RICHARDSON-EARLEY DRAIN
TENDER

TOWNSHIP OF ADELAIDE-METCALFE
TENDER for CONTRACT 2023-1588

CLOSING DATE: March 24, 2026 @ 1 p.m.

Dobbin Engineering Inc.

BID FORM

RICHARDSON-EARLEY DRAIN

TOWNSHIP OF ADELAIDE-METCALFE

OWNER:	Township of Adelaide-Metcalfe
CONTRACT ADMINISTRATOR:	R. Dobbin Engineering Inc.
LOCATION:	Lots 3-7, Concession 2 SER – 4 SER in the Township of Adeliade-Metcalfe between Napperton Drive and Mulifarry Drive.

Bids will be received in sealed envelopes clearly marked "**Richardson-Earley Drain**" at the Town office of:

Township of Adelaide-Metcalfe
2340 Egremont Drive – RR #5
Strathroy, ON
N7G 3H6

Your bid must be received at the above specified location no later than:
Tuesday, March 24th, 2026
1:00 P.M. LOCAL TIME

This will be a Public Tender Opening. Contractors may attend the opening. Results will be emailed out to all Bidders.

Bid inquiries shall be submitted as stated below:

David Moores
R. Dobbin Engineering Inc.
4218 Oil Heritage Road
Petrolia, Ontario
(519)-882-0032, ext. 203
(519) 331-3675
david@dobbineng.com

Tender enquiries shall be accepted until
Thursday, March 19, 2026

SCHEDULE OF TENDER PRICES

TENDER PRICE

A. **Offer by:** _____

Name: _____

Address: _____

_____

HST #: _____

Date: _____

To: The Township of Adelaide-Metcalfe

We, the undersigned, having examined the site of the Work, having carefully investigated the conditions pertaining to the Work and having secured all the information necessary to enable us to submit a bid, and having inspected all the Contract Documents and Drawings, hereby agree to enter into a Contract and perform all the Work in accordance with the Contract Documents and Drawings to the satisfaction of the Contract Administrator for the total bid price **INCLUDING HST** of:

_____

_____ ($)

1. **ADDENDA**
   We agree that we have received addenda ___ to ___ inclusive, and the bid price includes the provisions set out in such addenda.

TENDER TABLE

Item No.	Item Description (Supply and Install New)	Qty	Unit	Unit Cost ($)	Total ($)
1.0	Pre-Construction Meeting	1	LS		
	Benchmark Loop	1	LS		
				1.0 Total	
2.0	**Channel Work: Station 0+000 to 1+632**				
	Brushing	1632	m		
	Open Channel Excavation c/w Resloping Both Banks	146	m		
	Open Channel Excavation c/w Resloping One Bank	996	m		
	Open Channel Excavation (Bottom cleanout only)	490	m		
	Strip and Level Topsoil	1288	m		
	Level Excavated Material	1778	m		
	Reconnect Existing Tile Drains	50	ea		
	S. & I. Stone Erosion Protection where required	100	t		
	S. & I. Straw Matting and Grass Seed	7000	sq.m		
	Buffer Strip	2730	sq.m		
	Environmental Considerations (Silt Fence)	1	LS		
				2.0 Total	
3.0	**Culvert No.2: Station 0+365**				
	R. & D. Existing Culvert, Endwalls, and Excess Material	1	LS		
	S. & I. 1500mmø CSP Culvert	10	m		
	S. & I. Drainage Stone Bedding	20	t		
	S. & I. Granular B Backfill	120	t		
	S. & I. Granular A Driveway	20	t		
	S. & I. Conc Block Endwalls	32	ea		
	S. & I. Rip Rap Adjacent to Conc Block Endwalls	10	t		
				3.0 Total	

Item No.	Item Description (Supply and Install New)	Qty	Unit	Unit Cost ($)	Total ($)
4.0	**Culvert No.3: Station 0+854**				
	R. & D. Existing Culvert, Endwalls, and Excess Material	1	LS		
	S. & I. 1500mmø CSP Culvert	10	m		
	S. & I. Drainage Stone Bedding	20	t		
	S. & I. Granular B Backfill	120	t		
	S. & I. Granular A Driveway	20	t		
	S. & I. Conc Block Endwalls	32	ea		
	S. & I. Rip Rap Adjacent to Conc Block Endwalls	10	t		
				4.0 Total	
5.0	**Tile Drain Work (Branch D)**				
	Strip and Level Topsoil for Tile Drain	225	m		
	Locate & Abandoned Drain as Required	1	LS		
	Connect to Junstion Box #8	1	LS		
	S. & I. 250mmø Concrete Tile	225	m		
	Locate and Connect Existing Field Tile	10	ea		
				5.0 Total	
6.0	**Tile Drain Work (Main Drain): Station 1+620 to 4+330**				
	Strip and Level Topsoil for Tile Drain	2376	m		
	Remove Existing CB (Station 1+680)	1	LS		
	Remove Existing Outlet Pipe (Station 1+632)	1	LS		
	Remove Existing Junction Box (Station 2+284) - Branch A	1	LS		
	S. & I. 900mmø HDPE Outlet Pipe c/w Rodent Grate	6	m		
	S. & I. 900mmø Concrete Tile	346	m		
	S. & I. 750mmø Concrete Tile	330	m		
	S. & I. 675mmø Concrete Tile	380	m		

Item No.	Item Description (Supply and Install New)	Qty	Unit	Unit Cost ($)	Total ($)
6.0 (Con't)	S. & I. 525mmø Concrete Tile	1051	m		
	S. & I. 400mmø Concrete Tile	261	m		
	Catchbasin #1 (900mm x 1200mm) c/w Berm, Concrete Blocks, Overflow & Connections	1	LS		
	Catchbasin #2 (900mm x 1200mm) c/w Berm & Connections	1	LS		
	Junction Box #3 (900mm x 1200mm) c/w Connections	1	LS		
	Catchbasin #4 (900mm x 1200mm) c/w Berm & Connections	1	LS		
	Catchbasin #5 (900mm x 1200mm) c/w Berm & Connections	1	LS		
	Junction Box #6 (900mm x 1200mm) - Branch D c/w Connectons	1	LS		
	Catch Basin #9 (600mm x 600mm) c/w Connections	1	LS		
	Locate and Connect Existing Field Tile	200	ea		
	Energy Diffuser Structure at Outlet	1	LS		
				6.0 Total	
7.0	**Kerwood Road (Section 26) (Main Drain)**				
	Remove Existing Catchbasin	2	Ea		
	Remove Existing Hickenbottom & 150mmø CSP	1	LS		
	Catch Basin #7 (900mm x 1200mm) c/w Connections	1	LS		
	Catch Basin #8 (900mm x 1200mm) c/w Connections	1	LS		
	510mmø Steel Casing Pipe Installed by Jack & Bore	27	m		
	Grout Exisitng 375mmø Tile Drain	1	LS		
	Locate and Work Around Existing Utilities	1	LS		
	Traffic Control	1	LS		
	Restoration/Seeding and Ditch Grading	1	LS		
				7.0 Total	

Item No.	Item Description (Supply and Install New)	Qty	Unit	Unit Cost ($)	Total ($)
8.0	**Mulifarry Road (Section 26) (Branch D)**				
	Remove Existing Catchbasin	2	Ea		
	Catch Basin #10 (600mm x 600mm) c/w Connections	1	LS		
	Catch Basin #11 (600mm x 600mm) c/w Connections	1	LS		
	S.& I. 300mmø Steel Casing Pipe by Jack & Bore	15	m		
	Grout Exisitng 200mmø Tile Drain	1	LS		
	Locate and Work Around Existing Utilities	1	LS		
	Traffic Control	1	LS		
	Restoration/Seeding and Ditch Grading	1	LS		
				8.0 Total	
9.0	**Contingency**			**9.0 Total**	58,280.00
				Subtotal: 1.0 + 2.0 + 3.0 + 4.0 + 5.0 + 6.0 + 7.0 + 8.0 + 9.0	
				HST (13%)	
				Total Tender	

Tender Deposit in the form of a certified cheque or bid bond in the amount of 10% of the total tender price payable to the **Township of Adelaide-Metcalfe** is enclosed.

Work will begin on or before _____

Work will be completed on or before _____

The Contractor shall fill in the above starting and completion date. Failure to do so may render the tender invalid and subject to rejection by the Township.

OFFERED ON BEHALF OF THE CONTRACTOR	ACCEPTED ON BEHALF OF THE TOWNSHIP
Name _____	Mayor _____
Address _____	Clerk _____
_____	Date _____-

……

Date _____

This Form of Tender, when signed and completely filled in by both the Contractor and the Municipality, shall constitute a formal contract.

CONDITIONS OF BID

1. The lowest or any bid will not necessarily be accepted by the Owner.

2. **Contract Drawing No. 1 to 11** and the attached Specifications of Work for the **Richardson-Earley Drain** are made part of this Contract Bid. The Contractor is to complete construction in accordance with the Drawings and the conditions indicated within this Bid Document.

3. TENDER DEPOSIT

   The tender shall be accompanied by a tender deposit in the form of a certified cheque or a Bid Bond payable to the Owner (Township of Adelaide-Metcalfe) in the amount of 10% of the value of the tender price.

   The Tenderers shall keep their tenders open for acceptance for 45 days after the closing date. Withdrawal during this period will result in forfeiture or enforcement of the tender deposit.

4. CONTRACT SECURITY

   There are two (2) options:

   Bonding: The Contractor shall furnish the Township of Adelaide-Metcalfe with a 100% Performance Bond and 100% Labour and Material Payment Bond. The Performance and Labour and Material Payment Bonds shall include a maintenance clause for 100% of the Tender price extending for a twelve (12) month period from the date of substantial completion. If bonding is used then the tender deposit will be returned once the contract security is in place.

   OR

   10% Certified Cheque: The certified cheque submitted as the tender deposit will be held until the date of substantial performance, as determined by the Engineer.

5. SCHEDULE AND LIQUIDATED DAMAGES

a) The Contract shall be completed by **September 15th, 2026.** There shall be no in-water works between March 15th and July 15th.

b) If the time limit above is not sufficient to permit completion by the Contractor working a normal number of hours, the Contractor shall make changes to permit the Work to be completed by the above date. Additional costs incurred shall be deemed to be included in the price bid for the Works.

6. EXAMINATION

a) Upon receipt of Documents, verify that they are complete; notify the Contract Administrator should the Documents be incomplete.

b) Each firm submitting a Tender shall carefully examine the Documents for discrepancies or omissions, and immediately notify the Consultant upon finding discrepancies or omissions, at least four (4) days prior to the date specified for closing.

c) All firms submitting Tenders will acknowledge receipt of Addenda in the space provided in the Tender Form. If no Addenda are received, insert the word "None" in the space provided.

7. EXAMINATION OF SITE

a) The Tenderers shall visit the site of the Work before submitting their Tender and shall by personal examination satisfy themselves as to the local conditions that may be encountered during construction of the Work. They shall make their own estimate of the facilities and difficulties that may be encountered and the nature of the subsurface materials and conditions.

b) The Tenderer shall not claim at any time after submission of their Tender that there was any misunderstanding of the terms and conditions of the Contract relating to site conditions.

8. INSURANCE

a) The successful Bidder shall file with the Town within 10 calendar days of award of Contract – $5 million General Liability, Automobile and Property Damage Insurance coverage.

9. WORKER'S SAFETY INSURANCE BOARD

a) The successful Bidder will file with the Township within 10 calendar days of award of Contract, a current Certificate of good standing from the Worker's Safety Insurance Board (WSIB).

10. TIME CONSTRAINTS

a) All Work shall be completed within the times set above.

b) No weekend Work is permitted without prior approval by the Township or Municipality and Engineer Designate.

11. PAYMENT & SUBSTANTIAL PERFORMANCE

a) The project will be considered substantially performed when all parts of the Contract are completed in accordance with the Contract for the **Richardson-Earley Drain** as outlined in the General Conditions of Ontario Provincial Standards GC 105 and Section 11.c below.

b) The Contractor shall be entitled to receive monthly payments at the rate of 87% of the work completed and materials in place according to the Contract, less all stipulated forfeitures and deductions. These payments shall be made on progress payment certificates.

c) The contract shall be deemed Substantial Performance, as defined by the Construction Act, a Certificate of Substantial Performance will be issued by the Engineer to the Contractor. The Contractor shall advertise the project is substantial complete in the Daily Commercial News. The Contractor is required to provide to the Engineer with the following:

i) The certified copy of the publication of the Certificate of Substantial Performance in a construction trade newspaper;

ii) A statutory declaration in a form satisfactory to the Engineer, that all liabilities incurred by the Contractor, their subcontractors, and suppliers in carrying out the Contract have been paid and that there are no liens, garnishes, attachments, or claims relating to the work; and

iii) A satisfactory WSIB Clearance Certificate.

d) The publication date begins the construction sixty (60) day holdback period. After this date, or as soon as possible thereafter, the 10% holdback for work done shall be paid to the Contractor, with the 3% remaining held as a Guaranteed Maintenance.

e) The Contractor shall be entitled to receive monthly payments for work remaining to be done after the date of Substantial Performance at the rate of 97% of the work done and materials supplied as explained in paragraph (a) above. When all this remaining work has been completed, the process for completion, as stated in Section 12.b will be followed and the 3% will be paid.

12. GUARANTEE MAINTENANCE PERIOD

a) The Contractor shall guarantee the Material and Work for a period of 1-year from the date of publication of the certificate of substantial performance remain in such condition as will meet the Contract Administrator's approval, and that they will make good in a permanent manner, satisfactory to the Contract Administrator, any imperfections due to materials or workmanship used in the construction and any damage caused by such imperfections. The decision of the Contract Administrator shall be final as to the nature and cause of such imperfections and the necessity for remedying them.

b) On the expiration of the 1-year maintenance period from the date of substantial performance, as set out on the Certificate of Substantial Performance, and after all imperfect work has been rectified in accordance with the Contract and to the satisfaction of the Engineer, the Engineer will issue a "Completion Certificate" for the contract.

The completion certificate will deem that the Engineer is satisfied that the Contractor has discharged all their obligations under the Contract. At this point, the 3% guarantee maintenance can be released to the Contractor.

c) It is the desire of the Owner that all work, including payable and non-payable items of the tender, all cleanup and deficiencies, be finished and that all claims be resolved by the Date of Completion. Deductions from the Completion Payment Certificate will be made for any unfinished work or unresolved claims at the Date of Completion.

d) Should the Contractor fail to comply with the directions of the Contract Administrator, the Contract Administrator may, after giving the Contractor forty-eight (48) hours written notice, perform the necessary Work, and the cost may be deducted, or collected by the Owner as provided in the Contract.

e) Notwithstanding the provision of the subsection (a) of this clause, the Contract Administrator may, in cases of danger or public safety, make such immediate arrangements for repairs as he/she sees fit, and the Contract Administrator will inform the Contractor of such action. The cost of such emergency Work shall be borne by the Contractor.

f) If the Contract Administrator notifies the Contractor, in writing, of imperfections prior to the termination of the guarantee period, the Contractor shall make good the imperfections as required in subsection (a) above, notwithstanding that such Work of making good may commence after or extend beyond the end of the guarantee period.

13. EXTRA WORK

a) Extra Work shall be undertaken as described in subsection GC3.10.02 of the General Conditions listed in the OPSS.

b) If applicable tender items are provided in other parts of the Contract, extra Work shall be performed using the appropriate unit prices from these parts.

c) Extra Work shall be paid under the Contingency Allowance.

14. QUANTITY OVERUNS AND UNDERUNS

a) Compensation for quantity over runs and under runs shall be as described in GC 8.01.02 of the General Conditions listed in the OPSS.

15. DAMAGE

a) Any damage to existing infrastructure and neighboring properties shall be repaired by the Contractor to the satisfaction of the Contract Administrator. Any costs associated with the damage shall be borne by the Contractor.

16. UTILITIES

a) The Contractor shall secure locates at no extra cost to the Contract prior to any construction activities.

b) If applicable, the Contractor shall follow the requirements for working with mechanical equipment in the vicinity of any active pipelines when undertaking work within the distances specified by Utility Company.

