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January 6, 2023

The Mayor and Council
Municipality of North Middlesex
229 Parkhill Main Street
Parkhill, ON
N0M 2K0

Gentlemen and Mesdames:

Re: Cameron Drain Branch "E" Improvements and Cameron Drain Branch "A" Maintenance Update

In accordance with your instructions, R. Dobbin Engineering has undertaken an examination of the Cameron Drain Branch "E" with regards to improvements to its existing alignment in Lot 27, Concession 20 ECR in The Municipality of North Middlesex.

Authorization under the Drainage Act

This Engineers Report that has been prepared under Section 78 of the Drainage Act as per a request from affected Landowners.

Under Section 78 of the Drainage Act, Council may undertake and complete the maintenance or repair of any drainage works constructed under a bylaw passed under this Act or its predecessor. Section 78 is to be used where 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 Conditions

The existing Cameron Drain Branch "E" outlets into the Cameron Drain Branch "A" on the south side of Elginfield Road in Lot 27, Concession 20 ECR. The Cameron Drain Branch "E" continues westerly along the south limit of Elginfield as a 6" tile. The 6" tile heads south approximately 187m west of its connection to Branch "A" and continues for 117m.

The last Engineer's Report on the Cameron Drain Branches "A" to "E" is dated January 12, 1961. Under this report, Branches "A" through "E" were constructed.

On-Site Meeting

A site meeting was held on March 22, 2022.

The following were present at the meeting:

- Josh Warner (R. Dobbin Engineering)
- Joanne Sadler (Municipality of North Middlesex)
- Gerda Thirlwall (Landowner)
- Barry Tweedle (Landowner)
- Chuck Daigle (Landowner)
- Robert Nott (Landowner)

The following is a brief summary of the meeting:

- General discussion of the Drainage Act and Landowners rights under the Drainage Act.
- With the notice, Landowners were given a plan with a preliminary drainage area. It was mentioned that should Landowners have any concerns with the drainage area as presented they should bring it up to the engineer. No Landowners expressed any concerns with the drainage area as presented.
- The Landowner of the W ½ of Lot 27, Concession 5 expressed concerns with surface water coming onto his property from across Elginfield Road. The Landowner stated that there is a road culvert under Elginfield near the turn of Branch "E". With minimal provisions for surface water and continued issues with Branch "E" this culvert has been conveying significant amounts of overland flow through his property.
- The Landowner of the Lot 27, Concession 20 ECR expressed concerns with the current location of Branch "E" as tree roots were continuing to plug the tile and it was restricted with the capacity of Branch "A".

- Josh Warner stated that an alternate route for Branch "E" directly to the north looks to be the most viable alternative to alleviating these two concerns.
- The Landowner of the E ½ of Lot 28, Concession 20 ECR expressed concerns with water in front of her house. Josh Warner stated that when we are out there to do the survey, we could meet with her to discuss options, but a petition may be required as there is not currently a drain that provides a direct outlet for that portion of the property.
- No adverse soil conditions were noted at the site meeting.

Discussion

When doing the survey, R. Dobbin Engineering met with the Landowner of the E ½ of Lot 28, Concession 20 ECR. After visual observation and surveying it was discussed with the Landowner that the best route forward would be to request roadside ditch maintenance from the county and that a petition would not be required.

Draft Report

A draft report, dated December 7, 2022, was sent to all the affected Landowners and a meeting was held on January 5, 2023 to go over the report and address any questions and concerns related to the draft report. The following were present at the meeting:

- Josh Warner (R. Dobbin Engineering)
- Joanne Sadler (Municipality of North Middlesex)
- Jaden Hodgins (Municipality of North Middlesex)
- Barry Tweedle (Landowner)
- Chuck Daigle (Landowner)
- Rob Cornelis (Landowner)

The following is a brief summary of the meeting:

- Rob Cornelis requested that the tile on the south side of Elginfield Road extend further south to be outside of the county ROW.
- Landowners requested that construction be completed once crops are off.
- No other concerns were brought forward

Drain Classification

The Thirlwall Award Drain, where Branch "E" is proposed to outlet, is currently classified as a class "C" drain according to the Ontario Ministry of Agriculture, Food and Rural Affairs Mapping.

