ORTON DRAIN

(New Bridge for Ida & William Assinck, Parcel 480-01600)

Part Lot 17, Concession 6

Geographic Township of Gosfield North

TOWN OF KINGSVILLE
2021 Division Road North
Kingsville, Ontario N9Y 2Y9
519-733-2305

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Consulting Engineers
9 Nelson Street
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Project REI2019D015
January 4th, 2024

Rood
Engineering
Inc.

Consulting Engineers

January 4th, 2024

Mayor and Municipal Council
Corporation of the Town of Kingsville
2021 Division Road North
Kingsville, Ontario
N9Y 2Y9

Mayor Rogers and Members of Council:

ORTON DRAIN
(New Bridge for Assinck)
Geographic Twp. of Gosfield North
Project REI2019D015
Town of Kingsville, County of Essex

I. INTRODUCTION

In accordance with the instructions received by letter of December 13th, 2023, from your Drainage Superintendent, Lu-Ann Marentette, we have prepared the following report that provided for the construction of a new "temporary" access bridge in the Orton Drain and will be legalized through adoption of this drainage report. This proposed new bridge is intended to provide access to lands owned by Ida and William Assinck, Parcel 480-01600 in Part Lot 17, Concession 6, in the Geographic Township of Gosfield North. The Orton Drain is an open drain with a number of access bridges and extends from its upstream near Graham Sideroad and County Road 34 north-westerly to its outlet in the Belle River Drain. The drain was constructed pursuant to the Drainage Act. A plan showing the Orton Drain alignment, as well as the general location of the above-mentioned bridge, is included herein as part of the report.

Our appointment and the works related to the construction of the above-mentioned access bridge in the Orton 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 bridge, as well as the Orton Drain, and we report thereon as follows.

II. BACKGROUND

From our review of the Town's drainage files, we have determined that the Orton Drain portion encompassing the affected bridge was last repaired under an Engineer's Report dated February

19th, 1979 prepared by W.J. Setterington, P.Eng. The work included in said report consisted of drain cleaning. In addition, we have also established the following reports that we utilized as reference for carrying out this project:

1)	August 11th, 1964	Repair and improvement of the drain and bridge replacements	C.G. Russell Armstrong, P.Eng.
2)	February 3rd, 2010	New bridge report	Bruce D. Crozier, P.Eng.
3)	May 27th, 2011	New bridge report	Nick J. Peralta, P.Eng.

We have utilized the plans within said reports to establish the size parameters for the drain and the details to be used in establishing the new bridge culvert installation. We have also used these Engineers' reports to establish the drain profile grades, and to assist us in establishing the design grade for the subject farm access bridge installation. The Schedule of Assessment in the latest drainage report was used to establish the upstream watershed area and flows to be used in the design of the bridge.

III. PRELIMINARY EXAMINATION AND ON-SITE MEETING

After reviewing all of the available drainage information and documentation provided by the former Drainage Superintendent, Ken Vegh, we arranged with Town staff to schedule an on-site meeting for March 22nd, 2019. The following people were in attendance at said meeting: William Assinck, Ken Vegh (Drainage Superintendent), Kory Snelgrove (Rood Engineering) and Gerard Rood (Rood Engineering).

Mr. Vegh provided an introduction and explained to landowner the purpose for the meeting. Ken Vegh noted that the Town had received a request from the Assinck owners for a new access bridge in the Orton Drain.

The owner was advised that the minimum standard top width for an access bridge is 6.10 metres (20 ft.) and that any extra length will be charged 100% to the land owner for construction and future maintenance for the new access near the east limit of the agricultural property.

The overall drainage report procedure, future maintenance processes and grant eligibility were generally reviewed with the owner. 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.), and the Essex Region Conservation Authority (E.R.C.A.) and now the Ministry of Environment, Conservation and Parks (M.E.C.P.). We further discussed bridge maintenance, sizing, and material of the proposed bridge. We explained that the Town of Kingsville standard for pipe material is aluminized steel pipe that will approximately double the service life of the pipe at minimal cost.

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 this new access bridge.

A benchmark was looped from previous work carried out on the drain and was utilized in establishing a site benchmark near the location of the bridge. We surveyed the drain both upstream and downstream of the proposed new access bridge and picked up the existing concrete bridges and culvert elevations in order to establish a design grade profile for the installation of the new bridge. We also took cross-sections of the Orton Drain at the general location of the proposed bridge, as necessary for us to complete our design calculations, estimates and specifications.

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 which allows repairs, maintenance and improvements to be conducted by the Town within existing municipal drains, as administered by the Ministry of Environment, Conservation and Parks (M.E.C.P.). 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.

We reviewed the E.R.C.A. requirements and advised the Town to make initial submissions to the Essex Region Conservation Authority (E.R.C.A.) regarding their requirements and getting a permit for the “temporary” bridge installation. We checked for any D.F.O. (Department of Fisheries and Oceans) requirements for work that would be proposed to be carried out on the Orton Drain including review of the D.F.O. Species at Risk mapping for fish and mussels. Mitigation requirements for satisfying E.R.C.A. and D.F.O. are included in **Appendix “REI-A”**.

For the purposes of establishing the watershed area upstream of the proposed bridge, and determining the pipe size required, we investigated and reviewed the past drainage reports including the Engineer’s Reports of Wm. Setterington, P.Eng. on the Orton Drain dated July 21st, 1978 and February 26th 1979, Engineers Report of Bruce D. Crozier, P. Eng. on the Orton Drain dated February 3rd 2010 and the Engineers Report of N.J. Peralta, P. Eng. on the Orton Drain dated May 27th 2011.

General details and timelines were discussed for this project and its report. Gerard Rood explained the general process pursuant to the Drainage Act for the submittal of a bridge report and the timelines associated for submitting a report to Council.

V. FINDINGS AND RECOMMENDATIONS

Prior to the preparation of our report, we reviewed the details of the bridge installation including the end treatment options based on the regulatory restrictions and the cost estimates that we were to review. Through our investigations, it was determined that the precast concrete block wall end treatment was the most economical, we reviewed same with the owner, and we have proceeded with this option, along with the aluminized arch pipe, as discussed at the on-site meeting. The pipe sizing is based on minimum conveyance of a 1:2 year storm event corresponding to the capacity of upstream and downstream pipe culverts in the drain, plus an allowance for embedment of the pipe. This pipe avoids any adverse impacts to the drain upstream or downstream.

Based on our detailed survey, investigations, examinations, and discussions with the affected property owner, we would recommend that a new access bridge be constructed in the Orton Drain at the location and to the general parameters as established in our design drawings attached herein for Parcel 480-01600. As this is a new bridge for the parcel, all of the construction cost, as well as all the cost for the preparation of the Engineer's Report, will be borne by the affected owner of the parcel served by the bridge. Subsequent to the construction of the bridge, the bridge will form part of the drain, and the future maintenance cost of same shall be assessed to the owner since this will be a secondary access to the parcel. Information was provided to the Town for proceeding with construction of the bridge as a "temporary" structure and being able to get the E.R.C.A. permit that was required.

During the course of our investigations, this drainage project was reviewed for E.R.C.A. requirements, and how to deal with any E.R.C.A. and D.F.O. issues and comments related to this Municipal drain. In the interest of fish habitat and migration, D.F.O. requires that the invert of the new bridge culvert be embedded below the design or existing bottom of the drain a minimum of 10% of the pipe height to ensure a continued path for fish migration through the bridge culvert. Therefore, based on this, we have made provisions to set the invert of the proposed 2500mm x 1830mm corrugated steel arch pipe culvert required for this bridge installation, at approximately 0.297 metres below the drain bottom design grade. The D.F.O. Species at Risk screening maps confirm that there are no Species at Risk Fish or Mussels identified in this area. The Orton 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. and D.F.O. Details of these 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 (E.S.A.), 2007 Provincial Legislation, we have reviewed the former M.N.R.F. agreement with the Town. The M.N.R.F. mapping has basically confirmed that there are no foreseen impacts to natural heritage features or endangered or threatened species on this project; therefore, a permit or agreement under the E.S.A. 2007 is not necessary at this time. Because turtles and snakes are mobile and 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"**.

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.

Since all of the work will be carried out at the proposed driveway, and is primarily within the road allowance and limits of the drain, and because full restoration will be provided, we find that there is no requirement for damages or allowances pursuant to Sections 29 and 30 of the Drainage Act.

Based on all of the above, we recommend that a new access bridge be constructed in the Orton Drain to serve the residence and agricultural lands of Ida and William Assinck, in Part of Lot 17, Concession 6, 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. ESTIMATE OF COST

Our estimate of the total cost of this work including all incidental expenses and based on the 2019 construction is the sum of **THIRTY EIGHT THOUSAND FIVE HUNDRED DOLLARS ($38,500.00),** made up as follows:

CONSTRUCTION

Item 1)	Provide all labour, equipment and material to construct a new access bridge consisting of 8.0 metres (26.25 ft.) of 2500mm x 1830mm arch, 2.8mm thick, aluminized steel Type II corrugated Hel-Cor pipe with annular ends and 125mm x 25mm corrugation profile, 9 corrugation wide aluminized bolted coupler; providing precast concrete block headwall end treatments, granular bedding and backfill, granular approaches, tile diversions, and ancillary appurtenances, excavation, compaction, cleanup and restoration, complete.	Lump Sum	$ 26,900.00

Estimated Net H.S.T. (1.76%)		$ 474.00
TOTAL FOR CONSTRUCTION	**$**	**27,374.00**

INCIDENTALS

1) Report, Estimate, and Specifications	$	4,000.00
2) Survey, Assistants, Expenses, Drawings, Duplication Cost of Report and Drawings	$	4,500.00
3) Estimated Cost of Preparing Tender Documents	$	700.00
4) Estimated Cost of Construction Supervision and Inspection (based on 1 day)	$	1,000.00
5) Net H.S.T. on Items Above (1.76%)	$	180.00
6) Estimated Cost of E.R.C.A. permit	$	150.00
7) Estimated Contingency Allowance	$	596.00
TOTAL FOR INCIDENTALS	**$**	**11,126.00**
TOTAL FOR CONSTRUCTION (brought forward)	**$**	**27,374.00**
TOTAL ESTIMATE	**$**	**38,500.00**

VII. DRAWINGS AND SPECIFICATIONS

As part of this report, we have attached a design drawing for the construction of this new access bridge. The design drawing shows the subject bridge location and the details of the new access bridge installation. The design drawing is attached to the back of this report and is labelled **Appendix "REI-E"**.

Also attached, we have prepared Specifications which set out the required construction details for the proposed bridge installation, which also includes Standard Specifications within **Appendix "REI-C".**

VIII. CONSTRUCTION SCHEDULE OF ASSESSMENT

We would recommend that all of the costs associated with the construction of this new access bridge, and the preparation of this Engineer's report, be assessed against the agricultural lands of Ida and William Assinck (480-01600), in Part of Lot 17, Concession 6, in the Town of Kingsville. A Construction Schedule of Assessment has been prepared and included herein to indicate the lands assessed for this new access bridge installation.

It has been clearly established that this new access bridge is being provided to serve as the access from Road 7 East to an existing agricultural farm and residential parcel. Pursuant to the current Agricultural Drainage Infrastructure Program (A.D.I.P.) Policies that are in place, it is anticipated that these lands and upstream lands designated as Farm Property Tax Class will be eligible for a grant from the Ontario Ministry of Agriculture, Food and Rural Affairs (O.M.A.F.R.A.) in the amount of 1/3 of their total assessment for this project. Where a bridge structure has increased top width beyond the standard 6.10 metre (20.0 ft.) top width, all of the increased costs resulting from same are assessed 100% to the Owner, as provided for in the cost sharing set out in the attached Schedule of Assessment.

IX. FUTURE MAINTENANCE

We recommend that the bridge structure as identified herein, be maintained in the future as part of the drainage works. We would also recommend that the bridge, for which the maintenance costs are to be borne by the parcel served by the secondary access, be maintained by the Town and that said maintenance would include works to the bridge culvert, bedding, backfill and end treatment. Should concrete, asphalt, or other decorative driveway surfaces over the bridge culvert require removal as part of the maintenance works, these surfaces shall also be repaired or replaced as part of the works. Likewise, if any fencing, gate, decorative walls, guardrails, or other 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 bridge maintenance work. However, the cost of the supply and installation of any surface materials other than Granular "A" material and the cost of removal and restoration or replacement, if necessary, of any special features, shall be totally assessed to the benefiting adjoining Owner(s) served by said access bridge.

