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June 23, 2025

The Mayor and Council
Town of Essex
33 Talbot Street South
Essex, Ontario
N8M 1A8

Gentlemen & Mesdames:

Re: 4th Concession Road Drain South Side

In accordance with your instructions, I have undertaken an examination of the 4th Concession Road Drain South Side with regards to making drainage improvements in Lot 13 & 14, Concession 3 in the Town of Essex. The work includes the replacement of multiple access culverts. The course of the work has been surveyed with elevations taken as necessary.

Authorization under the Drainage Act

This Engineers Report has been prepared under section 78 of the Drainage Act as per the request of an affected Owner.

Section 78 of the Drainage Act states that, where, for the better use, maintenance or repair of any drainage works constructed under a bylaw passed under this Act, or of lands or roads, it is considered expedient to change the course of the drainage works, or to make a new outlet for the whole or any part of the drainage works, or to construct a tile drain under the bed of the whole or any part of the drainage works as ancillary thereto, or to construct, reconstruct or extend embankments, walls, dykes, dams, reservoirs, bridges, pumping stations, or other protective works as ancillary to the drainage works, or to otherwise improve, extend to an outlet or alter the drainage works or to cover the whole or any part of it, or to consolidate two or more drainage works, the Council whose duty it is to maintain and repair the drainage works or any part thereof may, without a petition required under section 4 but on the report of an Engineer appointed by it, undertake and complete the drainage works as set forth in such report.

Existing Drainage

The 4th Concession Road Drain South Side is an open channel drain located in Lots 13 & 14, Concession 3 located on the south side of the 4th Concession Road. The drain outlets into the Richmond Drain on the east side of McCormick Road.

The drain was constructed under petition and Engineer's Report dated August 23, 1968 by C.G.R. Armstrong, C.E. Under this report, the culvert identified as Culvert No.8 was installed.

An Engineer's Report dated August 9, 1996 prepared by N.J. Peralta Engineering Ltd. provided for the installation of a farm access bridge for roll no. 160-03507. This culvert will be identified in this report as Culvert No.10.

Engineering specifications were developed for a private culvert replacement at roll no. 160-031 by Crozier Baird Engineers on April 24, 2012. This culvert will be identified in this report as Culvert No.11.

Onsite Meeting

An Onsite Meeting was held on November 12, 2024.

The following were present at the meeting:

- Josh Warner (R. Dobbin Engineering)
- Lindsay Dean (Town of Essex)
- Tanya Tuzlova (Town of Essex)
- Burnie Mueller (Landowner)
- Arthur Martin (Landowner)
- Patrick Soulliere (Landowner)
- Robert Cote (Landowner)
- Larry Snively (Landowner)
- Cameron Waters (Landowner)
- Joseph Borg (Landowner)
- Chris Whaley (Landowner)
- Jennifer Gritke (Landowner)
- Stephen Armstrong (Landowner)

The following is a brief summary of the meeting:

- General discussion of the Drainage Act and Landowners rights under the Drainage Act.
- Landowners were made aware that a request to replace an access culvert was received by the Town and that this was the first step in the public process.
- Landowners were informed of the current culvert conditions and what ones appeared to require replacement.
- There was a general concern by all of the costs associated with culvert replacements.

- It was explained that Culvert No.8 and No.10 were completed under the Drainage Act and the remainder were considered private. This would mean that if Culvert No.8 or No.10 needed to be replaced, the work would be assessed with a cost shared to the property and a portion to upstream lands and roads. The remainder if replaced, the owner would be responsible to pay the full cost for the first culvert and then would be entitled to a cost share in the future.
- Landowners were informed that culverts would have a minimum top width of 6.1m with rip rap endwalls and full granular backfill. All culverts would have a gravel top. Any asphalt replacement would be the responsibility of the owner to have done in the future if required.
- Mr. Martin requested to be removed from the watershed as his land did not drain to the 4th Concession Road Drain South Side.
- Landowners were interested in going to Council to discuss the option of giving the project to one contractor to have the culverts relined.
- Landowners were informed that an information meeting would be held to discuss the final report and cost estimate prior to going to Council.

Discussion and Investigation

The drain was surveyed and a culvert inspection report was completed. It identified that seven (7) culverts required replacement. The open channel had been previously maintained and was in good condition.

After the site meeting, a couple of landowners requested that two options be reviewed and investigated. Option one consisted of full replacement of all required culverts and option two consisted of relining the culverts using Edge Water Sewer. A considerable amount of time was put in to determine design, cost estimates, and schedule of assessments for both options along with multiple conversation with landowners, Edgewater Sewer and the Town of Essex Drainage Superintendent. It was decided to hold a public meeting to obtain feedback on the preferred replacement method.

Below is a summary of the condition of the existing culverts:

Culvert Number	Location	Existing Culvert Size	Condition
1	McCormick Road	20m x 1050mm dia. CSP	Poor condition with holes along the bottom.
2	Roll Number 760-04100	7m x 900mm dia. CSP	Good condition

Culvert Number	Location	Existing Culvert Size	Condition
3	Roll Number 760-04000	7m x 900mm dia. CSP	Poor condition with holes throughout and endwalls falling toward the drain.
4	Roll Number 760-03900	6m x 900mm dia. CSP	Poor condition with holes throughout, the bottom is rotted out in multiple locations, and the endwalls are quikrete cement bags.
5	Roll Number 760-03900	7m x 900mm dia. CSP	Poor condition with holes throughout and the bottom is rotted out in multiple locations. There are no endwalls.
6	Roll Number 760-03800	6m x 900mm dia. CSP	Poor condition with holes throughout along with wood endwalls falling toward the drain being held up with t-posts.
7	Roll Number 760-03700	6m x 900mm dia. CSP	Poor condition with holes throughout, the bottom is rotted out in multiple locations, and endwalls consist of a mixture of cinder blocks, concrete blocks and broken pieces of concrete.
8	Roll Number 760-03600	8m x 900mm dia. CSP	Poor condition with holes throughout, the bottom is rotted out in multiple locations. The upstream endwall is a mixture of earth and broken concrete and there is no downstream endwall.

Culvert Number	Location	Existing Culvert Size	Condition
9 (Shared)	Roll Number 760-02700 & 760-03507	16m x 900mm dia. CSP	Good condition
10	Roll Number 760-03507	9m x 900mm dia. CSP	Good condition
11	Roll Number 760-03100	11m x 900mm dia. CSP	Good condition

Public Information Meeting (To Discuss Options)

A Public Information Meeting was held on February 26, 2025.

The following were present at the meeting:

- Josh Warner (R. Dobbin Engineering)
- Lindsay Dean (Town of Essex)
- Tanya Tuzlova (Town of Essex)
- Norm Nussio (Town of Essex)
- Rob Shepley (Town Deputy Mayor)
- Joesph Borg (Landowner)
- Larry Snively (Landowner)
- Jerald Cote (Landowner)
- Margaret Cote (Landowner)
- Chris Whaley (Landowner) - Phone
- Jennifer Gritke (Landowner)
- Frank Borg (Landowner)

The following is a brief summary of the meeting:

- An update was given to the landowners on what had been completed since the onsite meeting – that two options were reviewed and that the reason for this meeting was to obtain feedback on a path forward.
- Both the replacement option and the reline option was discussed in great detail.
- At the end of the meeting, it was decided to move forward with the replacement option, but the McCormick Road culvert would be relined due to the location of the bridge crossing the 4th Concession Road.
- Landowners were informed that there would not be another information meeting and that the report would be submitted to the Town and invitations would be sent out for a Meeting to Consider.

Recommendations

It is therefore recommended that the following work be carried out:

1. Culvert No.1 (McCormick Road) at Station 0+014 shall be relined.

2. Culvert No.2 at Station 0+149 shall be incorporated.

3. Culvert No.3 to No.8 shall be replaced.

4. Culvert No.9 at Station 0+578 shall be incorporated.

5. Future Specifications shall be provided for Culvert No.10.

6. Culvert No.11 at Station 0+780 shall be incorporated.

7. Maintenance provisions for future drainage works shall be prepared.

Design

All agricultural and residential culverts have been designed to meet a 1 in 5 yr storm event. McCormick Road, when relined will meet more than a 1 in 100-yr storm event.

Estimate of Cost

It is recommended that the work be carried out in accordance with the accompanying Specification of Work and the Profile, which form part of this Report. There has been prepared an Estimate of Cost in the amount of $181,850.00 including the cost of engineering. A Plan has been prepared showing the location of the work and the approximate drainage area. An estimate for tendering, inspections, and contract administration has been provided. This estimate includes attendance at the Meeting to Consider and the Court of Revision, but does not include any appearances before appeal bodies beyond the Court of Revision.

Assessment

As per section 21 of the Drainage Act, the Engineer in his report shall assess for benefit and outlet for each parcel of land and road liable for assessment.
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. (Section 22)

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. The assessment for outlet shall be based on the volume and rate of flow of the water artificially caused to flow into the drainage works from the lands and roads liable for such assessments. (Section 23)

The Engineer may assess for special benefit any lands for which special benefits have been provided by the drainage works. (Section 24)

A Schedule of Assessment for the lands and roads affected by the work and therefore liable for the cost thereof is attached as per the Drainage Act. Also, assessments may be made against any public utility or road authority, as per Section 26 of the Drainage Act, for any increased cost for the removal or relocation of any of its facilities and plant that may be necessitated by the construction or maintenance of the drainage works. Items to be assessed under Section 26, as specified, shall be tendered separately with the actual cost plus a portion of the engineering (25% of the construction cost).

The estimated cost of the drainage works has been assessed in the following manner:

1. Culverts No.1 (McCormick Road) has been assessed with 100% of the cost applied as a benefit assessment to the road authority under Section 26. This will be tendered separately and the actual cost plus 25% of engineering assessed to the road authority.

2. The cost to incorporate and provide future replacement specifications for Culverts No.2 and No.11 have been assessed with 100% of the cost applied as a benefit assessment to the property.

3. Culverts No.3, No.4, No.5, No.6, and No.7 have been assessed with 100% of the cost applied as a benefit assessment to the owner of the property.

4. Culvert No.8 has been assessed with 60% of the cost applied as a benefit assessment to the owner of the property and 40% of the cost has been assessed as outlet assessment to upstream lands and roads based on equivalent hectares.

5. Culvert No.9 is a shared culvert for roll no. 760-02700 and 760-03507. The cost to incorporate and provide future replacement specifications for Culvert No.9 has been assessed with 50% of the cost applied as a benefit assessment to the property with roll no. 760-02700 and 50% of the cost applied as benefit assessment to the property with roll no. 760-03507.

6. The cost to daylight and survey the utilities in the vicinity of the drain has been assessed 100% of the cost applied as benefit assessment to each utility under Section 26.

7. The cost to develop the maintenance schedules have been assessed as 100% outlet assessment to upstream lands and roads based on equivalent hectares.