17. CONSTRUCTION LAYOUT

a) The Contractor will be responsible for the layout of all lines and grades from the plans at no extra cost to the Contract. Control information will be provided to the successful Bidder by R. Dobbin Engineering Inc.

b) All discrepancies are to be reported to the Contract Administrator prior to proceeding with the work. The Contract Administrator will review the layout in the field prior to construction.

18. INCLEMENT WEATHER

a) There will be no compensation for inclement weather other than consideration of an extension for lost time at the end of the Contract that will be at the discretion of the Contract Administrator.

19. ONTARIO PROVINCIAL STANDARDS

a) GENERAL CONDITIONS OF CONTRACT (OPSS.MUNI 100), November 2006 apply to this Contract.

b) THE ONTARIO PROVINCIAL STANDARD SPECIFICATIONS (OPSS) and DRAWINGS (OPSD) apply to this contract. All required OPS Specifications can be downloaded at:

http://www.raqsb.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage

SPECIAL SPECIFICATIONS:

The following Special Specifications form part of the Contract. No additional costs will be made for completing work within these specifications. Payment for work associated with these specifications shall be included in the applicable unit price item.

1. The Contractor shall supply all material, labour, and equipment required to complete the job to the satisfaction of R. Dobbin Engineering Project Manager.

2. R. Dobbin Engineering shall be notified at least **1 week in advance** of arriving onsite to commence construction so that inspection can be arranged. Please contact David Moores, Project Manager at 519-331-3675.

3. A Pre-construction Meeting is required before construction can commence. R. Dobbin Engineering will provide the Contractor with contact information for all landowners. It is the responsibility for the Contractor to set up the meeting.

4. Geotechnical investigation has not been undertaken within the project limits.

5. The Contractor is responsible to complete the Contract within the schedule specified.

6. If the successful contractor choses bonding as contract security, then the cost of bonding must form part of the overall tender amount.

7. Environmental requirements set out in the Richardson-Earley specifications must be adhered to. R. Dobbin Engineering is still awaiting approvals from Fisheries and Oceans Canada and the St. Clair Region Conservation Authority. Approvals only apply to the open channel works. We do not see there to be any issues with the proposed work, but the open channel work is restricted to no in-water works between March 15 – July 15. The tile drain work can proceed at any time.

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

November 4, 2025

The Mayor and Council
Township of Adelaide-Metcalfe
2340 Egremont Drive – RR #5
Strathroy, ON
N7G 3H6

Gentlemen and Mesdames:

Re: Richardson-Earley Drain

In accordance with your instructions, I have undertaken an examination of the Richardson Earley Drain with regards to making drainage improvements in Lots 3-7, Concessions 2 SER to 4 SER in the Township of Adelaide-Metcalfe. The work includes the replacement of the Main Drain and Branch D along with culvert replacements and open channel improvements.

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.

R. Dobbin Engineering Inc. was appointed by Council on December 18, 2023.

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 Richardson-Earley Drain is both an open channel drain and closed tile drain. The open channel is approximately 1632 meters long and located in Lots 3 and 4, Concession

4 SER. The closed tile drain consists of a main drain and 5 branch drains located in Lots 4-7, Concession 2 SER & Concession 3 SER.

The last Engineer's Report completed on the Richardson-Earley Drain is dated January 20, 1975 was prepared by A.J. DeVos, P.Eng. Under this report, 1712 meters of open drain was cleaned and brushed along with the installation of 6105 meters of tile drain split into a main drain and 5 branch drain in Lots 3-7, Concessions 2 SER to 4 SER.

On-Site Meeting

A site meeting was held on February 8th, 2024.

The following were present at the meeting:

- Josh Warner (R. Dobbin Engineering)
- David Moores (R. Dobbin Engineering)
- Andrew Neely (Township of Adelaide Metcalf)
- Sarah Snetsinger (SCRCA)
- Merrick Van Der Vaart (SCRCA)
- Jared Tweddle (Couty of Middlesex)
- John Feddema (Landowner)
- Pete Jansen (Landowner)
- Simon Van Aert (Landowner)
- David Bolten (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 the Main Drain and Branch D was received by the Township.
- Landowners were informed of the design standards of 38mm in 24 hours would be used for the new tile design.
- Landowners expressed concern in the amount of erosion across their lands and in the open channel downstream. R. Dobbin Engineering to investigate and include in the proposed work as required.
- Catchbasins and berms would be placed at each property line to improve the erosion occurring across the lands due to surface water.
- Landowners asked for the twining the existing tile be investigated as a possible solution.
- Mr. Bolten requested the cost to enclosed the open channel across his property be investigated. Mr. Bolten was informed that an enclosure would not be grantable and that SCRCA would need to approve the work.

No adverse soil conditions were noted at the site meeting.

Discussion and Investigation

The drain was surveyed from its outlet at the Jarriott-Tyler Drain to the top end of the Main Drain at Mulifarry Drive and the entire Branch D. Drone footage was taken as well. The survey identified three (3) culverts in the open channel with one (1) requiring replacement. The open channel is out of repair with erosion throughout. The lands across Lots 4, 5, and 6 have major erosion. It appears that the tile is broken down in multiple locations and the water is forced to travel overland to an outlet. The outlet of the tile drain to the open channel is causing erosion to the property owner. The open channel will need to be improved for its entire length and will have to be deepened to provide sufficient outlet to the new tile drain replacement.

Enclosing the drain across the E1/2 Lot 4, Concession 4 SER was evaluated with an estimate of cost presented to the owner of roll no. 30-110. Due to the high cost to enclosed the drain the owner choose to leave as an open channel.

The option of twining the existing tile drain was investigated. Due to the age, size, and overall condition of the existing tile, we did not see there to be a cost savings. With the amount of erosion on the land, the tile was exposed in various sections and appears to be broken down. Twinning the existing tile would mean repairing the existing tile as well. When calculating the new tile size repaired there was not much difference in the size of tile required if there was one tile verses two tile drains.

Below is a summary of the condition of the existing culverts found along the open channel:

Culvert Number	Location	Existing Culvert Size	Condition
1	Roll Number 30-113	11m x 1500mm dia. CSP	Good Condition
2	Roll Number 30-112	8m x 1500mm dia. CSP	Culvert – Ok Condition, some rust at the springline, endwalls falling in to the drain
3	Roll Number 30-111	7m x 1350mm dia. CSP	Poor Condition – needs to be replaced

Public Consultation Meeting

A public consultation meeting was held on September 30th, 2025.

The following were present at the meeting:

- Josh Warner (R. Dobbin Engineering)
- David Moores (R. Dobbin Engineering)
- Rob Keidel (Township of Adelaide Metcalf)

- Colton Cahill (Township of Adelaide Metcalf)
- Merrick Van Der Vaart (SCRCA)
- Peter Jansen (Landowner)
- John Jansen (Landowner)
- Tony Van Aert (Landowner)
- Laura Van Aert (Landowner)
- Sean Kernohan (Landowner)
- David Bolten (Landowner)
- Jonny & Berthiene Feddema (Landowner)
- John Feddema (Landowner)

The following is a brief summary of the meeting:

- General discussion of the Drainage Act and Landowners rights under the Drainage Act.
- The draft report dated August 19, 2025 was presented to those in attendance. There was discussion in detail about the proposed work and estimated costs.
- Mr. Bolten requested an overflow be added to the CB/Berm.
- Mr. Thoma asked for the Engineer to contact Mr. Matthews regarding the Culvert No. 2 as he believed it needed to be replaced instead of just endwalls being replaced.
- The Township requested the Engineer reach out to Mr. Simon Van Aert of Sim Farms Ltd. as this property had an extremely high assessment and no one was present at the meeting.

Discussion

Following the Public Consultation Meeting, Culvert No.2 was inspected again. The culvert appears to be in ok condition with rust at the springline. In discussion with the landowner, he requested that the culvert be replaced to the same length as the proposed Culvert No. 3 replacement. As there is still life remaining in the culvert consideration will be given to the final assessment to the landowner and drain.

Mr. Simon Van Aert of Sim Farms Ltd. was contacted. He requested that the two catchbasins originally proposed on his property be removed as they are not required. He plans to tile the property after the new drain is installed. Mr. Van Aert is good with the having the CB/Berm on the property lines as proposed and had no more concerns with the overall scope outlined in the report.

Recommendations

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

1. The open channel from Station 0+000 to 1+632 shall be improved including brushing, cleanout, resloping, bank stabilization, and erosion control matting.

2. The open channel drain shall be deepened to accommodate 300mm freeboard for the proposed tile replacement.
3. Culvert No. 2 at Station 0+365 shall be replaced.
4. Culvert No.3 at Station 0+854 shall be replaced.
5. Grass buffer strips shall be 1.0 meters wide and installed along the top of open channel from Station 0+000 to 1+632.
6. The Main Drain portion of the tile drain from Station 1+632 to 4+033 shall be replaced with a tile of sufficient size to accommodate both surface and subsurface drainage. The existing tile drain shall be crushed and abandoned as part of the drainage works.
7. Catchbasins c/w berms and junction boxes shall be placed along the length of the drainage works.
8. Branch D shall be replaced with a tile of sufficient size to accommodate both surface and subsurface drainage. The existing tile drain shall be crushed and abandoned as part of the drainage works.
9. The road crossing pipes under Mulifarry Drive and Kerwood Road shall be replaced.

Design

The proposed tile drain shall be designed to accommodate a drainage coefficient of 38mm in 24 hours in accordance with the Drainage Guide for Ontario (Publication 29). Tile design criteria include a minimum tile depth of 760mm and a minimum freeboard of 300mm at the outlet. Culverts have been designed for a 1 in 2-year storm event.

Estimate of Cost

It is recommended that the work be carried out in accordance with the accompanying Specification of Work and Profile that forms part of this Report. There has been prepared an Estimate of Cost in the amount of $831,807.00 including engineering of the report, attending the Meeting to Consider the Report, attending the Court of Revision. An estimate for tendering, contract administration and inspection as been provided. Appearances before appeal bodies have not been included in the cost estimate.

A plan has been prepared showing the location of the work and the approximate drainage area. A profile is included showing the depths and grades of the proposed work.

Assessment

As per Section 21 of the Drainage Act, the Engineer in their 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 will be prepared 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.

The cost of any approvals, permits or any extra work, beyond that specified in this Report that is required by any utility, government ministry or organization (federal or provincial), or road authority shall be assessed to that organization requiring the permit, approval, or extra work.

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

1. The open channel works has generally been assessed with 50% of the cost applied as benefit assessment and 50% of the cost applied as an outlet assessment to the upstream lands and roads based on equivalent hectares.

2. The engineering for future replacement of Culvert No.1 and the current replacement Culvert No.3 has been assessed with 50% of the costs applied as benefit assessment to and the remainder of the cost applied as an outlet assessment to upstream lands and roads based on equivalent hectares.

3. The replacement of Culvert No.2 has been assessed with 60% of the costs applied as benefit assessment to and the remainder of the cost applied as an outlet assessment to upstream lands and roads based on equivalent hectares.

4. The tile replacement of the Main Drain has been assessed based on the average tile cost with 40% applied as benefit assessment to the abutting property and the remainder of the cost applied as an outlet assessment to upstream lands and roads based on equivalent hectares.

5. The tile replacement of the Branch D has been assessed based on the average tile cost with 50% applied as benefit assessment to the abutting property and the remainder of the cost applied as outlet assessment to upstream lands and roads based on equivalent hectares.

6. Catchbasin No.1, No.2, No.4, No.5, and No.9 has been assessed as benefit assessment with 50% assessed to the upstream property and 50% assessed to the downstream property.

7. Junction Box No.3 and No.6 has been assessed as outlet assessment to upstream lands and roads based on equivalent hectares.

8. As per Section 26 of the Drainage Act, the roads and utilities have been assessed the increased cost of the drainage works caused by the existence of the works of the public utility or road. The road crossings including catchbasins No.7, 8, 10, and 11, with the exception of the extra cost to locate and work around utilities, has been assessed with 100% of the estimated cost assessed as a special benefit assessment to the road authority. The utilities have been assessed 100% of the estimated cost to work around that utility as a special benefit assessment to that utility. These items shall be tendered separately with the actual cost plus a portion of the engineering (20% of the construction cost) being assessed to the owner of the utility or road. The additional costs as a result of the utilities (such as a daylighting and surveying) that are not to be tendered separately have been assessed to the utility as a benefit assessment and shall be pro-rated with the remainder of the drainage works.

9. The remaining cost of the drainage works has generally been assessed with 100% of the cost applied as outlet assessment to the upstream lands and roads based on equivalent hectares.

All final costs included in the cost estimate of this report, except as identified above, shall be pro-rated based on the Schedule of Assessment. Any additional costs shall be assessed in a manner as determined by the Engineer in accordance with the Drainage Act.

Allowances

Under Section 29 of the Drainage Act, the Engineer in his Report shall estimate and allow in money to the Landowner 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 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 for damage, if any, to ornamental trees, lawns, fences, land and crops occasioned by the disposal of material removed from a drainage works. This shall be considered an allowance for damages.

Allowances have been made, where appropriate, as per Section 29 of the Drainage Act for right-of-way and as per Section 30 of the Drainage Act for damages to lands and crops. Allowances for right of way are based on a land value of $65,000.00 per hectare. Allowances for crop loss are based on $5,500.00 per hectare for closed drains and $7,500.00 per hectare for open drains.

Access and Working Area

Access to the work site for construction and future maintenance shall be from Kerwood Road, Mulifarry Drive, and Napperton Drive using existing laneways to reach the drain, then along the length of the drainage works or as approved by the Drainage Superintendent or Engineer Designate. Access shall generally be restricted to a width of 6 metres and shall be along property lines, existing laneways, or otherwise agreed to with the landowner(s).

The working area for the construction and future maintenance of the proposed tile drain shall be restricted to a width of 20m along the length of the drainage works normally centred on the proposed tile drain.

The working area for construction and future maintenance of the open channel shall be restricted to 20 meters measured from the top of bank as follows:

1. Station 0+000 to 0+146 – North and South side
2. Station 0+146 to 0+369 – North side
3. Station 0+369 to 0+843 – East side (Cross at Culvert No.2)
4. Station 0+843 to 1+174 – South side
5. Station 1+174 to 1+632 – East side

If a landowner owns both sides of the drain, they reserve the right to have future maintenance completed from either side of the drain.

The working area shall include 3m on the side opposite the side identified above in order to allow for the installation of buffer strips. If, at the discretion of the Drainage Superintendent or Engineer, there is erosion on the channel opposite the working area access may be gained along the channel and nearest culvert to repair the bank.

Access for construction and future culvert maintenance and/or channel repair on a single property shall be from the properties in which the culvert or channel is being repaired or maintained. If maintenance is being done on multiple properties access shall be gained from the nearest roadway and shall be along the length of the drainage works. The working area at each culvert shall extend 10 metres from the bank on both sides and for 10 metres along the channel on either side of the culvert.

Drain Classification

The Richardson-Earley Drain is currently classified as a class “F” drain and a tile drain according to the Department of Fisheries and Oceans (DFO) classification as presented by the Ontario Ministry of Agriculture, Food and Agribusiness Information Atlas. Class “F” drains are intermittent or ephemeral (dry for more than two consecutive months).

The proposed work shall be carried out during low flows in the channel. The work area is to be maintained in a dry condition during construction by the Contractor.

Approvals

The drain will require approval from the St. Clair Conservation Authority and the Department of Fisheries and Oceans. Construction cannot commence without necessary approvals.

Restrictions

No trees and shrubs shall be planted nor shall permanent structures be erected within 10m of either side of the proposed drain without prior written permission of Council.

Attention is also drawn to Sections 80 and 82 of the Drainage Act, which refer to the removal of obstructions in a drain and damage caused to a drain.

Agricultural Grant

If available, it is recommended that application for subsidy be made for eligible agricultural properties. Any assessments against non-agricultural properties are shown separately in the Schedule of Assessment.

Existing Private Drainage

All existing subsurface drainage encountered during the construction of the proposed tile drain or open channel shall be reconnected to the proposed tile drain or open channel. Any drains cut off by the proposed drainage works shall be plugged and sealed to the satisfaction of the Drainage Superintendent.

