SHEPLEY DRAIN BANK REPAIRS

AND IMPROVEMENTS

Geographic Township of Colchester South

TOWN OF ESSEX
33 Talbot Street South
ESSEX, Ontario N8M 1A8
519-776-7336

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Project REI2022D018
2025-04-02

April 2nd, 2025

Mayor and Municipal Council
Corporation of the Town of Essex
33 Talbot Street South
Essex, Ontario
N8M 1A8

Mayor Bondy and Members of Council:

SHEPLEY DRAIN BANK REPAIRS
Stabilization and Improvements
Geographic Twp. of Colchester South
Project REI2022D018
Town of Essex, County of Essex

I. INTRODUCTION

In accordance with the instructions confirmed by letter of November 3rd, 2022, from your former Legal and Legislative Services Clerk, Robert Auger, we have prepared the following report that provides for repair and improvements of the open drain adjacent to the urban area, with ancillary work. The Shepley Drain comprises of an open drain generally located starting at Gore Road running northwest through private property then crossing Snake Lane and continuing through Harrow across County Road 13 to County Road 20 and then running west along the south side of County Road 20 to its outlet in the Richmond Drain, in the geographic township of Colchester South, Town of Essex. A plan showing the Shepley Drain alignment, as well as the general location of the current bank repairs and improvements along the drain, is included herein as part of the report.

Our appointment and the works relative to the repair and improvements to the Shepley Drain, proposed under this report, is in accordance with Section 78 of the "Drainage Act, R.S.O. 1990, Chapter D.17, as amended 2021". We have performed all of the necessary survey, investigations, etcetera, for the proposed repairs and improvements to the drain, and we report thereon as follows.

II. BACKGROUND

From our review of the information provided from the Town's drainage files we have established the following reports that we utilized as reference for carrying out this project:

1)	December 5th, 2017	Shepley Drain – Chisholm Bridge and Maintenance Schedule	Gerard Rood, P.Eng.
2)	January 22nd, 2009	Essex Outlet Drain Bank Improvements Report & Plans	Gerard Rood, P.Eng.
3)	October 27th, 2003	Shepley Drain Repair and Improvement Plan & Profile King Street Bend	Gerard Rood, P.Eng.
4)	April 29th, 1999	Shepley Drain Stability Report	James D. Rodger, P.Eng.
5)	September 22nd, 1997	Shepley Drain Widening Report	David McGeorge, P.Eng.
6)	May 5th, 1993	Shepley Drain Maintenance Schedule	Nick J. Peralta, P.Eng.
7)	October 14th, 1983	Shepley Drain Report and Plans for Repair and Improvements	Maurice Armstrong, P.Eng.

The 1983 report by M. Armstrong, P.Eng. provided for general repairs and improvements to the entire length of the drain and has the latest profile for the grading of the drain. The 1997 report by David McGeorge, P.Eng. provided for widening a stretch of the drain just south of County Road 20 to where the drain turns easterly. We referred to the 2017 Maintenance Schedule of Assessment by Gerard Rood, P.Eng. to determine the watershed limits and owners affected.

We arranged with the Town to provide us with the updated assessment roll information for the affected parcels. We also reviewed reports for the abutting drains and spoke to the owners to help in establishing the current watershed limit for the Shepley Drain.

III. PRELIMINARY EXAMINATION AND ON-SITE MEETING

After reviewing all of the available drainage information and documentation provided by the Drainage Superintendent, we arranged with Town staff to schedule an on-site meeting for December 15th, 2022. The following people participated in said meeting: Richard Kehl, Kevin Sinn, Andrew Russell, Garnet Talbot, Laurie McGhee, Bobby Whitehead, Craig Borkowski, Ed Pohanka, Mike Pillon, Bonny and Garry Quick, Rick Walters, Carl and Lucille McDonald, Herb Fox, James Bryant (E.R.C.A.), Ashley Gyori (E.R.C.A.), Tanya Tuzlova (Drainage Clerk), Lindsay Dean (Drainage Superintendent), and Gerard Rood (Rood Engineering).

Ms. Dean did an introduction of the purpose of the meeting and introduced all participants. We provided a brief history of the Shepley Drain to the Owners as set out in the background information above. We advised them of the various solutions that are typically considered for the bank slumping problem that has arisen here including:

a) reinforcement of the drain bank by placement of rock protection at the toe and up the side slope of the drain adjacent to the roadways and residential properties.
b) reinforcement of the drain bank by placement of a sheet pile metal wall at the toe and rock protection up the side slope of the drain adjacent to the roadways and residential properties.

c) reinforcement of the drain bank by placement of precast concrete blocks at the toe and rock protection up the side slope of the drain adjacent to the roadways and residential properties.

Mr. Rood explained the process of preparing a drainage report and Mr. Rood outlined the usual procedure and estimated time. Mr. Rood asked the Town and owners to provide information on any drainage changes that they might be aware of. The latest maintenance schedule of assessment will be used for determining and assessing the work to the drain.

It was discussed that all trees within the drain cross section from top of bank to top of bank will be removed to prevent obstruction of drainage. The west and south side of the drain will be used west of Erie Street and from the north and east side to the east of Erie Street for primary access to carry out the work and dispose of material. Material excavated along lawn areas will be done from the roadside or agricultural field and will be trucked away as needed. It was clarified that owners pay a portion of the cost if adjacent to the work area or upstream of the work. The Town is addressing the owners needs to restore the drain to an adequate capacity in the proposed work areas under this report and to stabilize the banks with block walls and bank resloping to a flatter side slope to maintain proper drainage and provide protection of residential properties and agricultural lands for those owners that have requested the work to be done at this time.

The overall drainage report procedure, future maintenance processes and grant eligibility were generally reviewed with the owners. They were also advised that the works will be subject to the approval of the Department of Fisheries and Oceans (D.F.O.), the Ministry of Natural Resources and Forestry (M.N.R.F.), the Ministry of Environment, Conservation and Parks (M.E.C.P.), and the Essex Region Conservation Authority (E.R.C.A.). We further discussed drain maintenance, sizing, and material of the proposed repairs and improvements.

IV. FIELD SURVEY AND INVESTIGATIONS

Following the on-site meeting we arranged for our survey crew to attend at the site and perform a topographic survey, including taking the necessary levels and details to establish the design parameters for the installation of any new bank stabilization from the outlet of the drain upstream to the drain location adjacent to the south park area at the Harrow arena. Design options for bank stabilization were established and provided to the Town. The Town sent out information and questionnaire to affected residents in the urban area for getting input on which option was preferred and to confirm which residents wanted to proceed with work to stabilize the drain bank along their parcel. Some site meetings were held with owners to discuss their questions on the proposed works.

A benchmark was looped from previous work carried out on the drain and was utilized in establishing site benchmarks along the length of the drain. We surveyed the entire length of the drain for the work area described above and picked up the existing bridges and culvert elevations in order to establish a design grade profile for the drain repairs and improvements. We also took

cross-sections of the Shepley Drain, as necessary for us to complete our design calculations, estimates and specifications.

The Town made initial submissions to the Essex Region Conservation Authority (E.R.C.A.) regarding their requirements for work that would be proposed to be carried out on the Shepley Drain to be repaired and improved. A response from the Conservation Authority was received via email on October 14th, 2022, from E.R.C.A. and stated that the Shepley Drain is located within a regulated area administered by E.R.C.A. and accordingly, a permit or approval will be required by E.R.C.A. for any repairs and/or maintenance works to the Drain.

D.F.O. information was checked, and no concerns were found, but we have included mitigation measures for aquatic species and habitat protection in **Appendix "REI-A"** that needs to be followed if any concerns arise. Former Ministry of Natural Resources & Forestry (M.N.R.F.) agreements are replaced with new legislation provisions under Ontario Regulation 242/08, Section 23.9 administered by the Ministry of Environment, Conservation and Parks (M.E.C.P.), which allows repairs, maintenance, and improvements to be conducted by the Town within existing municipal drains. These works are exempt from Sections 9 and 10 of the Endangered Species Act provided that the rules in the regulations are followed by the Town and their contractor. When eligible, the new regulations allow Municipalities to give notice to M.N.R.F. by registering their drainage activities through an online registry system.

For the purposes of establishing the watershed area of the Shepley Drain, and determining the drain repairs required, we investigated and reviewed the past drainage reports on the Shepley Drain and completed our field survey of the drain portion in the urban area identified as having concerns.

V. FINDINGS AND RECOMMENDATIONS

We find that the profile included in the 1983 report plans by engineer Maurice Armstrong provides a good fit to the existing profile of the drain. Said report provided for improvements to the open drain that still appear to suit the current conditions of the watershed. We also reviewed the David McGeorge report that provided for drain bottom widening for a portion of the drain where it extends south from County Road 20 to where it turns easterly.

Based on our detailed survey, investigations, examinations, and discussions with the affected property owners, and from the feedback that the Town received on the questionnaire with bank stabilization options sent to the owners, we would recommend that the Shepley Drain banks be repaired and improved at designated locations to the general parameters as established in our design drawings and specifications attached herein. The options used in this report were the ones selected by the majority of owners. For residential lots the bank stabilization will comprise of precast concrete blocks wall at the toe of the bank slope and rock on filter cloth above the wall. Along open and agricultural lands the work will comprise of resloping the drain bank to a two horizontal to 1 vertical slope with topsoil, grass seed and mulch applied.

During the course of our investigations, this drainage project was discussed and reviewed with E.R.C.A., to deal with any Authority issues and comments related to this Municipal drain. The drain is located within the Regulated Area and is under the jurisdiction of the E.R.C.A., and therefore all work has to comply with the current mitigation provisions of the E.R.C.A. Details of these mitigation measures are included in the Specifications and **Appendix "REI-A"** forming part of this report.

As part of our investigations, a D.F.O. self screening assessment of the project was carried out. The mapping indicated no species at risk or critical habitat for the area of the drain work. The D.F.O. Species at Risk screening maps confirm that there are no Species at Risk Fish or Mussels identified in this area. Should any species be encountered, details of required mitigation measures are included in the Specifications and **Appendix "REI-A"** forming part of this report.

As is now required under the new Endangered Species Act, 2007 Provincial Legislation administered by the Ministry of Environment, Conservation & Parks (M.E.C.P.), we have reviewed the former M.N.R.F. agreement with the Town. Because turtles and snakes are mobile and snakes are indicated as sensitive in the area, we have included herein a copy of the M.N.R.F. mitigation requirements for them in **Appendix "REI-B"**. The M.N.R.F. mapping on the Natural Heritage Information Centre (N.H.I.C.) website has basically confirmed that there are no foreseen impacts expected to natural heritage features; therefore, a permit or agreement under the E.S.A. 2007 is not necessary at this time. The Contractor for the work will be required to monitor the works for the species concerns as shown on the summary list from the N.H.I.C. website in **Appendix "REI-B"** and protect any listed species that are discovered.

Providing mitigation requirements are implemented it was concluded that present wildlife Species at Risk will be protected from negative impacts and will not contravene with Section 9 (species protection) or Section 10 (habitat protection) of the Endangered Species Act, 2007. Based on this information we find that the Town can proceed with the eligible repairs, maintenance, and improvements to the drain as they are exempt under Sections 9 and 10 of the Act, provided that they follow the rules within Ontario Regulation 242/08. To address these requirements the Town has established comprehensive mitigation measures as well as species identification guides for reference. Copies of the measures and guides shall be provided to the successful Tenderer for use during construction, and these documents are available for viewing by any interested parties at the Town office.

We would also recommend that the drain repairs and improvements, for which the maintenance costs are to be shared with the upstream lands and roads within the watershed, be maintained by the Town and that said maintenance would include repairs and improvements to the banks of the drain and ancillary works. If any fencing, gate, decorative walls, guard rails or special features exist that will be impacted by the maintenance work, they are also to be removed and restored or replaced as part of the maintenance work. However, the cost of the removal and restoration or replacement, if necessary, of any special features, shall be totally assessed to the benefiting adjoining owner(s) served by said drain maintenance.

Based on all of the above, we recommend that the Shepley Drain be repaired and improved, in accordance with this report, the attached specifications and the accompanying drawings, and that all works associated with same be carried out in accordance with Section 78 of the "Drainage Act, R.S.O. 1990, Chapter D.17 as amended 2021".

VI. ALLOWANCES

We have provided that all of the work on the open drain will generally be completed from open lands along each side of the drain. The Contractor will be required to restore any existing grassed buffer and driveway areas damaged by the work. We recommend that any materials removed from the open drain, be spread on the adjacent open lands along the drain by the Contractor, beyond the limits of any existing grass buffer or driveway access and materials from other areas are to be disposed of by the Contractor. Based on all of the above we find that allowances for land taken, and damages to the land are payable pursuant to Sections 29 and 30 of the Drainage Act.

We find that the provision of access along the open banks of the drain and spreading of excavated material on the abutting farm and open or non-residential lands requires payment for the land necessary to carry out same. For grassed access areas the Contractor will be required to restore with topsoil, seed and mulch and hence, minor allowances are provided to these owners to offset any work they need to do to establish final satisfactory restoration such as watering and fertilizing. Also, to maintain the 2:1 slope on the drain bank, a part of property would be utilised. We therefore recommend that the following owners be compensated for all work areas that will be impacted, including for the land taken, access to the drain and for damages to lands and crops, if any, as follows, namely:

1)	Windsor EEG Laboratory Inc., (710-03000),	Land taken	Part of Lot 7, Concession Gore,	$	1,038.00
2)	Windsor EEG Laboratory Inc., (710-03000),	Damages	Part of Lot 7, Concession Gore,	$	1,683.00
3)	AFF Farms Limited, (710-00700),	Land Taken	Part of Lot 7, Concession Gore,	$	988.00
4)	AFF Farms Limited, (710-00700),	Damages	Part of Lot 7, Concession Gore,	$	726.00
5)	Aaron & Sarah Swartz, (710-03200),	Land Taken	Part of Lot 7, Concession Gore,	$	741.00

6)	Aaron & Sarah Swartz, (710-03200),	Damages	Part of Lot 7, Concession Gore,	$	363.00
7)	Maria & Manuel Gomes, (970-02200),	Land Taken	Part of Lot 12, Concession Gore,	$	2,511.00
8)	Maria & Manuel Gomes, (970-02200),	Damages	Part of Lot 12, Concession Gore,	$	615.00
9)	Town of Essex, (980-00300)	Damages	Part of Lot 12, Concession Gore,	$	489.00
TOTAL FOR ALLOWANCES AND DAMAGES				**$**	**9,154.00**

These values for allowances and damages are based on a strip of land parallel to and immediately adjacent to the drain or grassed buffer and driveway, for the parcel abutting the open side of the Municipal drain and are based on a value of $1,225.00 per acre ($3,027.00 per hectare) for the affected lands and crops, if any. These allowances provide for a spread depth of 100mm and are calculated using a rate per acre of $700.00 for year one, $350.00 for year two and $175.00 for the third year. The impact after 3 years is considered negligible. The land taken allowance for farm parcels and grassed residential areas is based on $20,000.00 per acre as per Farm Credit Canada information.

Since the work on this drain for some areas will generally be limited to the area of the drain and the adjacent roadway, and since all damaged areas are to be restored as set out in the Specifications, we find that there is no requirement for allowances pursuant to Section 29 and 30 of the Drainage Act for work done on the drain along roadways.

We have provided for this in our estimate as is provided for under Sections 29 and 30 of the "Drainage Act, R.S.O. 1990, Chapter D.17, as amended 2021".

VII. ESTIMATE OF COST

Our estimate of the Total Cost of this work for the precast concrete block and rock on filter cloth option and flatter side slopes of the drain for parcels that have requested the work, including all incidental expenses, is the sum of **TWO HUNDRED EIGHTY NINE THOUSAND FIVE HUNDRED DOLLARS ($289,500.00),** made up as follows:

CONSTRUCTION

Item 1) **Station 0+550.0 to Station 0+750.0**; Excavate drain and slope west bank to 2 to 1 including all levelling, grading,

	topsoil, seeding, mulching, and restoration, approximately 200 lineal metres.			
	EEG Laboratory Inc.	Lump Sum	$	5,000.00
Item 2)	**Station 0+750.0 to Station 0+950.0;** Excavate drain and slope south bank to 2 to 1 including all levelling, grading, topsoil, seeding, mulching, salvage and reinstall rock, and restoration, approximately 200 lineal metres.			
	AFF Farms Limited	Lump Sum	$	5,250.00
Item 3)	**Station 0+950.0 to Station 1+100.0;** Excavate drain and slope south bank to 2 to 1 including all levelling, grading, topsoil, seeding, mulching, salvage and reinstall rock, and restoration, approximately 150 lineal metres.			
	Aaron & Sarah Swartz	Lump Sum	$	4,750.00
Item 4)	**Station 1+119.0 to Station 1+375.0;** Excavate drain and slope north bank to 2 to 1 including all levelling, grading, topsoil, seeding, mulching, salvage and reinstall rock, and restoration, approximately 256 lineal metres.			
	Maria Gomez	Lump Sum	$	7,400.00
Item 5)	**Station 1+375.0 to Station 1+625.0;** Excavate drain and slope east and north bank to 2 to 1 including all loading, hauling and disposal, levelling, grading, topsoil, seeding, mulching, salvage and reinstall rock, and restoration, approximately 250 lineal metres.			
	Town of Essex	Lump Sum	$	8,750.00
Item 6)	**Station 0+584.5 to Station 0+601.9;** Supply and install 17.4 lineal metres of bank protection including front wall of 2 courses of decorative precast concrete blocks on filter cloth and 300mm thick rip rap on filter cloth extending 3 metres from top of blocks toward bank top, decorative precast concrete block wingwalls on each end, including excavation, shaping, compaction, topsoil, seed and mulch, materials, placement and restoration, complete.			
	Kevin & Jamie Bessette	Lump Sum	$	15,250.00
Item 7)	**Station 0+674.0 to Station 0+705.0;** Supply and install 31.0 lineal metres of bank protection including front wall of 2 courses of decorative precast concrete blocks on filter cloth and 300mm thick rip rap on filter cloth extending 3 metres from top of blocks toward bank top, decorative			

	precast concrete block wingwalls on each end, including excavation, shaping, compaction, topsoil, seed and mulch, materials, placement and restoration, complete. Carl & Lucille McDonald and Brandon Smith & Jaycee Teves	Lump Sum	$	26,500.00
Item 8)	**Station 0+803.3 to Station 0+819.8;** Supply and install 16.5 lineal metres of bank protection including front wall of 2 courses of decorative precast concrete blocks on filter cloth and 300mm thick rip rap on filter cloth extending 3 metres from top of blocks toward bank top, decorative precast concrete block wingwalls on each end, including excavation, shaping, compaction, topsoil, seed and mulch, materials, placement and restoration, complete. Brian & Virginia Pollard	Lump Sum	$	14,500.00
Item 9)	**Station 0+852.7 to Station 0+885.6;** Supply and install 32.9 lineal metres of bank protection including front wall of 2 courses of decorative precast concrete blocks on filter cloth and 300mm thick rip rap on filter cloth extending 3 metres from top of blocks toward bank top, decorative precast concrete block wingwalls on each end, including excavation, shaping, compaction, topsoil, seed and mulch, materials, placement and restoration, complete. Jamie & Laurie McGhee and Steven Bakker & Julie Ann Edwards	Lump Sum	$	28,900.00
Item 10)	**Station 0+918.6 to Station 0+951.5;** Supply and install 32.9 lineal metres of bank protection including front wall of 2 courses of decorative precast concrete blocks on filter cloth and 300mm thick rip rap on filter cloth extending 3 metres from top of blocks toward bank top, decorative precast concrete block wingwalls on each end, including excavation, shaping, compaction, topsoil, seed and mulch, materials, placement and restoration, complete. Carla Teran and Renee White	Lump Sum	$	28,900.00
Item 11)	**Station 1+013.5 to Station 1+032.6;** Supply and install 19.1 lineal metres of bank protection including front wall of 2 courses of decorative precast concrete blocks on filter cloth and 300mm thick rip rap on filter cloth extending 3 metres from top of blocks toward bank top, decorative precast concrete block wingwalls on each end, including			

	excavation, shaping, compaction, topsoil, seed and mulch, materials, placement and restoration, complete. Community Living Essex County	Lump Sum	$	16,750.00
Item 12)	Tree removal, brushing and grubbing including all disposal and clean up (approximately 1075 lineal metres), removing and replacing fences, complete.	Lump Sum	$	16,500.00
Item 13)	Spread scavenged topsoil; carry out seeding and mulching on all newly excavated side slopes including all harrowing, raking, preparation, and clean up, complete.	Lump Sum	$	15,400.00
Item 14)	Estimated net Harmonized Sales Tax (1.76% H.S.T.) on construction items above.	Lump Sum	$	3,411.76
Item 15)	Contingency amount for construction.	Lump Sum	$	7,738.24
	TOTAL FOR CONSTRUCTION		**$**	**$205,000.00**

INCIDENTALS

1)	Report, Estimate, & Specifications	$	12,500.00
2)	Survey, Assistants, Expenses, and Drawings	$	33,500.00
3)	Duplication Cost of Report and Drawings	$	1,000.00
4)	Estimated Cost of Letting Contract	$	1,000.00
5)	Estimated Cost of Layout and Staking	$	1,200.00
6)	Estimated Cost of Part-Time Supervision and Inspection During Construction (based on 16 day duration)	$	16,000.00
7)	Estimated Net H.S.T. on Incidental Items Above (1.76%)	$	1,148.00
8)	Estimated Cost of E.R.C.A. Permit	$	800.00

9)	Contingency Allowance	$	8,198.00
	TOTAL FOR INCIDENTALS	**$**	**75,346.00**
	TOTAL FOR ALLOWANCES (brought forward)	**$**	**9,154.00**
	TOTAL FOR CONSTRUCTION (brought forward)	**$**	**205,000.00**
	TOTAL ESTIMATE	**$**	**289,500.00**

IX. DRAWINGS AND SPECIFICATIONS

As part of this report, we have attached design drawings for the construction of the drain improvements. The design drawings show the subject improvement locations and the details of the work, as well as the approximate location within the watershed area. The drain design drawings are attached to the back of this report and are labelled **Appendix "REI-E"**.

Also attached, we have prepared Specifications which set out the required construction details for the drain repair and improvements, which also include Standard Specifications labelled therein as **Appendix "REI-C".**

X. SCHEDULE OF ASSESSMENT

We would recommend that the Total Cost for construction of this project, including incidental costs, be charged against the lands and roads affected in accordance with the attached Schedule of Assessment. On September 22nd, 2005, the Ontario Ministry of Agriculture and Food Affairs (O.M.A.F.A.) issued Administrative Policies for the Agricultural Drainage Infrastructure Program (A.D.I.P.). This program has re-instated financial assistance for eligible costs and assessed lands pursuant to the Drainage Act. Sections 85 to 90 of the Drainage Act allow the Minister to provide grants for various activities under said Act. Sections 85 and 87 make it very clear that grants are provided at the discretion of the Minister. Based on the current A.D.I.P., "lands used for agricultural purposes" may be eligible for a grant in the amount of 1/3 of their total assessment. The new policies define "lands used for agricultural purposes" as those lands eligible for the "Farm Property Class Tax Rate". The Town provides this information to the Engineer from the current property tax roll. Properties that do not meet the criteria are not eligible for grants. In accordance with same we expect that this project will be qualified for the grant normally available for agricultural lands. The Ministry, however, is continually reviewing their policy for grants, and we recommend that the Town monitor the policies, and make application to the

Ministry for any grant should same become available through the A.D.I.P. program or other available funds.

XI. FUTURE MAINTENANCE

When maintenance work is carried out in the future to stabilize drain banks using the concrete block design within the area of the Shepley Drain reviewed under this report, the cost for said future maintenance shall be assessed with half (50%) of the cost as a Special Benefit to the adjacent residential land benefiting from the bank protection preventing erosion of their rear and side yards, and the balance to upstream lands and roads based on the current maintenance schedule of assessment that exists for the drain or any future updates to same pursuant to the Drainage Act. The Special Benefit assessment shall be applied to any residential parcel that has its rear yard abutting the drain and that needs their bank portion stabilized when requested by the residential owner. When future maintenance work is carried out on the open drain including the areas with 2:1 bank slopes, the amount of assessment to the affected Owners shall be based on the actual future maintenance cost shared on a pro-rata basis with the Benefit and Outlet Liability values in the current assessment schedule. The above provisions for maintenance cost sharing shall remain in effect as noted above unless modified under a new drainage report pursuant to the "Drainage Act, R.S.O. 1990, Chapter D.17, as amended 2021".

All of which is respectfully submitted.

***R**ood **E**ngineering **I**nc.*

Gerard Rood

Gerard Rood, P.Eng.

REGISTERED PROFESSIONAL ENGINEER
G.ROOD
2025-04-01
PROVINCE OF ONTARIO

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att.

