and compacted to a ninety-eight per cent (98%) Standard Proctor maximum dry density. All culverts are to be assembled according to the Manufacturers Specifications. Culverts to have a minimum of 600mm of cover over the pipe unless otherwise noted on the Drawings.

The backfill over culverts and subsurface pipes at all existing laneways that have granular surfaces on open ditch and closed drainage projects shall be surfaced with a minimum of 300mm of pit run granular material and 150mm of Granular 'A' material. All backfill shall be thoroughly compacted as directed by the Engineer. All granular material shall be placed to the full width of the travelled portion.

Any settling of backfilled material shall be repaired by or at the expense of the Contractor during the warranty period of the project as soon as required. Any existing bituminous pavement on laneways shall be placed to its original condition by the Contractor.

## **A.19 REMOVALS**

Unless otherwise specified, the cost of removing existing catchbasins, junction boxes, tile (any size), outlets, farm bridge/culverts, and other such structures that are no longer required for the proposed drainage works and are encounter during construction are consider part of the Contract price.

## **A.20 FINAL INSPECTION**

Final inspection will be made by the Engineer within ten (10) days after they have received notice in writing from the Contractor that the work is completed or as soon thereafter as weather conditions permit.

If, after receiving notice from the Contractor that the work has been completed, the Engineer or Drainage Superintendent in charge of the work finds items uncompleted which entail a further inspection of the whole or part of the work, the cost of such further inspection may be charged against the Contractor.

All the work included in the Contract must, at the time of final inspection, have the full dimensions and cross-sections called for in the Plans and Specifications.

## **A.21 COMPLETION OF WORK**

The work may commence immediately after the Contractor is notified of the acceptance of the Tender or at a later date as specified in the contract documents, when weather and ground conditions are suitable.

The work must proceed in such a manner as to ensure its completion at the earliest possible date consistent with the first class quality work and within the time limit set out in the Tender or the Contract Documents.

## **A.22 NOTICE OF COMMENCEMENT OF WORK**

The Contractor shall give the Engineer and the Drainage Superintendent a minimum of seventy-two (72) hours advance notice before commencement of work on any municipal drain.

If the Contractor leaves the job site for a period of time after initiation of work, they shall give the Engineer and Drainage Superintendent a minimum of forty-eight (48) hours advance notice prior to returning to the job.

If any work is commenced without such advance notice, the Contractor shall be fully responsible for all such work undertaken prior to such notification and shall make good any works or materials used judged to be inadequate or constructed in a manner that may have been subject to alteration if made known to the Engineer prior to commencement of construction.

## **A.23 FIELD MEETINGS**

At the Engineers discretion, a field meeting with the Contractor or representative, the Engineer and with those others that the Engineer deems to be affected, shall be held after notification of commencement of work has been given and prior to commencement of, or during construction.

## **A.24 SUPERVISION**

The Contractor shall provide site supervisors and/or forepersons as required and assume all responsibility for control and direction of the work in accordance with the OPS General Conditions of Contract.

## **A.25 MAINTENANCE OR FAULTY WORKMANSHIP**

The Contractor shall repair and make good any damages or faults in the drain that may appear within one (1) year after its completion (as evident by the final payment certificate) as the result of the imperfect or defective work done or materials furnished if certified by the Engineer as being due to one or both of these causes; but nothing herein contained shall be construed as in any way restricting or limiting the liability of the Contractor under the laws of the Country, Province or Locality in which the work is being done. Neither the final payment certificate nor payment there under, nor any provision in the Contract Documents shall relieve the Contractor from responsibility.

## **A.26 DRAINAGE SUPERINTENDENT**

Where a Drainage Superintendent is appointed by the Municipality, the Drainage Superintendent may act as the Engineer's representative, if so directed by the Engineer. The Drainage Superintendent shall have the power to direct the execution of the work and to make any necessary minor adjustments.



## SECTION B - OPEN DRAINS

### B.1 BOTTOM WIDTH AND SIDE SLOPES

The drain shall have the full specified bottom width at the grade line at the time of final inspection. Both sides of an open drain are to be sloped as shown on the accompanying Profile. Bottom widths will vary with the size of the drain. Where the width of the bottom of the existing ditch is sufficient to permit the desired width, depth and back slopes for the new ditch to be constructed without disturbing the existing banks, such banks shall be left as is, subject to clearing required as described in Section B.9 "Obstructions". Sides of the drain shall be smooth and have a uniform slope from top to bottom.

### B.2 EXCAVATED MATERIAL

Excavated material shall be deposited on one or both sides of the drain as directed by the Engineer. In general, the material shall be placed on the low side of the drain or opposite trees and fences. The Contractor shall contact all landowners before proceeding with the work to verify the location to place and level the excavated material.

A clear berm or margin of at least 2.0m shall be left between the top edge of the ditch and the leveled spoil. In no case shall the side of the spoil bank nearest the ditch have a slope greater than 1.5m to 1m.

Any large stones or boulders which exceed 500mm in diameter shall be buried adjacent to the ditch and at a depth so as to not interfere with farm machinery.

Where it is necessary to straighten any bends or irregularities in the alignment of the ditch or to relocate any portion or all of an existing ditch, the excavated material from the new cut shall be used for backfilling the original ditch. Regardless of the distance between the new ditch and the old ditch, no extra compensation will be allowed for this work and it must be included in the Contractor's price for the open work.

### B.3 SPREADING AND LEVELLING

The spoil shall be deposited, spread and leveled up to a maximum depth of 200mm and be left so that the land on which it lies may be cultivated with adjacent lands by use of ordinary farm machinery. If the Contractor obtains a statement in writing, signed by the owner of the lands affected that they do not wish the spoil to be leveled, the Engineer may release the Contractor from obligation in that regard. Disposal of the material shall be to the satisfaction of the Engineer. Through timbered land the excavated material may be spread to a maximum depth of 600mm unless otherwise noted on the Plans governing the work. The Contractor is not required to remove stones and boulders from the excavated material unless called for in the Special Provisions.

### B.4 FILLING OLD CHANNEL

At every new cut, the excavated material shall be used to fill the abandoned channel unless otherwise directed by the Engineer. Fill shall be placed to 300mm below finished ground surface.

Where the on-site soil available is of insufficient quantity or quality to fill the abandoned channel, new soil shall be imported from an approved source. The imported soil shall be of the quality necessary to support agricultural operations and shall meet the most current Table 1 standards for Agricultural Use under the "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*" as published by the Ontario Ministry of the Environment and Climate Change. All imported soil will be subject to the approval of the receiving landowner. Fill soil placed to fill in abandoned channels shall be compacted to 95% SPMDD or as otherwise directed by the Engineer.

Abandoned channels shall be finished with a 300mm layer of topsoil of the quality necessary to support agricultural operations, and subject to the approval of the Engineer and the receiving landowner.



## **B.5 INLETS FOR SURFACE WATER**

Inlets shall be left in the leveled spoil on each property but not over 90m apart, or as shown on the Plan or Profile. No excavated material is to be left in or any damage done to any ditches, depressions, furrows, pipes, or tiles intended to conduct water into or across the open drain.

## **B.6 EXCAVATION AT BRIDGE SITES**

The Contractor shall be required to excavate the drain to full depths and as nearly as possible to the full widths and slopes at the sites of all bridges. Bridges of a permanent character are not to be unnecessarily disturbed. The excavation at these bridges being made, if necessary, by hand or by other suitable means.

Excavation under culverts and bridges is to conform to the grades, bottom widths and side slopes specified. The Contractor shall be held liable for any damage to any structure caused by carelessness, neglect or over-excavation. The Contractor shall immediately notify the Engineer if it should become apparent that the excavation of the drain to the grades shown on the Plan will in any way endanger any culvert or bridge and the Contractor shall discontinue work on the drain until the Engineer instructs them to proceed.