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 Ausable Bayfield Conservation Authority and the Department of Fisheries and Oceans. Construction cannot commence without necessary approvals.

Design

Designing the tile drain to the current grantable standard of a 38mm/24hrs coefficient results in a 200mm diameter tile drain. R. Dobbin Engineering believes that considering the additional cost to increase the size of the tile to a 250mm diameter tile the larger pipe should be installed. The additional cost to increase the pipe size beyond the grantable coefficient has been assessed as a special benefit to the agricultural properties. This amount shall not be considered for grant.

Tile design criteria includes a minimum tile depth of 760mm.

Recommendations

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

1. The existing Cameron Drain Branch “E” shall be abandoned and will no longer be maintained by the Municipality. A new Cameron Drain Branch “E” shall be installed from the south side of Elginfield Road to the north, outletting into the Thirlwall Award Drain.
2. Due to the diversion of water the assessments for maintenance of the Cameron Drain Branch “A” shall be updated.

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 $65,897, including engineering of the report, attending the Meeting to Consider the Report, attending the Court of Revision, and an estimate for tendering, contract administration and inspection. 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. Items not included in the estimate of cost that are to be assessed under Section 26 shall be assessed with the actual cost plus a portion of the engineering (20% of the construction cost) being assessed to the owner of the road or public utility.

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. 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, 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 daylighting costs and the estimated cost to work around that utility as a special benefit assessment to that utility.

2. Catch Basins have generally been assessed as a benefit assessment with 50% of the estimated cost assessed to the upstream property and 50% assessed to the downstream property.

3. The remaining cost has generally been assessed with approx. 40% of the estimated cost assessed as a benefit assessment and the remainder assessed as outlet assessment to the upstream lands and roads based on equivalent hectares.

All final costs of items included in this report shall be pro-rated based on the Schedule of Assessment.

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 $30,000.00 per hectare. Allowances for crop loss are based on $2,000.00 per hectare for the first year, $1,000.00 for the second year ($3,000.00 per hectare total).

Access and Working Area

Access to the work site for construction and future maintenance shall be from Elginfield Road and along the length of the drainage works. Access shall generally be restricted to a width of 6 metres. 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 shall extend 5m past the top and lower end of the drain to allow for material storage and trucks to turn around.

Restrictions

No trees and shrubs shall be planted nor shall permanent structures be erected within 20m 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.

Special Benefit assessment contained in this report will not be eligible for grant based on the current ADIP Policies.

Existing Private Drainage

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

Maintenance

Catch basins and berms shall be maintained with 50% of the cost to the immediate upstream property and 50% to the immediate downstream property.

Upon completion of the work, the Cameron Drain Branch “E” road crossing, from Station 0+139 to 0+163 shall be maintained and repaired at the expense of the owner of Elginfield Road. Maintenance and repair of the Cameron Drain Branch “E” between Station 0+000 and 0+139 and 0+163 and 0+169 shall be assessed out in the same proportions as contained in the Schedule of Assessment (Branch “E”), less any Special Benefit, in this report. Maintenance and repair of the Cameron Drain Branch “A” shall be assessed out in the same relative proportions as contained in the Schedule of Maintenance (Branch “A”) in this report. Maintenance and repair of the Cameron Drain Branch “B”, “C” and “D” shall be assessed in accordance with the Engineer’s Report dated January 12th, 1961.

The Cameron Drain Branch "E" shall be maintained and repaired as per the specifications and drawings contained in this report. The Cameron Drain Branch "A" to "D" shall be maintained and repaired as per the specifications and drawings contained in the Engineers Report's dated January 12th, 1961.

The additional costs as a result of a road or utility shall be assessed to the owner of the road or utility as per Section 26 of the Drainage Act.

Yours truly,

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

Cameron Drain Branch "E"
Municipality of North Middlesex
January 6, 2023

ALLOWANCES

Allowances have been made as per Sections 29 & 30 of the Drainage Act for Right of Way and damages to lands and crops.

