DRAINAGE REPORT
FOR

NEW ACCESS BRIDGES & SOUTH TALBOT ROAD BRIDGE REPLACEMENT ON THE SOUTH TALBOT DRAIN

TOWN OF TECUMSEH

DILLON CONSULTING

(FINAL)

11 MARCH 2019

MARK D. HERNANDEZ, P.ENG

FILE No. 17-5749

Tecumseh File No. E095O(96)

File No. 17-5749

Mayor and Council
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Drainage Report for New Access Bridges & South Talbot Road Bridge Replacement on the
SOUTH TALBOT DRAIN
Town of Tecumseh

Mayor and Council:

Instructions

The Municipality received a request for a new access bridge serving Pt. Lot 303, South Talbot Road Concession (Roll No. 470-00700) over the South Talbot Drain that was filed at the Municipal Office on 6 March 2017. The request for the new culvert results from a request of severance where the severed agricultural zoned parcel requires its own access. Council accepted the request under Section 78 of the Drainage Act and on 2 May 2017 appointed Dillon Consulting Limited to prepare a report.

Watershed Description

The South Talbot Drain is located entirely within the Municipality of Tecumseh. The upper end starts at a point approximately 59 metres (195 feet) south of the southerly limit of King's Highway No. 3 on the west side of Oldcastle Road. The drain proceeds southerly along the west side of Oldcastle Road to Walker Road where the drain turns west and crosses Walker Road. The drain then turns southerly to run on the westerly side of Walker Road to South Talbot Road. The drain then flows westerly along the north side of South Talbot Road to Holden Road where it then turns south to run on the easterly side of Holden Road and outlets into the Holden Outlet Drain on the west side of Holden Road.

Drain History

The recent history of Engineers' reports for the South Talbot and Holden Outlet Drain follows:

- **16 May 2007 by Tim Oliver, P.Eng.:** The report recommended the replacement and extension of Bridge No. 5 as a joint-use bridge under By-law No. 2009-40.
- **26 April 2006 by Tim Oliver, P.Eng.:** The recommended work included the brushing and cleaning of the South Talbot Drain from Walker Road to its outlet into the Holden Outlet Drain. The report also recommended the removal of an existing access culvert and the lowering and extension of an existing culvert.

- **3 November 1978 by Maurice Armstrong, P.Eng.:** The recommended work included the entire South Talbot Drain and the portion of the Holden Outlet Drain east of Howard Avenue and west of Holden Road being brushed and the drain bottom cleaned. Work also included the repair and improvement of a number of private access culverts on the drain.

On-Site Meeting

An on-site meeting was held on 12 June 2017. A record of the meeting is provided in Schedule 'A', which is appended hereto.

Survey

Our survey and examination of the South Talbot Drain was carried out on the 13th day of June 2017. A portion of the drain was surveyed both upstream and downstream of the proposed site for the new access bridge. Additional survey was carried out on the July 17th, 2017 for a new bridge installed for the Chrysler Greenway Trail system. A portion of the drain was surveyed both upstream and downstream of the new bridge.

Existing Conditions and Recommendations

The bridge numbers correspond with the 26 April 2006 report prepared by Tim Oliver, P.Eng.

Specific bridge numbers have been designated for ease of reference between the specifications and the drawings. The locations, dimensions, condition and use of each bridge are as follows:

Bridge No. 1A: Roll No. Chrysler Greenway Trail System Access Bridge

A recently constructed 16 m long, 1200 mm diameter corrugated steel pipe with stone rip-rap end protection provides access for a new trail system as part of the Chrysler Canada Greenway Oldcastle Extension.

We recommend that this bridge be incorporated as part of the drain under this report.

Bridge No. 5: Roll No. 470-00800 Ronald R. & Melanie L. Gosselin

This access bridge was installed under the 2007 report as a joint-use (farm and residential) bridge replacement. With this land severance, this bridge will no longer provide access to the farm (Roll No. 470-00700) and will serve only the residential property. The top width exceeds the standard for a single use access bridge therefore the landowner will be assessed a larger portion of the maintenance costs. For these reasons, an amended Schedule of Assessment for assessment purposes is required. We recommend that for future repair and maintenance works on this bridge, Schedule 'E' shall be used for assessment purposes. The specifications for Bridge No. 5 in the 2007 report (By-law 2009-40) shall govern.

Bridge No. 5A: Roll No. 470-00700 1185604 Ontario Inc.

A new farm access bridge is required for access across South Talbot Drain serving Roll No. 470-00700. We recommend a new 19 m long, 1200 mm diameter aluminized corrugated steel pipe with stone rip-rap end protection providing a 12.2 m (40 ft.) driveable top width be installed under this report.

Bridge No. 8: Station 1+487 (South Talbot Road)

An 11.4 m long, 2.0 m span concrete culvert provides a road crossing at the intersection of South Talbot Road and Holden Road. A culvert was shown at this location on the profile in the 2006 report which references the bridge as Bridge No. 8. The municipality will be undertaking the reconstruction of South Talbot Road. It is understood that the replacement of this culvert will take place as part of the road reconstruction.

We recommend that this culvert be replaced with a new 22.4 m long, 2200 mm span x 1900 mm rise concrete box culvert complete with concrete block and sloped stone end walls.

Design Considerations

The Design and Construction Guidelines published by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) recommends that open drainage systems and farm crossings serving farmlands be designed to effectively contain and convey the peak runoff generated from a storm event having a frequency of occurrence of 1 in 2 years. Based on discussion with the Essex Region Conservation Authority, the road culvert has been designed to maintain the 100 year surface water elevation when compared to existing conditions. This will provide for a higher level of service for the roadway.

We believe that these design standards should provide a reasonable level of service, but it should be clearly understood that runoff generated from large storms or fast snow melts may sometimes exceed the capacity of the proposed systems and result in surface ponding for short periods of time.

Allowances

In accordance with Sections 29 and 30 of the Drainage Act, we do not anticipate any agricultural lands being damaged or taken as a result of the proposed drainage works. Any damage to existing grassed areas shall be restored to original conditions as part of the work. Therefore, 'Schedule B' for Allowances has not been included in this report.

Recommendations and Cost Estimate

Based on our review of the history, the information obtained during the site meeting, and our examination and analysis of the survey data, we recommend that the South Talbot Drain be repaired and improved as described below:

Item	Description	Amount
1.	New access bridge works, as follows:	
	a) Bridge No. 5A (Roll No. 470-00700) - Supply and place a new 19 m long, 1200 mm diameter aluminized corrugated steel pipe (CSP) culvert with 125 mm x 25 mm corrugations and 2.8 mm thickness including coupler and hardware (see Specifications), clear stone bedding with filter fabric overlay (approximately 15 tonnes), full Granular 'B' backfill (approximately 70 tonnes), native material to construct the 0.50 m wide native buffer strips (approximately 20 m^3), Granular 'A' driveway surface material (approximately 45 tonnes) and sloping stone end walls (approximately 25 m^2). All surplus native materials resulting from the culvert installation are to be trucked away to an approved dumping site at the Contractor's expense.	$18,700.00
	SUB-TOTAL – EXCLUDING SECTION 26 COSTS	$18,700.00
2.	Site meeting, drain survey, design, assessments and report preparation including expenses and incidentals and final inspection.	$5,000.00
3.	ERCA application review and permit fee	$800.00
	TOTAL – EXCLUDING SECTION 26 COSTS	**$24,500.00**
	SECTION 26 NON PRO-RATABLE COSTS	
4.	Road bridge replacement works, as follows:	
	a) Bridge No. 8 (South Talbot Road) – Removal and off-site disposal of existing 12 m long concrete box culvert, existing end walls and backfill that is not suitable for use as native backfill. Supply and installation of a new 2200 mm span x 1900 mm rise precast concrete box culvert, 22.4 m long with concrete block and sloped stone end walls (approximately 200 m^2) including Granular 'A' levelling base (approximately 35 tonnes) and compacted Granular 'A' backfill (approximately 800 tonnes). The work shall include cut-off walls, dowels, cast in place distribution slab, deck waterproofing membrane, protection board, concrete sealer, cable concrete mat, rigid insulation, 150 mm diameter Big 'O' subdrains with rodent gates, extensions to existing culverts, rip rap ,delineators and object markers.	$315,000.00
	SUB-TOTAL – SECTION 26 NON PRO-RATABLE COSTS	$315,000.00

Item	Description	Amount
5.	Bridge No. 8 engineering cost apportionment	$35,000.00
6.	Bridge No. 1A engineering cost apportionment	$1,500.00
	TOTAL – SECTION 26 NON PRO-RATABLE COSTS	**$351,500.00**
	OVERALL TOTAL ESTIMATE – SOUTH TALBOT DRAIN (Excluding Applicable Taxes)	**$376,000.00**

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.

Should the Road Authority elect to construct the drainage works across their road right-of-ways (Section 26.0 increased cost items) with their own forces, as per Section 69 of the Drainage Act, R.S.O., 1990, the Road Authority shall remain responsible for their allotment of costs for the preparation of this report as outlined in our estimate. Should the Road Authority elect not to undertake this work, the work items, as noted under Section 26 above, should be kept separate when tendering out the entire drainage works. Special Provisions for full detailed specifications for the South Talbot Road Bridge are appended to this report following the General Specifications.

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." Details of the Value of Special Benefit listed in Schedule 'C' are provided in Schedule 'D.'

All costs are pro-ratable unless specifically noted otherwise.

Assessment Rationale

Special Benefit assessment shown in Schedule 'C' and detailed in Schedule 'D' were derived as follows:

1. An engineering cost portion of $1,500.00 for the design provisions on the future replacement of Bridge No. 1A has been assessed 100% against Town of Tecumseh under Section 26 of the Drainage Act and shall be a non-proratable assessment.

2. Costs for the new access bridge (Bridge No. 5A) has been assessed 100% to adjoining property Roll No. 470-00700 as listed under "Value of Special Benefit."
3. Costs for the new road crossing (Bridge No. 8) has been assessed 100% to Town of Tecumseh Road Authority under Section 26 of the Drainage Act and shall be a non-proratable assessment.

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 future work of repair and maintenance of the South Talbot Drain access bridges (Bridge Nos. 1A, 5 and 5a) be carried out by the Town of Tecumseh at the expense of the property or properties accessed by the bridge and of the lands and roads in the same relative proportions as shown in Schedule 'E,' but only to those properties located upstream of each bridge. The specifications for the future maintenance of Bridge Nos. 1A and 5A are provided within this report.

Part of the maintenance cost of each bridge will be assessed as a Special Benefit assessment against the property or properties served by the bridge. The remainder of the maintenance cost will be assessed as Outlet assessment only to the lands and roads upstream of each bridge prorated to the assessments shown in Schedule 'E.'

Schedule 'E' represents all the lands and roads upstream of Bridge No. 5 and is applicable to the other primary access bridge (Bridge No. 5A) located further upstream by including only those properties that are upstream of the said bridge. The outlet assessment portion is based on an arbitrary amount of $10,000.00 of future access bridge maintenance costs. As for the distribution of assessment for future maintenance of the other upstream access bridges (Bridge Nos. 1, 2, 3, 4, 6 and 7) no provisions have been provided under this report.

The division between Special Benefit and Outlet assessment for future maintenance costs of each bridge shall be as follows:

Bridge No.	Type	Owner(s)	Special Benefit	Outlet
1A	Public Utility	Town of Tecumseh (Section 26)	100%	0%
5	Primary (Residential)	Roll No. 470-00800	65%	35%
5A	Primary (Farm)	Roll No. 470-00700	50%	50%
8	Road	Town of Tecumseh (Section 26)	100%	0%

Drawings and Specifications

Attached to this report is "Schedule F," which contain specifications setting out the details of the recommended works, and "Schedule G," which represents the following drawings that are also attached to this report:

Page 1 of 7:	**Watershed Plan**
Page 2 of 7:	**Plan 2**
Page 3 of 7:	**Bridge No. 1A Details**
Page 4 of 7:	**Bridge No. 5A Details & Design Table**
Page 5 of 7:	**Bridge No. 8 Details S-1**
Page 6 of 7:	**Bridge No. 8 Details S-2**
Page 7 of 7:	**Bridge No. 8 Details S-3**

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.

Grants

In accordance with the provisions of Sections 85, 86 and 87 of the Drainage Act, a grant in the amount of 33–1/3 percent of the assessment eligible for a grant may be made in respect to the assessment made under this report upon privately owned lands used for agricultural purposes. The assessments levied against privately owned agricultural land must also satisfy all other eligibility criteria set out in the Agricultural Drainage Infrastructure Program policies. Most of the privately owned lands are used for agricultural purposes and are eligible under the A.D.I.P. policies. We are not aware of any lateral drains involved in this work that would not be eligible for a grant. We recommend that application be made to the Ontario Ministry of Agriculture, Food and Rural Affairs in accordance with Section 88 of the Drainage Act, for this grant, as well as for all other grants for which this work may be eligible.

Respectfully submitted,

DILLON CONSULTING LIMITED

Mark D. Hernandez, P.Eng.
MDH:wlb:ges

SCHEDULE 'A

SOUTH TALBOT DRAIN – SITE MEETING

JUNE 12, 2017

Location: 1364 South Talbot Road

In Attendance (see sign-in sheet attached)

Melanie & Ron Gosselin
Marlene O'Neil
Randal and Celeste O'Neil
Rick and Laurie Raymond
Kerry Hric
Frank and Donna O'Neil
Sam Paglia – Town of Tecumseh
Mark Hernandez – Dillon Consulting Limited
Vishwa Thakkar – Dillon Consulting Limited

Mr. Paglia introduced himself as the Drainage Superintendent for the Town of Tecumseh and Mr. Hernandez and Ms. Thakkar of Dillon Consulting as the drainage engineers for the project. Mr. Paglia explained that the meeting is a formal meeting under the Drainage Act and that the South Talbot Holden Outlet Drain is a Municipal Drain having status under the Act. Further it was noted that Drainage Act is a provincial Act falling under the purview of the Ontario Ministry of Agriculture, Food and Rural Affairs but is administered by the local municipalities.

It was discussed that the Town received a formal request from 1364 South Talbot Road the requirement for a new culvert to access their farm property. In addition, the Town received concerns regarding blockage in road side ditch and it was determined by the Town that the blockage concern in the ditch belongs to the county. Therefore, the Town will advise the County of the concerns.

It was discussed that the cost of the culvert will be paid by the owner and the reason for inviting everyone to the site meeting was to make them aware that they are in the drain watershed and will have to contribute for future maintenance of this culvert. This meeting was also for residents to express any concern regarding the drain and culvert.
It was confirmed that the watershed design established in the previous report will be reviewed to determine whether or not it is sufficient or if it should be modified.