Maintenance

Upon completion of the work, the drainage works shall be repaired and maintained as per the specifications contained within this report and assessed out using the applicable Schedule of Maintenance, unless otherwise altered under provisions of the Drainage Act or as outlined below.

The access culverts located along the length of the drainage works shall be maintained and repaired in accordance with the specifications and drawings contained within this report and assessed out with 50% of the costs applied as benefit assessment to the benefiting property and the remainder of the cost applied as outlet assessment to upstream lands and roads based on equivalent hectares, as contained in the applicable Schedule of Maintenance.

Catchbasin No.1, No.2, No.4, No.5, and No.9 shall be repaired and maintained as per the specifications contained within this report and assessed out with 50% assessed to the upstream property and 50% assessed to the downstream property.

Junction Box No.6 shall be repaired and maintained as per the specifications contained within this report and assessed out with 100% of the cost assessed to upstream lands and roads in Branch D based on equivalent hectares, as contained in Schedule of Maintenance No.3.

Junction Box No.3 shall be repaired and maintained as per the specifications contained within this report and assessed out using Schedule of Maintenance No.4.

The road culverts including Catchbasin No.7, 8, 10, and 11 are to be maintained and repaired at the expense of the Road Authority as per section 26 of the Drainage Act.

If any landowner requests a longer culvert than what is specified in the report, then the extra costs shall be 100% the responsibility of the landowner.

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

All of the above is submitted for your consideration.

Yours truly,

Report Prepared By:

David Moores, C.E.T
R. Dobbin Engineering Inc.

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT
ONTARIO
DAVID MOORES
Nº 920778

Report Approved By:

Josh Warner, P. Eng.
R. Dobbin Engineering Inc

LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
NOV. 04/25
PROVINCE OF ONTARIO

Estimate of Cost

Item Description (Supply and Install New)	Quantity	Unit	Unit Cost ($)	Total ($)
Pre-Construction Meeting	1	LS	500	500
Benchmark Loop	1	LS	500	500
Channel Work: Station 0+000 to 1+632				
Brushing	1632	m	5	8,160
Open Channel Excavation c/w Resloping Both Banks	146	m	20	2,920
Open Channel Excavation c/w Resloping One Bank	996	m	10	9,960
Open Channel Excavation (Bottom cleanout only)	490	m	7	3,430
Strip and Level Topsoil	1288	m	8	10,304
Level Excavated Material	1778	m	2	3,556
Reconnect Exisitng Tile Drains	50	ea	150	7,500
S. & I. Stone Erosion Protection where required	100	t	125	12,500
S. & I. Straw Matting and Grass Seed	7000	sq.m	3.5	24,500
Buffer Strip	2730	sq.m	2	5,460
Environmental Considerations (Silt Fence)	1	LS	300	300
				88,590
Culvert No.2: Station 0+365				
R. & D. Existing Culvert, Endwalls, and Excess Material	1	LS	600	600
S. & I. 1500mmø CSP Culvert	10	m	900	9,000
S. & I. Drainage Stone Bedding	20	t	40	800
S. & I. Granular B Backfill	120	t	30	3,600
S. & I. Granular A Driveway	20	t	40	800
S. & I. Conc Block Endwalls	32	ea	135	4,320
S. & I. Rip Rap Adjacent to Conc Block Endwalls	10	t	125	1,250
				20,370
Culvert No.3: Station 0+854				
R. & D. Existing Culvert, Endwalls, and Excess Material	1	LS	600	600
S. & I. 1500mmø CSP Culvert	10	m	900	9,000
S. & I. Drainage Stone Bedding	20	t	40	800
S. & I. Granular B Backfill	120	t	30	3,600
S. & I. Granular A Driveway	20	t	40	800
S. & I. Conc Block Endwalls	32	ea	135	4,320
S. & I. Rip Rap Adjacent to Conc Block Endwalls	10	t	125	1,250
				20,370

Item Description (Supply and Install New)	Quantity	Unit	Unit Cost ($)	Total ($)
Tile Drain Work (Branch D)				
Strip and Level Topsoil for Tile Drain	225	m	6	1,350
Locate & Abandoned Drain as Required	1	LS	600	600
Connect to Junstion Box #8	1	LS	500	500
S. & I. 250mmø Concrete Tile	225	m	50	11,250
Locate and Connect Existing Field Tile	10	ea	150	1,500
				15,200
Tile Drain Work (Main Drain): Station 1+620 to 4+330				
Strip and Level Topsoil for Tile Drain	2376	m	6	14,256
Remove Existing CB (Station 1+680)	1	LS	600	600
Remove Existing Outlet Pipe (Station 1+632)	1	LS	600	600
Remove Existing Junction Box (Station 2+284) - Branch A	1	LS	600	600
S. & I. 900mmø HDPE Outlet Pipe c/w Rodent Grate	6	m	600	3,600
S. & I. 900mmø Concrete Tile	346	m	275	95,150
S. & I. 750mmø Concrete Tile	330	m	150	49,500
S. & I. 675mmø Concrete Tile	380	m	110	41,800
S. & I. 525mmø Concrete Tile	1051	m	75	78,825
S. & I. 400mmø Concrete Tile	261	m	60	15,660
Catchbasin #1 (900mm x 1200mm) c/w Berm, Concrete Blocks, Overflow & Connections	1	LS	4,000	4,000
Catchbasin #2 (900mm x 1200mm) c/w Berm & Connections	1	LS	3,500	3,500
Junction Box #3 (900mm x 1200mm) c/w Connections	1	LS	2,500	2,500
Catchbasin #4 (900mm x 1200mm) c/w Berm & Connections	1	LS	3,500	3,500
Catchbasin #5 (900mm x 1200mm) c/w Berm & Connections	1	LS	3,000	3,000
Junction Box #6 (900mm x 1200mm) - Branch D c/w Connectons	1	LS	2,500	2,500
Catch Basin #9 (600mm x 600mm) c/w Connections	1	LS	2,500	2,500
Locate and Connect Existing Field Tile				
Short Connections	100	ea	180	18,000
Long Connections	100	ea	240	24,000
Energy Diffuser Structure at Outlet	1	LS	1,500	1,500
				365,591
Kerwood Road (Section 26) (Main Drain)				
Remove Existing Catchbasin	2	Ea	600	1,200
Remove Existing Hickenbottom & 150mmø CSP	1	LS	500	500
Catch Basin #7 (900mm x 1200mm) c/w Connections	1	LS	3,000	3,000
Catch Basin #8 (900mm x 1200mm) c/w Connections	1	LS	3,000	3,000
510mmø Steel Casing Pipe Installed by Jack & Bore	27	m	1,200	32,400
Grout Exisitng 375mmø Tile Drain	1	LS	2,500	2,500
Locate and Work Around Existing Utilities	1	LS	2,500	2,500
Traffic Control	1	LS	1,000	1,000
Restoration/Seeding and Ditch Grading	1	LS	1,500	1,500
				47,600

Item Description (Supply and Install New)	Quantity	Unit	Unit Cost ($)	Total ($)
Mulifarry Road (Section 26) (Branch D)				
Remove Existing Catchbasin	2	Ea	600	1,200
Catch Basin #10 (600mm x 600mm) c/w Connections	1	LS	2,500	2,500
Catch Basin #11 (600mm x 600mm) c/w Connections	1	LS	2,500	2,500
S.& I. 300mmø Steel Casing Pipe by Jack & Bore	15	m	900	13,500
Grout Exisitng 200mmø Tile Drain	1	LS	1,500	1,500
Locate and Work Around Existing Utilities	1	LS	1,000	1,000
Traffic Control	1	LS	1,000	1,000
Restoration/Seeding and Ditch Grading	1	LS	500	500
				23,700
Contingency				58,280

Sub Total	640,701
Allowances	76,886
Engineering	69,600
Supervision and Inspection	25,000
Survey and Daylight Existing Utilities	6,000
SCRCA Fee	570
Total Estimate excluding HST	**818,757**
Non-Recoverable HST (1.76%)	13,050
Total Estimate	**$ 831,807**

Richardson-Earley Drain
Township of Adelaide-Metcalfe
November 4, 2025

SPECIFICATION OF WORK

1. Location

The Richardson-Earley Drain is located in Lots 3-7, Concession 2 SER to 4 SER in the Township of Adelaide Metcalf.

2. Scope of Work

The work included in this specification includes, but is not limited to, the following:

- Open channel improvements including brushing, bottom cleanout, deepening, widening, resloping, buffer strips, and bank stabilization
- Supply and installation of concrete tile
- Supply and installation of catch basins
- Road crossing replacements at Mulifarry Drive and Kerwood Road

3. 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 their 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.

Measurement for Payment Clauses have not been included in these specifications and will be part of the Construction document. If the Construction document has not identified Measurement for Payment Clauses, the Contractor must notify the Township of Adelaide-Metcalfe and request clarification 2 days prior to pricing the project.

4. Plans and Specifications

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.

5. 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.

When applicable the Contractor shall be responsible for traffic control as per the Ontario Traffic Manual Book 7 – Temporary Conditions (latest revision).

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 non-compliance 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.

The Contractor shall submit their traffic control plan within 10 working days of notice of award. Road closures will not be permitted on this project without the approval of the County of Middlesex and Township of Adelaide-Metcalfe.

6. Utilities

The Contractor is responsible for organizing locates and exposing all the utilities along the length of the drainage works. If any utilities interfere with the proposed drainage works in a manner not shown on the accompanying Estimate of Cost or profile the Contractor shall notify the Drainage Superintendent and Engineer.

The Contractor is responsible for coordinating the replacement of additional utilities with the utility company if they interfere with the proposed drain. All costs for the utility to replace their services will be outside of this report and shall be borne by the utility as per Section 26 of the Drainage Act.

All additional costs to work around and organize replacement of the utilities not included in the estimate shall be tracked separately and the cost plus a portion of the engineering (20% of the cost) shall be borne by that utility.

7. Pre-Construction Meeting

There is a requirement for a pre-construction meeting to be held prior to any construction taking place. The meeting shall be scheduled by the Contractor. The Landowners, Engineer, the Township of Adelaide-Metcalfe, and the County of Middlesex shall be notified of the pre-construction meeting at least 48 hours prior.

8. Benchmarks

The benchmarks are based on geodetic elevations. Elevations are available at the locations shown on the Plan and Profile drawings. Where these elevations are on existing structures to be replaced, they shall be transferred by the Contractor prior to the removal.

The Contractor is required to complete a benchmark loop prior to construction to verify the benchmarks. If discrepancies exist the Contractor must notify the Drainage Superintendent and Engineer prior to completing any work.

9. Traffic Control

Access and driveways to private properties shall not be obstructed longer than the minimum time necessary for the work and shall be reinstated as soon as possible all to the satisfaction of the Engineer. The contractor shall schedule any obstruction of existing driveways with the owners at least two full working days in advance. Roads must be kept open to local traffic and all obstructions and diversions of traffic must be approved by the Engineer or Drainage Superintendent and Roads Superintendent at least two (2) full working days in advance.

a) The Contractor shall supply, erect and maintain all detour signs and special signs necessary for detours to divert traffic from the area under construction as directed by the Road Superintendent or Engineer. All this work shall be at the Contractor's expense.

b) The Contractor shall be responsible for supplying, erecting and maintaining all signs, supports, barricades, flashers, cones, etc. in the construction area and at the boundaries of the work as part of the above detours, all to the satisfaction of the Engineer or Drainage Superintendent. All this work shall be done by the Contractor at their own expense.

c) The Contractor shall not be allowed to proceed with construction activities unless proper signage and flagmen are present. Flagging procedures, signage and detours shall conform to the recommendations of Book 7,

Temporary Conditions, Ontario Traffic Manual, issued by the Ministry of Transportation. Conformance shall be enforced by the Ministry of Labour Inspector.

10. Access and Working Area

Access to the work site for construction and future maintenance shall be from Kerwood Road, Mulifarry Drive, and Napperton Drive using existing laneways to reach the drain, then along the length of the drainage works or as approved by the Drainage Superintendent or Engineer Designate. Access shall generally be restricted to a width of 6 metres and shall be along property lines, existing laneways, or otherwise agreed to with the landowner(s).

The working area for the construction and future maintenance of the proposed tile drain shall be restricted to a width of 20m along the length of the drainage works normally centred on the proposed tile drain.

The working area for construction and future maintenance of the open channel shall be restricted to 20 meters measured from the top of bank as follows:

1. Station 0+000 to 0+146 – North and South side
2. Station 0+146 to 0+369 – North side
3. Station 0+369 to 0+843 – East side (Cross at Culvert No.2)
4. Station 0+843 to 1+174 – South side
5. Station 1+174 to 1+632 – East side

If a landowner owns both sides of the drain, they reserve the right to have future maintenance completed from either side of the drain.

The working area shall include 3m on the side opposite the side identified above in order to allow for the installation of buffer strips. If, at the discretion of the Drainage Superintendent or Engineer, there is erosion on the channel opposite the working area access may be gained along the channel and nearest culvert to repair the bank.

Access for construction and future culvert maintenance and/or channel repair on a single property shall be from the properties in which the culvert or channel is being repaired or maintained. If maintenance is being done on multiple properties access shall be gained from the nearest roadway and shall be along the length of the drainage works. The working area at each culvert shall extend 10 metres from the bank on both sides and for 10 metres along the channel on either side of the culvert.

11. Removals

The culverts and any native backfill material, when required, shall be removed in their entirety. The culvert, backfill and endwalls shall be disposed offsite at the expense of the Contractor. Native backfill shall not be reused in the culvert installation. Any broken concrete or rip rap (concrete bags) from the existing structures shall be disposed offsite at the expense of the Contractor unless determined re-usable by the Drainage Superintendent or Engineer as erosion protection.

The Contractor shall work around the existing fences and signs if they are able to. If the existing fences and signs are required to be removed, they shall be removed and re-installed in the same location with the existing materials. The Contractor shall take photos before the removal of any fence and after its reinstallation. All work in connection with fences and signs shall be carried out in a careful manner so they are replaced in as good a condition as the existing materials permit.

Where the culverts are not being replaced, the Contractor shall restore the channel in these sections to match the adjacent side slopes and shall restore them with straw matting and seed.

12. Access Culverts

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

ACCESS CULVERT TO BE REPLACED IN THE FUTURE:

Culvert No. 1 at Station 0+146 – Roll No. 30-113 consists of 11.0 metres of 1500 mm diameter CSP pipe with rip rap endwalls. The pipe shall be replaced with 10m of 1500mm diameter aluminized CSP with concrete block endwalls.

ACCESS CULVERTS TO BE REPLACED UNDER THIS REPORT:

Culvert No. 2 at Station 0+365 – Roll No. 30-112 consists of 8.0 metres of 1500 mm diameter CSP pipe with concrete jute bag endwalls. The pipe shall be replaced with 10m of 1500mm diameter aluminized CSP with concrete block endwalls.

Culvert No. 3 at Station 0+854 – Roll No. 30-111 consists of 7.0 metres of 1350 mm diameter CSP pipe with rip rap endwalls. The pipe shall be replaced with 10m of 1500mm diameter aluminized CSP with concrete block endwalls.

All culverts shall be aluminized with 2.8mm thickness and 68mmx13mm corrugations. If 68mmx 13mm corrugations is not available then 125mmx25mm corrugations shall be used.

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, this must be approved by the Drainage Superintendent. Culvert lengths in this report are based on using concrete block walls. If rip rap ends are to be utilized in the future, the culverts may be lengthened to accommodate the sloped ends (1.5:1.0).

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 upstream or 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 culvert shall be installed with the invert set 10% below the design channel bottom (minimum 150mm) and to grade shown on the Profile.

The existing culvert, endwall materials, and excess material shall be removed and disposed of off site by the contractor. Any native granular material shall be stockpiled for reuse.

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 drainage stone from the bottom of the excavation 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 150mm of finished grade with granular "B" to within 150mm of finished grade. The top 150mm for access culverts shall be backfilled with compacted granular "A" material to finished grade.

