ENGINEER'S REPORT

(Drainage Act, RSO 1990, c. D.17)

PROJECT

Lebo Creek Drain
Watershed Rehabilitation Project
(Geographic Township of Mersea)
Municipality of Leamington, County of Essex
Project No. D15-029

April 28, 2023

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PREAMBLE

MUNICIPAL DRAINS AND THE DRAINAGE ACT

The "Drainage Act" is one of the oldest pieces of legislation in Ontario, passed in 1859. It provides a democratic procedure for the construction, improvement and maintenance of drainage works. A procedure whereby the Municipality may assist in providing a legal drainage outlet for surface and subsurface waters not attainable under common law. Accordingly, provides much-needed assistance to facilitate the problems of obtaining a legal drainage outlet, engineering and cost distribution.

The Drainage Act provides a legal procedure by which an "area requiring drainage" may receive an outlet drain constructed to dispose of excess stormwater runoff to a sufficient outlet. This drainage infrastructure is otherwise known as a "Municipal Drain". Municipal Drains are identified by Municipal By-Law that adopts an Engineer's Report. The drainage engineer has the obligation to prepare an unbiased Engineer's Report based on information presented in written form, orally, and from visual inspection; in accordance with currently accepted design criteria. These reports form the legal basis for construction and management of the Municipal Drain. As such, an Engineer's Report shall contain specific details such as plans, profiles, and specifications that define the location, size and depth of the drainage infrastructure, together with establishing how costs are shared amongst all stakeholders.

Through the democratic procedure, the Engineer's Report is presented to all Stakeholders in front of Municipal Council (or a Drainage Board appointed by Council) for consideration. The Drainage Act provides an appeal process to address various aspects of Municipal Drains. These appeal bodies are the Court of Revision, the Ontario Drainage Tribunal and the Drainage Referee.

For additional information, Fact Sheets, and reference materials regarding the Drainage Act and Municipal Drains, please visit: **http://www.omafra.gov.on.ca/english/landuse/drainage.htm**

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EXECUTIVE SUMMARY

LEBO CREEK DRAIN WATERSHED REHABILITATION PROJECT

The Lebo Creek drainage system, a tributary of the Hillman Marsh, provides a drainage outlet for approximately 3,400 hectares (8,500 acres) of land. The naturally formed open channel of the Lebo Creek extends from the Hillman Marsh and meanders in a northwesterly direction through private property and crossing various public roads, where the most upstream portion terminates at the intersection of King's Highway No. 77 and Mersea Road 7. Portions of this drainage system are currently designated as a "Municipal Drain", through the Drainage Act, while others remain as a "Natural Watercourse". The Municipal Drain portion of the Lebo Creek Drain has a well-documented history, dating back to the late 1800s.

Based on concerns brought forward by various landowners within the Lebo Creek Drain watershed, the Municipality of Leamington has initiated an Engineer's Report through the provisions of the Drainage Act. Through the Drainage Act process, the Municipality has appointed our Firm to develop an Engineer's Report for the consideration of all stakeholders within this Drainage System. These stakeholders include all private property owners and public Road Authorities who contribute to and/or benefit from this drainage system. Furthermore, these stakeholders include both Federal and Provincial Agencies that regulate works associated with their legislation. This Engineer's Report intends to derive a solution to address the diminishing functionality and provide improvements for the long-term sustainability of the overall drainage system. This report also includes a detailed estimate of the cost of construction and incidentals to be paid for by the users of the drainage system, in accordance with the Drainage Act.

Through the Municipality's review of the concerns brought forward, the diminished functionality of the drainage system appeared to be associated with an excessive amount of fallen dead wood within wooded areas of the drainage system, which subsequently promoted the accumulation of debris and sediment ultimately creating blockages. The majority of these blockages were located within the "Natural Watercourse" sections of the drainage system. Based on Common Law "Riparian Rights Doctrine", the Municipality and the Conservation Authority do not have the authority to enter such lands to address these concerns. Therefore, with the lack of riparian owner participation, the Municipality felt obligated to initiate a request for improvement through Section 78 of the Drainage Act. Section 78 allows for the extension of a Municipal Drain downstream to a sufficient outlet. As a result, all "Natural Watercourse" sections of the Lebo Creek would be converted and become part of the Lebo Creek Drain as a "Municipal Drain".

The project was first introduced to the stakeholders through an On-Site Meeting scheduled in June 2016, where inherent concerns were presented. The purpose of the initial meeting was to introduce the concerns brought forward and allow the appointed Engineer to educate the affected stakeholders about the Drainage Act process and to provoke positive discussions towards gathering pertinent information related to the issues at hand.

With the environmentally sensitive nature of the watercourse, environmental stakeholders were brought into the project at an early stage to capture any concerns and/or issues with the intended scope. Based on these discussions and the requirements of the associated legislation, a Biological Consultant, LGL Limited, was retained to review the project site and meet any regulatory requirements related to the proposed drainage improvements. Based on the scale and scope of this project, it was determined that additional environmental considerations could be implemented as part of this project. As part of the Municipality of Leamington Policy E09, 3.0-metre-wide grassed buffer strips shall be incorporated on both sides of the open channel along all agricultural lands. Furthermore, with consultation and support from the Essex Region Conservation Authority (ERCA) and the Ministry of Natural Resources and Forestry (MNRF), the creation of a wetland was also investigated as part of this project.

Based on the progression and details of the project, various recommendations are considered as part of this project. They are generally as follows:

1. The conversion of the Natural Watercourse into a continuous Municipal Drain, extending from the mouth of the Hillman Marsh (at Deer Run Road) upstream to the intersection of King's Highway No. 77 and Mersea Road 7.

2. The removal of all trees within the channel limits, together with all debris and deadwood within (and surrounding) the open channel. This operation will require selective tree removal within the wooded areas, creating a meandering pathway, to maintain access to the channel.

3. The removal of all accumulated sediment within the open channel to restore the natural conveyance, where necessary.

4. General erosion protection shall be installed in various locations throughout the project site to address areas of excessive erosion within the drain, including the control of failing surface and/or subsurface inlets. Furthermore, the implementation of erosion mitigation measures to minimize the long-term channel erosion and provide some flow attenuation to reduce impacts to downstream lands.

5. The incorporation of a 3.0-metre-wide grassed buffer strip along both sides of the open channel within agricultural lands, that currently do not have naturalized buffers.

6. The identification of all access structures located within the drain and provide a mechanism to address these structures related to future maintenance and replacement.

7. The implementation of a wetland, located immediately north of Mersea Road 5. The wetland will provide additional storage within the drainage system, provide a sedimentation forebay, and reduce velocities and attenuation flows within the open channel. All costs associated with this wetland are intended to be addressed through external funding. These costs currently form part of the overall project cost and will be deducted as part of the final invoicing.

With the incorporation of the "Natural Watercourse" to be part of the "Municipal Drain" and the implementation of grassed buffer strips, compensation has been provided for the use of the affected lands and any short-term and long-term damages to lands and crops. The estimated costs for these construction works, together with the associated analysis, design, studies, miscellaneous fees, and allowances, amount to approximately $1,836,248.00 and are distributed amongst the lands and roads that benefit from and/or utilize the drainage system as a drainage outlet. The final costs shall be distributed to all affected properties and have been outlined within a "Construction Schedule of Assessment". This report also provides a general rationale for the distribution of these costs associated with the works outlined within this project. Furthermore, "Future Maintenance Schedules of Assessment" have also been provided as part of this project for the distribution of any costs associated with the future maintenance of the drain.

Based on the details outlined above, this report is intended to provide a detailed summary of the overall project, including the background, history, analysis and design of the recommended improvements, the estimated costs, and cost distribution. With the information presented within this report, we strongly encourage all stakeholders to participate in the Consideration of this report in front of the Municipality of Leamington Council. If you have any questions, comments or concerns that you wish to address before the Consideration of this report, please feel free to contact the Municipality's Drainage Superintendent and/or the author of the report.

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April 28, 2023

Mayor and Municipal Council
Corporation of the Municipality of Leamington
111 Erie Street North
Leamington, ON N8H 2Z9

I. INTRODUCTION

In accordance with the instructions received by email on May 4, 2016, from the Municipality of Leamington, we have completed the necessary survey, examinations, investigations, etc. and have prepared the following report that provides for the extension of the Municipal Drain through the Natural Watercourse portions of the Lebo Creek, while including the necessary improvements to provide a sufficient outlet for the entire drainage system. The overall project will include the necessary improvements to facilitate conveyance through the open channel, a review of all access structures along the course of the drain, together with providing green infrastructure to enhance the ecological footprint within the watershed. These investigations were initiated by a resolution passed by Council for our firm to investigate the current functionality, together with providing the necessary improvements towards providing a sufficient outlet for the entire reach of the Lebo Creek Drain. All of which are in accordance with the provisions of the Drainage Act. A plan showing the alignment of the Lebo Creek Drain, the general location of all access structures, and the general details of the proposed improvements, together with identifying all lands affected within the watershed of the drain. All of these details are included herein as part of this report.

The initial request to provide an Engineer's Report to address the necessary improvements to the Lebo Creek Drain was initiated by the Municipality of Leamington, based on numerous complaints from landowners along the open drain, south of Mersea Road 7. The concerns brought forward by the landowners identified that the open drain is not functioning as intended and the natural flow was impeded.

Our appointment and the works relative to these Municipal Drain improvements proposed under this report are being prepared in accordance with Section 78 of the "Drainage Act, RSO 1990, Chapter D.17, as amended in 2021". We have performed all of the necessary surveys, investigations, etc., for the proposed improvements to the Lebo Creek Drain, and we report thereon as follows.

II. WATERSHED CHARACTERISTICS AND BACKGROUND

Watershed Characteristics

The Lebo Creek is located within the Municipality of Leamington and extends from its outlet into the Hillman Marsh, south of Mersea Road 2 and ultimately into Lake Erie. The Hillman Marsh has been designated as an Environmentally Significant Area (ESA), where its north limit is located at the south side of Deer Run Road. This watercourse extends from the north limit of Hillman Marsh, upstream in a northwesterly direction, where it meanders and crosses various Municipal and County Roads to its top end located at the intersection of Highway No. 77 and Mersea Road 7. As illustrated in **Figure 1**, portions of the Lebo Creek Drain are designated as a Municipal Drain and other portions as a Natural Watercourse.

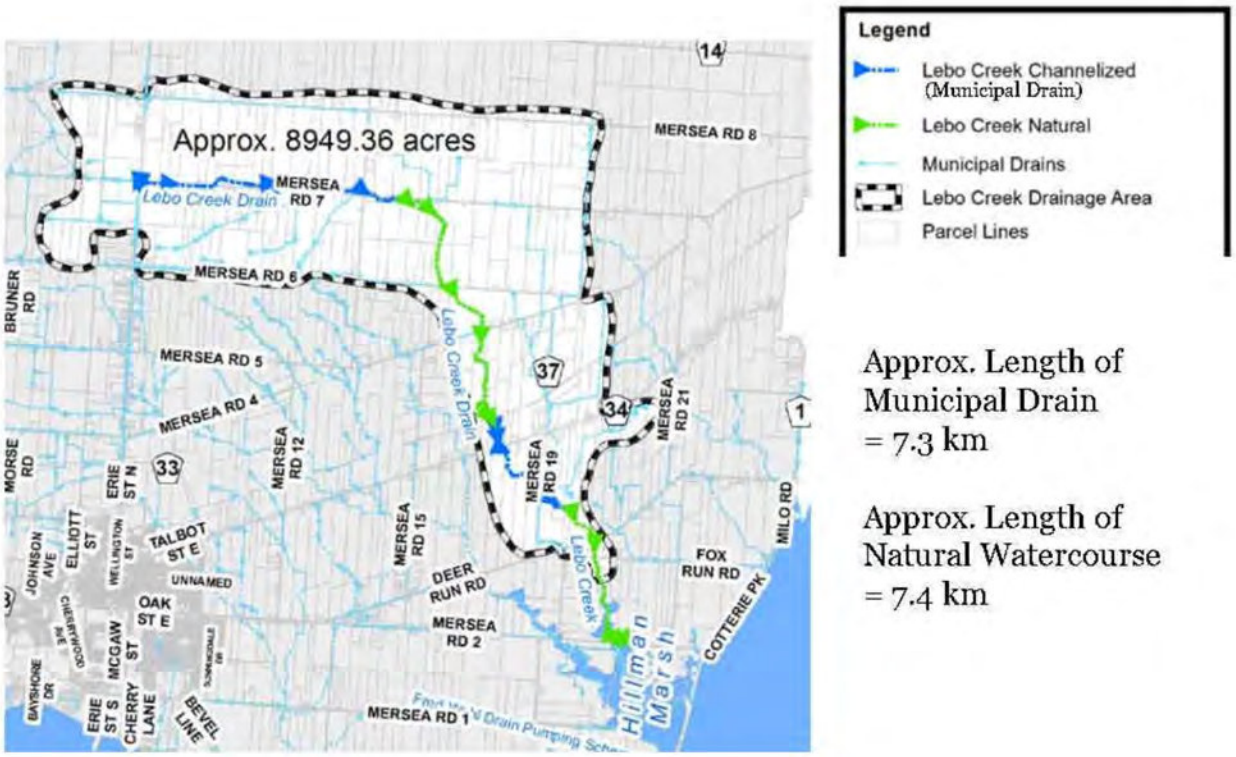

Figure 1 - Lebo Creek Watercourse

The Lebo Creek is the primary drainage outlet for numerous tributary Municipal Drains. The Lebo Creek is an irregularly shaped watershed which encompasses approximately 3,400 hectares (8,500 acres) of land, all of which reside within the Municipality of Leamington. The vast majority of the lands within this watershed area consist of agricultural production, with the lower reach of the open channel consisting of a mix of agricultural and woodlot properties. The upstream portion of the watershed (adjacent to the Highway No. 77 corridor) consists of high-density agricultural greenhouse developments. The lands within the watershed are generally situated within relatively flat terrain with very little topographic relief. The upstream portion of the Lebo Creek Drain channel, between Mersea Road 7 and County Road 34, has a good natural gradient. However, as the topography moves downstream, the gradient becomes very mild towards the head of the Hillman Marsh. The average gradient of the entire system is approximately 0.13% fall. The project site is primarily located within Brookston Clay Sand – Spot Phase and Berrien Sandy Loam soil types, with a small vane consisting of Plainfield Sand. These soils and Hydrologic Soil Groups are classified as follows:

Brookston Clay Sand – Spot Phase and Berrien Sandy Loam soils – Classified as Hydrologic Soil Group C & D; which is described as a low to very low infiltration rate when thoroughly wetted and consists primarily of soils with a layer that impedes downward movement of water with moderately fine to fine soil structure. As a result, these soils typically require effective artificial sub-surface drainage to be productive.

Plainfield Sand soils – Classified as Hydrologic Soil Group A; which is described as having high infiltration rates when thoroughly wetted and consists primarily of deep, well to excessively drained sand or gravels and have a high rate of water transmission.

Background

Through concerns brought forward by various landowners, agricultural lands upstream of the wooded areas are experiencing excessively high-water levels and reduced flow capacity within the open drain. Through their investigations, the Municipality has identified various blockages due to fallen dead trees, mature tree growth within the open channel, and accumulation of debris and sediment within the Natural Watercourse sections of the drain, thus causing drainage issues to upstream lands and roads. Based on Common Law "Riparian Rights Doctrine", the Municipality and the Conservation Authority do not have the authority to enter such lands and maintain or alter the channel through these Natural Watercourse sections of the drain. Therefore, with the lack of riparian landowner participation, the Municipality is unable to address these drainage concerns. As such, they have requested that improvements be conducted to extend the Municipal Drain portions through Section 78 of the Drainage Act, in order to address these concerns. Section 78(1.1)(5) of the Drainage Act allows for an existing Municipal Drain, constructed under By-Law and authorized through the auspices of this Act, to be improved and/or extended to a sufficient outlet. Based on the current issues identified by the various landowners within the watershed, together with the Municipality's limitations to maintain the Natural Watercourse sections of the channel, we find that the request to extend and improve the Lebo Creek Drain, through Section 78 of the Drainage Act, is warranted

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Ultimately, this led to our firm being appointed by the Municipality of Leamington to prepare an Engineer's Report pursuant to the Drainage Act for the necessary improvements to the Lebo Creek Drain.

The downstream portion of the Natural Watercourse extends across Deer Run Road, Fox Run Road, and Mersea Road 2 to its outlet into Lake Erie. However, portions of which form part of the Hillman Marsh are designated as an Environmentally Significant Area (ESA). The Hillman Marsh ESA extends from the south limit of Deer Run Road and continues to Lake Erie, as illustrated in **Figure 2** below. These areas are designated under an Official Plan that is consistent with the Provincial Policy Statement (PPS) issued under the Planning Act, protected by the Conservation Authorities Act, and most of the land is owned by the Essex Region Conservation Authority (ERCA). Therefore, the ESA is under the jurisdiction of the ERCA, where they have the responsibility to maintain this portion of the drainage system. Based on this information, the proposed drainage improvements under this report are not intended to be extended into the ESA.

Figure 2 - North Limit of the Hillman Marsh ESA

III. DRAINAGE HISTORY

From our review of the Municipality of Leamington's drainage records, we found various Engineer's Reports prepared through the provisions of the Drainage Act for the Lebo Creek Drain and its Branches. The northern Municipal Drain portion, along Mersea Road 7, was established as a Municipal Drain in the late 1800s. The south portion of the Municipal Drain, across County Road 34 and Mersea Road 19, was initially petitioned for and established in the 1980s. Based on this information, we have utilized the following relevant Engineer's Report as a reference for carrying out this project:

Lebo Creek Drain

a) **July 29, 1960,** Engineer's Report for the "Lebo Creek Drain and the Northwest Branch", prepared by C.G.R. Armstrong, P.Eng., was carried out through the Township of Mersea By-Law No. 2208. The improvements completed under this report included cleaning and improvements, together with brushing and grubbing along the entire length of the main drain established as a Municipal Drain (at that time), along with the Northwest Branch of the Lebo Creek Drain. Based on the details of this report, the top end of the Lebo Creek Drain commences at the west limit of Highway No. 77, within Concession 6. The Municipal Drain meanders downstream along Mersea Road 7, where it terminates at the midpoint of Lot 14, Concession 6.

Although various By-Laws were passed that superseded the vast majority of the northern portion of the Lebo Creek Drain, this report and By-Law will still govern over a small portion of the Municipal Drain between Station 4+728.4 and Station 5+071.5 and further establishes the most downstream extent of the northern portion of the Municipal Drain along Mersea Road 7, at the midpoint of Lot 14, Concession 6.

b) **February 22, 1978,** Engineer's Report for the "Lebo Creek Drain", prepared by W.J. Setterington, P.Eng., was carried out through the Township of Mersea By-Law No. 3407. The improvements completed under this report included cleaning and brushing of the main drain from the east limit of Highway No. 77 and extending downstream to approximately between Lots 9 and 10 of Concession 7. The improvements also included the replacement of an existing access bridge within Lot 9.

This report and By-Law currently govern over a small part of the northern portion of the Municipal Drain between Station 0+466.5 and Station 0+850.4 within parts of Lot 7 and 8, Concession 6.

c) **December 13th, 1982,** Engineer's Report for the "Lebo Creek Drain", prepared by W.J. Setterington, P.Eng., was carried out through the Township of Mersea By-Law No. 3992. The improvements completed under this report included cleaning and brushing of the main drain from the confluence of the McLeod Drain within Lot 11, Concession 7, to a point approximately 36.0 metres west of the limit between Lot 13 and Lot 14, Concession 7.

This report and By-Law currently govern over the northern portion of the Municipal Drain between Station 3+407.5 and Station 4+781.7 between Lot 11 and 14, Concessions 6 and 7.

d) **September 16, 1985,** Engineer's Report for the "Part of the Lebo Creek Drain", prepared by W.J. Setterington, P.Eng., was carried out through the Township of Mersea By-Law No. 4233. The improvements completed under this report provided the conversion of the Natural Watercourse section of the Lebo Creek to a Municipal Drain, as petitioned for through Section 4 of the Drainage Act. These improvements addressed a portion of the drain that had filled in with sediment and could no longer convey flows to a sufficient outlet. The extent of these improvements was limited to a stretch of the Lebo Creek located north of County Road 34 (south of the former Chesapeake & Ohio Railway), downstream to the north limit of the existing road crossing culvert at County Road 34 (former Highway No. 3), accounting for a total distance of approximately 391.4 metres (1,284.15 ft).

This report and By-Law currently govern over the southern portion of the Municipal Drain between Station 9+842.9 and Station 10+238.7 within Lot 229, North Talbot Road Concession.

e) **August 17, 1990,** Engineer's Report for the "Lebo Creek Drain", prepared by H.E. Regts, P.Eng., was carried out through the Township of Mersea By-Law No. 4850. The improvements completed under this report included the relocation of approximately 250.0 metres of the Lebo Creek Drain onto private lands to address slope instabilities along Mersea Road 7, at the confluence of the McLeod Drain. These works also included the brushing and cleaning of the Lebo Creek Drain upstream to approximately the westerly portion of Lot 8, Concession 6.

This report and By-Law currently govern over the northern portion of the Municipal Drain between Station 0+850.4 and Station 3+407.5 between Lot 7 and 11, Concessions 6 and 7.

f) **June 1, 1994,** Engineer's Report for the "Lebo Creek Drain", prepared by N.J. Peralta, P.Eng. and G. Rood, P.Eng., was carried out through the Township of Mersea By-Law No. 5275. The improvements completed under this report provided the extension of the Municipal Drain portion of the Lebo Creek Drain downstream through the Natural Watercourse section to a sufficient outlet, pursuant to Section 78 of the Drainage Act. The improvements proposed in this report included the establishment of a low-flow channel, cleaning, and brushing of the entire study length, together with the reconstruction of a low-level crossing, removal of an access bridge, the installation of erosion protection at various locations and the inclusion of three vernal pools downstream of Mersea Road 19 (former County Road 37). These improvements were initiated to address the ongoing issues of sedimentation and flooding occurring north of County Road 34 (former Highway No. 3), as well as the lands further downstream near Mersea Road 19. In order to obtain a sufficient outlet for this portion of the Lebo Creek Drain, the Municipal Drain was extended from the northern limit of the County Road 34 crossing, downstream to a point upstream of the confluence of Piggott Creek, north of Deer Run Road.

This report and By-Law govern over the southern portion of the Municipal Drain between Station 10+238.7 and Station 12+460.6 between Lots 229 and 226, North Talbot Road and South Talbot Road Concessions. The reconstruction of the low-level crossing has further been identified within this report as **Bridge 31**.

g) **November 30, 2004,** Engineer's Report for the "Bridge Over the Lebo Creek Drain (Gemus)", prepared by G. Rood, P.Eng., was carried out through the Municipality of Leamington By-Law No. 573-05. The improvements completed under this report included the replacement of an existing access bridge within Lot 9, Concession 7 to serve the lands of Madonna Gemus (750-00700)/[Parcel 423]. This access bridge has been further identified within this report as **Bridge 9**.

h) **July 9, 2008,** Engineer's Report for the "Lebo Creek Drain Re-Alignment", prepared by G. Rood, P.Eng., was carried out through the Municipality of Leamington By-Law No. 862-08. The improvements completed under this report included the realignment of approximately 444.0 metres of the Lebo Creek Drain through the private lands at the upstream end and along Mersea Road 7, in efforts to make better use of the subject agricultural property. These works also included the necessary erosion protection at specific locations, the installation of a new access bridge, together with the incorporation of the necessary environmental features such as refuge pools, U-Shaped bottom, and specific tree plantings.

This report and By-Law currently govern over the northern portion of the Municipal Drain between Station 0+022.8 and Station 0+466.5 within Lot 7, Concession 6. The access bridge installed as part of this report has been further identified within this report as **Bridge 2**.

John Leslie Drain

a) **May 11, 1973,** Engineer's Report for the "John Leslie Drain", prepared by C.G.R. Armstrong, P.Eng., was carried out through the Municipality of Leamington By-Law No. 3105. The improvements completed in this report included the cleaning and brushing of the entire drain length, together with the lowering of an existing farm culvert. The report identifies the overall limits of the drain established therein, where this Municipal Drain's outlet is located at a single point within the Natural Watercourse of the Lebo Creek located at the north end of the existing road crossing culvert crossing Mersea Road 6.

b) **January 12, 2016,** Engineer's Report for the "John Leslie Drain (DeGoey Bridge)", prepared by G. Rood, P.Eng., was carried out through the Municipality of Leamington By-Law No. 17-16. The improvements completed under this report included the installation of a new access bridge within the Lebo Creek Natural Watercourse to facilitate the property of John & Jane DeGoey (700-00900)/[Parcel 215].

Currently, the existing outlet portion of this John Leslie Drain differs from that identified within the governing 1973 report. As a result, this report implies the extension and/or assumption of the John Leslie Drain within the Lebo Creek Natural Watercourse without any associated profile or details. The access bridge installed as part of this report has been further identified within this report as **Bridge 21**.

From our detailed research of the above Engineer's Reports, we have determined that generally speaking, portions of Lebo Creek are designated as a Municipal Drain and others as a Natural Watercourse. The existing northern Municipal Drain portion located along Mersea Road 7 has been defined and governed by the portions of 1960, 1978, 1982, 1990, and the 2008 Engineer's Reports and By-Laws and extends from Station 0+000.0 to Station 5+071.5. The southern portion of this Municipal Drain has been defined and governed by the 1985 and 1994 Engineer's Reports and By-Laws. The existing southern Municipal Drain portion is located between the former Chesapeake & Ohio Railway, at Station 9+842.9, downstream just short of the confluence of the Piggot Creek (north of Deer Run Road), at Station 12+460.6.

As it relates to the area of land contributing to this drainage system, the 1994 report generally identifies the latest watershed boundary limits contributing flows to the Lebo Creek Drain from the upstream lands. As such, this report was utilized as a starting point in establishing the area of land contributing to the proposed improvements. Furthermore, we have also researched and reviewed several governing reports for all abutting watersheds to confirm all changes for the completion of the necessary analysis and determinations that formed part of this project.

Further to our review, we find that the vast majority of the drainage structures within the northern portion of the Lebo Creek Drain were constructed and/or identified within the above-mentioned By-Laws. Therefore, those identified would be considered legal entities with respect to this Municipal Drain and may be eligible to have the costs for their replacement and/or improvements shared with the lands and roads within the drain watershed contributing their runoff into the drain, upstream of said structures. As it relates to the southern portion of the Lebo Creek Drain, some access bridges identified within the 1994 Report have been established as legal entities with respect to the Municipal Drain. However, as part of the conversion to a Municipal Drain, the majority of the existing structures were not incorporated as part

of the Lebo Creek Drain. Therefore, these structures are currently considered to be private structures within the Municipal Drain until such time that they are addressed through an Engineer's Report and endorsed through the auspicious of the Drainage Act.

IV. PRE-CONSULTATION AND DISCUSSIONS WITH ENVIRONMENTAL AGENCIES

The Canadian and Ontario governments have partnered to prepare the Lake Erie Action Plan to reduce Phosphorus and other nutrient loadings into Lake Erie. With the Lebo Creek discharging to the Hillman Marsh, an established ESA, the Municipality of Leamington recognized that the Lebo Creek is a contributor of nutrient loading to the receiving marsh and Lake Erie. In addition to the Municipality's Policy E09-Buffer Strips, enacted in 2003, the Municipality recognized that this would be an opportune time to potentially incorporate other green infrastructure and consider the incorporation of a wetland as part of these drainage improvements. As such, Leamington Staff had reached out to the Ministry of Natural Resources and Forestry (MNRF) and the Essex Region Conservation Authority (ERCA), as environmental stakeholders, for partnership opportunities to incorporate environmental features to reduce the impacts on the Lebo Creek and its receiving water bodies. Due to the sensitive nature of this project, it was communicated that the improvements to this drainage system will require additional care and consideration for the environmental components of the watershed. As such, it was established that it would be appropriate to consider this project a Watershed Rehabilitation. Watershed Rehabilitation is the planning, designing and implementation of watershed improvements in order to restore waterways and associated habitats, improve water quality, and increase local water supply.

On March 24, 2016, a pre-consultation meeting was held at the Municipality of Leamington Office to initiate dialogue on the potential environmental stakeholder participation in this project. From the outcome of this meeting, it was generally discussed that both ERCA and the MNRF would like to participate in providing green infrastructure within the Lebo Creek Drain watershed. They further advised that they would seek financial assistance for the implementation of these environmental features. All parties agreed that the Drainage Act would be the appropriate tool to facilitate, protect, and maintain these features in perpetuity.

V. PRELIMINARY EXAMINATION AND ON-SITE MEETING

After reviewing all of the drainage information provided by the Municipality of Leamington and the pre-consultation with the environmental agencies, we arranged for an On-Site Meeting to be scheduled for June 2, 2016. The following people were in attendance at this meeting:

Table 1 - On-Site Meeting Attendance

Name	Property
Isaac Enns	Landowner
Andrew Marchok	Landowner
Ernie Purr	Landowner
Tammy Wiper	Landowner
Allison Klassen	Landowner
Ken Dawson	Landowner
Ivan Jones	Landowner
Russell Jones	Landowner

Dale Grainger	Landowner
Mark Lehn	Landowner
Vivian Collard	Landowner
Brain Evans	Landowner
Julia Kos	Landowner
Kathy Malott	Landowner
George Stasko	Landowner
Ken Stasko	Landowner
Mark Staudt	Landowner
Frank Schmitt	Landowner
Walt Brown	Landowner
Peter Banman	Landowner
Don Pearce	Landowner
Ron & Elaine Koop	Landowners
Ray Chesterfield	Landowner
Rick Bilinski	Landowner
Jerry Driedger	Landowner
Brady Tiessen	Landowner
Dennis Driedger	Landowner
Ron Bartel	Landowner
Paul Tiessen	Landowner
Antonino Figliomeni	Landowner
Ella Friesen	Landowner
Paul Rauch	Landowner
James Hairsine	Landowner
Fred Ulch & Deb Larkin	Landowners
Ernie Taves	Landowner
Richard Baptista	Landowner
Andy Amaral	Landowner
Graham Gunningham	Landowner
Henry Guenther	Landowner
Greg Coulter (for June Coulter)	Landowner
William Getty	Landowner
Tom Keller	Landowner
Linda Omstead	Landowner
Roy Churchill	Landowner
Cornelius Peters	Landowner
Stephen Groves & Vicki McKay	Landowners
Lu-Ann Marentette	Leamington Drainage Superintendent
Tony Peralta, P.Eng.	N.J. Peralta Engineering Ltd.

The following information was discussed:

1. Upon introductions, it was generally discussed that the Municipality of Leamington has received numerous complaints regarding the overall functionality of the Lebo Creek Drain. Many of the complaints were primarily focused on the constant backwater and poor flow conveyance which has caused flooding conditions in various locations downstream of Mersea Road 7.

2. Through a PowerPoint presentation, Mr. Peralta explained the unique dynamics of the Lebo Creek Drain and reviewed the details with all those in attendance. Generally speaking, it was explained that the Lebo Creek Drain currently consists of portions that are classified as Municipal Drains and others that are considered Natural Watercourses.

3. Upon the Municipality's review of the issues brought forward by the various landowners, they found that there were various blockages within the wooded areas, caused by an abundance of dead fallen trees, general debris, and sedimentation. All of which resided within the Natural Watercourse sections of the Lebo Creek. As a Natural Watercourse, the Municipality, nor the Conservation Authority, have any right to enter lands having riparian rights to maintain the Natural Watercourse. Through various attempts to work with these riparian owners, the Municipality was unable to address these ongoing issues. As such, the Municipality felt that the most appropriate solution to these ongoing issues was to utilize the provisions of the Drainage Act to extend the Municipal Drain downstream to a sufficient outlet.

4. Mr. Peralta further explained that a Municipal Drain is a communally accepted and owned drainage infrastructure that has been created through the provisions of the Drainage Act of Ontario. This Act provides for a democratic procedure for the construction, improvement, and maintenance of the drainage works. A Municipal Drain is adopted, administered, and maintained through Municipal By-Law. Therefore, once adopted as a Municipal Drain, the By-Law provides the Municipality with the authority to enter private lands, as the caretaker of the communal infrastructure. The Municipality's role is to ensure the drain is kept up and maintained on the watershed's behalf.

5. Mr. Peralta further explained the purpose of the "On-Site Meeting". He explained that this meeting is a mandatory requirement of the Drainage Act and is intended to be the initial step in the process to provide a general introduction to the project and to help establish a general scope of work based on the submitted request and subsequent discussions of this meeting. Mr. Peralta provided the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) Factsheets and encouraged landowners to review these documents and provide their input.

6. Mr. Peralta elaborated on the engineering roles for this project. He explained that he was appointed by the Municipality of Leamington, through the provisions of the Drainage Act, to prepare an Engineer's Report for the necessary improvements to the Lebo Creek Drain to address the current deficiencies within the drainage system.

7. In order to gain a better understanding of the current issues within the drain, a drone video and photos were shared with those in attendance. This information was provided to demonstrate the condition of the drainage system at various locations.

8. Mr. Peralta shared the general history of the Municipal Drain portion of the Lebo Creek and explained that the existing drain still maintains the natural characteristics of the Natural Watercourse.

9. Mr. Peralta advised that any improvements proposed through this project are intended to maintain the natural conveyance of runoff and to limit the amount of disturbance through the naturalized channel and wooded areas. To ensure the proper conveyance of runoff, a defined channel alignment will be established for the removal of all blockages and to establish a program for maintenance works through established access routes and working corridors.

10. Mr. Peralta advised that this project is under the jurisdiction of the Department of Fisheries and Oceans (DFO), the Essex Region Conservation Authority (ERCA), and the Ministry of Natural Resources and Forestry (MNRF). The landowners were informed that the Lebo Creek Drain is connected to an environmentally sensitive area. Therefore, in addition to the regulatory requirements necessary for this project, it would be imperative to work closely with environmental government agencies to consider the implementation of environmental features, such as buffer strips, wetlands, etc. At a minimum, buffer strips shall be incorporated as part of this project as directed through the Municipality of Leamington's buffer strip policy for improvements to Municipal Drains. The landowners were advised that pre-consultation has already been initiated with environmental stakeholders such as the ERCA and the MNRF.

11. Mr. Peralta further explained that through the provisions of the Drainage Act, landowners who contribute to and/or benefit from the drainage works are assessed their fair share of the project costs. Based on the likely scope of work intended for the Lebo Creek Drain, assessments may be levied to all affected owners based on the added benefits to the overall system and the contribution of runoff from each property. Allowances are allocated to landowners to accommodate for the lands required to establish access, maintenance corridors, and damages inflicted on the affected lands as part of the overall works. The landowners were advised that, at this early stage of the project, the scope, analysis, and design have yet to be considered. Therefore, the details and potential costs associated with the project have yet to be established.

12. Mr. Peralta explained the overall drainage report, future maintenance, and potential appeal processes, together with reviewing grant eligibility with the landowners.

13. Mr. Peralta opened up discussions with the landowners and requested that they provide their comments and concerns regarding the Lebo Creek Drain, as it relates to this overall project. He further explained that the information shared at this meeting will help establish the overall scope and direction of this project.

14. The majority of the dialogue revolved around the concern with the general improvements to the Lebo Creek Drain. Some landowners advised that they preferred to maintain the natural features that the Lebo Creek Drain currently provides and requested minimal to no disturbance. Furthermore, some landowners had concerns that the improvements were intended to increase the channel's carrying capacity, which in turn, would create flooding effects at the downstream portion of the drain. Many of the farmers requested the need to maintain flow within the drain to relieve flooding and maintain the agricultural production of the lands. Mr. Peralta reiterated that based on the early stages of this project, the overall intent is to convert the existing portions of the Natural Watercourse to a Municipal Drain for current and future maintenance. In turn, the improvements are intended to alleviate flooding and provide a sufficient outlet for the existing flow characteristics within the drain while creating the least amount of disturbance possible. As a result, the construction works are intended to clear out the debris within the existing channel alignment and remove the associated sedimentation caused by the accumulation of fallen trees and debris, with no intention of creating a new fully excavated channel or enhancing the drain's natural flow capacity.

To summarize the dialogue of the On-Site Meeting, a small group of landowners were opposed to any proposed improvements and felt they would not provide any benefit to the overall system. However, there were a considerable amount of landowners who were in support of the initiative and looked forward to receiving the benefits of such improvements.

At the conclusion of the discussions, we advised that we would remain in close consultation with the environmental stakeholders, together with landowners that would be directly affected by the proposed drainage improvements, towards the preparation of our Engineer's Report, to review the details of the proposed works.

On this note, the On-Site Meeting had concluded.

VI. INITIAL SCOPE OF WORK, INVESTIGATIONS AND FIELD SURVEY

Based on the information gathered at the On-Site Meeting and through consultation with the Drainage Superintendent, Ms. Lu-Ann Marentette, it was determined that the north portion of the Lebo Creek Drain was more recently cleaned and maintained from its top-end at Highway No. 77 (at approximately Station 0+000.0), downstream to the intersection of Mersea Road 7 and Mersea Road 12 (at approximate Station 4+030.1). With this portion of the Lebo Creek Drain improved through various Engineer's Reports over the years, the Municipality has sufficient information within these By-Laws to conduct future maintenance works through this section of the Municipal Drain. Based on this information, we generally established that the initial scope of work for this project shall focus specifically on the necessary review and analysis to establish a sufficient outlet for the portion of the Lebo Creek Drain located downstream of Mersea Road 7. With the Municipality's initiative to incorporate green infrastructure as part of the overall improvements, the Municipality of Leamington confirmed that they wish to proceed with incorporating buffer strips along the entire length of the drain as part of this project and per the requirements of their Policy E09-Buffer Strips. They also recognized that there are numerous access bridges located along the entire length of the open drain. However, there were no mechanisms established within the governing drainage By-Laws to address the future maintenance of these access structures. As such, Ms. Marentette had instructed our office to include provisions within this Report to address the future maintenance of all access structures within the Lebo Creek Drain and allocate cost-sharing measures (if necessary). In addition to buffer strips and further to the dialogue with the environmental stakeholders, these works shall also include investigations into incorporating wetlands within the watershed.

With the understanding of the general scope of work for this project, we arranged for our Survey Crew to attend the site to perform a topographic survey, including taking all necessary levels and details of the Lebo Creek. Our detailed survey commenced at Mersea Road 7, just east of Mersea Road 12, and extended downstream to Fox Run Road. These detailed investigations were conducted to verify the existing drain parameters throughout the project site and to analyze and achieve a sufficient outlet for the Municipal Drain. Benchmarks were established from previous work carried out on the drain, including a geodetic reference, and were utilized in establishing relative site Benchmarks at each road crossing along its reach. We also took numerous cross-sections of the Lebo Creek throughout the surveyed length, as necessary, for us to complete our review, analysis, and design.

To establish the watershed area, we investigated and reviewed all of the past Engineer's Reports on the Lebo Creek Drain. We also carried out cross-checks of the watershed limits utilizing the most recent reports of the numerous drains in the vicinity of the Lebo Creek Drain. In addition, we utilized current LiDAR information to cross-check the watershed limits at various locations throughout the watershed. All of the above investigations not only provided us with the correct watershed area but also provided us with accurate information to assist us with the preparation of our Construction Schedule of Assessment and Future Maintenance Schedules of Assessment for this project.

VII. REGULATORY REQUIREMENTS THROUGH ENVIRONMENTAL AGENCIES

As a regulatory requirement, through the provisions of the Drainage Act, applicable Federal and Provincial legislation and policy must be considered when completing drainage works.

The Drainage Act specifically identifies the rights of the Conservation Authority, through the Conservation Authorities Act, for all Municipal Drains within their jurisdiction. Upon receiving the request for improvements to the Lebo Creek Drain, and prior to our appointment to this project, the Municipality of Leamington had submitted a notice to the Essex Region Conservation Authority (ERCA) as required through Section 78(2) of the Drainage Act, for their comments and concerns related to the requested works.

On April 13, 2016, prior to the scheduled On-Site Meeting, we received the initial comments from the ERCA. The ERCA had confirmed that the Lebo Creek Drain is located within the limit of regulation through Section 28 of the Conservation Authorities Act and is subject to the necessary permitting for the proposed works. These comments identified that the ERCA will require that a Biological Assessment be conducted by a qualified biologist to identify and ensure that the proposed works will not impact the significant natural heritage features within the project area.

In addition to the comments provided by the ERCA, it would be prudent to reach out to the DFO and MNRF, to obtain comments and approvals from the governing agencies as part of our regulatory obligations through provisions of the Drainage Act.

At the onset of this project, the Endangered Species Act, 2007, was administered through the MNRF. At that time, we had engaged in the initial consultation with MNRF Staff. Initial comments were provided in an email dated July 18, 2016. The comments generally identified recommendations to ensure the protection of species and/or their habitat. These comments further recommended that a Biological Assessment be conducted by a qualified Biologist.

The Department of Fisheries and Oceans Canada (DFO) currently regulates the Fisheries Act, 1985. The Fisheries Act requires that fish and fish habitats are protected during all stages of a construction project. At the onset of the project, we performed a project-based self-assessment of the proposed scope of work. According to the guidelines and requirements established by the DFO and as listed on their website, this project will require the submission of a "Request for Review" application to the DFO, to ensure that the works proposed under this project will not cause serious harm to fish and their habitat. A "Request for Review" application was submitted on June 8, 2016, for this project and DFO's initial comments were provided on July 8, 2016.

Due to the ecological sensitivities of this watercourse, it was established that a Biological Consultant shall be retained to evaluate and review ecological concerns within the project site. The Consultant shall conduct a Biological Assessment, to satisfy the requirements of each environmental agency, and provide an appropriate mitigation plan to address any affected endangered species. A Request For Proposal (RFP) was initiated to retain a Biological Consultant. Through this process, LGL Limited was awarded this project to address all issues and/or concerns related to the Endangered Species Act, Conservation Authorities Act and Fisheries Act.

VIII. ENVIRONMENTAL STAKEHOLDER MEETING

Upon retaining LGL Limited, a Biological Scoping Meeting was conducted on February 13, 2017, with the ERCA, DFO, MNRF, LGL Limited, the Municipality of Leamington, and N.J. Peralta Engineering Ltd. This meeting was intended to introduce LGL Limited to the project and to collectively provide a general review of the details identified within the regulatory agency's initial comments. Generally speaking, the requested Biological Assessment shall provide an inventory of natural features, including any affected species (and their habitat) to help define the key points of interest within the Lebo Creek project site. This meeting confirmed that no works shall be conducted south of Deer Run Road as this area is currently part of the Environmentally Sensitive Area of the Hillman Marsh. We further established that the newly proposed working corridors will need to be reviewed for endangered tree species (such as butternut trees), where these working corridors will need to be flexible in order to minimize damage to these species and the general nature of the wooded areas. Other discussions ensued regarding potential funding opportunities from environmental agencies to offset costs for wetland features.

Various meetings and walkthroughs were conducted over the course of this project with LGL Limited, ERCA, and the Municipality towards addressing ecological concerns and obtaining the necessary approvals. We also conducted meetings and walkthroughs with Ducks Unlimited and Nature Conservancy Canada toward potential partnerships.

IX. CONSIDERATION OF CONSTRUCTING A WETLAND

Through our various correspondence and meeting with the environmental stakeholders, we evaluated the overall watershed to determine appropriate locations along the watercourse that would be ideal for the creation of a wetland within the Lebo Creek Drain. Various sites were considered based on their location relative to the reach of the drain, the proximity of the property relative to the watercourse, the ease of access, and the associated costs to create a wetland on the specific site. The selection of the wetland site would also be subject to the amount of outside funding available from environmental stakeholders. Through this evaluation, we narrowed the scope to three (3) potential wetland sites:

1. 700-01960- Parcel 231]: This site is designated as an agricultural property located alongside Mersea Road 7 and within the Municipal Drain section of the Lebo Creek Drain, located immediately upstream of the Natural Watercourse section. This site is located approximately 5.0 kilometres from the top end of the Lebo Creek Drain.