No concerns were raised with respect to the addition of the culvert.
Following this meeting the next steps include: a topographical survey of the area and preparation of a draft report. The draft report will be circulated to the landowners and a public meeting will be held to discuss the contents of the draft report. In particular feedback will be requested if there are any revisions to the watershed boundaries, ownership changes, or similar concerns. The public meeting will be an opportunity to discuss the report and answer questions prior to the formal board meetings. Following the public meeting, the report will be finalized.

The Drainage Act mandates that two meetings be held in front of council. The first is the Meeting to Consider which addresses the technical aspects of the report. The second is the Court of Revision which considers assessments. If there are no appeals, Council passes the report into bylaw and the Town can proceed to tender the project. Notices are sent out in advance to advice of the meeting dates. A current copy of the report is provided with the notice.

There is a grant program available through OMAFRA, whereby properties that have the farm class tax rate are eligible for a one-third grant. The municipality applies for the grant on behalf of the landowners and bills the landowners the net cost of their assessment after grant. Further, the municipality can work with qualifying landowners to debenture costs.

Minutes taken by Vishwa Thakkar, Dillon Consulting Ltd.

TOWN OF Tecumseh
ONTARIO · CANADA

SIGN IN SHEET – South Talbot Holden Outlet Drain. – SITE MEETING

June 12, 2017

NAME	ADDRESS	PHONE	EMAIL
Melanie & Ron Gosselin	1364 South Talbot Rd	519 7372694	redstripe@rogers.com
Marlene O'Neil	11578 ARVILLA ST. Windsor	519-739-1417	hugmar12@rogers.com
Frank & CELESTE O'NEIL	1914 SOUTH TALBOT	519 737-7871	frankcelestee@yahoo.ca
RICK & LAURIE RAYMOND	5670 WALKER RD.	519-737-9690	laurie_elegant@yahoo.ca
Kerry Hric	5680 walker Rd	5198187206	
FRANK & DONNA O'NEIL	1826 SOUTH TALBOT	519737-6886	

"SCHEDULE C"
SCHEDULE OF ASSESSMENT
SOUTH TALBOT DRAIN
TOWN OF TECUMSEH

PRIVATELY-OWNED - AGRICULTURAL LANDS (GRANTABLE)

Roll No.	Con.	Description	Area Affected (Acres)	Area Affected (Ha.)	Owner	Special Benefit	Benefit	Outlet	Total Assessment
470-00700	STR	Lot 303	99.08	40.10	1185604 Ontario Inc.	$24,500.00	$0.00	$0.00	$24,500.00
Total on Privately-Owned - Agricultural Lands						$24,500.00	$0.00	$0.00	$24,500.00

SECTION 26 INCREASED COSTS - NON PRO-RATABLE

Description	Owner	Special Benefit	Benefit	Outlet	Total Assessment
South Talbot Road	Town of Tecumseh Road Authority	$350,000.00	$0.00	$0.00	$350,000.00
Chrysler Canada Greenway Oldcastle Extension	Town of Tecumseh	$1,500.00	$0.00	$0.00	$1,500.00
Total Section 26 Increased Costs (Non Pro-ratable)		$351,500.00	$0.00	$0.00	$351,500.00
TOTAL ASSESSMENT		**$376,000.00**	**$0.00**	**$0.00**	**$376,000.00**

	(Acres)	(Ha.)
Total Area:	**99.08**	**40.10**

"SCHEDULE D"
DETAILS OF SPECIAL BENEFIT
SOUTH TALBOT DRAIN
TOWN OF TECUMSEH

SPECIAL BENEFIT ASSESSMENT
(AGRICULTURAL LANDS)

Roll No.	Owner	Item Description	Estimated Cost	Cost of Report	Special Benefit
470-00700	1185604 Ontario Inc.	Bridge No. 5A-Supply and place a new 19 m long, 1200 mm diameter aluminized corrugated steel pipe (CSP) culvert. (100%)	$18,700.00	$5,800.00	$24,500.00
Total Special Benefit Assessment (Excl. Non Pro-Ratable Costs)			$18,700.00	$5,800.00	$24,500.00

SPECIAL BENEFIT ASSESSMENT
(SECTION 26 - NON PRO-RATABLE COSTS)

	Owner	Item Description	Estimated Cost	Cost of Report	Special Benefit
South Talbot Road	Town of Tecumseh Road Authority	Bridge No. 8-Supply and place a new 27 m long, 1900 x 1900 mm precast concrete box culvert under South Talbot Road.	$315,000.00	$35,000.00	$350,000.00
	Town of Tecumseh	Bridge No. 1A-(Future Replacement) (100%)	$0.00	$1,500.00	$1,500.00
Total Special Benefit Assessment (Non Pro-Ratable Costs)			$315,000.00	$36,500.00	$351,500.00

OVERALL TOTAL SPECIAL BENEFIT ASSESSMENT **$376,000.00**

"SCHEDULE E"

SCHEDULE OF ASSESSMENT FOR FUTURE MAINTENANCE OF BRIDGE NO. 5

SOUTH TALBOT DRAIN

TOWN OF TECUMSEH

ONTARIO LANDS:

Description	Area Affected (Acres)	(Ha.)	Owner	Special Benefit	Benefit	Outlet	Total Assessment
King's Highway No. 3	0.37	0.15	Province of Ontario	$0.00	$0.00	$70.00	$70.00
Total on Ontario Lands.....				$0.00	$0.00	$70.00	$70.00

MUNICIPAL LANDS:

Description	Area Affected (Acres)	(Ha.)	Owner	Special Benefit	Benefit	Outlet	Total Assessment
South Talbot Road	5.90	2.39	Town of Tecumseh	$0.00	$0.00	$1,083.00	$1,083.00
Oldcastle Road	2.77	1.12	Town of Tecumseh	$0.00	$0.00	$507.00	$507.00
Walker Road (County Road No. 11)	9.27	3.75	County of Essex	$0.00	$0.00	$1,699.00	$1,699.00
Chrysler Canada Greenway Oldcastle Extension	1.17	0.47	Town of Tecumseh	$0.00	$0.00	$128.00	$128.00
Total on Municipal Lands.....				$0.00	$0.00	$3,417.00	$3,417.00

PRIVATELY-OWNED - NON-AGRICULTURAL LANDS:

Roll No.	Con.	Description	Area Affected (Acres)	(Ha.)	Owner	Special Benefit	Benefit	Outlet	Total Assessment
470-08400	STR	N. Pt. Lot 303	0.26	0.11	John M. Monaghan	$0.00	$0.00	$30.00	$30.00
470-08300	STR	N. Pt. Lot 303	0.31	0.13	Robert E. Harrison	$0.00	$0.00	$35.00	$35.00
470-08200	STR	N. Pt. Lot 303	0.31	0.13	Andre J. Masse	$0.00	$0.00	$35.00	$35.00
470-08100	STR	N. Pt. Lot 303	0.31	0.13	Donald F. & Cheryl McInnch	$0.00	$0.00	$35.00	$35.00
470-08000	STR	N. Pt. Lot 303 RP 12R16257 Pt. 2	0.31	0.13	Stephen Martin	$0.00	$0.00	$35.00	$35.00
470-07900	STR	N. Pt. Lot 303	0.31	0.13	Stephen Martin	$0.00	$0.00	$35.00	$35.00
470-07820	STR	Lot 303 RP 12R22456 Pt. 2	0.31	0.13	Richard L. Raymond	$0.00	$0.00	$35.00	$35.00
470-07800	STR	Lot 303 RP 12R22456 Pt. 1	0.28	0.11	Lorne Clarke & Christine M. Soanes	$0.00	$0.00	$30.00	$30.00
470-07600	STR	N. Pt. Lot 303	0.29	0.12	Kerry Hric	$0.00	$0.00	$33.00	$33.00
470-07500	STR	N. Pt. Lot 303	0.44	0.18	Mark S. Stephen	$0.00	$0.00	$49.00	$49.00
470-07200	STR	Pt. Lot 302 RP 12R1335 Pt. 1	1.04	0.42	Simon T. & Tammy L. Wicks	$0.00	$0.00	$75.00	$75.00
470-07201	STR	N. Pt. Lot 302 RP 12R4318 Pt. 2	0.73	0.30	George & Helen Dobrich	$0.00	$0.00	$68.00	$68.00
470-07202	STR	Pt. Lot 302 RP 1213926 Pt. 4	1.08	0.44	Vinko & Jelena Paulic	$0.00	$0.00	$77.00	$77.00
470-07203	STR	Pt. Lot 302 RP 12R13962 Pt. of Pt. 2&3	1.06	0.43	Paul & Danica Kalic	$0.00	$0.00	$76.00	$76.00
470-07300	STR	N. Pt. Lot 302 RP 12R15725 Pts 1&2	1.87	0.76	Ante Kalic	$0.00	$0.00	$90.00	$90.00
470-00800	STR	S. Pt. Lot 303	0.43	0.17	Ronald R. & Melanie L. Gosselin	$0.00	$0.00	$46.00	$46.00
470-00600	STR	S. Pt. Lot 302	1.49	0.60	Frank E. & Donna J. O'Neil	$0.00	$0.00	$83.00	$83.00
470-00400	STR	S. Pt. Lot 302 RP 12R15265 Pts 1&2	2.13	0.86	Randal & Celeste O'Neil	$0.00	$0.00	$95.00	$95.00

Roll No.	Con.	Description	Area Affected (Acres)	(Ha.)	Owner	Special Benefit	Benefit	Outlet	Total Assessment
470-00300	STR	S. Pt. Lot 302	0.69	0.28	Raymond J. & Lori M. Simard	$0.00	$0.00	$66.00	$66.00
Total on Privately-Owned - Non-Agricultural Lands.....						$0.00	$0.00	$1,028.00	$1,028.00

PRIVATELY-OWNED - AGRICULTURAL LANDS

Roll No.	Con.	Description	Area Affected (Acres)	(Ha.)	Owner	Special Benefit	Benefit	Outlet	Total Assessment
470-00700	STR	S. Pt. Lot 303	47.00	19.02	1185604 Ontario Inc.	$0.00	$0.00	$1,724.00	$1,724.00
470-00500	STR	S. Pt. Lot 302 RP 12R15074 Pts 1-4	62.73	25.39	1185610 Ontario Inc.	$0.00	$0.00	$2,301.00	$2,301.00
470-07400	STR	S. Pt. Lot 302	11.50	4.65	1185610 Ontario Inc.	$0.00	$0.00	$421.00	$421.00
470-08800	STR	N. Pt. Lot 302 RP 12R16121 Pts. 6 - 11 Pt. Pt. 5	28.35	11.47	Kalminder & Inderjeet Singh	$0.00	$0.00	$1,039.00	$1,039.00
Total on Privately-Owned - Agricultural Lands.....						$0.00	$0.00	$5,485.00	$5,485.00
TOTAL ASSESSMENT						**$0.00**	**$0.00**	**$10,000.00**	**$10,000.00**

	(Acres)	(Ha.)
Total Area:	**182.71**	**73.97**

"SCHEDULE F"

NEW ACCESS BRIDGES & SOUTH TALBOT ROAD BRIDGE REPLACEMENT ON THE SOUTH TALBOT DRAIN
Town of Tecumseh

SPECIAL PROVISIONS

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:

- New access bridge works, as follows:
  - Bridge No. 5A (Roll No. 470-00700) - Supply and place a new 19 m long, 1200 mm diameter aluminized corrugated steel pipe (CSP) culvert with 125 mm x 25 mm corrugations and 2.8 mm thickness including coupler and hardware (see Specifications), clear stone bedding with filter fabric overlay (approximately 15 tonnes), full Granular 'B' backfill (approximately 70 tonnes), native material to construct the 0.50 m wide native buffer strips (approximately 20 m^3, Granular 'A' driveway surface material (approximately 45 tonnes) and sloping stone end walls (approximately 25 m^2). All surplus native materials resulting from the culvert installation are to be trucked away to an approved dumping site at the Contractor's expense.
- Temporary Silt Control Measures During Construction
- Road bridge replacement works, as follows:
  - Bridge No. 8 (South Talbot Road) – Removal and off-site disposal of existing 12 m long concrete box culvert, existing end walls and backfill that is not suitable for use as native backfill. Supply and installation of a new 2200 mm span x 1900 mm rise precast concrete box culvert, 22.4 m long with concrete block and sloped stone end walls (approximately 200 m2) including Granular 'A' levelling base (approximately 35 tonnes) and compacted Granular 'A' backfill (approximately 800 tonnes). The work shall include cut-off walls, dowels, cast in place distribution slab, deck waterproofing membrane, protection board, concrete sealer, cable concrete mat, rigid insulation, 150 mm diameter Big 'O' subdrains with rodent gates, extensions to existing culverts, rip rap ,delineators and object markers.

3.0 ACCESS TO THE WORK

Access to the drain for Bridge No. 5A and Bridge No. 8 shall be from South Talbot Road. Access to the drain for Bridge No. 1A shall be from Oldcastle Road. Through traffic must be maintained at all times along municipal roads with the required traffic control as per Section 13.0 in the General Specifications. All construction materials for the bridge are to be placed on the field side of the road side drains. Any damage resulting from the Contractor's access to the bridge site shall be rectified to pre-existing conditions at his expense.

4.0 WORKING AREA

The working area at the bridge site shall be restricted to a radius of 20.0 m from the proposed centre of the new culvert.

Any damages to lands and/or roads from the Contractor's work within the working areas for the bridge sites shall be restored to pre-existing conditions at his/her expense.

5.0 BRIDGE CONSTRUCTION (BRIDGE NO. 5A)

5.1 Location of New Access Bridge

The new bridge structure shall be installed as shown on the drawing attached hereto.

5.2 Materials for New Bridge

Materials shall be as follows:

Culvert Pipe	***Bridge No. 5A**-New 19 m long, 1200 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.* *New 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 to each other with no more than a 25 mm gap between pipes prior to installation of the coupler and wrapped with filter fabric.*
Pipe Bedding Below Pipe	*20-25 mm clear stone conforming to OPSS Division 10.*
Backfill	*Granular 'B' conforming to OPSS Division 10.*
Driveway Surface	*Granular 'A' made from crushed limestone conforming to OPSS Division 10. Minimum 200 mm thickness.*
Erosion Stone	*All stone to be used for erosion protection shall be 125 - 250 mm clear quarried rock or OPSS 1004, minimum 300 mm thickness.*
Buffer Strips	*Dry native material free of topsoil, organic matter, broken concrete, steel, wood and deleterious substances.*
Filter Fabric	*"Non-Woven" geotextile filter fabric with a minimum strength equal to or greater than Terrafix 270R, Amoco 4546, Mirafi 140NC or approved equivalent.*

5.3 Culvert Installation

Suitable dykes shall be constructed in the drain so that the installation of the pipe 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; imported clean native materials shall be supplied, placed and compacted to 95% of their maximum dry density.

