Subject: Niagara-on-the-Lake Drainage

Report to: Public Works Committee

Report date: Tuesday, November 10, 2020

Recommendations

1. That this report **BE RECEIVED** for information.

Key Facts

- The purpose of this report is that it be received as an information only report to provide background context to a delegation request by a Town of Niagara-on-the-Lake resident.
- On May 7, 2018, the Town of Niagara-on-the-Lake received a petition from a resident for an improved drainage outlet for his private drains in Pt Lot 141, Concession 6, Niagara Township.
- Section 4 of the Drainage Act (R.S.O. 1990, c.D.17) allows landowners the right to petition to improve drainage works in order to increase the effectiveness of a drainage system or obtain a legal outlet for their drainage system.
- Under the Drainage Act, a petition for drainage works must be filed with the clerk of the local municipality in which the area is situated. This is led by the Town of Niagara-on-the-Lake as this falls under their jurisdiction.
- As the subject drainage system includes the Region's right-of-way ditch, Niagara Region is considered a landowner in this matter.
- The Town of Niagara-on-the-Lake appointed K. Smart Associates Limited on July 9, 2018, to prepare an engineer's report on the petition received pursuant to the Act.
- The Town of Niagara-on-the-Lake Council will consider the engineer's report for approval at its meeting on November 23, 2020.

Financial Considerations

If approved by the Town of Niagara-on-the-Lake, there will be costs assessed to Niagara Region for benefit, and outlet liability as per Section 21 of the Act, in the amount of $16,046, for an improved outlet provided by the drainage works. The drainage works will provide an outlet, established through by-law, for drainage from the Region's road allowance to flow through downstream lands to a sufficient outlet. The

Region will be assessed maintenance costs, when maintenance is deemed necessary by the Town's Drainage Superintendent. Those maintenance costs will be assessed in the proportions determined in the Engineer's Report, adopted by the Town. Initial assessments and future maintenance costs will be paid for out of Transportation's Capital and Operating Budgets.

Analysis

The Town of Niagara-on-Lake received complaints about flooding, drainage issues and erosion from a property owner abutting York Road, Regional Road 81, west of Concession 6 Road. In addition, a property on the north side of York Road in this area expressed they were experiencing erosion problems from water discharging thorough a culvert under the road.

The Town of Niagara-on-the-Lake undertook meetings with residents, Ministry of Transportation (MTO), Niagara Region and Niagara Peninsula Conservation Authority (NPCA) to review the drainage concerns, discuss solutions and attempt to reach an agreement on how to resolve the matter.

On May 7, 2018, the Town received a petition from a property owner for an improved drainage outlet for his lands. The Town appointed K. Smart Associates Limited to prepare a report on the petition received. Various options were reviewed with each of the property owners involved, plus the MTO, Niagara Region and the NPCA.

K. Smart Associates Limited presented a number of options with cost estimates to address the flooding, erosion and drainage issues in their report (attached as Appendix 2) presented to Niagara-on-the-Lake Council on September 28, 2020.

Niagara Region has a responsibility to formalize ditch and culvert water flows to a downstream property through a legal outlet agreement. The application of the Drainage Act addresses Niagara Region's responsibility to secure a sufficient outlet for drainage and therefore staff are in support of the Municipal Drain application.

Niagara Region staff have advised the Town of Niagara-on-the-Lake that the Region accepts the recommendation presented in the K. Smart Associates Limited report.

Alternatives Reviewed

Do-Nothing

- This alternative does not meet the objectives of the Transportation Master Plan or the 2019-2022 Council Strategy Implementation Plan.

Support Municipal Drain Process

- Niagara Region is in support of the Municipal drainage system recommended by the Town of Niagara-on-the-Lake's engineer's report.

Relationship to Council Strategic Priorities

- Supporting Businesses and Economic Growth
- Healthy and Vibrant Community
- Responsible Growth and Infrastructure Planning

Other Pertinent Reports

N/A.

Prepared by:
Carolyn Ryall
Director Transportation Services
Public Works Department

Recommended by:
Bruce Zvaniga, P.Eng.
Commissioner of Public Works (Interim)
Public Works Department

Submitted by:
Ron Tripp, P.Eng.
Acting Chief Administrative Officer

This report was prepared in consultation with Shawn McCauley, Associate Director Operations, Carolyn Ryall, Director Transportation Services, and reviewed by Bruce Zvaniga, Commissioner Public Works (Interim).

Appendices

Appendix 1 PW5.R01.3 Road Cross Section

Appendix 2 Town of Niagara-on-the-Lake Report (OPS-20-025)

Niagara Region

PUBLIC WORKS DEPARTMENT POLICY MANUAL PW5.RO1.3

SECTION	NAME OF POLICY
Transportation	Road Cross Section

DEVELOPED BY: TRANSPORTATION ENGINEERING

APPROVED BY: PUBLIC WORKS & UTILITIES COMMITTEE DATE: November 15, 2005

EFFECTIVE DATE: December 6, 2005 LATEST REVISION: December 15, 2005

POLICY STATEMENT:

The Regional Road system forms the critical transportation link between the twelve municipalities of the Niagara Region. This arterial roadway network provides consistency in planning and design for motorists commuting across the Region.

This policy provides guidance regarding cross-section elements. These elements consist of the travelled way, shoulders, curb and gutter, drainage features, roadway structure, side and back slopes, and utility locations. They include provisions for pedestrians, cyclists, and parking. These elements are designed with consideration of design speed and traffic volumes and the rural or urban character of the roadway to create a safe, efficient, and economical transportation system.

The Region of Niagara policy will supplement current roadway standards used in Ontario which are referenced in Section 6.

DEFINITIONS

- AADT = Average Annual Daily Traffic volume
- B = Base Thickness
- Design Speed = is the highest continuous speed vehicles can travel with safety on a road when conditions are favourable and traffic density is so low that the safe speed is determined by the geometric features of the road.
- Design Year = period in years to the first necessary rehabilitation by means of overlay or resurfacing when performance has become inadequate (anticipated life span of proposed improvement)
- DHV = Design Hourly Vehicles
- Highway = Synonymous with through-road
- HM = Hot Mix Asphalt
- OPSD = Ontario Provincial Standard Drawings
- OPSS = Ontario Provincial Standards and Specifications

- ROW = Right of Way

POLICY

Section 1.0 Roadway Cross-Section

The roadway cross-section Policy is based on Ontario Provincial guidelines for municipal roads and highways.

Section 1.1 Pavement Width

The pavement width is the sum of the widths of travelled lanes and median within the roadway and is always measured from edge of pavement to the edge of pavement. This width may also include parking facilities, bike way facilities, and vehicle breakdown amenities.

The Region of Niagara recognizes that truck and bus widths (including mirrors) can easily extend up to 3.2m and has therefore adopted a minimum through lane width of 3.5m. Additional lane width is relative to the design speed and volume of traffic for a given roadway and is outlined in the Geometric Design Standards for Ontario Highways.

The minimum urban pavement width for a Regional Road is 10m. The MTO Geometric Design Standards for Ontario Highways notes that "urban arterial streets normally experience average daily traffic volumes (AADT) of 5,000 to 50,000." The previous Ministry B-36 Directive dictated that the minimum pavement width for a two lane urban roadway with these traffic volumes was 10m which the Region has adopted as the minimum standard.

The minimum rural road pavement width in the Region of Niagara consists of two 3.5m lanes plus 0.5m partially paved shoulders for a total of 8.0m. The Region also recognizes that a minimum shoulder width of 2.0m is necessary for disabled vehicles.

The Regional road network as noted above is an arterial link through our region. This road system is recognized in the Road Closure Action Plan in the case of highway closures and would constitute main routes in the case of evacuations. Furthermore, unless otherwise posted, the road system is also recognized as the designated truck route. As such, the regional road system must reflect the ability to carry traffic efficiently and not be limited by vehicle breakdowns. Therefore, the minimum pavement and shoulder width standards must be maintained.

Section 1.2 Medians

Medians separate opposing traffic and reduce the risk of head-on collisions. Raised centre medians can control ingress/egress access at entranceways and side streets.

The MTO Standards dictate that the raised centre median should be 2.0m minimum. However, if the MTO minimum is cost prohibitive or creates problems with lane alignments, than the Transportation Association of Canada (TAC) minimum standard of 1.5m would also be acceptable.

Flush medians should be used on five lane cross sections where raised medians are not included. Flush medians must also be used on the approach to raised medians to reduce accidents.

Section 1.3 Shoulders

Shoulders provide a recovery area for errant vehicles and a storage area for stopped emergency/disabled vehicles. As outlined in the MTO Geometric Design Standards, the minimum desirable shoulder width should be 2.0m.

Paved shoulders supply support to the travelled lane pavement improving surface drainage and reducing maintenance. Paved shoulders shall be either full or partial (minimum 0.5m) depending on design requirement and available cross section.

Section 1.4 Curb and Gutter

Curb and gutter is placed adjacent to a lane or paved shoulder and is intended to control and conduct storm water as well as inhibit or at least hinder vehicles from leaving the roadway. Curb and gutter design is outlined in section D.8.1 of the Geometric Design Standards for Ontario Highways and construction should be consistent with OPSS and OPSD standards.

Section 1.5 Boulevards

The boulevard area extends from the back of curb to the sidewalk. This area provides a buffer from traffic for pedestrians and can accommodate street accessories such as signs, streetscape appurtenances as well as being a snow storage area. Boulevard widths should be 3.0m or greater with a minimum desirable width of 1.5m. Boulevards less than 1.5m wide should be considered for a hard surface treatment and “kill strips” of 600mm should be considered in problem areas.

Sidewalks in the Niagara Region are the responsibility of the local municipality. The MTO Guidelines point out that a minimum sidewalk width should be 1.5m. Sidewalk ramps at intersections should be a minimum of 1.8m wide. At the discretion of the local municipality, sidewalks in urban commercial areas may be wider as required.

Section 1.6 Ditches and Side Slopes

Ditches carry storm water runoff from the roadway as well as adjacent lands. These ditches must have adequate hydraulic capacity with relief systems that will not limit the operation of the arterial roadway.

Side slopes should follow the standards found in section D.9 Grading and Drainage Channels of the Geometric Design Standards for Ontario Highways. Side slopes shall be a maximum 3:1 front slope for vehicle recovery and ease of maintenance.

Section 1.7 Roadway Structure

For purposes of this section, it is assumed Niagara's arterial urban/rural road network carries 10% commercial trucks and that the foundation is a competent non-saturated subgrade of silty-clays having moderate to high susceptibility to frost heaving.

A geotechnical consultant shall be retained to determine the general soil type(s) from which it will recommend the most appropriate and cost-effective structure best suited to the specific project conditions (i.e. subgrade soil characteristics, drainage, traffic volume and loading, and the use of recycled materials).

1.7.1 Pavement Types

a) Flexible Pavements

All flexible pavement structures are to be designed having a minimum thickness that will produce a service life of 10-12 years. Design year for reconstruction projects shall be 20 years. Pavement structures shall be conventional comprised of an asphaltic wearing surface and binder course and granular "A" base course (crushed limestone or approved equivalent recycled material).

i) Minimum Rural Structure

HM	130mm (min. 50mm top course)
B	400mm
GBE	660mm

ii) Minimum Urban Structure

HM	130mm (min. 50mm top course)
B	500mm
GBE	760mm

b) Rigid Pavements

All rigid pavement structures are to be designed having a minimum thickness that will produce a service life of 20-25 years. Design year for reconstruction projects shall be 40 years. Pavement structures shall be composite plain concrete (Portland Cement Concrete) with short random contraction joint spacing with transverse load transfer devices and ties bars at all longitude joints. The pavement structure shall be either plain (exposed) or composite. Exposed pavements shall be comprised of a minimum 260mm of 30 MPa (at 28 days), concrete having a base of 120mm of granular "O" and sub-base of 80mm of granular "A" (crushed limestone), composite pavements shall be comprised of a minimum of 80mm of asphaltic wearing course over 225mm of 30 MPa (at 28 days) concrete, have a base of 120mm of granular "O", and sub-base of 80mm of granular "A" (crushed limestone).

Section 1.8 Utilities and Servicing

Utility placement should not inhibit the future expansion of the roadway. Underground utilities should be installed in a uniform alignment parallel to the right-of-way lines. Sewer manhole covers and watermain valves should not be located in the wheel track path. Above ground plant must conform to the MTO Roadside Safety Manual.

Section 2.0 Right-of-Way

Right-of-way refers to the public lands designated for the roadway. For more information on right-of-way, refer to the Region of Niagara Right-of-Way Policy and MTO Geometric Design Guidelines for Ontario Highways section D.10.

Section 3.0 Retrofit Construction of Roadways

The Region recognizes that existing conditions such as right-of-way, roadway geometrics, structure locations, ditches, utilities, and other variables may limit possible retrofit work. The costs to retrofit a pre-developed roadway may greatly exceed those of new construction because of existing deficiencies. In such cases, the design should reflect reasonable costs without compromising current safe conditions.

Section 4.0 New Construction

Construction of roadways in areas previously undeveloped should follow the design standards. These standards should not be compromised except in the case of extraordinary conditions.

Section 5.0 Extraordinary Conditions

Design judgements are made with safety as the predominant factor. Conditions such as extreme costs may limit the design and MTO specifications may not be practical. If for reasons beyond the designers control the MTO standards can not be achieved, the designer will utilize Transportation Association of Canada (TAC).

Section 6 REFERENCES

Ref. 1 Geometric Design Standards for Ontario Highways first published in 1985 and updated by the MTO (2002)

Ref. 2 MTO Roadside Safety Manual (1993)

Ref. 3 Ontario Provincial Standards and Specifications and Ontario Provincial Standard Drawings

Ref. 4 MTO Pavement Design and Rehabilitation Manual (1990)

Ref. 5 Niagara Peninsula Standard Contract Documents

REFERENCES:

Report	Committee Date	Council Date
PWA 208-2005	December 6, 2005	December 15, 2005

Operations
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The Town of Niagara-On-The-Lake

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Report:	**OPS-20-025**	**Committee Date:**	**September 21, 2020**
		Due in Council:	September 28, 2020

Report To: **Operations Advisory Committee**
Subject: **Lament Drain 2020 Engineering Report – Meeting to Consider**

1. RECOMMENDATION

It is respectfully recommended that:

1.1 Council adopt the Engineering Report (Option 1) for the Lament Drain dated April 9, 2020 prepared by K. Smart Associates Limited; and

1.2 That Council, having adopted the Engineering Report, give the attached Provisional By-law the two readings required by Section 45(1) of the *Drainage Act* , R.S.O 1990; and

1.3 That Council direct the Clerk to set a date for the first sitting of the Court of Revision and to distribute the Provisional By-law and the Notice of the Court of Revision, in accordance with Sections 46(2) and 46(3) of the *Drainage Act,* R.S.O. 1990.

2. PURPOSE / PROPOSAL

The purpose of this report is to seek Council's adoption of the Engineering Report for the construction of a drainage works for an improved drainage outlet for the private drains on property roll no. 020-019-10400, part of Lot 141 on the south side of York Road.

Drawing 1 of 8 showing the watershed and the route of the drain and drawings 4 and 5 of 8 showing details of the Main Drain are attached.

The drainage works consists of:

- excavation of ±230m (metres) of existing open roadside ditch on York Road and an existing watercourse on property roll no. 020-019-10305, including seeding of new banks
- power brushing in the watercourse and for a 10m width on the south side of the watercourse for the necessary work area
- removal of the existing 600mm ø (diameter) CSP culvert at the entrance to properties 020-019-10305 and 020-019-10300 and replacing it with a 600mm ø HDPE pipe
- installing a concrete catchbasin and connecting same to the new 600mm ø HDPE culvert

- lowering an existing 9 metres long 450mm ø plastic pipe on property roll no. 020-019-10305
- removing an existing 400mm ø CSP on property roll no. 020-019-10305 and replacing it with 9m of 450mm ø plastic pipe
- constructing an overflow weir at the outlet of an existing pond on property roll no. 020-019-10400
- constructing an earth berm along the north side of the north ditch of Hwy 405
- placing riprap at appropriate locations

Adoption of the Engineering Report will allow the Town to proceed with the requirements of the *Drainage Act* , R.S.O 1990.

3. BACKGROUND

The Engineering Report is pursuant to Section 4 of the *Drainage Act* , R.S.O.1990.

The Town has received numerous complaints about flooding and drainage issues from a property owner abutting the Lament property. As well, the property on the north side of York Road is subjected to erosion problems caused by water discharging through a culvert under York Road in the vicinity of the Lament property.

In an attempt to try to resolve the drainage issue, the Town held a “scoping meeting” on Tuesday, July 18, 2017. The meeting was attended by representatives from the Ministry of Transportation, the Regional Municipality of Niagara, the Niagara Peninsula Conservation Authority, an engineer from K. Smart Associates, two landowners, Stanley Lament and Mr. Steve Watson and Town staff. The only invited party who did not attend was Mr. Brzecka, the owner of the property on the north side of York Road.

The intent of the meeting was to review the problems, discuss solutions and attempt to reach an agreement on how to resolve the problem. The preferred and most realistic solution was to have one or more of the affected parties petition to have the existing watercourse become a municipal drain so that it could be properly managed and maintained. None of the parties were willing to sign a petition at that time, so the problem was not resolved. The Town does not have any lands or roads in the immediate area so the Town has no authority to proceed with any type of remedial work to deal with the drainage and erosion problems.

On May 7, 2018, the Town received a petition from Mr. Lament for an improved drainage outlet for his private drains on his property in Pt Lot 141, Concession 6, Niagara Township. Refer to attached report OPS 18-020.

Pursuant to Section 8(1) of the Drainage Act, on July 16, 2018, K. Smart Associates Limited was appointed by By-law 5074-18 to prepare a report on the petition received.

The on-site meeting required by the Drainage Act was held August 13, 2018. At this meeting, landowners suggested several options to be investigated to provide a legal

outlet for the proposed and existing tile drainage systems on the petitioner's properties roll no. 020-019-10300 and 020-019-10400.

Input from the landowners at the on-site meeting is detailed on page 5 of the Engineering Report. (Page 5 is attached).

A second meeting with the landowners was held on June 4, 2019. A representative from the MTO was present because the issue of runoff from Hwy 405 had been raised. At this meeting, the results of the investigation to date were presented along with a summary of the design options and preliminary cost estimates and assessments. The design options are described on pages 2, 3 and 4 of the Engineering Report. (Pages 2, 3 & 4 are attached) Comments from the attendees are listed on pages 8 and 9 of the Engineering Report. (Pages 8 & 9 are attached).

On February 21, 2020, a third meeting was held at the Centennial Arena. No representatives from the MTO, the Niagara Region or other affected agencies attended. The three affected private landowners were present as well as the engineer, Town staff and Councillor Erwin Wiens.

A summary of the final design cost estimates and assessments was presented by the engineer. Comments from the attendees are listed on page 11 of the Engineering Report. (Page 11 is attached).

After the second meeting of June 4, 2019, the engineer attempted to set-up an on-site meeting with Mr. Brzecka on July 11, July 22, August 12, September 4 and September 11, 2019; none of which worked out for Mr. Brzecka.

On October 15, 2018, an on-site meeting was held with Steve Watson (Roll No. 019-10305) at which time Mr. Watson stated that:

- there are flowering white dogwoods on his property
- there is currently a lawsuit with his neighbour (Lament)
- the neighbour (Lament) has recently dug the perimeter ditch such that it no longer flows into the Lament pond but instead goes around it
- the neighbour has increased the size of the outlet pipe from the pond
- the neighbour has increased the tiling to York Road
- Mr. Watson would prefer that the increased water not go through his property but go to the York Road ditch instead
- he would like that the two culverts, the one at his driveway entrance and the other in the bush, be improved
- there should be minimal cleanout of the ditch on his property

Due to concerns expressed by Mr. Watson about the impact of the proposed drainage works on the forest on his property; another on-site meeting was held at the Watson property at 835 York Road on March 9, 2020. The meeting was attended by the engineer, Jason Culp of the NPCA, Dan Drennan, the NPCA Forester / Forest Conservation By-law Officer, and Town staff Brett Ruck and Brandon Enns. The landowner, Steve Watson, was notified of the meeting but did not attend.

Dan Drennan, the NPCA Forester / Forest Conservation By-law Officer commented that:

- the working buffer around the Eastern Flowering Dogwood is 25 metres and thus the location will be safe in relation to where the drainage work will be completed
- the area along the watercourse as it flows through 835 York Road had been impacted in the past, whereas the rest of the bush has been left intact
- there is a Walnut tree in close proximity to the proposed culvert that should be protected
- most of the trees in the work area are dead Ash trees and the canopy will be minimally affected by the drainage works
- the Green Belt Plan is superseded by the Drainage Act and works of this nature do not pose an issue or conflict with the Green Belt Plan.

Mr. Ruck stated that larger trees will not be removed due to the drainage works, that provisions will be made to work around such trees.

At the conclusion of the meeting, the NPCA staff generally indicated that if the work is maintained within the proposed working limits and the rest of the bush is left intact, no harm is anticipated to the health or function of the forest.

4. DISCUSSION / ANALYSIS

The total estimated cost of the project is $152,360.00. A portion of the Town road allowance of Concession 6 Road is assessed for $738.00, the Region of Niagara is assessed $16,046.00 for York Road and the MTO $45,139.00 for Hwy 405. The remaining $90,437.00 is assessed to three properties within the watershed.

The Engineering Report establishes a 6m wide corridor for future maintenance, measured from the top of the bank, on each side of the municipal drain. A 10m wide working area is established along the south side of the drain on the Watson property, but this width will only be in effect during the construction; once the engineer certifies that the work is completed the work area will be reduced to the 6m wide maintenance corridor. All the work will be done on the south side to reduce possible damage to the trees along the north side of the drain. Allowances (compensation) for right-of-way and for damages are provided to properties owned by Mr. Lament and Mr. Watson and an insufficient outlet allowance is provided to the Brzecka property.
The allowances are summarized as follows:

Property	Right-of-way Width (m) $	Damages Width (m) $	Insufficient Outlet	Total $
Brzecka (020-019-07900)	-----	-----	$4,500	$4,500
Lament (020-019-10300)	7.5m $2,100	10m $300	-----	$2,400
Watson				

(020-019-10305)	10m	$8,400	15m	$700	-----	$9,100
Lament (020-019-10400)	6m	$100	15m	$100	-----	$200

At the Meeting to Consider, prior to passing the Provisional By-law, Council shall give any person who signed the petition the opportunity to withdraw from it; and any person present who owns land in the area requiring drainage and has not signed the petition, the opportunity to do so.

Once the Engineering Report is formally adopted and the Provisional By-law has been established, this project will be able to move forward under the legislative requirements of the *Drainage Act* , R.S.O. 1990 and the appeal procedures under the Act will become available to the affected land owners.

Council should keep in mind that complaints about the assessed amount to a property cannot be dealt with at the Meeting to Consider. Appeals about the cost assessed must first be dealt with at a Court of Revision; and adopting the Engineering Report will trigger the appeals procedure.

The Provisional By-law for the Lament Drain 2020 should receive first and second readings at the Council meeting of September 28, 2020. In accordance with Section 46(3) of the *Drainage Act* , R.S.O. 1990, the first sitting of the Court of Revision must be held on a day not earlier than twenty (20) nor later than thirty (30) days from the date of completing the mailing of the copies of the Provisional By-law. Assuming that the mailing to the assessed owners of the Provisional By-law and the notice of the time and place of the sitting of the Court of Revision is completed on October 2nd, 2020; the first sitting of the Court of Revision must be held between October 22 and October 30 2020 inclusive to meet this condition of the *Act* .

5. OPTIONS

Council only has three options at the Meeting to Consider.

1. Adopt the Engineering Report and continue the process under the Drainage Act, which allows affected parties to file appeals.
2. Not adopt the Report, in which case the petitioner(s) can appeal Council's decision to the Drainage Tribunal.
3. Refer the report back to the Engineer for reconsideration.

- Section 57 of the Drainage Act allows Council to refer the Engineering Report back to the engineer for reconsideration for any reason, but this option is primarily used if it appears that there are or may be significant errors in the Report. Staff has reviewed the Engineering Report and there does not appear to be any reasons to refer the Report back to the engineer. Staff believes that it is in the best interest of the Town and the affected landowners to accept the recommendations and proceed with the adoption of the Engineering Report.

6. FINANCIAL IMPLICATIONS

The Town will be required to front end the costs of this project until completed at which time these costs will be recovered through assessments on lands within the watershed.

In accordance with the provisions of Section 85 of the Drainage Act, and OMAFRA's ADIP policies, a grant not exceeding 1/3 (33-1/3%) may be available on the assessments against privately owned parcels of land which are used for agricultural purposes and are eligible for the Farm Property Class Tax Rate. Based on Town assessment roll information, parcels that have the Farm Property Tax Class are identified with an "F" in the first column of assessment schedule C, the schedule for the actual cost by-law.

Section 88 of the Drainage Act provides for the Town to apply for this possible grant upon certification of completion of the drain provided for in the Engineering Report. The Town will first confirm the Farm Property Tax Class for the parcel in the current assessment roll, and then deduct the grant from the assessments prior to collecting the final assessments.

If an assessed owner feels that their property should be eligible for the grant, and they can provide proof to the Town of this eligibility as noted prior to the final cost levy then the property could have the 1/3 (33-1/3%) grant deducted from the final cost levy.

Council should note that OMAFRA retains the final right to determine eligibility under the grant program, regardless of the designation in the Engineering Report.

8. COMMUNICATIONS

The Notice of the Meeting to Consider has been mailed to the affected owners within the watershed, as well as to the Secretary-Treasurer of the Niagara Peninsula Conservation Authority and the Director of the Ontario Ministry of Agriculture, Food and Rural Affairs; all as required by the Drainage Act.

All parties to this drainage works have been advised that the Meeting to Consider will be held via video teleconferencing and that arrangements to participate will be done through the Clerk's Department. The affected landowners have been informed that an Open House, via video teleconferencing, will be held from 4:00 to 5:30 p.m. on September 28, prior to the Meeting to Consider. The engineer and Town drainage staff will be available during the Open House to discuss the Engineering Report.

The affected landowners will be notified of the date of the first sitting of the Court of Revision as well as the other appeals which are available to them.

The appropriate appeal forms will be included with the mailing of the Provisional By-law and Notice of the sitting of the Court of Revision.

9. CONCLUSION

It is in the best interest of the Town and the landowners within the Lament Drain watershed for Council to adopt the Engineering Report for the Lament Drain 2020 prepared by K. Smart Associates Limited.

Respectfully submitted,

Rene Landry
Drainage Support Technician

Brett Ruck
Irrigation & Drainage Superintendent

Jeffrey Vyse, C.S.T.
Manager, Operations

Sheldon Randall
Chief Administrative Officer (I)

ATTACHMENTS

COTW Report OPS-18-020 re Accept Petition.pdf
Final Report - complete April 9 2020.pdf
Drawings 1, 4 & 5- Engineering Report Lament Drain.pdf
Pages 2, 3 & 4 - Engineering Report Lament Drain.pdf
Page 5 - Engineering Report Lament Drain.pdf
Pages 8 & 9 - Engineering Report Lament Drain.pdf
Page 11 - Engineering Report Lament Drain.pdf

WEB ATTACHMENTS

ATTACHMENTS FOR LINK

Operations
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Facsimile (905) 468-4555

The Town of Niagara-On-The-Lake

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Report:	**OPS-18-020**	**Committee Date:**	**June 04, 2018**
		Due in Council:	June 11, 2018

Report To: **Operations Advisory Committee**
Subject: **Petition for Drainage Works - York Road**

1. RECOMMENDATION

It is respectfully recommended:

1.1 That Council consider the attached Petition for Drainage Works filed by the property owner of 865 York Road under the provisions of Section 4 of the *Drainage Act* R.S.O. 2010.

1.2. That Council proceeds with the drainage works and directs that notice of its decision be sent to the appropriate parties in accordance with Section 5(1) of the *Drainage Act* R.S.O. 2010.

2. PURPOSE / PROPOSAL

The purpose of this report is to request that Council consider the attached Petition for Drainage Works which was filed by Mr. Stanley Lament and that Council consider proceeding with the drainage works requested by Mr. Lament (see attached map).

3. BACKGROUND

The Town has received numerous complaints about flooding and drainage issues from a property owner abutting the Lament property. As well, the property on the north side of York Road is subjected to erosion problems caused by water discharging through a culvert under York Road in the vicinity of the Lament property.

In an attempt to try to resolve the drainage issue, the Town held a "scoping meeting" on Tuesday, July 18, 2017. The meeting was attended by representatives from the Ministry of Transportation, the Regional Municipality of Niagara, the Niagara Peninsula Conservation Authority, an engineer from K. Smart Associates, two landowners, Stanley Lament and Steve Watson and Town staff. The only invited party who did not attend was Mr. Brzeczka, the owner of the property on the north side of York Road.

