

**DRAINAGE REPORT
FOR THE**

**14TH CONCESSION EAST
DRAIN AND BRANCH
(INSPIRATION INDUSTRIAL
PARK BRIDGE)**

**IN THE
TOWN OF ESSEX**



(FINAL)
18 SEPTEMBER 2024
OLIVER E. T. MOIR, P. ENG.

FILE No. 24-8160

File No. 24-8160

Corporation of the Town of Essex
33 Talbot Street South
Essex, Ontario
N8M 1A8

**Drainage Report for the
14TH CONCESSION EAST DRAIN AND BRANCH
(INSPIRATION INDUSTRIAL PARK BRIDGE)
In the Town of Essex**

Drainage Board:

Instructions

The Municipality received a request from the landowner of property Roll No. 570-03500 (Inspiration Industrial Park Ltd.) for an access bridge across 14th Concession East Drain Branch on 5 December 2023 to facilitate a new industrial development. Council accepted the request under Section 78(1) of the Drainage Act and on 1 March 2024 appointed Dillon Consulting Limited to prepare a report. Council also appointed Dillon under Section 78(1) of the Drainage Act on the 14th Concession East Drain to investigate impacts to the said working corridor because of the future development properties backing onto the drain.

The new bridge will serve as a future access bridge for a mutual agreement road serving a new industrial development referred to as Inspiration Industrial Park. The said roadway will intersect with Pinkerton Road thereby requiring access over the 14th Concession East Drain Branch.

Watershed Description

The 14th Concession East Drain Branch consists primarily of an open channel flowing along the northerly side of King's Highway No. 3 commencing at the line between Lot 16 and 17 S.T.R. Concession. It flows north-westerly then turns southerly across King's Highway No. 3. The drain then turns southerly to flow along the east side of Pinkerton Road to its outlet into the 14th Concession East Drain. The upstream drainage area for the proposed bridge is approximately 26.98 hectares (66.6 acres).

The lands comprising the watershed are of mixed agricultural, industrial, and commercial use. There is little topographic relief. From the Ontario Soil Survey, the principle surficial soil in the study area is described as Brookston Clay which is defined as having poor natural drainage.

On-Site Meeting

An on-site meeting was held on 3 May 2024. A record of the meeting is provided in Schedule 'A', which is appended hereto.



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Drain History

The recent history of Engineers' reports for the 14th Concession East Drain and Branch as follows:

- **8 January 2021 Tim R. Oliver, P.Eng.:** The report recommended drain cleaning and brushing of the 14th Concession East Drain upstream of Pinkerton Road. Works also included cleaning of the existing bridges. The property Roll No. 570-03500 was only assessed for head lands abutting the drain.
- **26 October 1976 Maurice Armstrong, P.Eng.:** The report recommended the drain be cleaned and the replacement of an access bridge in Lot 16, Concession 14. An addendum was issued 19 September 1977 specifying the excavated material from across King's Highway No. 3 be spread on the south side of the pavement area.
- **18 July 1969 C.G.R. Armstrong, P.Eng.:** The report recommended the diversion of a portion of the 14th Concession East Drain Branch just south of the line between Lot 16 and 17, Concession 14 to accommodate the new King's Highway No. 3. This portion of the drain would be known as the Diversion of the Branch of the 14th Concession East Drain.
- **29 January 1965 C.G.R. Armstrong, P.Eng.:** The report recommended the repair and improvement of the 14th Concession East Drain and Branch and the Rush Drain and Branch. The work included brushing and cleanout of the drains.

Survey

Topographic survey of the drain and abutting lands was provided by Inspiration Industrial Park Ltd. Our topographic survey of the 14th Concession East Drain Branch was carried out in May 2024. The survey comprised the recording of topographic data and examining the channel for available depth necessary to provide sufficient drainage.

Design Considerations

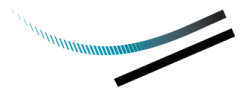
A Guide for Engineers working under the Drainage Act in Ontario, OMAFRA Publication 852 (2018) is the current reference document used by engineers carrying out drainage work on municipal drains under the Act. The 2-year design storm is the recommended design standard applied to municipal drains within rural Ontario specific to open drain channels and low hazard agricultural field access crossings. For road crossings, a higher 10-year design storm is the recommended design criteria. We have applied a 10-year design criterion for the proposed 14th Concession East Drain Branch bridge.

Updated Working Corridor

Following the full build out of the Inspiration Industrial Park, the working corridors for the 14th Concession East Drain and Branch may no longer be available for spreading of drain spoils. We recommend that drain spoils from the drain alongside the developed lots be trucked and disposed of off-site.

A new working corridor is also recommended to provide convenient access to the drain and for trucking of drain spoils. The working corridor is detailed on the Drawings and Specifications included herein.

Costs associated with management of excess soils as required by O.Reg. 406/19, trucking and disposal of material costs be assessed to the abutting lands. Should the owner elect to accept the material instead of it being removed from the site, the material shall be spread, levelled, and seeded within the respective lot at the cost of the respective owner.



Allowances

In accordance with Section 29 of the Drainage Act, we determined allowances be given at one third rate of \$16,550 per hectare (\$6,700 per acre) for land used for the purposes of a new working corridor for access and future maintenance of the 14th Concession East Drain. The Section 29 allowance for all lands was calculated to \$5,200. Allowances are based on the new working corridor specified in Schedule ‘F’ herein and detailed in Schedule ‘B’ appended hereto.

Recommendations and Cost Estimate

The existing access bridge on 14th Concession East Drain serving Roll No. 570-03500 as shown on the drawings is no longer required. Therefore, we recommend it be removed from the drain and the drain banks be restored. Further, we recommend the bridge be abandoned under Section 19 of the Drainage Act.

A new mutual agreement road will require an access across the 14th Concession East Drain Branch. We recommend the drain be repaired and improved as described below:

Item	Description	Amount
	<u>14th Concession East Drain</u>	
1.	Removal and disposal of existing 2.4 m span, 5 m long rigid span concrete bridge deck including partial removal and disposal of concrete abutments. Abutments shall be cut as close to the drain banks as practically possible. The Contractor shall re-establish the drain banks using stone erosion protection. Work includes restoration of drain banks, site clean-up and restoration of lands and road within the working area.	\$8,000.00
2.	Allowances under Section 29.	<u>\$5,200.00</u>
	<u>TOTAL- 14th Concession East Drain</u>	<u>\$13,200.00</u>
	<u>14th Concession East Drain Branch</u>	
3.	New Bridge Works, as follows:	
	a) Supply and installation of a new 26.5 m long, 1400 mm diameter aluminized, corrugated steel pipe (CSP) including couplers and hardware. Corrugations shall be 125 mm x 25 mm with a thickness of 2.8 mm thickness as supplied by Armttec of approved equal. (<i>see Specifications</i>). Wide bolt and angle aluminized corrugated steel couplers, 2.8 mm thickness and no single pipe less than 6 m in length. The work is to include drain bottom cleanout in close proximity (5 m upstream and downstream) of the bridge.	\$18,000.00

