BY-LAW NUMBER 130-24

-of-

THE CORPORATION OF THE COUNTY OF BRANT

To provide for drainage works in the County of Brant (Simmons-Hopkins Municipal Drain)

WHEREAS the Council of the Corporation of the County of Brant has appointed R.J. Burnside & Associates Limited by resolution to prepare a report to provide an improvement to the existing Simmons-Hopkins Municipal Drain in accordance with Section 78(5) of the Drainage Act, R.S.O. 1990;

AND WHEREAS the Council of The Corporation of The County of Brant has procured a report under Sections 78(5) of the Drainage Act, R.S.O. 1990, as amended, Chapter D.17, R.J. Burnside & Associates Limited, dated October 22, 2024, attached hereto as Schedule "A" and forming part of this by-law;

AND WHEREAS the estimated total cost to prepare the report for the drainage works is one hundred and sixty thousand dollars ($160,000.00);

AND WHEREAS one hundred and sixty thousand dollars ($160,000.00) is the amount to be contributed by the municipality for the County land and road portions of the drainage works;

AND WHEREAS the Council is of the opinion that the proposed works are required;

NOW THEREFORE THE COUNCIL OF THE CORPORATION OF THE COUNTY OF BRANT enacts as follows:

1. **THAT** the report prepared by R.J. Burnside & Associates Limited dated October 22, 2024, and attached hereto as Schedule "A" is hereby adopted

2. **AND THAT** the Corporation of the County of Brant may borrow on the credit of the corporation the amount of $160,000.00 being the amount necessary for the preparation and construction of the report

2. **AND THAT** for paying the amount of $160,000.00 being the amount assessed upon the lands and roads within the municipality, a special rate sufficient to pay the amount assessed, plus interest thereon, shall be levied upon the whole rateable properties in The Corporation of The County of Brant for one (1) year after the passing of this by-law to be collected in the same manner and at the same time as other taxes are collected

3. **AND THAT** the Corporation of the County of Brant may arrange the issue of debentures for the amount borrowed less the total of:

   (a) grants received under Section 85 of the Drainage Act

   (b) commuted payments made in respect of lands and roads assessed within the municipality

   (c) moneys paid under Section 61(3) of the Drainage Act

   (d) money assessed in and payable by another municipality, and such debentures shall be made payable within five (5) years from the date of the debenture and shall bear interest at a

rate not higher than the rate charged by Infrastructure Ontario on the date of sale of such debenture.

And such debentures shall be made payable within ten (10) years from the date of the debenture and shall bear interest at the rate prevailing at the time the debenture(s) is/are sold by the County of Brant.

4. **THAT** all assessments of One Thousand Dollars ($1000.00) or less are payable in the first year in which the assessment is imposed.

5. **THAT** this by-law comes into force on the passing thereof and may be cited as the Simmons-Hopkins Municipal Drain.

READ a first and second time and provisionally adopted, this 17th day of December, 2024.

THE CORPORATION OF THE COUNTY OF BRANT

_____
David Bailey, Mayor

_____
Sunayana Katikapalli, Clerk

READ a third time and finally passed in Council, this 11th day February of 2025.

THE CORPORATION OF THE COUNTY OF BRANT

_____
David Bailey, Mayor

_____
Spencer Pluck, Deputy Clerk

BURNSIDE

Engineer's Report
Simmons-Hopkins Municipal Drain Realignment - Minor Improvement Project

County of Brant
26 Park Avenue
P.O. Box 160
Burford, ON N0E 1A0

Engineer's Report
Simmons-Hopkins Municipal Drain Realignment - Minor Improvement Project

County of Brant
26 Park Avenue
P.O. Box 160
Burford, ON N0E 1A0

R.J. Burnside & Associates Limited
35 Perry Street
Woodstock ON N4S 3C4 CANADA

October 2024
300058650.0000

Disclaimer

Distribution List

No. of Hard Copies	PDF	Email	Organization Name
1	Yes	Yes	County of Brant
0	Yes	Yes	Stubbe's Precast Commercial Ltd. (Property Owner)
0	Yes	Yes	Development Engineering Limited
0	Yes	Yes	Long Point Region Conservation Authority
0	Yes	Yes	Department of Fisheries and Oceans Canada
0	Yes	Yes	Ontario Ministry of Agriculture, Food & Agribusiness
0	Yes	Yes	Ministry of the Environment, Conservation and Parks (MECP)

Record of Revisions

Revision	Date	Description
0	July 29, 2024	Draft Report for LPRCA Review
1	October 11, 2024	Draft Report for Review
2	October 22, 2024	Issued for Consideration

R.J. Burnside & Associates Limited

Report Prepared By:

Jacob Rooke, EIT
Project Manager
JR:cvh/tp

Report Reviewed By:

Wm. Paul MacIntyre, L.E.L., C.E.T.
Engineering Practitioner

Table of Contents

Tables

Appendices

1.0 Project Authorization

This report is being prepared in response to an appointment by the County of Brant at its council meeting on April 30, 2024 to provide an improvement to the existing Simmons-Hopkins Municipal Drain in accordance with Section 78 (5) of the Drainage Act, R.S.O. 1990. R.J. Burnside & Associates Limited (Burnside) was notified of the appointment on May 1, 2024.

1.1 Request for Improvement by Owner

The request for improvement dated March 12, 2024 was submitted by Mike Goor signing authority for 2160382 Ontario Inc. (Stubbe's Precast Commercial) (Roll No. 011-010-42100); owner of Pt. Lot 24, Concession 9 within the County of Brant.

2.0 Project Background and On-Site Meeting

The on-site meeting for the proposed minor improvement was held on June 4, 2024 at the Stubbe's Precast Commercial property. The following were present at the meeting:

Table 1: On-Site Meeting

Name	Title
Jacob Rooke	Project Manager, Burnside
Paul MacIntyre	Engineering Practitioner, Burnside
Max Cheng	Engineering Assistant, Burnside
Shannon Tweedle	Drainage Superintendent, County of Brant
Albert Meyer	VP of Projects, Stubbe's Precast Commercial
Mike Goor	Manager of Land Development and Facilities Management, Stubbe's Precast Commercial
Jon Bakker	Senior Project Engineer, Development Engineering Limited (DevEng)

Stubbe's Precast Commercial (owner) representatives expressed interest in relocating the existing Simmons-Hopkins Municipal Drain on their property to allow for further expansion of the existing manufacturing facility. DevEng has been retained by the owner to aid in the site plan application for the subject property and provide a proposed design for the proposed drain realignment. The owners expressed interest in Burnside working with DevEng to obtain the necessary agency approvals and administer the project under the Ontario Drainage Act. DevEng and Burnside agreed that DevEng would act as the design engineer with Burnside acting as the general review engineer as defined within the Professional Engineers Ontario (PEO) guidelines for the project.

3.0 Proposed Design

As the design engineer DevEng completed detailed design for the proposed re-alignment with review and input from Burnside. The detailed design drawings have been included with Appendix A for reference. OMAFRA Publication 852 provides recommendations for municipal drain design in rural/agricultural settings. At a minimum, Publication 852 recommends a channel design capacity of a 2-year return period storm. This design standard considers the relatively low risk of significant loss in a rural/agricultural setting and leans on historical knowledge of the watershed.

The existing channel has been analyzed using a Visual Otthymo (VO) model with a SCS Type-II storm distribution and intensity duration frequency values obtained from the County of Brant engineering & design standards. Model input parameters are summarized in Table 2 and peak flows from the watershed are described in Table 3 below.

Table 2: VO Model Input Parameters

Model Input Parameter	Value
Area	697.69 ha[1]
Composite Curve Number	81
Initial Abstraction	6.8 mm
Time to Peak (Airport Method)	12.54 hrs

[1] Watershed area as per K. Smart Associates Limited report produced by John Kuntze, P. Eng dated August 18, 1998.

Table 3: Peak Flows

Design Storm	Peak Flow (m^3/s)
2-year	1.96
5-year	3.10
10-year	3.89
25-year	4.95
50-year	5.74
100-year	6.55

The peak flows were used to complete a hydraulic analysis of the proposed realigned Simmons-Hopkins Municipal Drain. It was found that the 2-year design storm (1.96 m^3/s) can be conveyed with 0.24 m of freeboard. The channel has a bank full capacity of 3.35 m^3/s. Considering the proposed channel cross section matches that of existing, channel capacity and flood storage are not anticipated to change with the realignment.

4.0 Environmental and Fisheries Considerations

When an Engineer's report is prepared that could affect an existing Municipal Drain, natural watercourse, wetland a review of the proposed work is required and subsequent approvals and/or project requirements must be obtained from applicable agencies. These may include the local Conservation Authority (CA), The Ministry of the Environment, Conservation and Parks (MECP) and Fisheries and Oceans Canada (DFO).

4.1 Long Point Region Conservation Authority (LPRCA)

LPRCA has been contacted for comment on the proposed works. LPRCA has indicated that there are no concerns with the proposed work. Documentation has been included with Appendix B.

4.2 Ministry of the Environment, Conservation and Parks (MECP)

The proposed works are to occur in active agricultural fields currently used for row crops. A review of the site conditions has been completed and the following species were identified to have the potential to be present in the work area:

- Bank Swallow: Due to the silty clay loams this species is unlikely to be present in the project area.
- Eastern Small-footed Myotis: There are currently no unobstructed rock piles along the project area suggesting this species is unlikely to be present.
- Nine-spotted Lady Beetle and Transverse Lady Beetle: Considering the lack of riparian vegetation and the agricultural usage on either bank this species is unlikely to be present.

As a result of the above, no temporary or permanent impacts to species at risk (SAR) are anticipated. The Contractor will be responsible to ensure that during construction no extirpated, endangered, threatened, or special concern species or their habitats are adversely affected.

4.3 Department of Fisheries and Oceans Canada (DFO)

A request for review was submitted to DFO on June 17, 2024. A letter of advice (LoA) was received on July 25, 2024 via email and has been included in Appendix B for reference. All works shall be governed by the requirements of the LoA.

5.0 Project Cost Estimate

The cost estimate associated with the proposed project is as follows:

Table 4: Project Cost Estimate – Simmons-Hopkins Municipal Drain Realignment

Construction Line Item	Approximate Quantity	Unit	Total ($)
A1. Mobilization and Demobilization	1	LS	5,000
A2. Strip and stockpile topsoil for a minimum 20 m width along the course of the proposed channel	390	m	4,500
A3. Excavation of proposed channel	4,000	m^3	32,000
A4. Stockpiling excavated material and filling of existing channel	4,000	m^3	36,000
A5. Hydroseeding proposed channel banks and 3 m buffer with approved seed mix complete with erosion control blankets to mitigate washout.	3,850	m^2	32,700
A6. Install sediment basin (600 mm depth x 10 m length) immediately downstream of existing culvert crossing Muir Line and at the downstream channel linkage.	2	ea.	1,000
A7. Construction, maintenance, and removal of temporary rock flow check dam (OPSD 219.211).	1	ea.	1,500
A8. Supply & install 450 mm thickness of R50 quarry stone rip-rap with geotextile underlay immediately downstream of existing culvert crossing Muir Line.	40	m^2	3,000

Construction Line Item	Approximate Quantity	Unit	Total ($)
A9. Supply, install and removal of temporary straw bale flow check dam (OPSD 219.180).	2	ea.	1,000
Contingency Items			
B1. Supply & install 450 mm thickness of round river stone in channel bottom.	60	m^2	3,600
B2. Supply & install 450 mm thickness of R50 quarry stone rip-rap with geotextile underlay.	60	m^2	4,500
Total Estimated Cost: Construction & Contingencies			**$124,800**
Engineering – Coordination and attendance at on-site meeting including project background and verification of requirements under section 78 (5). Review of proposed design drawings including hydrologic analysis and hydraulic capacity calculations. Drainage report preparation which includes coordination with applicable agencies to obtain necessary approvals. Preparation and attendance at council Consideration meeting. Construction assistance and construction inspection. **Note:** The above summary contains cost estimates only. These estimates do not include costs for tendering or defending the Drainage Report and procedures if appeals are filed with the Drainage Referee.			$20,000
Total Estimated Cost: Engineering			**$20,000**
Sundry Costs – Net HST, contingencies			**$15,200**
Total Estimated Project Cost			**$160,000**

6.0 Construction Specifications

Standard drain construction specifications for open channels have been included within Appendix C for reference. The proposed works shall be conducted in accordance with the standard drain construction specifications.

7.0 Maintenance and Future Considerations

The proposed realigned section shall be adopted as a part of the Simmons-Hopkins Municipal Drain and shall be maintained in accordance with this report as it relates to the gradient and specifications. The K. Smart Associates Limited report produced by John Kuntze, P. Eng. dated August 18, 1998 shall be used to distribute all future maintenance costs until such time as is varied in accordance with the terms of the Act. The 1998 report has been included within Appendix D.

BURNSIDE

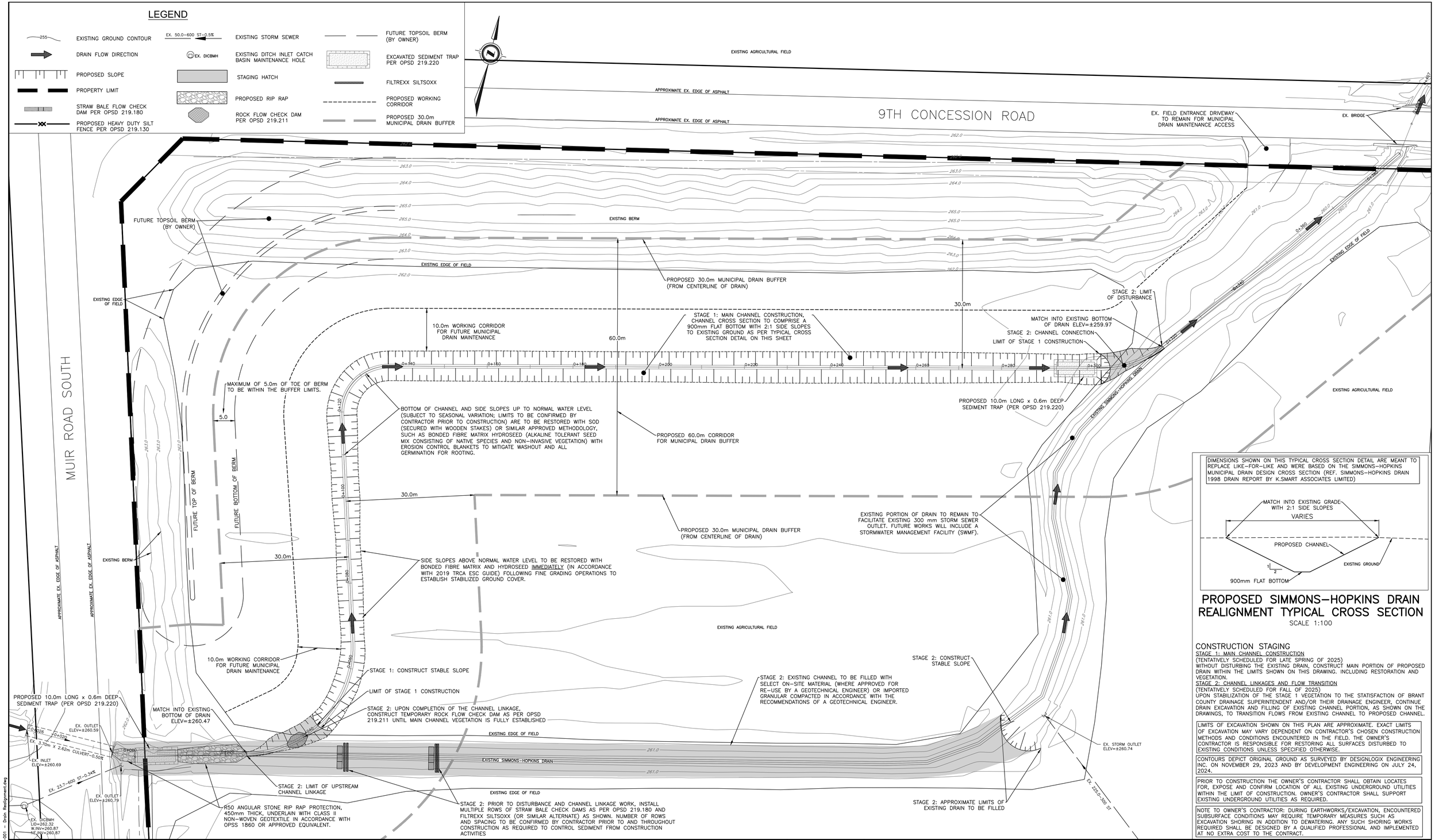
[THE DIFFERENCE IS OUR PEOPLE]

Appendix A

Design Drawings

LEGEND

- EXISTING GROUND CONTOUR (255)
- DRAIN FLOW DIRECTION
- PROPOSED SLOPE
- PROPERTY LIMIT
- STRAW BALE FLOW CHECK DAM PER OPSD 219.180
- PROPOSED HEAVY DUTY SILT FENCE PER OPSD 219.130
- EXISTING STORM SEWER (EX. 50.0–600 ST–0.5%)
- EXISTING DITCH INLET CATCH BASIN MAINTENANCE HOLE (EX. DICBMH)
- STAGING HATCH
- PROPOSED RIP RAP
- ROCK FLOW CHECK DAM PER OPSD 219.211
- FUTURE TOPSOIL BERM (BY OWNER)
- EXCAVATED SEDIMENT TRAP PER OPSD 219.220
- FILTREXX SILTSOXX
- PROPOSED WORKING CORRIDOR
- PROPOSED 30.0m MUNICIPAL DRAIN BUFFER



DIMENSIONS SHOWN ON THIS TYPICAL CROSS SECTION DETAIL ARE MEANT TO REPLACE LIKE–FOR–LIKE AND WERE BASED ON THE SIMMONS–HOPKINS MUNICIPAL DRAIN DESIGN CROSS SECTION (REF. SIMMONS–HOPKINS DRAIN 1998 DRAIN REPORT BY K.SMART ASSOCIATES LIMITED)

PROPOSED SIMMONS–HOPKINS DRAIN REALIGNMENT TYPICAL CROSS SECTION

SCALE 1:100

CONSTRUCTION STAGING

STAGE 1: MAIN CHANNEL CONSTRUCTION
(TENTATIVELY SCHEDULED FOR LATE SPRING OF 2025)
WITHOUT DISTURBING THE EXISTING DRAIN, CONSTRUCT MAIN PORTION OF PROPOSED DRAIN WITHIN THE LIMITS SHOWN ON THIS DRAWING. INCLUDING RESTORATION AND VEGETATION.