After the completion of all of the works included within this report, the access bridge within the Drain shall be maintained in the future by the Town of Kingsville. Furthermore, if any maintenance work is required to this access bridge in the future, we recommend that 100% of the future maintenance costs shall be assessed as a Benefit against the abutting property being served by the access bridge, which is currently owned by Ida and William Assinck, in Part of Lot 17, Concession 6, due to it being a secondary access bridge to the parcel as shown in the attached Schedule of Assessment.

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The above provisions for the future maintenance of this new access bridge, being constructed under this report, shall remain as aforesaid until otherwise determined under the provisions of 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.

tm

att.

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

SCHEDULE OF ASSESSMENT
ORTON DRAIN - BRIDGE 46E ROAD 7
Town of Kingsville

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
480-01600	6	17	20.234	50.00	20.234	Ida & William Assinck	$ 19,250.00	$ 19,250.00	$ -	$ 38,500.00
		Total on Privately Owned - Agricultural Lands (grantable).....					**$ 19,250.00**	**$ 19,250.00**	**$ -**	**$ 38,500.00**
		TOTAL ASSESSMENT		50.00	20.23		**$ 19,250.00**	**$ 19,250.00**	**$ -**	**$ 38,500.00**

1 Hectare = 2.471 Acres
Project No. REI2019D015
January 4th, 2024

SPECIFICATIONS

ORTON DRAIN

Bridge for Ida & William Assinck

(Geographic Township of Gosfield North)

TOWN OF KINGSVILLE

I. GENERAL SCOPE OF WORK

The Orton Drain currently comprises of an open Municipal drain which begins its upstream end at the Graham Sideroad near County Road 34 and is primarily located along agriculture parcels moving in a north direction until extending to meet its outlet to the Belle River Drain in a north-west direction. The drain is featured along County Road 34, Road 6 East, and Road 7 East in segments; and crosses under Road 8 East, County Road 14 and Road 10. The work under this project generally comprises of construction of a new access bridge to serve the lands of Ida and William Assinck. The work on the new bridge being constructed includes the installation of a new culvert bridge near Station 5+274.2; new culvert end treatments comprising of new precast concrete block wall end protection; and granular transition areas.

The Contractor shall provide all material, labour, and equipment to construct a new access bridge for the Assinck parcel, located just east of the hydro pole and swale serving Municipal Number (M.N.) 46 as seen on the plans in **Appendix "REI-E"**. The new bridge will consist of 8.0 metres (26.25 ft.) of 2500mm x 1830mm arch, 125mm X 25mm corrugation, Hel-Cor aluminized Type II corrugated steel arch pipe, 2.8mm thick in the Orton Drain. The new access bridge shall be constructed so that the bridge centreline is approximately 16.5 metres (54.13 ft.) east of the existing hydro pole. This location shall be the exact designated location of this access bridge culvert unless otherwise directed by the property owner and the Town Drainage Superintendent, prior to the construction of same. Any changes to the location of the new access bridge must be approved in writing by the Engineer. The general layout of the access bridge and other ancillary work shall be provided as shown and detailed in the accompanying drawing attached within **Appendix "REI-E"**. A Benchmark has been set near the proposed access bridge so that same can be utilized for the setting of the new bridge culvert invert grades and restoring the drain. The Benchmark is described in the detail plan for the bridge culvert installation along with its elevation.

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 new bridge improvements and new construction shall be of the size, type, depth, etcetera, as is shown

in the accompanying drawings, as determined from the Bench Marks, 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

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. The standard mitigation response received from E.R.C.A. shall be followed and a copy of same is included within **Appendix "REI-A"**. The Contractor shall ensure that sediment and erosion control provisions, set out further in these specifications and in **Appendix "REI-A"**, are followed. Work shall be scheduled so that it can be completed in the dry and when there is no risk of a rain event that might exceed the capacity of the water control system that the Contractor employs. Any damming of the drain will be done on the upstream side in accordance with the provisions set out in **Appendix "REI-A"**. The Contractor will be required to carry out a fish salvage operation if there is water in the drain when the work is being done. Details for the fish salvage are set out in **Appendix "REI-A"**.

The Contractor is to review **Appendix "REI-A"** in detail and is required to comply in all regards with the contents of said E.R.C.A. and D.F.O. measures, and follow the special requirements therein included during construction.

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 drainage system. 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 site subsequent to construction. The Contractor may be required to provide temporary silt fencing and straw bales as outlined further in these specifications.

III. M.N.R.F. & M.E.C.P. ENDANGERED SPECIES ACT CONSIDERATIONS

The Contractor is to note that the Ministry of Environment, Conservation and Parks (M.E.C.P.) screening process by way of a Species at Risk (S.A.R.) review of the M.E.C.P. "Endangered Species Act, 2007" (E.S.A.) 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 improvements 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 Ministry of Natural Resources & Forestry (M.N.R.F.) Species at Risk former Town agreement with M.N.R.F. pursuant to Section 23 of the "Endangered Species Act, 2007" expired as of June 30th, 2015. The former agreements are replaced with new regulation provisions under Ontario Regulation 242/08 administered by the Ministry of Environment, Conservation and Parks (M.E.C.P.). Section 23.9 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. 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.

The M.N.R.F. - M.E.C.P. mapping has basically confirmed that snake species including Butler's Garter Snake and Eastern Fox Snake are threatened and endangered, respectively, on this project. Because snakes are mobile and indicated as sensitive and endangered in the area, we have included herein a copy of the M.N.R.F. - M.E.C.P. mitigation requirements for them in **Appendix "REI-B"**. Providing mitigation requirements are implemented, it was concluded that present wildlife Species at Risk will be protected from negative impacts and the works will not contravene Section 9 (species protection) or Section 10 (habitat protection) of the Endangered Species Act, 2007.

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. & M.E.C.P. 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. 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 Road 7 East. 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. The Contractor shall also have access into the driveway as necessary to carry out the removal of unsuitable materials and to construct the new access bridge, as set out on the plans and in these specifications, along with a sufficient area in the vicinity of the bridge to carry out the required construction of the removal of deleterious materials and new structure installation and ancillary work.

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 Road 7 East for the proposed works, it shall obtain the permission of the 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 County of Essex and Town of Kingsville Public Works Departments.

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 drainage works, 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. 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 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 restored 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. TOPSOIL, SEED AND MULCH

The Contractor shall be required to restore all existing grassed areas and drain side slopes damaged by the structure construction or cutting of the drain cross section, by placing topsoil, and then seed and mulch over said areas including any specific areas noted on the bridge 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.

VIII. DETAILS OF BRIDGE WORK

When completed, the new access bridge along the centreline of the new culvert shall have a total top width, including the top width of the precast concrete block end walls, of approximately 8.0 metres (26.25 ft.) and a travelled driveway width of 6.10 metres (20.0 ft.). The precast concrete block headwall protection shall be installed on a slope no steeper than 1.0 horizontal to 5.0 vertical, and shall extend from the end of the new corrugated aluminized steel arch pipe structure to the top elevation of the driveway. The proposed pipe inverts are set approximately 297mm below the drain design grade. The Hel-Cor aluminized Type II corrugated steel arch pipe to be provided for this project is to be supplied as no more than two (2) approximately equal lengths of pipe for the bridge and joined together with a 9C (corrugation) aluminized bolted coupler with non-woven geotextile filter cloth wrapped around it, secured in accordance with the manufacturer's recommendations. The aluminized corrugated steel pipe to be utilized for this bridge installation must be a minimum of 2.8mm thick with 125mm by 25mm corrugations and shall be approved by the Town Drainage Superintendent or Engineer, prior to its placement in the drain.

The Contractor shall also note that the placement of the new access bridge culvert is to be performed totally in the dry, and it shall be prepared to take whatever steps are necessary to ensure same, all to the full satisfaction of the Town Drainage Superintendent or Engineer. As part of the work, the Contractor will be required to clean out the drain along the full length of the bridge pipe and for a distance of 10.0 metres (32.8 ft.) both upstream and downstream of said pipe. The design parameters of the Orton Drain at the location of this new access bridge installation consists of a 1.52m (4.98 ft.) bottom width, 0.075% grade, and 1.5 horizontal to 1.0 vertical sideslopes. The Contractor shall be required to cut any brush and strip the existing drain sideslopes of any vegetation as part of the grubbing operation. The Contractor shall also dispose of all excavated and deleterious materials, as well as any grubbed-out materials, to a site to be obtained by it at its own expense. The Contractor shall note that the survey indicates that the existing drain bottom is slightly above the design grade. The Contractor shall be required to provide any and all labour, material and equipment to set the pipe to the required design grades. The Contractor shall also be required to supply, if necessary for a solid base, a minimum thickness of 150mm (6") of 20mm (3/4") clear stone bedding underneath the culvert pipe, extending from the bottom of the excavation to the culvert invert grade, all to the full satisfaction of the Town Drainage Superintendent or Engineer.

The installation of the complete length of the new access bridge culvert, including all appurtenances, shall be completely inspected by the Town Drainage Superintendent or Engineer prior to backfilling any portions of same. Under no circumstance shall the Contractor backfill same until the Town Drainage Superintendent or Engineer inspects and approves said pipe installation. The Contractor shall provide a minimum notice of 2 working days to the Town Drainage Superintendent or Engineer prior to the commencement of this work. The installation of this new access bridge is to be performed during the normal working hours from Monday to Friday of the Town Drainage Superintendent or Engineer.

Once aluminized corrugated steel arch pipe has been satisfactorily set in place at the site, the Contractor shall completely backfill same with granular material M.T.O. Type "B" O.P.S.S. (Ontario Provincial Standard Specification) Form 1010, with the exception of the top 305mm (12") of the backfill material for the full top width of the drain and the access bridge, which shall be granular material M.T.O. Type "A" O.P.S.S. Form 1010. The end walls shall be constructed around the pipe and into the drain banks in line with the end of the bridge culvert pipe as shown on the plans included in **Appendix "REI-E"** and include 45 degree bends at the road side of the bridge.

The Contractor shall also perform the necessary excavation to extend the driveway northerly from the south top bank of the drain to the north limit of the roadway granular. This driveway approach from the existing edge of granular shoulder to approximately 1.0 metres south of the south top of bank shall consist of a minimum of 305mm (12") of granular material M.T.O. Type "A" satisfactorily compacted in place. The gravel apron shall extend for the full width of the access culvert top and include a gore section at the roadside deflection with a 5.0m turning radius to the edge of the roadway granular, as shown on the plans. The gravel backfill shall also extend across the pipe to approximately 1.0m beyond the north top of bank as shown on the plans. The pipe shall have a minimum of 409mm of cover and be uniformly graded down to the existing driveway level from the existing road edge level.

Once the aluminized corrugated steel arch pipe has been set in place at the required location, the Contractor shall completely backfill same with granular material, and precast concrete block headwall protection on both ends of the bridge. The installation of the endwalls, as well as the backfilling of the pipe where applicable, shall be provided in compliance with Items 1), 3), and 4) of the **"Standard Specifications for Access Bridge Construction"** attached within **Appendix "REI-C"** and in total compliance and in all respects with the General Conditions included in Item 4) of said Appendix. The Contractor, in all cases, shall comply with these specifications and upon completion of the precast concrete block end protection installation shall restore the adjacent areas to their original conditions. The precast concrete blocks shall be a minimum of 600mmX600mm X1200mm in size as available from Underground Specialities – Wolsely in Windsor Ontario, or equal.

The aluminized corrugated steel arch pipe for this installation shall be provided with a depth of cover measured from the top of the aluminized steel arch pipe to the top of the granular backfill of approximately 0.409m (16.1 in.) for the new bridge and if the arch culvert is placed at its proper

elevations, this should be easily achieved. If the Contractor finds that the specified cover is not being met, they shall notify the Drainage Superintendent and the Engineer immediately so that steps can be taken to rectify the condition prior to the placement of any backfill. The cover requirement is **critical** and must be attained. In order for this new access bridge culvert to properly fit the channel parameters, all of the design grade elevations provided below must be strictly adhered to.