2. 670-00600/[Parcel 175]: This site is designated as an agricultural property located between Mersea Road 5 and Mersea Road 6 and is within the Natural Watercourse section of the Lebo Creek. This site is located approximately 7.8 kilometres from the top end of the Lebo Creek Drain.

3. 700-00901/[Parcel 120]: This site is designated as agricultural property, having portions with existing wooded areas along the course of the drain. The property is located in the middle of Lot 20, North Talbot Road Concession and is within the Natural Watercourse section of the Lebo Creek. This site is located approximately 9.0 kilometres from the top end of the Lebo Creek Drain.

Concept designs were prepared for each of the project sites and a meeting was held with representatives of all three properties on April 2, 2019, to discuss and review their potential participation in this project. Others in attendance included Staff of the Municipality of Leamington, ERCA, and N.J. Peralta Engineering Ltd. These landowners were advised of the ecological benefits of incorporating green infrastructure within their property. We further discussed the potential for environmental partners and funding for these works. This meeting included discussions regarding specific details on ideal features on each property, together with general discussions regarding allowances and compensation for the land required to incorporate these features. Based on these discussions, all three (3) landowners expressed their willingness to have their properties enhanced with green infrastructure. Upon the conclusion of this meeting, it was discussed that we would further investigate potential funding opportunities. If their site is chosen for this project, additional details will be provided to each affected property, before proceeding.

X. HYDRAULIC ANALYSIS AND DESIGN REQUIREMENTS

Based on the requirements outlined by the ERCA's initial comments, the proposed works should not aggravate or increase flood levels. Furthermore, they requested that the proposed work shall not decrease the floodplain storage area associated with this waterway. Based on this request, we conducted a hydraulic analysis to evaluate the flows and water levels within the existing drainage system relative to the minor and major storm events. This evaluation was conducted in concert with the proposed design details to ensure that the proposed works within the drain will not create any negative impacts on the system. Further to the hydraulic evaluation conducted as part of this project, our office (in collaboration with Landmark Engineers) was also retained by the Municipality of Leamington to conduct a Lebo Creek Master Drainage Study that focussed primarily on the effects of the greenhouse developments located within the watershed, while providing a holistic stormwater management approach for future developments. The evaluation and analysis conducted for this project were cross-checked and verified with the flow analysis completed as part of the Master Drainage Study.

"A Guide for Engineers Working Under the Drainage Act in Ontario" - OMAFRA Publication 852 (2018), is the current reference documentation used by Engineer's carrying out work on Municipal Drains through provisions of the Drainage Act. Based on this document, the 2-year return period storm design (50% chance of occurring each year) is the recommended design standard applied to Municipal Drains within rural Ontario specific to open drain channels and low-hazard agricultural access crossings. The exception is for residential, industrial, and commercial properties where flooding could create significant damage to the surrounding properties. Therefore, a higher 5-year (20% chance of occurring each year) to 10-year

(20% chance of occurring each year) return period storm design could be utilized. Considering the lands adjacent to Lebo Creek Drain are predominately rural land-use, a minimum two (2) year return period storm design was utilized for the evaluation of the open drain.

Residential, major agricultural culverts, or bridge structures within a Municipal Drain require a 5-year to 10-year return period (20% to 10% chance of occurring each year, respectively) is the recommended design criteria. Considering most of the agricultural crossings are of low-hazard variety, a 5-year return period was utilized in the analysis of the residential and agricultural crossings. For culverts in Municipal Drains crossing Municipal Roads, a 10-year return period (10% chance of occurring each year) storm is the recommended design criteria. For culverts crossing County Roads, a 25-year return period (4% chance of occurring each year) storm is the recommended design criteria. For culverts crossing the Ministry of Transportation's (MTO) rural arterial roads, a minimum of a 50-year return period (2% chance of occurring each year) storm is the recommended design criteria.

XI. FINDINGS AND RECOMMENDATIONS

Based on the topographic survey, detailed investigations, discussions and reviews with affected landowners, Municipal Staff, and environmental agencies, together with information derived from the On-Site Meeting and other directions issued for this project, we have established the general requirements to adequately address the necessary improvements to the Lebo Creek Drain. Our findings and recommendations are outlined in the following paragraphs.

ERCA, DFO and MNRF/MECP Considerations

As part of the Biological Evaluation for this project, LGL Limited has been retained to conduct a Biological Assessment to identify the natural heritage features (aquatic and terrestrial) along the course of the drainage works. This evaluation was conducted to satisfy the requirements of the Conservation Act through the Essex Region Conservation Authority (ERCA), the Fisheries Act through the Department of Fisheries and Oceans (DFO), and the Endangered Species Act through the Ministry of the Environment, Conservation and Parks (MECP), formally the Ministry of Natural Resources and Forestry (MNRF). Through project meetings and correspondence with all affected environmental stakeholders, an Environmental Constraints Analysis Report was prepared by LGL Limited outlining the natural heritage features found along the open channel of the Lebo Creek. This analysis further identified the constraints that these features pose to access routes and working corridors while providing recommendations for avoidance and/or mitigation. Based on the findings of the Environmental Constraints Analysis, a Mitigation Plan was prepared to provide detailed information for the Species At Risk confirmed and/or potentially present within the project area and to satisfy the requirements of the Endangered Species Act. The Mitigation Plan provides general details on an overall approach, timing windows, screening, and inspection requirements during construction. The following are the general recommendations outlined within the Mitigation Plans:

1. Construction Timing – Construction should be avoided during the sensitive periods of April 1 to May 31 and September 15 to October 15 of any given year. It is recommended that the works be conducted through the winter months when the ground is frozen to create minimal impacts.

2. Screening – Field screening of the construction area or vehicle access routes prior to any ground clearing or vegetation removal by a qualified Biologist.

3. Monitoring – Monitoring of the site during periods of construction by a qualified Inspector/Biologist.

These documents were prepared in compliance with the Endangered Species Act and the Fisheries Act, with general approval from the governing agencies. Copies of both documents are included in **Appendix "A"**.

During the course of our investigations, this drainage project was discussed and reviewed in detail with Cynthia Casagrande, Ashley Gyori and James Bryant, P.Eng., of the ERCA, to address the regulatory requirements, concerns, and comments related to this Municipal Drain. The Lebo Creek Drain is located within the regulated area and is under the jurisdiction of the ERCA. Therefore, an ERCA Permit is required for the improvements to the Lebo Creek Drain. Further to the above, the ERCA provided us with their comments and concerns through email correspondence. A copy of the ERCA response is included in **Appendix "A"**.

Lebo Creek Drain Open Drain General Improvements

From our investigations, examinations, calculations, discussions, and determinations with the affected parties, the following findings were noted and recommendations regarding the general improvements required to the Lebo Creek Drain are provided as follows:

1) Conversion to Municipal Drain - Through our review and investigations, we have found that the overall Lebo Creek currently consists of portions which are designated as Municipal Drains and others as Natural Watercourses. Currently, the Municipal Drain portions of the Lebo Creek are governed through Municipal By-Law are as such:

   a. Northern Portion - Located along Mersea Road 7 and extends from its top-end at Highway No. 77 at Station 0+000.0 downstream to Station 5+071.5, located along Mersea Road 7, east of Mersea Road 12.

   b. Southern Portion - Located between the former Chesapeake & Ohio Railway, at Station 9+842.9, downstream just short of the confluence of the Piggot Creek (north of Deer Run Road), at Station 12+460.6.

   We have found that portions of the Natural Watercourse between the north and south portions of the Municipal Drain are congested with a considerable amount of sedimentation, overgrown vegetation, fallen dead wood, and general debris, creating blockages in various locations along the course of the channel. As such, this reach can no longer properly afford drainage to the lands and roads that it intends to serve. Although the portion of the Natural Watercourse located downstream of the confluence of Pigott Creek currently shows no significant accumulation of sediment, the Municipality currently has no means to perform maintenance through this Natural Watercourse portion which makes it susceptible to future sedimentation and blockages.

Therefore, in addition to the reach between the Municipal Drain portions, it would prove beneficial to the overall watershed to convert this downstream portion of the Lebo Creek into a Municipal Drain to a sufficient outlet to the Hillman Marsh ESA for better access and care for future maintenance works.

Through the authority of Section 78(1.1)(5) of the Drainage Act (major improvement), an existing Municipal Drain can be extended to an outlet deemed sufficient for the drainage system. To ensure proper and safe drainage for the lands within the watershed and to ensure the maintainability of the channelized portion of the drain, it is recommended that the Municipal Drain portion of the Lebo Creek be extended to the south limit of Deer Road Road, as a sufficient outlet for the drainage system. Based on the above, we recommend that the entire reach of the Lebo Creek from Station 0+000.0 to 13+212.1 be hereinafter known as the "Lebo Creek Drain".

2) Convert Portion of John Leslie Drain to Lebo Creek Drain – Through an Engineer's Report for the John Leslie Drain prepared by G. Rood, P.Eng. and dated January 12, 2016 (By-Law No. 17-16), the John Leslie Drain was extended and/or assumed into the Natural Watercourse of the Lebo Creek with a new access bridge (**Bridge 21**) installed within this section of watercourse. In order to maintain conveyance and continuity within the Lebo Creek Drain, we recommend that this portion of the drain, between Station 6+769.0 to Station 6+861.6, be abandoned as the John Leslie Drain pursuant to Section 19 of the "Drainage Act, RSO 1990, Chapter D.17, as amended in 2021", and the said portion of open drain, together with **Bridge 21**, shall now form part of the Lebo Creek Drain.

3) Conservation Considerations - Due to the sensitive nature of the watercourse and the wooded areas associated with this project, we carefully considered the intent of the proposed improvements and minimize negative impacts on the upstream and downstream lands within the watercourse. As such these improvements shall consider the following:

a. It is recommended the works be conducted through the winter months when the ground is frozen to create minimal impacts.

b. Emphasizing natural stream recovery and promoting natural flow attenuation rather than an artificial drainage channel design.

c. Carrying out drain rehabilitation to a more natural state (where practical).

d. The removal of sediment from the wooded areas utilizing dump trucks was considered as part of this project. However, in addition to the significant cost associated with trucking, we found that this process would introduce adverse impacts and disruption to the fragile native floodplain soils, creating compaction/rutting, destabilization of the soils, and further compounding the effects of sedimentation within the floodplain area. Introducing large dump trucks to these wooded areas would also require additional space to work and traverse, resulting in more clear-cutting of the wooded area that would create significant disruption while having a negative impact on the native species and wildlife within the drainage system.

e. The impacts of keeping the sedimentation removal within the wooded/floodplain areas were also considered as part of the project. These effects were inputted into the hydraulic analysis of the Lebo Creek Drain and it was found that the additional sediment removed from the drain will produce no negative impacts on the floodplain of the Lebo Creek Drain drainage system, relative to storage and conveyance. As such, excavated sediment removed from the wooded areas shall remain on-site and randomly placed in piles located a minimum of 6.0 metres from the top of the drain bank and along the extreme limits of the working corridor, spaced out through the higher lands (where possible) to avoid the disruption of the natural flow conveyance through the floodplain.

f. Selective tree removal shall be conducted through densely wooded areas rather than clear-cutting. This will maintain healthy, productive forests for present and future use.

g. All fallen dead wood shall be removed from along the drain banks and within the stream bed. Hand removal of dead wood, overhanging limbs, and selective cutting of the brush and trees through the wooded areas.

h. All trees and dead wood shall be cut into logs and remain on-site for use by the adjacent property owners and/or used for naturalized features within the drain.

4) Dead Wood Removal and Brushing - Through various portions of the watercourse, the open channel is congested with brush and trees, not only along the side slopes of the drain but also within the bottom of the channel as outlined in **Figure 3**. Furthermore, within the various woodlots and wooded areas, several fallen dead trees and debris have accumulated in the channel creating numerous blockages that are adversely affecting the performance of the drain as outlined in **Figure 4**. The combination of the trees grown within the channel and the accumulation of deadwood has created blockages through these portions of the drain. In certain areas, the extent of the blockages has been extreme to the point where the watercourse in these areas can no longer drain the lands that it was intended to serve unless these obstructions/trees are completely cut or removed, as outlined in **Figure 5**. Therefore, it is recommended that all dead wood be removed from the working corridors of the wooded areas along the Lebo Creek Drain. As a result, selective tree removal and brushing are required to maneuver through these wooded areas. In areas outside of the wooded areas where sediment removal is required to maintain the drain conveyance, light brushing of the existing drain will be performed as part of the overall drainage improvements. It is further recommended that all dead wood be removed by hand utilizing light service vehicles, ATVs, and chainsaws. All dead wood and trees shall remain on-site, cut into logs having a maximum length of 2.0 metres and place a minimum of 6.0 metres from the top of the drain bank.

Figure 3 - Tree Growth within the Drain Channel

Figure 4 - Accumulation of Dead Wood and Debris within the Channel

Figure 5 - Blockage Created by Built-Up Dead Wood and Debris

Figure 6 - Example of Hand Removal of Dead Wood and Trees

5) Light Sedimentation Removal - Throughout the studied length of the drain, it was found that the watercourse had intermittent locations where light to mild sediment had accumulated and inadvertently restricted the natural flow of runoff through the drainage system. The area of light to mild sediment accumulation occurs from approximately Station 4+736.9 downstream of Mersea Road 7 and continues downstream to the Mersea Road 6 crossing at Station 6+898.6. Therefore, we recommend that this portion of the drain be cleaned and improved of all sedimentation to the grades and elevations established within the accompanying drawings.

6) Heavy Sedimentation Removal - From Mersea Road 6, at Station 6+910.7, downstream to a point upstream of County Road 34, at approximately Station 9+632.0, it was found that significant sedimentation has accumulated and impeded the natural flow of runoff through the drainage system creating flows to backup within the system. This portion of the drainage system spans through areas of thickly wooded areas and the sediment buildup is especially considerable and at times fairly consistent through this section of the drain. Therefore, we recommend that this portion of the drain be cleaned and improved of all sedimentation to the grades and elevations established within the accompanying drawings.

Figure 7 - Example of Drain Sediment Removal

7) General Erosion Protection – At specific locations along the reach of the Lebo Creek Drain we have identified key locations where extensive bank erosion has occurred. These areas tend to be located in areas where the drain banks are susceptible to downcutting caused by instabilities within the channel, lack of vegetation and/or variability in soils. Therefore, we recommend that 300mm thick quarried limestone erosion protection be installed on non-woven filter cloth at specific locations to address existing drain bank failures and to help reduce future issues with erosion and sediment build-up along the Lebo Creek Drain. More specifically, general erosion protection shall be installed at the following locations, or as otherwise established by the Drainage Superintendent and/or Consulting Engineer during construction:

a. Station 6+765.5 to Station 6+893.6 – Restore the drain bank to a 1.5 horizontal to 1.0 vertical side slope and install approximately 107.1 metres of quarried limestone erosion protection on the south bank of the Lebo Creek Drain to address the significant bank erosion at the John Leslie Drain outlet that extends along Mersea Road 6. This erosion protection installation shall be tied into the existing erosion protection at Bridge 21 and the proposed erosion protection proposed at the north end of the Mersea Road 6 road crossing.

b. Station 6+893.6 to Station 6+898.6 - Install approximately 5.0 metres of quarried limestone erosion protection on both sides of the Lebo Creek Drain to protect the drain banks at the north end of the Mersea Road 6 road crossing culvert.

c. Station 6+910.7 to Station 6+925.7 - Restore the drain bank to a 1.5 horizontal to 1.0 vertical side slope and install approximately 15.0 metres of quarried limestone erosion protection on the east side of the Lebo Creek Drain to protect the drain bank at the south end of the Mersea Road 6 road crossing culvert.

d. Station 7+110.0 to Station 7+115.0 – Restore the drain bank to a 1.5 horizontal to 1.0 vertical side slope and install approximately 5.0 metres of quarried limestone erosion protection centred along an existing pond outlet pipe within the lands currently owned by A. Driedger Farms Inc. (670-00600)/[Parcel 175].

e. Station 7+867.8 to Station 7+875.8 - Install approximately 8.0 metres of quarried limestone erosion protection on both sides of the Lebo Creek Drain to protect the various tile outlet pipes and drain banks at the north end of the Mersea Road 5 road crossing culvert.

f. Station 11+510.2 to Station 11+540.2 - Restore the drain bank to a 1.5 horizontal to 1.0 vertical side slope and install approximately 30.0 metres of quarried limestone erosion protection on the west side of the Lebo Creek Drain to protect the drain bank at the west end of the Mersea Road 19 road crossing culvert.

Figure 8 - Example of Drain Bank Restoration and Erosion Protection

8) Surface Inlet Repairs - At specific locations along the reach of the Lebo Creek Drain we have identified key locations where extensive surface inlets have created considerable erosion along the drain bank of the Lebo Creek Drain. In order to address and control the erosion, it is recommended that rock chute inlet erosion protection be installed at these locations along the drain as part of this report. More specifically, surface inlet repairs shall be installed at the following locations, or as otherwise established by the Drainage Superintendent and/or Consulting Engineer during construction:

a. Station 8+615.0 – Restore the drain bank to a 1.5 horizontal to 1.0 vertical side slope and install a quarried limestone rock chute inlet erosion protection on the east bank of the Lebo Creek Drain, within the lands currently owned by June & Greg Coulter (620-00901)/[Parcel 120].

b. Station 8+687.0 – Restore the drain bank to a 1.5 horizontal to 1.0 vertical side slope and install a quarried limestone rock chute inlet erosion protection on the east bank of the Lebo Creek Drain, within the lands currently owned by June & Greg Coulter (620-00901)/[Parcel 120].

c. Station 8+827.0 – Restore the drain bank to a 1.5 horizontal to 1.0 vertical side slope and install a quarried limestone rock chute inlet erosion protection on the east bank of the Lebo Creek Drain, within the lands currently owned by June & Greg Coulter (620-00901)/[Parcel 120].

9) Erosion Mitigation Measures – At specified locations within the channel of the open drain, we have found areas where excessive erosion has occurred, causing pockets of accumulated sedimentation. In order to address and mitigate the long-term channel erosion within the centre of the channel, it is recommended that vanes (single and cross) be installed at various locations throughout the drain as part of this report. In addition to erosion protection, these features also provide a means of flow attenuation to reduce impacts to downstream lands. Typically, these structures are installed with large rocks. However, with the selective tree removal intended to form part of the brushing process, we recommend that these structures be installed utilizing timber removed from the wooded areas within the project site.

Single Vanes: Single vanes are linear structures that extend out from the drain bank into the channel in an upstream direction. They are placed at bends in the drain and along the drain bank where erosion is occurring along the toe of the slope. The purpose of a single vane is to reduce erosion along the drain bank by redirecting the flow toward the center of the channel. An example of a single timber vane is illustrated in **Figure 9** below. We recommend single vanes be installed at the following locations:

a. Between Station 7+580.0 and Station 7+680.0 – Install a total of five (5) Single Rock Vanes along the north/east bank of the Lebo Creek Drain spaced approximately 20.0 metres apart along the bend.

b. Between Station 11+065.0 and Station 11+110.0 – Install a total of three (3) Single Rock Vanes along the north/east bank of the Lebo Creek Drain spaced approximately 15.0 metres apart along the bend.

c. Between Station 11+255.0 and Station 11+285.0 – Install a total of three (3) Single Rock Vanes along the north/east bank of the Lebo Creek Drain spaced approximately 10.0 metres apart along the bend.

Cross Vanes: Cross vanes are structures that span the width of the open channel providing grade control, dissipating energy, deflecting flow to the center of the channel, and creating pools for fish habitat. These structures stabilize the channel by reducing velocities and erosion. An example of a cross timber vane is illustrated in **Figure 10** below. We recommend cross vanes be installed at the following locations:

a. Station 6+720.0 – Upstream of the John Leslie Drain Outlet

b. Station 10+220.0 – Upstream of the County Road 34 Crossing

c. Station 11+490.0 – Upstream of the Mersea Road 19 Crossing

d. Station 13+180.0 – Upstream of the Mersea Road 19 Crossing

Further to the locations identified above, erosion mitigation measures may be installed at locations otherwise established by the Drainage Superintendent and/or Consulting Engineer during construction.

Figure 9 - Example of a Single Timber Vane

Figure 10 - Example of Timber Cross Vanes

10) Access Routes and Working Corridors - As part of the conversion from a Natural Watercourse to a Municipal Drain, we recommend that new working corridors (or drainage easements) be established herein for access and maintenance of the new Municipal Drain portions. Specific access routes have further been established to minimize construction disruption throughout the length of the Lebo Creek Drain. All working corridors shall be a free unencumbered and uninterrupted easement in perpetuity on, in, over, under, across, alongside and through the lands described herein, for the purpose of installing, maintaining, replacing, altering, cleaning, repairing, providing and operating the drainage system. We further recommend that this area shall remain free and clear of any new buildings, structures, fences, concrete or asphalt paving, or other structures or obstructions of any kind. In the event any such item is placed on any of the lands referred to herein, the Owner or Owners of the said lands at the time shall be liable for the cost incurred by the transferee, its servants, agents and assigns, in the removal of such items. The access routes and working corridors have been established in conjunction with the "Environmental Constraints Analysis" and the "Mitigation Measures" prepared for this project and have been summarized in the specifications and further illustrated within **Appendix "B"**.

Generally speaking, we have determined that a sufficient working corridor required to perform the necessary improvements through agricultural and residential properties would encompass a minimum width of 9.0 metres from the existing top of the bank located on (1) one side of the open channel. When working through densely wooded areas along the course of the drain, methods to reduce the clear-cutting are important when establishing working corridors for the removal of sediment and obstructions along the course of the drain. As a result, we recommend the following practice through these sensitive woodlot areas:

(1) A primary maintenance corridor shall be permitted on one (1) side of the open channel that will have a 12.0m width from the existing top of the bank to allow for a meandering pathway while conducting selective removal and cutting of trees and brush.

(2) A secondary maintenance corridor shall be established on the opposite side of the open channel intended only for the initial improvements as defined under this project. The secondary maintenance corridor shall have a 6.0m width from the existing top of the bank for access only with small equipment and utility vehicles to help facilitate the hand removal of dead wood and small tree removal. Following the initial improvements, it is anticipated that the primary working corridor shall be sufficient for future maintenance works within these woodlots.

11) Buffer Strips - In accordance with the Municipality of Leamington Policy E09, we recommend the installation of a 3.00-metre wide grass buffer along both sides (where applicable) of all agricultural lands abutting the entire length of the Lebo Creek Drain. Generally speaking, grassed buffer strips shall only be installed on agricultural lands that currently do not have a grassed/brush buffer. All areas designated for grassed buffer strips shall be removed from agricultural production and remain as part of the drainage system as buffer strips, in perpetuity. Those agricultural lands where natural buffers already exist adjacent to agricultural productive lands shall still be compensated for the necessary lands taken out of production. An example of grassed buffer strips has been illustrated in **Figure 11** below**.** Locations and details of these buffer strips are identified within the construction items and further illustrated in **Appendix "C".**

Figure 11 - Example of Grassed Buffer Strips

Lebo Creek Drain Bridge and Road Crossing Improvements

Municipal Drains provide a means to convey storm runoff from the watershed and may traverse along roadways or through private lands. Drain crossings provide access across the open channel (whether it is providing ingress and egress from a roadway or simply gaining access from one side of a property to another) and are important drainage infrastructure for all public roads and private landowners to gain access to their lands. The size of the crossing is typically dictated by the amount of runoff contributing to the drainage system at a specific location within the watershed. Section 17 and 18 of the Drainage Act

provides a mechanism within the Drainage Act to allow for the construction, improvement and/or reconstruction of drain crossings that form a legal entity with respect to the Municipal Drain. As part of the overall scope of this project, we also investigated all of the access bridges and road crossings along the full length of the Lebo Creek Drain. We find that the majority of the structures within the existing Municipal Drain portion of the Lebo Creek Drain were identified within the various Engineer's Reports previously mentioned. However, in order to establish a basis for the replacement or improvement of these structures, we reviewed and analyzed each structure based on the following criteria:

1. The vintage of each structure.
2. The condition of the existing culvert and headwalls.
3. The culvert size and/or capacity requirements.
4. The invert elevations of the culvert pipe relative to the design grade (where applicable).

Furthermore, we found that there are several access bridges and road crossing culverts located within the Natural Watercourse sections of the Lebo Creek Drain. These structures have also been identified and reviewed as part of this project. From our survey, investigations, and the criteria mentioned above, we find and recommend the following:

Bridge 1 - Ministry of Transportation for Highway No. 77

The existing road crossing extending from Station 0+005.2 to Station 0+022.8, serves as access across Highway No. 77, between Lot 6 and Lot 7, Concession 6, was most recently identified within the July 9, 2008, Engineer's Report prepared by G. Rood, P.Eng., and further identified within the 1960 Engineer's Report. Therefore, this structure is considered a legal entity with respect to the Lebo Creek Drain. The culvert consists of 17.6 metres of 3.10m Span x 1.50m Rise concrete box culvert with reinforced concrete headwalls. It shall be noted that the typical design criteria for Municipal Drain crossing rural arterial roads, such as Highway No. 77, is sized to a minimum 1:50-year peak storm event. We find the existing access structure to be adequately sized for the 1:50-year peak storm event and in good physical condition with years of serviceable life remaining. Based on our evaluation, we recommend that no improvements are required to this structure as part of this report, at this time. As part of this report, cost-sharing provisions have been made to address future maintenance and/or replacement of this structure (if applicable). This structure has further been labelled herein as **Bridge 1.**

Bridge 2 - Trison Farms Inc. (710-03900)/[Parcel 307]

The existing access bridge extends from Station 0+374.4 to Station 0+386.4, serving as the primary access to the agricultural lands of Trison Farms Inc. (710-03900)/[Parcel 307], within Lot 7, Concession 6, was installed as part of the July 9, 2008, Engineer's Report prepared by G. Rood, P.Eng. Therefore, this structure is considered a legal entity with respect to the Lebo Creek Drain. The existing culvert consists of 12.00 metres of a 2230mm Span by 1700mm Rise corrugated steel pipe arch with concrete-filled jute bag headwalls, which provides approximately 10.20 metres (33.46 ft.) of travelled top width. We find the existing access structure to be adequately sized with respect to the minimum 1:5-year peak storm event and in good physical condition with years of serviceable life remaining. Based on our evaluation, we recommend that no improvements are required to this structure as part of this report. As part of this report, cost-sharing provisions have been made to address future maintenance and/or replacement of this structure (if applicable). This structure has further been labelled herein as **Bridge 2**.

Bridge 3 - Neal & Shirley Lehn (710-04105)/[Parcel 308]

The existing access bridge extending from Station 0+740.3 to Station 0+748.3, serves as the primary access to the agricultural lands of Neal & Shirley Lehn (710-04105)/[Parcel 308], within Lot 8, Concession 6, was installed as part of the June 12, 2001, Engineer's Report prepared by G. Rood, P.Eng. Therefore, this structure is considered a legal entity with respect to the Lebo Creek Drain. The existing culvert consists of 8.00 metres of a 2590mm Span x 1880mm Rise corrugated steel pipe arch with concrete-filled jute bag headwalls, which provides approximately 6.10 metres (20.00 ft.) of travelled top width. We find the existing access structure to be adequately sized with respect to the minimum 1:5-year peak storm event and in fair physical condition with years of serviceable life remaining. Based on our evaluation, we recommend that no improvements are required to this structure as part of this report. As part of this report, cost-sharing provisions have been made to address future maintenance and/or replacement of this structure (if applicable). This structure has further been labelled herein as **Bridge 3**.

Bridge 4 - Henry & Elizabeth Kroeker (710-04200)/[Parcel 309] and Wilhelm & Kathelena Friesen (710-04205)/[Parcel 310]

The existing shared access bridge extending from Station 0+818.3 to Station 0+825.2, serves as the primary access to the residential lands of Henry & Elizabeth Kroeker (710-04200)/[Parcel 309] and Wilhelm & Kathelena Friesen (710-04205)/[Parcel 310], within Lot 8, Concession 6, was improved as part of the July 29, 1960, Engineer's Report prepared by C.G.R. Armstrong, P.Eng. and further identified within the 1978 and 1990 Engineer's Report. Therefore, this structure is considered a legal entity with respect to the Lebo Creek Drain. The existing structure consists of 6.90 metres of 4.25m Span x 1.90m Rise concrete span bridge with reinforced concrete headwalls, which provides approximately 6.10 metres (20.00 ft.) of travelled top width. We find the existing access structure to be adequately sized with respect to the minimum 1:5-year peak storm event and in good physical condition with years of serviceable life remaining. Based on our evaluation, we recommend that no improvements are required to this structure as part of this report. As part of this report, cost-sharing provisions have been made to address future maintenance and/or replacement of this structure (if applicable). This structure has further been labelled herein as **Bridge 4**.

Bridge 5 - Lehn Farms Ltd. (710-04300)/[Parcel 311]

The existing access bridge extending from Station 0+852.3 to Station 0+858.6, serves as the primary access to the agricultural lands of Lehn Farms Ltd. (710-04300)/[Parcel 311], within Lot 8, Concession 6. This structure has never been identified within any of the previous By-Laws for the Lebo Creek Drain. Although this structure appears to be in fair physical condition, it is unknown when this access bridge was installed, nor are we aware of the quality of materials used or the standards to which this access bridge was constructed. Therefore, this structure is not currently a legal entity with respect to the Lebo Creek Drain and is currently considered a private structure within this Municipal Drain. As such, the future repair and maintenance of this access bridge shall be the sole responsibility of the abutting landowner.

The existing culvert consists of 6.30 metres of a 2400mm Span by 1800mm Rise corrugated steel pipe arch with stacked concrete headwalls, which provides approximately 5.30 metres (17.39 ft.) of travelled top width. We find the existing access structure to be adequately sized with respect to the minimum 1:5-year

peak storm event and does not currently pose an obstruction within this drain. This structure has further been labelled herein as **Bridge 5**.

In order for this structure to form a legal entity with respect to the Lebo Creek Drain, it is recommended that its future replacement be conducted through an Engineer's Report and pursuant to Section 78 of the Drainage Act.

Bridge 6 – Neal & Shirley Lehn (710-04400 and 710-04410)/[Parcels 312 and 313]

The existing shared access bridge extending from Station 1+117.8 to Station 1+124.1, serving as the primary access to the agricultural lands of Neal & Shirley Lehn (Parcels 312 and 313), within Lot 8, Concession 6, was improved as part of the July 29, 1960, Engineer's Report prepared by C.G.R. Armstrong, P.Eng. and further identified within the 1978 Engineer's Report. Therefore, this structure is considered a legal entity with respect to the Lebo Creek Drain. The existing structure consists of 6.30 metres of 4.27m Span x 2.20m Rise concrete span bridge with reinforced concrete headwalls, which provides approximately 6.10 metres (20.00 ft.) of travelled top width. We find the existing access structure to be adequately sized with respect to the minimum 1:5-year peak storm event and in fair physical condition with years of serviceable life remaining. Based on our evaluation, we recommend that no improvements are required to this structure as part of this report. As part of this report, cost-sharing provisions have been made to address future maintenance and/or replacement of this structure (if applicable). This structure has further been labelled herein as **Bridge 6.**

Bridge 7 - Municipality of Leamington for Mersea Road 7

The existing road crossing extending from Station 1+279.0 to Station 1+288.3 serves as access across Mersea Road 7, between Lot 8 and Lot 9, Concession 7, was improved as part of the July 29, 1960, Engineer's Report prepared by C.G.R. Armstrong, P.Eng. and further identified within the 1978 and 1990 Engineer's Report. Therefore, this structure is considered a legal entity with respect to the Lebo Creek Drain. The existing structure consists of 9.30 metres of 5.50m Span x 2.67m Rise concrete span bridge with reinforced concrete headwalls. It shall be noted that the typical design criteria for Municipal Drain road crossings, such as Mersea Road 7, is sized to a minimum 1:10-year peak storm event. We find the existing access structure to be adequately sized for the 1:10-year peak storm event and in fair physical condition with years of serviceable life remaining. Based on our evaluation, we recommend that no improvements are required to this structure as part of this report, at this time. As part of this report, cost-sharing provisions have been made to address future maintenance and/or replacement of this structure (if applicable). This structure has further been labelled herein as **Bridge 7**.

Bridge 8 - Ernest Purr (750-00705)/[Parcel 424]

The existing access bridge extending from Station 1+535.4 to Station 1+539.6, serving as the primary access to the agricultural lands of Ernest Purr (750-00705))/[Parcel 424], within Lot 9, Concession 7, was improved as part of the August 17, 1990, Engineer's Report prepared by H.E. Regts, P.Eng. and further identified within the 1978 and 1960 Engineer's Report. Therefore, this structure is considered a legal entity with respect to the Lebo Creek Drain. The existing structure consists of 4.20 metres of 2.59m Span x 1.10m Rise concrete span bridge with reinforced concrete headwalls and repaired concrete filled jute bag wing walls and provides approximately 3.80 metres (12.47 ft.) of travelled top width. We find that the

existing access bridge culvert is in extremely poor physical condition. Therefore, based on the vintage and the condition of the existing access bridge, we recommend that measures be taken to address this structure as part of this report. This structure has further been labelled herein as **Bridge 8**.

Details of this existing access bridge were reviewed and discussed with the Owner. The Owner had identified that since the creation of the residential lots on the south side of the Lebo Creek Drain, only a small strip of land on the south side of the Lebo Creek Drain remains with the farm. As a result, this access is rarely used. He further identified that his tenant farmer gains access to the remaining farmland from Mersea Road 8. We further reviewed the options of replacement or abandonment of this structure. Based on the seldom use of this access, the Owner confirmed that the cost to replace this structure outweighed the benefits of having access to the small strip of property.

Based on the details outlined above, we recommend that this structure be completely removed and abandoned pursuant to Section 19 of the "Drainage Act, RSO 1990, Chapter D.17, as amended in 2021"., and the open channel be completely restored to the open drain parameters.

Bridge 9 - Madonna Gemus (750-00700)/[Parcel 423]

The existing access bridge extending from Station 1+869.0 to Station 1+877.0, serving as the primary access to the agricultural lands of Madonna Gemus (750-00700)/[Parcel 423], within Lot 9, Concession 7, was installed as part of the November 30, 2004, Engineer's Report prepared by G. Rood, P.Eng. Therefore, this structure is considered a legal entity with respect to the Lebo Creek Drain. The existing culvert consists of 8.00 metres of a 2590mm Span by 1880mm Rise corrugated steel pipe arch with concrete-filled jute bag headwalls, which provides approximately 3.80 metres (12.47 ft.) of travelled top width. We find the existing access structure to be adequately sized with respect to the minimum 1:5-year peak storm event and in good physical condition with years of serviceable life remaining. Based on our evaluation, we recommend that no improvements are required to this structure as part of this report. As part of this report, cost-sharing provisions have been made to address future maintenance and/or replacement of this structure (if applicable). This structure has further been labelled herein as **Bridge 9**.

Bridge 10 – Kenneth, Cornelia, Nicocina & Louisa Dawson (750-00100)/[Parcel 411]

The existing access bridge extending from Station 3+580.9 to Station 3+585.8, serving as the primary access to the agricultural lands of Kenneth, Cornelia, Nicocina & Louisa Dawson (750-00100)/[Parcel 411], within Lot 12, Concession 7, was identified within the December 13, 1982, Engineer's Report prepared by W.J. Setterington, P.Eng. Therefore, this structure is considered a legal entity with respect to the Lebo Creek Drain. The existing structure consists of 4.90 metres of 3.50m Span x 2.45m Rise concrete span bridge with reinforced concrete wing walls, which provides approximately 4.20 metres (13.80 ft.) of travelled top width. We find the existing access structure to be adequately sized with respect to the minimum 1:5-year peak storm event and in fair physical condition with years of serviceable life remaining. Based on our evaluation, we recommend that no improvements are required to this structure as part of this report. As part of this report, cost-sharing provisions have been made to address future maintenance and/or replacement of this structure (if applicable). This structure has further been labelled herein as **Bridge 10**.

Bridge 11 - John & Mary Braun (750-03900)/[Parcel 466]

The existing footbridge extending from Station 3+905.4 to Station 3+906.8, serves as pedestrian access to the agricultural lands of John & Mary Braun (750-03900)/[Parcel 466], within Lot 12, Concession 7. This pedestrian access has never been identified within any of the previous By-Laws. Therefore, this structure is not considered a legal entity with respect to the Lebo Creek Drain. The existing structure consists of a 1.40-metre-wide timber structure, spanning over the drain. As a pedestrian access over the drain, this structure shall be considered a private entity with respect to the Lebo Creek Drain and is solely the responsibility of the affected property owner, including all associated construction and maintenance costs. This access currently does not present as an obstruction to the flows within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 11**.

Bridge 12 - Municipality of Leamington for Mersea Road 12

The existing road crossing extending from Station 4+037.2 to Station 4+045.3 serves as access across Mersea Road 12, between Lot 12 and Lot 13, Concession 7, was improved as part of the July 29, 1960, Engineer's Report prepared by C.G.R. Armstrong, P.Eng. and further identified within the 1982 Engineer's Report. Therefore, this structure is considered a legal entity with respect to the Lebo Creek Drain. The existing structure consists of 8.10 metres of 6.10m Span x 2.70m Rise concrete span bridge with reinforced concrete headwalls. It shall be noted that the typical design criteria for Municipal Drain road crossings, such as Mersea Road 12, is sized to a minimum 1:10-year peak storm event. We find the existing access structure to be adequately sized for the 1:10-year peak storm event and in fair physical condition with years of serviceable life remaining. Based on our evaluation, we recommend that no improvements are required to this structure as part of this report, at this time. As part of this report, cost-sharing provisions have been made to address future maintenance and/or replacement of this structure (if applicable). This structure has further been labelled herein as **Bridge 12**.

Bridge 13 - Municipality of Leamington for Mersea Road 7

The existing road crossing extending from Station 4+249.2 to Station 4+264.9, serves as access across Mersea Road 7, within Lot 13, Concession 7, was identified within the July 29, 1960, Engineer's Report prepared by C.G.R. Armstrong, P.Eng. and further identified within the 1982 Engineer's Report. Therefore, this structure is considered a legal entity with respect to the Lebo Creek Drain. The existing structure consists of 15.70 metres of 6.40m Span x 2.50m Rise precast concrete box culvert bridge with stacked precast concrete block headwalls. It shall be noted that the typical design criteria for Municipal Drain road crossings, such as Mersea Road 7, is sized to a minimum 1:10-year peak storm event. We find the existing access structure to be adequately sized for the 1:10-year peak storm event and in good physical condition with years of serviceable life remaining. Based on our evaluation, we recommend that no improvements are required to this structure as part of this report, at this time. As part of this report, cost-sharing provisions have been made to address future maintenance and/or replacement of this structure (if applicable). This structure has further been labelled herein as **Bridge 13**.

Bridge 14 - 700-01960/[Parcel 231]

The existing access bridge extending from Station 4+524.0 to Station 4+525.1, serves as a pedestrian access to the residential lands of (700-01960)/[Parcel 231], within Lot 13, Concession 6. This pedestrian access has never been identified within any of the previously identified By-Laws. Therefore, this structure is not considered a legal entity with respect to the Lebo Creek Drain. The existing structure consists of a 1.10-metre-wide timber structure, spanning over the drain. As a pedestrian access over the drain, this structure shall be considered a private entity with respect to the Lebo Creek Drain and is solely the responsibility of the affected property owner, including all associated construction and maintenance costs. This access currently does not present as an obstruction to the flows within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 14**.

Bridge 15 - 700-01960/[Parcel 231] and 700-02000/[Parcel 232]

The existing access bridge extending from Station 4+730.1 to Station 4+736.9, serves as a shared access to the agricultural lands of (700-01960)/[Parcel 231] and the agricultural lands of (700-02000)/[Parcel 232], within Lot 14, Concession 6, and serves as the primary access to each property. This structure has never been identified within any of the previous By-Laws for the Lebo Creek Drain. Although this structure appears to be in fair physical condition, it is unknown when this access bridge was installed, nor are we aware of the quality of materials used or the standards to which this access bridge was constructed. Therefore, this structure is not currently a legal entity with respect to the Lebo Creek Drain and is currently considered a private structure within this Municipal Drain. As such, the future repair and maintenance of this access bridge shall be the sole responsibility of the abutting landowner.

The existing structure consists of 6.80 metres of 5.90m Span x 2.20m Rise concrete span bridge with reinforced concrete headwalls and concrete-filled jute bag wing walls, which provides approximately 6.10 metres (20.00 ft.) of travelled top width. We find the existing access structure to be adequately sized with respect to the minimum 1:5-year peak storm event and does not currently pose an obstruction within this drain. This structure has further been labelled herein as **Bridge 15**.

In order for this structure to form a legal entity with respect to the Lebo Creek Drain, it is recommended that its future replacement be conducted through an Engineer's Report and pursuant to Section 78 of the Drainage Act.

Bridge 16 - (700-02050)/[Parcel 233]

The existing access bridge extending from Station 5+137.0 to Station 5+140.8, serves as the primary access to the residential lands of (700-02050)/[Parcel 233], within Lot 14, Concession 6. With this structure residing within the Natural Watercourse section of the Lebo Creek, this structure has never been identified within any of the previous By-Laws for the Lebo Creek Drain. Although this structure appears to be in fair physical condition, it is unknown when this access bridge was installed, nor are we aware of the quality of materials used or the standards to which this access bridge was constructed. Therefore, this structure is not currently a legal entity with respect to the Lebo Creek

Drain and shall be currently considered a private structure within this Municipal Drain. As such, the future repair and maintenance of this access bridge shall be the sole responsibility of the abutting landowner.

The existing structure consists of 3.80 metres of 5.50m Span x 1.85m Rise composite span deck composed of concrete and steel I-Beams which sit on concrete abutments with reinforced concrete headwalls, which provides approximately 3.50 metres (11.48 ft.) of travelled top width. This structure has further been labelled herein as **Bridge 16**.

In order for this structure to form a legal entity with respect to the Lebo Creek Drain, it is recommended that its future replacement be conducted through an Engineer's Report and pursuant to Section 78 of the Drainage Act.

Bridge 17 - 700-02101/[Parcel 235]

The existing footbridge extending from Station 5+339.5 to Station 5+341.0, serves as a pedestrian access through the wooded lands of (700-02101)/[Parcel 235], within Lot 14, Concession 6. With this structure residing within the Natural Watercourse section of the Lebo Creek, this structure has not been previously identified in any By-Law. The existing structure consists of a 1.50-metre-wide timber and angle iron steel structure, spanning over the drain. As a pedestrian access over the drain, this structure shall be considered a private entity with respect to the Lebo Creek Drain and is solely the responsibility of the affected property owner, including all associated construction and maintenance costs. This access currently does not present as an obstruction to the flows within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 17**.

Bridge 18 - 700-02101/[Parcel 235]

The existing footbridge extending from Station 5+420.9 to Station 5+425.9, serves as a pedestrian access through the wooded lands of (700-02101)/[Parcel 235], within Lot 14, Concession 6. With this structure residing within the Natural Watercourse section of the Lebo Creek, this structure has not been previously identified in any By-Law. The existing structure consists of a 1.40-metre-wide steel framed structure with a timber deck, spanning over the drain. As a pedestrian access over the drain, this structure shall be considered a private entity with respect to the Lebo Creek Drain and is solely the responsibility of the affected property owner, including all associated construction and maintenance costs. This access currently does not present as an obstruction to the flows within the Lebo Creek Drain. However, the structure appears to be in poor condition and unsafe for private use. It is recommended that the owner address (remove, repair, or replace) this structure privately before it becomes an obstruction within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 18**.