All backfill shall be free from deleterious material. Any excess granular material shall be placed at the surface on the travel portion of the access culvert. All granular bedding material shall be mechanically compacted to 95% modified standard proctor density. All backfill material above the springline shall be mechanically compacted using appropriate compaction equipment. The Contractor shall supply any extra backfill material required above the springline.

The culverts shall be installed as per manufacture recommendations with a minimum cover of 1/6 of the span diameter 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 consist of concrete blocks with dimensions of approx. 600mm x 600mm x 1200mm, 600mm x 600mm x 2400mm or 300mm x 600mm x 1200mm as required. The top of the culvert shall govern block elevation. The correct block shall be set with the top of the block equal to the top of the culvert. The blocks shall be set at each end of the culvert so that each row of blocks will be offset approx. 100mm from the row below. The bottom row shall consist of one block placed parallel to the culvert. The blocks shall be imbedded a minimum of 300mm into each bank and shall extend into the drain bottom to match the pipe invert or below.

The blocks shall be placed over a layer of filter fabric (Mirafi P150 or approved equal). The culvert shall be backfilled in conjunction with the placement of the blocks. The gaps between the culvert and the blocks shall be filled with concrete cinder blocks/bricks and mortar to give the endwall a finished appearance. Rip rap shall be placed on the drain banks along the edge of the concrete blocks from the bottom to the top for a width to not exceed 0.60 meters.

If rip rap ends are to be used, the pipes shall be lengthened to accommodate the travel width plus minimum 1.5:1 sideslopes. 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 400mm 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.

The Contractor shall be responsible for maintenance of the access culverts for a period of one year after their installation (within the guaranteed maintenance period). This will include repairing any settlement areas on the travel surface with Granular “A”.

13. Brushing and Tree Removal

A mechanical grinder attached to an excavator shall be used for brush and tree removal. For construction and future maintenance of the drain, all brush, stumps, trees, vegetation, etc. within the working area, the drain bottom, along the both drain banks as determined by the Drainage Superintendent or Engineer, shall be removed. Brush along the top of the drain along the bush section between Sta 0+843 to 1+174 can remain unless it impedes with the flow.

Any brush and trees too large to grind shall be close cut. The Contractor shall stockpile the trees and brush in a single pile on the property in which they were removed or dispose of the trees and brush offsite. The Contractor is responsible for the burning of the trees and brush. The Contractor is responsible for obtaining all necessary permits for any disposal sites. Burning of the trees and brush is subject to local bylaws and guidelines of the Ministry of the Environment Conservation and Parks.

Certain trees may be left in place at the discretion of the Drainage Superintendent or Engineer Designate. 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.
The drain in the future may be sprayed on an annual basis as brush and phragmite control or as determined by the Drainage Superintendent.

14. Excavation of Open Channel

For construction and future maintenance, the open channel shall be excavated and maintained to the depths and grades as per the profile and drawings as contained in this Engineers Report. The channel shall be excavated to the proper depth using a laser or similar approved device with a labourer onsite to ensure correctness of grade and to confirm location of tile ends. Existing culverts shall be cleaned to the proposed grade line.

The excavated material shall generally be cast on the side it is being excavated from and shall be cast at least 1.5 metres clear of the bank. Excavated material shall not be placed in low runs or swales outletting surface water to the channel. The excavated material shall be levelled to a maximum depth of 150mm and left in a condition suitable for cultivation. This shall include the removal of any rocks larger then 10cm in diameter and any debris/wood that could damage or plug farm equipment. Leveling shall occur when the material is dry enough to do so as determined by the Drainage Superintendent or Engineer. All high spots above grade shall be removed. The sediment shall be removed leaving a rounded bottom with the intent not to undercut the existing side slopes. All material unfit for placing on farmlands shall be disposed of offsite by the Contractor.

The following drain banks shall be resloped to 2:1:

1. Station 0+000 to 0+146 both the north and south banks
2. Station 0+146 to 0+369 north side only
3. Station 0+843 to 1+174 south bank only
4. Station 1+174 to 1+632 east bank only

Additional re-sloping to 2:1 shall be completed at the discretion of the Drainage Superintendent or Engineer at the established unit prices. All areas to be re-sloped shall have the adjacent working area stripped of topsoil. Once the excavated material is levelled the topsoil shall be placed on top in a condition suitable for cultivation.

The drain banks shall be handed seeded and covered with double straw erosion control matting installed as per manufactured specifications. Matting shall be secured to the bank using steel U shaped staples.

For future maintenance, all excavated material shall be levelled as described above. Across agricultural properties, a Landowner may request to have the excavated material trucked. The additional cost for trucking, beyond levelling, shall be assessed to the Landowner and will not be eligible for grant.

15. Installation of Tile

The Contractor shall supply, install, and backfill the specified sizes of tile and pipe to the depths and grades as shown on the drawings.

Concrete tile shall conform to ASTM C412, extra quality. Tile shall have a circular interior and exterior shape.

Where the concrete tile depth is greater than 2.5m the tile shall be 2000D concrete tile and shall be bedded to the spring line with clear stone. The estimated length of 2000D concrete tile required has been shown as a separate item. Clear stone bedding to the spring line shall be included as part of this item.

HDPE shall be CSA Approved smooth wall gasketed pipe with bell and spigot joints (320 kPa) and shall include clear stone bedding to the spring line under gravel driveways and accesses. Under roadways the road crossing specification shall be used.

The Contractor shall strip the topsoil for a width of 6m normally centered on the proposed drain. The topsoil shall be stockpiled at the edge of the working allowance for the duration of the tile installation. Once the tile is installed, the Contractor shall level the topsoil over the drain to their pre-construction condition ensuring a minimum of 760mm cover.

The tile drain shall run in the low runs at property lines in order to maximize the surface water captured by the in-line catch basins with berms. The exact location of tile can be changed under the direction of the Drainage Superintendent or Engineer. The drain shall run along the south and west side of the bush area.

The trenching and laying of the concrete tile shall be done by wheel machine. An excavator must be used in areas of soil instability, unless approved by the Engineer. All tile joints shall be wrapped with a minimum 300mm width of Mirafi P150 (or approved equal) filter fabric. The filter fabric shall be overlapped by 450mm at the top of the tile. The tile shall be laid in straight lines or on smooth gradual curves with a minimum radius or 25m.

Where approved by the Engineer (or specified), concrete tile may be laid in tighter curves by saw cutting joints. The maximum deflection of one concrete tile joint shall be 22 degrees. Turns of greater than 22 degrees shall require the use of manufactured bends (PE smooth wall).

Laser control shall be used to ensure proper grades. The grades calculated on the Profile are to the invert of the tile and pipe with allowances to be made by the Contractor for the wall thickness of the tile and pipe. The depths shown and figured are from ground level to the invert of the pipe along the line of the proposed drain. Should an error appear in the figured depth at any station or stations, the grade shall be made to correspond with that shown on the Profile without extra charge.

WHEEL MACHINE

A wheel machine shall be used to excavate the trench to allow for a round bottom. Prior to backfilling, the tile shall be covered manually to a depth of approx. 100mm over the pipe to ensure that the tile and pipe are not displaced by large clumps of earth. The trench shall be backfilled with excavated material free of stones, broken tile or other deleterious material. All stones larger than 100mm in diameter evident immediately after construction shall be picked up by the Contractor and disposed offsite. The Landowners are responsible for stones after that. The material shall be left windrowed over the trench to allow for settlement.

EXCAVATOR

When concrete tile is installed with an excavator, the tile must be installed as per the manufacturer's recommendations **complete with bedding to the spring line** then backfilled with excavated material. Prior to backfilling, the tile shall be covered manually to a depth of approx. 100mm over the pipe to ensure that the tile and pipe are not displaced by large clumps of earth. The trench shall be backfilled with excavated material free of stones, broken tile or other deleterious material. All stones larger than 100mm in diameter evident immediately after construction shall be picked up by the Contractor and disposed offsite. The Landowners are responsible for stones after that. The material shall be left windrowed over the trench to allow for settlement.

If the land level must be lowered in order to carry out trenching operations, then it is up to the Contractor to determine if it is necessary and include any extra cost involved. They shall first strip the topsoil to its full depth and stockpile it along one side of the working width and then grade the area to allow the trenching to be carried out. All excavated material shall be windrowed on the side opposite the trench that the topsoil is stockpiled. After trenching and backfilling operations are complete, the topsoil shall be spread to its original depth.

All areas disturbed by construction, except the material windrowed over the trench, shall be left in a condition suitable for cultivation.

The Contractor shall not operate any trenching or backfill equipment, delivery trucks or equipment, pickup trucks or other vehicles along or over the trench during or after construction. The Contractor shall be responsible for any damage caused by any

equipment or vehicles operated over the trench. If the Contractor must cross the trench, he will do so in one area.

The Landowners are also warned not to operate farm equipment over the trench or along the length of the trench for 1 year after construction in order to protect the tile. Future replacements shall conform to these specifications.

16. Catch Basins and Junction Boxes

Structure	Station	Type (mm)	Top Elev. (m)	Outlet Pipe Elev. (m)	Inlet Pipe Elev. (m)
CB #1 c/w Berm	1+680	900x1200	232.49	230.59 (S) 900 CONC	230.60 (N) 900 CONC
CB #2 c/w Berm	1+984	900x1200	233.13	231.19 (W) 900 CONC	231.34 (E) 750 CONC
JB #3 BR. A	2+284	900x1200	234.40	233.11 (W) 750 CONC	233.12 (E) 750 CONC 233.17 (N) 300 CONC
CB #4 c/w Berm	2+314	900x1200	235.12	233.30 (W) 750 CONC	233.37 (E) 675 CONC
CB #5 c/w Berm	2+694	900x1200	237.38	235.61 (W) 675 CONC	235.66 (E) 525 CONC
JB #6 BR. D	3+677	900x1200	245.18	244.04 (W) 525 CONC	244.06 (E) 525 CONC 244.37 (N) 250 CONC
CB #7 c/w Berm	3+745	900x1200	246.00	244.55 (W) 525 CONC	244.79 (E) 510 STL
CB #8 c/w Berm	3+772	900x1200	246.13	244.99 (W) 510 STL	245.01 (N) 400 CONC
CB #9 c/w Berm	4+033	600x600	248.12	246.83 (S) 400 CONC	246.90 (N) 200 CSP

CB #10 BR. D	0+225	600x600	247.76	246.30 (S) 250 CONC	246.31 (N) 300 HDPE
CB #11 BR. D	0+240	600x600	247.85	246.37 (S) 300 HDPE	246.51 (N) 150 CONC

The catch basins shall be square precast concrete structures as noted above and shall have a birdcage type grate. The catch basins shall be flat top. The catch basins shall be located as identified on the Plans. When specified the catch basins shall have a berm constructed on the downstream end. The top of the berm shall be 0.60m above the inlet elevation. The berm shall have a 2:1 front slope and 5:1 back slope with a 1m wide top. The height and back slopes can be increased under the direction of the Drainage Superintendent in order to reduce erosion and facilitate farming. Care shall be taken to ensure this does not negatively impact upstream lands.

The berm at CB#1 shall be constructed as per the CB/Berm Detail with concrete blocks. The remaining catchbasins shall be constructed as an Earth CB/Berm. All berms shall be constructed as per Drawing 11 of 11. Excess materials on site shall be used. If more material is required it shall be supplied at the expense of the drainage works.

The catch basins shall be made with the top sections separate from the base sections in order to allow riser sections to be installed or removed as necessary (i.e. the base section shall not extend for more than 150mm above the top of the highest opening in the base section). The wall thickness of all structures shall be 115mm and each shall have a 300mm sump. Birdcage grates shall be manufactured with a bar spacing no larger than 50mm.

The catch basins shall be set at the final elevations as directed by the Drainage Superintendent or Engineer Designate. The catch basins shall be set on a layer of drainage stone. The drainage stone shall be extended up to the spring line of the inlet and outlet pipe connections.

The tile at the connection to the catch basins shall be concreted on both the inside and outside prior to backfilling. Any pipe or tile shall not protrude more than 50mm inside the wall.

As part of this item the Contractor shall grade the area in the vicinity of the basin to ensure proper drainage as directed by the Engineer or Drainage Superintendent. Rip rap shall be installed around the basins. The rip rap shall be 150mmx300mm c/w filter fabric. The area to receive the rip rap shall first be graded to allow the placement of the rip rap to a depth of 400mm below finished grade. After grading, a layer of filter fabric (Mirafi P150 or approved equal) is to be placed with any joints overlapped a minimum of

600mm. Rip rap shall then be placed with the smaller pieces placed in the gaps and voids to give it a uniform appearance

The Drainage Superintendent or Engineer Designate may change a birdcage type grate on a catch basin to a concrete lid or sloped birdcage grate at the request of a Landowner.

The junction boxes shall be made with the top sections separate from the base sections in order to allow the height to be adjusted to ensure a minimum of 450mm cover. The wall thickness of all structures shall be 115mm and each shall have a 300mm sump. Junction boxes shall have a flat concrete lid. Filter fabric shall be placed over the junction box opening before the lid is installed.

17. Subsurface Drainage

All existing subsurface drains encountered during construction of the tile drain shall be connected to the proposed tile drain unless otherwise noted on the drawings or as directed by the Drainage Superintendent. The downstream end shall be plugged to the satisfaction of the Drainage Superintendent.

For 100mm and 150mm subsurface drains, the upstream end of the subsurface drain shall be connected to the tile drain at a 45-degree angle. A suitable length of equivalent sized PE agricultural tubing shall be used to connect the drains. Manufactured fittings shall connect the PE tile to the existing drain and to the concrete tile. The connections shall be carefully backfilled to ensure there is adequate support under the pipe and large clumps of clay do not displace the tile. It is recommended that clear stone be used under the connections at the tile drain.

All existing subsurface drains encountered during construction of the open drain shall be extended to the open channel using PE agricultural tubing, contain a rodent grate and rip rap shall be installed under the tile to the bottom of the channel.

18. Road Crossings

The existing culverts and catch basins, where specified, shall be removed in their entirety. The culvert and the concrete rubble shall be disposed offsite at the expense of the Contractor. Suitable backfill shall be stockpiled adjacent to the site for reuse during installation of the proposed culvert. Any broken concrete or rip rap (concrete bags) from the existing structures shall be disposed offsite at the expense of the Contractor.
Where High Density Polyethylene Pipe is specified, the Contractor shall supply, install, and backfill the HPDE smooth wall gasketed pipe with bell and spigot joints (320 KPa) or approved equivalent under road crossings. Future culvert replacements shall be to the same specifications.

The proposed culverts shall be installed in the same general location as the existing culverts, unless otherwise stated on the drawings or in the specification. The location of the culvert may be moved a short distance if approved by the Engineer or Drainage Superintendent.

KERWOOD ROAD

The new crossing location shall be south of the existing main tile drain in the location of the 450mm diameter HDPE road crossing. The existing 450mm pipe shall be remain in place.

The Contractor shall supply and install approximately 25 metres of 510 mm diameter steel pipe casing by boring and jacking to the depths and grades as shown on the profile under the 450mm road pipe in accordance with the accompanying details. The steel casing shall be schedule 40 and have a minimum wall thickness of 6.35 mm. Cathodic protection is not required.

The existing 375mm dia. tile shall be located prior to installing the new road crossing pipe. It shall be cut, capped and filled with flowable grout (K-Crete or approved equivalent) for the full length under Kerwood Road.

CB #7 and #8 shall be installed on the 510mm diameter steel pipe in line with the 450mm HDPE pipe as per the catchbasin specification above.

The rip rap end walls shall consist of 150mm x 300mm quarry stone or approved equal shall be installed on the existing 450mm HDPE pipe and extend to each catchbasin and around the catchbasin. The area to receive the rip rap shall be graded to a depth of 400mm below finished grade. Filter fabric (Mirafi P150 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. The rip rap shall be extended to include around the 450mm pipe as directed by the Engineer or Drainage Superintendent.

It is the Contractors responsibility to locate and expose any utilities prior to the installation of any tile. If there is a conflict with the tile elevation the Contractor is required to notify the Engineer.

The ditches shall be graded to ensure the surface water is collected to the catch basins and culverts on all road crossings. Any existing tiles shall be connected to the respective catchbasin.