ROOD ENGINEERING INC.
Consulting Engineers
9 Nelson Street
LEAMINGTON, Ontario N8H 1G6

SCHEDULE OF ASSESSMENT
SHEPLEY DRAIN BANK REPAIRS
Town of Essex

3. MUNICIPAL LANDS:

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Hectares Owned	Acres Afft'd	Hectares Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
		County Road 20		4.80	1.943	County of Essex	$ -	$ 795.00	$ -	$ 795.00
		County Road 13		8.08	3.270	County of Essex	$ -	$ 2,038.00	$ -	$ 2,038.00
		Gore Road		6.90	2.792	Town of Essex	$ -	$ 4,524.00	$ -	$ 4,524.00
		Snake Lane		5.00	2.023	Town of Essex	$ -	$ 1,964.00	$ -	$ 1,964.00
		Ferris Road		3.54	1.433	Town of Essex	$ -	$ 945.00	$ -	$ 945.00
		Kael Crescent		0.20	0.081	Town of Essex	$ -	$ 3.00	$ -	$ 3.00
		Harrow Centre Roads		54.36	21.999	Town of Essex	$ -	$ 23,733.00	$ -	$ 23,733.00
980-00300	Gore	12		13.06	5.285	Town Of Essex	$ -	$ 32.00	$ -	$ 32.00
		Total on Municipal Lands					**$ -**	**$ 34,034.00**	**$ -**	**$ 34,034.00**

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS:

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Hectares Owned	Acres Afft'd	Hectares Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
		Harrow Centre Lands		247.72	100.251	Town of Essex	$ -	$ 55,280.00	$ -	$ 55,280.00
630-13300	1	56	0.209	0.52	0.210	Hailey Trealout & Jaremy Mayville & Sheri Mayville	$ -	$ 174.00	$ -	$ 174.00
630-13301	1	57	0.415	1.03	0.417	Catherine Gaspar	$ -	$ 273.00	$ -	$ 273.00
630-13410	1	57	1.011	2.50	1.012	James Wright	$ -	$ 663.00	$ -	$ 663.00
630-13440	1	58	0.917	2.27	0.919	Tyler Ryersee & Hailey Broadwell	$ -	$ 601.00	$ -	$ 601.00
630-13710	1	60	0.248	0.61	0.247	Terry Dube & Kristi Taylor	$ -	$ 199.00	$ -	$ 199.00
630-13900	1	62	0.563	1.39	0.563	Russell & Kimberly Gyori	$ -	$ 298.00	$ -	$ 298.00
640-32300	1	66	0.706	1.74	0.704	Peter & Patricia McKeen	$ -	$ 346.00	$ -	$ 346.00
640-32400	1	66	0.921	2.28	0.923	Christopher & Linda Palmer	$ -	$ 298.00	$ -	$ 298.00

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Hectares Owned	Acres Afft'd	Hectares Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
640-32701	1	64	0.227	0.56	0.227	Kevin Carter	$ -	$ 149.00	$ -	$ 149.00
640-32750	1	63	0.465	1.15	0.465	Jerome & Rose Ferriss	$ -	$ 100.00	$ -	$ 100.00
640-32850	1	63	0.416	1.03	0.417	Philip Jr & Eleonore Kroh	$ -	$ 89.00	$ -	$ 89.00
700-00101	1	58	0.735	1.82	0.737	Hardeep Saund, Mandeep Sembhi & Mandeep Kaur	$ -	$ 204.00	$ -	$ 204.00
700-00106	1	58	7.357	18.18	7.357	UCG Land Inc.	$ -	$ 2,038.00	$ -	$ 2,038.00
700-00300	1	60 & 61	0.949	2.34	0.947	Joan & Martin Bansky	$ -	$ 262.00	$ -	$ 262.00
700-00400	1	61	0.203	0.50	0.202	Steven & Tonya Hammel	$ -	$ 149.00	$ -	$ 149.00
700-00609	Gore	11	0.547	1.35	0.546	Colleen & Michael Cox	$ -	$ 256.00	$ -	$ 256.00
700-00695	Gore	11	1.682	4.16	1.684	Edmund & Sherri Winter	$ -	$ 788.00	$ -	$ 788.00
700-00900	Gore	11	0.350	0.86	0.348	Gordon & Brenda Dunn	$ -	$ 190.00	$ -	$ 190.00
700-01000	Gore	11	0.584	1.44	0.584	Loraine Crosby	$ -	$ 224.00	$ -	$ 224.00
700-01100	Gore	11	3.513	8.68	3.513	Michael & Roberta Pillon	$ -	$ 764.00	$ -	$ 764.00
700-01200	Gore	11	0.877	2.17	0.877	Gale Williams	$ -	$ 273.00	$ -	$ 273.00
700-01309	Gore	14	0.209	0.52	0.210	Vincent & Helen Klomp	$ -	$ 149.00	$ -	$ 149.00
700-01700	Gore	13	0.171	0.42	0.170	Gerald Vigneux	$ -	$ 99.00	$ -	$ 99.00
700-01800	Gore	13	0.076	0.19	0.077	Christine Leal	$ -	$ 75.00	$ -	$ 75.00
700-01900	Gore	13	0.435	1.08	0.437	Andrew & Barbara Spurdza	$ -	$ 250.00	$ -	$ 250.00
700-01950	Gore	13	0.309	0.76	0.308	Maureen Hess	$ -	$ 199.00	$ -	$ 199.00
700-02001	Gore	13	0.372	0.92	0.372	Robin Cadieux-Grayson	$ -	$ 199.00	$ -	$ 199.00
700-02150	Gore	10	19.683	48.64	19.684	Felix Weigt-Bienzle & Susan Weaver	$ -	$ 4,052.00	$ -	$ 4,052.00
700-02201	Gore	10	0.374	0.92	0.372	Robert & Danne Whitehead	$ -	$ 229.00	$ -	$ 229.00
700-02290	Gore	10	0.371	0.92	0.372	Lynne & Rainer Pahl	$ -	$ 228.00	$ -	$ 228.00
700-02401	Gore	9	0.325	0.80	0.324	James Bryant & & Ashley Gyori	$ -	$ 199.00	$ -	$ 199.00
700-03100	Gore	9	11.170	27.60	11.170	Colchester Bay Inc.	$ -	$ 1,862.00	$ -	$ 1,862.00
700-03104	Gore	9	0.165	0.41	0.165	Austin Vojvodin & Maria Quiring	$ -	$ 98.00	$ -	$ 98.00
700-03200	Gore	12	8.695	21.49	8.695	Richard & Cheryl Huczel	$ -	$ 1,143.00	$ -	$ 1,143.00
700-03210	Gore	12	0.223	0.55	0.223	Derek & Julie Hedges	$ -	$ 108.00	$ -	$ 108.00

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700-03220	Gore	8	0.223	0.55	0.223	Christopher & Roseann O'Keefe	$ -	$ 108.00	$ -	$ 108.00
700-03231	Gore	8	2.339	5.78	2.339	1552843 Ontario Ltd.	$ -	$ 1,014.00	$ -	$ 1,014.00
700-03250	Gore	7	0.223	0.55	0.223	Brian & Elizabeth Yaciuk	$ -	$ 108.00	$ -	$ 108.00
700-03300	Gore	12	0.336	0.83	0.336	2740599 Ontario Inc.	$ -	$ 149.00	$ -	$ 149.00
700-03400	Gore	12	0.437	1.08	0.437	Teresa Pereira	$ -	$ 149.00	$ -	$ 149.00
700-03450	Gore	12	0.344	0.85	0.344	Bradley & Alice Laporte	$ -	$ 167.00	$ -	$ 167.00
700-03470	Gore	12	0.344	0.85	0.344	2275694 Ontario Inc.	$ -	$ 167.00	$ -	$ 167.00
700-03500	Gore	12	0.329	0.81	0.328	Owl Management Inc.	$ -	$ 160.00	$ -	$ 160.00
700-03550	Gore	12	0.602	1.49	0.603	Harrow Health Centre Inc.	$ -	$ 292.00	$ -	$ 292.00
700-04800	1	58	0.247	0.61	0.247	Michael Daum	$ -	$ 199.00	$ -	$ 199.00
710-02900	Gore	6	1.020	2.52	1.020	Garry & Bonny Quick	$ -	$ 495.00	$ -	$ 495.00
710-03300	Gore	7	0.139	0.34	0.138	Jordan Castro & Dayna St. Louis	$ -	$ 75.00	$ -	$ 75.00
710-03400	Gore	7	0.147	0.36	0.146	Margaret Hennessey	$ -	$ 75.00	$ -	$ 75.00
710-03500	Gore	7	0.153	0.38	0.153	Margaret Hennessey	$ -	$ 75.00	$ -	$ 75.00
710-03600	Gore	7	0.802	1.98	0.801	Kyle & Lloyd Lefaive & Laura Gentili	$ -	$ 224.00	$ -	$ 224.00
710-03700	Gore	7	0.816	2.02	0.817	Roger Cadieux & Rachel Oliver	$ -	$ 224.00	$ -	$ 224.00
710-03800	Gore	7	0.163	0.40	0.162	Teresa Durand	$ -	$ 75.00	$ -	$ 75.00
710-03900	Gore	7	0.140	0.35	0.142	Ronald & Deborah Tofflemire	$ -	$ 75.00	$ -	$ 75.00
710-04000	Gore	7	0.677	1.67	0.676	Jose Matos	$ -	$ 174.00	$ -	$ 174.00
710-04100	Gore	7	0.614	1.52	0.615	Jose & Joana Roberto	$ -	$ 174.00	$ -	$ 174.00
710-04101	Gore	7	0.113	0.28	0.113	Dean Adam & Tania Morin	$ -	$ 75.00	$ -	$ 75.00
710-04200	Gore	7	0.127	0.31	0.125	Patrick & Judy Ford	$ -	$ 75.00	$ -	$ 75.00
710-04300	Gore	7	0.267	0.66	0.267	Richard & Mary Sinasac	$ -	$ 149.00	$ -	$ 149.00
710-04400	Gore	7	0.151	0.37	0.150	Michael Ferriss	$ -	$ 75.00	$ -	$ 75.00
710-04500	Gore	7	0.129	0.32	0.130	Bradley Swarts	$ -	$ 75.00	$ -	$ 75.00
710-04600	1504	9	0.130	0.32	0.130	Brent & Sarah Scratch	$ -	$ 75.00	$ -	$ 75.00
710-04700	1504	8	0.129	0.32	0.130	Erin Gall	$ -	$ 75.00	$ -	$ 75.00

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Hectares Owned	Acres Afft'd	Hectares Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
710-04800	1504	7	0.128	0.32	0.130	Antonio Gomes & Diane Bondy	$ -	$ 75.00	$ -	$ 75.00
710-04900	1504	6	0.129	0.32	0.130	Timothy & Jacqueline Shepley	$ -	$ 75.00	$ -	$ 75.00
710-05000	1504	5	0.129	0.32	0.130	Preston Weaver	$ -	$ 75.00	$ -	$ 75.00
710-05100	1504	4	0.129	0.32	0.130	Sarah Rocheleau	$ -	$ 75.00	$ -	$ 75.00
710-05200	1504	3	0.130	0.32	0.130	Robyn & Matthew Shaften	$ -	$ 75.00	$ -	$ 75.00
710-05300	1504	2	0.109	0.27	0.109	Colin McVittie	$ -	$ 75.00	$ -	$ 75.00
710-06420	Gore	8	1.054	2.60	1.052	Eric & Karen Vanier	$ -	$ 273.00	$ -	$ 273.00
710-03100	Gore	7	0.473	1.17	0.473	Joseph & Susan Chisholm	$ -	$ 174.00	$ -	$ 174.00
710-03200	Gore	7	0.819	2.02	0.819	Aaron & Sarah Swartz	$ -	$ 224.00	$ 1,618.00	$ 1,842.00
940-01420	Gore	7	0.063	0.15	0.061	Kevin & Jamie Bessette	$ -	$ -	$ 10,388.00	$ 10,388.00
940-01743	Gore	7	0.057	0.14	0.057	Carl & Lucille McDonald	$ -	$ -	$ 9,025.00	$ 9,025.00
940-01744	Gore	7	0.057	0.14	0.057	Brandon Smith & Jaycee-Lee Teves	$ -	$ -	$ 9,025.00	$ 9,025.00
940-01748	Gore	7	0.063	0.15	0.061	Brian & Virginia Pollard	$ -	$ -	$ 9,877.00	$ 9,877.00
940-01751	Gore	7	0.063	0.15	0.061	Jamie & Laurie McGhee	$ -	$ -	$ 9,843.00	$ 9,843.00
940-01752	Gore	7	0.063	0.15	0.061	Julie Edwards & Steven Bakker	$ -	$ -	$ 9,843.00	$ 9,843.00
940-01755	Gore	7	0.063	0.15	0.061	Carla Arandia	$ -	$ -	$ 9,843.00	$ 9,843.00
940-01756	Gore	7	0.063	0.15	0.061	Renee White	$ -	$ -	$ 9,843.00	$ 9,843.00
940-01760	Gore	7	0.115	0.28	0.113	Community Living Essex County	$ -	$ -	$ 11,409.00	$ 11,409.00
970-02200	Gore	12	2.138	5.28	2.137	Maria & Manuel Gomes	$ -	$ -	$ 2,520.00	$ 2,520.00
		Total on Privately Owned - Non-Agricultural Lands.....					**$ -**	**$ 78,407.00**	**$ 93,234.00**	**$ 171,641.00**

5. PRIVATELY OWNED - AGRICULTURAL LANDS (grantable):

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Hectares Owned	Acres Afft'd	Hectares Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
630-09640	1	61	25.904	15.00	6.070	Shirley Reh-Dube	$ -	$ 1,069.00	$ -	$ 1,069.00
630-13250	1	56	12.243	19.48	7.883	Bonnefield Farmlands Ontario	$ -	$ 2,013.00	$ -	$ 2,013.00

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Hectares Owned	Acres Afft'd	Hectares Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
630-13500	1	58	19.653	27.80	11.251	Betty Agla , Catherine & Barbara Bansky & Linda Kavanaugh	$ -	$ 2,858.00	$ -	$ 2,858.00
630-13600	1	59	15.043	29.00	11.736	Allen & Scott McLean	$ -	$ 3,008.00	$ -	$ 3,008.00
630-13700	1	60	20.742	8.08	3.270	Terry Dube & Kristi Taylor	$ -	$ 845.00	$ -	$ 845.00
630-13800	1	61	18.955	25.75	10.421	Sammour Holdings Inc.	$ -	$ 2,660.00	$ -	$ 2,660.00
640-32301	1	67	34.892	25.00	10.117	Bernard & Martin Gorski	$ -	$ 2,187.00	$ -	$ 2,187.00
640-32500	1	65 & 66	16.665	41.18	16.665	Gorski Land Holdings Inc.	$ -	$ 3,554.00	$ -	$ 3,554.00
640-32800	1	64	0.251	0.62	0.251	Bernard Gorski	$ -	$ 60.00	$ -	$ 60.00
700-00100	1	58	9.021	22.29	9.021	Chun Shi & Xianglin Wu	$ -	$ 2,251.00	$ -	$ 2,251.00
700-00200	1	58	25.602	63.26	25.603	Jerry Fabok	$ -	$ 5,294.00	$ -	$ 5,294.00
700-00320	1	60 & 61	34.139	84.36	34.140	1808236 Ontario Limited	$ -	$ 7,652.00	$ -	$ 7,652.00
700-00500	1	61	8.927	22.06	8.928	David & Yvonne Hernandez	$ -	$ 1,988.00	$ -	$ 1,988.00
700-00600	1	62	4.050	10.01	4.051	Marilyn Boulton	$ -	$ 895.00	$ -	$ 895.00
700-00700	Gore	11	13.975	34.53	13.974	Edward & David Pohanka	$ -	$ 3,030.00	$ -	$ 3,030.00
700-00800	Gore	11	7.871	19.45	7.871	1808236 Ontario Limited	$ -	$ 1,690.00	$ -	$ 1,690.00
700-01300	Gore	11	12.596	31.13	12.596	David & Laura Jenner	$ -	$ 2,684.00	$ -	$ 2,684.00
700-01400	Gore	14	14.912	5.00	2.023	Mary Hrutka	$ -	$ 447.00	$ -	$ 447.00
700-01600	Gore	11	9.550	23.60	9.551	Michael & Amy Flanagan	$ -	$ 1,856.00	$ -	$ 1,856.00
700-02000	Gore	13	20.026	49.48	20.024	John & Roberta Mailloux	$ -	$ 3,697.00	$ -	$ 3,697.00
700-02100	Gore	13	10.021	24.76	10.020	James Lamoure	$ -	$ 2,063.00	$ -	$ 2,063.00
700-02200	Gore	10	46.877	115.84	46.880	AFF Farms Limited	$ -	$ 8,377.00	$ -	$ 8,377.00
700-02203	Gore	10	2.812	6.95	2.813	Felix Weigt-Bienzle & Susan Weaver	$ -	$ 1,219.00	$ -	$ 1,219.00
700-02400	Gore	10	40.973	101.25	40.974	Ronald Stefani	$ -	$ 8,252.00	$ -	$ 8,252.00
700-02500	Gore	9	16.374	7.50	3.035	Roger Stefani	$ -	$ 671.00	$ -	$ 671.00
700-03000	Gore	9	16.368	20.00	8.094	Mary Rechwan & Tivador & Kathleen Boros	$ -	$ 1,740.00	$ -	$ 1,740.00
700-04750	Gore	12	9.103	22.49	9.102	Joe & Susan DaSilva	$ -	$ 2,272.00	$ -	$ 2,272.00
710-03000	Gore	7	8.913	6.61	2.674	Windsor EEG Laboratory Inc.	$ -	$ 2,585.00	$ 1,703.00	$ 4,288.00

Tax Roll No.	Con. or Plan No.	Lot or Part of Lot	Hectares Owned	Acres Afft'd	Hectares Afft'd	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
710-00700	Gore	7	62.471	54.45	22.036	AFF Farms Limited	$ -	$ 3,417.00	$ 1,788.00	$ 5,205.00
		Total on Privately Owned - Agricultural Lands (grantable).....					**$ -**	**$ 80,334.00**	**$ 3,491.00**	**$ 83,825.00**
		TOTAL ASSESSMENT	1464.30	592.59			**$ -**	**$ 192,775.00**	**$ 96,725.00**	**$ 289,500.00**

1 Hectare = 2.471 Acres

Project No. REI2022D018

February 26th, 2025

SPECIFICATIONS

SHEPLEY DRAIN BANK REPAIRS

Stabilization & Improvements

Geographic Township of Colchester South

TOWN OF ESSEX

I. GENERAL SCOPE OF WORK

The Shepley Drain comprises of an open drain generally located starting at Gore Road running northwest through private property then crossing Snake Lane and continuing through Harrow across County Road 13 (Erie Street) and then running north and then west along the south side of County Road 20 to its outlet in the Richmond Drain, in the geographic township of Colchester South, Town of Essex. The work under this project generally comprises of constructing repairs and improvements to the open drain banks at designated locations, and ancillary work. The work on the drain being repaired and improved includes work on the channel where the drain turns southerly from County Road 20 and upstream to the Town parkland south of the arena, brushing and tree removal in work areas, the removal of the excess sediment in the drain bottom to restore the drain its original design grade along areas of bank repairs of the open channel; the installation along the designated areas of precast concrete blocks wall at the toe of the drain bank and sloped quarried limestone rip rap on filter cloth up the drain bank from the block wall for three (3) metres; topsoil placement, seeding and mulching on slopes, buffer strips and disturbed areas, and ancillary work including loading, hauling and disposal of excavated material along the Essex lands and any other deleterious materials along the course of the work in accordance with excess soil regulations.

All work shall be carried out in accordance with these specifications, the plans forming part of this drainage project, as well as the Standard Details included in **Appendix "REI-C"**. The repairs and improvements shall be of the size, type, depth, etcetera, as is shown in the accompanying drawings, as determined from the Benchmarks, and as may be further laid out at the site at the time of construction. All work carried out under this project shall be completed to the full satisfaction of the Town Drainage Superintendent and the Consulting Engineer.

II. E.R.C.A. AND D.F.O. CONSIDERATIONS

The Contractor will be required to implement stringent erosion and sedimentation controls during the course of the work to help minimize the amount of silt and sediment being carried downstream into the outlet. It is intended that work on this project be carried out during

relatively dry weather to ensure proper site and drain conditions and to avoid conflicts with sediment being deposited into the outlet drainage system. All disturbed areas shall be restored as quickly as possible with grass seeding and mulching installed to ensure a protective cover and to minimize any erosion from the work sites subsequent to construction. The Contractor may be required to provide temporary silt fencing and straw bales as outlined further in these specifications.

All of the work shall be carried out in accordance with any permits or authorizations issued by the Essex Region Conservation Authority (E.R.C.A.) or the Department of Fisheries and Oceans (D.F.O.), copies of which will be provided, if available, and the notes in **Appendix "REI-A"**. The Contractor is advised that no work may be carried out in the existing drain from March 15th to July 15th of any given year because the drain is directly connected to a downstream area that is classified as sensitive to impacts on aquatic life and habitat by D.F.O.

As part of its work, the Contractor will implement the following measures that will ensure that any potential adverse effects on fish and fish habitat will be mitigated:

a) As per standard requirements, work will not be conducted at times when flows in the drain are elevated due to local rain events, storms, or seasonal floods. Work will be done in the dry.

b) All disturbed soils on the drain banks and within the channel, including spoil, must be stabilized immediately upon completion of work. The restoration of the site must be completed to a like or better condition to what existed prior to the works. The spoil material must be hauled away and disposed of at a suitable site; or spread an appropriate distance from the top of the drain bank to ensure that it is not washed back into the drain.

c) To prevent sediment entry into the Drain, in the event of an unexpected rainfall, silt barriers and/or traps must be placed in the channel during the works and until the site has been stabilized. All sediment and erosion control measures are to be in accordance with related Ontario Provincial Standards. It is incumbent on the proponent and their Contractors to ensure that sediment and erosion control measures are functioning properly and are maintained and upgraded as required.

d) Silt or sand accumulated in the barrier traps must be removed and stabilized on land once the site is stabilized.

e) All activities including maintenance procedures should be controlled to prevent the entry of petroleum products, debris, rubble, concrete, or other deleterious substances into the water. Vehicular refuelling and maintenance should be conducted away from the water.

III. M.N.R.F. – M.E.C.P. CONSIDERATIONS

The Contractor is to note that the Ministry of Natural Resources and Forestry (M.N.R.F.) screening process by way of a Species at Risk (S.A.R.) review of the M.N.R.F. "Endangered Species Act, 2007" (E.S.A.) that is now administered by the Ministry of Environment, Conservation and Parks (M.E.C.P.) will be completed as a self-assessment by the Town pursuant to Section 23.9 of the E.S.A. prior to construction. This Section allows the Town to conduct eligible works of repair, maintenance, and improvement to existing municipal drains under the Drainage Act, and exemptions from Sections 9 and 10 of the E.S.A., provided that the requirements are followed in accordance with Ontario Regulation 242/08. The results of the review will be provided to the Contractor and copies of the mitigation measures, habitat protection and identification sheets will be included within **Appendix "REI-B"**.

The Contractor is to review **Appendix "REI-B"** in detail and is required to comply in all regards with the contents of said M.N.R.F. measures, and follow the special requirements therein included during construction. Throughout the course of construction, the Contractor will be responsible to ensure that all necessary provisions are undertaken to protect all species at risk and their habitats including the N.H.I.C. mapping list of species included in the appendix. If a threatened or sensitive species is encountered, the Contractor shall notify the Town and M.N.R.F. – M.E.C.P. and provide all the equipment and materials stipulated by the mitigation requirements for handling the species and cooperate fully with the Town and M.N.R.F. – M.E.C.P. staff in the handling of the species.

IV. ACCESS TO WORK

The Contractor is advised that the majority of the work to be carried out on this project extends along the South side of the drain from station 0+055 to 0+425 and from station 0+750 to 1+100. Also, along the East side of the drain from station 0+425 to 0+532, West side of the drain from station 0+532 to 0+750, then to North of drain from station 1+120 to 1+625. The Contractor shall have access for the full width of the roadway abutting the proposed drainage works. The Contractor may utilize the right-of-way as necessary, to permit the completion of all of the work required to be carried out for this project and will have access from County Road 20 into the Windsor EEG Laboratory Inc. parcel through the access bridge and along the south and west sides of the drain in the specified working corridor. The Contractor shall also have access into the driveways as necessary to carry out the repairs and improvements to the drain, as set out on the plans and in these specifications, along with a sufficient area in the vicinity of the bridges to carry out the required repairs and ancillary work. Where the drain abuts agricultural lands, the Contractor shall carry out the drain cleaning from the open field side of the drain in a minimum 8 metre wide corridor and spread the excess excavated material on the lands to a depth not exceeding 100mm in thickness and clear of any grass buffers. Some materials will be required to repair the upper part of the drain banks where precast decorative concrete block walls and rip rap on filter cloth work is designated.

The Contractor shall ensure that the traveling public is protected at all times while utilizing the roadway for its access. The Contractor shall provide traffic control, including flag persons when required. Should the Contractor have to close County Road 13 or County Road 20 for the proposed works, it shall obtain the permission of the County of Essex, Town Drainage Superintendent or Consulting Engineer and arrange to provide the necessary notification of detours around the site. The Contractor shall also ensure that all emergency services, school bus companies, etcetera are contacted about the disruption to access at least 48 hours in advance of same. All detour routes shall be established in consultation with the Essex Works Department and the County of Essex.

Throughout the course of the work, it is imperative that the Contractor protect as much landscaping and vegetation as possible when accessing along the drain. This will be of particular concern along the lawn areas of residential properties. Due to the extent of the work and the area for carrying out the work, the Contractor will be required to carry out all of the necessary steps to direct traffic and provide temporary diversion of traffic around work sites, including provision of all lights, signs, flag persons, and barricades required to protect the safety of the traveling public. Any accesses or areas used in carrying out the works are to be fully restored to their original conditions by the Contractor at its cost, including topsoil placement and lawn restoration as directed by the Town Drainage Superintendent and the Consulting Engineer. Restoration shall include but not be limited to all necessary levelling, grading, shaping, topsoil, seeding, mulching, and granular placement required to make good any damage caused.