Bridge 19 –700-02300)/[Parcel 238]

The existing footbridge at Station 5+493.1, serves as pedestrian access through the wooded lands of (700-02300)/[Parcel 238], within Lot 15, Concession 6. With this structure residing within the Natural Watercourse section of the Lebo Creek, this structure has not been previously identified in any By-Law. The existing structure consists of a steel tube structure with a steel railing, spanning over the drain. As a pedestrian access over the drain, this structure shall be considered a private entity with respect to the Lebo Creek Drain and is solely the responsibility of the affected property owner, including

all associated construction and maintenance costs. This access currently does not present as an obstruction to the flows within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 19**.

Bridge 20 - 700-00800/[Parcel 214]

The existing footbridge extending from Station 5+789.8 to Station 5+792.0, serves as a pedestrian access through the wooded lands of (700-00800)/[Parcel 214], within Lot 15, Concession 6. With this structure residing within the Natural Watercourse section of the Lebo Creek, this structure has not been previously identified in any By-Law. The existing structure consists of a 2.20-metre-wide steel framed structure with a timber deck, spanning over the drain. As a pedestrian access over the drain, this structure shall be considered a private entity with respect to the Lebo Creek Drain and is solely the responsibility of the affected property owner, including all associated construction and maintenance costs. This access currently does not present as an obstruction to the flows within the Lebo Creek Drain. However, the structure appears to be in poor condition and unsafe for private use. It is recommended that the owner address (remove, repair, or replace) this structure privately before it becomes an obstruction within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 20**.

Bridge 21 - 700-00900/[Parcel 215]

The existing access bridge extending from Station 6+825.1 to Station 6+846.8, serves as access to the agricultural lands of (700-00900)/[Parcel 215], within Lot 15, Concession 6, was installed as part of the January 12, 2016, Engineer's Report prepared by G. Rood, P.Eng. for the John Leslie Drain. Under this report, the portion of the Lebo Creek Natural Watercourse was extended/assumed as the John Leslie Drain and this structure was installed and identified as a secondary access to the subject property. The existing culvert consists of 21.00 metres of a 3890mm Span by 2690mm Rise corrugated steel pipe arch with sloped quarried limestone end treatments, which provides approximately 9.10 metres (30.00 ft.) of travelled top width. We find the existing access structure to be adequately sized with respect to the minimum 1:5-year peak storm event and in good physical condition with years of serviceable life remaining.

As previously noted within this report, in order to maintain suitable flow and continuity within the Lebo Creek Drain, this portion of the John Leslie Drain shall be converted to the new Lebo Creek Drain, as a Municipal Drain. With this structure located within the newly converted section of the Municipal Drain and recently installed through the auspicious of the Drainage Act, we recommend that no improvements are required to this structure as part of this report. As part of this report, cost-sharing provisions have been made to address future maintenance and/or replacement of this structure (if applicable). This structure has further been labelled herein as **Bridge 21**.

Bridge 22 - Municipality of Leamington for Mersea Road 6

The existing road crossing extending from Station 6+898.6 to Station 6+910.7, serves as access across Mersea Road 6, within Lot 15, Concession 6. With this structure residing within the Natural Watercourse section of the Lebo Creek, this structure has never been identified within any of the previous By-Laws for the Lebo Creek Drain. Although this structure appears to be in fair physical condition, it is unknown when

this access bridge was installed, nor are we aware of the quality of materials used or the standards to which this access bridge was constructed. Therefore, this structure is not currently a legal entity with respect to the Lebo Creek Drain and is currently considered a private structure within this Municipal Drain. As such, the future repair and maintenance of this access bridge shall be the sole responsibility of the governing Road Authority.

The existing structure consists of 12.60 metres of 8.50m Span x 2.50m Rise concrete span bridge with reinforced concrete headwalls. It shall be noted that the typical design criteria for Municipal Drain road crossings, such as Mersea Road 6, is sized to a minimum 1:10-year peak storm event. We find the existing access structure to be adequately sized for the 1:10-year peak storm event and does not present as an obstruction within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 22**.

As a road crossing culvert, it is recommended that the future replacement of this structure be conducted through Section 78 and/or Section 69 of the Drainage Act.

Bridge 23 - Municipality of Leamington for Mersea Road 5

The existing road crossing extending from Station 7+876.9 to Station 7+888.7, serves as access across Mersea Road 5, within Lot 16, Concession 5. With this structure residing within the Natural Watercourse section of the Lebo Creek, this structure has never been identified within any of the previous By-Laws for the Lebo Creek Drain. Although this structure appears to be in fair physical condition, it is unknown when this access bridge was installed, nor are we aware of the quality of materials used or the standards to which this access bridge was constructed. Therefore, this structure is not currently a legal entity with respect to the Lebo Creek Drain and is currently considered a private structure within this Municipal Drain. As such, the future repair and maintenance of this access bridge shall be the sole responsibility of the governing Road Authority.

The existing structure consists of 11.80 metres of 8.70m Span x 2.30m Rise concrete span bridge with reinforced concrete headwalls. It shall be noted that the typical design criteria for Municipal Drain road crossings, such as Mersea Road 5, is sized to a minimum 1:10-year peak storm event. We find the existing access structure to be adequately sized for the 1:10-year peak storm event and does not present as an obstruction within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 23**.

As a road crossing culvert, it is recommended that the future replacement of this structure be conducted through Section 78 and/or Section 69 of the Drainage Act.

Bridge 24 – 620-02700/[Parcel 133]

The existing foot/ATV bridge extending from Station 8+110.4 to Station 8+112.4, serves as a pedestrian access through the wooded lands of (620-02700)/[Parcel 133], within Lot 230, NTR Concession. With this structure residing within the Natural Watercourse section of the Lebo Creek, this structure has not been previously identified in any By-Law. The existing structure consists of a 2.00-metre-wide steel framed structure with a steel mesh deck, spanning over the drain. As a pedestrian access over the drain, this structure shall be considered a private entity with respect to the Lebo Creek Drain and is solely the responsibility of the affected property owner, including all associated construction

and maintenance costs. This access currently does not present as an obstruction to the flows within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 24**.

Bridge 25 -620-00901/[Parcel 120]

The existing footbridge extending from Station 9+629.5 to Station 9+631.9, serves as a pedestrian access through the wooded lands of (620-00901)/[Parcel 120], within Lot 230, NTR Concession. With this structure residing within the Natural Watercourse section of the Lebo Creek, this structure has not been previously identified in any By-Law. The existing structure consists of a 2.30-metre-wide steel framed structure with a timber deck, spanning over the drain. As a pedestrian access over the drain, this structure shall be considered a private entity with respect to the Lebo Creek Drain and is solely the responsibility of the affected property owner, including all associated construction and maintenance costs. This access currently does not present as an obstruction to the flows within the Lebo Creek Drain. However, the structure appears to be in poor condition and unsafe for private use. It is recommended that the owner address (remove or replace) this structure privately before it becomes an obstruction within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 25**.

Bridge 26 – 620-00800/[Parcel 118]

The existing access bridge extending from Station 9+838.5 to Station 9+842.9, serves as the primary access to the agricultural lands of (620-00800)/[Parcel 118], within Lot 230, NTR Concession. With this structure residing within the Natural Watercourse section of the Lebo Creek, this structure has never been identified within any of the previous By-Laws for the Lebo Creek Drain. Although this structure appears to be in fair physical condition, it is unknown when this access bridge was installed, nor are we aware of the quality of materials used or the standards to which this access bridge was constructed. Therefore, this structure is not currently a legal entity with respect to the Lebo Creek Drain and shall be considered a private structure within this Municipal Drain. As such, the future repair and maintenance of this access bridge shall be the sole responsibility of the abutting landowner.

The existing structure consists of a 4.40-metre wide composite structure with a timber deck with steel I-Beams supports which sit on concrete abutments, spanning over the drain providing approximately 4.40 metres (14.44 ft.) of travelled top width. We find the existing access structure to be adequately sized for the 1:5-year peak storm event and does not present as an obstruction within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 26**.

In order for this structure to form a legal entity with respect to the Lebo Creek Drain, it is recommended that its future replacement be conducted through an Engineer's Report and pursuant to Section 78 of the Drainage Act.

Bridge 27 - County of Essex for County Road 34

The existing road crossing extending from Station 10+243.1 to Station 10+270.1, serves as access across County Road 34, within Lot 229, NTR Concession, was identified within the June 1, 1994, Engineer's Report prepared by G. Rood, P.Eng. and N.J. Peralta, P.Eng. However, this report identifies this structure as a private entity and the future upkeep and maintenance shall remain the responsibility of the Owner.

The existing structure consists of 27.0 metres of 9.15m Span x 2.30m Rise double cell concrete span bridge with reinforced concrete wing walls on the upstream end. It shall be noted that the typical design criteria for Municipal Drain road crossings, such as County Road 34, is sized to a minimum 1:25-year peak storm event. We find the existing access structure to be adequately sized for the 1:25-year peak storm event and does not present as an obstruction within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 27**.

As a road crossing culvert, it is recommended that the future replacement of this structure be conducted through Section 78 and/or Section 69 of the Drainage Act.

Bridge 28 – 570-06502/[Parcel 44]

The existing access bridge extending from Station 10+852.4 to Station 10+857.7, serves as the primary access to the agricultural lands of (570-06502)/[Parcel 44], within Lot 229, STR Concession. This structure was identified within the June 1, 1994, Engineer's Report prepared by G. Rood, P.Eng. and N.J. Peralta, P.Eng. However, this report identifies this structure as a private entity and the future upkeep and maintenance shall remain the responsibility of the Owner.

The existing structure consists of a 4.40-metre wide composite structure with a timber deck with steel I-Beams supports which sit on concrete abutments, spanning over the drain providing approximately 4.40 metres (14.44 ft.) of travelled top width. We find the existing access structure to be adequately sized for the 1:5-year peak storm event and does not present as an obstruction within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 28**.

In order for this structure to form a legal entity with respect to the Lebo Creek Drain, it is recommended that its future replacement be conducted through an Engineer's Report and pursuant to Section 78 of the Drainage Act.

Bridge 29 - 570-06600/[Parcel 46]

The existing access bridge extending from Station 10+866.6 to Station 10+870.9, serves as the primary access to the agricultural lands of (570-06600)/[Parcel 46], within Lot 228, STR Concession. This structure was identified within the June 1, 1994, Engineer's Report prepared by G. Rood, P.Eng. and N.J. Peralta, P.Eng. However, this report identifies this structure as a private entity and the future upkeep and maintenance shall remain the responsibility of the Owner.

The existing structure consists of a 5.50-metre wide composite structure with a timber deck with steel I-Beams supports which sit on concrete abutments, spanning over the drain providing approximately 5.50 metres (18.04 ft.) of travelled top width. We find the existing access structure to be adequately sized for the 1:5-year peak storm event and does not present as an obstruction within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 29**.

In order for this structure to form a legal entity with respect to the Lebo Creek Drain, it is recommended that its future replacement be conducted through an Engineer's Report and pursuant to Section 78 of the Drainage Act.

Bridge 30 - Municipality of Leamington for Mersea Road 19

The existing road crossing extending from Station 11+541.3 to Station 11+560.1, serving as access across Mersea Road 19, between Lot 227 & Lot 228, STR Concession, was identified within the June 1, 1994, Engineer's Report prepared by G. Rood, P.Eng. and N.J. Peralta, P.Eng. and further identified within the 1972 Engineer's Report. However, the 1994 report identifies this structure as a private entity and the future upkeep and maintenance shall remain the responsibility of the Owner.

The existing structure consists of 18.30 metres of 8.90m Span x 4.39m Rise Multi Plate Super-Span Elliptical bridge with gabion basket headwalls. It shall be noted that the typical design criteria for Municipal Drain road crossings, such as Mersea Road 19, is sized to a minimum 1:10-year peak storm event. We find the existing access structure to be adequately sized for the 1:10-year peak storm event and does not present as an obstruction within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 30**.

As a road crossing culvert, it is recommended that the future replacement of this structure be conducted through Section 78 and/or Section 69 of the Drainage Act.

Bridge 31 –560-02302/[Parcel 10-1]

The existing low-level crossing extending from Station 12+035.2 to Station 12+040.2, serves as the primary access to the agricultural lands of 560-02302)/[Parcel 10-1], within Lot 227, STR Concession. This structure was reconstructed as part of the June 1st, 1994, Engineer's Report prepared by G. Rood, P.Eng. and N.J. Peralta, P.Eng. Therefore, this structure is considered a legal entity with respect to the Lebo Creek Drain. The existing structure consists of a 5.00-metre wide x 10.00-metre long x 0.30-metre thick quarried limestone ramp through the bottom of the channel. We find the existing low-level crossing is seldom used. However, freely allows the minimum 1:5-year peak storm event to pass over this access. Based on our evaluation, we recommend that no improvements are required to this structure as part of this report. As part of this report, cost-sharing provisions have been made to address future maintenance and/or replacement of this structure (if applicable). This structure has further been labelled herein as **Bridge 31**.

Bridge 32 - 560-02950/[Parcel 19]

The existing footbridge at Station 12+408.7, serves as a pedestrian access to the wooded lands of 560-02950/[Parcel 19], within Lot 226, STR Concession. Therefore, this structure is not considered a legal entity with respect to the Lebo Creek Drain. The existing structure consists of a timber frame and deck, spanning over the drain. As a pedestrian access over the drain, this structure shall be considered a private entity with respect to the Lebo Creek Drain and is solely the responsibility of the affected property owner, including all associated construction and maintenance costs. This access currently does not present as an obstruction to the flows within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 32**.

Bridge 33 –560-01800/[Parcel 5]

The existing footbridge extending from Station 12+766.9 to Station 12+768.6, serves as a pedestrian access through the wooded lands of (560-01800)/[Parcel 5], within Lot 226, STR Concession. With this structure residing within the Natural Watercourse section of the Lebo Creek, this structure has not been previously identified in any By-Law. The existing structure consists of a 2.60-metre-wide steel and timber framed structure, spanning over the drain. As a pedestrian access over the drain, this structure shall be considered a private entity with respect to the Lebo Creek Drain and is solely the responsibility of the affected property owner, including all associated construction and maintenance costs. This access currently does not present as an obstruction to the flows within the Lebo Creek Drain. However, the structure appears to be in poor condition and unsafe for private use. It is recommended that the owner address (remove, repair, or replace) this structure privately before it becomes an obstruction within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 33**.

Bridge 34 - Municipality of Leamington for Deer Run Road

The existing road crossing extending from Station 13+200.1 to Station 13+208.8, serves as access across Deer Run Road, between Lot 225, STR Concession. With this structure residing within the Natural Watercourse section of the Lebo Creek, this structure has never been identified within any of the previous By-Laws for the Lebo Creek Drain. Although this structure appears to be in fair physical condition, it is unknown when this access bridge was installed, nor are we aware of the quality of materials used or the standards to which this access bridge was constructed. Therefore, this structure is not currently a legal entity with respect to the Lebo Creek Drain and is currently considered a private structure within this Municipal Drain. As such, the future repair and maintenance of this access bridge shall be the sole responsibility of the governing Road Authority.

The existing structure consists of 8.60 metres of 12.30m Span x 3.16m Rise concrete span bridge with reinforced concrete headwalls. It shall be noted that the typical design criteria for Municipal Drain road crossings, such as Deer Run Road, is sized to a minimum 1:10-year peak storm event. We find the existing access structure to be adequately sized for the 1:10-year peak storm event and does not present as an obstruction within the Lebo Creek Drain. This structure has further been labelled herein as **Bridge 34**.

As a road crossing culvert, it is recommended that the future replacement of this structure be conducted through Section 78 and/or Section 69 of the Drainage Act.

Private Bridge Structures

As noted above, several access structures span over the existing Municipal Drain and Natural Watercourse identified above and within the Lebo Creek and are considered private structures and shall not form part of this Municipal Drain. These structures have been deemed private as it is unknown when these structures were installed, nor are we aware of the quality of materials used, nor the standards to which these structures were constructed. Therefore, the maintenance and upkeep of these structures, including any cost associated with same, shall be the sole responsibility of the benefiting Property Owner. The review of these structures was primarily conducted to verify their existence and to document the current size, type, location, etc. of each structure. Under no circumstance shall the Consulting Engineer, Municipality, nor drainage system, be responsible for the structural integrity of these structures. Based on

the size and function of the bridge structure, when future repair or replacement is required, it is recommended that these structures be reviewed by a qualified Engineer. Furthermore, in order for this structure to form a legal entity with respect to the Lebo Creek Drain, it is recommended that its future replacement be conducted through an Engineer's Report and pursuant to Section 78 of the "Drainage Act, RSO 1990, Chapter D.17, as amended 2021".

Pedestrian Footbridges

As noted above, there are several "pedestrian footbridges" that span over the existing Municipal Drain and Natural Watercourse identified above and within the Lebo Creek and are considered private structures and shall not form part of this Municipal Drain. Therefore, the maintenance and upkeep of these structures shall be the sole responsibility of the adjacent Owner/Occupant. Currently, these footbridges do not obstruct flows within the Lebo Creek Drain. However, if these structures become an obstruction within the drain, or cause damage to the Municipal Drain, these obstructions must be addressed and/or removed through Sections 80(1) and 80(2) of the "Drainage Act, RSO 1990, Chapter D.17, as amended 2021".

Lebo Creek Drain Bridge and Road Crossing Summary

In summary, we have reviewed all of the existing structures within the Lebo Creek and provided our recommendations as detailed herein, which define which structures are considered part of the Municipal Drain and which are considered private structures. Our recommendations also include the removal of **Bridge 8** which shall be performed in accordance with this report and the attached specifications. Furthermore, all of the above shall be carried out in accordance with Section 17, Section 18, and Section 78 of the "Drainage Act, RSO 1990, Chapter D.17, as amended 2021".

Lebo Creek Drain Wetland Considerations

Wetlands are important features in the landscape that provide numerous beneficial services for people, fish, and general wildlife. Some of these services, or functions, include protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters and maintaining surface water flow during dry periods. These valuable functions are the result of the unique natural characteristics of wetlands.

Through the various discussions and meetings with the environmental stakeholders, Municipal Staff and the potentially affected landowners, steps have been taken to incorporate suitable green infrastructure, including a wetland, where various sites were investigated. ERCA and the Municipality of Leamington were able to acquire external funding to assist with the costs to implement the proposed wetland as part of this project. Based on the available funding, only one (1) of the three (3) potential wetland sites were able to be incorporated as part of this project. This green infrastructure shall not create any negative impacts on the upstream or downstream landowners. By incorporating the wetland as part of the Municipal Drain and included as part of the Engineer's Report, this green infrastructure is protected through Municipal By-Law and can remain in perpetuity, until modified or abandoned through the provisions of the Drainage Act. The following are the details related to the proposed wetland for this project:

1. It was established that the proposed wetland shall be constructed within the lands of 670-00600/ [Parcel 175] and located immediately east of the Lebo Creek Drain and adjacent to Mersea Road 5, within Lot 16, Concession 5. The wetland is located between Station 7+719.3 and Station 7+875.8 of the Lebo Creek Drain and the works associated with the wetlands extend from Station 0+000W to 0+110.0W as outlined and detailed within the accompanying drawings. It was determined that this property would be the more suitable site to implement the wetland based on the size, location, accessibility, and available funding associated to implement the wetland.

2. The implementation of a wetland within the Lebo Creek Drain is intended to provide improved water quality and additional habitat, along with providing additional storage and flow attenuation for the overall drainage system.

3. ERCA and the Municipality of Leamington were able to procure external funding partners to offset all of the overall cost of the wetland implementation, including construction, engineering, and land allowances. The cost to implement the wetland has been incorporated as part of this report. However, the external funding procured from external sources will be deducted from the total cost of the project once the project is complete.

4. With assistance from Kathryn Arthur, ERCA's Restoration Biologist and Kevin Money, ERCA's Director of Conservation Services, we were able to derive a wetland configuration to include the pertinent ecological features associated with a wetland. As such, we recommend that this wetland include the following details and ecological benefits:

    a. A shallow wier shall be installed within the bottom of the Lebo Creek Drain to divert flows into the wetland and assist with flow attenuation. During periods of low flow (Summer and Winter months), the proposed weir shall divert the majority of flows through the wetland that shall be discharged at a slower rate of flow. During periods of high flow (Spring and Fall months), the flows within the drain shall overtop the proposed weir and convey flows through the open channel, while maintaining the water levels within the wetland.

    b. A deep pool sediment forebay shall be installed upstream of the proposed weir to capture sediment from the open drain before entering the wetland. This feature will also assist with isolating sedimentation to reduce future maintenance work within the downstream portion of the open drain.

    c. The sediment forebay and deep pool will include varying side slopes and create stormwater quality features to assist with filtering excess nutrients with the help of native aquatic and terrestrial plant species.

    d. Immediately downstream of the sediment forebay, we recommend a deep permanent pool accompanied by inlet and outlet structures to regulate the flows into and exiting the wetland, allowing stormwater to freely pass through the system with no adverse effects on the overall drainage system. The Inlet and outlet structures are as follows:

i. The inlet structure shall consist of approximately 12.0 metres of 525mm smoothwall HDPE plastic pipe with a gasketed joining system and installed with floatation anchors and sloped quarried limestone erosion protection.

ii. The outlet structure shall consist of approximately 18.0 metres of 525mm smoothwall HDPE plastic pipe with a gasketed joining system and installed with floatation anchors and sloped quarried limestone erosion protection.

e. In order to protect the adjacent residential lands from adverse impacts and flooding, a berm shall be installed along the east limit of the project site to ensure that the lands to the east are protected.

f. With the use of the hydraulic analysis, we were able to ensure that the wetland design shall not create negative impacts on the Lebo Creek Drain or the surrounding lands.

g. In an effort to reduce overall cost, all materials excavated from the wetland shall remain within the project site and form part of the landscaped rolling berm.

In summary, we would recommend that a new wetland be installed within and adjacent to the Lebo Creek Drain at the location shown on the accompanying drawings. We further recommend that all works be completed in accordance with this Report, the attached Specifications, and the accompanying Drawings and that all of the works associated with same be carried out in accordance with Sections 78 of the "Drainage Act, RSO 1990, Chapter D.17, as amended 2021".

XII. ALLOWANCES AND COMPENSATION

As part of the improvements to the Lebo Creek Drain, various properties are directly affected by the proposed drainage improvements. As such, certain properties affected by the proposed drainage improvements are entitled to allowances and/or compensation through Sections 29 through Section 31 of the Drainage Act.

Land Appraisals

Based on the general scope and direction of this project, we recognized that the conversion of the Natural Watercourse to a Municipal Drain, together with the required buffer strips within all agricultural lands, will require a considerable amount of allowances and compensation issued to all affected lands. To ensure that we are fair and reasonable with the allowances issued to these lands along the drain, we determined that it would be prudent to have the general lands within this watershed evaluated and appraised to establish their fair market value. In addition to establishing current market values for the necessary lands the drain and buffer strips, we also required fair market value for potential wetland sites previously identified.

In order to obtain a fair and unbiased opinion on the fair market value of the associated lands, we reached out to the Municipality of Leamington to seek a reputable Land Appraiser that is familiar with this area. As a result, Municipal Staff recommended two (2) appraisal companies. Through a request for quotation

process, we retained Fuerland Realty Ltd. (Fuerland), located in the City of Windsor, to complete this evaluation. On July 9, 2019, Fuerland provided us with their initial Market Value Assessment Reports for lands affected by this project. The appraisal reports were geared toward the value of partial agricultural lands adjacent to the Lebo Creek Drain. With the amount of time that elapsed from 2019 to the time of this report, Fuerland provided an Updated Appraisal Report for partial takings of agricultural Lands affected to reflect the change in market value during this period. The updated report was dated December 19, 2022.

As part of this evaluation, the partial lands affected by the drain channel intended to be taken for drainage purposes (buffer strips and working corridors) are those that reside on the fringe of the productive farming area with irregular configuration and inferior soils. Therefore, the value of these lands is reflective of the use of these land for agricultural purposes. Furthermore, the real estate appraisal reports also included fair market values for lands associated with wetlands/woodlots.

Copies of the pertinent land value appraisals and associated correspondence are included in this report and within **Appendix "D"**. As a result, these values were utilized in establishing the allowances and compensation to all affected properties.

Allowances for Land Taken

Through Section 29 of the Drainage Act, an allowance to specific landowners is provided for the right-of-way required for the construction and maintenance of a Municipal Drain. Allowances provided under the section of the Act are generally allocated only once and at the time when the land is taken for the required purpose. This allowance is typically provided for lands that are permanently and/or periodically taken out of production/use as a result of the drainage works.

Buffer Strips – With the incorporation of buffer strips through agricultural lands along both sides of the Lebo Creek Drain, an allowance for land taken shall be provided to each affected agricultural property. This allowance is being provided to those agricultural lands which are being taken out of production permanently as a result of the required buffer strips.

- Compensation Rates – Based on the information established within the Updated Appraisal Report, the following are the compensation rates used for establishing the necessary allowance for buffer strips along the affected properties:

  a. Arable Agricultural Lands = $20,500 per Acre
  b. Agricultural Wetland/Wooded Lands = $10,500 per Acre

Working Corridors – In order to conduct the improvements along the course of the open drain of the Lebo Creek Drain, maintenance corridors (or drainage easements) have been established as a defined right-of-way for these drainage works. Providing a one-time allowance for the use of these lands establishes the legal right to utilize the lands for the purpose of the initial and periodic future improvements to this Municipal Drain.

As previously established herein, the working corridor required through agricultural and/or residential properties shall have a minimum width of 9.0 metres from the existing top of the bank located on (1) one side of the open channel, or as otherwise defined herein. When working through the densely wooded areas along the course of the drain, a primary maintenance corridor shall be permitted on one (1) side of the open channel that will have a width of 12.0 metres from the existing top of the bank to allow for a meandering pathway for selective tree removal. Where needed, a secondary maintenance corridor shall be established on the opposite side of the open channel intended only for the initial improvements as defined under this project and will not be required for future maintenance works. This secondary maintenance corridor shall have a 6.0 metres width from the existing top of the bank for access with small equipment and utility vehicles to help facilitate the removal of dead wood and small tree removal. Further to the above, we wish to further establish the following:

- Existing Municipal Drain Portions – Where the Lebo Creek has previously been established as a Municipal Drain, the affected lands along the course of the open drain have already been compensated for the land taken under previous Engineer's Reports and By-Laws. Therefore, further compensation for the use of the specified working corridor shall not be required. Therefore, only a nominal value of $1.00 per property shall be paid to re-establish the legal right of these working corridors. However, where additional lands beyond what has previously established working corridors are required to complete the necessary drainage works, further compensation shall be provided to these affected properties.

- New Municipal Drain Portions – Through the portions of the Natural Watercourse being converted to a Municipal Drain, new maintenance corridors are being established herein. As such, an allowance is being provided to establish the legal right to utilize these lands for the purpose of performing the necessary improvements and the use of such lands for future maintenance.

- Compensation Rates – Based on the information provided by the Land Appraiser, the following are the compensation rates used for establishing the necessary compensation to the affected properties:

  Land Used for Primary Working Corridor (25% of fair market value):
  a. Arable Agricultural Lands = $5,125 per Acre
  b. Agricultural Wetland/Wooded Lands = $2,625 per Acre

  Land Used for Secondary (Temporary) Working Corridor (10% of fair market value)::
  a. Agricultural Wetland/Wooded Lands = $1,050 per Acre

Access Routes – Specific access routes have been established on various properties throughout the course of the Lebo Creek Drain. These access routes are being established for the legal right for periodic and temporary use of the lands and/or laneways to access the working corridors/open channel during the construction and future maintenance of the drainage works.

Wetland – With the incorporation of a wetland as part of the Municipal Drain, located within Parcel 175, these lands will be permanently taken out of agricultural production and will be repurposed as a wetland.

- Compensation Rates – Based on the information provided by the Land Appraiser, together with the necessary adjustments for inflation between 2019 and to present, the subject agricultural lands shall be compensated at a rate of $29,760 per Acre of the arable land permanently removed from agricultural production.

We have provided for the necessary compensation for land taken in our estimate, as is provided for under Section 29 of the "Drainage Act, RSO 1990, Chapter D.17, as amended 2021". All Section 29 allowances allocated to all affected lands have been summarized in **Table 2.**

Allowances For Damages

Through Section 30 of the Drainage Act, an allowance to specific landowners is provided for damages caused by the construction and future maintenance of a Municipal Drain. Allowances provided under the section of the Act are generally allocated to properties that endure damages caused to lands and crops as a result of the disposal of materials removed from the drainage system. Furthermore, areas disturbed by the drainage works that can be fully restored to pre-construction condition (such as lawns, access routes, fences, etc.) are typically specified for full restoration and are not compensated.

Compensation of damages to lands and crops caused by the disposal of excavated material provides for temporary disruption in the productivity or use of the affected lands. Typically, these allowances are based on the damage to the affected lands and estimated crop loss within the working corridor, resulting from the initial construction and the long-term effects on crop production over the next few years. However, it shall be noted that based on the Biological Assessment and Mitigation recommendations, the majority of the works shall be conducted through the Winter months when the ground is frozen and no crops exist. Based on this, it is anticipated that no crop damage will occur within agricultural lands for the initial year of construction. However, the long-term effects of sedimentation spread on the adjoining maintenance corridors shall be considered. Taking the above into consideration, a compensation rate of $700.00 per acre of land damaged has been allocated.

We have provided for the necessary compensation for damages in our estimate, as is provided for under Section 29 of the "Drainage Act, RSO 1990, Chapter D.17, as amended 2021". All Section 30 allowances allocated to all affected lands have been summarized in **Table 2.**

Allowances For the Existing Drain

Through Section 31 of the Drainage Act, an allowance to specific landowners is provided for incorporating the whole or part of an existing drainage works previously created or established. The Lebo Creek Drain was primarily created as a naturally forming watercourse with no excavation works required to create the channel. The allowance provided for the existing drain is dependent on its current condition and its value to the overall drainage system. Consideration is given to the value of the existing system relative to the necessary improvements required to restore the drainage works to a like new condition. Therefore, the value of compensation shall be based on any cost savings to the project to maintain the open channel.

- Compensation Rates – Any cost savings created by incorporating the existing drain, the affected property owner may be compensated for the added value to the drainage system as follows:

  a. For portions of the existing channel where minimal to no improvements are required, the adjacent landowner shall be compensated a value of $10.00 per lineal meter of drain within the property. This allowance is consistent with the cost for basic cleaning of an open channel.

  b. For portions of the existing channel where minor improvements are required, the adjacent landowner shall be compensated a value of $3.00 per lineal meter of drain within the property. With minor works required to restore the open channel, this allowance is a diminished value for basic cleaning of an open channel.

  c. For portions of the existing channel where considerable improvements are required, the adjacent landowner shall be compensated a nominal value of $1.00 per lineal meter of drain within the property.

We have provided for the necessary compensation for the value of the existing drain in our estimate, as is provided for under Section 31 of the "Drainage Act, RSO 1990, Chapter D.17, as amended 2021". All Section 31 allowances allocated to all affected lands have been summarized in **Table 2**

TABLE 2 - SCHEDULE OF ALLOWANCES

					Land and Right-of-Way (Section 29)			Damages (Section 30)		Existing Drain (Section 31)	
Parcel ID	Conc	Lot	Owner/s	Roll No.	Land Taken (Buffer Strips)	Land Taken (Wetland)	Access & Maintenance Corridor	Lands & Crops Along Drain Route	Lands & Crops Along Access		**TOTAL**
307	6	7		710-03900	$3,075.00	$0.00	$1.00	$0.00	$5.00	$0.00	**$3,081.00**
308	6	8		710-04105	$1,230.00	$0.00	$1.00	$0.00	$5.00	$0.00	**$1,236.00**
309	6	8		710-04200	$0.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$1.00**
310	6	8		710-04205	$0.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$1.00**
311	6	8		710-04300	$1,845.00	$0.00	$1.00	$0.00	$5.00	$0.00	**$1,851.00**
312	6	8		710-04400	$2,255.00	$0.00	$1.00	$0.00	$5.00	$0.00	**$2,261.00**
313	6	8		710-04410	$2,255.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$2,256.00**
430	7	8		750-01000	$1,025.00	$0.00	$1.00	$0.00	$5.00	$0.00	**$1,031.00**
424	7	9		750-00705	$4,920.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$4,921.00**
423	7	9		750-00700	$9,225.00	$0.00	$1.00	$0.00	$5.00	$0.00	**$9,231.00**
455	7	10		750-03100	$2,255.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$2,256.00**
458	7	10		750-03190	$2,665.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$2,666.00**
460	7	10		750-03300	$4,715.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$4,716.00**
461	7	11		750-03400	$5,125.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$5,126.00**
462	7	11		750-03500	$1,640.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$1,641.00**
463	7	11		750-03600	$615.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$616.00**
414	7	12		750-00400	$410.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$411.00**
411	7	12		750-00100	$6,560.00	$0.00	$1.00	$0.00	$41.00	$0.00	**$6,602.00**
464	7	12		750-03700	$4,920.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$4,921.00**
466	7	12		750-03900	$2,460.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$2,461.00**
381	7	13		740-00600	$0.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$1.00**
385	7	13		740-00700	$615.00	$0.00	$1.00	$0.00	$5.00	$0.00	**$621.00**
230	6	13		700-01950	$2,460.00	$0.00	$1.00	$0.00	$5.00	$0.00	**$2,466.00**
231	6	13		700-01960	$3,255.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$3,256.00**
232	6	14		700-02000	$5,355.00	$0.00	$1.00	$1,068.00	$4.00	$0.00	**$6,428.00**
233	6	14		700-02050	$2,205.00	$0.00	$1,158.00	$617.00	$23.00	$595.00	**$4,598.00**
235	6	14		700-02101	$3,990.00	$0.00	$1,511.00	$806.00	$0.00	$777.00	**$7,084.00**
238	6	15		700-02300	$2,835.00	$0.00	$1,044.00	$557.00	$115.00	$537.00	**$5,088.00**
214	6	15		700-00800	$5,880.00	$0.00	$2,215.00	$1,181.00	$0.00	$1,139.00	**$10,415.00**
215	6	14 & 15		700-00900	$20,910.00	$0.00	$5,595.00	$764.00	$5.00	$737.00	**$28,011.00**
175	5	15 & 16		670-00600	$22,755.00	$23,165.00	$9,339.00	$1,276.00	$15.00	$820.00	**$57,370.00**
134	NTR	230		620-02800	$0.00	$0.00	$0.00	$0.00	$222.00	$0.00	**$222.00**
133	NTR	230		620-02700	$8,505.00	$0.00	$5,086.00	$2,543.00	$5.00	$545.00	**$16,684.00**
123	NTR	230		620-01101	$7,140.00	$0.00	$4,289.00	$2,145.00	$0.00	$459.00	**$14,033.00**
120	NTR	230		620-00901	$12,915.00	$0.00	$7,752.00	$3,876.00	$5.00	$830.00	**$25,378.00**
118	NTR	229		620-00800	$5,535.00	$0.00	$1,401.00	$191.00	$0.00	$553.00	**$7,680.00**

TABLE 2 - SCHEDULE OF ALLOWANCES

					Land and Right-of-Way (Section 29)			Damages (Section 30)		Existing Drain (Section 31)	
Parcel ID	Conc	Lot	Owner/s	Roll No.	Land Taken (Buffer Strips)	Land Taken (Wetland)	Access & Maintenance Corridor	Lands & Crops Along Drain Route	Lands & Crops Along Access		**TOTAL**
116	NTR	229		620-00600	$2,205.00	$0.00	$1.00	$0.00	$0.00	$0.00	**$2,206.00**
114	NTR	229		620-00500	$2,940.00	$0.00	$1.00	$0.00	$103.00	$0.00	**$3,044.00**
110	NTR	229		620-00402	$0.00	$0.00	$1.00	$0.00	$41.00	$0.00	**$42.00**
42	STR	229		570-06400	$1,890.00	$0.00	$1.00	$196.00	$10.00	$0.00	**$2,097.00**
44	STR	229		570-06502	$7,350.00	$0.00	$1.00	$730.00	$0.00	$0.00	**$8,081.00**
46	STR	228		570-06600	$9,635.00	$0.00	$1.00	$637.00	$0.00	$0.00	**$10,273.00**
53	STR	228		570-07200	$2,835.00	$0.00	$1.00	$416.00	$5.00	$0.00	**$3,257.00**
10	STR	227		560-02300	$3,990.00	$0.00	$1.00	$398.00	$5.00	$0.00	**$4,394.00**
10-1	STR	227		560-02302	$4,410.00	$0.00	$1.00	$441.00	$0.00	$0.00	**$4,852.00**
16-1	STR	227		560-02752	$4,410.00	$0.00	$1.00	$444.00	$0.00	$0.00	**$4,855.00**
19	STR	226		560-02950	$1,575.00	$0.00	$1.00	$153.00	$0.00	$0.00	**$1,729.00**
19	STR	226		560-02950	$1,680.00	$0.00	$638.00	$255.00	$0.00	$1,093.00	**$3,666.00**
7	STR	226		560-02100	$1,470.00	$0.00	$560.00	$224.00	$0.00	$960.00	**$3,214.00**
6	STR	226		560-01900	$820.00	$0.00	$607.00	$124.00	$0.00	$533.00	**$2,084.00**
5	STR	226		560-01800	$3,570.00	$0.00	$1,353.00	$541.00	$0.00	$2,318.00	**$7,782.00**
3	STR	225		560-01700	$1,680.00	$0.00	$1,222.00	$489.00	$144.00	$2,094.00	**$5,629.00**
Mersea Road 6			Municipality of Leamington		$0.00	$0.00	$1.00	$1.00	$1.00	$0.00	**$3.00**
Mersea Road 7			Municipality of Leamington		$0.00	$0.00	$1.00	$1.00	$1.00	$0.00	**$3.00**
Mersea Road 12			Municipality of Leamington		$0.00	$0.00	$1.00	$1.00	$1.00	$0.00	**$3.00**
Mersea Road 19			Municipality of Leamington		$0.00	$0.00	$1.00	$1.00	$1.00	$0.00	**$3.00**
Deer Run Road			Municipality of Leamington		$0.00	$0.00	$1.00	$1.00	$1.00	$0.00	**$3.00**
County Road 34			County of Essex		$0.00	$0.00	$1.00	$1.00	$1.00	$0.00	**$3.00**
				TOTALS	**$212,010.00**	**$23,165.00**	**$43,812.00**	**$20,078.00**	**$789.00**	**$13,990.00**	**$313,844.00**

XIII. ESTIMATE OF COST

Our estimate of the total cost of this work, including all incidental expenses, is the sum of **One Million Eight Hundred Thirty-Six Thousand Two Hundred Forty-Eight Dollars ($1,836,248.00)** made up as follows:

CONSTRUCTION ITEMS – DRAIN IMPROVEMENT WORKS

PART A – Drain Improvements

Item	Description	Est Qty	Unit	Unit Price	Total
1.	**Water, Sediment and Erosion Control Plans, Fish Salvage, Fish Exclusion and Biological Walkthrough;** Provide Water, Sediment and Erosion Control Plans required to obtain the necessary permits and approval; Provide all labour, equipment, and materials to implement these Plans together with the Fish Salvage and Fish Exclusion Measures . The Contractor shall also participate in a walkthrough with the Biologist intended to identify areas/species of special care and consideration. All of which are outlined within the Special Provisions for Open Drain Works Section II – Environmental Considerations	1.0	Lump Sum	$ 10,000.00	$ 10,000.00
2..	**Dead Wood Removal and Brushing;**				
a)	**Station 4+786.1 to Station 5+135.0 – Heavy Brushing and Tree Removal;** Provide all labour, equipment, and materials to remove fallen dead wood from within and adjacent to the existing drain, including selective tree removal along the primary working side of the drain for approximately 348.9 lineal metres including all flailing, chipping, cutting, piling, complete.	348.9	LM	$ 127.66	$ 44,400.00
b)	**Station 5+224.9 to Station 6+037.6 – Heavy Brushing and Tree Removal;** Provide all labour, equipment, and materials to remove fallen dead wood from within and adjacent to the existing drain, including selective tree removal along the primary working side of the drain for approximately 812.7 lineal metres including all flailing, chipping, cutting, piling, complete.	812.7	LM	$ 126.37	$ 102,700.00
c)	**Station 6+037.6 to Station 7+868.5 – Light Brushing and Tree Removal;** Provide all labour, equipment, and materials to clear the drain bottom, bank slopes, and top of bank along the drain for approximately 1830.9 lineal metres including all flailing, chipping, cutting, complete.	1830.9	LM	$ 10.87	$ 19,900.00

Item	Description	Est Qty	Unit	Unit Price	Total
d)	**Station 7+892.7 to Station 9+856.3 – Heavy Brushing and Tree Removal;** Provide all labour, equipment, and materials to remove fallen dead wood from within and adjacent to the existing drain, including selective tree removal along the primary working side of the drain for approximately 1963.6 lineal metres including all flailing, chipping, cutting, piling, complete. .	1963.6	LM	$ 126.35	$ 248,100.00
e)	**Station 10+269.2 to Station 11+540.2 – Heavy Brushing and Tree Removal;** Provide all labour, equipment, and materials to remove fallen dead wood from within and adjacent to the existing drain, including selective tree removal along the primary working side of the drain for approximately 1271.0 lineal metres including all flailing, chipping, cutting, piling, complete.	1271.0	LM	$ 118.17	$ 150,200.00
f)	**Station 11+558.5 to Station 13+200.1 – Heavy Brushing and Tree Removal;** Provide all labour, equipment, and materials to remove fallen dead wood from within and adjacent to the existing drain, including selective tree removal along the primary working side of the drain for approximately 1641.6 lineal metres including all flailing, chipping, cutting, piling, complete.	1641.6	LM	$ 134.99	$ 221,600.00
3.	**Drain Cleaning;**				
a)	**Station 4+736.9 to Station 6+037.6 – Light Sediment Removal;** Provide all labour, equipment, and materials to excavate, bottom dip and remove all accumulated sediment material and restore the drain to the profile grade shown on the drawings (approx. 900m^3), including placement of excavated materials, in random piles a minimum of 6.0m from the drain bank, cleanup and restoration, complete.	1300.7	LM	$ 12.69	$ 16,500.00
b)	**Station 6+037.6 to Station 6+898.6 – Light Sediment Removal;** Provide all labour, equipment, and materials to excavate, bottom dip and remove all accumulated sediment material and restore the drain to the profile grade shown on the drawings (approx. 800m^3), including spreading and levelling, restoration, cleanup and restoration, complete. .	861.0	LM	$ 18.12	$ 15,600.00

Item	Description	Est Qty	Unit	Unit Price	Total
c)	**Station 6+913.8 to Station 7+876.9 – Heavy Sediment Removal;** Provide all labour, equipment, and materials to excavate, bottom dip and remove all accumulated sediment material and restore the drain to the profile grade shown on the drawings (approx. 1400m^3), including spreading and levelling, restoration, clean-up and restoration, complete.	963.1	LM	$ 27.10	$ 26,100.00
d)	**Station 7+888.7 to Station 9+632.0 – Heavy Sediment Removal;** Provide all labour, equipment, and materials to excavate, bottom dip and remove all accumulated sediment material and restore the drain to the profile grade shown on the drawings (approx. 5900m^3), including placement of excavated materials, in random piles a minimum of 6.0m from the drain bank, cleanup and restoration, complete.	1743.3	LM	$ 21.86	$ 38,100.00
4.	**Flushing and Cleaning Culverts;** Provide all labour, equipment, and materials to carry out flushing and cleaning of all accumulated sediment and deleterious materials for restoration of the drain to the design grade as called out on the drawings for access bridges, including loading, hauling, and disposal of material, complete.				
a)	Bridge 21 (3.89m x 2.69m CSP Arch Bridge) – Access Bridge	21.0	LM	$ 100.00	$ 2,100.00
b)	Bridge 22 (8.50m x 2.50m Conc. Span Bridge) – Mersea Road 6	12.6	LM	$ 200.00	$ 2,600.00
c)	Bridge 23 (8.70m x 2.30m Conc. Span Bridge) – Mersea Road 5	11.8	LM	$200.00	$ 2,400.00
5.	**Access Bridge Removal;** **Bridge 8 (Station 1+535.4 to Station 1+539.6);** Provide all labour, equipment, and materials to completely remove and dispose of the existing concrete structure, end treatments, and delirious materials; restore the drain banks to its original drain configuration; Provide topsoil, seeding and mulch, clean-up and restoration, complete.	1.0	Lump Sum	$ 5,000.00	$ 5,000.00
				SUBTOTAL FOR PART A =	**$ 895,300.00**