Item	Description	Amount
	b) Supply and install clear stone bedding materials (minimum 150 mm thickness) with filter fabric underlay under the new culvert pipe (approximately 25 tonnes).	\$1,500.00
	c) Supply and install full compacted Granular 'A' backfill materials up to the underside of road surface materials (approximately 575 tonnes).	\$29,000.00
	d) Supply and installation of vertical interlocking concrete block end walls consisting of approximately 42 concrete blocks (approximately 16 full blocks, 14-half wide blocks and 12-half high cap blocks). Interlocking concrete blocks walls shall be designed by Contractor. Shop drawings sealed by a Professional Engineer licensed in the Province of Ontario shall be submitted by the Contractor to the project engineer for review prior to materials delivered to site.	\$18,000.00
	e) Supply and install stone erosion protection on drain banks, minimum 300 mm thickness, c/w filter fabric underlay, minimum 1 m wide beside concrete block end walls on all drain banks adjacent to block walls (approximately 20 m ²).	\$1,700.00
4.	Temporary silt control measures during construction.	\$500.00
5.	Traffic Control per OTM Book 7.	<u>\$2,500.00</u>
	SUB-TOTAL	\$71,200.00
6.	Report, Assessments and Final Inspection.	\$15,500.00
7.	Construction observation and administration (cost portion).	\$3,000.00
8.	Expenses and Incidentals.	\$500.00
9.	ERCA application review and permit fee.	<u>\$500.00</u>
	TOTAL ESTIMATE – 14th Concession East Drain Branch (excluding Net HST)	\$90,700.00
	TOTAL ESTIMATE – 14th Concession East Drain & Branch (excluding Net HST)	\$103,900.00

The estimate provided in this report was prepared according to current materials and installation prices as of the date of this report. In the event of delays from the time of filing of the report by the Engineer to the time of tendering the work, it is understood that the estimate of cost is subject to inflation. The rate of inflation shall be calculated using the Consumer Price Index applied to the cost of construction from the date of the report to the date of tendering.

Assessment of Costs

The individual assessments are comprised of three (3) assessment components:

- i. Benefit (*advantages relating to the betterment of lands, roads, buildings, or other structures resulting from the improvement to the drain*).
- ii. Outlet Liability (*part of cost required to provide outlet for lands and roads*).
- iii. Special Benefit (*additional work or feature that may not affect function of the drain*).

We have assessed the estimated costs against the affected lands and roads as listed in Schedule 'C' under "Value of Special Benefit," "Value of Benefit" and "Value of Outlet." Since there is only one Special Benefit assessment, a separate schedule for Details of Special Benefit (Schedule 'D') is not required or included herein.

Assessment Rationale

Special Benefit assessments shown in Schedule 'C' were derived as follows:

1. As the proposed works are directly a result of the proposed development, all associated construction and engineering costs for preparation and consideration of this report shall be assessed 100% against Roll No. 570-035 (Inspiration Industrial Park Ltd.)

Utilities

It may become necessary to temporarily or permanently relocate utilities that may conflict with the construction recommended under this report. In accordance with Section 26 of the Drainage Act, we assess any relocation cost against the public utility having jurisdiction. Under Section 69 of the Drainage Act, the public utility is at liberty to do the work with its own forces, but if it should not exercise this option within a reasonable time, the Municipality will arrange to have this work completed and the costs will be charged to the appropriate public utility.

Future Maintenance

We recommend that all future work of repair and/or maintenance of the access bridge for the mutual access road be carried out by the Town of Essex and the costs assessed 80% against the affected property on which the mutual access road resides (Roll Number to be assigned upon severance) as a Special Benefit assessment and the remaining 20% be assessed to the upstream lands and roads as Outlet assessment in the same relative proportions listed in Schedule 'E'.

These provisions for maintenance are subject, of course, to any variations that may be made under the authority of the Drainage Act.

Drawings and Specifications

Attached to this report is Schedule 'F', which are Specifications setting out the details of the recommended works and Schedule 'G' which represent the drawings that are attached to this report.

Page 1 of 2 – Watershed Plan

Page 2 of 2 – Bridge Details

Approvals

The construction and/or improvement to a drainage works, including repair and maintenance activities, and all operations connected therewith are subject to the approval, inspection, by-laws and regulations of all Municipal, Provincial, Federal and other authorities having jurisdiction in respect to any matters embraced by the proposed works. Prior to any construction or maintenance works, the Municipality or proponent designated on the Municipality's behalf shall obtain all required approvals/permits and confirm any construction limitations including timing windows, mitigation/off-setting measures, standard practices or any other limitations related to in-stream works.

Respectfully submitted,

DILLON CONSULTING LIMITED



Oliver E.T. Moir, P.Eng.

OEM:wlb:lld

Meeting Summary

Subject: 14th Concession Drain East & Branch – On-Site Meeting
 Date: May 3, 2024
 Location: 14th Concession Road
 Our File: 24-8160

Attendees

Mark Fishleigh	County of Essex
David McBeth	Town of Essex
Robin Noble	Landowner
Sean Bezaire	Landowner
Marvel Hormiz	R.C. Spencer
John Friesen	Landowner
Abe Friesen	Landowner
Oliver Moir	Dillon Consulting Limited

Notes

Item	Discussion	Action by
1.	Introductions:	
1.1.	The Town made introductions and explained that Dillon was appointed on the 14 th Concession Drain East & Branch under Section 65 and Section 78 of the Drainage Act. Spencer has been retained by the landowner of 14978 14 th Concession Road (Abe Friesen) to assist with the development of the property.	INFO
2.	Project Background:	
2.1.	Mr. Friesen is seeking to have the subject property severed into lots for future industrial developments. A private road within the property is proposed to provide access to the lots and is to intersect with Pinkerton Road. The private road requires a crossing over the 14 th Concession Drain East Branch. Each future lot will have its own dedicated stormwater management control in place, and discharge to the abutting drain.	INFO
2.2.	Dillon explained the Section 78 request is for a new privately owned road bridge across the 14 th Concession Drain East Branch to access Pinkerton Road.	INFO
2.3.	The Town requested the following to be investigated to support the development: <ul style="list-style-type: none"> Existing working corridors that may be impacted because of future development, including potential increased future maintenance costs considering spreading of drain spoils may no longer be feasible. Changes in assessment because of the anticipated change in land use be investigated and reported thereon per Section 65 of the Act. The existing access bridge to 14978 14th Concession Road be removed. 	INFO