V. REMOVAL OF BRUSH, TREES AND RUBBISH

Where there is any brush, trees, or rubbish along the course of the drain work areas, including the full width of the work access, all such brush, trees or rubbish shall be close cut and grubbed out, and the whole shall be chipped up for recycling, burned or otherwise satisfactorily disposed of by the Contractor. The brush and trees removed along the course of the work are to be put into piles by the Contractor in locations where they can be safely chipped and disposed of, or burned by it, or hauled away and disposed of by the Contractor to a site to be obtained by it at its expense. Prior to and during the course of any burning operations, the Contractor shall comply with the guidelines prepared by the Air Quality Branch of the Ontario Ministry of the Environment; and shall ensure that the Environmental Protection Act is not violated. The Contractor will be required to notify the local fire authorities to obtain any permits and co-operate with them in the carrying out of any work. The removal of brush and trees shall be carried out in close consultation with the Town Drainage Superintendent or Consulting Engineer to ensure that no decorative trees or shrubs are disturbed by the operations of the Contractor that can be saved. It is the intent of this project to save as many trees and bushes as practical within the roadway allowances and on private lands. Where decorative trees or shrubs are located directly over drainage pipes, the Contractor shall carefully extract same and turn them over to the Owner when requested to do so and shall cooperate with the Owner in the reinstallation of same if required.

The Contractor shall protect all other trees, bushes, and shrubs located along the length of the drainage works except for those trees that are established, in consultation with the Town Drainage Superintendent, the Consulting Engineer, and the Owners, to be removed as part of the works. The Contractor shall note that protecting and saving the trees may require the Contractor to carry out hand work around the trees, bushes, and shrubs to complete the necessary final site grading and restoration.

Following the completion of the work, the Contractor is to trim up any broken or damaged limbs on trees which are to remain standing, and it shall dispose of said branches along with other brush, thus leaving the trees in a neat and tidy condition.

The Contractor shall remove all deleterious materials and rubbish along the course of the open drain in the location of the work areas while carrying out its cleaning of same. All such deleterious materials and rubbish shall be loaded up and hauled away by the Contractor to a site to be obtained by it at its cost and in accordance with excess soil regulations.

VI. FENCING

Where it is necessary to take down any fence to proceed with the work, the same shall be done by the Contractor across or along that portion of the work where such fence is located. The Contractor will be required to exercise extreme care in the removal of any fencing so as to cause a minimum of damage to same. The Contractor will be required to reinstall any fence that is taken down in order to proceed with the work, and the fence shall be reinstated in a neat and workmanlike manner. The Contractor will not be required to procure any new materials for rebuilding the fence provided that it has used reasonable care in the removal and replacement of same. When any fence is removed by the Contractor, and the Owner thereof deems it advisable and procures new material for replacing the fence so removed, the Contractor shall replace the fence using the new materials and the materials from the present fence shall remain the property of the Owner.

VII. DETAILS OF OPEN DRAIN WORK

The open drain shall be excavated to the lines, levels, grades, and cross-sections as shown on the accompanying drawings, or as may be further established by the Town Drainage Superintendent or the Engineer at the time of the work. At the designated bank repairs the drain shall be carefully excavated so as not to disturb the existing banks, rock protection and vegetation, except for those portions of the drain where widening or restoration of a stable drain bank configuration is required. The bottom width of the drain and the sideslopes of the excavation shall conform to the dimensions given on the drawings.

The drain shall be of the size, type, depth, etcetera as shown on the accompanying drawings. When completed, the drain shall have a uniform and even bottom and in no case shall such

bottom project above the grade line, as shown on the accompanying drawings, and as determined from the Benchmarks. The finished side slopes of the drain shall be completed to the slopes indicated on the profile and cross sections for each portion of the works.

The excavated material is to be used where required to carry out the bank repairs at designated areas or where cast onto the adjoining lands shall be well and evenly spread over a sufficient area so that no portion of the excavated earth is more than 100mm in depth. The material shall be kept at least 1.2 metres clear from the finished edge of the drain or beyond any grass buffer areas, care being taken not to fill up any existing tiles, ditches, furrows or drains with the excavated material. The excavated material to be spread upon the lands shall be free from rocks, cobbles, boulders, stumps, rubble, rubbish or other similar material and these materials, if encountered, shall be hauled away by the Contractor, and disposed of at a site to be obtained by it at its expense.

Where the drain crosses any lawn, garden, orchard, parking, roadway or driveway areas, the excavated material for the full width of the above-mentioned areas shall be hauled by the Contractor and disposed of to the nearest open area site along the drain at its expense. If necessary and approved by the Drainage Engineer or Superintendent for material that is being removed from the project area, the Contractor shall obtain and supply the Town of Essex with permission in writing from the landowners confirming acceptance of material in accordance with the regulation. All work at the disposal site shall be established between the Contractor and the site owner. The Contractor shall be responsible for any permits required and shall provide copies of same to the Town and Consulting Engineer when requested. The Contractor is responsible for all components related to the Excess Soil regulations including but not limited to hauling records which must be supplied to the Town of Essex. The Town will need to review the paperwork with the landowner's permission, beneficial re-use, sign off if it may be impacted by salt and confirmation that it is not tested, and no liability is to be assumed by the Town of Essex.

Where there is any brush or rubbish in the course of the drain, including both side slopes of the drain, all such brush or rubbish shall be close cut and grubbed out. Where there is any brush or rubbish where the earth is to be spread, or on that strip of land between where the earth is to be spread and the edge of the drain, all such brush or rubbish shall be close cut and grubbed out. The whole is to be burned, chipped, or otherwise satisfactorily disposed of by the Contractor as noted above.

VIII. DETAILS OF BANK REPAIRS

The open drain bank repairs shall be excavated to the lines, levels, grades, and cross-sections as shown on the accompanying drawings, or as may be further established by the Town Drainage Superintendent or the Engineer at the time of the work. At the designated bank repairs the drain shall be carefully excavated so as not to disturb the existing banks, rock protection and vegetation, except for those portions of the drain where widening or restoration of a stable drain bank configuration is required. The bottom width of the drain and the sideslopes of the

excavation shall conform to the dimensions given on the drawings. Drain bank repairs at designated areas shall include the installation of 2 courses of precast concrete blocks at the toe of the bank embedded in the drain bottom and tilted at 1 horizontal to 5 vertical with filter cloth backing as shown on the cross sections. Blocks shall be a minimum size of 600mmX600mmX1200mm with half blocks used to provide staggering of joints between the two courses of blocks. Blocks shall be placed on a level solid foundation with compacted 20mm clear stone bedding provided if required. The drain bank shall be prepared by placing fill where required and compacting the material in place to achieve a 1.5 horizontal to 1 vertical slope. Quarried limestone rip rap on filter cloth shall be installed from the top of the block wall up the side slope for 3 metres as shown on the cross sections. Quarried limestone rock from 100mm to 250mm in size shall be utilized. The decorative precast concrete blocks shall be as available from Underground Specialties – Wolseley in Windsor, or equal.

IX. BENCHMARKS

Also, for use by the Contractor, we have established Benchmarks along the course of the work. The plans include details illustrating the work to be carried out. For each detail a Benchmark has been indicated and the Elevation has been shown and may be utilized by the Contractor in carrying out its work. The Contractor shall note that in each case a specific design elevation grade has been provided for the drain bottom in the cross sections accompanying each detail. In all cases, the Contractor is to utilize the specified drain grade to restore the bottom of the drain in the designated work areas. The Contractor shall ensure that it takes note of the direction of flow to assure that all grades flow from east to west and south to north to match the direction of flow within the drain.

X. ANCILLARY WORK

During the course of any work to the drain, the Contractor will be required to protect or extend any existing tile ends or swales and connect them to the drainage works to maintain the drainage from the adjacent lands and provide rodent grates on the ends. All existing tiles shall be extended utilizing solid Big 'O' "standard tile ends" or equal plastic pipe of the same diameter as the existing tile and shall be installed in accordance with the **"Standard Lateral Tile Detail"** included in the Appendix plans, unless otherwise noted. Connections shall be made using a manufacturer's coupling where possible. Wherever possible, tiles shall be extended to outlet near the toe of the drain.

Where the drain works interferes with the discharge of an existing swale, the Contractor shall re-grade the existing swales to allow for the surface flows to freely enter the drain. Any disturbed grass areas shall be fully restored with topsoil, seed, and mulch. All damaged hard surface driveway areas shall be neatly saw cut and the damaged materials removed and disposed of by the Contractor prior to carrying out any restoration work.

Although it is anticipated that the drain bank repairs shall be undertaken in the dry, the Contractor shall supply and install a temporary straw bale or silt curtain check dam in the drain bottom immediately downstream of each site during the time of construction. The straw bale or silt curtain check dam shall be to the satisfaction of the Town Drainage Superintendent or Consulting Engineer and must be removed upon completion of the construction. The check dam materials may be reused at each site subject to their condition. All costs associated with the supply and installation of this straw bale or silt curtain check dam shall be included in the cost bid for the drain works.

XI. TOPSOIL, SEED AND MULCH

The Contractor shall be required to restore all existing grassed areas and drain side slopes damaged or created by the construction or cutting of the drain cross section and the re-sloping at designated repair areas, by placing topsoil, and then seed and mulch over said areas including any specific areas noted on the details. The Contractor shall be required to provide all the material and to cover the above-mentioned surfaces with approximately 50mm of good, clean, dry topsoil on slopes and 100mm of good, clean, dry topsoil on horizontal surfaces, fine graded and spread in place ready for seeding and mulching. The placing and grading of any topsoil shall be carefully and meticulously carried out in accordance with Ontario Provincial Standard Specifications, Form 802 dated November 2010, or as subsequently amended, or as amended by these specifications and be readied for the seeding and mulching process. The seeding and mulching of all of the above-mentioned areas shall comply in all regards to Ontario Provincial Standard Specifications, Form 803 dated November 2010 and Form 804, dated November 2013, or as subsequently amended, or as amended by these specifications. The seeding mixture shall be the Standard Roadside Mix (Canada No. 1 Lawn Grass Seed Mixture) as set out in O.P.S.S. 804. All cleanup and restoration work shall be performed to the full satisfaction of the Town Drainage Superintendent or Engineer.

When all of the work for this installation has been completed, the Contractor shall ensure that positive drainage is provided to all areas; and shall ensure that the site is left in a neat and workmanlike manner, all to the full satisfaction of the Town Drainage Superintendent or Engineer.

XII. GENERAL CONDITIONS

a) The Town Drainage Superintendent or Consulting Engineer shall have authority to carry out minor changes to the work where such changes do not lessen the efficiency of the work.

b) The Contractor shall satisfy itself as to the exact location, nature and extent of any existing structure, utility, or other object which it may encounter during the course of the work. The Contractor shall indemnify and save harmless the Town of Essex, County of Essex, and the Consulting Engineer and their representatives for any damages which it may cause or sustain

during the progress of the work. It shall not hold the Town of Essex, County of Esses, or the Consulting Engineer liable for any legal action arising out of any claims brought about by such damage caused by it.

c) The Contractor shall provide a sufficient number of layout stakes and grade points so that the Drainage Superintendent and Consulting Engineer can review same and check that the work will generally conform to the design and project intent.

d) The Contractor will be responsible for any damage caused by it to any portion of the Town or County road system, especially to the travelled portion. When excavation work is being carried out and the excavation equipment is placed on the travelled portion of the road, the travelled portion shall be protected by having the excavation equipment placed on satisfactory timber planks or timber pads. If any part of the travelled portion of the road is damaged by the Contractor, the Town or County shall have the right to have the necessary repair work done by its' employees and the cost of all labour and materials used to carry out the repair work shall be deducted from the Contractor's contract and credited to the Town or the County. The Contractor, upon completing the works, shall clean all debris and junk, etcetera, from the roadside of the drain, and leave the site in a neat and workmanlike manner. The Contractor shall be responsible for keeping all public roadways utilized for hauling materials free and clear of mud and debris.

e) The Contractor shall provide all necessary lights, signs, and barricades to protect the public. All work shall be carried out in accordance with the requirements of the Occupational Health and Safety Act, and latest amendments thereto. If traffic control is required on this project, signing is to comply with the M.T.O. Manual of Uniform Traffic Control Devices (M.U.T.C.D.) for Roadway Work Operations and Ontario Traffic Manual Book 7.

f) During the course of the work the Contractor shall be required to connect existing drainage pipes to the Municipal Drain. In the event that polluted flows are discovered, the Contractor shall delay the connection of the pipe and leave the end exposed and alert the Town, the Drainage Superintendent, and the Consulting Engineer so that steps can be taken by the Town to address the concern with the owner and the appropriate authorities. Where necessary the Contractor shall cooperate with the Town in providing temporary measures to divert the drain or safely barricade same. Should the connection be found acceptable by the authorities, the Contractor shall complete the connection of the drain as provided for in the specifications, at no extra cost to the project.

g) Following the completion of the work, the Contractor is to trim up any broken or damaged limbs on trees which are to remain standing, and it shall dispose of said branches along with other brush, thus leaving the trees in a neat and tidy condition.

h) The whole of the work shall be satisfactorily cleaned up, and during the course of the construction, no work shall be left in any untidy or incomplete state before subsequent portions are undertaken.

i) During the course of the project the Contractor shall deal with any excess soil management from the project in accordance with Ontario Reg 406/19 pursuant to the Environmental Protection Act, R.S.O. 1990, c. E.19 and any subsequent amendments to same.

j) All driveways, laneways and access bridges, or any other means of access on to the job site shall be fully restored to their former condition at the Contractor's expense. Before authorizing Final Payment, the Town Drainage Superintendent and the Consulting Engineer shall inspect the work in order to be sure that the proper restoration has been performed. In the event that the Contractor fails to satisfactorily clean up any portion of these accesses, the Consulting Engineer shall order such cleanup to be carried out by others and the cost of same be deducted from any monies owing to the Contractor.

k) The Contractor will be required to submit to the Town, a Certificate of Good Standing from the Workplace Safety and Insurance Board prior to the commencement of the work and the Contractor will be required to submit to the Town, a Certificate of Clearance for the project from the Workplace Safety and Insurance Board before Final Payment is made to the Contractor.

l) The Contractor shall furnish a Performance and Maintenance Bond along with a separate Labour and Material Payment Bond within ten (10) days after notification of the execution of the Agreement by the Town. One copy of said bonds shall be bound into each of the executed sets of the Contract. Each Performance and Maintenance Bond and Labour and Material Payment Bond shall be in the amount of 100% of the total Tender Price. All Bonds shall be executed under corporate seal by the Contractor and a surety company, authorized by law to carry out business in the Province of Ontario. The Bonds shall be acceptable to the Town in every way and shall guarantee faithful performance of the contract during the period of the contract, including the period of guaranteed maintenance which will be in effect for twelve (12) months after substantial completion of the works.

   The Tenderer shall include the cost of bonds in the unit price of the Tender items as no additional payment will be made in this regard.

m) The Contractor shall be required, as part of this Contract, to provide Comprehensive Liability Insurance coverage for not less than $5,000,000.00 on this project; and shall name the Town of Essex and its' officials, the County of Essex and its' officials, and the Consulting Engineer and their staff as additional insured under the policy. The Contractor must submit a copy of this policy to both the Town Clerk and the Consulting Engineer prior to the commencement of work.

n) Monthly progress orders for payment shall be furnished the Contractor by the Town Drainage Superintendent. Said orders shall be for not more than 90% of the value of the work done and the materials furnished on the site. The paying of the full 90% does not imply that any portion of the work has been accepted. The remaining 10% will be paid 60 days

after the final acceptance and completion of the work and payment shall not be authorized until the Contractor provides the following:

i) a Certificate of Clearance for the project from the Workplace Safety and Insurance Board

ii) proof of advertising

iii) a Statutory Declaration, in a form satisfactory to the Engineer and the Town, that all liabilities incurred by the Contractor and its Sub-Contractors in carrying out the Contract have been discharged and that all liens in respect of the Contract and Sub-Contracts thereunder have expired or have been satisfied, discharged, or provided for by payment into Court.

The Contractor shall satisfy the Consulting Engineer or Town that there are no liens or claims against the work and that all of the requirements as per the Construction Act, 2018 and its' subsequent amendments have been adhered to by the Contractor.

o) In the event that the Specifications, Information to Tenderers, or the Form of Agreement do not apply to a specific condition or circumstance with respect to this project, the applicable section, or sections from the Canadian Construction Documents Committee C.C.D.C.2 shall govern and be used to establish the requirements of the work.

p) Should extra work be required by the Town Drainage Superintendent or Consulting Engineer, and it is done on a time and material basis, the actual cost of the work will be paid to the Contractor with a 15% markup on the total actual cost of labour, equipment and materials needed to complete the extra work.

q) The Contractor shall provide shop drawings of the proposed wall for decorative precast concrete block headwalls for approval by the Drainage Superintendent or Engineer prior to construction.

APPENDIX “REI-A”

STANDARD E.R.C.A. AND D.F.O.
MITIGATION REQUIREMENTS

As part of its work, the Contractor will implement the following measures that will ensure that any potential adverse effects on fish and fish habitat will be mitigated:

1. As per standard requirements, work will not be conducted at times when flows in the drain are elevated due to local rain events, storms, or seasonal floods. Work will be done in the dry.

2. All disturbed soils on the drain banks and within the channel, including spoil, must be stabilized immediately upon completion of work. The restoration of the site must be completed to a like or better condition to what existed prior to the works. The spoil material must be hauled away and disposed of at a suitable site, or spread an appropriate distance from the top of the drain bank to ensure that it is not washed back into the drain.

3. To prevent sediment entry into the drain in the event of an unexpected rainfall, silt barriers and/or traps must be placed in the channel during the works and until the site has been stabilized. All sediment and erosion control measures are to be in accordance with the related Ontario Provincial Standards. It is incumbent on the proponent and Contractors to ensure that sediment and erosion control measures are functioning properly and maintained/upgraded as required.

4. Silt or sand accumulated in the barrier traps must be removed and stabilized on land once the site is stabilized.

5. All activities including maintenance procedures should be controlled to prevent the entry of petroleum products, debris, rubble, concrete, or other deleterious substances into the water. Vehicular refuelling and maintenance should be conducted away from the water.

6. Any drain banks trimmed outside of the July 1st to September 15th timing window will require bio-degradable erosion control blankets to be installed to promote re-vegetation and to protect the slope from erosion in the interim.

Measures to Avoid Causing Harm to Fish and Fish Habitat

If you are conducting a project near water, it is your responsibility to ensure you avoid causing serious harm to fish in compliance with the *Fisheries Act*. The following advice will help you avoid causing harm and comply with the *Act*.

PLEASE NOTE: This advice applies to all project types and replaces all "Operational Statements" previously produced by DFO for different project types in all regions.

Measures

- Time work in water to respect timing windows to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed.
- Minimize duration of in-water work.
- Conduct instream work during periods of low flow, or at low tide, to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows.
- Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.

- Design and plan activities and works in waterbody such that loss or disturbance to aquatic habitat is minimized and sensitive spawning habitats are avoided.
- Design and construct approaches to the waterbody such that they are perpendicular to the watercourse to minimize loss or disturbance to riparian vegetation.
- Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the stream bed or the built structures.
- Undertake all instream activities in isolation of open or flowing water to maintain the natural flow of water downstream and avoid introducing sediment into the watercourse.

- Plan activities near water such that materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals do not enter the watercourse.
- Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance and keep an emergency spill kit on site.
- Ensure that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.

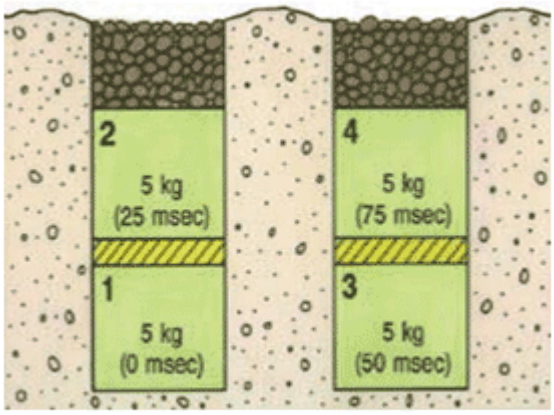
- Develop and implement an Erosion and Sediment Control Plan for the site that minimizes risk of sedimentation of the waterbody during all phases of the project. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear. The plan should, where applicable, include:
    - Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the water body.
    - Measures for managing water flowing onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering a waterbody. For example, pumping/diversion of water to a vegetated area, construction of a settling basin or other filtration system.
    - Site isolation measures (e.g., silt boom or silt curtain) for containing suspended sediment where in-water work is required (e.g., dredging, underwater cable installation).
    - Measures for containing and stabilizing waste material (e.g., dredging spoils, construction waste and materials, commercial logging waste, uprooted or cut aquatic plants, accumulated debris) above the high water mark of nearby waterbodies to prevent re-entry.
    - Regular inspection and maintenance of erosion and sediment control measures and structures during the course of construction.
    - Repairs to erosion and sediment control measures and structures if damage occurs.
    - Removal of non-biodegradable erosion and sediment control materials once site is stabilized.

- Clearing of riparian vegetation should be kept to a minimum: use existing trails, roads or cut lines wherever possible to avoid disturbance to the riparian vegetation and prevent soil compaction. When practicable, prune or top the vegetation instead of grubbing/uprooting.
- Minimize the removal of natural woody debris, rocks, sand or other materials from the banks, the shoreline or the bed of the waterbody below the ordinary high water mark. If material is removed from the waterbody, set it aside and return it to the original location once construction activities are completed.
- Immediately stabilize shoreline or banks disturbed by any activity associated with the project to prevent erosion and/or sedimentation, preferably through re-vegetation with native species suitable for the site.
- Restore bed and banks of the waterbody to their original contour and gradient; if the original gradient cannot be restored due to instability, a stable gradient that does not obstruct fish passage should be restored.
- If replacement rock reinforcement/armouring is required to stabilize eroding or exposed areas, then ensure that appropriately-sized, clean rock is used; and that rock is installed at a similar slope to maintain a uniform bank/shoreline and natural stream/shoreline alignment.
- Remove all construction materials from site upon project completion.

- Ensure that all in-water activities, or associated in-water structures, do not interfere with fish passage, constrict the channel width, or reduce flows.
- Retain a qualified environmental professional to ensure applicable permits for relocating fish are obtained and to capture any fish trapped within an isolated/enclosed area at the work site and safely relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur on the site.
- Screen any water intakes or outlet pipes to prevent entrainment or impingement of fish. Entrainment occurs when a fish is drawn into a water intake and cannot escape. Impingement occurs when an entrapped fish is held in contact with the intake screen and is unable to free itself.
    - In freshwater, follow these measures for design and installation of intake end of pipe fish screens to protect fish where water is extracted from fish-bearing waters:
        - Screens should be located in areas and depths of water with low concentrations of fish throughout the year.
        - Screens should be located away from natural or artificial structures that may attract fish that are migrating, spawning, or in rearing habitat.
        - The screen face should be oriented in the same direction as the flow.
        - Ensure openings in the guides and seals are less than the opening criteria to make “fish tight”.
        - Screens should be located a minimum of 300 mm (12 in.) above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the bottom area.
        - Structural support should be provided to the screen panels to prevent sagging and collapse of the screen.
        - Large cylindrical and box-type screens should have a manifold installed in them to ensure even water velocity distribution across the screen surface. The ends of the structure should be made out of solid materials and the end of the manifold capped.
        - Heavier cages or trash racks can be fabricated out of bar or grating to protect the finer fish screen, especially where there is debris loading (woody material, leaves, algae mats, etc.). A 150 mm (6 in.) spacing between bars is typical.
        - Provision should be made for the removal, inspection, and cleaning of screens.
        - Ensure regular maintenance and repair of cleaning apparatus, seals, and screens is carried out to prevent debris-fouling and impingement of fish.
        - Pumps should be shut down when fish screens are removed for inspection and cleaning.
- Avoid using explosives in or near water. Use of explosives in or near water produces shock waves that can damage a fish swim bladder and rupture internal organs. Blasting vibrations may also kill or damage fish eggs or larvae.
    - If explosives are required as part of a project (e.g., removal of structures such as piers, pilings, footings; removal of obstructions such as beaver dams; or preparation of a river or lake bottom for installation of a structure such as a dam or water intake), the potential for impacts to fish and fish habitat should be minimized by implementing the following measures:

- Time in-water work requiring the use of explosives to prevent disruption of vulnerable fish life stages, including eggs and larvae, by adhering to appropriate fisheries timing windows.
- Isolate the work site to exclude fish from within the blast area by using bubble/air curtains (i.e., a column of bubbled water extending from the substrate to the water surface as generated by forcing large volumes of air through a perforated pipe/hose), cofferdams or aquadams.
- Remove any fish trapped within the isolated area and release unharmed beyond the blast area prior to initiating blasting
- Minimize blast charge weights used and subdivide each charge into a series of smaller charges in blast holes (i.e., decking) with a minimum 25 millisecond (1/1000 seconds) delay between charge detonations (see Figure 1).
- Back-fill blast holes (stemmed) with sand or gravel to grade or to streambed/water interface to confine the blast.
- Place blasting mats over top of holes to minimize scattering of blast debris around the area.
- Do not use ammonium nitrate based explosives in or near water due to the production of toxic by-products.
- Remove all blasting debris and other associated equipment/products from the blast area.

Figure 1: Sample Blasting Arrangement



Per Fig. 1: 20 kg total weight of charge; 25 msecs delay between charges and blast holes; and decking of charges within holes.

- Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds.

- Whenever possible, operate machinery on land above the high water mark, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody.
- Limit machinery fording of the watercourse to a one-time event (i.e., over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, construct a temporary crossing structure.
- Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (e.g., dominated by organic materials and silts) banks and beds. For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording.
- Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.

Date modified:

2013-11-25

SECTION II

SPECIFICATIONS

FOR FISH SALVAGE

GENERAL
SECTION 201

The Work shall include the capture, salvage and release of fish that are trapped or stranded as the result of the Contractor's operations, at locations identified in the Fish Salvage Plan, and in co-operation with the Essex Region Conservation Authority (E.R.C.A.).