## **B.7 FARM BRIDGES AND FARM CULVERTS**

All farm bridges hereafter constructed or reconstructed, in order not to be regarded as obstruction, shall have minimum openings equal to the cross-section area recommended in the Report or of clear width equal to twice the specified bottom width of the drain. If required, it shall be the responsibility of the landowner to arrange for the supply, delivery and installation of a culvert of the recommended size. This work shall not form part of the Contract.

If a landowner at the time of construction has furnished a suitable culvert at the site, the Contractor shall install it as part of the work at the landowner's expense, with the invert 150mm below the grade of the drain, and with a suitable earth backfill such that a crossing with normal farm machinery can be made. Final grading, shaping or rip rapping of backfill shall be the responsibility of the landowner(s) involved. A minimum of 500mm cover shall be placed over each culvert.

Where it is necessary to remove a temporary farm bridge in order to perform the necessary excavation, the material from the bridge shall be carefully handled and left at the side of the drain for the use of the owner.

## **B.8 RIP RAP PROTECTION FOR CULVERTS**

Where rip rap protection is called for at either or both ends of a new culvert such rip rap shall be heavy field stone or quarry stone rip rap protection with geotextile filter material (Terrafix 270R filter cloth or approved equivalent).

The Contractor shall be responsible for any defects or damages that may develop in the rip rap or the earth behind the rip rap that the Engineer deems to have been fully or partially caused by the faulty workmanship of the materials for a period of one (1) year from the time of the final payment certificate.

## **B.9 OBSTRUCTIONS**

All brush, bushes, fallen timber and debris shall be removed from the banks and slopes of the drain to such a distance on each side to eliminate any interference with the spreading of the spoil bank. Grubbing shall include the removal and disposal of all stumps to the satisfaction of the Engineer. The slopes shall be cleared whether or not they are directly affected by the excavation. The roots shall be left in the banks if no bank excavation is required as part of the new channel excavation. Any trees necessarily removed are to be brushed and left for the landowner. In wooded or heavily overgrown areas, the brush, limbs, etc. may be pushed into piles back out of the way. All dead trees alongside the drain that impede the performance of the drain shall be removed prior to excavation and

put in piles, unless directed otherwise by the Engineer. All brush, limbs, debris, etc. shall be put into pile for disposal by the landowner.

## **B.10 ROADS**

Where an open drain is being removed from the road allowance, it must be reconstructed wholly on the adjacent land with a minimum berm width of 1,200mm on the roadway side of the ditch, unless otherwise noted on the Drawings. The excavated material shall be used to fill the existing open ditch and any excess excavated material shall be placed and leveled on the adjacent farm land. Any work done on the road allowance with respect to excavation, disposal of materials, installation of culverts, cleaning under bridges, etc., shall be to the satisfaction of the Road Authority. Any pipe culvert laid under the traveled portion of the road allowance shall be constructed as per Section A.17.

All excavated excess material from the construction of a road culvert or cleanout through culverts on any road allowance shall be trucked away for disposal. Any culverts suitable for salvage shall become the property of the landowner, if the landowner wishes to retain same, otherwise the Contractor be responsible for the disposal of the culvert to the satisfaction of the Engineer.

## **B.11 TILE OUTLETS IN EXISTING DITCHES**

All tile outlets in existing ditches shall be noted by the Contractor prior to excavation. The Contractor shall contact all landowners and ask them to mark all their tile outlets which enter the ditch. Any tile drain outlets that were marked and are subsequently damaged by the Contractor shall be repaired by the Contractor at their expense. If any ditch bank is altered due to the construction at the tile outlet, the Contractor shall replace the altered outlet.

In general, if the existing outlet is tile only, the new outlet shall consist of undamaged lengths of tile. If the existing outlet is a metal pipe with or without a rodent grate, such outlet shall either be relocated to adjust to the new banks or shall be replaced if damaged. If any outlet becomes plugged as a result of construction, the Contractor shall be obliged to free such outlet of impediments. Where stone or concrete rip rap protection exists at any existing outlet, such protection shall be moved as necessary to protect the outlet after reconstruction of the ditch. Where any damage results to tile leading to and upstream of the outlet as a consequence of construction, the Engineer may direct the Contractor to repair such tile and shall determine fair compensation to be paid to the Contractor for performing the work.

## **B.12 GRASS SEED AND FERTILIZER**

The ditch slopes where disturbed shall be seeded using an approved seed mixture. The grass seed and fertilizer shall be applied the same day as the excavation of the open ditch. Grass seed shall only be applied between April 15<sup>th</sup> and November 15<sup>th</sup>, unless otherwise directed by the Engineer.

Grass seed shall be fresh, clean and new crop seed, meeting the requirements of OPSS 804 for Standard Roadside Mix.

Grass seed shall be applied at the rate of 170kg/ha (150lbs/acre) and the fertilizer shall be applied at the rate of 365kg/ha (325lbs/acre), or as directed otherwise. Fertilizer shall be 8-32-16 (N-P-K).

### **B.13 EQUIPMENT**

An approved hydraulic excavator shall be used to carry out the excavation of the open ditch unless otherwise directed by the Engineer.

### **B.14 COMPLETION**

At the time of completion and final inspection, all work in the Contract shall have the full dimensions and cross-sections specified without any allowance for caving of banks or sediment in the ditch bottom.

## SECTION C - TILE DRAINS

### C.1 TILE QUALITY

All tile installed under these Specifications shall be sound and of first quality and shall meet all ASTM Specifications as set out in Designation C412-15 for Concrete Tile. Tile shall be approved by the Engineer before being incorporated into the work and the Engineer shall have the right to order such tests as deemed necessary to be made upon the tile, including that of testing by an independent testing laboratory. The costs of all such tests shall be borne by the Contractor and may be deducted from monies due to the Contractor under this Contract.

### C.2 LINE

New tile drains shall be constructed at an offset from and parallel to any existing ditch or defined watercourse in order that fresh backfill will not be endangered by the flow of surface water. Where any existing tile drains are to remain, the Contractor shall exercise care not to disturb any existing tile drains which follow the same course as the new drain. Where any such existing drain is disturbed or damaged, the Contractor shall perform the necessary correction or repair at their expense.

The Contractor shall verify the location of the new tile drain with the Engineer, Drainage Superintendent and the landowner before proceeding with the work.

### C.3 TILE LAYING

All tile shall be laid carefully on a rounded, smooth solid bottom with all joints aligned both vertically and horizontally. All tile being laid in a straight line shall be placed together as tightly as possible with the maximum space between successive tiles not exceeding 6mm. All tile being laid on a curve shall be fitted with a maximum space between successive tiles not exceeding 6mm at any point on the circumference. Any tile joint exceeding this tolerance shall be covered with wire mesh and sealed **all around** with concrete not less than 150mm thick. The grades and location of the tile shall be as specified on the Plan and Profile. No deviation shall be permitted without the written permission of the Engineer with the exception of that stated in Section A.4 of these Specifications. The maximum trench width at the top of the tile shall not be greater than the outside diameter of the tile plus 600mm. The trench shall not be opened up for a distance greater than 60m in advance of the tile laying. All dirt, foreign material and obstructions shall be removed from inside the tile before laying. Where corrugated metal or plastic pipe is used, the joints between the pipe and the field tile shall be sealed with concrete not less than 150mm all around. When construction is stopped for the day, the open ends of all tile drains shall be completely closed to prevent entry by animals or unnecessary water.