Item	Discussion	Action by
3.	Drainage Act Process:	
3.1.	Dillon explained the Drainage Act process: <ul style="list-style-type: none"> • A request is submitted • The Engineer is appointed by the Town • The on-site meeting is held • The report is prepared • A meeting is held to consider the technical aspects of the report (Meeting to Consider) • A meeting is held to consider cost aspects of the report (Court of Revision) 	INFO
4.	Other Discussion	
4.1.	<ul style="list-style-type: none"> • The Town requests that the proposed bridge enclose the 25 metre wide private road allowance, and that the road have block end walls, considering the road will have trucks turning (minimum 12 m turning radius) onto the road and traffic lights installed at the intersection. • Since the proposed bridge will be the only access to the property, cost sharing of maintenance costs with upstream lands and roads will be considered. • Mr. Friesen requested Dillon make use of topographic survey already completed as part of the development. Spencer has topographic survey that can be sent to Dillon. • Spencer indicated that the bridge is holding up development and requests the report proceed as quickly as possible. • Dillon expects one Section 78 report for both drains where the Section 65 letters could be appended to said report. • Dillon will complete a final inspection. 	INFO
5.	Subsequent Discussion	
5.1.	<ul style="list-style-type: none"> • Dillon requested Mr. Friesen and Spencer to have the stormwater management outlet directed downstream of the culvert, requiring a daylight corner be added to the south private road limit. 	INFO
5.2.	<ul style="list-style-type: none"> • Austin Friesen, Spencer, the Town, and Dillon met virtually to discuss the location of a new working corridor that would provide for convenient access for drain maintenance and trucking of material. The working corridor shall include the mutual access road, as well as a shared laneway through proposed Lot 5, and the retained parcel. 	

Errors and/or Omissions

This meeting summary was prepared by Oliver Moir, who should be notified of any errors and/or omissions.

"SCHEDULE B"
SCHEDULE OF ALLOWANCES
14th CONCESSION EAST DRAIN
TOWN OF ESSEX

Roll No.	Con.	Description	Owner	Section 30 Damages	Section 29 Land	Total Allowances
570-03500	14	Pt. Lot 17	Inspiration Industrial Park Ltd.	\$0.00	\$5,200.00	\$5,200.00
TOTAL ALLOWANCES				\$0.00	\$5,200.00	\$5,200.00

"SCHEDULE C"
SCHEDULE OF ASSESSMENT
14TH CONCESSION EAST DRAIN & BRANCH (INSPIRATION INDUSTRIAL PARK)
TOWN OF ESSEX

PRIVATELY-OWNED - NON-AGRICULTURAL LANDS:

Roll No.	Con.	Description	Area Affected		Owner	Special Benefit	Benefit	Outlet	Total Assessment
			(Acres)	(Ha.)					
570-035	14	Pt. Lot 17	33.44	13.53	Inspiration Industrial Park Ltd.	\$103,900.00	\$0.00	\$0.00	\$103,900.00
Total on Privately-Owned - Non-Agricultural Lands.....						\$103,900.00	\$0.00	\$0.00	\$103,900.00
TOTAL ASSESSMENT						\$103,900.00	\$0.00	\$0.00	\$103,900.00
			(Acres)	(Ha.)					
Total Area:			33.44	13.53					

"SCHEDULE E"
SCHEDULE OF ASSESSMENT FOR FUTURE MAINTENANCE
14TH CONCESSION EAST DRAIN BRANCH (INSPIRATION INDUSTRIAL PARK BRIDGE)
TOWN OF ESSEX

ONTARIO LANDS:

Description	Area Affected		Owner	Special Benefit	Benefit	Outlet	Total Assessment
	(Acres)	(Ha.)					
King's Highway No. 3 (By-pass)	12.00	4.86	Ministry of Transportation	\$0.00	\$0.00	\$703.04	\$703.04
Total on Ontario Lands.....				\$0.00	\$0.00	\$703.04	\$703.04

MUNICIPAL LANDS:

Description	Area Affected		Owner	Special Benefit	Benefit	Outlet	Total Assessment
	(Acres)	(Ha.)					
Essex Urban Centre (Lands)	38.00	15.38	Town of Essex	\$0.00	\$0.00	\$953.50	\$953.50
Essex Urban Centre (Roads)	2.00	0.81	Town of Essex	\$0.00	\$0.00	\$83.69	\$83.69
Pinkerton Road	1.50	0.61	Town of Essex	\$0.00	\$0.00	\$63.03	\$63.03
County Road No. 8	1.60	0.65	County of Essex	\$0.00	\$0.00	\$67.16	\$67.16
South Talbot Road	1.00	0.40	Town of Essex	\$0.00	\$0.00	\$41.33	\$41.33
570-03300 Con. 14 Pt. Lot 16	0.56	0.23	Town of Essex	\$0.00	\$0.00	\$4.75	\$4.75
Total on Municipal Lands.....				\$0.00	\$0.00	\$1,213.47	\$1,213.47

PRIVATELY-OWNED - NON-AGRICULTURAL LANDS:

Roll No.	Con.	Description	Area Affected		Owner	Special Benefit	Benefit	Outlet	Total Assessment
			(Acres)	(Ha.)					
XXX-XXXXX (Lot 1)	14	Pt. Lot 17	9.98	4.04	Inspiration Industrial Park Ltd.	\$0.00	\$0.00	\$83.49	\$83.49
XXX-XXXXX (Mutual Access Road)	14	Pt. Lot 17	0.00	0.00	Inspiration Industrial Park Ltd.	\$8,000.00	\$0.00	\$0.00	\$8,000.00
Total on Privately-Owned - Non-Agricultural Lands.....						\$8,000.00	\$0.00	\$83.49	\$8,083.49

TOTAL ASSESSMENT						\$8,000.00	\$0.00	\$2,000.00	\$10,000.00
			(Acres)	(Ha.)					
Total Area:			66.64	26.98					

”SCHEDULE F”

DRAINAGE REPORT FOR THE **14TH CONCESSION EAST DRAIN AND BRANCH** (INSPIRATION INDUSTRIAL PARK BRIDGE) IN THE TOWN OF ESSEX

SPECIAL PROVISIONS - GENERAL

1.0 GENERAL SPECIFICATIONS

The General Specifications attached hereto is part of “Schedule F.” It also forms part of this specification and is to be read with it, but where there is a difference between the requirements of the General Specifications and those of the Special Provisions which follow, the Special Provisions will take precedence.

2.0 DESCRIPTION OF WORK

The work to be carried out under this Contract includes, but is not limited to, the supply of all **labour, equipment and materials** to complete the following items:

14th Concession East Drain

- Removal and disposal of existing 2.4 m span, 5 m long rigid span concrete bridge deck including partial removal and disposal of concrete abutments. Abutments shall be cut as close to the drain banks as practically possible. The Contractor shall re-establish the drain banks using stone erosion protection. Work includes restoration of drain banks, site clean-up and restoration of lands and road within the working area.