STAGE 2: CHANNEL LINKAGES AND FLOW TRANSITION
(TENTATIVELY SCHEDULED FOR FALL OF 2025)
UPON STABILIZATION OF THE STAGE 1 VEGETATION TO THE STATISFACTION OF BRANT COUNTY DRAINAGE SUPERINTENDENT AND/OR THEIR DRAINAGE ENGINEER, CONTINUE DRAIN EXCAVATION AND FILLING OF EXISTING CHANNEL PORTION, AS SHOWN ON THE DRAWINGS, TO TRANSITION FLOWS FROM EXISTING CHANNEL TO PROPOSED CHANNEL.

LIMITS OF EXCAVATION SHOWN ON THIS PLAN ARE APPROXIMATE. EXACT LIMITS OF EXCAVATION MAY VARY DEPENDENT ON CONTRACTOR'S CHOSEN CONSTRUCTION METHODS AND CONDITIONS ENCOUNTERED IN THE FIELD. THE OWNER'S CONTRACTOR IS RESPONSIBLE FOR RESTORING ALL SURFACES DISTURBED TO EXISTING CONDITIONS UNLESS SPECIFIED OTHERWISE.

CONTOURS DEPICT ORIGINAL GROUND AS SURVEYED BY DESIGNLOGIX ENGINEERING INC. ON NOVEMBER 29, 2023 AND BY DEVELOPMENT ENGINEERING ON JULY 24, 2024.

PRIOR TO CONSTRUCTION THE OWNER'S CONTRACTOR SHALL OBTAIN LOCATES FOR, EXPOSE AND CONFIRM LOCATION OF ALL EXISTING UNDERGROUND UTILITIES WITHIN THE LIMIT OF CONSTRUCTION. OWNER'S CONTRACTOR SHALL SUPPORT EXISTING UNDERGROUND UTILITIES AS REQUIRED.

NOTE TO OWNER'S CONTRACTOR: DURING EARTHWORKS/EXCAVATION, ENCOUNTERED SUBSURFACE CONDITIONS MAY REQUIRE TEMPORARY MEASURES SUCH AS EXCAVATION SHORING IN ADDITION TO DEWATERING. ANY SUCH SHORING WORKS REQUIRED SHALL BE DESIGNED BY A QUALIFIED PROFESSIONAL AND IMPLEMENTED AT NO EXTRA COST TO THE CONTRACT.

EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION

DETAILS	No.	REVISIONS	DATE	CONSULTANT
DESIGN BY TW/BB	1	ISSUED FOR DRAINAGE REPORT	OCT. 17/24	DEVENG
DRAWN BY BB				
CHECKED BY PJB				
F.BK. P–17				

FILE: DEL24–001 – DRAIN REALIGNMENT.DWG

CONSULTANT

London Office
41 Adelaide St. N., Unit 71
(519) 672-8310

Paris Office
31 Mechanic St., Unit 301
(519) 442-1441

development engineering (London) Limited
CONSULTING CIVIL ENGINEERS

ENGINEER'S STAMP
LICENSED PROFESSIONAL ENGINEER
P. J. BAKKER
100224635
OCT. 17 /24
PROVINCE OF ONTARIO

COUNTY OF Brant Simply Grand

SCALE

SCALE – 1:400
4 0 8m

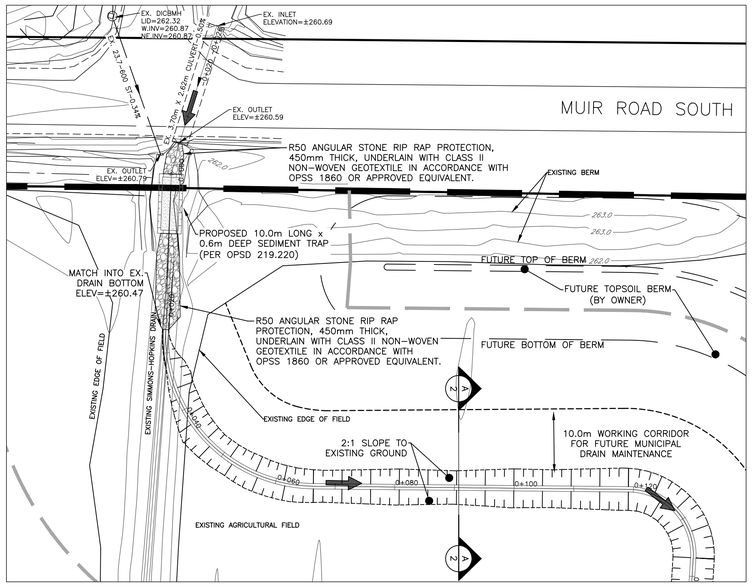
TITLE

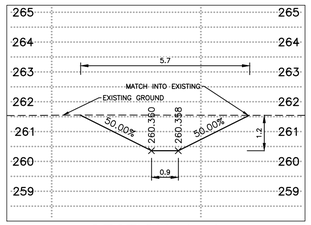
STUBBE'S PRECAST CAMPUS IMPROVEMENTS
44 MUIR ROAD SOUTH, HARLEY, COUNTY OF BRANT

SIMMONS–HOPKINS DRAIN REALIGNMENT OVERVIEW AND STAGING PLAN

PROJECT No. DEL24–001
SHEET No. 1
PLAN FILE No.

twinger Oct.17/24–12:32pm DEL24–001 – Drain Realignment.dwg





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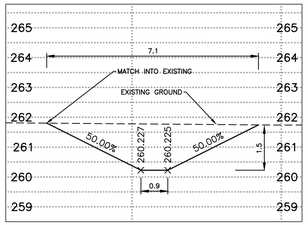
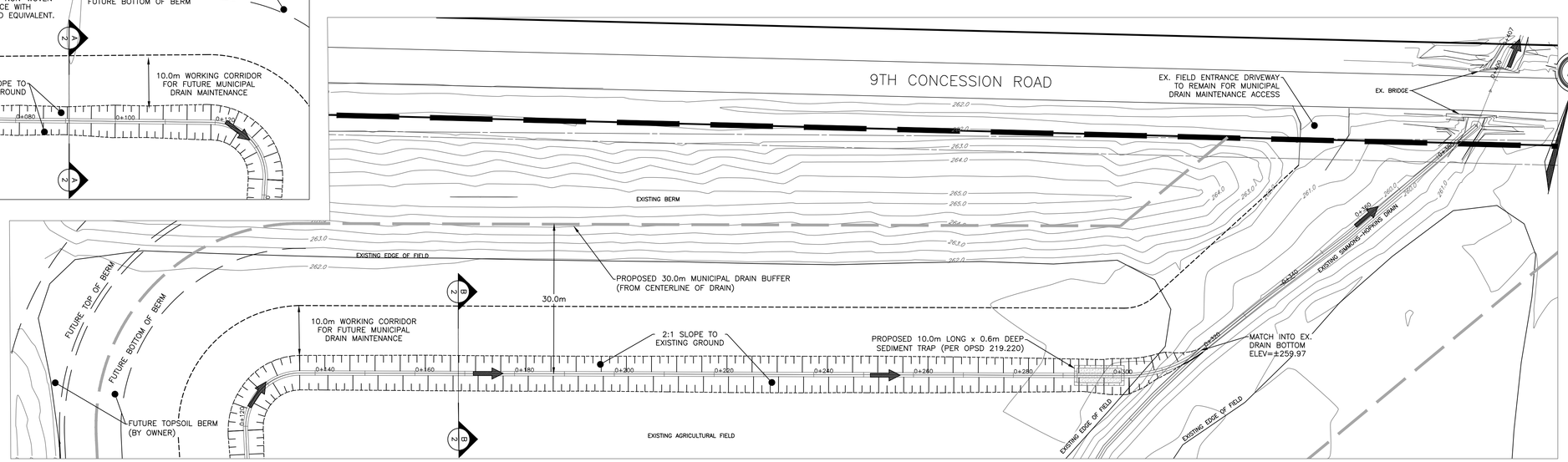


SECTION B–B
SCALE 1:100

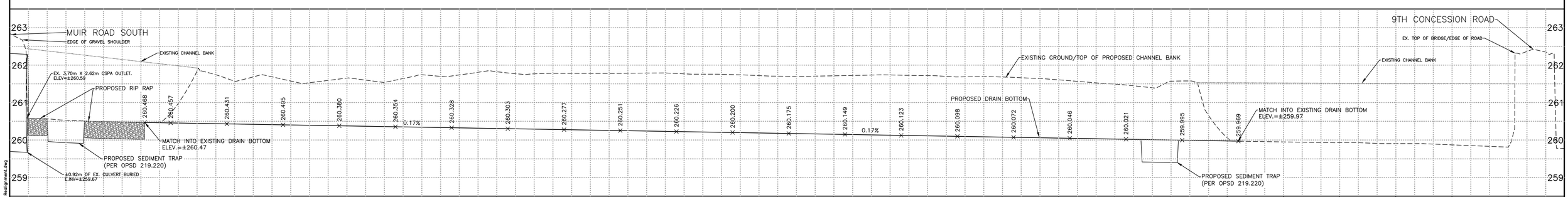
LEGEND

- EX. 50.0–600 ST–0.5% — EXISTING STORM SEWER
- EX. DICBMH — EXISTING DITCH INLET CATCH BASIN MAINTENANCE HOLE
- 255 — EXISTING GROUND CONTOUR
- PROPOSED SLOPE
- DRAIN FLOW DIRECTION
- PROPOSED WORKING CORRIDOR
- FUTURE TOPSOIL BERM (BY OWNER)
- EXCAVATED SEDIMENT TRAP PER OPSD 219.220
- PROPOSED RIP RAP
- A / SE1 — SECTION LOCATION, NAME AND SHEET REFERENCE
- PROPOSED 30.0m MUNICIPAL DRAIN BUFFER



EXISTING SIMMONS–HOPKINS DRAIN DESIGN NOTES (REF. TO SIMMONS–HOPKINS DRAIN REPORT DATED AUGUST, 1998):
- 2:1 SIDE SLOPES (WHERE REQUIRED)
- 1.55–1.80m DEPTH
- 0.10% DRAIN DESIGN SLOPE
- 900mm BOTTOM OF DRAIN (WHERE REQUIRED)

SIMMONS–HOPKINS DRAIN REALIGNMENT



EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION

DETAILS	No.	REVISIONS	DATE	CONSULTANT
DESIGN BY TW/BB	1	ISSUED FOR DRAINAGE REPORT	OCT. 17/24	DEVENG
DRAWN BY BB				
CHECKED BY PJB				
F.BK. P–17				

FILE: DEL24–001 – DRAIN REALIGNMENT.DWG

CONSULTANT
London Office
41 Adelaide St. N., Unit 71
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OCT. 17/24
PROVINCE OF ONTARIO

COUNTY OF Brant Simply Grand

SCALE
HORIZONTAL – 1:500
5 0 10m
VERTICAL – 1:50
0.5 0 1m

TITLE
STUBBE'S PRECAST CAMPUS IMPROVEMENTS
44 MUIR ROAD SOUTH, HARLEY, COUNTY OF BRANT

SIMMONS–HOPKINS DRAIN REALIGNMENT DETAILS

PROJECT No. DEL24–001
SHEET No. 2
PLAN FILE No.

DEL24–001 – Drain Realignment.dwg
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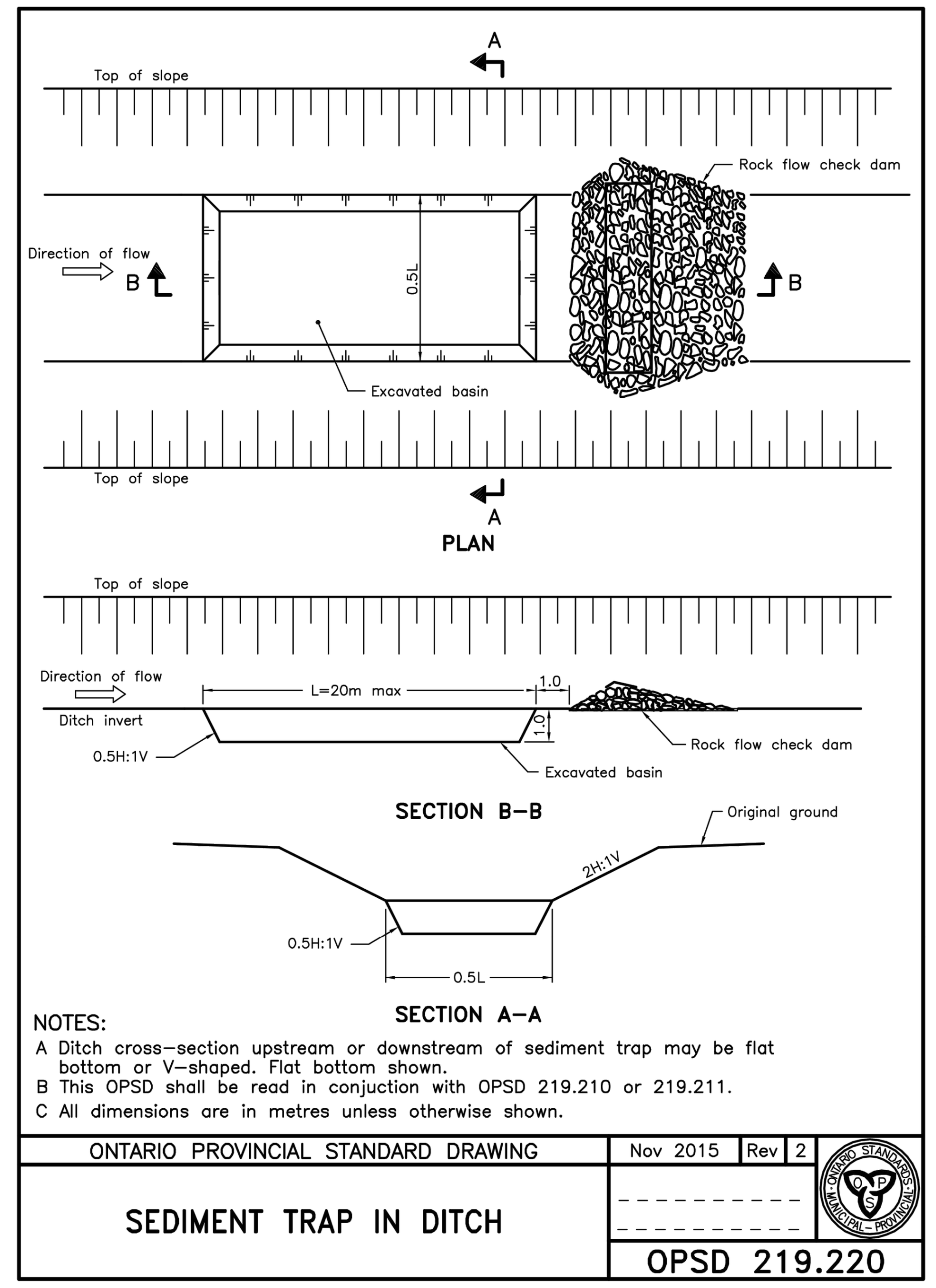
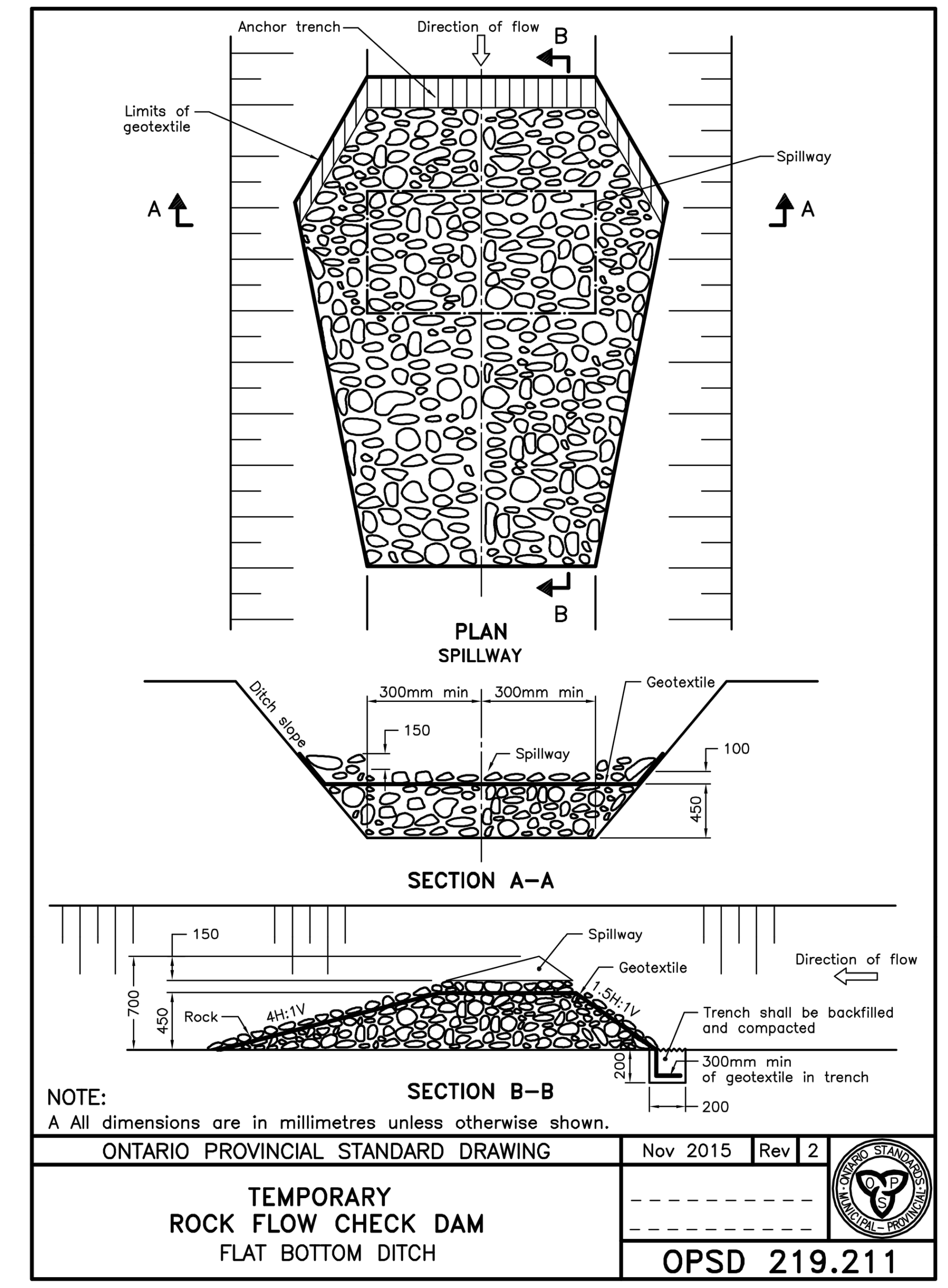
GENERAL CONSTRUCTION NOTES