Fish capture shall be performed prior to dewatering, and in such manner that will minimize the injury to the fish.

MATERIALS
SECTION 202

All materials required for fish capture, salvage and release shall be supplied by the Contractor.

CONSTRUCTION
SECTION 203

The Contractor shall not commence any fish capture, salvage and release work until the Fish Salvage Plan has been accepted by the Consultant and the Conservation Authority. All work shall be performed in accordance with the Fish Salvage Plan unless otherwise determined by the Consultant or the Conservation Authority.

The Contractor shall ensure an ice-free pool is maintained throughout all fish capture and release operations.

All fish shall be captured within the area specified and released at an acceptable location in the downstream water body. Fish shall be captured by electro fishing, netting, seining, trapping, or other method acceptable to the Consultant and/or the Conservation Authority.

MEASUREMENT AND PAYMENT
SECTION 204

Payment for this Work will be included in the price bid for drainage work components or made at the lump sum price bid for "Fish Capture and Release". The lump sum price will be considered full compensation for all labour, materials, equipment, tools, and incidentals necessary to complete the Work to the satisfaction of the Consultant.

APPENDIX “REI-B”

The mitigation plan will be provided to the Contractor upon request.

NHIC Data 2023-07-31

Shepley Drain - Essex

REI2022D018

OGF ID	Element Type	Common Name	Scientific Name	SRank	SARO Status	COSEWIC Status	ATLAS NAD83 IDENT	COMMENTS
702339	SPECIES	Common Gallinule	Gallinula galeata	S3B			17LG4055	
702339	SPECIES	American Coot	Fulica americana	S3B,S4N	NAR	NAR	17LG4055	
702339	SPECIES	Blue-winged Teal	Spatula discors	S3B,S4M			17LG4055	
702339	SPECIES	Grasshopper Sparrow	Ammodramus savannarum	S4B	SC	SC	17LG4055	
702339	SPECIES	Wood Thrush	Hylocichla mustelina	S4B	SC	THR	17LG4055	
702339	SPECIES	Eastern Wood-pewee	Contopus virens	S4B	SC	SC	17LG4055	
702339	SPECIES	American Burying Beetle	Nicrophorus americanus	SH	EXP	EXP	17LG4055	
702339	SPECIES	Hackberry Emperor	Asterocampa celtis	S3			17LG4055	
702339	SPECIES	Red-headed Woodpecker	Melanerpes erythrocephalus	S3	END	END	17LG4055	
702339	SPECIES	Broad-banded Forestsnail	Allogona profunda	S1S2	END	END	17LG4055	
702339	SPECIES	Culver's Root	Veronicastrum virginicum	S2			17LG4055	
702339	SPECIES	Massasauga (Carolinian population)	Sistrurus catenatus pop. 2	S1	END	END	17LG4055	
702339	SPECIES	Pawpaw	Asimina triloba	S3			17LG4055	
702339	SPECIES	Cicada Killer	Sphecius speciosus	S1S2			17LG4055	
702339	SPECIES	Tufted Titmouse	Baeolophus bicolor	S3			17LG4055	
702339	SPECIES	Eastern Meadowlark	Sturnella magna	S4B,S3N	THR	THR	17LG4055	
702339	SPECIES	Barn Swallow	Hirundo rustica	S4B	THR	THR	17LG4055	
702339	SPECIES	Henslow's Sparrow	Centronyx henslowii	S1B	END	END	17LG4055	
702339	SPECIES	Bobolink	Dolichonyx oryzivorus	S4B	THR	THR	17LG4055	

APPENDIX “REI-C”

STANDARD SPECIFICATIONS
FOR ACCESS BRIDGE CONSTRUCTION

1. PRECAST CONCRETE BLOCK & CONCRETE FILLED JUTE BAG HEADWALLS

After the Contractor has set the endwall foundations and the new pipe in place, it shall completely backfill same and install new precast concrete blocks or concrete filled jute bag headwalls at the locations and parameters indicated on the drawing. All concrete used for headwalls shall be a minimum of 30 mPa at 28 days and include 6% +/- 1% air entrainment.

Precast concrete blocks shall be interlocking and have a minimum size of 600mmX600mmX1200mm. Half blocks shall be used to offset vertical joints. Cap blocks shall be a minimum of 300mm thick. A foundation comprising minimum 300mm thick poured concrete or precast blocks the depth of the wall and the full bottom width of the drain plus 450mm embedment into each drain bank shall be provided and placed on a firm foundation as noted below. The Contractor shall provide a levelling course comprising a minimum thickness of 150mm Granular “A” compacted to 100% Standard Proctor Density or 20mm clear stone, or a lean concrete as the base for the foundation. The base shall be constructed level and flat to improve the speed of installation. Equipment shall be provided as required and recommended by the block supplier for placing the blocks such as a swift lift device for the blocks and a 75mm eye bolt to place the concrete caps,. The headwall shall extend a minimum of 150mm below the invert of the access bridge culvert with the top of the headwall set to match the finished driveway grade, unless a 150mm high curb is specified at the edge of the driveway. To achieve the required top elevation, the bottom course of blocks and footing may require additional embedment into the drain bottom. The Contractor shall provide shop drawings of the proposed wall for approval by the Drainage Superintendent or Engineer prior to construction.

Blocks shall be placed so that all vertical joints are staggered. Excavation voids on the ends of each block course shall be backfilled with 20mm clear stone to support the next course of blocks above. Walls that are more than 3 courses in height shall be battered a minimum of 1 unit horizontal for every 5 units of vertical height. The batter shall be achieved by careful grading of the footing and foundation base, or use of pre-battered base course blocks. Filter cloth as specified below shall be placed behind the blocks to prevent the migration of any fill material through the joints. Backfill material shall be granular as specified below. Where the wall height exceeds 1.8 metres in height, a uni-axial geogrid SG350 or equivalent shall be used to tie back the walls and be installed in accordance with the manufacturer’s recommendations. The wall face shall not extend beyond the end of the access bridge pipe. Non-shrink grout shall be used to fill any gaps between the blocks and the access bridge pipe for the full depth of the wall. The grout face shall be finished to match the precast concrete block walls as closely as possible.

When constructing the concrete filled jute bag headwalls, the Contractor shall place the bags so that the completed headwall will have a slope inward from the bottom of the pipe to the top of the finished headwall. The slope of the headwall shall be one unit horizontal to five units vertical. The Contractor shall completely backfill behind the new concrete filled jute bag headwalls with Granular "B" and Granular "A" material as per O.P.S.S. Form 1010 and the granular material shall be compacted in place to a Standard Proctor Density of 100%. The placing of the jute bag headwalls and the backfilling shall be performed in lifts simultaneously. The granular backfill shall be placed and compacted in lifts not to exceed 305mm (12") in thickness.

The concrete filled jute bag headwalls shall be constructed by filling jute bags with concrete. All concrete used to fill the jute bags shall have a minimum compressive strength of 25 MPa in 28 days and shall be provided and placed only as a wet mix. Under no circumstance shall the concrete to be used for filling the jute bags be placed as a dry mix. The jute bags, before being filled with concrete, shall have a dimension of 460mm (18") x 660mm (26"). The jute bags shall be filled with concrete so that when they are laid flat, they will be approximately 100mm (4") thick, 305mm (12") to 380mm (15") wide and 460mm (18") long.

The concrete jute bag headwall to be provided at the end of the bridge pipe shall be a single or double bag wall construction as set out in the specifications. The concrete filled bags shall be laid so that the 460mm (18") dimension is parallel with the length of the new pipe. The concrete filled jute bags shall be laid on a footing of plain concrete being 460mm (18") wide, and extending for the full length of the wall, and 305mm (12") thick extending below the bottom of the culvert pipe.

All concrete used for the footing, cap and bags shall have a minimum compressive strength of 30 mPa at 28 days and shall include 6% ± 1% air entrainment.

Upon completion of the jute bag headwall the Contractor shall cap the top row of concrete filled bags with a layer of plain concrete, minimum 100mm (4”) thick, and hand trowelled to obtain a pleasing appearance. If the cap is made more than 100mm thick, the Contractor shall provide two (2) continuous 15M reinforcing bars set at mid-depth and equally spaced in

the cap. The Contractor shall fill all voids between the concrete filled jute bags and the corrugated steel pipe with concrete, particular care being taken underneath the pipe haunches to fill all voids.

The completed jute bag headwalls shall be securely embedded into the drain bank a minimum of 450mm (18") measured perpendicular to the sideslopes of the drain.

As an alternate to constructing a concrete filled jute bag headwall, the Contractor may construct a grouted concrete rip rap headwall. The specifications for the installation of a concrete filled jute bag headwall shall be followed with the exception that broken pieces of concrete may be substituted for the jute bags. The concrete rip rap shall be approximately 460mm (18") square and 100mm (4") thick and shall have two (2) flat parallel sides. The concrete rip rap shall be fully mortared in place using a mixture composed of three (3) parts of clean sharp sand and one (1) part of Portland cement.

The complete placement and backfilling of the headwalls shall be performed to the full satisfaction of the Drainage Superintendent and the Engineer.

2. QUARRIED LIMESTONE ENDWALLS

The backfill over the ends of the corrugated steel pipe shall be set on a slope of 1-½ units horizontal to 1 unit vertical from the bottom of the corrugated steel pipe to the top of each end slope and between the drain banks. The top 305mm (12") in thickness of the backfill over the ends of the corrugated steel pipe shall be quarried limestone. The quarried limestone shall also be placed on a slope of 1-½ units horizontal to 1 unit vertical from the bottom of the corrugated steel pipe to the top of each bank of the drain adjacent each end slope. The quarried limestone shall have a minimum dimension of 100mm (4") and a maximum dimension of 250mm (10"). The end slope protection shall be placed with the quarried limestone pieces carefully tamped into place with the use of a shovel bucket so that, when complete, the end protection shall be consistent, uniform, and tightly laid in place.

Prior to placing the quarried limestone end protection over the granular backfill and on the drain banks, the Contractor shall lay non-woven geotextile filter fabric "GMN160" conforming to O.P.S.S. 1860 Class I or approved equal. The geotextile filter fabric shall extend from the bottom of the corrugated steel pipe to the top of each end slope of the bridge and along both banks of the drain to a point opposite the ends of the pipe.

The Contractor shall take extreme care not to damage the geotextile filter fabric when placing the quarried limestone on top of the filter fabric.

3. BRIDGE BACKFILL

After the corrugated steel pipe has been set in place, the Contractor shall backfill the pipe with Granular "B" material, O.P.S.S. Form 1010 with the exception of the top 305mm (12") of the backfill. The top 305mm (12") of the backfill for the full width of the excavated area (between each bank of the drain) and for the top width of the driveway, shall be Granular "A" material, O.P.S.S. Form 1010. The granular backfill shall be compacted in place to a Standard Proctor Density of 100% by means of mechanical compactors. All of the backfill material, equipment used, and method of compacting the backfill material shall be inspected and approved and meet with the full satisfaction of the Drainage Superintendent and Engineer.

4. GENERAL

Prior to the work commencing, the Drainage Superintendent and Engineer must be notified, and under no circumstances shall work begin without one of them being at the site. Furthermore, the grade setting of the pipe must be checked, confirmed, and approved by the Drainage Superintendent or Engineer prior to continuing on with the bridge installation.

The alignment of the new bridge culvert pipe shall be in the centreline of the existing drain, and the placing of same must be performed totally in the dry.

Prior to the installation of the new access bridge culvert, the existing sediment build-up in the drain bottom must be excavated and completely removed. This must be done not only along the drain where the bridge culvert pipe is to be installed, but also for a distance of 3.05 metres (10 ft.) both upstream and downstream of said new access bridge culvert. When setting the new bridge culvert pipe in place it must be founded on a good undisturbed base. If unsound soil is encountered, it must be totally removed and replaced with 20mm (3/4") clear stone, satisfactorily compacted in place.

When doing the excavation work or any other portion of the work relative to the bridge installation, care should be taken not to interfere with, plug up, or damage any existing surface drains, swales, and lateral or main tile ends. Where damage is encountered, repairs to correct same must be performed immediately as part of the work.

The Contractor and/or landowner performing the bridge installation shall satisfy themselves as to the exact location, nature and extent of any existing structure, utility or other object that they may encounter during the course of the work. The Contractor shall indemnify and save harmless the Town, or the Municipality, the Engineer, and their staff from any damages which it may cause or sustain during the progress of the work. It shall not hold them liable for any legal action arising out of any claims brought about by such damage caused by it.

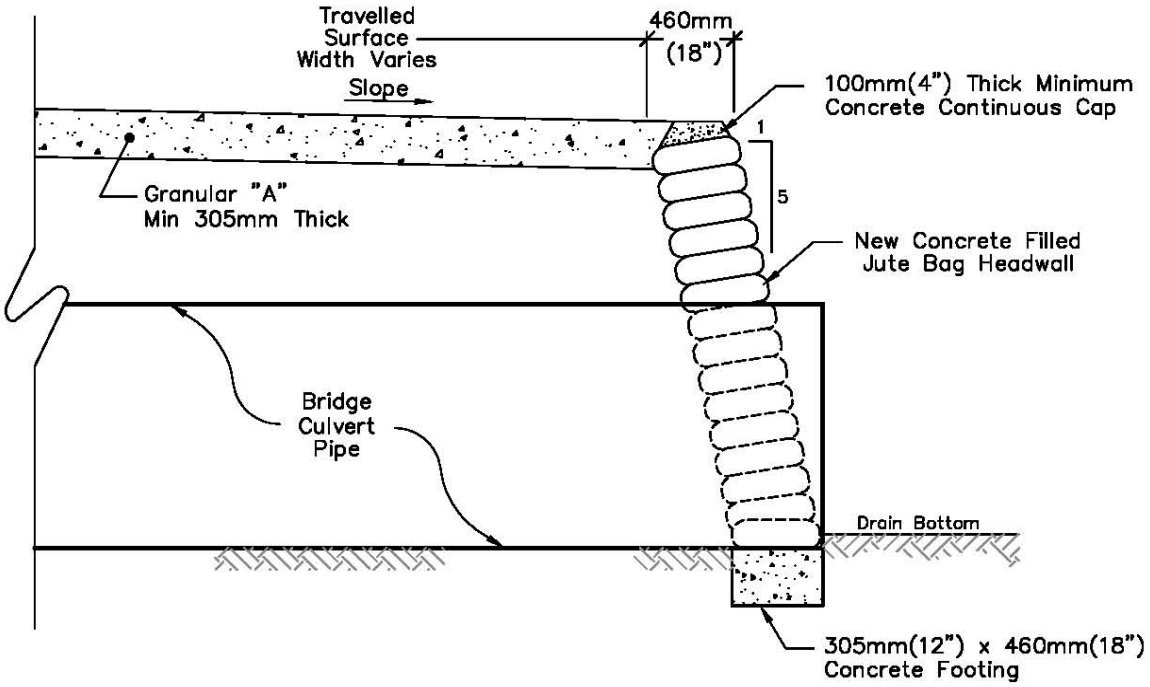
Where applicable, the Contractor and/or landowner constructing the new bridge shall be responsible for any damage caused by them to any portion of the Town road right-of-way. They shall take whatever precautions are necessary to cause a minimum of damage to same and must restore the roadway to its original condition upon completion of the works.

When working along a municipal roadway, the Contractor shall provide all necessary lights, signs, barricades and flagpersons as required to protect the public. All work shall be carried out in accordance with the requirements of the Occupational Health and Safety Act, and latest amendments thereto. If traffic control is required on this project, it is to comply with the M.T.O. Traffic Control Manual for Roadway Work Operations and Ontario Traffic Manual Book 7.

Once the bridge installation has been completed, the drain sideslopes directly adjacent the new headwalls and/or endwalls are to be completely restored including revegetation, where necessary.

All of the work required towards the installation of the bridge shall be performed in a neat and workmanlike manner. The general site shall be restored to its' original condition, and the general area shall be cleaned of all debris and junk, etc. caused by the work

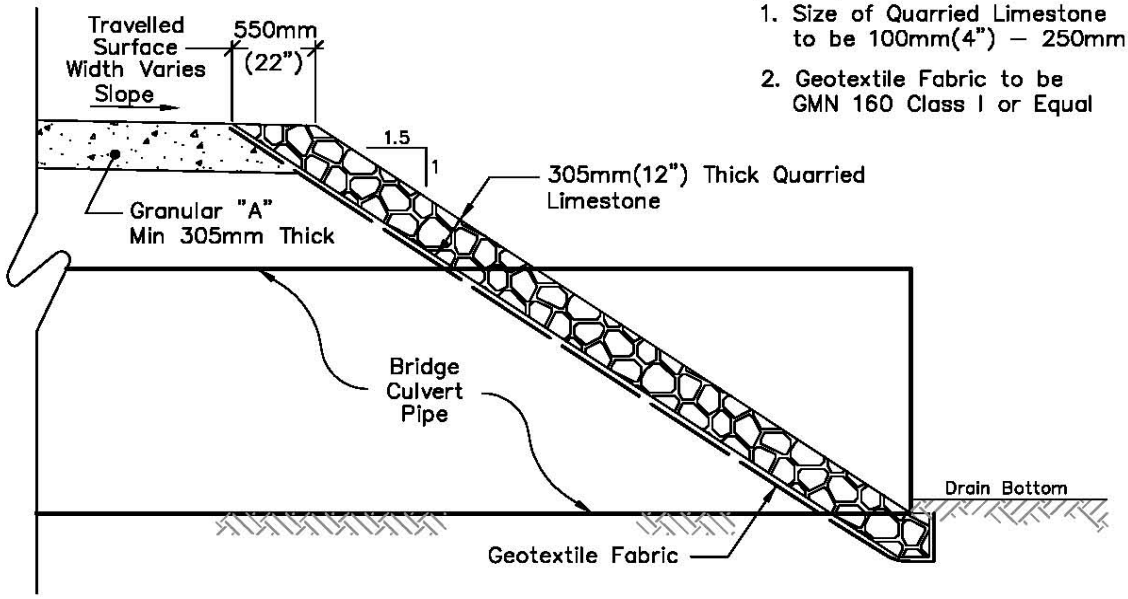
All of the excavation, installation procedures, and parameters as above mentioned are to be carried out and performed to the full satisfaction of the Drainage Superintendent and Engineer.



Typical Jute Bag Headwall

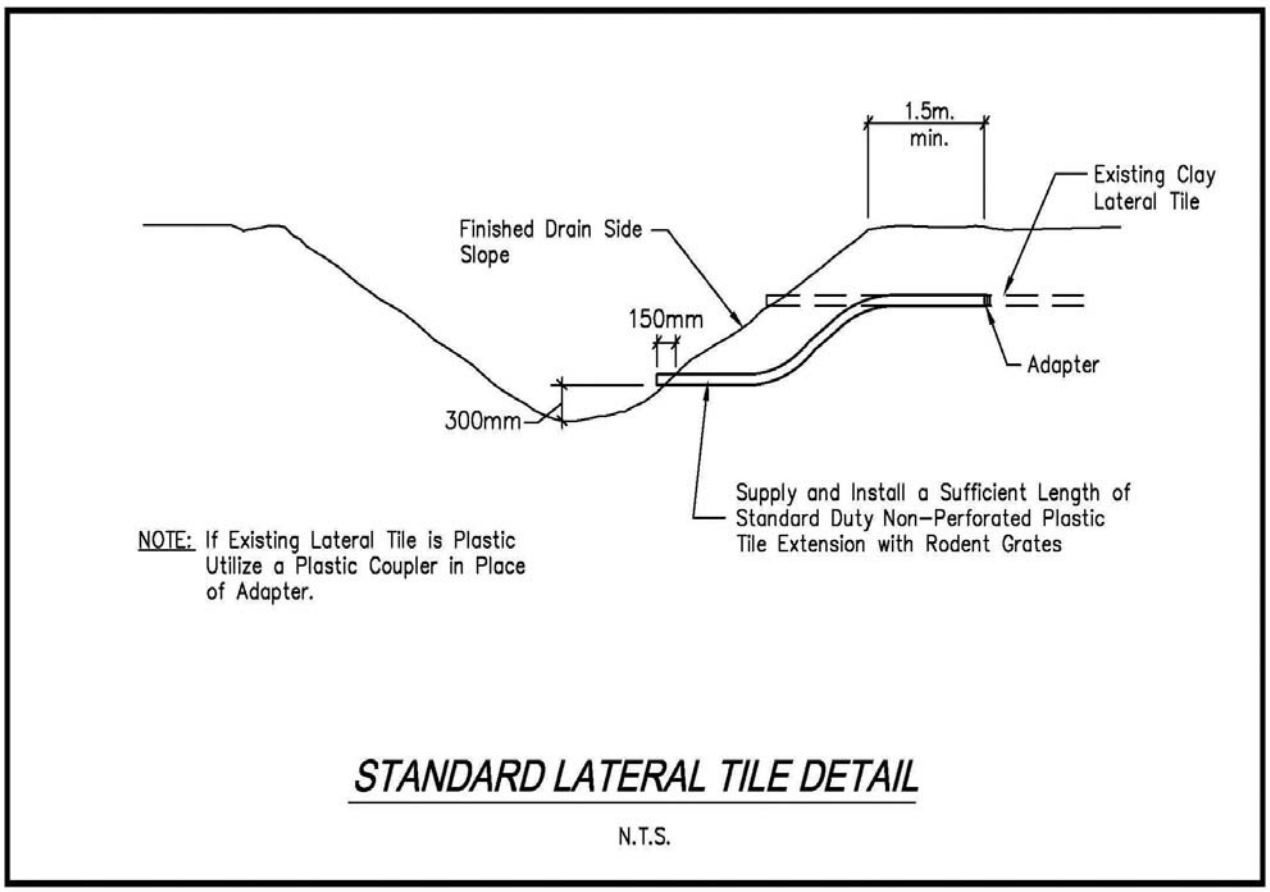
NOTE:

1. Size of Quarried Limestone to be 100mm(4") – 250mm(10")
2. Geotextile Fabric to be GMN 160 Class I or Equal



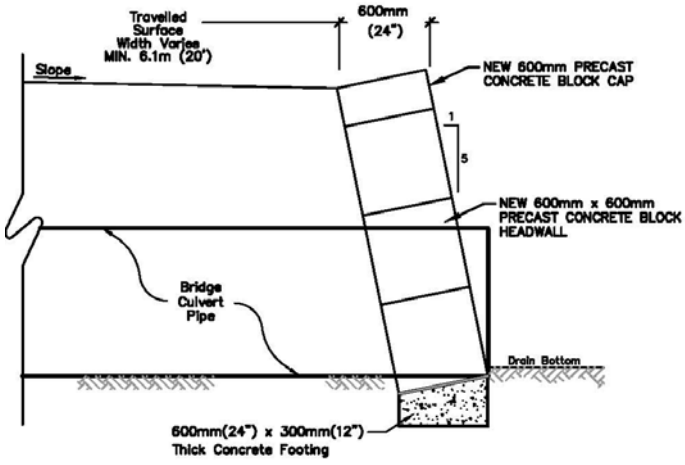
Typical Quarried Limestone End Protection

Rood Engineering Inc.
Consulting Engineers
9 Nelson Street
Leamington, Ontario N8H 1G6
519-322-1621



STANDARD LATERAL TILE DETAIL

N.T.S.



TYPICAL PRECAST CONCRETE BLOCK END PROTECTION

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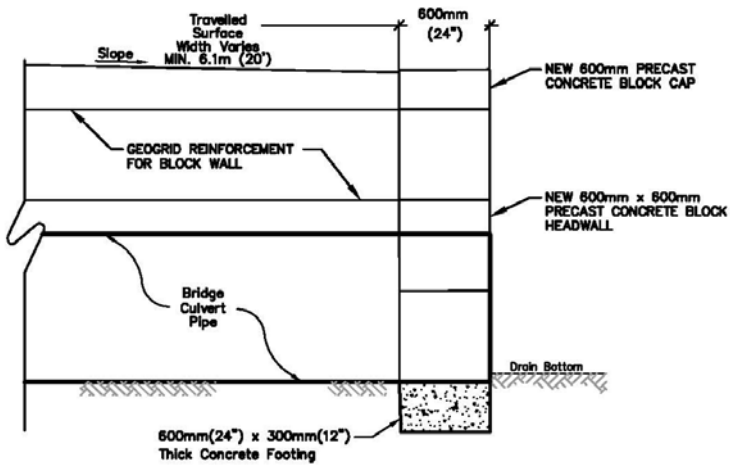

TYPICAL VERTICAL PRECAST CONCRETE BLOCK END PROTECTION

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APPENDIX “REI-D”

Appendix D – General Conditions and Specifications not required.

APPENDIX “REI-E”

WATERSHED, KEY & DRAIN PLANS. PROFILE AND CROSS-SECTIONS

OF THE

SHEPLEY DRAIN

(BANK STABILIZATION)

(Geographic Township of Colchester South)

IN THE

TOWN OF ESSEX (HARROW CENTRE)

IN THE

COUNTY OF ESSEX • ONTARIO

Gerard Rood

GERARD ROOD, P.ENG.