All final costs included in the cost estimate of this report shall be pro-rated based on the Schedule of Assessment. Any additional costs shall be assessed in a manner as determined by the Engineer.

Allowances

Under section 29 of the Drainage Act, the Engineer in his report shall estimate and allow in money to the Owner of any land that it is necessary to use for the construction or improvement of a drainage works or for the disposal of material removed from a drainage works. This shall be considered an allowance for right of way.

Under section 30 of the Drainage Act, the Engineer shall determine the amount to be paid to persons entitled thereto to damage, if any, to ornamental trees, fences, land, and crops occasioned by the disposal of material removed from a drainage works. This shall be considered an allowance for damages.

In this report, allowances have been made under section 30 for damages to lands occasioned by the operation of excavation equipment to replace the culverts and for access to culverts.

Access and Working Area

Access to the drain for the installation of culverts and future maintenance of the open channel shall be from either 4th Concession Road or McCormick Road, using existing culverts and laneways, and then along the length of the drainage works.

The working area shall be along the south side of the drain through agricultural properties and along the north side of the drain where the drain crosses any lawn, garden, orchard, parking or roadway. From Station 0+000 to 0+003, the south side of the drain shall be used to access the outlet due to the location of the road bridge.

When working from the south side the working area shall be 10 meters measured from the top of the drain. When working from the north side the working area shall be from the travelled portion of the road and shall be restricted to one travel lane.

The working area at each culvert to be replaced, maintained, or repaired either under this report or in the future shall extend 10 metres on either side of the culvert within the same property or road.

Approvals and Drain Classification

The 4th Concession Road Drain South Side is currently classified as a class "F" drain along its length.

Class "F" drains are intermittent or ephemeral (dry for more than three consecutive months). A permit is required by the St. Clair Conservation Authority. No authorization is required from Fisheries and Oceans if the work is completed in the dry.

The proposed improvements and culvert replacements will have very little effect on the drainage works if carried out during low flows in the channel. The work area is to be maintained in a dry condition during construction by the Contractor.

The proposed work will require a permit from the Essex Region Conservation Authority. A request for review will be sent to the Fisheries and Oceans Canada (DFO). No works can take place until all approvals are received.

Restrictions

No trees and shrubs shall be planted nor shall permanent structures be erected within 10 metres of either side of the proposed drain without prior written permission of Council. If trees are planted that interfere with access for future maintenance of the drainage works, they shall be removed at the expense of the Owner.

Attention is also drawn to sections 80 and 82 of the Drainage Act that refer to the obstruction of a drainage works.

Agricultural Grant

It is recommended that application for subsidy be made for eligible farm tax class agricultural properties. Any assessments against non agricultural properties are shown separately in the Schedule of Assessment and the applicable Schedule of Maintenance.

Maintenance

The open channel shall be maintained and repaired in accordance with the specifications and drawings contained within this report and assessed out using the Schedule of Maintenance.

The access culverts located along the length of the drain shall be maintained and repaired in accordance with the specifications and drawings contained within this report and assessed out using the Schedule of Maintenance. The equivalent hectares shown on the Schedule of Maintenance shall be used to prorate the cost for upstream lands and roads. Below describes the percentage cost share to be assessed to the benefiting land and the upstream lands and roads.

Culvert No.	**Benefit Lands**	**Upstream Lands and Roads based on Equivalent Ha.**
1	100% (McCormick Rd.)	0%
2	100% (760-04100)	0%
3	60% (760-04000)	40%
4	100% (760-03900)	0%
5	60% (760-03900)	40%
6	60% (760-03800)	40%
7	60% (760-03700)	40%
8	60% (760-03600)	40%
9 (Shared)	50% (760-02700) 50% (760-03507)	0%
10	60% (760-03507)	40%
11	100% (760-03100)	0%

Culvert No.4 shall be considered the secondary access and Culvert No.5 shall be considered the primary access for roll no. 760-03900.

Culvert No.9 is a shared access with roll no. 760-00700 and roll no. 760-03507. The west portion of the access located on roll number 760-03507 shall be considered a secondary access for the property.

When Culvert No.2, No.9, and No.11 are replaced in the future, a percentage cost share described below shall be used and assessed out in the same manner as described above.

Culvert No.	Benefit Lands	Upstream Lands and Roads based on Equivalent Ha.
2	60% (760-04100)	40%
9 (Shared)	30% (760-02700) 50% (760-03507)	20%
11	60% (760-03100)	40%

Any extra cost as a result of the location of underground utilities shall be assessed 100% to the utility as per section 26 of the Drainage Act.

If an owner requests an additional length of culvert beyond that specified in this report, the extra cost shall be borne by the owner making the request including the future maintenance and repair. Each property is allowed one access culvert for each municipal drain with any second culvert on the property maintained and repaired 100% by the owner.

These above conditions will apply unless otherwise altered under the provisions of the Drainage Act.

All of the above is submitted for your consideration.

Yours truly,

Josh Warner, P. Eng.

LICENSED PROFESSIONAL ENGINEER
J.H. WARNER
100520016
JUNE 23/25
PROVINCE OF ONTARIO

4th Concession Road Drain South Side
Town of Essex
June 23, 2025

ALLOWANCES

Allowances have been made as per Sections 30 of the Drainage Act for damages to lands and crops.

Conc.	Lot or part	Roll No.	Owner	Section 30	Total
3	Pt. Lot 14	760-03600	G. & M. Cote	100.00	100.00
	Pt. Lot 14	760-03700	L. & M. Snively	100.00	100.00
	Pt. Lot 14	760-03800	S. & T. Waters	100.00	100.00
	Pt. Lot 14	760-03900	J. Borg	200.00	200.00
	Pt. Lot 14	760-04000	J. Gritke & C. Whaley	100.00	100.00
			TOTAL ALLOWANCES	$600.00	$600.00

Estimate of Cost

To reline one road crossing culvert and replace six access culverts on the drain along with providing future maintenance provisons.

	Quantity	Unit	Unit Cost	Total
Culvert No. 1 - Station 0+000				
Traffic Control	1	LS	1,000.00	1,000.00
Supply and Installation of PVC Liner	21	m	1,000.00	21,000.00
Rip Rap endwalls	30	t	100.00	3,000.00
Brushing & Rock Chute Downstream	1	LS	2,000.00	2,000.00
Environmental Considerations (Silt Fence)	1	LS	100.00	100.00
				27,100.00
Culvert No. 3 - Station 0+174				
R.& D. Culvert c/w Excess Material & Asphalt	1	LS	1,800.00	1,800.00
Supply and Installation of 900mmø HDPE	12	m	700.00	8,400.00
Supply Clearstone Bedding	20	t	40.00	800.00
Supply Granular "B" Type II Backfill	60	t	40.00	2,400.00
Supply Granular "A" Driveway	30	t	40.00	1,200.00
Rip Rap Endwalls	15	t	100.00	1,500.00
Environmental Considerations (Silt Fence)	1	LS	100.00	100.00
				16,200.00
Culvert No. 4 - Station 0+209				
R.& D. Culvert c/w Excess Material	1	LS	1,500.00	1,500.00
Supply and Installation of 900mmø HDPE	12	m	700.00	8,400.00
Supply Clearstone Bedding	20	t	40.00	800.00
Supply Granular "B" Type II Backfill	60	t	40.00	2,400.00
Supply Granular "A" Driveway	30	t	40.00	1,200.00
Rip Rap Endwalls	15	t	100.00	1,500.00
Environmental Considerations (Silt Fence)	1	LS	100.00	100.00
				15,900.00

	Quantity	Unit	Unit Cost	Total
Culvert No. 5 - Station 0+236				
R.& D. Culvert c/w Excess Material	1	LS	1,500.00	1,500.00
Supply and Installation of 900mmø HDPE	12	m	700.00	8,400.00
Supply Clearstone Bedding	20	t	40.00	800.00
Supply Granular "B" Type II Backfill	60	t	40.00	2,400.00
Supply Granular "A" Driveway	30	t	40.00	1,200.00
Rip Rap Endwalls	15	t	100.00	1,500.00
Environmental Considerations (Silt Fence)	1	LS	100.00	100.00
				15,900.00
Culvert No. 6 - Station 0+265				
R.& D. Culvert c/w Excess Material	1	LS	1,500.00	1,500.00
Supply and Installation of 900mmø HDPE	12	m	700.00	8,400.00
Supply Clearstone Bedding	20	t	40.00	800.00
Supply Granular "B" Type II Backfill	60	t	40.00	2,400.00
Supply Granular "A" Driveway	30	t	40.00	1,200.00
Rip Rap Endwalls	15	t	100.00	1,500.00
Environmental Considerations (Silt Fence)	1	LS	100.00	100.00
				15,900.00
Culvert No. 7 - Station 0+308				
R.& D. Culvert c/w Excess Material & Asphalt	1	LS	1,800.00	1,800.00
Supply and Installation of 900mmø HDPE	12	m	700.00	8,400.00
Supply Clearstone Bedding	20	t	40.00	800.00
Supply Granular "B" Type II Backfill	60	t	40.00	2,400.00
Supply Granular "A" Base	30	t	40.00	1,200.00
Rip Rap Endwalls	15	t	100.00	1,500.00
Environmental Considerations (Silt Fence)	1	LS	100.00	100.00
				16,200.00
Culvert No. 8 - Station 0+383				
R.& D. Culvert c/w Excess Material	1	LS	1,500.00	1,500.00
Supply and Installation of 900mmø HDPE	12	m	700.00	8,400.00
Supply Clearstone Bedding	20	t	40.00	800.00
Supply Granular "B" Type II Backfill	60	t	40.00	2,400.00
Supply Granular "A" Driveway	30	t	40.00	1,200.00
Rip Rap Endwalls	15	t	100.00	1,500.00
Environmental Considerations (Silt Fence)	1	LS	100.00	100.00
				15,900.00

	Quantity	Unit	Unit Cost	Total
Contingency				10,000.00
	Sub Total			133,100.00
	Allowances			600.00
	Engineering			15,980.00
	Future Maintenance Schedule			2,000.00
	Future Culverts			5,250.00
	Surveying & Daylighting Utilities			7,000.00
	Estimate for Tendering, Inspection & Contract Admin.			14,000.00
	ERCA Fees (Permit)			800.00
	Total Estimate excluding HST			178,730.00
	Non-Recoverable HST (1.76%)			3,120.00
	Total Estimate			**$181,850.00**

SCHEDULE OF ASSESSMENT

To reline one road crossing culvert and replace six access culverts on the drain along with providing future maintenance provisons.