5.4 Sloping Stone End Walls

End walls shall be constructed of quarry stone rip-rap, as specified herein. Each end wall shall extend from the invert of the new culvert to the top of the proposed lane. The end walls shall be sloped 1 vertical to 1.5 horizontal with a filter fabric underlay surrounding the pipe and spanning across the entire width of the drain and wrapping around the drain banks to align with the ends of the new pipe culvert. The minimum thickness requirement of the erosion stone layer is 300 mm with no portion of the filter fabric to be exposed to sunlight.

5.5 Granular 'A' Driveway

The Contractor shall construct the driveway with a maximum 3% cross-fall grade consisting of a minimum 200 mm thickness of compacted Granular 'A' (crushed limestone) surface. The minimum top width of the driveway shall be as shown on the drawings.

5.6 Native Materials

Native materials suitable for use as backfill, as defined under Section 5.2, shall be salvaged from the existing bridge site, as required to complete the work as shown on the drawings, (**Native Backfill Zone only**). Where there is an insufficient amount of native fill materials for backfilling the culvert, the Contractor may elect to import additional dry native materials or alternatively use Granular 'B' at his/her own expense.

5.7 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.

6.0 ROAD BRIDGE CONSTRUCTION (BRIDGE NO. 8)

6.1 Location of New Road Bridge

The new bridge structure shall be installed as shown on the drawing attached hereto.

6.2 Materials for New Road Bridge

Materials shall be as follows:

Culvert	***Bridge No. 8**-New 22.4m long, 2200 mm span x 1900 mm rise precast concrete box culvert as per OPSS 1821*
Pipe Bedding Below Culvert	*20-25 mm clear stone conforming to OPSS Division 10.*
Backfill	*Granular 'B' conforming to OPSS Division 10.*
Concrete Block	*750 mm x 750 mm x 1500 mm precast concrete Lock-Block with Texturlock™ finish*

Erosion Stone	*All stone to be used for erosion protection shall be 125 - 250 mm clear quarried rock or OPSS 1004, minimum 300 mm thickness.*
Filter Fabric	*"Non-Woven" geotextile filter fabric with a minimum strength equal to or greater than Terrafix 270R, Amoco 4546, Mirafi 140NC or approved equivalent.*

6.3 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; imported clean native materials shall be supplied, placed and compacted to 95% of their maximum dry density.

6.4 Sloping Stone End Walls

End walls shall be constructed of quarry stone rip-rap, as specified herein. Each end wall shall extend from the invert of the new culvert to the top of the proposed lane. The end walls shall be sloped 1 vertical to 1.5 horizontal with a filter fabric underlay surrounding the pipe and spanning across the entire width of the drain and wrapping around the drain banks to align with the ends of the new pipe culvert. The minimum thickness requirement of the erosion stone layer is 300 mm with no portion of the filter fabric to be exposed to sunlight.

6.5 Site Clean-up 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.

7.0 ACCESS BRIDGE WORK – FUTURE REPLACEMENT (BRIDGE NO. 1A)

7.1 Location of New Bridge

The future replacement Bridge No. 1A shall be constructed in accordance with the specifications and drawings attached hereto. The centerline of the new culvert shall be located to align itself with the existing trail in each case.

7.2 Removal of Existing Culvert

The Contractor shall exercise caution when removing these materials as to minimize damage to the drain banks. Any damage to the drain shall be restored to original conditions at the expense of the Contractor. The removed materials (existing culvert debris and end wall materials) shall be hauled away off-site.

7.3 Materials for New Bridge

Materials shall be as follows:

Culvert Pipe	**Bridge No. 1A:** *New 16 m long, 1200 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.* *New CSP culverts 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 to each other with no more than a 25 mm gap between pipes prior to installation of the coupler and wrapped with filter fabric.*
Pipe Bedding Below Pipe	*20-25 mm clear stone conforming to OPSS Division 10.*
Backfill	*Granular 'A' conforming to OPSS Division 10.*
Trail Surface	*Limestone screenings surface course. Minimum 100 mm thickness. Granular 'A' conforming to OPSS Division 10 base course. Minimum 200 mm thickness.*
Erosion Stone	*All stone to be used for erosion protection shall be 125 - 250 mm clear quarried rock or OPSS.Muni 1004, minimum 300 mm thickness.*
Driveway Buffer Strips	*Dry native material free of topsoil, organic matter, broken concrete, steel, wood and deleterious substances.*
Filter Fabric	*"Non-Woven" geotextile filter fabric with a minimum strength equal to or greater than Terrafix 270R, Amoco 4546, Mirafi 140NC or approved equivalent.*

7.4 Culvert Installation

Suitable dykes shall be constructed in the drain so that the installation of the pipe 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; imported clean native materials shall be supplied, placed and compacted to 95% of their maximum dry density.

7.5 Sloping Stone End Walls

End walls shall be constructed of quarry stone rip-rap, as specified herein. Each end wall shall extend from the invert of the new culvert to the top of the proposed lane. The end walls shall be sloped 1 vertical to 1.5 horizontal with a filter fabric underlay surrounding the pipe and spanning across the entire width of the drain and wrapping around the drain banks to align with the ends of the new pipe culvert. The minimum thickness requirement of the erosion stone layer is 300 mm with no portion of the filter fabric to be exposed to sunlight.

7.6 Trail Surface

The Contractor shall construct the driveway with a maximum 3% longitudinal grade approach over the new culvert providing a minimum 300 mm cover. This work includes the installation of a minimum 200 mm thickness of compacted Granular 'A' (crushed limestone) base course and 100 mm thick limestone screenings surface course. The minimum top width of the trail shall be as 3.0 m wide.

7.7 Native Materials

Native materials suitable for use as backfill, as defined under Section 7.3, shall be salvaged from the existing bridge site, as required to complete the work as shown on the drawings, (Native Backfill Zone only). Where there is an insufficient amount of native fill materials for backfilling the culvert, the Contractor may elect to import additional dry native materials or alternatively use Granular 'B' at his/her own expense.

7.8 Lateral Tile Drains

Should the Contractor encounter any lateral tiles within the proposed culvert limits not shown on the 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.

Care must be taken in handling plastic drain pipe in cold weather to avoid causing damage.

Plastic drain pipe shall be held in position on planned grade immediately after installation by careful placement of backfill material.

7.9 Site Clean-up 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.

SPECIFICATIONS

FOR ROAD BRIDGE

SPECIFICATIONS FOR ROAD BRIDGE

INDEX

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1.0 EXCAVATION AND BACKFILLING OF STRUCTURE

OPSS 902 and OPSS.MUNI 206 including Appendix 902-B shall apply and govern except as amended and extended herein.

Amendments to OPSS 902, November 2010

902.09 Measurement for Payment
902.09.01 Actual Measurement

Clause 902.09.01.01 of OPSS 902 is deleted in its entirety and replaced with the following:

902.09.01.01 Excavation for Structure

No measurement shall be made for this work.

All over-excavation shall be backfilled with Granular "B" material compacted to 100% SPMDD.

Amendments to OPSS.MUNI 206, November 2013

206.07 Construction

206.07.03 Earth Excavation, Grading

206.07.03.01 General

Clause 206.07.03.01 of OPSS.MUNI 206 is amended by the addition of the following:

The Contractor shall excavate and remove any and all required existing road base materials as shown on the Contract Drawings or as directed by the Contract Administrator. Grading of the road base materials shall be to the lines and grades as shown on the Contract Drawings.

Re-grading of ditches as shown on the Contract Drawings shall also be considered incidental. This item shall also include the realignment of the drain.

Embankment side slopes shall also be graded as shown on the Contract Drawings. All vegetation shall be stripped prior to placing embankment fill material, and shall be considered incidental.

Granular material for the new road base (if required) shall be paid for separately under the appropriate tender items.

206.09 Measurement for Payment

206.09.01 Actual Measurement

Clause 206.09.01.01 of OPSS.MUNI 206 is deleted in its entirety and replaced with the following:

206.09.01.01 Earth Excavation, Grading

No measurement shall be made for this work. Payment shall be made at the Lump Sum Price bid in the Form of Tender and shall be compensation in full for all labour, equipment and materials required to complete this work.

2.0 REMOVAL OF STRUCTURAL COMPONENTS

OPSS 510 shall apply and govern except as amended and extended herein.

Amendments to OPSS 510, April 2010

510.03 Definitions

Section 510.03 of OPSS 510 is amended by the addition of the following:

Structural Components include the following items:

- Existing concrete bridge including but not limited to concrete culverts, deck, walls, footings, wingwalls, retaining walls and all other components associated with the complete removal of the existing bridge and associated appurtenances.

510.07 Construction
510.07.02 Bridge Work

Subsection 510.07.02 of OPSS 510 is amended by the addition of the following clause:

510.07.02.03 Removal of Structural Components

The Contractor shall excavate behind the existing concrete structures as shown on the Contract Drawings prior to removing any structural components listed in this Special Provision.

The Contractor shall remove and dispose of all components of the existing concrete structures. All removed materials shall become the property of the Contractor, and shall be removed from site. All removed materials shall be transported off site by the end of each day.

Any damage to existing parts of the structure which are to remain as a result of the Contractor's removal activities shall be adequately repaired using an approved method at no additional cost to the Owner.

Removal of asphalt pavement shall be paid for separately under the appropriate Tender item.

510.09 Measurement for Payment
510.09.01 Actual Measurement

Subsection 510.09.01 of OPSS 510 is amended by the addition of the following clause:

510.09.01.25 Removal of Structural Components

No measurement shall be made for this work.

510.10 Basis of Payment

Section 510.10 of OPSS 510 is amended by the addition of the following subsection:

510.10.04 Removal of Structural Components

Payment at the Contract Price for the above Tender item shall be full compensation for all labour, equipment and materials to do the work.

3.0 GRANULAR "A" BEDDING AND BACKFILL OF CULVERTS

General

OPSS 401 and 421 shall apply and govern except as amended and extended herein.

Scope of Work

This work shall include the supply, placing and compaction of new imported Granular "A" required for the bedding and backfill including water for compaction. Recycled material cannot be used for granular bedding and backfill.

Granular materials shall be compacted to 100 percent of the Standard Proctor Maximum Dry Density. Water shall be added as required to aid compaction.

Measurement

Measurement shall be made in tonnes from weigh tickets.

Payment

Payment shall be made at the Unit Price bid in the Form of Tender and shall be compensation in full for all labour, equipment and materials required to complete this work including water for compaction.

4.0 2200 mm x 1900 mm PRECAST CONCRETE BOX CULVERT

Amendment to OPSS 422, April 2004 (Reissued November 2010) and OPSS 1821, May 1993.

422.02 REFERENCES

Section 422.02 of OPSS 422 is amended by the addition of the following:

Ontario Provincial Standard Specifications, Material

OPSS 1359 Unshrinkable Backfill

CSA Standards

G164-M92 (R2003) Hot Dip Galvanizing of Irregularly Shaped Articles

ASTM International

C990-03	Standard Specifications for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants.
D75-94	Standard Practice for Random Sampling of Construction Material.
D3665-94	Standard Practice for Sampling Aggregates.

United States Federal Specifications:

SS-S210A Sealing Compound Preformed Plastic for Pipe Joints

422.04 DESIGN AND SUBMISSIONS REQUIREMENTS

Section 422.04 of OPSS 422 is deleted and replaced with the following:

422.04.01 Working Drawings

The Contractor shall submit 3 sets (including a digital version in PDF format) of the box culvert Working Drawings to the Contract Administrator at least 3 weeks prior to commencement of fabrication, for information purposes only. Prior to making a submission, the seals and signatures of a design Engineer and a design-checking

Engineer (2 stamps) shall be affixed on the Working Drawings verifying that the drawings are consistent with the Contract Documents.

Where multi-discipline engineering work is depicted on the same Working Drawing and the design or design checking Engineer or both are unable to seal and sign the Working

Drawing for all aspects of the work, the drawing shall be sealed and signed by as many additional design and design-checking Engineers as necessary.

The Contractor shall coordinate and review all the associated required Working Drawings, including but not limited to the precast boxes and the reinforcing steel drawings for cast in place components, prior to submission to ensure that there is no conflict between various components or the required field work.

The Working Drawings shall include at least the following:

a) Design details

b) Fabrication details

c) Assembly details

d) Site number and date

422.04.02 Certificates of Conformance

422.04.02.01 Interim Inspection after Fabrication of Units

Upon completion of fabrication of units in each structure and prior to shipment from the fabrication facility, the Quality Verification Engineer shall conduct an Interim Inspection of the work to certify that the fabrication has been carried out in general conformance with the sealed and signed Working Drawings and Contract Documents.

422.04.02.02 Certificate of Conformance upon Completion of the Work

Upon completion of delivery and installation of all the units in each structure, the Contractor shall submit to the Contract Administrator a Certificate of Conformance sealed and signed by the Quality Verification Engineer. The Certificate shall state that the work has been carried out in general conformance with the contract documents.

422.05 MATERIALS

422.05.04 Precast Reinforced Concrete Box Units

Section 422.05.04 of OPSS 422 is deleted in its entirety and replaced with the following:

Precast reinforced concrete box units shall be according to the requirements of OPSS 1821 amended as follows:

1821.01 Scope

Section 1821.01 of OPSS 1821 is deleted and replaced with the following:

This specification covers the requirements for materials, design and fabrication of precast reinforced concrete culverts, including the cast-in-place concrete distribution slab.

1821.02 REFERENCES

Section 1821.02 of OPSS 1821 is amended by the addition of the following:

CSA Standards:

CSA S6-14	Canadian Highway Bridge Design Code (CL-625-ONT Live Loading) Including All Associated Supplements

Ministry of Transportation Publications:

Structural Manual (2016) - Division 1 - Exceptions to the Canadian Highway Bridge Design Code.

Other:

Ontario Concrete Pipe Association Publication – Prequalification Requirements for Precast Concrete Drainage Products.

1821.04 SUBMISSION AND DESIGN REQUIREMENTS

1821.04.02 Design Requirements

Subsection 1821.04.02 of OPSS 1821 is deleted and replaced with the following:

Design shall be completed in accordance with the CAN/CSA S6 and the Structural Manual, Division 1 for the appropriate placement under the fills provided for the culvert.

The minimum thickness for walls and slabs shall be 356 mm.

1821.05 MATERIALS

1821.05.03 Steel Reinforcement

Subsection 1821.05.03 of OPSS 1821 is deleted and replaced with the following:

The use of welded wire fabric or welded wire mesh is not permitted.

Steel reinforcing shall conform to OPSS 1440. Welding of reinforcing steel is not permitted unless approved in writing by the Contract Administrator. Haunch reinforcement is required.

1821.05.04 Associated Hardware

Subsection 1821.05.04 of OPSS 1821 is deleted and replaced with the following:

All support systems shall be capable of withstanding the loads to be placed on them. All embedded hardware within 35 mm of exposed faces shall be hot dip galvanized in accordance with CAN/CSA G164 or be of an acceptable non-metallic material.