REGISTERED PROFESSIONAL ENGINEER G.ROOD 2025-04-01 PROVINCE OF ONTARIO

ROOD ENGINEERING INC. CONSULTING ENGINEERS

Leamington, Ontario
519-322-1621

DATE: April 2nd, 2025

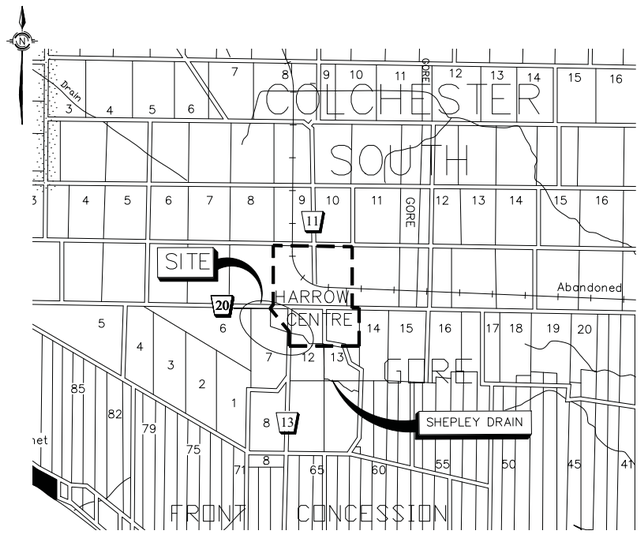
TOWN OF ESSEX

MAYOR: SHERRY BONDY
CLERK: JOSEPH MALANDRUCCOLO
DRAINAGE SUPERINTENDENT: LINDSAY DEAN, B.Sc.

BENCHMARK:

TOP CENTER OF WEST END OF BRIDGE UNDER COUNTY ROAD 13
ELEV. = 189.536m

TOP OF NUT OF FIRE HYDRANT AT SOUTH SIDE OF COUNTY ROAD 20 IMMEDIATELY NORTH OF MN 399
ELEV. = 188.746m



KEY PLAN
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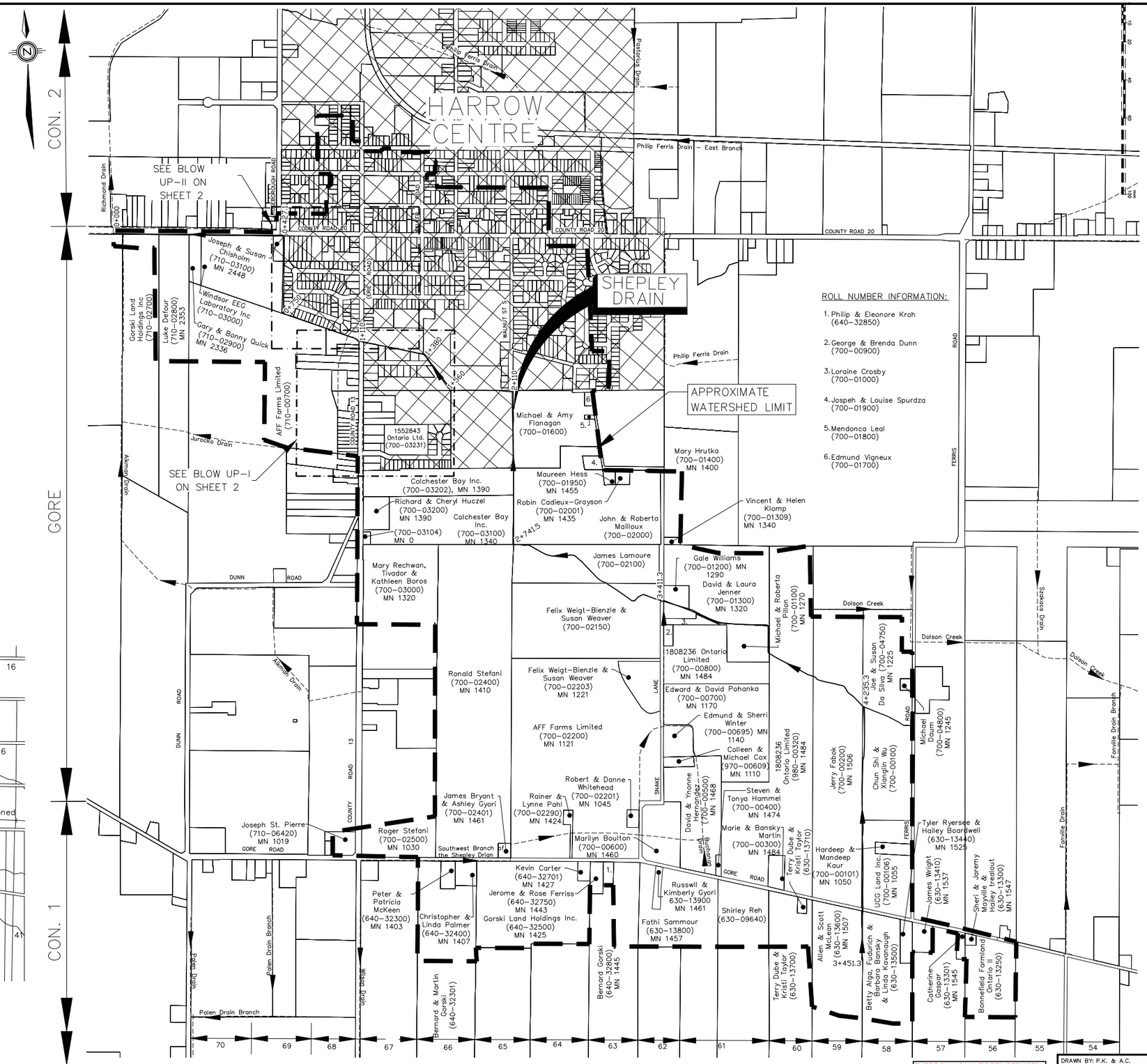

WATERSHED PLAN
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THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.

DRAWN BY: P.K. & A.C.
PLOT CODE: 1:1
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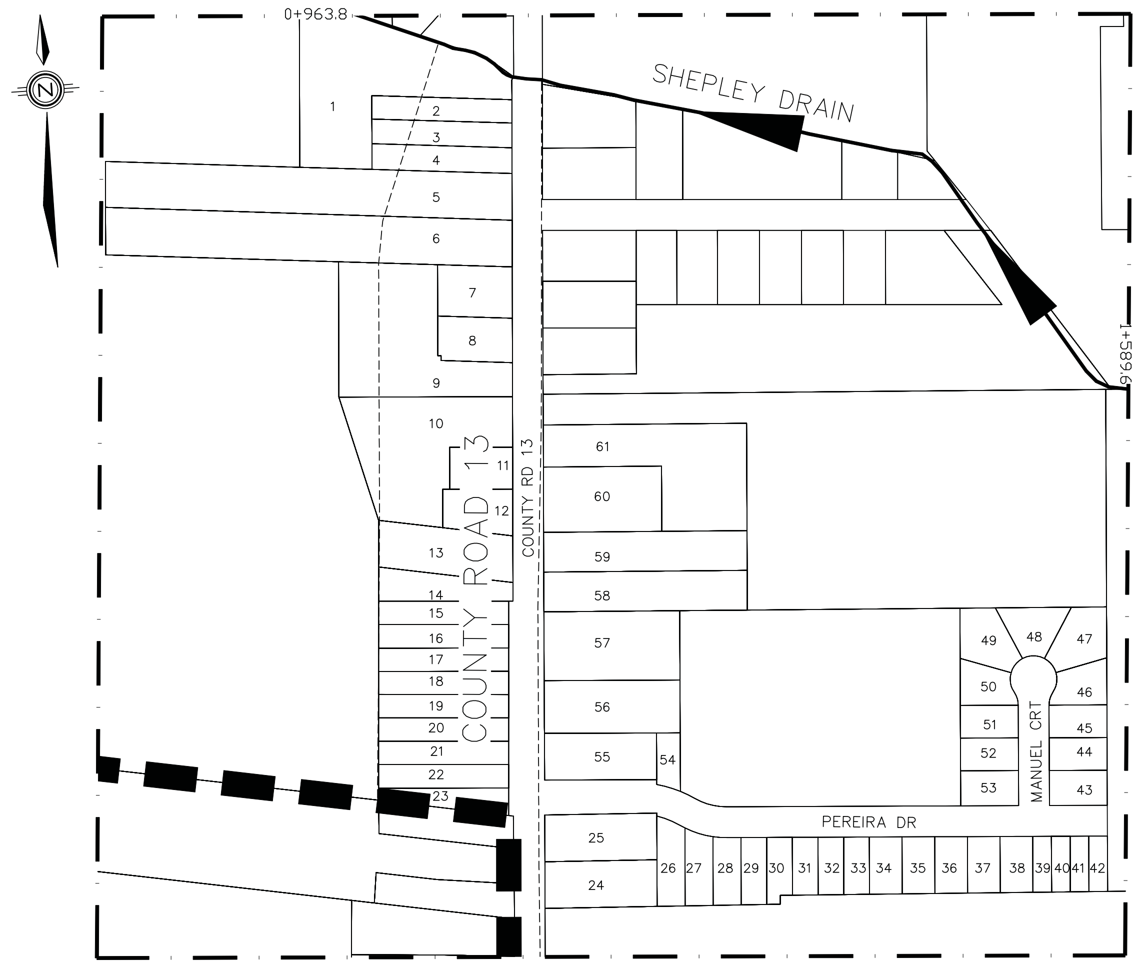
FILE No.: REI2022D018

SHEET No.: 1 of 21



BLOW UP – I

Scale = N.T.S.

BLOW UP – II

Scale = N.T.S.

Urban Block

ROLL NUMBER INFORMATION:

1. Aaron & Sarah Jane (710–03200)
2. Jordan Castro & Dayna St.Louis (710–03300)
3. Margaret Hennessey (710–03400)
4. Colin McVittie (710–03500)
5. Kyle & Lloyd Lefaive & Laura Gentili (710–03600)
6. Roger Cadieux & Rachel Oliver (710–03700)
7. Teresa Durand (710–03800)
8. Ronald & Lynn Tofflemire (710–03900)
9. Jose Matos (710–04000)
10. Jose & Joana Roberto (710–04100)
11. Michael & Angela Morin (710–04101)
12. Wilson & Anne Ford (710–04200)
13. Arthur & Elizabeth Sinasac (710–04300)
14. Hugh Ferriss (710–04400)
15. Fillmore Swarts (710–04500)
16. Brent & Sarah Scratch (710–04600)
17. Erin Gall (710–04700)
18. Vieira & Antonio Bondy (710–04800)
19. Timothy & Jacqueline Shepley (710–04900)
20. Travis Weaver (710–05000)
21. Kathleen Rocheleau (710–05100)
22. Lyn & Thomas Shaften (710–05200)
23. Colin McVittie (710–05300)
24. Wayne & Ann Hedges (700–03210)
25. Thomas & Marie O'Keefe (700–03220)
26. Urban Block
27. Urban Block
28. Urban Block
29. Urban Block
30. Urban Block
31. Urban Block
32. Urban Block
33. Urban Block
34. Urban Block
35. Urban Block
36. Urban Block
37. Urban Block
38. Urban Block
39. Urban Block
40. Urban Block
41. Urban Block
42. Urban Block
43. Urban Block
44. Urban Block
45. Urban Block
46. Urban Block
47. Urban Block
48. Urban Block
49. Urban Block
50. Urban Block
51. Urban Block
52. Urban Block
53. Urban Block
54. 1552843 Ontario Ltd (700–03251)
55. Brian & Elizabeth Yaciuk (700–03250)
56. 2740599 Ontario Inc, (700–03300)
57. Teresa Pereira (700–03400)
58. Bradley & Alice Laporte (700–03450)
59. 2275694 Ontario Inc. (700–03470)
60. Owl Management Inc. (700–03500)
61. Harrow Health Centre Inc. (700–03550)
62. John Dufour (700–00100)
63. Gregory Polkinghorne (940–01418)
64. Wayne Garant & Helen Gignac (940–01419)
65. Kevin & Jean Bessette (940–01420)
66. Loren Walters (940–01421)
67. Edward Bechard & Jennifer Dumouchelle (940–01740)
68. Jeremy & Julie Bloomfield (940–01741)
69. Stanley Smith (940–01742)
70. Vernon & Marie McDonald (940–01743)
71. Murray Smith & Jaycee–Lee Teves (940–01744)
72. Arthur & Margaret Brush (940–01745)
73. Bahnam Badria & Alexander Chatta (940–01746)
74. Mushtaq Ahmad (940–01474)
75. James & Margaret Pollard (940–01748)
76. Matilde McCarthy (940–01749)
77. Donald Zoch (940–01750)
78. Douglas & Laurie McGhee (940–01751)
79. Steven Bakker & Ann Edwards (940–01752)
80. Victor Gomes (940–01753)
81. Alexander & Irene Kopka (940–01754)
82. Arandia Teran (940–01755)
83. Charlene White (940–01756)
84. Timothy Boiciuc & Larisa Aitonean (940–01757)
85. David & Jean Russel (900–02602)
86. Community Living Essex County (940–01760)
87. Victor & Leigh Dufour (940–01770)

THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.

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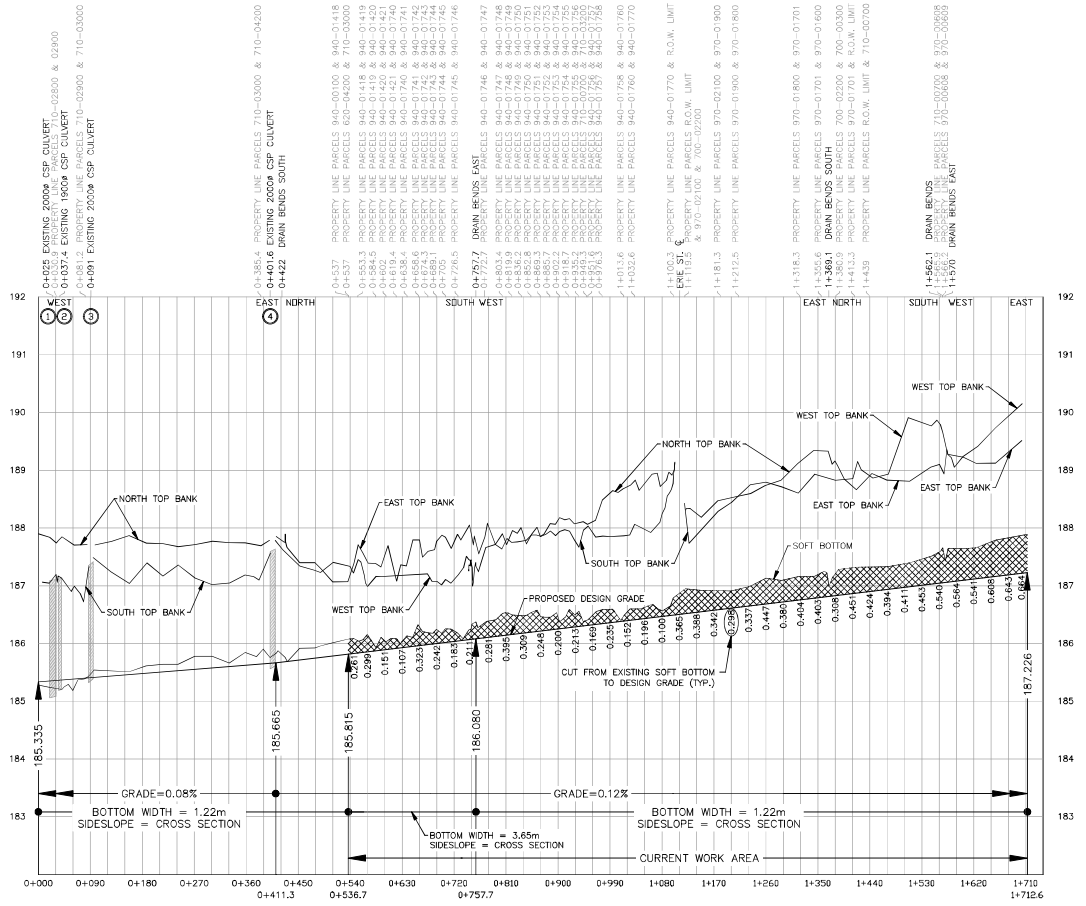

PROFILE – SHEPLEY DRAIN BANK STABILIZATION

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COMPUTER FILE: REI2022D018.DWG

FILE No.: REI2022D018

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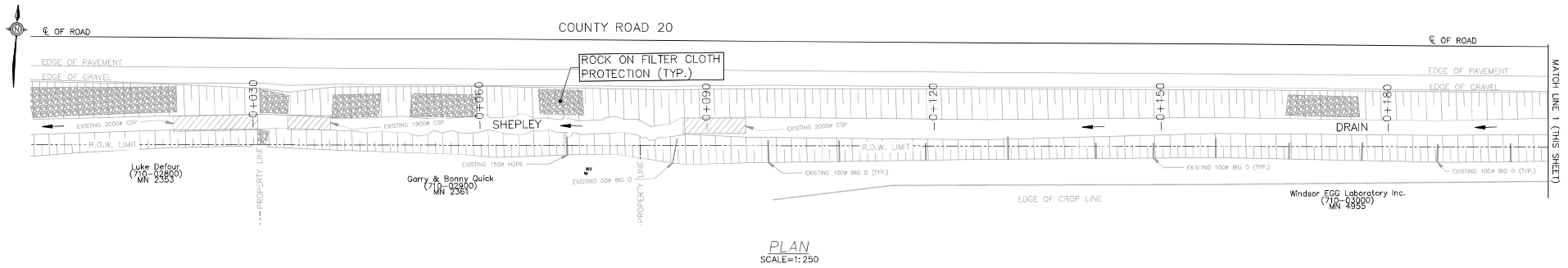

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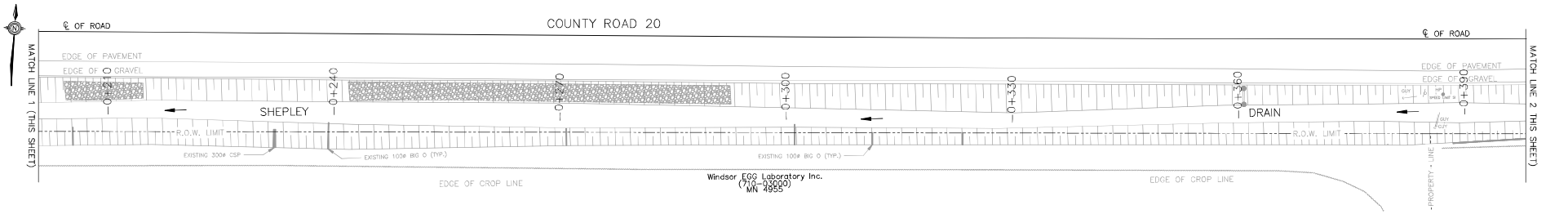

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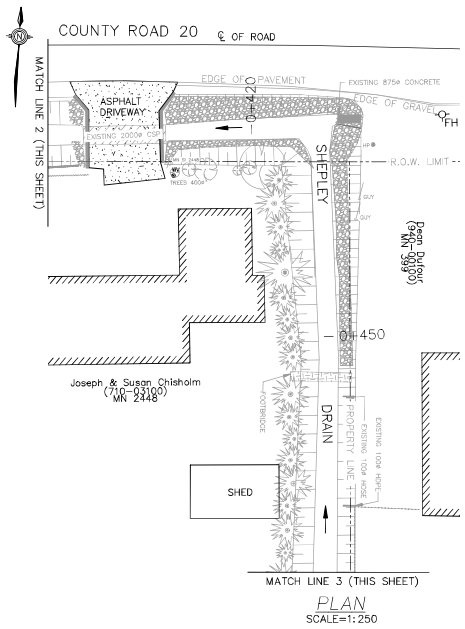

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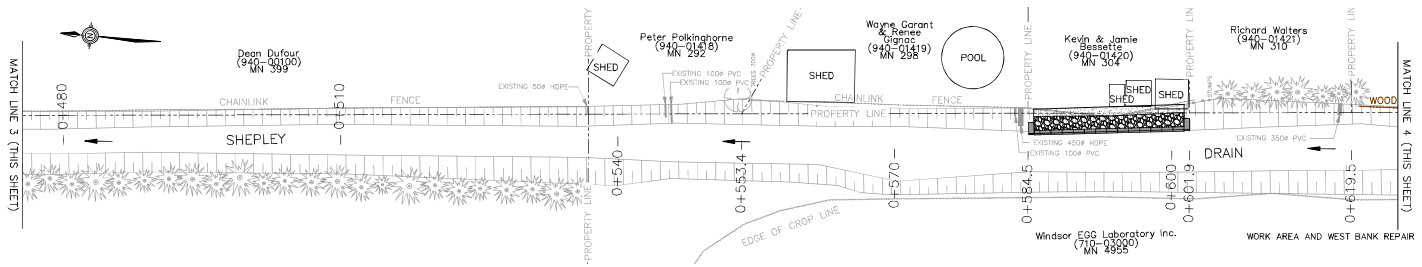

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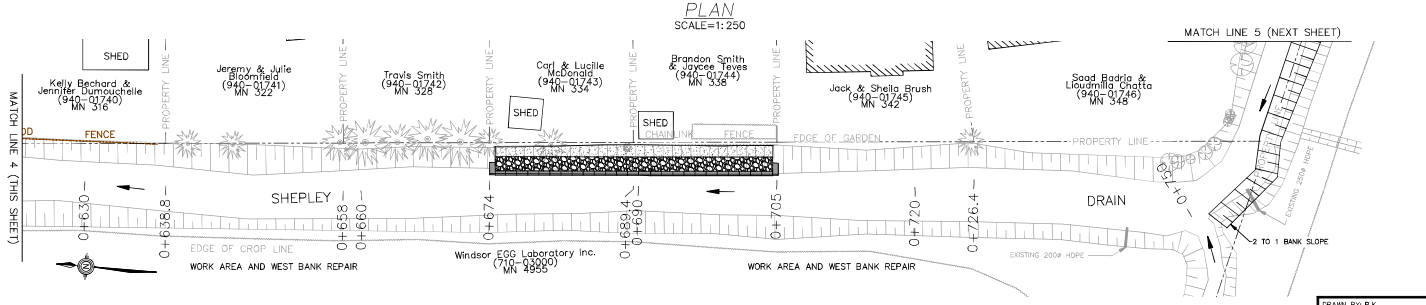

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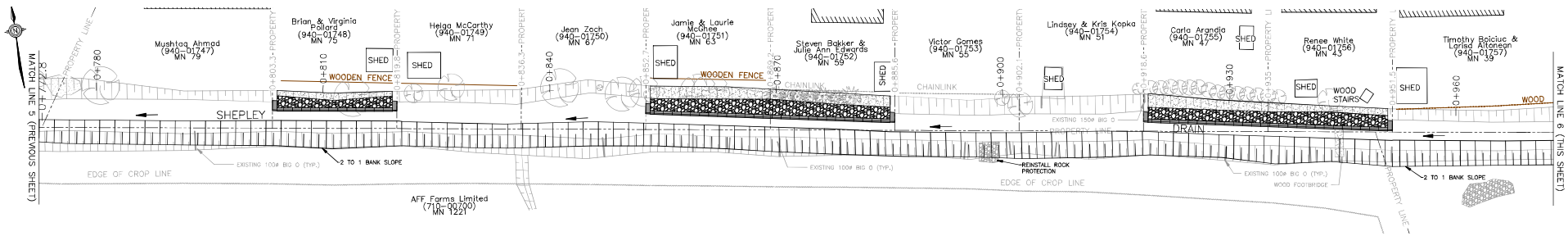

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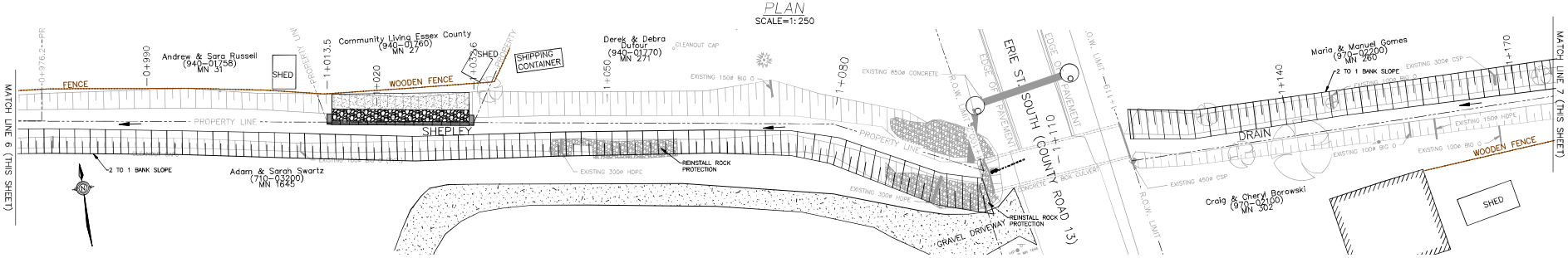

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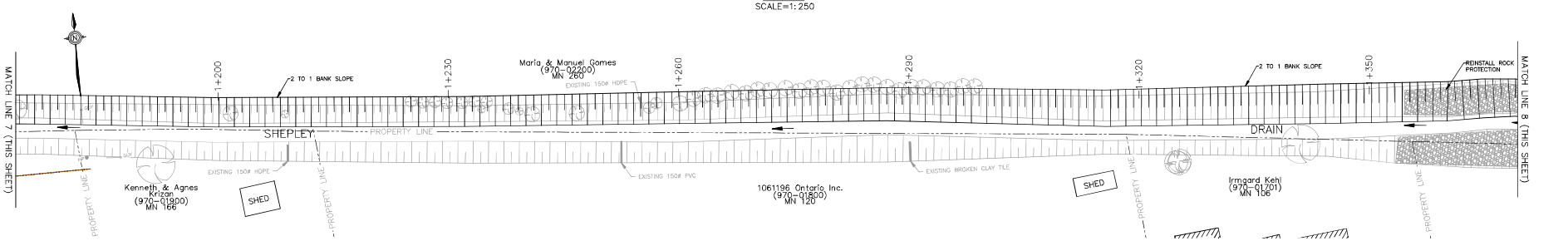