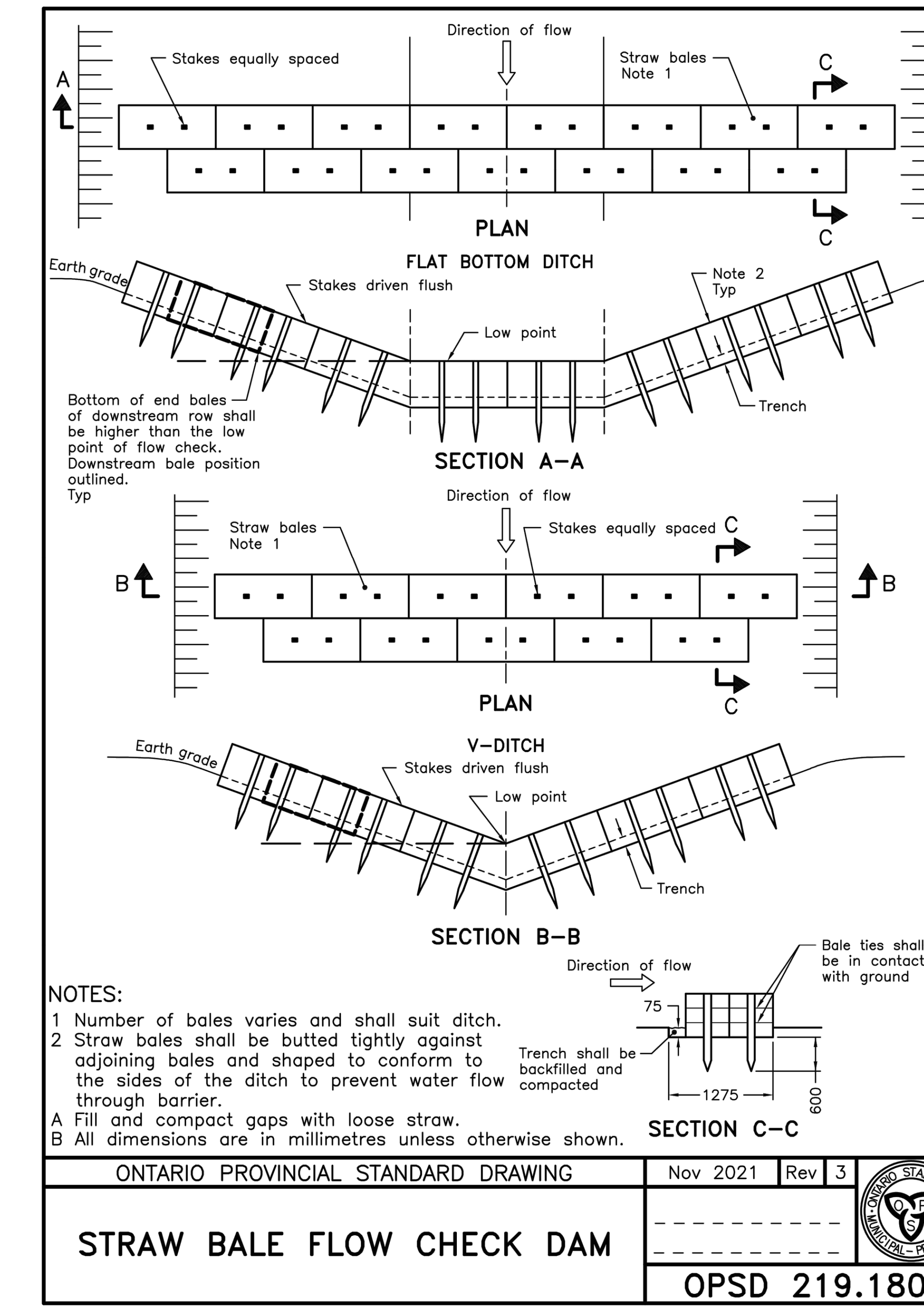
1. All existing underground utilities, either shown or not shown, are to be located and marked prior to commencing construction within the site and on existing abutting road allowance. Any utilities damaged or disturbed during construction shall be repaired or replaced to the satisfaction of the governing body at the sole expense of the Owner's Contractor.
2. Prior to commencing ANY construction, the Owner's Contractor must verify all outlet information, benchmarks, elevations and dimensions and report any discrepancies immediately to the Engineer.
3. Prior to commencing any work on the installation of services, an approved set of plans must be available on the job site and shall remain there until work is completed.
4. The Owner's Contractor is responsible for the control of surface and subsurface water.
5. The Owner's Contractor shall take all necessary precautions to prevent the spilling or dumping of hazardous materials while fueling and maintaining vehicles and equipment.
6. Existing servicing and topographic information was obtained by DESIGNLOGIX Engineering Inc., dated November 30, 2023 and by Development Engineering (London) Limited, dated July 31, 2024.
7. Existing legal (boundary) information was obtained by MacAulay, White and Muir Ltd. dated March 26, 2024.

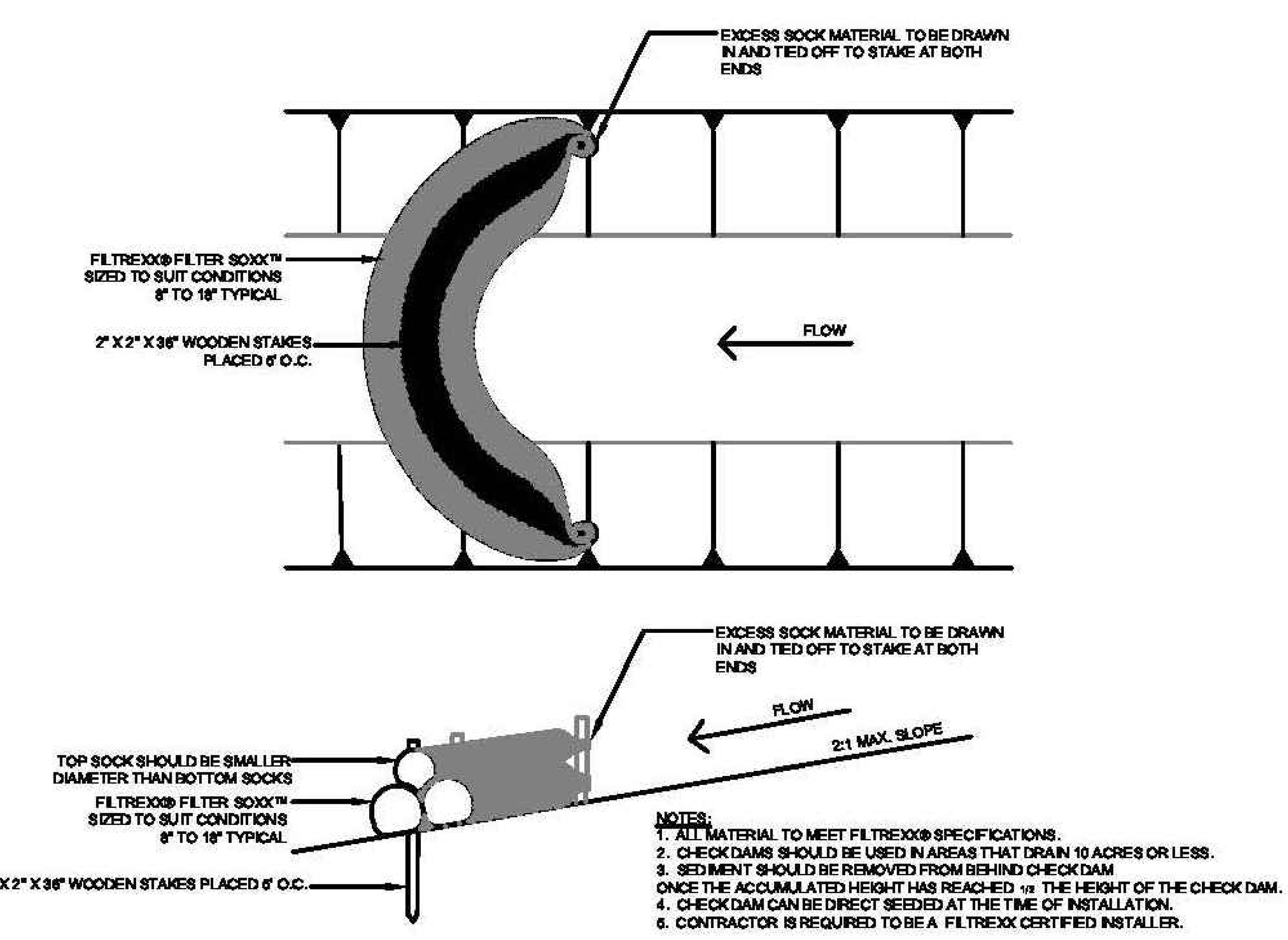
SEDIMENT, EROSION AND DUST CONTROL

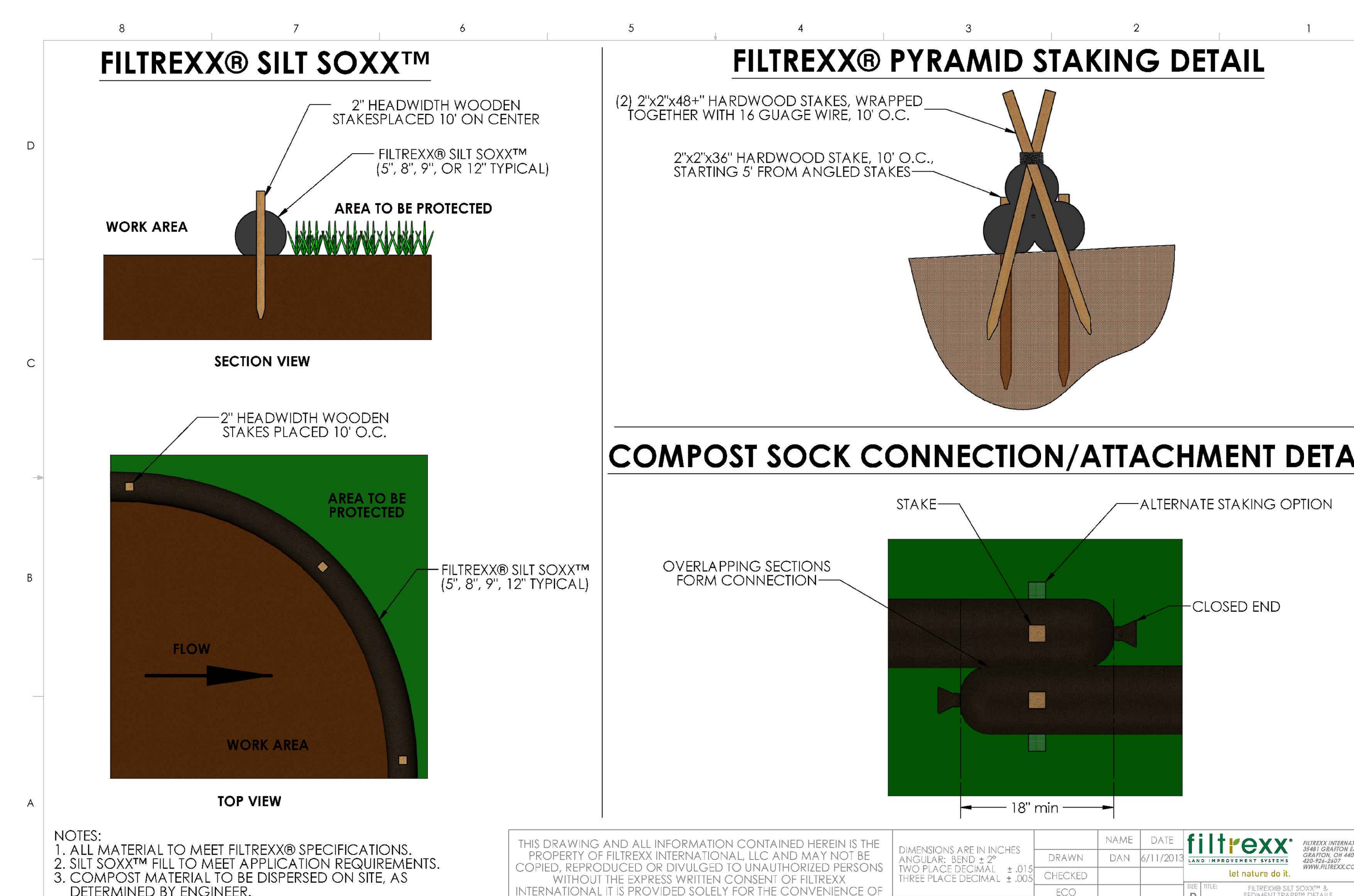
1. Protect all exposed surfaces and control all runoff during construction.
2. All erosion control measures to be in place before starting construction and remain in place until restoration is complete.
3. All collected sediment to be disposed of at an approved location.
4. Minimize area disturbed during construction.
5. Protect all existing and proposed catchbasins, manholes, and pipe ends from sediment intrusion with Terrafix Siltsacks, or similar approved alternate.
6. Prevent wind–blown dust.
7. Obtain approval from LPRCA before construction of works which are in the defined regulated area.
8. For current industry best–management practices related to temporary erosion and sediment control measures required throughout construction, the contractor should reference the Erosion and Sediment Control Guide (2019) prepared by Sustainable Technologies Evaluation Program, and/or consult the owner's engineer.
9. All erosion control measures are at the minimum to be in accordance the Ministry of Natural Resources Guidelines on Erosion and Sediment Control for Urban Construction Sites.
10. The Contractor shall be responsible for sediment, erosion, and dust control on the site and for the protection of the adjacent lands, habitats, watercourses and water bodies. The perimeter erosion and sediment control measures shown on this plan or otherwise identified on these drawings are not meant to comprise an exhaustive list or final ESC strategy. The Contractor shall use their judgement and expertise in providing additional sediment and erosion control measures, as required during various stages of construction, subject to their methodology, to protect the adjacent lands and waters, and to meet the turbidity requirements for any runoff or pumped discharge leaving the site. The Contractor should request an opinion from the owner's Engineer when they feel the additional expertise are warranted. The Contractor shall provide and maintain all sediment, erosion, and dust control measures as required by site conditions and/or as recommended by the Engineer during periodic inspections. All required sediment, erosion, and dust control measures must be in place before starting construction and remain in place until restoration is complete.
11. The Contractor shall be responsible for the design, operation, installation, inspection, regular maintenance, and replacement of all sediment, erosion, and dust controls to meet the requirements of the applicable legislation (e.g., Fisheries Act, Species at Risk Act, Federal and Provincial Environmental Protection Acts, Provincial Water Resources Act, Lakes and Rivers Improvement Act, Ontario Endangered Species Act, the current Provincial Policy statement empowered through the Planning Act, Conservation Authorities Act, all regulations under those acts, and any local by–laws) and approvals granted for this project. Where the Contractor feels an opinion from the owner's Engineer is warranted, the Contractor shall review its designs and plans for sediment control with the Engineer at the start of the work and prior to critical stages of the work as it progresses. If the Contractor does not engage the owner's Engineer, it will be assumed the owner and owner's contractor have used their own expertise or consulted another qualified professional for recommendations.
12. Where excavation dewatering is necessary, pump discharge shall be directed to stable, vegetated areas with end of pipe filter bag or dedicated sediment traps (OPSD 219.240) or industry standard erosion & sediment control method. If significant construction dewatering is necessary, the contractor shall have a third–party professional engineer prepare a dewatering design and plan, including appropriate erosion control and sediment removal, as necessary.
13. The Contractor shall maintain an operations log of erosion & sediment control structure inspections throughout the project, with particular emphasis on control measures after rainfall events of 12mm or greater. Periodic removal of accumulated sediment shall be undertaken as necessary to maintain effective sediment removal or at the expressed direction of the Engineer.
14. Containment, settling and/or direct filtering techniques may be required to remove suspended solids from all site effluent and runoff during rainfall events. The Contractor must monitor the turbidity of the downstream watercourse and provide additional temporary sediment controls when the downstream turbidity exceeds the upstream turbidity by more than 25 NTU over an 8–hour period. This would constitute a moderate negative impact on the receiving watercourse and should be mitigated immediately.
15. A visual inspection of the sediment, erosion and dust control measures must be completed by the Contractor daily. Clogged, ruptured or otherwise ineffective sediment filters (e.g., socks, bags, etc.) or other sediment controls (e.g., silt fence, sediment traps, etc.) must be replaced or repaired immediately upon identification, prior to releasing additional runoff and/or dewatering pump effluent.
16. Any stockpiled soil material shall be appropriately protected from erosion (safely sloped as specified by a geotechnical engineer and, if necessary, seeded to improve long–term stability and erosion resistance). The toe of the stockpile slopes should be wrapped in heavy–duty silt fence as per OPSD 219.130 (or approved alternate) to help prevent sediment transport.
17. The owner and their contractor should confirm any restricted activity timing windows for the protection of fish, birds, and other wildlife, including their habitat, and avoid construction activities and vegetation removal, as appropriate. An opinion from a qualified wildlife and/or aquatic biologist may be necessary to ensure construction timing does not contravene any federal, provincial, or local laws.