The sides of the tile are to be supported by partial filling of the trench prior to inspection by the Engineer. The remainder of the excavated material shall be used to restore and maintain the natural surface of the ground. No tile shall be backfilled until inspected by the Drainage Superintendent or Engineer unless directed otherwise by the Engineer. The tile shall be backfilled such that a sufficient mound of backfill is placed over the disturbed area. The Contractor's Tender Price shall include the cost of stripping the topsoil, bulldozing of the subsoil to the depth required and subsequent replacement of subsoil and topsoil.

### C.4 LOWERING OF SURFACE GRADES

If necessary, the Contractor shall strip back and stockpile the topsoil, and strip the subsoil in order that the tiling machine may trench to the correct depths. After the tile is installed, the trench shall be backfilled, subsoil replaced, and the topsoil shall be spread over the disturbed area. The Contractor's Tender Price shall include the cost of stripping the topsoil, bulldozing of the subsoil to the depth required and subsequent replacement of subsoil and topsoil.

## C.5 TRIBUTARY DRAINS

Any tributary tile encountered in the course of the drain is to be carefully taken up by the Contractor and placed clear of the excavated earth. If the tributary drains encountered are clean or reasonably clean, they shall be connected into the new drain. Tributary tile drain connections into the new drain shall be made using high density polyethylene agricultural drain tubing installed on and backfilled with 19mm clear crushed stone. All tile drain connections into the new drain shall be cored hole with an InsertaTee or a manufactured “tee”.

Where the existing drains are full of sediment, the decision to connect or not to connect the new drain shall be left to the Engineer. The Contractor shall be paid for each tributary drain connection as outlined in the Form of Tender and Articles of Agreement.

The Contractor shall be responsible for all tributary tile connections for a period of one (1) year after the issuance of the final payment certificate by the Engineer. After construction, any missed tile connections required to be made into the new drain shall be paid at the same rate as defined in the Form of Tender and Agreement. The Contractor will have the option to make any subsequent tile connections or have the Municipality make the required connections and have the cost of which deducted from the holdback.

Where the Contractor is required by the Engineer to hook up an existing tile which is not encountered in the course of the drain, the cost of such work shall constitute an extra and the basis for payment shall be determined by the Engineer subject to the provision of Section A.20 “Completion of Work”.

## C.6 CONNECTIONS

All tile encountered shall be connected into the main drain or a catch basin. Tile connections may be made by using the same size of concrete field tile or one size larger of standard corrugated plastic drainage tubing. Connections are included as part of the Contract. The Unit Price shall include the supply and installation of up to 3m of tile in order that the connection will be sloped at not greater than 3m horizontal to 1m vertical. All tile connections will be made in the upper 1/3 of the circumference of the main tile. Connection at the main shall be “earth tight” to the satisfaction of the Engineer. **All connections shall be left uncovered for inspection** by the Engineer.

Any open ends of tile left by making the connections shall be securely plugged with concrete.

## C.7 BACKFILLING

All tile shall be left open, as the laying of tile progresses, until after inspection. After laying and prior to inspection, partial filling (blinding) is to be made at the sides of the tile and compacted sufficiently to maintain the alignment. The upper 1/3 of the tile shall be left uncovered until after inspection by the Engineer or Drainage Superintendent in charge of the works. Where conditions indicate that damage may occur, arrangements shall be made for daily or continuous inspection by the Engineer or Drainage Superintendent. The Engineer or the Drainage Superintendent in charge of the work reserves the right to demand that all or any part of the works be uncovered to allow for adequate inspection and the Contractor shall supply, at their own expense, all equipment and labour to do the said work.

After the work is inspected by the Engineer or Drainage Superintendent in charge of the work, the remainder of the excavated material shall be used to restore and maintain the natural surface of the ground. Stones having any dimensions larger than 150mm shall not be used for backfill material within 300mm of the tile.

## C.8 OUTLET PROTECTION

The protection at the outlet of a tile drain shall be a length of corrugated metal or plastic pipe, as specified, fitted with a rodent-proof grate. The grate shall be hinged at the top to permit the exit of foreign material from the tile. The pipe shall be protected with rip rap protection consisting of quarry stone or heavy field stone and geotextile

filter material in a manner satisfactory to the Engineer. The rip rap shall extend from the bottom of the trench to the original ground surface and for a distance of at least 4m from the end of the outlet pipe unless otherwise specified on the Drawings. The protection shall extend to the top of the backfilled trench and below the pipe to 400mm under the streambed and also extend 600mm into undisturbed soil on either side of the backfilled trench unless otherwise specified on the Drawings.

Where the outlet occurs at the end of an open ditch, the above rip rap protection will extend all around the end of the ditch and to a point 800mm downstream on either side unless otherwise specified on the Drawings. Where heavy overflow is likely to occur, sufficient additional rip rap and filter material shall be placed as directed by the Engineer to prevent the water cutting around the protection. A concrete structure may be required to protect against heavy overflow if so indicated on the Drawings. The corrugated outlet pipe shall have a hinged metal grate on the outlet end to prevent the entry of small animals. Maximum spacing between bars shall be 50mm.

## C.9 CATCH BASINS

All catch basins shall be approved reinforced precast units having inside dimensions as noted on the drawings with a 600mm sump. The sides shall be a minimum of 115mm thick, and the bottom shall have a minimum thickness of 150mm. The elevation of the top of the catch basin shall be as set by the Engineer at the time of construction. All necessary grading to convey water to the catch basin shall be included as part of the Contract.

All tile and pipe entering a catch basin shall be sealed all around with 15 MPa concrete which shall extend a minimum of 150mm beyond the **OUTSIDE WALL** of the catch basin. The **INSIDE WALL** of the catch basin shall be formed and the void around all tile and pipe entering a catch basin shall be completely filled with concrete to form a smooth flush surface.

If there are no existing drains to be connected to the catch basin at the top end of the drain, a plugged tile shall be placed in the upstream wall, with the same diameter and at the same elevation as the outlet tile.

Offset catch basins shall be offset with tile in the size specified on the drawings. All offsets shall enter into the main tile at a maximum angle of 45 degrees downstream with a maximum grade of 0.50%. The connection into the main tile shall be fitted and sealed all around with a minimum of 150mm of 15 MPa concrete. It shall be the responsibility of the Contractor to supply and install all tile required for the construction of the offset. Payment shall be made for the actual quantity installed, as measured at the time of construction, in accordance with the Unit Prices. **All** offsets shall be left open for inspection by the Engineer.

All blind inlets shall be constructed with 19mm clean, crushed stone placed to a minimum depth of 150mm over the top of the tile between the stations as specified in the Special Provisions.

## C.11 BRUSH, TREES, DEBRIS, ETC.

The Contractor is to include the removal of all excavation of whatever nature, disposal of material, removal and cutting of all brush, supplying of all labour and completing the whole work in accordance with the Plan, Profile and Specifications. Any trees necessarily removed are to be brushed and left for the Owner of the property on which they are found. All brush, limbs, etc. are to be put in piles by the Contractor and left for disposal by the landowner. No additional payment will be made for brushing of scattered trees where required by the Engineer.

Where, in the opinion of the Engineer, the drain or proposed location of the drain is heavily overgrown with small trees and brush, the Contractor may use a bulldozer or other such equipment to clear a maximum width of 20m. The resulting debris shall be placed where directed by the Engineer and/or the landowner(s) and left for disposal by the landowner(s). Where roots may interfere with the new drain, all such roots shall be grubbed and placed in a pile convenient for disposal by the landowner. No additional payment will be made for such work.

## **C.12 POOR SOIL CONDITIONS**

The Contractor shall immediately contact the Engineer or Drainage Superintendent if poor soil conditions are encountered. The Engineer or Drainage Superintendent may direct the Contractor to construct a temporary open drain to lower the water table or to lay the tile on a crushed stone mat, or to take such action as may be necessary. The basis of payment for such work shall be determined by the Engineer or Drainage Superintendent.