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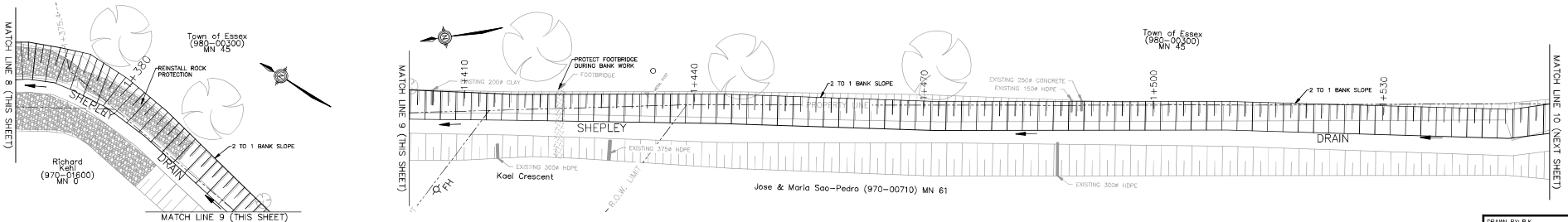

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PLAN
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SHEET No.: 5 of 21

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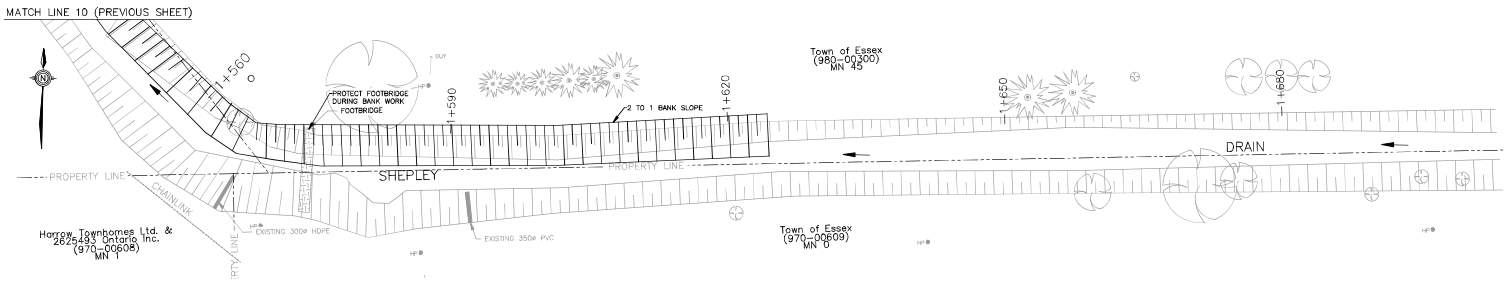

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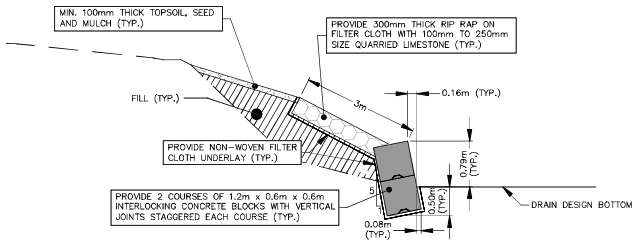

Option 4 – Concrete Block Detail
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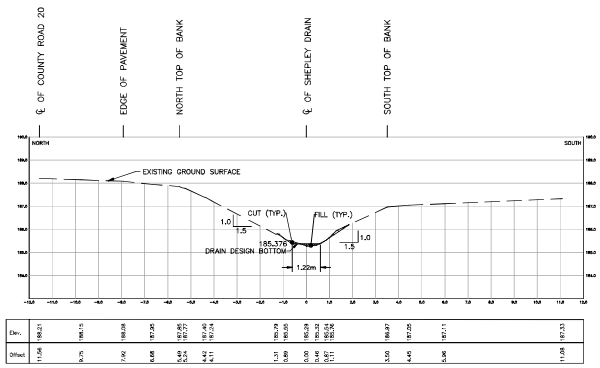

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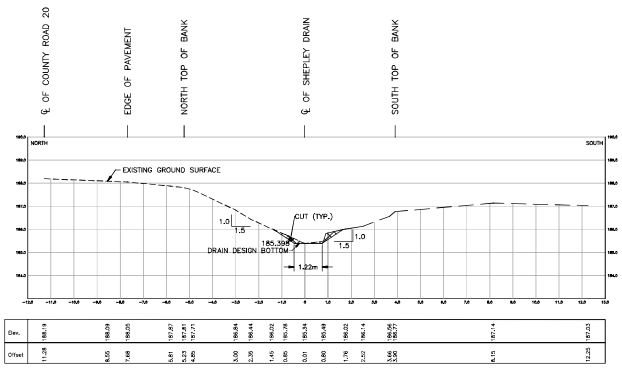

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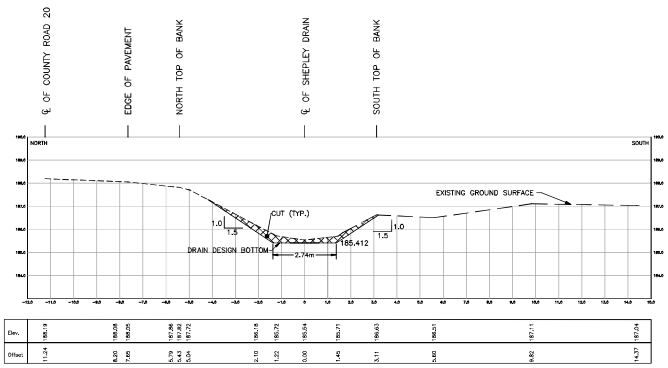

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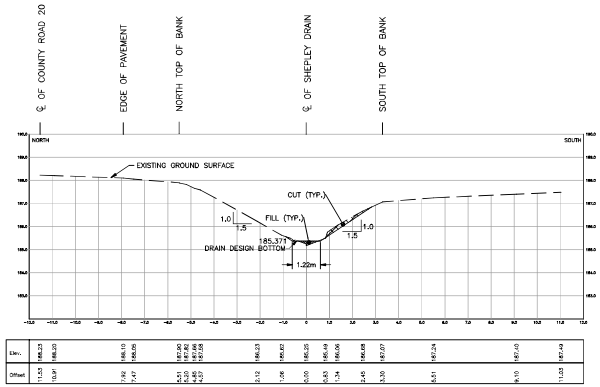

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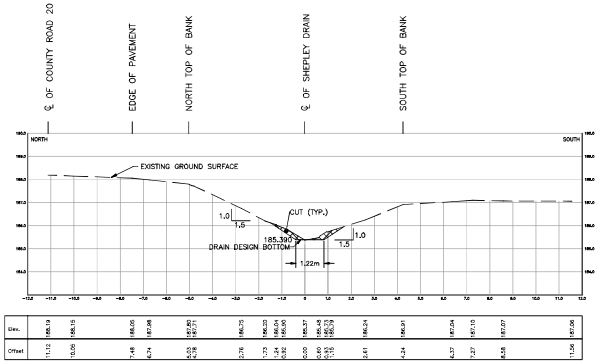
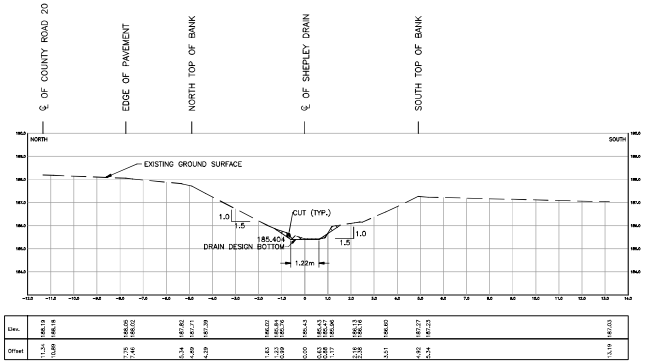
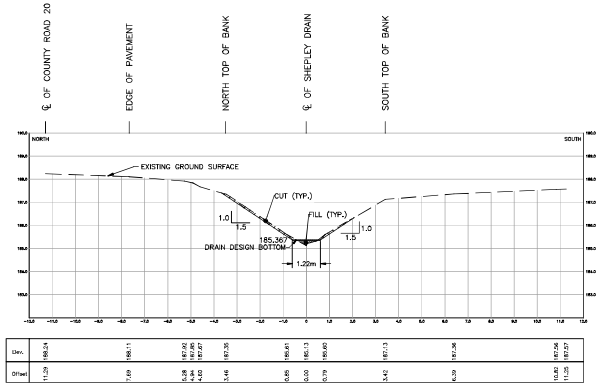


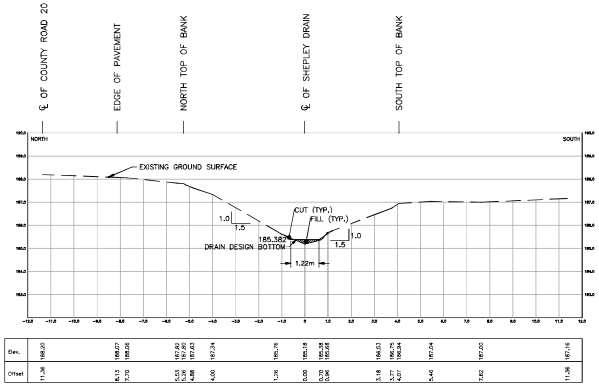
STA. 0+068.48



STA. 0+086.27



STA. 0+040.81



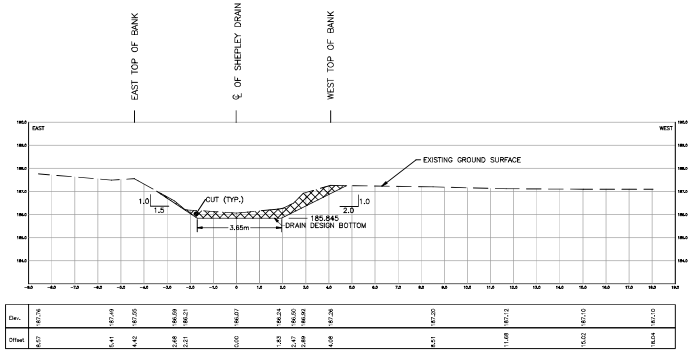
STA. 0+059.63

DRAWN BY: P.K
PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

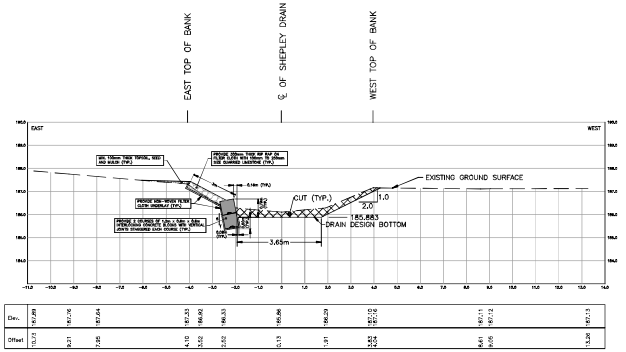
FILE No.: REI2022D018

SHEET No.: 7 of 21

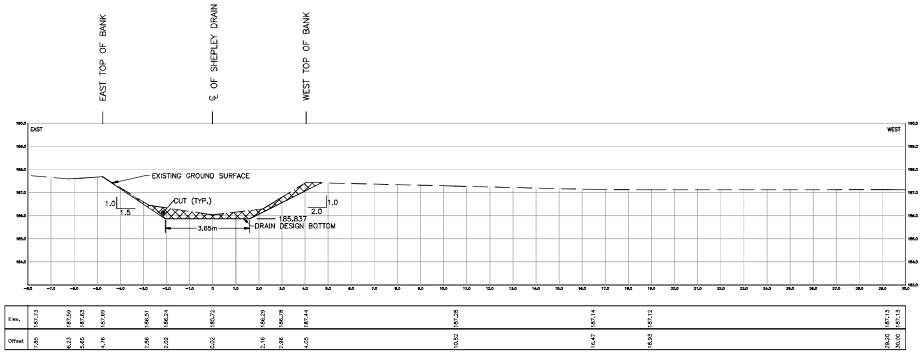
THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



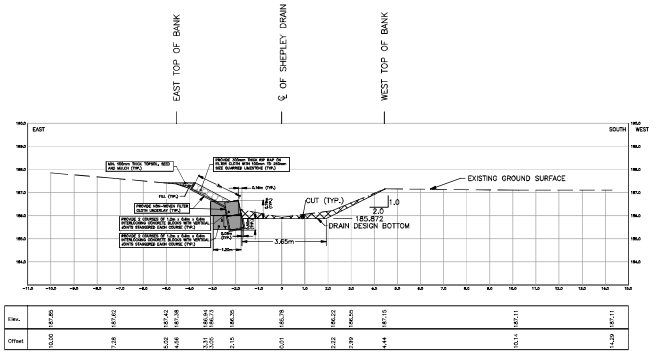
STA. 0+562.4



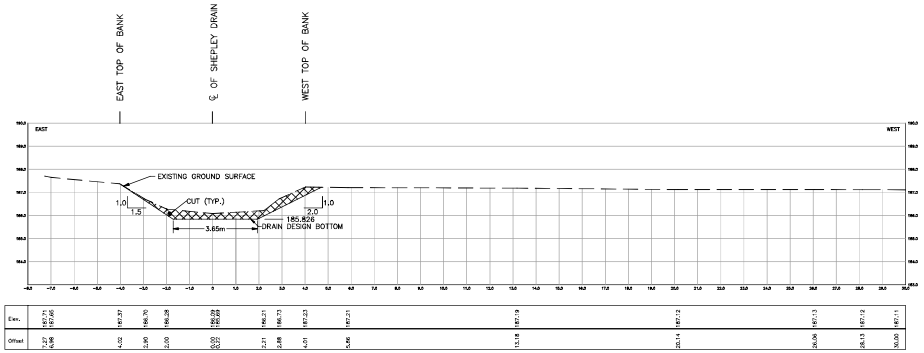
STA. 0+593.46



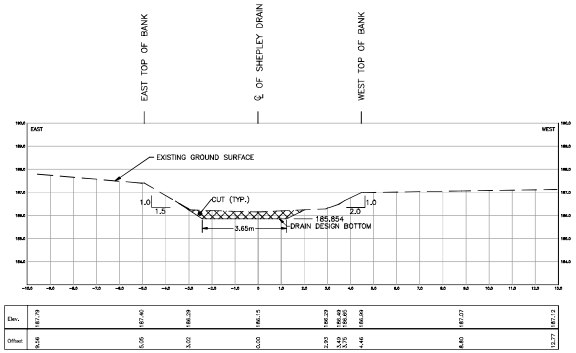
STA. 0+555.05



STA. 0+584.74



STA. 0+546.2



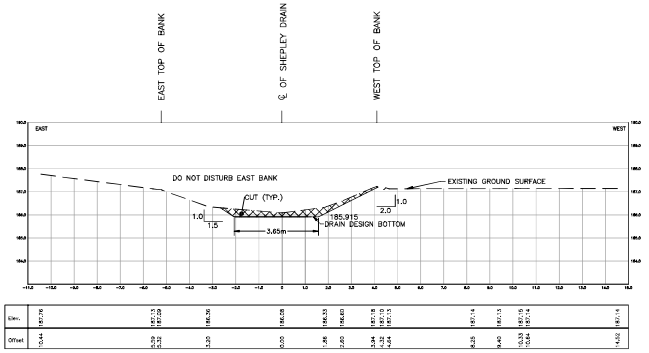
STA. 0+569.92

DRAWN BY: P.K
PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

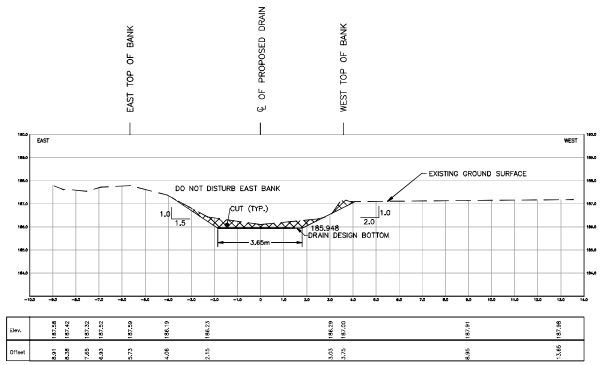
FILE No.: REI2022D018

SHEET No.: 8 of 21

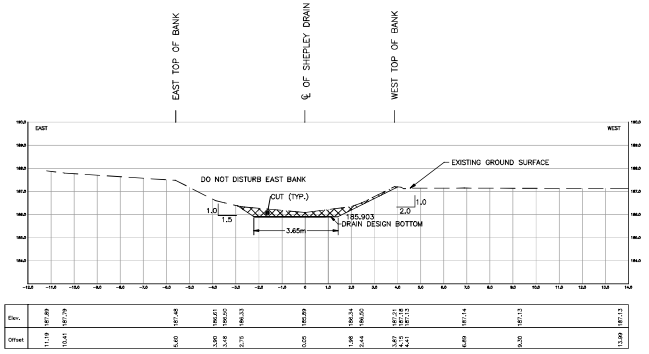
THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



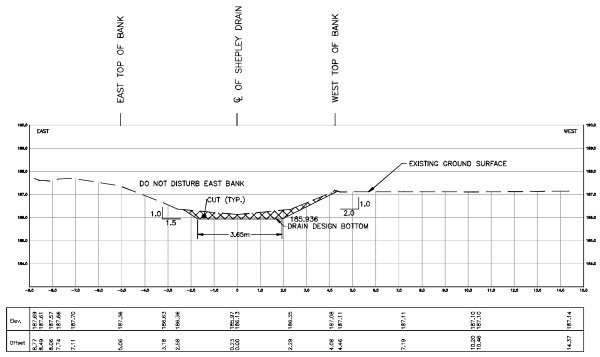
STA. 0+620.39



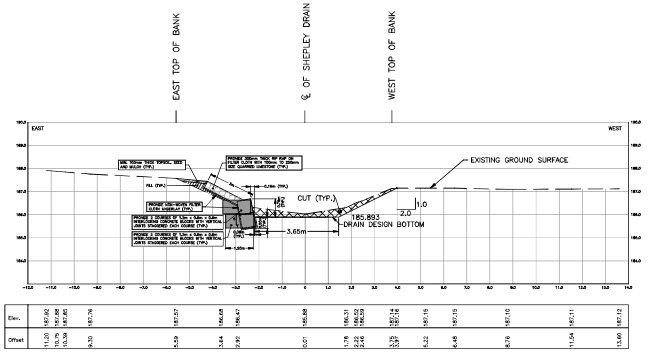
STA. 0+648.07



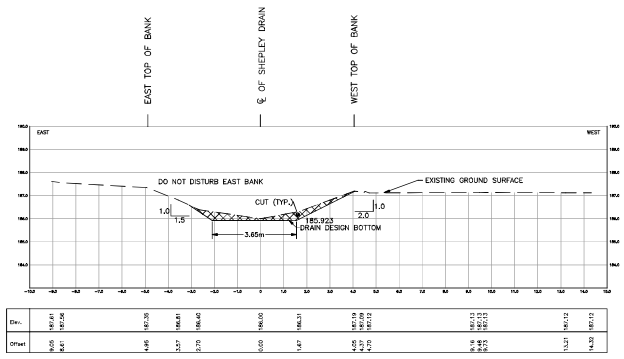
STA. 0+610.68



STA. 0+637.77



STA. 0+601.75



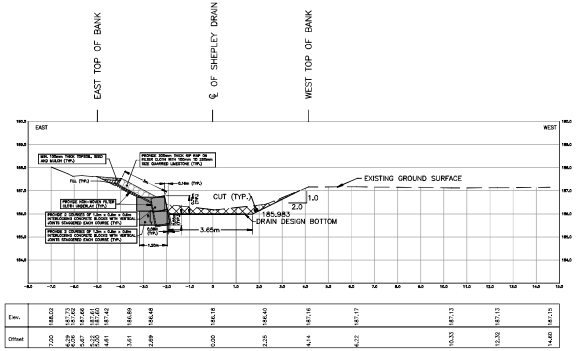
STA. 0+627.11

DRAWN BY: P.K
PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

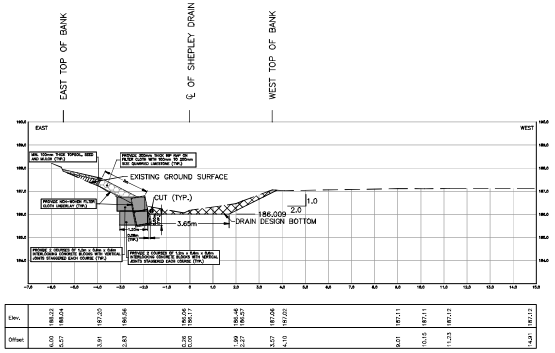
FILE No.: REI2022D018

SHEET No.: 9 of 21

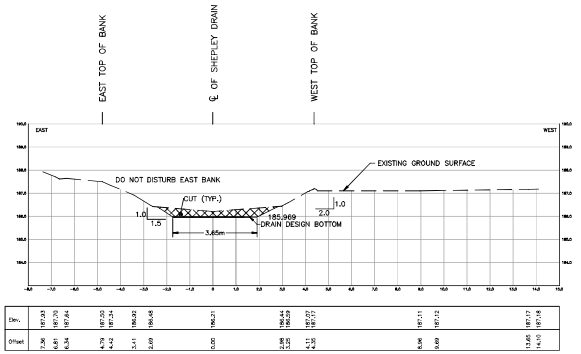
THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



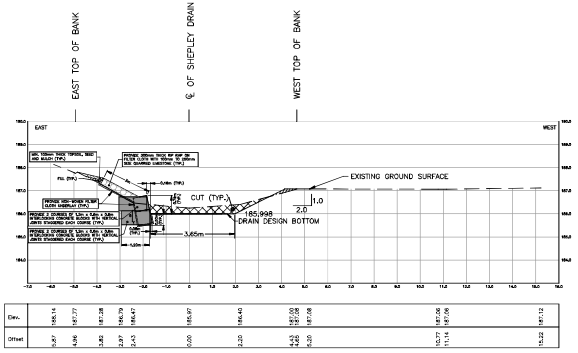
STA. 0+676.5



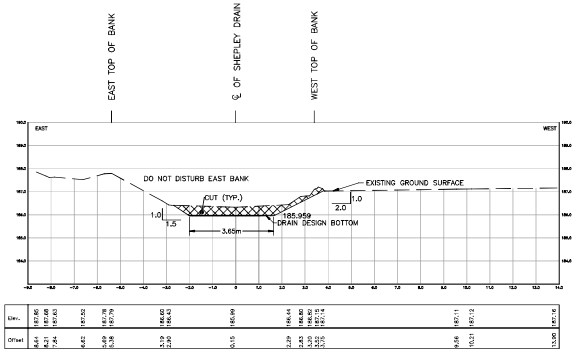
STA. 0+698.49



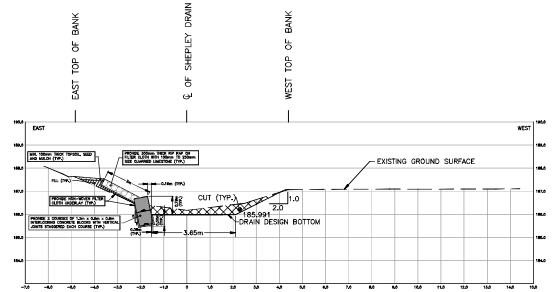
STA. 0+665.17



STA. 0+689.37



STA. 0+657.39



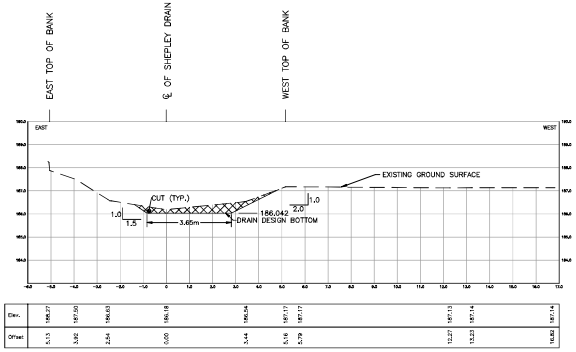
STA. 0+683.4

DRAWN BY: P.K. & A.C.
PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

FILE No.: REI2022D018

SHEET No.: 10 of 21

THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



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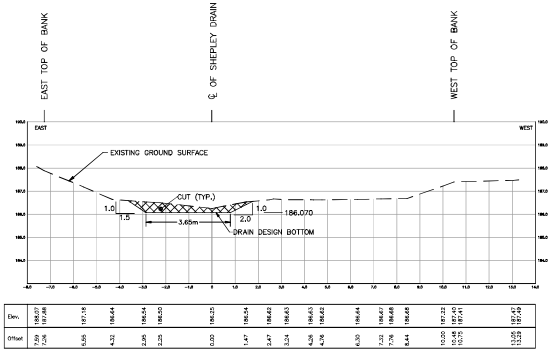