PART B – Erosion Protection and Mitigation Measures

Item	Description	Est Qty	Unit	Unit Price	Total
6.	**General Erosion Protection;**				
a)	**Station 6+765.5 to Station 6+893.6 – Along Mersea Road 6;** Provide all labour, equipment, and materials to restore 107.1m of existing drain bank to a 2.0 horizontal to 1.0 vertical side slope and installation of sloped quarried limestone erosion protection, together with a 450mm wide x 450mm deep keyway along the toe of the slope, including the supply and placement of non-woven filter cloth underlay, excavation, compaction, grading and restoration, complete.				
	i. Drain Bank Restoration	107.10	LM	$ 83.10	$ 8,900.00
	ii. Quarried Limestone	289.17	tonnes	$ 100.00	$ 29,000.00
	iii. Filter Cloth	481.95	m^2	$ 5.00	$ 2,500.00
b)	**Station 6+893.6 to Station 6+898.6 – Mersea Road 6 Crossing (North Side);** Provide all labour, equipment, and materials to install approximately 5.0m of sloped quarried limestone erosion protection on both sides of the drain, together with a 450mm wide x 450mm deep keyway along the toe of the slope, including the supply and placement of non-woven filter cloth underlay, excavation, compaction, grading and restoration, complete.				
	i. Quarried Limestone	27.00	tonnes	$ 100.00	$ 2,700.00
	ii. Filter Cloth	45.00	m^2	$ 5.00	$ 300.00
c)	**Station 6+910.7 to Station 6+925.7 – Mersea Road 6 Crossing (South Side);** Provide all labour, equipment and materials to restore 15.0m of existing drain bank along the east side to a 1.5 horizontal to 1.0 vertical side slope and installation of sloped quarried limestone erosion protection, together with a 450mm wide x 450mm deep keyway along the toe of the slope, including the supply and placement of non-woven filter cloth underlay, excavation, compaction, grading and restoration, complete.				
	i. Drain Bank Restoration	15.0	LM	$ 100.00	$ 1,500.00
	ii. Quarried Limestone	37.80	tonnes	$ 100.00	$ 3,800.00
	iii. Filter Cloth	63.00	m^2	$ 5.00	$ 400.00

Item	Description	Est Qty	Unit	Unit Price	Total
d)	**Station 7+110.0 to Station 7+110.0 – Pond Outlet;** Provide all labour, equipment and materials to restore 5.0m of existing drain bank at the pond outlet pipe to a 1.5 horizontal to 1.0 vertical side slope and installation of sloped quarried limestone erosion protection, together with a 450mm wide x 450mm deep keyway along the toe of the slope, including the supply and placement of non-woven filter cloth underlay, excavation, compaction, grading and restoration, complete.				
	i. Drain Bank Restoration	5.00	LM	$ 300.00	$1,500.00
	ii. Quarried Limestone	10.50	tonnes	$ 100.00	$ 1,100.00
	iii. Filter Cloth	17.50	m^2	$ 5.00	$ 100.00
e)	**Station 7+867.8 to Station 7+875.8 – Mersea Road 5 Crossing (North Side);** Provide all labour, equipment and materials to install approximately 8.0m of sloped quarried limestone erosion protection on both sides of the drain, together with a 450mm wide x 450mm deep keyway along the toe of the slope, including the supply and placement of non-woven filter cloth underlay, excavation, compaction, grading and restoration, complete.				
	i. Quarried Limestone	33.60	tonnes	$ 100.00	$ 3,400.00
	ii. Filter Cloth	56.00	m^2	$ 5.00	$ 300.00
f)	**Station 11+510.2 to Station 11+540.2 – Mersea Road 19 Crossing. (West Side);** Provide all labour, equipment, and materials to restore 30.0m of existing drain bank along the west bank to a 1.5 horizontal to 1.0 vertical side slope and installation of sloped quarried limestone erosion protection, together with a 450mm wide x 450mm deep keyway along the toe of the slope, including the supply and placement of non-woven filter cloth underlay, excavation, compaction, grading and restoration, complete.				
	i. Drain Bank Restoration	30.00	LM	$ 100.00	$ 3,000.00
	ii. Quarried Limestone	90.00	tonnes	$ 100.00	$ 9,000.00
	iii. Filter Cloth	150.00	m^2	$ 5.00	$ 800.00

Item	Description	Est Qty	Unit	Unit Price	Total
7.	**Surface Inlet Repairs** **Surface Inlet Rock Chute Repairs at Station 8+615.0, 8+687.0, & 8+827.0;** Provide all labour, equipment and materials to restore the existing drain bank to a 1.5 horizontal to 1.0 vertical side slope and install a 3.0m wide sloped quarried limestone rock chute, together with a 450mm wide x 450mm deep keyway along the toe of the slope, including the supply and placement of non-woven filter cloth underlay, excavation, compaction, grading and restoration, complete.	3.0	Each	$ 1,600.00	$ 4,800.00
8.	**Log Vanes**				
a)	**Single Log Vanes – Between Station 7+580.0 and 7+680, 11+065.0 and 11+115.0, 11+255.0 and 11+285.0;** Provide all labour, equipment, and materials to utilized timber salvaged from the selective tree removal as part of this project and install single log vanes, including the supply and placement of repurposed timber, excavation, stability supports, anchor posts, scour pool, complete.	11.0	Each	$ 800.00	$ 8,800.00
b)	**Cross Vanes – Station. 6+720.0, 10+220.0, 11+490.0, and 13+180.0;** Provide all labour, equipment, and materials to utilized timber salvaged from the selective tree removal as part of this project to install cross vanes, including the supply and placement of repurposed timber, excavation, stability supports, anchor posts, scour pool, complete.	4.0	Each	$ 2,700.00	$ 10,800.00
				SUBTOTAL FOR PART B =	**$ 92,700.00**

PART C – Buffer Strip Installation

Item	Description	Est Qty	Unit	Unit Price	Total
9.	**Buffer Strips;**				
a)	**Station 0+466.5 to Station 0+746.4 – Install Grassed Buffer Strip;** Till the 3.0 metre buffer strips adjacent to the south drain bank and carry out hydro-seeding and mulching along the top of bank for approximately 279.9 lineal metres (839.7m^2) of affected area.	839.7	m^2	$ 3.10	$ 2,600.00
b)	**Station 0+855.8 to Station 1+261.8 – Install Grassed Buffer Strip;** Till the 3.0 metre buffer strips adjacent to the south drain bank and carry out hydro-seeding and mulching along the top of bank excluding existing grassed areas, for approximately 406.0 lineal metres (1218.0m^2) of affected area.	1218.0	m^2	$ 3.04	$ 3,700.00
c)	**Station 1+293.5 to Station 1+872.0 – Install Grassed Buffer Strip;** Till the 3.0 metre buffer strips adjacent to the west and north drain bank and carry out hydro-seeding and mulching along the top of bank for approximately 578.5 lineal metres (1735.5m^2) of affected area.	1735.5	m^2	$ 3.05	$ 5,300.00
d)	**Station 1+997.0 to Station 3+083.7 – Install Grassed Buffer Strip;** Till the 3.0 metre buffer strips adjacent to the north and east drain bank and carry out hydro-seeding and mulching along the top of bank for approximately 1086.7 lineal metres (3260.1m^2) of affected area.	3260.1	m^2	$ 3.01	$ 9,800.00
e)	**Station 3+362.0 to Station 4+030.1 – Install Grassed Buffer Strip**; Till the 3.0 metre buffer strips adjacent to the north drain bank and carry out hydro-seeding and mulching along the top of bank for approximately 668.1 lineal metres (2004.3m^2) of affected area.	2004.3	m^2	$ 3.04	$ 6,100.00
f)	**Station 3+405.9 to Station 3+865.5 – Install Grassed Buffer Strip;** Till the 3.0 metre buffer strips adjacent to the south drain bank and carry out hydro-seeding and mulching along the top of bank for approximately 459.6 lineal metres (1378.8 m2) of affected area.	1378.8	m^2	$ 3.05	$ 4,200.00

Item	Description	Est Qty	Unit	Unit Price	Total
g)	**Station 4+216.1 to Station 4+247.0 – Install Grassed Buffer Strip**; Till the 3.0 metre buffer strips adjacent to the north drain bank and carry out hydro-seeding and mulching along the top of bank for approximately 30.9 lineal metres (92.7m^2) of affected area.	92.7	m^2	$ 3.24	$ 300.00
h)	**Station 4+268.1 to Station 4+351.8 – Install Grassed Buffer Strip**; Till the 3.0 metre buffer strips adjacent to both sides of the drain and carry out hydro-seeding and mulching along the top of bank for approximately 83.7 lineal metres (502.2m^2) of affected area.	502.2	m^2	$ 3.19	$ 1,600.00
i)	**Station 6+037.4 to Station 6+774.0 – Install Grassed Buffer Strip;** Till the 3.0 metre buffer strips adjacent to both sides of the drain and carry out hydro-seeding and mulching along the top of bank for approximately 736.6 lineal metres (4419.6m^2) of affected area.	4419.6	m^2	$ 3.01	$ 13,300.00
j)	**Station 6+774.0 to Station 6+888.4 – Install Grassed Buffer Strip**; Till the 3.0 metre buffer strips adjacent to the north drain bank and carry out hydro-seeding and mulching along the top of bank for approximately 114.4 lineal metres (343.2m^2) of affected area.	343.2	m^2	$ 3.21	$ 1,100.00
k)	**Station 6+913.4 to Station 7+013.4 – Install Grassed Buffer Strip**; Till the 3.0 metre buffer strips adjacent to the east drain bank and carry out hydro-seeding and along the top of bank for approximately 100.0 lineal metres (300.0m^2) of affected area.	300.0	m^2	$ 3.00	$ 900.00
l)	**Station 7+054.2 to Station 7+868.3 – Install Grassed Buffer Strip;** Till the 3.0 metre buffer strips adjacent to the west drain bank and carry out hydro-seeding and mulching along the top of bank for approximately 814.1 lineal metres (2442.3m^2) of affected area.	2442.3	m2	$ 3.03	$ 7,400.00
m)	**Station 7+439.7 to Station 7+733.7 – Install Grassed Buffer Strip;** Till the 3.0 metre buffer strips adjacent to the east drain bank and carry out hydro-seeding and mulching along the top of bank for approximately 294.0 lineal metres (882.0m^2) of affected area.	882.0	m2	$ 3.06	$ 2,700.00

Item	Description	Est Qty	Unit	Unit Price	Total
n)	**Station 10+864.2 to Station 11+086.0 – Install Grassed Buffer Strip;** Till the 3.0 metre buffer strips adjacent to the north drain bank and carry out hydro-seeding and mulching along the top of bank for approximately 221.8 lineal metres (665.4m^2) of affected area.	665.4	m^2	$ 3.01	$ 2,000.00
				SUBTOTAL FOR PART C =	**$ 61,000.00**

CONSTRUCTION TOTALS SUMMARY – DRAIN IMPROVEMENT WORKS	
TOTAL FOR PART A – Drain Improvements (brought forward)	$ 905,300.00
TOTAL FOR PART B – Erosion Protection & Mitigation Measures (brought forward)	$ 92,700.00
TOTAL FOR PART C – Buffer Strip Installation (brought forward)	$ 61,000.00
SUBTOTAL	**$ 1,059,000.00**
Net HST (1.76%)	**$ 18,638.00**
TOTAL FOR CONSTRUCTION =	**$ 1,077,638.00**

INCIDENTALS FOR DRAIN IMPROVEMENT WORKS (PARTS A THROUGH C)	
Report, Estimates and Specifications	$ 89,900.00
Survey, Assistance, Expenses and Drawings	$ 89,900.00
Conduct Hydraulic Analysis and Modelling	$ 22,500.00
Updated Maintenance Schedule	$ 22,500.00
Duplicating Report and Drawings	$ 800.00
Estimated Cost for Letting Contract	$ 3,700.00
Estimated Cost for Part-Time Inspection, Supervision and Project Management during Construction (approx. 17 weeks duration)	$ 36,500.00
Real Estate Appraisal Reports	$ 5,500.00
Environmental Constraints Analysis and Mitigation Plan	$ 26,800.00
Biological Mitigation and Monitoring Implementation Plan (during construction)	$ 30,000.00
Net HST on the above items (1.76%)	$ 5,776.00
Estimate Cost for ERCA Permit	$ 800.00

TOTAL FOR INCIDENTALS =	**$**	**334,676.00**
TOTAL FOR LAND TAKEN (brought forward) =	**$**	**255,822.00**
TOTAL FOR DAMAGES (brought forward) =	**$**	**20,867.00**
TOTAL FOR EXISTING DRAIN (brought forward) =	**$**	**13,990.00**
TOTAL FOR CONSTRUCTION (brought forward) =	**$**	**1,077,638.00**
TOTAL ESTIMATE (PARTS A THROUGH C)=	**$**	**1,702,993.00**

CONSTRUCTION ITEMS - WETLAND

PART D – Wetland Construction

Item	Description	Est Qty	Unit	Unit Price	Total
10	**Water, Sediment, and Erosion Control Plan, Fish Salvage and Fish Exclusion;** Provide a Water Control Plan required to obtain the necessary permits and approval; Provide all labour, equipment, and materials to implement the Water Control Plan, together with the Fish Salvage and Fish Exclusion Measures as outlined within the specifications, complete.	1.0	Lump Sum	$4,000.00	$4,000.00
11.	**Station 7+770.0 to Station 7+875.8;** Provide all labour, equipment, and materials to remove all accumulated sediment material and restore the bottom of the Lebo Creek Drain to the profile grade shown on the drawings (approximately 155m^3), including spreading and levelling spoil material, restoration, loading and handling, cleanup and restoration, complete.	105.8	LM	$ 28.36	$ 3,000.00
12.	**Station 0+000.0W to Station 0+098.1W;** Provide all labour, equipment, and materials to strip and windrow all topsoil from the entire wetland site; excavate the new wetland and forebay, approximately 98.1 lineal metres (approximately 2250m^3) in accordance with the accompanying drawings and specifications, including grading of side slopes, channel, and deep pools, complete.	98.1	LM	$ 277.27	$ 27,200.00
13.	**Station 0+060.0W to Station 0+075.8W;** Provide all labour, equipment, and materials to spread excavated material to the north and to construct the new earthen berm along the east limit of the Wetland (approximately 2250m^3) in accordance with the accompanying drawings and specifications, including placement, compaction, grading, complete.	2250	m3	$ 3.33	$ 7,500.00

Item	Description	Est Qty	Unit	Unit Price	Total
14.	**Station 0+035.1W to Station 0+047.1W;** Supply and install approximately 12.0 lineal metres of 525mm diameter 320kPa, smoothwall HDPE plastic pipe with gasketed bell and spigot joining system for pond inlet, including excavation, backfill, compaction and restoration, complete.	12.0	LM	$ 250.00	$ 3,000.00
15.	**Station 0+080.1W to Station 0+098.1W;** Supply and install approximately 18.0 lineal metres of 525mm diameter 320kPa, smoothwall HDPE plastic pipe with gasketed bell and spigot joining system for pond outlet, including excavation, backfill, compaction and restoration, complete.	18.0	LM	$ 250.00	$ 4,500.00
16.	**Quarried Limestone End Protection;** Supply and install 300mm thick quarried limestone erosion protection on non-woven geotextile at the wetland pipe inlet and outlet ends, including all excavation, hauling, disposal and placement, compaction, complete.				
	a) Approximately 135.0 tonnes of 100mm to 250mm graded quarried limestone.	135.0	tonnes	$ 89.63	$ 12,100.00
	b) Approximately 20.0 square meters of non-woven filter cloth.	20.0	m2	$ 30.00	$ 600.00
17.	**Topsoil, Seeding and Mulching – Side Slopes;** Spread 50mm thick of scavenged topsoil on all newly excavated side slopes, (approx. 1500m^2), complete.	1500.0	m2	$ 1.33	$ 2,000.00
18.	**Topsoil, Seeding and Mulching – Uplands;** Spread 100mm thick of scavenged topsoil on all uplands, disturbed areas, earthen berm and the new 4.0 metre wide buffer strip on the east side of the Lebo Creek Drain, (approx. 2500m^2), complete.	2500.0	m^2	$ 1.36	$ 3,400.00
19.	**Precast Concrete Interlocking Block Weir;** Supply and install a 4.80 metre long x 0.61-metre high precast concrete block weir with footing, including placement, all excavation, drain widening, hauling, and disposal complete.	1.0	Lump Sum	$ 6,500.00	$ 6,500.00

Item	Description	Est Qty	Unit	Unit Price	Total
20.	**Quarried Limestone End Protection;** Supply and install 300mm thick quarried limestone erosion protection on non-woven geotextile on each end of the precast concrete block weir, including all excavation, hauling, disposal and placement, complete.				
	a) Approximately 30.0 tonnes of 100mm to 250mm graded quarried limestone.	30.0	tonnes	$ 90.00	$ 2,700.00
	b) Approximately 10.0 square meters of non-woven filter cloth.	10.0	m^2	$ 30.00	$ 300.00
21.	**Final Cleanup and Restoration;** Provide all labour, and materials to clean-up the project site on completion of the work, complete.	1.0	Lump Sum	$ 600.00	$ 600.00
				SUBTOTAL PART D	**$ 77,400.00**
				Net HST (1.76%)	**$ 1,362.00**
				TOTAL FOR CONSTRUCTION =	**$ 78,762.00**

INCIDENTALS FOR WETLAND (Part D Only)	
Meetings, Coordination, Site Walkthroughs etc.	$ 10,500.00
Survey, Assistance, Expenses and Drawings etc.	$ 12,000.00
Contract Administration, Inspections etc.	$ 7,500.00
Net HST on the above items (1.76%)	$ 528.00
Estimate Cost for ERCA Permit	$ 800.00
TOTAL FOR INCIDENTALS =	**$ 31,328.00**
TOTAL FOR LAND TAKEN (brought forward) =	**$ 23,165.00**
TOTAL FOR CONSTRUCTION (brought forward) =	**$ 78,762.00**
TOTAL ESTIMATE (PART D ONLY) =	**$ 133,255.00**

SUMMARY OF ESTIMATE (Including Net HST)	
TOTAL FOR CONSTRUCTION – PART A THROUGH C (brought forward) =	$ 1,077,638.00
TOTAL FOR CONSTRUCTION – PART D (brought forward) =	$ 78,762.00
TOTAL FOR INCIDENTALS =	$ 366,004.00
TOTAL FOR LAND TAKEN (brought forward) =	$ 278,987.00
TOTAL FOR DAMAGES (brought forward) =	$ 20,867.00
TOTAL FOR EXISTING DRAIN (brought forward) =	$ 13,990.00
TOTAL ESTIMATE =	**$ 1,836,248.00**

XIV. DRAWINGS AND SPECIFICATIONS

As part of this report, we have attached the design drawings for the improvements proposed under this project. The design drawings show the alignment of the Lebo Creek Drain, the overall watershed limits, and the approximate location of all structures within this drain. These drawings further illustrate the required improvements and ancillary works associated with this Municipal Drain. The design drawing is attached to the back of this report and is labelled herein as **Appendix "E"**. The drawings attached herein have been reduced in size and the scale therefore varies. However, full-scale drawings can be viewed at the Leamington Municipal Office, if required.

Furthermore, we have prepared Specifications which set out the required construction details for the various aspects of the works to be conducted under this report.

As part of the Biological Evaluation for this project, LGL Limited has provided an Environmental Constraints Analysis and Mitigation Plan to meet the requirements of the Endangered Species Act. Copies of these documents are included herein as **Appendix "A"**.

To assist with defining working corridors and access routes, together with identifying buffer strip installations, detailed aerial photo maps have been included within **Appendix "B"** and **Appendix "C"** respectively. Also attached, are Appraisal Reports provided by Fuerland Realty Ltd., which outline the pertinent fair market real estate values of the pertinent land affected by the project. These reports are attached herein as **Appendix "D"**.

XV. COST DISTRIBUTION AND CONSTRUCTION SCHEDULE OF ASSESSMENT RATIONALE

We would recommend that all of the costs associated with the improvements to the Lebo Creek Drain, including all related incidental expenses, be charged against the lands and roads affected per the attached **Construction Schedule of Assessment**.

It should be noted that the attached Construction Schedule of Assessment shall be utilized only for the sharing of all of the costs associated with the work being provided for under this report and said Construction Schedule of Assessment should not be utilized, under any circumstance, for the sharing of any future maintenance works conducted to any portion of the Municipal Drainage System established herein.

Assessment Components

The total individual assessments, within the Construction Schedule of Assessments, are comprised of four (4) separate assessment components, including:

i. Benefit *is defined as advantages to any lands, roads, buildings or other structures from the construction, improvement, repair or maintenance of a drainage works such as will result in a higher market value or increased crop production or improved appearance or better control of surface or subsurface water, or any other advantages relating to the betterment of lands, roads, buildings or other structures, as it relates to Section 22 of the Drainage Act.*

ii. Outlet Liability *is defined as part of the cost of the construction, improvement or maintenance of a drainage works that is required to provide such outlet or improved outlet, as it relates to Section 23 of the Drainage Act.*

iii. Special Benefit *is defined as any additional work or feature included in the construction, repair or improvement of a drainage works that has no effect on the functioning of the drainage works, as it relates to Section 24 of the Drainage Act.*

iv. Special Non-Proratable (Section 26) Assessment *is defined as; in addition to all other sums lawfully assessed against the property of a public utility or road authority under this Act, and despite the fact that the public utility or road authority is not otherwise assessable under the Act, the public utility or road authority shall be assessed for and shall pay all the increase of cost of such drainage works caused by the existence of the works of the public utility or road authority.*

Assessments Shared with the Watershed

Based on the details of this project, we have established our construction assessment rationale and determinations relative to the various improvements being carried out to the Lebo Creek Drain. Through this review, we have determined that specific components of this project shall be assessed to the lands and roads within the Lebo Creek Drain watershed. These components include the following:

a) Dead Wood Removal, Brushing and Drain Cleanout: These works alongside and within the open drain form part of the general maintenance and upkeep of the Municipal Drain. These works include the removal of all brush and trees to facilitate the removal of accumulated sediment. These works are necessary to enhance the hydraulic carrying capacity of the channel, restore the drain to its optimal design and provide peak performance, together with providing a sufficient outlet for the drainage system. Based on the current condition of the drain, and the works required to restore and maintain the necessary conveyance of flow through the system, these improvements are focused on the portions of the watercourse downstream of Mersea Road 7. All of the construction costs, together with the applicable incidental costs, associated with the dead wood removal, brushing, and drain cleanout of the Lebo Creek Drain amount to a total estimated cost of **$1,190,648.00**. These costs shall be assessed to all lands and roads adjacent to the portion of this drain, between Station 4+786.1 and Station 13+200.1, and all upstream lands and roads that contribute their runoff to this section of the Lebo Creek Drain.

b) Bridge 8 Removal: Through our investigations, it was found that Bridge 8 was in disrepair and no longer required to access the property. It was further found that this access bridge forms a legal entity with respect to the existing Municipal Drain. The construction costs, together with the applicable incidental costs, associated with the removal of Bridge 8 amount to a total estimated cost of **$6,665.00**. With this access structure as an established entity within this Municipal Drain, where flows from upstream contributed to the sizing and overall deterioration of this access structure, these costs shall be shared with the adjacent property and all upstream lands and roads that contribute flows through this structure.

c) Erosion Mitigation Measures: As part of the works outlined within this report, erosion control vanes have been incorporated at strategic locations to assist in mitigating long-term channel erosion. The erosion protection and mitigation measures will help reduce the sedimentation and deposition within the open drain, while also providing overall ecological benefits for the entire drain. All of the construction costs, together with the applicable incidental costs, associated with the erosion mitigation measures within the Lebo Creek Drain amount to a total estimated cost of **$26,065.00**. Due to their overall ecological benefits and reduction in overall future maintenance, these costs shall be assessed to all lands and roads adjacent to the entire length of the drain, together with all upstream lands and roads that contribute their runoff to this Municipal Drain.

d) Specific Erosion Protection Measures (Surface Inlet and Tile Outlet Repairs): As part of the works outlined within this report, erosion protection has been recommended at specific locations along the course of the open drain to help stabilize the drain banks, together with reducing erosion and sedimentation caused by the flows entering and/or exiting the open channel. The quarried limestone erosion protection shall be placed along the drain banks at specific locations where surface and sub-surface flows enter and/or exit the Lebo Creek Drain channel and have created significant erosion. These locations are as follows:

i. Station 7+110.0 to Station 7+115.0 within Parcel 175: Erosion protection is recommended to restore the drain bank where an existing pond outlet pipe has created significant erosion along the drain bank. The construction costs, together with the applicable incidental costs, associated with the erosion protection within the Lebo Creek Drain amount to a total estimated cost of **$3,751.00**. With the recommended repair to facilitate and protect the adjacent agricultural lands, these costs shall be assessed directly to the benefitting property as a Special Benefit assessment.

ii. Stations 8+615.0, 8+687.0, and 8+827.0 within Parcel 120: Rock Chute Erosion protection is recommended to restore the drain bank at specific locations where the drain flows have exited the open channel and have created significant erosion along the drain bank. The construction costs, together with the applicable incidental costs, associated with these rock chutes within the Lebo Creek Drain amount to a total estimated cost of **$6,383.00**. With the recommended repair to facilitate and protect the adjacent agricultural lands, these costs shall be assessed directly to the benefitting property as a Special Benefit assessment.

All of the construction costs, together with the applicable incidental costs, associated with the erosion protection within the Lebo Creek Drain amount to a total estimated cost of **$10,134.00**.

e) Buffer Strips: As part of the works outlined within this report, buffer strips are to be installed along the Lebo Creek Drain where none currently exist. Healthy soils in the areas alongside open channels perform vital functions such as protecting water quality and providing habitat for local fish and wildlife. These areas can become degraded and less functional when impacted by poor management practices in adjacent croplands and pastures. Buffer strips can provide a last line of defence to protect water quality from runoff and form part of an overall soil health plan complementary to agricultural Best Management Practices (BMPs) for soil and cropland. As such, the Municipality of Leamington has implemented a policy to ensure that the incorporation of buffer strips in drainage reports is handled consistently across the Municipality. All of the construction costs, together with the applicable incidental costs, associated with the installation of buffer strips alongside the Lebo Creek Drain amount to a total estimated cost of **$81,122.00**. Due to their overall ecological benefits and reduction in overall future maintenance, these costs shall be assessed to all lands and roads adjacent to the entire length of the drain, together with all upstream lands and roads that contribute their runoff to this Municipal Drain.

f) Wetland: As part of the works outlined within this report, a wetland shall be installed alongside the Lebo Creek Drain. All of the construction costs, together with the applicable incidental costs, associated with the installation of the wetland amount to a total estimated cost of **$110,090.00**. Wetlands play an integral role in the ecology of the watershed by enhancing fish and wildlife habitat, together with providing flood protection measures. As such, these costs shall be assessed to all lands and roads adjacent to the entire length of the drain, together with all upstream lands and roads that contribute their runoff to this Municipal Drain. **Although external funding has been procured for the wetland construction, these costs have been included as part of the overall project cost to reflect the works that form part of the Municipal Drain.**

g) Allowances: All allowances and compensation outlined within this report are to be distributed to individual property owners for the damages and land taken to facilitate the necessary improvements to the Lebo Creek Drain. The total amount of payment to these affected lands is **$313,844.00.** These costs shall be assessed to all lands and roads adjacent to the entire length of Lebo Creek Drain, together with all upstream lands and roads that contribute their runoff to this Municipal Drain.

As a result of the above, the total cost to be assessed to the lands and roads within the Lebo Creek Drain watershed is an estimated value of $**1,836,248.00**. Generally speaking, these costs have been distributed within the attached Construction Schedule of Assessment, based on the following principles:

Assessment Rationale

Benefit Assessment - The removal of trees, brush and debris, along with the excavation of accumulated sediment within the open channel will drastically improve the flow of water through the drainage system. The improvements to the drain will enhance the hydraulic capacity of the channel and provide a sufficient outlet for the drainage system. As a result, the properties located close to the Lebo Creek Drain channel benefit from the improvements to the open drain, reducing the backup of flood water and potential damages to their property. Therefore, the Benefit Assessment shown within the Construction Schedule of Assessment is levied against those properties that reside in close proximity to the drain and the works proposed, based on the definition provided above.

Special Benefit Assessment – Any special feature requested or required for the sole betterment of a single property, that does not affect the functionality of the drainage system shall be assessed as a Special Benefit Assessment. This Special Benefit Assessment would also include any special features to enhance a property, such as surface inlet repairs, pond outlet repairs, etc.

Outlet Assessment – According to the parameters set within Section 23 of the Drainage Act, all lands which utilize the Municipal Drain as a drainage outlet may be assessed for Outlet Liability. As further outlined within Section 23(3) of the Drainage Act, the Outlet Assessment is "***…based on the volume and rate of flow of the water artificially caused to flow***…". Based on the characteristics of the lands that contribute flow to the Lebo Creek Drain, runoff factors have been applied based on the land use of each property to reflect the actual amount of water that is artificially collected and discharged into this Municipal Drain. Therefore, developed lands (residential, commercial, industrial lots and roads) have an increased run-off factor applied to their assessment. Contrarily, lands which have surface (or subsurface) runoff that exits the watershed, or contains woodlots would have a decreased run-off factor applied to their assessment. Furthermore, additional factors have been included in these outlet assessments that relate to soil types and the location of where each property's runoff enters the Lebo Creek Drain.

Special Non-Proratable Assessments

The Special Assessments outlined below are to provide additional clarification and summarize the assessments listed under Section 6 of the Construction Schedule of Assessment, based on the assessment rationale determined in the preceding paragraphs:

A. We determined that a Special Assessment shall be assessed to the **Municipality of Leamington Roads Department** for the increase of cost to the project related to the flushing of Bridge 22 and Bridge 23, which serve Mersea Road 6 and Mersea Road 5 crossings, respectively. This extra **non-proratable** cost to the project consists of all construction works associated with Construction Items 4b and 4c, within this report. The estimated net increase in cost to the project caused by these above special improvements in the Lebo Creek Drain, together with all related incidental expenses is **$6,648.00**.

The above estimated Special Assessment to the Municipality of Leamington Roads Department pursuant to Section 26 of the Drainage Act, is listed under Section 6 of the Construction Schedule of Assessment and is to be **non-proratable**. The incidental cost portion associated with the above net cost consists of an amount of **$1,560.00**.

Once the construction of this work is completed, the Municipality of Leamington Roads Department shall be assessed for the **actual construction costs** for Construction Items 4b and 4c, together with its share of the project incidental costs associated with these works, in the estimated amount of **$1,560.00**. This combined total represents the actual Section 26 Special Assessment amount to be assessed to the Municipality of Leamington Roads Department for this work and this actual amount shall replace the estimated amount outlined in Section 6 of the Construction Schedule of Assessment when charging out the works to the affected lands and roads.

B. We determined that a Special Assessment shall be assessed to the **Municipality of Leamington Roads Department** for the increase of cost to the project related to the necessary erosion protection measures, which serve Mersea Road 6, Mersea Road 5, and Mersea Road 19 right-of-way, respectively. This extra **non-proratable** cost to the project consists of all construction works associated with Construction Items 6a, 6b, 6c, 6e, and 6f, within this report. The estimated net increase in cost to the project caused by these above special improvements in the Lebo Creek Drain, together with all related incidental expenses is **$91,047.00**.

The above estimated Special Assessment to the Municipality of Leamington Roads Department pursuant to Section 26 of the Drainage Act, is listed under Section 6 of the Construction Schedule of Assessment and is to be **non-proratable**. The incidental cost portion associated with the above net cost consists of an amount of **$24,293.00.**

Once the construction of this work is completed, the Municipality of Leamington Roads Department shall be assessed for the **actual construction costs** for Construction Items 6a, 6b, 6c, 6e, and 6f, together with its share of the project incidental costs associated with these works, in the estimated amount of **$24,293.00**. This combined total represents the actual Section 26 Special Assessment amount to be assessed to the Municipality of Leamington Roads Department for this work and this actual amount shall replace the estimated amount outlined in Section 6 of the Construction Schedule of Assessment when charging out the works to the affected lands and roads.

Distribution of Unforeseen Costs

These non-proratable assessments to the Municipality of Leamington do not include any unforeseen costs that may arise during construction, nor does it include any potential costs for appeals to the Court of Revision, Tribunal or Referee. Any costs to the project associated with dealing with any of these Appeals shall be shared by all assessments in the Construction Schedule of Assessment including all Section 6 non-proratable assessments, as well as any Special Benefit Assessments on a pro-rata basis, or as otherwise established in any Decisions from these forums.

Furthermore, during construction, it may become necessary to temporarily or permanently relocate existing utilities that may conflict with the works outlined within this report. Under these circumstances, the relocation of these utilities shall be assessed for any relocation costs against the public utility having jurisdiction in accordance with Section 26 of the Drainage Act. In accordance with Section 69 of the Drainage Act, the utility company is allowed the option to carry out this work utilizing their own forces and at their own cost. However, should they not exercise this option within a reasonable time, the Municipality may arrange to have this work completed and the costs for this work shall be charged to the appropriate public utility. Furthermore, any unforeseen construction costs directly related to the Section 26 works shall be assessed entirely, as an extra, to the applicable Road Authority or Utility.

Agricultural Grants and Grant Eligibility

The Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) issued Administrative Policies for the Agricultural Drainage Infrastructure Program (ADIP). This program provides financial assistance for eligible costs and assessed lands pursuant to the Drainage Act. Sections 85 to 90 of the Drainage Act allow the Minister to provide grants for various activities under said Act. Sections 85 and 87 make it very clear that grants are provided at the discretion of the Minister. Based on the current ADIP, "lands used for agricultural purposes" may be eligible for a grant in the amount of 1/3 of their total assessment. The policy defines "lands used for agricultural purposes" as those lands eligible for the "Farm Property Class Tax Rate". The Municipal Clerk has provided this information to the Engineer from the current property tax roll and the Engineer has further confirmed this information with the AGMaps Geographic Information Portal Services through OMAFRA. Properties that meet the criteria for "lands used for agricultural purposes" are shown in the attached Assessment Schedules under the subheading "**5. PRIVATELY OWNED – AGRICULTURAL LANDS (grantable)**" and are expected to be eligible for the 1/3 grant from OMAFRA. Under these provisions, we expect that this project will qualify for the grant normally available for agricultural lands. We would, therefore, recommend that the Municipality of Leamington make an application, on their behalf, for a Grant from the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) in the amount of 1/3 of their total assessment for this project, in accordance with the provisions of Sections 85 and 88 of the "Drainage Act, RSO 1990, Chapter D.17, as amended 2021". Even though it is our opinion that certain lands shall likely be eligible for grants, there is no guarantee that these lands will qualify or that grants may be available in the future.

During our investigations, we determined that some agricultural lands, which may be used for agricultural purposes, are not currently eligible for this grant primarily because they do not have a Farm Tax Classification. These lands are as follows:

Table 3 - Agricultural Lands Currently Not Eligible for Grant

Parcel ID Number	Roll Number	Owner's Name
7	560-02100	
14	560-02600	
23	560-03300	
42	570-06400	
64	610-01600	
79	610-02205	
93	610-02800	
104	620-00150	
129	620-02602	
131	620-02604	
133	620-02700	
149	620-03303	
155	620-03600	
156	620-03601	
157	620-03700	
158	620-03702	
164	620-04000	
185	670-02900	
186	670-03000	
231	700-01960	
233	700-02050	
235	700-02101	
248	700-02805	
302	710-03500	
331	710-05370	
369	730-00250	
382	740-00610	
384	740-00650	
415	750-00500	
417	750-00520	
418	750-00600	
431	750-01005	
457	750-03150	
485	760-03300	
531	790-00405	

These lands, in the Schedules of Assessment, have been categorized and listed under the heading "**5. PRIVATELY OWNED – AGRICULTURAL LANDS (non-grantable)**" which means that these properties would not be eligible for the OMAFRA grant. If these agricultural lands, qualify for the Farm Tax Classification, it would be anticipated that they would have been eligible for the grant. From our research into how the Farm Tax Classifications are determined, and from further discussions with OMAFRA representatives, in order to gain a Farm Tax Classification, the Owner would need to meet the following criteria:

1) Property Owner must be a Canadian Citizen or Permanent Resident of Canada

2) Registered Farm Business that generates a minimum gross income of $7,000.00.

For the agricultural lands currently listed under the heading "**5. PRIVATELY OWNED – AGRICULTURAL LANDS (non-grantable)**" one of the above items is likely the reason why they are not eligible for the OMAFRA grant. Therefore, we encourage these eligible landowners, which meet these criteria, to apply to become eligible for this grant. For more information on Farm Property Class Tax Rate Program, please visit: http://omafra.gov.on.ca/english/policy/ftaxfaq.html

As part of this project, we have provided separate Maintenance Schedules of Assessment for the Lebo Creek Drain. It should be noted that the preparation of these new Maintenance Schedules of Assessment under Section 76 of the Drainage Act is not normally eligible for the grant. However, according to Section 2.3(e) of the OMAFRA "Agricultural Drainage Infrastructure Program: Administrative Policies", where the cost of developing new Assessment Schedules is less than 25% of the engineering costs for the total project, the engineering cost expended towards the preparation of same shall be eligible for the grant. Since the engineering costs for the preparation of Maintenance Schedules of Assessment included herein are less than 25% of the overall engineering costs, we would expect that all of the agricultural assessments associated with the preparation of the new maintenance schedule **shall** be eligible for the grant.

We would, therefore, recommend that all of the costs associated with the preparation of these new Maintenance Schedules of Assessment be charged against the lands and roads affected per the attached Construction Schedule of Assessment included herein. Lands that are used for agricultural purposes have been listed in the Construction Schedule of Assessment under Subheading **"5. PRIVATELY OWNED - AGRICULTURAL LANDS (grantable)**".

XVI. SPECIAL CONSIDERATIONS

Stormwater Management Provisions

It shall be noted that some developments within the Lebo Creek Drain watershed convey their runoff through existing Stormwater Management (SWM) facilities. SWM facilities are utilized to control stormwater discharge from a site with increased runoff caused by development and further restrict flows to a pre-development flow rate (or less). Although SWM is intended to control the peak discharge into the receiving drainage system, the rainfall on developed sites with increased impermeable conditions creates an additional volume of runoff that is stored within SWM facilities (Ponds, underground chambers, etc.). The increased total volume of water is discharged from the SWM facilities over an extended period, to empty the pond after a rain event. As a result, SWM facilities generally contribute a higher total volume of water that travels through the receiving drains. Also, with the delayed release of runoff created by SWM facilities, these facilities discharge flows over an extended period of time, creating extended saturation and higher direct erosion throughout the drain bottom. These extended flows and added volume tend to destabilize the drain banks, as the receiving drains are wetter for longer periods. The effects of SWM are considered an injuring liability to the receiving drains, which will generally reduce the service life of the open drain and result in more periodic drain maintenance. Thus, creating increased

maintenance costs. Pursuant to Section 23 of the Drainage Act we have taken into account the increased volume of artificial runoff discharging from the SWM systems and have factored this provision into the outlet assessment for the lands being served by the SWM systems within our new Schedules of Assessment for the Lebo Creek Drain.

Future Developments

The assessments derived within the Schedules of Assessments have been evaluated based on the current conditions and existing developments. It is anticipated that additional areas within the Lebo Creek Drain watershed are slated for future agricultural, residential, commercial, and industrial developments. These future developments will create higher runoff from each site and will result in increased flows into the Lebo Creek Drain. It shall be noted that the Municipality had completed a holistic stormwater management study for the Lebo Creek Drain watershed to derive specific stormwater management design criteria, such as the allowable release rate(s) and flood control measures for future development within the watershed. This document is titled the "Lebo Creek Master Drainage Study" and the final version is dated September 20, 2022. **Therefore, we recommend that when future developments are proposed within the Lebo Creek Drain watershed, the proponent and/or their consultant shall adhere to the recommendations outlined within the Lebo Creek Master Drainage Study Report**. Proper SWM facilities restricting the flows to the allowable release rate will ensure that the subsequent flows will have no adverse effect on the capacity of the Lebo Creek Drain. However, as outlined above, SWM provisions will increase the total volume of water that travels through the receiving drains. Therefore, if the Municipality of Leamington is prepared to approve the increased total flow volumes from future developments, we recommend that an update to the "Outlet Assessments" shall be established for each future development site, through Section 65 or Section 76 of the Drainage Act.

XVII. FUTURE MAINTENANCE

Lebo Creek Drain – Open Drain

After the completion of all of the works associated with this Engineer's Report, we would recommend that the Lebo Creek Drain as established within this report, be kept up and maintained in the future through the Municipality of Leamington and at the expense of the lands and roads included within the Maintenance Schedules of Assessment attached herein and labelled **Appendix "F**".

In addition to the overall length of the Lebo Creek Drain, we have identified three (3) distinct sections of this drain where maintenance provisions shall be established and distributed on the following basis:

1. Entire Drain Length (Station 0+000.0 to Station 13+212.1)

   When future maintenance works are performed over the entire length of the Lebo Creek Drain, we recommend that the cost for these works of future maintenance shall be shared by the abutting landowners and upstream affected lands and roads, following the same proportions established within the **Future Maintenance Schedule of Assessment #1 Lebo Creek Drain (Station 0+000 to Station 13+212.1)** included within **Appendix "F"**. This Schedule of Assessment has been developed based on an assumed cost of **$100,000.00** and the future maintenance costs shall be

levied pro-rata to the affected lands and roads that are adjacent to and situated upstream of this section of drain for which future maintenance works have been carried out. Therefore, when **$100,000.00** worth of future maintenance work is expended on the entire length of the drain, the assessment to each of the individual affected property owners and roads shall be levied per the noted Maintenance Schedule of Assessment. It should be clearly understood that the amounts shown within this Schedule are only for prorating future maintenance costs for the drain and do not form part of the current cost for the work.

2. Upstream Section (Station 0+000.0 to Station 5+220.0)

When future maintenance works are performed strictly between Station 0+000.0 and Station 5+220.0 within the Lebo Creek Drain, we recommend that it be maintained in the future by the Municipality of Leamington. This reach of the Municipal Drain extends from its top end to a point immediately upstream of the confluence of the Hooker Drain. The cost for these works of future maintenance shall be shared by the abutting landowner and upstream affected lands and roads, following the same proportions established within the **Future Maintenance Schedule of Assessment #2 Lebo Creek Drain – Upstream Section (Station 0+000.0 to Station 5+220.0)** included within **Appendix "F"**. This Schedule of Assessment has been developed based on an assumed cost of **$50,000.00** and the future maintenance costs shall be levied pro-rata to the affected lands and roads that are situated adjacent to and upstream of this section of drain for which future maintenance works have been carried out. Therefore, when **$50,000.00** worth of future maintenance work is expended on this section of the drain, the assessment to each of the individual affected property owners and roads shall be levied per the noted Maintenance Schedule of Assessment. It should be clearly understood that the amounts shown within this Schedule are only for prorating future maintenance costs for the drain and do not form part of the current cost for the work.