## **C.13 ROCKS**

The Contractor shall immediately contact the Engineer or Drainage Superintendent if boulders of sufficient size and number are encountered such that the Contractor cannot continue trenching with a tiling machine. The Engineer or Drainage Superintendent may direct the Contractor to use some other method of excavating to install the drain. The basis of payment for this work shall be determined by the Engineer or Drainage Superintendent.

If only scattered large stone or boulder are removed on any project, the Contractor shall either excavate a hole to bury same adjacent to the drain, or they shall haul the same to a nearby bush or fence line, or other convenient location as approved by the landowner(s).

## **C.14 BROKEN OR DAMAGED TILE**

The Contractor shall either bury or remove all damaged tile. NO tile shall be left on the ground for the landowner(s).

## **C.15 FILLING IN EXISTING DITCHES**

The Contractor shall backfill the ditch sufficiently for traversing by farm machinery. If sufficient material is not available from the old spoil banks to fill in the existing ditch, the topsoil shall be stripped and the subsoil shall be bulldozed into the ditch and the topsoil shall then be spread over the backfilled waterway.

## **C.16 CONSTRUCTION OF GRASSED SWALES/WATERWAYS**

Where the Contractor is required to construct a grassed swale/waterway, the existing waterway shall be filled in, regarded, shaped and a seed bed prepared prior to applying the grass seed and fertilizer. The grass seed shall be fresh, clean and new crop seed, meeting the requirements of "Lowland Mix" as per OPS 804.

Grass seed shall be applied at the rate of 170kg/ha (150lbs/acre) and the fertilizer shall be applied at the rate of 350kg/ha (300lbs/acre), or as directed otherwise. Fertilizer shall be 8-32-16 (N-P-K).

## **C.18 TILE CROSSING ROADWAYS BY OPEN CUT**

- (a) Unless otherwise specified, the Municipality will supply no labour, equipment or materials for the construction of any road crossing.
- (b) The excavated material removed from the right-of-way shall be removed and disposed of off the site by the Contractor. No excavated material shall be spread on the right-of-way without written consent of the Engineer.
- (c) The backfill material for the excavation on the right-of-way, shall be in accordance with A.17 "Road Crossings".
- (d) The Contractor shall apply calcium chloride at the rate of 1 kg/m<sup>3</sup> to the finished surface for the entire width of the excavation covered in this section.

- (e) The excavated material from the trench may be replaced in the trench in the case of covered drains. This material shall be compacted by hand tamping in layers not exceeding 300mm. The finished work shall be left in a clean and orderly condition, flush with or slightly higher than the adjacent ground, and seeded with a good quality grass seed mixture to the requirements of the Engineer.
- (f) The type, location on the right-of-way and the elevation of the top of catch basins, inlets and junction boxes on the right-of-way shall be as required by the Engineer.
- (g)
  - (i) The Contractor shall give the Road Authority such notice as it may require before the Contractor commences any work on the right-of-way of any road. A copy of the notice shall at the same time be sent to the Engineer.
  - (ii) The Contractor shall be responsible for maintaining the road crossing until the work has been approved by the Engineer and shall be responsible for any deficiencies arising from their work for the period of guaranteed maintenance.
- (h) If at all possible, the Contractor shall keep the road open to traffic at all times. The Contractor shall provide suitable warning signs and/or flagpersons to satisfy all requirements for safety and to notify motorists of work on the road ahead. If it is necessary to close the road to through traffic, the Contractor shall provide for and adequately sign the detour road as per the Ontario Traffic Manual Book 7.

## **C.19 RECOMMENDED PRACTICE FOR CONSTRUCTION OF SUBSURFACE DRAINAGE SYSTEMS**

The latest version of The Drainage Guide for Ontario, as published by OMAFRA, shall be the guide to all methods and materials to be used in the construction of tile drains except where superseded by other Specification of the Contract.



Appendix F  
Unofficial Enbridge Crossing Agreement

{Prepare on Union Gas letterhead}

[Insert Date], 20\_\_\_\_

[Applicant Company Name]

[Address]

[Domicile]

[Postal Code]

Attention: [Name and Title]

**RE: \_\_\_\_\_ (Applicant)**  
**Proposed Crossing of Union Gas Limited's NPS \_\_\_\_ Natural Gas Pipeline**  
**("Union Pipeline") with a \_\_\_\_\_ (the "Facility") in Lot \_\_\_\_, Concession \_\_\_\_,**  
**Township of \_\_\_\_\_ (the "Crossing")**

---

We acknowledge your request for Union Gas Limited ("Union") to consent to the Crossing.

Union constructs and operates natural gas transmission, distribution and storage pipeline facilities. Natural gas is viewed as the cleanest-burning fossil fuel and is an economical source of energy for those persons dependant on it for residential, industrial and commercial uses. Union's activities are regulated by the Ontario Energy Board who must determine, among other things, that our projects serve the public interest. Union must therefore protect its pipelines to ensure an uninterrupted supply of heat and energy in the public interest. Additionally, Union is a regulated utility subject to a fixed rate of return and must avoid unnecessary costs of operating its pipelines.

The Union Pipeline is contained within an easement registered against the title to the subject lands. Details of the easement agreement are available at the registry office or through our Lands Department.

In consideration of Union consenting to the Crossing, the Applicant agrees to the following general terms and conditions;

1. The Applicant and the Applicant's Contractors will make the necessary arrangements through Union contacts as defined in Appendix A.
2. The Applicant and the Applicant's Contractors will comply with the general conditions for consent in Schedule A, attached hereto;
3. The Applicant and the Applicant's Contractors will install the Crossing strictly in the manner described in Schedule B and C, attached hereto;

[Name of Crossing Applicant]

[Insert Date], 20\_\_\_\_\_

Page 2 of 2

4. The Crossing will be designed and constructed strictly in accordance with Schedule D, your drawing dated \_\_\_\_\_, and approved by Union prior to commencing with construction.

Please have three (3) copies of this letter dated and executed by your authorized signing officer(s) and return it to the writer within 30 days of the date hereof. We will return one fully executed agreement to you whereupon it shall form an agreement between us for the Crossing. The Applicant and Applicant's Contractor shall give Union a **minimum of three (3) business days' advance notice**, by telephone and/or email, and receive confirmation before any work may begin.

Yours very truly,

[District Engineer]

[Title]

Read and agreed to at \_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Witness:

Applicant  
(Name of Company/person(s))

\_\_\_\_\_  
Name/Title

\_\_\_\_\_  
Name/Title

"I/we have authority to bind the corporation."

Copies to:     Division/GSO  
                    Lands (file)

## **APPENDIX A**

### **Union Gas District and Contact Information**

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Please note the following pipelines that your proposed line would cross:

#### **CONTACTS**

NAME: \_\_\_\_\_ PHONE: \_\_\_\_\_ (office)

CELL: \_\_\_\_\_

NAME: \_\_\_\_\_ PHONE: \_\_\_\_\_ (office)

CELL: \_\_\_\_\_

London Planning (519) 667-4200 Ext. 147 to arrange for 3<sup>rd</sup> party observation

Emergency Call Centre 1-877-969-0999

#### **CRITERIA for Crossing Union Gas Pipelines;**

1. Field locates are required before any construction begins. These may be obtained by calling Ontario One Call - **ON1Call** at **1-800-400-2255**.
2. The Applicant and the Applicant's Contractors are responsible to contact appropriate personnel **three (3) business days advance notice** to arrange for 3<sup>rd</sup> party inspection for the excavation and crossing. Third part observation is required when excavating within 1.5m of a pipeline(s).
3. It is the Applicant's responsibility to verify depth of existing line to maintain this separation, using hydro vac excavation.
4. The Applicant and the Applicant's Contracts are **NOT** to make any changes to the existing grade, as to maintain the depth of the pipelines.
5. The Applicant and the Applicant's Contractors shall use extreme caution while working around these high pressure pipelines
6. Any pipe support drawings shall be reviewed by Union before beginning work.