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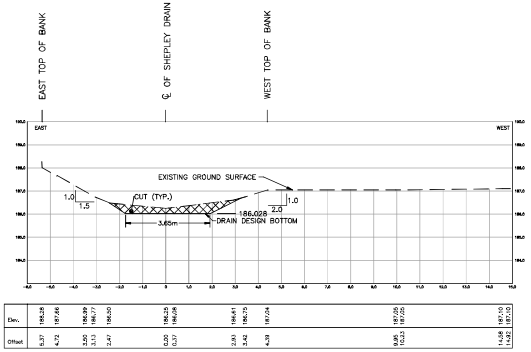
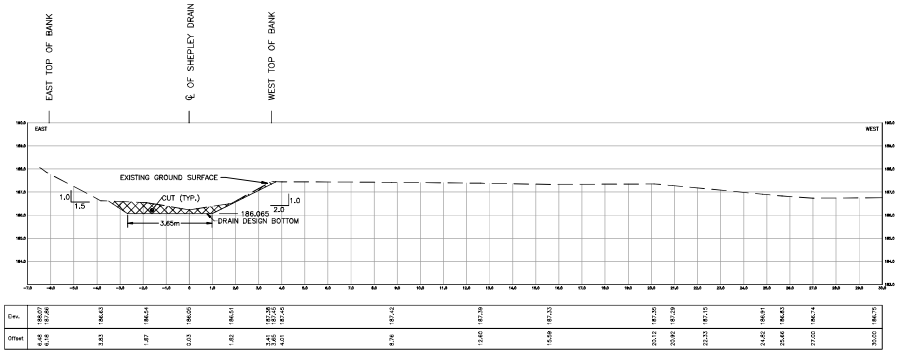
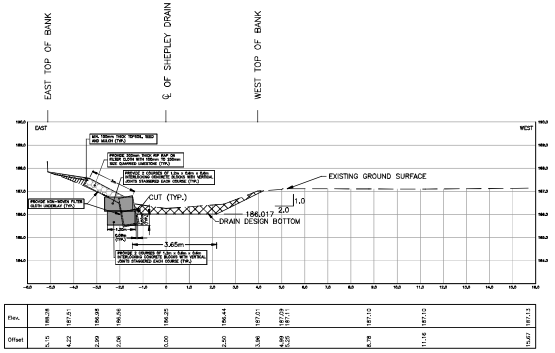


STA. 0+714.61



STA. 0+745.42



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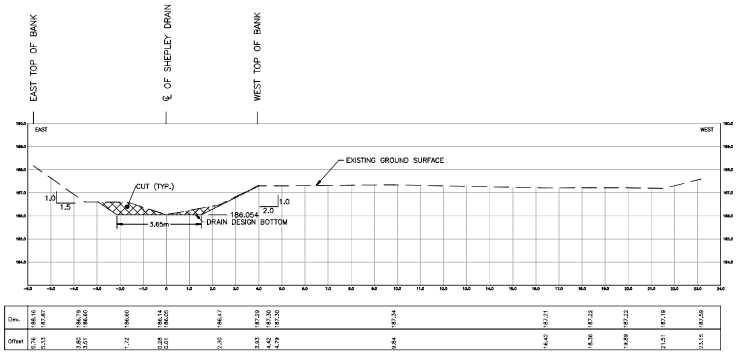


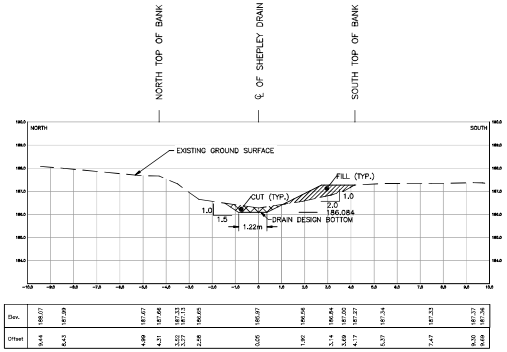
STA. 0+735.83

DRAWN BY: P.K. & A.C.
PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

FILE No.: REI2022D018

SHEET No.: 11 of 21

THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



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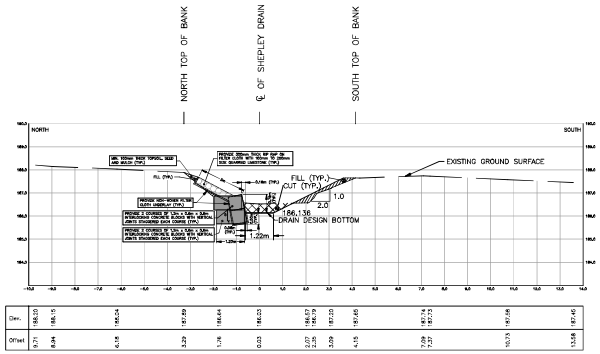

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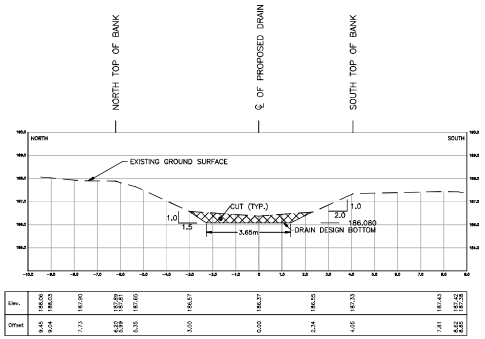
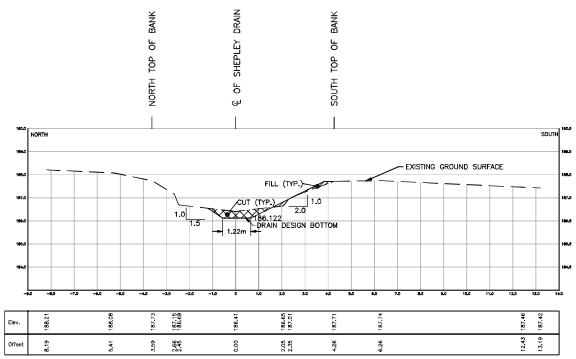
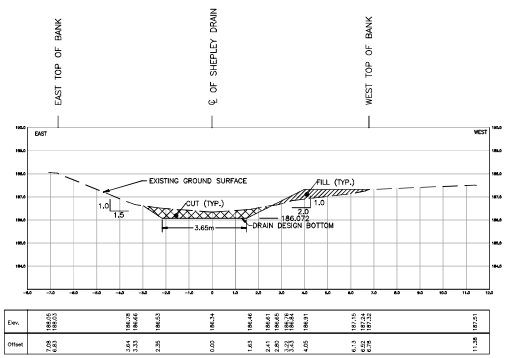


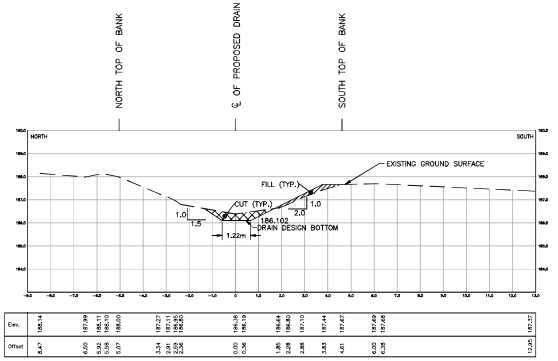
STA. 0+757.73



STA. 0+792.3



STA. 0+751.27



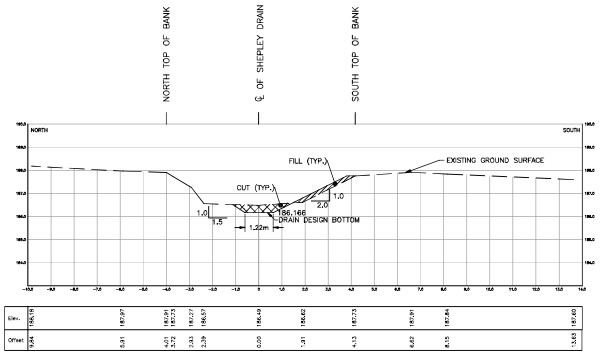
STA. 0+776.12

DRAWN BY: P.K
PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

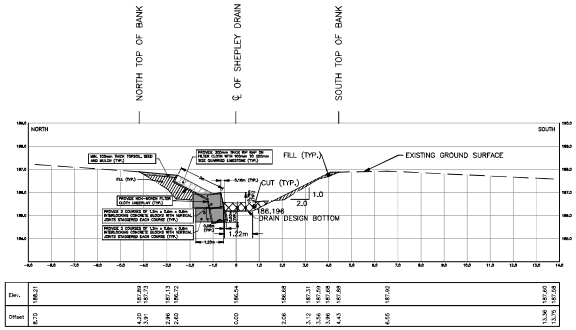
FILE No.: REI2022D018

SHEET No.: 12 of 21

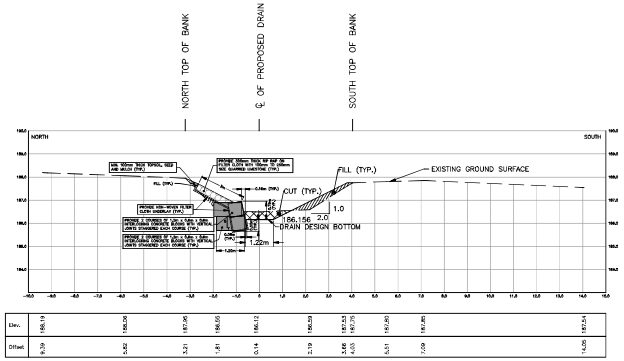
THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



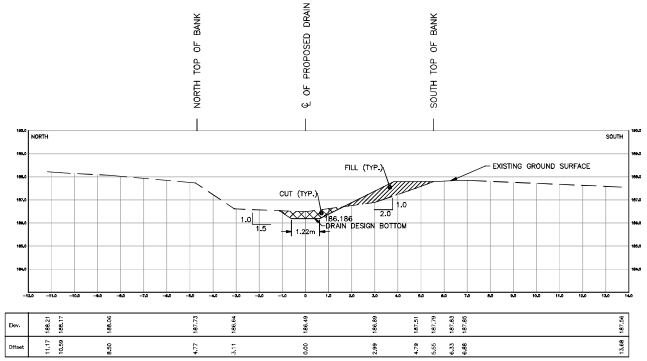
STA. 0+829.53



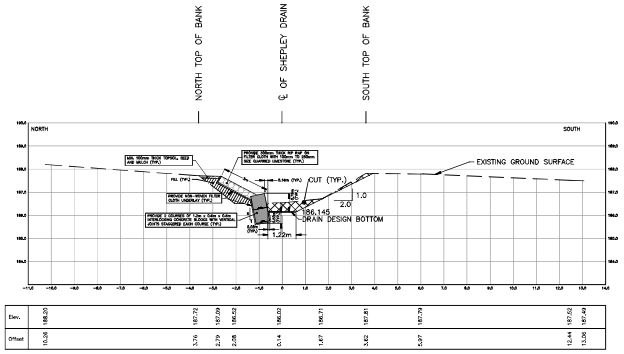
STA. 0+854.14



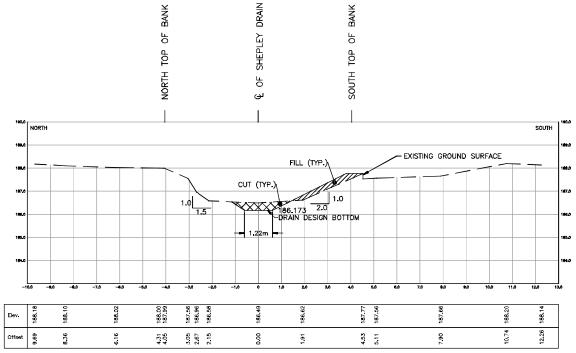
STA. 0+820.64



STA. 0+845.57



STA. 0+811.37



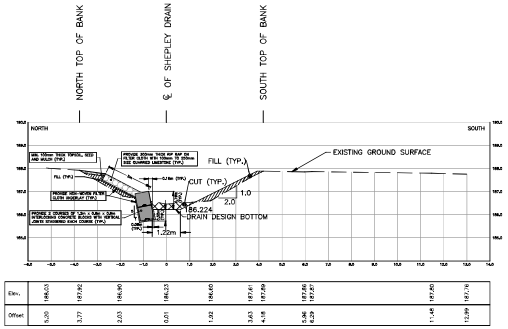
STA. 0+835.1

DRAWN BY: P.K
PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

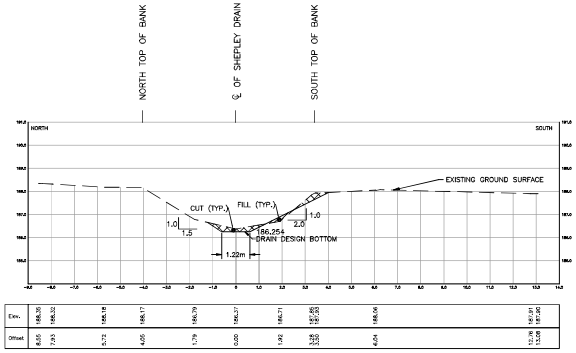
FILE No.: REI2022D018

SHEET No.: 13 of 21

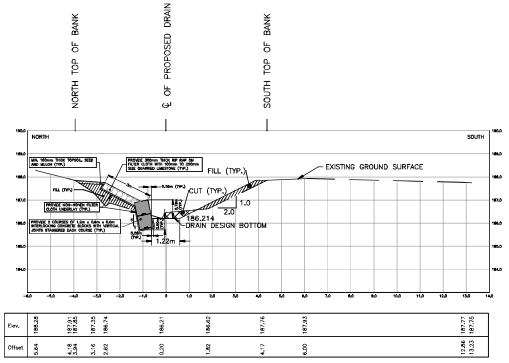
THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



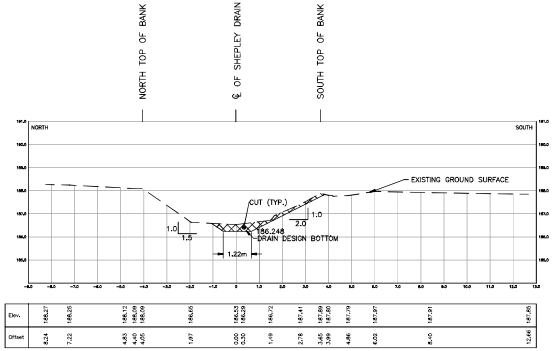
STA. 0+877.32



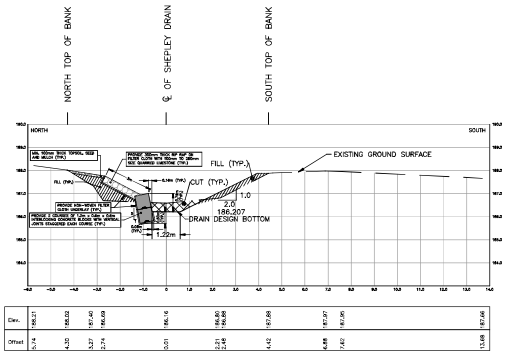
STA. 0+902.53



STA. 0+869.5



STA. 0+897.31



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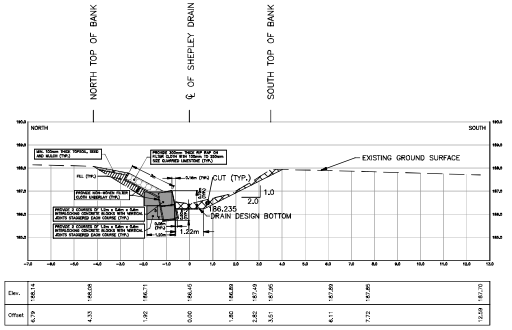


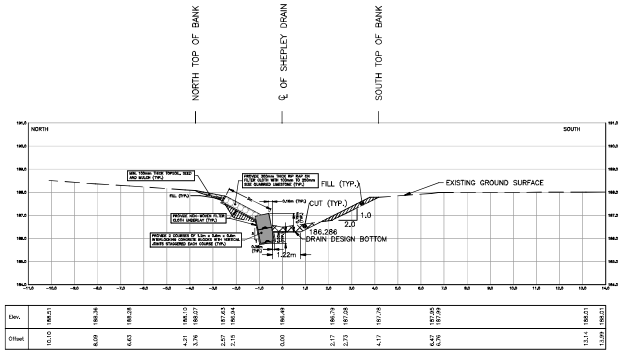
STA. 0+886.81

DRAWN BY: P.K
PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

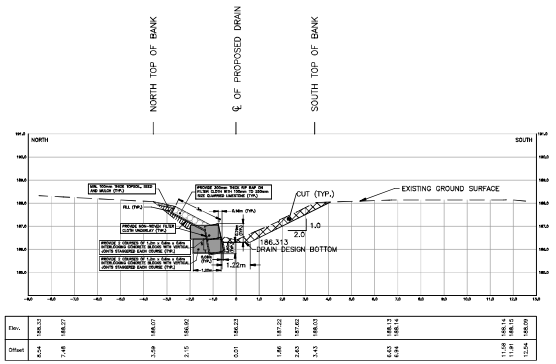
FILE No.: REI2022D018

SHEET No.: 14 of 21

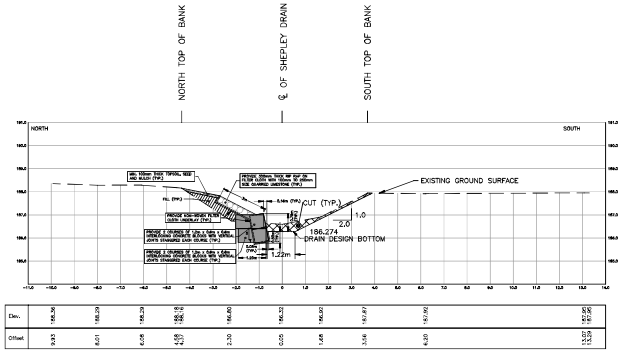
THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



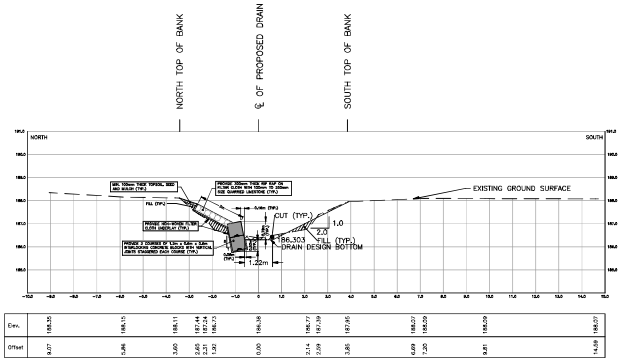
STA. 0+929



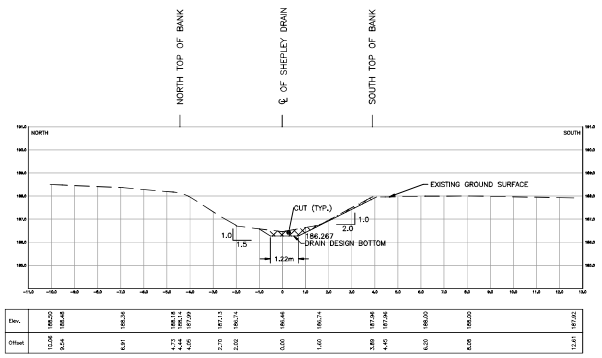
STA. 0+951.78



STA. 0+919.48



STA. 0+943.51



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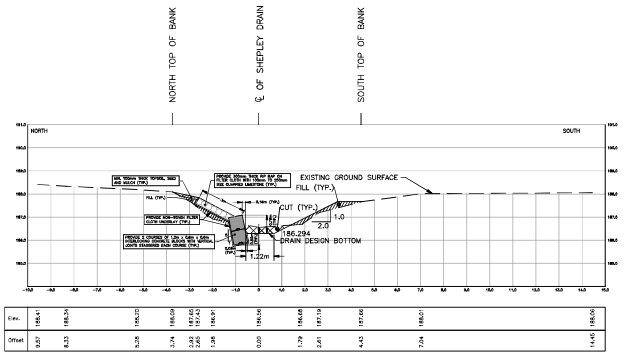

STA. 0+936.08

DRAWN BY: P.K
PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

FILE No.: REI2022D018

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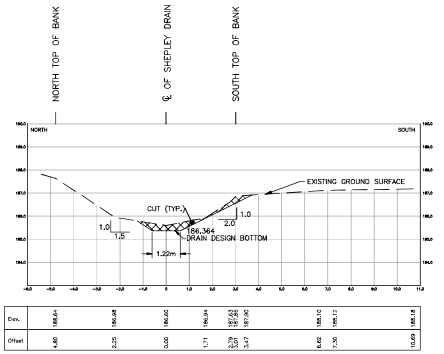
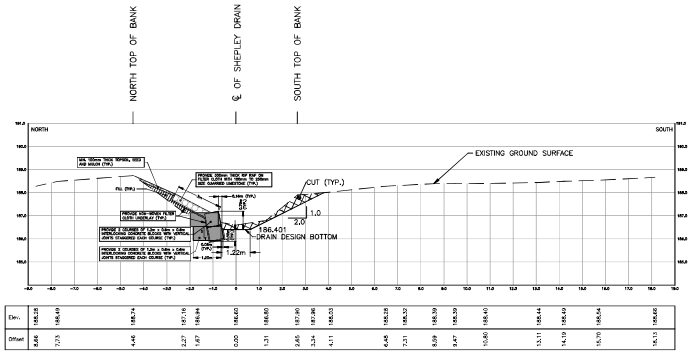
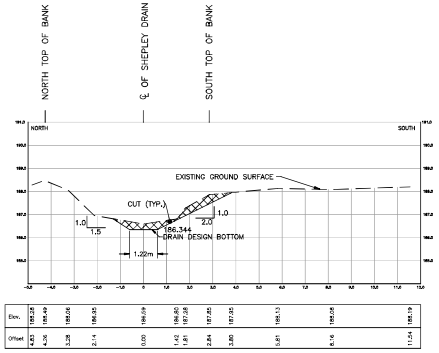
THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



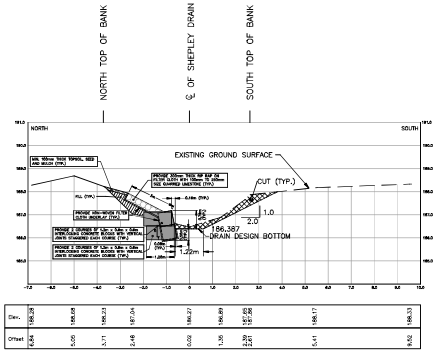
STA. 0+994.63



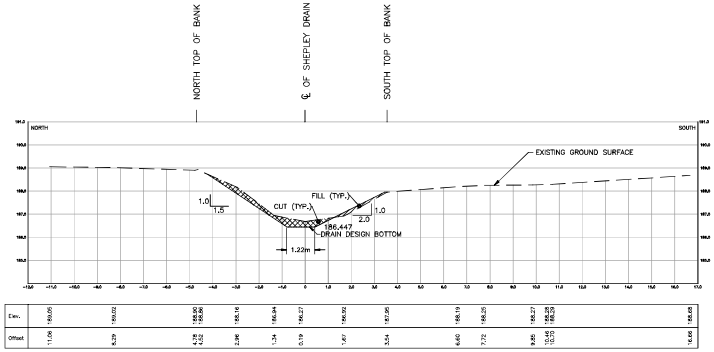
STA. 1+024.89



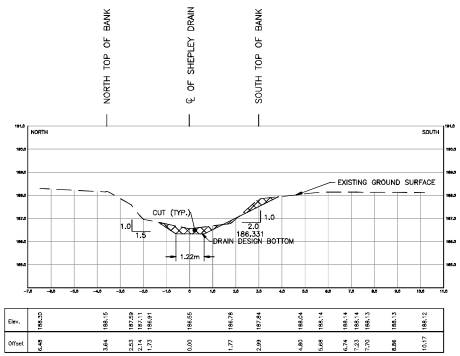
STA. 0+977.28



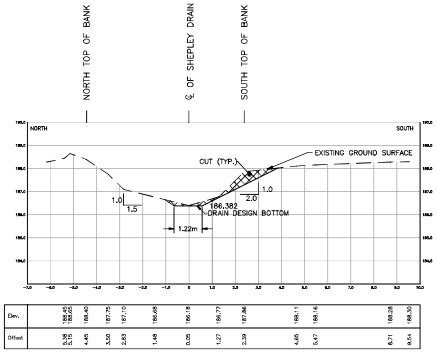
STA. 1+013.36



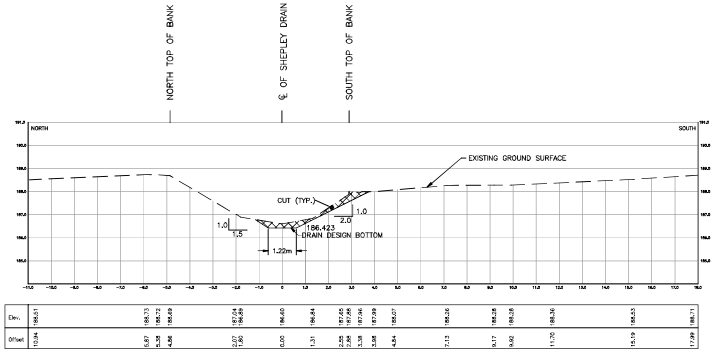
STA. 1+063.19



STA. 0+966.25



STA. 1+008.96



STA. 1+043.48

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PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