3. Middle Section (Station 5+220.0 to Station 12+485.0)

When future maintenance works are performed strictly between Station 5+220.0 and Station 12+485.0 within the Lebo Creek Drain, we recommend that it be maintained in the future by the Municipality of Leamington. This reach of the Municipal Drain extends from a point immediately upstream of the confluence of the Hooker Drain to a point immediately upstream of the confluence of the Piggot Creek Drain. The cost for these works of future maintenance shall be shared by the abutting landowner and upstream affected lands and roads, following the same proportions established within the **Future Maintenance Schedule of Assessment #3 Lebo Creek Drain – Middle Section (Station 5+220.0 to Station 12+485.0)** included within **Appendix "F"**. This Schedule of Assessment has been developed based on an assumed cost of **$50,000.00** and the future maintenance costs shall be levied pro-rata to the affected lands and roads that are situated adjacent to and upstream of this section of drain for which future maintenance works have been carried out. Therefore, when **$50,000.00** worth of future maintenance work is expended on this section of the drain, the assessment to each of the individual affected property owners and roads shall be levied per the noted Maintenance Schedule of Assessment. It should be clearly understood that the amounts shown within this Schedule are only for prorating future maintenance costs for the drain and do not form part of the current cost for the work.

4. Downstream Section (Station 12+485.0 to Station 13+212.1)

When future maintenance works are performed strictly between Station 12+485.0 and Station 13+212.1 within the Lebo Creek Drain, we recommend that it be maintained in the future by the Municipality of Leamington. This reach of the Municipal Drain extends from a point immediately upstream of the confluence of the Piggot Creek Drain to its outlet into the Hillman Marsh, on the south side of Deer Run Road. The cost for these works of future maintenance shall be shared by the abutting landowner and upstream affected lands and roads, following the same proportions established within the **Future Maintenance Schedule of Assessment #4 Lebo Creek Drain – Downstream Section (Station 12+485.0 to Station 13+212.1)** included within **Appendix "F"**. This Schedule of Assessment has been developed based on an assumed cost of **$50,000.00** and the future maintenance costs shall be levied pro-rata to the affected lands and roads that are situated adjacent to and upstream of this section of drain for which future maintenance works have been carried out. Therefore, when **$50,000.00** worth of future maintenance work is expended on this section of the drain, the assessment to each of the individual affected property owners and roads shall be levied per the noted Maintenance Schedule of Assessment. It should be clearly understood that the amounts shown within this Schedule are only for prorating future maintenance costs for the drain and do not form part of the current cost for the work.

The attached Future Maintenance Schedules of Assessment for the Lebo Creek Drain are to be utilized only for the maintenance of the open drain, together with the flushing of sediment material within any existing access and municipal roadway crossing structures in the drain. If spot maintenance is performed within the specified reach of the drain, it is recommended that only those lands adjacent and upstream of the maintenance site be assessed for any future costs. It shall be noted that these schedules shall not be utilized for any other maintenance and repair works being conducted to any of the existing access or roadway crossing structures. These existing structures are to be assessed in a different fashion, as outlined below.

Lebo Creek Drain - Working Corridors and Access Routes

Access routes and working corridors have either been established in previous By-Laws or established within this Engineer's Report to help facilitate the necessary drainage improvements and future maintenance of the Lebo Creek Drain. The lands in which these working corridors and access routes have been established have currently or previously been compensated for and shall remain in perpetuity for initial construction and future maintenance works on the Lebo Creek Drain. Therefore, when construction and/or future maintenance works are being conducted, the Contractor shall be expected to keep all future equipment and forces within the established working corridors for any future maintenance performed on the Lebo Creek Drain. Although some of the working corridors have not been established herein, we have provided a summary of all access routes and working corridors within the Lebo Creek Drain and they are identified within the specifications and further illustrated on aerial maps included herein as **Appendix "B"**.

Lebo Creek Drain – Access and Road Crossing Structures

It shall be noted that for the Lebo Creek Drain a mechanism shall be established herein so that the Municipality can undertake future maintenance works to the existing access and roadway crossing structures (where applicable) within this Municipal Drain so that the future maintenance costs associated with each can be properly assessed to the affected lands and roads.

Therefore, as a mechanism for allocation of the cost for any works of future maintenance to all of the existing access and roadway crossing structures within the Lebo Creek Drain, the following provisions related to cost allocation for each of same, per the percentages shown in the following table:

Table 4 - Access & Road Structure Cost Sharing

BRIDGE	STATION	OWNERS	% TO BENEFITING OWNER	% TO UPSTREAM LANDS & ROADS
1	0+005.2 to 0+022.8	Ministry of Transportation Highway No. 77 (Road Crossing)	100.0%	0.0%
2	0+374.4 to 0+386.4	(710-04102)/[Parcel 307] (Primary Access)	86.8%	13.2%
3	0+740.3 to 0+748.3	(710-04105)/[Parcel 308] (Primary Access)	81.0%	19.0%
4	0+818.3 to 0+825.2	(710-04200)/[Parcel 309] (Primary Access)	40.3%	19.4%
		(710-04205)/[Parcel 310] (Primary Access)	40.3%	
5	0+852.3 to 0+858.6	(710-04300)/[Parcel 311] (Primary Access)	80.2%	19.8%
6	1+117.8 to 1+124.1	(710-04400)/[Parcels 312] (Primary Access)	39.6%	20.8%
		(710-04410)/[Parcels 313] (Primary Access)	39.6%	

BRIDGE	STATION	OWNERS	% TO BENEFITING OWNER	% TO UPSTREAM LANDS & ROADS
7	1+279.0 to 1+288.3	Municipality of Leamington Mersea Road 7 (Road Crossing)	100.0%	0.0%
8	1+535.4 to 1+539.6	(750-00705)/[Parcel 424] (Primary Access)	N/A (Removed)	
9	1+869.0 to 1+877.0	(750-00700)/[Parcel 423] (Primary Access)	75.2%	24.8%
10	3+580.9 to 3+585.8	750-00100)/[Parcel 411] (Primary Access)	65.9%	34.1%
11	3+905.4 to 3+906.8	(750-03900)/[Parcel 466] (Pedestrian Crossing)	100.0%	0.0%
12	4+037.2 to 4+045.3	Municipality of Leamington Mersea Road 12 (Road Crossing)	100.0%	0.0%
13	4+249.2 to 4+264.9	Municipality of Leamington Mersea Road 7	100.0%	0.0%
14	4+524.0 to 4+525.1	(700-01960)/[Parcel 231] (Pedestrian Crossing)	100.0%	0.0%
15	4+730.1 to 4+736.9	(700-01960)/[Parcel 231] (Primary Access)	50.0%	0.0%
		(700-02000)/[Parcel 232] (Primary Access)	50.0%	
16	5+137.0 to 5+140.8	(700-02050)/[Parcel 233] (Primary Access)	100.0%	0.0%
17	5+339.5 to 5+341.0	(700-02101)/[Parcel 235] (Pedestrian Crossing)	100.0%	0.0%
18	5+420.9 to 5+425.9	(700-02101)/[Parcel 235] (Pedestrian Crossing)	100.0%	0.0%

BRIDGE	STATION	OWNERS	% TO BENEFITING OWNER	% TO UPSTREAM LANDS & ROADS
18	5+420.9 to 5+425.9	(700-02101)/[Parcel 235] (Pedestrian Crossing)	100.0%	0.0%
19	5+493.1	(700-02300)/[Parcel 238] (Pedestrian Crossing)	100.0%	0.0%
20	5+789.8 to 5+792.0	(700-00800)/[Parcel 214] (Pedestrian Crossing)	100.0%	0.0%
21	6+825.1 to 6+846.8	(700-00900)/[215] (Primary Access[(1)])	100.0%	0.0%
22	6+898.6 to 6+910.7	Municipality of Leamington Mersea Road 6	100.0%	0.0%
23	7+876.9 to 7+888.7	Municipality of Leamington Mersea Road 5	100.0%	0.0%
24	8+110.4 to 8+112.4	(620-02700)/[Parcel 133] (Pedestrian Crossing)	100.0%	0.0%
25	9+629.5 to 9+631.9	(620-00901)/[Parcel 120] (Pedestrian Crossing)	100.0%	0.0%
26	9+838.5 to 8+842.9	(620-00800)/[Parcel 118] (Primary Access)	100.0%	0.0%
27	10+243.1 to 10+270.1	County of Essex County Road 34 (Road Crossing)	100.0%	0.0%
28	10+852.4 to 10+857.7	(570-06502)/[Parcel 44] (Primary Access)	100.0%	0.0%
29	10+866.6 to 10+870.9	(570-06600)/[Parcel 46] (Primary Access)	100.0%	0.0%

BRIDGE	STATION	OWNERS	% TO BENEFITING OWNER	% TO UPSTREAM LANDS & ROADS
30	11+541.3 to 11+560.1	Municipality of Leamington Mersea Road 19 (Road Crossing)	100.0%	0.0%
31	12+035.2 to 12+040.2	(560-02302)/[Parcel 10-1] (Primary Access)	21.1%	78.9%
32	12+408.7	(560-02950)/[Parcel 19] (Pedestrian Crossing)	100.0%	0.0%
33	12+766.9 to 12+768.6	(560-01800)/[Parcel 5] (Pedestrian Crossing)	100.0%	0.0%
34	13+200.1 to 13+208.8	Municipality of Leamington Deer Run Road (Road Crossing)	100.0%	0.0%

Primary Access Bridges with Cost Sharing:

Access bridge structures that are considered a primary access to the associated property relative to the Lebo Creek Drain and have cost-sharing provisions associated with each are those that have been previously identified and/or improved under an existing Engineer's Report passed through Municipal By-Law. The sharing percentages between the abutting owner and the upstream lands and roads affected by each structure have been established on the basis of where it is located relative to the entire reach of the drain and based on a standard bridge top width of 6.10 metres (20.00 ft.). For those accesses having a top width wider than the standard 6.10 metres (20.00 ft.), the additional cost for the additional top width is assessed entirely to the benefitting property. For those with a wider than standard access width, a blended cost-sharing percentage has been provided above that accounts for the bridge user share of the increased bridge length beyond the length available to provide the standard 6.10 metres (20.00 ft.) minimum driveway top width.

As noted above, part of the future maintenance cost of each access bridge shall be assessed as a "Benefit Assessment" against the property or properties served by the access. The remainder of the maintenance cost will be assessed as "Outlet Assessments" only to the lands and roads upstream of each access bridge and prorated to the assessments shown in the same proportions established within the **Schedule of Assessment for Future Access Bridge Structure Maintenance** attached herein and labelled **Appendix "F"**. This Schedule of Assessment has been developed on the basis of an assumed cost of **$10,000.00** and the future maintenance costs for each affected access bridge structure within the drain shall be levied pro rata on only the affected lands and roads that are situated upstream of the particular access bridge for which future maintenance works has been carried out.

We would further recommend that all access bridge structures in this drain, for which future maintenance costs are to be shared with upstream lands and roads within the watershed, be maintained by the Municipality and that said maintenance work would include works to the access bridge culvert, their bedding and backfill, end treatment, and any other ancillary work. Should concrete, asphalt or other special surfaces over these access bridge driveways require removal as part of the maintenance work these surfaces should be repaired or replaced as part of the work. Likewise, if any fencing, gate, decorative walls, guard rails 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 material 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 served by said access bridge and/or road crossing structures.

Primary Access Bridges Without Cost Sharing:

Access bridge structures that have been established as the primary access structures relative to the Lebo Creek Drain where cost-sharing provisions have not been established (100% to benefitting owner) are those residing within the Natural Watercourse section of the Lebo Creek or previously established as "Private" structures within existing By-Laws of the Lebo Creek Drain. Although these structures appear to be in fair physical condition, it is unknown when these access bridges were installed, nor are we aware of the quality of materials used or the standards to which this access bridge was constructed. Therefore, these structures shall not be considered a legal entity with respect to the Lebo Creek Drain and are currently considered private structures within this Municipal Drain. As such, the future repair and maintenance of this access bridge shall be the sole responsibility of the abutting/benefitting landowner. In order for this structure to form a legal entity with respect to the Lebo Creek Drain, it is recommended that its future replacement be conducted through an Engineer's Report and pursuant to Section 78 of the Drainage Act.

Primary Access[(1)] – It shall be noted that **Bridge 21** was previously formed as a legal entity with respect to the John Leslie Drain as a secondary access to the subject property. The report in which this structure was installed established that the cost for any future repair and/or replacement of this access was solely the responsibility of the benefitting property owner. With the conversion of a portion of the John Leslie Drain to the Lebo Creek Drain, this access becomes the only access to the property over the Lebo Creek Drain, making it a primary access. However, with its installation originally intended as a secondary access for the sole betterment of the property, where any costs for the future repair and/or replacement of this access bridge be solely the responsibility of the benefitting property owner, it shall remain entirely the landowner's responsibility for all future maintenance costs of this structure.

Pedestrian Crossings:

As previously noted within this report, pedestrian accesses crossing the Lebo Creek Drain are considered a private entity with respect to the Municipal Drain and if future maintenance is required to these structures, any costs are solely the responsibility of the affected property owner. As outlined in this report, the existing pedestrian crossings currently do not present as an obstruction to the flows within the Lebo Creek Drain. However, in the event that these structures become an obstruction to the flows within the drain, or cause damage to the Municipal Drain, these obstructions must be addressed and/or removed through Sections 80(1) and 80(2) of the "Drainage Act, RSO 1990, Chapter D.17, as amended 2021".

Road Crossings:

As noted above, each road crossing structure within the Lebo Creek Drain is within or under the jurisdiction of a road authority or public utility. Therefore, under no circumstances shall any of the costs for the maintenance or replacement of these structures be assessed to any upstream lands or roads within the drain's watershed. Furthermore, when future maintenance is required to these structures, each governing road authority or public utility may elect to carry out the future works on these structures using their own forces, through Section 69 of the Drainage Act, if they choose to do so. If these structures are to be replaced under an Engineer's Report through the provisions of the Drainage Act, it is recommended that Section 26 be utilized for the increased cost to the project as a result of their existence.

Future Maintenance Summary

All of the above provisions for the future maintenance of the Lebo Creek Drain shall remain as aforesaid until otherwise varied and/or determined under the provisions of the "Drainage Act, RSO. 1990, Chapter, D.17, as amended 2021", or subsequent amendments made thereto.

All of which is respectfully submitted,

N.J. PERALTA ENGINEERING LTD.

Antonio B. Peralta, P.Eng.

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CONSTRUCTION SCHEDULE OF ASSESSMENT

2. ONTARIO LANDS:

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
	Highway 77				17.87	7.234	Ministry of Transportation Ontario	$ 607.00	$ 19,963.00	$ -	$ 20,570.00
	Total on Ontario Lands.....							**$ 607.00**	**$ 19,963.00**	**$ -**	**$ 20,570.00**

3. MUNICIPAL LANDS:

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
	Mersea Road 5				12.37	5.007	Municipality of Leamington	$ 1,989.00	$ 4,340.00	$ -	$ 6,329.00
	Mersea Road 6				33.10	13.395	Municipality of Leamington	$ 2,869.00	$ 22,181.00	$ -	$ 25,050.00
	Mersea Road 7				43.74	17.703	Municipality of Leamington	$ 12,449.00	$ 23,428.00	$ -	$ 35,877.00
	Mersea Road 8				14.48	5.860	Municipality of Leamington	$ -	$ 11,532.00	$ -	$ 11,532.00
	Mersea Road 12				13.75	5.565	Municipality of Leamington	$ 819.00	$ 6,848.00	$ -	$ 7,667.00
	Mersea Road 19				8.39	3.395	Municipality of Leamington	$ 2,852.00	$ 1,757.00	$ -	$ 4,609.00
	Deer Run Road				0.67	0.272	Municipality of Leamington	$ 787.00	$ 45.00	$ -	$ 832.00
	County Road 34				23.63	9.565	County of Essex	$ 2,711.00	$ 5,591.00	$ -	$ 8,302.00
	County Road 37				20.18	8.168	County of Essex	$ -	$ 1,908.00	$ -	$ 1,908.00
	Total on Municipal Lands.....							**$ 24,476.00**	**$ 77,630.00**	**$ -**	**$ 102,106.00**

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS:

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
1	560-01002	STR	226	0.39	0.39	0.158		$ -	$ 53.00	$ -	$ 53.00
2	560-01601	STR	225	1.00	1.00	0.405		$ 509.00	$ 77.00	$ -	$ 586.00
4	560-01701	STR	225	1.71	1.71	0.692		$ 1,714.00	$ 108.00	$ -	$ 1,822.00
11	560-02309	STR	227	0.82	0.82	0.332		$ -	$ 120.00	$ -	$ 120.00

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS: ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
12	560-02400	STR	227	0.48	0.48	0.194		$ -	$ 76.00	$ -	$ 76.00
13	560-02500	STR	227	0.88	0.88	0.356		$ -	$ 115.00	$ -	$ 115.00
17	560-02800	STR	227	0.52	0.52	0.210		$ -	$ 84.00	$ -	$ 84.00
25	560-03400	STR	225	0.17	0.17	0.069		$ -	$ 36.00	$ -	$ 36.00
27	560-03510	STR	225	0.97	0.97	0.393		$ -	$ 120.00	$ -	$ 120.00
29	560-03650	STR	225	1.19	1.19	0.482		$ -	$ 157.00	$ -	$ 157.00
31	560-03800	STR	224	0.82	0.82	0.332		$ -	$ 102.00	$ -	$ 102.00
32	560-03805	STR	224	0.88	0.88	0.356		$ -	$ 120.00	$ -	$ 120.00
35	560-04000	STR	223	47.42	5.00	2.023		-	$ 300.00	$ -	$ 300.00
37	570-06002	STR	230	0.38	0.38	0.154		-	$ 293.00	$ -	$ 293.00
38	570-06100	STR	230	0.29	0.29	0.117		-	$ 154.00	$ -	$ 154.00
41	570-06320	STR	229	0.42	0.42	0.170		$ 182.00	$ 233.00	$ -	$ 415.00
43	570-06405	STR	229	0.61	0.61	0.247		$ 274.00	$ 425.00	$ -	$ 699.00
45	570-06550	STR	228	1.00	1.00	0.405		$ -	$ 516.00	$ -	$ 516.00
47	570-06700	STR	228	1.07	1.07	0.433		$ -	$ 162.00	$ -	$ 162.00
48	570-06800	STR	228	0.66	0.66	0.267		$ -	$ 96.00	$ -	$ 96.00
49	570-06900	STR	228	0.34	0.34	0.138		$ -	$ 52.00	$ -	$ 52.00
50	570-07000	STR	228	2.00	2.00	0.809		$ -	$ 209.00	$ -	$ 209.00
51	570-07100	STR	228	1.00	1.00	0.405		$ -	$ 117.00	$ -	$ 117.00
52	570-07101	STR	228	0.54	0.54	0.219		$ -	$ 73.00	$ -	$ 73.00
54	570-07300	STR	228	1.90	1.90	0.769		$ 1,651.00	$ 300.00	$ -	$ 1,951.00
55	570-07400	STR	228	0.95	0.95	0.384		$ 713.00	$ 345.00	$ -	$ 1,058.00
56	610-00805	NTR	224	0.83	0.83	0.336		$ -	$ 221.00	$ -	$ 221.00
58	610-01000	NTR	224	5.44	5.44	2.202		$ -	$ 644.00	$ -	$ 644.00
60	610-01102	NTR	225	1.10	1.10	0.445		$ -	$ 135.00	$ -	$ 135.00
61	610-01200	NTR	225	0.72	0.72	0.291		$ -	$ 94.00	$ -	$ 94.00
62	610-01300	NTR	225	0.71	0.71	0.287		$ -	$ 86.00	$ -	$ 86.00
63	610-01400	NTR	225	0.92	0.92	0.372		$ -	$ 128.00	$ -	$ 128.00
66	610-01705	NTR	225	0.34	0.34	0.138		$ -	$ 62.00	$ -	$ 62.00
68	610-01800	NTR	226	0.64	0.64	0.259		$ -	$ 102.00	$ -	$ 102.00

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS: ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
69	610-01801	NTR	226	0.35	0.35	0.142		$ -	$ 65.00	$ -	$ 65.00
70	610-01900	NTR	226	0.18	0.18	0.073		$ -	$ 37.00	$ -	$ 37.00
71	610-02000	NTR	226	0.22	0.22	0.089		$ -	$ 33.00	$ -	$ 33.00
72	610-02001	NTR	226	1.37	1.37	0.554		$ -	$ 162.00	$ -	$ 162.00
74	610-02105	NTR	226	0.70	0.70	0.283		$ -	$ 109.00	$ -	$ 109.00
75	610-02110	NTR	226	0.66	0.66	0.267		$ -	$ 105.00	$ -	$ 105.00
77	610-02201	NTR	227	0.67	0.67	0.271		$ -	$ 87.00	$ -	$ 87.00
82	610-02400	NTR	227	1.80	1.80	0.728		$ -	$ 175.00	$ -	$ 175.00
83	610-02500	NTR	227	0.28	0.28	0.113		$ -	$ 16.00	$ -	$ 16.00
84	610-02502	NTR	227	2.00	2.00	0.809		$ -	$ 224.00	$ -	$ 224.00
85	610-02505	NTR	227	0.74	0.74	0.299		$ -	$ 104.00	$ -	$ 104.00
87	610-02508	NTR	227	1.43	1.43	0.579		$ -	$ 172.00	$ -	$ 172.00
88	610-02600	NTR	227	0.91	0.91	0.368		$ -	$ 186.00	$ -	$ 186.00
89	610-02602	NTR	227	1.01	1.01	0.409		$ -	$ 108.00	$ -	$ 108.00
92	610-02702	NTR	227	1.46	1.46	0.591		$ -	$ 204.00	$ -	$ 204.00
96	610-02900	NTR	227	1.75	1.75	0.708		$ -	$ 149.00	$ -	$ 149.00
101	620-00100	NTR	228	1.20	1.20	0.486		$ -	$ 222.00	$ -	$ 222.00
102	620-00115	NTR	228	0.72	0.72	0.291		$ -	$ 115.00	$ -	$ 115.00
103	620-00125	NTR	228	1.14	1.14	0.461		$ -	$ 208.00	$ -	$ 208.00
105	620-00200	NTR	228	1.47	1.47	0.595		$ -	$ 186.00	$ -	$ 186.00
109	620-00401	NTR	229	0.97	0.97	0.393		$ 27.00	$ 605.00	$ -	$ 632.00
112	620-00404	NTR	229	0.99	0.99	0.401		$ -	$ 576.00	$ -	$ 576.00
113	620-00405	NTR	229	0.55	0.55	0.223		$ -	$ 421.00	$ -	$ 421.00
116	620-00600	NTR	229	3.60	3.60	1.457		$ 3,129.00	$ 907.00	$ -	$ 4,036.00
117	620-00700	NTR	229	1.31	1.31	0.530		$ 1,003.00	$ 486.00	$ -	$ 1,489.00
121	620-00905	NTR	230	1.22	1.22	0.494		$ 101.00	$ 609.00	$ -	$ 710.00
124	620-01110	NTR	230	0.43	0.43	0.174		$ -	$ 264.00	$ -	$ 264.00
125	620-01120	NTR	230	0.40	0.40	0.162		$ -	$ 132.00	$ -	$ 132.00
128	620-02601	NTR	232	0.82	0.82	0.332		$ -	$ 479.00	$ -	$ 479.00

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS: ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
130	620-02603	NTR	231	1.00	1.00	0.405		$ -	$ 603.00	$ -	$ 603.00
132	620-02605	NTR	231	1.02	1.02	0.413		$ -	$ 668.00	$ -	$ 668.00
135	620-02802	NTR	230	0.63	0.63	0.255		$ -	$ 549.00	$ -	$ 549.00
136	620-02805	NTR	229	0.80	0.80	0.324		$ -	$ 644.00	$ -	$ 644.00
138	620-02910	NTR	229	1.13	1.13	0.457		$ -	$ 1,155.00	$ -	$ 1,155.00
139	620-03000	NTR	229	2.09	2.09	0.846		$ -	$ 167.00	$ -	$ 167.00
140	620-03100	NTR	229	0.49	0.49	0.198		$ -	$ 61.00	$ -	$ 61.00
141	620-03101	NTR	229	1.32	1.32	0.534		$ -	$ 143.00	$ -	$ 143.00
143	620-03104	NTR	229	0.84	0.84	0.340		$ -	$ 126.00	$ -	$ 126.00
144	620-03200	NTR	229	2.31	2.31	0.935		$ -	$ 402.00	$ -	$ 402.00
148	620-03301	NTR	228	0.39	0.39	0.156		$ -	$ 54.00	$ -	$ 54.00
150	620-03320	NTR	228	2.98	2.98	1.206		$ -	$ 329.00	$ -	$ 329.00
152	620-03401	NTR	228	0.41	0.41	0.166		$ -	$ 50.00	$ -	$ 50.00
154	620-03550	NTR	228	0.69	0.69	0.279		$ -	$ 83.00	$ -	$ 83.00
159	620-03800	NTR	228	2.51	2.51	1.016		$ -	$ 420.00	$ -	$ 420.00
160	620-03810	NTR	228	1.23	1.23	0.498		$ -	$ 172.00	$ -	$ 172.00
161	620-03820	NTR	228	0.72	0.72	0.291		$ -	$ 94.00	$ -	$ 94.00
162	620-03850	NTR	228	0.37	0.37	0.150		$ -	$ 48.00	$ -	$ 48.00
165	620-04050	NTR	228	1.51	1.51	0.611		$ -	$ 152.00	$ -	$ 152.00
166	620-04100	NTR	228	0.99	0.99	0.401		$ -	$ 201.00	$ -	$ 201.00
167	620-04200	NTR	228	1.73	1.73	0.700		$ -	$ 250.00	$ -	$ 250.00
170	670-00225	5	17	0.63	0.63	0.255		$ -	$ 87.00	$ -	$ 87.00
171	670-00300	5	16	1.31	1.31	0.530		$ -	$ 155.00	$ -	$ 155.00
172	670-00406	5	16	2.48	2.48	1.004		$ -	$ 292.00	$ -	$ 292.00
173	670-00500	5	16	0.98	0.98	0.397		$ 426.00	$ 850.00	$ -	$ 1,276.00
174	670-00520	5	16	2.55	2.55	1.032		$ 1,873.00	$ 1,313.00	$ -	$ 3,186.00
176	670-00700	5	15	1.91	1.91	0.773		$ 1,660.00	$ 1,434.00	$ -	$ 3,094.00
177	670-00800	5	15	0.62	0.62	0.251		$ -	$ 478.00	$ -	$ 478.00
178	670-00900	5	15	1.17	1.17	0.473		$ -	$ 840.00	$ -	$ 840.00

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS: ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
179	670-01000	5	15	0.39	0.22	0.089		$ -	$ 273.00	$ -	$ 273.00
187	670-03001	5	15	0.87	0.87	0.352		$ 675.00	$ 853.00	$ -	$ 1,528.00
189	680-05900	5	7	0.98	0.98	0.397		$ -	$ 1,215.00	$ -	$ 1,215.00
190	680-05950	5	7	1.88	1.05	0.425		$ -	$ 1,003.00	$ -	$ 1,003.00
191	680-06500	5	8	0.52	0.52	0.210		$ -	$ 685.00	$ -	$ 685.00
193	680-07101	5	10	0.48	0.48	0.194		$ -	$ 713.00	$ -	$ 713.00
195	680-07201	5	10	0.69	0.69	0.279		$ -	$ 907.00	$ -	$ 907.00
196	680-07202	5	10	0.83	0.83	0.336		$ -	$ 965.00	$ -	$ 965.00
198	680-07400	5	10	0.56	0.56	0.227		$ -	$ 749.00	$ -	$ 749.00
199	680-07401	5	11	0.56	0.56	0.227		$ -	$ 1,008.00	$ -	$ 1,008.00
201	700-00100	6	18	0.50	0.50	0.202		$ -	$ 40.00	$ -	$ 40.00
203	700-00200	6	18	0.67	0.67	0.271		$ -	$ 71.00	$ -	$ 71.00
205	700-00205	6	18	0.59	0.59	0.239		$ -	$ 73.00	$ -	$ 73.00
207	700-00301	6	17	1.76	1.76	0.712		$ -	$ 211.00	$ -	$ 211.00
209	700-00500	6	17	1.00	1.00	0.405		$ -	$ 102.00	$ -	$ 102.00
211	700-00601	6	16	0.53	0.53	0.214		$ -	$ 81.00	$ -	$ 81.00
212	700-00705	6	16	1.97	1.97	0.797		$ -	$ 1,487.00	$ -	$ 1,487.00
219	700-01250	6	14	0.86	0.86	0.348		$ -	$ 940.00	$ -	$ 940.00
221	700-01400	6	13	1.01	1.01	0.409		$ -	$ 1,075.00	$ -	$ 1,075.00
222	700-01500	6	13	0.74	0.74	0.299		$ -	$ 657.00	$ -	$ 657.00
225	700-01700	6	13	0.56	0.56	0.227		$ -	$ 477.00	$ -	$ 477.00
226	700-01800	6	13	0.59	0.59	0.239		$ -	$ 518.00	$ -	$ 518.00
228	700-01901	6	13	0.76	0.76	0.308		$ 69.00	$ 802.00	$ -	$ 871.00
229	700-01920	6	13	0.75	0.75	0.304		$ 84.00	$ 907.00	$ -	$ 991.00
234	700-02100	6	14	0.85	0.85	0.344		$ 103.00	$ 786.00	$ -	$ 889.00
236	700-02105	6	14	0.95	0.95	0.384		$ 802.00	$ 891.00	$ -	$ 1,693.00
237	700-02200	6	14	0.50	0.50	0.202		$ 217.00	$ 493.00	$ -	$ 710.00
239	700-02360	6	15	1.24	1.24	0.502		$ -	$ 840.00	$ -	$ 840.00
244	700-02701	6	17	0.82	0.82	0.332		$ -	$ 143.00	$ -	$ 143.00
247	700-02804	6	18	2.40	2.40	0.971		$ -	$ 323.00	$ -	$ 323.00

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS: ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
250	700-02905	6	18	1.50	1.50	0.607		$ -	$ 180.00	$ -	$ 180.00
251	710-00100	6	12	1.64	1.64	0.664		$ -	$ 1,358.00	$ -	$ 1,358.00
252	710-00200	6	12	0.66	0.66	0.267		$ -	$ 463.00	$ -	$ 463.00
253	710-00300	6	12	1.30	1.30	0.526		$ -	$ 934.00	$ -	$ 934.00
254	710-00400	6	12	1.21	1.21	0.490		$ -	$ 905.00	$ -	$ 905.00
255	710-00410	6	12	1.96	1.96	0.793		$ -	$ 1,344.00	$ -	$ 1,344.00
256	710-00450	6	12	0.50	0.50	0.202		$ -	$ 544.00	$ -	$ 544.00
257	710-00500	6	12	0.50	0.50	0.202		$ -	$ 474.00	$ -	$ 474.00
259	710-00650	6	12	0.37	0.37	0.150		$ -	$ 370.00	$ -	$ 370.00
260	710-00655	6	12	0.46	0.46	0.186		$ -	$ 526.00	$ -	$ 526.00
263	710-00900	6	11	1.64	1.64	0.664		$ -	$ 1,976.00	$ -	$ 1,976.00
264	710-00950	6	11	0.59	0.59	0.239		$ -	$ 858.00	$ -	$ 858.00
267	710-01010	6	11	1.14	1.14	0.461		$ -	$ 1,450.00	$ -	$ 1,450.00
270	710-01210	6	10	0.52	0.52	0.210		$ -	$ 749.00	$ -	$ 749.00
271	710-01300	6	10	2.55	2.55	1.032		$ -	$ 2,858.00	$ -	$ 2,858.00
274	710-01600	6	9	0.57	0.57	0.231		$ -	$ 901.00	$ -	$ 901.00
276	710-01750	6	9	1.03	1.03	0.417		$ -	$ 1,366.00	$ -	$ 1,366.00
277	710-01800	6	9	1.03	1.03	0.417		$ -	$ 1,363.00	$ -	$ 1,363.00
287	710-02500	6	8	0.34	0.34	0.138		$ -	$ 603.00	$ -	$ 603.00
289	710-02610	6	7	0.59	0.59	0.239		$ -	$ 939.00	$ -	$ 939.00
290	710-02620	6	7	0.31	0.31	0.125		$ -	$ 516.00	$ -	$ 516.00
291	710-02630	6	7	0.27	0.27	0.109		$ -	$ 364.00	$ -	$ 364.00
292	710-02640	6	7	0.31	0.31	0.125		$ -	$ 399.00	$ -	$ 399.00
293	710-02700	6	7	0.99	0.99	0.401		$ -	$ 1,106.00	$ -	$ 1,106.00
294	710-02800	6	7	0.99	0.99	0.401		$ -	$ 776.00	$ -	$ 776.00
295	710-02900	6	7	0.99	0.99	0.401		$ -	$ 1,113.00	$ -	$ 1,113.00
296	710-03000	6	7	0.99	0.99	0.401		$ -	$ 1,106.00	$ -	$ 1,106.00
297	710-03100	6	7	0.39	0.39	0.158		$ -	$ 485.00	$ -	$ 485.00
299	710-03300	6	7	0.49	0.49	0.198		$ -	$ 875.00	$ -	$ 875.00

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS: ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
301	710-03405	6	7	0.40	0.40	0.162		$ -	$ 921.00	$ -	$ 921.00
303	710-03505	6	7	0.72	0.72	0.291		$ -	$ 1,229.00	$ -	$ 1,229.00
306	710-03800	6	7	0.49	0.49	0.198		$ -	$ 1,043.00	$ -	$ 1,043.00
309	710-04200	6	8	1.60	1.60	0.648		$ 290.00	$ 3,108.00	$ -	$ 3,398.00
310	710-04205	6	8	1.29	1.29	0.522		$ 190.00	$ 2,332.00	$ -	$ 2,522.00
314	710-04500	6	9	1.42	1.42	0.575		$ 129.00	$ 2,082.00	$ -	$ 2,211.00
316	710-04602	6	9	1.16	1.16	0.469		$ 120.00	$ 2,072.00	$ -	$ 2,192.00
319	710-04750	6	9	5.42	5.42	2.193		$ 493.00	$ 6,001.00	$ -	$ 6,494.00
321	710-04901	6	10	0.58	0.58	0.235		$ 93.00	$ 989.00	$ -	$ 1,082.00
325	710-05201	6	11	2.32	2.32	0.939		$ 388.00	$ 1,816.00	$ -	$ 2,204.00
326	710-05290	6	11	2.31	2.31	0.935		$ 313.00	$ 2,431.00	$ -	$ 2,744.00
327	710-05295	6	11	1.35	1.35	0.546		$ 184.00	$ 1,279.00	$ -	$ 1,463.00
328	710-05300	6	11	1.35	1.35	0.546		$ 183.00	$ 1,281.00	$ -	$ 1,464.00
334	710-05450	6	12	0.60	0.60	0.243		$ -	$ 634.00	$ -	$ 634.00
336	710-05501	6	12	0.91	0.91	0.368		$ -	$ 806.00	$ -	$ 806.00
337	710-05510	6	12	1.71	1.71	0.692		$ -	$ 1,774.00	$ -	$ 1,774.00
338	710-05575	6	12	0.92	0.92	0.372		$ -	$ 828.00	$ -	$ 828.00
339	720-00100	6	6	1.02	1.02	0.413		$ -	$ 1,604.00	$ -	$ 1,604.00
345	720-01005	6	4	0.99	0.99	0.401		$ -	$ 1,974.00	$ -	$ 1,974.00
349	720-03801	6	5	0.44	0.44	0.178		$ -	$ 948.00	$ -	$ 948.00
354	720-04200	6	6	1.44	1.44	0.583		$ -	$ 2,511.00	$ -	$ 2,511.00
356	720-04290	6	6	0.99	0.99	0.401		$ -	$ 819.00	$ -	$ 819.00
357	720-04300	6	6	1.00	1.00	0.405		$ -	$ 3,130.00	$ -	$ 3,130.00
361	720-04550	6	6	0.56	0.56	0.227		$ -	$ 964.00	$ -	$ 964.00
362	720-04604	6	6	0.63	0.63	0.254		$ -	$ 1,309.00	$ -	$ 1,309.00
363	720-04602	6	6	0.33	0.33	0.134		$ -	$ 720.00	$ -	$ 720.00
364	720-04700	6	6	0.36	0.36	0.146		$ -	$ 792.00	$ -	$ 792.00
365	720-04800	6	5	5.21	5.21	2.108		$ -	$ 10,458.00	$ -	$ 10,458.00

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS: ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
367	730-00200	6	19	2.90	2.90	1.174		$ -	$ 360.00	$ -	$ 360.00
368	730-00210	6	19	1.28	1.28	0.518		$ -	$ 114.00	$ -	$ 114.00
370	730-00252	6	19	0.53	0.53	0.214		$ -	$ 61.00	$ -	$ 61.00
373	740-00120	7	17	1.00	1.00	0.405		$ -	$ 134.00	$ -	$ 134.00
380	740-00501	7	13	0.52	0.52	0.210		$ 94.00	$ 651.00	$ -	$ 745.00
383	740-00640	7	13	1.07	1.07	0.433		$ 194.00	$ 853.00	$ -	$ 1,047.00
386	740-00705	7	13	0.69	0.69	0.279		$ -	$ 871.00	$ -	$ 871.00
387	740-00710	7	13	0.86	0.86	0.348		$ -	$ 931.00	$ -	$ 931.00
388	740-00740	7	13	0.99	0.99	0.401		$ -	$ 1,295.00	$ -	$ 1,295.00
389	740-00750	7	13	0.99	0.99	0.401		$ -	$ 1,311.00	$ -	$ 1,311.00
393	740-00910	7	14	0.64	0.64	0.259		$ -	$ 946.00	$ -	$ 946.00
405	740-01801	7	18	0.81	0.81	0.328		$ -	$ 100.00	$ -	$ 100.00
407	740-01850	7	18	1.50	1.50	0.607		$ -	$ 213.00	$ -	$ 213.00
409	740-01910	7	18	1.00	1.00	0.405		$ -	$ 145.00	$ -	$ 145.00
412	750-00106	7	12	1.49	1.49	0.603		$ 270.00	$ 1,632.00	$ -	$ 1,902.00
413	750-00300	7	12	1.22	1.22	0.494		$ 221.00	$ 1,263.00	$ -	$ 1,484.00
414	750-00400	7	12	0.48	0.48	0.194		$ 87.00	$ 666.00	$ -	$ 753.00
416	750-00510	7	11	4.37	4.37	1.769		$ 631.00	$ 6,725.00	$ -	$ 7,356.00
419	750-00601	7	10	1.11	1.11	0.449		$ 201.00	$ 825.00	$ -	$ 1,026.00
420	750-00605	7	10	1.50	1.50	0.607		$ 259.00	$ 1,115.00	$ -	$ 1,374.00
421	750-00610	7	10	1.52	1.52	0.615		$ 255.00	$ 1,106.00	$ -	$ 1,361.00
422	750-00650	7	10	1.79	1.79	0.724		$ 324.00	$ 2,342.00	$ -	$ 2,666.00
425	750-00720	7	9	1.38	1.38	0.558		$ 250.00	$ 2,141.00	$ -	$ 2,391.00
426	750-00800	7	9	0.47	0.47	0.190		$ 83.00	$ 895.00	$ -	$ 978.00
427	750-00820	7	9	1.22	1.22	0.494		$ 208.00	$ 2,070.00	$ -	$ 2,278.00
428	750-00850	7	9	1.17	1.17	0.473		$ 212.00	$ 1,994.00	$ -	$ 2,206.00
429	750-00900	7	9	1.09	1.09	0.441		$ 197.00	$ 1,711.00	$ -	$ 1,908.00
432	750-01100	7	8	0.52	0.52	0.210		$ 94.00	$ 1,158.00	$ -	$ 1,252.00
434	750-01110	7	7	1.79	1.79	0.724		$ 262.00	$ 2,402.00	$ -	$ 2,664.00

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS: ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
435	750-01115	7	7	1.79	1.79	0.724		$ 262.00	$ 2,402.00	$ -	$ 2,664.00
436	750-01150	7	7	1.33	1.33	0.538		$ 205.00	$ 2,153.00	$ -	$ 2,358.00
438	750-01500	7	7	0.16	0.16	0.065		$ -	$ 301.00	$ -	$ 301.00
439	750-01600	7	7	0.19	0.19	0.077		$ -	$ 360.00	$ -	$ 360.00
440	750-01700	7	7	0.24	0.24	0.097		$ -	$ 414.00	$ -	$ 414.00
441	750-01800	7	7	0.54	0.54	0.219		$ -	$ 790.00	$ -	$ 790.00
442	750-01900	7	7	0.25	0.25	0.101		$ -	$ 320.00	$ -	$ 320.00
443	750-02000	7	7	0.15	0.15	0.061		$ -	$ 226.00	$ -	$ 226.00
444	750-02100	7	7	0.16	0.16	0.065		$ -	$ 243.00	$ -	$ 243.00
445	750-02200	7	7	0.43	0.43	0.174		$ -	$ 732.00	$ -	$ 732.00
446	750-02300	7	7	0.24	0.24	0.097		$ -	$ 369.00	$ -	$ 369.00
447	750-02400	7	7	0.29	0.29	0.117		$ -	$ 441.00	$ -	$ 441.00
448	750-02500	7	7	0.46	0.46	0.186		$ -	$ 563.00	$ -	$ 563.00
454	750-03010	7	9	1.55	1.55	0.627		$ -	$ 785.00	$ -	$ 785.00
456	750-03110	7	10	1.29	1.29	0.522		$ 234.00	$ 1,714.00	$ -	$ 1,948.00
459	750-03200	7	10	0.63	0.63	0.255		$ -	$ 689.00	$ -	$ 689.00
467	750-03950	7	12	2.69	2.69	1.089		$ 487.00	$ 2,166.00	$ -	$ 2,653.00
469	760-00105	7	5	0.98	0.98	0.397		$ -	$ 1,953.00	$ -	$ 1,953.00
470	760-00110	7	5	1.27	1.27	0.514		$ -	$ 1,923.00	$ -	$ 1,923.00
471	760-00325	7	5	0.74	0.74	0.299		$ -	$ 1,038.00	$ -	$ 1,038.00
472	760-00350	7	5	0.46	0.46	0.186		$ -	$ 988.00	$ -	$ 988.00
474	760-00410	7	5	0.30	0.30	0.121		$ -	$ 496.00	$ -	$ 496.00
477	760-02701	7	4	1.13	1.13	0.457		$ -	$ 1,091.00	$ -	$ 1,091.00
478	760-02800	7	5	0.46	0.46	0.186		$ -	$ 651.00	$ -	$ 651.00
480	760-02950	7	5	0.84	0.84	0.340		$ -	$ 1,015.00	$ -	$ 1,015.00
481	760-03000	7	5	0.36	0.36	0.146		$ -	$ 578.00	$ -	$ 578.00
482	760-03100	7	5	0.81	0.81	0.328		$ -	$ 1,040.00	$ -	$ 1,040.00
483	760-03110	7	5	0.76	0.76	0.308		$ -	$ 982.00	$ -	$ 982.00
488	760-03550	7	6	0.98	0.98	0.397		$ -	$ 1,003.00	$ -	$ 1,003.00
489	760-03600	7	6	0.47	0.47	0.190		$ -	$ 601.00	$ -	$ 601.00