Conc.	Lot or part	Roll No.	Owner	Section 29	Section 30	Total
5 ECR	W 1/2 Lot 27	40-002	C. Daigle & B. Rosser	1,250	830	2,080
20 ECR	Lot 27	10-100	Gerard Cornelis Farms Inc.	-	100	100
			TOTAL ALLOWANCES	1,250	930	2,180

Cameron Drain Branch "E"
Municipality of North Middlesex
January 6, 2023

Estimate of Cost

	Quantity	Unit	Unit Cost	Total Cost
Pre-Construction Meeting	1	LS	300	300
Brushing and Tree Removal	1	LS	500	500
Benchmark Loop	1	LS	200	200
Locate Existing Tile in Property with Roll Number 40-002	1	LS	1,000	1,000
Strip and Place Topsoil (Station 0+000 to 0+139)	139	m	8	1,112
250mmø HDPE Pipe	139	m	60	8,340
Rodent Grate at Outlet	1	LS	300	300
Catchbasin #1 (600mmx600mm) c/w Connections and Berm	1	LS	2,800	2,800
Catchbasin #2 (600mmx600mm) c/w Connections	1	LS	2,500	2,500
6m of 200mmø HDPE Pipe and Connection to Existing Private Tile	1	LS	1,000	1,000
Rip Rap at Outlet	1	LS	1,500	1,500
Connect Existing Tiles to Proposed Drain	5	ea	100	500
Elginfield Road Crossing				
323mmø Steel Casing Installed by Boring and Jacking	24	m	600	14,400
Traffic Control	1	LS	500	500
Restoration and Ditch Grading	1	LS	500	500
Locate and Work Around Watermain	1	LS	1,000	1,500
Locate and Work Around Telecom	1	LS	2,000	2,500
Locate and Work Around Gas Main	1	LS	1,000	1,500
Environmental Considerations	1	LS	500	500
Miscellaneous/Contingency				$2,000

Sub Total	$43,452
Allowances	$2,180
Engineering	$10,070
Estimate for Tendering, Contract Administration and	$4,500
Locate and Survey Utilities	$4,200
ABCA Fee	$400
Total Estimate	**$64,802**
Non-Recoverable HST (1.76%)	$1,095
Total Estimate	**$65,897**

SCHEDULE OF ASSESSMENT (BRANCH "E")

Conc.	Lot or Part	Affected Hect.	Roll No.	Owner	Special Benefit	Benefit	Outlet	Total	Equivalent Ha.
Agricultural Lands									
5 ECR	W 1/2 Lot 27	1.37	40-002	C. Daigle & B. Rosser	556	10,844	1,199	12,599	1.37
	E 1/2 Lot 27		40-001	B. & B. Tweddle		-	-	-	0.00
20 ECR	Lot 27	1.70	10-100	Gerard Cornelis Farms Inc.	350	2,115	5,952	8,417	1.70
	W 1/2 Lot 28		10-099	Gerard Cornelis Farms Inc.		-	-	-	0.00
	E 1/2 Lot 28		10-098	G. Thirlwall		-	-	-	0.00
	Lot 29		10-097	Schlegel Poultry Inc.		-	-	-	0.00
	Lot 30		10-096	Schlegel Poultry Inc.		-	-	-	0.00
					906	12,959	7,151	21,016	
Municipal Lands									
Elginfield Road		0.67	County of Middlesex		21,500	4,405	7,036	32,941	2.01
					21,500	4,405	7,036	32,941	
Utilities									
Watermain			Municipality of North Middlesex (OCWA)		3,180	-	-	3,180	
Telecom			Bell Telecom		5,580	-	-	5,580	
Gas			Enbridge Gas		3,180	-	-	3,180	
					11,940	-	-	11,940	
			Total Utilities		11,940				
			Total Municipal Lands		32,941				
			Total Agricultural Lands		21,016				
			Total Assessment		$65,897				

Cameron Drain Branch "E"
Municipality of North Middlesex
January 6, 2023

ESTIMATED NET ASSESSMENT

Net assessment subject to OMAFRA ADIP Policy and actual construction costs.