Conc.	Lot or Part		Affected Hect.	Roll No.	Owner	Sp. Benefit	Benefit	Outlet	Total
Agricultural Lands									
3	Pt. Lot 13		2.02	760-03350	1627015 Ontario Limited	-	-	865.00	865.00
	Pt. Lot 13		1.21	760-03200	M. & S. Parks	-	-	518.00	518.00
	Pt. Lot 13		0.78	760-03108	M. & S. Parks	-	-	334.00	334.00
	Pt. Lot 14		1.21	760-03507	C. & S. Soulliere	-	875.00	518.00	1,393.00
	Pt. Lot 14		1.21	760-02700	Silva Homes Inc	-	875.00	518.00	1,393.00
4	Pt. Lot 13	*	0.40	790-02302	2275694 Ontario Inc	-	-	86.00	86.00
	Pt. Lot 13		0.97	790-02202	Silva Homes Inc	-	-	415.00	415.00
	Pt. Lot 13		1.21	790-02100	J. & S. Colagiacomo	-	-	518.00	518.00
	Pt. Lot 13		1.21	790-02000	M. Ripley	-	-	518.00	518.00
	Pt. Lot 13		0.36	790-01700	D. & C. Chaney	-	-	154.00	154.00
					Total Agricultural Lands	-	1,750.00	4,444.00	6,194.00
Non-Agricultural Lands									
3	Pt. Lot 14		0.43	760-03100	Mathias Baumgartner Trust	-	1,750.00	368.00	2,118.00
	Pt. Lot 14		0.63	760-03600	G. & M. Cote	-	12,932.00	78.00	13,010.00
	Pt. Lot 14		0.63	760-03700	L. & M. Snively	-	21,891.00	78.00	21,969.00
	Pt. Lot 14		0.63	760-03800	S. & T. Waters	-	21,553.00	78.00	21,631.00
	Pt. Lot 14		0.63	760-03900	J. Borg	-	43,106.00	78.00	43,184.00
	Pt. Lot 14		0.65	760-04000	J. Gritke & C. Whaley	-	21,891.00	81.00	21,972.00
	Pt. Lot 14		0.63	760-04100	S. & J. Armstrong	-	1,750.00	78.00	1,828.00
	Pt. Lot 14		0.50	760-04200	M. & D. Paquette	-	-	62.00	62.00

Conc.	Lot or Part	Affected Hect.	Roll No.	Owner	Sp. Benefit	Benefit	Outlet	Total
4	Pt. Lot 13	0.00	790-02300	R. & E. Martin	-	-	-	-
	Pt. Lot 13	0.24	790-02200	J. & D. Baiano	-	-	205.00	205.00
	Pt. Lot 14	0.10	790-01900	D. & L. Mathews	-	-	86.00	86.00
	Pt. Lot 14	0.10	790-01800	A. & C. Mannell	-	-	86.00	86.00
				Total Non-Agricultural Lands	-	124,873.00	1,278.00	126,151.00
Public Lands								
	4th Concession Road	2.75		Town of Essex	-	-	4,709.00	4,709.00
	McCormick Road	0.11		Town of Essex	37,607.00	-	189.00	37,796.00
				Total Public Lands	37,607.00	-	4,898.00	42,505.00
Utilities								
	Gas Utility			Enbridge Pipelines	3,000.00	-	-	3,000.00
	Water Utility			Town of Essex	3,000.00	-	-	3,000.00
	Telephone Utility			Bell Canada	1,000.00	-	-	1,000.00
				Total Utilities	7,000.00	-	-	7,000.00
				Total Agricultural Lands	6,194.00			
				Total Non-Agricultural Lands	126,151.00			
				Total Public Lands	42,505.00			
*	Denotes Surface water only			Total Utilities	7,000.00			
	Total Area	**18.61**		**Total Assessment**	**181,850.00**			

4th Concession Road Drain South Side
Town of Essex
June 23, 2025

SCHEDULE OF MAINTENANCE

To maintain the open channel and future maintenance of culverts.

Conc.	Lot or Part	Affected Hecatares	Roll No.	Owner	Benefit ($)	Outlet ($)	Total ($)	Equivalent Ha
Agricultural Lands								
3	Pt. Lot 13	2.02	760-03350	1627015 Ontario Limited	536.00	583.00	1,119.00	2.02
	Pt. Lot 13	1.21	760-03200	M. & S. Parks	475.00	188.00	663.00	1.21
	Pt. Lot 13	0.78	760-03108	M. & S. Parks	314.00	84.00	398.00	0.78
	Pt. Lot 14	1.21	760-03507	C. & S. Soulliere	456.00	97.00	553.00	1.21
	Pt. Lot 14	1.21	760-02700	Silva Homes Inc	454.00	45.00	499.00	1.21
4	Pt. Lot 13	0.40	790-02302	2275694 Ontario Inc	-	163.00	163.00	0.20
	Pt. Lot 13	0.97	790-02202	Silva Homes Inc	160.00	235.00	395.00	0.97
	Pt. Lot 13	1.21	790-02100	J. & S. Colagiacomo	226.00	200.00	426.00	1.21
	Pt. Lot 13	1.21	790-02000	M. Ripley	224.00	144.00	368.00	1.21
	Pt. Lot 13	0.36	790-01700	D. & C. Chaney	131.00	26.00	157.00	0.36
				Total Agricultural Lands	2,976.00	1,765.00	4,741.00	10.38
Non-Agricultural Lands								
3	Pt. Lot 14	0.43	760-03100	Mathias Baumgartner Trust	164.00	83.00	247.00	0.86
	Pt. Lot 14	0.63	760-03600	G. & M. Cote	106.00	40.00	146.00	1.26
	Pt. Lot 14	0.63	760-03700	L. & M. Snively	116.00	33.00	149.00	1.26
	Pt. Lot 14	0.63	760-03800	S. & T. Waters	116.00	26.00	142.00	1.26
	Pt. Lot 14	0.63	760-03900	J. Borg	116.00	20.00	136.00	1.26
	Pt. Lot 14	0.65	760-04000	J. Gritke & C. Whaley	116.00	15.00	131.00	1.30
	Pt. Lot 14	0.63	760-04100	S. & J. Armstrong	116.00	9.00	125.00	1.26
	Pt. Lot 14	0.50	760-04200	M. & D. Paquette	217.00	-	217.00	1.00
4	Pt. Lot 13	0.24	790-02200	J. & D. Baiano	52.00	220.00	272.00	0.48
	Pt. Lot 14	0.10	790-01900	D. & L. Mathews	55.00	20.00	75.00	0.20
	Pt. Lot 14	0.10	790-01800	A. & C. Mannell	55.00	18.00	73.00	0.20
				Total Non-Agricultural Lands	1,229.00	484.00	1,713.00	10.34

Conc.	Lot or Part	Affected Hecatares	Roll No.	Owner	Benefit ($)	Outlet ($)	Total ($)	Equivalent Ha
Public Lands								
	4th Concession Road	2.75		Town of Essex	2,395.00	1,151.00	3,546.00	11.00
				Total Public Lands	2,395.00	1,151.00	3,546.00	11.44
	Total Area	**18.61**		**Total Maintenance Assessment**	**6,600.00**	**3,400.00**	**10,000.00**	**32.16**

ESTIMATED NET ASSESSMENT

Final Costs will vary based on Construction Costs and Grant

To reline one road crossing culvert and replace six access culverts on the drain along with providing future maintenance provisons.

Conc.	Lot or Part	Roll No.	Owner	Assessment	Estimated Grant	Allowances	Estimated Net Assess.
Agricultural Lands							
3	Pt. Lot 13	760-03350	1627015 Ontario Limited	865.00	288.00	-	577.00
	Pt. Lot 13	760-03200	M. & S. Parks	518.00	173.00	-	345.00
	Pt. Lot 13	760-03108	M. & S. Parks	334.00	111.00	-	223.00
	Pt. Lot 14	760-03507	C. & S. Soulliere	1,393.00	464.00	-	929.00
	Pt. Lot 14	760-02700	Silva Homes Inc	1,393.00	464.00	-	929.00
4	Pt. Lot 13	790-02302	2275694 Ontario Inc	86.00	29.00	-	57.00
	Pt. Lot 13	790-02202	Silva Homes Inc	415.00	138.00	-	277.00
	Pt. Lot 13	790-02100	J. & S. Colagiacomo	518.00	173.00	-	345.00
	Pt. Lot 13	790-02000	M. Ripley	518.00	173.00	-	345.00
	Pt. Lot 13	790-01700	D. & C. Chaney	154.00	51.00	-	103.00
			Total Agricultural Lands	6,194.00	2,064.00	-	4,130.00
Non-Agricultural Lands							
3	Pt. Lot 14	760-03100	Mathias Baumgartner Trust	2,118.00		-	2,118.00
	Pt. Lot 14	760-03600	G. & M. Cote	13,010.00		100.00	12,910.00
	Pt. Lot 14	760-03700	L. & M. Snively	21,969.00		100.00	21,869.00
	Pt. Lot 14	760-03800	S. & T. Waters	21,631.00		100.00	21,531.00
	Pt. Lot 14	760-03900	J. Borg	43,184.00		200.00	42,984.00
	Pt. Lot 14	760-04000	J. Gritke & C. Whaley	21,972.00		100.00	21,872.00
	Pt. Lot 14	760-04100	S. & J. Armstrong	1,828.00		-	1,828.00
	Pt. Lot 14	760-04200	M. & D. Paquette	62.00		-	62.00
4	Pt. Lot 13	790-02200	J. & D. Baiano	205.00		-	205.00
	Pt. Lot 14	790-01900	D. & L. Mathews	86.00		-	86.00
	Pt. Lot 14	790-01800	A. & C. Mannell	86.00		-	86.00
			Total Non-Agricultural Lands	126,151.00	-	600.00	125,551.00

Conc.	Lot or Part	Roll No.	Owner	Assessment	Estimated Grant	Allowances	Estimated Net Assess.
Public Lands							
	4th Concession Road		Town of Essex	4,709.00		-	4,709.00
	McCormick Road		Town of Essex	37,796.00		-	37,796.00
			Total Public Lands	42,505.00	-	-	42,505.00
Utilities							
	Gas Utility		Enbridge Pipelines	3,000.00		-	3,000.00
	Water Utility		Town of Essex	3,000.00		-	3,000.00
	Telephone Utility		Bell Canada	1,000.00	-	-	1,000.00
			Total Utilities	7,000.00	-	-	7,000.00
			Total Net Assessments	**181,850.00**	**2,064.00**	**600.00**	**179,186.00**

4th Concession Road Drain
Town of Essex
June 23, 2025

SPECIFICATION OF WORK

1. Scope of Work

The work includes the replacement of six (6) access culverts in Lots 14, Concession 3, relining the road culvert under McCormick Road, and developing future specifications for the drain in the Town of Essex.

2. General

Each tenderer must inspect the site prior to submitting their tender and satisfy themselves by personal examination as to the local conditions that may be encountered during this project. The Contractor shall make allowance in the tender for any difficulties which they may encounter. Quantities or any information supplied by the Engineer is not guaranteed and is for reference only.

All work and materials shall be to the satisfaction of the Drainage Superintendent who may vary these specifications as to minor details but in no way decrease the proposed capacity of the drain.