### **CRITERIA for Crossing Union Gas Pipeline with Heavy Equipment;**

The Applicant and the Applicant's Contractors have approval to cross the sections of pipeline stated in Appendix B with the equipment referenced in Appendix B.

The Applicant and the Applicant's Contractors shall not drive any other heavy equipment directly over the pipelines without first obtaining approval from Union Gas. If changes are required, the crossing will need to be re-assessed. Re-assessment turnaround time is 1-2 weeks, once all information is received from the Applicant.

When crossing the sections of pipeline stated in Appendix B with the above equipment, the following conditions must be followed by the Applicant and the Applicant's Contractors;

1. The number of crossings (back and forth) should be minimized.
2. The equipment must cross our pipeline perpendicular to the line (not running along the length of the line).
3. Equipment using the crossing shall be operated at slow speeds when crossing the pipeline to minimize impact loading.
4. The equipment cannot remain stationary on the pipeline.

## **SCHEDULE A**

### **General Conditions for Crossing Consent**

---

1. In this agreement:
  - (a) the term "Applicant" refers to the person(s) who will own, operate and maintain the Facility;
  - (b) the term "Contractor" means the person(s) who constructs and installs the Facility;
  - (c) the term "Facility" refers to the works of the Applicant as described in the covering letter-agreement to this Schedule;
  - (d) the term "Crossing" refers to the crossing of Union's pipeline(s) by the Facility at the location described in the covering letter-agreement to this Schedule.
2. Union consents to the Crossing to the extent that it has the right to do so and the Applicant shall be responsible for obtaining all other applicable approvals, permits, orders and permissions required to construct and install the Facility.
3. Applicant agrees to comply with all applicable rules, orders, regulations, codes and guidelines of any competent government body or organization affecting the design, installation, construction and operation of the Facility.
4. Applicant agrees to indemnify and save Union harmless against any claims, demands, actions, suits, proceedings, damages, injuries (including injuries resulting in death) that may arise as a result of the construction, installation and operation of the Facility, unless caused by the negligent or intentional acts of union, its agents, employees, licensees, invitees, successors and assigns.
5. In connection with Clause 4, above, Applicant, at its own expense shall carry and keep in full force and effect:
  - (a) Comprehensive General Liability insurance with an inclusive limit for personal injury and property damage of Five Million Dollars (\$5,000,000.00), and such limits may be made up of a combination of Primary and Excess Liability policy. Applicant must add Union Gas as an additional insured on this policy with respect to this agreement and have its insurers provide a waiver of subrogation in Union Gas's favour, and;
  - (b) Automobile Liability Insurance ("Owned" and "Non-Owned") with an inclusive limit for bodily injury (including passengers) and property damage of One Million Dollars (\$1,000,000.00).

Applicant shall submit certificates or other evidence of such insurance to Union prior to any work commencing for the Crossing.

6. Applicant agrees to personally perform the installation and construction of the Facility or else to closely supervise its installation and construction by a duly qualified contractor(s) and to ensure that said contractor(s) complies with all terms and conditions of this agreement.
7. The Applicant shall pay forthwith upon presentation of an invoice by Union, all reasonable costs incurred by Union for:
  - (a) Review, approval and inspection of the Crossing;
  - (b) Reinforcing, modifying or relocating Union's pipeline(s) to accommodate the installation of Applicant's Crossing or the maintenance and repair of its Facility;
  - (c) Any reasonable incremental costs incurred by Union in the operation, maintenance, inspection, replacement and repair of its pipeline(s) which are caused by the Crossing.
8. The terms and conditions of this consent shall apply to the construction and installation of the Crossing and any future maintenance work that may be required.
9. This consent is for the Facility shown in Schedule C only and any additional works or facilities proposed by the Applicant shall be the subject of a separate agreement.
10. Applicant hereby agrees and acknowledges that its rights in the Crossing are subordinate to the easement(s) of Union that have been registered or obtained prior to this date and Applicant shall cooperate with all reasonable requests made by Union related to the operation, maintenance and repair of Union's pipeline(s) within the easement(s).
11. In the case of default by the Applicant to carry out any of the provisions of this agreement or if the condition of Applicant's Facility has deteriorated and adversely affects to the operation of Union's pipeline(s), Union may give written notice thereof. If the Applicant fails to take all reasonable steps to remedy the default or the deterioration of the Facility within fifteen (15) days after receipt of the written notice by Union, Union may take such steps as are necessary to remedy the default or deterioration and Applicant shall be liable for and shall pay forthwith all reasonable costs incurred by Union in this regard.
12. All notices required to be given hereunder shall be delivered by registered mail or facsimile to the addresses shown on the covering letter-agreement and shall be deemed to be received on the fifth (5th) day following mailing thereof or upon confirmation of facsimile transmission.
13. This agreement shall be governed in accordance with the laws of Ontario.

14. Neither party to this agreement shall assign or transfer their rights and obligations hereunder to a third party without first obtaining the written consent of the other party, except for a Permitted Assignment. A Permitted Assignment is an assignment by Applicant to an affiliate of the Applicant or lender(s) to Applicant. Applicant does not need consent from Union for a Permitted Assignment, but Union must receive notice regarding any assignment or proposed assignment to an affiliate.
15. The rights and obligations of the parties hereto shall terminate upon the later of:
  - (a) two (2) years from the date hereof if the Applicant has not completed the construction and installation of the Facility and restoration of the lands affected by the Crossing; or,
  - (b) upon the proper abandonment or removal of the Facility and restoration of the lands to a condition acceptable to Union and the owner of the property where the Crossing is situate.
16. This agreement and Schedules A, B and C constitute the entire agreement between Union and the Applicant and any change or alteration hereof shall be made in writing between the parties.
17. If any part of this agreement shall become null and void by virtue of law or governmental regulation, it shall be severed from the agreement, but the remaining terms and conditions shall remain in full force and effect.



## **SCHEDULE B**

### **Installation Guidelines**

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#### Excavation

1. The following conditions shall apply whenever any construction activities shall require the need for the operation of equipment or excavation near the Union pipeline(s).
  - (a) To protect exposed Union Pipeline from damage during the proposed work, Union's on-site inspector may require the Applicant to install certain safety precautions before beginning construction.
  - (b) To avoid possible damage to the Union Pipeline while excavating, it shall be supported adequately, as directed by Union's on-site inspector.
  - (c) To avoid possible damage to Union Pipeline, heavy equipment shall be restricted to crossing within the travelled portion of the easement unless other crossing locations are approved by Union's on-site inspector.
  - (d) Applicant shall provide at least three (3) business days' advance notice prior to commencing any excavation near the Union pipeline(s).

#### General Conditions for Crossings of the Pipeline by Highways, Private Roads, Railways and Utilities

2. The following general conditions shall apply to Crossings of the Union Pipeline by a highway, private road, railway or utility.
  - (a) In the case of a crossing of the Union Pipeline by a highway, private road, railway or utility the Crossing shall, except as otherwise provided herein, conform to the respective specifications and requirements of the current Canadian Standards Association Z662 for Gas Pipeline Systems and if the facility will result in the Union Pipeline not conforming, the Crossing may be made only if the Union Pipeline is reconstructed to conform to such requirements, the cost of which shall be borne and paid for by the Applicant.
  - (b) The Applicant shall pay all costs to ensure the Union Pipeline shall, in all cases, be of sufficient strength to withstand all stresses and strains resulting from the Crossing .
  - (c) The Crossing shall be constructed so as to cross the Union Pipeline at an angle as close as practicable to ninety (90) degrees, but not less than forty-five (45) degrees.
3. At any crossing of the Union Pipeline, except crossings by overhead telephone,

telegraph, telecommunication or electrical power lines, the Union Pipeline and the Facility shall be identified by suitable markers.