Any holes or recesses provided in the culvert to suit fabrication or handling, including those required to accommodate lifting lugs or support systems shall be plugged using a cementitious grout.

Tie wire shall be 1.5 mm diameter annealed wire.

1821.07 PRODUCTION

1821.07.01 Prequalification

Subsection 1821.07.01 of OPSS 1821 is amended by the addition of the following:

Precast concrete box units shall be fabricated by a manufacturer certified in conformance to Ontario Concrete Pipe Association Publication – Prequalification Requirements for Precast Concrete Drainage Products.

1821.07.02 Manufacturer's Design Dimensions

1821.07.02.01 Design Tables

Clause 1821.07.02.01, Table 1 and Figure 1 of OPSS 1821 are deleted.

1821.07.02.02 Placement of Reinforcement

Clause 1821.07.02.02 of OPSS 1821 is deleted and replaced with the following:

The clear distance of the end perimeter reinforcement shall be not less than 35 mm or more than 50 mm from the ends of the box unit. The cover to reinforcing bars shall be 50 mm ± 15 mm. Boxes shall be reinforced with steel bars and shall be assembled with single layers of reinforcement in each face in each direction. Splices in the perimeter reinforcement shall be made by lapping and reinforcing steel shall not be lapped in tension zones.

422.05.07 Mortar

Subsection 422.05.07 of OPSS 422 is amended by deleting the first sentence and replacing it with the following:

Mortar for joints shall be according to OPSS 904.

422.05.08 Preformed Gasket

Subsection 422.05.08 is deleted and replaced with the following:

Flexible preformed gaskets shall conform to U.S. Federal Specification SS-S-210. Joint surface preparation, application, connection of sections and finishing shall be in accordance with the manufacturer's recommendations.

422.05.09 Joint Sealing Compound

Subsection 422.05.09 of OPSS 422 is deleted in its entirety and replaced with the following:

Joint sealing compound shall be as specified in the Contract Documents.

422.05.13 Bedding

Subsection 422.05.13 of OPSS 422 and Table 1 is deleted and replaced with the following:

Bedding shall be as specified in the Contract Documents and according to OPSS 902.

Clear stone shall be wrapped in geotextile with minimum overlap of 0.5 m.

422.05.14 Backfill

Subsection 422.05.14 of OPSS 422 is deleted in its entirety and replaced with the following:

Backfill shall be according to OPSS 902.

422.05.15 Cover

Subsection 422.05.15 of OPSS 422 is deleted in its entirety and replaced with the following:

Cover shall be as specified in the Contract Documents.

Section OPSS 422.05 of OPSS 422 is amended by the addition of the following Subsections:

422.05.16 Joints Between Box Units

The joints between adjacent precast box culvert units shall be treated as shown in the Contract Drawings.

422.05.17 Concrete Finishing

Concrete finishing shall be according to OPSS 904 with the exception of the following:

a) Use of a bridge deck finishing machine is not required.

b) The top surface of precast unit, against which new concrete is to be placed, shall be intentionally roughened while it is sufficiently plastic so that the depth of the indentations is at least 5 mm and the spacing not greater than 15 mm. All concrete surfaces against which new concrete is to be placed shall be clean, sound and free from any loose particles and laitance.

The following surface shall be abrasive blast cleaned according to OPSS 929, prior to shipping the unit:

a) Top portion of members against which new concrete is to be placed.

422.05.18 Unshrinkable Fill

Unshrinkable fill shall be according to OPSS 1359.

422.07 CONSTRUCTION

422.07.02 Excavation

Subsection 422.07.02 of OPSS 422 is amended by the addition of the following:

Lateral stability shall be maintained throughout the excavation and box unit installation. Soil cave-in into the excavation hole shall be prevented.

422.07.06 Foundations

Subsection 422.07.06 of OPSS 422 is deleted in its entirety and replaced with the following:

The box units shall be founded on competent in situ soil or compacted backfill with a minimum 150 mm thick tamped and level 9.5 mm dia. clear stone bedding on non-woven geotextile, or as specified in the Contract Documents. Clear stone bedding extending beyond box section shall have top covered additionally with geotextile.

When unsuitable material is encountered during excavation for the box units' foundation, the unsuitable material shall be removed to competent stratum and replaced to the foundation grade with compacted Granular "A" material.

The final founding elevations shall be as specified in the Contract Documents or an elevation approved in writing by the Contract Administrator.

422.07.09 Installing Box Units

422.07.09.01 Box Units

Section 422.07.09.01 of OPSS 422 is amended by deleting the fourth paragraph and replacing it with the following:

All precast box unit joints shall be provided with steel reinforced articulated ends such as bell and spigot. The box units shall be installed to make a continuous line forming a box culvert or box sewer. The gap at the box unit joints shall not exceed 15 mm. End units shall be as specified in the Contract Documents. All other units shall be a minimum of 0.914 m in length.

As part of the work, the contractor shall include fabrication, delivery, and installation of the following:

a) Precast site connections, wall drains, and associated accessories.

b) Construct dowel holes at precast culvert end unit's bottom slab and apron wall for installation of dowels.

c) Precast concrete apron walls, including supply and install of dowel and non-shrink grout to connect the apron wall together with the precast concrete culvert end units.

d) Fill over-excavation behind apron walls and at interface between precast concrete box and apron walls with fully compacted Granular "A".

e) Construct the corbels for the approach slab support as per detail in the Contract Documents and supply and install dowel at top slab.

f) Supply and install dowels for distribution slab as per detail in the Contract Documents, including cast-in-place couplers.

g) Scarify top surface for composite bond with distribution slab overlay.

All shall be as shown on the Contract Drawings.

422.07.09.02 Geotextile at Joints (Not Applicable)

Clause 422.07.09.02 of OPSS 422 is deleted in its entirety and replaced with the following:

Unless otherwise specified in the Contract Documents, a minimum 450 mm wide strip of self-adhering SBS rubbered composite asphalt waterproofing membrane including primer followed by a 900 mm cap sheet and protection board shall be placed to form a continuous barrier centered around the exterior of all buried joints.

422.07.11 Backfill

Subsection 422.07.11 of OPSS 422 is amended by deleting the second paragraph and replacing it with the following:

The Contractor shall be responsible for placing the backfill without any damage to or movement of the box culvert or box sewer. Backfill on each side of the box units shall be completed simultaneously. At no time shall the levels on each side differ by more than 500 mm.

422.07.12 Cover

Subsection 422.07.12 of OPSS 422 is amended by the addition of the following:

A reinforced cast-in-place concrete distribution slab with profiled surface shall be supplied and installed as per details in the Contract Documents. Supply and installation of this concrete shall meet the minimum requirements of OPSS.MUNI.930 for overlays and OPSS.MUNI.904.

422.07.16 Mechanical Couplers (Not Applicable)

The end units of the precast concrete box culvert shall come complete with mechanical couplers cast integral with the units.

422.07.17 Date and Site Identification Figures

All precast concrete box culverts shall be inscribed with one set of date figures and site numbers at the exposed ends of the first and last precast elements as specified in the Contract Documents. The plastic figures and site numbers shall be the responsibility of the Contractor.

422.10 BASIS OF PAYMENT

Subsection 422.10.01 of OPSS 422 is amended by the addition of the following items:

- **2200 x 1900 precast box culvert.**

5.0 PRECAST CONCRETE BLOCK RETAINING WALL

General

OPSS 1352 shall apply and govern except as amended or extended herein.

Scope of Work

The Contractor shall design, supply, and install precast concrete retaining wall system in accordance to the latest CAN/CSA S6, including the required foundation and granular backfill as indicated in the Contract Drawing.

Submission Requirements

Working Drawings

The Contractor shall submit 3 sets (including a digital version in PDF format) of the retaining wall system Working Drawings to the Contract Administrator at least 3 weeks prior to commencement of fabrication, for information purposes only. Prior to making a submission, the seals and signatures of a design Engineer and a design-checking Engineer (2 stamps) shall be affixed on the Working Drawings verifying that the drawings are consistent with the Contract Documents.

Where multi-discipline engineering work is depicted on the same Working Drawing and the design or design checking Engineer or both are unable to seal and sign the Working Drawing for all aspects of the work, the drawing shall be sealed and signed by as many additional design and design-checking Engineers as necessary.

The Contractor shall coordinate and review all the associated required Working Drawings prior to submission to ensure that there is no conflict between various components or the required field work.

The Working Drawings shall include at least the following:

d) Design details

e) Fabrication details

f) Assembly details

d) Site number and date

Certificates of Conformance

Upon completion of fabrication of units in each structure and prior to shipment from the fabrication facility, the Quality Verification Engineer shall conduct an Interim Inspection of the work to certify that the fabrication has been carried out in general conformance with the sealed and signed Working Drawings and Contract Documents.

Upon completion of delivery and installation of all the units in each structure, the Contractor shall submit to the Contract Administrator a Certificate of Conformance sealed and signed by the Quality Verification Engineer. The Certificate shall state that the work has been carried out in general conformance with the contract documents.

Design Requirements

Retaining walls shall be designed in accordance with CAN/CSA S-6 and shall be designed for a minimum of 75 year service life.

Materials

Section 904.05 of OPSS 904 shall apply.

Measurement

No measurement shall be made for this item.

Payment

Payment shall be made at the Lump Sum Price bid in the Form of Tender and shall be compensation in full for all labour, equipment, and materials required to complete this work as shown on the Contract Drawings.

6.0 CONCRETE DISTRIBUTION SLAB OVERLAY

OPSS.MUNI Forms 904 and 930 and 905 shall apply and govern except as amended or extended herein.

Amendments to OPSS.MUNI 904, November 2012

904.04 Design and Submission Requirements

Subsection 904.04.01 of OPSS.MUNI 904 is amended by the addition of the following clause:

904.04.01.06 Concrete Mix Design

The Contractor shall be responsible for the design of all proposed concrete mixes. Proposed mix designs shall be submitted to the Contract Administrator a minimum of two (2) weeks prior to placement of concrete.

The review of the design mixes by the Contract Administrator shall in no way relieve the Contractor of responsibility to provide concrete of the quality as required in the Contract Documents.

904.05 Materials

Subsection 904.05.01 of OPSS.MUNI 904 is amended by the addition of the following paragraph:

904.05.01 Concrete

All concrete shall meet CSA C-1 Exposure Class requirements.

Section 904.05 is amended by the addition of the following subsection:

904.05.15 Admixtures

Concrete admixtures shall be compatible with the concrete mix design and shall be listed in the MTO Designated Sources for Materials (DSM) list.

904.07 Construction
904.07.06 Placing of Concrete

The precast concrete shall be abrasive blasted prior to installation of the distribution overlay slab and OPSS 929 shall apply and govern.

Clause 904.07.06.02 of OPSS.MUNI 904 is amended by the addition of the following paragraphs:

904.07.06.02 Concrete Placing Restrictions

Concrete shall not be placed until all reinforcement and/or formwork has been inspected and approved by the Contract Administrator.

At the end of construction, all embedded hardware in the structures shall be either removed and/or the associated holes filled with an approved non-shrink grout or an approved equivalent material appropriate for this application.

Concrete shall not be placed when the air temperature or existing concrete surface temperature is below 5°C or likely to fall below 5°C, or is above 25°C or likely to rise above 25°C, throughout the duration of the concrete placing operation.

904.09 Measurement for Payment

Section 904.09 of OPSS.MUNI 904 is amended by deleting in its entirety and replacing it with the following:

Measurement

No measurement shall be made for this work.

904.10 Basis of Payment

Subsection 904.10 of OPSS.MUNI 904 is amended by deleting in its entirety and replacing it with the following:

Payment shall be made at the Lump Sum Price bid in the Form of Tender and shall be compensation in full for all labour, equipment, and materials required to complete this work as shown on the Contract Drawings.

7.0 WATERPROOFING MEMBRANE AND PROTECTION BOARD FOR JOINTS

Scope of Work

This specification covers the requirements for the complete preparation, supply and installation of proprietary self-adhering composite rubberized asphalt with high density polyethylene surface film and asphalt protection bond.

Products

Waterproofing to be Blueskin ® WP200 by Henry Company, MEL-ROL by W.R. Meadows or approved equal. Substrate primer and surface preparation shall be as per manufacturer's directions.

Protection board to be 6.4 mm thick VIBRAFLEX PC as manufactured by W.R. Meadows or approved equal.

Measurement

No measurement shall be made for this item.

Payment

Payment shall be made at the Lump Sum Price bid in the Form of Tender and shall be compensation in full for all labour, equipment, and materials required to complete this work as shown on the Contract Drawings.

8.0 CABLE CONCRETE MAT

Scope of Work

This specification covers the requirements for the complete supply, fabrication and installation of proprietary articulated block revetment system on embankment surfaces where depicted on the drawings.

Products

Articulate block revetment system CC 35 as manufactured by Cable Concrete; or approved equal.

Measurement

No measurement shall be made for this work.

Payment

Payment shall be made at the Lump Sum Price bid in the Form of Tender and shall be compensation in full for all labour, equipment and materials required to complete this work.

9.0 RIGID INSULATION

General

OPSS 1605 shall apply and govern except as amended or extended herein.

Scope of Work

Culvert pipe shall be supplied and installed as shown on the Contract Drawings including all joint connection plates and anchors and described herein and as noted on the Contract Drawings.

Materials

Section 1605.05 shall be amended with the following:

The minimum compressive strength shall be 415 kPa (60 psi) tested in accordance with ASTM D1621.

Measurement

No measurement shall be made for this item.

Payment

Payment shall be made at the Lump Sum Price bid in the Form of Tender and shall be compensation in full for all labour, equipment and materials required to complete this work.

10.0 PAVEMENT JOINT

General

OPSS Form 914 shall apply and govern except as amended or extended herein.

Scope of Work

This specification covers the requirements for the forming and filling of pavement joints.

The location and size of joints are shown on the Contract Drawings.

Pavement joints shall be installed within 7 days from final paving.

Pavement Joint

Where hot mix asphaltic concrete is carried directly over expansion and fixed joints and where specified in the Contract Documents, a rectangular groove shall be formed. This groove shall be made either by dry sawing or routing, with vertical sides, and be located directly over the joint for the full length of the joint.

Immediately prior to placing the hot-poured asphaltic sealing compound, the groove shall be dry and clean of any dust or debris using oil-free compressed air.

Cakes of joint sealing compound shall be melted on the job site and shall be continuously agitated in the mechanically agitated heating and mixing kettle. The contents shall be continuously agitated until the material can be drawn free flowing and lump free from the mixing kettle at a temperature within the range recommended by the manufacturer.

Joint sealing compound shall be poured using hand pouring pots, mechanical methods, or any other method that gives satisfactory results.

Shields shall be provided to prevent the compound from being spilled on the concrete curb, barrier or parapet walls, expansion joints, deck drains, and on the newly placed hot mix asphalt.