The Contractor shall be responsible for the notification of all utilities prior to the start of construction.

3. Plans and Specifications

These specifications shall apply and be part of the contract. This specification of work shall take precedence over all plans and general conditions pertaining to the contract. The Contractor shall provide all labour, equipment, and supervision necessary to complete the work as shown in the plans and described in these specifications. Any work not described in these specifications shall be completed according to the Ontario Provincial Standard Specifications and Standard Drawings.

4. Health and Safety

The Contractor at all times shall be responsible for health and safety on the worksite including ensuring that all employees wear suitable personal protective equipment including safety boots and hard hats.

The Contractor shall be responsible for traffic control as per the Ontario Traffic Manual Book 7 – Temporary Conditions (latest revision) when working on public road allowances. A copy of a traffic control plan shall be kept on site at all times. The Contractor shall maintain suitable barricades, warning lights, and temporary traffic notices, at his expense, in their proper position to protect the public both day and night. Flagmen are the responsibility of the Contractor when working on the road allowance and when entering or exiting a worksite onto a roadway.

The Contractor shall be responsible to ensure that all procedures are followed under the Occupational Health and Safety Act to ensure that work sites are safe and that accidents are prevented. In the event of a serious or recurring problem, a notice of noncompliance will be issued. The Contractor will be responsible for reacting immediately to any deficiency and correcting any potential health and safety risk. Continuous disregard for any requirement of the Occupational Health and Safety Act could be cause for the issuance of a stop work order or even termination of the contract.

The Contractor shall also ensure that only competent workers are employed onsite and that appropriate training and certification is supplied to all employees.

5. Workplace Safety and Insurance Board

The Contractor hereby certifies that all employees and officers working on the project are covered by benefits provided by the Contractor. The WSIB clearance certificate must be furnished prior to the execution of the Contract and updated every 60 days.

6. Weather Conditions

Work shall be carried out under this Report and completed within the agreed upon Schedule as permitted by weather. The Engineer or the Drainage Superintendent reserves the right to restrict construction and access to the site based on the weather and ground conditions.

7. Access and Working Area

Access to the drain for the installation of culverts and future maintenance of the open channel shall be from either 4th Concession Road or McCormick Road, using existing culverts and laneways, and then along the length of the drainage works.

The working area shall be along the south side of the drain through agricultural properties and along the north side of the drain where the drain crosses any lawn, garden, orchard,

parking or roadway. From Station 0+000 to 0+003, the south side of the drain shall be used to access the outlet due to the location of the road bridge.

When working from the south side the working area shall be 10 meters measured from the top of the drain. When working from the north side the working area shall be from the travelled portion of the road and shall be restricted to one travel lane.

8. Removal of Access Culverts

Access culverts set for replacement shall be removed in their entirety from the open channel. The steel culverts, the end treatment, and any asphalt shall be disposed offsite at the expense of the Contractor. Asphalt shall be sawcut straight across the driveway as directed by the Engineer or Drainage Superintendent. The asphalt shall be removed all the way to the road. All material shall be disposed offsite at the expense of the Contractor in accordance with all municipal, provincial, and federal laws and legislation.

9. Access Culverts

This item shall apply to the proposed access culvert replacements along the length of the drainage works:

<u>CULVERTS TO BE REPLACED IN THE FUTURE</u>:

These culverts shall be incorporated into the drain and now form part of the 4th Concession Road Drain South Side.

Culvert No.2 (Station 0+149) – roll no. 760-041 consists of 7.0 metres of 900 mm diameter corrugated steel pipe with jute bag endwalls and a gravel drive. The pipe shall be replaced in the future with 12.0 metres of 900 mm diameter HDPE pipe with rip rap endwalls, full granular backfill, and a gravel drive.

Culvert No. 9 (Station 0+578) – Shared culvert with roll no. 760-027 & 760-03507 consists of 16.0 metres of 900 mm diameter corrugated steel pipe with concrete block endwalls and a gravel drive. The pipe shall be replaced in the future with 18.0 metres of 900 mm diameter HDPE pipe with rip rap endwalls, full granular backfill, and a gravel drive.

Culvert No.10 (Station 0+698) – roll no. 760-03507 consists of 9.0 metres of 900 mm diameter corrugated steel pipe with concrete block endwalls and a gravel drive. The pipe shall be replaced in the future with 12.0 metres of 900 mm diameter HDPE pipe with rip rap endwalls, full granular backfill, and a gravel drive.

Culvert No.11 (Station 0+780) – roll no. 760-031 consists of 11.0 metres of 900 mm diameter corrugated steel pipe with concrete block endwalls and a gravel drive. The pipe shall be replaced in the future with 12.0 metres of 900 mm diameter HDPE pipe with rip rap endwalls, full granular backfill, and a gravel drive.

CULVERTS TO BE REPLACED UNDER THIS REPORT:

These culverts shall be incorporated into the drain and now form part of the 4th Concession Road Drain South Side.

Culvert No. 3 (Station 0+174) – roll no. 760-040 consists of 7.0 metres of 900 mm diameter corrugated steel pipe with jute bag endwalls and an asphalt drive. The pipe shall be replaced with 12.0 metres of 900 mm diameter HDPE pipe with rip rap endwalls, full granular backfill, and a gravel drive.

Culvert No. 4 (Station 0+209) – roll no. 760-039 consists of 6.0 metres of 900 mm diameter corrugated steel pipe with quikrete bags of cement for endwalls and a gravel drive. The pipe shall be replaced with 12.0 metres of 900 mm diameter HDPE pipe with rip rap endwalls, full granular backfill, and a gravel drive.

Culvert No. 5 (Station 0+236) – roll no. 760-039 consists of 7.0 metres of 900 mm diameter corrugated steel pipe with no endwalls and a gravel drive. The pipe shall be replaced with 12.0 metres of 900 mm diameter HDPE pipe with rip rap endwalls, full granular backfill, and a gravel drive.

Culvert No. 6 (Station 0+265) – roll no. 760-038 consists of 6.0 metres of 900 mm diameter corrugated steel pipe with wood endwalls held up with t-posts that are falling toward the drain and a gravel drive. The pipe shall be replaced with 12.0 metres of 900 mm diameter HDPE pipe with rip rap endwalls, full granular backfill, and a gravel drive.

Culvert No. 7 (Station 0+308) – roll no. 760-037 consists of 6.0 metres of 900 mm diameter corrugated steel pipe with a mixture of concrete cinder blocks, concrete blocks, and broken concrete as endwalls and an asphalt drive. The pipe shall be replaced with 12.0 metres of 900 mm diameter HDPE pipe with rip rap endwalls, full granular backfill, and a gravel drive.

Culvert No. 8 (Station 0+383) – roll no. 760-036 consists of 8.0 metres of 900 mm diameter corrugated steel pipe with the upstream endwall a mixture of earth and broken concrete and no downstream endwall c/w a gravel drive. The pipe shall be replaced with 12.0 metres of 900 mm diameter HDPE pipe with rip rap endwalls, full granular backfill, and a gravel drive.

Culverts shall be HDPE smooth wall pipe (320 kPa) CSA approved, either bell and spigot or manufactured couplings.

The proposed access culverts shall be installed in the same general location as the existing access culverts. The culvert shall be installed with the invert 10% (minimum 150mm) below the proposed channel bottom elevation and to grade shown on the Profile.

If an owner requests a longer culvert than that specified above, please refer to the report. The culvert lengths are based on using rip rap endwalls. If concrete block endwalls are to be utilized now or in the future, the culverts may be shortened, but a minimum travel width of 6.1 meters is required.

The culvert may be moved upstream or downstream as necessary to avoid existing tile outlets. If they cannot be avoided the pipes shall be extended downstream of the proposed culvert and shall be done with non-perforated HDPE agricultural tubing with a manufactured coupling, elbow and rodent grate. Any tile outlets extended as a result of extra length requested by an owner shall be extended at the owner's expense.

The bottom of the excavation shall be excavated to the required depth with any over excavation backfilled with granular material or drainage stone. When the pipe has been installed to the proper grade and depth, the excavation shall be backfilled with clearstone from 100mm below the bottom of the pipe up to the springline of the pipe. Care shall be taken to ensure that the backfill on either side of the culvert does not differ by more than 300 mm so that the pipe is not displaced. The access culverts shall be backfilled from the springline to 300mm of finished grade with granular "B" type 2 or 100% crushed granular "A" to within 300mm of finished grade. The top 300mm for access culverts shall be backfilled with compacted 100% crushed granular "A" material to finished grade.

All backfill shall be free from deleterious material. All granular material shall be mechanically compacted to 98% modified standard proctor density. All backfill material above the springline shall be mechanically compacted using appropriate compaction equipment.

The culverts shall be installed as per manufacture recommendations with a minimum cover of 300mm over top of the pipe measured from the top of the culvert to finished grade. It shall be the responsibility of the contractor to ensure the culvert has no traffic on it until the minimum cover is met.

End protection shall be rip rap quarry stone placed with a minimum slope of 1.5:1. The rip rap shall consist of 150 mm x 300 mm quarry stone or approved equal. The area to receive the rip rap shall be graded to a depth of 450mm below finished grade. Filter fabric (Terrafix 250R or approved equal) shall then be placed with any joints overlapped a minimum 600mm. The quarry stone shall then be placed with the smaller pieces placed in the gaps and voids to give it a uniform appearance.

10. McCormick Road Culvert

This item shall apply to Culvert No.1 located at Station 0+014.

The existing culvert consists of 20.0 metres of 1050 mm diameter corrugated steel pipe with rip rap endwalls and an asphalt road over top. Due to the presence of guardrails and the bridge abutment from the bridge crossing the Richmond Drain, this culvert will not be replaced, instead it will be relined using a Fold and Form PVC liner in accordance with Ontario Provincial Standard Specification, OPSS 465.

The PVC liner shall comply with ASTM D1784-20 “Specification for Rigid PVC compounds and Chlorinated PVC compounds”.

Appendix A contains OPSS 465 details and specifications.

11. Open Channel Excavation (Future)

The open channel shall be excavated to the grade line and elevations shown on the attached profile. A laser or similar approved device with a labourer onsite to ensure correctness of grade and to confirm location of tile ends. The sediment shall be removed leaving a rounded bottom with the intent not to undercut the existing sideslopes.

The excavated material shall be cast at least 1.5 metres clear of the top of the bank on agricultural lands with the excavated material spread back and levelled to a maximum depth of 150 mm and left in a cultivated condition.

Excavated material shall be hauled away from any lawn, garden, orchard, parking, roadway, or driveway areas by the contractor at its expense. All work at the disposal site shall be established between the contractor and site owner. The contractor shall be responsible for obtaining any permits required and shall provide copies of the same to the Town.

Excavated material shall not be placed in low runs or swales outletting surface water to the channel. Stones and large branches shall be removed and disposed offsite and shall not be buried when the excavated material is spread.