Also, for use by the Contractor, we have established a Benchmark near the site. This Benchmark is the "*top of nail in the north face of hydro pole located on the south side of Road 7 East at Municipal Number (M.N.) 46 approximately 16.5 metres west of the proposed bridge centreline*", with same being **Elevation 196.827 metres**. The new arch pipe culvert and the backfilling are to be placed on the following basis:

i) The **East (upstream) invert** of the proposed bridge culvert is to be set at Elevation **194.388** metres.

ii) The **West (downstream) invert** of the proposed bridge culvert is to be set at Elevation **194.382** metres.

iii) The centreline of driveway for this bridge installation shall be set to approximately Elevation **196.704** metres at the existing gravel shoulder edge, Elevation **196.673** metres at the culvert pipe centreline, and Elevation **196.472** metres at approximately 1.0 metre south of the south top of bank and then graded to match the existing ground elevation at each end of the granular approaches. The access bridge driveway, in all cases, shall be graded with a cross-fall from the centreline of the driveway to the outer edges of the driveway at an approximate grade of 1.50%.

As a check, all of the above design grade elevations should be confirmed before commencing to the next stage of the new access bridge installation. The Contractor is also to check that the arch pipe invert grades are correct by referencing the Benchmark provided for the site.

The Contractor shall also be required to provide all labour, equipment and material to provide granular fill to all gore areas at the road as noted on the plans. The Contractor shall provide a 5.0 metre radius on the roadside approach of the drain as seen on the plans and protect any existing landscape features during the course of the work.

As part of the work provided for the construction of the access bridge, the Contractor shall be required to protect or extend any existing lateral tile ends, pipes and swales which conflict with the bridge installation. All existing lateral tile drains, pipes and swales, where required, shall be diverted and extended to the ends of the new access bridge culvert and shall be extended and installed in accordance with the "Standard Lateral Tile Detail" as shown in **Appendix "REI-C"**, unless otherwise noted. Connections shall be made using manufacturer's couplers wherever possible. All other connections shall be completely sealed with concrete grout around the full exterior perimeter of each joint. Grouted mortar joints shall be composed of three (3) parts of clean, sharp sand to one (1) part of Portland cement and the mortar connection shall be performed to the full satisfaction of the Town Drainage Superintendent or the Engineer. The

mortar joint shall be of a sufficient mass around the full circumference of the joint to ensure a tight, solid seal.

The Contractor is to note that the granular driveway approaches extending from the existing edge of gravel shoulder to the north top of bank of the drain shall consist of granular material M.T.O. Type "A" O.P.S.S. Form 1010 and is to be provided to a minimum depth of 305mm (12"), and be satisfactorily compacted in place. The Contractor is to also note that all granular "A" material being placed as backfill for this bridge installation shall be compacted in place to a minimum Standard Proctor Density of 100%, and that all granular fill material to be used for the construction shall be compacted in place to a minimum Standard Proctor Density of 95%.

All of the granular backfill and the compaction levels for same shall be provided to the full satisfaction of the Town Drainage Superintendent or the Engineer. The Contractor shall also note that any sediment being removed from the drain bottom as previously specified herein, shall not be utilized for the construction of the driveway, and shall be disposed of by the Contractor to a site to be obtained by it at its own expense. The Contractor shall be required to restore any and all drain sideslopes damaged by the access bridge installation and removal of vegetation, utilizing the available scavenged topsoil, and shall seed and mulch over all of said areas.

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.

IX. CONCRETE FILLED JUTE BAG, PRECAST CONCRETE BLOCK OR SLOPED END PROTECTION

Unless otherwise shown or noted, the Contractor is to provide new concrete filled jute bag headwalls, precast concrete block, or sloped quarried limestone on non-woven filter cloth end protection for the access bridges and enclosures being replaced or constructed on this drain.

The concrete filled jute bags are to be provided and laid out as is shown and detailed in the drawings provided by the Town and as noted in the Standard Specifications in **Appendix "REI-C"**. In all cases, the concrete filled jute bag headwalls shall be topped with a minimum 100mm (4") thick continuous concrete cap comprising 30mPa concrete with 6% ±1% air entrainment for the entire length of the headwalls. The headwalls shall be installed on an inward batter to be not less than 1 horizontal to 5 vertical, and under no circumstances shall this batter, which is measured from the top of the headwall to the projection of the end of the pipe, be less than 305mm (12"). From the midpoint of the pipe height down to the concrete footing, the wall shall be a double concrete filled jute bag installation. On the road side the walls shall be deflected as shown to provide daylighting and a better approach across the new bridge.

The installation of the concrete filled jute bag headwalls, unless otherwise specified, shall be provided in total compliance with the Items 1, 3, and 4 included in the **"STANDARD**

SPECIFICATIONS FOR ACCESS BRIDGE CONSTRUCTION". These are attached to the back of these specifications and labelled **Appendix "REI-C"**. The Contractor shall comply in all respects with the General Conditions included in Item 4 and the **"Typical Concrete Filled Jute Bag Headwall End Protection"** detail also shown therein.

The Contractor shall install interlocking precast concrete blocks with filter cloth backing for walls on both ends of the bridges requiring same. The blocks shall be minimum 600X600X1200mm in size as available from Underground Specialties - Wolseley, Windsor, Ontario, or equal, and installed as set out in **Appendix "REI-C"**. Shop drawings shall be provided to the Drainage Superintendent or Engineer for review before proceeding. Vertical joints shall be staggered by use of half blocks where needed and wingwall deflections when required shall employ 45-degree angled blocks. Voids between the blocks and the pipe shall be grouted with 30mPa concrete having 6% ±1% air entrainment and extend for the full thickness of the wall, and have a smooth uniform finish on the face that blends with the precast blocks. The installation of the endwalls, as well as the backfilling of the pipe where applicable, shall be provided in compliance with Items 1), 3), and 4) of the "Standard Specifications for Access Bridge Construction" attached within **Appendix "REI-C"** and in total compliance and in all respects with the General Conditions included in said Appendix. The Contractor shall submit shop drawings for approval of the wall installation that includes details for a minimum 300mm thick concrete footing that extends from the pipe invert downward. The footing shall extend into the drain banks each side for the required embedment of the blocks and be constructed to ensure that the completed wall will be completely vertical or tipped slightly back towards the driveway. Where the block walls extend more than 1.8 metres in height, the supplier shall provide the Contractor with uni-axial geogrid (SG350 or equivalent) reinforcement for installation to tie the wall back into the granular backfill. The Contractor, in all cases, shall comply with these specifications and upon completion of the stacked precast concrete end protection installation shall restore the adjacent areas to their original conditions. The Contractor shall supply quarried limestone on filter cloth rock protection adjacent to the headwalls at each corner of the bridge. All rock protection shall be 1.0 metres wide and 305mm (12") thick, installed on non-woven filter cloth, and shall be installed in accordance with Item 2) of the "Standard Specifications for Access Bridge Construction". The synthetic filter mat to be used shall be non-woven geotextile GMN160 conforming to O.P.S.S. 1860 Class I, as available from Armtec Construction Products through Underground Specialties - Wolseley in Windsor, Ontario or equal. The quarried limestone to be used shall be graded in size from a minimum of 100mm to a maximum of 250mm, and is available from Walker Industries Amherst Quarries, in Amherstburg, Ontario, or equal.

Where sloped end protection is specified, the top 305mm (12") of backfill material over the ends of the access pipe, from the invert of said pipe to the top of the driveway elevation of the access bridge or enclosure, shall be quarried limestone. The quarried limestone shall be provided as shown and detailed on the plans or as indicated in the Standard Specifications in **Appendix "REI-C"** and shall be graded in size from a minimum of 100mm (4") to a maximum of 250mm (10"). The quarried limestone to be placed on the sloped ends of an access bridge or enclosure shall be underlain with a synthetic **non-woven** geotextile filter fabric. The sloped quarried limestone protection is to be rounded as shown on the plan details and shall also extend along the drain

side slopes to a point directly in line with the ends of the culvert pipe. The roadside approach to the entrance shall be provided with a minimum 5.0m radius at each end of the driveway entrance. All work shall be completed to the full satisfaction of the Town Drainage Superintendent or the Consulting Engineer.

The installation of the sloped quarried limestone end protection, unless otherwise specified herein, shall be provided in total compliance with Item 2), 3), and 4) of the **"STANDARD SPECIFICATIONS FOR ACCESS BRIDGE CONSTRUCTION"**. These are attached to the back of these specifications and labelled **Appendix "REI-C"**. The Contractor shall comply in all respects with the General Conditions included in Item 4 and the **"Typical Quarried Limestone End Protection Detail"** also in **Appendix "REI-C"**.

The quarried limestone erosion protection shall be embedded into the sideslopes of the drain a minimum thickness of 305mm and shall be underlain in all cases with non-woven synthetic filter mat. The filter mat shall not only be laid along the flat portion of the erosion protection, but also contoured to the exterior limits of the quarried limestone and the unprotected slope. The width of the erosion protection shall be as established in the accompanying drawings or as otherwise directed by the Town Drainage Superintendent or the Consulting Engineer during construction. In placing the erosion protection, the Contractor shall carefully tamp the quarried limestone pieces into place with the use of the excavator bucket so that the erosion protection when completed will be consistent, uniform and tightly laid. In no instance shall the quarried limestone protrude beyond the exterior contour of the unprotected drain sideslopes along either side of said protection. The synthetic filter mat fabric to be used shall be non-woven geotextile GMN160 conforming to O.P.S.S. 1860 Class I, as available from Armtec Construction Products, or equal. The quarried limestone to be used shall be graded in size from a minimum of 100mm to a maximum of 250mm, and is available from Walker Aggregates Amherst Quarries, in Amherstburg, Ontario, or equal.

X. 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 Kingsville 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 Kingsville 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 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 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. 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 Kingsville 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 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 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.

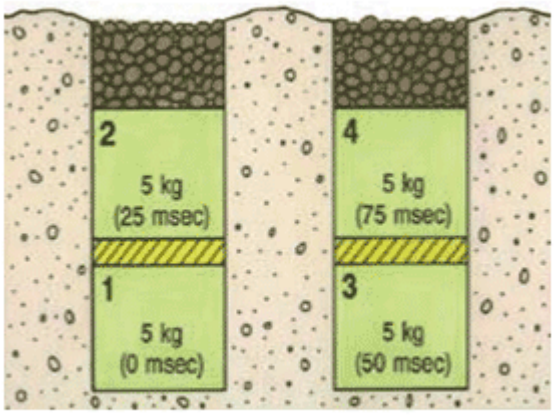
- Develop and implement an Erosion and Sediment Control Plan for the site that minimizes risk of sedimentation of the waterbody during all phases of the project. Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has 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

APPENDIX “REI-B”

SCHEDULE C

MITIGATION PLAN

The Municipality shall undertake measures to minimize adverse effects on species at risk in accordance with the general conditions described in Part B and taxa-specific conditions described in Part C, and the monitoring and reporting requirements described in Part D of this Mitigation Plan.

PART A. DEFINITIONS

1. Definitions:

1.1. In this Schedule, the following words shall have the following meanings:

"DFO" means Fisheries and Oceans Canada;

"MNR" means the Aylmer District Office of the Ministry of Natural Resources;

"Contact" means to contact the MNR in accordance with the notification/contact schedule provided to the Municipality by the MNR Designated Representative from time to time;

"Holding Tub" means a large, light-coloured container fitted with a non-airtight latchable lid approved by the MNR for the temporary storage of captured snakes, turtles, amphibians, birds or eggs;

"Interagency Notification Form" means the form issued by DFO, available at www.dfo-mpo.gc.ca, which is required to be completed when a drain is being maintained or constructed;

"Monitoring and Reporting Form" means the document that must be completed by the Municipality in accordance with Part D to this Schedule and will be provided to the Municipality;

"Ontario Operational Statement" means one of the documents issued by DFO, available at www.dfo-mpo.gc.ca, that sets out the conditions and measures to be incorporated into a project in order to avoid negative impacts to fish and fish habitat in Ontario, as modified from time to time;

"Process Charts" means the charts attached as Part E to this Schedule which describe the steps set out in this Mitigation Plan;

"Seasonal Timing Windows Chart" means the chart attached as Part G to this schedule which describes the Sensitive Periods applicable to each Taxonomic Group;

"Sensitive Area" means a geographic area in the Municipality where additional mitigation measures are required to be undertaken for one or more Taxonomic Groups;

"Sensitive Areas Map" means any one of the maps attached as Part F to this schedule which sets out the applicable Sensitive Areas;

"Sensitive Period" means a time of year set out in the Seasonal Timing Windows Chart during which taxa-specific mitigation measures are required to be undertaken for a Taxonomic Group because of ambient air/water temperatures, water-levels or important life-history stages;

"Taxonomic Group" means the distinct group comprising one or more Species based on their taxonomic relationship and common approaches to mitigating adverse effects (i.e., fish, mussels, turtles, snakes, amphibians, birds or plants); and

"Work Zone" means the geographic area in the Municipality where an Activity in respect of one of the Drainage Works is being conducted.