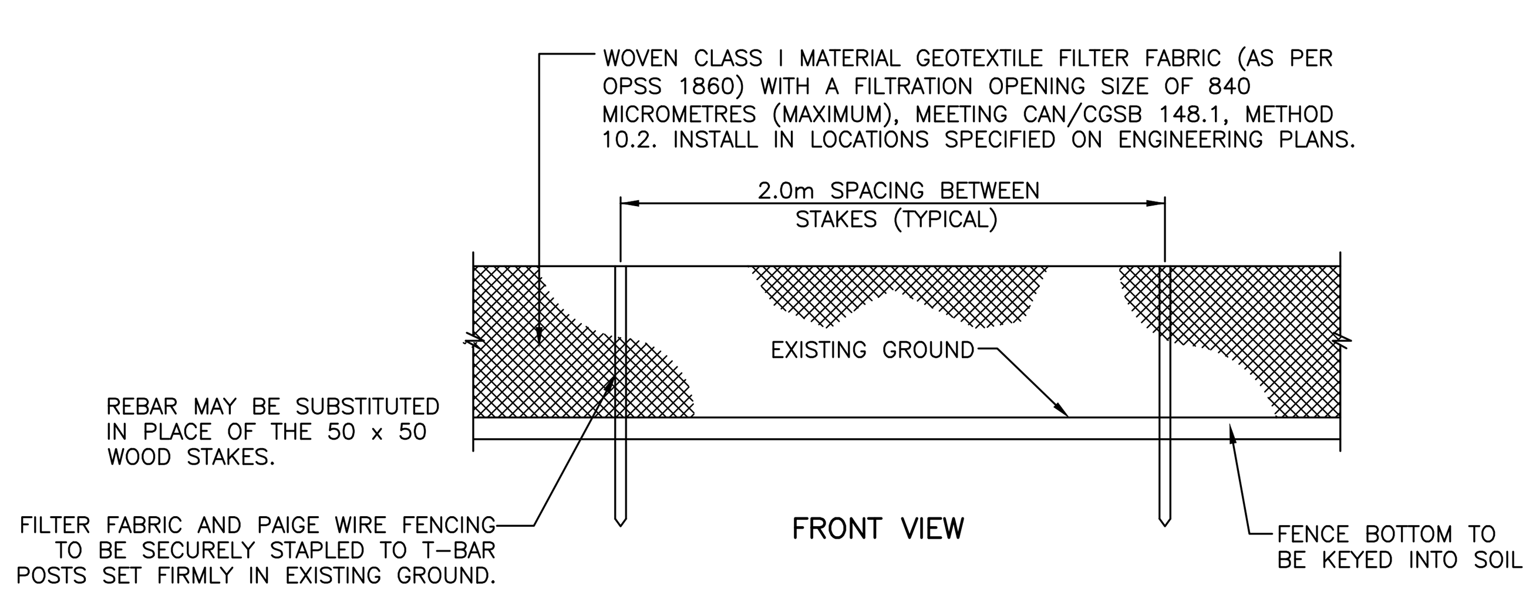












HEAVY–DUTY SILT FENCE
OPSD 219.130
NTS

EXISTING SERVICES	DRAWING #, SOURCE	DATE	AS CONSTRUCTED SERVICES	COMPLETION	DETAILS	No.	REVISIONS	DATE	CONSULTANT
					DESIGN BY TW/BB	1	ISSUED FOR DRAINAGE REPORT	OCT. 17/24	DEVENG
					DRAWN BY BB				
					CHECKED BY PJB				
					F.BK. P–17				
					FILE: DEL24–001 – DRAIN REALIGNMENT.DWG				

CONSULTANT

London Office
41 Adelaide St. N., Unit 71
(519) 672-8310

Paris Office
31 Mechanic St., Unit 301
(519) 442-1441

development engineering (London) Limited
CONSULTING CIVIL ENGINEERS

ENGINEER'S STAMP
LICENSED PROFESSIONAL ENGINEER
P.J. BAKKER
100224635
Oct. 17/24
PROVINCE OF ONTARIO

COUNTY OF Brant Simply Grand

SCALE
HORIZONTAL – 1:500
VERTICAL – 1:50

TITLE
STUBBE'S PRECAST CAMPUS IMPROVEMENTS
44 MUIR ROAD SOUTH, HARLEY, COUNTY OF BRANT

NOTES & DETAILS

PROJECT No.
DEL24-001
SHEET No.
3
PLAN FILE No.

twinger Oct.17/24–12:31pm DEL24–001 – Drain Realignment.dwg

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Appendix B

Agency Approvals

Jacob Rooke

From: OP Habitat (DFO/MPO) <DFO.OPHabitat.MPO@dfo-mpo.gc.ca>
Sent: Thursday, July 25, 2024 10:14 AM
To: Jacob Rooke
Cc: Max Cheng
Subject: RE: 24-HCAA-01725 - 058650 Simmons-Hopkins Municipal Drain Proposed Realignment - DFO Request for Review

Fisheries and Oceans Canada
Ontario and Prairie Region
Fish and Fish Habitat Protection Program
867 Lakeshore Rd.
Burlington, ON
L7S 1A1

Pêches et Océans Canada
Région de l'Ontario et des Prairies
Programme de protection du poisson et de son habitat
867 chemin Lakeshore
Burlington, ON
L7S 1A1

Dear Jacob:

Subject: [Drain Realignment, Simmons-Hopkins Drain, Class C, Brant] (24-HCAA-01725) – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

The Fish and Fish Habitat Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your proposal on June 17, 2024. We understand that you propose to:

- Realignment of approx. 400m of the Simmons-Hopkins Drain. The new alignment will be excavated first in the dry and allow vegetation to establish; and
- Once established the existing drain to be filled in once flows are redirected; and,
- Work in isolation of flow or open water to avoid sedimentation of the watercourse.

Our review considered the following information:

- Request for Review form and associated documents.

Your proposal has been reviewed to determine whether it is likely to result in:

- the death of fish by means other than fishing and the harmful alteration, disruption or destruction of fish habitat which are prohibited under subsections 34.4(1) and 35(1) of the *Fisheries Act*;
- effects to listed aquatic species at risk, any part of their critical habitat or the residences of their individuals in a manner which is prohibited under sections 32, 33 and subsection 58(1) of the *Species at Risk Act*; and,
- the introduction of aquatic species into regions or bodies of water frequented by fish where they are not indigenous, which is prohibited under section 10 of the *Aquatic Invasive Species Regulations*.

The aforementioned impacts are prohibited unless authorized under their respective legislation and regulations.

To avoid and mitigate the potential for prohibited effects to fish and fish habitat (as listed above), we recommend implementing the measures listed below:

- Plan in-water works, undertakings and activities to respect timing windows to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed and migrate;
    - No in-water work between March 15 – July 15;
- Capture, relocate and monitor for fish trapped within isolated, enclosed, or dewatered areas;
    - Dewater gradually to reduce the potential for stranding fish;
- Screen intake pipes to prevent entrainment or impingement of fish;
    - Use the code of practice for water intake screens;
- Aquatic invasive species are introduced and spread through transporting sands and sediments and using contaminated construction equipment. To prevent the spread of aquatic invasive species during construction in aquatic environments:
    - Clean, drain and dry any equipment used in the water; and,
    - Never move organisms or water from one body of water to another;
- Limit impacts on riparian vegetation to those approved for the work, undertaking or activity;
    - Limit access to banks or areas adjacent to waterbodies;
    - Construct access points and approaches perpendicular to the watercourse or waterbody;
    - Re-vegetate the disturbed area with native species suitable for the site;
- Develop and implement an erosion and sediment control plan to avoid the introduction of sediment into any waterbody during all phases of the work, undertaking or activity;
    - Conduct all in-water works, undertakings or activities in isolation of open or flowing water to reduce the introduction of sediment into the watercourse;
        - Use the code of practice for temporary cofferdams and diversion channels;
    - Schedule work to avoid wet, windy and rainy periods (and heed weather advisories) that may result in high flow volumes and/ or increase erosion and sedimentation;
    - Monitor the watercourse to observe signs of sedimentation during all phases of the work, undertaking or activity and take corrective action; and,
- Develop and implement a response plan to avoid a spill of deleterious substances.

Provided that you incorporate these measures into your plans, the Program is of the view that your proposal is not likely to result in the contravention of the above mentioned prohibitions and requirements.

Should your plans change or if you have omitted some information in your proposal, further review by the Program may be required. Consult our website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) or consult with a qualified environmental consultant to determine if further review may be necessary. It remains your responsibility to remain in compliance with the *Fisheries Act*, the *Aquatic Invasive Species Regulations* or the *Species at Risk Act*.

It is also your *Duty to Notify* DFO if you have caused, or are about to cause, the death of fish by means other than fishing and/or the harmful alteration, disruption or destruction of fish habitat. Such notifications should be directed to FisheriesProtection@dfo-mpo.gc.ca or 1-855-852-8320.

Please notify this office at least 10 days before starting any in-water works. Send your notification to the assessor (contact information below) and the DFO 10 notification mailbox: DFO.OP.10DayNotification-Notification10Jours.OP.MPO@dfo-mpo.gc.ca. We recommend that a copy of this letter be kept on site while the work is in progress. It remains your responsibility to meet all other federal, territorial, provincial and municipal requirements that apply to your proposal.

If you have any questions with the content of this letter, please contact Lucas Coletti at Lucas.Coletti@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Lucas Coletti
Biologist | Biologiste
Fisheries and Oceans Canada| Pêches et Océans Canada
Fish and Fish Habitat Protection Program | Programme de Protection du Poisson et de Son Habitat
M: (905)-317-1541
Email/Courriel: Lucas.Coletti@dfo-mpo.gc.ca

From: Jacob Rooke <Jacob.Rooke@rjburnside.com>
Sent: Monday, June 17, 2024 2:02 PM
To: OP Habitat (DFO/MPO) <DFO.OPHabitat.MPO@dfo-mpo.gc.ca>
Cc: Max Cheng <Max.Cheng@rjburnside.com>; Nolan, Colby <Colby.Nolan@dfo-mpo.gc.ca>
Subject: 24-HCAA-01725 - 058650 Simmons-Hopkins Municipal Drain Proposed Realignment - DFO Request for Review

Hi Colby,

Please see attached for the completed request for review for the Simmons-Hopkins Municipal Drain proposed re-alignment within the County of Brant.

If there are any questions don't hesitate to call or email.

As a note this project is under section 78(5) of the Ontario Drainage Act (minor improvement) and there are specified timelines set out for the minor improvement process. We would like to obtain agency approvals prior to filing the report at the end of August. Could you please provide any comments or design considerations before this. If this timeline is an issue please let me know.

Thanks,
Jacob

BURNSIDE
Jacob Rooke
Engineering Assistant

R.J. Burnside & Associates Limited
35 Perry Street, Woodstock, Ontario N4S 3C4
Office: +1 800-265-9662 Direct: +1 519-340-2005
www.rjburnside.com

Jacob Rooke

From: planning <planning@lprca.on.ca>
Sent: Monday, August 19, 2024 2:24 PM
To: Jacob Rooke
Cc: Max Cheng
Subject: RE: 058650 Simmons-Hopkins Municipal Drain - LPRCA Permit Application

Good afternoon,

LPRCA staff have had a chance to review the draft report. Staff have no concerns as long as DFO's mitigation measures are adhered to.

Please contact me should you have further questions in this regard. Thank you,

Isabel Johnson, *Resource Planner*
Regulations Officer
Long Point Region Conservation Authority
4 Elm Street, Tillsonburg, ON. N4G 0C4
519-842-4242 ext. 229.

From: Jacob Rooke <Jacob.Rooke@rjburnside.com>
Sent: July 29, 2024 3:38 PM
To: planning <planning@lprca.on.ca>
Cc: Max Cheng <Max.Cheng@rjburnside.com>
Subject: 058650 Simmons-Hopkins Municipal Drain - LPRCA Permit Application

Hi Isabel,

Please see attached for the draft Simmons-Hopkins Municipal Drain Report as well as a permit application form.

Just as a note this project is under section 78(5) of the Ontario Drainage Act. There are specific timelines under this section of the act.
We plan to submit the report to the County of Brant at the end of August for their consideration. If LPRCA has any concerns with the proposal or would like to offer advisory comments, please let me know and we will update the report prior to submission with the County of Brant.

Feel free to call or email with any questions.

Thanks,
Jacob

Jacob Rooke
Engineering Assistant

R.J. Burnside & Associates Limited
35 Perry Street, Woodstock, Ontario N4S 3C4
Office: +1 800-265-9662 Direct: +1 519-340-2005
www.rjburnside.com

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Appendix C

Standard Drain Specifications

Appendix C – Standard Drain Specifications

1.0 Scope of Specifications

This specification covers the general conditions governing the construction of a Municipal Drain under the most recent revision of the Drainage Act and amendments. All work shall be done in accordance with current and applicable Ontario Provincial Standard Specifications and Drawings (OPSS and OPSD).

1.1 Benchmarks

Benchmarks shall be set at intervals along the course of the work at locations shown on the accompanying plan and/or profile. The Contractor or landowner shall be held liable for the cost of re-establishing benchmarks destroyed. Attention is drawn to Section 13 of the Drainage Act.

1.2 Stakes/Flags/Markers

Stakes, flags or markers are typically set at intervals throughout the course of the work, at all fences and property lines. The Contractor or landowner shall be held liable for the cost of replacing any stakes removed or destroyed.

1.3 Profile

The Drain is to be excavated or installed to regular gradient lines as shown on the profiles. These gradients show the bottom of the finished drain and are governed entirely by the benchmarks. The profile shows the approximate depth from the surface of the ground to the invert of the tile or drain bottom at the point where the stations are set and from the average bottom of the open drain as taken at the time of survey. Open drains shall be brought to an even gradient in the bottom to prevent standing water.

1.4 Clearing

Clearing means the cutting of all standing trees, brush, bushes and other vegetation to a maximum height of 300 mm above original ground level as well as the removal of felled materials and windfalls. Trees measuring 150 mm or more in diameter shall be felled, delimbed, cut into lengths no longer than 4 m and stacked to the designated side of the working space. The work shall not damage or disturb the area outside the areas specified in the Contract Documents.

The work shall consist of clearing all areas of earth excavation, earth surfaces to be covered by embankments up to and including 1.2 m in height, and any other areas specified in the Contract Documents.

No trees, brush or bushes are to be left inside the slopes of the Drain, whether they are located within the limits of the excavation or not. Brush cleared in accordance with the above shall be piled in a location and in a manner satisfactory to the Engineer for burning by the Owner. Unless otherwise specified or directed, these piles shall be a minimum of 100 m apart and shall contain only cleared material. All work shall be done in accordance with OPSS 201.

1.5 Close Cut Clearing

Close Cut Clearing means the cutting of all standing trees, stumps, brush, bushes and other vegetation at original ground level and the removal of felled materials and windfalls. Grubbing means the removal of all stumps, roots, embedded logs, debris and secondary growth. Trees measuring 150 mm or more in diameter shall be felled, delimbed, cut into lengths no longer than 4 m and stacked to the designated side of the working space. The work shall not damage or disturb the area outside the areas specified in the Contract Documents.

The work shall consist of close cut clearing all earth surfaces to be covered by embankments greater than 1.2 m in height, and any other areas specified in the Contract Documents.

No trees, stumps, brush or bushes are to be left inside the slopes of the Drain whether they are located within the limits of the excavation or not. Brush cleared in accordance with the above shall be piled in a location and in a manner satisfactory to the Engineer for burning by the Owner. Unless otherwise specified or directed, these piles shall be a minimum of 100 m apart and shall contain only cleared material. All work shall be done in accordance with OPSS 201.

1.6 Brushing

Brushing means the grinding or chipping to ground level of vegetation in the working space under 150 mm in diameter by means of a hydraulic brushing attachment used with an excavator or approved equivalent. This includes grinding or chipping all standing trees, stumps, brush, bushes and other vegetation to original ground level.

Trees measuring 150 mm or more in diameter shall be felled, delimbed, cut into lengths no longer than 4 m and stacked to the designated side of the working space. The work shall not damage or disturb the area outside the areas specified in the Contract Documents. All work shall be done in accordance with OPSS 201.

1.7 Grubbing

Grubbing means the removal of all stumps, roots, embedded logs, debris and secondary growth.

The work shall consist of grubbing all areas of earth excavation, earth surfaces to be covered by embankments up to and including 1.2 m in height and any other areas specified in the Contract Documents.

Grubbing is not required in swamps. Mechanical stump cutters are permitted, provided the entire root structure is removed. Depressions remaining after grubbing shall be backfilled with suitable earth material and compacted to avoid settlement. When clearing has been previously completed by others, all secondary growth, brush and debris shall be removed.

Piled boulders and surface boulders that are not specified in the Contract Documents for removal and lie within areas to be grubbed shall be removed. The work shall not damage or disturb the area outside the areas specified in the Contract Documents. All work shall be done in accordance with OPSS 201.

1.8 Removal of Surface Boulders and Removal of Piled Boulders

Piled Boulders means any cobbles, boulders or rock fragments that have been placed in fence rows or piles.

Rock means rock as defined in OPSS 206.

Surface Boulder means any boulder or rock fragment that measures 200 mm or greater in any one dimension, extends a minimum of 200 mm above original ground and can be removed without excavation.

The work shall consist of the removal of surface boulders and removal of piled boulders within the areas specified in the Contract Documents. Depressions remaining after removal shall be backfilled with suitable earth material and compacted to avoid settlement. The work shall not damage or disturb the area outside the areas specified in the Contract Documents. All work shall be done in accordance with OPSS 201.