The intent of the meeting was to review the problems, discuss solutions and attempt to

reach an agreement on how to resolve the problem. The preferred and most realistic solution was to have one or more of the affected parties petition to have the existing watercourse become a municipal drain so that it could be properly managed and maintained. None of the parties were willing to sign a petition at that time, so the problem was not resolved. The Town does not have any lands or roads in the area so the Town has no authority to proceed with any type of remedial work to deal with the drainage and erosion problems.

4. DISCUSSION / ANALYSIS

Proceeding with the drainage works will provide the necessary outlet and will greatly help to resolve the drainage and erosion issues. Once the watercourse becomes a municipal drain, the Town will be able to repair and maintain the watercourse as required at the expense of the contributing lands.

There are still many steps to the process: appointing an engineer, a site meeting, determining the validity of the petition and more; but through the entire process, the landowners will have opportunities to voice concerns, make suggestions and provide input.

There is the potential that the watershed may extend into the City of Niagara Falls; if so, notification to the City of Niagara Falls in the early stages of the process will be prudent.

5. STRATEGIC PLAN

N/A

6. OPTIONS

Council has only two options when dealing with a petition for drainage works.

One is to decide **not** to proceed with the drainage works, in which case the petitioner(s) can appeal the decision to the Drainage Tribunal; an appeal which the petitioner will very likely win in this situation.

The other option is to decide to proceed with the drainage works, as is recommended in this report.

7. FINANCIAL IMPLICATIONS

The Town will initially carry the costs during the process under the Drainage Act however the costs will be recovered through assessment to the lands within the watershed.

It does not appear that there are any Town owned lands or roads within the watershed affected by the petition therefore in the end, there should not be any costs to the Town associated with this drainage works.

The magnitude of this type of project exceeds the current staffing level that we have and will require the assistance of Contract Staff to manage this project internally. Funds associated with this project are not included in the Operating Budget, however these costs will be assessed to the benefitting land owners within the watershed.

8. COMMUNICATIONS

The petitioner, all affected landowners and road authorities, the Niagara Peninsula Conservation Authority and other relevant agencies will be notified of Council's decision, as well as all future procedures in the process of establishing the drainage works.

9. CONCLUSION

Proceeding with the drainage works will improve the efficiency of the watercourse which will be of benefit not only to the petitioner but also to the other lands within the watershed.

Respectfully Submitted

Brett J Ruck

Brett Ruck
Environmental Services Supervisor

Sheldon Randall
Director of Operations

Holly Dowd
Chief Administrative Officer

ATTACHMENTS

Drainage Petition - Lament.pdfLamentProperty-YorkRdCon6.pdf

ENGINEERING REPORT

For

LAMENT DRAIN

Town of Niagara-on-the-Lake

(Geographic Township of Niagara)

Region of Niagara

Date: April 9, 2020

File No. 18-218

K. SMART ASSOCIATES LIMITED

Kitchener Sudbury

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TABLE OF CONTENTS

1 EXECUTIVE SUMMARY 1
2 BACKGROUND 2
3 DRAINAGE HISTORY 4
4 INVESTIGATION 5
4.1 On-Site Meeting 5
4.2 Site Examination and Survey 6
4.3 Watershed Description 6
5 AUTHORITY FOR REPORT 6
6 DESIGN CONSIDERATIONS 6
6.1 Sufficient Outlet 6
6.2 Drain Capacity (Sizing) 7
6.3 Soil Conditions 7
7 MEETING(S) 7
7.1 Meeting with Steve Watson 7
7.2 Second Meeting 8
7.3 On-site Meeting with Mr. Brzecka 9
7.4 Letter to Mr. Brzeczka 9
7.5 Letter and Discussions with MTO 10
7.6 Third Meeting 10
7.7 NPCA Third Meeting 11
8 ENVIRONMENTAL CONSIDERATIONS 12
8.1 Agency Notification 12
8.2 Agency Responses 12
9 RECOMMENDED WORK 13
9.1 Culverts 13
9.2 Changes to the Drain After the Bylaw is Passed 14
10 CONSTRUCTION CONSIDERATIONS 14
10.1 Pre-Construction Approvals 15
10.2 Construction Scheduling 15
10.3 Minor Adjustments During Construction 15
10.4 Substantial Alterations to the Drain 15
10.5 Alignment of Drains 15
11 DRAWINGS AND SPECIFICATIONS 16
11.1 Drawings 16
11.2 Specifications 16
12 COST ESTIMATE 16
12.1 Allowances 16
12.2 Construction Cost Estimate 18
12.3 Engineering Cost Estimate 18
12.4 Estimate of Section 73 Costs 19
12.5 Harmonized Sales Tax 19
13 ASSESSMENTS 21
13.1 Calculation of Assessments 21
13.2 Benefit Assessments (Section 22 and 24) 21
13.3 Outlet Liability Assessments (Section 23) 22
13.4 Increased Cost (Special) Assessments (Section 26) 23
13.5 Assessment Schedules 23
14 GRANT 24
15 PRIVACY OF LANDS 25
16 MAINTENANCE 25
16.1 General 25
16.2 Updating Future Maintenance Schedules 25
16.3 Culvert Maintenance 26
17 BYLAW 26

SCHEDULE A – SCHEDULE OF ASSESSMENTS
SCHEDULE B – SCHEDULE OF ASSESSMENTS FOR MAINTENANCE
SCHEDULE C – SCHEDULE FOR ACTUAL COST BYLAW
APPENDIX A – CALCULATION OF ASSESSMENTS FOR SCHEDULE A
APPENDIX B – CALCULATION OF ASSESSMENTS FOR SCHEDULE B
SPECIFICATIONS

- Section 200 - General Conditions
- Section 300 - Special Provisions (See Drawing 10)
- Section 400 - Standard Specifications for Construction of Drains
- Section 410 – Standard Specifications for Open Drains

DRAWINGS 1 TO 7

Definitions:

"Act" means The Drainage Act RSO 1990
"CSP" means corrugated steel pipe
"Drain" means Lament Drain
"Grant" means grant paid under the Agricultural Drainage Infrastructure Program
"HDPE" means high-density polyethylene
"Municipality" means Town of Niagara-on-the-Lake
"NPCA" means Niagara Peninsula Conservation Authority
"OMAFRA" means the Ontario Ministry of Agriculture, Food and Rural Affairs
"MECP" means Ministry of Environment, Conservation and Parks
"DFO" means Fisheries and Oceans Canada
"Tribunal" or "Drainage Tribunal" means Agriculture, Food and Rural Affairs Appeal Tribunal

Tables:

Table 9.1-1 – Summary of Culverts 9
Table 12.1-1 - Section 29 Allowance Rates 17
Table 12.1-2 - Section 30 Allowance Rates 17
Table 12.1-3 - Summary of Allowances 18
Table 12.5-1 – Estimated Cost Summary 20
Table 13.2-1 - Benefit Assessments 22
Table 13.3-1 - Runoff Factors Table 22
Table 13.4-1 - Estimated Special Assessments 23

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April 9, 2020 File No. 18-218

LAMENT DRAIN

TOWN OF NIAGARA-ON-THE-LAKE

1 EXECUTIVE SUMMARY

This report is prepared in accordance with Section 4 of the Drainage Act RSO 1990 (the Act).

On May 7, 2018, the Municipality received a petition from Stanley Lament for improved drain outlet for his private drains in Pt Lot 141, Concession 6, Niagara Township. Pursuant to Section 8(1) of the Act, on July 9, 2018, K. Smart Associates Limited was appointed by By-law No. 5074-18, dated July 16, 2018 of Council to prepare a report on the petition received.

To address the petition received, this report recommends the following:

- Improvement of 295m of open drain

The estimated cost of this project is $152,360.

The watershed served is approximately 28.1 hectares (69.4 acres).

Assessment schedules are provided for construction and future maintenance of the drainage works.

- Schedule A shows the assessment of the total estimated cost
- Schedule B will be used for prorating future maintenance cost
- Schedule C will be used for levying the final cost of the Drain.
- Appendix A illustrates the calculation of the assessments outlined in Schedule A.
- Appendix B illustrates the calculation of the assessments outlined in Schedule B.

2 BACKGROUND

The Town had received numerous complaints about flooding and drainage issues from a property owner abutting the Lament property. As well, the property on the north side of York Road is subjected to erosion problems caused by water discharging through a culvert under York Road in the vicinity of the Lament property.

In an attempt to try to resolve the drainage issue, the Town held a "scoping meeting" on Tuesday, July 18, 2017. The meeting was attended by representatives from the Ministry of Transportation, the Regional Municipality of Niagara, the Niagara Peninsula Conservation Authority, an engineer from K. Smart Associates, two landowners, Stanley Lament and Steve Watson and Town staff. The only invited party who did not attend was Mr. Brzeczka, the owner of the property on the north side of York Road.

The intent of the meeting was to review the problems, discuss solutions and attempt to reach an agreement on how to resolve the problem. The preferred and most realistic solution was to have one or more of the affected parties petition to have the existing watercourse become a municipal drain so that it could be properly managed and maintained. None of the parties were willing to sign a petition at that time, so the problem was not resolved. The Town does not have any lands or roads in the area, so the Town has no authority to proceed with any type of remedial work to deal with the drainage and erosion problems.

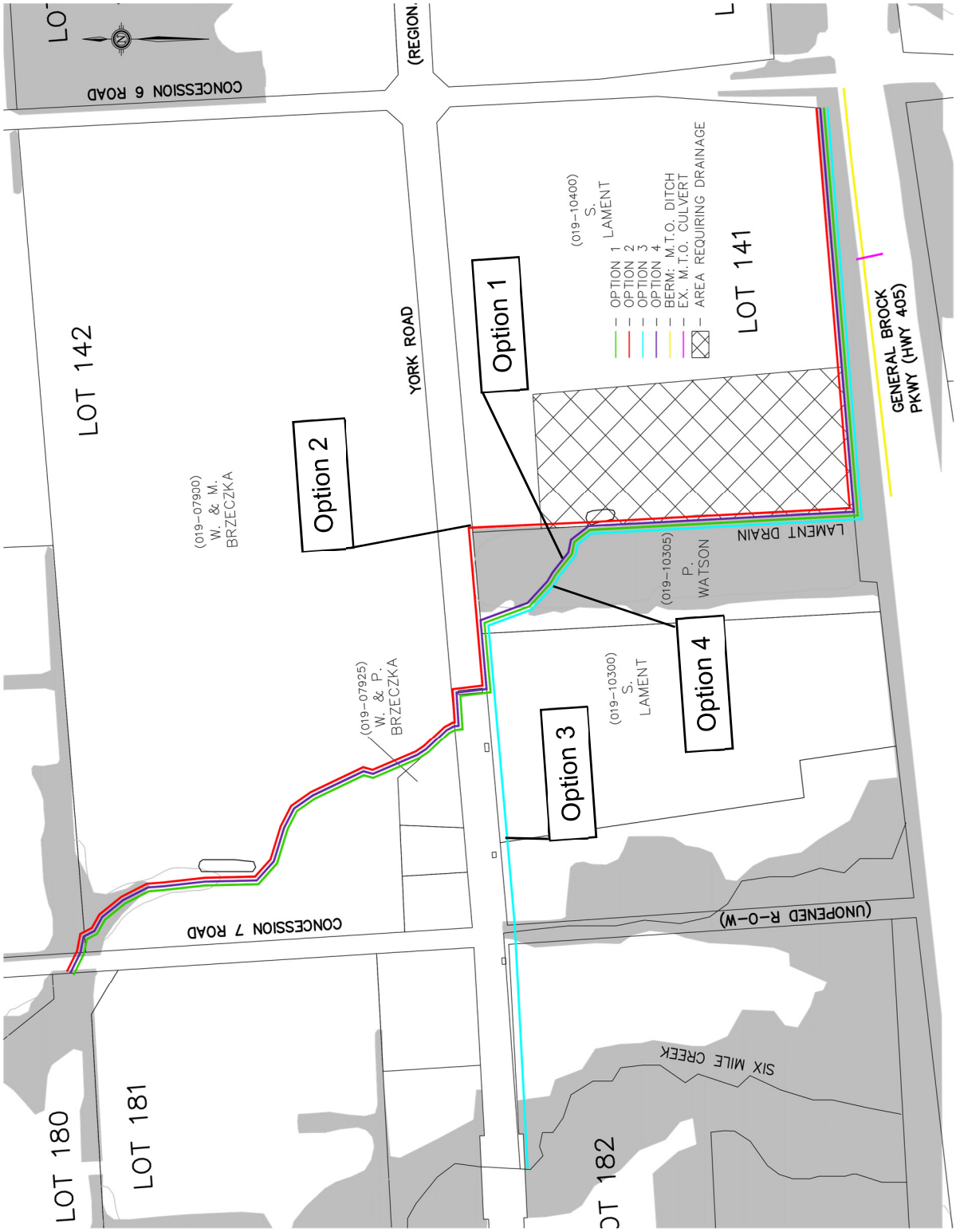
Proceeding with the drainage works will provide the necessary outlet and will greatly help to resolve the drainage and erosion issues. Once the watercourse becomes a municipal drain, the Town will be able to repair and maintain the watercourse as required at the expense of the contributing lands.

At the on-site meeting on August 13, 2018, discussions with landowners indicated that several options be investigated to provide a legal outlet for proposed and existing tiling on the petitioner's properties (Roll No. 019-10300 and 019-10400) located in Pt Lot 141, Concession 6, Township of Niagara.

At the second meeting on June 4, 2019, the following options were presented.

The first option would be to improve and incorporate the existing ditch downstream of York Road across Roll No. 019-07900 and 019-16000 and incorporate the existing culvert across Concession 7 Road and then across and upstream of York Road to the west side of Concession 6 Road. This option is an open ditch with an estimated total project cost of $224,550. See Figure 1 for the route on the following page.

The second option would be to improve and incorporate the existing ditch downstream of York Road and across Concession 7 Road as in the first option, incorporate the York Road culvert, improve and incorporate the existing ditch and culvert along the south side of the road to Roll No. 019-10305, then a pipe drain



along the south side of the road to Roll No. 019-10400, and then south along the property line to the existing ditch on Roll No. 019-10400 and then improve and incorporate the existing ditch to the west side of Concession 6 Road. This option would have a tile system from the east side of Roll No. 019-10300 along York Road, then south along the property line to the existing pond on Roll No. 019-10400. An

overflow swale would still be required through the existing bush on Roll No. 019-10305. An open ditch along the route of the pipe drain was also investigated but was felt to be a public safety concern. This option has an estimated total project cost of $300,765. See Figure 1 for the route.

The third option would be to improve and incorporate the existing road ditch along the south side of York Road, from a possible outlet into Six Mile Creek approximately 230m west of Concession 7 Road, east to Roll No. 019-10305, then improving and incorporating the existing ditch and culverts southeasterly to the west side of Concession 6 Road as in the first option. This option has an estimated cost of $259,890. See Figure 1 for the route.

The options were presented at the second meeting with costs and schedules, and also further letters were sent to, and discussions were had with the downstream owners (Roll No. 019-07900, 019-10300, 019-10305 and 019-10400) and the MTO. The landowners were informed that if they wanted option 2 or 3, the increased cost would be assessed to them.

A fourth option was suggested by a landowner for the engineer to investigate. This option was to tile through the bush, and the remaining work would be the same as option 1. This would involve the installation of a 600x600DICB, 158m of 300mm plastic tubing and establishing the existing swale as an overflow route. The estimated cost of this option is $230,960. See Figure 1 for the route.

3 DRAINAGE HISTORY

The proposed Drain is not in the watershed of nor does have any common watershed boundaries with any existing municipal drains.

There is an existing ditch/ravine downstream of Concession 7 Road, which outlets into Six Mile Creek. These is a 1200mm CSP existing culvert crossing Concession 7 Road. A ditch/ravine and several culverts/crossings currently exist along the proposed drain in Lot 142, Concession 6 (Niagara Twp.) between Concession 7 Road and York Road.

There is a 900mm CSP culvert across York Road and a roadside ditch with several laneway culverts along the south side of York Road. From York Road, a shallow ditch with several culvert/crossings runs southeasterly across Roll No. 019-10305 to the west side of Roll No. 019-10400, then south along that west limit to the HWY 405 right-of-way then east along that property limit to the west side of Concession 6 Road.

4 INVESTIGATION

4.1 On-Site Meeting

On August 13, 2018, an on-site meeting was held in accordance with S. 9(1) and 9(2) of the Act. Notice of the meeting was sent to the petitioner and landowners most affected by the drain and the affected agencies.

Attendees:

- Stanley Lament (Patitioner)and son (Roll No. 019-10300 and 019-10400)
- Steve Watson (Roll No. 019-10305)
- Brandon Enns and Rene Landry – Town of Niagara-on-the-Lake
- Neal Morris, P.Eng. – K. Smart Associates Limited

Those in attendance provided the following input:

Stanley Lament

- Wants an outlet for his pond
- Would like his pond longer to provide more storage for irrigation
- His property line runs along the edge of the bush on the Watson property
- The perimeter ditch along his property has existed for many years and was already in place when he acquired the property
- He has not excavated the perimeter ditch
- Some of the water comes from the MTO HWY 405 right-of-way which enters his property in two locations
- He removed the plum trees that were originally on the property and planted grapes
- Seven years ago he installed a tile down each vine row
- Most of his land is tiled to the north, to the roadside ditch along York Road
- Says that Steve Watson caused his own problems because the ditch on his property is not cleaned out

Steve Watson

- Wants the water from the Lament property to go to York Road
- Excavation of the perimeter ditch and land levelling done by Lament is now causing flooding on his property
- Lament disconnected the perimeter ditch from the pond and the size of the pond outlet pipe was increased, all of which caused an increase in water which is damaging his property and downstream properties

Mr. Brzeczka (Roll No. 019-079) (905-682-5862)

- Did not attend but called the engineer
- He has erosion problems from the water from upstream lands and that this drain does not involve him.

4.2 Site Examination and Survey

The route of the drain was examined after the on-site meeting and on several occasions during 2018 and 2019. A topographic (GPS) survey was completed in November and December 2018 along an existing open ditch, from the west side of Concession Road 7 southeasterly crossing York Road and upstream to the east side of Concession Road 6 and also along several option routes.

4.3 Watershed Description

The perimeter watershed of the Drain has been established based on a site investigation, topographic information and historical reports.

Land use in the watershed is predominately agricultural except for the road allowances and scattered bush areas.

5 AUTHORITY FOR REPORT

Section 4 of the Drainage Act provides for the construction of new drainage works for an area requiring drainage. As a result of discussion at the site meeting and on-site examination, the area requiring drainage was determined to be Pt Lot 141, Concession 6, Niagara Twp., the properties owned by the petitioner, to provide a tile outlet. The signature on the petition represents 84% of the area requiring drainage and 66% of the owners; thus, the petition is valid in accordance with Sections 4(1)(a) and 4(1)(b) of the Drainage Act.

6 DESIGN CONSIDERATIONS

6.1 Sufficient Outlet

Section 15 of the Act requires that the proposed work be continued downstream to a sufficient outlet. Section 1 of the Act defines sufficient outlet as “a point at which water can be discharged safely so that it will do no damage to lands or roads.” For this project, it was determined that the proposed work will cause damages to lands owned by Roll No. 019-07900 as there was existing erosion problems along the ditch. While the outlet is an adequate outlet for functional proposes, it was determined not to be a sufficient outlet, so an insufficient outlet allowance was given to the downstream owner, based on the cost of works to repair the existing ditch.

6.2 Drain Capacity (Sizing)

The open ditch is designed to provide adequate depth for tile drain outlets and will also convey the 2-year storm within the channel cross-section. It is customary for open municipal drains serving agricultural or rural lands to be sized for a 2-year storm.

The tile options were sized using the Drainage Guide for Ontario drainage coefficient of 45mm/ day. Tile sizes were based on open inlets surface water and high-value specialty crop subsurface drainage.

Laneway culverts are designed for the 5-year storm.

The York Road crossing will satisfy a 25-year storm.

A PC-SWMM model was created to model the flows from upstream and the MTO lands. It was found that for the existing conditions, a 2-year storm would spill into the existing system. For this reason and the requests from the owners of Roll Number 019-10305 and 019-07900, a berm will be incorporated along the HWY 405 ditches from Concession 6 Road. The berm, identified as Interval 3, is approximately 650m long and between 0.7m to 1.1m in height from the bottom of the MTO ditch to the top of the berm, with 3:1 side slopes and a 1.5m width top width. This berm would contain the 100 year storm.

6.3 Soil Conditions

The Region of Niagara soil mapping for this area indicates that the soils adjacent to this drain are primarily Beverly loamy phase along the proposed ditch and berm work.

The Beverly loam phase soils have loamy textures over lacustrine silty clay, have imperfect drainage, are smooth basin to level and are stone free.

Based on available information, no adverse subsurface conditions are expected on this project, and the use of conventional construction equipment is anticipated.

7 MEETING(S)

7.1 Meeting with Steve Watson

On October 15, 2018, an on-site meeting was held with Steve Watson (Roll No. 019-10305) at which time Mr. Watson stated that:

- There are flowering white dogwoods on his property
- There is currently a lawsuit with his neighbour (Lament)

- The neighbour (Lament) has recently dug the perimeter ditch such that it no longer flows into the Lament pond but instead goes around it
- The neighbour has increased the size of the outlet pipe from the pond
- The neighbour has increased the tiling to York Road
- He would prefer that the increased water not go through his property but go to the York Road ditch instead
- He would like that the two culverts, the one at his driveway entrance and the other in the bush, to be improved
- There should be minimal cleanout of the ditch on his property

7.2 Second Meeting

On June 4, 2019, a second meeting with landowners was held. Notice for the meeting was sent to all landowners in the watershed, the MTO, affected agencies and the Municipality. At the meeting, the results of the investigation to-date were presented along with a summary of the design alternatives and preliminary cost estimates and assessments.

Attendees:

Landowners Stan & Michelle Lament, Eric Galloway (Roll No. 019-14605), Mike Brzeczka (Roll No. 019-07900 and 019-07925), S.C. Watson (Roll No. 019-10305), Kyle Saulnier (MTO), and Neal Morris, P.Eng. (K. Smart Associates Ltd.)

The engineer explained the Drainage Act, the proposed work and the assessment schedules.

Stan Lament

- He preferred the berm be placed on HWY 405 land or the property line.
- Wanted to know if he could do the work on his own property. No.
- Wanted the MTO to clean out their own ditch.
- He preferred the water on Concession 6 Road to stay on the Town road
- Wanted another berm along the top end of the drain near Concession 6 Road and HWY 405.
- Did not want the proposed control structures on the perimeter ditch.
- Wanted the pond extended to the south, not to the north.
- Wanted the drain process to move forward.
- Thought that his assessment was high.

Mike Brzeczka

- Wants to know where the spoil will go. The engineer said haul away or level along the drain.
- Concerned about restrictions to the use of his land.

- Earlier, he had asked if he could enclose part of the ditch.

Steve Watson

- Commented many times that the only problem is that HWY 405 water enters this system.
- Does not want to pay the increased cost for the system to go around his property.
- Said that the perimeter ditch was dug reasonably by Stan Lament.
- Asked for a damage study.
- Asked for the tile plan for the Lament property. Was informed that the tile plan is shown on the watershed plan.
- Thinks that he should not have to pay anything since all the water is from the MTO.
- Was concerned that one landowner's name on a petition can cause all these project costs.
- Also concerned about the cost of the project

Kyle Saulnier

- Wants to know if their water is actually flowing into this system.
- Will report back to his team.

7.3 On-site Meeting with Mr. Brzecka

After the second meeting, the engineer attempted to set-up an on-site meeting with Mr. Brzecka on July 11, July 22, August 12, September 4 and September 11, 2019, all of which did not work for Mr. Brzecka.

7.4 Letter to Mr. Brzeczka

On November 5, 2019, a letter and drawings were sent to the landowner (Roll No. 019-07900), outlining two options for him to consider in regards to the existing ditch on his property that has erosion problems due to the water from the upstream lands. The letter stated that a sufficient outlet for the upstream water could not be made without the involvement of his property to achieve the requirements of the Drainage Act.

Option1 would be to make the ditch a municipal drain and would involve placing riprap on eroded banks and the cleanout out of 100m of ditch downstream of York Road and incorporating the ditch from York Road to Concession 7 Road. The estimated net assessment would be -$4,000, or in other words, $4,000 provided/paid to him. The net assessment is based on little new construction and allowances for ROW and damages.

Option 2 would be to provide him with an insufficient outlet allowance in accordance with Section 32 of the Drainage Act. The allowance would cover the costs, as described in Option 1. The allowance would allow the upstream lands to drain through his property. He would not be able to block the water, and no future work would be done on his property unless the flow is blocked or it becomes a municipal drain. The allowance would be registered on the title of the property, and if it became a municipal drain in the future, the allowance would be added to the assessment at that time. The estimated insufficient outlet allowance would be $4,000 provided to his property.

The landowner was to respond to this letter by November 22, 2019. If no response were submitted, then the insufficient outlet allowance would be provided.

On November 15, 2019, a letter was received from the landowner. The letter was dated November 9, 2019. The landowner opposed both options as he did not want us or any contractors doing any work on his property. He does, however, look forward to reviewing and commenting on the report once submitted.

7.5 Letter and Discussions with MTO

On December 23, 2019, a letter was sent to the MTO, which provided the results of models of the Highway 405 north ditch between Concession 6 Road and Concession 7 Road right-of-way, as requested by MTO staff. A PC-SWMM model was created for this ditch and detailed the results for a berm with an overflow.

The results show that the existing highway ditch has sufficient capacity to drain the road surface with the addition of the proposed berm along the property line without the use of the current overflow route across private lands.

After several discussions with MTO, it was agreed that the MTO would construct a berm an along the north side of the north ditch of HWY 405, from Concession 6 Road for approximately 650m to the west. The berm is going to be part of the drain to ensure the maintenance of the berm to protect the downstream landowners. The MTO has agreed to pay for all costs of the berm. The existing road ditch is to be regraded with MTO forces to the west to Six Mile Creek. The ditch is not part of the municipal drain.

7.6 Third Meeting

On February 21, 2020, a meeting was held at the Centennial Arena. Notice for the meeting was sent to all landowners in the watershed, the MTO, affected agencies and the Municipality. At the meeting, a summary of the final design cost estimates and assessments was presented.

Attendees:

Landowners Stan Lament (Roll No. 019-1040), William Brzeczka (Roll No. 019-07900 and 019-07925), Steve Watson (Roll No. 019-10305), Brett Ruck (Town of Niagara-on-the-Lake), Rene Landry (Town of Niagara-on-the-Lake),) Brandon Enns (Town of Niagara-on-the-Lake), Erwin Wiens(Councilor), and Neal Morris, P.Eng. (K. Smart Associates Ltd.)

Steve Watson

- Concerned that MTO and Concession 6 Road water should not go through his property.
- Stated that there is a sensitive forest on his property.
- The existing watercourse on his property is not a natural watercourse with fish habitat but does give him riparian water rights.
- Does not want his trees cleared.
- Claims that Stan Lament changed the perimeter ditch, and he wants it filled in.
- Said that he did block the ditch from the Lament property at one time.
- Asked what the size of the Area Requiring Drainage is. The Engineer replied that it is 5.3 ha.
- Asked if a tile would be cheaper. The Engineer replied that it would not be cheaper.
- Is concerned that the Town staff is prejudiced against him.

Stan Lament

- Stated that he has no problem with MTO water on his property.
- Wants to change the pond outlet to match the existing ditch.

William Brzeczka

- Thinks that he did not have enough time to make a choice.
- Feels that there was a lack of communication.

Rene Landry

- Reminded attendees that Stan Lament, as the petitioner, will have the right to appeal to the Drainage Tribunal if Council does not adopt the Engineer's Report.
- If the petitioner withdraws his name from the petition, he will be responsible for all engineering costs associated with the petition.

7.7 NPCA Third Meeting

Due to concerns from the landowner and the NPCA of the proposed drain on the existing forest, an on-site meeting was held at 835 York Road on March 9th, 2020. The meeting was attended by Neal Morris (Engineer), Jason Culp(NPCA), Dan Drennan (NPCA), Brett Ruck (Drainage Superintendent for NOTL) and Brandon

Enns (Town of NOTL). The landowner, Steve Watson, was notified of the meeting but did not attend.

The proposed drain route was walked. Neal Morris also noted the area where a rock check dam and a culvert will be installed. The rock check dam is meant to reduce velocity and dissipate energy. The culvert will allow for a crossing to link the walking trail on either side of the watercourse. Dan Drennan commented that the area along the watercourse as it flows through 835 York Road had been impacted in the past. It was also noted that there is a Walnut tree close to the proposed culvert that should be protected.

The general area of the Eastern Flowering Dogwood was pointed out by Dan Drennan. He explained that the working buffer around that species is 25 metres, and thus the location would be safe with where the drainage work would be completed.

Jason, Dan, and Neal made a note of the species composition of the trees in the area where drainage works would occur. Dan explained that most of the trees in that area were dead Ash trees and that the canopy would be minimally affected by the drainage works.

Brett Ruck reassured that larger trees would not be removed due to the drainage work. He explained that provisions would be made to work around those trees.