14th Concession East Drain Branch

- New Bridge Works, as follows:
 - Supply and installation of a new 26.5 m long, 1400 mm diameter aluminized, corrugated steel pipe (CSP) including couplers and hardware. Corrugations shall be 125 mm x 25 mm with a thickness of 2.8 mm thickness as supplied by Armtec of approved equal. (see Specifications). Wide bolt and angle aluminized corrugated steel couplers, 2.8 mm thickness and no single pipe less than 6 m in length. The work is to include drain bottom cleanout in close proximity (5m upstream and downstream) of the bridge.
 - Supply and install clear stone bedding materials (minimum 150 mm thickness) with filter fabric underlay under the new culvert pipe (approximately 25 tonnes).
 - Supply and install full compacted Granular ‘A’ backfill materials up to the underside of road surface materials (approximately 575 tonnes).
 - Supply and installation of vertical concrete block end walls consisting of approximately 42 concrete blocks (approximately 16 full blocks, 14-half wide blocks and 12-half high cap blocks). Interlocking concrete blocks walls shall be designed by Contractor. Shop drawings sealed by a Professional Engineer licensed in the Province of Ontario shall be submitted to the project engineer for review prior to materials delivered to site.

- Supply and install stone erosion protection on drain banks, minimum 300 mm thickness, c/w filter fabric underlay, minimum 1 m wide beside concrete block end walls on all drain banks adjacent block walls (approximately 20 m²).
- Temporary silt control measures during construction.
- Traffic Control per OTM Book 7.

3.0 ACCESS TO THE WORK (Construction)

Access to the drain shall be from the Pinkerton Road and 14th Concession Road right-of-way. Contractor shall make his/her own arrangements for any additional access for his/her convenience. All grass areas disturbed shall be restored to original conditions at the Contractor's expense.

4.0 WORKING AREA (Construction)

The working area for construction purposes shall be restricted to the road rights-of-way. One lane shall remain open during the construction period and traffic control (as per Section 11.0 in the General Specifications) maintained at all times. **Any damages to lands and/or roads from the Contractor's work within the working areas for the new culvert site shall be rectified to pre-existing conditions at his/her expense.**

5.0 ACCESS TO WORK (Future Maintenance)

Access to the 14th Concession East Drain and Branch will be from Pinkerton Road and the mutual access road. The working corridor for the Branch Drain may be used for access to 14th Concession East Drain.

6.0 WORKING CORRIDOR (Future Maintenance)

For the purpose of future maintenance of the 14th Concession East Drain, the Contractor shall restrict equipment to within a 9.0 m wide working corridor measured from the north top of bank located within Lots 2, 3, 4, 5 and the retained parcel of Inspiration Industrial Park.

For the purposes of future maintenance of the 14th Concession East Drain Branch, the Contractor shall restrict equipment to within a 9.0 m wide working corridor measured from the top of the east and southeast top of bank, located within Lots 1 and 2 of the Inspiration Industrial Park.

A new working corridor for the purpose of access to the drains and trucking of drain spoils off-site shall be as follows:

- 6.1 m wide, measured east of the east lot line of Lot 4, located within Lot 5 and the Retained Parcel as shown on the drawings.
- Mutual Access roadway as shown on the drawings.

7.0 BRIDGE REMOVAL

The Contractor shall carefully remove the concrete span bridge deck and dispose of materials off-site. The abutments shall be cut as close to the drain bank as practically possible and dispose of material off-site.

The drain banks shall be reconstructed to the design cross section of the drain with 1.5:1 side slopes. Sloping stone erosion protection as per Section 8.0 shall be used to reinforce the re-established drain bank as necessary or directed by the Drainage Superintendent. The Contractor shall be responsible for the repair and restoration of lands and roads disturbed by the works.

8.0 STONE EROSION PROTECTION

The Contractor shall supply and install the required quantities of graded stone rip-rap erosion protection materials where specified. All stone to be used for erosion protection shall be 125 - 250 mm clear **quarried rock** or OPSS 1001 placed over a non-woven filter fabric Terrafix 270R or approved equivalent. **Concrete rip-rap will not be permitted.**

The minimum thickness requirement of the erosion stone layer is 300 mm with no portion of the filter fabric to be exposed.

9.0 BRIDGE CONSTRUCTION

9.1 Location of New Culvert

The new culvert shall be located and installed as shown on the drawings attached hereto.

9.2 Materials

Materials shall be as follows:

<i>Culvert</i>	<i>New 26.5 m long, 1400 mm diameter aluminized Type II, corrugated steel pipe (CSP) wall thickness of 2.8 mm and 125 mm x 25 mm corrugations with rerolled ends.</i>
	<i>Note: All new corrugated steel pipe culvert shall be joined with annular aluminized corrugated wide bolt and angle couplers (minimum of 8 corrugation overlap and 2.8 mm wall thickness) and no single pipe less than 6.0 m in length. All pipes connected with couplers shall abut each other with no more than a 25 mm gap between pipes prior to installation of the coupler and wrapped with filter fabric.</i>
<i>Pipe Bedding Below Pipe</i>	<i>19 mm clear stone conforming to OPSS Division 10.</i>
<i>Pipe Backfill to underside of road surface materials</i>	<i>Granular 'A' conforming to OPSS Division 10.</i>
<i>Interlocking Concrete Blocks</i>	<i>New Concrete Interlocking Blocks, 600 mm x 600 mm x 1200 mm (full block), 600 mm x 600 mm x 600 mm (half wide block) with filter fabric underlay. The concrete to be used for the block endwalls shall have a minimum strength of 25MPa shall be air entrained concrete with air content ranging from 5-7%. The void space between the blocks and pipe shall be formed and filled with concrete minimum 20MPa and shall be air entrained concrete with air content ranging from 5-7%.</i>
<i>Filter Fabric</i>	<i>"Non-Woven" geotextile filter fabric with a minimum strength equal to or greater than Terrafix 270R, Amoco 4546, Mirafi 140NC or approved equivalent.</i>
<i>Erosion Stone</i>	<i>All stone to be used for erosion protection shall be 125 – 250 mm clear quarried rock or OPSS 1001, minimum 300 mm thickness.</i>

9.3 Culvert Installation

Suitable dykes shall be constructed in the drain so that the installation of the culvert can be accomplished in the dry. The drain bottom shall be cleaned, prepared, shaped and compacted to suit the new culvert configuration, as shown on the drawings. Granular materials shall be compacted to 100% of their maximum dry density.

9.4 Concrete Lock-Block End Walls

Concrete block end walls shall be designed by a Professional Engineer licensed in the Province of Ontario. The Contractor shall provide shop drawings to the Engineer for review prior to delivery of materials to the site. End walls shall be constructed of interlocking concrete blocks as shown on the attached drawings using 600 mm wide x 600 mm high x 1200 mm long blocks. Where specified, the Contractor shall make use of half blocks (600 mm x 600 mm x 600 mm), half-high blocks (600 mm x 300 mm x 1200 mm), and half-high, half blocks (600 mm x 300 mm x 600 mm). The concrete block end walls shall be keyed into the existing drain banks and provided with a filter fabric backing to separate the backfill materials from the concrete blocks. All void space between the culvert and the concrete blocks shall be filled with concrete minimum 20 MPa compressive strength. The Contractor shall arrange for inspection and certification of the block wall installation by the design engineer.