1.9 Fences

The Contractor will be permitted to remove fences to the extent necessary to allow the construction of the Drain and to dispose of any excess material according to the specifications. Any such fences shall be carefully handled to cause no unnecessary damage. Unless allowance has been provided, such fences shall be replaced by the Contractor in as good a condition as found. The Contractor shall supply all material necessary to properly reconstruct any fences. The Contractor shall not leave any fence

open when he is not at work in the immediate area and shall replace the fence in a timely manner, all to the satisfaction of the Engineer.

1.10 Standing Crops and Livestock

Should a property owner wish to harvest any crop along an access route or within the construction working space as set out in the Engineer's Report, then it shall be the responsibility of the property owner to do so prior to construction. Provisions for the loss of, or damage to, crops along the access route or in the construction area ("Working Space") have been made in the Report and such loss or damage shall not be the liability of the Contractor.

The Contractor shall contain construction operations to the working space and width specified. As long as the construction operations are contained within the specified working space, the Contractor shall not be responsible for damages to crops along the course of the Drain.

It shall be the responsibility of the property owners to keep their livestock clear of the construction area upon receiving 24 hours advance notice by the Contractor. After receiving proper notice, the Owner of the property upon which a drain is being constructed shall be liable for any loss or damage to livestock, the Drain, drain materials or the Contractor's equipment caused by their livestock.

1.11 Notification of Agencies

The Contractor shall notify the appropriate agency before performing any work affecting the land or property of the Ontario Ministry of Transportation (MTO), railway, telephone, pipeline or public utility or regulatory agency. The Contractor shall further agree to perform the work affecting such lands or property in accordance with the specifications and approval/permit of the applicable agency.

1.12 Final Inspections

After substantial completion of the work, but prior to demobilization and final removal of all equipment and materials from the site, the Contractor **must** arrange an on-site **Final** Inspection of the work with the engineer to ensure all aspects of the work have been satisfactorily completed and/or that arrangements have been made to expedite the completion of any outstanding "minor" items or deficiencies. All the work included in the contract, at the time of the Final Inspection, must have the full dimensions and cross-sections called for in the plans and specifications. Notification to the Engineer of this Final Inspection shall be provided at least five days prior and it shall be completed as soon as possible or as soon thereafter as weather conditions permit.

2.0 Specifications for Open Drains

2.1 Geometry

The Drain shall have the full bottom width, at the gradient, specified or shown on the accompanying plan, profiles and details.

2.2 Alignment

The Drain shall run in straight lines throughout each course except at intersections, where it shall run on a minimum curve of 15 m radius unless otherwise specified. If the work consists of the improvement of an existing open drain, then the centre line of the existing drain shall be the centre line of the finished work unless otherwise specified.

2.3 Excavated Material

A clear buffer of at least 3 m shall be left between the top edge of the open drain and the excavated material. Excavated material shall be placed on the side specified or, if not specified, on the lower side of the Drain or on the side opposite trees or fences. No excavated material is to be left in any low runs intended to conduct water into the open drain. It shall be deposited, spread and leveled to a maximum depth of 150 mm, unless specified otherwise and left in a manner such that the lands on which it is spread may be cultivated with adjacent lands by use of ordinary farm machinery. Material excavated in land that is timbered, may be spread to the depth specified or to a maximum depth of 300 mm, whichever is greater. In cultivated areas, the Contractor shall remove stones and boulders on the surface greater than 100 mm diameter from the excavated material and dispose of them in an approved location. Treatment of excavated material shall be to the satisfaction of the Engineer. After the excavated material has been spread and leveled, it shall be seeded as specified.

2.4 Surface Water Inlets

Surface water inlets to the Drain shall be provided through the leveled spoil on each property at obvious natural low runs or at other locations as specified by the Engineer on site at the time of construction. No excavated material shall be left in, or any damage done to a ditch, furrow, pipe, tile or depression that is intended to conduct water into an open drain. The Drain bank at all such inlets shall be riprapped as directed by the Engineer and reimbursed under the appropriate contract item.

2.5 Outlets

During the construction of an open drain, the Contractor shall guard against damaging the outlet of any tributary drain or pipes encountered. The Contactor will be reimbursed for damage to unmarked outlet pipes under the appropriate contract item.

2.6 Access Culverts

All culverts shall be installed with the invert a minimum of 10% of its diameter or as specified below the gradient and the firm bottom of the Drain.

All pipes installed under these specifications shall be carefully bedded to ensure uniform bearing throughout its entire length.

Except where requiring concrete cradle or encasement, all pipes shall be bedded on granular fill as specified or as shown on the contract drawings. Bedding shall be hand placed, tamped and consolidated throughout. Granular fill and bedding shall be gravel or crushed stone having no particles over 20 mm in size, except where otherwise specified.

Concrete cradle and concrete encasement shall be placed as shown on the drawings, and the concrete shall be minimum 25 megapascals (MPa).

From the top of the bedding material to a point 150 mm below the existing grade of the laneway, backfill material shall be clean pit run gravel meeting OPSS Granular B or approved equivalent. The material shall be placed in lifts not to exceed 300 mm in depth and all granular materials shall be compacted to 100% standard proctor maximum dry density (SPMDD) and all subsoil or previously excavated material to 95% SPMDD.

The final 150 mm of the excavation shall be filled with clean crushed gravel conforming to OPSS Granular A specifications. The material shall be placed in lifts not exceeding 150 mm in depth and shall be thoroughly compacted to 100% SPMDD.

2.7 Excavation at Bridge Sites

The excavation at bridge sites shall be to the full depth of the Drain and as nearly as possible the full width of the Drain as specified for the bridge location. The excavation at a bridge site shall be made in a manner to protect the structural integrity of any permanent bridge. A temporary bridge may be carefully removed to allow excavation. The removal of a bridge is to be done in such a manner to cause no damage to the bridge components. Temporary bridges removed to allow excavation shall be replaced in as good a condition as found, so far as material allows. Replacing of such bridges shall be to the satisfaction of the Engineer. The Contractor shall immediately notify the Engineer if it becomes apparent that excavating to a specified gradient will endanger or

underpin any culvert or bridge. The Contractor shall cease excavation at the bridge or culvert site until the Engineer instructs the Contractor to proceed.

2.8 Seeding

Unless indicated otherwise in the Special Provisions, the Contractor shall seed all disturbed areas which includes newly excavated drain banks and leveled spoil (where specified) with the OPSS (MTO) Standard Roadside Seed Mix, consisting of 55% Creeping Red Fescue, 27% Kentucky Bluegrass, 15% Perennial Ryegrass and 3% White Clover, at an application rate of 100 kg/10,000 m^2, plus a nurse crop of Fall Rye Grain or Winter Wheat Grain at an application rate of 60 kg/10,000 m^2, at the end of each working day.

2.9 Temporary Sediment Controls

Unless otherwise specified, the Contractor shall install an approved sediment control measure at the downstream end of the open drain excavation and at any other locations specified. The Contractor shall remove any accumulated sediment at regular intervals or as directed by the Engineer. The Contractor shall then remove these temporary measures, and any accumulated sediment therein, after the new open drain has stabilized and only after authorized by the Engineer or the Drainage Superintendent.

2.10 Permanent Sediment/Stilling Basins

The Contractor shall construct and maintain sediment control or stilling basins as specified.

2.11 Rip-Rap and Non-woven Geotextile

Rip-Rap – The Contractor shall supply and install a 450 mm thickness of 150 mm to 300 mm (R-50) diameter quarry stone rip rap with filter cloth underlayment for culvert and pipe outlets. This will include areas of the existing bank where erosion or bank slumping has occurred, as directed on-site by the Engineer. For the area surrounding catchbasins, unless noted otherwise, the contractor shall supply and install a 300 mm thickness of 100 to 150 mm (R-10) diameter quarry stone rip-rap with filter cloth underlayment.

Non-Woven Geotextile - All geotextile used for tile wrapping under these specifications shall be non-woven Terrafix® 200R (or equivalent). All geotextile used under these specifications for heavy duty applications such as under rip-rap surrounding catchbasins, and at tile outlets into drains shall be non-woven Terrafix® 270R (or equivalent).

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Appendix D

Simmons-Hopkins Drain 1998 - Report

NORTH BRANCH BIG CREEK DRAIN 1998
SIMMONS-HOPKINS DRAIN 1998

TOWNSHIP OF NORWICH
and
TOWNSHIP OF BURFORD

Date: August 18, 1998

File No. 97115

K. SMART ASSOCIATES LIMITED
Kitchener Englehart Sudbury

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS

85 McINTYRE DRIVE
KITCHENER, ONTARIO N2R 1H8
RR 2 ENGLEHART, ONTARIO P0J 1H0
LASALLE BLVD., SUDBURY, ONTARIO P3A 2A3

TELEPHONE (519) 748-1199
FAX (519) 748-6100
(705) 544-2750
(705) 670-0445

August 18, 1998

File No. 97115

NORTH BRANCH, BIG CREEK DRAIN 1998
SIMMONS-HOPKINS DRAIN 1998

Township of Norwich and Township of Burford

SUMMARY

This report is prepared pursuant to Sections 4, 8, 76 and 78 of the Drainage Act, RSO 1990 as amended and in accordance with a Norwich Township Council resolution dated October 14, 1997. The resolution indicated that the Township of Norwich had received a petition for improved drainage for the North Branch Big Creek Drain in the north parts of Lots 2 and 3, Concession 1 (North Norwich) and that a report was required to address such. Subsequent investigation revealed that work would be required on the Simmons-Hopkins Drain and Norwich Township Council passed a further resolution to have an updated Schedule of Assessment prepared for future maintenance on the Simmons-Hopkins Drain.

The main objective of this report is to provide for improved drainage outlet for lands in the watershed of the North Branch Big Creek Drain in the north parts of Lots 1 to 4, Concession 9 (North Norwich) in the Township of Norwich.

This objective will be achieved by constructing a larger tile drain along the route of the existing North Branch Big Creek Drain from an outlet into the Simmons-Hopkins Drain on the north side of Beaconsfield Road in Lot 1, Concession 8 (East Oxford) and continuing southwesterly and westerly into Lot 3, Concession 8 and then northerly in Lot 3 to the north side of Beaconsfield Road.

In order to provide adequate outlet for the new North Branch Big Creek Drain it is necessary to clean out the Simmons-Hopkins Drain from the outlet into an existing watercourse in the south part of Lot 24, Concession 8, Burford Township upstream to the new tile outlet described above.

Since the cost of this cleanout will be assessed to all lands and roads in the Simmons-Hopkins Drain watershed, it was deemed to be an appropriate time to provide in this report a new Schedule of Assessment for Maintenance on the Simmons-Hopkins Drain.

A summary of the work proposed is as follows:

- 816m of ditch cleanout
- 25m of 750mm dia. solid plastic pipe for outlet across Beaconsfield Road
- 1756m of 675mm to 250mm dia. concrete tile
- 18m of 200mm dia. solid plastic pipe across Beaconsfield Road at head of drain
- 6 concrete catchbasins
- 2 concrete junction boxes
- Miscellaneous work such as clearing and grubbing, removing old catchbasins, connecting up old drain

The existing North Branch Big Creek Drain where parallel to the new drain shall remain to be maintained as part of the North Branch Big Creek Drain. The portion of the existing drain across Muir Line shall remain as Branch A. All other portions of the existing North Branch Big Creek Drain are abandoned of status under the Drainage Act.

The total estimated cost of the work is $139,000
($128,850 in Norwich Township; $10,150 in Burford Township).
The total length of the proposed drain construction is 2,615m (816m open; 1,799 closed).
The total drainage area affected is 661.9 ha (1,635 acres)
North Branch Big Creek Drain watershed is 152.3 ha (376 acres).

Schedule A shows the assessments of the total estimated cost for construction of the North Branch Big Creek Drain 1998 and the Simmons-Hopkins Drain 1998 and also indicates the net assessments after deducting grants and allowances where applicable. Schedules B-1 and B-2 contain the assessment schedules for future maintenance on the North Branch Big Creek Drain 1998 and the Simmons-Hopkins Drain 1998 respectively. Appendix A and B illustrate in tabular form the calculation of the assessments which are summarized in Schedule A and B respectively.

DRAINAGE HISTORY

The North Branch of the Big Creek Drain was originally constructed as a ditch under a report of Henry Lawe, P.L.S. dated May 7, 1884. The ditch work started about 200' (61m) west of the Lot 3-4 property line in Concession 1, North Norwich and proceeded easterly to an outlet at the Concession 8-9 Road, Lot 24, in Burford Township.

In February 1894, a report was issued by F. J. Ure, which recommended that the ditch be extended further downstream or north of the Concession 8-9 Road in Burford. The ditch was then to be cleaned out to the centre of Lot 3, Concession 1 (North Norwich). Upstream of this point the owner was planning to replace the ditch with a tile drain.

The ditch in the Township of Burford was made part of the Simmons-Hopkins Drain in 1905, by a report of F. J. Ure, which extended the ditch upstream to the line between Lots 7 & 8 near the centre of Concession 8 (East-Oxford).

A report by F. J. Ure, in 1914 found the North Branch Big Creek Drain once again in poor condition and a tile drain was recommended from the east side of the Townline between North Norwich and Burford to 200 metres ± west of the line between Lots 3 and 4, Concession 1. Tile sizes varied from 125mm at the top end to 400mm in the lower portions. The 150mm tile portion was an incorporation of the tile installed as described in the 1894 report. The Simmons-Hopkins Drain was cleaned out from the Townline Road downstream.

The Simmons-Hopkins Drain was cleaned out again in 1966 pursuant to a report by H.M. Gibson, P. Eng, OLS. The work extended from the east limits of Lot 24, Concession 9, Burford to Lot 4, Concession 8, East Oxford. A 1968 report by H. M. Gibson, P. Eng. OLS, installed a new tile drain upstream to the line between Lots 8 and 9, Concession 8 and included a Branch A drain. Main Drain tile sizes varied form 525mm to 150mm. Branch A was 200mm tile.

Records in the Township file indicate that the Simmons-Hopkins Drain was cleaned out in Burford Township in 1980.

SITE MEETING

On November 6, 1997, an on-site meeting was conducted. All landowners within the watershed of the North Branch Big Creek Drain were notified of the meeting, along with the Township of Norwich, the County of Oxford, the County of Brant, the Conservation Authority and the Ministry of Natural Resources. The following is a summary of the discussion at the on-site meeting:

2847906 Canada Incorporated, N½ of Lot 1, Concession 1, Roll No. 030-020-113

This property was not represented at the meeting. Doug Wilson, Township Drainage Superintendent indicated that he has had to do frequent repairs on the drain on this property mostly near the outlet. Doug noted that there is a catchbasin near the outlet where the drain enters the road allowance. The drain currently outlets through a steel pipe under the County Road. This farm was systematically tile drained last fall. The drainage system has headers alongside of the existing North Branch Drain, with at least four connections into the existing drain. Doug noted that there is also a catchbasin at the west limits of this property. The catchbasin is to east of the linefence a distance. The suggestion was made that consideration should be given to removing the existing tile near the outlet when installing the new drain as the existing drain is shallow and requires frequent repair.

Homeland Farms, Pt SPt of Lots 1 & 2, Concession 1, Roll No. 030-020-100
Leigh Cohoe represented this property. He indicated that this property was tiled in the 1960's with the easterly part outletting into an existing tile that goes south through the woodlot on the property to the north in Lot 1. Leigh is not certain where this tile drain finds its outlet. He is not having a problem with the drainage outletting into this old tile. The westerly part of the watershed outlets into a tile drain that was installed a number of years ago when tile drainage was done on the McClellan property. There also is no problem with the drainage in this area. Leigh did not see a need for a branch drain for his property. He was not certain on the number of acres that would drain south, but thought that the area shown on the 1914 drainage plan looked reasonable. Leigh did not feel that there would be a significant amount of surface drainage from the corner of the Lendvay property in the southeast part of Lot 1, Concession 1.

Helen Neville, NE¼ of Lot 1, Concession 1, Roll No. 030-020-114
Helen indicated that they have some tile drainage on their property done approximately twenty years ago and they do have a sketch of the tile drainage pattern. Helen's main concern is that the drainage in the North Branch Drain is very slow. They have considerable flooding and water ponding on their property after heavy run-off events and this water is very slow to drain away. It was noted that there have not been many repairs to the North Branch Drain on this property. Discussion indicated that consideration should be given to leaving the old tile in place on this property and to also consider an option for using the old tile for some of the upgrade capacity for the new drainage system. However, discussion also indicated that the cost saving would have to be significant in order to make the twin flow capacity option acceptable. The consensus seemed to be that the old drain should be left for reserve capacity and the new drain should be sized to provide a 5/8" Drainage Coefficient on its own. Helen noted that there is some drainage on the northeast part of their property which outlets into an old tile going into the property to the east. This old tile was to have been repaired by the Contractor who did the tiling on the property to the east. They will know better in the spring whether this drain is still functional. A branch drain did not seem to be necessary for this area, though it was suggested that it be investigated to see whether this area could reasonably be drained south to the North Branch Drain. In discussing the watershed, it was also noted that there is a small corner of the Neville property which may drain north to the Simmons-Hopkins Drain. The small lot severed out of this parcel was not represented at the meeting. The Nevilles' indicated that they were not aware of any drainage problems related to this lot, but felt that there was a tile drain from the house which drains easterly to the tile outlet described above.

Mary McLellan, NW¼ Lot 2, Concession 1, Roll No. 030-020-116
The McLellans' indicated that their concerns are similar to that of Neville in that the drainage in the North Branch Drain is very slow and that this tile is greatly undersized. They also get considerable flooding and surface water ponding on their property which is slow to drain away. There is a catchbasin at the east limits of their property just west of the linefence and they have seen water pond 2' over top of this catchbasin. There is some older random drainage on this property and they do have a map showing what the drainage pattern is. This drainage was done approximately fifteen years ago. The McLellans' are not aware that there has been any repairs made to the North Branch Drain on their property. The drain is fairly deep on their property. The McLellans' indicated that they would support retaining the old drain instead of having it removed. In reviewing the drainage area, it was noted that there was an area on the north part of the farm that appears to drain north across Beaconsfield Road.