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS: ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
490	760-03700	7	6	0.50	0.50	0.202		$ -	$ 756.00	$ -	$ 756.00
491	760-03800	7	6	0.50	0.50	0.202		$ -	$ 644.00	$ -	$ 644.00
492	760-03900	7	6	0.24	0.24	0.097		$ -	$ 399.00	$ -	$ 399.00
493	760-04000	7	6	1.17	1.17	0.473		$ -	$ 1,150.00	$ -	$ 1,150.00
494	760-04100	7	6	1.66	1.66	0.672		$ -	$ 1,563.00	$ -	$ 1,563.00
495	760-04101	7	6	0.34	0.34	0.138		$ -	$ 486.00	$ -	$ 486.00
496	760-04200	7	6	0.28	0.28	0.113		$ -	$ 438.00	$ -	$ 438.00
497	760-04300	7	6	0.78	0.78	0.316		$ -	$ 861.00	$ -	$ 861.00
498	760-04400	7	6	0.43	0.43	0.174		$ -	$ 523.00	$ -	$ 523.00
499	760-04500	7	6	0.64	0.64	0.259		$ -	$ 772.00	$ -	$ 772.00
500	760-04600	7	6	0.24	0.24	0.097		$ -	$ 318.00	$ -	$ 318.00
501	760-04700	7	6	0.25	0.25	0.101		$ -	$ 462.00	$ -	$ 462.00
502	760-04800	7	6	2.47	2.47	1.000		$ -	$ 4,782.00	$ -	$ 4,782.00
503	760-04900	7	6	0.74	0.74	0.299		$ -	$ 1,064.00	$ -	$ 1,064.00
504	760-05000	7	6	0.33	0.33	0.134		$ -	$ 506.00	$ -	$ 506.00
505	760-05100	7	6	0.31	0.31	0.125		$ -	$ 477.00	$ -	$ 477.00
507	760-05300	7	6	0.48	0.48	0.194		$ -	$ 718.00	$ -	$ 718.00
508	760-05400	7	6	0.96	0.96	0.389		$ -	$ 981.00	$ -	$ 981.00
509	760-05500	7	6	0.96	0.96	0.389		$ -	$ 996.00	$ -	$ 996.00
510	760-05600	7	6	0.86	0.86	0.348		$ -	$ 1,031.00	$ -	$ 1,031.00
511	760-05700	7	6	0.86	0.86	0.348		$ -	$ 893.00	$ -	$ 893.00
512	760-05800	7	6	1.29	1.29	0.522		$ -	$ 1,581.00	$ -	$ 1,581.00
513	760-05900	7	6	2.18	2.18	0.882		$ -	$ 1,343.00	$ -	$ 1,343.00
514	760-06000	7	6	0.72	0.72	0.291		$ -	$ 1,005.00	$ -	$ 1,005.00
515	760-06100	7	6	0.71	0.71	0.287		$ -	$ 991.00	$ -	$ 991.00
516	760-06200	7	6	0.71	0.71	0.287		$ -	$ 993.00	$ -	$ 993.00
517	760-06300	7	6	0.71	0.71	0.287		$ -	$ 991.00	$ -	$ 991.00
518	760-06400	7	6	1.28	1.28	0.518		$ -	$ 1,389.00	$ -	$ 1,389.00
519	760-06401	7	6	0.95	0.95	0.384		$ -	$ 1,023.00	$ -	$ 1,023.00

4. PRIVATELY OWNED - NON-AGRICULTURAL LANDS: ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
520	760-06500	7	6	1.74	1.74	0.704		$ -	$ 1,862.00	$ -	$ 1,862.00
523	760-06800	7	5	5.18	5.18	2.096	Municipality of Leamington	$ -	$ 8,643.00	$ -	$ 8,643.00
525	790-00150	8	12	0.78	0.78	0.316		$ -	$ 478.00	$ -	$ 478.00
528	790-00303	8	11	2.30	2.30	0.931		$ -	$ 1,133.00	$ -	$ 1,133.00
533	790-00550	8	10	0.74	0.74	0.299		$ -	$ 465.00	$ -	$ 465.00
535	790-00605	8	9	0.61	0.61	0.247		$ -	$ 379.00	$ -	$ 379.00
537	790-00800	8	9	0.43	0.43	0.174		$ -	$ 226.00	$ -	$ 226.00
538	790-00900	8	9	1.33	1.33	0.538		$ -	$ 686.00	$ -	$ 686.00
540	790-01201	8	8	1.00	1.00	0.405		$ -	$ 1,026.00	$ -	$ 1,026.00
541	790-01800	8	7	0.88	0.88	0.356		$ -	$ 1,363.00	$ -	$ 1,363.00
542	790-02000	8	7	0.23	0.23	0.093		$ -	$ 289.00	$ -	$ 289.00
543	790-02100	8	7	0.90	0.90	0.364		$ -	$ 1,346.00	$ -	$ 1,346.00
544	790-02250	8	7	0.45	0.45	0.182		$ -	$ 635.00	$ -	$ 635.00
545	790-02300	8	7	0.41	0.41	0.166		$ -	$ 455.00	$ -	$ 455.00
547	790-02402	8	7	0.63	0.63	0.255		$ -	$ 940.00	$ -	$ 940.00
548	790-02403	8	7	0.63	0.63	0.255		$ -	$ 948.00	$ -	$ 948.00
549	790-02410	8	7	0.46	0.46	0.186		$ -	$ 504.00	$ -	$ 504.00
550	790-02450	8	7	0.70	0.70	0.283		$ -	$ 944.00	$ -	$ 944.00
551	790-02500	8	7	0.59	0.19	0.077		$ -	$ 232.00	$ -	$ 232.00
552	790-02510	8	7	1.12	0.37	0.150		$ -	$ 264.00	$ -	$ 264.00
553	790-02520	8	7	1.12	0.37	0.150		$ -	$ 264.00	$ -	$ 264.00
554	790-02530	8	7	1.12	0.37	0.150		$ -	$ 264.00	$ -	$ 264.00
555	790-02540	8	7	1.12	0.37	0.150		$ -	$ 264.00	$ -	$ 264.00
556	790-02550	8	7	1.12	0.37	0.150		$ -	$ 264.00	$ -	$ 264.00
557	790-02560	8	7	1.12	0.37	0.150		$ -	$ 264.00	$ -	$ 264.00
558	790-02570	8	7	1.12	0.37	0.150		$ -	$ 264.00	$ -	$ 264.00
560	800-00700	8	6	2.49	2.49	1.008		$ -	$ 5,840.00	$ -	$ 5,840.00
Total on Privately Owned - Non-Agricultural Lands.....								**$ 22,625.00**	**$ 250,360.00**	**$ -**	**$ 272,985.00**

5. PRIVATELY OWNED - AGRICULTURAL LANDS (grantable):

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
3	560-01700	STR	225	48.69	15.72	6.362		$ 6,882.00	$ 200.00	$ -	$ 7,082.00
5	560-01800	STR	226	51.05	49.27	19.939		$ 12,435.00	$ 731.00	$ -	$ 13,166.00
6	560-01900	STR	226	11.26	9.42	3.812		$ 3,483.00	$ 219.00	$ -	$ 3,702.00
8	560-02200	STR	227	35.66	15.00	6.070		$ 1,189.00	$ 699.00	$ -	$ 1,888.00
9	560-02210	STR	227	26.42	5.59	2.262		$ 255.00	$ 260.00	$ -	$ 515.00
10	560-02300	STR	227	45.12	45.12	18.260		$ 5,552.00	$ 1,330.00	$ -	$ 6,882.00
10-1	560-02302	STR	227	14.14	14.14	5.722		$ 5,500.00	$ 473.00	$ -	$ 5,973.00
15	560-02700	STR	227	25.00	25.00	10.117		$ -	$ 493.00	$ -	$ 493.00
16	560-02750	STR	227	26.56	26.56	10.749		$ -	$ 423.00	$ -	$ 423.00
16-1	560-02752	STR	227	22.89	22.89	9.263		$ 6,714.00	$ 571.00	$ -	$ 7,285.00
18	560-02900	STR	226	27.54	27.54	11.145		$ -	$ 634.00	$ -	$ 634.00
19	560-02950	STR	226	50.00	50.00	20.235		$ 8,697.00	$ 806.00	$ -	$ 9,503.00
20	560-03000	STR	266	51.52	51.52	20.850		$ -	$ 777.00	$ -	$ 777.00
21	560-03100	STR	226	0.56	0.56	0.227		$ -	$ 32.00	$ -	$ 32.00
22	560-03200	STR	225	7.07	7.07	2.861		$ -	$ 360.00	$ -	$ 360.00
24	560-03350	STR	225	1.00	1.00	0.405		$ -	$ 68.00	$ -	$ 68.00
26	560-03500	STR	225	30.12	7.50	3.035		$ -	$ 203.00	$ -	$ 203.00
28	560-03600	STR	225	29.73	10.00	4.047		$ -	$ 267.00	$ -	$ 267.00
30	560-03700	STR	224	53.28	23.69	9.587		$ -	$ 389.00	$ -	$ 389.00
33	560-03900	STR	224	28.26	14.01	5.670		$ -	$ 229.00	$ -	$ 229.00
34	560-03901	STR	224	32.79	16.23	6.566		$ -	$ 393.00	$ -	$ 393.00
36	570-05900	STR	230	63.56	1.50	0.607		$ -	$ 344.00	$ -	$ 344.00
39	570-06200	STR	230	24.73	6.00	2.428		$ 350.00	$ 539.00	$ -	$ 889.00
40	570-06300	STR	229	68.69	24.56	9.939		$ 6,050.00	$ 1,649.00	$ -	$ 7,699.00
44	570-06502	STR	229	26.87	26.87	10.874		$ 8,076.00	$ 1,545.00	$ -	$ 9,621.00
44-1	570-06500	STR	229	74.86	13.14	5.318		$ 3,378.00	$ 819.00	$ -	$ 4,197.00

5. PRIVATELY OWNED - AGRICULTURAL LANDS (grantable): ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
46	570-06600	STR	228	101.23	51.23	20.732		$ 13,169.00	$ 3,010.00	$ -	$ 16,179.00
53	570-07200	STR	228	46.24	46.24	18.713		$ 11,250.00	$ 2,380.00	$ -	$ 13,630.00
57	610-00900	NTR	224	52.73	4.17	1.688		$ -	$ 71.00	$ -	$ 71.00
59	610-01100	NTR	225	53.48	24.45	9.895		$ -	$ 415.00	$ -	$ 415.00
65	610-01700	NTR	225	44.66	44.66	18.074		$ -	$ 780.00	$ -	$ 780.00
67	610-01706	NTR	226	35.20	35.20	14.245		$ -	$ 657.00	$ -	$ 657.00
73	610-02100	NTR	226	32.63	32.63	13.205		$ -	$ 556.00	$ -	$ 556.00
76	610-02200	NTR	226 & 227	20.90	20.90	8.458		$ -	$ 417.00	$ -	$ 417.00
78	610-02203	NTR	226 & 227	3.50	3.50	1.416		$ -	$ 162.00	$ -	$ 162.00
80	610-02250	NTR	226 & 227	31.61	31.61	12.792		$ -	$ 587.00	$ -	$ 587.00
81	610-02300	NTR	227	26.99	26.99	10.923		$ -	$ 543.00	$ -	$ 543.00
86	610-02506	NTR	227	32.40	32.40	13.112		$ -	$ 696.00	$ -	$ 696.00
90	610-02700	NTR	227	49.24	49.24	19.927		$ -	$ 817.00	$ -	$ 817.00
91	610-02701	NTR	227	16.94	16.94	6.856		$ -	$ 303.00	$ -	$ 303.00
94	610-02809	NTR	226	26.01	26.01	10.526		$ -	$ 441.00	$ -	$ 441.00
95	610-02815	NTR	226	4.49	4.49	1.817		$ -	$ 73.00	$ -	$ 73.00
97	610-02901	NTR	226	86.94	86.94	35.184		$ -	$ 1,304.00	$ -	$ 1,304.00
98	610-02905	NTR	225	47.15	42.27	17.106		$ -	$ 619.00	$ -	$ 619.00
106	620-00210	NTR	228	7.78	7.78	3.149		$ -	$ 172.00	$ -	$ 172.00
107	620-00300	NTR	228 & 229	32.67	32.67	13.221		$ -	$ 659.00	$ -	$ 659.00
108	620-00400	NTR	229	13.21	13.21	5.346		$ -	$ 918.00	$ -	$ 918.00
110	620-00402	NTR	229	10.02	10.02	4.055		$ 1,278.00	$ 696.00	$ -	$ 1,974.00
111	620-00403	NTR	229	39.85	39.85	16.127		$ -	$ 1,560.00	$ -	$ 1,560.00
114	620-00500	NTR	229	48.04	48.04	19.442		$ 10,033.00	$ 3,363.00	$ -	$ 13,396.00
115	620-00501	NTR	229	1.15	1.15	0.465		$ 590.00	$ 216.00	$ -	$ 806.00
118	620-00800	NTR	230	25.42	25.42	10.287		$ 10,365.00	$ 2,055.00	$ -	$ 12,420.00
119	620-00900	NTR	230	14.68	14.68	5.941		$ 2,980.00	$ 1,331.00	$ -	$ 4,311.00
120	620-00901	NTR	230	35.00	35.00	14.164		$ 12,981.00	$ 2,244.00	$ 6,383.00	$ 21,608.00
122	620-01100	NTR	230	24.82	8.81	3.565		$ 470.00	$ 772.00	$ -	$ 1,242.00
123	620-01101	NTR	230	53.00	53.00	21.449		$ 22,022.00	$ 4,085.00	$ -	$ 26,107.00

5. PRIVATELY OWNED - AGRICULTURAL LANDS (grantable): ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
126	620-02100	NTR	231 & 232	149.24	85.54	34.618		$ 2,095.00	$ 5,182.00	$ -	$ 7,277.00
127	620-02600	NTR	232	27.53	5.53	2.238		$ -	$ 74.00	$ -	$ 74.00
134	620-02800	NTR	230	27.40	27.40	11.089		$ 4,961.00	$ 2,731.00	$ -	$ 7,692.00
137	620-02900	NTR	229	42.13	42.13	17.050		$ 312.00	$ 2,875.00	$ -	$ 3,187.00
142	620-03102	NTR	229	21.45	21.45	8.681		$ -	$ 488.00	$ -	$ 488.00
145	620-03201	NTR	229	9.62	9.62	3.893		$ -	$ 169.00	$ -	$ 169.00
146	620-03202	NTR	228	16.00	16.00	6.475		$ -	$ 271.00	$ -	$ 271.00
147	620-03300	NTR	228	13.95	13.95	5.645		$ -	$ 475.00	$ -	$ 475.00
151	620-03400	NTR	228	11.31	11.31	4.577		$ -	$ 292.00	$ -	$ 292.00
153	620-03500	NTR	228	24.31	24.31	9.838		$ -	$ 626.00	$ -	$ 626.00
163	620-03900	NTR	228	39.73	39.73	16.079		$ -	$ 738.00	$ -	$ 738.00
168	670-00100	5	18	27.23	27.23	11.020		$ -	$ 521.00	$ -	$ 521.00
169	670-00200	5	17	61.58	61.58	24.921		$ -	$ 1,041.00	$ -	$ 1,041.00
175	670-00600	5	15 & 16	152.86	152.86	61.862		$ 31,501.00	$ 13,699.00	$ 3,751.00	$ 48,951.00
180	670-01100	5	15	36.46	35.45	14.346		$ -	$ 3,557.00	$ -	$ 3,557.00
181	670-01300	5	14	19.60	15.07	6.099		$ -	$ 2,024.00	$ -	$ 2,024.00
182	670-01500	5	14	25.96	18.15	7.345		$ -	$ 1,940.00	$ -	$ 1,940.00
183	670-01505	5	14	26.70	15.07	6.099		$ -	$ 1,552.00	$ -	$ 1,552.00
184	670-02400	5	13	6.00	1.50	0.607		$ -	$ 530.00	$ -	$ 530.00
188	670-03100	5	15	12.50	12.50	5.059		$ 3,279.00	$ 2,381.00	$ -	$ 5,660.00
192	680-06600	5	8 & 9	35.73	2.74	1.109		$ -	$ 576.00	$ -	$ 576.00
194	680-07200	5	10	24.96	7.06	2.857		$ -	$ 1,340.00	$ -	$ 1,340.00
197	680-07300	5	10	26.55	6.42	2.598		$ -	$ 1,144.00	$ -	$ 1,144.00
200	680-07500	5	11	25.60	1.00	0.405		$ -	$ 156.00	$ -	$ 156.00
202	700-00105	6	18	76.26	76.26	30.862		$ -	$ 1,254.00	$ -	$ 1,254.00
204	700-00201	6	18	27.50	27.50	11.129		$ -	$ 472.00	$ -	$ 472.00
206	700-00300	6	17	50.56	50.56	20.461		$ -	$ 827.00	$ -	$ 827.00
208	700-00400	6	17	51.06	51.06	20.664		$ -	$ 887.00	$ -	$ 887.00
210	700-00600	6	16	34.47	34.47	13.950		$ -	$ 1,426.00	$ -	$ 1,426.00

5. PRIVATELY OWNED - AGRICULTURAL LANDS (grantable): ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
213	700-00710	6	16	60.59	60.59	24.520		$ -	$ 6,484.00	$ -	$ 6,484.00
214	700-00800	6	15	78.17	78.17	31.635		$ 14,104.00	$ 9,221.00	$ -	$ 23,325.00
215	700-00900	6	14 & 15	56.55	56.55	22.885		$ 25,425.00	$ 15,542.00	$ -	$ 40,967.00
216	700-01000	6	14	21.74	21.74	8.798		$ 5,155.00	$ 2,761.00	$ -	$ 7,916.00
217	700-01101	6	14	17.32	17.32	7.009		$ -	$ 3,218.00	$ -	$ 3,218.00
218	700-01200	6	14	31.73	31.73	12.841		$ -	$ 4,665.00	$ -	$ 4,665.00
220	700-01300	6	13 & 14	51.02	51.02	20.648		$ -	$ 9,314.00	$ -	$ 9,314.00
223	700-01550	6	13	25.20	25.20	10.198		$ -	$ 2,919.00	$ -	$ 2,919.00
224	700-01600	6	13	50.27	50.27	20.344		$ -	$ 6,783.00	$ -	$ 6,783.00
227	700-01900	6	13	44.89	44.89	18.167		$ 617.00	$ 5,722.00	$ -	$ 6,339.00
230	700-01950	6	13	50.51	50.51	20.441		$ 1,415.00	$ 6,846.00	$ -	$ 8,261.00
232	700-02000	6	14	51.18	51.18	20.712		$ 1,691.00	$ 6,667.00	$ -	$ 8,358.00
238	700-02300	6	15	74.50	74.50	30.150		$ 7,706.00	$ 7,350.00	$ -	$ 15,056.00
240	700-02400	6	16	44.17	44.17	17.875		$ -	$ 3,704.00	$ -	$ 3,704.00
241	700-02500	6	16	65.42	65.42	26.475		$ -	$ 5,622.00	$ -	$ 5,622.00
242	700-02600	6	17	52.39	52.39	21.202		$ -	$ 855.00	$ -	$ 855.00
243	700-02700	6	17	26.00	26.00	10.522		$ -	$ 541.00	$ -	$ 541.00
245	700-02702	6	17	26.00	26.00	10.522		$ -	$ 444.00	$ -	$ 444.00
246	700-02803	6	18	24.98	24.98	10.109		$ -	$ 547.00	$ -	$ 547.00
249	700-02900	6	18	51.64	51.64	20.898		$ -	$ 1,080.00	$ -	$ 1,080.00
258	710-00600	6	12	48.88	48.88	19.781		$ -	$ 5,656.00	$ -	$ 5,656.00
261	710-00700	6	12	33.02	33.02	13.363		$ -	$ 4,703.00	$ -	$ 4,703.00
262	710-00701	6	11	24.74	22.74	9.203		$ -	$ 3,219.00	$ -	$ 3,219.00
265	710-01000	6	11	49.72	49.72	20.121		$ 619.00	$ 9,114.00	$ -	$ 9,733.00
266	710-01002	6	11	48.11	43.11	17.446		$ -	$ 6,808.00	$ -	$ 6,808.00
268	710-01100	6	11	26.28	26.28	10.635		$ -	$ 5,084.00	$ -	$ 5,084.00
269	710-01200	6	10	51.10	51.10	20.680		$ 175.00	$ 8,967.00	$ -	$ 9,142.00
272	710-01400	6	10	25.00	25.00	10.117		$ -	$ 4,090.00	$ -	$ 4,090.00
273	710-01500	6	10	39.50	39.50	15.985		$ -	$ 6,783.00	$ -	$ 6,783.00

5. PRIVATELY OWNED - AGRICULTURAL LANDS (grantable): ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
275	710-01700	6	9	76.19	76.19	30.834		$ -	$ 12,535.00	$ -	$ 12,535.00
278	710-01900	6	9	26.22	26.22	10.611		$ -	$ 4,311.00	$ -	$ 4,311.00
279	710-02100	6	8	26.47	26.47	10.712		$ -	$ 4,335.00	$ -	$ 4,335.00
280	710-02150	6	8	25.56	25.56	10.344		$ -	$ 4,646.00	$ -	$ 4,646.00
281	710-02200	6	8	12.99	12.99	5.257		$ -	$ 2,442.00	$ -	$ 2,442.00
282	710-02300	6	8	11.22	11.22	4.541		$ -	$ 1,725.00	$ -	$ 1,725.00
283	710-02302	6	8	1.01	1.01	0.409		$ -	$ 566.00	$ -	$ 566.00
284	710-02400	6	7 & 8	13.78	13.78	5.577		$ -	$ 4,530.00	$ -	$ 4,530.00
285	710-02402	6	7 & 8	25.00	25.00	10.117		$ -	$ 4,056.00	$ -	$ 4,056.00
286	710-02403	6	7 & 8	31.27	31.27	12.655		$ -	$ 5,215.00	$ -	$ 5,215.00
288	710-02601	6	7	6.37	6.37	2.578		$ -	$ 1,568.00	$ -	$ 1,568.00
298	710-03200	6	7	5.10	5.10	2.064		$ -	$ 959.00	$ -	$ 959.00
300	710-03400	6	7	15.97	15.97	6.463		$ -	$ 4,296.00	$ -	$ 4,296.00
304	710-03600	6	7	7.20	7.20	2.914		$ -	$ 2,149.00	$ -	$ 2,149.00
305	710-03700	6	7	8.45	8.45	3.420		$ -	$ 2,044.00	$ -	$ 2,044.00
307	710-03900	6	7	103.28	103.28	41.797		$ 2,550.00	$ 22,423.00	$ -	$ 24,973.00
308	710-04105	6	8	24.13	24.13	9.765		$ 495.00	$ 5,131.00	$ -	$ 5,626.00
311	710-04300	6	8	24.60	24.60	9.955		$ 566.00	$ 5,125.00	$ -	$ 5,691.00
312	710-04400	6	8	26.56	26.56	10.749		$ 674.00	$ 6,272.00	$ -	$ 6,946.00
313	710-04410	6	8	25.27	25.27	10.227		$ 688.00	$ 5,283.00	$ -	$ 5,971.00
315	710-04600	6	9	24.72	24.72	10.004		$ 130.00	$ 4,607.00	$ -	$ 4,737.00
317	710-04603	6	9	35.08	35.08	14.197		$ 548.00	$ 6,868.00	$ -	$ 7,416.00
318	710-04700	6	9	12.50	12.50	5.059		$ 129.00	$ 2,263.00	$ -	$ 2,392.00
320	710-04900	6	9 & 10	41.06	41.06	16.617		$ 418.00	$ 10,816.00	$ -	$ 11,234.00
322	710-05000	6	10	19.50	19.50	7.892		$ 354.00	$ 5,173.00	$ -	$ 5,527.00
323	710-05100	6	10	50.60	50.60	20.478		$ 422.00	$ 8,565.00	$ -	$ 8,987.00
324	710-05150	6	11	26.32	26.32	10.652		$ 110.00	$ 4,589.00	$ -	$ 4,699.00
329	710-05301	6	11 & 12	38.09	38.09	15.415		$ 492.00	$ 6,238.00	$ -	$ 6,730.00

5. PRIVATELY OWNED - AGRICULTURAL LANDS (grantable): ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
330	710-05360	6	12	5.65	5.65	2.287		$ 160.00	$ 928.00	$ -	$ 1,088.00
332	710-05400	6	12	43.63	43.63	17.657		$ 428.00	$ 7,315.00	$ -	$ 7,743.00
333	710-05405	6	12	23.72	23.72	9.599		$ -	$ 2,743.00	$ -	$ 2,743.00
335	710-05500	6	12	20.31	20.31	8.219		$ -	$ 2,348.00	$ -	$ 2,348.00
340	720-00500	6	5	24.46	21.95	8.883		$ -	$ 5,547.00	$ -	$ 5,547.00
341	720-00600	6	5	25.00	22.50	9.106		$ -	$ 4,792.00	$ -	$ 4,792.00
342	720-00800	6	5	24.82	24.51	9.919		$ -	$ 5,306.00	$ -	$ 5,306.00
343	720-00900	6	5	25.00	25.00	10.117		$ -	$ 5,581.00	$ -	$ 5,581.00
344	720-01000	6	4	25.04	25.04	10.134		$ -	$ 5,311.00	$ -	$ 5,311.00
346	720-01100	6	4	25.50	25.50	10.320		$ -	$ 6,036.00	$ -	$ 6,036.00
347	720-01200	6	4	40.00	25.01	10.121		$ -	$ 6,136.00	$ -	$ 6,136.00
348	720-03800	6	5	25.42	25.42	10.287		$ -	$ 5,675.00	$ -	$ 5,675.00
351	720-04000	6	5	75.67	75.67	30.623		$ -	$ 20,628.00	$ -	$ 20,628.00
352	720-04100	6	6	26.70	26.70	10.805		$ -	$ 8,941.00	$ -	$ 8,941.00
353	720-04150	6	6	27.65	27.65	11.190		$ 895.00	$ 9,260.00	$ -	$ 10,155.00
355	720-04250	6	6	46.49	46.49	18.814		$ -	$ 15,569.00	$ -	$ 15,569.00
358	720-04400	6	6	26.77	26.77	10.834		$ -	$ 8,965.00	$ -	$ 8,965.00
359	720-04450	6	6	23.10	23.10	9.348		$ -	$ 7,736.00	$ -	$ 7,736.00
360	720-04500	6	6	33.21	22.98	9.298		$ -	$ 7,694.00	$ -	$ 7,694.00
366	730-00100	6	19	14.00	2.97	1.202		$ -	$ 80.00	$ -	$ 80.00
371	730-00300	6	19	60.92	3.01	1.218		$ -	$ 49.00	$ -	$ 49.00
372	740-00100	7	17	25.59	25.59	10.356		$ -	$ 440.00	$ -	$ 440.00
374	740-00150	7	17	25.59	25.59	10.356		$ -	$ 440.00	$ -	$ 440.00
375	740-00200	7	17	25.54	25.54	10.336		$ -	$ 430.00	$ -	$ 430.00
376	740-00250	7	17	25.99	25.99	10.518		$ -	$ 543.00	$ -	$ 543.00
377	740-00300	7	16	78.91	78.91	31.934		$ -	$ 1,462.00	$ -	$ 1,462.00
378	740-00400	7	15	55.39	55.39	22.416		$ -	$ 990.00	$ -	$ 990.00
379	740-00500	7	13	24.48	24.48	9.907		$ 500.00	$ 4,511.00	$ -	$ 5,011.00
381	740-00600	7	13	15.84	15.84	6.410		$ 867.00	$ 3,364.00	$ -	$ 4,231.00
385	740-00700	7	13	51.13	51.13	20.692		$ 1,063.00	$ 7,952.00	$ -	$ 9,015.00

5. PRIVATELY OWNED - AGRICULTURAL LANDS (grantable): ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
390	740-00760	7	13	74.12	74.12	29.996		$ -	$ 10,733.00	$ -	$ 10,733.00
391	740-00800	7	13 & 14	82.10	82.10	33.225		$ -	$ 11,430.00	$ -	$ 11,430.00
391-1	740-00810	7	13 & 14	37.57	37.57	15.204		$ 945.00	$ 5,566.00	$ -	$ 6,511.00
392	740-00904	7	14	4.49	4.49	1.817		$ -	$ 1,978.00	$ -	$ 1,978.00
394	740-01000	7	14	101.71	101.71	41.161		$ 533.00	$ 14,635.00	$ -	$ 15,168.00
395	740-01100	7	15	62.81	62.81	25.419		$ -	$ 9,048.00	$ -	$ 9,048.00
396	740-01110	7	15	40.77	35.76	14.472		$ -	$ 5,179.00	$ -	$ 5,179.00
397	740-01200	7	15	44.50	37.96	15.362		$ -	$ 5,496.00	$ -	$ 5,496.00
398	740-01300	7	16	26.02	20.02	8.102		$ -	$ 300.00	$ -	$ 300.00
399	740-01310	7	16	25.06	19.96	8.078		$ -	$ 344.00	$ -	$ 344.00
400	740-01500	7	16 & 17	125.56	104.70	42.372		$ -	$ 1,800.00	$ -	$ 1,800.00
401	740-01600	7	17	55.40	45.40	18.373		$ -	$ 999.00	$ -	$ 999.00
402	740-01700	7	18	26.30	21.30	8.620		$ -	$ 407.00	$ -	$ 407.00
403	740-01750	7	18	27.58	22.60	9.146		$ -	$ 389.00	$ -	$ 389.00
404	740-01800	7	18	26.41	23.60	9.551		$ -	$ 441.00	$ -	$ 441.00
406	740-01830	7	18	25.12	25.12	10.166		$ -	$ 557.00	$ -	$ 557.00
408	740-01900	7	18	49.00	49.00	19.830		$ -	$ 842.00	$ -	$ 842.00
410	740-02000	7	18	50.23	50.23	20.328		$ -	$ 903.00	$ -	$ 903.00
411	750-00100	7	12	48.25	48.25	19.527		$ 1,605.00	$ 8,192.00	$ -	$ 9,797.00
423	750-00700	7	9	25.00	25.00	10.117		$ 1,625.00	$ 4,370.00	$ -	$ 5,995.00
424	750-00705	7	9	20.29	20.29	8.211		$ 6,734.00	$ 4,216.00	$ -	$ 10,950.00
430	750-01000	7	8	25.44	25.44	10.295		$ 896.00	$ 5,354.00	$ -	$ 6,250.00
433	750-01101	7	7	70.09	70.09	28.365		$ 656.00	$ 17,845.00	$ -	$ 18,501.00
437	750-01200	7	7	97.43	97.43	39.429		$ 1,086.00	$ 25,846.00	$ -	$ 26,932.00
449	750-02600	7	7	28.49	28.49	11.530		$ -	$ 4,154.00	$ -	$ 4,154.00
450	750-02700	7	8	25.00	25.00	10.117		$ -	$ 4,691.00	$ -	$ 4,691.00
450-1	750-02702	7	8	79.25	79.25	32.072		$ 1,126.00	$ 14,601.00	$ -	$ 15,727.00
451	750-02800	7	8	71.97	71.97	29.126		$ 161.00	$ 12,257.00	$ -	$ 12,418.00
452	750-02900	7	9	77.19	77.19	31.238		$ -	$ 14,826.00	$ -	$ 14,826.00

5. PRIVATELY OWNED - AGRICULTURAL LANDS (grantable): ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
453	750-03000	7	9	75.22	75.22	30.441		$ -	$ 12,279.00	$ -	$ 12,279.00
455	750-03100	7	10	46.75	46.75	18.919		$ 845.00	$ 8,314.00	$ -	$ 9,159.00
458	750-03190	7	10	48.64	48.64	19.684		$ 964.00	$ 8,366.00	$ -	$ 9,330.00
460	750-03300	7	10	94.20	94.20	38.122		$ 1,411.00	$ 15,647.00	$ -	$ 17,058.00
461	750-03400	7	11	92.93	92.93	37.608		$ 1,496.00	$ 15,972.00	$ -	$ 17,468.00
462	750-03500	7	11	49.36	49.36	19.976		$ 1,021.00	$ 8,213.00	$ -	$ 9,234.00
463	750-03600	7	11	79.19	79.19	32.048		$ 788.00	$ 13,052.00	$ -	$ 13,840.00
464	750-03700	7	12	64.57	64.57	26.131		$ 995.00	$ 9,403.00	$ -	$ 10,398.00
465	750-03800	7	12	36.50	36.50	14.771		$ -	$ 5,285.00	$ -	$ 5,285.00
466	750-03900	7	12	23.41	23.41	9.474		$ 1,024.00	$ 3,288.00	$ -	$ 4,312.00
468	760-00100	7	5	16.53	16.53	6.690		$ -	$ 5,035.00	$ -	$ 5,035.00
473	760-00400	7	5	79.93	29.17	11.805		$ -	$ 6,556.00	$ -	$ 6,556.00
475	760-02600	7	4	50.93	2.06	0.834		$ -	$ 283.00	$ -	$ 283.00
476	760-02700	7	4	49.10	23.87	9.660		$ -	$ 3,533.00	$ -	$ 3,533.00
479	760-02900	7	5	48.12	48.12	19.474		$ -	$ 6,968.00	$ -	$ 6,968.00
484	760-03200	7	5	11.05	11.05	4.472		$ -	$ 2,090.00	$ -	$ 2,090.00
486	760-03400	7	5	23.50	23.50	9.510		$ -	$ 4,530.00	$ -	$ 4,530.00
487	760-03500	7	6	24.02	24.02	9.721		$ -	$ 3,478.00	$ -	$ 3,478.00
506	760-05200	7	6	33.69	33.69	13.634		$ -	$ 5,125.00	$ -	$ 5,125.00
521	760-06600	7	6	67.90	67.90	27.479		$ -	$ 22,894.00	$ -	$ 22,894.00
522	760-06700	7	6	52.64	52.64	21.303		$ -	$ 17,748.00	$ -	$ 17,748.00
524	790-00100	8	12	50.70	15.50	6.273		$ -	$ 1,123.00	$ -	$ 1,123.00
526	790-00205	8	11	50.20	15.50	6.273		$ -	$ 1,123.00	$ -	$ 1,123.00
527	790-00300	8	11	46.10	11.30	4.573		$ -	$ 953.00	$ -	$ 953.00
529	790-00306	8	11	2.30	2.30	0.931		$ -	$ 466.00	$ -	$ 466.00
530	790-00400	8	11	48.04	22.00	8.903		$ -	$ 1,593.00	$ -	$ 1,593.00
532	790-00500	8	10	99.25	21.76	8.806		$ -	$ 1,575.00	$ -	$ 1,575.00
534	790-00600	8	10	101.78	30.00	12.141		$ -	$ 2,172.00	$ -	$ 2,172.00
536	790-00700	8	9	46.17	10.00	4.047		$ -	$ 724.00	$ -	$ 724.00

5. PRIVATELY OWNED - AGRICULTURAL LANDS (grantable): ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
539	790-01110	8	9	49.45	12.00	4.856		$ -	$ 869.00	$ -	$ 869.00
546	790-02400	8	7	23.54	0.80	0.324		$ -	$ 115.00	$ -	$ 115.00
559	790-03100	8	9	48.71	25.00	10.117		$ -	$ 1,969.00	$ -	$ 1,969.00
561	730-01700	7	19	47.92	9.22	3.731		$ -	$ 79.00	$ -	$ 79.00
	Total on Privately Owned - Agricultural Lands (grantable)							**$ 288,154.00**	**$ 934,033.00**	**$ 10,134.00**	**$ 1,232,321.00**

5. PRIVATELY OWNED - AGRICULTURAL LANDS (non-grantable):

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
7	560-02100	STR	226	12.61	8.85	3.582		$ 1,756.00	$ 409.00	$ -	$ 2,165.00
14	560-02600	STR	227	3.57	3.57	1.445		$ -	$ 344.00	$ -	$ 344.00
23	560-03300	STR	225	42.49	29.00	11.736		$ -	$ 556.00	$ -	$ 556.00
42	570-06400	STR	229	3.33	3.33	1.348		$ 2,894.00	$ 1,171.00	$ -	$ 4,065.00
64	610-01600	NTR	225	5.50	5.50	2.226		$ -	$ 461.00	$ -	$ 461.00
79	610-02205	NTR	227	6.10	6.10	2.469		$ -	$ 696.00	$ -	$ 696.00
93	610-02800	NTR	227	21.83	21.83	8.834		$ -	$ 508.00	$ -	$ 508.00
104	620-00150	NTR	228	3.47	3.47	1.404		$ -	$ 352.00	$ -	$ 352.00
129	620-02602	NTR	231	22.69	22.69	9.183		$ -	$ 4,210.00	$ -	$ 4,210.00
131	620-02604	NTR	231	28.38	28.38	11.485		$ 3,279.00	$ 3,285.00	$ -	$ 6,564.00
133	620-02700	NTR	230	21.99	21.99	8.899		$ 9,472.00	$ 3,139.00	$ -	$ 12,611.00
149	620-03303	NTR	228	5.01	5.01	2.028		$ -	$ 217.00	$ -	$ 217.00
155	620-03600	NTR	228	7.07	7.07	2.861		$ -	$ 597.00	$ -	$ 597.00
156	620-03601	NTR	228	9.24	9.24	3.739		$ -	$ 793.00	$ -	$ 793.00
157	620-03700	NTR	228	10.50	10.50	4.249		$ -	$ 181.00	$ -	$ 181.00
158	620-03702	NTR	228	0.76	0.76	0.308		$ -	$ 13.00	$ -	$ 13.00
164	620-04000	NTR	228	5.79	5.79	2.343		$ -	$ 191.00	$ -	$ 191.00
185	670-02900	5	14	12.40	12.40	5.018		$ 83.00	$ 4,540.00	$ -	$ 4,623.00

5. PRIVATELY OWNED - AGRICULTURAL LANDS (non-grantable): ***Continued***

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
186	670-03000	5	15	11.70	11.70	4.735		$ 1,794.00	$ 2,398.00	$ -	$ 4,192.00
231	700-01960	6	13	7.25	7.25	2.934		$ 875.00	$ 4,160.00	$ -	$ 5,035.00
233	700-02050	6	14	24.02	24.02	9.721		$ 4,833.00	$ 5,369.00	$ -	$ 10,202.00
235	700-02101	6	14	26.29	26.29	10.639		$ 9,616.00	$ 6,926.00	$ -	$ 16,542.00
248	700-02805	6	18	25.50	25.50	10.320		$ -	$ 540.00	$ -	$ 540.00
302	710-03500	6	7	9.15	9.15	3.703		$ -	$ 2,884.00	$ -	$ 2,884.00
331	710-05370	6	12	4.52	4.52	1.829		$ 462.00	$ 1,764.00	$ -	$ 2,226.00
369	730-00250	6	19	14.86	14.86	6.014		$ -	$ 388.00	$ -	$ 388.00
382	740-00610	7	13	4.23	4.23	1.712		$ -	$ 4,271.00	$ -	$ 4,271.00
384	740-00650	7	13	5.00	5.00	2.023		$ -	$ 3,745.00	$ -	$ 3,745.00
415	750-00500	7	11	3.82	3.82	1.546		$ 680.00	$ 1,274.00	$ -	$ 1,954.00
417	750-00520	7	11	3.64	3.64	1.473		$ 585.00	$ 4,422.00	$ -	$ 5,007.00
418	750-00600	7	10	3.11	3.11	1.259		$ 563.00	$ 1,822.00	$ -	$ 2,385.00
431	750-01005	7	8	3.05	3.05	1.234		$ 456.00	$ 3,056.00	$ -	$ 3,512.00
457	750-03150	7	10	4.11	4.11	1.663		$ -	$ 4,231.00	$ -	$ 4,231.00
485	760-03300	7	5	14.35	14.35	5.807		$ -	$ 2,800.00	$ -	$ 2,800.00
531	790-00405	8	11	3.28	2.90	1.174		$ -	$ 1,510.00	$ -	$ 1,510.00
	Total on Privately Owned - Agricultural Lands (non-grantable)							**$ 37,348.00**	**$ 73,223.00**	**$ -**	**$ 110,571.00**

6. SPECIAL NON PRO-RATEABLE ASSESSMENTS (non-agricultural Sec.26):

Parcel ID Number	Tax Roll Number	Con. or Plan Number	Lot or Part of Lot	Acres Owned	Acres Affected	Hectares Affected	Owner's Name	Value of Benefit	Value of Outlet	Value of Special Benefit	TOTAL VALUE
A.	Bridge #22 & #23 Flushing for Mersea Road 6 Crossing (Construction Item 4b & 4c)						Municipality of Leamington	$ 6,648.00	$ -	$ -	$ 6,648.00
B.	Erosion Protection along Mersea Road 6, Mersea Road 5, and Mersea Road 19 (Construction Items 6a, 6b, 6c, 6e, & 6f)						Municipality of Leamington	$ 91,047.00	$ -	$ -	$ 91,047.00
	Total on Special Non Pro-Rateable Assessments (non-agricultural Sec.26)							**$ 97,695.00**	**$ -**	**$ -**	**$ 97,695.00**
	TOTAL ASSESSMENT			**8498.81**	**3439.422**			**$ 470,905.00**	**$ 1,355,209.00**	**$ 10,134.00**	**$ 1,836,248.00**

1 Hectare = 2.471 Acres

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STANDARD SPECIFICATIONS

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Peralta Engineering

STANDARD SPECIFICATIONS

General

(Revised Feb 2023)

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I. GENERAL CONDITIONS FOR SPECIFICATIONS

The specifications, together with the accompanying drawings and appendices, delineate the furnishing of all labour, equipment, materials and supplies required for the performance of all operations relating to the construction and/or improvements of a Municipal Drain under the most recent revision of the Drainage Act and/or amendments made thereto. These specifications serve to supplement and/or amend the current Ontario Provincial Standard Specifications and Standard Drawings, adopted by the Ontario Municipal Engineers Association. "Special Provisions" are included as part of the overall document and shall be read in conjunction with these standard specifications. Where a discrepancy occurs between the requirements of the Standard Specifications and the Special Provisions, the Special Provisions shall govern. 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 (CCDC) shall govern and be used to establish the requirements of the work.

Any reference to "Drainage Superintendent" and/or "Consulting Engineer" within this document shall refer to the person (or persons) appointed by the Council of the Municipality having jurisdiction over the drainage works.

All work shall be done in a first-class and workmanlike manner, complete in all respects and including all items specified herein, or as necessary for the accomplishment of a complete, satisfactory, and approved installation.

II. REVIEW OF SITE, PLANS AND SPECIFICATIONS

As part of the Tender process, each tenderer shall visit the site(s) and review all documentation associated with the project prior to their tender submission and satisfy themselves with the full extent of the scope of work and conditions to complete the project. The Contractor may request, at any time prior to the closing of the tender, to examine any associated information available from the Drainage Superintendent and/or Consulting Engineer. Claims that there are any misunderstandings of the terms and conditions of the Contract related to site conditions will not be permitted.

The quantities identified within the Construction Items, drawings and/or specifications are estimates only and are intended for the sole purpose of identifying the general extent of the proposed work. The tenderer shall be responsible to verify the quantities for accuracy prior to submitting their tender.

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

III. MAINTENANCE PERIOD

The successful tenderer shall guarantee and warrant the work for a period of twelve (12) months from the time that substantial completion is issued. Upon the expiry of the maintenance period, with ordinary wear and tear, the work shall remain in such condition as will meet with the approval of the Consulting Engineer, and it will be responsible for rectification in a manner satisfactory to the Consulting Engineer. The cost thereof, of any imperfect work due to or arising from materials, equipment or plant incorporated into or used in the construction thereof, or due to or arising from workmanship or methods of construction, that is discovered by any means at any time prior to the issuance of the Final Certificate. The Consulting Engineer shall decide as to the nature, extent, cause of, and responsibility for imperfect work and the necessity for and the method of rectification thereof. In the event that the Contractor fails to comply with the above and address any deficiencies, the Municipality may complete these deficiencies, with the guidance of the Consulting Engineer, to make such repairs or complete such works, and the whole costs, charges and/or expenses so incurred may be deducted from any amount due or collected from the Contractor.