1.2. For greater certainty, any defined terms that are not defined in section 1.1 have the same meanings as in the Agreement.

PART B. GENERAL MEASURES TO MINIMIZE ADVERSE EFFECTS

2. Process Charts

2.1. The general steps set out in this Part B are visually described in the Process Charts (Part E).

3. Review of Documentation

3.1. Prior to conducting any Activities in respect of the Drainage Works the Municipality shall determine if conditions apply to the place, time or manner in which the Municipality wishes to pursue them by reviewing:

(a) the Sensitive Areas Maps (Part F) to determine if the Work Zone for the proposed Activities will occur within a Sensitive Area;

(b) the DFO Reference Guide for Fish and Mussel Species at Risk Distribution Maps: A Referral Review Tool for Projects Affecting Aquatic Species at Risk;

(c) the Seasonal Timing Windows Chart (Part G) to determine if the proposed Activities will occur during a Sensitive Period for one or more of the Taxonomic Groups; and

(d) the Process Charts to determine if prior notification is required;

(e) the mitigation measures for each applicable Taxonomic Group in Part C to determine what additional site-specific mitigation measures, if any, are required.

3.2. The Municipality shall document the results of the review undertaken in accordance with section 3.1 using the Monitoring and Reporting Form.

4. Sensitive Areas Maps

4.1. The Sensitive Areas Maps contain sensitive information about the distribution of species at risk, are provided for the sole purpose of informing this Agreement and are not to be copied or distributed for any other purposes or to any other party without the prior written authorization of the MNR Designated Representative.

5. Prior Notification to Seek Direction

5.1. If, after completing the review of documents described in section 3.1, the Municipality determines that the proposed Activities will be undertaken:

(a) in a place;

(b) at a time; or

(c) in a manner,

that requires prior notification in accordance with the Process Charts, the Municipality shall provide prior notification to the MNR in order for the MNR to determine if the Municipality must undertake additional site-specific or Species-specific mitigation

measures to minimize adverse effects on the Species and, if applicable, to identify such measures.

5.2. The prior notification under section 5.1 shall include a completed Interagency Notification Form:

(a) in respect of maintenance/repair where the proposed Activities are being undertaken pursuant to subsection 3(18) or section 74 of the *Drainage Act*; or

(b) in respect of construction/improvement where the proposed Activities are being undertaken pursuant to section 77 or 78 of the *Drainage Act*.

5.3. Where an Activity is undertaken in accordance with section 124 of the *Drainage Act* and would otherwise have required prior notification under section 5.1, the Municipality shall Contact the MNR by email prior to the commencement of the Activity, and complete and submit the applicable Interagency Notification Form within one week of the Activity's completion, unless otherwise directed in writing by the MNR Designated Representative.

6. General Mitigation Measures

6.1. Notwithstanding that prior notification or additional mitigation measures may be required in accordance with this schedule, in undertaking any Activity at any time in respect of the Drainage Works the Municipality shall:

(a) undertake the mitigation measures for sediment control and for erosion control and bank stabilization set out in The Drain Primer (Cliff Evanitski 2008) published by DFO (ISBN 978-0-662-48027-3), unless otherwise authorized in writing by the MNR Designated Representative;

(b) use net free, 100% biodegradable erosion control blanket for all erosion control or bank stabilization done in conjunction with their Activities or, if authorized in writing by the MNR Designated Representative, alternative erosion control blankets that provide equal or greater protection to individual Species; and

(c) where applicable, follow the guidelines set out in the following Ontario Operational Statements:

(i) Beaver Dam Removal;

(ii) Bridge Maintenance;

(iii) Culvert Maintenance;

(iv) Isolated Pond Construction;

(v) Maintenance of Riparian Vegetation in Existing Right of Ways; and

(vi) Temporary Stream Crossing.

PART C. TAXA-SPECIFIC MEASURES TO MINIMIZE ADVERSE EFFECTS

ADDITIONAL MITIGATION MEASURES FOR FISH SPECIES

7. Activities undertaken in Sensitive Areas for Fish

7.1. Subject to section 7.2, where a proposed Activity will occur in a Sensitive Area for a fish Species, the Municipality shall contact the MNR to seek further direction.

7.2. Section 7.1 does not apply where the applicable Drainage Works are:

(a) in a naturally dry condition;

(b) classified as a Class F drain under DFO's *Class Authorization System for the Maintenance of Agricultural Municipal Drains in Ontario* (ISBN 0-662-72748-7); or

(c) a closed drain.

ADDITIONAL MITIGATION MEASURES FOR MUSSEL SPECIES

8. Activities undertaken in Sensitive Areas for Mussels

8.1. Subject to section 8.2, where a proposed Activity will occur in a Sensitive Area for a mussel Species, the Municipality shall contact the MNR to seek further direction.

8.2. Section 8.1 does not apply where the applicable Drainage Works are:

(a) in a naturally dry condition;

(b) classified as a Class F drain in DFO's *Class Authorization System for the Maintenance of Agricultural Municipal Drains in Ontario* (ISBN 0-662-72748-7); or

(c) a closed drain.

ADDITIONAL MITIGATION MEASURES FOR TURTLE SPECIES

9. Training and Required On Site Materials for Turtles

9.1. The Municipality will ensure any person:

(a) involved in the capture, temporary holding, transfer and release of any turtle Species has received training in proper turtle handling procedures; and

(b) who undertakes an Activity has a minimum of two Holding Tubs and cotton sacks on site at all times.

10. Activities undertaken in Sensitive Areas and Sensitive Periods for Turtles

10.1. Subject to section 10.2, where a proposed Activity will occur in a Sensitive Area for any turtle Species and during a Sensitive Period for that Species, the Municipality shall:

(a) not undertake any Activities that include the excavation of sediment or disturbance to banks during the applicable Sensitive Period unless otherwise authorized;

(b) undertake Activities in accordance with any additional site-specific measures provided in writing by the MNR Designated Representative;

(c) avoid draw-down and de-watering of the Sensitive Area during the applicable Sensitive Period; and

(d) if authorized by the MNR Designated Representative under (a) above to undertake Activities that include excavation of sediment or disturbance of banks, in addition to any other measures required under (b) above, ensure any person undertaking an Activity has at least two Holding Tubs on site at all times.

10.2. Section 10.1 does not apply where the applicable Drainage Works are:

(a) in a naturally dry condition;

(b) classified as a Class F drain in DFO's *Class Authorization System for the Maintenance of Agricultural Municipal Drains in Ontario* (ISBN 0-662-72748-7); or

(c) a closed drain.

11. Measures for Encounters with Turtles During a Sensitive Period

11.1. Where one or more individuals belonging to a turtle Species is encountered in the undertaking of an Activity in any part of a Work Zone (including, but not limited to, a Sensitive Area) during a Sensitive Period for that Species, the Municipality shall:

(a) capture and transfer all uninjured individuals of that Species into a Holding Tub;

(b) capture and transfer all individuals injured as a result of the Activities into a Holding Tub separate from any Holding Tub containing uninjured individuals;

(c) ensure that the Holding Tubs with the captured individuals are stored at a cool temperature to prevent freezing until the individuals can be transferred; and

(d) immediately Contact the MNR to seek direction and to arrange for the transfer of the individual turtles.

12. Measures for Encounters with Turtles Laying Eggs or Nest Sites

12.1. Where one or more individuals belonging to a turtle Species laying eggs, or an active nest site of any turtle Species, is encountered in undertaking an Activity in a Work Zone, the Municipality shall:

(a) not disturb a turtle encountered laying eggs and not conduct any Activities within 20 metres of the turtle while it is laying eggs;

(b) collect any displaced or damaged eggs and capture any injured dispersing juveniles and transfer them to a Holding Tub;

(c) store all captured injured individuals and collected eggs out of direct sunlight;

(d) immediately Contact the MNR to seek direction and to arrange for the transfer of any injured individuals and eggs;

(e) immediately stop any disturbance to the nest site and recover exposed portions with soil or organic material to protect the integrity of the remaining individuals;

(f) not drive any equipment over the nest site or conduct any Activities within 5 metres of the nest site;

(g) not place any dredged materials removed from the Drainage Works on top of the nest site;

(h) mark out the physical location of the nest site for the duration of the project but not by any means that might increase the susceptibility of the nest to predation or poaching; and

(i) where there are no collected eggs or captured individuals, record relevant information and Contact the MNR within 72 hours to provide information on the location of the nest site.

13. Measures for Encounters with Turtles Outside of a Sensitive Period

13.1. Where one or more individuals belonging to a turtle Species is encountered while undertaking an Activity in any part of a Work Zone (including, but not limited to, a Sensitive Area) but outside of any Sensitive Period for that Species, the Municipality shall:

(a) briefly stop the Activity for a reasonable period of time to allow any uninjured individual turtles of that Species to leave the Work Zone;

(b) where individuals do not leave the Work Zone after the Activity is briefly stopped in accordance with (a) above, capture all uninjured individuals and release them in accordance with section 14.1;

(c) where circumstances do not allow for their immediate release, transfer captured uninjured individuals for a maximum of 24 hours into a Holding Tub which shall be stored out of direct sunlight and then release them in accordance with section 14.1;

(d) capture and transfer any individuals that have been injured into a Holding Tub separate from any Holding Tub containing uninjured individuals; and

(e) store all captured injured individuals out of direct sunlight and immediately Contact the MNR to seek direction and to arrange for their transfer.

14. Release of Captured Individuals Outside of a Sensitive Period

14.1. Where uninjured individuals are captured under section 13.1, they shall be released:

(a) within 24 hours of capture;

(b) in an area immediately adjacent to the Drainage Works;

(c) in an area that will not be further impacted by the undertaking of any Activity; and

(d) not more than 250 metres from the capture site.

14.2. Following a release under section 14.1, the Municipality shall Contact the MNR within 72 hours of the release to provide information on the name of the Drainage Works, the location of the encounter and the location of the release site.

15. Measures for Dead Turtles

15.1. Where one or more individuals of a turtle Species is killed as a result of an Activity in a Work Zone, or if a person undertaking an Activity finds a deceased individual of a turtle Species within the Work Zone, the Municipality shall:

(a) place any dead turtles in a Holding Tub outside of direct sunlight; and

(b) Contact the MNR within 72 hours to seek direction and to arrange for the transfer of the dead individuals.

ADDITIONAL MITIGATION MEASURES FOR SNAKE SPECIES

16. Training and Required On Site Materials for Snakes

16.1. The Municipality will ensure any person:

(a) involved in the capture, temporary holding, transfer and release of any snake Species has received training in proper snake handling procedures; and

(b) who undertakes an Activity has a minimum of two Holding Tubs and cotton sacks on site at all times.

17. Activities undertaken in Sensitive Areas and Sensitive Periods for Snakes

17.1. Where a proposed Activity involves physical infrastructure (e.g., culverts, pump houses, etc.) and will occur in a Sensitive Area for any snake Species and during a *Sensitive Period – Hibernation* for that Species, the Municipality shall undertake the Activity outside of the Sensitive Period, unless otherwise authorized by and in accordance with any site-specific measures provided in writing by the MNR Designated Representative.

17.2. Where a proposed Activity will occur at or adjacent to a known hibernacula (as identified by the MNR) for any snake Species and during a *Sensitive Period – Staging* for that Species, the Municipality shall:

(a) erect effective temporary snake barriers approved by the MNR that will not pose a risk of entanglement for snakes and that shall be secured so that individual snakes may not pass over or under the barrier or between any openings to enter or re-enter the Work Zone;

(b) inspect the temporary snake barriers daily during periods when snakes are active, capture any individuals incidentally encountered within the area bounded by the snake barrier and release the captured individuals in accordance with section 21.1; and

(c) remove the temporary snake barriers immediately upon completion of the Activity.

17.3. Where a proposed Activity that does not involve physical infrastructure will occur in a Sensitive Area for any snake Species and during a *Sensitive Period – Staging* for that Species, the Municipality shall undertake the Activity outside of the Sensitive Period, unless otherwise authorized by and in accordance with any site-specific measures provided in writing by the MNR Designated Representative.