Sufficient joint sealing compound shall be poured into the groove so that upon completion of the work the surface of the compound is flush with the surface of the pavement. If the compound subsides to a level below the surface of the pavement, a second pouring shall be done. When more than one pouring is required to fill the groove, succeeding pours shall be made immediately.

Damage to the joint sealing compound caused by the Contractor's operation shall be repaired. Traffic shall not be permitted over the joint sealing compound until the compound has cooled to ambient temperature.

Related Ontario Standard Drawings

OPSD 552.010

Measurement

Measurement shall be made in lineal metres.

Payment

Payment shall be made at the Unit Price bid in the Form of Tender and shall be full compensation for all labour, equipment and materials required to complete this work.

11.0 CONCRETE SEALER

Scope of Work

This specification covers the requirements for the complete supply, preparation and installation of proprietary Silane Sealer (100%) on exposed cast-in-place concrete surfaces where depicted on the drawings.

Products

Master Protect H1000 as manufactured by BASF; or Sikagard ® SN100 as manufactured by Sika Canada; or approved equal.

Measurement

No measurement shall be made for this work.

Payment

Payment shall be made at the Lump Sum Price bid in the Form of Tender and shall be compensation in full for all labour, equipment, and materials required to complete this work as shown on the Contract Drawings.

12.0 PRECAST CONCRETE BOX CULVERT AND CUT-OFF WALLS

Amendment to OPSS 422, April 2004 (Reissued November 2010) and OPSS 1821, May 1993.

422.02 REFERENCES

Section 422.02 of OPSS 422 is amended by the addition of the following:

Ontario Provincial Standard Specifications, Material

OPSS 1359 Unshrinkable Backfill

CSA Standards

G164-M92 (R2003) Hot Dip Galvanizing of Irregularly Shaped Articles

ASTM International

C990-03 Standard Specifications for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants.
D75-94 Standard Practice for Random Sampling of Construction Material.
D3665-94 Standard Practice for Sampling Aggregates.

United States Federal Specifications:

SS-S210A Sealing Compound Preformed Plastic for Pipe Joints

422.04 DESIGN AND SUBMISSIONS REQUIREMENTS

Section 422.04 of OPSS 422 is deleted and replaced with the following:

422.04.01 Working Drawings

The Contractor shall submit 3 sets (including a digital version in PDF format) of the box culvert and cut-off walls Working Drawings to the Contract Administrator at least 3 weeks prior to commencement of fabrication, for information purposes only. Prior to making a submission, the seals and signatures of a design Engineer and a design-

checking Engineer (2 stamps) shall be affixed on the Working Drawings verifying that the drawings are consistent with the Contract Documents.

Where multi-discipline engineering work is depicted on the same Working Drawing and the design or design checking Engineer or both are unable to seal and sign the Working

Drawing for all aspects of the work, the drawing shall be sealed and signed by as many additional design and design-checking Engineers as necessary.

The Contractor shall coordinate and review all the associated required Working Drawings, including but not limited to the precast boxes and the reinforcing steel drawings for cast in place components, prior to submission to ensure that there is no conflict between various components or the required field work.

The Working Drawings shall include at least the following:

g) Design details

h) Fabrication details

i) Assembly details

d) Site number and date

422.04.02 Certificates of Conformance

422.04.02.01 Interim Inspection after Fabrication of Units

Upon completion of fabrication of units in each structure and prior to shipment from the fabrication facility, the Quality Verification Engineer shall conduct an Interim Inspection of the work to certify that the fabrication has been carried out in general conformance with the sealed and signed Working Drawings and Contract Documents.

422.04.02.02 Certificate of Conformance upon Completion of the Work

Upon completion of delivery and installation of all the units in each structure, the Contractor shall submit to the Contract Administrator a Certificate of Conformance sealed and signed by the Quality Verification Engineer. The Certificate shall state that the work has been carried out in general conformance with the contract documents.

422.05 MATERIALS

422.05.04 Precast Reinforced Concrete Box Units

Section 422.05.04 of OPSS 422 is deleted in its entirety and replaced with the following:

Precast reinforced concrete box units shall be according to the requirements of OPSS 1821 amended as follows:

1821.01 Scope

Section 1821.01 of OPSS 1821 is deleted and replaced with the following:

This specification covers the requirements for materials, design and fabrication of precast reinforced concrete culverts, including the cast-in-place concrete distribution slab.

1821.02 REFERENCES

Section 1821.02 of OPSS 1821 is amended by the addition of the following:

CSA Standards:

CSA S6-14	Canadian Highway Bridge Design Code (CL-625-ONT Live Loading) Including All Associated Supplements

Ministry of Transportation Publications:

Structural Manual (2016) - Division 1 - Exceptions to the Canadian Highway Bridge Design Code.

Other:

Ontario Concrete Pipe Association Publication – Prequalification Requirements for Precast Concrete Drainage Products.

1821.04 SUBMISSION AND DESIGN REQUIREMENTS

1821.04.02 Design Requirements

Subsection 1821.04.02 of OPSS 1821 is deleted and replaced with the following:

Design shall be completed in accordance with the CAN/CSA S6 and the Structural Manual, Division 1 for the appropriate placement under the fills provided for the culvert.

The minimum thickness for walls and slabs shall be 356 mm.

1821.05 MATERIALS

1821.05.03 Steel Reinforcement

Subsection 1821.05.03 of OPSS 1821 is deleted and replaced with the following:

The use of welded wire fabric or welded wire mesh is not permitted.

Steel reinforcing shall conform to OPSS 1440. Welding of reinforcing steel is not permitted unless approved in writing by the Contract Administrator. Haunch reinforcement is required.

1821.05.04 Associated Hardware

Subsection 1821.05.04 of OPSS 1821 is deleted and replaced with the following:

All support systems shall be capable of withstanding the loads to be placed on them. All embedded hardware within 35 mm of exposed faces shall be hot dip galvanized in accordance with CAN/CSA G164 or be of an acceptable non-metallic material.

Any holes or recesses provided in the culvert to suit fabrication or handling, including those required to accommodate lifting lugs or support systems shall be plugged using a cementitious grout.

Tie wire shall be 1.5 mm diameter annealed wire.

1821.07 PRODUCTION

1821.07.01 Prequalification

Subsection 1821.07.01 of OPSS 1821 is amended by the addition of the following:

Precast concrete box units shall be fabricated by a manufacturer certified in conformance to Ontario Concrete Pipe Association Publication – Prequalification Requirements for Precast Concrete Drainage Products.

1821.07.02 Manufacturer's Design Dimensions

1821.07.02.01 Design Tables

Clause 1821.07.02.01, Table 1 and Figure 1 of OPSS 1821 are deleted.

1821.07.02.02 Placement of Reinforcement

Clause 1821.07.02.02 of OPSS 1821 is deleted and replaced with the following:

The clear distance of the end perimeter reinforcement shall be not less than 35 mm or more than 50 mm from the ends of the box unit. The cover to reinforcing bars shall be 50 mm ± 15 mm. Boxes shall be reinforced with steel bars and shall be assembled with single layers of reinforcement in each face in each direction. Splices in the perimeter reinforcement shall be made by lapping and reinforcing steel shall not be lapped in tension zones.

422.05.07 Mortar

Subsection 422.05.07 of OPSS 422 is deleted.

422.05.08 Preformed Gasket

Subsection 422.05.08 is deleted.

422.05.09 Joint Sealing Compound

Subsection 422.05.09 of OPSS 422 is deleted in its entirety and replaced with the following:

Joint sealing compound shall be as specified in the Contract Documents.

422.05.13 Bedding

Subsection 422.05.13 of OPSS 422 and Table 1 is deleted and replaced with the following:

Bedding shall be as specified in the Contract Documents Specification 19.0.

422.05.14 Backfill

Subsection 422.05.14 of OPSS 422 is deleted in its entirety and replaced with the following:

Bedding shall be as specified in the Contract Documents Specification 19.0.

422.05.15 Cover

Subsection 422.05.15 of OPSS 422 is deleted in its entirety and replaced with the following:

Cover shall be as specified in the Contract Documents.

Section OPSS 422.05 of OPSS 422 is amended by the addition of the following Subsections:

422.05.16 Joints Between Box Units

The joints between adjacent precast box culvert units shall be treated as shown in the Contract Drawings.

422.05.17 Concrete Finishing

Concrete finishing shall be according to OPSS 904.

422.05.18 Unshrinkable Fill

Unshrinkable fill shall be according to OPSS 1359.

422.07 CONSTRUCTION

422.07.02 Excavation

Subsection 422.07.02 of OPSS 422 is amended by the addition of the following:

Lateral stability shall be maintained throughout the excavation and box unit installation. Soil cave-in into the excavation hole shall be prevented.

422.07.06 Foundations

When unsuitable material is encountered during excavation for the box units' foundation, the unsuitable material shall be removed to competent stratum and replaced to the foundation grade with compacted Granular "A" material.

The final founding elevations shall be as specified in the Contract Documents or an elevation approved in writing by the Contract Administrator.

422.07.09 Installing Box Units

422.07.09.01 Box Units

Section 422.07.09.01 of OPSS 422 is amended by deleting the fourth paragraph and replacing it with the following:

All precast box unit joints shall be provided with steel reinforced articulated ends such as bell and spigot. The box units shall be installed to make a continuous line forming a box culvert or box sewer. The gap at the box unit joints shall not exceed 15 mm. End units shall be as specified in the Contract Documents. All other units shall be a minimum of 0.914 m in length.

As part of the work, the contractor shall include fabrication, delivery, and installation of the following:

a) Precast site connections, wall drains, and associated accessories.

b) Construct dowel holes at precast culvert end unit's bottom slab and apron wall for installation of dowels.

c) Precast concrete apron walls, including supply and install of dowel and non-shrink grout to connect the apron wall together with the precast concrete culvert end units.

d) Fill over-excavation behind apron walls and at interface between precast concrete box and apron walls with fully compacted Granular "A".

e) Construct the corbels for the approach slab support as per detail in the Contract Documents and supply and install dowel at top slab.

f) Supply and install dowels for distribution slab as per detail in the Contract Documents, including cast-in-place couplers.

g) Scarify top surface for composite bond with distribution slab overlay.

All shall be as shown on the Contract Drawings.

422.07.09.02 Geotextile at Joints

Clause 422.07.09.02 of OPSS 422 is deleted in its entirety.

422.07.11 Backfill

Subsection 422.07.11 of OPSS 422 is amended by deleting the second paragraph and replacing it with the following:

The Contractor shall be responsible for placing the backfill without any damage to or movement of the box culvert or box sewer. Backfill on each side of the box units shall be completed simultaneously. At no time shall the levels on each side differ by more than 500 mm.

422.07.12 Cover

Subsection 422.07.12 of OPSS 422 is amended by the addition of the following:

A reinforced cast-in-place concrete distribution slab with profiled surface shall be supplied and installed as per details in the Contract Documents.

422.07.16 Mechanical Couplers (Not Applicable)

422.07.16 shall be deleted.

422.07.17 Date and Site Identification Figures

All precast concrete box culverts shall be inscribed with one set of date figures and site numbers at the exposed ends of the first and last precast elements as specified in the Contract Documents. The plastic figures and site numbers shall be the responsibility of the Contractor.

422.10 BASIS OF PAYMENT

Subsection 422.10.01 of OPSS 422 is amended by the addition of the following items:

Measurement

No measurement shall be made for this work.

Payment

Payment shall be made at the Lump Sum Price bid in the Form of Tender and shall be compensation in full for all labour, equipment and materials required to complete this work as shown on the Contract Drawings.

SITE BENCHMARKS

BM1– BRASS CAP, 23cm BELOW GRADE ON NORTH SHOULDER OF SOUTH TALBOT ROAD APPROXIMATELY 60m SOUTHEAST OF OF BRIDGE NO. 5 ACCESS FOR MUN. NO. 1400.

ELEVATION=188.05m

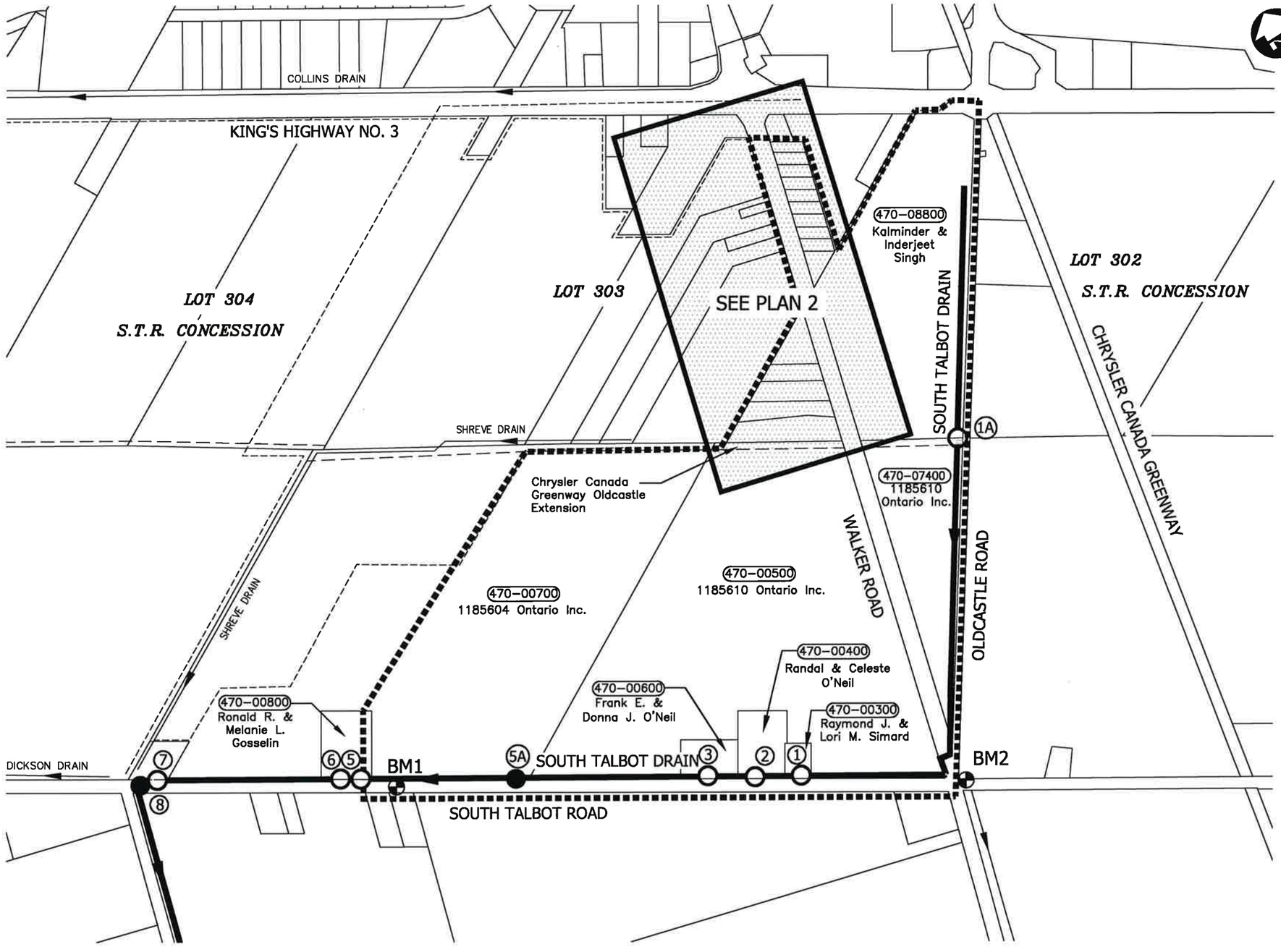
BM2– TOP OF NORTHWEST CORNER OF CONC. HEADWALL ON NORTHEAST CORNER OF WALKER ROAD & SOUTH TALBOT ROAD INTERSECTION.