IV. LIABILITY OF THE CONTRACTOR

The Contractor, its agents, workforce and/or sub-contractors, shall satisfy itself as to the exact location, nature and extent of any existing structure, utility or other objects that it may encounter during the course of the work. The Contractor will be responsible for any damage caused by it to any person, property, public utilities, and/or municipal infrastructure. The Contractor shall indemnify and save harmless, the Municipality and the Consulting Engineer for any damages which it may cause or sustain during the progress of the work. The Contractor shall not hold the Municipality or the Consulting Engineer liable for any legal action arising out of any claims brought about by such damage caused by it.

V. GENERAL COORDINATION

The Contractor shall be responsible for the coordination with other organizations, agencies, and utility companies in connection with the works. The Contractor shall not take action against the Municipality or the Engineer for delays caused by the site being unavailable to them by the Municipality or Consulting Engineer because of the acts, omissions, conduct or misconduct of other organizations or utility companies engaged in other work.

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

VI. LEGAL SURVEY BARS AND MONUMENTS

The Contractor is to note that legal survey bars may exist within the work site, and it shall take whatever steps necessary to protect these features. If any iron bar or monument is damaged or removed by the Contractor, it shall arrange for an Ontario Land Surveyor licensed in the Province of Ontario to restore same, all at the Contractor's expense.

VII. MAINTAINING CONVEYANCE

The drainage works shall not be conducted at times when flows in the drain are elevated due to local rain events, storms, or seasonal floods. Work shall be completed during times when the drain is dry or frozen. When performing excavation work, care should be taken not to interfere with, plug up, or damage any existing surface drains, swales, and lateral or main tile ends. The Contractor shall be responsible to maintain permanent flow at all times. Temporary damming of flow is permitted to conduct the necessary works. However, the Contractor is responsible to monitor and ensure no damage occurs as a result of its actions. Under no circumstances shall temporary damming be permitted for an extended period (ie. overnight, etc.) without a suitable water control plan approved by the Drainage Superintendent, Consulting Engineer and/or the Conservation Authority.

VIII. APPROVALS, PERMITTING, AND INSPECTION

The works proposed under this project is subject to the approval, inspection, regulations, and by-laws of all Municipal, Provincial, and Federal entity, or any other agency having jurisdiction associated with the drainage works established herein. The Contractor shall ensure that all applicable permits and approvals are procured from all affected authorities prior to carrying out any of the prescribed works identified within the Contract, or in the vicinity of any public utility, railway and/or road authority.

The drainage works forming part of this project, including all appurtenances, shall be completely inspected by the Town Drainage Superintendent and/or the Consulting Engineer's Inspector prior to its completion. Under no circumstance shall the Contractor commence the construction or backfill of any underground feature without the site presence of the Drainage Superintendent and/or the Consulting Engineer's Inspector to inspect and approve said installation. The Contractor shall provide a minimum of forty-eight (48) hours' notice to the Drainage Superintendent and/or the Consulting Engineer prior to the commencement of the work. All works shall be performed during normal working hours of the Drainage Superintendent and/or the Consulting Engineer from Monday to Friday unless written authorization is provided by them to amend these working hours.

Upon completion of the works and prior to the demobilization and removal of all equipment and materials from the site, the Contractor shall notify the Drainage Superintendent and/or Consulting Engineer to arrange a final inspection of the works. The final inspection is intended to ensure that all aspects of the drainage work are satisfactorily completed and/or identify any outstanding deficiencies. Any outstanding deficiencies shall be addressed expeditiously as weather permits.

IX. TRAFFIC CONTROL

The Contractor shall ensure that the travelling public is always protected while utilizing the roadway for its access. The Contractor shall be required to carry out all 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 travelling public. The Contractor shall be required to submit a Traffic Control Plan to the Consulting Engineer for approval from the governing Road Authorities. The Traffic Control Plan shall be carried out in accordance with the requirements of the Ontario Traffic Manual's Book 7 for Temporary Conditions. Should the Contractor have to close any roads for the proposed works,

it shall arrange to obtain the necessary authorizations from the Municipality, County, or Provincial Roads Departments (if applicable) and distribute notification of detours around the site. The Contractor shall also ensure that all emergency services, school bus companies, etc. 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 Municipality and County Roads Department (if applicable).

X. BENCHMARKS

For use by the Contractor, Benchmarks have been established along the course of the work. The plans include details illustrating the available Benchmarks and the work to be carried out. Benchmarks have been indicated and the Elevations have been shown and shall be utilized by the Contractor in carrying out its work. The Contractor shall note that specific design elevations and grades have been provided for the proposed works. The plans also set out side slopes, bottom width, and other requirements relative to its installation. In all cases, the Contractor is to utilize the specified Benchmarks to establish the identified elevations and grades. The Contractor shall ensure that it takes note of the direction of flow and sets all grades to match the direction of flow within the drain.

XI. ENVIRONMENTAL CONSIDERATIONS

Prior to commencing work, the Contractor must familiarize themselves with all associated environmental approvals and mitigations. The Contractor shall review the results of any environmental reviews performed for the project, including documents for the purpose of identification of known Species at Risk within the project area and mitigation measures for species and habitat protection. It is the responsibility of the Contractor to make certain that necessary provisions are undertaken to ensure the protection of all Species at Risk and their habitats throughout the course of construction. The Contractor will be responsible for providing the necessary equipment and materials required by any mitigation plans and shall contact the Drainage Superintendent immediately if any Endangered Species are encountered during construction.

XII. FINAL CLEANUP AND RESTORATION

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

Any accesses or areas used in carrying out the works are to be fully restored to their original conditions by the Contractor, including topsoil placement and lawn restoration as directed by the Drainage Superintendent and/or the Consulting Engineer. Restoration shall include, but not be limited to, all necessary levelling, grading, shaping, topsoil, seeding and mulching, and granular placement required to make good any damage caused. Any damages caused, resulting from non-compliance with the above-noted provisions, shall be restored by the Contractor to its original condition, at the Contractor's expense.

All roadways, driveways and access bridges, or any other means of access onto the job site shall be fully restored to their former condition at the Contractor's expense. 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 to be deducted from any monies owing to the Contractor.

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Peralta Engineering

STANDARD SPECIFICATIONS

FOR OPEN DRAINS

(Revised Feb 2023)

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I. GENERAL CONDITIONS FOR SPECIFICATIONS

These specifications, together with the accompanying drawings and appendices, delineate the furnishing of all labour, equipment, materials and supplies required for the performance of all operations relating to the construction and/or improvements of a Municipal Drain under the most recent revision of the Drainage Act and/or amendments made thereto. These specifications serve to supplement and/or amend the current Ontario Provincial Standard Specifications and Standard Drawings, adopted by the Ontario Municipal Engineers Association. "Special Provisions" are included as part of the overall document and shall be read in conjunction with these standard specifications. Where a discrepancy occurs between the requirements of the Standard Specifications and the Special Provisions, the Special Provisions shall govern. 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 (CCDC) shall govern and be used to establish the requirements of the work.

Any reference to "Drainage Superintendent" and/or "Consulting Engineer" within this document shall refer to the person (or persons) appointed by the Council of the Municipality having jurisdiction over the drainage works

All work shall be done in a first-class and workmanlike manner, complete in all respects and including all items specified herein, or as necessary for the accomplishment of a complete, satisfactory, and approved installation.

II. GEOMETRY AND ALIGNMENT

Except for details otherwise specified, any drain excavation shall adhere to the course of the existing drain, as close as practical, with the defined sloping and widths carried out on each bank as required to produce the specified cross-section. The works shall be of the size, shape, type, depth, width, etc., as shown in the accompanying drawings and as determined from the Benchmark.

At locations where sharp or irregular bends exist, all excavation, sloping, and widening shall be completed on the side of the drain which will provide a reduced radius and improve the alignment of the channel. When works are completed adjacent to a fence row or the travelled portion of the roadway/laneway, all excavation, sloping and widening shall be completed from the furthest side of the drain from this feature, unless otherwise established by the Drainage Superintendent and/or Consulting Engineer.

Where a drain is intended to be relocated from the road allowance and onto private lands, the top edge of the nearest drain bank shall be set a minimum of 1.0 metres from the road right-of-way or the top of the former channel to be abandoned. The centerline of the proposed channel shall be as straight as practical with any change in the direction provided with a smooth transition and set to the radii established within the accompanying drawings.

The Contractor shall provide a sufficient number of layout stakes and grade points so that the Drainage Superintendent and/or Consulting Engineer can review and verify that the work will generally conform with the design and project intent. The cost of placing layout stakes shall form part of their tender price.

III. PROFILE

The excavation of the drain must adhere to the depths and grades as established within the accompanying Profile. For the convenience of the Contractor, the profile indicates the approximate depth of cut from the existing ground levels to the proposed new drain bottom elevation. Benchmarks have been established along the course of the drain and shall govern the final elevation of the drain. These Benchmarks have been included as part of the accompanying drawings.

The Contractor shall ensure that the profile grades are constructed with an even gradient to prevent standing water. Laser Control must be provided to maintain drain lines and grades, and the Contractor shall have a qualified Operator to set up and operate the equipment. In some instances, but only at the discretion of the Consulting Engineer, an approved system of batter boards or stakes may be utilized for this purpose. However, the cost of placing grade stakes and determining the cut information shall be provided by or paid for entirely by the Contractor.

IV. BOTTOM WIDTHS AND SIDE SLOPES

As indicated on the accompanying profile and cross-sections, bottom widths and side slopes have been provided for the various sections of the drain. These parameters shall represent the finished grade of the cross-section. Although these parameters have been established as a guide for the Contractor, the finished cross-section shall closely resemble the cross-section established within the accompanying drawings. Minor deviations are permitted to accommodate the existing restrictions. However, under no circumstances shall the finished side slopes be steeper, nor the bottom width narrower, than those established within the accompanying drawings. Unless otherwise stipulated, the Contractor shall not excavate the drain bottom deeper than the established grade resulting in the formation of pockets that will cause standing water within the drain. Any corrections to the grades resulting in over-excavation of the drain bottom shall be corrected per the Consulting Engineer's recommendations and at the Contractor's expense.

Based on the overall depths and widths of the drain, the Contractor shall ensure that appropriate excavating equipment is utilized for the works and ensure that no damage is caused by the use of improper excavating equipment.

V. OBSTRUCTIONS

All stones, brush, timber, logs, stumps, or other potential obstructions encountered within the limits of the channel or along the course of the drain, shall be removed by the Contractor. Any large stones, concrete, or other materials of this nature shall be neatly piled near the extreme limit of the maintenance corridor so that it shall not interfere with the spreading or placement of any excavated materials. All timber, logs, and stumps shall be dealt with in the same manner established in the proceeding sections related to the Removal of Brush, Trees and Debris. Once placed in appropriate locations, these materials shall become the responsibility of the adjacent landowner.

VI. DEAD WOOD REMOVAL

Any and all dead trees located within the drain cross-section and within the established working corridors shall be neatly cut into logs with a chainsaw, piled and set near the extreme limit of the maintenance corridor for the use of the adjoining property owner unless otherwise directed by the Drainage Superintendent and/or Consulting Engineer. In addition to the dead wood located within the drain and working corridor, the Contractor shall also remove and dispose of all dead wood located on the opposite side within a 1.0-metre perpendicular distance into the headland beyond the top of the drain bank where no brushing is intended.

VII. REMOVAL OF BRUSH, TREES, AND DEBRIS

Where the existing side slopes and drain bottom of the drain is sufficient to permit the necessary sediment removal without disturbing the existing drain banks above the present drain bottom, the Contractor will be required to cut the brush and trees flush with the slope of the drain. However, it is imperative not to remove any stumps or roots associated with the trees, unless they present a clear obstruction to the flow within the drain. Any healthy trees in the drain situated along the top 0.30 metres from the top of the bank could be left if they are not impeding the flow in the drain. All of the brushing works shall be carried out from the same side of the drain where the excavation of the drain is being carried out.

Where it is necessary to widen the drain channel and excavate material from the drain bank, all brush and trees within the excavated portion, including the spread area and within 1.0 metres from the top of the bank, all trees and brush shall be removed and those roots and stumps within the drain channel shall be completely grubbed out unless otherwise established by the Drainage Superintendent and/or the Consulting Engineer. As part of the drain widening process, where there are any trees, brush, or debris adjacent to the drain, or where the excavated spoil materials are to be spread (including any brush piles, rubbish piles or rock piles), this material shall be grubbed out and close cut, and be burned or otherwise disposed of, by the Contractor, unless otherwise noted within the Special Provisions.

All trees intended to be removed and having a diameter greater than 150mm shall have their branches trimmed and the trunks/branches cut into logs not longer than 2.0 metres in length. These logs shall be piled for the use of the adjoining property owner unless otherwise directed by the Drainage Superintendent and/or Consulting Engineer. All trees intended to be removed and having a diameter of 150mm or less shall be cut off flush with the ground and brushed. Brushing is to be carried out by means of shredding or machine type equipment excluding any trees with a diameter of 150mm or greater, which are to be cut by tree shears, chainsaw, or a similar method. Any stumps remaining as a result of tree removal shall have a

maximum stump height of 75mm (3"), where practical. Small branches, limbs, and brush shall be disposed of by the Contractor unless otherwise established within the Special Provisions.

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.

Under no circumstances shall brush, branched, trees, or rubbish be allowed to be buried in the spoil bank or within the excavated material, and the Contractor will require to brush rake the excavated material to remove all such debris if so instructed by the Drainage Superintendent.

Where there is any brush, trees or debris along the course of the drainage works, including the full width of any access, all such brush, trees or debris shall be close-cut and grubbed out, and the whole shall be 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 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 the burning operations, the Contractor shall comply with the guidelines prepared by the Air Quality Branch of the Ontario Ministry of the Environment, Conservation and Parks and shall ensure that the Environmental Protection Act is not violated. The Contractor will be required to notify the local fire authorities and cooperate with them in the carrying out of any work. The removal of brush and trees shall be carried out in close consultation with the 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.

VIII. 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 the same. The Contractor will be required to replace any fence that is taken down in order to proceed with the work, and the fence shall be replaced 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.

IX. PLANTED CROPS AND LIVESTOCK

Where required, provisions for loss of, or damages to, crops along the working corridors of the drain have been established within the Engineer's Report for this drain. As a result, the Contractor shall not be liable for such loss or damage as part of the project, unless these damages extend beyond the established working corridor.

Should the Property Owner wish to harvest any crop within the established working corridor, then it shall be the responsibility of the property to do so prior to construction. Likewise, it will be the Property Owner's responsibility to keep their livestock clear of the construction area upon 24 hours of advanced notice by the Contractor. Upon notice, the Contractor shall not be liable for any damage to livestock, the drain, materials or equipment caused by the Owner's livestock.

X. SEDIMENTATION REMOVAL

When drain cleaning is specified for an existing drain alignment, the works intend to remove all sedimentation built up within the drain channel. As part of these operations, the Contractor shall remove all accumulated sediment within the channel while minimizing the disturbances of the existing side slopes of the drain when carrying out its maintenance work, unless otherwise specified. However, trimming of the drain bank may be required in areas where drain bank failures have occurred, the banks are over-steepened and unstable, or where overhangs exist. At these locations, the drain bank on the side from which the excavation equipment is operating shall be trimmed to the specified slope. Any deviation from the specified drain parameters shall be directed by the Drainage Superintendent and/or the Consulting Engineer and no claims for extra compensation for minor drain bank trimming will be considered. It shall be noted that no drain excavations or cleaning shall be performed until after all brushing operations have been completed.

XI. ROAD CROSSINGS AND ACCESS CULVERTS

Where an existing road crossing structure or private access (bridge/culvert) exists along the course of the drain, the Contractor shall excavate and remove all accumulated sediment through the full cross-section of its opening. The Contractor shall take extra care not to damage the existing structure. Upon the completion of the cleaning process, if it is found that repairs or replacement is required to the structure, the Contractor shall notify the Drainage Superintendent of its condition.

It is recommended that the Drainage Superintendent notify the governing road authority having jurisdiction over the structure of its condition. Where the necessary repairs, underpinning, strengthening, or replacement of a road crossing structure is required, these works shall be conducted under the authority of the governing Road Authority and at their expense.

XII. EXCAVATED MATERIALS

Where specified, the excavated material to be cast on the adjoining agricultural lands shall be well and evenly spread over a sufficient space so that no portion of the excavated material is more the six (6) inches in depth, or as otherwise identified within the Special Provisions. The excavated material shall be kept at least five (5) feet clear of the finished top of the bank of the drain. The Contractor shall take special care not to fill up any existing tiles, ditches, furrows, or drains. The excavated material to be spread upon the lands shall be free from deleterious materials (rocks, boulders, stumps, rubble, or other similar material) if encountered. All deleterious materials shall be hauled away and disposed of at a site to be obtained by the Contractor at their expense. With the placement of spread excavated materials along the working corridor, surface water inlets shall be installed through the spread excavated materials at natural low runs or at locations specified by the Drainage Superintendent or Consulting Engineer at the time of construction.

Under no circumstances shall any excavated material be placed in any ditches, furrows, pipes, tiles, or depressions intended to convey runoff to the open drain.

Where the drain passes along any farmhouse or dwelling, driveway, lawn area, garden plot, built-up residential or grassed area, the excavated materials from the drain for the full width of these areas shall be hauled away by the Contractor and spread on the adjoining agricultural lands as part of the tendered price. The Contractor will be required to operate its equipment from the roadside where applicable, in front of these areas. The Contractor should visit the drain sites and confirm for itself the extent of trucking required on this project. All of the excavated material across the full width of the municipal roadways, including all of the sediment material cleaned from within the concrete roadway bridges, shall be completely trucked away by the Contractor and taken for half the length and spread on the adjoining lands on both sides of the Roadway.

The Contractor shall be responsible for keeping all laneways, and all private and public roadways free and clear of mud and debris resulting from their use of any access and hauling purposes.

XIII. TILE OUTLET PIPES AND ROAD DRAINS

Along the length of the drain, the Contractor may encounter tile mains, lateral tiles, or road drains along the bottom or within the drain's bank. Where an existing tile outlet pipe is removed, damaged, or altered by the excavation of the drain, the Contractor will be required to protect or extend any existing tile ends to maintain the drainage from the adjacent lands. All existing tiles shall be extended utilizing a minimum of 3.0 metres of Boss 1000 (or equal plastic pipe) of the same diameter as the existing tile, or one (1) size bigger than, and installed in accordance with the "**Standard Lateral Tile Detail**" included within the accompanying drawings.

Connections shall be made using a Manufacturer's coupling wherever possible. For other connections, the Contractor shall utilize a grouted connection. Grouted mortar joints shall be composed of three (3) parts of clean, sharp sand to one (1) part of Portland Cement with just sufficient water added to provide a stiff plastic mix, and the mortar connection shall be performed to the full satisfaction of the Drainage Superintendent and/or the Consulting Engineer. The mortar joint shall be of sufficient mass around the full circumference of the joint on the exterior side to ensure a tight, solid seal.

XIV. TEMPORARY SEDIMENT CONTROLS AND ENVIRONMENTAL CONSIDERATIONS

The Contractor shall be required to implement stringent erosion and sedimentation controls during the course of the work to minimize the amount of silt and sediment being carried downstream. It is intended that work on this project be carried out during relatively dry weather to ensure the proper site and drain conditions and to avoid conflicts with sediment being deposited into the outlet drainage systems. 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.

All of the work shall be carried out in accordance with any permits or authorizations issued by the Conservation Authority or the Department of Fisheries and Oceans (DFO), copies of which shall be provided, if available. The Contractor is advised that no work shall be carried out in the existing drain from March 15th to July 15th, of any given year.

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

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

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

c) To prevent sediment entry into the Drain, in the event of an unexpected rainfall, temporary silt barriers and/or traps must be placed in the channel during the works and until the site has been stabilized. All temporary sediment and erosion control measures (straw bale check dam or silt fences) shall conform to the Ontario Provincial Standards O.P.S.D. 219.130 or approved equivalent. The Contractors shall ensure that sediment and erosion control measures are functioning properly and are maintained/upgraded as required. Any temporary sediment features must be removed upon completion of the construction. All costs associated with the supply and installation temporary erosion control measure shall be included in the tender price for the project.

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

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

IX. UTILITIES

The Contractor will be responsible at all times for a complete investigation to determine the location of all such utilities or structures known or unknown, and it shall indemnify and save harmless the Consulting Engineer and the Municipality for any responsibility, injury, or liability arising from any damage to such utilities or structures by the Contractor.

The Contractor shall protect all other services located in the vicinity of the proposed drainage works including any sanitary sewers and connections, watermains and connections, telephone and gas services, along with any private systems and services. Any damaged components shall be replaced by the Contractor, totally at its own expense and it shall fully restore the functionality of same.

The Contractor shall further contact or notify such Utility Company or Commission of its intention to carry out work in the area and cooperate with such Utility Company or Commission in the location, maintenance and preservation of all such utilities. The location of the pipes and appurtenances as shown on the drawings is approximate and may be changed by the Consulting Engineer if deemed advantageous for the progress of the work.

X. GENERAL EROSION PROTECTION

Where specified, or as directed by the Drainage Superintendent or Consulting Engineer, the Contractor shall install sloped quarried limestone erosion protection, on a slope no steeper than 1.50 horizontal to 1.00 vertical. It shall have a depth of 300mm and shall extend from the top bank to the toe of the bank, all in accordance with the **"Standard Erosion Protection Detail"** shown within the accompanying drawings. Where sloped quarried limestone is to be placed, it shall be underlain with a synthetic non-woven geotextile filter fabric. All work shall be completed to the full satisfaction of the Drainage Superintendent and/or the Consulting Engineer.

The quarried limestone shall be provided as shown and detailed and shall vary in size from a minimum of 100mm (4") to a maximum of 250mm (10"). The quarried limestone pieces shall be carefully tamped into place with the use of a shovel bucket so that, when complete, the quarried limestone erosion protection shall be consistent, uniform, and tightly laid in place. Prior to placing the quarried limestone, the Contractor shall place non-woven geotextile filter fabric "MacTex MX140" conforming to OPSS 1860 Class 1 or approved equal, as an underlay underneath all areas to be covered in quarried limestone erosion protection. The Contractor shall take extreme care not to damage the geotextile filter fabric when placing the quarried limestone. The placement of the geotextile filter fabric and the quarried limestone, and the completion of the quarried limestone erosion protection shall be conducted to the full satisfaction of the Drainage Superintendent and/or Consulting Engineer.

IX. ROCK CHUTE SURFACE INLETS

Where specified, or as directed by the Drainage Superintendent or Consulting Engineer, the Contractor shall construct rock chutes to provide drainage for low-lying areas. All rock chutes and swale inlets shall be constructed to a minimum width of 2.0 metres and provided as a V-shaped channel through the middle. It is intended that the rock chute and swale inlets be constructed so that all water will flow within the confines of the rock protection. The Contractor shall deepen the centre portion of the rock chute, or swale inlet, so that when the stone is laid to a minimum 305mm thickness, a definite V-shape shall remain through the centre portion of the rock protection to direct all water safely to the new drain bottom. Furthermore, the rock chutes and swale invert shall be installed in accordance with the **"Standard Rock Chute Surface Inlet Detail"** shown within the accompanying drawings.

IX. TOPSOIL, SEED AND MULCH

Unless otherwise noted in the Special Provisions, the Contractor shall be required to restore all existing grassed areas and drain side slopes damaged or disturbed by the works, and place topsoil and seed and mulch over said areas including any specific areas noted within the Drawings. The Contractor shall be required to provide all materials to cover the above-mentioned surface areas 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 Contractor is to note that prior to fine grading the topsoil over the backfilled areas, positive drainage is to be provided off of these areas and into the swales, and the Contractor shall also be required to make minor changes where necessary to ensure positive drainage. The Contractor shall be required to restore all existing grassed areas and roadway boulevard areas damaged by the work and shall provide topsoil and seed and mulch over all of these areas. The placing and grading of all topsoil shall be carefully carried out according to Ontario Provincial Standard Specifications, Form 802, dated November 2010, or as subsequently amended or as amended by these Specifications. Once the topsoil has been properly placed and fine-graded, the Contractor shall seed and mulch the area. Seeding and mulching operations shall be carried out according to Ontario Provincial Standard Specifications, Form 572, dated November 2003, or as subsequently amended or as amended by these Specifications. The seeding mixture shall be OSECO Seed Mixture Canada No. 1, as available from Morse Growers Supply in Leamington, or equal. As part of the seeding and mulching operation, the Contractor will be required to provide either a hydraulic mulch mix or a spread straw mulch with an adhesive binder in accordance with OPSS 1103.05.03 dated November 2016, or as subsequently amended, to ensure that the grass seed will be protected during germination and provide a thick, uniform cover to protect against erosion, where necessary. All work shall be completed to the full satisfaction of the Drainage Superintendent or the Consulting Engineer.

In order to promote good germination, if the seeding and mulching operation is carried out in the spring, the seeding mixture shall contain oats. If the seeding and mulching operation is carried out in the fall, the mixture shall contain rye. The seeding and mulching operations within the newly excavated drain slopes shall be carried out as soon as practical. All other areas shall only be carried out as weather conditions permit in either the months of May or June in the spring or during September and October in the fall unless written permission is obtained from either the Drainage Superintendent or the Consulting Engineer. All of the work relative to the placement of topsoil and the seeding and mulching operation shall be meticulously done and completed in a good and workmanlike manner all to the full satisfaction of the Drainage Superintendent or Consulting Engineer.

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SPECIAL PROVISIONS

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Peralta Engineering

SPECIAL PROVISIONS
FOR OPEN DRAIN WORKS

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I. GENERAL SCOPE OF WORK

These specifications, along with the Report, Appendices, Standard Specifications and the accompanying drawings, consider the furnishings of all labour, equipment and materials required for the performance of all operations related to the improvements of the Lebo Creek Drain. The Lebo Creek Drain is generally an open Municipal Drain with several access structures throughout its length, extending from its upstream end located at the intersection of Highway No. 77 and Mersea Road 7 to its outlet into the Hillman Marsh, south of Mersea Road 2.

The scope of this work shall consist of the cleaning and maintaining of a portion of the Lebo Creek Drain. The works shall include the hand removal of dead wood, brushing, cleaning, and excavating portions of the open channel. Further, it will include culvert removal, culvert cleanings, buffer strip installation, bank restoration and various erosion protection measures.

In addition to the open channel improvements, this project includes the construction of a new wetland within the private lands of A. Driedger Farms Inc., located within Lot 16, Concession 5, immediately north of Mersea Road 5 and adjacent to the east side of the Lebo Creek Drain. This wetland has been previously installed and the specifications herein will be provided for future maintenance purposes. All of the above works are being provided pursuant to Section 78 of the Drainage Act.

All work shall be carried out in accordance with these Special Provisions, along with the accompanying Standard Specifications, that serve to supplement and/or amend the current Ontario Provincial Standard Specifications and Standard Drawings, adopted by the Ontario Municipal Engineers Association. The Contractor shall review the information outlined within **Appendix "A", Appendix "B",** and **Appendix "C"**. The works shall be further carried out in accordance with the accompanying drawings labelled herein as **Appendix "E"**. Where there are differences between the Special Provisions and the Standard Specifications included herein, the Special Provisions shall govern. The works shall be of the size, type, depth, etc., as is shown in the accompanying drawings, as determined from the **Benchmark**, 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 Drainage Superintendent or the Consulting Engineer.

II. ENVIRONMENTAL CONSIDERATIONS

Due to the sensitive nature of this project, biological investigations were performed to identify natural heritage features (aquatic and terrestrial) along the course of the drainage works. This evaluation was

conducted to satisfy the requirements of the Conservation Authorities Act through the Essex Region Conservation Authority (ERCA), the Fisheries Act through the Department of Fisheries and Oceans (DFO), and the Endangered Species Act through the Ministry of Environment, Conservation, and Parks (MECP). As such, an Environmental Constraints Analysis and a Mitigation Plan were prepared by LGL Limited. to provide detailed information on Species at Risk confirmed and/or potentially present within the project area. These details provide provisions on the overall approach, timing windows, screening and inspection requirements during construction. These details have been included in **Appendix "A"**. The Contractor shall familiarize themselves with these documents and be responsible to make certain that necessary provisions are undertaken to ensure the protection of all Species at Risk and their habitats throughout the course of construction. The Contractor will be responsible for providing the necessary equipment and materials required by the mitigation plans and shall contact the Municipality of Leamington Drainage Superintendent immediately if any Endangered Species are encountered during construction. **It shall be noted that the Contractor will be required to attend a walkthrough meeting with the Biologist with the intent to identify sensitive areas and specific features to avoid during construction.**

Furthermore, the Contractor shall provide all labour and equipment to conduct a fish salvage operation to ensure that no fish, mussels, or turtles are harmed by the proposed works. Any species found within the project site shall be removed and relocated downstream of the project site. The fish salvage operations shall be completed to the full satisfaction of the Drainage Superintendent, ERCA, DFO, MECP and/or the MNRF.

In addition to the fish salvage operations, the Contractor shall be responsible to provide Fish Exclusion Measures within the length of the existing open drain where work is being performed. The Fish Exclusion Measures shall be initiated prior to the start of the drain filling process by use of a standard fish seine net. This seine net shall be installed in the water and shall be dragged through the water along the entire length of the Lebo Creek Drain to be filled and abandoned. The fish seine net shall not be a permanent fixture during the course of the construction works and shall be removed once passed through the water.

The above-noted works shall be completed by the Contractor, at its own expense, and such labour, equipment and materials, and the cost for same shall form part of the Schedule of Items and Prices. Furthermore, all of the above shall be completed to the full satisfaction and compliance of the Drainage Superintendent, ERCA, DFO MECP and/or the MNRF.

III. ALIGNMENT

From Station 0+000.0 to Station 1+276.3, the open channel consists of a primarily linear trapezoidal shape and any drain excavation shall follow, as nearly as practical, the course of the existing drain alignment to the satisfaction of the Drainage Superintendent and/or the Consulting Engineer.

From Station 1+276.3 to Station 13+212.1, the channel consists of a naturally meandering alignment where the top width is relatively wide, with a low flow channel that follows an irregular path within the drain bottom. Any excavation shall be centred on the alignment of the existing waterway, as nearly as practical. Every effort should be made to excavate the drain bottom through the various curves and bends in such a manner as to reduce the extent of erosion at the curves.

IV. PROFILE

The Contractor shall exercise caution in adhering strictly to the design grade line of the drain throughout the length of the work. Generally, the design grade line of the drain is very mild. However, excavation to the grade line is necessary to provide an outlet for the tributary drainage systems that discharge into this Municipal Drain. Any excavation greater than 150mm below the design grade line, except at the locations where the deep pools are to be constructed (or exist), will not be permitted. The cost for any corrections in the profile grades shall be the sole responsibility of the Contractor and these works shall be approved by the Engineer.

The profile included as part of this project commences at Station 4+030.1, at the confluence of Mersea Road 12, through the existing portion of the Municipal Drain and extends downstream to its outlet into the Hillman Marsh, at Station 13+212.1 (south side of Deer Run Road). Portions of the watercourse have previously been established as Municipal Drain and others were previously identified as a natural watercourse. The following delineates the extent of what now forms the Lebo Creek Drain, as a Municipal Drain.

- From Station 0+000.0 to Station 5+071.5: Previously defined as a Municipal Drain through various By-Laws and governed by Engineer's Reports dating back to 1960.
- From Station 5+071.5 to Station 9+849.3: Previously defined as a Natural Watercourse, where new profile grades have been established herein.
- From Station 9+849.3 to Station 12+460.6: Previously defined as a Municipal Drain through various By-Laws. The profile included herein shall supersede the previously established profile.
- From Station 12+460.6 to Station 13+212.1: Previously defined as a Natural Watercourse, where new profile grades have been established herein.

V. REMOVAL OF SEDIMENT

As part of the works outlined within this project, drain bottom excavations are required to remove sedimentation within the Lebo Creek Drain. The sedimentation removal for this project has been established from Station 4+736.9 to Station 6+898.6 and from Station 6+910.7 to Station 9+632.0 and shall be completed in accordance with the parameters outlined within the Profile and cross-sections outlined within the accompanying drawings.

It shall be noted that from Station 9+849.3 to its outlet at Station 13+212.1, the design grade line nearly matches (or slightly above) the existing channel bottom. Therefore, no drain sediment removals is anticipated through this reach of the open drain. However, as part of the deadwood removal process, the Contractor shall ensure that no blockages occur through this reach of the drain.

VI. BOTTOM WIDTHS AND SIDE SLOPES

The bottom width and side slopes are shown on the profile and cross-sections. Through much of the length of the work, the excavation will be limited to the removal of the material from the drain bottom only. However, trimming of the drain banks shall only be required where sedimentation of considerable depth occurs or where the drain banks have failed, bank overhangs exist, or bank stabilization is required. At these locations, the drain bank on the side from which the excavation equipment is operating shall be trimmed to the specified slope. The Contractor shall trim all such bank slopes as part of the tender submission for the items of drain cleaning. The Drainage Superintendent or Consulting Engineer shall provide direction as to the extent of bank trimming. No claim for extra compensation for bank trimming will be considered. Furthermore, no trimming of the drain banks on the roadside will be permitted.

The Contractor must take note that portions of the drain are quite wide and deep relative to the widths established within the profile. Therefore, the bottom excavation shall only be carried out through the existing bottom centreline of the channel to meet the specified parameters. The Contractor must provide excavation equipment with sufficient reach to accomplish these excavations. Throughout the course of the open channel, sediment/vernal pools exist and shall be excavated below the design grade line of the drain as identified within the accompanying drawings.

VII. ACCESS TO WORK

The Contractor is advised that the majority of the work to be carried out on this project extends through private lands and wooded areas within the project site. As a result, access to the drain is required from Mersea Road 7, Mersea Road 12, Mersea Road 6, Mersea Road 5, County Road 34, Mersea Road 19, and Deer Run Road. The Contractor shall have access to the full width of the roadway abutting the proposed drainage works and may use the entire width of the right-of-way as necessary to permit the completion of the work required to be carried out for this project. The Contractor shall also have the means of accessing private lands by utilizing existing access bridges and culverts where deemed necessary, provided that they shall be responsible for any damage caused to same by their operations. The Contractor may be permitted to install temporary access culverts to gain access across any roadside ditches to access the Lebo Creek Drain. Once temporary access culverts are no longer required, the disturbed areas in which the temporary accesses were located must be fully restored to their pre-use condition at the full expense of the Contractor.

The Contractor shall note that recommended accesses have been established through private lands and are available for them to gain access to the Lebo Creek Drain. Prior to the use of the pre-established access, the Contractor is required to contact the Owners of these lands, on which the recommended accesses are being made available, prior to its utilization. These accesses are as follows:

1. Recommended access is available to the Contractor utilizing the existing access bridge (Bridge 2) to the lands of 710-03900)/[Parcel 307], located between Station 0+374.4 and Station 0+386.4, along Mersea Road 7

2. Recommended access is available to the Contractor utilizing the existing access bridge (Bridge 3) to the lands of (710-04105)/[Parcel 308], located between Station 0+740.3 and Station 0+748.3, immediately west of 808 Mersea Road 7.

3. Recommended access is available to the Contractor utilizing the existing access bridge (Bridge 5) to the lands of (710-04300)/[Parcel 311], located between Station 0+852.3 and Station 0+858.6, immediately east of 810 Mersea Road 7.

4. Recommended access is available to the Contractor utilizing the existing shared access bridge (Bridge 6) to the lands of (710-04400 & 710-04410)/[Parcels 312 & 313], located between Station 1 +117.8 and Station 1+124.1, at 828 Mersea Road 7.

5. Recommended access is available to the Contractor onto the lands of (750-01000)/[Parcel 430], located immediately west of the Mersea Road 7 road crossing culvert and along the west side of the Lebo Creek Drain.

6. Recommended access is available to the Contractor onto the lands of (750-00700)/[Parcel 423], at the east limit of the subject property, including the utilization of the existing access bridge (Bridge 9) between Station 1+869.0 and Station 1+877.0.

7. Recommended access is available to the Contractor onto the lands of (750-00100)/[Parcel 411], at the west limit of the subject property, including the utilization of the existing access bridge (Bridge 10) between Station 3+580.9 and Station 3+585.8.

8. Recommended access is available to the Contractor onto the lands of (740-00700)/[Parcel 385], located immediately east of the existing Mersea Road 7 road crossing and along the east side of the Lebo Creek Drain.

9. Recommended access is available to the Contractor onto the lands of (700-01950)/[Parcel 230], located immediately west of the existing Mersea Road 7 road crossing and along the south side of the Lebo Creek Drain.

10. Recommended access is available to the Contractor utilizing the existing shared access bridge (Bridge 15) to the lands of (700-01960)/[Parcel 231] and (700-0200)/[Parcel 232], located between Station 4+730.1 and Station 4+736.9, east of 1336 Mersea Road 7.

11. Recommended access is available to the Contractor utilizing the existing access bridge (Bridge 16) to the lands of (700-02050)/[Parcel 233], located between Station 5+137.0 and Station 5+140.8, at 1418 Mersea Road 7.

12. Recommended access is available to the Contractor utilizing the existing access and laneway from Mersea Road 7 onto the lands of (700-02300)/[Parcel 238], located east of 1430 Mersea Road 7.

13. Recommended access is available to the Contractor onto the lands of (700-00900)/[Parcel 215], including the utilization of the existing access bridge (Bridge 21) between Station 6+825.1 and Station 6+846.8.

14. Recommended access is available to the Contractor onto the lands of (670-00600)/[Parcel 175], located immediately east of the existing Mersea Road 6 road crossing and along the east side of the Lebo Creek Drain.

15. Recommended access is available to the Contractor onto the lands of (670-00600)/[Parcel 175], located on both sides of the drain and north of the existing Mersea Road 5 road crossing the Lebo Creek Drain.

16. Recommended access is available to the Contractor onto the lands of (620-02700)/[Parcel 133], located on both sides of the drain and south of the existing Mersea Road 5 road crossing the Lebo Creek Drain, at 1620 Mersea Road 5.

17. Recommended access is available to the Contractor utilizing the existing access and laneway from Mersea Road 5 onto the lands of (620-02800)/[Parcel 134], located east of 1620 Mersea Road 5.

18. Recommended access is available to the Contractor utilizing the existing access and laneway from Mersea Road 5 onto the lands of (620-00402)/[Parcel 110], located east of 597 Talbot Road East. The access to the Lebo Creek Drain shall continue westerly onto the lands of (620-00500)/[Parcel 114] to the Lebo Creek Drain.

19. Recommended access is available to the Contractor onto the lands of (570-06400)/[Parcel 42] to the south of Talbot Road East (County Road 34) located at the east limit of the subject property, east of the existing roadway guardrail.

20. Recommended access is available to the Contractor onto the lands of (570-07200)/[Parcel 53] to the west, located north of the existing Mersea Road 19 road crossing the Lebo Creek Drain.

21. Recommended access is available to the Contractor onto the lands of (560-02300)/[Parcel 10] to the east, located south of the existing Mersea Road 19 road crossing the Lebo Creek Drain.

22. Recommended access is available to the Contractor utilizing the existing access and laneway from Deer Run Road onto the lands of (560-01700)/[Parcel 3], located west of 1937 Deer Run Road. The access to the Lebo Creek Drain shall continue westerly along the existing laneway to the west limit of the subject property.

The Contractor shall note that the accesses to be utilized for each of the above-mentioned recommended access routes shall be approximately 6.0 metres wide. These access routes have further been identified within the aerial photo maps illustrated in **Appendix "C"**. The Contractor shall note that the recommended accesses described above and shown in the illustrations are to be strictly complied with and under no circumstance shall the Contractor differ or expand on these access routes in any way, without written approval from the landowner. Any deviations from the recommended access routes for the use of other private lands outside the designated areas will be the responsibility of the Contractor to negotiate any terms for use of such lands with the Property Owner. Furthermore, under no circumstances shall the Contractor

utilize the private bridge structures without written approval from the adjoining landowner(s). The Contractor shall note that any deviation from the above-mentioned accesses without the explicit approval of the adjacent landowners and the Drainage Superintendent could result in the Contractor being liable for damages sustained. The value for such damage shall be determined by the Drainage Superintendent and the Consulting Engineer and be subsequently deducted from the Contract Price.

Due to the sensitive nature of the drainage system, the Contractor must protect as much vegetation as possible when accessing the open drain through any non-cultivated areas with the preservation of trees, bushes, and herbaceous vegetation being a primary concern. Further details of selective tree clearing and brushing are identified within subsequent sections of these Special Provisions. Any accesses or areas used in carrying out the works are to be fully restored to their original conditions by the Contractor, including, but not limited to, any gravel restoration, topsoil placement, and lawn restoration as directed by the Drainage Superintendent and/or the Consulting Engineer. Restoration shall include, but not be limited to, all necessary levelling, grading, shaping, topsoil, seeding and mulching, loosening of compacted croplands, and granular placement required to make good of any damage caused.

In addition to outlining the recommended access routes, the accompanying maps within **Appendix "C"** also illustrate the location of the established working corridors and buffer strip installations on the specified side of the Lebo Creek Drain.

VIII. REMOVAL OF BRUSH, TREES, AND DEBRIS

Further to the details outlined within the Standard Specifications for Open Drains, all brush and trees intended to be cut or brushed shall remain on-site. All trees and branches having a diameter greater than 150mm shall have their branches trimmed and the trunks/branches cut into logs no longer than 2.0 metres in length. Tree cutting shall be completed utilizing mechanical equipment such as tree shears, chainsaw, or similar methods. All logs shall be piled and set near the extreme limit of the maintenance corridor for the use of the adjoining property owner unless otherwise directed by the Drainage Superintendent and/or Consulting Engineer. All small trees and branches intended to be removed and having a diameter of 150mm or less shall be cut off flush with the ground utilizing mechanical equipment and chipped, flailed, or shredded, or similar method. All chipped and/or flailed tree material shall also be piled and set near the extreme limit of the maintenance corridor.

Any debris removed from the drain shall be disposed of by the Contractor unless otherwise directed by the Drainage Superintended and/or Consulting Engineer. Under no circumstances shall any brush, branches, tress or debris be allowed to be buried in the spoil bank/piles or within any excavated material.

As part of the brushing work, the Contractor will be required to monitor the drain during the first two (2) storm events following the completion of the work to remove any blockages caused by flailed materials floating downstream and accumulating at various locations. All such materials removed from the obstruction shall be spread at the furthest limit within the working corridor.

IX. SELECTIVE TREE REMOVAL AND DEAD WOOD REMOVAL

Where the Lebo Creek Drain is located within wooded areas, selective tree removal will be necessary to obtain access within the working corridors of the open channel. Under no circumstances shall any tree clearing be conducted outside of the established working corridors. These works will require the cutting of standing trees, brush, and other vegetation to create a meandering pathway through the wooded areas. In these areas, wider working corridors have been established to help facilitate the meandering pattern without clear-cutting the affected area. It is intended for only trees and the brush within the open channel to be removed. Trees and brush along the top of the bank are intended to remain. However, selective removal of trees along the top of the bank to reduce obstructions and to maintain access to the channel to conduct the necessary drain cleaning. Under no circumstances shall any cut trees, limbs or debris be left within the open channel. Due to the sensitive nature of these wooded areas, it is imperative to maintain as much vegetative canopy as practical over the existing open channel and keep as many healthy trees as practical.