MULIFARRY DRIVE (BRANCH 'D')

The new crossing location shall be just east of the existing 200mm diameter tile drain for Branch D.

The Contractor shall supply and install approximately 15 metres of 300 mm diameter steel pipe casing by boring and jacking to the depths and grades as shown on the profile in accordance with the accompanying details. The steel casing shall be schedule 40 and have a minimum wall thickness of 6.35 mm. Cathodic protection is not required.

The existing 200mm dia. tile shall be located prior to installing the new road crossing pipe. It shall be cut, capped and filled with flowable grout (K-Crete or approved equivalent) for the full length under Mulifarry Drive.

CB #10 and #11 shall be installed on the 300mm diameter steel pipe. The existing 150mm diameter tile on the north side of Mulifarry Drive shall be connected to CB #11. Any existing tiles found shall be connected to the respective catchbasin.

It is the Contractors responsibility to locate and expose any utilities prior to the installation of any tile. If there is a conflict with the tile elevation the Contractor is required to notify the Engineer.

19. Seeding/Restoration

All areas disturbed by construction as directed by the Engineer of Drainage Superintendent shall be returned to their pre-constructions state. Within the road right of way all areas where disturbed by construction, shall be topped with 100mm of screened topsoil and hand seeded on a daily basis or hydroseeded immediately following construction in accordance with the seed mixture, fertilizer and application rate as shown below. Spreading of the seed shall be by use of a mechanical spreader.

Through the open drain section, the reshaped drain banks shall be hand seeded daily as they are being reshaped and covered with double straw erosion control blanket secured to the banks with steel staples as per manufactured specifications.

No seeding required over the new tile drain section.

If the hand seed or hydroseed has not germinated, at the discretion of the Engineer or Drainage Superintendent, prior to the one-year maintenance period, 100mm of topsoil shall be placed and hydroseeded in accordance with the seed mixture, fertilizer and application rate as shown below.

Seed mixture, fertilizer and application rates are as follows:

- Hydraulic mulch (2,999 kg/ha.) type “B” and water (52,700 litres/ha.) in accordance with OPSS 572 (hydroseed).

The above seed mixture shall apply unless otherwise approved by the Drainage Superintendent or Engineer.

20. Buffer Strip

A grassed buffer strip shall be incorporated on both sides of the drain along the drainage works. The buffer strip shall extend 1.0 meter measured from the top of bank. The seed mixture shall be as specified in the Seeding/Restoration specification.

Buffers shall be installed as follows:

1. Station 0+000 to 0+146 both the north and south banks
2. Station 0+146 to 0+369 north side only
3. Station 0+369 to 0+843 west bank only
4. Station 0+843 to 1+174 south bank only
5. Station 1+174 to 1+632 both west and east banks

There is an existing grass buffer strip between Station 0+369 to 0+843 on the east side that will be incorporated to the drainage works and shall remain. No seed will be required at this location. There is a bush along the north side of the drain from Station 0+843 to 1+174, therefore no seeding is required at this location. If in the future the bus is cleared a buffer strip shall be installed at the expense of the drainage works.

21. Outlet Works

The outlet works for the drain shall consist of 6m of 900mm diameter HDPE pipe c/w a manufactured rodent rotating grate. It shall be installed at the outlet to the open channel.

An outlet structure to diffuse the energy of the water from the closed drain shall be constructed as per the attached drawings. It shall consist of two 600 mm x 600 mm x 1200 mm and two 600 mm x 600 mm x 2400 mm concrete blocks placed over filter fabric (Mirafi P150 or approved equal).

Erosion protection made up of rip rap and filter fabric shall be installed on the channel side slope from the bottom of the channel to the top of the bank and for a distance of 1m on either side of the outlet. Rip rap shall be made up of 150mm to 300mm quarry stone or approved equal. The area to receive the rip rap shall first be graded to allow the placement of the rip rap to a depth of 400mm below finished grade. After grading, a layer of filter fabric (Mirafi P150 or approved equal) is to be placed with any joints overlapped a minimum of 600mm. Rip rap shall then be placed with the smaller pieces placed in the gaps and voids to give it a uniform appearance.

Any additional erosion protection required along the length of the drainage works shall follow this specification.

22. 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.
- Material shall not be in areas regulated by the Conservation Authority or Ministry of Natural Resources.
- All granular and erosion control materials shall be stockpiled a minimum of 3.0m 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.

23. Silt Fence

Light duty silt fencing shall be installed down-gradient of the work for the duration of construction.

The light duty silt fencing shall be supplied and installed in accordance with OPSS 577 and OPSD 219.110. The light duty silt fencing shall be removed once the disturbed area has been re-vegetated.

LOT 3 LOT 4 LOT 5 LOT 6 LOT 7 LOT 8

CONC. 2 SER

CONC. 3 SER

CONC. 4 SER

CONC. 5 SER

PROVINCIAL HIGHWAY 402

HOUBEN DRAIN

HOUBEN DRAIN BRANCH 5

HOUBEN DRAIN BRANCH 2

HOUBEN DRAIN BRANCH 3

HOUBEN DRAIN BRANCH 4

HOUBEN DRAIN BRANCH 6

SULLIVAN ROAD

STEVENSON DRAIN BRANCH

KERWOOD ROAD

SULLIVAN DRAIN EXTENSION

MORGAN DRAIN BRANCH 'A'

MULIFARRY DRIVE

JARRIOTT – TYLER DRAIN

SULLIVAN DRAIN

MORGAN–EARLEY DRAIN

OTTEN DRAINAGE WORKS BRANCH 'B'

OTTEN DRAINAGE WORKS BRANCH 'A'

NAPPERTON DRIVE

HARRIS DRAIN

GALBRAITH–MATTHEWS DRAIN

GEORGE DRAIN

JOHNSON DRAIN

JOHNSON DRAIN BRANCH 'A'

RICHARDSON – EARLEY DRAIN

30–028 FEDDEMA FAMILY FARMS LTD. 4.45 Ha

30–027 B. & M. MILLER 7.41 Ha

30–026 B. & M. MILLER 5.13 Ha

30–024 M. BERTENS & A. McGINNIS 0.40 Ha

30–025 BERTENS DAIRY FARMS INC. 2.03 Ha

30–023 W. BARCLAY 0.10 Ha

30–023–01 W. & A. BARCLAY 0.30 Ha

30–053 J. & J. FEDDEMA 1.21 Ha

2.43 Ha

10.53 Ha

2.78 Ha

30–055–10 L. EARLEY 0.40 Ha

30–050 FEDDEMA FAMILY FARMS LTD. 33.59 Ha

30–051 J. & J. HOLSTEINS LTD. 35.20 Ha

30–052 SIM FARMS LTD. 63.53 Ha

30–054 T. & A. VAN AERT 17.83 Ha

30–055 L. & A. VAN AERT 13.74 Ha

30–056 S. & L. KERNOHAN 10.52 Ha

30–049 P. & J. JANSEN 11.73 Ha

4.80 Ha BUSH

2.30 Ha BUSH

30–112 M. & W. MATTHEWS 5.66 Ha

30–113 J. & E. JANSEN 4.36 Ha

7.40 Ha BUSH

30–111 P. THOMA 22.26 Ha

30–110 SELDOM REST FAMILY FARMS LTD. 11.73 Ha

30–113–01 W. MURPHY 0.50 Ha

PROP CB#11 0+240

PROP CB#10 0+225

PROP CB#9 4+033

PROP CB#8 3+772

PROP CB#7 3+745

PROP JB#6 3+677

PROP CB#5 2+694

PROP CB#4 2+314

PROP JB#3 2+284

PROP CB#2 1+984

PROP CB#1 1+680

BM#1 BM#2 BM#3 BM#4 BM#5 BM#6 BM#7 BM#8

TILE OUTLET 1+632

0+000 0+146 0+369 0+843 1+174 1+334

250ø 400ø 525ø 525ø 675ø 750ø 900ø

'A' 'B' 'C' 'D' 'E' 'F' 'G' 'H' 'J'

'1' '2' '3'

LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
NOV. 04/25
PROVINCE OF ONTARIO

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT
ONTARIO
DAVID MOORES
Nº 920778

LEGEND

- DRAINAGE AREA
- RICHARDSON EARLEY DRAIN
- MUNICIPAL DRAIN
- ① CULVERT LOCATION
- PROPOSED CULVERT REPLACEMENT
- PROPOSED CB OR JB
- EXISTING CULVERT

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

DRAWING NAME: Richardson Earley Drain Plan

PROJECT No. 2023–1588

APPROVED	NO.	REVISIONS	DATE	BY
J. WARNER				
CHECKED D. MOORES	1	FINAL REPORT	NOV. 04, 2025	CS
DRAWN C. SAUNDERS				

SCALE: 1:15,000
0 400m

TOWNSHIP of ADELAIDE - METCALFE

RICHARDSON - EARLEY DRAIN PLAN

1 OF 11

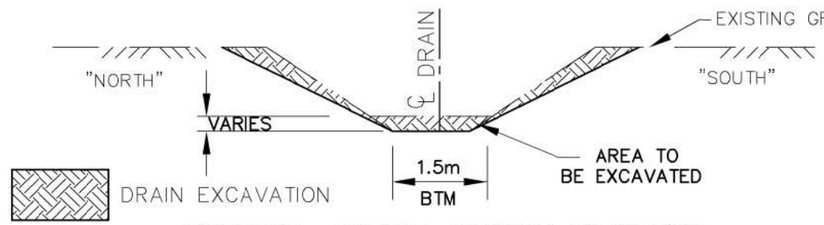
Last Updated: October 7, 2025

GENERAL NOTES

1. BENCHMARK No.1 ELEV. 229.02
   TOP WEST END OF EXISTING 1500ø CSP
   STATION 0+146
   BENCHMARK No.2 ELEV. 229.62
   TOP WEST END OF EXISTING 1500ø CSP
   STATION 0+365
2. UPPER NUMBERS ARE DEPTH FROM EXISTING GROUND TO PROPOSED TILE INVERT
3. LOWER NUMBERS ARE THE DEPTH OF MATERIAL TO BE REMOVED TO PROP. CHANNEL BOTTOM

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT
ONTARIO
DAVID MOORES
Nº 920778

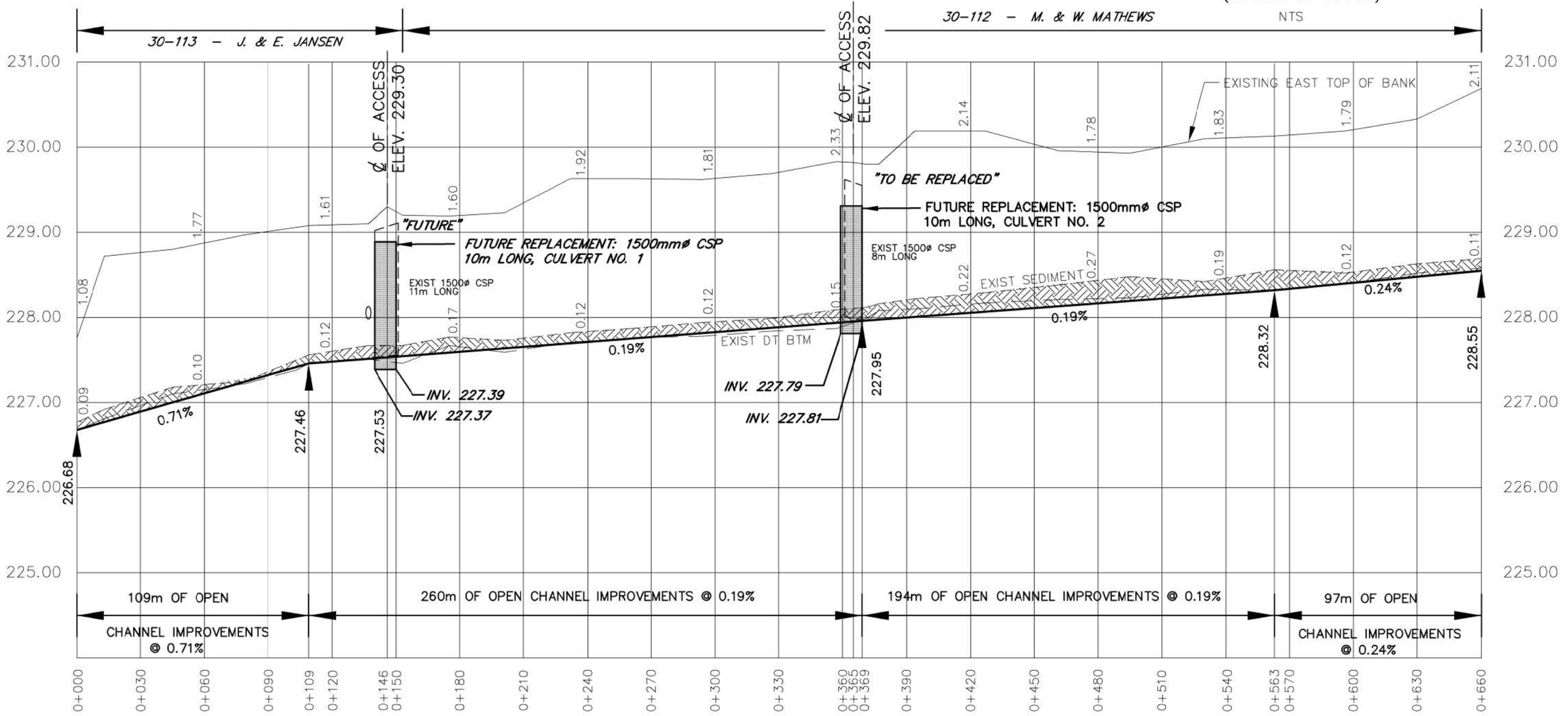
LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
NOV. 04/25
PROVINCE OF ONTARIO



TYPICAL DRAIN CROSS SECTION

(0+000 TO 0+146)

NTS



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

DRAWING NAME: Richardson Earley Drain Profile 1

PROJECT No. 2024–1588

APPROVED	NO.	REVISIONS	DATE	BY
J. WARNER				
CHECKED	1	FINAL REPORT	NOV. 04, 2025	CS
D. MOORES				
DRAWN				
C. SAUNDERS				

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

TOWNSHIP of ADELAIDE - METCALFE

RICHARDSON - EARLEY DRAIN
PROFILE

Last Updated: October 7, 2025

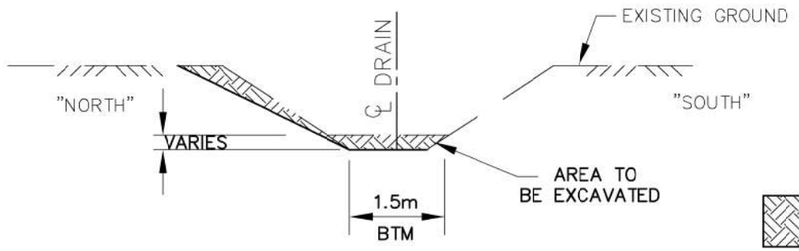
GENERAL NOTES

1. BENCHMARK No.3 ELEV. 230.64
   TOP WEST END OF EXISTING 1350ø CSP
   STATION 0+854

   BENCHMARK No.4 ELEV. 230.60
   TOP OF 200ø CSP FROM EAST
   STATION 1+249

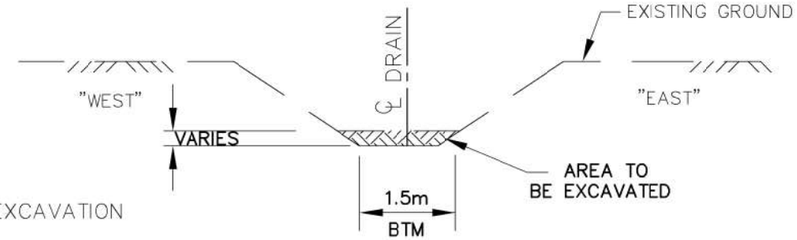
2. UPPER NUMBERS ARE DEPTH FROM TOP OF BANK TO PROPOSED CHANNEL BOTTOM.