18. Measures for Encounters with Snakes During a Sensitive Period

18.1. Where one or more individuals belonging to a snake Species is encountered, or should an active hibernacula be uncovered, while conducting an Activity in any part of a Work Zone (including, but not limited to, a Sensitive Area) during a Sensitive Period for that Species, the Municipality shall:

(a) capture and transfer all injured and uninjured individual snakes of that Species into individual light-coloured, drawstring cotton sacks;

(b) place all cotton sacks filled with the captured individuals into a Holding Tub;

(c) ensure that the Holding Tub with the captured individuals is stored at a cool temperature to protect the snakes from freezing until the individuals can be retrieved or transferred;

(d) if an active hibernacula is uncovered, cease all Activities at the hibernacula site; and

(e) immediately Contact the MNR to seek direction and to arrange for the transfer and/or retrieval.

19. Measures for Encounters with Snake Nests

19.1. Where an active nest of any of the snake Species is encountered and disturbed while undertaking an Activity in any part of a Work Zone, the Municipality shall:

(a) collect any displaced or damaged eggs and transfer them to a Holding Tub;

(b) capture and transfer all injured dispersing juveniles of that Species into a light-coloured drawstring cotton sack;

(c) place all cotton sacks with the captured injured individuals into a Holding Tub;

(d) ensure that the Holding Tub with the captured injured individuals is stored out of direct sunlight;

(e) immediately Contact the MNR to seek direction and to arrange for the transfer of the injured individuals;

(f) immediately stop any disturbance to the nest site and loosely cover exposed portions with soil or organic material to protect the integrity of the remaining individuals;

(g) not drive any equipment over the nest site or conduct any Activities within 5 metres of the nest site;

(h) not place any dredged materials removed from the Drainage Works on top of the nest site;

(i) mark out the physical location of the nest site but not by any means that might increase the susceptibility of the nest to predation or poaching; and

(j) where there are no collected eggs or captured individuals, Contact the MNR within 72 hours to provide information on the location of the nest site.

20. Measures for Encounters with Snakes Outside of a Sensitive Period

20.1. Where one or more individuals belonging to a snake Species is encountered while undertaking an Activity in any part of a Work Zone (including, but not limited to, a Sensitive Area) but outside of any Sensitive Period for that Species, the Municipality shall:

(a) follow the requirements in section 16;

(b) briefly stop the Activity for a reasonable period of time to allow any uninjured individual snakes of that Species to leave the Work Zone;

(c) if the individuals do not leave the Work Zone after the Activity is briefly stopped in accordance with (b) above, capture all uninjured individuals and release them in accordance with section 21.1;

(d) where circumstances do not allow for the immediate release of captured uninjured individuals, they may be transferred into individual, light-coloured, drawstring cotton sacks before placing them in a Holding Tub which shall be stored out of direct sunlight for a maximum of 24 hours before releasing them in accordance with section 21.1;

(e) capture and transfer any individuals injured as a result of conducting the Activities into a Holding Tub separate from any Holding Tub containing uninjured individuals; and

(f) store all captured injured individuals out of direct sunlight and immediately Contact the MNR to seek direction and to arrange for their transfer.

21. Release of Captured Individuals Outside of a Sensitive Period

21.1. Where uninjured individuals are captured under section 20.1, they shall be released:

(a) within 24 hours of capture;

(b) in an area immediately adjacent to the Drainage Works where there is natural vegetation cover;

(c) in an area that will not be further impacted by the undertaking of any Activity; and

(d) not more than 250 metres from the capture site.

21.2. Following a release under section 21.1, the Municipality shall Contact the MNR within 72 hours of the release to provide information on the name of the Drainage Works, the location of the encounter and the location of the release site.

22. Measures for Dead Snakes

22.1. Where one or more individuals belonging to a snake Species is killed as a result of an Activity in a Work Zone, or if a person undertaking an Activity finds a deceased individual of a snake Species within the Work Zone, the Municipality shall:

(a) collect and transfer any dead individuals into a Holding Tub outside of direct sunlight; and

(b) Contact the MNR within 72 hours to seek direction and to arrange for the transfer of the carcasses of the dead individuals.

ADDITIONAL MITIGATION MEASURES FOR HERBACEOUS PLANTS

23. Activities Undertaken In Sensitive Areas for Herbaceous Plants

23.1. Where a proposed Activity will occur that involves physical disturbance to vegetated banks or the killing and/or removal of vegetation through chemical or mechanical means in a Sensitive Area for any herbaceous plant Species, the Municipality shall:

(a) undertake the Activity outside of the Sensitive Period, unless otherwise authorized;

(b) limit equipment access and operations to the side of the Drainage Works that will minimize disturbances where any of the plant Species occur;

(c) locate temporary storage sites for excavated sediments or bank materials on areas of open soil away from where any of the plant Species are likely to occur;

(d) not use any broad spectrum herbicides in Sensitive Areas; and

(e) undertake Activities in accordance with any additional site-specific measures provided in writing by the MNR Designated Representative.

ADDITIONAL MITIGATION MEASURES FOR TREE SPECIES

24. Additional Measures for Butternut

24.1. Where Butternuts may exist in a Work Zone and may be affected by an Activity, the Municipality shall:

(a) identify and mark as retainable trees all individual Butternut trees within the Work Zone during work planning site visits unless the individual Butternut has been assessed as a non-retainable tree due to infection by Butternut canker by a person designated by the Minister as a Butternut Health Assessor;

(b) retain and avoid disturbance to all individuals identified under (a) above that have been identified as retainable trees or that have not been assessed, unless otherwise authorized in writing by the MNR Designated Representative;

(c) conduct Activities by:

(i) limiting equipment access and operations to the side of the Drainage Works that will minimize disturbance to where any of the individual Butternut trees occur,

(ii) working around trees,

Town of Kingsville: Sensitive Areas Map for Fish Species at Risk

LEGEND

Ontario

Sensitive Areas for Fish SAR

DFO Data (valid until May 2010)

- *SARA Protected (EX, EN, TH)*
- *To be listed in 1yr+ (EN, TH)*
- *All SC (Sch 1, 3, newly listed)*

MNR/NHIC Data

- *EXP, END, THR*
- *SC*

Conservation Authority

- *Essex Region*

- Subwatershed Boundaries
- Municipal Boundaries
- First Nations Territories
- Urban Area

N

SCALE: 1:110,000

0 1 2 4

Kilometres

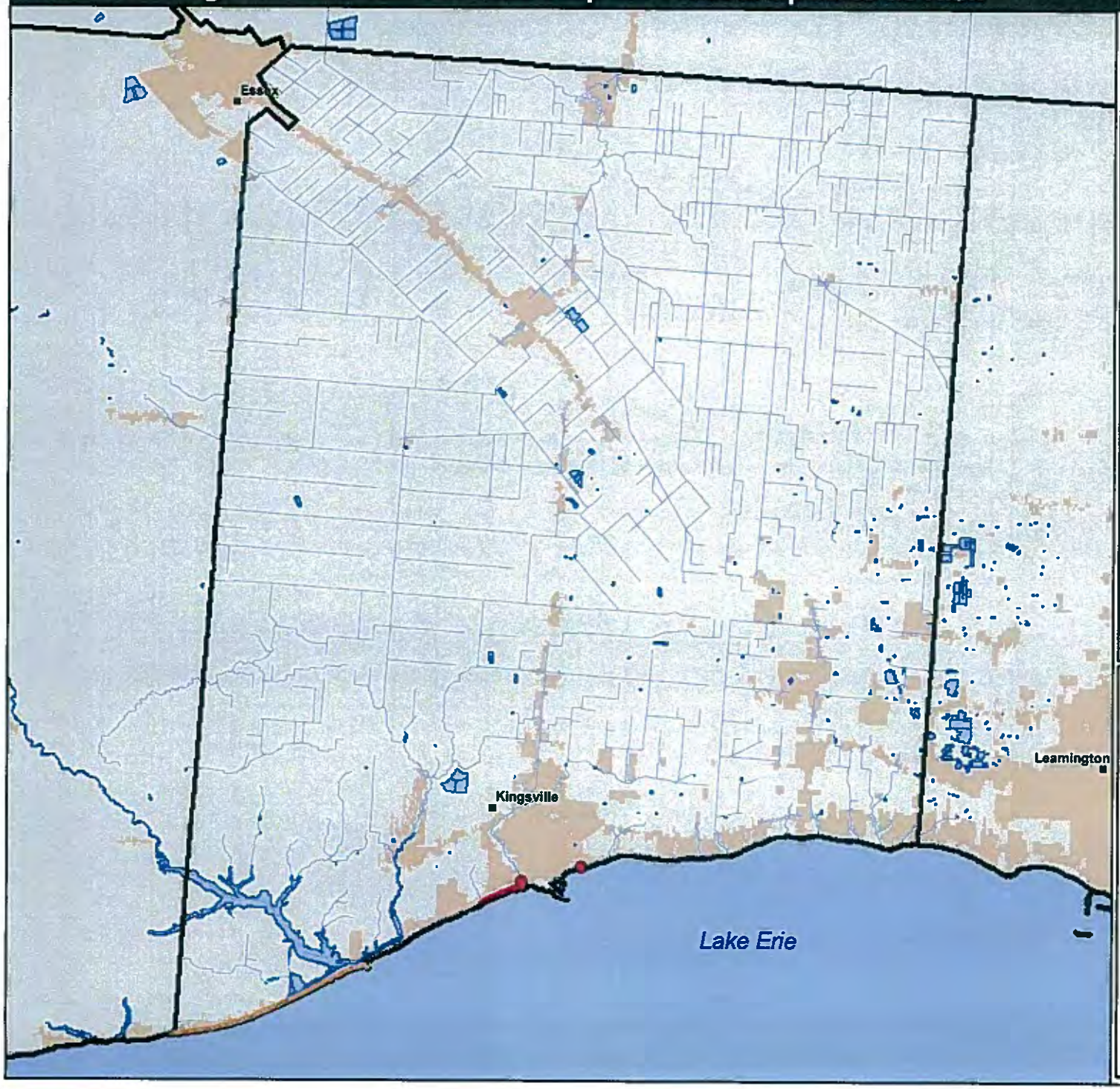
UTM NAD83 CNT Zone 17.

Base data derived from the Natural Resource Values Information System (NRVIS). Element Occurrence & Observation Data provided by Natural Heritage Information Centre (NHIC). Colour-coded stream segments provided by Fisheries & Oceans Canada, 2009. Subwatershed Boundaries provided by Conservation Authorities.

This map was produced by the Aylmer District Office GIS Unit, Ministry of Natural Resources.

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Natural Resources (OMNR) shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.

Town of Kingsville: Sensitive Areas Map for Mussel Species at Risk



LEGEND

Ontario

Sensitive Areas for Mussel SAR

DFO Data (valid until May 2010)

- *SARA Protected (EX, EN, TH)*
- *To be listed in 1yr+ (EN, TH)*
- *All SC (Sch 1, 3, newly listed)*

MNR/NHIC Data

- *EXP, END, THR*
- *SC*

Conservation Authority

- *Essex Region*
- Subwatershed Boundaries
- Municipal Boundaries
- First Nations Territories
- Urban Area