9.5 Lateral Tile Drains

Should the Contractor encounter any lateral tiles within the proposed culvert limits not shown on attached drawings, the Contractor shall re-route the outlet tile drain(s) in consultation with the Drainage Superintendent, as required, to accommodate the new culvert. **Tile drain outlets through the wall of the new culvert pipe will not be permitted.** All costs associated with re-routing lateral tile drains (if any) shall be at the Contractor's expense.

9.6 Site Cleanup and Restoration

As part of the work and upon completion, the Contractor shall remove and dispose of, off-site any loose timber, logs, stumps, large stones, rubber tires, cinder blocks or other debris from the drain bottom and from the side slopes. Where the construction works cross a lawn, the Contractor shall take extreme care to avoid damaging the lawn, shrubs and trees encountered. Upon completion of the work, the Contractor shall completely restore the area by the placement and fine grading of topsoil and seeding or sodding the area as specified by the Engineer or Drainage Superintendent.

GENERAL SPECIFICATIONS

1.0 AGREEMENT AND GENERAL CONDITIONS

The part of the Specifications headed "Special Provisions" which is attached hereto forms part of this Specification and is to be read with it. Where there is any difference between the requirements of this General Specification and those of the Special Provisions, the Special Provisions shall govern.

Where the word "Drainage Superintendent" is used in this specification, it shall mean the person or persons appointed by the Council of the Municipality having jurisdiction to superintend the work.

Tenders will be received, and contracts awarded only in the form of a lump sum contract for the completion of the whole work or of specified sections thereof. The Tenderer agrees to enter into a formal contract with the Municipality upon acceptance of the tender. The General Conditions of the contract and Form of Agreement shall be those of the Stipulated Price Contract CCDC2-Engineers, 1994 or the most recent revision of this document.

2.0 EXAMINATION OF SITE, PLANS AND SPECIFICATIONS

Each tenderer must visit the site and review the plans and specifications before submitting his/her tender and must satisfy himself/herself as to the extent of the work and local conditions to be met during the construction. Claims made at any time after submission of his/her tender that there was any misunderstanding of the terms and conditions of the contract relating to site conditions, will not be allowed. The Contractor will be at liberty, before bidding to examine any data in the possession of the Municipality or of the Engineer.

The quantities shown or indicated on the drawings or in the report are estimates only and are for the sole purpose of indicating to the tenderers the general magnitude of the work. The tenderer is responsible for checking the quantities for accuracy prior to submitting his/her tender.

3.0 MAINTENANCE PERIOD

The successful Tenderer shall guarantee the work for a period of one (1) year from the date of acceptance thereof from deficiencies that, in the opinion of the Engineer, were caused by faulty workmanship or materials. The successful Tenderer shall, at his/her own expense, make good and repair deficiencies and every part thereof, all to the satisfaction of the Engineer. Should the successful Tenderer for any cause, fail to do so, then the Municipality may do so and employ such other person or persons as the Engineer may deem proper to make such repairs or do such work, and the whole costs, charges and expense so incurred may be deducted from any amount due to the Tenderer or may be collected otherwise by the Municipality from the Tenderer.

4.0 GENERAL CO-ORDINATION

The Contractor shall be responsible for the coordination between the working forces of other organizations and utility companies in connection with this work. The Contractor shall have no cause of action against the Municipality or the Engineer for delays based on the allegation that the site of the work was not made available to him by the Municipality or the Engineer by reason of the acts, omissions, misfeasance or non-feasance of other organizations or utility companies engaged in other work.

5.0 RESPONSIBILITY FOR DAMAGES TO UTILITIES

The Contractor shall note that overhead and underground utilities such as hydro, gas, telephone and water are not necessarily shown on the drawings. It is the Contractor's responsibility to contact utility companies for information regarding utilities, to exercise the necessary care in construction operations and to take other precautions to safeguard the utilities from damage.

All work on or adjacent to any utility, pipeline, railway, etc., is to be carried out in accordance with the requirements of the utility, pipeline, railway, or other, as the case may be, and its specifications for such work are to be followed as if they were part of this specification. The Contractor will be liable for any damage to utilities.

6.0 CONTRACTOR'S LIABILITY

The Contractor, his/her agents and all workmen or persons under his/her control including sub-contractors, shall use due care that no person or property is injured and that no rights are infringed in the prosecution of the work. The Contractor shall be solely responsible for all damages, by whomsoever claimable, in respect to any injury to persons or property of whatever description and in respect of any infringement of any right, privilege or easement whatever, occasioned in the carrying on of the work, or by any neglect on the Contractor's part.

The Contractor shall indemnify and hold harmless the Municipality and the Engineer, their agents and employees from and against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of or attributable to the Contractor's performance of the contract.

7.0 PROPERTY BARS AND SURVEY MONUMENTS

The Contractor shall be responsible for marking and protecting all property bars and survey monuments during construction. All missing, disturbed, or damaged property bars and survey monuments shall be replaced at the Contractor's expense, by an Ontario Land Surveyor.

8.0 MAINTENANCE OF FLOW

The Contractor shall, at his/her own cost and expense, permanently provide for and maintain the flow of all drains, ditches and water courses that may be encountered during the progress of the work.

9.0 ONTARIO PROVINCIAL STANDARDS

Ontario Provincial Standard Specifications (OPSS) and Ontario Provincial Standard Drawings (OPSD) shall apply and govern at all times unless otherwise amended or extended in these Specifications or on the Drawing. Access to the electronic version of the Ontario Provincial Standards is available online through the MTO website, free of charge to all users. To access the electronic standards on the Web go to <http://www.mto.gov.on.ca/english/transrd/>. Under the title Technical Manuals is a link to the Ontario Provincial Standards. Users require Adobe Acrobat to view all pdf files.

10.0 APPROVALS, PERMITS AND NOTICES

The construction of the works and all operations connected therewith are subject to the approval, inspection, by-laws and regulations of all Municipal, Provincial, Federal and other authorities having jurisdiction in respect to any matters embraced in this Contract. The Contractor shall obtain all approvals and permits and notify the affected authorities when carrying out work in the vicinity of any public utility, power, underground cables, railways, etc.

11.0 SUBLETTING

The Contractor shall keep the work under his/her personal control, and shall not assign, transfer, or sublet any portion without first obtaining the written consent of the Municipality.