12. Brushing (Future)

All brush, trees, woody vegetation, cattails, phragmites, etc. shall be removed from the sideslopes of the existing channel within 1.5 metres of the top of the bank. Other brush and trees may be removed from the side the equipment is operating to allow access for the equipment. Trees and brush in the channel bottom shall be removed in their entirety including stumps and disposed offsite. Trees and brush on the sideslopes shall be close cut.

It is recommended that a mechanical grinder attached to an excavator be used for the removal of brush and trees. Any brush and trees too large to grind shall be close cut with the logs and brush disposed offsite by the Contractor. The Contractor shall be responsible for obtaining all necessary permits for any disposal sites.

Certain trees may be left in place at the direction of the Drainage Superintendent. Any trees to be salvaged by the individual landowners shall be removed by the landowners with all resulting brush and branches cleaned up prior to the start of construction. If the Contractor agrees to remove any trees and set them aside for a landowner, the landowner will be responsible for any cleanup as above.

13. Silt Fence

The Contractor shall maintain a dry working area during construction. The Contractor shall install a silt fence downstream of the work area.

The silt fence shall consist of filter fabric or manufactured silt fence supported with posts (OPSD 219.110). The silt fence shall remain in place until construction is complete. Any sediment that has collected upstream of the silt fence shall be removed prior to the removal of the silt fence.

Silt fences are generally to be installed downstream of the working area or as directed by the Engineer or Drainage Superintendent.

14. Environmental Considerations

The Contractor shall take care to adhere to the following considerations.

- Operate machinery in a manner that minimizes disturbance to the banks of the watercourse.

- Erosion and sediment control measures must be installed prior to construction to prevent sediment from entering the water body.

- All granular and erosion control materials shall be stockpiled a minimum of 1.5 metres from the top of the bank or excavation. Material shall not be placed in surface water runs or open inlets that enter the channel.

- All activities, including maintenance procedures, shall be controlled to prevent the entry of petroleum products, debris, rubble, concrete, or other deleterious substances into the water. Vehicle and equipment refuelling and maintenance shall be conducted away from the channel, any surface water runs, or open inlets. All waste materials shall be stockpiled well back from the top of the bank and all surface water runs and open inlets that enter the drain.

- When possible, all construction within the open channel shall be carried out during periods of low flow or in dry conditions.

- The Contractor shall conduct regular inspections and maintain erosion and sediment control measures and structures during the course of construction.

- The Contractor shall repair erosion and sediment control measures and structures if damage occurs.

- The Contractor shall remove non-biodegradable erosion and sediment control materials once site is stabilized.

- Remove all construction materials from site upon project completion.

15. Benchmarks

The benchmarks are based on geodetic elevations. Elevations are available at the culvert locations shown on the profile drawings. Where these elevations are on existing structures to be replaced, they shall be moved prior to the removal of the culverts. Prior to construction, it is the responsibility of the contractor to preform a benchmark loop and report any discrepancies to the Engineer or Drainage Superintendent.

16. Miscellaneous

Any fences that must be removed to allow construction or maintenance shall be reinstalled by the Contractor using the existing materials.

APPENDIX A

CONSTRUCTION SPECIFICATION FOR THE REHABILITATION OF GRAVITY PIPE BY THERMOFORMED FORM AND FOLD LINER

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465.01 SCOPE

This specification covers the requirements for the rehabilitation of an existing pipe culvert or stormsewer using thermoformed PVC Alloy or PE Pipe Liner through fold and form liner trenchless technology technique.

465.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

Ontario Provincial Standard Specifications, Construction

OPSS 409	Closed-Circuit Television (CCTV) Inspection of Pipelines
OPSS 411	Construction Specification for the Cleaning and Flushing of Culverts, Pipe Sewers, Catchbasins, Maintenance Holes, Ditch Inlets, and Oil-Grit Separators
OPSS 490	Construction Specification for Site Preparation
OPSS 491	Preservation, Protection, and Reconstruction of Existing Facilities
OPSS 510	Construction Specification for Removal
OPSS 517	Construction Specification for Dewatering
OPSS 539	Construction Specification for Temporary Protection Systems

Ontario Provincial Standard Specifications, Material

OPSS 1840 Material Specification for Non-Pressure Polyethylene (PE) Plastic Pipe Products
OPSS 1841 Material Specification for Non-Pressure Polyvinyl Chloride (PVC) Pipe Products

ASTM International

D638-22	Test Method for Tensile Properties of Plastics
D790-17	Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
D1784-20	Specification for Rigid Poly Vinyl Chloride (PVC) Compounds and Chlorinated Poly Vinyl Chloride (CPVC) Compounds
D2412-21	Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
D2444-21	Test Method for Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
D2657-05(2015)	Practice for Heat Fusion of Joining Polyolefin, Pipe and Fittings
D2990-17	Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
D3350-21	Specification for Polyethylene (PE) Plastics Pipe and Fitting Materials
F585-16(2021)	Guide for Insertion of Flexible Polyethylene (PE) Pipe Into Existing Sewers
F810-12(2018)	Specification for Smoothwall Polyethylene (PE) Pipe for Use in Drainage and Waste Disposal Absorption Fields
F1504-21e1	Specification for Folded Poly Vinyl Chloride (PVC) Pipe for Existing Sewer and Conduit Rehabilitation
F1533-20	Specification for Deformed Polyethylene (PE) Folded Pipe
F1606-19	Practice for Rehabilitation of Existing Sewers and Conduits with Deformed Polyethylene (PE) Liner
F1867-22	Specification for Installation of Folded/Formed Poly Vinyl Chloride (PVC) Pipe Type A for Existing Sewer and Conduit Rehabilitation
F1947-21a	Practice for Installation of Folded Poly Vinyl Chloride (PVC) Pipe into Existing Sewers and Conduits

465.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Design Engineer means the Engineer retained by the Contractor who produces the design and Working Drawings and other engineering documents required of the Contractor.

Fold and Form Liner means a method of pipeline rehabilitation in which a Polyvinyl Chloride (PVC) or Polyethylene (PE) pipe is folded to reduce its size before insertion and reversion to its original shape by thermoforming i.e. the application of heat and/or pressure. The reformed plastic pipe fits snugly to and takes the shape of the inner diameter (ID) of the host pipe. [North American Society for Trenchless Technology (NASTT)]. Depending on the size, the PVC Alloy or PE Pipe Liner shall be coiled either in a flat shape and folded during insertion for smaller sizes, whereas the larger PVC Alloy or PE Pipe Liner shall be coiled in an "H" or “U” shape.

Host Pipe means existing original pipe culvert or sewer to be internally rehabilitated by installation of the PVC Alloy or PE Pipe Liner.

Non-Destructive Testing means a testing and analysis technique used by the industry to evaluate the properties of a material, component, structure or system without damaging or destroying the object being tested.

Thermoform means to give final shape to a material with the aid of heat and/or pressure.

465.04 DESIGN AND SUBMISSION REQUIREMENTS

465.04.01 Design Requirements

465.04.01.01 Fold and Form Liner

The fold and form liner shall be manufactured with a diameter substantially smaller than the inside diameter of the host pipe. The pipe liner shall be manufactured with sufficient excess wall thickness to allow it to meet or exceed the manufacturer's dimension ratio (DR) requirements after being thermoformed.

The fold and form liner shall be designed to meet the following installation performance requirements:

a) Capable of expanding to a full pipe size larger than the nominal diameter without splitting, or rupturing;

b) Precisely conform to the configuration of the host pipe after thermoforming, and if required, with a concave dimple typically appearing at each lateral connection;

c) Impact resistance cell classification of no less than the required ASTM standard, to resist splitting during remote controlled connection reinstatement;

d) Processing of the fold and form liner shall cause no degradation of the pipe liner physical properties;

e) The material shall be NSF approved as an indication of its lack of impact on the environment and human health;

f) No styrene based liners shall be utilized anywhere in the work.

465.04.02 Submission Requirements

465.04.02.01 Product Data

A minimum of 2 weeks or as specified in the Contract Documents, the manufacturer's product data with samples of the proposed fold and form liner and installation instructions including handling and storage requirements shall be submitted to the Contract Administrator.

465.04.02.02 Certifications

Installation shall be preformed by a licensed installer of the fold and form liner. The following shall be submitted to the Contract Administrator:

a) A letter of certification from the manufacturer that the product meets or exceeds all technical and packaging requirements.

b) Manufacturer's certifications that materials have been approved for the installation conditions shown on the Contract Drawings and as specified herein.

c) Manufacturer's materials warranty certificate.

d) Installer's job history, reference certificates, and a certified statement from the manufacturer that the installer performing the work has been trained and approved in the handling and installing of the product to be used. Certification letter shall be dated within 6 months of the bid date.

e) Proof of any necessary federal, provincial, or local permits or licenses necessary for the project.

465.04.02.03 Working Drawings and Technical Information

A minimum of 2 weeks or as per the Contract Documents, prior to commencement of the fold and form liner installation three copies of written procedures and Working Drawings showing the design calculations and entire work plan for the fold and form liner rehabilitation of the host pipe shall be submitted to the Contract Administrator. Prior to making a submission, the seal and signature of a design Engineer shall be affixed on the written procedures and Working Drawings verifying the drawings are consistent with the Contract Documents.

The written procedures and Working Drawings shall include the following:

a) The Working Area layout;

b) A work plan outlining the materials, procedures, methods and schedule to be used to execute the work;

c) A traffic control plan;

d) A work plan including all materials and methods for any repairs necessary to the host pipe prior to the pipe insert line application;

e) A safety plan including the company safety manual and emergency procedures;

f) The fold and form liner size shall be the maximum allowable internal diameter size that will fit the host pipe as per the manufacture's specifications;

g) Demonstrate, in conjunction with the manufacturer's specifications, that the heat and pressure resistance of the host pipe material is sufficient to tolerate, without damage, the heat and pressure exerted during the fold and form liner installation;

h) Pipe culvert or sewer flow by-pass plan, when specified in the Contract Documents;

i) A containment and contingency plan in conformance with the Contract Documents for the following potential conditions:

   i) Improper placement of the fold and form liner.
   ii) Damage to the host pipe.
   iii) The product's failure to achieve the intended use.
   iv) Potential environmental impacts and emergency containment and clean-up procedures.

465.05 MATERIALS

465.05.02 Delivery of Materials

When the delivered quality of certified fold and form liner product is deemed to be unacceptable by the Contract Administrator, the product shall be rejected.

465.05.03 Transporting, Unloading, Storing, and Handling Materials

Manufacturer's recommendations for transporting, unloading, storing, and handling of materials shall be followed.

465.07 CONSTRUCTION

465.07.01 General

The Contract Administrator shall be notified, minimum of 48 hours, in advance of starting the work. The exact size and length of all existing pipes and culverts to be rehabilitated shall be confirmed prior to installation. All required equipment shall be on-site and in satisfactory working order prior to commencing the installation of a lining section.