N

SCALE: 1:110,000

0 1 2 4

Kilometres

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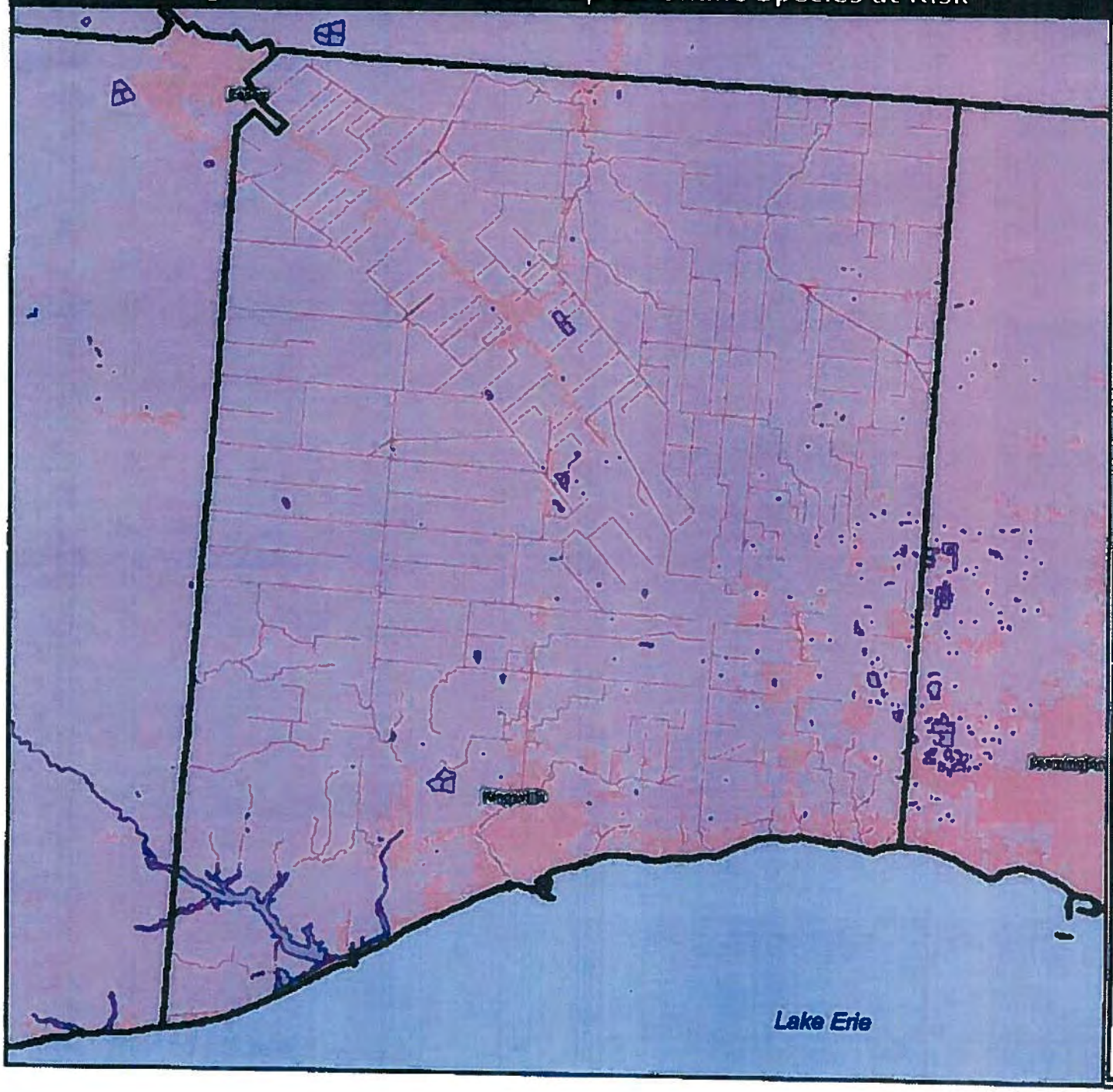
Town of Kingsville: Sensitive Areas Map for Snake Species at Risk



LEGEND Ontario

- Sensitive Areas for all Snake SAR
- Sensitive Areas for Butler's Garter Snake
- Municipal Drains
- Conservation Authority
  - Essex Region
- Subwatershed Boundaries
- Municipal Boundaries
- First Nations Territories
- Urban Area

SCALE: 1:110,000

0 1 2 4

Kilometres

UTM NAD83 CNT Zone 17

Base data derived from the Natural Resource Values Information System (NRVIS). Sensitive Areas based on data from MNRC. Subwatershed Boundaries provided by Conservation Authorities.

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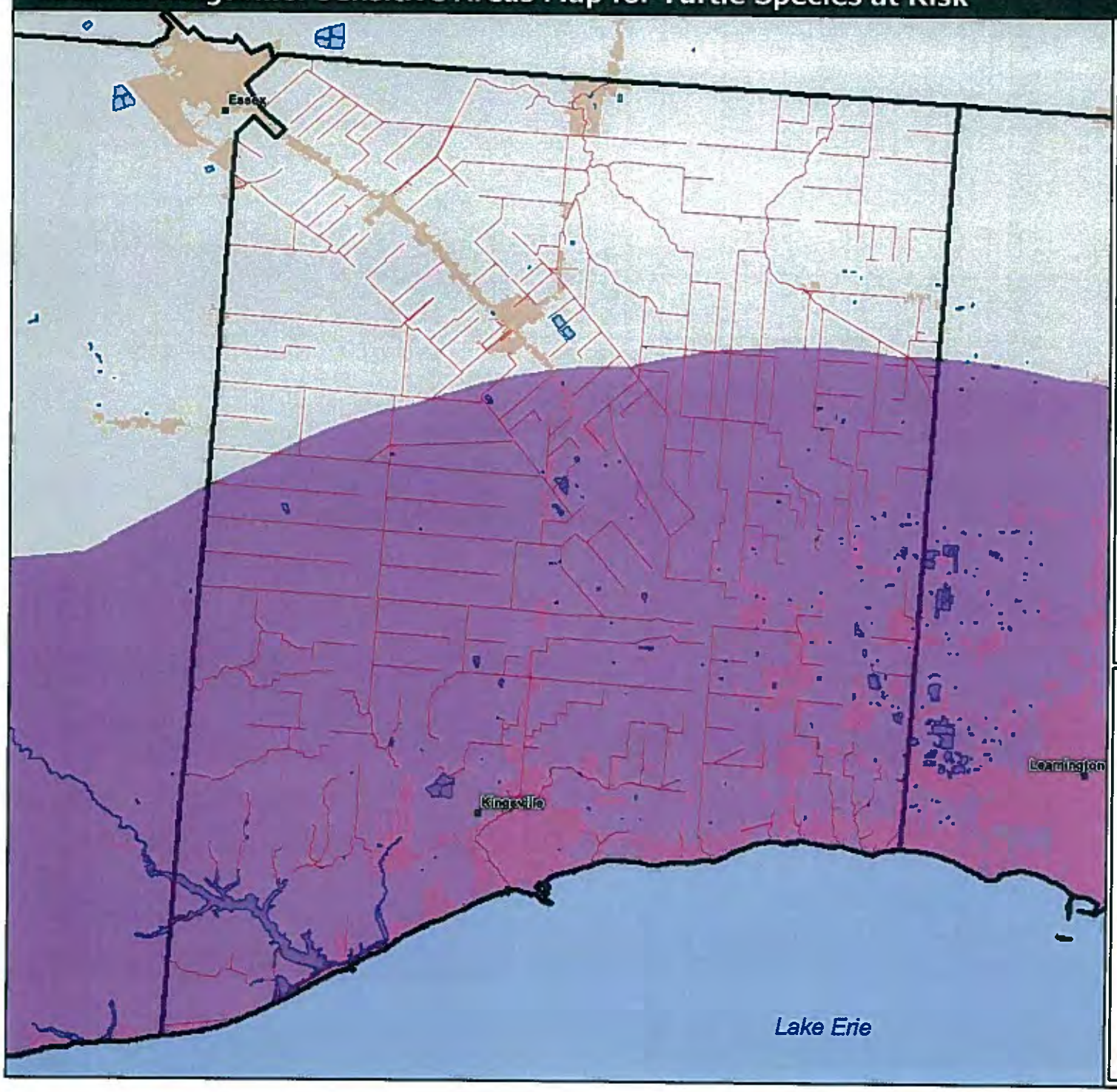
Town of Kingsville: Sensitive Areas Map for Turtle Species at Risk



LEGEND Ontario

- Sensitive Areas for Turtle SAR
- Municipal Drains

Conservation Authority

- *Essex Region*
- Subwatershed Boundaries
- Municipal Boundaries
- First Nations Territories
- Urban Area

N

SCALE: 1:110,000

0 1 2 4

Kilometres

UTM NAD83 CNT Zone 17.

Base data derived from the Natural Resource Values Information System (NRVIS). Sensitive Areas based on data from NHIC. Subwatershed Boundaries provided by Conservation Authorities.

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Seasonal Timing Windows Chart

Date Codes	Monthly Intervals: E=Early(days 1-10); M=Middle(days 11-20); L=Late(days 21-31)																							
Dates	*Jan*		*Feb*		*Mar*			*Apr*			*May*			*Jun*			*Jul*			*Aug*			*Sept*			*Oct*			*Nov*	*Dec*
					E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L	E	M	L		
Taxa/Common Name																														
Aquatic Species																														
Fish	IF in a Sensitive Area Identified on Maps THEN Prior Notification to the MNR is required (regardless of time of year)																													
Mussels	IF in a Sensitive Area Identified on Maps THEN Prior Notification to the MNR is required (regardless of time of year)																													
Turtles																														
Fowler's Toad																														
Jefferson Salamander																														
Terrestrial Species																														
Snakes - Hibernation																														
Snakes - Staging																														
Butler's Gartersnake - Hibernation																														
Butler's Gartersnake - Staging																														
Herbaceous Plants																														
Birds																														

NOT *a* Sensitive Time	IF **NO** Sensitive Areas Identified on Maps THEN **NO** Prior Notification to the MNR is required
Sensitive Time	IF in a Sensitive Area Identified on Maps THEN Prior Notification to the MNR is required
On-site Consultation	IF in a Highly Sensitive Area (e.g., a known hibernacula) **THEN** On-site consultation with the MNR is required

Staging refers to the time just after emergence from hibernation in the spring and the aggregation of individuals in the fall just prior to entering into hibernation sites.

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.

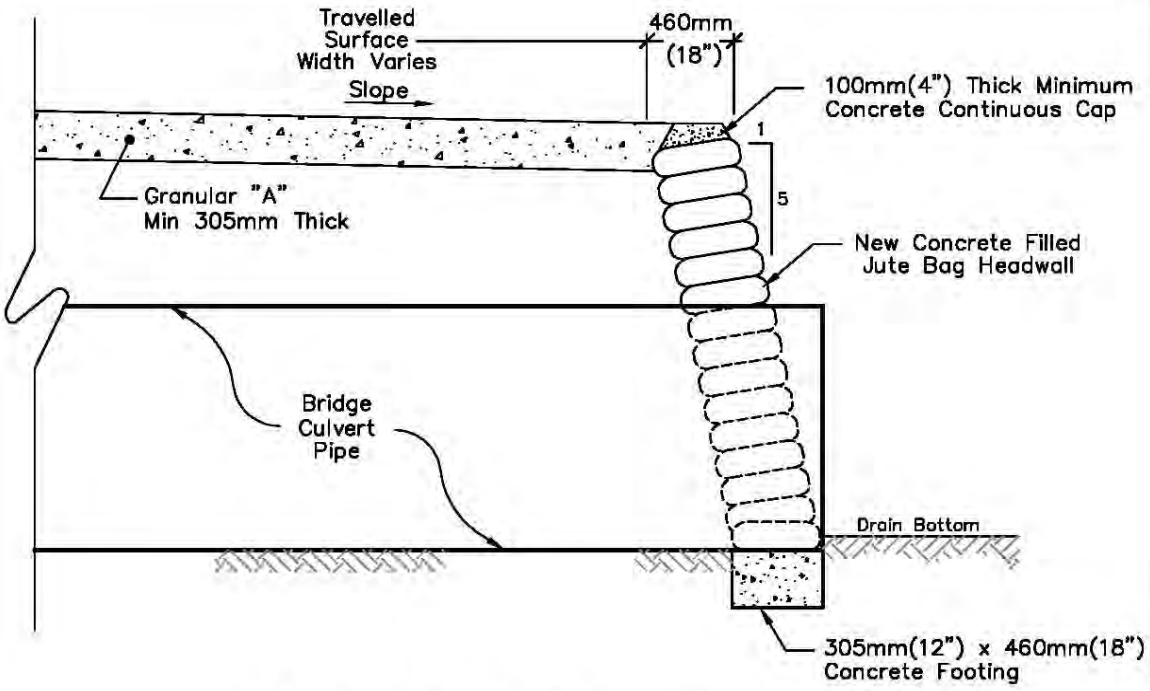
Where applicable, the Contractor and/or landowner constructing the new bridge shall be responsible for any damage caused by them to any portion of the Town road right-of-way. They shall take whatever precautions are necessary to cause a minimum of damage to same and must restore the roadway to its original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

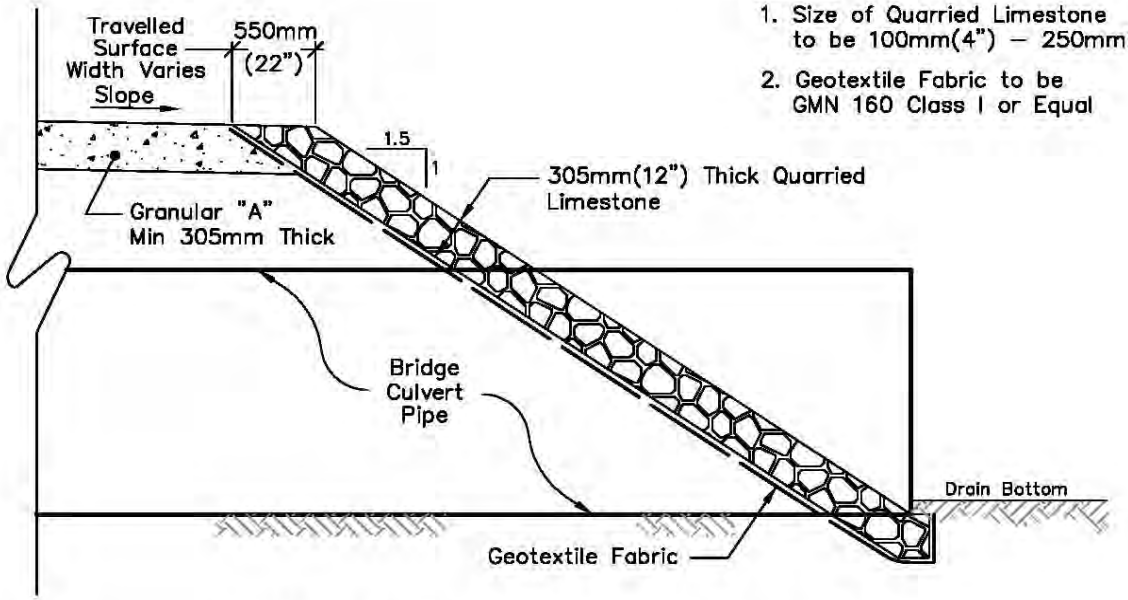
All of the excavation, installation procedures, and parameters as above mentioned are to be carried out and performed to the full satisfaction of the Drainage Superintendent and Engineer.