12.0 TIME OF COMPLETION

The Contractor shall complete all work on or before the date fixed at the time of tendering. The Contractor will be held liable for any damages or expenses occasioned by his/her failure to complete the work on time and for any expenses of inspection, superintending, re-tendering or re-surveying, due to their neglect or failure to carry out the work in a timely manner.

13.0 TRAFFIC CONTROL

The Contractor will be required to control vehicular and pedestrian traffic along roads at all times and shall, at his/her own expense, provide for placing and maintaining such barricades, signs, flags, lights and flag persons as may be required to ensure public safety. The Contractor will be solely responsible for controlling traffic and shall appoint a representative to maintain the signs and warning lights at night, on weekends and holidays and at all other times that work is not in progress. All traffic control during construction shall be strictly in accordance with the **Occupational Health and Safety Act** and the current version of the **Ontario Traffic Manuals**. Access to the electronic version of the **Ontario Traffic Manual** is available online through the MTO website, free of charge to all users.

To access the electronic standards on the Web go to <http://www.mto.gov.on.ca/english/transrd/>, click on "Library Catalogue," under the "Title," enter "Ontario Traffic Manual" as the search. Open the applicable "Manual(s)" by choosing the "Access Key," once open look for the "Attachment," click the pdf file. Users require Adobe Acrobat to view all pdf files.

Contractors are reminded of the requirements of the Occupational Health and Safety Act pertaining to Traffic Protection Plans for workers and Traffic Control Plan for Public Safety.

14.0 SITE CLEANUP AND RESTORATION

As part of the work and upon completion, the Contractor shall remove and dispose of, off-site any loose timber, logs, stumps, large stones, rubber tires, cinder blocks or other debris from the drain bottom and from the side slopes. Where the construction works cross a lawn, the Contractor shall take extreme care to avoid damaging the lawn, shrubs and trees encountered. Upon completion of the work, the Contractor shall completely restore the area by the placement and fine grading of topsoil and seeding or sodding the area as specified by the Engineer or Drainage Superintendent.

15.0 UTILITY RELOCATION WORKS

In accordance with Section 26 of the Drainage Act, if utilities are encountered during the installation of the drainage works that conflict with the placement of the new culvert, the operating utility company shall relocate the utility at their own costs. The Contractor however will be responsible to co-ordinate these required relocations (if any) and their co-ordination work shall be considered incidental to the drainage works.

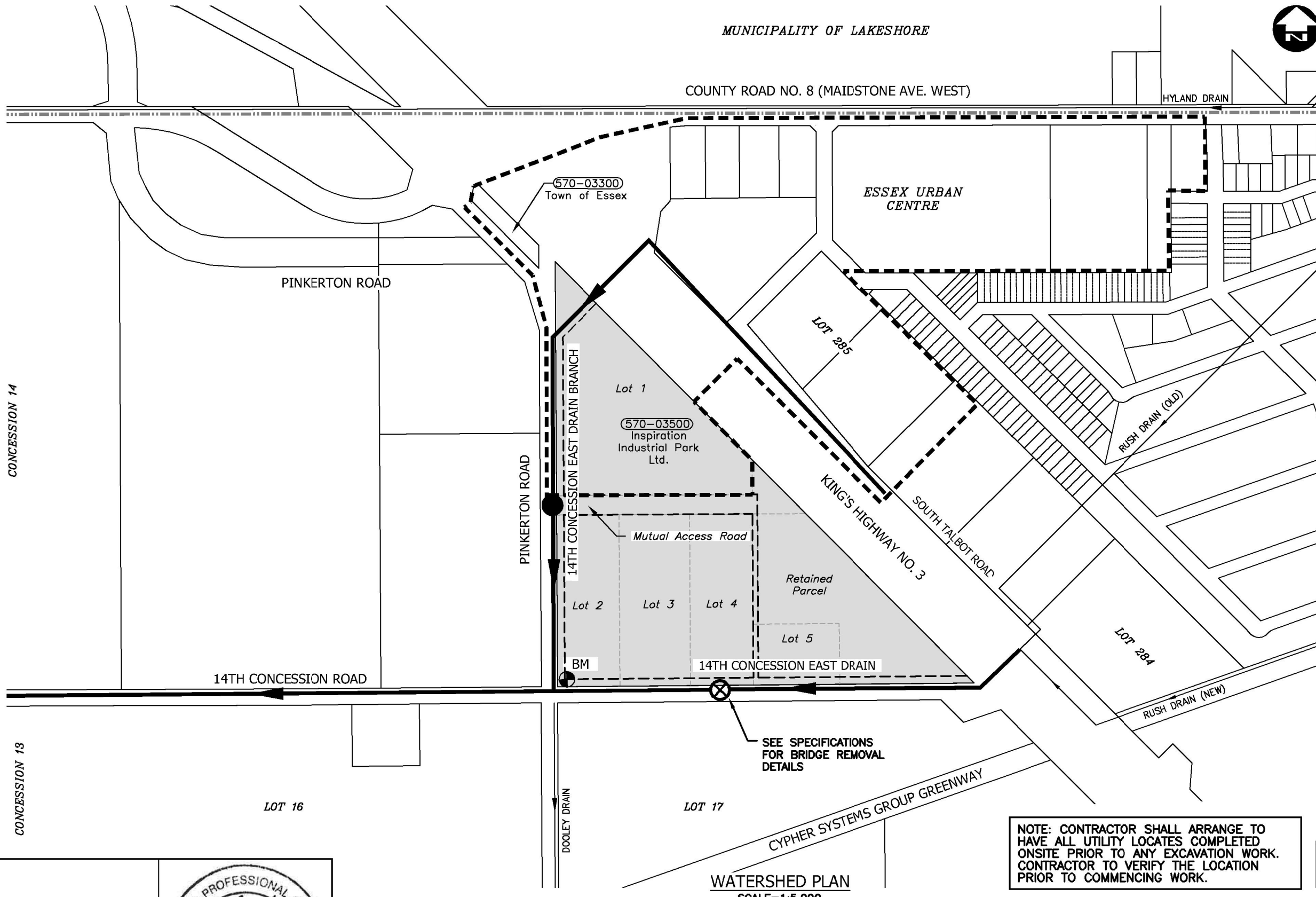
16.0 FINAL INSPECTION

All work shall be carried out to the satisfaction of the Drainage Superintendent for the Municipality, in compliance with the specifications, drawings and the Drainage Act. Upon completion of the project, the work will be inspected by the Engineer and the Drainage Superintendent. Any deficiencies noted during the final inspection shall be immediately rectified by the Contractor.

Final inspection will be made by the Engineer within 20 days after the Drainage Superintendent has received notice in writing from the Contractor that the work is completed, or as soon thereafter as weather conditions permit.

17.0 FISHERIES CONCERNS

Standard practices to be followed to minimize disruption to fish habitat include embedment of the culvert a minimum 10% below grade, constructing the work 'in the dry' and cutting only trees necessary to do the work (no clear-cutting). No in-water work is to occur during the timing window unless otherwise approved by the appropriate authorities.