ELEVATION=190.07m

NOTE: CONTRACTOR TO VERIFY BENCHMARKS PRIOR TO CONSTRUCTION.

LEGEND

- SOUTH TALBOT DRAIN WATERSHED BOUNDARY
- SOUTH TALBOT DRAIN
- OTHER DRAINS
- EXISTING BRIDGE
- BRIDGE REPLACEMENT/ NEW BRIDGE



OVERALL PLAN
SCALE=1:7,500

'SCHEDULE G'

LICENSED PROFESSIONAL ENGINEER
M. D. HERNANDEZ
100078099
March 8/19
PROVINCE OF ONTARIO

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No.	ISSUED FOR	DATE	BY
3	FINAL REPORT SUBMISSION	MAR. 11/19	MDH
2	PUBLIC INFORMATION CENTRE REVIEW	FEB. 13/19	MDH
1	CLIENT REVIEW	OCT. 1/18	MDH

DESIGN MDH	REVIEWED BY FRF
DRAWN WLB	CHECKED BY TRO
DATE MARCH 11, 2019	
SCALE AS SHOWN	

DILLON CONSULTING

PROJECT NO. 17-5749

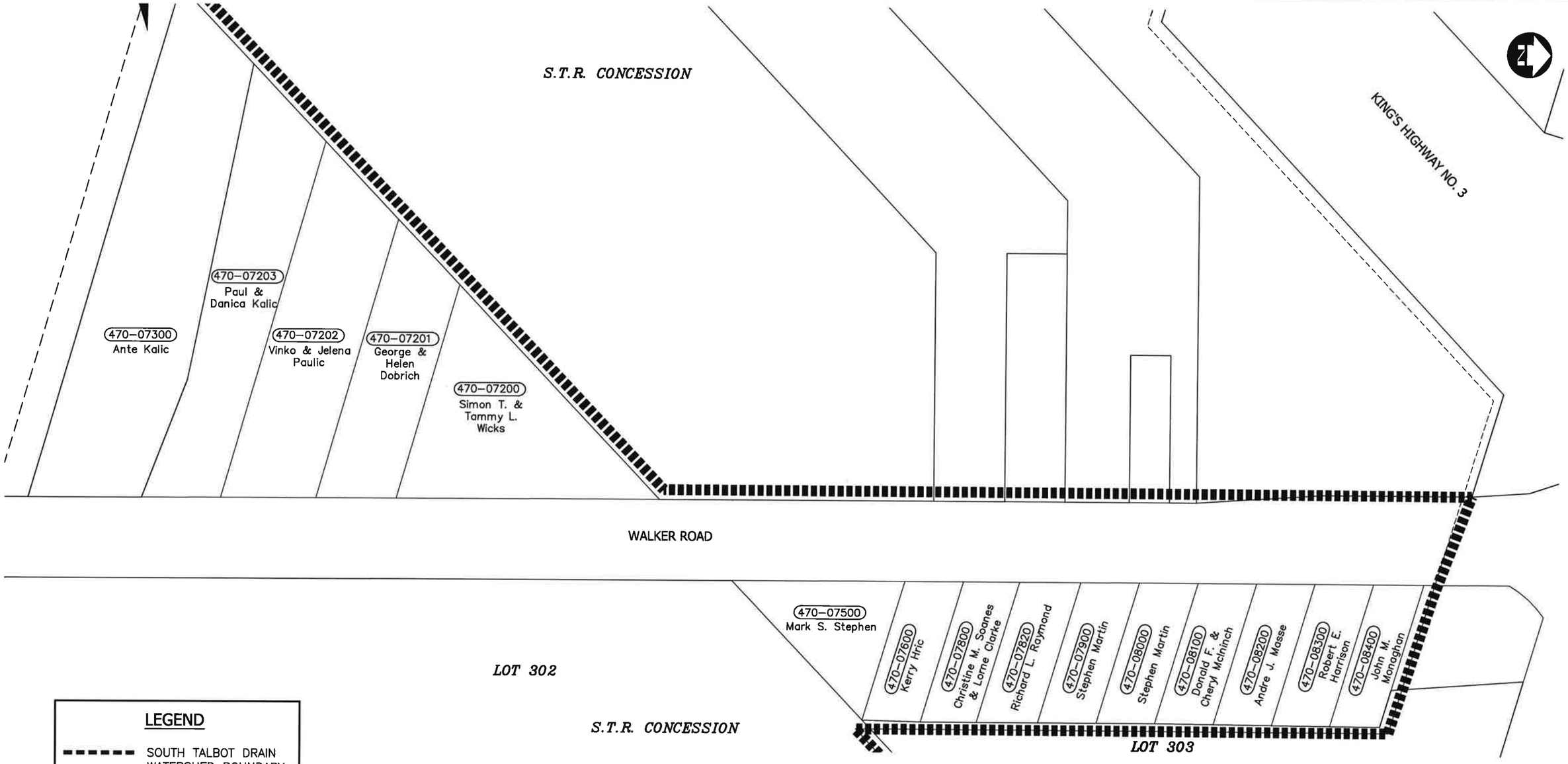
DRAWING SCALES BASED ON A 11" X 17" SHEET

Drainage Report for the
SOUTH TALBOT DRAIN
Town of Tecumseh

SHEET TITLE OVERALL PLAN

PAGE NO. 1 of 7

Mar 11, 2019 – 12:57pm C:\projectwise\working directory\active\33mlb\d05126888\175749-DRN-CON.dwg



PLAN 2
SCALE=1:1500

LICENSED PROFESSIONAL ENGINEER
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Mar 8/19
PROVINCE OF ONTARIO

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DATE MARCH 11, 2019	
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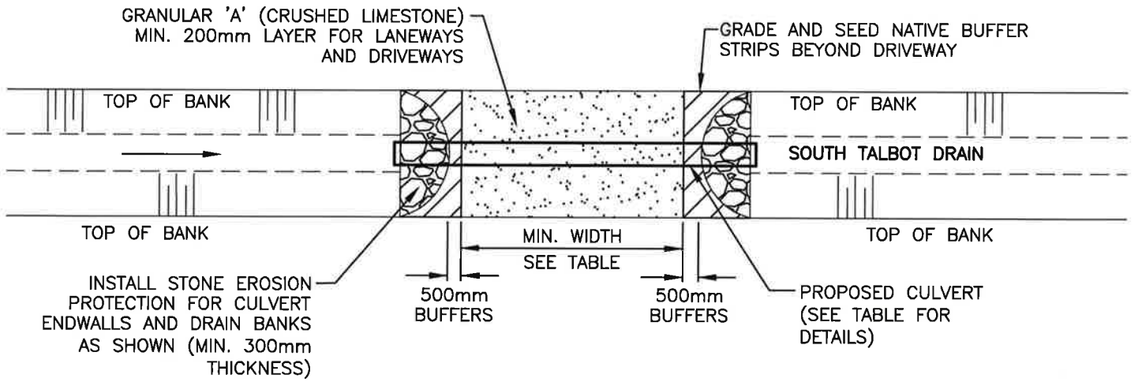
PROJECT NO. 17-5749

DRAWING SCALES BASED ON A 11" X 17" SHEET

'SCHEDULE G'

Drainage Report for the
SOUTH TALBOT DRAIN
Town of Tecumseh

SHEET TITLE PLAN 2



BRIDGE PLAN
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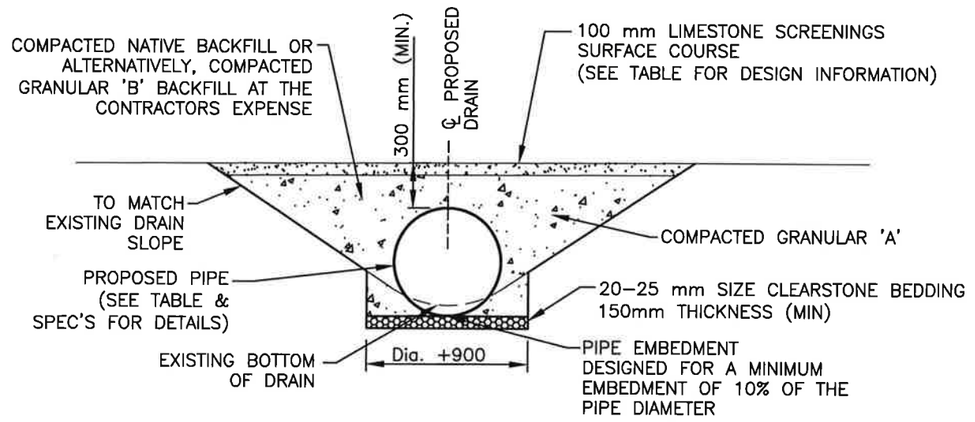

CROSS SECTION
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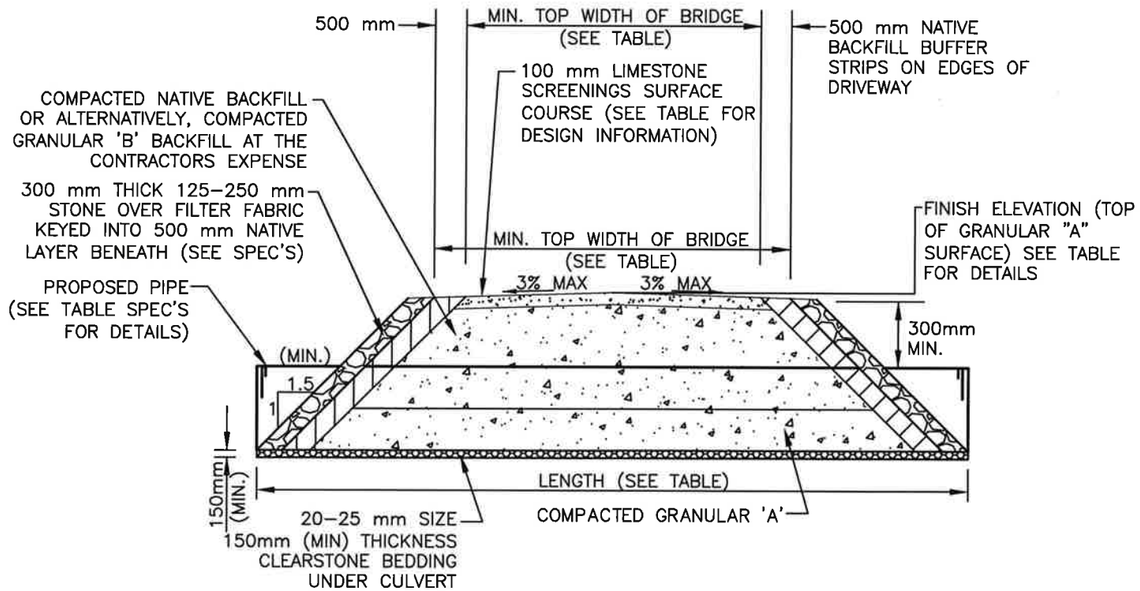

LONGITUDINAL SECTION
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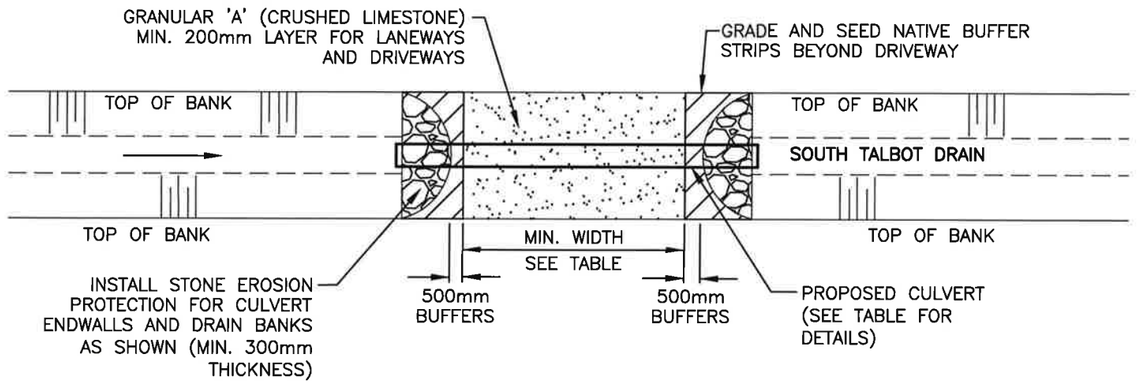
'SCHEDULE G'

Drainage Report for the
SOUTH TALBOT DRAIN
Town of Tecumseh

SHEET TITLE BRIDGE NO. 1A DETAILS

PAGE NO. 3 of 7



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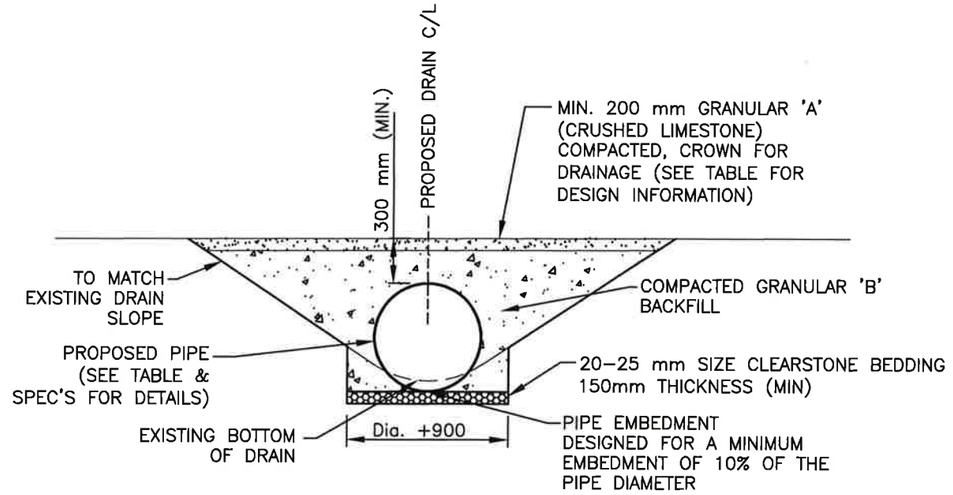