3. LOWER NUMBERS ARE DEPTH OF MATERIAL TO BE REMOVED TO PROPOSED CHANNEL BOTTOM

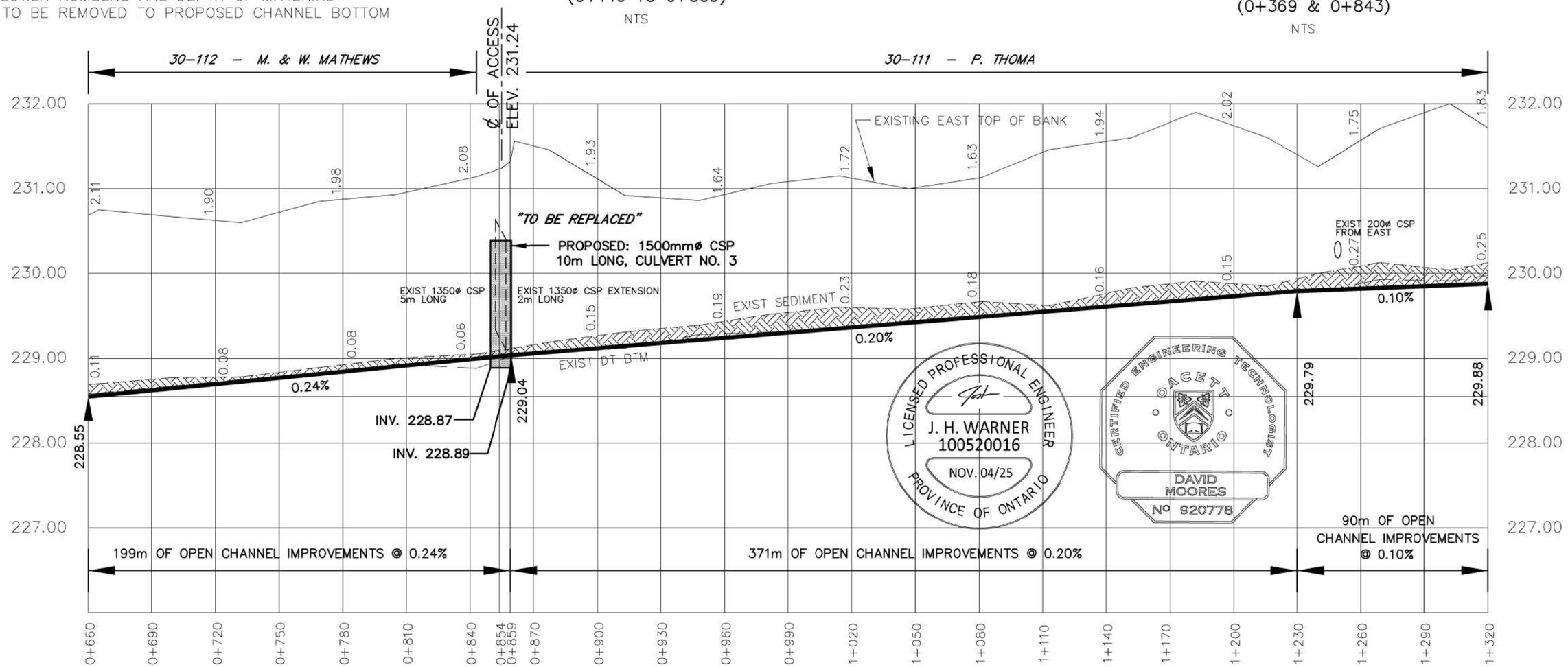


TYPICAL DRAIN CROSS SECTION
(0+146 TO 0+369)
NTS

DRAIN EXCAVATION



TYPICAL DRAIN CROSS SECTION
(0+369 & 0+843)
NTS



LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
NOV. 04/25
PROVINCE OF ONTARIO

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT
ONTARIO
DAVID MOORES
No 920778

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

DRAWING NAME: Richardson Earley Drain Profile 2

PROJECT No. 2024–1588

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

NO.	REVISIONS	DATE	BY
1	FINAL REPORT	NOV. 04, 2025	CS

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

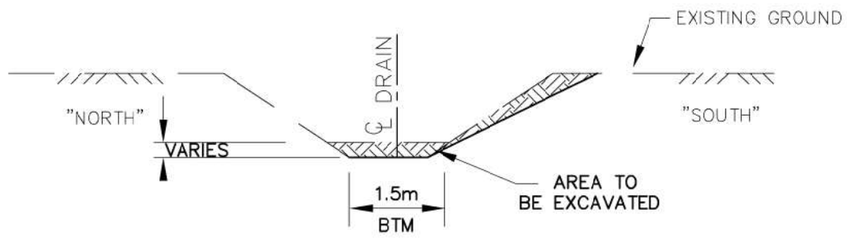
TOWNSHIP of ADELAIDE - METCALFE

RICHARDSON - EARLEY DRAIN
PROFILE

Last Updated: October 7, 2025

GENERAL NOTES

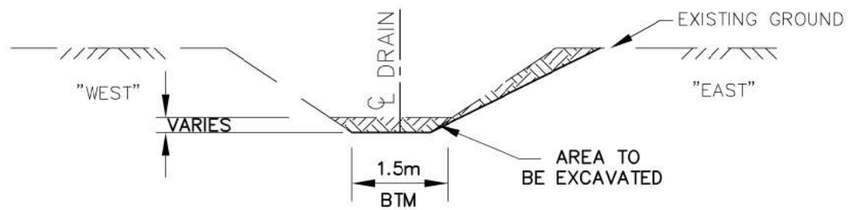
1. BENCHMARK No.5 ELEV. 231.53
   TOP WEST END OF EXISTING 650ø HDPE
   STATION 1+362
2. UPPER NUMBERS ARE DEPTH FROM EXISTING GROUND TO PROPOSED TILE INVERT AND TOP OF BANK TO THE PROPOSED CHANNEL BOTTOM.
3. LOWER NUMBERS ARE DEPTH OF MATERIAL TO BE REMOVED TO PROPOSED CHANNEL BOTTOM



TYPICAL DRAIN CROSS SECTION

(0+843 TO 1+174)

NTS

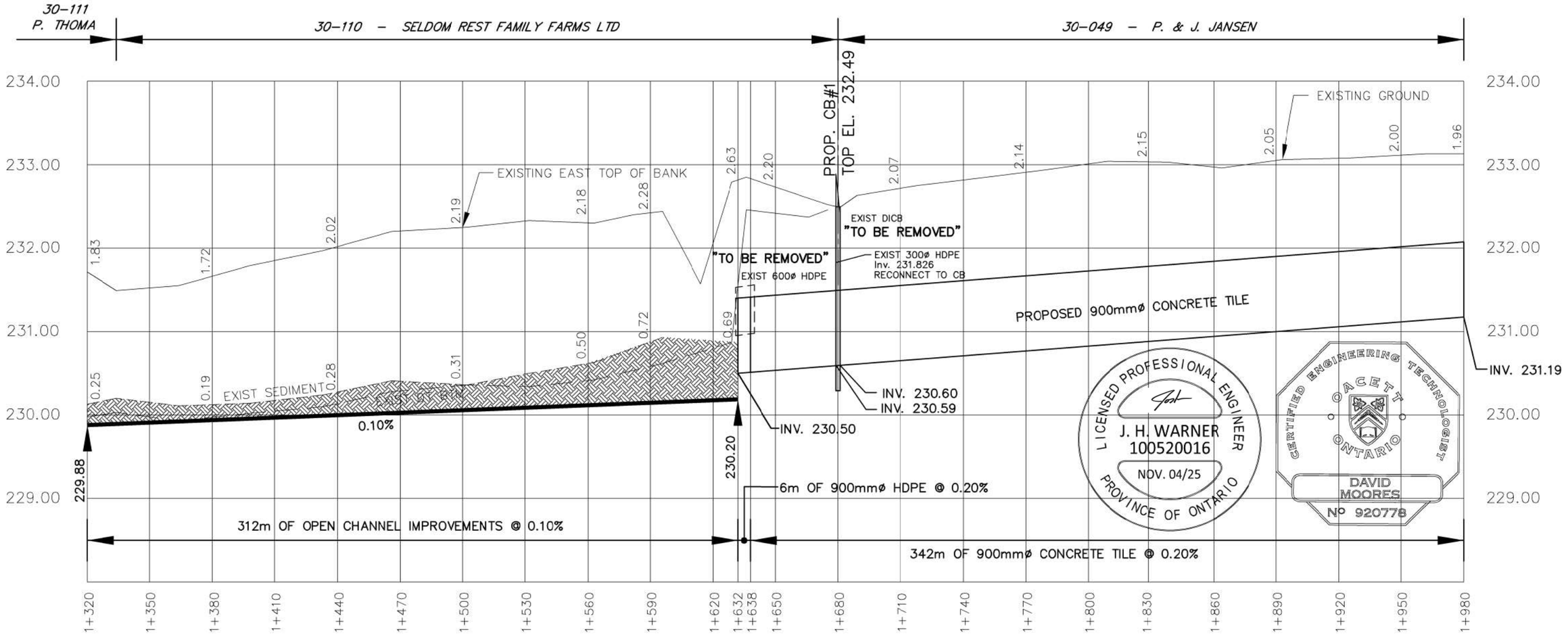


TYPICAL DRAIN CROSS SECTION

(1+174 TO 1+632)

NTS

DRAIN EXCAVATION



LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
NOV. 04/25
PROVINCE OF ONTARIO

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT
ONTARIO
DAVID MOORES
Nº 920778

Dobbin Engineering Inc.

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

DRAWING NAME: Richardson Earley Drain Profile 3

PROJECT No. 2024–1588

APPROVED	NO.	REVISIONS	DATE	BY
J. WARNER				
CHECKED	1	FINAL REPORT	NOV. 04, 2025	CS
D. MOORES				
DRAWN				
C. SAUNDERS				

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

TOWNSHIP of ADELAIDE - METCALFE

RICHARDSON - EARLEY DRAIN
PROFILE

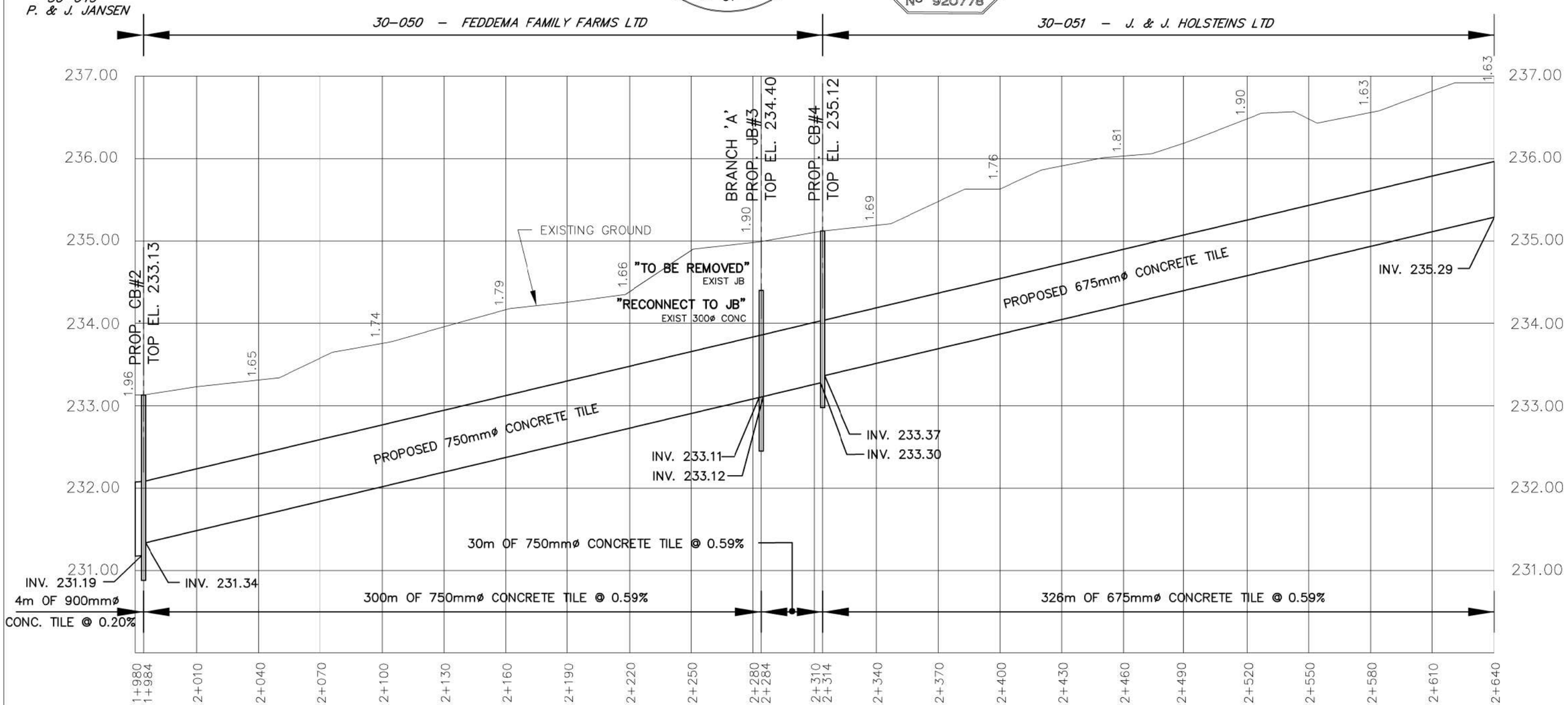
Last Updated: October 7, 2025

GENERAL NOTES

1. BENCHMARK No.5 ELEV. 231.53
   TOP WEST END OF EXISTING 600ø HDPE
   STATION 1+362
2. UPPER NUMBERS ARE DEPTH FROM EXISTING GROUND TO PROPOSED TILE INVERT

LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
NOV. 04/25
PROVINCE OF ONTARIO

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT
ONTARIO
DAVID MOORES
Nº 920778



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

DRAWING NAME: Richardson Earley Drain Profile 4
PROJECT No. 2024-1588

APPROVED	NO.	REVISIONS	DATE	BY
J. WARNER				
CHECKED	1	FINAL REPORT	NOV. 04, 2025	CS
D. MOORES				
DRAWN	SCALE: 1:2,000			
C. SAUNDERS	0 20 40 60m			