At the conclusion of the meeting, the NPCA staff generally indicated that if the work is maintained within the proposed working limits and the rest of the bush is left intact, there would be no harm anticipated to the health or function of the forest.

8 ENVIRONMENTAL CONSIDERATIONS

8.1 Agency Notification

Contact was made with the Niagara Peninsula Conservation Authority (NPCA), the MECP and DFO.

8.2 Agency Responses

8.2.1 NPCA

The NPCA did not request an environmental appraisal under Section 6 of the Act. The Conservation Authority was sent notice of the public meetings. There were several sit down meetings with the NPCA to discuss the proposed work for this drain, on February 22, 2019, January 1, 2019, and October 29, 2019. There was no concern put forward with the proposed drainage works at those meetings. An application for Development, Interference with Wetlands and Alteration to Shorelines and Watercourses permit, along with a project description and drawing

package, were provided to the NPCA on December 20, 2019. The site was walked with NPCA staff on March 9, 2020.

8.2.2 MECP

A screening request for Species at Risk was submitted to MECP on June 14, 2019. There has been no response from the Ministry to date. There is a known Eastern Flowering Dogwood near the proposed drain. The works are to occur more than 25m from the Eastern Flowering Dogwood and, therefore, outside the regulated area.

8.2.3 DFO

An existing drain downstream and the proposed work have been classified as an F Drain.

A Request for Review was submitted to the DFO on June 26, 2019, along with a project description, drawings and photo package. Also, there was a site visit on September 20, 2019, and email correspondence between Neal Morris, P.Eng. and the DFO on September 26-27, 2019.

The response from the DFO in an email/letter dated October 3, 2019, indicated that to avoid and mitigate the potential for prohibited effects to fish and fish habitat that the following measures be implemented: a permanent rock sediment trap be installed near the downstream end of the proposed drain and that the work is conducted in dry conditions.

Provided that these measures are incorporated into the project, it is the DFO's view that the project will not require authorization under the Fisheries Act or the Species at Risk Act.

The DFO should be notified at least 10 days before starting construction on this project.

9 RECOMMENDED WORK

A description of the drain for construction and future maintenance can be found in the Special Provisions and Drawings.

9.1 Culverts

Table 9.1-1 – Summary of Culverts identifies culverts that are part of the Drain and specifies minimum capacity for future culverts that may be installed by landowners

at their expense, subject to the approval of the Municipality as required by the "Maintenance" section of this report.

Table 9.1-1 – Summary of Culverts

Roll Number or Road	Station	Existing	Proposed	Responsibility
York Road (Region of Niagara)	0+000 to 0+025	25m of 900mm dia. CSP	Retain existing 25m of 900mm dia. CSP	Road
019-10300 / 019-10305	0+071 to 0+092	21m of 600mm CSP	Lower and retain existing 21m of 600mm CSP	Drain
019-10305	0+093 to 0+102	9m of 450mm plastic pipe	Lower and retain existing 9m of 450mm plastic pipe	Owner
019-10305	0+215 to 0+224	6m of 400mm CSP	9m of 450mm plastic pipe	Owner

Based on the responsibility noted above, culverts constructed under this report are assessed as follows:

- Drain – 50% to the listed roll number and 50% to the upstream watershed
- Road – special assessment to the road authority per Section 26
- Owner – 100% to the registered roll number

Refer to the "Maintenance" section of this report for instructions regarding assessing future maintenance costs.

9.2 Changes to the Drain After the Bylaw is Passed

If a substantial addition, deletion, or change is made to the drain proposed in this report, a revised report can be prepared and processed through the Act, or an application can be made under the Act to the Drainage Tribunal to recognize the substantial addition, deletion or change. The appeal to the Tribunal must occur before final costs are levied.

10 CONSTRUCTION CONSIDERATIONS

10.1 Pre-Construction Approvals

Before starting work, the Contractor shall ensure all public utilities are located and shall contact all landowners along the proposed drain route to determine the location of any private utilities.

A permit from NPCA has been submitted for the proposed work.

An Encroachment Permit application has been submitted to the MTO for the berm work in the Highway 405 right-of-way.

Along the north side of York Road, there is an existing underground Bell line, and along the south side of the road, there may be an underground gas line and a watermain.

10.2 Construction Scheduling

Construction cannot commence until 10 days after a bylaw to adopt this report is given third reading in accordance with the Act.

The timing windows identified by the DFO require that work is to be done in dry conditions and that DFO should be notified at least 10 days before starting the construction of this project.

10.3 Minor Adjustments During Construction

Minor changes to the drain may be made during construction if the changes are approved by the Engineer and the Municipality in accordance with the Specifications in this report. Such changes must occur before final costs are levied.

Additional work desired by the landowner(s), which is not part of the drainage works, may be arranged with the Contractor provided the cost of the work is paid by the landowner(s), and the additional work is reviewed by the engineer in advance. Such additional work is not part of the drainage works for future maintenance.

10.4 Substantial Alterations to the Drain

Any alterations that would affect the function of the drain, which are requested by landowners, agencies or other authorities after the bylaw is passed, cannot be undertaken unless the report is amended.

10.5 Alignment of Drains

All drains shall be constructed and maintained generally to the alignment, as noted on the plans and specified by the Special Provisions. In the absence of survey bars, existing fences and similar boundary features represent property lines.

Should landowners desire a more precise location for the drains in relation to their property line or if there is a dispute about the location of any property line, it is recommended that landowners obtain a legal survey at their own cost prior to construction and maintenance.

11 DRAWINGS AND SPECIFICATIONS

11.1 Drawings

The location of the drain, watershed boundary and the affected properties are shown on Drawing No. 1 included with this report. The numbers adjacent to the drain are station numbers, which indicate in metres the distance along the drain from the outlet.

The profiles for the Drain is on Drawing 2. The profiles show the depth and grade for proposed work and future maintenance.

Drawings No. 3 to 6 contain the details and cross-sections. Drawing 7 contains the Special Provisions.

11.2 Specifications

This report incorporates the General Conditions, Standard Specifications and Special Provisions listed in the Table of Contents.

12 COST ESTIMATE

The estimated cost of this project includes allowances to owners, the construction cost, the engineering cost and other costs associated with the project.

12.1 Allowances

Sections 29 to 33 of the Drainage Act provides for allowances (compensation) to owners affected by proposed drain construction. On this drain, there are allowances for Sections 29, 30, 31 and 32.

12.1.1 Section 29 – Right of Way

Section 29 provides for payment of an allowance to landowners for the right-of-way required for construction and maintenance of the new drain. This allowance compensates the owners for land to accommodate the drain, access routes to the drain and for a corridor along the drain for construction and maintenance purposes. A Right of Way, corridor 6 metres wide, measured from the top of the bank, along

both sides of the drain, exists for maintenance. Current municipal assessment rolls were reviewed to establish land values for computing right of way allowances. For this project, Section 29 allowances are based on the following rates:

Table 12.1-1 - Section 29 Allowance Rates

Land Use	Area Land Value
Cultivated Lands	$ 4.88/m²
Bush Lands	$ 3.66/m²

There is a minimum Section 29 allowance of $100.

12.1.2 Section 30 - Damages

Section 30 provides for payment of an allowance to landowners along the drain for damages caused by the construction of the drain. Where separate access routes to the working area are specified in this report, Section 30 allowances also account for access route damage. In agricultural areas, crop damages are computed based on published crop values and declining productivity loss in the years following construction. For this project, Section 30 allowances are based on the following rates:

Table 12.1-2 - Section 30 Allowance Rates

Land Use	Area Land Value
Cultivated Lands	$ 0.3850/m²
Bush Lands	$ 0.1925/m²

There is a minimum Section 30 allowance of $100.

12.1.3 Section 32 – Insufficient Outlet

Section 32 provides for payment of an allowance to owners affected when a drain is not constructed to a sufficient outlet. The proposed drain is not constructed to sufficient outlet, so an allowance is required under Section 32.

Insufficient outlet allowance can be given if the costs of constructing the drainage works exceed the amount of injury likely to be caused downstream of the drainage works. An insufficient outlet can only be given when there is an adequate outlet, an outlet that has no potential of injury due to poor drainage on the area requiring drainage.

The proposed work will cause damages to lands downstream of York Road owned by Roll No. 019-07900. This landowner will receive an insufficient outlet allowance of $4,500, which is based on the cost of works to repair the existing ditch. In this case, the injury to the area requiring drainage is low because the outlet is adequate as the existing York Road ditch is an adequate outlet.

An insufficient outlet was investigated for Roll Number 019-10305, but in the engineer's opinion, there is not an adequate outlet for the petitioner's property. An adequate outlet for the petitioner's land would be a ditch through the bush. So an insufficient outlet could not be done as there is not an adequate outlet for the petitioner.

The table below summarizes the dimensions and amounts of the allowances to be provided under this report.

Table 12.1-3 - Summary of Allowances

Roll Number (2627-020-)	R.O.W. Width (m)	(Sec.29) ($)	Damages Width (m)	(Sec.30) ($)	Insufficient Outlet (Sec.32) ($)	Total ($)
019-07900	--	--	--	--	4,500	4,500
019-10300	7.5	2,100	10	300	--	2,400
019-10305	10	8,400	15	700	--	9,100
019-10400	6	100	15	100	--	200
Highway 405 (MTO)						
TOTAL ALLOWANCES:		**10,600**		**1,100**	**4,500**	**16,200**

In accordance with Section 62(3) of the Act, the allowances shown may be deducted from the final assessment levied. Payment to the owner would only be made when the allowance is greater than the final assessment. The allowances are a fixed amount and are not adjusted at the conclusion of construction.

12.2 Construction Cost Estimate

The estimated cost for Labour, Equipment and Materials to construct the proposed drain is outlined in detail in Table 12.6-1 Estimated Costs Summary. The construction cost estimate is based on recent costs for comparable work. A contingency amount is included to cover additional work that may be required due to field conditions or minor alterations to the project.

The contract for the drain will be awarded by public tender. If the contract price is more than 33% over the engineer's estimate, Section 59 of the Act requires a Council meeting with the petitioner to determine if the project should proceed.

12.3 Engineering Cost Estimate

Engineering costs include report preparation and attending the Council meeting to consider the report and the Court of Revision

Construction Phase Services may include: preparing tender documents and tender call, review of tenders, attending pre-construction meeting, periodic construction inspection, payments, final inspection, post-construction follow-up, final cost analysis and preparation of the grant application.

The cost for report preparation is usually not altered unless the report is referred back, or the report is appealed to the Drainage Tribunal, which would result in additional costs. The amount shown for meetings is an estimate. The final cost will be based on the actual time required for meetings. The estimate shown for construction phase services is based on experience and assumes good construction conditions and a Contractor who completes the construction in an efficient manner. The final cost for the construction phase will vary as per the actual time spent during and following drain construction. Engineering costs are summarized in Table 12.6-1 Estimated Costs Summary.

12.4 Estimate of Section 73 Costs

Section 73(2) and 73(3) of the Act direct that the cost of services provided by municipal staff and the Council to carry out the Act process shall not form part of the final cost of the drain. However, Section 73(1) outlines that the following costs incurred by the Municipality can be included in the cost of the drain: "*cost of any application, reference or appeal and the cost of temporary financing."*

The estimate of Section 73 costs is included to cover the above-referenced items from Section 73(1) and primarily provides for interest charges on financing the project until it is completed. This cost estimate may not be adequate to cover legal or engineering costs incurred by or assessed to the Municipality should the project be appealed beyond the Court of Revision though such costs will form part of the final drain cost.

Grant policy indicates that municipal cost for photo-copying and mailing required to carry out the required procedures under the Act can do not affect the final drain cost. This cost estimate includes an allowance for these costs.

Section 73 costs are summarized in Table 12.6-1 Estimated Cost Summary.

12.5 Harmonized Sales Tax

The Harmonized Sales Tax (HST) will apply to most costs on this project. The Municipality is eligible for a partial refund on HST paid, the net 1.76% HST is included in the cost estimates in this report.

Estimated Cost Summary

Table 12.5-1 – Estimated Cost Summary

DESCRIPTION						TOTAL COST
ALLOWANCES						**$16,200**
CONSTRUCTION COST ESTIMATE						
Item	Stations	Description	Unit	Quantity	Unit Price	Cost
1	-0+035 to 0+000	Ditch excavation (1.0m bottom, 2:1 side slopes). Haul spoil away.	m	35	50.00	$ 1,800
2	-0+035 to 0+000	Seeding new banks (3m sides)	m²	105	1.00	100
3	0+000 to 0+025	No work required. Existing 25m of 900mm CSP road culvert to remain and to be incorporated.		25	0.00	0
4	0+000 & 0+025	Place 5m² of riprap	m²	10	90.00	900
5	0+025 to 0+071	Ditch excavation (1.0m bottom, 2:1 side slopes). Haul spoil away.	m	46	20.00	900
6	0+025 to 0+071	Seeding new banks (3m sides)	m²	138	1.00	200
7	0+081	Install new 600x600mm concrete catchbasin with traffic grate, with 5m lead and 5m² of rip-rap	L.S.	1	4,100.00	4,100
8	0+071 to 0+092	Remove existing 600mm CSP and install 21m new 600mm HDPE culvert. Place 5m² riprap at each end (10m² riprap total). Restore laneways.	L.S.	1	8,000.00	8,000
9	0+093 to 0+102	Remove & reinstall (lower) existing 9m of 450mm plastic pipe	L.S.	1	2,000.00	2,000
10	0+102 to 0+260	Power brushing in ditch and 10m width on south side (15m total width)	m²	2,370	2.00	4,900
11		Place 5m² rip-rap rock check dam	m²	5	90.00	500
11	0+092 to 0+093 & 0+102 to 0+260	Ditch excavation (0.5m bottom, 2:1 side slopes). Level spoil on south side.	m	150	30.00	4,600
12	0+215 to 0+224	Remove and dispose of existing 400mm CSP. Replace with 9m of 450mm plastic pipe. Place 5m² riprap at each end (10m² riprap total). Restore laneway	L.S.	1	4,000.00	4,000
14	0+250	Place 5m² of riprap on east bank	m²	5	90.00	500
15	0+102 to 0+260	Seeding banks (3m sides)	m²	474	1.00	500
16	0+260±	Construct overflow weir including 30m long berm, 10m² riprap, water control structure and 6m of 250mm HDPE pipe	L.S.	1	8,000.00	8,000
18	-0+487 to 0+164 HWY 405	Construct 652m long earth berm along north side of north ditch of HWY 405	m	652	25.00	16,300
		Sub Total				$57,300

		DESCRIPTION					TOTAL COST
Contingencies							
19		Lump sum contingency allowance	L.S.	1	5,700	5,700	
		Net HST (1.76%)				1,110	
		TOTAL CONSTRUCTION COST ESTIMATE:					**$64,110**
ENGINEERING COST ESTIMATE							
		Report Preparation				62,500	
		Consideration of Report Meeting				1,200	
		Court of Revision				1,200	
		Construction Phase Services				2,200	
		Net HST (1.76%)				1,185	
		TOTAL ENGINEERING COST ESTIMATE:					**$68,285**
SECTION 73 COSTS ESTIMATE							
		Printing ($100 KSAL plus $250 Town costs for printing of reports)				350	
		Printing of tender documents				200	
		Agencies Permit Fee				500	
		Interest Estimate				1,150	
		Unforeseen costs				1,500	
		Net HST (1.76%)				65	
		TOTAL SECTION 73 COSTS ESTIMATE:					**$ 3,765**
		TOTAL ESTIMATED COST:					**$152,360**

13 ASSESSMENTS

The Drainage Act requires that the total estimated cost be assessed to the affected lands and roads under the categories of Benefit (Section 22), Outlet Liability (Section 23), Injuring Liability (Section 23), Special Benefit (Section 24) and Increased Cost (Section 26). On this project assessment for Benefit, Special Benefit and Outlet Liability are involved.

13.1 Calculation of Assessments

The method of calculating the assessments for the Drain is illustrated in Appendix A, which has been included in this report. The first step in the assessment calculation is to determine the benefit assessment to the affected lands and roads, then special benefits and special assessments to roads and utilities are determined, where applicable. After deducting the total benefit, special benefit and special assessments from the cost the balance of the cost is then assessed as outlet liability on a per hectare basis to all lands and roads in the watershed.

13.2 Benefit Assessments (Section 22 and 24)

Section 22 benefits were determined based on the estimated value the drain provides to the property and are not proportional to the watershed area.

Section 24 special benefit is assessed to lands where additional work or features are requested that do not affect the functionality of the drain. Special benefit examples include hauling spoil offsite, aesthetic features and installing lateral drains. Non-grantable benefits relate to work that is not eligible for Grant according to the current OMAFRA policy. Non-proratable benefits are not used to determine the actual cost factor for the final cost levy. Some examples would be lateral drains, culverts or hauling of spoil. Columns with non-grantable and non-proratable are used to complete the final assessment. Table 13.2-1 - Benefit Assessments provides a summary of the benefit assessments. The Special Benefit to Roll No. 019-10300 in Interval 1 is for 25% of the culvert cost from Sta. 0+071 to 0+092. The Special Benefit to Roll No. 019-10305 in Interval 1 is for 25% of the culvert cost from Sta. 0+071 to 0+092. The Special Benefit to Roll No. 019-10305 in Interval 2 is for 50% of the culvert cost from Sta. 0+093 to 0+102 plus 50% of the culvert costs from Sta. 0+125 to 0+224.

Table 13.2-1 - Benefit Assessments

Roll Number (Owner)	Location	Section 22	Section 24	Total Benefit	Non-grantable	Non-proratable
York Road	Interval 1	14,400		14,400		
019-10300	Interval 1	15,100	2,000	17,100		2,000
019-10305	Interval 1		2,000	2,000	2,000	2,000
York Road	Interval 2	100		100		
019-10305	Interval 2	9,800	8,000	17,800	4,000	8,000
019-10400	Interval 2	19,100	8,000	27,100		8,000
TOTALS:		58,500	12,000	78,500	6,000	24,000

13.3 Outlet Liability Assessments (Section 23)

Section 23(3) of the Drainage Act states that outlet liability assessment is to be based on the volume and rate of flow of the water artificially caused to flow. To satisfy this requirement, the lands and roads in the watershed are assessed on a per hectare basis, with adjustments made to recognize the different amount of runoff generated by different land uses. The basis for the adjustments is 1 hectare of cleared agricultural land contributing both surface and subsurface water to the drain. Land uses with a different runoff rate are adjusted by the factors given in Table 13.3-1 - Runoff Factors Table.

Table 13.3-1 - Runoff Factors Table

Land Use	Runoff factor
Agricultural	1.0
Forest/Tiled Elsewhere	0.5
Built-up	1.5
Gravel Road	1.5
Paved Road	2.0

13.4 Increased Cost (Special) Assessments (Section 26)

Section 26 of the Drainage Act directs that any increased cost due to a public utility (utility) or road authority (road) shall be paid for by that utility or road. This assessment is known as a Special Assessment.

The estimated special assessments are presented in **Error! Reference source not found.**. The equivalent drain cost is based on the length of Drain affected by the road allowance or utility right of way and the normal cost of drain construction. The increased cost caused by the road or utility is determined by subtracting the equivalent drain cost from the construction and engineering costs.

Table 13.4-1 - Estimated Special Assessments

Location	Interval 3
Road/Railroad/Utility	HWY 405
Authority/Owner	MTO
Construction Cost	$17,900
+ Engineering Cost	$25,400
+ Section 73 Costs	0
- Equivalent Drain Cost	0
+ Net HST	$765
= Estimated Special Assess.	$44,065

The actual special assessments will be determined after construction by inserting the actual construction and engineering costs in the Special Assessments Table. Any additional costs identified by the engineer will be added to the Special Assessment where appropriate.

The road authority or utility may elect to construct the Drain within their right of way with their forces. In this case, the special assessment is calculated by inserting zero for the construction cost.

If there are increased costs to the drain project due to a utility or road not listed in the table above, a Special Assessment will be based on the actual costs incurred.

Special Assessments do not apply to future maintenance assessments.

13.5 Assessment Schedules

13.5.1 Schedule A- Schedule of Assessments

The estimated cost for the drainage works in this report is distributed among lands, roads and utilities, as shown in Schedule A, the Schedule of Assessments. In Schedule A each parcel of land assessed has been identified by the municipal assessment roll number at the time of the preparation of this report. The size of each parcel was established using the assessment roll information. For convenience only, each parcel is also identified by the owner name(s) from the last revised assessment roll.

13.5.2 Schedule B -Schedule of Assessments for Maintenance

In accordance with Section 74 of the Act, the drain shall be maintained by the Municipality, and the cost of maintenance shall be assessed to lands and roads upstream of the maintenance location, prorata with the amounts in Schedule B. The amounts in Schedule B are derived from the cost distribution shown in Appendix B, and will not be levied with the final cost of the drainage works.

Roll numbers are per the Municipality's last revised assessment roll, names included for convenience. Amounts are not payable at this time, and they determine the share of future maintenance costs. The Municipality will confirm eligibility for the grant at the time the maintenance cost is levied.

Schedule B is divided into columns to reflect the different drain intervals where maintenance work may be undertaken. These column intervals assist in identifying upstream lands and roads to be assessed for future maintenance. The percentages shown in Schedule B determine the share of future maintenance to be levied to property or road. For example, a $1,000 repair will result in a $50 assessment to a property with a 5% maintenance assessment.

A minimum assessment of 0.01% is to be applied to all future small lots in the watershed per interval.

13.5.3 Schedule C – Schedule for Actual Cost Bylaw

After the construction of the drain is certified complete by the engineer, the Municipality will determine the actual cost of the drain. Actual assessments will be determined by prorating the actual cost of the drain using Schedule C. Schedule C illustrates the estimated net assessments after deducting allowances and grants from the total assessments shown in Schedule A. Eligibility for the grant will be confirmed by the Municipality at the time the actual cost is levied. Actual assessments in Schedule C will be levied to the owner of the identified parcel at the time the Actual Cost Bylaw is passed. Roll numbers are per the Municipality's last revised assessment roll, and the names are included for convenience.

14 GRANT

In accordance with the provisions of Section 85 of the Act, a grant not exceeding 1/3 (33-1/3%) may be available on the assessments against lands used for agricultural purposes. The current OMAFRA grant policy defines agricultural lands as privately owned parcels of land which have the Farm Property Class Tax Rate. Based on Municipal assessment roll information, parcels that have the Farm Property Tax Class are identified with an 'F' in the first column of the assessment schedules.

Section 88 of the Act provides for the Municipality to apply for this grant after the construction of the drain is certified complete by the engineer. The Municipality must confirm the Farm Property Tax Class on the assessed parcels at the time the

grant application is completed and submitted to OMAFRA. OMAFRA has the authority to determine grant eligibility regardless of the designation herein.

If any portion of the drainage works is not eligible for the grant, those ineligible costs have been separately identified in this report.

15 PRIVACY OF LANDS

Although a municipal drain is situated on the property of various landowners, one landowner may not enter another landowner's property through the drain. Persons authorized to enter private lands to carry out duties authorized under the Act include Engineers (or their assistants), Contractors (or their assistants) and the appointed Drainage Superintendents (or their assistants).

16 MAINTENANCE

16.1 General

Section 74 of the Act requires the Drain, as outlined in this report, to be maintained by the Municipality, and the cost of maintenance to be assessed to the upstream lands and roads prorata with the assessments in Schedule B.

All parties affected by the Drain, are encouraged to periodically inspect the drain and report any visible or suspected problems to the Municipality.

A right-of-way along the drain and access routes to the drain exist for the Municipality to maintain the drain. The right-of-way for the drain, as described in the Allowances section of this report, shall remain free of obstructions. The cost of removing obstructions is the responsibility of the owner.

Any landowner making a new connection to the Drain shall notify the Drainage Superintendent before making the connection. If the Drainage Superintendent is not notified, the cost to remedy new connections that obstruct or otherwise damage the drain will be the responsibility of the owner.

The discharge of anything but clean, unpolluted water into a drain is regulated by other provincial legislation. Any non-compliance will be reported to the appropriate environmental agency. The costs incurred by the Town of Niagara-on-the-Lake associated with containing and cleaning up spills or other pollution of the Drain will be charged to person(s) responsible for the pollution.

It is recommended that each abutting owner work no closer than 1.2m (4') to any ditch bank. Such area does not have to be grassed, but it should not be cultivated.

16.2 Updating Future Maintenance Schedules

To ensure future maintenance assessments are equitable, the assessments provided in this report should be reapportioned under Section 65 when severances

or amalgamations occur, when new lands are connected to the Drain or when a land-use change occurs that can be accommodated by the existing Drain. If a future land-use change causes the drain capacity to be exceeded, a report under Section 4 or 78 may be required to provide increased capacity.

16.3 Culvert Maintenance

- The costs of cleaning through all culverts shall be assessed as drain maintenance to upstream lands and roads.
- The cost for future structural repair, extension or replacement of road culverts will be assessed fully to the road authority.
- When the responsibility for an access culvert is designated in Table 9.1-1 – Summary of Culverts as "Drain," the cost for repair or replacement shall be assessed 50% to the abutting landowner and the remainder to the upstream watershed. The cost of additional culvert length is assessed to the owner.
- When the responsibility for an access culvert is designated as "Owner," the cost for installation, repair, replacement and removal are the responsibility of the roll number listed in Table 9.1-1 – Summary of Culverts
- Culverts installed to service public utilities, if any, shall be assessed 50% to the utility and 50% to the affected land or road.
- Prior approval of the Municipality is required before a landowner installs a culvert not constructed under this report and culvert shall be installed per sizing and design grade specified in this report. If culverts smaller than the minimum recommended size are installed, such culverts will be deemed an obstruction to the drain and removed at the landowner's expense.

17 BYLAW

This report, including the drawings and specifications, assessment schedules and appendices, when adopted by bylaw in accordance with the Act, provides the basis for construction and maintenance of the Drain.

All of which is respectfully submitted,

K. SMART ASSOCIATES LTD.

Neal Morris

REGISTERED PROFESSIONAL ENGINEER
N. W. MORRIS
100109137
April 9/2020
PROVINCE OF ONTARIO

N. Morris, P. Eng.

mw

SCHEDULE A - SCHEDULE OF ASSESSMENTS
LAMENT DRAIN
Town of Niagara-on-the-Lake

Con	Lot	Roll No.	Owner	Total Ha Affected	Benefit ($)	Outlet ($)	Total ($)
		(26-27-020-)	***(Niagara Twp)***				
6	Pt 142	019-07900	W. & M. Brzeczka	0.00	-	-	-
6	Pt 141	019-10300	S. Lament	4.60	17,100	2,370	19,470
6	Pt 141	019-10305	P. Watson	4.10	19,800	5,019	24,819
6	Pt 141	019-10400	S. Lament	17.00	27,100	19,048	46,148
Sub-total (Lands):				25.70	64,000	26,437	90,437
Concession 6 Rd.			Town of Niagara-On-The-Lake	0.40	-	738	738
General Brock Parkway (Hwy 405)			M.T.O.	0.50	44,065	1,074	45,139
York Road (Reg. Road 81)			Region of Niagara	1.50	14,500	1,546	16,046
Sub-Total (Roads):				2.40	58,565	3,358	61,923
TOTAL LAMENT DRAIN:				**28.10**	**122,565**	**29,795**	**152,360**

Note:

1. Section 21 of the Drainage Act, RSO 1990 requires that assessments be shown opposite each parcel of land and road affected. The affected parcels of land have been identified using the roll number from the last revised assessment roll for the Township. For convenience only, the owners' names as shown by the last revised assessment roll, has also been included.

SCHEDULE B - SCHEDULE OF ASSESSMENTS
FOR FUTURE MAINTENANCE
LAMENT DRAIN
Town of Niagara-on-the-Lake

Conc.	Lot	Roll No.	Owner	Interval 1 0+350 to 0+092 Assess. ($)	%	Interval 2 0+092 to 0+255 Assess. ($)	%	Interval 3 Berms Assess. ($)	%
		(26-27-020-)	***(Niagara Twp)***						
6	Pt 142	019-07900	W. & M. Brzeczka	-	-	-	-	-	-
6	Pt 141	019-10300	S. Lament	445	22.25	-	-	-	-
6	Pt 141	019-10305	P. Watson	404	20.20	1,247	49.88	-	-
6	Pt 141	019-10400	S. Lament	720	36.00	1,177	47.08	-	-
Sub-total (Lands):				**1,569**	**78.45**	**2,424**	**96.96**	**-**	**-**
Concession 6 Rd.			Town of Niagara-On-The-Lake	33	1.65	22	0.88	-	-
General Brock Parkway (Hwy 405)			M.T.O.	21	1.05	54	2.16	6,500	100.00
York Road (Reg. Road 81)			Region of Niagara	377	18.85	-	-	-	-
Sub-Total (Roads):				**431**	**21.55**	**76**	**3.04**	**6,500**	**100.00**
TOTAL LAMENT DRAIN:				**2,000**	**100.00**	**2,500**	**100.00**	**6,500**	**100.00**

Notes:

1. Section 21 of the Drainage Act, RSO 1990 requires that assessments be shown opposite each parcel of land and road affected.
   The affected parcels of land have been identified using the roll number from the last revised assessment roll for the Township.
   For convenience only, the owners' names as shown by the last revised assessment roll, has also been included.
2. The dollar amounts shown are not amounts to be paid at this time. These amounts are only to be used to create the percentages or portion that each property (parcel) and road will pay for any future maintenance repair or maintenance costs.
3. Grant eligibility to be determined at the time of maintenance cost levy.