4. A buried utility shall cross under the Union Pipeline unless otherwise approved by Union. A clearance of not less than 0.6m shall be maintained at the point of crossing between the utility and Union Pipeline and all other underground structures. In all circumstances, minimum clearances as stipulated in the current edition of Canadian Standards Association code CAN/CSA-Z662 "Gas Pipeline Systems" shall be complied with.
  - (a) Underground utility crossings shall also be subject to the following design constraints:
    - (i) Utilities must be installed at a level grade across the entire width of the Union Pipeline easement with the exception of gravity dependent structures. In such cases, the minimum clearances *specified in* between the utility and Union Pipeline(s) crossed must be maintained.
    - (ii) In the case of any Applicant's buried pipelines, no joints may be made over or under any Union Pipeline(s).
    - (iii) If Applicant's pipeline(s) will operate under pressure, it (they) shall be pre-tested to at least the required pressure test pressure prior to its installation across the Union Pipeline easement.
    - (iv) In the case of buried power cables or electrical grounding installed by open-cut method, the Applicant shall install a 75mm thick concrete slab, or suitable equivalent (i.e. patio paving stones) placed 300mm above the utility service installation, the full width of the Union Pipeline Easement. There shall be a minimum separation of 300mm between the top of the concrete slab and the bottom of the Union Pipeline(s). This separation shall be maintained over the entire width of the Union Pipeline easement(s). The concrete slab should be un-reinforced red dye concrete. The utility shall be permanently identified with "caution" tape on top of the concrete slab.
    - (v) In the case of buried power cables or electrical grounding conductors installed by directional drilling, the Applicant shall install the cables with a minimum 600 mm separation between the bottom of the Union Pipeline(s) and the top of the power cable.
    - (vi) in the case of buried cables, no joints, splices or other connections shall be made within the Union Pipeline easement.
    - (vii) The method of installation of all utilities crossing Union Pipeline(s) below ground level must be specified in the Applicant's submission to Union.
5. A highway or private road shall be constructed so that the travelled surface thereof shall be not less than 1.2m above the top of the Union Pipeline or the casing pipe, where required. The bottom of the ditches shall be not less than 1.0m or the

minimum distance required by the local M.T.O. office above the top of the Union Pipeline or casing pipe.

#### Railway Crossing Requirements

6. The following conditions apply to the crossings of Union Pipeline(s) by railways and shall supplement or supersede the conditions detailed in Section 2 through 5.
- (a) Where Union specifications stipulate, the Union Pipeline within the vicinity under and around the crossing as specified in CSA Z662-11 (latest edition) shall be subject to one of the following modifications:
- Replaced with new piping of sufficient grade and wall thickness to meet the design requirements for such a crossing; or
  - Encased in a metal casing pipe, to be installed by Union.
    - The design requirements for the pipe in either of the cased or uncased crossings are specified in CSA Z662-11 (latest edition), except where superseded by TC E-10 (Standards Respecting Pipeline Crossing Under Railways).
    - The cost of the selected course of action shall be borne and paid for by the Applicant.
- (b) Railway crossings shall be constructed to allow the following minimum clearances for cased and uncased piping as specified in TC E-10:
- (i) Cased Piping
    - One hundred and sixty-eight (168) centimetres between the top of the Union Pipeline or casing pipe and the base of the rail for a distance of at least 7.0m from the centreline of the outermost track.
    - Ninety-one (91) centimetres between the top of the Union Pipeline or casing pipe and the bottom of the railway right-of-way ditch and/or natural ground surface.
  - Uncased Piping
    - Three hundred and five (305) centimetres between the top of the Union Pipeline or casing pipe and the base of the rail for a distance of at least 7.0m from the centreline of the outermost track.
    - One hundred and eighty-three (183) centimetres between the top of the Union Pipeline or casing pipe and the bottom of the railway right-of-way ditch and/or natural ground surface.

The cost of ensuring all depth of cover requirements are met shall be borne and paid for by the Applicant.

- (c) Accessible emergency shutoff valves shall be located each side of the railway within effective distances as mutually agreed to by the Chief Engineer of the railway company and the pipeline company. These valves shall be marked with signs for identification. The cost of installing said valves shall be borne and paid for by the Applicant. Where pipelines are provided with automatic control stations and/or valves that are remotely operated, no emergency shutoff valves are required.
- (d) The pipeline right of way shall be prominently marked on either side of the rail crossing easement, approximately on the limits thereof, by signs in a language or languages appropriate to the region in which the sign is located. Such signs shall meet the requirements of C.S.A Z662-11 (latest edition), as amended herein. Where such signage is not deemed visible from the track by the Chief Engineer of the railroad company, the appropriate signage should be installed. The cost of installing any and all signage shall be borne and paid for by the Applicant.

#### Overhead Crossing Requirements

- 7. The following conditions apply when crossing, paralleling, or working in close proximity of the Union Pipeline by overhead and underground telephone, telegraph, telecommunication and electrical power lines.

- (a) Prior to construction, unless otherwise agreed upon by both Union and Applicant, the Applicant shall determine if electrical interference between the Applicant's facilities and the Union Pipeline(s) will occur under the following conditions;
  - Steady State Induced Voltage when Paralleling Pipeline
  - Induced Voltage spikes from electric power line transient fault conditions
  - Energizing and Arcing to pipe under ground fault conditions at poles, ground rods, anchors

If so, the Applicant is responsible for conducting an Engineering study and providing mitigation as required to ensure that no unsafe voltage levels greater than 15 volts A.C. will be impacted on the Pipeline. Generally in accordance with CSA Standard C22.3 No 6M-91 (Reaffirmed 2003 – latest edition), "Principles and Practices of Electrical Coordination Between Pipelines and Electric Supply Lines". Included in the Applicant's facilities are the poles, pylons, towers, guys, anchors, ground rods and any other supports of an overhead line. The Engineering study shall be made available to Union Gas for review.

- (b) The vertical distance between the lowest wire of an overhead line catenary and the surface of the ground within the pipeline easement shall not be less than the minimum vertical clearance distance set out in that part of the Canadian Electrical Code Part 111 (CSA Standard C22.3, "Overhead Systems and Underground Systems").
- (c) The poles, pylons, towers, guys, anchors and any other supports of an overhead line and grounding items of underground line, shall be located

outside the Union Pipeline easement and not within ten (10) metres of any Union Pipeline or appurtenance, unless locations are otherwise agreed to by Union and Applicant.

- (d) The Applicant, for an overhead line shall, where directed by Union, install aerial warning devices for the protection of Union personnel and equipment conducting aerial patrols.
- (e) Overhead utilities are not allowed to be overhead of any above grade piping, or fenced-in area of a Union facility.
- (f) Upon completion of Electrical power lines that run parallel to Union pipeline, voltage testing will be required to ensure unsafe voltage levels, are not induced on Union Pipeline(s). The Applicant will be responsible for the cost of such testing and any mitigation requirements as a result of the Applicant's facilities will be conducted by either Union or Applicant.

#### Blasting Requirements

- 8. Prior written approval is required if construction of the Facility requires the use of explosives. The Contractor shall comply with all applicable government laws, regulations and orders concerning the use, storage and transportation of explosives, including, but not limited to, the Canadian Explosives Act. The applicant shall comply with the safety requirements of Union.
- 9. The following conditions shall apply whenever any construction activities shall require the need for blasting when working within thirty (30) metres of the Union Pipeline.
  - (a) The effects of blasting shall be controlled.
  - (b) A leakage survey of the designated area shall be performed prior to and after blasting by the Union inspector to determine the effect of such operations, the cost of which shall be borne and paid for by the Applicant.
  - (c) When blasting is necessary in the vicinity of the Union Pipeline under pressure, the Applicant shall limit the intensity of the ground vibrations emanating from any particular blast, measured on the ground's surface above the pipeline at the location nearest to the blast to the following specifications:
    - (i) Maximum amplitude of vibrations 0.1524 mm.
    - (ii) Maximum horizontal peak particle velocity 50 mm/sec.
    - (iii) The permissible quantities of explosive per delay period shall be governed by the recorded measurements as influenced by the work site conditions.
    - (iv) Explosive agents must, in all instances, be acceptable to Union.