Conc.	Roll No.	Owner	BRANCH "E" Assessment	Estimated Allowances	Grant	Total Estimated Net Assessmnet
Agricultural Lands						
5 ECR	40-002	C. Daigle & B. Rosser	12,599	4,014	2,080	6,505
	40-001	B. & B. Tweddle	-			-
20 ECR	10-100	Gerard Cornelis Farms Inc.	8,417	2,689	100	5,628
	10-099	Gerard Cornelis Farms Inc.	-			-
	10-098	G. Thirlwall	-			-
	10-097	Schlegel Poultry Inc.	-			-
	10-096	Schlegel Poultry Inc.	-			-
Municipal Lands						
Elginfield Road		County of Middlesex	32,941			32,941
Utilities						
Watermain		Municipality of North Middlesex (OCWA)	3,180			3,180
Telecom		Bell Telecom	5,580			5,580
Gas		Enbridge Gas	3,180			3,180
		Total	$65,897	$6,703	$2,180	$57,014

Cameron Drain Branch 'A'
Municipality of North Middlesex
January 6, 2023

SCHEDULE OF MAINTENANCE (BRANCH "A")

To maintain Branch "A" of the Cameron Drain

Conc.	Lot or Part	Affected Hect.	Roll No.	Owner	Benefit	Outlet	Total
Agricultural Lands							
5 ECR	E 1/2 Lot 27	1.21	40-001	B. & B. Tweddle	375	-	375
20 ECR	Lot 27	11.25	10-100	Gerard Cornelis Farms Inc.	1,050	130	1,180
	W 1/2 Lot 28	15.38	10-099	Gerard Cornelis Farms Inc.	945	225	1,170
	E 1/2 Lot 28	11.33	10-098	G. Thirlwall	360	225	585
	Lot 29	12.95	10-097	Schlegel Poultry Inc.	75	225	300
	Lot 30	4.05	10-096	Schlegel Poultry Inc.	-	75	75
					2,805	880	3,685
Municipal Lands							
Elginfield Road		1.30	County of Middlesex		660	30	690
					660	30	690
				Total Municipal Lands	690		
				Total Agricultural Lands	3,685		
				Total Assessment	$4,375		

Cameron Drain Branch "E"
Municipality of North Middlesex
January 6, 2023

SPECIFICATION OF WORK

1. Location

The Cameron Drain Branch "E" is located in Lot 27, Concession 5 ECR and 20 ECR in The Municipality of North Middlesex.

2. Scope of Work

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

- Road Crossing via Boring and Jacking
- Supply and installation of HDPE tile
- Supply and installation of catch basins structures

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 Municipality of North Middlesex 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.

6. 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, County of Middlesex and the Municipality of North-Middlesex shall be notified of the pre-construction meeting at least 48 hours prior.

7. 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.

8. 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.

9. Access and Working Area

Access to the work site for construction and future maintenance shall be from Elginfield Road and along the length of the drainage works. Access shall generally be restricted to a width of 6 metres. 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 shall extend 5m past the top and lower end of the drain to allow for material storage and trucks to turn around.

10. Expose Existing Drain

The existing tile drain shall be exposed at the discretion of the Drainage Superintendent or Engineer and Contractor in order to adequately determine the proposed alignment. The proposed tile drain shall generally run up or beside the existing drain. The existing tile drain shall be abandoned by crushing it where it is located. The side the new tile runs on shall be determined by the Drainage Superintendent or Engineer once the existing tile is exposed.

11. Brushing and Tree Removal

All brush, trees, woody vegetation, stumps etc. shall be removed for a width of 10 metres along the tile drain and as required to facilitate construction. They shall be removed in their entirety including stumps. Removal of all brush, trees, woody vegetation, stumps etc. in order to facilitate the excavation of the open channel shall be removed at the discretion of the Drainage Superintendent or Engineer and shall be included as part of this item.

It is recommended that a mechanical grinder attached to an excavator be used for the removal of brush and trees. Any brush and trees too large to grind shall be close cut. 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 direction of the Drainage Superintendent.