SCHEDULE C - SCHEDULE FOR ACTUAL COST BYLAW
LAMENT DRAIN
Town of Niagara-on-the-Lake

	Con	Lot	Roll No.	Owner	Gross Total ($)	1/3 Grant ($)	Allowance ($)	NET ($)
			(26-27-020-)	***(Niagara Twp)***				
F	6	Pt 142	019-07900	W. & M. Brzeczka	-	-	4,500	(4,500)
F	6	Pt 141	019-10300	S. Lament	19,470	6,490	2,400	10,580
	6	Pt 141	019-10305	P. Watson	24,819	-	9,100	15,719
F	6	Pt 141	019-10400	S. Lament	46,148	15,383	200	30,565
Sub-total (Lands):					**90,437**	**21,873**	**16,200**	**52,364**
			Concession 6 Rd.	Town of Niagara-On-The-Lake	738	-	-	738
			General Brock Parkway (Hwy 405)	M.T.O.	45,139	-	-	45,139
			York Road (Reg. Road 81)	Region of Niagara	16,046	-	-	16,046
Sub-Total (Roads):					**61,923**	**-**	**-**	**61,923**
TOTAL LAMENT DRAIN:					**152,360**	**21,873**	**16,200**	**114,287**

Notes:

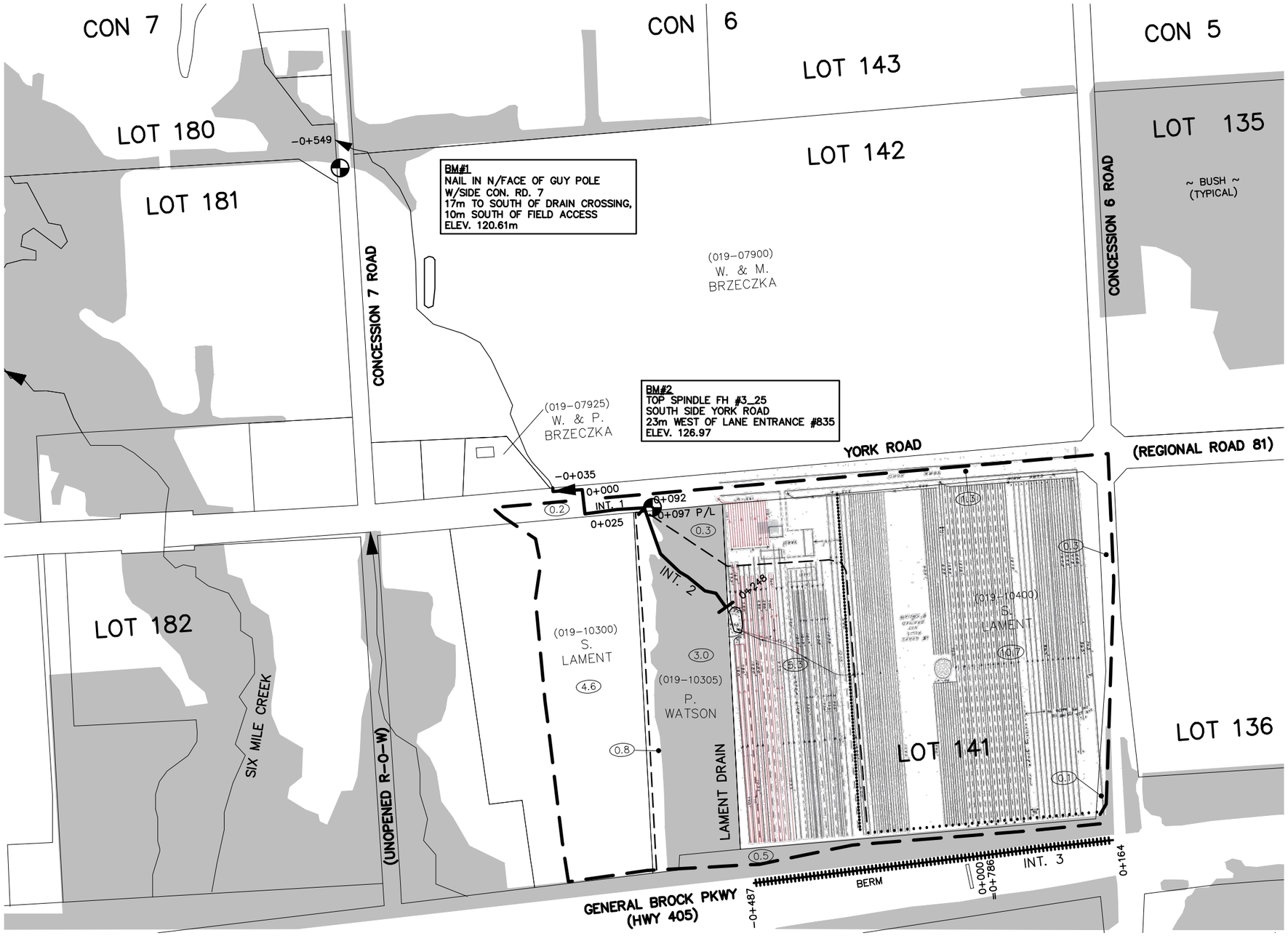
1. Section 21 of the Drainage Act, RSO 1990 requires that assessments be shown opposite each parcel of land and road affected. The affected parcels of land have been identified using the roll number from the last revised assessment roll for the Town. For convenience only, the owners' names as shown by the last revised assessment roll, has also been included.
2. "F" denotes lands with current Farm Proeprty Tax Class designation that may qualify for grant.
3. Net assessment is leveied to the owner at the time of actual cost levy.
4. Amounts in brackets ( ) would be paid to the respective owner.
5. Grant eligibility subject to Farm Property Tax Class at the time of actual cost levy.

						Interval 1 -0+035 to 0+092			Interval 2 0+092 to 0+260			Interval 3 0+260 to 0+952			TOTAL		
COST ESTIMATE																	
Allowances:							7,400			8,800			0			16,200	
Construction:							17,910			27,985			18,215			64,110	
Engineering:							21,270			22,285			24,730			68,285	
Administration							1,525			1,120			1,120			3,765	
TOTAL COST ESTIMATE:							**48,105**			**60,190**			**44,065**			**152,360**	
Con	**Lot**	**Roll No.**	**Owner**	**Affected Area (Ha)**	**Adjusted Area (Ha)**	**Benefit ($)**	**Adjusted Area (Ha)**	**Outlet ($)**	**Benefit ($)**	**Adjusted Area (Ha)**	**Outlet ($)**	**Benefit ($)**	**Adjusted Area (Ha)**	**Outlet ($)**	**Total Benefits**	**Total Outlets**	**TOTAL**
		(26-27-020-)	***(Niagara Twp)***														
6	Pt 142	019-07900	W. & M. Brzeczka	0.00	0.00		0	0		0	0		0	0	0	0	0
6	Pt 141	019-10300	S. Lament	4.60	4.60	17,100	4.60	2,370		0	0		0	0	17,100	2,370	19,470
6	Pt 141	019-10305	P. Watson	4.10	2.45	2,000	2.45	1,262	17,800	2.30	3,757		0	0	19,800	5,019	24,819
6	Pt 141	019-10400	S. Lament	17.00	17.00		17.00	8,758	27,100	6.30	10,290		1.00	0	27,100	19,048	46,148
Sub-Total (Lands):				25.70	24.05	19,100	24.05	12,390	44,900	8.60	14,047	0	1.00	0	64,000	26,437	90,437
Concession 6 Rd.			Town of Niagara-On-The-Lake	0.40	0.80		0.80	411		0.20	327		0.20	0	0	738	738
General Brock Parkway (Hwy 405)			M.T.O.	0.50	0.50		0.50	258		0.50	816	44,065	0.50	0	44,065	1,074	45,139
York Road (Reg. Road 81)			Region of Niagara	1.50	3.00	14,400	3.00	1,546	100	0	0		0	0	14,500	1,546	16,046
Sub-Total (Roads):				2.40	4.30	14,400	4.30	2,215	100	0.70	1,143	44,065	0.70	0	58,565	3,358	61,923
TOTAL LAMENT DRAIN:				28.10	28.35	33,500	28.35	14,605	45,000	9.30	15,190	44,065	1.70	0	122,565	29,795	152,360

APPENDIX B - CALCULATION OF ESTIMATED COSTS FOR FUTURE MAINTENANCE
LAMENT DRAIN
Town of Niagara-on-the-Lake

TOTAL COST ESTIMATE:						Interval 1 -0+035 to 0+092 $ 2,000 ($15/m for Ditch Cleanout)				Interval 2 0+092 to 0+260 $ 2,500 ($15/m for Ditch Cleanout)				Interval 3 -0+487 to 0+164 $ 6,500 (Berms)			
Con	Lot	Roll No.	Owner	Affected Area (Ha)	Adjusted Area (Ha)	Benefit ($)	Adjusted Area (Ha)	Outlet ($)	%	Benefit ($)	Adjusted Area (Ha)	Outlet ($)	%	Benefit ($)	Adjusted Area (Ha)	Outlet ($)	%
		(26-27-020-)	***(Niagara Twp)***														
6	Pt 142	019-07900	W. & M. Brzeczka	0.00	0.00		0	0	0.00		0.00	0	0.00		0	0	0.00
6	Pt 141	019-10300	S. Lament	4.60	4.60	250	4.60	195	22.25		0.00	0	0.00		0	0	0.00
6	Pt 141	019-10305	P. Watson	4.10	2.45	300	2.45	104	20.20	1,000	2.30	247	49.88		0	0	0.00
6	Pt 141	019-10400	S. Lament	17.00	17.00		17.00	720	36.00	500	6.30	677	47.08		0	0	0.00
Sub-Total (Lands):				25.70	24.05	550	24.05	1,019	78.45	1,500	8.60	924	96.96	0	0	0	0.00
			Roads														
Concession 6 Rd.			Town of Niagara-On-The-Lake	0.40	0.80		0.80	33	1.65		0.20	22	0.88		0	0	0.00
General Brock Parkway (Hwy 405)			M.T.O.	0.50	0.50		0.50	21	1.05		0.50	54	2.16	6,500	0	0	100.00
York Road (Reg. Road 81)			Region of Niagara	1.50	3.00	250	3.00	127	18.85		0.00	0	0.00		0	0	0.00
Sub-Total (Roads):				2.40	4.30	250	4.30	181	21.55	0	0.70	76	3.04	6,500	0	0	100.00
TOTAL LAMENT DRAIN:				28.10	28.35	800	28.35	1,200	100.00	1,500	9.30	1,000	100.00	6,500	0.00	0	100.00

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL BE INFORMED OF THE EXACT LOCATION OF ALL SUCH UTILTIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



BENCHMARK / VERTICAL DATUM
ELEVATIONS SHOWN ARE REFERENCED TO THE CANADIAN GEODETIC VERTICAL DATUM OF 1928 (CGVD28:78).
THE BENCHMARK 10920020089 AT ELEVATION 123.206 WAS USED FOR THIS PROJECT.
BENCHMARK INFORMATION WAS ACQUIRED FROM THE NIAGARA REGION CONTROL POINTS WEBSITE

PLAN LEGEND

- MAJOR WATERSHED
- INTERMEDIATE WATERSHED
- PROPOSED WORK OR INCORPORATION
- EXISTING WATERCOURSE
- ACCESS WAY
- (5.3) — APPROXIMATE HECTARES IN WATERSHED
- (019-10300) — ASSESSMENT ROLL NUMBER
- BUSH/WETLAND

GEOGRAPHIC TOWNSHIP OF NIAGARA

DESIGNED BY:	H.A.W.
CHECKED BY:	K.A.S.
DRAWN BY:	N.M.B.
CHECKED BY:	K.A.S.

LICENSED PROFESSIONAL ENGINEER
N. W. MORRIS
100109137
MAR. 31/20
PROVINCE OF ONTARIO

SCALE
0 50 100m
(1:5000 ON 11"x17")

LAMENT DRAIN

REGION OF NIAGARA — TOWN OF NIAGARA-ON-THE-LAKE

WATERSHED PLAN

MAR. 31, 2020

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER — SUDBURY

REVISED:
JOB NUMBER: **18-218**
DRAWING 1 OF 8

\\server\ksdata\Data\2018\18-218\Drafting\WS 18-218.dwg WS 8-Apr-20 4:05:11 PM

=SSION 7 RO-

EX. 1200mm CSP
EX. 200mm CSP
EX. 200mm CSP
EX. 900mm CSP
EX. 900mm CSP
EX. 750mm CSP
INLET TO POND
EX. 100mm PLASTIC
TOP OF 2x3m
BOULDER
CHECK DAM
EX. 900mm CSP
.21
123.66
YORK ROAD
(REGION
OF NIAGARA)
35m O- ITCH CL=- T
(1m BOTTOM, 2:1 SID= SLOP=S)
SPOIL TO B= H =D
- \ IN- \M-TION PURPOS=S ONL\

128 126 124 122 120 118 116

-0+549 -0+400 -0+200 -0+035 B=ND P/L 0+000

BM#
TOP SPINDLE F.H. #3/25 BLUE TOP AND
SILVER SIDE VALVES S/S YORK ROAD
12m EAST OF STA. 0+092
- = . 126.970

ST-. 0+071 TO 0+092
R- =. - \=INST =R)
=X. 21m O- mm CSP
= 5m² RIPR -T =- H =ND
U/S INV. 124.60
D/S INV. 124.4

ST-. 0+260
=X. 9m O-
mm CSP TO B= R=MOV=D
- TRUCT W=IR
(S== DWG. 5)

ST-. 0+000 TO 0+025
25m O- mm CSP
CULV=RT TO R=M-IN
- TO B=
INCORPOR-T=D

T-. 0+093 TO 0+102
R=MOV= - \=INST
=R) =X. 9m O- mm
PL- TIC PIP= =
5m² RIPR -T U/S =ND
D/S INV. 124.65
U/S INV. 124.70

T-. 0+255
INST- mm HDP= PIP=
(S== DWG. 5)

T-. 0+250
PL = 5m² RIPR
=- T B- K

(R=G. RO-
RO-

ST-. 0+215 TO 0+224
R=PL = =X. 400mm CSP WITH
9m O =W 450mm PL- TIC PIP=
U/S INV. 125.62
D/S INV. 125.54

=K

ST-. 0+025
PL = 5m² RIPR-

ST-. 0+201
PL = 5m² RIPR-
\OCK CH=CK D-

T-. 0+000
PL = 5m² RIPR-

EX. 450mm CSP
L =W \/TOP O =RM
=L=V. 127.5

EX. 900mm CSP
EX. 600mm CSP
EX. 450mm PLASTIC
LANEWAY
LANEWAY
EX. 400mm CSP
EX. 450mm CSP
1.62%
126.22
0.65%
125.34
.30%
124.60
124.65
124.70
.82
124.40
123.66
POWER BRUSHING
IN DITCH -
m WIDTH ON W/SID=
(15m TOT-
S== DWG. 4 & 5
YORK ROAD
(REGION
OF NIAGARA
(019-10300
(019-10305)
158m O- ITCH =XC -TION
(0.5m BOTTOM, 2:1 SID= SLOPE=S)
SPOIL TO B= H =D
S== DWG. 3

134 132 130 128 126 124 122

0+000 0+025 BEND 0+071 0+092 B=ND 0+093 0+102 0+152 BEND 0+200 X 0+201 B=ND +248 P/L 0+250 BEND 0+255

MAIN DRAIN

EX. 750mm CSP
/BK
S/BK
EX. D/B
- \ IN- \M-TION PURPOS=S ONL\

134 132 130 128 126

0+400 0+600 0+786 0+600 12

D=SIGN=D BY:	H.A.W.
CH=CK=D BY:	N.W.M.
DRAWN BY:	L.R.D
CH=CK=D BY:	N.W.M.

LICENSED PROFESSIONAL ENGINEER
N. W. MORRIS
100109137
PROVINCE OF ONTARIO

SCAL=
0 50 100m
(SC = 1 : 5000)
HORZ.
0 0.5 1m
(SC = 1 : 50)
V=RT.
(ON 11"x17")

LAMENT DRAIN

REGION OF NIAGARA — TOWN OF NIAGARA-ON-THE-LAKE

MAIN DRAIN PROFILE

M-\. 31, 2020

R=VIS=D:

=R: 18-218

DR- ING

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUDBURY

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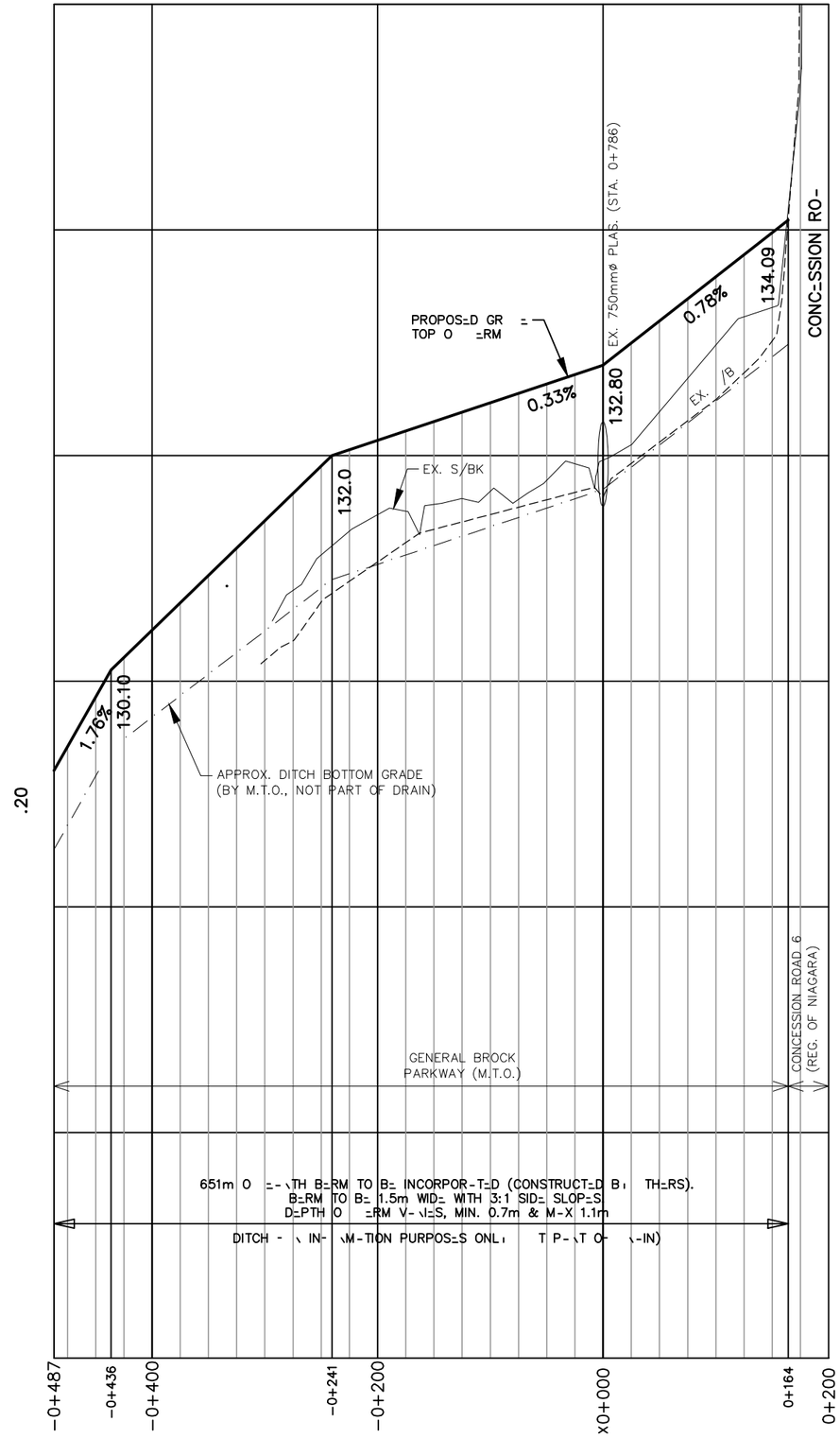


.20

DESIGNED BY:	H.A.W.
CHECKED BY:	N.W.M.
DRAWN BY:	A.M.P.
CHECKED BY:	N.W.M.

LICENSED PROFESSIONAL ENGINEER
N. W. MORRIS
100109137
MAR. 31/20
PROVINCE OF ONTARIO

SCALE
0 50 100m
(SC = 1 : 5000)
HORZ.
0 0.5 1m
(SC = 1 : 50)
VERT.
(ON 11"x17")

LAMENT DRAIN

REGION OF NIAGARA — TOWN OF NIAGARA-ON-THE-LAKE

HWY 405 BERM INTERVAL 3 PROFILE

MAR. 31, 2020

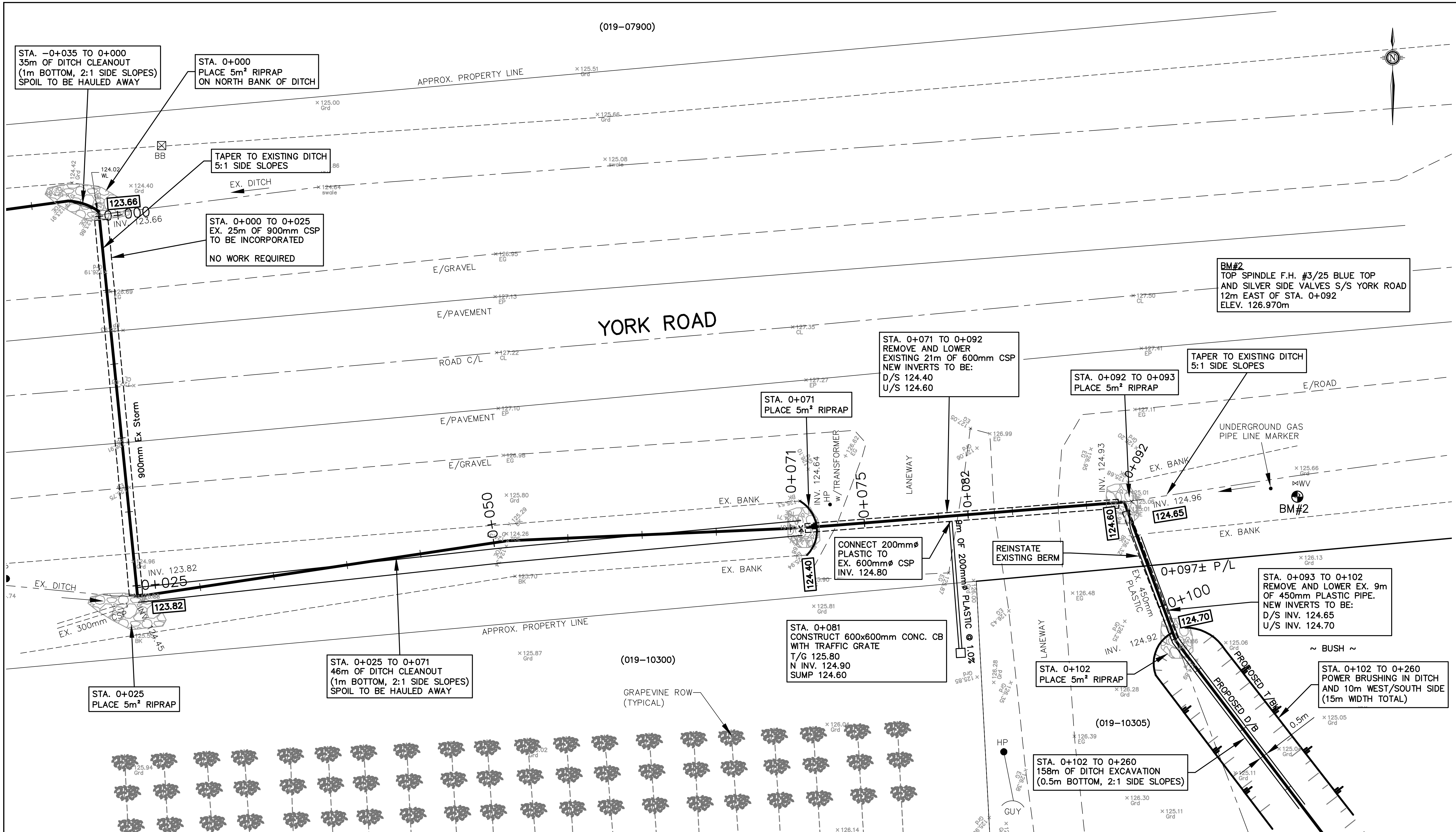
REVISED:

FILE: 18-218

DRAWING

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER — SUDBURY

\\server\ksda-a\Data\2018\18-218\Drawing\PRO-ILE 18-218.dwg SOUTH DITCH 8-Apr-20 4:06:46 PM



(019–07900)
STA. –0+035 TO 0+000
35m OF DITCH CLEANOUT
(1m BOTTOM, 2:1 SIDE SLOPES)
SPOIL TO BE HAULED AWAY
STA. 0+000
PLACE 5m² RIPRAP
ON NORTH BANK OF DITCH
APPROX. PROPERTY LINE
TAPER TO EXISTING DITCH
5:1 SIDE SLOPES
EX. DITCH
123.66
0+000
INV. 123.66
STA. 0+000 TO 0+025
EX. 25m OF 900mm CSP
TO BE INCORPORATED
NO WORK REQUIRED
E/GRAVEL
E/PAVEMENT
YORK ROAD
ROAD C/L
BM#2
TOP SPINDLE F.H. #3/25 BLUE TOP
AND SILVER SIDE VALVES S/S YORK ROAD
12m EAST OF STA. 0+092
ELEV. 126.970m
STA. 0+071 TO 0+092
REMOVE AND LOWER
EXISTING 21m OF 600mm CSP
NEW INVERTS TO BE:
D/S 124.40
U/S 124.60
STA. 0+092 TO 0+093
PLACE 5m² RIPRAP
TAPER TO EXISTING DITCH
5:1 SIDE SLOPES
E/ROAD
STA. 0+071
PLACE 5m² RIPRAP
UNDERGROUND GAS
PIPE LINE MARKER
900mm Ex Storm
LANEWAY
0+071
0+075
0+082
0+092
INV. 124.64
HP
w/TRANSFORMER
INV. 124.93
EX. BANK
INV. 124.96
124.65
124.60
BM#2
0+050
EX. BANK
124.40
CONNECT 200mmø
PLASTIC TO
EX. 600mmø CSP
INV. 124.80
9m OF 200mmø PLASTIC @ 1.0%
REINSTATE
EXISTING BERM
0+097± P/L
INV. 123.82
0+025
123.82
EX. DITCH
EX. 300mm CSP
EX. 450mm PLASTIC
0+100
124.70
STA. 0+093 TO 0+102
REMOVE AND LOWER EX. 9m
OF 450mm PLASTIC PIPE.
NEW INVERTS TO BE:
D/S INV. 124.65
U/S INV. 124.70
INV. 124.92
~ BUSH ~
STA. 0+081
CONSTRUCT 600x600mm CONC. CB
WITH TRAFFIC GRATE
T/G 125.80
N INV. 124.90
SUMP 124.60
(019–10300)
STA. 0+025 TO 0+071
46m OF DITCH CLEANOUT
(1m BOTTOM, 2:1 SIDE SLOPES)
SPOIL TO BE HAULED AWAY
STA. 0+025
PLACE 5m² RIPRAP
STA. 0+102
PLACE 5m² RIPRAP
PROPOSED T/B
PROPOSED D/B
0.5m
STA. 0+102 TO 0+260
POWER BRUSHING IN DITCH
AND 10m WEST/SOUTH SIDE
(15m WIDTH TOTAL)
GRAPEVINE ROW
(TYPICAL)
(019–10305)
HP
GUY
STA. 0+102 TO 0+260
158m OF DITCH EXCAVATION
(0.5m BOTTOM, 2:1 SIDE SLOPES)

LAMENT DRAIN

REGION OF NIAGARA — TOWN OF NIAGARA–ON–THE–LAKE

YORK ROAD DETAIL

DESIGNED BY:	N.W.M.
CHECKED BY:	H.A.W.
DRAWN BY:	L.R.D.
CHECKED BY:	N.W.M.