Appropriate heating procedures shall be adopted during the liner installation phase to reduce the risk of compromising the structural integrity of the liner pipe and liner flotation.

Any joints shall be as per the manufacturer's recommendations, shall be watertight, interlocking, and shall not increase or decrease the inside or outside diameter of the pipe insert liner.

The product shall be protected from damage during the pullback operation.

465.07.02 Site Preparation

Site preparation shall be according to OPSS 490.

465.07.03 Preservation and Protection of Existing Facilities

Preservation and protection of existing facilities shall be according to OPSS 491.

465.07.04 Dewatering

When required, flow diversion, unwatering/dewatering, shall be installed to fulfill the Contract requirements. Dewatering when required shall be according to OPSS 517.

The Environment Canada weather forecast shall be monitored prior to commencement of lining operations. Where the anticipated weather conditions are such that anticipated host pipe/box culvert flows may exceed the installed bypass pumping capacity or may cause potential site flooding, commencement of construction shall be delayed until favourable weather is forecast.

465.07.05 Temporary Protection Systems

The construction of all protection systems shall be according to OPSS 539.

465.07.06 Cleaning of Host Pipe

The host pipe cleaning shall be according to OPSS 411.

465.07.07 Preparation and Pre-Lining Repairs

Prior to liner installation, the host pipe shall be inspected using visual observations or when specified, CCTV/zoom camera, especially where personnel entry is impracticable. CCTV inspection shall be according to OPSS 409.

Any open joints and voids shall be sealed with approved material prior to the lining of the host pipe. If required, non-destructive testing (e.g. InSight™ Lite, Backscatter Computed Tomography, endoscope camera inspections, or other testing methods approved by the Contract Administrator) shall be performed to confirm that all identified voids and low density soil areas have been successfully filled with the approved material.

If additional repair procedures are required to restore the host pipe for lining, for example invert reconstruction, a repair plan shall be submitted to the Contract Administrator prior to proceeding.

All active infiltration shall be sealed prior to application of the fold and form liner material and ensure that the host pipe is sufficiently dewatered as per the manufacturer's instructions.

Additional materials including quick setting mortars, chemical grouts and hydraulic cements necessary to stop infiltration and create a surface for the fold and form liner to be applied to may be necessary and shall be in accordance with the relevant standards. All products used to stop active infiltration shall be approved by the Contract Administrator and used in accordance with the manufacturer's recommendations.

The diameter, profile, length and all other dimensions of all host pipes or box culvert to be rehabilitated shall be accurately measure for planning all construction activities and choosing appropriate equipment.

The Contract Administrator shall be provided with the assistance and access necessary to check the layout of the pipe installation and associated appurtenances.

465.07.08 Construction and Operational Constraints

All activities shall be confined to the designated Working Areas.

The length of the fold and form liner shall be that which is deemed necessary to effectively carry out the liner insertion and to seal the fold and form liner at the inlet and outlet ends. Any necessary excavation shall be approved in writing by the Contract Administrator prior to commencement of such excavation.

The thermoformed fold and form liner shall be positioned to enable it to naturally curve and directly insert into the host pipe. The fold and form liner shall be pulled into the host pipe by means of a winch cable extending the length of the host pipe. The fold and form liner shall be uncoiled at approximately the same speed that it is being pulled as evidenced by slack in the pipe liner as it uncoils. In order to limit insertion stresses, speed should be adjusted according to the fold and form liner temperature, the required pulling force, and the risk of abrasion. The liner's ends shall be equipped with flow-through plugs or fittings to allow for the controlled introduction and release of steam and pressure.

If required, the host pipe ends shall be removed and reinstated or replaced to facilitate the installation of the new fold and form liner. Removals shall be according to OPSS 510.

During the installation process, the maximum axial/compression forces and bending moments shall not exceed tolerable limits of the host pipe in order to avoid damaging the host pipe and/or joints.

A rounding device or a "squeegee" type apparatus shall not be used in an attempt to unfold or to expand the fold and form liner. It shall only be accomplished by using steam and pressure as per the manufacturer's recommendations.

The fold and form liner, once thoroughly heated to permit proper expansion, shall be expanded with sufficient air and steam pressure to form tightly against the inner wall of host pipe. Temperatures and pressures shall be monitored to ensure that the minimums and maximums recommended within the technology supplier's installation guidelines are not exceeded. After the fold and form liner is thermoformed tightly to conform to the host pipe, the pipe liner shall be cooled to a temperature as directed by the technology supplier's installation guidelines before relieving the pressure required to hold the fold and form liner tightly against the host pipe. In no case shall this temperature be in excess of 38 °C/100 °F.

During cooling of the fold and form liner, the plugs shall remain properly pressurized throughout the cooling process. After the fold and form liner has cooled, the plugs shall be removed and the pipe liner ends shall be trimmed, leaving a minimum of 75 mm and a maximum of 150 mm protruding beyond the host pipe in order to maintain the tight fit created by the flaring of the fold and form liner.

Lateral connections, as may be visible in the pre-lining video inspection, shall be reinstated using remote robotic devices. Only experienced operators shall make robotic connection reinstatements.

465.07.09 Supervision

The Superintendent shall have received adequate training from the technology supplier and shall have a minimum of 3 years demonstrated experience on projects with similar scope and complexity.

465.07.10 Preservation and Protection of Existing Facilities

Preservation and protection of existing facilities shall be according to OPSS 491.

465.07.11 Site Restoration

Site restoration shall be according to OPSS 492.

465.07.12 Environmental Protection and Contingency

Environmental protection requirements and mitigation measures shall be according to the Contract Documents. Prior to any discharge, it shall be confirmed with the Contract Administrator that the quality of the discharge meets the requirement of the receiver.

465.07.13 Electrical Equipment, Fixtures and Systems

Electrical equipment shall be suitably insulated for noise reduction. Noise produced by electrical equipment must comply with local municipal noise by-laws.

465.07.14 Management of Excess Material

Management of excess material shall be according to the Contract Documents.

465.08 QUALITY ASSURANCE

465.08.01 Fold and Form Liner Material

The fold and form liner shall be continuous and joint-less, free of all visual and material defects except those resulting from pre-lined conditions. Such conditions shall be brought to the attention of the Contract Administrator prior to the fold and form liner installation. In the event that the fold and form liner requires repair, materials used in the repair shall not contain styrene and the thickness of the repair shall not exceed the thickness of one fold and form liner.

Appropriate inflation and cooling procedures must be adhered to during the installation phase to reduce the risk of compromising the structural integrity of the fold and form liner.

465.08.01.01 Sampling

All QA sampling and testing of the installed fold and form liner shall be in accordance with the requirements of the Liner manufacturer's specifications & design recommendations, and applicable standards. A sample shall be taken from the obvert of the installed fold and form liner, sufficient in size to meet the requirements for testing of ASTM D790 and ASTM D638 for flexural strength, flexural modulus, and tensile strength as per ASTM F1867, ASTM F1871, or ASTM F1533, to confirm compliance with the requirements specified in the Contract Documents.

The Contractor shall provide a truly representative sample of each installed liner. The field sample shall be a restrained sample made by extending the liner installation through a cylindrical form (e.g. PVC pipe) that closely matches the inside diameter of the installation. The form shall not expand or otherwise distort during sample forming or processing. The sample shall be taken from each installed fold and form liner extended at an access point or from Liner that extends into an access point of the section.

In areas with limited access, the sample shall be fabricated from material taken from the precursor pipe tube and formed with sandbags in a restrained manner that simulates the heat sink present during the actual installation. The environmental conditions under which the field sample is made shall result in a cured sample that has properties representative of the cured fold and form liner.

The length and size of any sample shall be sufficient to obtain at least five test specimens for ASTM D790 testing (or at least 200 mm).

The Contract Administrator or designated representative shall witness the sampling and administer as specified in the Contract Documents, except that delivery shall be to the qualified independent testing laboratory retained by the Contract Administrator. Samples shall be delivered to the laboratory within 24 hours of sampling.

In the case of stormsewer, as per the Contract Documents, the fold and form liner's ends at the maintenance hole walls, shall be trimmed as close as practical to the maintenance hole walls with allowance for thermal contraction to produce a slight outward flare on the liner ends. The space behind the liner flare and the sewer pipe or the maintenance hole wall shall be sealed with epoxy and/or non-styrene resin material that can withstand differential expansion/contraction of the liner.

465.08.01.02 Testing

The testing of the samples shall be done by an independent testing laboratory retained by the Contract Administrator. Subject to the approval of the Contract Administrator, an independent testing laboratory certified by the Standards Council of Canada can perform all the tests as required per the ASTM standards. The

Contractor shall provide the testing laboratory with the design parameters for the Liner corresponding with the field samples. The testing laboratory report shall reference these values as the specified values.

The testing laboratory technician shall cut the required test/specimen samples and complete the specified testing.

Reports detailing test results shall be issued within 10 Working Days of delivery of the sample to the testing laboratory.

465.08.02 Inspection of Materials

The fold and form liner materials shall be subject to rejection by the Contract Administrator at any time on account of failure to meet any of the requirements in the Contract Documents, even though samples may have been accepted as satisfactory at the place of manufacture. Materials rejected after delivery shall be marked for identification and shall be removed from the job site at once.

465.08.03 Closed-Circuit Television (CCTV) Inspection

Lined host pipe with fold and form liner shall be inspected using visual observations or specified CCTV/zoom camera where personnel entry is impracticable. CCTV inspection shall be according to OPSS 409.

In the case of repairs required to restore the host pipe for lining, such as joints sealing, invert reconstruction, or additional repairs etc., a post preparation CCTV inspection shall be completed for each host pipe, when specified in the Contract Documents.

465.09 MEASUREMENT FOR PAYMENT

465.09.01 Actual Measurement

465.09.01.01 Fold and Form Liner

Measurement for payment shall be the length in meters of the concrete canvas liner installed, as measured along the centerline of the invert of the host pipe.