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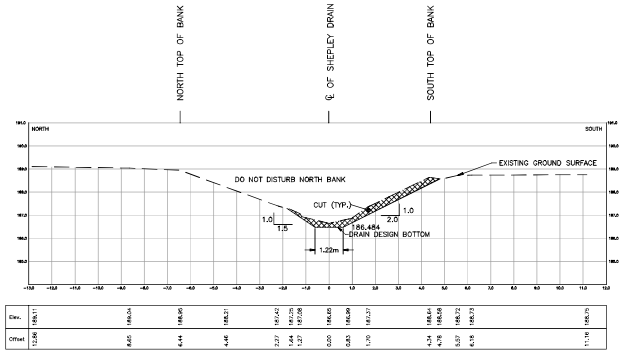
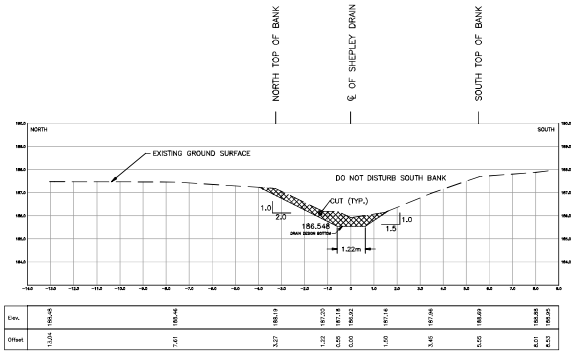
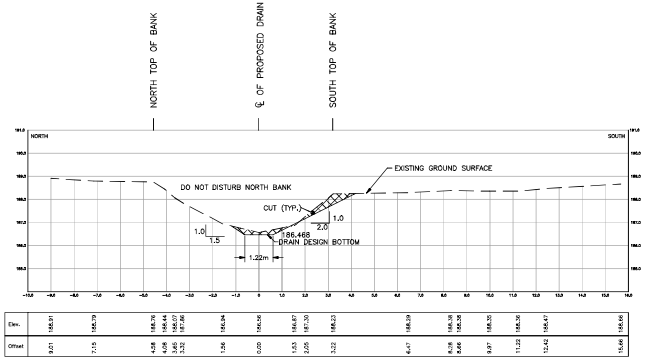
THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



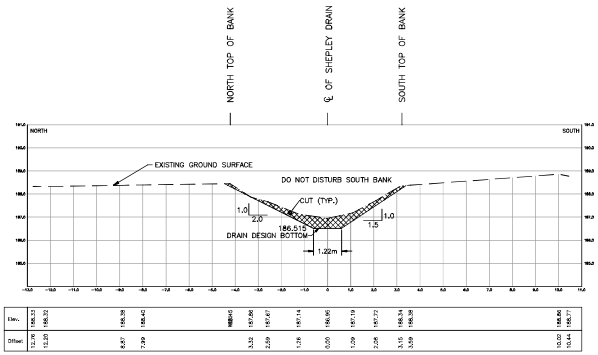
STA. 1+094.54



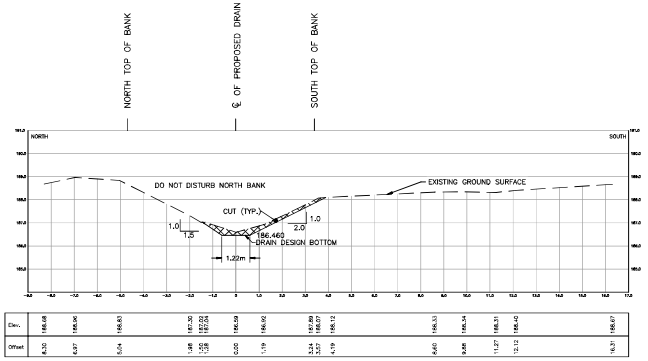
STA. 1+147.58



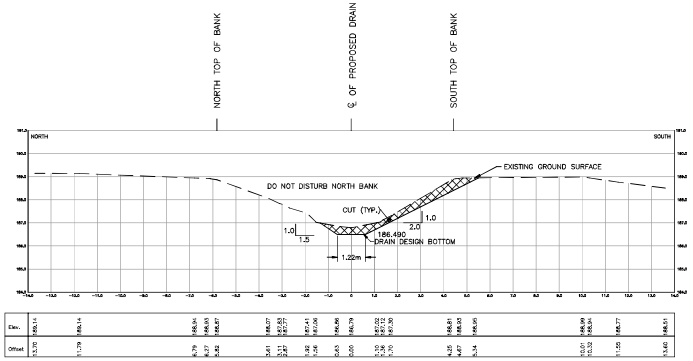
STA. 1+080.51



STA. 1+120.26



STA. 1+073.83



STA. 1+099.5

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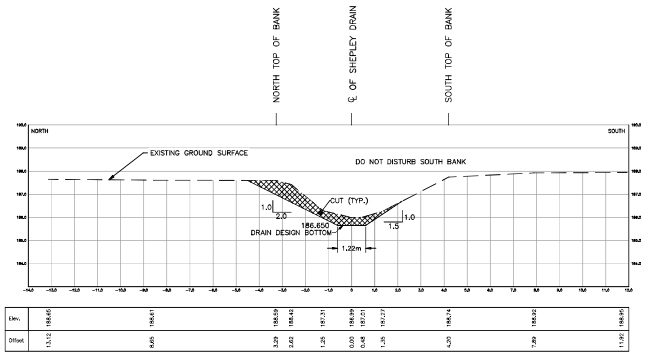
PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

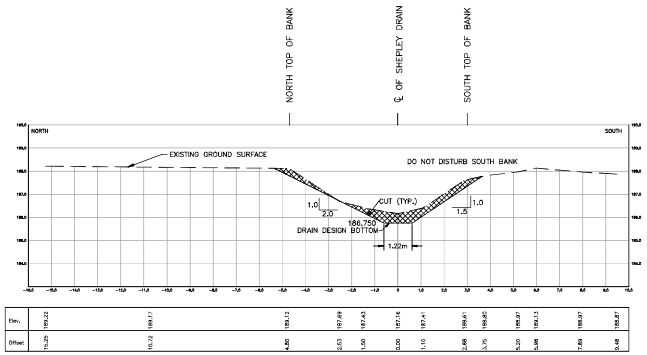
FILE No.: REI2022D018

SHEET No.: 17 of 21

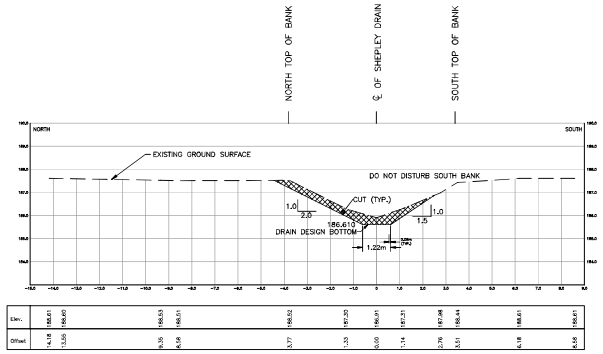
THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



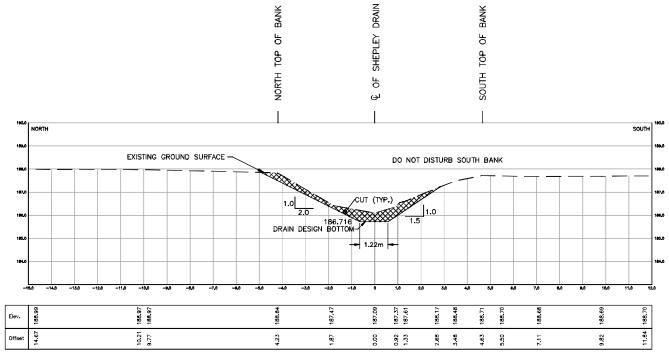
STA. 1+232.28



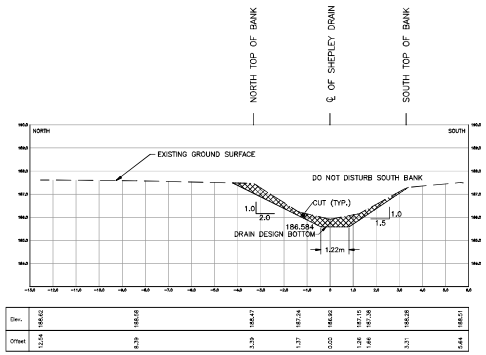
STA. 1+315.55



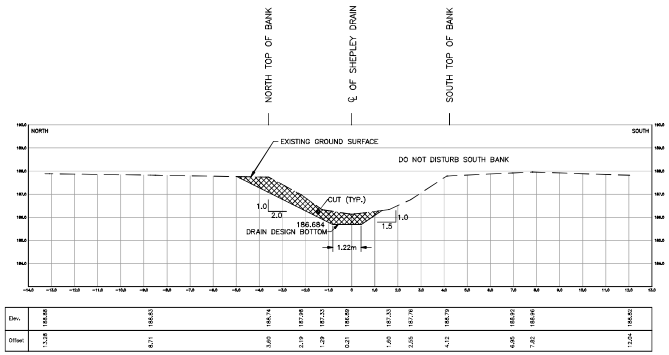
STA. 1+199.47



STA. 1+287.13



STA. 1+176.83



STA. 1+260.15

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PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

FILE No.: REI2022D018

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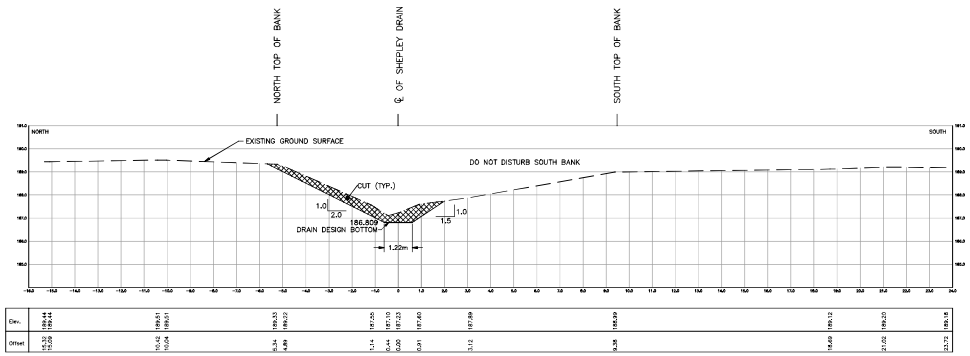
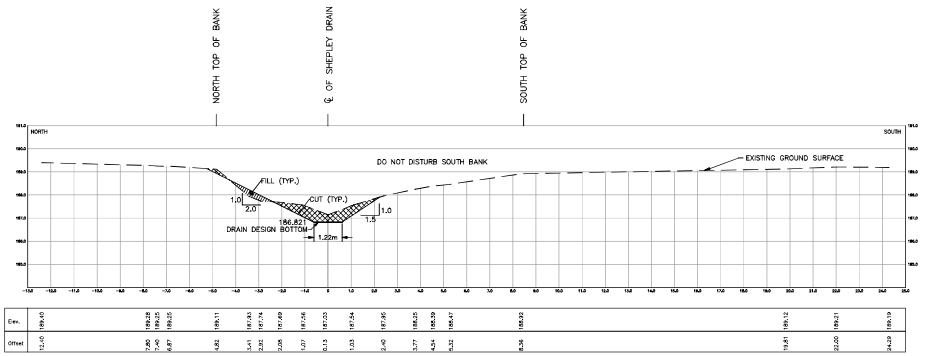
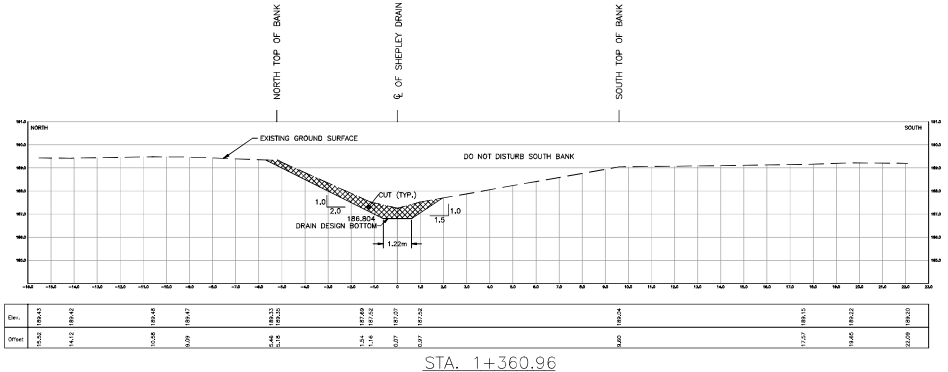
THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



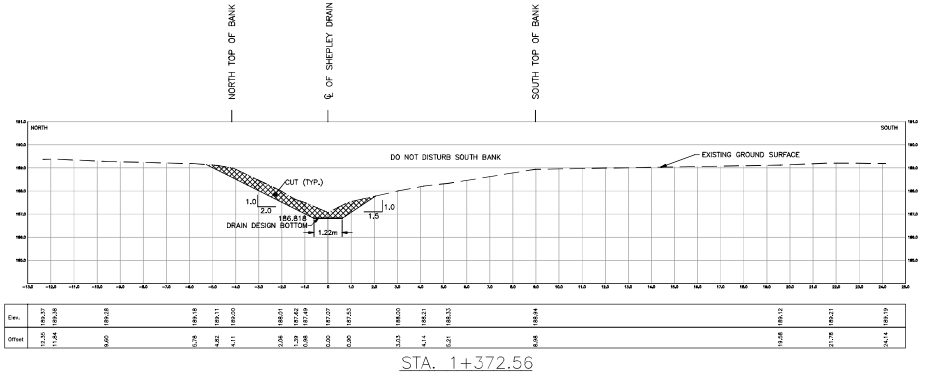
STA. 1+365.4



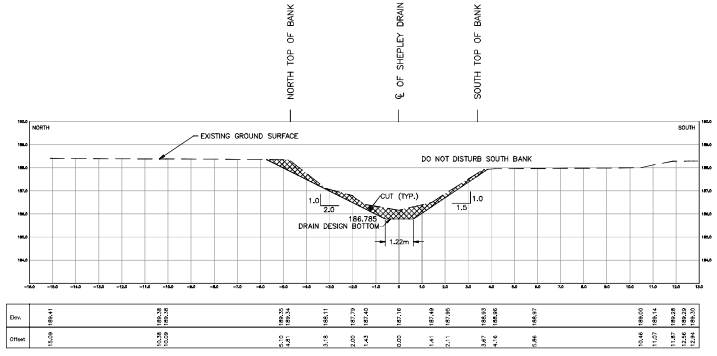
STA. 1+375



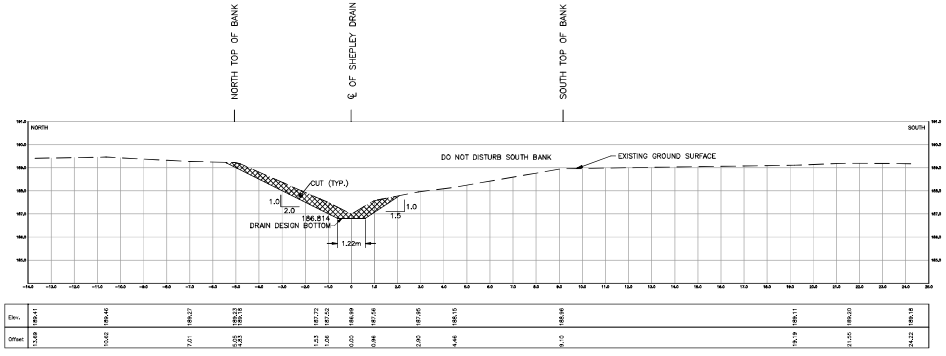
STA. 1+360.96



STA. 1+372.56



STA. 1+344.28



STA. 1+369.12

DRAWN BY: P.K
PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

FILE No.: REI2022D018

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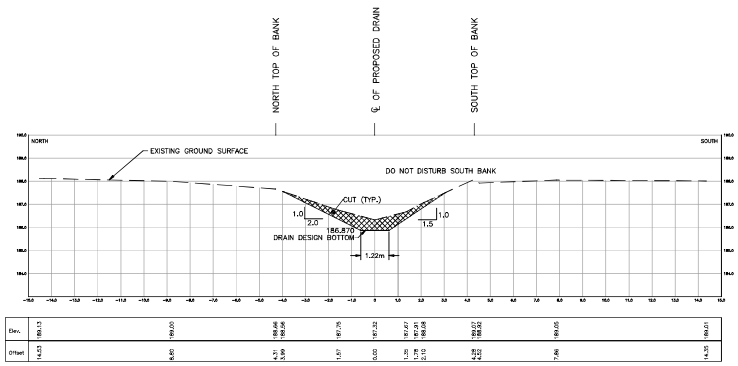
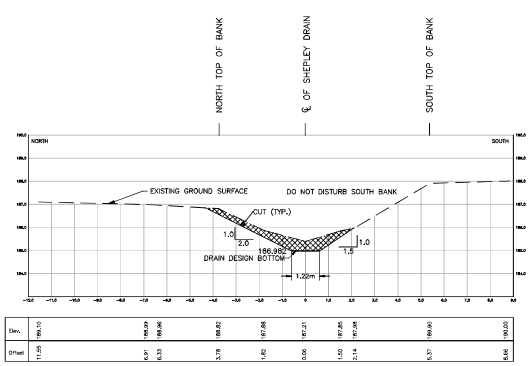
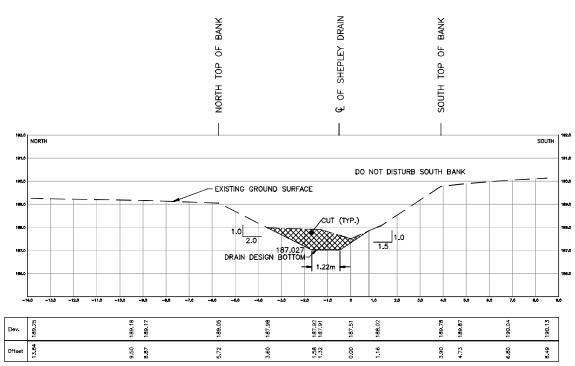
THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



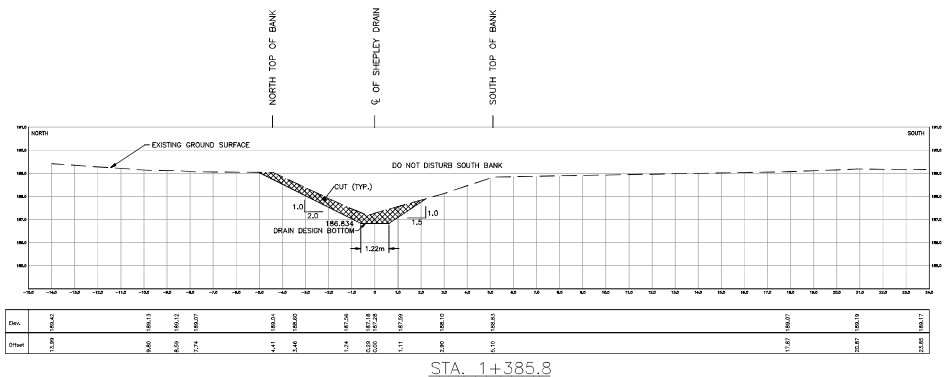
STA. 1+416.59



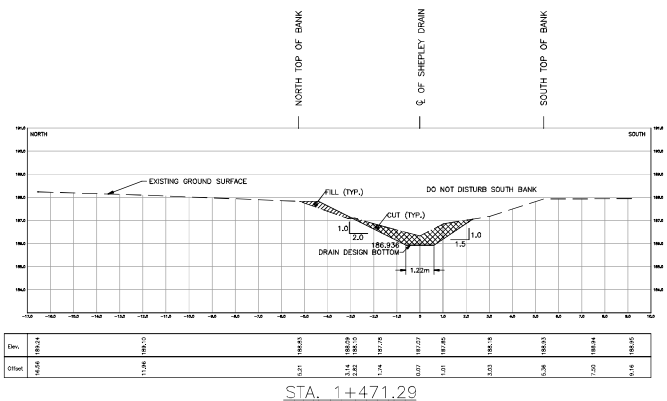
STA. 1+509.62



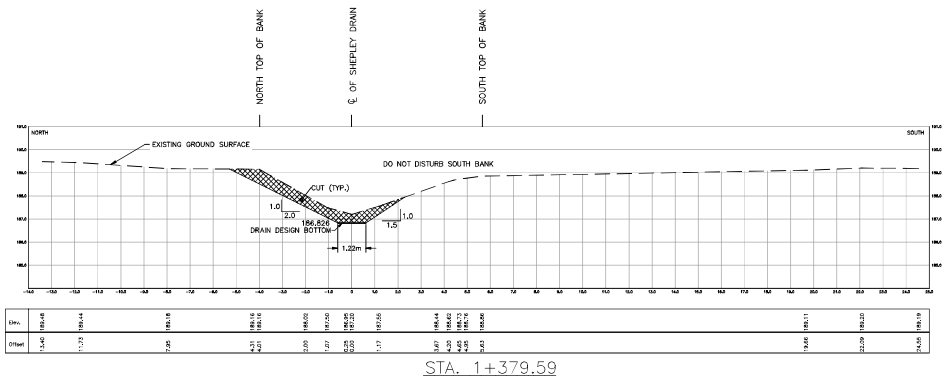
STA. 1+546.88



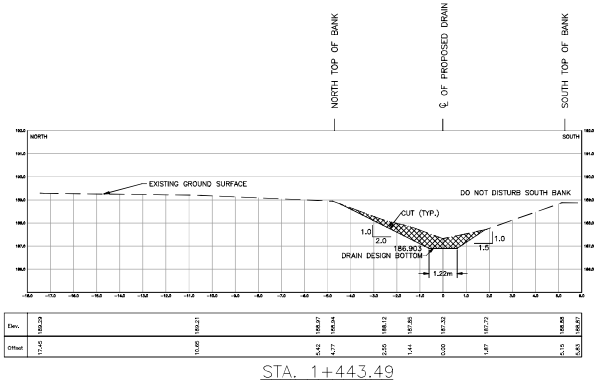
STA. 1+385.8



STA. 1+471.29



STA. 1+379.59



STA. 1+443.49

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PLOT CODE: 1:1
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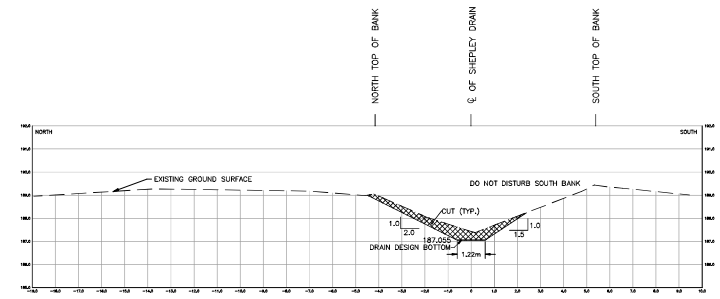
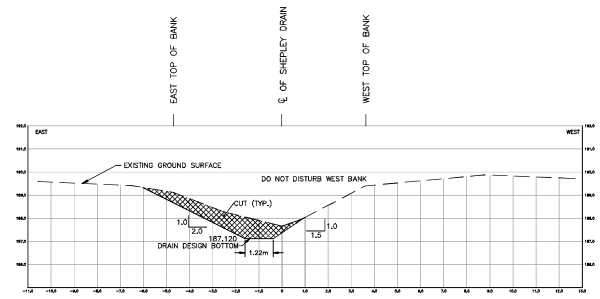
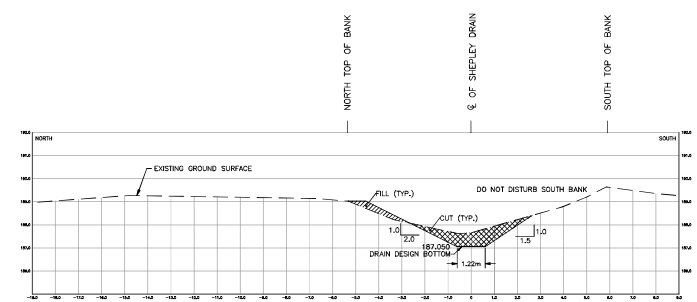
THESE PLANS HAVE BEEN REDUCED AND THE SCALE THEREFORE VARIES. FULL SCALE PLANS MAY BE VIEWED AT THE MUNICIPAL OFFICE.



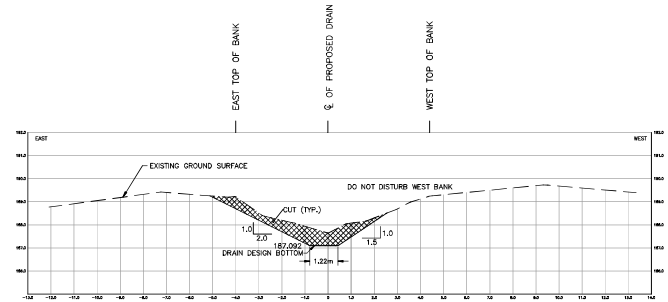
STA. 1+570.51



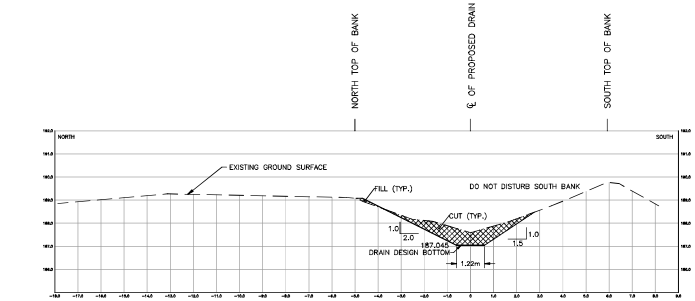
STA. 1+624.32



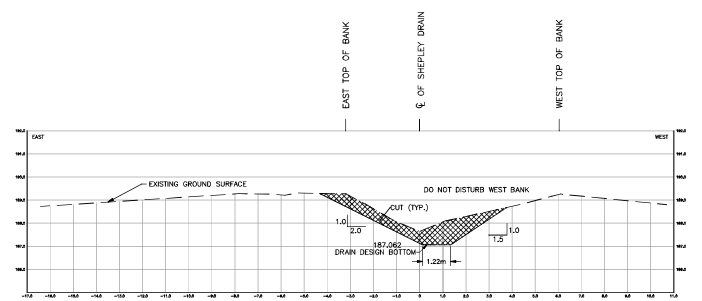
STA. 1+566.2



STA. 1+601.4



STA. 1+562.13



STA. 1+575.65

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PLOT CODE: 1:1
COMPUTER FILE: REI2022D018.DWG

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