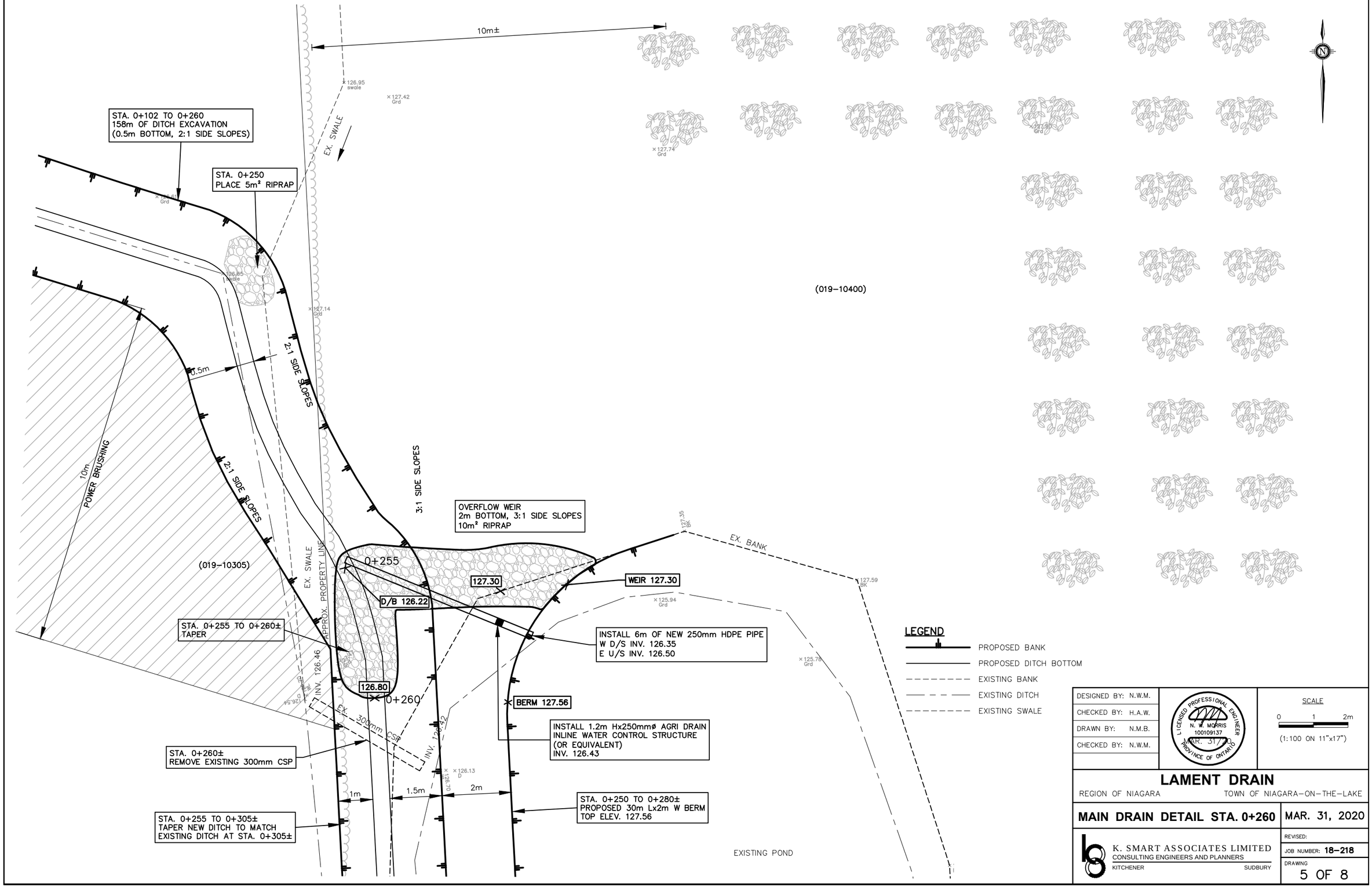
LICENSED PROFESSIONAL ENGINEER — N. W. MORRIS — 100109137 — MAR. 31/20 — PROVINCE OF ONTARIO

SCALE
0 2.5 5m
(1:250 ON 11"x17")

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUDBURY

MAR. 31, 2020
REVISED:
JOB NUMBER: 18–218
DRAWING
4 OF 8

\\server\ksdata\Data\2018\18–218\Drafting\PROFILE 18–218.dwg YORK ROAD DETAIL 25–Mar–20 12:10:56 PM



DESIGNED BY:	N.W.M.
CHECKED BY:	H.A.W.
DRAWN BY:	N.M.B.
CHECKED BY:	N.W.M.

LICENSED PROFESSIONAL ENGINEER
N. W. MORRIS
100109137
MAR. 31/20
PROVINCE OF ONTARIO

SCALE
0 1 2m
(1:100 ON 11"x17")

LAMENT DRAIN

REGION OF NIAGARA — TOWN OF NIAGARA-ON-THE-LAKE

MAIN DRAIN DETAIL STA. 0+260

MAR. 31, 2020

REVISED:

JOB NUMBER: **18-218**

DRAWING 5 OF 8

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUDBURY

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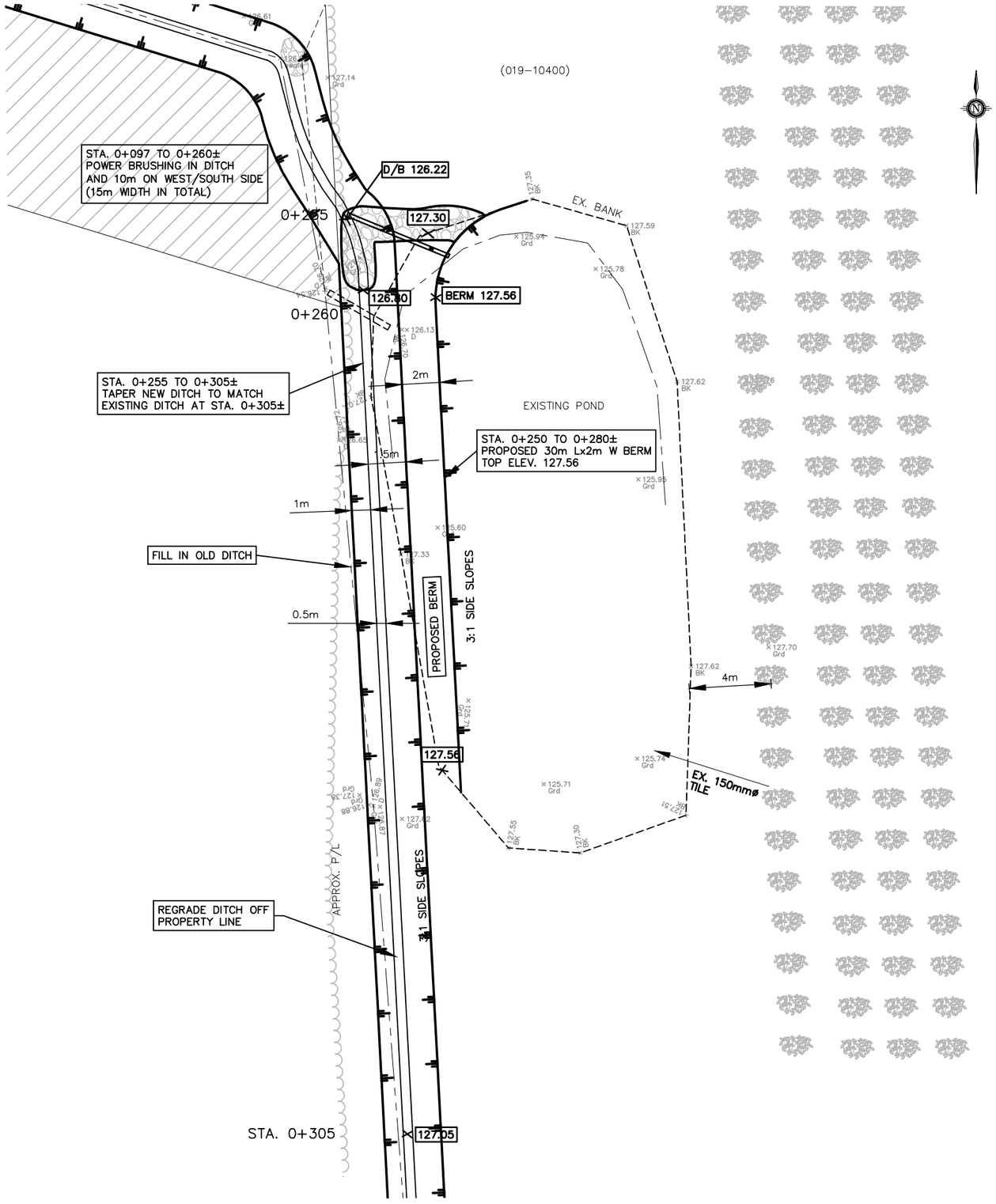

DESIGNED BY:	N.W.M.
CHECKED BY:	H.A.W.
DRAWN BY:	N.M.B.
CHECKED BY:	N.W.M.

LICENSED PROFESSIONAL ENGINEER
N. W. MORRIS
100109137
MAR. 31/20
PROVINCE OF ONTARIO

SCALE
0 2.5 5m
(1:250 ON 11"x17")

LAMENT DRAIN

REGION OF NIAGARA — TOWN OF NIAGARA-ON-THE-LAKE

MAIN DRAIN DETAIL STA. 0+260

MAR. 31, 2020

REVISED:

JOB NUMBER: **18-218**

DRAWING
6 OF 8

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER — SUDBURY

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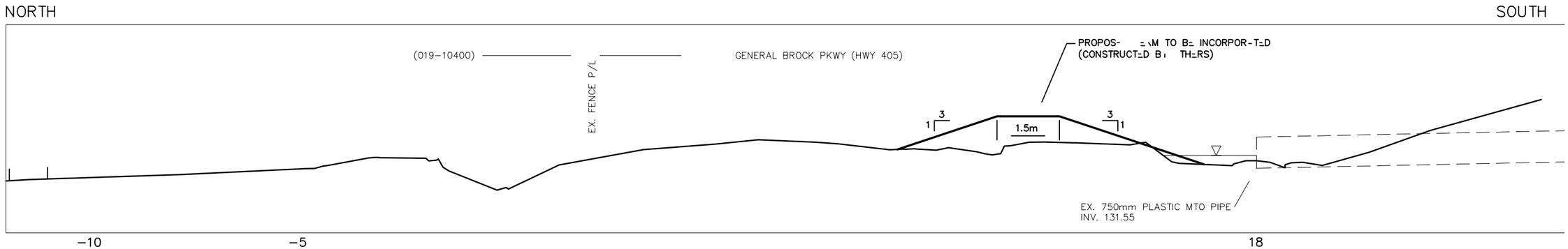
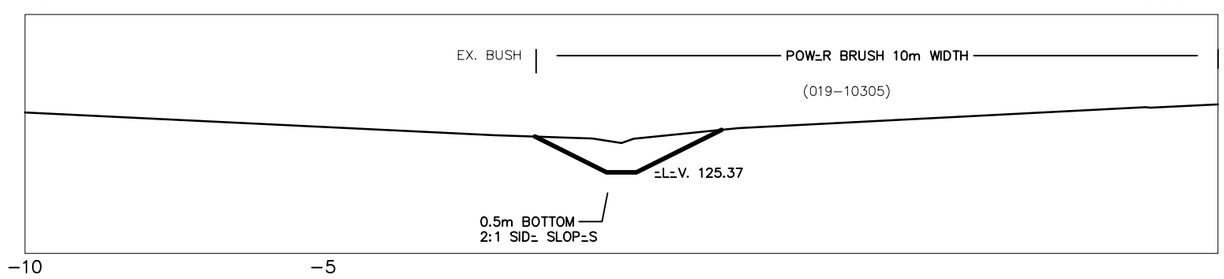


STA. 0+786



STA. 0+200

LAMENT DRAIN

REGION OF NIAGARA — TOWN OF NIAGARA-ON-THE-LAKE

MAIN DRAIN CROSS-SECTIONS

M-\. 31, 2020

D=SIGN=D BY:	H.A.W.
CH=CK=D BY:	N.W.M.
DRAWN BY:	N.M.B.
CH=CK=D BY:	N.W.M.

LICENSED PROFESSIONAL ENGINEER — N. W. MORRIS — 100109137 — PROVINCE OF ONTARIO

SCAL=
0 1 2m
(SC = 1 : 100)
HORZ.
0 1 2m
(SC = 1 : 100)
V=RT.
(ON 11"x17")

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER — SUDBURY

R=VIS=D:

=R: 18-218

DR- ING

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300) CONSTRUCTION NOTES (SPECIAL PROVISIONS)

300.1) SPECIFIC NOTES

Sta.	Description
York Road (Region of Niagara)	
-0+035 to 0+000	- 35m of ditch cleanout (1m bottom, 2:1 side slopes). Spoil to be hauled away. - Seed new banks (3m sides)
0+000 to 0+097±	- See detail on Drawing 4
0+000	- Place 5m² riprap on the north bank of the ditch
0+000 to 0+025	- Existing 25m of 900mm dia. CSP across the road to be incorporated. No work required.
0+025	- Place 5m² riprap
0+025 to 0+071	- 46m of ditch cleanout (1m bottom, 2:1 side slopes). Spoil to be hauled away. - Seed new banks (3m sides)
0+071	- Place 5m² riprap
0+071 to 0+092	- Remove and lower existing 21m of 600mm dia. CSP and restore laneways
0+081	- Construct offset 600 x 600mm CB and connect to lowered 600mm CSP with 9m of 200mm dia. plastic pipe
0+092 to 0+093	- Place 5m² riprap
S. Watson (Roll No. 019-10305)	
0+093 to 0+102	- Remove and lower existing 9m of 450mm dia. plastic pipe and reinstate/restore the existing berm
0+102	- Place 5m² riprap
0+102 to 0+260±	- Selective power brushing in the ditch and 10m width on the south side (15m width total). Work around all trees larger than 30cm in diameter that are not dead. - 150m of ditch excavation (deepening and widening) (0.5m bottom, 2:1 side slopes). Level spoil on south side - Seed banks (3m sides)
0+201	- Place 5m² rip-rap rock check dam
0+215 to 0+224	- Remove and dispose of existing 400mm CSP. Replace with 9m of 450mm plastic pipe. Place 5m² riprap at each end (10m² riprap total). Restore laneway
0+248 to 0+260	- See details on Drawings 4 and 5
0+248 to 0+260	- Ditch to taper to match the existing ditch from Sta. 0+255 to 0+260±. Level spoil. - Seed banks (3m sides)
0+250	- Place 5m² riprap on the north bank at the swale entry location
S. Lament (Roll No. 019-10400)	
0+255 to 0+260±	- Construct overflow weir from pond including 30m long earth berm, 10m² riprap, 1.2m high x 250mm diameter agricultural drain inline water control structure and 6m of 250mm dia. HDPE pipe and removal of existing 4m of 300mm CSP.
Highway 405 (MTO)	
-0+487 to 0+164	- Construct 651m long earth berm along the north bank of the existing ditch on the north side of Highway 405. The berm shall have 3:1 side slopes with a 1.5m top width. See cross-section on Drawing 7

300.2) PROJECT NOTES

300.2.1) Working Area

The working area is to be as shown on Drawings 3 to 6. Refer to Section 400.4 of Standard Specifications for Construction of Drains for exceptions.

300.2.2) Access

The contractor shall have access to the drain along the routes if any, shown on Drawing 1. The access routes shall be along existing laneways or paths or where none exist, along a 6m wide (maximum) path. No other access routes shall be used unless first approved by the Engineer and affected landowner. The contractor shall also contact each owner using designated accesses. Refer to Section 400.5 of the Standard Specifications for the Construction of Drains. Telephone numbers for contact are:

019-10300, 019-10400	S. Lament	(To be Supplied at
019-10305	P. Watson	time of Tendering)
Neal Morris, P.Eng. (K. Smart Associates Limited)		519-748-1199 ext. 240
Niagara On-The-Lake Hydro (Kevin Sidey)		905-468-1285 ext. 530
Niagara On-The-Lake (Brett Ruck, Drainage Superintendent)		905-468-3278 ext. 255
Ministry of Transportation (Kyle Saulnier)		416-235-5534
One Call Centre		1-800-400-2055

300.2.3) Soils Considerations

The Region of Niagara soil's mapping for this area indicates that the soils adjacent to this drain are primarily Beverly loamy phase.

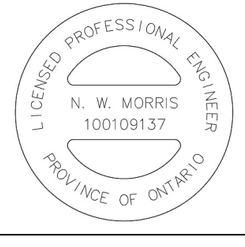
The Beverly loam phase soils have loamy textures over lacustrine silty clay, have imperfect drainage, are smooth basin to level and are stone free.

Based on available information, no adverse subsurface conditions on this project and the use of conventional construction equipment is anticipated.

300.2.4) Environmental

The following agencies have been notified of the project:

- Applications to MECP, DFO and NPCA have been submitted in regards to Species at Risk dated June 14, 2019, June 26, 2019, and December 20, 2019, respectively.
- DFO has been notified regarding working in water and associated permits.
- There has been no response from MECP or NPCA to date.
- The response from DFO dated October 3, 2019, indicated that, provided the erosion measures we have shown in this report (drawings, etc.) are adhered to, it is DFO's view that the project will not require authorization under the Fisheries Act or the Species at Risk Act. The work should be conducted in dry conditions, and DFO is to be notified at least ten days before starting the construction of this project.



LAMENT DRAIN
Town of Niagara-on-the-Lake
File No. 18-218 April 9, 2020
Drawing 8 of 8

200 **GENERAL CONDITIONS**

TABLE OF CONTENTS

200.1	SCOPE	1
200.2	ORDER OF PRECEDENCE	1
200.3	MUNICIPALITY	1
200.4	TENDERS	1
200.5	EXAMINATION OF SITE, PLANS AND SPECIFICATIONS	1
200.6	COMMENCEMENT AND COMPLETION OF WORK	2
200.7	NOTICES RE COMMENCEMENT OF WORK	2
200.8	PERMITS, NOTICES, LAWS AND RULES	2
200.9	HEALTH AND SAFETY	2
200.10	LIMITATIONS OF OPERATIONS	2
200.11	SUPERVISION	3
200.12	CHARACTER AND EMPLOYMENT OF WORKERS	3
200.13	SUB-CONTRACTORS	3
200.14	PAYMENT	3
200.15	TERMINATION OF CONTRACT BY THE MUNICIPALITY	3
200.16	LIQUIDATED DAMAGES	4
200.17	CONTRACTOR'S LIABILITY	4
200.18	LIABILITY INSURANCE	5
200.19	LOSSES DUE TO ACTS OF NATURE, ETC.	5

200 GENERAL CONDITIONS

200.1 SCOPE

The work to be done under this contract consists of supplying all labour, equipment and materials to construct the drainage work as outlined in the Instructions to Tenderers, the Form of Tender and Agreement, the Schedule of Tender Prices, the Drawings, the General Conditions, Special Provisions and the Standard Specifications.

200.2 ORDER OF PRECEDENCE

In case of any inconsistency or conflict between the drawings and specifications, the following order of precedence shall apply: Addenda, Form of Tender and Agreement, Schedule of Tender Prices, Special Provisions, Contract Drawings, Standard Specifications, General Conditions.

200.3 MUNICIPALITY

Municipality refers to a municipal corporation in the Province of Ontario. Where reference to Township, County, Region, Town, City or Owner appears it shall be deemed to be the same as the word Municipality. Where reference to owner appears in the specifications it is usually in reference to the owner of the property on which the drain is being constructed.

200.4 TENDERS

Tenders are to be submitted on a lump sum basis for the complete works or a portion thereof, as instructed by the Municipality. The Schedule of Tender Prices must be completed and submitted with the Form of Tender and Agreement even though the Contract will be a lump sum. As outlined in the Instructions to Tenders a deposit in the form of a certified cheque, bank draft, bonding or irrevocable letter of credit must accompany each tender as a guarantee of good faith. The deposit shall name the Municipality as the payee. All deposits, except that of the Tenderer to whom the work is awarded, will be returned within 10 days of the time the contract is awarded. The certified cheque of the Tenderer awarded the work will be retained as Contract Security and returned with the Completion Certificate for the work. A Performance Bond may also be required to ensure maintenance of the work for a period of one year after the date of the Completion Certificate.

200.5 EXAMINATION OF SITE, PLANS AND SPECIFICATIONS

Prior to the submission of the Tender, the Tenderer must examine the premises and site to compare them with the Drawings and Specifications in order to be satisfied with the existing conditions and the extent of the work to be done. The Tenderer must ensure that the meaning and intent of the drawings, estimated quantities and specifications is clearly understood before submission of the Tender. No allowances shall be made on behalf of the Contractor by reason of any error made in the preparation of the tender submission.

Any estimates of quantities shown or indicated on the drawings or elsewhere in the tender document are provided for the convenience of the Tenderer. The Tenderer should check the estimate of quantities for accuracy. Any use made of the estimated quantities by the Tenderer in calculating the tendered amounts is done at the Tenderers risk.

200.6 COMMENCEMENT AND COMPLETION OF WORK

The work must commence immediately after the Tenderer is notified of the contract award or at a later date, if set out as a condition in the Form of Tender and Agreement. If weather and ground conditions are unsuitable, work may be started at a later date from either of the above two dates if such delay is approved by the Engineer. The Contractor shall provide a minimum of 48 hours advance notice to the Engineer and the Municipality before commencement of any work. The work must proceed in such manner as to ensure its completion at the earliest possible date consistent with first class workmanship and within the time limit set out in the tender/contract document. Failure to commence or complete the work as set out in the tender/contract document may result in a forfeiture of all or part of the Contract Security if the Engineer deems that damages have been sustained to the Municipality or to any landowner because of the non-commencement or non-completion of the contract as awarded and that the failure to meet the specified dates has been the fault of the Contractor.

200.7 NOTICES RE COMMENCEMENT OF WORK

If the Contractor leaves the job site for a period of time after initiation of work, a minimum of 48 hours advance notice shall be given to the Engineer and the Municipality before commencement of any further work. If any work is commenced without the advance notice the Contractor shall be fully responsible for all such work undertaken prior to such notification and shall make good any works or materials judged to be inadequate or constructed in any manner that may have been subject to alteration if made known to the Engineer prior to commencement of construction.

200.8 PERMITS, NOTICES, LAWS AND RULES

The Contractor shall apply and pay for all necessary permits or licenses required for the execution of the work. This shall not include the obtaining of permanent easements or rights or servitude. The Contractor shall give all necessary notices and pay all fees required by the law and comply with all laws, ordinances, rules and regulations relating to the work and to the preservation of the public's health and safety and if the specifications and drawings are at variance therewith, any resulting additional expense incurred by the Contractor shall constitute an addition to the contract price.

200.9 HEALTH AND SAFETY

Contractor must comply with the Occupational Health and Safety Act (OHSA) and the associated Regulations for Construction Projects. Contractor will also follow any site-specific safety and training requirements of the Municipality, agencies, utility companies or other authorities.

Communication about site-specific hazards and safety requirements shall occur at the pre-construction meeting. If no pre-construction meeting is conducted, Contractor will communicate site-specific hazards and safety requirements before beginning work.

Contractor shall immediately report any workplace incidents, near misses, injuries and occupational illnesses to the Engineer.

200.10 LIMITATIONS OF OPERATIONS

Except for such work as may be required by the Engineer to maintain the works in a safe and satisfactory condition, the Contractor shall not carry out operations under the contract on Sundays or Statutory Holidays without permission in writing from the Engineer. The Engineer may direct in writing to the Contractor to cease or limit operations under the contract on any day or days if the operations are of such a nature, or if the work is so located, or if the traffic is of such a volume, that the Engineer deems it necessary or expedient to do so.

200.11 SUPERVISION

The Contractor shall provide constant supervision of the construction work and shall keep a competent foreman in charge at the site.

200.12 CHARACTER AND EMPLOYMENT OF WORKERS

The Contractor shall employ only orderly, competent and skillful workers to do the work and shall give preference to available qualified residents in the area of the contract. Whenever the Engineer informs the Contractor in writing that any workers are, in the opinion of the Engineer, disorderly, incompetent, or breaking the law, such workers shall be discharged from the job site and shall not again be employed on the job site without the written consent of the Engineer.

200.13 SUB-CONTRACTORS

If the Municipality so directs, the Contractor shall not sublet the whole or any part of this contract without the approval of the Engineer.

200.14 PAYMENT

Progress payments in cash equal to about 90% of the value of the work done and materials incorporated in the work will be made to the Contractor monthly. If directed by the Engineer the Contractor may be required to provide a written request for the progress payment amount. An additional 7% will be paid 45 days after the date of the Completion Certificate by the Engineer and 3% of the contract price may be reserved by the Municipality as a maintenance holdback for one year from the date of the Completion Certificate.

The holdbacks noted above may be increased by the Municipality if, in the written opinion of the Engineer, particular conditions of the contract require such greater holdback.

After the completion of the work any part of maintenance holdback may be used to correct defects from faulty construction and/or materials provided that notice shall first be given by the Engineer in writing to the Contractor stating that the Contractor has seven (7) days in which to remedy the defect in construction and/or materials.

200.15 TERMINATION OF CONTRACT BY THE MUNICIPALITY

Termination of the contract by the Municipality may be considered if the Contractor:

1. should be adjudged bankrupt or make a general assignment for the benefit of creditors or if a receiver should be appointed on account of insolvency;
2. should refuse or fail to supply enough properly skilled workmen or proper materials after having received seven (7) days' notice in writing from the Engineer to supply such additional workmen or materials in order to commence or complete the works;
3. should fail to make prompt payment to sub-contractors or for materials or labour;
4. should persistently disregard laws, ordinances, or instructions from the Engineer, or otherwise be guilty of a substantial violation of the provisions of the contract;

then the Municipality, upon Certificate of the Engineer that sufficient cause exists to justify such action, may without prejudice to any other right or remedy, give written notice to the Contractor to terminate the employment of the Contractor and take possession of the premises, and of all materials, tools and appliances thereon, and may finish the work by whatever method the Municipality may deem expedient, but without undue delay or expense. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price will exceed the expense of finishing the work including compensation to the Engineer for additional

services and including other damages of every name and nature, such excess shall be paid to the Contractor. If such expense will exceed such unpaid balance including the Contract Security, the Contractor shall pay the difference to the Municipality. The expense incurred by the Municipality, as herein provided, shall be certified by the Engineer. If the contract is terminated by the Municipality due to the Contractor's failure to properly commence the works, the Contractor shall forfeit the Contract Security and furthermore shall pay to the Municipality an amount to cover the increased costs, if any, associated with a new tender for the contract being terminated.

If any unpaid balance and the Contract Security do not equal the monies owed by the Contractor upon the termination of the contract, the Municipality may also charge such expenses against any money which is or may thereafter be due to the Contractor from the Municipality.

200.16 LIQUIDATED DAMAGES

It is agreed by the parties to the Contract that in case all the work called for under the Contract is not finished or complete within the period of time as set forth in the Tender/Contract Document, damage will be sustained by the Municipality. It is understood by the parties that it will be impracticable and extremely difficult to ascertain and determine the actual damage which the Municipality will sustain in the event of and by reason of such delay. The parties hereto agree that the Contractor will pay to the Municipality a sum as set out in the Form of Tender and Agreement for liquidated damages for each and every calendar day delay, including Saturdays, Sundays and Statutory Holidays, in finishing the work in excess of the number of working days prescribed. It is agreed that the liquidated damages amount is an estimate of the actual damage to the Municipality which will accrue during the period in excess of the prescribed number of working days.

The Municipality may deduct any amount due under this section from any monies that may be due or payable to the Contractor on any account whatsoever. The liquidated damages payable under this section are in addition to and without prejudice to any other remedy, action or other alternative that may be available to the Municipality.

The Contractor shall not be assessed with liquidated damages for any delay caused by acts of nature, or of the Public Enemy, Acts of the Province or of any Foreign State, Fire, Flood, Epidemics, Quarantine Restrictions, Embargoes or any delays of Sub-Contractors due to such causes.

If the time available for the completion of the work is increased or decreased by reason of alterations or changes made under the provisions of the Contract, the number of working days shall be increased or decreased as determined by the Engineer.

If the Form of Tender and Agreement does not show an amount for Liquidated Damages then Liquidated Damages do not apply for this contract.

200.17 CONTRACTOR'S LIABILITY

The Contractor and all workers, agents or any party under the Contractor's control, including Sub-Contractors, shall use due care that no person or property is injured and that no rights are infringed during the construction work outlined in the contract. The Contractor shall be solely responsible for all damages by whomsoever claimable in respect of any injury to persons or to lands, buildings, structures, fences, livestock, trees, crops, roadways, ditches, drains and watercourses, whether natural or artificial, or property of whatever description and in respect of any infringement of any right, privilege or easement wherever occasioned in the carrying on of the work or any part thereof, or by any neglect, misfeasance or non-feasance on the Contractor's part or on the part of any workers, agents or parties under the Contractor's control including Sub-Contractors, and shall bear the full cost thereof. The Contractor shall be fully responsible to make such temporary provisions as may be necessary to ensure the avoidance of any such damage, injury or infringement and to prevent the interruption of or danger or menace to the traffic in any railway or any public or private road entrance or sidewalk and to secure to all persons and corporations the uninterrupted enjoyment of all their

rights, in and during the performance of the work. The Contractor shall indemnify and save harmless the Municipality and the Engineer from and against all claims, demands, losses, costs, damages, actions, suits or other proceedings by whomsoever made, brought or prosecuted in any manner based upon, occasioned by, or attributed to any such damage, injury or infringement.