TOWNSHIP of ADELAIDE - METCALFE

RICHARDSON - EARLEY DRAIN

PROFILE

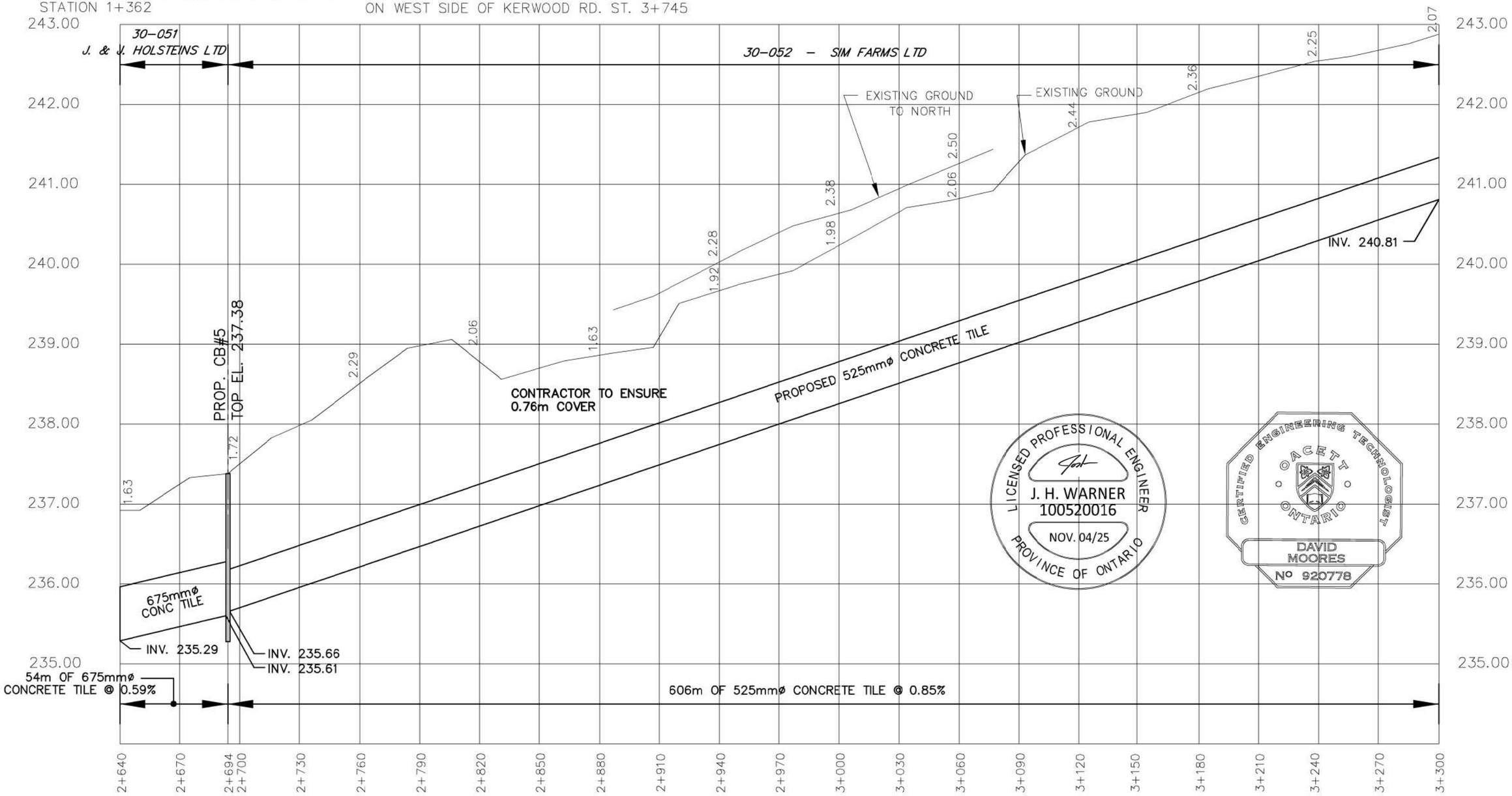
Last Updated: October 7, 2025

GENERAL NOTES

1. BENCHMARK No.5 ELEV. 231.53
TOP WEST END OF EXISTING 600ø HDPE
STATION 1+362

BENCHMARK No.6 ELEV. 230.60
TOP OF INLET OF EXISTING DICB
ON WEST SIDE OF KERWOOD RD. ST. 3+745

2. UPPER NUMBERS ARE DEPTH FROM EXISTING GROUND TO PROPOSED TILE INVERT



LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
NOV. 04/25
PROVINCE OF ONTARIO

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT
ONTARIO
DAVID MOORES
No 920778

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

DRAWING NAME: Richardson Earley Drain Profile 5
PROJECT No. 2024-1588

APPROVED	NO.	REVISIONS	DATE	BY
J. WARNER				
CHECKED	1	FINAL REPORT	NOV. 04, 2025	CS
D. MOORES				
DRAWN	SCALE: 1:2,000			
C. SAUNDERS	0 20 40 60m			

TOWNSHIP of ADELAIDE - METCALFE

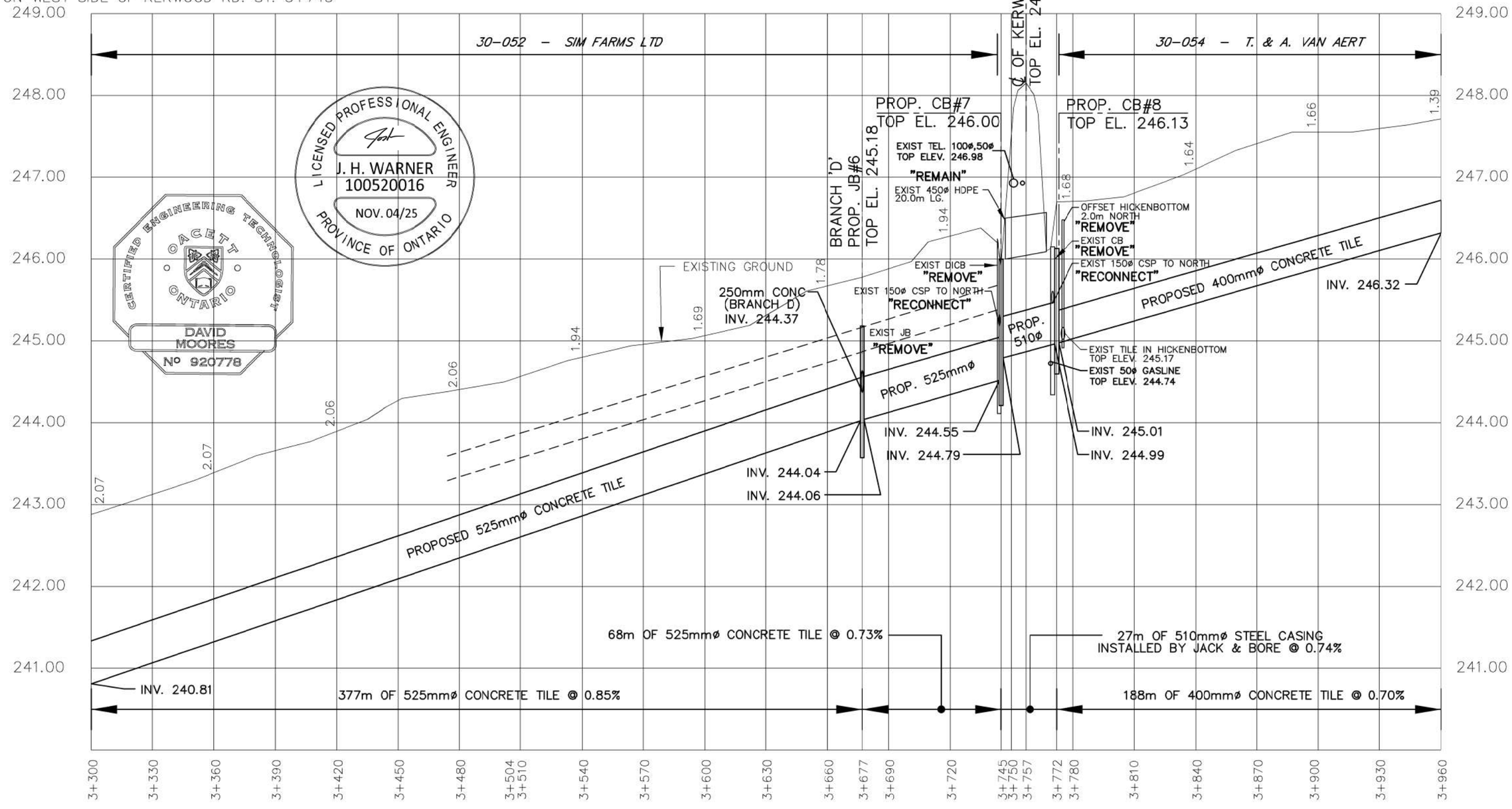
RICHARDSON - EARLEY DRAIN
PROFILE

Last Updated: October 7, 2025

GENERAL NOTES

1. BENCHMARK No.6 ELEV. 245.93
   TOP OF INLET OF EXISTING DICB
   ON WEST SIDE OF KERWOOD RD. ST. 3+745

2. UPPER NUMBERS ARE DEPTH FROM EXISTING GROUND TO PROPOSED TILE INVERT



LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
NOV. 04/25
PROVINCE OF ONTARIO

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT
ONTARIO
DAVID MOORES
Nº 920778

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

DRAWING NAME: Richardson Earley Drain Profile 6
PROJECT No. 2024-1588

APPROVED	NO.	REVISIONS	DATE	BY
J. WARNER				
CHECKED	1	FINAL REPORT	NOV. 04, 2025	CS
D. MOORES				
DRAWN				
C. SAUNDERS				

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

TOWNSHIP of ADELAIDE - METCALFE

RICHARDSON - EARLEY DRAIN
PROFILE

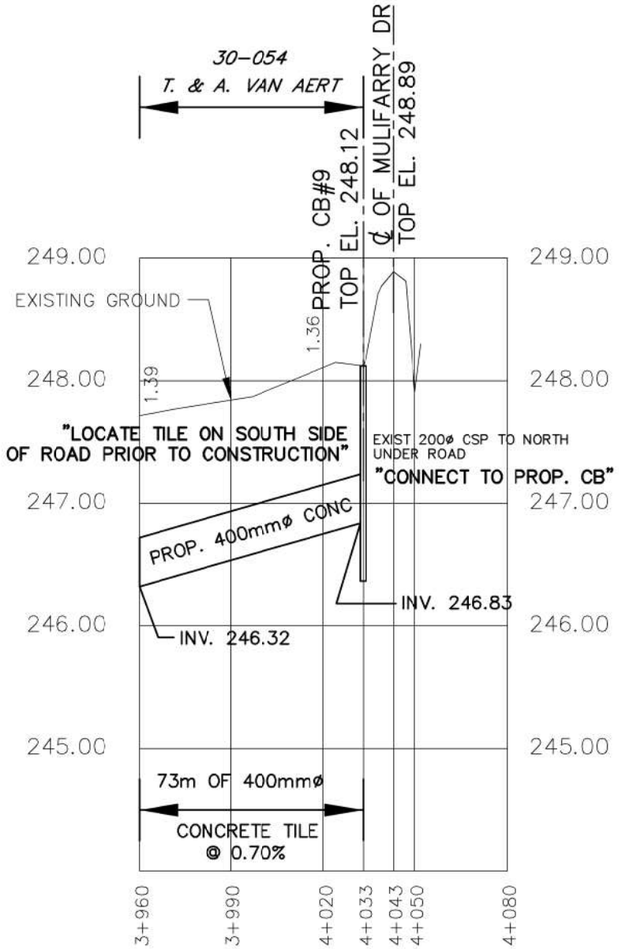
Last Updated: October 7, 2025

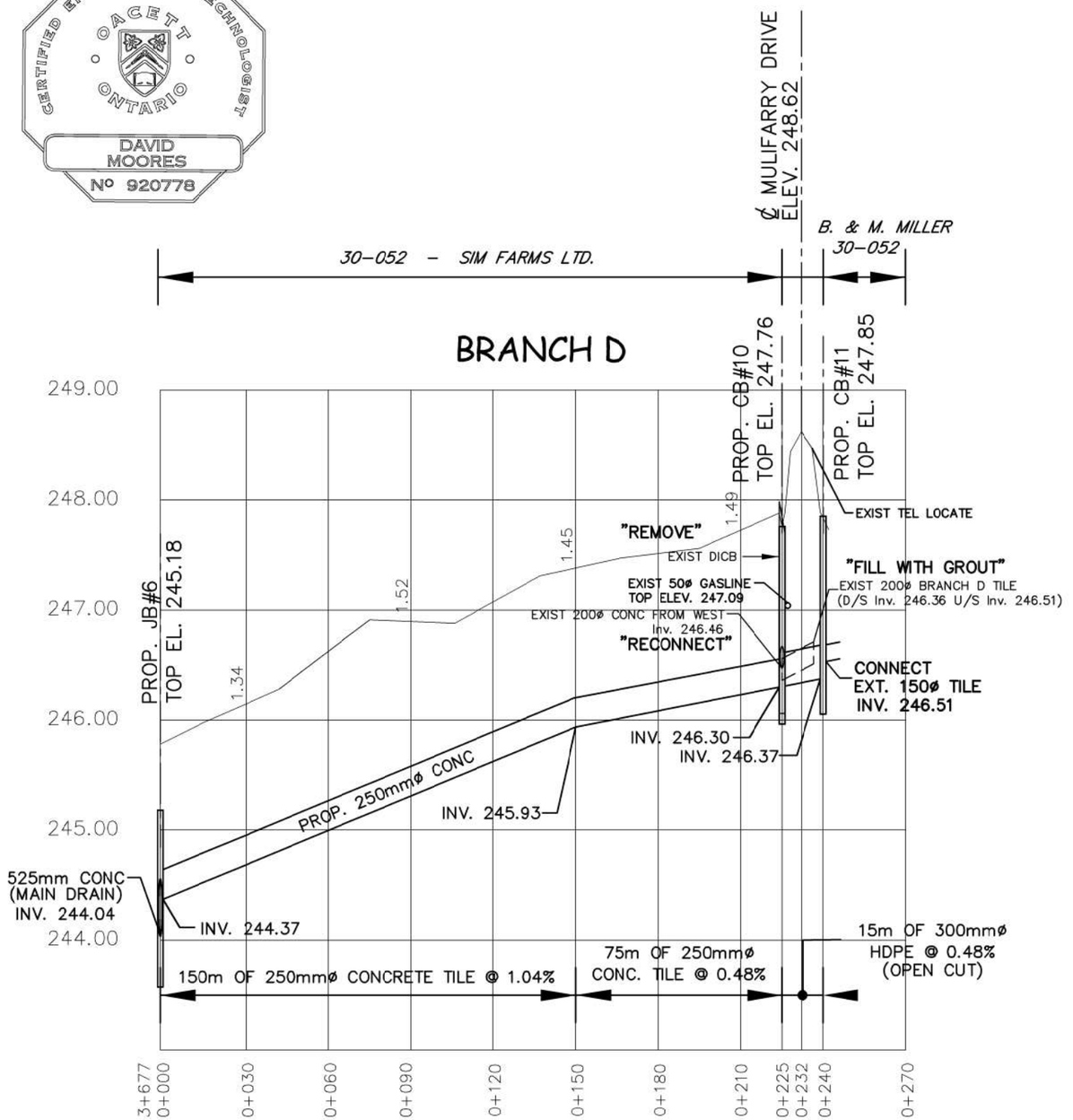
GENERAL NOTES

1. BENCHMARK No.7 ELEV. 247.98 (MAIN DRAIN)
   TOP OF EXISTING CATCHBASIN ON NORTH SIDE OF MULIFARRY RD. ST. 4+050
1. BENCHMARK No.8 ELEV. 247.69 (BRANCH D)
   TOP OF EXISTING INLET ON DITCH INLET CATCHBASIN SOUTH SIDE OF MULIFARRY RD. ST. 0+225
2. UPPER NUMBERS ARE DEPTH FROM EXISTING GROUND TO PROPOSED TILE INVERT

LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
NOV. 04/25
PROVINCE OF ONTARIO

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT
ONTARIO
DAVID MOORES
No 920778