LEGEND

- MUNICIPAL BOUNDARY
- - - 14TH CONCESSION EAST DRAIN BRANCH UPSTREAM OF NEW BRIDGE DRAINAGE AREA
- ➔ 14TH CONCESSION EAST DRAIN & BRANCH
- ➔ OTHER DRAINS
- NEW BRIDGE
- ⊗ BRIDGE REMOVAL
- ⊕ LOCAL BENCHMARK
- INSPIRATION INDUSTRIAL PARK
- - - WORKING CORRIDOR

SITE BENCHMARK
 BM-TOP OF NORTHEAST CONCRETE WINGWALL AT PINKERTON ROAD AND 14TH CONCESSION ROAD INTERSECTION.
 ELEVATION=194.14m

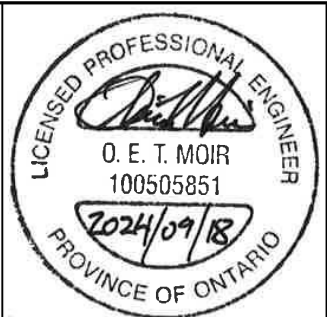
NOTE: CONTRACTOR TO VERIFY BENCHMARKS PRIOR TO CONSTRUCTION.

NOTE: CONTRACTOR SHALL ARRANGE TO HAVE ALL UTILITY LOCATES COMPLETED ONSITE PRIOR TO ANY EXCAVATION WORK. CONTRACTOR TO VERIFY THE LOCATION PRIOR TO COMMENCING WORK.

WATERSHED PLAN
 SCALE=1:5,000

CONCESSION 14

CONCESSION 13



Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.
 Do not scale dimensions from drawing.
 Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

No.	ISSUED FOR	DATE	BY
2	FINAL REPORT SUBMISSION	SEPT. 18/24	OEM
1	CLIENT REVIEW	SEPT. 9/24	OEM

DESIGN	OEM	REVIEWED BY	VJH
DRAWN	WLB	CHECKED BY	TRO
DATE	September 18, 2024		
SCALE	AS SHOWN		

PROJECT NO. 24-8160
 DRAWING SCALES BASED ON A 11" X 17" SHEET

'SCHEDULE G'

Drainage Report for the
 14TH CONCESSION EAST DRAIN & BRANCH
 (INSPIRATION INDUSTRIAL PARK BRIDGE)
 Town of Essex