Wherever any work is of such an extent and nature that it must necessarily be confined to particular areas of a roadway, a working area, or private property, the Contractor shall use reasonable care not to damage or deface the remaining portions of the property, and if any damage is occasioned as a result of the Contractor's operations, it shall be rectified by and at the expense of the Contractor, to the satisfaction of the Engineer. Notwithstanding the indemnity provisions contained in this section, where in the opinion of the Engineer the Contractor has failed to rectify any damage, injury or infringement or has failed to adequately compensate any person for any damage, injury or infringement for which the Contractor is responsible under the contract, the Engineer, following notice in writing to the Contractor of an intention so to do, may withhold payment of any monies due the Contractor under this or any other contract until the Contractor has rectified such damage, injury or infringement or has paid adequate compensation for such damage, injury or infringement, provided however, that the Municipality will not withhold such monies where in the opinion of the Engineer there are reasonable grounds upon which the Contractor denies liability for such damage, injury or infringement and the Contractor has given the claimant a reasonable time in which to establish the validity of the claim, and provided further that the amount withheld under this section shall not exceed the amount of such claims against the Contractor.

Where the Contractor uses privately owned lands for pits or waste disposal areas, the Contractor shall comply with applicable laws and provide the Engineer with a release signed by or on behalf of the owner of each pit or waste disposal area used by the Contractor. If the said release is not obtained, then sufficient monies will be withheld from the Contractor except, however, where the owner's signature is withheld solely on the basis of damage, injury, or infringement it will be dealt with as provided elsewhere in this subsection.

Nothing herein contained shall be construed as in any way restricting or limiting the liability of the Contractor under the laws of the country, province or locality in which the work is being done. Neither the Completion Certificate nor final payment thereunder, nor any provision in the Contract Document shall relieve the Contractor from this liability.

200.18 LIABILITY INSURANCE

The Contractor shall take out and keep in force until the date of acceptance of the entire work by the Engineer, a comprehensive policy of public liability and property damage insurance providing insurance coverage of at least $3,000,000 for each and every accident, exclusive of interest and cost, against loss or damage resulting from bodily injury to or death of one or more persons and loss of or damage to property and such policy shall where, and as requested by the Municipality, name the Municipality and the Engineer as an additional insured thereunder and shall protect the Municipality against all claims for all damage or injury including death to any person or persons and for damage to any property of the Municipality or any other public or private property resulting from or arising out of any act or omission on part of the Contractor or any of his servants or agents during the execution of the Contract.

200.19 LOSSES DUE TO ACTS OF NATURE, ETC.

All damage, loss, expense and delay incurred or experienced by the Contractor in the prosecution of the work, by reason of unanticipated difficulties, bad weather, strikes, wars, acts of nature, or other mischances, shall be borne by the Contractor and shall not be the subject of a claim for additional compensation.

400 STANDARD SPECIFICATIONS FOR CONSTRUCTION OF DRAINS

TABLE OF CONTENTS

400.1 ABBREVIATIONS....1
400.2 PRE CONSTRUCTION MEETING....1
400.3 COLD WEATHER....1
400.4 WORKING AREA....1
400.5 ACCESS....1
400.6 ACCESS TO PROPERTIES ADJOINING THE WORK....2
400.7 DRAINAGE SUPERINTENDENT....2
400.8 ALTERATIONS TO WORK....2
400.9 ERRORS AND UNUSUAL CONDITIONS....2
400.10 TESTS....2
400.11 BENCHMARKS AND STAKES....3
400.12 OPENING UP OF FINISHED WORK....3
400.13 FINAL INSPECTION....3
400.14 WARRANTY....3
400.15 MATERIALS....4
400.16 RIPRAP....5
400.17 GEOTEXTILE....5
400.18 DISPOSAL OF MATERIALS....5
400.19 NOTIFICATION OF RAILROADS, ROAD AUTHORITIES AND UTILITIES....5
400.20 WORKING IN ROAD ALLOWANCES....6
400.21 LOCATIONS OF EXISTING UTILITIES....6
400.22 LANEWAYS....7
400.23 EXISTING CROSSING CLEANOUT....7
400.24 FENCES....7
400.25 LIVESTOCK....8
400.26 STANDING CROPS....8
400.27 CLEARING VEGETATION....8
400.28 ROCK REMOVAL....9
400.29 SEEDING....10
400.30 EROSION CONTROL BLANKETS....11
400.31 SEDIMENT CONTROL....11
400.32 GRASSED WATERWAYS AND OVERFLOW SWALES....12
400.33 BUFFER STRIPS....13
400.34 MAINTENANCE CORRIDOR....13
400.35 POLLUTION....13
400.36 SPECIES AT RISK....13

400 STANDARD SPECIFICATIONS FOR CONSTRUCTION OF DRAINS

400.1 ABBREVIATIONS

i) M.T.O. means the Ministry of Transportation of Ontario.
ii) A.S.T.M. means the American Society for Testing Materials.
iii) C.S.A. means the Canadian Standard Association.
iv) O.P.S.D. means Ontario Provincial Standard Drawings
v) O.P.S.S. means Ontario Provincial Standard Specifications
vi) DFO means Fisheries and Oceans Canada
vii) MNRF means Ministry of Natural Resources and Forestry
viii) MECP means Ministry of Environment, Conservation and Parks

400.2 PRE CONSTRUCTION MEETING

The Contractor should arrange a pre-construction meeting with the Engineer, Municipality, affected landowners prior to commencement of construction.

If there is no pre-construction meeting or if a landowner is not present at the pre-construction meeting, the following shall apply. The drain is to be walked by the Contractor and each landowner prior to construction to ensure that both agree on the work to be done. Any difference of opinion shall be referred to the Engineer for decision. If the landowner is not contacted for such review, they are to advise the Engineer and/or Municipality.

400.3 COLD WEATHER

When working in cold weather is approved by the Engineer, the Contractor shall provide suitable means for heating, protection, and snow and ice removal. All work completed in cold weather conditions shall be to the satisfaction of the Engineer and any additional cost to remedy unsatisfactory work, or protect the work shall be borne by the Contactor. All backfilling operations shall be done as soon as possible to avoid backfilling with ground containing frozen particles. The Contractor will assume all responsibility for damages to any tile drains and for settlements or bank slippages that may result from work in cold weather.

400.4 WORKING AREA

Where any part of the drain is on a road allowance, the road allowance shall be the working area. For a closed drain the working area shall be a 10 metre width on either side of the trench or any combination not exceeding 20 metres. A 10m x 10m working area shall exist around any catchbasin, junction box or access point. For an open drain the working area shall be 17 metres on the side for leveling and 3 metres on the opposite side. A 10m working area shall exist for any overflow swale or grassed waterway. If any part of the drain is close to a property line then the fence line shall be one of the limits of the work area. Reduced or increased working areas will be described in detail on the Drawings.

400.5 ACCESS

The Contractor shall have access to the drain by entering the working area directly from road allowances or along access routes shown on the Drawings. All specifications governing fences, livestock and crops during drain construction apply to access routes. No other access routes shall be used unless first approved by the Engineer and the affected landowner. The Contractor shall contact each landowner prior to using the designated access routes. Contractor shall make good any damages caused by using the designated access routes.

400.6 ACCESS TO PROPERTIES ADJOINING THE WORK

The Contractor shall provide at all times and at no additional cost, adequate pedestrian access to private homes and commercial establishments unless otherwise authorized by the Engineer. Where interruptions to access have been authorized by the Engineer, reasonable notice shall be given by the Contractor to the affected landowners and such interruptions shall be arranged to minimize interference to those affected.

400.7 DRAINAGE SUPERINTENDENT

Where a Drainage Superintendent (Superintendent) is appointed by the Municipality, the Engineer may designate the Superintendent to act as the Engineer's representative. If so designated, the Superintendent will have the power to inspect and direct the execution of the work.

Any instructions given by the Superintendent which change the proposed work or with which the Contractor does not agree shall be referred to the Engineer for final decision.

400.8 ALTERATIONS TO WORK

The Engineer shall have the power to make alterations, additions and/or deletions in the work as shown or described in the Drawings or Specifications and the Contractor shall proceed to implement such changes without delay. Alterations ordered by the Engineer shall in no way render the contract void.

If a landowner desires deviations from the work described on the Drawings, the landowner shall submit a written request to the Engineer, at least 48 hours in advance of the work in question.

In every such case, the contract amount shall be increased or decreased as required according to a fair evaluation of the work completed. Where such changes involve additional work similar to items in the contract, the price for additional work shall be determined after consideration is given to the tendered price for similar items.

In no case shall the Contractor commence work considered to be extra work without the Engineer's approval. Payment for extra work is contingent on receipt of documentation to the satisfaction of the Engineer. Refer to the Extra Work Summary included in the Special Provisions.

400.9 ERRORS AND UNUSUAL CONDITIONS

The Contractor shall notify the Engineer immediately of any error or unusual conditions which may be found. Any attempt by the Contractor to correct the error without notice shall be done at the Contractor's risk. Any additional cost incurred by the Contractor to remedy an error or unusual condition without notice shall be borne by the Contractor. The Engineer shall direct the alteration necessary to correct errors or unusual conditions. The contract amount shall be adjusted in accordance with a fair evaluation of documentation for the work added, deleted or adjusted.

400.10 TESTS

The Engineer reserves the right to subject any materials to a competent testing laboratory for compliance with the standard. If any materials supplied by the Contractor are determined to be inadequate to meet the applicable standards, the Contractor shall bear full responsibility to remove and/or replace all such inadequate materials with materials capable of meeting the standards.

The cost of testing the materials supplied by the Contractor shall be borne by the Contractor.

400.11 BENCHMARKS AND STAKES

Prior to construction, the Engineer will confirm the benchmarks. The Contractor shall be held liable for the cost of replacing any benchmarks destroyed during construction.

If the Engineer provides layout stakes, the Contractor shall be held liable for the cost of replacing any layout stakes destroyed during construction.

Where property bars are shown on the Drawings, they are to be protected and if damaged by the Contractor, they will be reinstated by an Ontario Land Surveyor at the expense of the Contractor. Where property bars not shown on the Drawings are damaged, they will be reinstated by an Ontario Land Surveyor at the expense of the project.

400.12 OPENING UP OF FINISHED WORK

If ordered by the Engineer, the Contractor shall make such openings in the work as are needed to re-examine the work, and shall forthwith make the work good again. Should the Engineer find the work so opened up to be faulty in any respect, the whole of the expense of opening, inspecting and making the work good shall be borne by the Contractor. Should the Engineer find the work opened up to be in an acceptable condition the Contractor shall be paid for the expense of opening and making the work good, unless the Contractor has been obligated by any specification or by the direction of the Engineer to the leave the work open for the Engineer's inspection.

400.13 FINAL INSPECTION

Final inspection by the Engineer will be made within twenty (20) days after receiving notice in writing from the Contractor that work is complete, or as soon thereafter as weather conditions permit. All the work included in the contract must at the time of final inspection have the full dimensions and cross-sections.

Prior to commencing the final inspection an on-site meeting may be held by the Engineer and landowners directly affected by the construction of the drain. The Contractor will attend this meeting upon notice by the Engineer.

If there is no on-site meeting with the Engineer and landowners, the Contractor shall obtain from each landowner a written statement indicating that the work has been performed to the owner's satisfaction. If the Contractor is unable to obtain a written statement from the landowner, the Engineer will determine if further work is required prior to issuing the Completion Certificate.

400.14 WARRANTY

There shall be a one-year warranty period on all completed work. The warranty period will commence on the date of the Completion Certificate.

When directed by the Engineer, the Contractor shall repair and make good any deficiencies in the work that may appear during the warranty period.

Before the work shall be finally accepted by the Municipality, the Contractor shall complete all work as directed by the Engineer and remove all debris and surplus materials and leave the work neat and presentable.

400.15 MATERIALS

400.15.1 Concrete Drain Tile

Concrete drain tile shall conform to the requirements of the most recent ASTM C412 specifications for heavy duty extra quality, unless a stronger concrete tile is required by the Special Provisions or Drawings. All tile furnished shall be subject to the approval of the Engineer.

The minimum nominal lengths of the tile shall be 750mm for 150 to 350mm diameter tile and 1200mm for 400 to 900mm diameter tile.

All tile should be of good quality, free from distortions and cracks and shall meet the standards specified. The ends should be smooth and free from cracks or checks. All rejected tile are to be immediately removed from the site.

Granular backfill, where required, shall consist of approved sand or gravel having no particles retained on a screen having 50mm square openings.

Earth backfill shall consist of approved material having no large lumps or boulders.

400.15.2 Corrugated Plastic Tubing

Corrugated plastic tubing shall conform to the *Land Improvement Contractors of Ontario Standard Specification for Corrugated Plastic Drainage Tubing, 2006*. Type of material (solid or perforated) and need for filter sock will be specified on the Drawings or in the description of the work in the Special Provisions. Filter sock where specified shall be a standard synthetic filter material as provided by a recognized plastic tubing manufacturer unless noted differently on the contract drawings or elsewhere in the contract document. Protect coils of plastic tubing from damage and deformation.

400.15.3 Corrugated Steel Pipe

Corrugated Steel Pipe (CSP) shall be according to OPSS 1801 (CSA G401). Unless stated otherwise in the Special Provisions the pipe shall be:

- galvanized
- helical corrugation with lock seam and re-rolled annular ends
- 68mm x 13mm corrugation profile for diameters up to 1200mm
- 125mm x 25mm corrugation profile for diameters 1200mm and larger
- minimum wall thickness of 1.6mm for diameters up to 500mm
- minimum wall thickness of 2.0mm for diameters 600mm and larger
- joined using standard couplers matching the pipe diameter and material

Other coatings that may be specified include aluminized Type 2 or polymer. Polymer coating shall be a 254mm polymer film laminated to both sides of the pipe.

400.15.4 Plastic Pipe

Plastic Pipe shall be a high density polyethylene (HDPE) double wall corrugated pipe with smooth inner wall, solid with no perforations in accordance with OPSS 1840.

A minimum stiffness of 320 KPa at 5% deflection

The pipe shall be joined with snap-on or split couplers.

400.15.5 Concrete Sewer Pipe

Concrete sewer pipe shall be in accordance with OPSS 1820.

Non-reinforced concrete sewer pipe shall be used for pipe 375mm in diameter and smaller and reinforced concrete sewer pipe shall be used for pipe over 375mm.

Classes shall be as shown on the Contract Drawings or as described in the Form of Tender.

All new concrete sewer pipe shall have rubber-type gasket joints.

Where concrete sewer pipe “seconds” are specified, the pipe should exhibit no damage or cracks on the barrel section and shall be capable of satisfying the crushing strength requirements of OPSS 1820. The pipe may contain cracks or chips in the bell or spigot which prevent the use of rubber gaskets but the joints must be protected with filter cloth.

400.16 RIPRAP

All riprap is to be placed on a geotextile underlay (Terrafix 360R or equal) unless directed otherwise in the specific construction notes. The riprap is to be graded heavy angular stone (quarry stone is recommended) with particles averaging in size from 225mm to 300mm and is to be placed at 300mm thickness. Fine particles may be included to fill voids. Along upstream edges of riprap, where surface water will enter, underlay is to extend a minimum of 300mm upstream from riprap and then be keyed down a minimum of 300mm. Wherever riprap is placed, the area is to be over-dug so that finished top of riprap is at design cross-section, at design elevation or flush with existing ground.

400.17 GEOTEXTILE

To be non-woven fabric that is rot proof, non-biodegradable, chemically resistant to acidic or alkaline soils and is dimensionally stable under different hydraulic conditions. The filter fabric is to be a material whose primary function is to act as a highly permeable, non-clogging soil separator for fine soils (Terrafix 360R or equal). Contractor is to avail himself of manufacturer's recommendations for cutting, installation and precautions necessary to avoid damage to fabric. Other approved equals will be considered by the Engineer prior to construction.

400.18 DISPOSAL OF MATERIALS

The Contractor shall remove all surplus materials from the job site at the end of the project. The Contractor shall locate the disposal site for all materials to be disposed of. Disposal of materials shall comply with applicable regulations.

400.19 NOTIFICATION OF RAILROADS, ROAD AUTHORITIES AND UTILITIES

Contractor will notify any Railroad, Road Authority or Utility at least 48 hours in advance regarding work to be performed on their property or affecting their infrastructure. The notice will be in writing and is exclusive of Saturdays, Sundays and Holidays.

A utility includes any entity supplying the general public with necessaries or conveniences.

400.20 WORKING IN ROAD ALLOWANCES

400.20.1 General

Work within public road allowances shall be done in accordance with the Ontario Traffic Manual Book 7, latest edition.

400.20.2 Road Crossings

If no specific detail is provided for road crossings on the drawings or in the specifications the following shall apply:

- A Road Authority will supply no labour, equipment or materials for the construction of the road crossing.
- Contractor will not commence road crossing work until any required permits have been obtained. The Engineer may apply for any required permits prior to construction.
- Contractor will notify the Road Authority at least 72 hours in advance of any construction in the road allowance.
- Road crossings may be made with an open cut unless otherwise noted.
- Exact location of crossing shall be verified with the Road Authority and the Engineer.
- Pipe shall be placed on a minimum 150mm depth of Granular A shaped for the pipe.
- Pipe backfill shall be compacted Granular A and extend 300mm above the top of the pipe.
- Trench shall be backfilled with acceptable native material for the base width of the road bed.
- The material shall be placed in lifts not exceeding 300mm in depth and shall be thoroughly compacted with an approved mechanical vibrating compactor.
- Top 600mm of the road bed backfill shall consist of 450mm Granular B and 150mm of Granular A placed in lifts and fully compacted.
- Any surplus excavated material within the road allowance may be spread on the right-of-way with consent of the Road Superintendent otherwise the surplus material shall be hauled away.
- Existing asphalt or concrete pavement or surface treatment shall be replaced by the Contractor to the satisfaction of the Engineer and Road Authority.
- Contractor shall be responsible for correcting any backfill settlement during construction and during the warranty period. Upon approval of the road authority, surplus gravel shall be stockpiled near gravel road crossings to provide backfill for future trench settlement.
- All road crossings shall meet the approval of the Road Authority.
- If any road crossing is not left in a safe manner at the end of the working day barricades and warning signs shall be erected to guarantee the safety of the travelling public.
- If the Engineer deems a road to surface to have been damaged by the construction of a drain, either across or along the road, the Engineer may direct the Contractor to restore the road surface to existing or better condition at no additional cost.

400.20.3 Maintenance of Traffic

Unless directed otherwise on the drawings or in the specifications the Contractor shall keep the road open to traffic at all times. The Contractor shall provide suitable warning signs and/or flagging to the satisfaction of the Road Authority to notify of the construction work.

If a detour is required, the Contractor shall submit a proposal as to the details of the detour for approval by the Road Authority. If necessary to close the road to through traffic, the Contractor shall provide for and adequately sign the detour route. Contractor shall undertake all notifications required for a road closure in consultation with the Municipality.

400.21 LOCATIONS OF EXISTING UTILITIES

The position of pole lines, conduits, watermains, sewers and other underground and overhead utilities are not necessarily shown on the Contract Drawings, and, where shown, the accuracy of the position of such utilities and structures is not guaranteed. Before starting work, the Contractor shall have all utilities located in accordance with the Ontario Underground Infrastructure Notification System Act.

All utilities shall be exposed to the satisfaction of the utility company to verify that the construction proposed will not conflict with the utility structure. Additional payment will be allowed for relocation of utilities if conflicts should occur.

The Contractor is responsible for protecting all located and exposed utilities from damage during construction. The Contractor shall assume liability for damage caused to all properly located utilities.

400.22 LANEWAYS

If no specific detail is provided for laneway crossings on the Drawings or in the Specifications the following shall apply:

- Pipe backfill shall be acceptable native material that can be compacted in place.
- Top 450mm of laneway backfill shall consist of 300mm Granular B and 150mm of Granular A placed in lifts and fully compacted.
- Minimum cover on laneway culverts shall be 300mm.
- Existing asphalt or concrete pavement or surface treatment shall be replaced by the Contractor.
- The width of surface restoration shall match the existing laneway.
- Contractor shall be responsible for correcting any backfill settlement during construction and during the warranty period.

The timing of laneway closures will be coordinated by the Contractor to the satisfaction of the landowner.

400.23 EXISTING CROSSING CLEANOUT

Where the Special Provisions require an existing crossing to be cleaned, the Contractor shall provide a bottom width and depth that provides capacity equivalent to the capacity of the channel on either side. Excavated materials shall be hauled away unless adjacent landowners give permission for leveling. Care shall be taken to ensure that existing abutments or any portion of the structure are not damaged or undercut. The method of removing the material is to be pre-approved by the Engineer.

400.24 FENCES

If the Contractor is responsible to remove and install fences, the following shall apply:

- All fences removed by a Contractor are to be re-erected in as good a condition as existing materials permit.
- All fences shall be properly stretched and fastened. Where directed by the Engineer, additional steel posts shall be placed to adequately support a fence upon re-erection.
- Where practical and where required by the landowner, the Contractor shall take down an existing fence at the nearest anchor post and roll the fence back rather than cutting the fence and attempting to patch it.
- Where fence materials are in such poor condition that re-erection is not possible, the Contractor shall replace the fence using equivalent materials. Such fence material shall be approved by the Engineer and the landowner. Where the Engineer approves new fence material, additional payment will be provided.

Any fences paralleling an open drain, that are not line fences, that hinder the proper working of the excavating machinery for drain construction or maintenance shall be removed and rebuilt by the landowner at their own expense. If such parallel fences are line fences they shall be removed and reinstalled by the Contractor.

No excavated or cleared material shall be placed against fences.

The installation of all fences shall be done to the satisfaction of the Engineer and the landowner.

400.25 LIVESTOCK

If any construction will be within a fenced field containing livestock that are evident or have been made known to the Contractor, the Contractor shall notify the owner of the livestock 48 hours in advance of access into the field. Thereafter, the owner shall be responsible for the protection of the livestock in the field during construction and shall also be liable for any damage to or by the livestock.

Where the owner so directs or where the Contractor has failed to reach the owner, the Contractor shall adequately re-erect all fences at the end of each working day. No field containing livestock shall have a trench left open at the end of the working day, unless the trench has been adequately backfilled or protected. Failure of the Contractor to comply with this paragraph shall render the Contractor liable for any damage to or by the livestock.

Where livestock may be encountered on any property the Contractor shall notify the Engineer to arrange for inspection of the work prior to backfilling.

400.26 STANDING CROPS

The Contractor shall not be held responsible for damages to standing crops within the working area for the drain. However, the Contractor shall notify the owner of the crops 48 hours prior to commencement of construction so as to allow the owner an opportunity to harvest or salvage the crop within the drain working area. If this advance notice is not given the Contractor may be liable for the loss of the standing crops.

400.27 CLEARING VEGETATION

400.27.1 General
The area for clearing, if not defined elsewhere, shall be 15m on each side of the drain.

400.27.2 Trees to Remain
Where it is feasible to work around existing trees that do not impede the function of the drainage works, the Contractor shall not remove any deciduous tree larger than 300mm and any coniferous tree larger than 200mm, unless authorized by the Engineer.

400.27.3 Incidental Clearing
Incidental clearing includes removal of trees, brush or other vegetation with an excavator during construction activities, and the cost is to be included in the price for the related construction activity.

400.27.4 Power Brushing
Power brushing includes removal of above-ground vegetation with a rotary brush cutter or other mechanical means. Stump and root removal is not required. Power brushed vegetation in a channel cross-section shall be removed and leveled in the working area. Excavated material may be placed and leveled on power brushed vegetation.

400.27.5 Close-Cut Clearing
Close-cut clearing includes removal of above-ground vegetation cut flush with the ground. Stump and root removal is not required.

400.27.6 Clearing And Grubbing
Clearing and grubbing includes removal of vegetation, including stumps and roots. Removal of earth from the grubbed area into the windrows or piles is to be minimized.

400.27.7 Disposal of Cleared Vegetation

400.27.7.1 *In Bush Areas*

Cleared vegetation is to be pushed into windrows or piles at the edge of the cleared area. Stumps and roots are to be piled first at the edge of the cleared area, followed by other vegetation (trunks, branches, etc.). Provisions for lateral drainage are required through all windrows. Windrows are not to block any laneways or trails. After removing cleared vegetation, the working area shall be leveled to the satisfaction of the Engineer.

400.27.7.2 *In Field Areas*

Cleared vegetation resulting from incidental clearing or power brushing may be hauled away, mulched in place or reduced to a size that permits cultivation using conventional equipment without causing undue hardship on farm machinery.

Cleared vegetation resulting from close-cut clearing or clearing and grubbing is to be hauled away to an approved location. Disposal sites may be in bush areas or other approved locations on the same farm. No excavated material shall be levelled over any logs, brush or rubbish of any kind.

400.27.8 Landowner Requested Salvage

A landowner may request that wood be separated from the windrows for the landowner's future use. This additional work would be eligible for extra payment, subject to the approval of the Engineer. The cost of the additional work would be assessed to the landowner.

400.27.9 Clearing by Landowner

Wherever the Special Provisions indicate that clearing may be undertaken by the landowner, work by the landowner shall be in accordance with the Clearing Vegetation requirements of this specification and must be completed so as not to cause delay for the Contractor. If the landowner does not complete clearing in accordance with these requirements, the Contractor will undertake the clearing at a price approved by the Engineer.

400.28 ROCK REMOVAL

400.28.1 General

Rock shall be defined as bedrock and boulders that are greater than one-half cubic metre in size and that require blasting or hoe-ram removal. Bedrock or boulders that can be removed with a standard excavator bucket are not considered rock removal.

400.28.2 Blasting Requirements

All blasting shall be performed by a competent, qualified blaster in accordance with OPSS 120. Blasting mats are required. A pre-blast survey meeting the requirements of OPSS 120 must be completed for any structure within 200m of any blasting. The cost for pre-blast survey shall be included in the tender price for rock removal.

400.28.3 Typical Sections and Pay Limits

For tile drains and road culverts, rock shall be removed to 150mm below the proposed grade shown on the profile so that pipes are not in direct contact with rock. The width of rock removal shall be 1m minimum or the diameter of the pipe plus 600mm.

For open drains, rock removal shall match the proposed grade and bottom width shown on the Drawings. Side slopes shall be vertical or sloped outward. Side slopes shall be free of loose rock when excavation is completed.

Payment for the quantity of rock removed will be based on the typical sections described in these specifications and confirmed by field measurements. There will be no payment for overbreak.

400.28.4 Disposal of Rock
Excavated rock shall be piled at the edge of the working area at locations designated by the landowner. The cost to pile excavated rock shall be included in the tender price for rock removal. If the Special Provisions or the landowner require excavated rock to be hauled away, additional payment will be considered.

Where approved by the Engineer, excavated rock may be used in place of imported riprap.

400.29 SEEDING

400.29.1 General
Contractor responsible for re-seeding as necessary for uniform catch during warranty period.
Areas that remain grassed after construction may not need to be seeded unless directed otherwise by the Engineer.

400.29.2 Drainage Works and Road Allowances
All disturbed ditch banks, berms and road allowances are to be seeded at the end of the day.

The following seed mixture shall be applied at 60kg/ha using a mechanical (cyclone) spreader:

- 35% Creeping Red Fescue
- 25% Birdsfoot Trefoil
- 25% Kentucky Bluegrass
- 10% Cover Crop (Oats, Rye, Barley, Wheat)
- 5% White Clover

Provide temporary cover for late fall planting by adding an additional 10 kg/ha of rye or winter wheat.

400.29.3 Hydroseeding
Where hydroseeding is specified, disturbed areas will be restored by the uniform application of a standard roadside mix, fertilizer, mulch and water at a rate of 2,000 kg/ha and be in accordance with OPSS 804.

400.29.4 Seeding Lawns
Unless specified otherwise, lawn areas shall be seeded with Canada No. 1 lawn grass mixture applied at 300 kg/ha using a mechanical (cyclone) spreader on 100mm of topsoil. Fertilizer shall be 5:20:20 or 10:10:10 applied at 300 kg/ha. Seed and fertilizer shall be applied together. Contractor shall arrange for watering with landowners.

400.29.5 Sod
Where sod is specified, sod is to be commercial grade turfgrass nursery sod, Kentucky Bluegrass placed on 50mm of topsoil. Fertilizer shall be 5-20-20 applied at 10kg/ha. Place sod in accordance with supplier instructions. Contractor is responsible for saturating the sod with water on the day of sod placement. Subsequent watering is the responsibility of the landowner.

400.30 EROSION CONTROL BLANKETS

Erosion Control Blankets (ECB) shall be biodegradable and made of straw/coconut (Terrafix SC200, Nilex SC32 or equal) or coconut (Terrafix C200, Nilex C32 or equal) with photodegradable, double net construction. The blanket and the staples shall be supplied and installed as per OPSS 804.