Throughout the course of the works where grass areas, fruit trees, decorative trees, bushes or shrubs are located adjacent to the open drain, including the protected trees identified within the biological walkthrough and the Biological Constraints Analysis included within **Appendix "A"**, the Contractor shall take special measures to work around and protect such features.

Select removed dead wood in good condition and removed trees, particularly those of coniferous variety, shall be reused in timber structures (single and cross vane) as noted within these Specifications and in the attached drawings. Any dead wood or trees unsuitable for reuse shall be cut into logs and remain on-site for use by the adjacent Property Owners.

Tree cutting may be completed utilizing a tree shear or flail attachment in areas where an excavator is permitted. Otherwise, it is expected that the Contractor carries out the selective tree-cutting utilizing hand-cutting equipment and smaller utility vehicles.

X. WORKING CORRIDOR

Throughout the length of the Lebo Creek Drain, working corridors have been established to perform the necessary works of improvement and future maintenance. In addition to the area or work along the drain, these designated working corridors also serve as the area where excavated materials are to be placed and/or spread. The width of the working corridors has been established and shall be measured perpendicularly from the adjacent finished top of the bank. Where any excavated material is to be spread within the working corridor, the width of the spread material (if applicable) shall be 2.0 metres less than the corridor width. Damage resulting from non-compliance to the designated areas would result in any necessary remediation costs to be borne fully by the Contractor. The Contractor shall be required to utilize and adhere to the designated working corridors specified below.

Table 1 - Working Corridor Details

Station	Primary Working Corridor	Secondary Working Corridor
0+022.8 to 0+466.5	15.0m wide to the East/South (Pre-Established)	N/A
0+466.5 to 0+850.4	9.0m wide to the South (Pre-Established)	N/A
0+850.5 to 1+276.3	15.0m wide to the South (Pre-Established)	N/A
1+293.5 to 3+407.5	15.0m wide to the North/East/West (Pre-Established)	N/A
3+407.5 to 4+030.1	9.0m wide to the North (Pre-Established)	N/A
4+050.6 to 4+216.1	9.0m wide to the North (Pre-Established)	N/A
4+268.1 to 5+071.5	9.0m wide to the South (Pre-Established)	N/A
5+071.9 to 5+478.9	12.0m wide to the South (New)	N/A
5+478.9 to 6+037.4	12.0m wide to the North/East (New)	N/A
6+037.4 to 6+888.4	9.0m wide to the North/East (New)	N/A
6+913.8 to 7+054.2	9.0m wide to the East (New)	N/A
7+054.2 to 7+868.5	9.0m wide to the West (New)	N/A
7+731.7 to 7+868.5	4.0m wide to the East for Wetland (New)	N/A
7+892.7 to 9+737.3	12.0m wide to the East/North (New)	6.0m to the West/South (New)
9+737.3 to 9+856.3	9.0m wide to the East (New)	N/A
9+856.3 to 10+238.7	9.0m wide to the East (Pre-Established)	N/A
10+269.2 to 10+864.2	6.0m wide to the East (Pre-Established)	N/A
10+864.2 to 11+272.9	6.0m wide to the South/West (Pre-Established)	N/A
11+272.9 to 11+541.0	6.0m wide to the North/West (Pre-Established)	N/A
11+567.3 to 12+490.6	6.0m wide to the South/West (Pre-Established)	N/A
12+490.6 to 13+190.3	12.0m wide to the East/North (New)	N/A

It shall be noted that these working corridors have been further illustrated on aerial mapping included within **Appendix "C"**.

Primary Working Corridor: Is defined as the main access and work area along the side of the drain where the majority of all construction equipment may travel for all excavations, sediment removal, and spoil placement and/or spreading unless otherwise noted. In order to facilitate these works, selective tree-cutting previously identified shall only be permitted within the primary working corridor, where applicable.

Secondary Working Corridor: Is defined as the access corridor along the side of the drain established to facilitate the hand cutting and removal of all dead wood, minor bank repair, tile inlet/outlet repairs, surface inlet repairs, and/or grass buffer strips to be installed within the designated space. The secondary working corridor is intended to facilitate smaller construction equipment (such as utility vehicles, wagons, and tractor backhoes). A tractor backhoe shall be the maximum size of construction equipment allowed to traverse through this working corridor.

The Owner of the lands in which the working corridor has been established shall make such lands available to the Contractor for the specified improvements outlined within this project and for future maintenance of the drain. Some of the above-noted working corridors are specified on a specific side of the drain and shall strictly be adhered to. However, if a landowner requests that the material be placed outside of the established working corridor, the Contractor will be responsible to negotiate the terms of these works outside the scope of this project.

XI. BUFFER STRIPS

Grassed buffer strips shall be installed along all agricultural lands that currently do not have grassed/brush buffers along the top of the Lebo Creek Drain banks. The grassed buffer strips on agricultural lands shall consist of a width of 3.0m on both sides of the drain and as specified within the Construction Items and as outlined within the aerial maps included in **"Appendix C"**. As part of the buffer strip installation, the area shall be tilled and levelled before the planting of any vegetation. A specific grass seed mix has been identified within the "Erosion Control and Seeding" section of these Special Provisions.

XII. DISPOSAL OF EXCAVATED MATERIALS

It is intended for this project that the vast majority of materials excavated from the open drain be deposited and/or spread onto the adjoining land within the working corridors while protecting the existing shrubs, trees and blooming vegetation.

The following provisions have been established for the placement and/or spreading of any excavated materials throughout the course of the drain:

Arable Agricultural Lands - Where the Lebo Creek Drain is situated adjacent to arable agricultural lands, all excavated materials shall be well and evenly spread over the designated working corridor, including the buffer strips, so that no portion of the excavated material is within 1.50 metres (5.00 ft.) from the finished top of the drain bank. The material to be spread shall have a maximum depth of 100mm and shall be free from rocks (cobbles), boulders, stumps, rubble, debris, or other similar materials. If these materials are encountered, they shall be hauled away and disposed of by the Contractor, at their expense.

Wooded Lands – Where the Lebo Creek Drain is situated adjacent to or within wooded areas, all excavated materials shall be deposited in randomly placed piles (no larger than 1.5-metre long x 1.5-metre wide x 1.0-metre high) on higher lands (where possible) between the various trees/brush and located a minimum distance of 6.0 metres (19.68 ft.) from the finished top of the drain bank. All of which situated to minimize the potential for erosion and washing back into the low-lying area and causing infilling of the drain.

Residential Lands – Where the Lebo Creek Drain crosses any residential lands or lawn areas, gardens, orchards, driveways, etc. the excavated materials shall be hauled and spread onto the adjoining upstream and/or downstream non-residential lands. Half of which shall be placed/spread within the upstream agricultural or wooded lands, and the other half within the downstream lands agricultural or wooded lands.

Access Bridges and Road Crossing Culverts – Excavated materials from the cleaning out of existing bridges and road crossing culverts shall be deposited onto the adjoining upstream and/or downstream non-residential lands. Half of which shall be placed/spread within the upstream agricultural or wooded lands, and the other half within the downstream agricultural or wooded lands of the existing bridge/road crossing culvert. Under no circumstances shall the material be placed over an existing driveway/laneway or residential grassed areas.

In addition to the above parameters, further provisions regarding the placement and or spreading of excavated materials are outlined within the Standard Specifications of Open Drains. It is recommended that the Contractor confirms with the Drainage Superintendent and the property Owner their intended work plan regarding the deposition and/or spreading of the excavated materials prior to commencing any excavation works. In addition to the details outlined above, the Contractor shall also adhere to the "excavated materials" section of the Standard Specifications for Open Drains.

It is intended that all materials excavated from the Lebo Creek Drain, remain within the project site. Based on consultation with the Ministry of Environment, Conservations and Parks (MECP), it is understood that soils excavated from the drain, that remain within the project site, are exempt from the On-Site and Excess Soil Management (Regulation 406/19), passed under Ontario Environmental Protection Act. However, if any excavated materials are trucked from the project site, the Contractor will be fully responsible to adhere to this regulation.

XIII. REMOVAL OF BRIDGE 8

The existing **Bridge 8** is currently located between Station 1+535.4 and Station 1+539.6. As part of the works outlined within this project, the Contractor shall completely remove the existing 2.59m Span x 1.10m Rise concrete span bridge, reinforced concrete headwalls and jutebag wing walls in its entirety. All of the materials removed shall be hauled away and disposed of by the Contractor and shall form part of the costs in its tender submission. Once the materials have been removed from the site, the Contractor shall then restore the drain to its original configuration, having a 2.0m bottom width and 1.5 horizontal to 1.0 vertical side slopes. The side slopes shall then be topsoiled, seeded, and mulched to the satisfaction of the Drainage Superintendent and/or Consulting Engineer.

XIV. DRAIN BANK RESTORATION

The southerly roadside drain bank along Mersea Road 6 has endured significant bank erosion. The Contractor will be required to reconstruct the roadside drain bank from Station 6+765.5 to Station 6+825.1 and from Station 6+486.8 to Station 6+893.6, to the designed slope and provide sloped quarried limestone erosion protection according to the Standard Specifications. The drain design parameters through this portion of the Lebo Creek Drain consist of a 2.0-metre wide drain bottom with a 1.5 horizontal to 1.0 vertical bank slope and shall be strictly adhered to. In areas where the drain cross-section does not meet these parameters, the Contractor will be required to place native fill material to reconstruct the bank slope before the placement and compaction of any quarried limestone rock protection. The roadside drain bank shall be restored in a stepwise or tiered approach using compacted native fill having a minimum width of 0.60m (2'), to act as a solid foundation for the quarried limestone erosion protection. The placement and compaction of the native fill shall be completed in lifts no thicker than 0.15m (6"). Non-woven geotextile underlay shall be added and installed between the tiered shelf native fill and the quarried limestone erosion protection. All of which shall be installed in accordance with the **"Standard Bank Restoration Detail"** included within the accompanying drawings. The bank restoration and erosion protection shall be transitioned into a solid bank slope. In addition to the above, the quarried limestone erosion protection shall be installed per the "General Erosion Protection" section of the Standard Specifications for Open Drains.

XV. GENERAL EROSION PROTECTION

In addition to the drain bank restoration, various areas along the course of the drain (at bends, surface and tile inlet/outlets, road crossings, etc.) are experiencing general drain bank erosion along the toe of the slope that requires general erosion protection. The erosion protection shall extend from the toe of the slope to the top of the drain bank. More specifically, general erosion protection shall be installed at the following locations:

1. Station 6+893.6 to Station 6+898.6: Located at the north end of the road crossing culvert at Mersea Road 6 on both sides of the drain.

2. Station 6+910.7 to Station 6+925.7: Located at the south end of the road crossing culvert at Mersea Road 6 on the east side of the drain.

3. Section 7+110.0 to Station 7+115.0: Located within the lands of A. Driedger Farms Inc. (670-00600)/[Parcel 175] for the protection of an existing pond outlet pipe.

4. Section 7+867.8 to Station 7+875.8: Located at the north end of the road crossing culvert at Mersea Road 5 for the protection of existing tile outlets on both sides of the drain.

5. Station 11+510.2 to Station 11+540.2: Located at the west end of the road crossing culvert at Mersea Road 19 on the west side of the drain.

All of these erosion protection works shall be maintained in the future as part of the cost of the drainage works. Should additional erosion protection be required to repair the above-noted sites, the Drainage Superintendent and/or the Consulting Engineer shall provide direction on the extent of these works. The cost of any additions to the general erosion protection works shall be charged as a Change Order to the Contract.

In addition to the installation details included as part of the "General Erosion Protection" section of Standard Specifications for Open Drains, the Contractor shall refer to the "**Standard Erosion Protection Detail**" included within the accompanying drawings.

XVI. SURFACE INLET REPAIRS

In addition to the general erosion protection, various areas along the course of the drain surface inlets have created sedimentation to accumulate within the Lebo Creek Drain. In order to address and control the erosion from the headlands, rock chute spillways are recommended. These spillways shall extend from the toe of the slope to the top of the drain bank, having a minimum width of approximately 2.0m and the inlet portion recessed to direct surface water into the rock chute. More specifically, rock chute spillways shall be installed at the following locations:

1. Station 8+615.0: Located within the lands of (620-00901)/[Parcel 120].
2. Station 8+687.0: Located within the lands of (620-00901)/[Parcel 120].
3. Station 8+827.0: Located within the lands of (620-00901)/[Parcel 120].

All of these rock chute works shall be maintained in the future as part of the cost of the drainage works. Should additional erosion protection be required to repair the above-noted sites, the Drainage Superintendent and/or the Consulting Engineer shall provide direction on the extent of these works. Likewise, where it is deemed necessary to install additional rock chutes in other locations, direction from the Drainage Superintendent and/or the Consulting Engineer is required. The cost of any additions to the general erosion protection works and/ or rock chutes shall be charged as a Change Order to the Contract.

In addition to the installation details included as part of the "General Erosion Protection" section of Standard Specifications for Open Drains, the Contractor shall refer to the "**Standard Rock Chute Surface Inlet Detail**" included within the accompanying drawings.

XVII. EROSION MITIGATION MEASURES

In an effort to reduce long-term channel erosion and to promote aquatic habitat within the Lebo Creek Drain, erosion mitigation measures shall be installed at various locations within the open channel. These erosion mitigation measures come in the form of vanes (single and cross) strategically placed at various bends and straight portions of the drain to direct flows to the centre of the channel. In many cases, these vanes are typically installed utilized rock materials. However, with an abundance of timber accumulated from the project site, timber logs shall be used for the initial construction of these features. In the event that there is insufficient wood to craft such vanes, these features can be constructed using large

rocks/boulders, with the approval of the Drainage Superintendent and/or Consulting Engineer at no additional cost to the project.

Single Vanes

Single timber vanes shall be installed at the following locations:

1. Between Station 7+580.0 and Station 7+680.0 – Install a total of five (5) Single Rock Vanes along the north/east bank of the Lebo Creek Drain spaced approximately 20.0 metres apart along the bend.

2. Between Station 11+065.0 and Station 11+110.0 – Install a total of three (3) Single Rock Vanes along the north/east bank of the Lebo Creek Drain spaced approximately 15.0 metres apart along the bend.

3. Between Station 11+255.0 and Station 11+285.0 – Install a total of three (3) Single Rock Vanes along the north/east bank of the Lebo Creek Drain spaced approximately 10.0 metres apart along the bend.

Single timber vanes shall consist of a log structure protruding upstream of the bank at an angle away from the bank in which it is anchored. These vanes shall consist of single tree trunks between 200-250mm in diameter or smaller trunks fastened together to create a similar overall diameter. The vane shall be angled towards the upstream flows, angled between 20°-30° from the adjacent bank. The bank end of the vane shall be embedded within the drain bank a minimum of one-third (1/3) of the bank width. The overall span of the vane shall extend towards the center of the channel approximately one-third (1/3) of the channel width. The elevation of the vane at the drain bank shall be installed approximately 200mm above the drain design bottom (approximate elevation at the baseflow). The vane shall further be installed at a downward slope of approximately 2-7%, towards the centre of the channel. The vane shall be secured in place utilizing a large footer rock/boulder installed on the downstream side of the vane, located at the toe of the slope, and T-bar and cable support at the upstream end of the vane. As an alternative to the T-bars and cables support, the Contractor may utilize smaller tree trunks driven vertically on the downstream end of the structure. In addition to the details outlined above, the Contractor shall refer to The **"Standard Single Timber Vane Detail"** included within the accompanying drawings.

Cross Vanes

Timber cross vanes shall be installed at the following locations:

1. Station 6+720.0 – Upstream of the John Leslie Drain Outlet

2. Station 10+220.0 – Upstream of the County Road 34 Crossing

3. Station 11+490.0 – Upstream of the Mersea Road 19 Crossing

4. Station 13+180.0 – Upstream of the Mersea Road 19 Crossing

Timber cross vanes shall consist of a U-shaped structure, with the mouth of the structure facing downstream and extending across the entire width of the channel. Timber cross vanes, in terms of construction, can be thought of as two single timber vanes, connected by a timber connection, perpendicular to the direction of flow (thought of as a weir). Thus, the arms of the cross vane shall be installed to the same provisions as a single timber vane, connected through the apex. Consistent with the single vane, the apex portion of the cross vane should extend for 1/3 the width of the channel, with each arm extending for 1/3 the channel width to complete the cross-section of the structure. The apex of the U-shape shall be at the drain design grade and each arm shall rise 2-7%, similar to the single cross vane. Special structure anchoring or increased vane thickness may be used to ensure a stable structure. In addition to the details outlined above, the Contractor shall refer to the **"Standard Cross Timber Vane Detail"** included within the accompanying drawings.

Should additional vanes (single or cross) be required at other locations not identified herein, the Drainage Superintendent and/or the Consulting Engineer shall provide direction on the extent of these works. The cost of any additions to the general erosion protection works shall be charged as a Change Order to the Contract.

The T-bar and cable supports for both timber vane structures shall consist of two (2) steel T-bar fence posts having a minimum length of 1.20 metres (4.00 ft.) on each side of the log, together with heavy steel galvanized cable/wire across the top of the logs and secured with stainless steel clamps, or approved equal. The top of each post shall be set no higher than the top of the proposed logs.

XVIII. EROSION CONTROL AND SEEDING

In addition to the "Temporary Sediment Controls and Environmental Considerations" within the Standard Specifications for Open Drains, t he Contractor is advised that control of erosion and sedimentation is a major requirement of this project. The Contractor will be expected to implement sediment control measures including, but not limited to, utilizing silt fences and straw bales through the channel to reduce the amount of sediment being transported through the system. As an integral part of the erosion and sedimentation control, the Contractor will be required to carry out seeding and mulching on a timely basis so that no portion of the excavated drain or fill placement in natural areas is left exposed for extended lengths of time. As such, the Contractor shall supply all labour, equipment, and materials to seed all disturbed drain banks, lawns, and boulevard areas.

Further to the Standard Specifications for seed mixtures and application details, the seed mix for the buffer strips and naturalized areas shall consist of a Base Restoration Seed mix applied at a rate of 10kg/hectare. Details of these seed mixtures are included within **Appendix "A"** and are available from St. Williams Nursery & Ecology Centre, Norfolk County, Ontario, or equal. If the species listed above are unavailable, other native prairie plant species indigenous to Essex County may be included in the seed mix. However, no native plant species listed on the Ontario Noxious Weed list can be included.

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Peralta Engineering

SPECIAL PROVISIONS
FOR WETLAND CONSTRUCTION

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I. GENERAL SCOPE OF WORK

These Special Provisions relate to the construction of a new wetland within the private lands of (670-00600)/[Parcel 175], located within Lot 16, Concession 5, immediately north of Mersea Road 5 and adjacent to the east side of the Lebo Creek Drain. This project includes all excavation, spreading of excavated material, installation of general erosion protection, inlet and outlet pipes, precast interlocking concrete block weir, brushing and grubbing, sediment removal from the open drain, seeding and mulching, restoration, and other ancillary work to provide a complete and satisfactory job. The wetland shall be of the size, type, depth, etc. as shown on the accompanying drawings, as determined from the Benchmarks and as may be further laid out at the site at the time of construction. **It shall be noted that this wetland has already been constructed and the provisions included herein provide a summary of the wetland details to help facilitate any future maintenance.**

All work shall be carried out in accordance with these Special Provisions, along with the accompanying General Provisions, which serve to supplement and/or amend the current Ontario Provincial Standard Specifications and Standard Drawings, adopted by the Ontario Municipal Engineers Association. The Contractor shall review the information outlined within **Appendix "A"** and **Appendix "B"**. The works shall be further carried out in accordance with the accompanying drawings included herein as **Appendix "E"**. Where there is a discrepancy between these Special Provisions and the Standard Specifications, the Special Provisions shall govern. The works shall be of the size, type, depth, etc., as is shown in the accompanying drawings, as determined from the **Benchmark**, 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 Drainage Superintendent and/or the Consulting Engineer.

II. ENVIRONMENTAL CONSIDERATIONS

Due to the sensitive nature of this project, Biological investigations were performed to identify natural heritage features (aquatic and terrestrial) along the course of the drainage works. This evaluation was conducted to satisfy the requirements of the Conservation Authorities Act through the Essex Region Conservation Authority (ERCA), the Fisheries Act through the Department of Fisheries and Oceans (DFO), and the Endangered Species Act through the Ministry of Environment, Conservation, and Parks (MECP). As such, an Environmental Constraints Analysis and a Mitigation Plan were prepared by LGL Limited. to provide detailed information on Species at Risk confirmed and/or potentially present within the project area. These details provide provisions on the overall approach, timing windows, screening and inspection requirements during construction. These details have been included in **Appendix "A"**. The Contractor shall familiarize

themselves with these documents and be responsible to make certain that necessary provisions are undertaken to ensure the protection of all Species at Risk and their habitats throughout the course of construction. The Contractor will be responsible for providing the necessary equipment and materials required by the mitigation plans and shall contact the Municipality of Leamington Drainage Superintendent immediately if any Endangered Species are encountered during construction.

Prior to any work conducted on the project, the Contractor shall submit a suitable Water, Sediment and Erosion Control Plan. All of these plans shall be submitted for review and approval from all applicable environmental approval agencies. Furthermore, the Contractor shall provide all labour and equipment to conduct a fish salvage operation to ensure that no fish, mussels, or turtles are harmed by the proposed works. Any species found within the project site shall be removed and relocated downstream of the project site. The fish salvage operations shall be completed to the full satisfaction of the Drainage Superintendent, ERCA, DFO, MECP and/or the MNRF.

In addition to the fish salvage operations, the Contractor shall be responsible to provide Fish Exclusion Measures within the length of the existing open drain where work is being performed. The Fish Exclusion Measures shall be initiated prior to the start of the drain filling process by use of a standard fish seine net. This seine net shall be installed in the water and shall be dragged through the water along the entire length of the Lebo Creek Drain to be filled and abandoned. The fish seine net shall not be a permanent fixture during the course of the construction works and shall be removed once passed through the water.

The above-noted works shall be completed by the Contractor, at its own expense, and such labour, equipment and materials, and the cost for same shall form part of the Schedule of Items and Prices. Furthermore, all of the above shall be completed to the full satisfaction and compliance of the Drainage Superintendent, ERCA, DFO and/or the MNRF.

III. ACCESS TO WORK AND WORKING CORRIDORS

Initial Construction and Future Maintenance

The Contractor is advised that all the work carried out on this project extends within the private lands of (670-00600)/[Parcel 175], on the north side of Mersea Road 5 and east of the Lebo Creek Drain. The Contractor may use the entire width of the Mersea Road 5 right-of-way necessary to permit the completion of all the work required for this project. The Contractor may also utilize the full site area, bounded by Mersea Road 5 to the south, the Lebo Creek Drain to the West, and approximately 170.0 metres north of the Mersea Road 5 right-of-way Lebo Creek Drain to construct the wetland. Upon the completion of the wetland, it is recommended that the Contractor utilize the 4.0-metre strip of land between the east top of the bank of the Lebo Creek Drain and the new wetland as the primary access. The Contractor shall also utilize a 9.0-metre wide strip of land along the west side of the Lebo Creek Drain measured from the west top of the bank for approximately 170.0 metres of the north right-of-way limit of Mersea Road 5.

Any accesses or areas used in carrying out the works are to be fully restored to their original conditions by the Contractor, including topsoil placement and lawn restoration as directed by the Drainage Superintendent and/or the Consulting Engineer. Restoration shall include, but not be limited to, all necessary levelling, grading, shaping, topsoil, seeding and mulching, and granular placement required to

make good of any damage caused. Any damages caused, resulting from non-compliance with the above-noted provisions, shall be restored by the Contractor to its original condition, at the Contractor's expense.

The Contractor shall not use any other access unless otherwise established by the Owner and the Drainage Superintendent before the commencement of construction. The Contractor may also be provided access by the Owner in order to stockpile any excess excavated materials for future use by the Owner. The Contractor shall note that it will be required to restore all existing driveways and laneways utilized for access, to their pre-construction condition before the completion of the overall project.

The Contractor shall ensure that the travelling public is always protected while utilizing the roadway for its access. The Contractor shall be required to carry out all 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 travelling public. The Contractor shall be required to submit a Traffic Control Plan to the Consulting Engineer for approval from the governing Road Authorities. The Traffic Control Plan shall be carried out in accordance with the requirements of the Ontario Traffic Manual's Book 7 for Temporary Conditions. It is expected that the Contractor shall not require Mersea Road 5 to be closed when carrying out the necessary work. However, should the Contractor have to close Mersea Road 5 for the proposed works, it shall arrange to obtain the necessary authorizations from the affected Road Authorities and distribute notification of detours around the site. The Contractor shall also ensure that all emergency services, school bus companies, etc. 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 Municipal and County Roads Departments.

IV. REMOVAL OF BRUSH, TREES AND RUBBISH

Prior to the construction of the wetland within the subject property, the Contractor is to prepare the site for this operation.

Initial Construction:

Where there is any brush, trees or rubbish along the course of the drainage works, including the full width of the access, all such brush, trees or rubbish shall be close cut and grubbed out, and the whole shall be 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 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 the burning operations, the Contractor shall comply with the guidelines prepared by the Air Quality Branch of the Ontario Ministry of the Environment, Conservation and Parks and shall ensure that the Environmental Protection Act is not violated. The Contractor will be required to notify the local fire authorities and cooperate with them in the carrying out of any work. The removal of brush and trees shall be carried out in close consultation with the Municipal 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.

It shall be noted that the existing cedar line along the east limit of the project site shall remain and be protected throughout the course of construction. Under no circumstances shall the cedar line be removed without the written consent of the affected Property Owners.

Future Maintenance:

Due to the sensitive nature of this project, the Contractor must protect as much vegetation as possible when accessing the wetland through any non-cultivated areas with the preservation of trees, bushes, and herbaceous vegetation being a primary concern. Following the completion of the work, the Contractor is to trim up any broken or damaged limbs on trees which are to remain to stand, and it shall dispose of said branches along with other brush, thus leaving the trees in a neat and tidy condition.

V. WETLAND EXCAVATION AND LEBO CREEK DRAIN CLEANING

The Contractor is to note that the excavation of the new wetland shall be done in a very meticulous manner, to the general lines, levels, grades and cross-sections as shown on the accompanying drawings, or as may be further established by the Drainage Superintendent or the Consulting Engineer at the time of the work. The widths of the wetland and the side slopes of the excavation shall generally conform to the dimensions given on the drawings. The overall wetland shape and side slopes are not intended to be rigid and exact with clean lines and slopes, but rather consist of irregular edges with varying side slopes and depths. However, in no case shall the wetland bottom project be above the grade line as shown on the accompanying drawings and as determined from the Benchmark.

Prior to any wetland excavation, the Contractor is expected to stip all of the topsoil from the full width of the new wetland site. This topsoil shall be windrowed and stockpiled within the project site area while maintaining a minimum distance of 4.0 metres from the Lebo Creek Drain open channel. Once all topsoil is satisfactorily stripped from the wetland area, the Contractor shall commence with any excavation works. The stripped topsoil shall be re-used for spreading over all newly excavated wetland side slopes, earth berm, and 4.00-metre grass buffer strip area between the west limit of the proposed wetland and the existing east top bank of the Lebo Creek Drain. Any surplus topsoil shall remain on-site and stockpiled for the use of the Owner.

The Contractor shall note that in order to satisfactorily construct the new wetland and the new weir details in its entirety, all sedimentation within the Lebo Creek Drain between Station 7+770.0 to Station 7+875.8 shall be removed from the open channel. Through these operations, the Contractor shall not disturb the existing side slopes of the open drain when carrying out these maintenance works. The Contractor shall refer to Section A-A through Section C-C for additional details of the open drain excavations. The Contractor shall note that the excavated material from the drain bottom shall be cast onto the adjoining lands to the west and spread evenly over the 9.0-metre wide working corridor on the west side of the Lebo Creek Drain and/or (once dried) used as surplus topsoil for placement over the newly constructed wetland area. If spread, the material shall be spread no more than 250mm (10") in depth and shall be kept a minimum of 1.52 metres (5.00 ft.) clear of the finished west top of the bank of the Lebo Creek Drain. The Contractor shall also ensure that no excavated material shall be spread over any existing ditches or furrows within the specified area that would impede the natural conveyance of runoff to the Lebo Creek Drain. The excavated material to be spread shall be free from rocks, boulders, stumps, rubble, or other similar material. If encountered, these deleterious materials shall be hauled away and disposed of by the Contractor.

The Contractor shall note that the precast concrete block weir shall not be installed within the Lebo Creek Drain, until such a time that the entire length of the new wetland has been substantially completed, protected from erosion, and is functioning as intended, along with having the Lebo Creek Drain cleaned of all accumulated sediment.

Laser Control must be provided to maintain the minimum channel line and grades, and the Contractor shall have a qualified Operator to set up and operate the equipment. In some instances, but only at the discretion of the Consulting Engineer, an approved system of batter boards may be utilized for this purpose. However, the cost of placing grade stakes and determining the cut information, shall be provided by and/or paid for entirely by the Contractor.

At the upstream end of the new wetland, the Contractor shall transition the new forebay to coincide with the details on the drawings. The cleaning and transitioning of the existing drain to the proposed new wetland shall be carried out to the full satisfaction of the Drainage Superintendent and Consulting Engineer.

At the locations noted on the Plans and Profile, the Contractor shall construct deep pools at the bottom of the aligned wetland channel. The deep pools shall be constructed in the centre of the channel bottom a minimum depth of 0.90 metres (3.00 ft.) to a maximum depth of 1.52 metres (5.00 ft.). The deep pools shall have a minimum 2.0 horizontal to 1.00 vertical side slope, as shown and detailed on the plans.

VI. EARTHEN BERM CONSTRUCTION AND SPREADING OF EXCAVATED MATERIAL

The Contractor shall provide all labour and equipment, to spread all excavated material to the north and construct the new earthen berm along the east limit of the project area, to the lines, levels, and grades as shown and detailed in the accompanying drawings. Overall, the spread material and earthen berm shall be constructed with a top width varying between a minimum of 1.0 metre (3.28 ft.)to a maximum of 15.25 metres (50.03 ft.) set to a minimum elevation of 182.850 metres, as noted on the plans. The berm shall also be constructed no steeper than 2.00 horizontal to 1.00 vertical finished side slopes.

VII. WETLAND INLET AND OUTLET PIPES

As part of the overall functionality of the wetland, the Contractor shall install inlet and outlet pipes as shown and detailed in the accompanying drawings. These pipes are intended to divert flows from the open drain channel to the newly constructed wetland.

Between approximately Station 0+035.1W to Station 0+047.1W, the Contractor shall install inlet pipes consisting of 525mm diameter, 320kPa, Smoothwall Inside Corrugated Outside (SICO) High Density Polyethylene (HDPE) pipe extending from the forebay wetland into the north end of the wetland. The pipe shall be set to the lines and levels as shown on the Drawings.

Between approximately Station 0+080.1W to Station 0+098.1W, the Contractor shall install outlet pipes consisting of 525mm diameter, 320kPa, Smoothwall Inside Corrugated Outside (SICO) High Density Polyethylene (HDPE) extending from the south end of the wetland and outletting into the existing Lebo Creek Drain at the general alignment and location shown on the Drawings.

Each length of the new HDPE plastic pipe for this project shall be supplied as no more than two (2) lengths of pipe for the inlet pipe and three (3) lengths for the outlet pipe. All of which are to be joined together with the use of a water-tight bell and gasket joining system, secured in accordance with the Manufacturer's recommendations. The minimum length of a continuous pipe section shall be no less than 6.00 metres (20.0 ft.). The HDPE plastic pipe for this installation must be of the length, size, and thickness identified in the Plans and approved by the Drainage Superintendent and the Consulting Engineer, prior to its placement in the drain.

Any changes relative to the inlet and outlet pipes must be approved by the Consulting Engineer prior to proceeding with construction. Benchmarks have been established near the wetland site and are noted and detailed within the accompanying drawings. Laser control must be provided to maintain drain lines and grades, and the Contractor shall have a qualified Operator to set up and operate the equipment. In some instances, but only at the discretion of the Consulting Engineer, an approved system of batter boards may be utilized for this purpose; However, the cost of placing grade stakes and determining the cut information shall be provided by or paid for entirely by the Contractor.

The Contractor shall note that the placement of any new wetland pipes shall 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 Drainage Superintendent or the Consulting Engineer.

The installation of the complete length of the pipes, including all appurtenances, shall be completely inspected by the Drainage Superintendent or the Consulting Engineer's Inspector prior to backfilling any portions of same. Under no circumstance shall the Contractor commence the construction or backfill of the new culvert pipe without the site presence of the Drainage Superintendent or the Consulting Engineer's Inspector to inspect and approve said installation.

For new smoothwall HDPE culvert pipes that are shown on the drawings to have sloped quarried limestone erosion protection at their ends, both ends of the pipe shall be securely anchored against floatation utilizing two (2) steel T-bar fence posts having a minimum length of 1.30 metres (4.00 ft.) or approved equal, on each side of the pipe, together with heavy steel galvanized wire secured between them across the top of the pipe. The top of each post shall be set no higher than the top of the proposed culvert. Pipe anchors shall be installed in accordance with the **"Floatation Anchor Details"** outlined within the accompanying drawings.

All pipe materials shall be stored and handled by the Contractor at its own expense. It shall be responsible for the safe storage of all materials, for obtaining storage areas, for the safe transportation and distribution of all the materials at the job site, and for inspection in order to determine defects and breakage. No additional recompense will be allowed by the Contractor for any loss incurred by it in the storage and handling of the materials. Should the Contractor permit damaged pipe or materials to be installed, it shall be responsible for the removal and replacement of same at its own expense, should the Consulting Engineer require such removal and replacement. If the drain pipe is laid in freezing weather, the Contractor shall take all the necessary precautions to prevent damage to the pipe or to any of the materials used in the construction of the work. In addition, the Contractor shall take care that no frozen ground or backfill is placed in the trench backfilling adjacent to the drain pipe.

The bottom of the trenches must be carefully excavated and trimmed to the elevation and shape of the bottom of the pipe. The bottom of the trenches shall be recessed to receive the pipe in order to allow the pipe to be uniformly supported on firm undisturbed earth for its' entire length. Corrections in the depth of excavation caused by the Contractor excavating to an extent greater than that required for the elevation of the pipe shall be made by bedding the pipe with 20mm (3/4") clear stone granular material is placed at the time that the pipes are being installed, at the Contractors expense.

No extras will be allowed for excavating any hardpan, boulders, rocks, ice or other obstacles found in the excavation or in the line of the trench or for any pumping or baling of water required in the excavation of the work. The trench must be drained or pumped in order to avoid the necessity of making joints underwater. The trench must also be drained to avoid any possibility of groundwater entering the pipe in the trench until the installation has been successfully completed.

All pipe and the various other materials used in the placing of said pipe shall be installed in strict compliance with the Manufacturer's recommendations. All pipe excavation shall be made in compliance with the drawings and in such a manner and at such depths and widths as will give ample room for installing the pipe, the bracing, sheeting, or otherwise supporting the sides of the excavation and for the pumping of groundwater if encountered. The Contractor is fully responsible for the safety of all its men and equipment and must conform completely with the provisions of the "Construction Safety Act" and "Regulations for Construction Projects".

VIII. WETLAND FLOW DIVERSION WEIR

The Contractor shall install the precast interlocking concrete block diversion weir within the Lebo Creek Drain, as shown and laid out as is shown and detailed in the accompanying drawings. This low-flow weir is intended to divert flows from the open drain channel to the newly constructed wetland.

The weir shall be installed vertically and extend across the full width of the open drain channel and be embedded a minimum of 500mm into the drain banks, having a total weir length of 4.80 meters (16.00 ft.) with a minimum depth of 0.61 metres (2.00 ft.). The top of the weir shall be set to an elevation of 180.230 metres, where the Contractor shall embed the bottom course of blocks into the drain bottom at the appropriate depth to achieve the required top elevation of the wall.

The standard precast interlocking concrete blocks shall be rectangular in shape with square corners and be a minimum size of 600mm x 600mm x 1200mm (2' x 2' x 4') or approved equal. Blocks with modified lengths may be utilized to fill in staggered sections of the block wall. All blocks shall be cast in one pour with no cold joints and shall have a minimum compression strength of 20MPa at 28 days. All precast concrete blocks shall be formed with interlocking pockets and tenons and each block shall be assembled in a staggered formation to prevent sliding at the interface between blocks. All precast concrete blocks shall be uniform in size with relatively smooth and consistent joints and shall have a stone exterior finish. Each block shall be fitted with a lifting ring that will not interfere with the assembly of the block wall once they are set in place. Cap blocks may be utilized on the top course of the wall with the top of the cap blocks having a smooth exterior finish. The precast interlocking concrete block headwalls are available from Underground Specialties Inc./Wolseley Inc. (Canada) or approved equal.

The block weir shall be founded on a firm solid base. When necessary, the Contractor shall provide a minimum of 150mm thickness of level compacted granular bedding, or a lean concrete footing, as a firm foundation for the blocks. The base block shall be set level and shall convey a vertical projection throughout its full height and shall include filter cloth behind the wall for the full height of the blocks to prevent soil migration through any joints. Filter cloth fabric shall be non-woven geotextile material and be minimum GMN-160 meeting OPSS Class I. The non-woven filter cloth is available from Armtec Construction Products or approved equal.

The Contractor shall arrange for the Supplier to provide interlocking block layout drawings outlining block assembly of the proposed headwall to the Consulting Engineer for approval prior to proceeding with fabrication and assembly of same. The Contractor shall arrange with the Supplier for technical assistance with the assembly of the structure on-site in full accordance with the requirements of the Supplier. All assembly installation shall be carried out to avoid any damage to the culvert and shall follow the Supplier's recommendation in every respect to ensure a proper and safe installation.

The installation of the precast interlocking concrete block weir and the placement of the backfill shall be carried out at the same time and shall be provided in total compliance with the **"Weir Details"** outlined within the accompanying drawings.

IX. GENERAL EROSION PROTECTION

Once the excavation of the wetland has been completed and all of the necessary pipes and appurtenances have been installed, the Contractor shall install the general erosion protection in all areas identified within the Drawings. The quarried limestone erosion protection shall be provided as illustrated within the accompanying drawings and installed per the Standard Specifications.

X. ANCILLARY WORK

During the course of the work, the Contractor will be required to maintain the drainage from the adjacent lands. All existing tiles intercepted by the excavation of the wetland shall be extended and diverted to the Lebo Creek Drain open channel utilizing solid standard duty High Density Polyethylene (HDPE) or equal plastic pipe of the same diameter as the existing. Connections shall be made using a Manufacturer's coupling wherever possible. For other connections, the Contractor shall utilize a grouted connection. Grouted mortar joints shall be composed of three (3) parts of clean, sharp sand to one (1) part of Portland cement with just sufficient water added to provide a stiff plastic mix, and the mortar connection shall be performed to the full satisfaction of the Drainage Superintendent or the Consulting Engineer. The mortar joint shall be of sufficient mass around the circumference of the connection to ensure a tight, solid seal.

The Contractor, when doing their excavation or any other portion of the work, shall be very careful not to interfere with, plug up or damage, any existing surface drains, swales and lateral or main tile ends. If it is found that said existing drains are interfered with in any way, the Contractor will be required to unplug or repair said drains immediately, at no extra cost to the project. If it is found that any existing lateral tiles or main tile drains have been cut off or damaged in any way during the course of the work, the Contractor will be required to either repair or replace same, to the full satisfaction of the Drainage Superintendent and the Consulting Engineer.

Although it is anticipated that the drainage works shall be undertaken in the dry, the Contractor shall supply and install a temporary straw bale check dam or silt fences in the drain bottom immediately downstream of the wetland site during the time of construction. These provisions shall be installed in addition to the Water, Sediment, and Erosion Control Plan. The straw bale check dam or silt fences shall conform to OPSD 219.130 or approved equivalent and shall be to the satisfaction of the Drainage Superintendent or Consulting Engineer these temporary sediment features must be removed upon completion of the construction. All costs associated with the supply and installation of this straw bale check dam shall be included in the cost bid for the wetland installation.

XI. TOPSOIL, SEEDING AND MULCHING

Once the new wetland has been constructed, the Contractor is to cover all newly excavated side slopes with a minimum thickness of 50mm (2") of the stripped topsoil, and all of these areas are to be seeded and mulched. The Contractor is also required to place stripped topsoil, with a minimum thickness of 100mm (4") over the spread excavated materials, earthen berm, and 4.00-metre grass buffer strip area which lies between the west limit of the proposed wetland and alongside the existing east top bank of the Lebo Creek Drain. The Contractor shall also provide stripped topsoil with a minimum thickness of 100mm (4") on all other disturbed areas as a result of its operations so that all areas are fully restored to their original conditions. All of the above-mentioned topsoiled surfaces shall be seeded and mulched with the recommended seed mixes.

Upon the completion of the project, the Contractor shall note that if any surplus topsoil remains from the site, it shall be neatly stockpiled by the Contractor at a location on-site designated by the Owner and Drainage Superintendent for future use by the Owner. Under no circumstances shall the surplus topsoil be removed from the site without the expressed written permission from the Owner and/or Drainage Superintendent.

The placing and grading of all topsoil shall be carefully and meticulously carried out according to Ontario Provincial Standard Specifications, Form 802, dated November 2019, or as subsequently amended or as amended by these Specifications.

Once all topsoil has been properly placed and fine-graded, the Contractor shall seed and mulch the area. Seeding and mulching operations shall be carried out according to Ontario Provincial Standard Specifications, Form 804, dated November 2014, or as subsequently amended or as amended by these Specifications**. The seeding mixture for all areas surrounding the wetland (uplands) shall be a Base Restoration Seed mix, applied at a rate of 10kg/hectare. For all areas within the wetland (riparian lands), the seeding mixture shall be a Water's Edge Seed mix, applied at a rate of 10kg/hectare.** Details of these seed mixtures are included within **Appendix "A"** and are available from St. Williams Nursery & Ecology Centre, Norfolk County, Ontario, or equal. If the species listed above are unavailable, other native prairie plant species indigenous to Essex County may be included in the seed mix. However, no native plant species listed on the Ontario Noxious Weed list can be included. As part of the seeding and mulching operation, the Contractor shall be required to provide either a hydraulic mulch mix or a spread straw mulch with an adhesive binder in accordance with OPSS 804 dated November 2014, or as subsequently amended, to ensure that the grass seed shall be protected during germination and provide a thick, uniform cover to protect against erosion, where necessary. All areas hand seeded by the Contractor, if deemed necessary by

the Drainage Superintendent, shall be covered with a straw mulch to reduce the extent of erosion and facilitate germination of the grass seed.

In order to promote good germination, if the seeding and mulching operation is carried out in the spring, the seeding mixture shall contain oats, and if the seeding and mulching operation is carried out in the fall, the mixture shall contain rye. The seeding and mulching operations within the newly excavated side slopes shall be carried out as soon as practical. All other areas shall only be carried out as weather conditions permit in either the months of May or June in the Spring or during the months of September and October in the Fall unless written permission is obtained from either the Drainage Superintendent or the Consulting Engineer

All of the work related to the placements of topsoil and the seeding and mulching operation shall be meticulously done and shall be carried out to the full satisfaction of the Drainage Superintendent and the Consulting Engineer. In addition, all work shall satisfy the Essex Region Conservation Authority (ERCA) and the Department of Fisheries and Oceans (DFO) and comply with all Permits and Authorizations issued by said Authorities. Substantial Completion shall not be provided for this work until the completed plantings have been inspected and approved by ERCA and DFO.

APPENDIX "A"

Note: Due to the size of the attachments, they have not been included herein. If you are interested in viewing the associated appendices, please contact the Municipality for further details.

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APPENDIX "B"

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APPENDIX "C"

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APPENDIX "D"

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APPENDIX "E"

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APPENDIX "F"

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