12. Strip and Place Topsoil

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.

13. 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.

HDPE shall be CSA Approved smooth wall pipe with bell and spigot joints (320 kPa).

A piece of rubber shall be installed between the tile and the watermain and the Contractor shall ensure that a OCWA representative is on site when the main is crossed.

The trenching and laying of the pipe shall be done by wheel machine, tile plow or excavator. An excavator must be used in areas of soil instability, unless approved by the Engineer. The pipe shall be laid in straight lines or on smooth gradual curves with a minimum radius of 25m. Turns of greater than 11 degrees shall require the use of manufactured bends (HDPE 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 pipe is installed with an excavator, the tile must be installed as per the manufacturer's recommendations **complete with bedding to the spring line**. 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. Final levelling or the removal of excess material shall be the responsibility of the Landowner.

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.

Clear stone shall be placed as bedding for the concrete tile where poor soil conditions are encountered, where existing channels are crossed or as directed by the Drainage Superintendent.

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.

14. Elginfield Road Bore

The Contractor shall supply and install a steel pipe casing by boring and jacking to the depths and grades as shown on the Profile. All work shall be completed in accordance with OPSS 416. The steel casing shall have a thickness of 3/8". Cathodic protection is not required. It is the Contractors responsibility to ensure that the bore or any construction activity does not negatively affect the roadway. Any repairs required will be at the Contractors expense.

The bore is intended to be installed under the existing road culvert.

15. Catch Basins

Structure	Station	Type (mm)	Inlet Elev. (m)	Outlet Pipe Elev. (m)	Inlet Pipe Elev. (m)
CB #1 c/w Berm	0+139	600x600	232.02	232.02 (N) 250	232.08 (S) 323
CB #2	0+163	600x600	233.15	232.20 (N) 323	232.24 (S) 200

The catch basins shall be square precast concrete structures as noted above and shall have a birdcage type grate. The ditch inlet catch basins (DICB) shall have a 2:1 sloped top. The direction in the inlet elevation column denotes the direction the low side of the ditch inlet catch basins shall face. The catch basins shall be located with the backside at the property line and at the locations identified on the Plans. The catch basin elevations shall be 50mm above grade. When specified the catch basins shall have a berm constructed on the downstream property. 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 berms shall be constructed using excess materials on site. 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. The catch basins shall be set on a layer of clear stone. The clear 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.

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

16. 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.

17. Outlet Works

The outlet works for the drain shall consist of a manufactured rodent rotating grate. It shall be installed at the outlet to the open channel.

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 pipe. 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.

18. Seeding/Restoration

The side slopes of the channel, road right of way, grassed waterway and finished lawns, and all areas where disturbed by construction, shall be 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.

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 on the side slopes of the channel, road right of way, grassed waterway and finished lawns, where disturbed by construction, and shall be hydroseeded in accordance with the seed mixture, fertilizer and application rate as shown below.

Seed mixture, fertilizer and application rates are as follows:

- Canada Wild Rye (Elymus Canadensis), Virginia Wild Rye (Elymus virginicus), or Indian grass (Sorghastrum nutans)
- Fertilizer (300 kg/ha.) consisting of 8-32-16.
- 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.

19. 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.

The light duty silt fencing shall be supplied and installed downstream of the proposed work for the duration of construction in accordance with OPSS 577 and OPSD 219.110. The light duty silt fencing shall be removed once construction has been completed.

LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
JAN. 6, 2023
PROVINCE OF ONTARIO

LOT 26 LOT 27 LOT 28 LOT 29

40–001
B. & B. TWEDDLE

40–002
C. DAIGLE &
B. ROSSER
1.37 Ha.

PROPOSED CAMERON DRAIN
BRANCH 'E'

BM #1
0+000

PROP CB#1
0+0139

BM #2
PROP CB#2
0+163
0+169

'E'

QUEEN STREET

THIRLWALL AWARD DRAIN

ELGINFIELD ROAD

VANDAELE MUNICIPAL DRAIN

CON. 5
EAST OF CENTRE ROAD

10–100
GERARD CORNELIS
FARMS Inc.
1.70 Ha.