- (v) Delays shall be designed to prevent double readings.
- (vi) Further restrictions shall be stipulated, as required, by Union.

#### Cathodic Protection Requirements

10. Applicant agrees to install, at its cost, all cathodic protection facilities deemed necessary by Union to protect the Union Pipeline(s) or otherwise, reimburse Union for the costs of such facilities and installation. Testing may be required to ensure that Union's Pipeline cathodic protection system does not impact the Applicant's facilities. The Applicant is responsible for conducting this testing and implementation of any mitigation requirements.

## **SCHEDULE C**

### **General Guidelines for Union Gas Collector System Installations**

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#### **A. Overhead Systems (34.5 kv)**

For all new overhead (34.5 kv) systems, it is recommended that any grounded part of the 34.5 kv lines (i.e. ground rods, anchors, metal poles, etc.) be installed to maintain a minimum distance of 300 mm from any pipelines. This would include all transmission, distribution and any service laterals that run from the main to the individual customer meter sets serving the homes along the pipeline system.

If this distance cannot be maintained for some reason, then these specific locations (i.e. where separation is less than 300 mm) will need to be identified and further field investigations will need to be conducted. Investigation of impacts shall occur once the system is operational to identify specific impacts and to determine potential remediation measures, as required. For any locations where facilities are installed closer than 2144 mm from the pipeline, Union shall be provided with a drawing showing the specific location with GPS coordinates, and measurements from the structure, etc. to the pipeline.

When installing or drilling (poles) near pipeline facilities, a minimum clearance of 300 mm must be maintained from any structure, anchor, etc. Appropriate locates are required and third part inspection may also be necessary when constructing near gas lines.

#### **B. Perpendicular Underground Crossing of High Pressure Lines on Easements**

Applicable Drawing – Directional Bore Details (Gas Pipeline Crossings)

When crossing high pressure transmission lines, extreme care must be taken to prevent any damage to these facilities. Cable crossings of pipeline easements shall be perpendicular to the pipeline and shall undercross the pipeline. A minimum separation distance of 300 mm shall be required between the bottom of the pipeline and top of casing containing power cables. The casing pipe must be installed at the same elevation for the entire width of the easement. Union shall be advised of the method of construction of each crossing in advance of work for approval and be provided with a drawing (*see Schedule D for details*) for each crossing location.

Structures (poles) are not permitted to be installed on any pipeline easement corridor.

#### **C. Perpendicular Underground Crossing of Distribution Pipelines (Road Allowance)**

All locations where cables will undercross distribution lines and service lines, a minimum separation of 600 mm will be required. Cables shall be encased at all crossings for a minimum distance of 460 mm on either side of the pipeline. Union shall be advised of the method of construction of each crossing in advance of work for approval and be provided with a drawing (*see Schedule D for details*) for each crossing location.

D. Buried Cables Running Parallel to Gas Lines

For situations where buried cables are to run parallel to existing gas pipelines, a minimum separation of 600 mm will be required. If this separation distance cannot be maintained, then Union shall be advised of the method of installation of each crossing in advance of work for approval and be provided with a drawing (*see Schedule D for details*) for each crossing location.

E. Directional Drilling of Crossings

Any directional drilling shall use the wireline directional drilling method, in which route of drill head can be tracked to ensure proper clearance. Gas pipelines are to be exposed at each crossing location during directional drilling and monitoring of the drill head as it approaches the pipeline shall be completed until the drill is known to be past the pipeline. Exposure must be in the upstream direction of the drilled pipe coming towards the crossing. Drilling is to stop immediately if the drill is observed in the monitoring hole ahead of the pipeline.

F. Heavy and Compacting Equipment

Detailed load analysis will be required for crossing all pipeline with heavy and compacting equipment used in the construction of wind towers. The following detailed information will be required for each piece of heavy and compacting equipment;

- make
- model
- specifications – including dimensions, weights, track information (gauge, track width and track length)

Union will provide a form to complete for each piece of heavy and compacting equipment used in the construction of the wind towers.



## SCHEDULE D

### Plan Showing Approved Crossing

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A drawing of each crossing shall be prepared in accordance with sub-sections A, B and D below. The drawing shall show the location and dimensions of the crossing and the clearance between the lowest catenary and the surface of the ground within the pipeline right-of-way or its projected limits.

#### **Standard Drawing Requirements**

*Note: ALL VIEWS TO BE COMBINED IN ONE DRAWING.*

#### A. Plan View

##### Scale

- in metric - scale of 1:500 or at a scale which clearly defines all details of the crossing.

##### Dimensions

- distance along the Union Pipeline easement to the crossing from a definable legal limit; ie. lot line, river, road allowance limit, etc.
- width of the Union Pipeline easement to one-tenth (0.0) of a metre.
- location of the Union Pipeline(s) within the easement to one-tenth (0.0) of a meter at right angles to the pipeline easement.
- angle of the crossing (measured to the Union Pipeline easement)
- show the width of the utility easement(s) to one tenth (0.0) of a metre.
- width of streets in vicinity of crossing.

*Note: Parallel Utility easements shall not encroach on the Union Pipeline easement without the written consent of Union.*

##### Identify

- legal description of the crossing location; ie. lot, section, concession, township, town, village, etc.
- all additional Union Pipeline appurtenances; ie' concrete slabs, weights, pipeline markers, etc.
- north arrow
- scale

B. Section View

The section view is to be along the proposed utility that crosses the Union Pipeline.

Scale

- in metric, vertical 1:100, horizontal 1:200 or to a scale that clearly identifies all details of the crossing.

Dimensions

- depth of the Union Pipeline(s) to one-tenth (0.0) of a metre
- Vertical distance of the proposed utility below grade to one-tenth (0.0) of a metre
- clearance to the Union Pipeline
- diameter of each Union Pipeline to be crossed
- easement or right-of-way limits

Identify

- if elevations are assumed, then reference the point of the assumed datum
- distance of the pipeline(s) to the Union Pipeline easement limits
- ground surface profile for 20m on either side of crossing
- scale

C. Profile View

The profile view is to be along the Union Pipeline and is only required if the encroachment is on the Union Pipeline easement for a definable distance; ie. parallel encroachments such as roads and any grading of the easement, etc.