A & B Cohoe, N pt Lot 3, Concession 1, Roll No. 030-020-117
Leigh Cohoe stated that land was tiled in 1980/81 with one of the outlets near the catchbasin in the field. There is an old 6" (150 mm) diameter tile from the north, into the catchbasin, which connects across Beaconsfield Road to a second catchbasin. He would like a new tile along this route made part of the North Branch Drain.

P., J., & G. Walker, N Pt 3, N½ 4, Concession 1, Roll No. 030-020-229
Glenn Walker represented this property. There are old random tiles on the property. In 1985 ± a section of the drain was relaid from the west limit to the old catchbasin. A new catchbasin was installed just upstream of the old for additional relief. He doesn't know of any other repairs on the property.
He stated there may be a problem on the east linefence. Water boils out of the catchbasin on the Lot 3-4 Line. He thinks tile needs repair up to catchbasin in bush for sure, with a catchbasin at the line fence, a junction box on the branch. The tile should perhaps continue to the lot line catcbbasin. The farm may be used for cash crops and will need tile drainage.

A. Chambers and S. Hughes, S Pt Lot 3, Concession 8, Roll No. 040-020-110
Angela Chambers noted that previous tiling on the property was to the north and was old.

Dusty Lane Farms Ltd. SE ¼ Lot 4, Concession 8, Roll No. 040-020-112
Ed Thompson represented property. He is planning on tiling but would mostly go north, some surface water does go east.

SITE EXAMINATION AND SURVEY

The route of the existing North Branch Big Creek Drain from the County Road to the Lot 3-4 line in Concession 1 was examined as well as the route for the existing drain north to Beaconsfield Road in Lot 3. An alternative outlet route which crossed Beaconsfield Road west of the County Road was also examined. The Simmons-Hopkins Drain was later

inspected from the portion along the north side of Beaconsfield Road in Lot 1, Concession 8, easterly and north to its outlet in Lot 24, Concession 8, Burford Township. A profile survey was done on all the proposed routes. The watershed of the North Branch Big Creek Drain was examined in Lots 1 to 4, Concession 1 (North Norwich) and Concession 8 (East Oxford).

AREA REQUIRING DRAINAGE

As a result of the on-site meeting and examination, the area requiring drainage was determined to be the north half of Lots 2 and 3, Concession 1. The petition complies with Section 4(1)(b) of the Drainage Act, RSO 1990 since the petition was signed by Helen Neville, owner of the NE¼ of Lot 2, Concession 1 and Leigh and Bonnie Cohoe, owners of the N½ of Lot 3, Concession 1. These properties represent in excess of 60% of the area requiring drainage.

WATERSHED DESCRIPTION

The perimeter watershed for the lands and roads upstream of the County Road was established using the watershed outlined in the North Branch Big Creek Drain report of 1914 and the Simmons-Hopkins Drain reports of 1966 and 1968. Both watersheds were compared to other drains that have common watersheds, topographic maps and the North Branch watershed was field checked as noted above.

For the Simmons-Hopkins Drain, the historical watershed was used as amended by the Court of Revision on the 1968 report. The areas were not adjusted to adjacent drains. In the future, any report by an engineer on the Simmons-Hopkins Drain or adjacent drains, (Cassidy Drain, Donald Rush Drain, etc.) should examine the watershed to ensure areas reflect field conditions and changes due to systematic tile drainage, etc.

The North Branch Big Creek Drain watershed is primarily an agricultural watershed with most of the lands within the watershed under cultivation. The soil report for Oxford County identifies the soil type along the major portion of the tile drain as Perth Silt Loam. The edges of the watershed are Honeywood Silt Loam and Huron silt loams which have good internal drainage, and are smooth, moderately sloping. The Perth silt loam has imperfect drainage and is smooth gently sloping. The Drainage Guide for Ontario identifies all three soil types as having drainage problems relating to excess surface water and subsurface drainage is recommended to improve and maintain agricultural production. The silt loams should not present a construction problem.

DESIGN CONSIDERATIONS

Tile drains are designed using an agricultural drainage design criteria referred to as the Drainage Coefficient Method which is outlined in the Drainage Guide for Ontario (OMAF Publication 29). To provide adequate outlet for subsurface drainage of agricultural lands, the outlet drain should provide a minimum ½" (12.5mm) drainage coefficient. For lands which also require an outlet for surface water, the Drainage Guide would recommend a 1" (25mm) drainage coefficient. During the site meeting, it was decided that a $^{5}/_{8}$" (16mm) drainage coefficient would be used. The existing tile would be used as a header for field tile and also for reserve capacity. To replace the proposed tile, with a new tile designed for a 1" (25mm) drainage co-efficient, the main drain would increase by 1 to 2 tile sizes. (27" and 30" diameter)

The 1914 report had the main drain tile installed with a minimum of cover of between 20" (0.5m) and 4' (1.2m) and with a 0.09% grade. Today's standards are such that for a tile drain, 0.1% is the recommended minimum grade and cover should be 0.7 to 0.75m minimum. The new tile will accordingly be installed approximately 400 to 500m deeper and have a minimum 0.1% grade throughout.

In order to maintain a minimum cover of 0.8 to 1.0m and also to not have to install a larger pipe under Muir Line (County Road 22/129), the tile will outlet into the Simmons-Hopkins Drain on the north side of Beaconsfield Road approximately 180m upstream of the existing outlet. The grade for the new tile drain enters the Simmons-Hopkins Drain approximately 170mm (7") below the ditch bottom. To provide a minimum 0.2m freeboard for the tile outlet will require a cleanout of the Simmons-Hopkins Drain to an average depth of 400mm. The grade for the cleanout wil be set at 0.1% and will match the channel bottom at the outlet into the existing watercourse in Lot 24, Concession 8, Burford. This proposed grade is slightly flatter than the 1966 design grade from the 9th Concession Road upstream. The proposed ditch grade is approximately 450mm above the invert of the large steel pipe under Muir Line.

Environmental Concerns

The North Branch Big Creek Drain and the Simmons-Hopkins Drain are not believed to be associated with any environmentally significant areas. They are located within a prime agricultural area. The North Branch, Big Creek Drain is a tile drain and therefore will have little impact on erosion and sediment transport. In the Simmons-Hopkins Drain, it is proposed to do deepening but within the bottom only, where possible. A bank would only be reworked if necessary and would subsequently be seeded.
To protect against sediment transport, a temporary sediment trap is proposed in the downstream portion of the channel. The sediment trap is to be in place for the construction work and may remain for the 1 year warranty period. The Long Point Region Conservation Authority has been notified of both site meetings.

SECOND SITE MEETING

On August 13, 1998, a second meeting was conducted with the affected owners to present the work proposed, cost estimates and preliminary assessments. As a result of the discussions at the meeting, it was determined that the work as outlined on the following section should be proceeded with. There were minor suggestions for work changes or improvements.

RECOMMENDED WORK

The following work is recommended for the reconstruction of the North Branch Big Creek Drain and the repair of the Simmons-Hopkins Drain.

NORTH BRANCH BIG CREEK DRAIN

Beaconsfield Road

- Install 25m of 750mm diameter solid plastic pipe, (Big 0 Boss 2000 or equivalent) across road by open cut. Install 10m^2 riprap protection on filter fabric at tile outlet

2847906 Canada Inc. (Roll No. 030-020-113)

- Install 57m of 675mm diameter concrete tile
- Construct 900 x 1500mm concrete junction box, existing tile connected on upstream
- Install 523m of 600mm diameter concrete tile to north of existing tile.
- Remove an existing catchbasin and connect tile.

H. Neville (Roll No. 030-020-114)

- Install 900 x 1200mm concrete catchbasin on east linefence with 400mm diameter solid plastic tubing cross-connection to existing tile.
- Install 298m of 600mm diameter concrete tile to north of existing tile.

M. McLellan (Roll No. 030-020-116)

- Install 900 x 1200mm concrete catchbasin on east linefence with 400mm diameter solid plastic tubing cross connection to existing tile. Remove existing catchbasin.
- Install 263m of 600mm diameter concrete tile to north of existing tile.

P., J., & G. Walker (Roll No. 030-020-115)

- Install 900 x 1200mm concrete ditch inlet catchbasin on east linefence
- Install 164m of 525mm diameter concrete tile to north of existing tile.
- Clear and grub along the route of the tile.
- Remove existing catchbasins and install 900 x 1200mm junction box on old tile with provision for future connections.
- Connect existing tile into and out of the new junction box using plastic tubing.
- Install 21m of 400mm diameter concrete tile north to north linefence.

A. & B. Cohoe (Roll No. 030-020-117)
- Install new 600 x 600mm concrete catchbasin on south linefence.
- Locate and connect 2 tile headers into catchbasin
- Install 129m of 350mm diameter concrete tile.
- Install 260m of 300mm diameter concrete tile.
- Install 101m of 250mm diameter concrete tile.
- Existing tile to be removed or broken up by new tile.

Beaconsfield Road
- Install 18m of 200mm diameter solid plastic pipe (Big 0 Boss 2000 or equivalent) across road by open cut.
- Install two (2) 600 x600mm concrete ditch inlet catchbasin with 20 metres of road ditch regrading.
- Remove existing catchbasin and connect existing tile to new catchbasin.

SIMMONS-HOPKINS DRAIN
Lola-May Farms Limited (Roll No. 1-338-01)
- Construct temporary sediment trap structure.
- 256 metres of brushing and ditch bottom cleanout.

9th Concession Road (Burford)
- Clean through concrete culvert

A & M Tune (Roll No. 1-421)
- 383m of ditch bottom cleanout
  Note: There is a Union Gas pipeline that crosses the ditch on the east side of the County Road right-of-way.

Muir Line (Oxford County Road 22/Brant County Road 129)
- Clean through culvert as required

Lola-May Farm Limited (Roll No. 040-020-106)
- 159m of brushing and ditch bottom cleanout

CONSTRUCTION METHODS

The concrete tile are recommended to be installed by a wheel trencher. All tile and pipe joints to be wrapped with filter fabric. Backhoe installation may be required if subsoil instability is encountered along the route of the concrete tile. Stripping and replacing of topsoil is required when using a backhoe. The ditch cleanout will be by hydraulic excavator equipped with a ditching bucket. Seeding will be done manually.

CONSTRUCTION SCHEDULING

Construction cannot commence until after the statutory requirements of the Drainage Act have been satisfied. If there are no appeals, construction may commence approximately two months after the adoption of this report. Appeals under the procedures in the Drainage Act could result in a later starting date, as construction cannot commence until all appeals are settled. Once construction commences, if the work is proceeded with continuously, it should be completed in approximately fifteen to twenty working days. The engineer will periodically supervise the construction of the drain and may conduct at least two meetings with the contractor and the landowners affected by construction: at the commencement and completion of construction. The contract for construction of the drain will be awarded by public tender. Unless construction commencement and completion dates are requested prior to the tender call, the contractor will specify the starting and completion dates for construction in the tender.

PERMITS AND UNDERGROUND UTILITIES

No permits should be required for the construction of the drain. The Contractor will be required to notify North Norwich Telephone and Union Gas in advance of any work on or adjacent to the Township and County Road right-of-ways so that all buried utilities can be located. If any owner knows of any other public or private underground utility in the vicinity of the proposed drain, they should make the engineer aware of such prior to construction.

PLAN

The location of the North Branch Big Creek Drain and Simmons-Hopkins Drain and the affected properties are shown on Drawing No. 1 included with this report. The heavy solid line indicates the location of the proposed drains. The numbers adjacent to the lines are station numbers which indicate in metres the distance along the drain measured from the tile outlet for the North Branch and the outlet for the Simmons-Hopkins Drain. The heavy broken lines with shading indicate the approximate watershed boundaries for the drains. The plan also shows other existing drains, property boundaries, Township assessment roll numbers, property owners' names and hectares affected for each parcel.

PROFILES

The profiles for the improvements to the North Branch Big Creek Drain and Simmons-Hopkins Drain are on Drawing No. 2. The profile shows the depth and grade of the proposed new tile and the bottom proposed for the ditch cleanout. The upper solid line represents the existing ground level. The lower heavy solid line (the grade line) indicates the proposed tile invert and ditch bottom. The numbers above the profile line for the existing ground indicate the depth to invert the bottom of the new drain measured in metres from the ground level at the survey stake to the proposed grade line.

COST ESTIMATE

The cost estimate of this project is outlined in the following section.

Allowances

Section 30 of the Drainage Act provides for the payment of allowances to landowners along the drain for damages caused to lands and crops by the construction of the drain. In this report the affected owners have been granted an allowance for the working area estimated to be affected. The allowance for damage to lands and crops was calculated at a rate of $1,500 per hectare. Allowances were also allowed for access routes.

In accordance with Section 62(3) of the Drainage Act RSO 1990, 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. Allowances can only be changed if the report is modified prior to adoption of the report by bylaw or in accordance with the paragraph in this report that deals with changing the scope of work after the bylaw is passed.

The allowances payable to the owners entitled thereto on this project are as follows:

Con	Lot	Roll No.	Owner	Allowances
North Branch Big Creek Drain				
1	1	030-020-113	2847096 Canada Inc.	$ 1,750
1	NE¼ 2	030-020-114	H. Neville	1,200
1	NW¼ 2	030-020-116	M. McLellan	1,100
1	Pt 3	030-020-119	P., J. & G. Walker	550
1	N Pt 3	030-020-117	A. & B. Cohoe	1,300
8	S Pt 3	030-020-110	A. Chambers & S. Hughes	50
Sub Total				$ 5,950
Simmons-Hopkins Drain				
Burford				
8	SPt24	1-328-01	Lola-May Farms Limited	$ 650
9	NPt24	1-421	A. & M. Tune	1,000
Norwich				
8	SPt1	040-020-1076	Lola-May Farms Limited	400
Sub Total				$ 2,050
	TOTAL ALLOWANCES:			**$ 8,000**

Construction Cost Estimate

The estimated cost for labour, equipment, and materials to construct the proposed drain is outlined in detail in the following section. The final cost of drain construction cannot be established until all of construction is completed. The contractor is to supply all labour, equipment and materials.

Station	Item	Cost
NORTH BRANCH BIG CREEK DRAIN		
130 to 155	- 25m of 750mm dia. solid plastic pipe (Big O Boss 2000 or equivalent) by open cut under Beaconsfield Road	$ 3,500
	- 10m² riprap protection on filter fabric	300
155 to 212	- 57m of 675mm dia. concrete tile with filter wrapped joints	3,300
212	- 900 x 1500mm concrete junction box	1,200
	- Connect existing 400mm dia. tile, seal downstream portion of tile	100
212 to 735	- 523m of 600mm dia. concrete tile with filter wrapped joints	24,400
731	- Remove existing catchbasin and re-connect existing tile	100
735	- 900 x 1200mm concrete catchbasin	1,000
	- Cross-connection to existing tile with 400mm dia. solid plastic pipe using 400mm plastic tee on existing drain	400
735 to 1+033	- 298m of 600mm dia. concrete tile with filter wrapped joints	14,000
1+033	- 900 x 1200mm concrete catchbasin	1,000
	- Remove existing catchbasin and cross-connect to existing tile with 400mm dia. solid plastic pipe using 400mm plastic tee	400
1+033 to 1+296	- 263m of 600mm dia. concrete tile with filter wrapped joints	12,300
1+296	- 900 x 1200mm concrete ditch inlet catchbasin	1,000
1+296 to 1+460	- 164m of 525mm dia. concrete tile with filter wrapped joints	6,600
	- clearing and grubbing	600
1+460, 1+462	- Remove existing catchbasins	200
1+460	- 900 x 1200mm concrete junction box	800
	- Connect existing 300mm tile	100

000 to 021	-	21m of 400mm dia. concrete tile with filter wrapped joints	600
021	-	600 x 600mm concrete catchbasin	1,000
021 to 150	-	129m of 350mm concrete tile with filter wrapped joints	3,100
150 to 350	-	200m of 300mm dia. concrete tile with filter wrapped joints including removal of existing catchbasin	4,000
350 to 451	-	101m of 250mm dia. concrete tile with filter wrapped joints	1,700
451 to 469	-	18m of 200mm dia. solid plastic pipe (Big O Boss 2000 or equivalent) by open cut under Beaconsfield Road	1,700
451, 469	-	2 – 600 x 600mm concrete ditch inlet catchbasins including ditch regrading, tile connection upstream and removing existing catchbasin	2,000
		Sub Total North Branch Big Creek Drain:	$ 85,400

SIMMONS-HOPKINS DRAIN

010	-	Rock check dam	$ 300
000 to 256	-	256m of ditch bottom cleanout and clearing	1,200
256 to 276	-	Clean through road culvert	200
276 to 659	-	383m of ditch bottom cleanout and clearing	1,200
659 to 686	-	Clean through road culvert	200
686 to 842	-	156m of ditch bottom cleanout and clearing	800
		Sub Total Simmons-Hopkins Drain:	$ 3,900

Contingencies:

-	Tile connections	$ 700
-	50m of tile on stone bedding in areas of soil instability	1,000
-	10m² of riprap	300
-	Lump sum allowance	5,000
	Sub Total Contingencies:	$ 7,000
	Sub Total Construction	$ 96,300
	Net GST (3%)	2,890
	TOTAL CONSTRUCTION COST ESTIMATE:	**$ 99,190**

Engineering Cost Estimate

Report Preparation

Set up file, prepare for & attend on-site meeting, site examination and survey, prepare plan & profile drawings, drain design, alternative cost estimates and assessments, prepare for and attend second site meeting, write report, complete drawings, print report and plans, attend consideration of report and court of revision

Total Report Preparation	$ 17,000
Total for Future Maintenance Schedules	3,000

Construction Supervision

Prepare tender documents and tender call, review tenders, attend pre-construction meeting, periodic construction inspection, payments, final inspection, post-construction follow-up, and review grant application

Total Construction Supervision	$ 8,000
Sub Total Engineering	$ 28,000
Net GST (3%)	840
TOTAL ENGINEERING COST ESTIMATE:	**$ 28,840**

The cost for report preparation is usually not altered at the conclusion of a project unless the report is referred back or the report is appealed to the Drainage Tribunal. The estimate shown for construction supervision is based on past experience and assumes good construction conditions and a contractor who completes the construction in an efficient manner. The final cost for construction supervision will vary as per the actual time spent during the construction stage.