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

DRAWING NAME: Richardson Earley Drain Profile 7
PROJECT No. 2024-1588

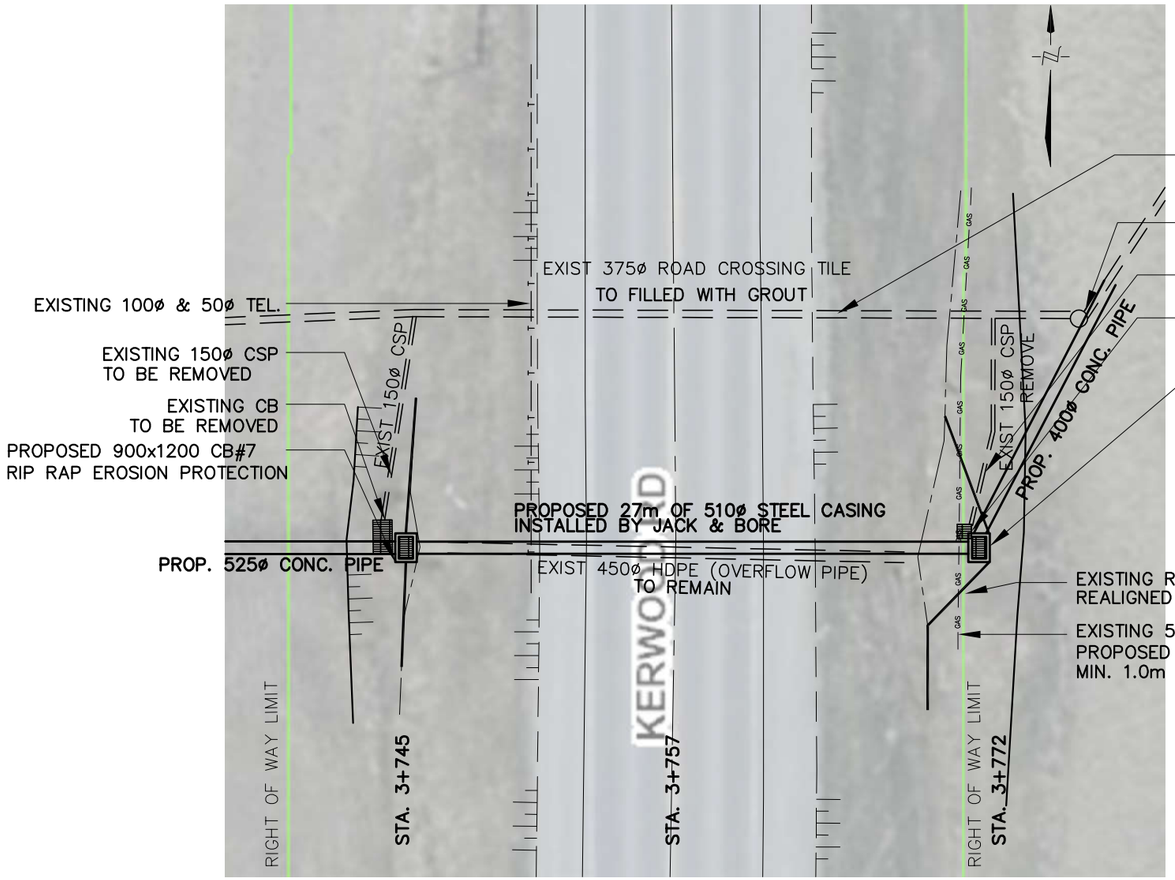
APPROVED	NO.	REVISIONS	DATE	BY
J. WARNER				
CHECKED	1	FINAL REPORT	NOV. 04, 2025	CS
D. MOORES				
DRAWN				
C. SAUNDERS				

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

TOWNSHIP of ADELAIDE - METCALFE

RICHARDSON - EARLEY DRAIN & BRANCH 'D'
PROFILE

Last Updated: October 7, 2025

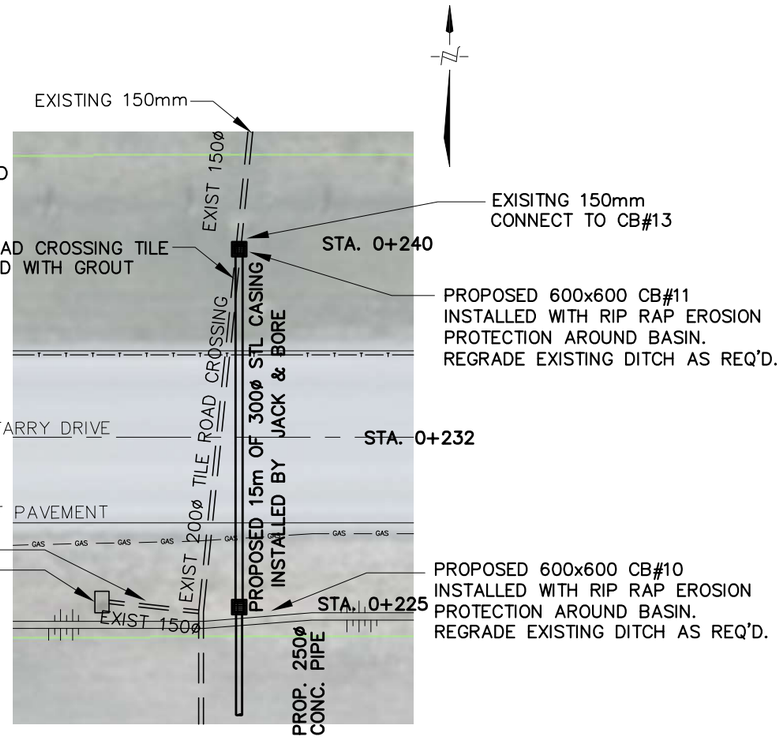


KERWOOD ROAD – ROAD CROSSING PLAN (MAIN DRAIN)

NTS

T T T T EXISTING BURIED TELEPHONE

GAS GAS EXISTING BURIED GAS LINE



MULIFARRY DRIVE – ROAD CROSSING PLAN (BRANCH D)

NTS

LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
NOV. 04/25
PROVINCE OF ONTARIO

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

DRAWING NAME: Richardson Earley Drain Road Crossing Plans

PROJECT No. 2024–1588

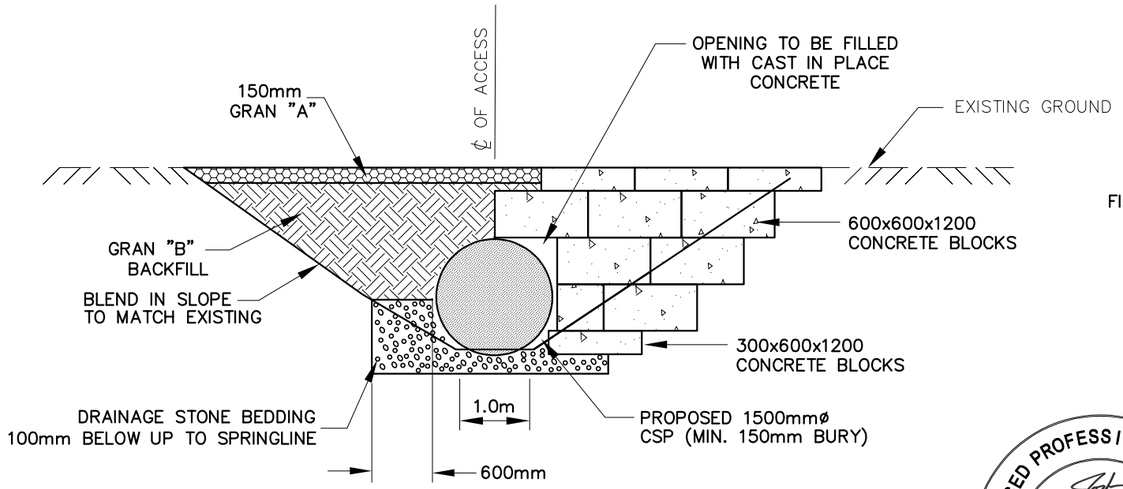
APPROVED	NO.	REVISIONS	DATE	BY
J. WARNER				
CHECKED	1	FINAL REPORT	NOV. 04, 2025	CS
D. MOORES				
DRAWN				
C. SAUNDERS				

SCALE: 1:250
0 2 4 6m

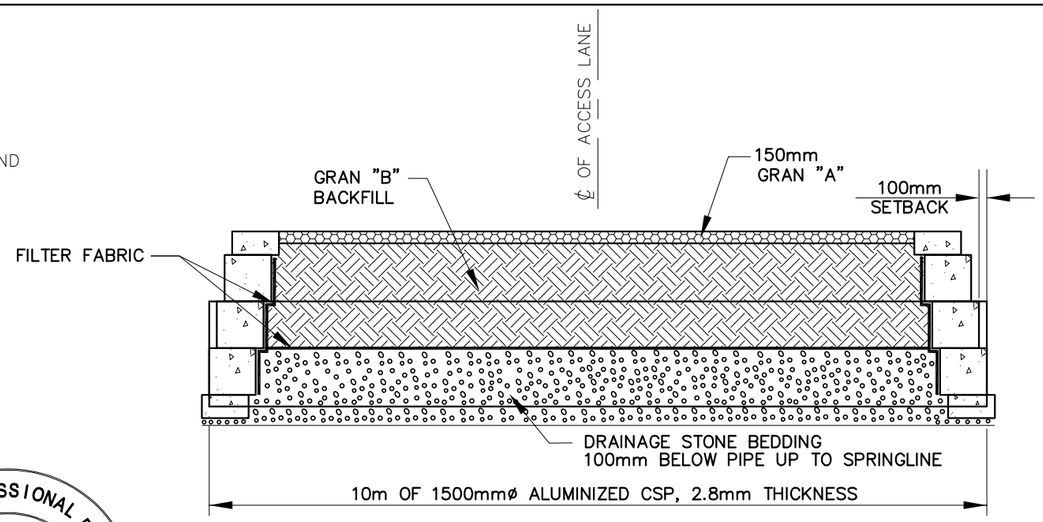
TOWNSHIP of ADELAIDE - METCALFE

RICHARDSON - EARLEY DRAIN ROAD CROSSING PLANS

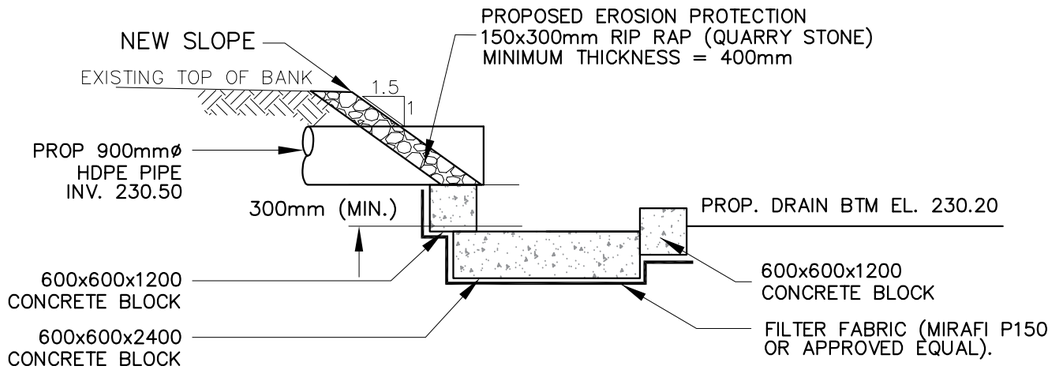
Last Updated: October 7, 2025



PROPOSED PIPE END SECTION



PROPOSED CROSS-SECTION



OUTLET WORKS DETAIL DRAIN

NTS

GENERAL NOTES:

1. CULVERTS No.1, No.2, and No.3 SHALL BE 1500mmø ALUMINIZED CSP 2.8mm THICKNESS.
2. BACKFILL MATERIAL TO BE GRANULAR MATERIAL UNLESS OTHERWISE SPECIFIED.
3. CONCRETE BLOCK ENDWALLS TO MATCH EXISTING GROUND.
4. CONCRETE BLOCKS ARE TO BE SET TO BOTTOM OF PIPE OR EMBEDDED TO ALLOW BLOCKS TO SIT LEVEL WITH THE TOP OF PIPE.
5. FILTER FABRIC TO BE INSTALLED BETWEEN THE DRAINAGE STONE AND GRANULAR B.

LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
NOV. 04/25
PROVINCE OF ONTARIO

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT
ONTARIO
DAVID MOORES
Nº 920778

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

DRAWING NAME: Richardson-Earley Drain Details
PROJECT No. 2023-1588

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

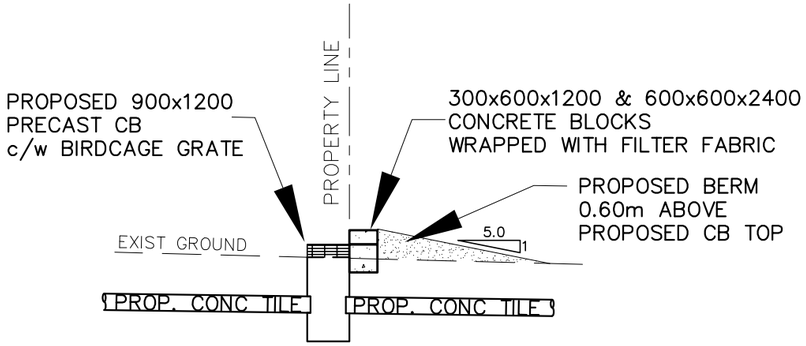
NO.	REVISIONS	DATE	BY
1	FINAL REPORT	NOV. 04, 2025	DM

SCALE 1:75
0 2m

TOWNSHIP of ADELIADE - METCALFE
RICHARDSON - EARLEY DRAIN
DETAILS

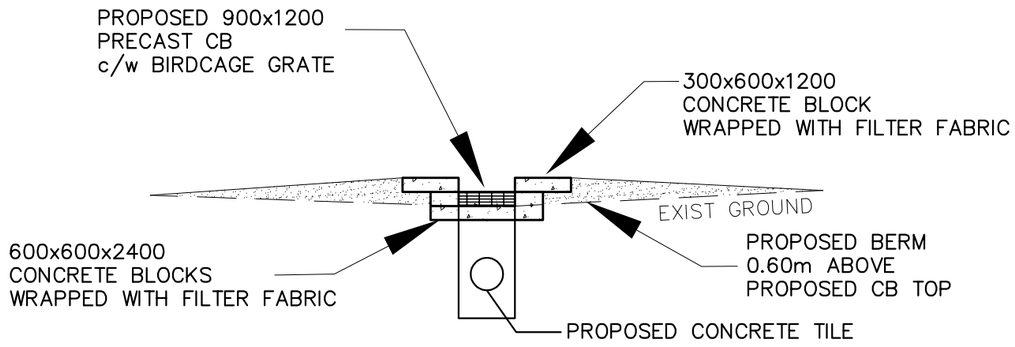
10 OF 11

Last Updated: August 14, 2025



CB/BERM WITH CONCRETE BLOCKS & OVERFLOW DETAIL

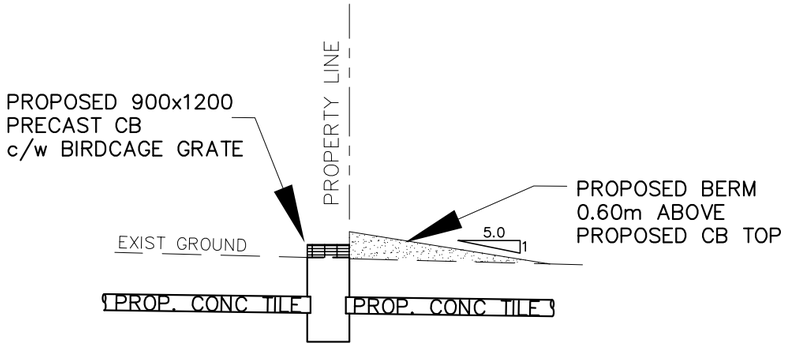
NTS



CB/BERM WITH CONCRETE BLOCKS & OVERFLOW DETAIL

NTS

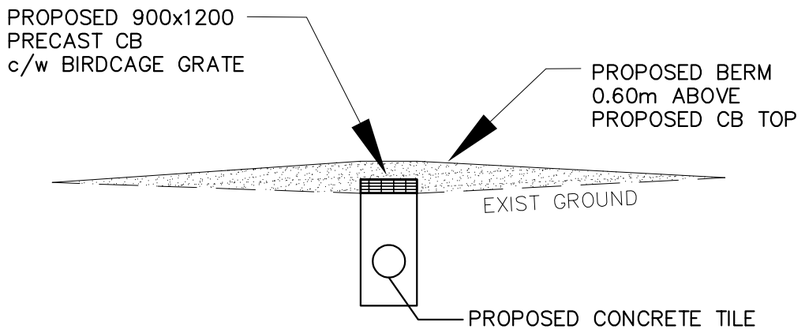
LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
NOV. 04/25
PROVINCE OF ONTARIO



EARTH CB/BERM DETAIL

NTS

CERTIFIED ENGINEERING TECHNOLOGIST
OACETT
ONTARIO
DAVID
MOORES
Nº 920778



EARTH CB/BERM DETAIL

NTS

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

DRAWING NAME:
Richardson-Earley Drain CB/Berm Details

PROJECT No.
2023-1588

APPROVED
R. DOBBIN

CHECKED
C. SAUNDERS

DRAWN
D. MOORES

NO.	REVISIONS	DATE	BY
1	FINAL REPORT	NOV. 04, 2025	DM

SCALE 1:75
0 2m

TOWNSHIP of ADELIADE - METCALFE

RICHARDSON - EARLEY DRAIN
CB/BERM DETAILS

Last Updated: October 7, 2025