Scale

- in metric, vertical 1:100, horizontal 1:200 or to a scale that clearly identifies all details of the crossing

Dimensions

- depth of the Union Pipeline(s) to one-tenth (0.0) of a metre
- depth of the proposed utility to one-tenth (0.0) of a metre
- clearance to the Union Pipeline
- diameter of each Union Pipeline to be crossed

- easement or right-of-way limits
- Identify
- if elevations are assumed, then reference the point of the assumed datum
  - distance of the pipeline(s) to the Union Pipeline easement limits to one-tenth (0.0) of a meter
  - ground surface profile for 20m on either side of crossing
  - scale
  - existing Union Pipeline markers

D. Location Plan View

Scale

- in metric, scale of 1:12000 or to a scale that clearly identifies the location

Dimensions

- distance to the nearest town or major geographic feature to 0.1 of a kilometre

Identify

- township, town, village, city, county, regional municipality, etc.
- lot, concession, street, highway, road, etc.
- north arrow

## **TITLE BLOCK**

Identify

- name of the Applicant and the name of the engineering company who compiled the drawing (where applicable)
- drawing number and the date of the drawing
- revision dates (if applicable)
- signature of the applicant and the engineering company
- legal description of the crossing location
- description of the utility
- date of the survey

## **ADDITIONAL INFORMATION**

Identify

- all specifications of the utility, ie. diameter, wall thickness, material to be conveyed, minimum yield strength, operating pressure, field test pressure, mill test pressure, materials comprising the utility, protective devices to be installed and the proper method of installation.
- show a note referencing compliance with the applicable CSA standards, Union Gas Limited's Specifications for Pipeline Crossings and the National Energy Board Pipeline Crossing Regulations.
- date of the proposed crossing

## **OPERATIONAL CONSTRAINT – UNION GAS PIPELINE**

### **COMPLIANCE MEASURES**

The Contractor shall contact all pipeline owners listed below and request from them a copy of their technical guidelines for work adjacent to their pipelines.

Pipeline Owner	Contact Information
UNION GAS	

The Contractor shall comply with all conditions, requirements and procedures of the pipeline owner.

The Contractor shall submit a written application to the pipeline owner in accordance with the requirements of the pipeline owner, seeking permission to perform the work under this contract.

Activities requiring permission from the pipeline owner include;

- Construction or installation of a facility across, on, along, or under an existing pipeline right of way;
- Excavation using explosives or power-operated equipment over the right of way;
- Operation of a vehicle or mobile equipment across a right of way, outside the travelled portion of a highway or public road (any equipment or vehicle greater than a 3,800 kg pickup truck);
- Excavation using explosives or power-operated equipment within 30 metres of the pipeline right of way or;
- Seismic/vibration activity within 40 metres of a pipeline right of way.

Once the pipeline owner has given its permission, the Contractor shall comply with the following:

#### **1. Notification of the Pipeline Owner**

- Provide the pipeline owner three working-days notice before starting any work approved in the application.
- Provide 24 hours notice before backfilling over the pipe (if applicable).
- Any contact with the pipe or its coating shall be reported to the pipeline owner immediately.

#### **2. The Contractor shall comply with the following rules for excavation within three metres of the pipe;**

Excavation using power-operated equipment is not permitted within three metres of the pipe unless:

- a) The pipe has been exposed by hand under the direct supervision of the pipeline representative at the point of crossing or;
  - i) where the excavation runs parallel to the pipe, the pipe has been exposed at sufficient intervals to confirm its location or,
  - ii) the pipeline owner has informed the Contractor that it has confirmed the location of the pipe by probing and has staked the location of the pipeline.

- b) Where the excavation crosses a pipe, the pipeline owner has informed the Contractor that it has confirmed the location of the pipe by probing and the pipe is at least 600 mm deeper than the proposed excavation.
- c) Where ground conditions render exposure of the pipe by hand impractical, the pipeline owner has agreed that the excavation may be performed safely to within one metre of the pipe under the direct supervision of the pipeline representative.

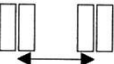

The Contractor shall not move or alter the pipe or its fittings, or in any other way interfere with the pipe without the written consent of the pipeline owner.



### 3. Equipment Loading Forms

These forms must be filled out and returned to Union Gas after award. These forms will be used to perform loading calculations prior to the start of construction and will form the basis of construction stipulations.

## Vehicles or Equipment with Tires

**INDICATE UNITS**

Equipment Description:			Manufacturer and Model:	
Fully Loaded Gross Vehicle Weight:			Road legal without overweight permit? Y / N	
Axle	Maximum weight on axle	Tire pressure	Distance between tire set centerlines 	Centerline distance between axle in front 
Steering				
2				
3				
4				
5				
6				
7				

Equipment Description:			Manufacturer and Model:	
Fully Loaded Gross Vehicle Weight:			Road legal without overweight permit? Y / N	
Axle	Maximum weight on axle	Tire pressure	Distance between tire set centerlines 	Centerline distance between axle in front 
Steering				
2				
3				
4				
5				
6				
7				

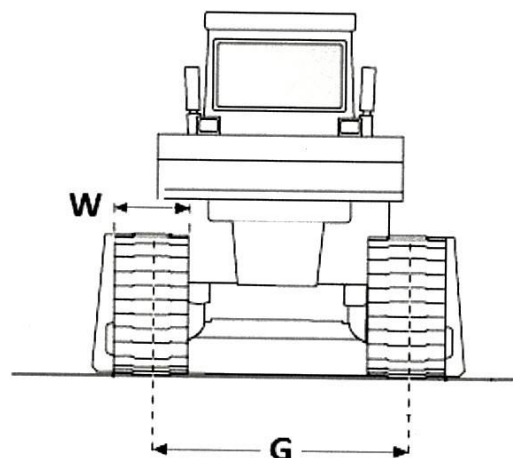
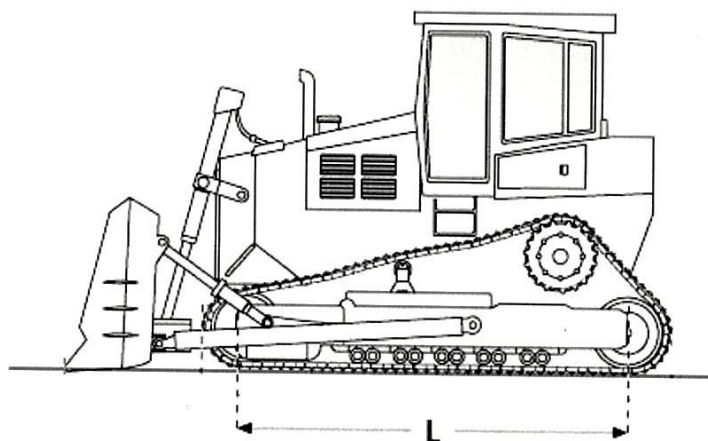
Submitted by:	Date:
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Retain a copy with calculation spreadsheet.

## Equipment on Tracks

INDICATE UNITS

Equipment Description	Manufacturer and Model	Fully Loaded Gross Vehicle Weight	Track Shoe Width (W)	Track Length on Ground (L)	Track Gauge (on centre) (G)
1					
2					
3					
4					
5					
6					



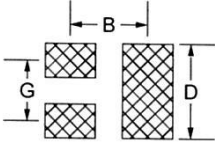
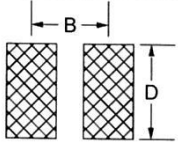
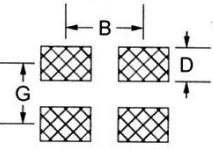
Submitted by:

Date:

Retain a copy with calculation spreadsheet.



## Compaction Equipment

Manufacturer:	Model:			
Equipment Description:				
<i>Attach equipment manufacturer's data sheets if available.</i>				
Select or sketch the correct loading diagram	<b>Drum and 2 tires</b>  <input type="checkbox"/>	<b>2 drums</b>  <input type="checkbox"/>	<b>4 drums</b>  <input type="checkbox"/>	<b>Other (sketch here)</b> <div style="height: 100px;"></div>

### INDICATE UNITS

<b>Dimensions (per circled/selected diagram)</b>			
Drum width:	D=		Drum diameter:
Wheelbase:	B=		Tire width:
Gauge (on centre):	G=		
Other dimensions from sketch:      =      =      =			
<b>Loading (include units):</b>			
Total operating weight:	<input type="checkbox"/> Smooth drums <input type="checkbox"/> Padfoot drums		
Static weight on front drum/axle:			
Static weight on rear drum/axle:			
Centrifugal force: High Vibration Low Vibration			
Other information which may be relevant:			

Submitted by:	Date:
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Retain a copy with calculation spreadsheet.