Erosion control blanket shall be placed and stapled into position as per the manufacturer's installation instructions on slopes as directed by the Engineer. Blankets shall be installed in direct contact with the ground surface to form a uniform, cohesive mat over the seeded earth area. The blankets are to be single course with 150mm overlap between blankets and joints are to be staggered. The Contractor shall ensure that the ECB is anchored to the soil and that tenting of the ECB does not occur.

On slopes, when the ECB cannot be extended 1m beyond the crest of the slope, the uppermost edge of the ECB shall be anchored in a 150mm wide by 150mm deep trench. The trench shall be backfilled with earth and compacted.

400.31 SEDIMENT CONTROL

400.31.1 General

Contractor shall install sediment control features at the downstream limits of the project and at other locations as shown on the drawings or directed by the Engineer.

Sediment control features shall be installed prior to any excavation taking place upstream of that location. The Contractor shall maintain all sediment control features throughout construction and the warranty period.

Sediment that accumulates during construction shall be removed and levelled as required.

400.31.2 Flow Check Dams

400.31.2.1 *Temporary Straw Bale Flow Check Dam*

The straw bale flow check dam shall consist of a minimum of 3 bales. Each bale is to be embedded at least 150mm into the channel bottom and shall be anchored in place with 2 T-bar fence posts or 1.2m wooden stakes driven through the bale.

Straw bales shall be hauled away at the end of the warranty period. Accumulated sediments shall be excavated and levelled when the temporary straw bale flow check dam is removed.

400.31.2.2 *Temporary Rock Flow Check Dam*

The temporary rock flow check dam shall extend to the top of the banks so that dam overtopping does not cause bank erosion. Rock shall be embedded a minimum of 150mm into the ditch bottom and banks. No geotextile is required for temporary rock flow check dams.

Accumulated sediments shall be excavated and levelled when the temporary rock flow check dam is removed at the conclusion of the warranty period.

400.31.2.3 *Permanent Rock Flow Check Dam*

The requirements of temporary rock flow check dams shall apply except rock shall be placed on geotextile and the dam shall remain in place permanently.

400.31.3 Sediment Traps

400.31.3.1 *General*
The channel bottom shall be deepened in accordance with the dimensions provided in the Drawings or Special Provisions. If dimensions are not specified on the Drawings, the sediment trap shall be excavated within the channel cross-section at least 0.3m below the design grade.

The Contractor will monitor the sediment trap during construction and cleanout accumulated sediments as required to maintain the function of the sediment trap.

If specified to be temporary, no sediment trap maintenance is required after construction is complete.

If specified to be permanent, the contractor will clean out the sediment trap at the conclusion of the warranty period, unless directed otherwise by the Engineer.

400.31.3.2 *Sediment Trap with Flow Check Dam*
A permanent rock sediment trap shall include a permanent sediment trap and a rock flow check dam.

A temporary rock/straw sediment trap shall include a temporary sediment trap and a rock/straw flow check dam.

400.31.4 Turbidity Curtains
A turbidity curtain is required when there is permanent water level/flow and a sediment trap is not feasible.

Turbidity curtains shall be in accordance with OPSS 805 and installed per manufacturer's instructions.

Turbidity curtains shall be sized and anchored to ensure the bottom edge of the curtain is continuously in contact with the waterbody bed so that sediment passage from the enclosed area is prevented. The curtain must be free of tears and capable of passing the base flow from the drainage works. Turbidity curtain locations may be approved by the Engineer.

Turbidity curtains are to remain functional until work in the enclosed area is completed. Prior to relocating or removing turbidity curtains, accumulated sediment is to be removed from the drain and levelled.

Where a turbidity curtain remains in place for more than two weeks it shall be inspected for damage or clogging and replaced, repaired or cleaned as required.

400.31.5 Silt Fence
Silt fence shall be in accordance with OPSS 805.07.02.02 and OPSD 219.110 (light-duty).

400.32 GRASSED WATERWAYS AND OVERFLOW SWALES

Grassed waterways and overflow swales typically follow low ground along the historic flow route. The cross-section shall be saucer shaped with a nominal 1m bottom width, 8:1 side slopes and 300mm depth unless stated otherwise in the Special Provisions.

All grassed waterways are to be permanently vegetated. Grassed waterways shall be seeded with the following permanent seed mixture: 50% red fescue, 45% perennial ryegrass and 5% white clover, broadcast at 80 kg/ha. Fertilizer to be 7-7-7 applied at 80 kg/ha.
Provide temporary cover for late fall planting by adding an additional 10 kg/ha of rye or winter wheat.

Overflow swales may be cropped using conventional farming practice.

400.33 BUFFER STRIPS

Open drains shall include minimum 3m wide, permanently vegetated buffer strips on each side of the drain. Catchbasins shall include a minimum 1m radius, vegetated buffer strip around the catchbasin.

Cultivation of buffer strips using conventional farming practice may be undertaken, provided sediment transport into the drain is minimized.

400.34 MAINTENANCE CORRIDOR

The maintenance corridor along the route of the drain, as established in the report, shall be kept free of obstructions, ornamental vegetation and structures. When future maintenance is undertaken, the cost of removing such items from the corridor shall be assessed to the landowner.

400.35 POLLUTION

The Contractor shall keep their equipment in good repair. The Contractor or any landowner shall not spill or cause to flow any polluted material into the drain that is not acceptable to the MECP. The local MECP office and the Engineer shall be contacted if a polluted material enters the drain. The Contractor shall refill or repair equipment away from open water. If the Contractor causes a spill, the Contractor is responsible to clean-up the spill in accordance with MECP clean-up protocols.

400.36 SPECIES AT RISK

If a Contractor encounters a known Species At Risk designated by the MECP, MNRF or DFO, the Contractor shall notify the Engineer immediately and follow the Ministry's guidelines for work around the species.

410 STANDARD SPECIFICATIONS

FOR

OPEN DRAINS

TABLE OF CONTENTS

410.1 DESCRIPTION 1
410.2 MATERIALS 1
410.3 CONSTRUCTION 1
410.3.1 Excavation 1
410.3.2 Low Flow Channels 1
410.3.3 Line 1
410.3.4 Grade Control 1
410.3.5 Variation from Design Grade 2
410.3.6 Excavated Material 2
410.3.7 Excavation at Existing Bridge and Culvert Sites 3
410.3.8 Bridges and Culverts 3
410.3.9 Obstructions 3
410.3.10 Tile Outlets 4
410.3.11 Completion 4

410.1 DESCRIPTION

Work under this item shall include the supply of labour, equipment and materials required for: channel excavation to the cross-section specified, leveling or disposal of all excavated material (spoil) as directed, reconstruction of all intercepted drains as required and any other items related to open drain construction as required by the Schedule of Tender Prices, Special Provisions or the Drawings.

410.2 MATERIALS

Refer to Section 400, Standard Specifications for Drain Construction for any materials required for open drain construction.

410.3 CONSTRUCTION

410.3.1 Excavation

The bottom width and the side slopes of the ditch shall be as shown on the profile drawing. If the channel cross-section is not specified in the Special Provisions it shall be a 1m bottom width with 1.5m horizontal to 1m vertical (1.5:1) bank slope. At locations along the drain where the specified side slopes change there shall be a transitional length of not less than 5m between the varying side slopes. At locations along the drain where the specified bottom width changes there shall be a transitional length of not less than 5m. In all cases there shall be a smooth transition between changes in any part of the channel cross-section. Where the bottom width of the existing ditch matches the specified bottom width, ditch excavation shall be completed without disturbing existing banks.

410.3.2 Low Flow Channels

Unless specified otherwise in the Special Provisions, all intermittent open drains with a bottom width greater than 1.8m and a grade less than 0.07%, shall have a low flow channel. The bottom of the low flow channel shall be the grade shown on the profiles.

The low flow channel shall have a U-shaped cross-section with an average top width of 0.5m and a minimum depth of 0.3m. The low flow channel will not be seeded and may meander along the main channel bottom provided it remains at least .3m from the toe of main channel bank slope.

410.3.3 Line

The drain shall be constructed according to the alignment shown on the drawings or shall follow the course of the existing ditch. All bends shall have a minimum inside radius of 2m. There shall be a smooth transition between changes in the channel alignment. The Contractor shall contact the Engineer before removing any bends or irregularities in an existing ditch.

410.3.4 Grade Control

The profile shows the grade line for the bottom of the ditch. Cuts may be shown on the profile from the existing top of bank and/or from the existing ditch bottom to the new ditch bottom. These cuts are shown for the convenience of the Contractor and are not recommended for quantity estimate or grade control. Accurate grade control must be maintained by the Contractor during ditch excavation. The ditch bottom elevation should be checked every 50 metres and compared to the elevation on the profile.

Benchmarks are identified on the Contract Drawings. The Engineer will confirm all benchmark elevations prior to construction.

410.3.5 Variation from Design Grade

A variation of greater than 25mm above the design grade line may require re-excavation. Excavation below design grade up to 150mm is recommended so that sediment accumulation during or following excavation will not place the ditch bottom above the design grade at completion. Under some circumstances the Engineer may direct that over excavation greater than 200mm will have to be backfilled. No additional payment will be made if backfilling is required to remedy over excavation.

410.3.6 Excavated Material

Excavated material (spoil) shall be deposited on either or both sides of the drain within the specified working area as directed in the Special Provisions. The Contractor shall verify the location for the spoil with each landowner before commencing work on their property. If not specified, spoil shall be placed on the low side of the ditch or opposite trees and fences. The spoil shall be placed a minimum 1m from the top of the bank. No excavated material shall be placed in tributary drains, depressions, or low areas such that water is trapped behind the spoil bank. Swales shall be provided through the leveled or piled spoil at approximately 60m intervals to prevent trapping water behind the spoil bank.

The excavated material shall be placed and leveled to a maximum depth of 250mm; unless otherwise instructed. If excavating more than 450mm topsoil shall be stripped, stockpiled separately and replaced over the leveled spoil, unless stated otherwise in the Special Provisions. The edge of the spoil bank furthest from the ditch shall be feathered down to existing ground. The edge of the spoil bank nearest the ditch shall have a maximum slope of 2:1. The material shall be leveled such that it may be cultivated with conventional equipment without causing undue hardship on farm machinery.

Wherever clearing is necessary prior to leveling, the Contractor shall remove all stumps and roots from the working area. No excavated material shall cover any logs, brush or rubbish of any kind. Large stones in the leveled spoil that are greater than 300mm in diameter shall be moved to the edge of the spoil bank nearest to the ditch but in general no closer than 1m to the top of bank.

Lateral channels that outlet into the drain shall be tapered over a distance of 10m to match the grade of drain excavation. No additional payment will be made for this work.

Where the elevation difference between the lateral channel and the drain is greater than 450mm, a rock chute or similar bank protection approved by the Engineer shall be provided. Additional payment may be allowed for this work.

Where it is specified to straighten any bends or irregularities in the alignment of the ditch or to relocate any portion of an existing ditch, the excavation from the new cut shall be used for backfilling the original ditch. Regardless of the distance between the new ditch and old ditch, no additional payment will be allowed for backfilling the existing ditch.

The Contractor shall contact the Engineer if a landowner indicates in writing that spoil on the owner's property does not need to be leveled. The Engineer may release the Contractor from the obligation to level the spoil and the Engineer shall determine the credit to be applied to the Contractor's payment. No additional compensation is provided to the owner if the spoil is not leveled.

The Engineer may require the Contractor to obtain written statements from any or all of the landowners affected by the leveling of the spoil. Final determination on whether or not the leveling of spoil meets the specification shall be made by the Engineer.

410.3.7 Excavation at Existing Bridge and Culvert Sites

The Contractor shall excavate the drain to the specified depth under all bridges and to the full width of the structure unless specified otherwise in the Special Provisions. All necessary care and precautions shall be taken to protect permanent structures. Temporary bridges may be removed and left on the bank of the drain. In cases where the design grade line falls below the top of footings, the Contractor shall take care to not over-excavate below the grade line. The Contractor shall notify the Engineer if excavation of the channel exposes the footings of the bridge or culvert, so the Engineer can make an evaluation.

The Contractor shall clean through all pipe culverts to the grade line and width specified on the profile. The Contractor shall immediately contact the Engineer after a culvert cleanout if it is found that the culvert bottom is above the grade line or where the structural integrity of the culvert is questionable.

Material resulting from cleanout through bridges or culverts shall be levelled on the adjacent private lands or hauled offsite at the expense of the bridge/culvert owner.

410.3.8 Bridges and Culverts

The size and material for any new ditch crossings shall be as outlined in the Special Provisions.

For culvert installation instructions, refer to the General Specifications for Drain Construction and the Drawings.

Any crossings assembled on-site shall be assembled in accordance with the manufacturer's specifications.

If directed on the drawings that the existing crossing is to be salvaged for the owner, the Contractor shall carefully remove the existing crossing and place it beside the ditch or haul to a location as specified by the owner. If the existing crossing is not to be saved then the Contractor shall remove and dispose of the existing crossing. Disposal by burying on-site must be approved by the Engineer and the owner.

All new pipe crossings shall be installed at the invert elevations as specified on the Drawings, usually a minimum of 50mm below design grade. If the ditch is over excavated greater than 200mm below design grade the Contractor shall confirm with the Engineer the elevations for installation of the new pipe crossing.

For backfill and surface restoration, refer to the General Specifications for Drain Construction and the Drawings.

Installation of private crossings during construction must be approved by the Engineer.

410.3.9 Obstructions

All trees, brush, fallen timber and debris shall be removed from the ditch cross-section and as required for spreading of the spoil. The roots shall be left in the banks if no bank excavation is required as part of the new channel excavation. In wooded or heavily overgrown areas all cleared material may be pushed into piles or rows along the edge of the cleared path and away from leveled spoil. All dead trees along either side of the drain that may impede the performance of the drain if allowed to remain and fall into the ditch, shall be removed and put in piles, unless directed otherwise by the Engineer.

410.3.10 Tile Outlets

The location of all existing tile outlets may not be shown on the profile for the drain. The Contractor shall contact each owner and ensure that all tile outlets are marked prior to commencing excavation on the owner's property. If a marked tile outlet or the tile upstream is damaged due to construction, it shall be replaced at the Contractor's expense. Additional payment will be allowed for the repair or replacement of any unmarked tile outlets encountered during excavation. In all cases, if an existing tile outlet requires replacement the Contractor shall confirm the replacement tile outlet with the Engineer. Where riprap protection exists at any existing tile outlet such protection shall be removed and replaced as necessary to protect the outlet after reconstruction of the channel.

If any tile outlet becomes plugged as a result of construction, the Contractor shall remove the obstruction.

410.3.11 Completion

At the time of final inspection, all work in the contract shall have the full dimensions and cross-sections specified.

420 **STANDARD SPECIFICATIONS**

FOR

TILE DRAINS

TABLE OF CONTENTS

420.1 DESCRIPTION 1

420.2 MATERIALS 1

420.3 CONSTRUCTION 1

420.3.1 Outlet 1
420.3.2 Line 1
420.3.3 Grade Control 2
420.3.4 Variation from Design Grade 2
420.3.5 Installation 2
420.3.6 Backfilling 3
420.3.7 Tile Connections 3
420.3.8 Stones and Rock 4
420.3.9 Brush, Trees and Debris 4
420.3.10 Subsoil Instability 4
420.3.11 Broken or Damaged Tile 4
420.3.12 Excess Tile 4
420.3.13 Catchbasins 5
420.3.14 Junction Boxes 5

420 STANDARD SPECIFICATIONS FOR TILE DRAINS

420.1 DESCRIPTION

Work under this specification will consist of supplying, hauling, laying and backfilling subsurface drainage conduit with the conduit materials as described on the Drawings and in the location, depth and invert grade as shown on the Drawings. In this specification the word "tile" will apply to all described conduit materials. Lengths are in millimeters (mm) and meters (m).

The work shall include the supplying of all labour, tools, equipment and extra materials required for the installation of the tile; the excavation and backfilling of the trenches; the hauling, handling, placing and compaction of the excavated material for backfill, the loading, hauling, handling and disposal of surplus excavation material; the removal and replacing of topsoil and sod where required by the Engineer.

All existing laterals crossed by the new line shall be reconnected in an approved manner. Either special manufactured connections shall be used or another method of sealing connections as approved by the Engineer. The Contractor shall also construct catchbasins, junction boxes and other structures where directed by the Engineer.

Except where complete removal of an existing pipe is required by new construction, existing pipes to be abandoned shall be sealed with a concrete or mortar plug with a minimum length of 300mm to the satisfaction of the Engineer.

Sections 6 and 7 of the current version of the *Drainage Guide for Ontario*, OMAFRA Publication 29 shall provide a general guide to all methods and materials to be used in the construction of tile drains except where superseded by this Contract.

The licensing requirements of the *Agricultural Tile Drainage Installation Act, 1990* will not be applicable to this Contract unless specified otherwise by this Contract.

420.2 MATERIALS

Refer to Section 400, Standard Specifications for Drain Construction for any materials required for tile drain construction.

420.3 CONSTRUCTION

420.3.1 Outlet

A tile drain outlet into a ditch or creek shall be protected using a 6m length of rigid pipe with a hinged grate for rodent protection. Maximum spacing between bars on the rodent grate shall be 50mm. Material for rigid pipe will be specified in the Special Provisions, plastic pipe is preferred. The joint between the rigid pipe and the tile drain shall be wrapped with filter fabric. All outlets will be protected with rock riprap to protect the bank cut and as a splash apron. In some locations riprap may also be required on the bank opposite the outlet. The quantity of riprap required will be specified in the Special Provisions. A marker stake as approved by the Engineer shall be placed at each tile outlet.

420.3.2 Line

The Engineer will designate the general location of the new drain. A landowner may indicate a revised location for the drain which must be approved by the Engineer. Where a change in alignment is required that is not accommodated in a catchbasin, junction box or similar structure the alignment change shall run on a curve with a radius not less than the minimum installation radius specified for the tile material.

The Contractor shall exercise care to not disturb any existing tile drains which parallel the course of the new drain, particularly where the new and existing tile act together to provide the necessary capacity. Where an existing tile is disturbed or damaged the Contractor shall perform the necessary correction or repair with no additional compensation.

NOTE: It is the Contractor's responsibility to ascertain the location of, and to contact the owners of all utility lines, pipes and cables in the vicinity of drain excavations. The Contractor shall be completely responsible for all damages incurred.

420.3.3 Grade Control

Tile is to be installed to the elevation and grade shown on the profiles. Accurate grade control must be maintained by the Contractor at all times during tile installation. The tile invert elevation should be checked every 50m and compared to the elevation on the profile.

Benchmarks are identified on the Contract Drawings. The Engineer will confirm all benchmark elevations prior to construction.

420.3.4 Variation from Design Grade

No reverse grade will be allowed. A small variation in grade can be tolerated where the actual capacity of the drain exceeds the required capacity. The constructed grade should be such that the drain will provide the capacity required for the drainage area. Constructed grade should not deviate from design grade by more than 10% of the internal diameter for more than 25m. Grade corrections shall be made gradually over a distance not less than 10m.

420.3.5 Installation

At each work stoppage, the exposed end of the tile shall be covered by a tight fitting board or metal plate. No installed tile shall be left exposed overnight. Any tile damaged or plugged during construction shall be replaced or repaired at the Contractor's expense.

Topsoil over the trench shall be stripped, stockpiled separately and replaced after the trench is backfilled. Where installation is across a residential lawn, existing sod over the trench shall be cut, lifted and replaced in a workmanlike manner or new sod laid to match pre-construction conditions.

420.3.5.1 Installation of Concrete Tile

Concrete tile shall be installed by a wheel trencher unless an alternate method of construction is noted on the Drawings.

Digging of the trench shall start at the outlet end and proceed upstream. The location and grade shall be as shown on Drawings but shall be liable to adjustment or change by the Engineer on site with no additional payment allowed except where the change involves increased depth of cut beyond the limitation of the wheel trencher in use at the time of the change. The trench width measured at the top of the tile should be at least 150mm greater than the tile diameter.

The bottom of the trench is to be cut accurately to grade and shaped so that the tile will be embedded in undisturbed soil or in a compacted bed at least for 10% of its overall height. Where hard shale, boulders or other unsuitable bedding material is encountered, the trench shall be excavated to 75mm below grade and backfilled with granular material compacted to a shaped, firm foundation. If the trench is overcut below the proposed grade, it is to be backfilled with granular material to the correct grade and compacted to a shaped, firm foundation.

Where the depth for the tile installation exceeds the depth capacity of the wheel trencher the Contractor shall excavate a trench of sufficient depth so that the wheel trencher can install the tile at the correct depth

and grade. The tender price shall include the cost of the additional excavation and backfilling and stripping and replacing topsoil over the trench.

The inside of the tile is to be kept clean during installation. All soil and debris should be removed before the next tile is laid. Maximum spacing at joints between tiles should be about 3mm. Directional changes can be made without fittings or structures provided the centre-line radius of the bend is not less than 15m radius. The tiles are to be beveled, if necessary, to ensure close joints on all bends.

All tile joints and connections with other pipe materials are to be fully and tightly wrapped with a minimum 300mm width of geotextile drain wrap. A 150mm overlap on top is required. No additional payment will be made for joint wrapping.

420.3.5.2 Installation of Corrugated Plastic Tubing

Corrugated plastic tubing shall be installed by a drainage plow or wheel trencher unless an alternate method of construction is specified on the Drawings. For other installation methods, proper bedding and backfill is required to maintain the structural integrity of the plastic tubing so that surface and earth loads do not deflect the tubing by more than 20% of its nominal diameter.

For all installation methods:

- the plastic tubing should not be stretched by more than 7% of its normal length
- protect tubing from floating off grade when installing in saturated soil conditions
- directional changes can be made without fittings provided the centre-line radius of the bend is not less than five times the tubing diameter

Drainage plow equipment should construct a smooth bottomed opening in the soil and maintain the opening until the tubing is properly installed. The size of the opening in the soil should conform closely to the outside diameter of the tubing.

420.3.5.3 Installation of Concrete Sewer Pipe or Plastic Pipe

The Contractor may install pipe using a wheel trencher. For concrete sewer pipe, the bells must be recessed.

The Contractor may install pipe using an excavator by shaping the bottom of the trench to receive and support the pipe over 10% of its diameter if the trench is backfilled with native material. Shaping the trench bottom is not required where 150mm of granular bedding is placed to the satisfaction of the engineer.

420.3.6 Backfilling

All tile should be blinded by the end of the day's work to protect and hold them in place against disturbances. After tile is inspected, it shall initially be backfilled with a minimum cover of 300mm.

For blinding and initial backfilling use clean native soil with no organic matter. Initial backfill shall be tamped around the pipe by backhoe bucket or similar if directed by the Engineer.

The tile shall be backfilled with native material such that there is a minimum cover of 600mm. In addition, a sufficient mound must be placed over the trench to ensure that no depression occurs after settling along the trench.

420.3.7 Tile Connections

All lateral drains encountered along the route of the new tile drain are to be connected to the new drain if the intercepted tile are clean and do not contain polluted water. Lateral drains that are full of sediments or contain polluted waters will be addressed by the Engineer at the time of construction. All lateral drains are to be connected to the new tile using a pipe material and size that will provide the same flow capacity as the existing lateral drain unless a different connection is described in the Special Provisions. Corrugated plastic tubing can be used for all tile connections. Tubing can be solid or perforated, filter sock is not required.

Contractor is responsible for installation and backfilling in a manner than maintains the structural integrity of the connection. Manufactured fittings should be used to ensure tight connections. Where an opening must be made in the new tile drain for a connection, the opening shall be field cut or cored. After the opening is cut in the new tile any gaps or voids around the connection shall be sealed with mortar, low-expanding spray foam or geotextile. Lateral tubing shall not protrude more than 25mm beyond the inside wall of the new tile drain. The Contractor shall ensure than any material used to seal the connection does not protrude beyond the inside wall of the new tile drain.

All connections that are described in the Special Provisions are considered to be part of the original Contract price. For all other connections the Contractor will be paid in accordance with the price established in the Schedule of Tender Prices. The Contractor must list all connections on the Lateral Connection Summary sheet, if included in the Special Provisions, in order to qualify for payment. The Lateral Connection Summary sheet describes all tile encountered based on location (station), side of trench, size and type of tile and approximate length and type of material used for the connection.

420.3.8 Stones and Rock

The Contractor shall immediately contact the Engineer if bedrock or stones of sufficient size and number are encountered such that installation by wheel trencher cannot continue. The Engineer may direct the Contractor to use some other method of excavation to install the tile. The basis of payment for such extra work shall be determined by the Engineer. Stones greater than 300mm in diameter that are removed during excavation shall be disposed of by the Contractor at an offsite location. No additional payment for excavating or hauling these stones will be provided.

420.3.9 Brush, Trees and Debris

Unless stated otherwise in the Special Provisions, the following requirements shall apply for installation of a tile drain in a wooded area. The Contractor will clear and grub a minimum corridor width of 30m centered on the tile drain alignment. The resulting debris shall be placed in a windrow along the edge of the working area. No additional payment will be made for such work.

420.3.10 Subsoil Instability

If poor subsoil conditions are encountered during tile installation by wheel trencher an attempt shall be made to install the tile with a continuous geotextile underlay in the trench bottom. The cost of the underlay, if approved by the Engineer, will be paid as an extra. If the continuous geotextile underlay is not sufficient then the tile will be installed by backhoe or excavator on a bedding of 19mm clear crushed stone (300mm depth) to achieve trench bottom stability for the new tile. If approved, the above work will be paid based on the unit price provided on the Form of Tender. The unit price shall include the cost to supply and place the stone. If more than 300mm depth of stone is required for bottom stability, additional payment will be allowed for the additional depth of stone. The additional quantity of stone shall be supported by weigh tickets and the suppliers invoice.

If poor subsoil conditions are encountered during tile installation by backhoe or excavator, the tile shall be installed on stone bedding as noted above. For this installation only the material cost of the stone will be paid as an extra. Supply of stone and cost to be supported by weigh tickets and supplier's invoice.

If the subsoil is a fine grained soil it may necessary to place the stone on a geotextile with the geotextile wrapped over the stone before laying the tile. Additional payment will be allowed to supply and install the geotextile.

420.3.11 Broken or Damaged Tile

The Contractor shall dispose of all damaged or broken tile and broken tile pieces off-site.

420.3.12 Excess Tile

All excess tile shall be removed from the job site.

420.3.13 Catchbasins

420.3.13.1 General

All catchbasins shall have minimum inside dimensions matching the dimensions shown on the Drawings. Contractor is responsible for ordering catchbasins to match the inlet and outlet connections and top elevations required by the Special Provisions and the Drawings.

420.3.13.2 Materials

Requirements in this section apply to catchbasins in non-travelled locations. Where catchbasins are proposed for travelled locations, refer to the Special Provisions and the Drawings for applicable OPSD information.

Precast concrete catchbasins shall be manufactured by as Coldstream Concrete or approved equal. Minimum wall thickness for catchbasins without reinforcement is 150mm and with reinforcement 100mm. The joints between precast catchbasin sections shall be protected with geotextile to prevent soil material from entering into the catchbasin. Joint protection using mortar or water tight barrier is also acceptable. Grates are to be birdcage grates as manufactured by Coldstream Concrete or approved equal unless specified otherwise on the Drawings. All grates to be secured with corrosion resistant hardware.

HDPE catchbasins shall be as fabricated by ADS, Armtec, Hancor or approved equal. Steel catchbasins shall be the Heavy Duty Steel Catch Basin as manufactured by AgriDrain or approved equal. PVC catchbasins shall be Nyloplast as manufactured by ADS or approved equal. HDPE, steel and PVC catchbasins shall be supplied with integral stubouts fabricated by the manufacturer and sized according to the pipe connections shown on the Drawings. Grates for HDPE, steel or PVC catchbasins shall be in accordance with the Special Provisions and manufacturer recommendations.

Marker stakes as supplied by Coldstream Concrete or equal are to be placed beside each catchbasin unless specified otherwise on the Drawings.

420.3.13.3 Installation

All tile or pipe connected to concrete catchbasins shall be mortared or secured in place so that no gaps remain at the connection. Mortar is to be applied on both the inside and outside wall surfaces.