Administration Cost Estimate

The administration cost estimate is included to cover items listed in Section 73 of the Drainage Act as eligible drain costs. The main aspect of this cost estimate is to provide for financing until the project is completed. The interest estimate for this financing is based on a past record of interest charges and assumes that a project will be completed within one year of the report filing.

The administration cost estimate also includes for application to the Ontario Municipal Board for bylaw approval if such is required. The administration cost estimate does not cover legal expenses incurred by the Municipality or assessed to the Municipality should the project be appealed beyond the Court of Revision, though such costs if incurred, will form part of the final drain cost.

TOTAL ADMINISTRATION COST ESTIMATE	**$ 2,970**

ESTIMATED COST SUMMARY

Allowances	$ 8,000
Construction	99,190
Engineering	28,840
Administration	2,970
TOTAL ESTIMATED COST:	**$ 139,000**

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 Special Assessment (Section 26). On this project Benefit, Outlet Liability, and Special Assessment are involved.

The method of calculating the assessments for this drain is illustrated in Appendix A which has been included with this report. Appendix A divides the drain into intervals. The estimated cost for each of these intervals is then determined. The first step in the assessment calculation is to apply benefit and special assessments, if applicable, to the affected lands and roads in each of the drain intervals. After deducting the total benefit and special assessments from the interval 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. As noted, the hectares affected are adjusted prior to calculating the outlet liability. The basis for this adjustment is 1 hectare of cleared agricultural land contributing both surface and subsurface water to the drain. Areas which generate greater runoff such as paved roads, are increased by a factor of 3.0 and areas which generate lesser runoff such as woodlots are decreased by a factor of 0.5.

Benefit Assessments

NORTH BRANCH BIG CREEK

Oxford County Road 22, Brant County Road 129 - $2,000

- $1,000 each benefit by cut-off with new outlet across Beaconsfield Road

2847906 Canada Inc. (Roll No. 030-020-113) - $19,000

- $1,500 for improved direct drainage outlet
- $17,500 for improved subsurface drainage and surface water control (580m x $30/m)

H. Neville (Roll No. 030-020-114) - $12,000

- $3,000 for improved direct drainage outlet
- $9,000 for improved subsurface drainage and surface water control (298m x $30/m)

M. McLellan (Roll No. 030-020-116) - $11,000
- $3,000 for improved direct drainage outlet
- $8,000 for improved subsurface drainage and surface water control (263m x $30/m)

P. J. & G. Walker (Roll No. 030-020-119) - $7,000
- $3,000 for improved direct drainage outlet
- $4,000 for improved subsurface drainage and surface water control (164m x $25/m)

A. & B. Cohoe (Roll No. 030-020-117) - $9,500
- $3,000 for improved direct drainage outlet
- $6,500 for improved subsurface drainage and surface water control (430m x $15/m)

Beaconsfield Road - $2,000
- $2,000 for improved direct drainage outlet

A. Chambers and S. Hughes (Roll No. 040-020-110) - $1,000
- $1,000 for improved direct drainage outlet

SIMMONS-HOPKINS DRAIN

Lola-May Farms Ltd. (Roll No. 1-338-01) - $1,300
- $1,300 for improved drainage from ditch cleanout (256m x $5/m)

Burford 9th Concession Road - $600
- $100 for improved drainage from ditch cleanout
- $500 for cleanout through culvert

A. & M. Tune (Roll No. 1-421) - $1,900
- $1,900 for improved drainage from ditch cleanout (383m x $5/m)

Oxford Road 22 and Brant Road 129 - $600
- $100 for improved drainage from ditch cleanout
- $500 for cleanout through culvert

Lola-May Farms Limited (Roll No. 040-020-106) - $600 and Beaconsfield Road - $200
- $800 for improved drainage from ditch cleanout

Upstream lands North Branch Big Creek Drain - $1,000
- $200 each for improved outlet provided for new drain

Special Assessments

In accordance with Section 26 of the Drainage Act, the Township of Norwich is assessed the increased costs of constructing the proposed North Branch Big Creek Drain across Beaconsfield Road. The final special assessment will be determined from the contract for construction and as described below. The equivalent drain cost for the Township Road crossings will be based on the tendered rate for the equivalent sized concrete pipe by the

length of plastic pipe. The cost for the work will be based on the tendered amount for the solid plastic pipe. Any additional costs identified by the Engineer will be added to the special assessment where appropriate. Net GST (3%) is added to the special assessments. The following table illustrates the calculation of the Special Assessments:

Work	Cost of Work (Estimate)	Less Equivalent Drain Cost	Plus Eng. Cost	Net GST (3%)	Special Assess. (Estimate)
25m of 750mm dia. pipe	3,500	1,450	1,000	90	3,140
18m of 250mm dia. pipe	1,700	300	1,000	70	2,470

If the Township elect to construct the works subject to the Special Assessments (this option is available) the special assessment shall be calculated with zero for cost of work. The special assessments will not apply for future maintenance.

Assessment Summary

The assessments against the affected lands and roads are summarized in Schedule A. Schedule A also illustrates the net assessment to each owner after grants and allowances are deducted. This schedule will be used to assess the final cost of the drain which may vary, depending on final construction and engineering costs. Net assessments may vary depending on the availability of grants. In Schedule A, each parcel of land assessed has been identified by the Assessment Roll Number for the Townships of Norwich and Burford 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 further identified by the owner's name from the last revised assessment roll. Final assessments are not levied until after the work is certified complete by the engineer. The final assessments will thus be levied to the owner of the identified parcel at the time that the final cost is levied.

MAINTENANCE

The North Branch Big Creek Drain as constructed by this report including the 1914 drain parallel to the new drain shall be maintained by the Township of Norwich with maintenance cost assessed to the upstream lands and roads prorata with the assessments in Schedule B-1.

Branch A of the North Branch Big Creek Drain shall consist of the 1.2m diameter concrete ditch inlet manhole and the 600mm dia. CSP road crossing and outlet with riprap protection. Future maintenance cost shall be assessed 25% to Roll # 030-020-113; 25% to Beaconsfield Road; 25% to Oxford County; 25% to Brant County.

The Simmons-Hopkins Drain from the new outlet of the North Branch Big Creek Drain downstream to its original outlet shall be maintained at the grade as per this report. Upstream of the outlet, the Simmons-Hopkins Drain shall be maintained as set out in the

Simmons-Hopkins Drain report of June 23, 1966 by H. M. Gibson, P.Eng., OLS, of Skelton, Gibson and Associates. Both the tile and open portion of the drain shall be assessed as set out in the maintenance Schedule B-2 of this report.

Schedules B-1 and B-2 are divided into columns to reflect the different portions of drain upon which maintenance work may be undertaken and to help identify which lands and roads are upstream of these drain portions. The dollars in the maintenance schedules are not amounts to pay but are included to establish percentages for future maintenance.

All parties affected by the North Branch Big Creek Drain and the Simmons-Hopkins Drains are encouraged to periodically inspect the drain once constructed and report any visible or suspected problems to the Townships of Norwich or Burford. Repeated inspection and maintenance of the drains should allow the drains to provide a service for many years. Each owner must provide an access route to the drains for access by the Townships to undertake necessary repair or maintenance. As well, a right-of-way along the drain routes equal to the working area described on the drawings with this report, is also to be available for future maintenance.

Culverts on Simmons-Hopkins

If a new crossing is required on one of the following parcels, it shall be at least the recommended size or equivalent end area (based on the 1966 report as detailed below). The cost shall be assessed with 50% to the property where the crossing is located and the remaining 50% to be prorated using the 2nd column of Appendix B-2, "Main Drain, Downstream of Tile Outlet", excluding the assessment to the affected parcel and any downstream parcels

Recommended Culvert Sizes

Con	Lot	Roll Number	Owner	Culvert Size
Township of Burford				
8	24	1-338-01	Lola-May Farms Ltd.	2700mm of CSP
9	24	1-421	A & M Tune	2400mm of CSP
Township of Norwich				
8	S Pt 1	040-020-106	Lola-May Farms Ltd.	2200mm of CSP
8	S Pt 2	040-020-109	H. Neville	2200mm of CSP
8	S Pt 4	040-020-112	Dusty Lane Farms Ltd.	1800mm of CSP

ABANDONED DRAINS

The North Branch Big Creek Drain tile from 1914 is to be considered abandoned from the junction box at Station 212 to the ditch inlet manhole at the County Road and upstream from the junction box at Station 1+460.

GRANTS

In accordance with the provisions of Section 85 of the Drainage Act, a grant not exceeding 1/3 may be available on the assessments against privately owned parcels of land which are used for agricultural purposes. On the North Branch Big Creek Drain 1998 all of the lands except for two lots are considered eligible for the grant. On the Simmons-

Hopkins Drain, there are several non-agricultural lots denoted with an asterisk on the Schedules. Section 88 of the Drainage Act directs the Township of Norwich to make applications for this grant upon certification of completion of the drain provided for in this report. The Township will then deduct the grant from the assessment prior to collecting the final assessment. In accordance with Section 85 of the Drainage Act, a grant not exceeding 1/3 may also be available in the future on the assessment against privately owned parcels of land used for agriculture for maintenance or repair of the North Branch Big Creek or Simmons-Hopkins Drains if done on the recommendation and supervision of the Township Drainage Superintendent.

CHANGES TO DRAIN AFTER BYLAW IS PASSED AND BEFORE COST IS LEVIED

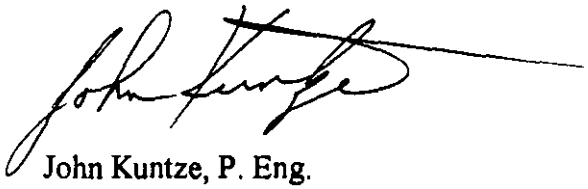
Should changes, deletions or extensions to the drain proposed in this report be requested or required after the bylaw is passed and the contract is awarded, there may be some difficulty in attending to such. Since this drain is to be constructed in accordance with a Bylaw of Norwich Township, changes to the drain cannot be undertaken without a change to the bylaw. An exception would be minor changes which are approved by the Engineer and the Township in accordance with Section E.7 of the General Conditions in the report and can be accommodated generally within 10% of the construction estimate. The above statement does not apply to the items listed in the contingency allowance section of the cost estimate which may exceed the quantities listed and may cause the cost to increase beyond 10% of the construction estimate. The cost of minor changes to the drain and increased cost from the contingency items may be prorated against some or all assessments as directed in this report.

If it is desired to make a substantial addition or deletion to the drain proposed in this report, it will be necessary that a revised report be prepared and processed through the Drainage Act, or an application to the Ontario Drainage Tribunal would be required under the Drainage Act to obtain approval for any modification.

If any individual or group of owners require additional work on the proposed drain and are prepared to pay for such, they may make their own arrangements with the Contractor to have such work constructed. The Engineer should pre-approve such additions. Even so, the work added would not form part of the drain for the purpose of future maintenance.

All of which is respectfully submitted.

K. SMART ASSOCIATES LIMITED



John Kuntze, P. Eng.
ks

August 18, 1998

File No. 97115

SCHEDULE A - SCHEDULE OF ASSESSMENTS
NORTH BRANCH BIG CREEK DRAIN 1998 and SIMMONS-HOPKINS DRAIN 1998
Township of Norwich and Township of Burford

Con	Lot	Roll No.	Owner	MAIN DRAIN Approx ha Affected	MAIN DRAIN Benefit	MAIN DRAIN Outlet	MAIN DRAIN Total	SIMMONS-HOPKINS DRAIN Approx ha Affected	SIMMONS-HOPKINS DRAIN Benefit	SIMMONS-HOPKINS DRAIN Outlet	SIMMONS-HOPKINS DRAIN Total	Grand Total	1/3 Grant	Allowances	NET
Norwich Township															
(North Norwich)		(030-020)													
1	SE Pt 1	-095	D. Lendvey	0.6		78	78	0.6		7	7	85	28	0	57
1	SW Pt 1	-095-10	Homeland Farms Ltd.	4.7		615	615	4.7		39	39	654	218	0	436
1	Pt 2-6	-100	Homeland Farms Ltd.	5.1		947	947	43.4		447	447	1,394	465	0	929
1	Pt N 1/27	-107	C. Sanders	–		0	0	2.0		11	11	11	4	0	7
1	N Pt 1	-113	2847906 Canada Inc.	25.9	19,000	2,945	21,945	29.2	200	274	474	22,419	7,473	1,750	13,196
1	NE 1/4 2	-114	H. Neville	19.8	12,000	4,216	16,216	19.8	200	208	408	16,624	5,541	1,200	9,883
*1	Pt NE 1/4 2	-115	W. & J. Remey	0.4		104	104	0.4		8	8	112	0	0	112
1	NW 1/4 2	-116	M. McLellan	20.2	11,000	6,764	17,764	20.2	200	213	413	18,177	6,059	1,100	11,018
1	NPt 3	-117	A. & B. Cohoe	20.2	12,000	10,857	22,857	20.2	200	213	413	23,270	7,757	1,300	14,213
*1	Pt N 1/2 4	-118	R. Hoekstra	0.2		214	214	0.2		5	5	219	0	0	219
1	Pt N 1/2 3 & 4	-119	P., J., & G. Walker	39.7	7,000	16,454	23,454	39.7	200	418	618	24,072	8,024	550	15,498
*1	Pt NPt 5	-121	R. Lees & L. Coughlin	–		0	0	0.4		8	8	8	0	0	8
*1	Pt NPt 6	-122	B. & J. Slingerland	–		0	0	1.6		17	17	17	0	0	17
1	Pt NPt 6 & 7	-124	A. & J. Veldhuizen	–		0	0	31.2		309	309	309	103	0	206
*1	Pt NPt 7	-125	B. Veldhuizen	–		0	0	0.7		8	8	8	0	0	8
*1	Pt NPt 7	-126	R. & K. Van Wilgen	–		0	0	0.4		8	8	8	0	0	8
*1	Pt NPt 7	-127	J. & S. Lightheart	–		0	0	0.4		8	8	8	0	0	8
*1	Pt NPt 8	-130	D. & L. Rolleson	–		0	0	0.4		3	3	3	0	0	3
*1	Pt NPt 8	-131	J. & N. Bennell	–		0	0	0.7		8	8	8	0	0	8
1	Pt NPt 8	-132	D. & G. Avey	–		0	0	1.6		17	17	17	6	0	11
(East Oxford)		(040-020)													
8	NPt 9	-089	H. & M. Vanderweard	–		0	0	2.1		11	11	11	4	0	7
8	NPt 8	-090	L. & M. Warboys	–		0	0	6.1		65	65	65	22	0	43
8	NPt 7	-091	A. & A. Farms Ltd.	–		0	0	5.3		56	56	56	19	0	37
8	NPt 6	- 093	L. & M. Warboys	–		0	0	6.1		60	60	60	20	0	40
8	Pt NPt 4	-096	E. Mees et al	–		0	0	1.6		9	9	9	3	0	6
8	Pt NPt 4	-100	W. & B. Daldn	–		0	0	4.0		42	42	42	14	0	28
8	NPt 3	-102	K. & C. McLellan	–		0	0	0.2		2	2	2	1	0	1
8	NPt 2	-104-01	Lois-May Farms Limited	–		0	0	11.7		123	123	123	41	0	82
8	NPt 2	-105	A. & A. Farms Ltd.	–		0	0	4.9		52	52	52	17	0	35
8	SPt 1	- 106	Lois-May Farms Limited	–		0	0	29.9	600	304	904	904	301	400	203
*8	SPt 1	- 108	R. & D. Rossheart	–		0	0	0.7		8	6	6	0	0	6
8	SPt 2	-109	H. Neville	–		0	0	30.4		320	320	320	107	0	213
8	SPt 3	-110	A. Chamber & S. Hughes	6.7	1,000	3,777	4,777	23.1		243	243	5,020	1,673	50	3,297
8	SPt 3	- 111	R. Thompson	–		0	0	19.5		206	206	206	69	0	137
8	SPt 4	-112	Dusty Lane Farms Ltd.	4.9		2,764	2,764	25.2		255	255	3,019	1,006	0	2,013
8	SPts 4 & 5	- 114	G. & L. Buckrell	–		0	0	46.3		468	468	468	156	0	312
8	WPt 5	- 114-01	D. & D. Avey	–		0	0	20.0		211	211	211	70	0	141
8	SEPt 6	-115	A. & V. Westra	–		0	0	19.8		207	207	207	69	0	138
8	SWPt 6	-116	W. Bates	–		0	0	38.4		379	379	379	126	0	253
8	SEPt 7	-117	D. Wills	–		0	0	33.6		356	356	356	119	0	237
8	SWPt 7	-118	P. & A. Wilson	–		0	0	33.6		356	356	356	119	0	237
8	SEPt 8	-119	B. & J. Droogers Farm Ltd.	–		0	0	26.7		281	281	281	94	0	187
8	SWPt 8	-120	L., M., & G Warboys	–		0	0	10.1		105	105	105	35	0	70
8	SEPt 9	-121	1032281 Ontario Ltd.	–		0	0	4.0		40	40	40	13	0	27
Total Assessments on Lands:				148.4	62,000	49,735	111,735	621.1	1,600	6,386	7,986	119,721	39,775	6,350	73,596
Oxford Road 14			County of Oxford	–		0	0	3.2		101	101	101	0	0	101
1/2 Muir Line (Rd 22)			County of Oxford	–	1,000	0	1,000	0.7	300	18	318	1,318	0	0	1,318
Vandecar Line			Township of Norwich	0.5		733	733	1.8		48	48	781	0	0	781
Beaconsfield Road			Township of Norwich	3.4	2,000	3,752	5,752	7.7	200	203	403	6,155	0	0	6,155
Special Assessment to Beaconsfield Road				–	5,610	0	5,610	–	0	0	0	5,610	0	0	5,610
Total Assessments on Roads:				3.9	8,610	4,485	13,095	13.4	500	370	870	13,965	0	0	13,965
Total Assessments Norwich Township:				152.3	70,610	54,220	124,830	634.5	2,100	6,756	8,856	133,686	39,775	6,350	87,561
Burford Township		(010-)													
8	SPT 24	- 336-01	Lois-May Farms Limited	–	0	0	0	7.0	1,300	42	1,342	1,342	447	650	245
9	SPT 24	- 421	A. & M. Tune	–	0	0	0	18.6	1,900	137	2,037	2,037	679	1,000	358
Total Assessments on Lands:				0.0	0	0	0	25.6	3,200	179	3,379	3,379	1,126	1,650	603
1/2 Muir Line (Rd 129)			County of Brant	–	1,000	0	1,000	0.7	300	18	318	1,318	0	0	1,318
9th Concession Rd			Township of Burford	–	0	0	0	1.1	600	17	617	617	0	0	617
Total Assessments on Roads:				0	1,000	0	1,000	1.8	900	35	935	1,935	0	0	1,935
Total Assessments Burford Township:				0.0	1,000	0	1,000	27.4	4,100	214	4,314	5,314	1,126	1,650	2,538
TOTAL ON NORTH BR. BIG CREEK DRAIN 1998 & SIMMONS-HOPKINS DRAIN 1998:				152.3	71,610	54,220	125,830	661.9	6,200	6,970	13,170	139,000	40,901	8,000	90,099

Notes:

1. All of the above lands are classified as agricultural, except those as noted with an asterisk (*).
2. 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 owner's names as shown by the last revised assessment roll, have also been included.
3. Amount(s) enclosed in brackets ( ) would be paid to the respective owner(s).