Typical Jute Bag Headwall

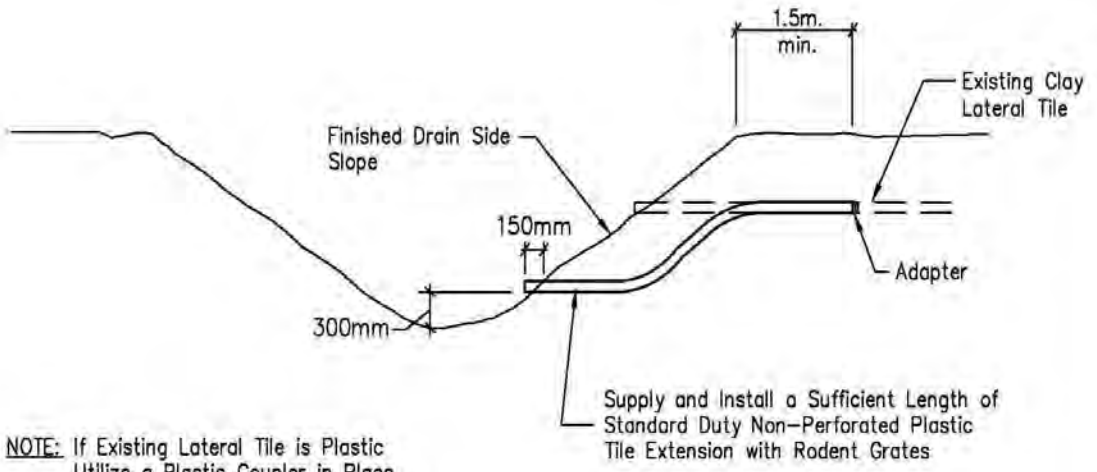
NOTE:

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



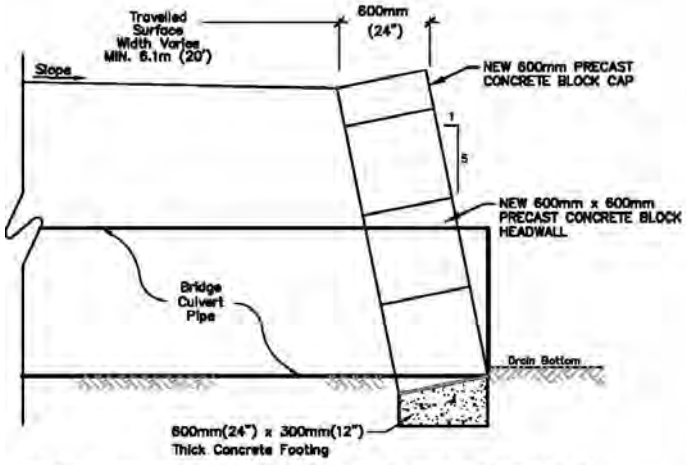
Typical Quarried Limestone End Protection

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



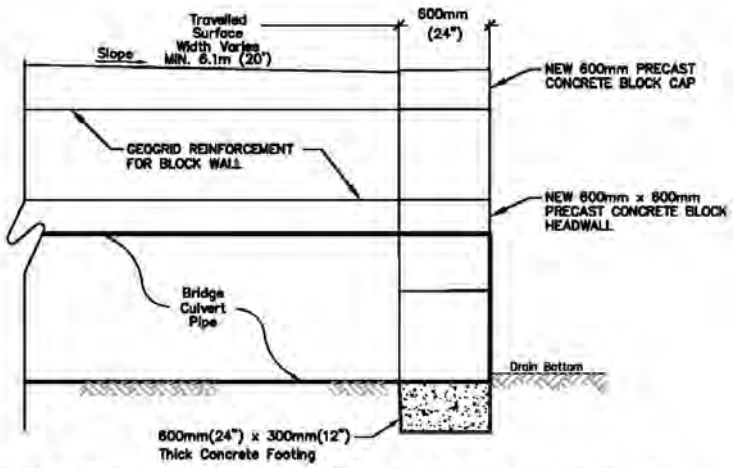
STANDARD LATERAL TILE DETAIL

N.T.S.



TYPICAL PRECAST CONCRETE BLOCK END PROTECTION

Scale = N.T.S.



TYPICAL VERTICAL PRECAST CONCRETE BLOCK END PROTECTION

Scale = N.T.S.

APPENDIX “REI-D”

General Conditions and Specifications not required.

APPENDIX “REI-E”

PROFILE AND SECTIONS

OF THE

ORTON DRAIN

(For Ida & William Assinck, 480–01600)

(Geographic Township of Gosfield North)

IN THE

TOWN OF KINGSVILLE

IN THE

COUNTY OF ESSEX • ONTARIO

Gerard Rood

GERARD ROOD, P.ENG.

REGISTERED PROFESSIONAL ENGINEER
G.ROOD
2024-01-12
PROVINCE OF ONTARIO

ROOD ENGINEERING INC.

CONSULTING ENGINEERS
Leamington, Ontario
519–322–1621

DATE: January 4th, 2024

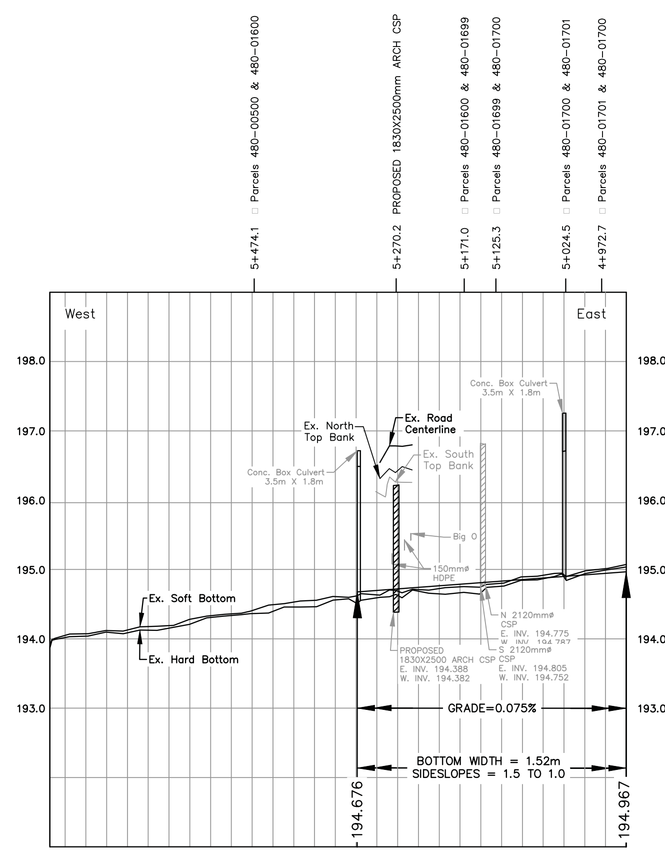
TOWN OF KINGSVILLE

MAYOR: Dennis Rogers
CLERK: Paula Parker
DRAINAGE SUPERINTENDENT: LuAnn Marentette

BENCHMARKS:

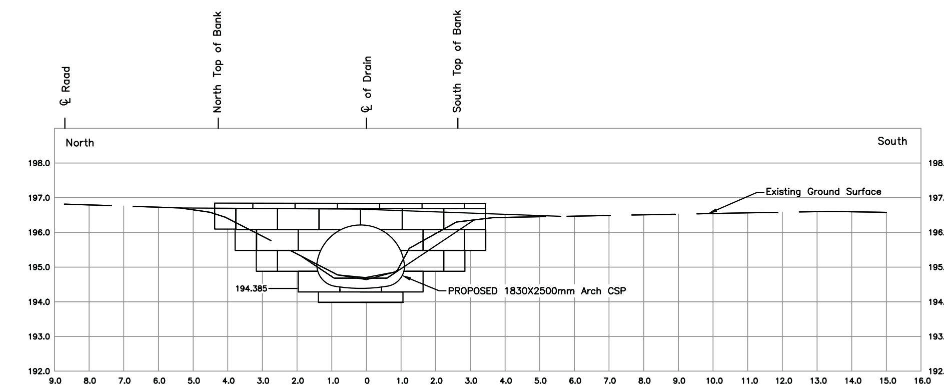
TOP OF NAIL IN NORTH FACE OF HYDRO POLE LOCATED ON THE SOUTH SIDE OF ROAD 7 EAST AT MN 46 APPROX. 16.5 METRES WEST OF THE PROPOSED BRIDGE CENTRELINE

ELEV. = 196.827m



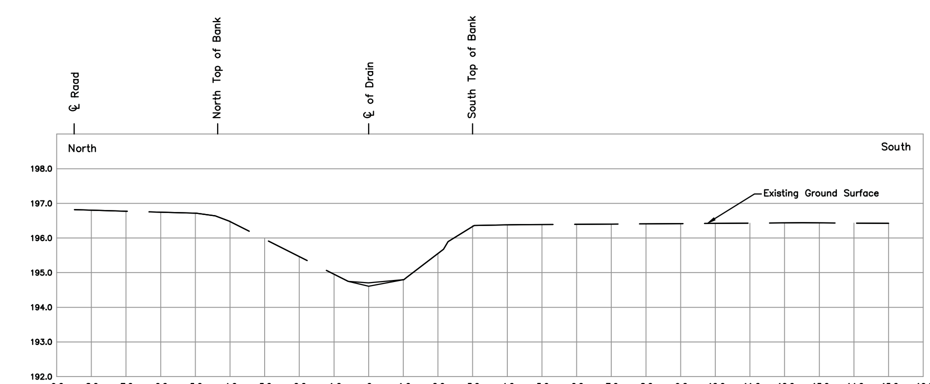
PROFILE – ORTON DRAIN

SCALE=1:5000 hor.
1:50 vert.