EXISTING BRANCH 'E'
TO BE ABANDONED

STOKES DRAIN 'B'

STOKES DRAIN 'A'

CAMERON DRAIN

'D'

'C'

'B'

'A'

10–099
GERARD CORNELIS
FARMS INC.

10–098
G. THIRWALL

10–097
SCHLEGEL POULTRY Inc.

10–096
SCHLEGEL POULTRY Inc.

LOT 30

CAMERON–THIRLWALL DRAIN

CON. 20
EAST OF CENTRE ROAD

MCINTYRE DRAIN

CON. 19
ECR

LEGEND

- DRAINAGE AREA
- CAMERON DRAIN BRANCH "E"
- MUNICIPAL DRAIN
- EXISTING CULVERT

R Dobbin Engineering Inc.

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

DRAWING NAME:
Cameron Drain Plan Branch "E"

PROJECT No.
2022–1380

APPROVED	NO.	REVISIONS	DATE	BY
J. WARNER				
CHECKED				
J. WARNER	1	FINAL REPORT	JAN. 6, 2023	CS
DRAWN				
C. SAUNDERS				

SCALE: 1:7500
0 100 200 300m

MUNICIPALITY of NORTH MIDDLESEX

CAMERON DRAIN BRANCH "E"
PLAN

1
OF 2

Last Updated: February 08, 2022

GENERAL NOTES

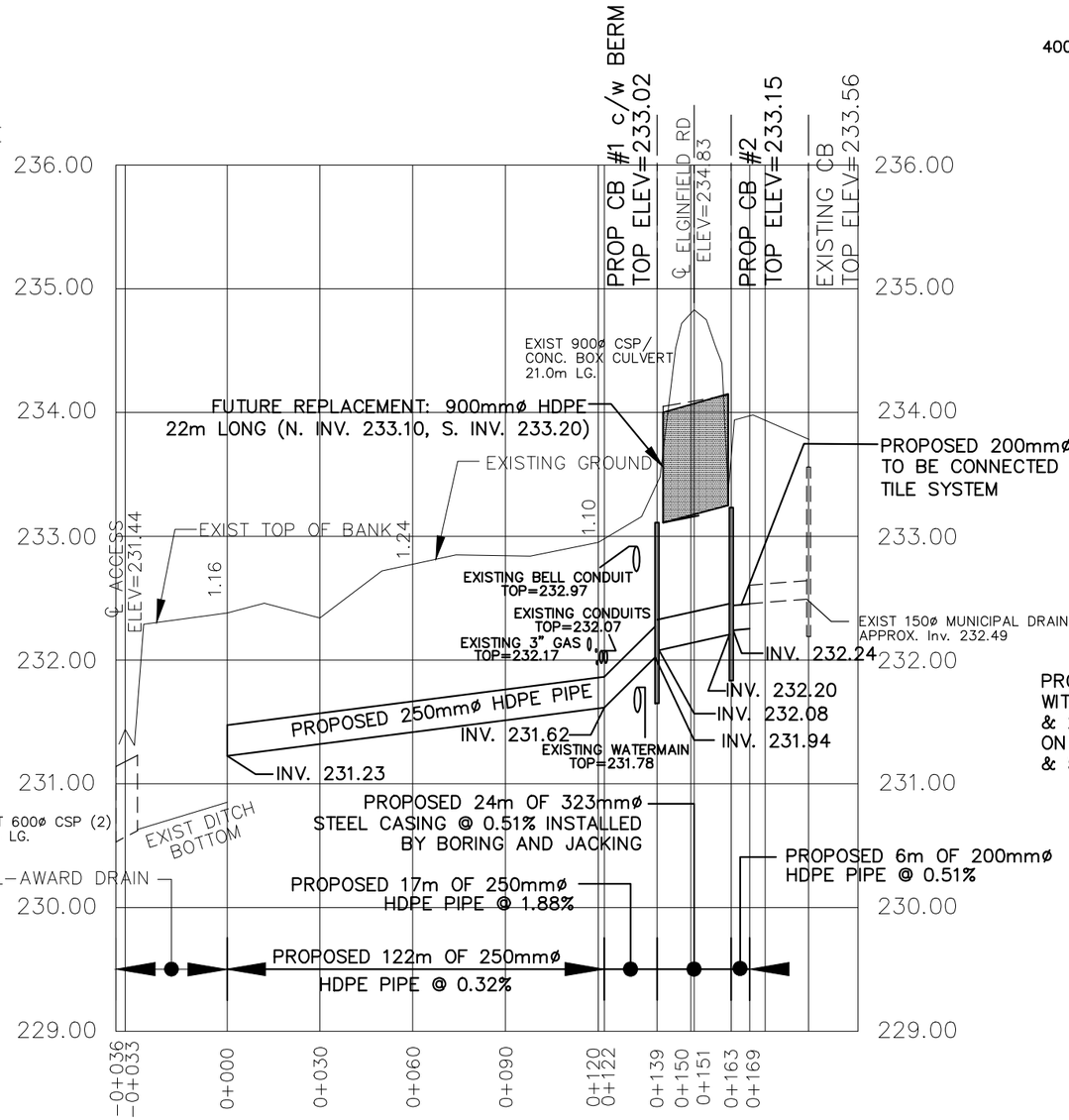
1. BENCHMARK No.1 ELEV. 231.23
   TOP EAST END OF EXISTING SOUTH 600ø
   AT STATION −0+033