SHEET TITLE	WATERSHED PLAN
PAGE NO.	1 of 2

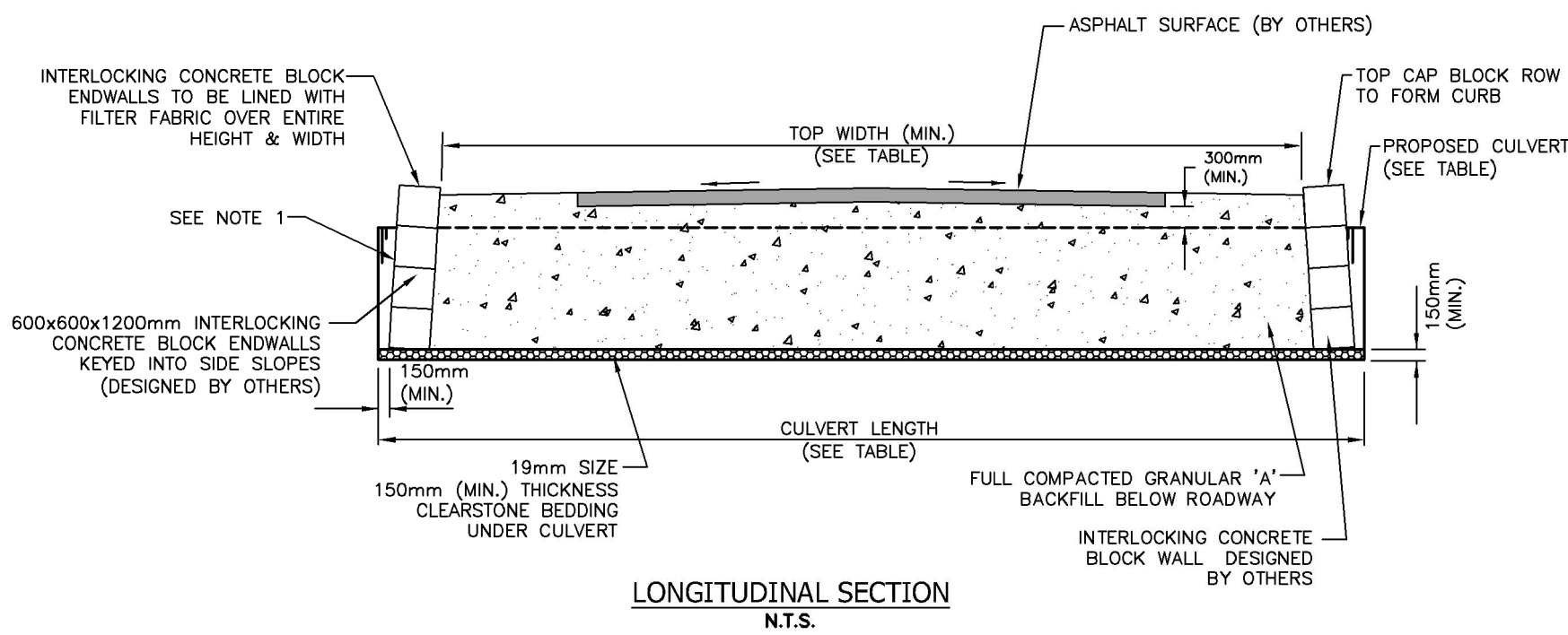
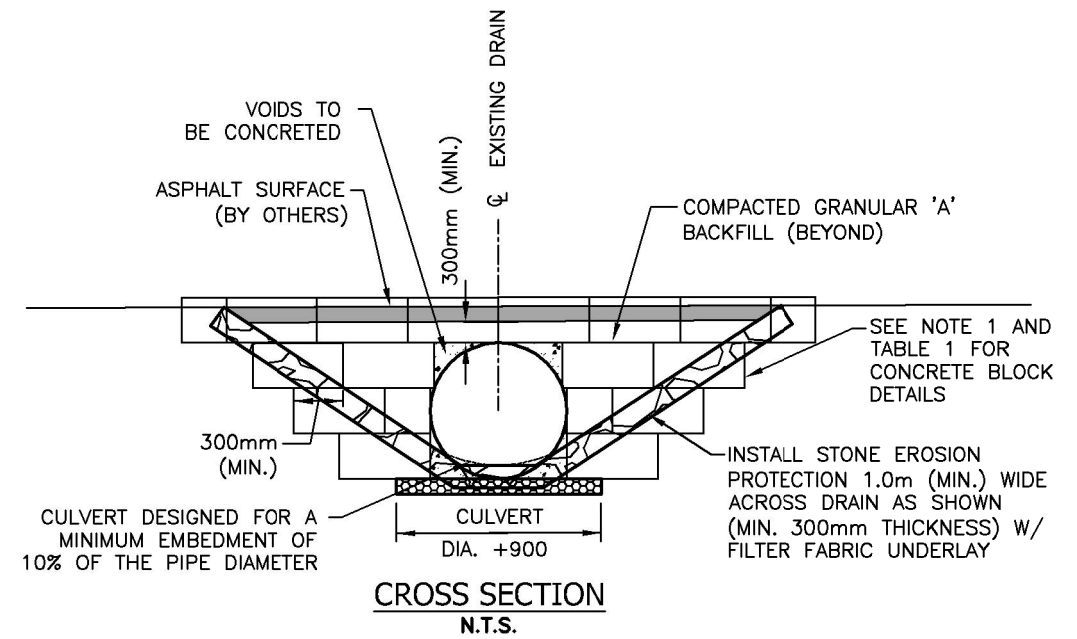
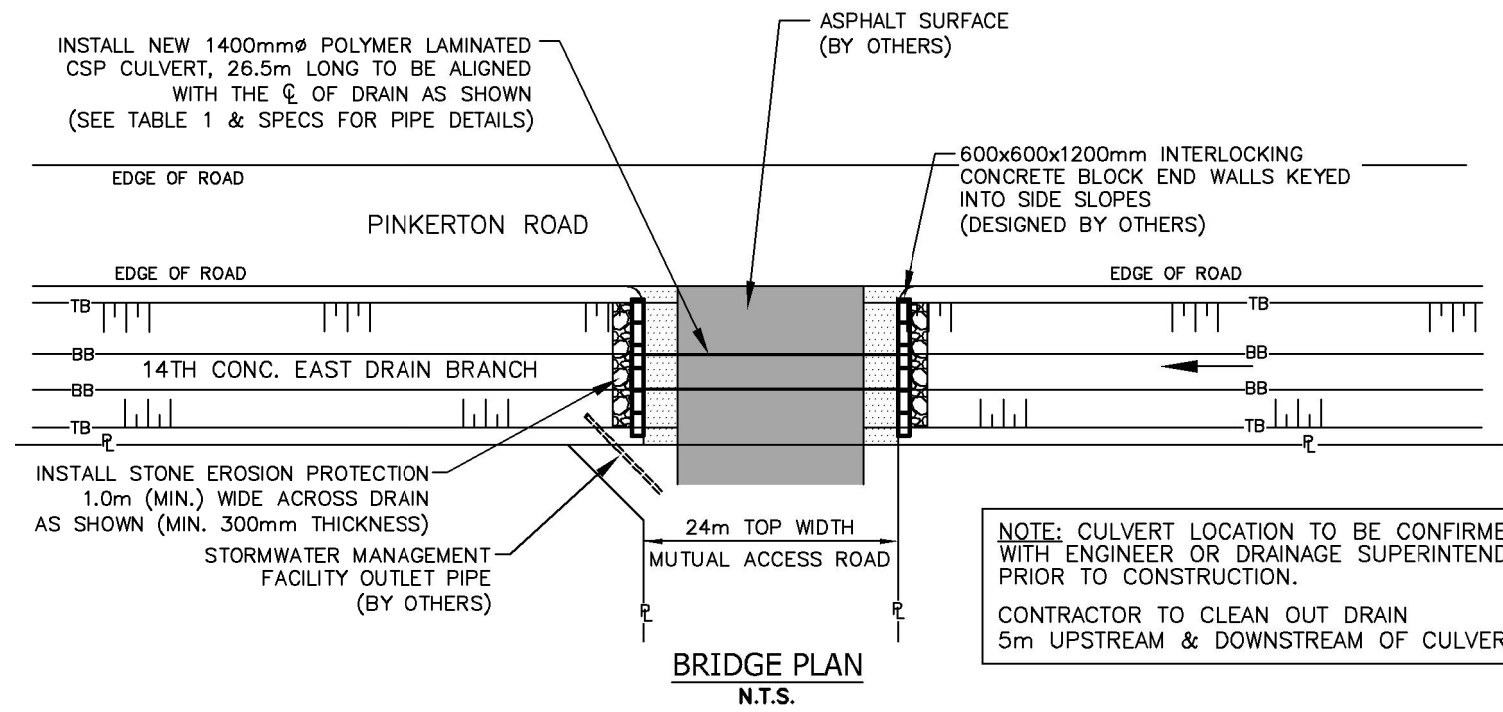


TABLE 1 - ACCESS BRIDGE DESIGN INFORMATION

DESCRIPTION	BRIDGE
PIPE INVERT ELEV. U/S SIDE(m)	191.70
PIPE INVERT ELEV. D/S SIDE(m)	191.67
TOP OF CL ROADWAY SURFACE ELEV. (m)	194.20
DRAIN BOTTOM (m) (DESIGN) (AT CENTRELINE OF CULVERT)	191.81
MIN. TOP WIDTH OF ROADWAY (m)	24.0
MIN. CULVERT GRADE (%)	0.10
CULVERT TYPE	CSP
CULVERT MATERIAL	ALUMINIZED
CULVERT LENGTH (m)	26.5
CULVERT SIZE (mm)	1400
CULVERT THICKNESS (mm)	2.8
CULVERT CORRUGATIONS (mm)	125x25
TOP OF CONCRETE BLOCK WALL ELEV. (m)	194.11
APPROXIMATE NO. OF CONCRETE BLOCKS (FOR COST ESTIMATION PURPOSES)	16 FULL 14 HALF WIDE 12 HALF HIGH

NOTE 1: CONCRETE BLOCK WALLS TO BE DESIGNED & SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO. A 1H:5V BATTER HAS BEEN ASSUMED.

CONCRETE BLOCK LAYOUT SHOWN FOR COST ESTIMATION PURPOSES ONLY.

SHOP DRAWINGS SHALL BE PROVIDED TO PROJECT ENGINEER FOR REVIEW PRIOR TO MATERIALS BEING DELIVERED TO SITE.

THE PIPE CULVERT TO PROTRUDE A MINIMUM 150mm BEYOND THE LOWEST BLOCK ROW.

TOP OF WALL TO BE MIN. 150mm HIGHER THAN FINISHED ELEVATION BEHIND WALL

Sep 18, 2024 - 9:20am C:\pwworking\directory\projects\2024\dillon_33\wb\dms36659\248160-03-DRN-CON.dwg



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DRAWING SCALES BASED ON A 11" X 17" SHEET

'SCHEDULE G'

Drainage Report for the
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Town of Essex

SHEET TITLE **BRIDGE DETAILS**

PAGE NO. **2 of 2**