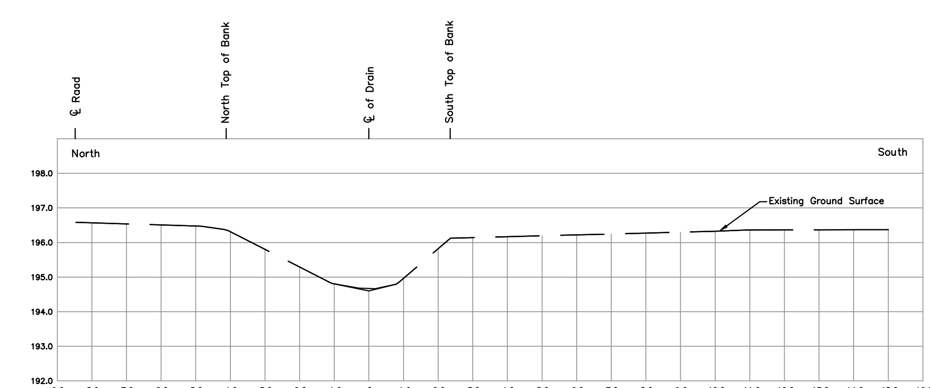
Elev.	196.82	196.70	196.59	196.44	194.80	194.64	194.86	195.54	196.30	196.43	196.56	196.60	196.60	196.58
Offset	8.71	5.38	4.61	4.07	0.89	0.00	0.82	1.24	2.60	3.66	11.04	13.32	13.54	15.00

STA. 5+269.9
Scale = 1:100



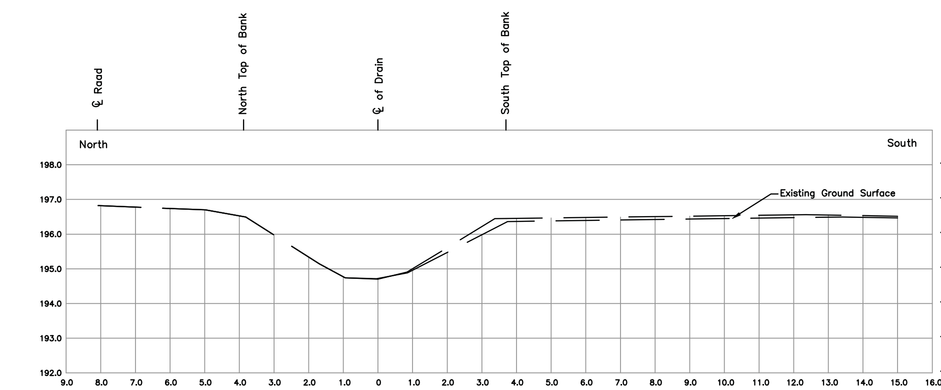
Elev.	196.82	196.71	196.65	196.49	194.77	194.61	194.80	195.67	196.36	196.38	196.39	196.44	196.42
Offset	8.49	4.98	4.49	4.05	0.64	0.00	1.02	2.16	3.04	4.10	4.38	12.50	15.00

STA. 5+279.0
Scale = 1:100



Elev.	196.58	196.47	196.38	194.85	194.60	194.80	196.13	196.32	196.36	196.37	196.37
Offset	8.46	4.85	4.19	1.14	0.00	0.79	2.36	9.97	10.90	14.21	15.00

STA. 5+292.7
Scale = 1:100



Elev.	196.82	196.70	196.49	195.14	194.74	194.70	194.91	196.45	196.56	196.52
Offset	8.08	4.98	3.82	1.69	0.94	0.00	0.84	3.37	12.36	15.00

STA. 5+245.8
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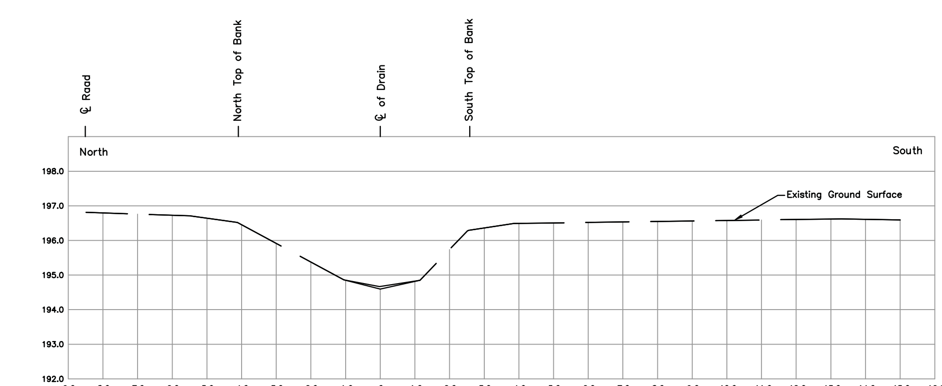


Elev.	196.81	196.71	196.58	196.52	194.86	194.59	194.85	196.28	196.41	196.49	196.62	196.62	196.59
Offset	8.49	5.47	4.52	4.13	1.05	0.00	1.15	2.52	3.36	3.86	12.99	13.31	15.00

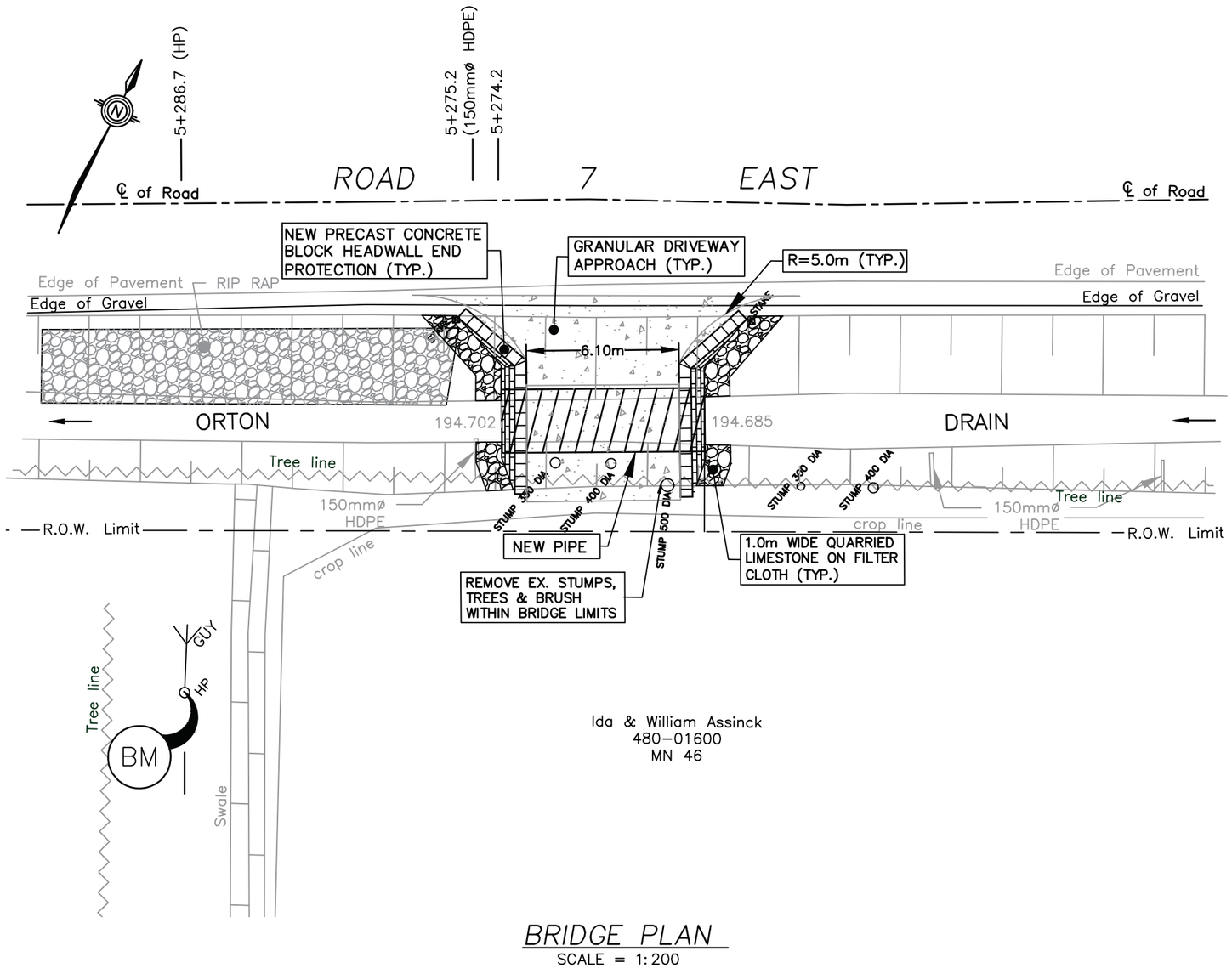
STA. 5+260.7
Scale = 1:100

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

DRAWN BY: L.V.
PLOT CODE: 1:1
COMPUTER FILE: REI2019D0015.DWG

FILE No.: REI2019D015

SHEET No.: 1 OF 2



BRIDGE PLAN
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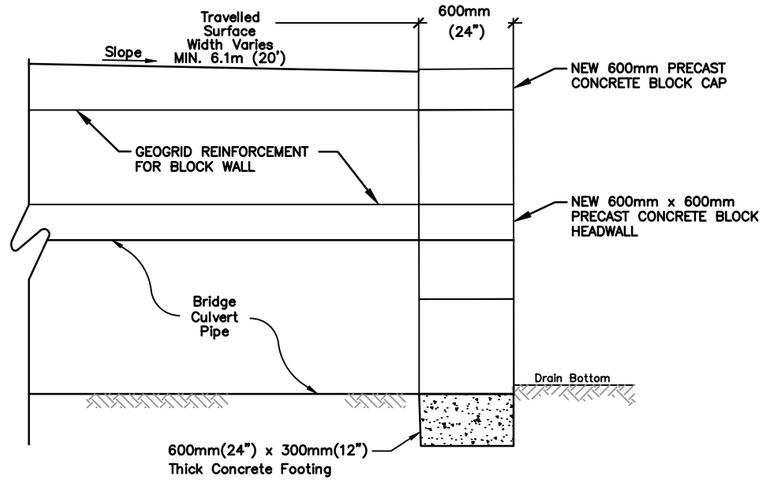

TYPICAL VERTICAL PRECAST CONCRETE BLOCK END PROTECTION
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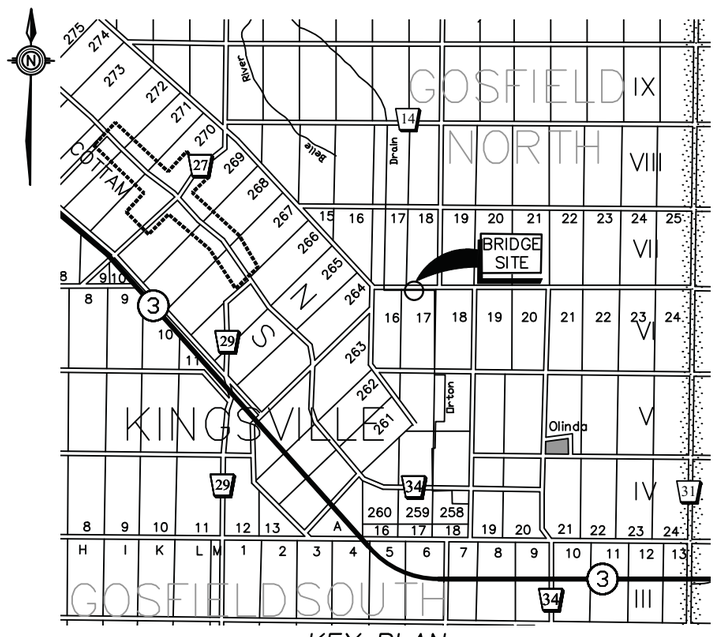

KEY PLAN
Scale = 1:100,000

BENCHMARK:
TOP OF NAIL IN NORTH FACE OF HYDRO POLE LOCATED ON THE SOUTH SIDE OF ROAD 7 EAST AT MN 46 APPROX. 16.5 METRES WEST OF THE PROPOSED BRIDGE CENTRELINE

ELEV. = 196.827m

PIPE SIZE:	PIPE LENGTH:	PIPE GAUGE:	CORRUGATIONS:	TYPE OF PIPE:	DESIGN ELEVATIONS:
2500x1830mm CSP ARCH	8.0m (26.25 FT.)	2.8mm (12 GA.)	125x25mm (5" X 1")	ALUMINIZED PIPE ARCH	UPSTREAM INV. (E) =194.388m DOWNSTREAM INV. (W) =194.382m ℄ TOP OF DRIVEWAY =196.673m DRAIN GRADE = 0.075%

ORTON DRAIN
New Bridge for Ida & William Assinck
(GEOGRAPHIC TOWNSHIP OF GOSFIELD NORTH)
IN THE
TOWN OF KINGSVILLE
IN THE
COUNTY OF ESSEX•ONTARIO

REGISTERED PROFESSIONAL ENGINEER G.ROOD 2024-01-12 PROVINCE OF ONTARIO

ROOD ENGINEERING INC.
CONSULTING ENGINEERS
Leamington, Ontario
519-322-1621

DATE: 2024-01-04

FILE No.:	DRAWN BY: K.S. PLOT CODE: 1:1 FILE: REI2019D015.DWG	APPENDIX 'E' 2 OF 2
REI2019D015		