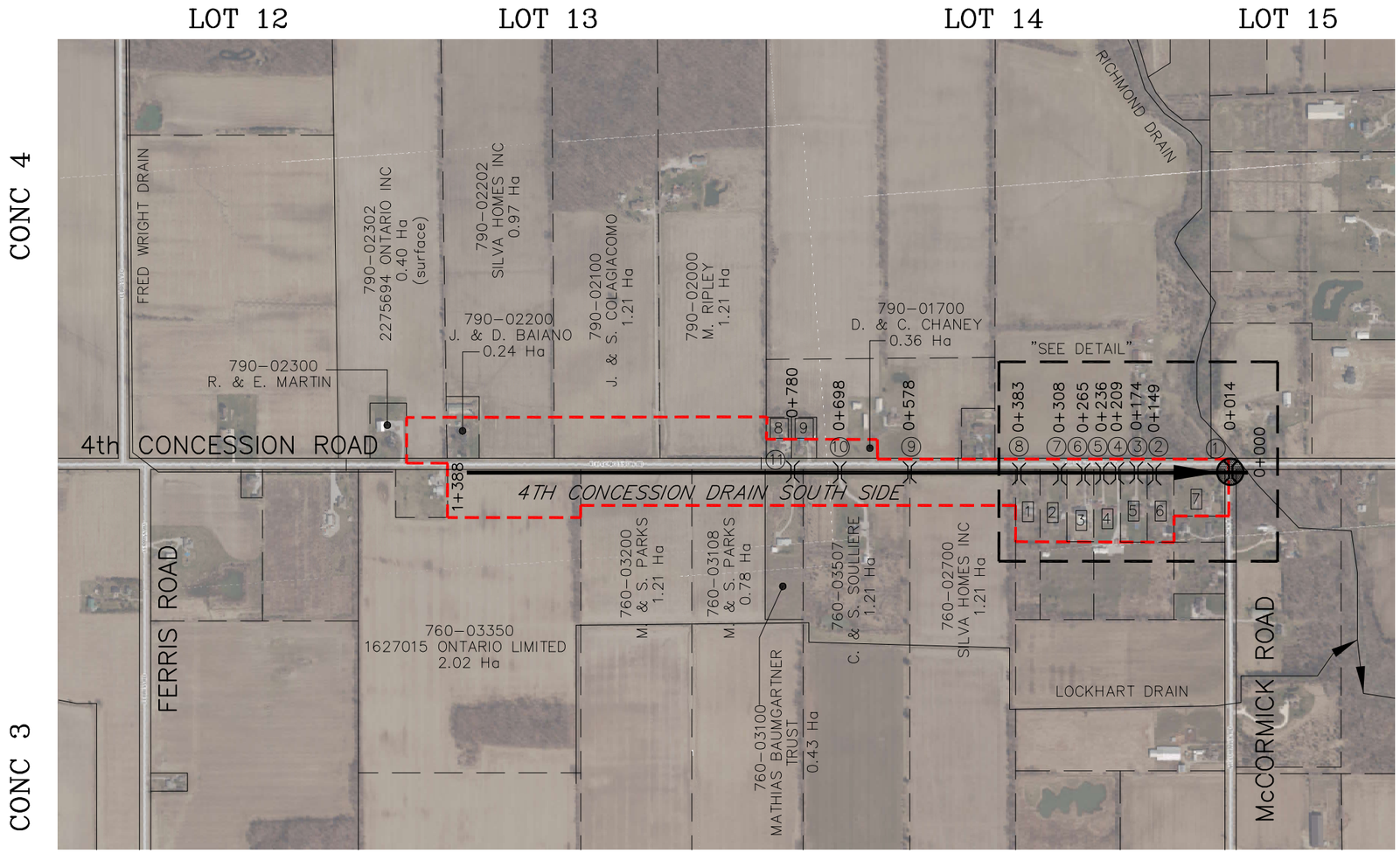
465.09.02 Plan Quantity Measurement

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clause under Actual Measurement.

465.10 BASIS OF PAYMENT

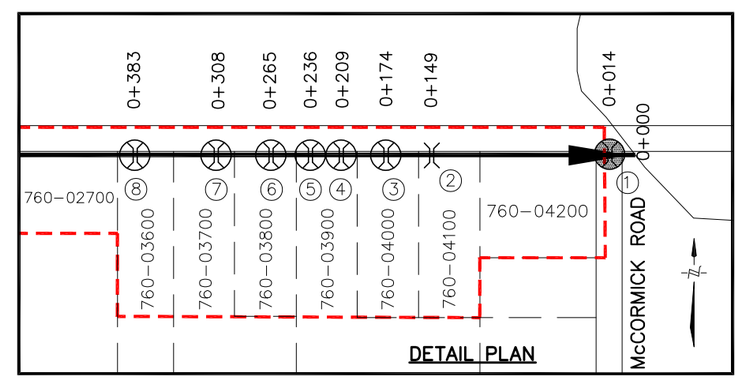
465.10.01 Fold and Form Liner - Item

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the work.



PARCEL IDENTIFICATION NUMBER

1	760-03600 G. & M. COTE 0.63 Ha	6	760-04100 S. & J. ARMSTRONG 0.63 Ha
2	760-03700 L. & M. SNIVELY 0.63 Ha	7	760-04200 M. & D. PAQUETTE 0.50 Ha
3	760-03800 S. & T. WATERS 0.63 Ha	8	790-01900 D. & L. MATHEWS 0.10 Ha
4	760-03900 J. BORG 0.63 Ha	9	790-01800 A. & C. MANNELL 0.10 Ha
5	760-04000 J. GRITKE & C. WHALEY 0.65 Ha		



LEGEND

- DRAINAGE AREA
- 4th CONCESSION ROAD DRAIN SOUTH SIDE
- MUNICIPAL DRAIN
- EXISTING CULVERT
- (1) CULVERT NUMBER
- EXISTING CULVERT TO BE RELINED
- EXISTING CULVERT TO BE REPLACED
- [1] PROPERTY IDENTIFICATION NUMBER

LICENSED PROFESSIONAL ENGINEER
J.H. WARNER
100520016
JUNE 23/25
PROVINCE OF ONTARIO

Dobbin Engineering Inc.
4218 Oil Heritage Road
Petrolia Ontario, N0N 1R0
Phone: (519) 882-0032 Fax: (519) 882-2233

DRAWING NAME: 4th Concession Road Drain South Side Plan
PROJECT No. 2024-1677

APPROVED: J. WARNER
CHECKED: D. MOORES
DRAWN: C. SAUNDERS

NO.	REVISIONS	DATE	BY
1	FINAL REPORT	JUNE 23, 2025	CS

SCALE 1:10,000
0 80 160 240m

TOWN of ESSEX

4TH CONCESSION ROAD DRAIN SOUTH SIDE PLAN

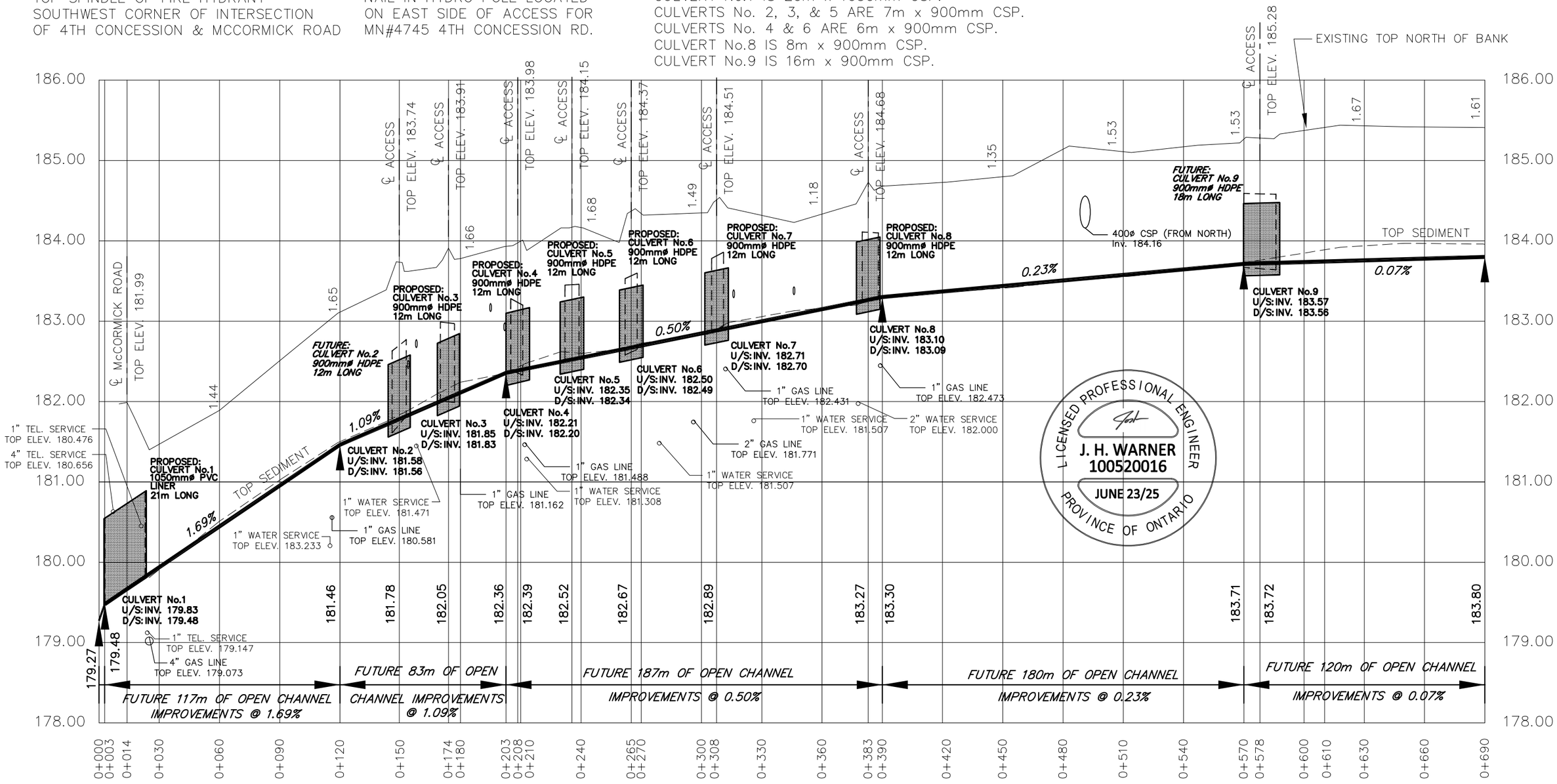
Last Updated: May 14, 2025

GENERAL NOTES

1. BENCHMARK No.1 ELEV. 186.45
   TOP SPINDLE OF FIRE HYDRANT
   SOUTHWEST CORNER OF INTERSECTION
   OF 4TH CONCESSION & MCCORMICK ROAD

BENCHMARK No.2 ELEV. 183.98
NAIL IN HYDRO POLE LOCATED
ON EAST SIDE OF ACCESS FOR
MN#4745 4TH CONCESSION RD.

2. EXISTING CULVERT INFORMATION:
   CULVERT No.1 IS 20m x 1050mm CSP.
   CULVERTS No. 2, 3, & 5 ARE 7m x 900mm CSP.
   CULVERTS No. 4 & 6 ARE 6m x 900mm CSP.
   CULVERT No.8 IS 8m x 900mm CSP.
   CULVERT No.9 IS 16m x 900mm CSP.



LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
JUNE 23/25
PROVINCE OF ONTARIO

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DRAWING NAME:
4th Concession Road Drain South Side Profile

PROJECT No.
2024–1677

APPROVED
J. WARNER

CHECKED
D. MOORES

DRAWN
C. SAUNDERS

NO.	REVISIONS	DATE	BY
1	FINAL REPORT	JUNE 23, 2025	CS

SCALE: 1:2,000
0 20 40 60m

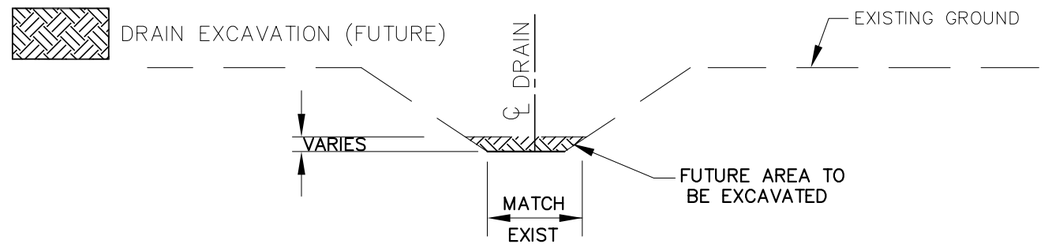
TOWN of ESSEX

4th CONCESSION ROAD DRAIN SOUTH SIDE PROFILE

Last Updated: May 14, 2025

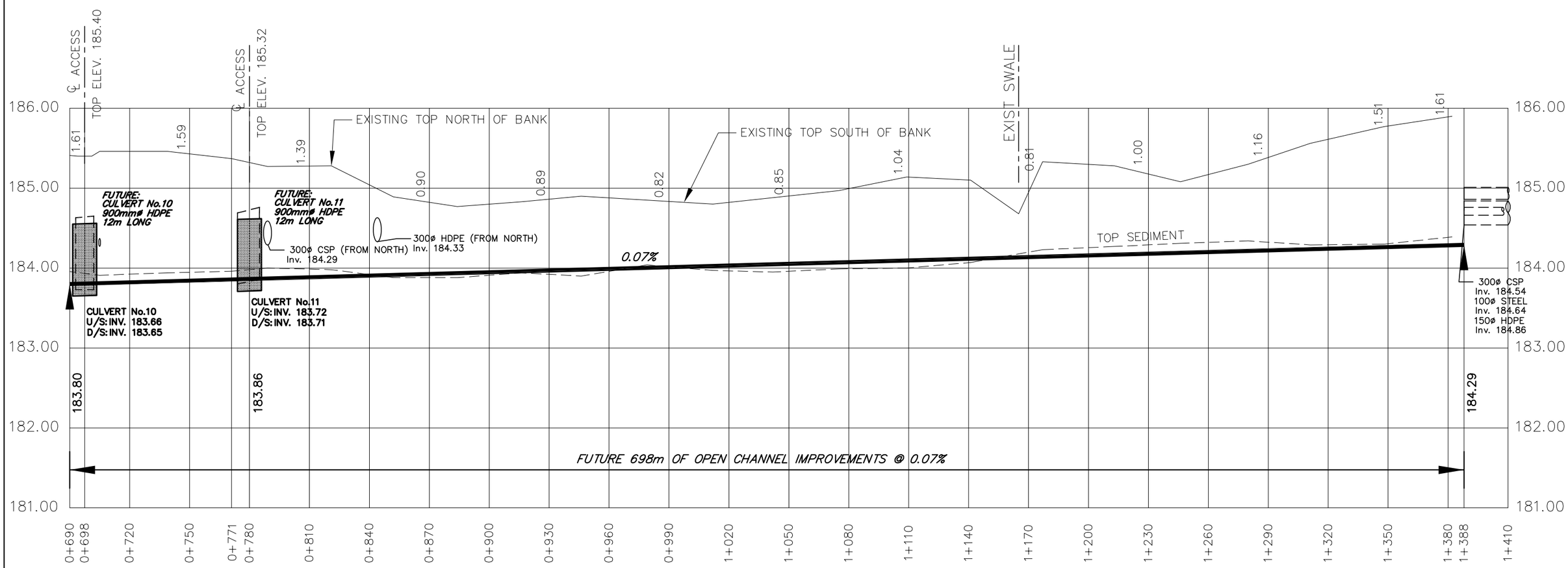
GENERAL NOTES

1. BENCHMARK No.3 ELEV. 186.22
   TOP SPINDLE OF FIRE HYDRANT
   44m WEST OF ACCESS AT ST. 0+780
2. EXISTING CULVERT INFORMATION:
   CULVERT No.10 IS 9m x 900mm CSP.
   CULVERT No.11 IS 11m x 900mm CSP.



TYPICAL DRAIN CROSS SECTION
NTS

LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
JUNE 23/25
PROVINCE OF ONTARIO



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DRAWING NAME:
4th Concession Road Drain South Side Profile

PROJECT No.
2024–1619

APPROVED
J. WARNER

CHECKED
D. MOORES

DRAWN
C. SAUNDERS

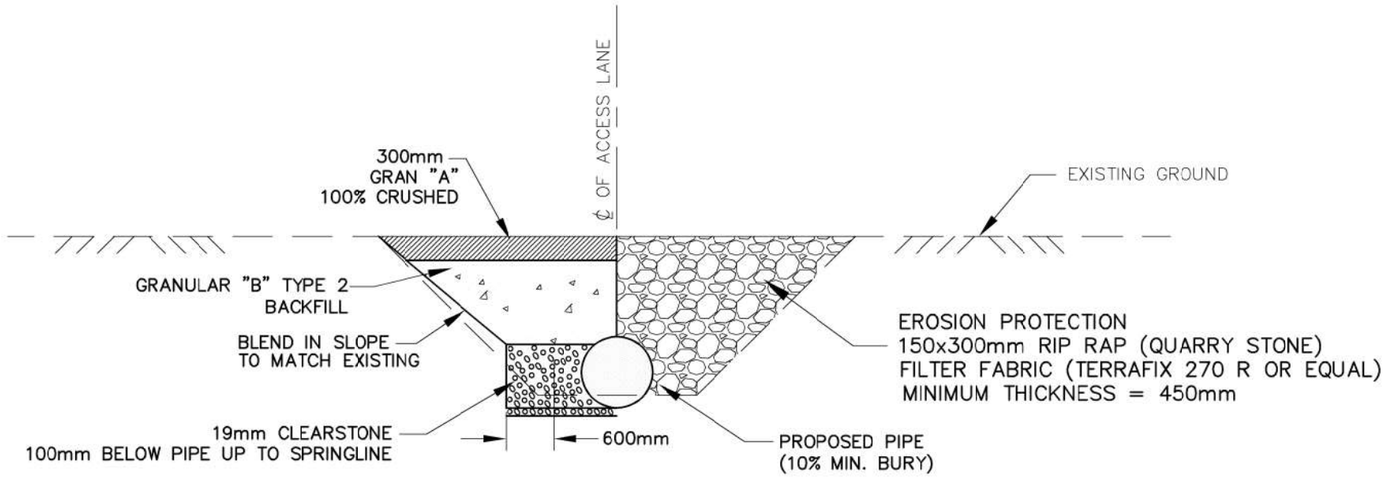
NO.	REVISIONS	DATE	BY
1	FINAL REPORT	JUNE 23, 2025	CS

SCALE: 1:2,000
0 20 40 60m

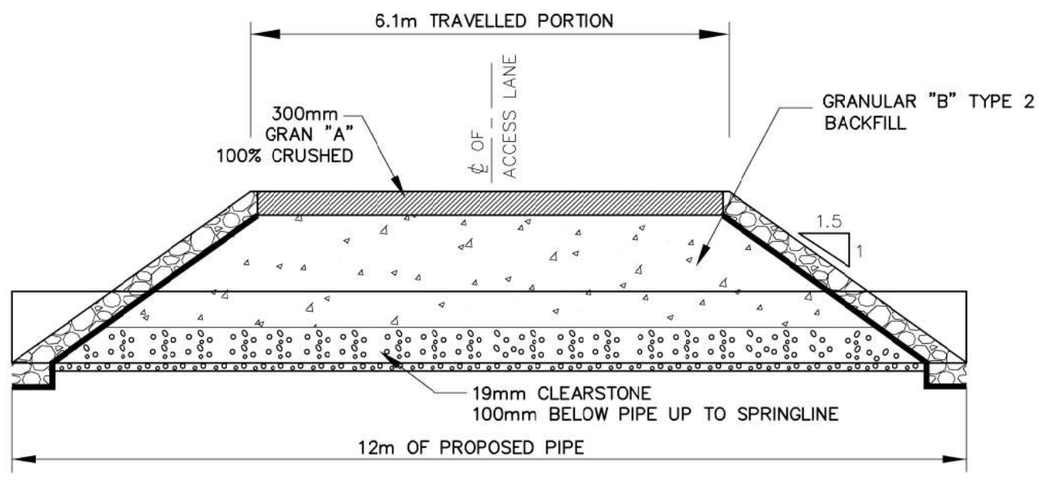
TOWN of ESSEX

4th CONCESSION ROAD DRAIN SOUTH SIDE PROFILE

Last Updated: May 14, 2025



PROPOSED PIPE END SECTION



PROPOSED CROSS-SECTION

GENERAL NOTES

1. BENCHMARK No.1 ELEV. 186.45
   TOP SPINDLE OF FIRE HYDRANT
   SOUTHWEST CORNER OF INTERSECTION
   OF 4TH CONCESSION & MCCORMICK ROAD

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   NAIL IN HYDRO POLE LOCATED
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   44m WEST OF ACCESS AT ST. 0+780

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   CULVERTS No. 4 & 6 ARE 6m x 900mm CSP.
   CULVERT No.8 IS 8m x 900mm CSP.
   CULVERT No.9 IS 16m x 900mm CSP.
   CULVERT No.10 IS 9m x 900mm CSP.
   CULVERT No.11 IS 11m x 900mm CSP.

3. PROPOSED CULVERT INFORMATION:
   ALL CULVERT REPLACEMENTS TO BE 900mm HDPE SMOOTH WALL PIPE.
   REFER TO SPECIFICATIONS AND PROFILE DRAWINGS FOR PROPOSED CULVERT REPLACEMENT LENGTHS.
   ENDWALLS TO BE RIP RAP QUARRY STONE
   150mm X 300mm 450mm THICK
   BACKFILL:
   DRAINAGE PEASTONE OR CLEAR STONE BEDDING
   GRANULAR B TYPE 2 BACKFILL
   100% CRUSHED GRANULAR A TOP

NOTE:
ALL GRANULARS COMPACTED
TO 98% MODIFIED PROCTOR DENSITY

Dobbin Engineering Inc.
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DRAWING NAME: 4th Concession Drain South Side Typical Culvert Details
PROJECT No. 2024-1677

APPROVED J. WARNER
CHECKED J. WARNER
DRAWN D. MOORES

NO.	REVISIONS	DATE	BY
1	FINAL REPORT	JUNE 23, 2025	DM

SCALE 1:75
0 2m

TOWN of ESSEX

4TH CONCESSION ROAD DRAIN SOUTH SIDE
TYPICAL CULVERT REPLACEMENT DETAILS

Last Updated: May 14, 2025