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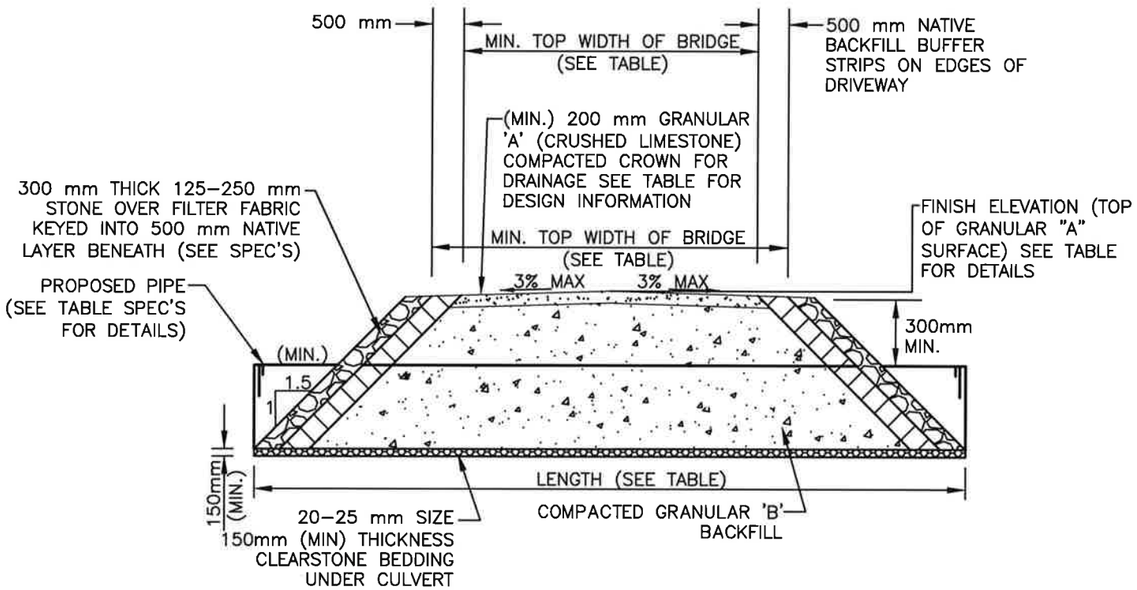

LONGITUDINAL SECTION
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TABLE 1 – DESIGN INFORMATION

DESCRIPTION	BRIDGE NO. 1A (FUTURE)	BRIDGE NO. 5A	BRIDGE NO. 8
PIPE INVERT ELEV. U/S SIDE(m)	188.78	186.96	185.93
PIPE INVERT ELEV. D/S SIDE(m)	188.76	186.94	185.93
TOP OF ℄ DRIVEWAY SURFACE ELEV. (m)	190.90	188.53	188.60
DRAIN BOTTOM (m) (DESIGN) (AT CENTRELINE OF CULVERT)	188.89	187.07	186.24
MIN. TOP WIDTH OF DRIVEWAY (m)	3.0	12.2	8.6
MIN. CULVERT GRADE (%)	0.10	0.10	0.00
CULVERT TYPE	CSP	CSP	BOX
CULVERT MATERIAL	ALUMINIZED	ALUMINIZED	PRECAST CONCRETE
CULVERT LENGTH (m)	16	19	22.4
CULVERT THICKNESS (mm)	2.8	2.8	–
CULVERT CORRUGATIONS (mm)	125 x 25	125 x 25	–
PIPE SIZE (mm)	1200	1200	2200x1900
CULVERT ENDWALL TYPE	SLOPED STONE	SLOPED STONE	CONC. BLOCK (N. END)
			SLOPED STONE (S. END)

LICENSED PROFESSIONAL ENGINEER
M. D. HERNANDEZ
100078099
PROVINCE OF ONTARIO

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Town of Tecumseh
SHEET TITLE BRIDGE NO. 5A DETAILS & DESIGN TABLE
PAGE NO. 4 of 7

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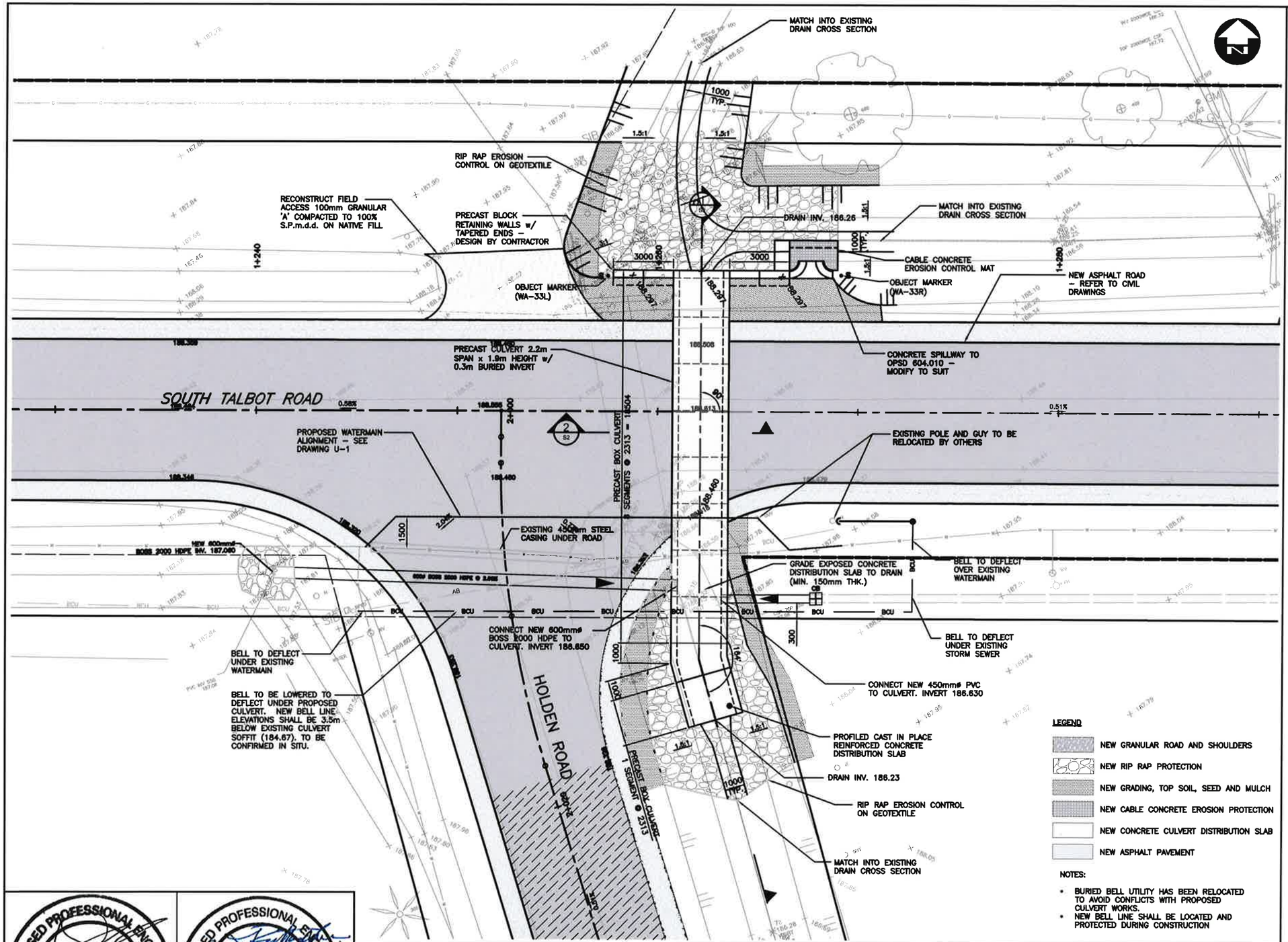

CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS OF THE PROPOSED WORK AND ALL DETAILS ON SITE AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. SOUTH TALBOT ROAD AND HOLDEN ROAD TO BE CLOSED DURING CONSTRUCTION. SEE SUGGESTED MINIMUM TRAFFIC DETOUR DRAWING FOR DETAILS.
3. BACKFILL SHALL BE PLACED SIMULTANEOUSLY AND COMPACTED IN LIFTS BEHIND BOTH SIDES OF CULVERT KEEPING THE HEIGHT OF FILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
4. ALL EXPOSED CONCRETE EDGES TO HAVE 20mm CHAMFER UNLESS NOTED OTHERWISE.
5. SUPPORTS FOR REINFORCING STEEL SHALL BE AS PER OPSD-3929.101 AND OPSD-3329.100 ON FORMED SURFACES. ON NON-FORMED SURFACES, CONCRETE BLOCKS (MIN. 20MPa) SHALL BE USED.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, CERTIFICATION, SUPPLY, AND INSTALLATION OF ALL PRECAST BRIDGE AND RETAINING WALL COMPONENTS. SUBMIT CERTIFIED SHOP DRAWINGS FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. DESIGN FOR CUT OFF WALL BY PRECAST SUPPLIER. REFER TO SPECIFICATIONS FOR FURTHER REQUIREMENTS.
7. THE CONTRACTOR SHALL ENSURE ALL WORK IS COMPLETED IN THE DRY. THE CONTRACTOR SHALL PROVIDE A TEMPORARY WATER CONVEYANCE SYSTEM AS SPECIFIED AND SHALL SUBMIT DESIGN DETAILS INCLUDING THE DEWATERING SCHEME FOR REVIEW AND APPROVAL BY THE ENGINEER AND ERCA PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. THE WORK AREA SHALL BE COMPLETELY ISOLATED FOR WORK IN THE DRY. SHOULD LARGER EXCAVATION BE REQUIRED, INCLUDE ALL ADDED COSTS FOR EXCAVATION AND GRANULAR FILL IN THIS ITEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING CREEK AND ROADSIDE DITCH FLOW THROUGH THE WORK AREA THROUGHOUT THE DURATION OF THE CONTRACT. TEMPORARY EARTHEN BERMS SHALL BE CONSTRUCTED TO A MAXIMUM HEIGHT OF 450mm AND PROTECTED AGAINST EROSION TO THE SATISFACTION OF ERCA.
8. CONTRACTOR TO LOCATE AND PROTECT ALL EXISTING UTILITIES WITH A METHOD APPROVED BY THE GOVERNING UTILITY.
9. DESIGN SOILS MINIMUM NET BEARING CAPACITIES MUST BE VERIFIED BY THE GEOTECHNICAL ENGINEER ON SITE IMMEDIATELY FOLLOWING EXCAVATION:
   @ULS = 225 kPa
   @SLS = 150 kPa
   REFER TO GEOTECHNICAL REPORT ENTITLED CULVERT REPLACEMENT (CULVERT NO.46) SOUTH TALBOT ROAD TECUMSEH, ONTARIO – NO. 1787469-R01 AS PREPARED BY GOLDER ASSOCIATES AND DATED NOVEMBER 2017.) PRECAST CULVERT SUPPLIER TO CONFIRM DESIGN BEARING ADEQUACY IN SHOP DRAWING SUBMISSION.
10. CLASS OF CONCRETE
    • 'C1' AS PER CSA A23.1
    • 35MPA (MIN.) UNLESS OTHERWISE NOTED
12. ALL STRUCTURES TO BE DESIGNED BY CONTRACTOR IN ACCORDANCE TO CAN/CSA-S6-14, CL625 (ONT) TRUCK
13. REINFORCING STEEL
    • REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
    • UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS B.
    • STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN OR DUPLEX 2205 AND HAVE A MINIMUM YIELD STRENGTH OF 500MPa UNLESS NOTED OTHERWISE.
    • BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS.
    • BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWING SS12-1 UNLESS INDICATED OTHERWISE.
    • REINFORCING STEEL TO BE PLACED IN PRECAST CONC. HAUNCHES
14. EXPOSED FACE OF PRECAST CULVERT END UNITS SHALL BE CAST WITHOUT BELL OR SPIGOT FOR AESTHETICS WITH EMBOSSED DATE OF CONSTRUCTION.
15. KEY SURFACE FINISH ELEVATIONS HAVE BEEN SHOWN ON THE PLAN. THE CONTRACTOR SHALL BE RESPONSIBLE TO GRADE THE ASPHALT FOR PROPER SURFACE DRAINAGE TO THE SATISFACTION OF THE ENGINEER.
16. LINE PAINTING BY OWNER TO BE COORDINATED BY CONTRACTOR PRIOR TO ROAD OPENING.

APPLICABLE STANDARD DRAWINGS

OPSD 552.010	CONCRETE PAVEMENT, JOINT DETAILS
OPSD 555.010	CONCRETE PAVEMENT – APPROACH TREATMENT TO HOT MIX AND COMPOSITE PAVEMENTS AND STRUCTURE APPROACHES
OPSD 604.010	90° CONCRETE OUTLET FOR CONCRETE CURB WITH GUTTER
OPSD 3390.100	DECK DRIP CHANNEL

'SCHEDULE G'

LICENSED PROFESSIONAL ENGINEER
D. M. KLASSEN
100191356
MARCH 11, 2019
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
N. RATTANAWANGCHAROEN
100527903
MARCH 11, 2019
PROVINCE OF ONTARIO

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SHEET TITLE: BRIDGE NO. 8 DETAILS S-1