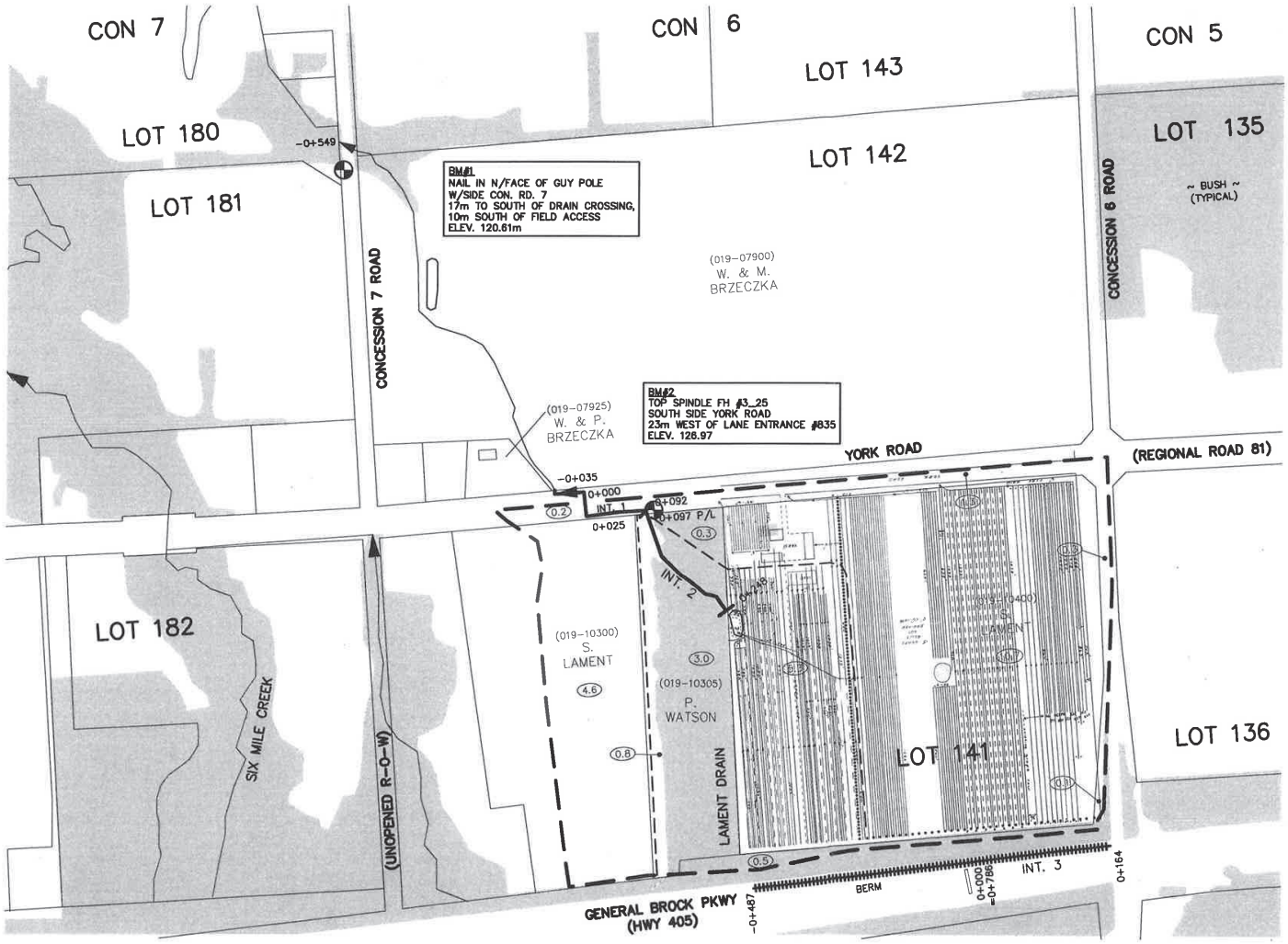
Backfill around all new catchbasins is recommended to be 19mm clear crushed stone to avoid future settlements. The Contractor shall be responsible backfilling all settlement areas around catchbasins during the contract warranty period. No additional payment will be provided for adding backfill to settlement areas around catchbasins.

All catchbasin sumps to be fully cleaned by the Contractor after completion of drain installation and backfilling.

420.3.14 Junction Boxes

Junction boxes shall be precast concrete to the same specification as above for catchbasins except that the junction box shall have a solid lid. The lid shall be a minimum of 125mm thick with wire mesh reinforcement and 2 lifting handles. The top of the junction box should have a minimum ground cover of 450mm.

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL BE INFORMED OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.



BENCHMARK / VERTICAL DATUM
ELEVATIONS SHOWN ARE REFERENCED TO THE CANADIAN GEODETIC VERTICAL DATUM OF 1928 (CGVD28:78).
THE BENCHMARK 10920020089 AT ELEVATION 123.206 WAS USED FOR THIS PROJECT.
BENCHMARK INFORMATION WAS ACQUIRED FROM THE NIAGARA REGION CONTROL POINTS WEBSITE

PLAN LEGEND
- MAJOR WATERSHED
- INTERMEDIATE WATERSHED
- PROPOSED WORK OR INCORPORATION
- EXISTING WATERCOURSE
- ACCESS WAY
- (5.3) APPROXIMATE HECTARES IN WATERSHED
- (019-10300) ASSESSMENT ROLL NUMBER
- BUSH/WETLAND

GEOGRAPHIC TOWNSHIP OF NIAGARA

DESIGNED BY: H.A.W.	
CHECKED BY: K.A.S.	
DRAWN BY: N.M.B.	
CHECKED BY: K.A.S.	

LICENSED PROFESSIONAL ENGINEER N. W. MORRIS 100109137 PROVINCE OF ONTARIO

SCALE
0 50 100m
(1:5000 ON 11"x17")

LAMENT DRAIN

REGION OF NIAGARA — TOWN OF NIAGARA-ON-THE-LAKE

WATERSHED PLAN

MAR. 31, 2020

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUDBURY

REVISED:
JOB NUMBER: 18-218
DRAWING 1 OF 8

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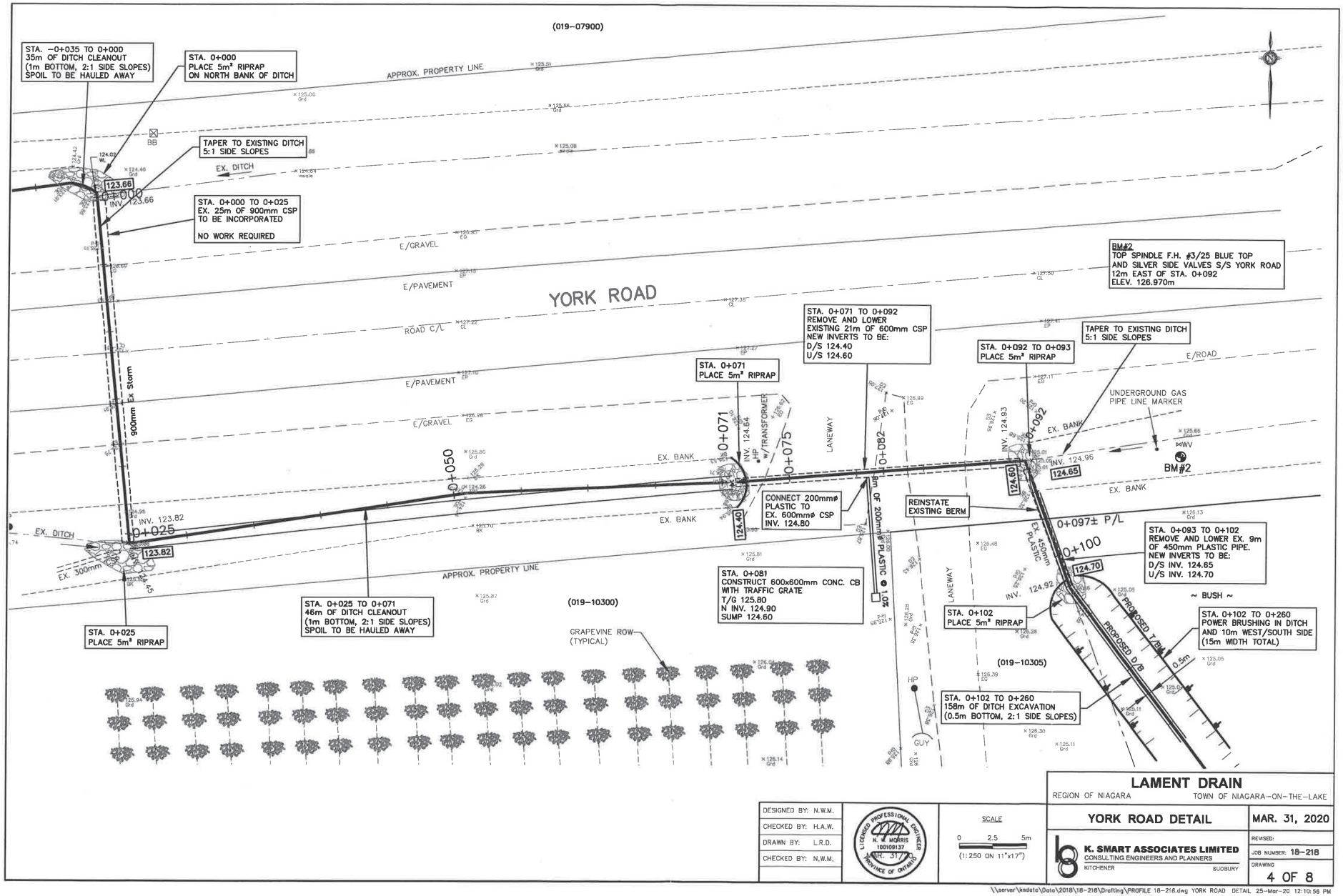

LAMENT DRAIN

REGION OF NIAGARA — TOWN OF NIAGARA-ON-THE-LAKE

YORK ROAD DETAIL

MAR. 31, 2020

DESIGNED BY:	N.W.M.
CHECKED BY:	H.A.W.
DRAWN BY:	L.R.D.
CHECKED BY:	N.W.M.

LICENSED PROFESSIONAL ENGINEER — N. W. MORRIS — 100109137 — MAR. 31/20 — PROVINCE OF ONTARIO

SCALE: 0 2.5 5m (1:250 ON 11"x17")

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER — SUDBURY

REVISED:

JOB NUMBER: 18-218

DRAWING: 4 OF 8

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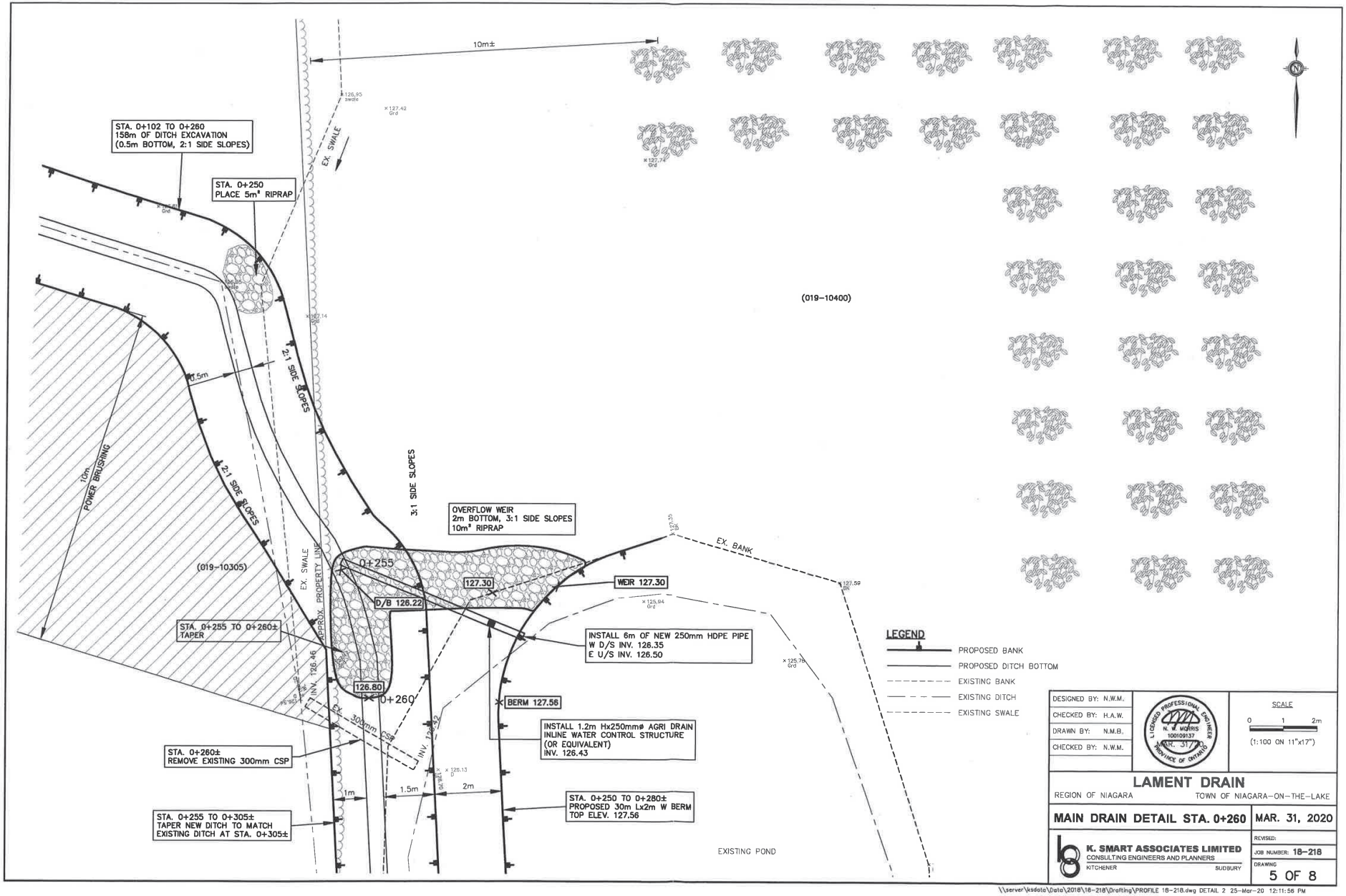

DESIGNED BY: N.W.M.	
CHECKED BY: H.A.W.	
DRAWN BY: N.M.B.	
CHECKED BY: N.W.M.	

N. MORRIS 100109137 MAR. 31/20 — LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

SCALE
0 1 2m
(1:100 ON 11"x17")

LAMENT DRAIN

REGION OF NIAGARA — TOWN OF NIAGARA-ON-THE-LAKE

MAIN DRAIN DETAIL STA. 0+260

MAR. 31, 2020

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
KITCHENER SUDBURY

REVISED:
JOB NUMBER: 18-218
DRAWING 5 OF 8

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2 BACKGROUND

The Town had received numerous complaints about flooding and drainage issues from a property owner abutting the Lament property. As well, the property on the north side of York Road is subjected to erosion problems caused by water discharging through a culvert under York Road in the vicinity of the Lament property.

In an attempt to try to resolve the drainage issue, the Town held a "scoping meeting" on Tuesday, July 18, 2017. The meeting was attended by representatives from the Ministry of Transportation, the Regional Municipality of Niagara, the Niagara Peninsula Conservation Authority, an engineer from K. Smart Associates, two landowners, Stanley Lament and Steve Watson and Town staff. The only invited party who did not attend was Mr. Brzeczka, the owner of the property on the north side of York Road.

The intent of the meeting was to review the problems, discuss solutions and attempt to reach an agreement on how to resolve the problem. The preferred and most realistic solution was to have one or more of the affected parties petition to have the existing watercourse become a municipal drain so that it could be properly managed and maintained. None of the parties were willing to sign a petition at that time, so the problem was not resolved. The Town does not have any lands or roads in the area, so the Town has no authority to proceed with any type of remedial work to deal with the drainage and erosion problems.

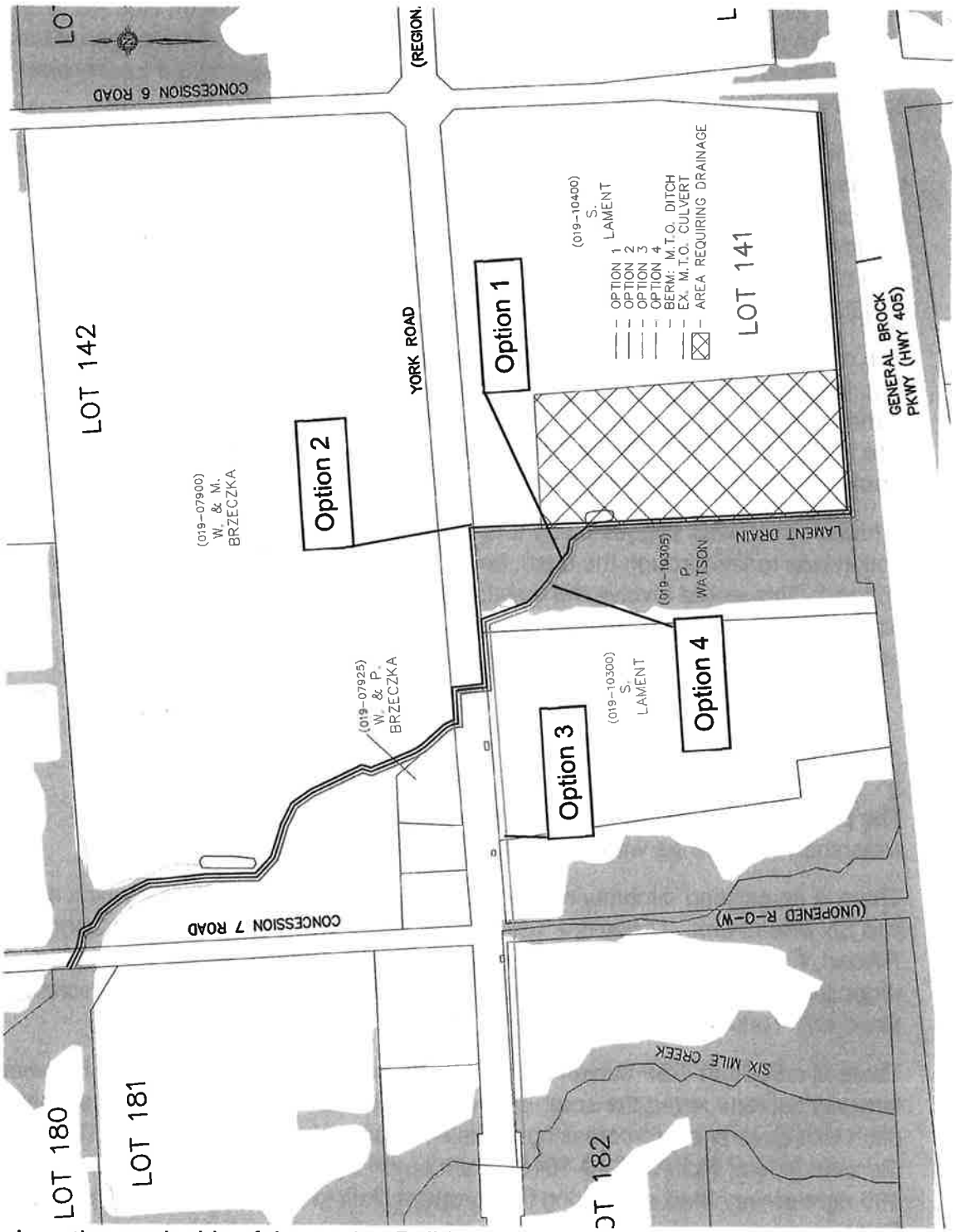
Proceeding with the drainage works will provide the necessary outlet and will greatly help to resolve the drainage and erosion issues. Once the watercourse becomes a municipal drain, the Town will be able to repair and maintain the watercourse as required at the expense of the contributing lands.

At the on-site meeting on August 13, 2018, discussions with landowners indicated that several options be investigated to provide a legal outlet for proposed and existing tiling on the petitioner's properties (Roll No. 019-10300 and 019-10400) located in Pt Lot 141, Concession 6, Township of Niagara.

At the second meeting on June 4, 2019, the following options were presented.

The first option would be to improve and incorporate the existing ditch downstream of York Road across Roll No. 019-07900 and 019-16000 and incorporate the existing culvert across Concession 7 Road and then across and upstream of York Road to the west side of Concession 6 Road. This option is an open ditch with an estimated total project cost of $224,550. See Figure 1 for the route on the following page.

The second option would be to improve and incorporate the existing ditch downstream of York Road and across Concession 7 Road as in the first option, incorporate the York Road culvert, improve and incorporate the existing ditch and culvert along the south side of the road to Roll No. 019-10305, then a pipe drain



along the south side of the road to Roll No. 019-10400, and then south along the property line to the existing ditch on Roll No. 019-10400 and then improve and incorporate the existing ditch to the west side of Concession 6 Road. This option would have a tile system from the east side of Roll No. 019-10300 along York Road, then south along the property line to the existing pond on Roll No. 019-10400. An

overflow swale would still be required through the existing bush on Roll No. 019-10305. An open ditch along the route of the pipe drain was also investigated but was felt to be a public safety concern. This option has an estimated total project cost of $300,765. See Figure 1 for the route.

The third option would be to improve and incorporate the existing road ditch along the south side of York Road, from a possible outlet into Six Mile Creek approximately 230m west of Concession 7 Road, east to Roll No. 019-10305, then improving and incorporating the existing ditch and culverts southeasterly to the west side of Concession 6 Road as in the first option. This option has an estimated cost of $259,890. See Figure 1 for the route.

The options were presented at the second meeting with costs and schedules, and also further letters were sent to, and discussions were had with the downstream owners (Roll No. 019-07900, 019-10300, 019-10305 and 019-10400) and the MTO. The landowners were informed that if they wanted option 2 or 3, the increased cost would be assessed to them.

A fourth option was suggested by a landowner for the engineer to investigate. This option was to tile through the bush, and the remaining work would be the same as option 1. This would involve the installation of a 600x600DICB, 158m of 300mm plastic tubing and establishing the existing swale as an overflow route. The estimated cost of this option is $230,960. See Figure 1 for the route.

3 DRAINAGE HISTORY

The proposed Drain is not in the watershed of nor does have any common watershed boundaries with any existing municipal drains.

There is an existing ditch/ravine downstream of Concession 7 Road, which outlets into Six Mile Creek. These is a 1200mm CSP existing culvert crossing Concession 7 Road. A ditch/ravine and several culverts/crossings currently exist along the proposed drain in Lot 142, Concession 6 (Niagara Twp.) between Concession 7 Road and York Road.

There is a 900mm CSP culvert across York Road and a roadside ditch with several laneway culverts along the south side of York Road. From York Road, a shallow ditch with several culvert/crossings runs southeasterly across Roll No. 019-10305 to the west side of Roll No. 019-10400, then south along that west limit to the HWY 405 right-of-way then east along that property limit to the west side of Concession 6 Road.

4 INVESTIGATION

4.1 On-Site Meeting

On August 13, 2018, an on-site meeting was held in accordance with S. 9(1) and 9(2) of the Act. Notice of the meeting was sent to the petitioner and landowners most affected by the drain and the affected agencies.

Attendees:

- Stanley Lament (Patitioner)and son (Roll No. 019-10300 and 019-10400)
- Steve Watson (Roll No. 019-10305)
- Brandon Enns and Rene Landry – Town of Niagara-on-the-Lake
- Neal Morris, P.Eng. – K. Smart Associates Limited

Those in attendance provided the following input:

Stanley Lament

- Wants an outlet for his pond
- Would like his pond longer to provide more storage for irrigation
- His property line runs along the edge of the bush on the Watson property
- The perimeter ditch along his property has existed for many years and was already in place when he acquired the property
- He has not excavated the perimeter ditch
- Some of the water comes from the MTO HWY 405 right-of-way which enters his property in two locations
- He removed the plum trees that were originally on the property and planted grapes
- Seven years ago he installed a tile down each vine row
- Most of his land is tiled to the north, to the roadside ditch along York Road
- Says that Steve Watson caused his own problems because the ditch on his property is not cleaned out

Steve Watson

- Wants the water from the Lament property to go to York Road
- Excavation of the perimeter ditch and land levelling done by Lament is now causing flooding on his property
- Lament disconnected the perimeter ditch from the pond and the size of the pond outlet pipe was increased, all of which caused an increase in water which is damaging his property and downstream properties

Mr. Brzeczka (Roll No. 019-079) (905-682-5862)

- Did not attend but called the engineer
- He has erosion problems from the water from upstream lands and that this drain does not involve him.

- The neighbour (Lament) has recently dug the perimeter ditch such that it no longer flows into the Lament pond but instead goes around it
- The neighbour has increased the size of the outlet pipe from the pond
- The neighbour has increased the tiling to York Road
- He would prefer that the increased water not go through his property but go to the York Road ditch instead
- He would like that the two culverts, the one at his driveway entrance and the other in the bush, to be improved
- There should be minimal cleanout of the ditch on his property

7.2 Second Meeting

On June 4, 2019, a second meeting with landowners was held. Notice for the meeting was sent to all landowners in the watershed, the MTO, affected agencies and the Municipality. At the meeting, the results of the investigation to-date were presented along with a summary of the design alternatives and preliminary cost estimates and assessments.

Attendees:

Landowners Stan & Michelle Lament, Eric Galloway (Roll No. 019-14605), Mike Brzeczka (Roll No. 019-07900 and 019-07925), S.C. Watson (Roll No. 019-10305), Kyle Saulnier (MTO), and Neal Morris, P.Eng. (K. Smart Associates Ltd.)

The engineer explained the Drainage Act, the proposed work and the assessment schedules.

Stan Lament

- He preferred the berm be placed on HWY 405 land or the property line.
- Wanted to know if he could do the work on his own property. No.
- Wanted the MTO to clean out their own ditch.
- He preferred the water on Concession 6 Road to stay on the Town road
- Wanted another berm along the top end of the drain near Concession 6 Road and HWY 405.
- Did not want the proposed control structures on the perimeter ditch.
- Wanted the pond extended to the south, not to the north.
- Wanted the drain process to move forward.
- Thought that his assessment was high.

Mike Brzeczka

- Wants to know where the spoil will go. The engineer said haul away or level along the drain.
- Concerned about restrictions to the use of his land.

- Earlier, he had asked if he could enclose part of the ditch.

Steve Watson

- Commented many times that the only problem is that HWY 405 water enters this system.
- Does not want to pay the increased cost for the system to go around his property.
- Said that the perimeter ditch was dug reasonably by Stan Lament.
- Asked for a damage study.
- Asked for the tile plan for the Lament property. Was informed that the tile plan is shown on the watershed plan.
- Thinks that he should not have to pay anything since all the water is from the MTO.
- Was concerned that one landowner's name on a petition can cause all these project costs.
- Also concerned about the cost of the project

Kyle Saulnier

- Wants to know if their water is actually flowing into this system.
- Will report back to his team.

7.3 On-site Meeting with Mr. Brzecka

After the second meeting, the engineer attempted to set-up an on-site meeting with Mr. Brzecka on July 11, July 22, August 12, September 4 and September 11, 2019, all of which did not work for Mr. Brzecka.

7.4 Letter to Mr. Brzeczka

On November 5, 2019, a letter and drawings were sent to the landowner (Roll No. 019-07900), outlining two options for him to consider in regards to the existing ditch on his property that has erosion problems due to the water from the upstream lands. The letter stated that a sufficient outlet for the upstream water could not be made without the involvement of his property to achieve the requirements of the Drainage Act.

Option1 would be to make the ditch a municipal drain and would involve placing riprap on eroded banks and the cleanout out of 100m of ditch downstream of York Road and incorporating the ditch from York Road to Concession 7 Road. The estimated net assessment would be -$4,000, or in other words, $4,000 provided/paid to him. The net assessment is based on little new construction and allowances for ROW and damages.

Attendees:

Landowners Stan Lament (Roll No. 019-1040), William Brzeczka (Roll No. 019-07900 and 019-07925), Steve Watson (Roll No. 019-10305), Brett Ruck (Town of Niagara-on-the-Lake), Rene Landry (Town of Niagara-on-the-Lake),) Brandon Enns (Town of Niagara-on-the-Lake), Erwin Wiens(Councilor), and Neal Morris, P.Eng. (K. Smart Associates Ltd.)

Steve Watson

- Concerned that MTO and Concession 6 Road water should not go through his property.
- Stated that there is a sensitive forest on his property.
- The existing watercourse on his property is not a natural watercourse with fish habitat but does give him riparian water rights.
- Does not want his trees cleared.
- Claims that Stan Lament changed the perimeter ditch, and he wants it filled in.
- Said that he did block the ditch from the Lament property at one time.
- Asked what the size of the Area Requiring Drainage is. The Engineer replied that it is 5.3 ha.
- Asked if a tile would be cheaper. The Engineer replied that it would not be cheaper.
- Is concerned that the Town staff is prejudiced against him.

Stan Lament

- Stated that he has no problem with MTO water on his property.
- Wants to change the pond outlet to match the existing ditch.

William Brzeczka

- Thinks that he did not have enough time to make a choice.
- Feels that there was a lack of communication.

Rene Landry

- Reminded attendees that Stan Lament, as the petitioner, will have the right to appeal to the Drainage Tribunal if Council does not adopt the Engineer's Report.
- If the petitioner withdraws his name from the petition, he will be responsible for all engineering costs associated with the petition.

7.7 NPCA Third Meeting

Due to concerns from the landowner and the NPCA of the proposed drain on the existing forest, an on-site meeting was held at 835 York Road on March 9th, 2020. The meeting was attended by Neal Morris (Engineer), Jason Culp(NPCA), Dan Drennan (NPCA), Brett Ruck (Drainage Superintendent for NOTL) and Brandon