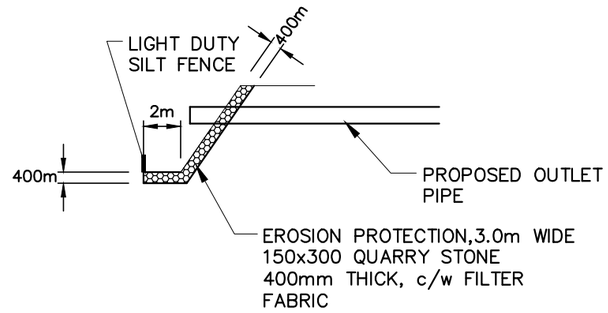
   BENCHMARK No.2 ELEV. 234.14
   TOP SOUTH END OF EXISTING 900ø
   CSP UNDER ELGINFIELD ROAD, STATION 0+151

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

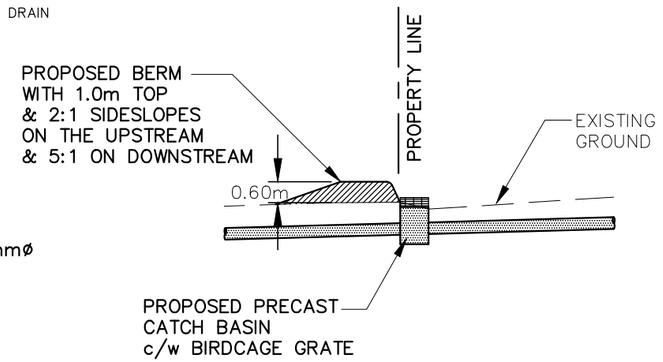
3. ELEVATION OF THE EXISTING TILE IS AN APPROXIMATE BASED ON PREVIOUS DRAINAGE REPORTS.

4. GRADE MAY BE ADJUSTED BETWEEN STATIONS 0+122 AND 0+139 IN ORDER TO INCREASE THE SEPARATION TO THE WATERMAIN, BUT SHALL NOT BE LESS THAN 0.32%





OUTLET DETAIL
NTS



TYPICAL BERM DETAIL
NTS

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

DRAWING NAME: Cameron Drain Branch "E" Profile 1

PROJECT No. 2022−1380

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

NO.	REVISIONS	DATE	BY
1	FINAL REPORT	JAN. 6, 2023	CS

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

MUNICIPALITY of NORTH MIDDLESEX

CAMERON DRAIN
PROFILE - BRANCH "E"

Last Updated: January 6, 2023