PAGE NO. 5 of 7

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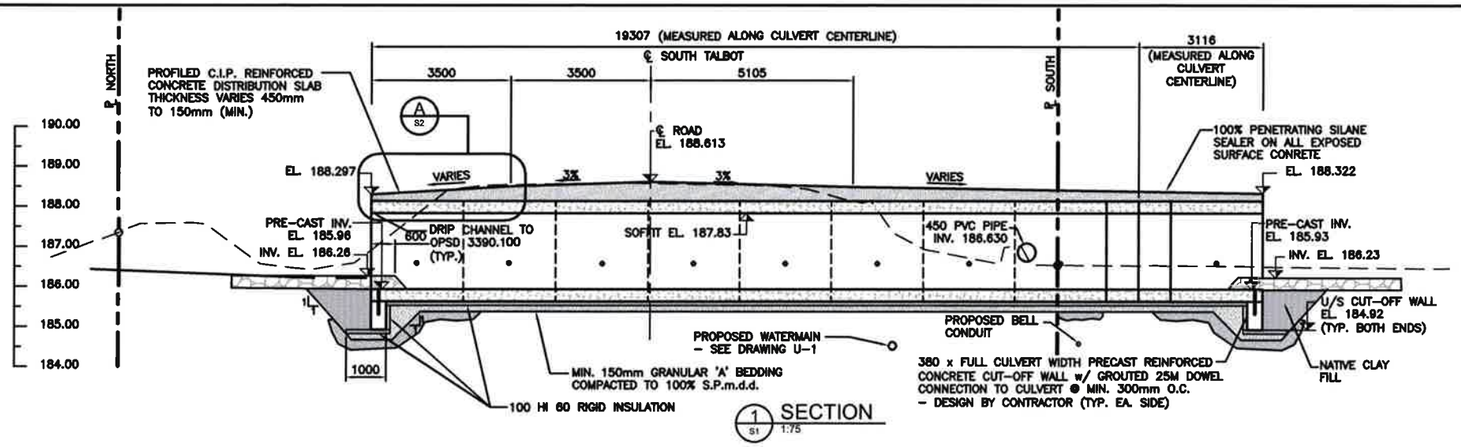
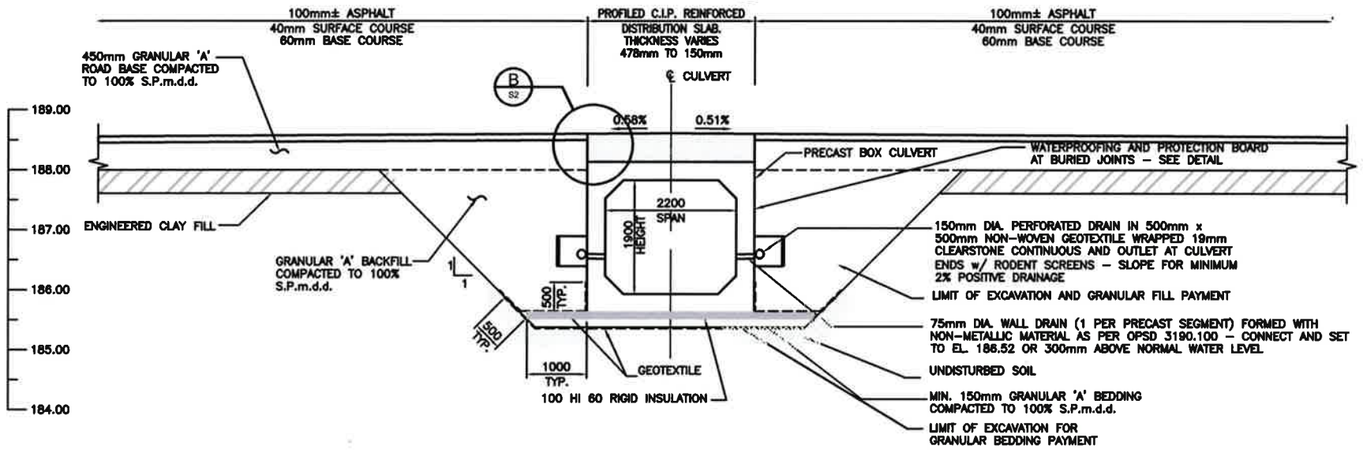
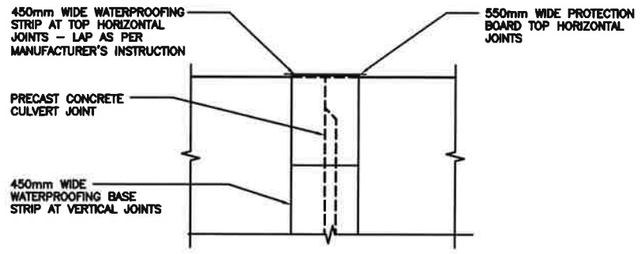


1 S1 SECTION 1:75

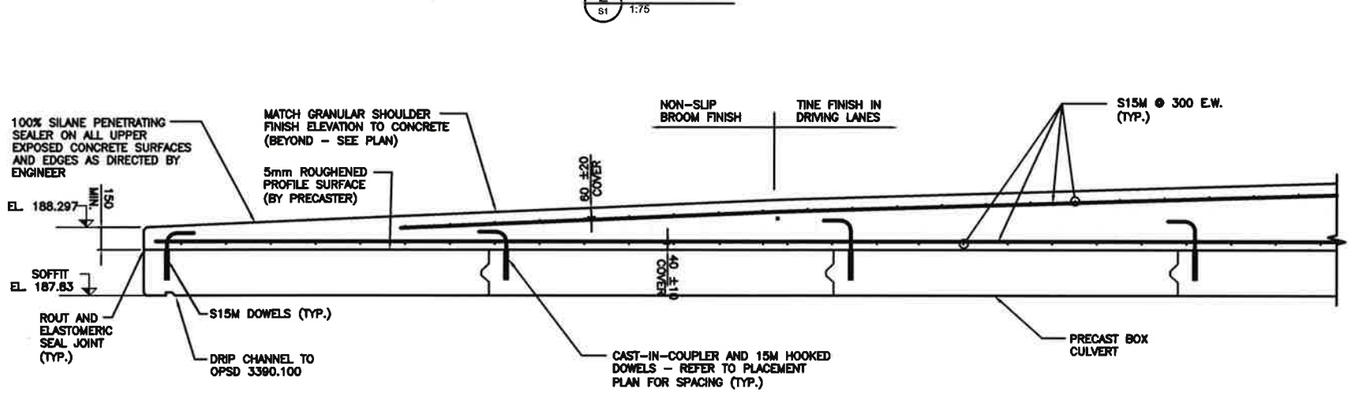


2 S1 SECTION 1:75

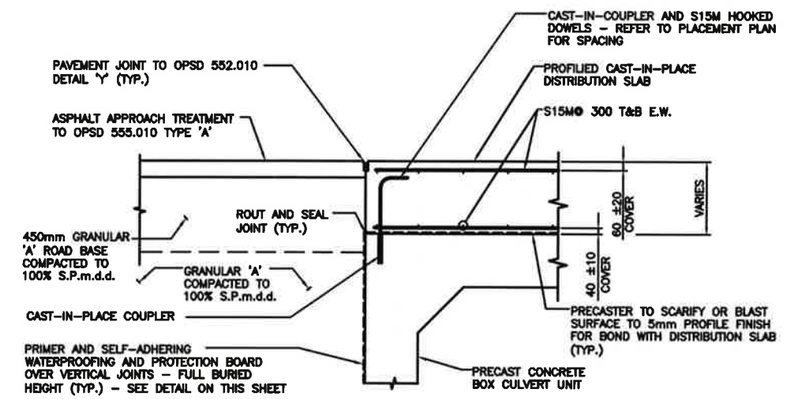
EXISTING AND PROPOSED CULVERT #46 INFORMATION		
	Existing 1.9m x 1.2m Concrete Box	Proposed 1.9m x 2.2m Concrete Box (0.3m embedment)
Upstream Drain Bottom (m)	186.26	186.26
Downstream Drain Bottom (m)	186.33	186.23
Upstream Culvert Invert (Buried) (m)	186.93	185.96
Downstream Culvert Invert (Buried) (m)	186.97	185.93
Length (m)	10.3	20.0
Slope (%)	-0.39	0.15



JOINT WATERPROOFING DETAIL 1:20



A S2 DETAIL 1:20



B S2 DETAIL 1:20

'SCHEDULE G'

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MARCH 11, 2019
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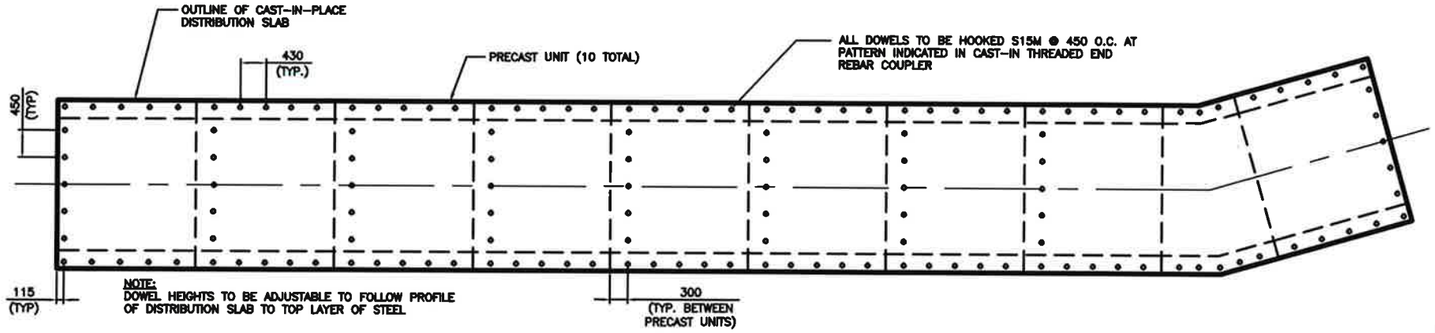
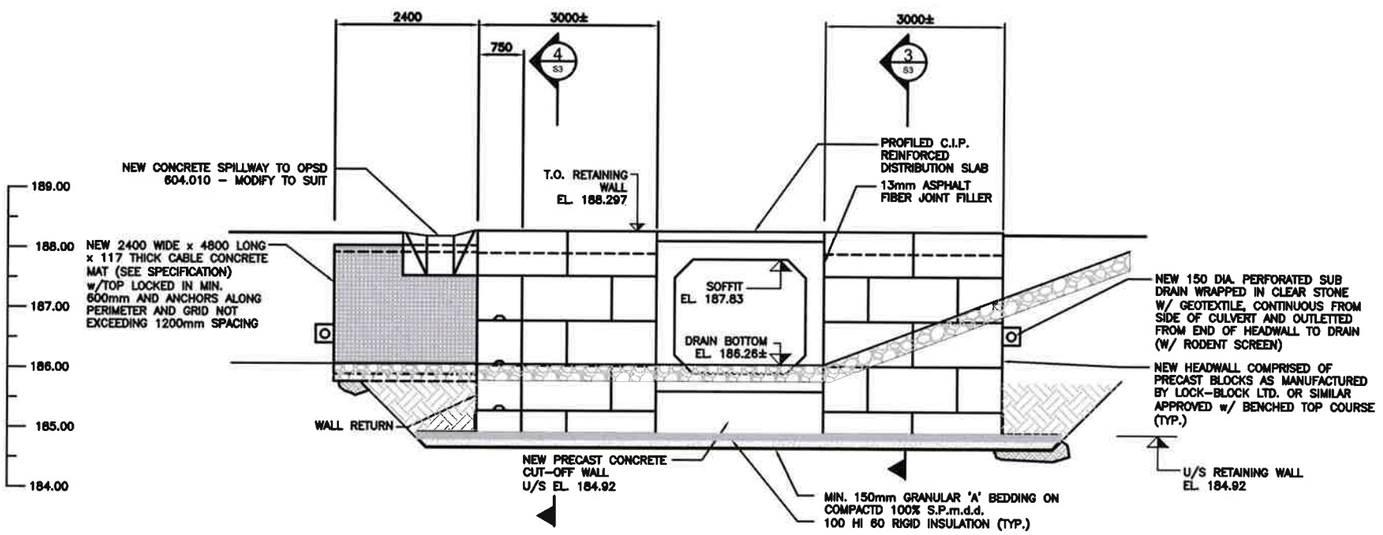


DOWEL PLACEMENT PLAN FOR DISTRIBUTION SLAB

1:50

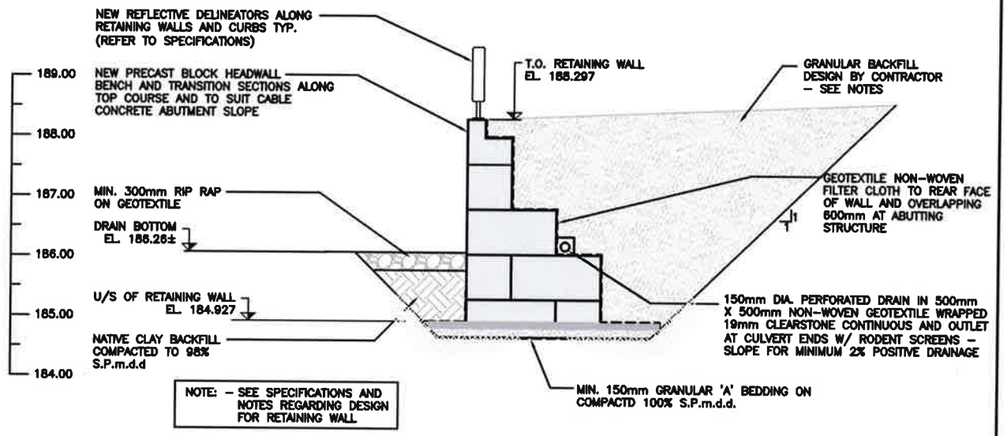


NORTH RETAINING WALL ELEVATION

1:50

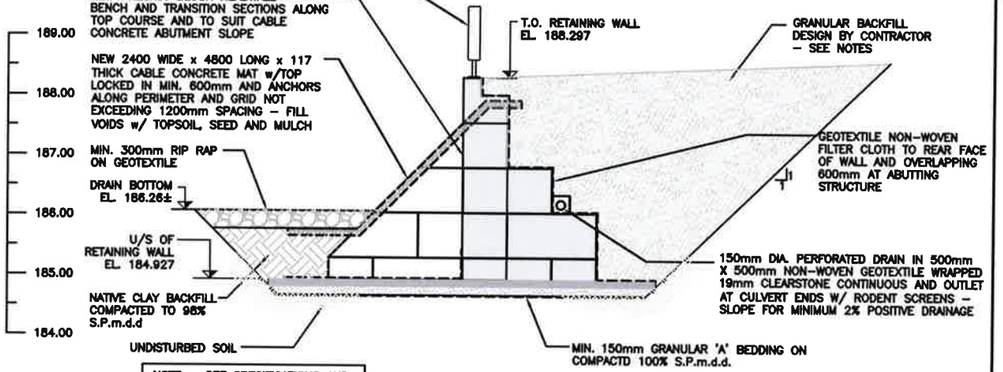
RETAINING WALL NOTES

1. RETAINING WALL SHALL BE DESIGNED BY CONTRACTOR IN ACCORDANCE TO CAN/CSA-S6.
2. DESIGN SHALL PROVIDE A 75 YEAR SERVICE LIFE.
3. DESIGN SHALL ADDRESS RETAINING WALL LOCATED WITHIN A WATERCOURSE. BACKFILL SHALL BE DESIGNED BY CONTRACTOR. COARSE BACKFILL WITHOUT FINES, WRAPPED IN GEOTEXTILE. MAY BE USED TO PREVENT LOSS OF BACKFILL.
4. TIED BACK AND REINFORCED EARTH SYSTEMS RETAINING WALLS WILL NOT BE ACCEPTABLE. SATURATED CONDITIONS SHALL BE CONSIDERED AND SATISFIED FOR ALL LOADING CONDITIONS
5. DESIGN SHALL ACCOMMODATE DIFFERENTIAL HYDROSTATIC PRESSURE.
6. PERFORMANCE TOLERANCE FOR THE RETAINING WALL IS 50mm (GLOBAL).



3 S3 RETAINING WALL SECTION

1:75



4 S3 RETAINING WALL SECTION

1:75

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