SCHEDULE B-1 - SCHEDULE OF ASSESSMENT FOR FUTURE MAINTENANCE
NORTH BRANCH BIG CREEK DRAIN 1998 - Township of Norwich

Con	Lot	Roll No.	Owner	130 to 155 (Beaconsfield Road)	155 to 735 (2847906 Ont Inc.)	735 to 1+033 (Neville)	1+033 to 1+296 (McLellan)	1+296 to 1+460 (Walker)	000 to 021 (Walker/ Cohoe)	451 to 471 (Beaconsfield Road)
		(030-020)								
1	SE Pt 1	-095	D. Lendvay	2	76	0	0	0	0	0
1	SW Pt1	-095-10	Homeland Farms Ltd.	13	468	134	0	0	0	0
1	Pt 2-6	-100	Homeland Farms Ltd.	14	519	323	91	0	0	0
1	Pt N1/2 7	-107	C. Slenders	0	0	0	0	0	0	0
1	N Pt 1	-113	2847906 Canada Inc.	72	12,121	252	0	0	0	0
1	NE1/4 2	-114	H. Neville	69	3,706	6,277	45	36	83	0
*1	Pt NE 1/4 2	-115	W. & J. Ramey	3	101	0	0	0	0	0
1	NW 1/4 2	-116	M. McLellan	70	2,808	2,341	6,330	216	499	0
1	NPt 3	-117	A. & B. Cohoe	70	2,808	1,841	2,080	1,951	8,107	0
*1	Pt N1/2 4	-118	R. Hoekstra	1	51	31	36	29	66	0
1	Pt N1/2 3 & 4	-119	P., J., & G. Walker	138	5,277	3,376	4,098	5,353	1,712	0
*1	PtNPt 5	-121	R. Lees & L. Coughlin	0	0	0	0	0	0	0
*1	PtNPt 6	-122	B. & J. Slingerland	0	0	0	0	0	0	0
1	PtNPt 6 & 7	-124	A. & J. Veldhuizen	0	0	0	0	0	0	0
*1	PtNPt 7	-125	B. Veldhuizen	0	0	0	0	0	0	0
*1	PtNPt 7	-126	R. & K. Van Willigen	0	0	0	0	0	0	0
*1	PtNPt 7	-127	J. & S. Lightheart	0	0	0	0	0	0	0
*1	PtNPt 8	-130	D. & L. Rolocon	0	0	0	0	0	0	0
*1	PtNPt 8	-131	J. & N. Bennett	0	0	0	0	0	0	0
1	PtNPt 8	-132	D. & G. Avey	0	0	0	0	0	0	0
(East Oxford)		(040-020)								
8	NPt 9	-089	H. & M. Vanderweerd	0	0	0	0	0	0	0
8	NPt 8	-090	L. & M. Warboys	0	0	0	0	0	0	0
8	NPt 7	-091	A. & A. Farms Ltd.	0	0	0	0	0	0	0
8	NPt 6	- 093	L. & M. Warboys	0	0	0	0	0	0	0
8	PtNPt 4	-096	E. Maas et al	0	0	0	0	0	0	0
8	PtNPt 4	-100	W. & B. Dakin	0	0	0	0	0	0	0
8	NPt 3	-102	K. & C. McLellan	0	0	0	0	0	0	0
8	NPt 2	-104-01	Lois-May Farms Limited	0	0	0	0	0	0	0
8	NPt 2	-105	A. & A. Farms Ltd.	0	0	0	0	0	0	0
8	SPt 1	- 106	Lois-May Farms Limited	0	0	0	0	0	0	0
*8	SPt 1	- 108	R. & D. Rosehearl	0	0	0	0	0	0	0
8	SPt 2	-109	H. Neville	0	0	0	0	0	0	0
8	SPt 3	-110	A. Chamber & S. Hughes	23	848	527	607	481	1,363	428
8	SPt 3	- 111	R. Thompson	0	0	0	0	0	0	0
8	SPt 4	-112	Dusty Lane Farms Ltd.	17	620	386	444	352	814	131
8	SPts 4 & 5	- 114	G. & L. Buckrell	0	0	0	0	0	0	0
8	WPt 5	- 114-01	D. & D. Avey	0	0	0	0	0	0	0
8	SEPt 6	-115	A. & V. Westra	0	0	0	0	0	0	0
8	SWPt 6	-116	W. Bates	0	0	0	0	0	0	0
8	SEPt 7	-117	D. Wills	0	0	0	0	0	0	0
8	SWPt 7	-118	P. & A. Wilson	0	0	0	0	0	0	0
8	SEPt 8	-119	B. & J. Droogers Farm Ltd.	0	0	0	0	0	0	0
8	SWPt8	-120	L., M., & G Warboys	0	0	0	0	0	0	0
8	SEPt 9	-121	1032281 Ontario Ltd.	0	0	0	0	0	0	0
Total Assessments on Lands:				492	29,403	15,488	13,731	8,418	12,644	559
Oxford Road 14			County of Oxford	0	0	0	0	0	0	0
1/2 Muir Line (Rd 22)			County of Oxford	0	0	0	0	0	0	0
Vandecar Line			Township of Norwich	4	165	102	118	93	216	35
Beaconsfield Road			Township of Norwich	529	862	535	616	739	1,380	591
Total Assessments on Roads:				533	1,027	637	734	832	1,596	626
TOTAL NORTH BRANCH BIG CREEK DRAIN 1998				1,025	30,430	16,125	14,465	9,250	14,240	1,185

Notes:

1. All of the above lands are classified as agricultural, except those as noted with an asterick (*).

SCHEDULE B-2 - SCHEDULE OF ASSESSMENT FOR FUTURE MAINTENANCE
SIMMONS-HOPKINS DRAIN 1998 - Township of Norwich and Township of Burford

Con	Lot	Roll No.	Owner	MAIN DRAIN (OPEN) 000 to 686	686 to 842	842 to Tile outlet	MAIN DRAIN (TILE) Tile Outlet to Walker Dr	Walker Dr. to Branch A	Upstream of Branch A	BRANCH A
Township of Norwich										
(North Norwich)		(030-020)								
1	SE Pt 1	-095	D. Lendvay	6	1	0	0	0	0	0
1	SW Pt1	-095-10	Homeland Farms Ltd.	32	7	0	0	0	0	0
1	Pt 2-6	-100	Homeland Farms Ltd.	366	81	861	0	0	0	0
1	Pt N1/2 7	-107	C. Slenders	9	2	22	61	0	0	0
1	N Pt 1	-113	2847906 Canada Inc.	224	50	0	0	0	0	0
1	NE 1/4 2	-114	H. Neville	170	38	0	0	0	0	0
*1	Pt NE 1/4 2	-115	W. & J. Ramey	6	2	0	0	0	0	0
1	NW 1/4 2	-116	M. McLellan	174	39	0	0	0	0	0
1	NPt 3	-117	A. & B. Cohoe	174	39	0	0	0	0	0
*1	Pt N1/2 4	-118	R. Hoekstra	4	1	0	0	0	0	0
1	Pt N1/2 3 & 4	-119	P., J., & G. Walker	342	76	0	0	0	0	0
*1	PtNPt 5	-121	R. Lees & L. Coughlin	6	2	18	49	0	0	0
*1	PtNPt 6	-122	B. & J. Slingerland	14	3	35	98	0	0	0
1	PtNPt 6 & 7	-124	A. & J. Veldhuizen	253	56	645	1,796	0	0	0
*1	PtNPt 7	-125	B. Veldhuizen	6	2	15	43	0	0	0
*1	PtNPt 7	-126	R. & K. Van Willigen	6	2	18	49	0	0	0
*1	PtNPt 7	-127	J. & S. Lightheart	6	2	18	49	0	0	0
*1	PtNPt 8	-130	D. & L. Roloson	2	1	18	49	0	0	0
*1	PtNPt 8	-131	J. & N. Bennett	6	2	15	43	0	0	0
1	PtNPt 8	-132	D. & G. Avey	14	3	35	98	0	0	0
(East Oxford)		(040-020)								
8	NPt 9	-089	H. & M. Vanderweard	9	2	22	61	95	216	0
8	NPt 8	-090	L. & M. Warboys	53	12	134	373	581	1,319	0
8	NPt 7	-091	A. & A. Farms Ltd.	46	10	116	324	505	0	0
8	NPt 6	- 093	L. & M. Warboys	49	11	123	343	534	0	0
8	PtNPt 4	-098	E. Mass et al	7	2	18	49	0	0	0
8	PtNPt 4	-100	W. & B. Dekin	34	8	88	245	0	0	0
8	NPt 3	-102	K. & C. McLellan	2	0	4	12	0	0	0
8	NPt 2	-104-01	Lola-May Farms Limited	101	22	257	0	0	0	0
8	NPt 2	-105	A. & A. Farms Ltd.	43	9	108	0	0	0	0
8	SPt 1	- 106	Lola-May Farms Limited	257	347	1,539	0	0	0	0
*8	SPt 1	- 108	R. & D. Roseheart	6	0	0	0	0	0	0
8	SPt 2	-109	H. Neville	262	58	2,387	0	0	0	0
8	SPt 3	-110	A. Chamber & S. Hughes	199	44	960	0	0	0	0
8	SPt 3	- 111	R. Thompson	169	37	1,326	0	0	0	0
8	SPt 4	-112	Dusty Lane Farms Ltd.	209	46	1,223	226	0	0	0
8	SPts 4 & 5	- 114	G. & L. Buckrell	383	85	972	9,060	667	0	0
8	WPt 5	- 114-01	D. & D. Avey	173	38	439	4,374	1,334	0	0
8	SEPt 6	-115	A. & V. Westra	169	38	430	1,199	3,382	0	0
8	SWPt 6	-116	W. Bates	310	69	790	2,203	6,511	0	0
8	SEPt 7	-117	D. Wills	290	66	737	2,056	5,711	0	185
8	SWPt 7	-118	P. & A. Wilson	290	66	737	2,056	4,152	3,033	1,829
8	SEPt 8	-119	B. & J. Droogers Farm Ltd.	230	51	586	1,634	2,544	5,369	262
8	SWPt 8	-120	L., M., & G Warboys	86	19	217	606	943	3,191	24
8	SEPt 9	-121	1032281 Ontario Ltd.	33	7	83	233	362	822	0
Total Assessments on Lands:				5,230	1,458	14,978	27,391	27,321	13,950	2,100
Oxford Road 14			County of Oxford	83	18	211	587	929	0	0
1/2 Muir Line (Rd 22)			County of Oxford	318	0	0	0	0	0	0
Vandecar Line			Township of Norwich	39	9	170	153	0	0	0
Beaconsfield Road			Township of Norwich	166	237	241	569	0	0	0
Total Assessments on Roads:				606	264	622	1,309	929	0	0
Total Assessments Township of Norwich				5,836	1,720	15,600	28,700	28,250	13,950	2,100
Township of Burford										
8	SPT 24	- 336-01	Lola-May Farms Limited	1,342	0	0	0	0	0	0
9	SPT 24	- 421	A. & M. Tune	2,037	0	0	0	0	0	0
Total Assessments on Lands:				3,379	0	0	0	0	0	0
1/2 Muir Line (Rd 129)			County of Brant	318	0	0	0	0	0	0
9th Concession Rd			Township of Burford	617	0	0	0	0	0	0
Total Assessments on Roads:				935	0	0	0	0	0	0
Total Assessments Township of Burford:				4,314	0	0	0	0	0	0
TOTAL SIMMONS-HOPKINS DRAIN 1998				10,150	1,720	15,600	28,700	28,250	13,950	2,100

Notes:

1. All of the above lands are classified as agricultural, except those as noted with an asterisk (*).

APPENDIX A - CALCULATION OF ASSESSMENTS
NORTH BRANCH BIG CREEK DRAIN AND SIMMONS-HOPKINS DRAIN - Townships of Norwich and Burford

				NORTH BRANCH BIG CREEK DRAIN																		SIMMONS-HOPKINS DRAIN										GRAND TOTAL
INTERVAL				130to 155 (Beaconsfield Road)		155 to 735 (2847906 Ont Inc.)		735to 1+033 (Neville)		1+033 to 1+296 (McLellan)		1+296 to 1+460 (Walker)		000 to 451 (Walker/Cohoe)		451 to 471 (Beaconsfield Road)		Total		000 to 256 (Lola-May Farms Ltd.)		256 to 686 (Tune & Muir Line)		686 to 842 (Lola-May Farms Ltd.)		Total		
COST ESTIMATE																																
Allowances				0		1,750		1,200		1,100		500		1,350		50		5,950		900		850		300		2,050		8,000
Construction				4,225		32,755		17,100		15,240		9,690		12,670		2,990		94,870		1,850		1,540		930		4,320		99,190
Engineering				1,310		6,515		3,350		2,955		1,840		5,065		1,255		22,290		3,090		1,730		1,730		6,550		28,840
Administration				130		910		475		420		270		405		110		2,720		115		75		60		250		2,970
Total Cost Estimate				5,665		41,930		22,125		19,715		12,500		19,490		4,405		125,830		5,955		4,195		3,020		13,170		139,000
BENEFIT ASSESSMENTS	Roll No.																															
(Norwich Township)	(030-020)																															
2847906 Ont Inc.	-113					19,000												19,000						200		200		19,200
H. Neville	-114					2,500		9,500										12,000						200		200		12,200
M. McLellan	-116					500		1,500		9,000								11,000						200		200		11,200
A. & B. Cohoe	-117					500		500		500		1,000		9,500				12,000						200		200		12,200
P., J., & G. Walker	-119					500		500		1,000		5,000						7,000						200		200		7,200
	(040-020)																															
Lola-May Farms Limited	- 106																	0						600		600		600
A. Chambers & S. Hughes	-110													500		500		1,000								0		1,000
(Burford Township)	(010)																															
Lola-May Farms Limited	1-338-01																	0		1,300						1,300		1,300
A. & M. Tune	1-421																	0		500		1,400				1,900		1,900
9th Concession Road																		0		100		500				600		600
Brant County Road 129				1,000														1,000				300				300		1,300
Oxford County Road 22				1,000														1,000				300				300		1,300
Beaconsfield Road												500		500		1,000		2,000						200		200		2,200
SPECIAL ASSESSMENTS																																
Beaconsfield Road				3,140												2,470		5,610								0		5,610
TOTAL BENEFITS & SPECIALS				5,140		23,000		12,000		10,500		6,500		10,500		3,970		71,610		1,900		2,500		1,800		6,200		77,810
OUTLET ASSESSMENTS				525		18,930		10,125		9,215		6,000		8,990		435		54,220		4,055		1,695		1,220		6,970		61,190
Ha. Into Interval				151.6		149.5		128.6		101.7		83.5		54.1		16.3				672.5		653.6		633.9				
Outlet Rate/Ha.				3.46		126.62		78.73		90.61		71.86		166.17		26.69				6.03		2.59		1.92				
Owner	Roll No.	Total ha Affected	Total ha Adjusted	Ha	$	Ha	$	Ha	$	Ha	$	Ha	$	Ha	$	Ha	$			Ha	$	Ha	$	Ha	$			
(Norwich)	(030-020)																											
D. Lendvay	-095	0.6	0.6	0.6	2	0.6	76	0	0	0	0	0	0	0	0	0	0	78		0.6	4	0.6	2	0.6	1	7		85
Homeland Farms Ltd.	-095-10	4.7	3.7	3.7	13	3.7	468	1.7	134	0	0	0	0	0	0	0	0	615		3.7	22	3.7	10	3.7	7	39		654
Homeland Farms Ltd.	-100	43.4	42.4	4.1	14	4.1	519	4.1	323	1.0	91	0	0	0	0	0	0	947		42.4	255	42.4	111	42.4	81	447		1,394
C. Slenders	-107	2.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.0	6	1.0	3	1.0	2	11		11
2847906 Canada Inc.	-113	29.2	26.0	20.7	72	20.7	2,621	3.2	252	0	0	0	0	0	0	0	0	2,945		26.0	157	26.0	67	26.0	50	274		3,219
H. Neville	-114	19.8	19.8	19.8	69	19.4	2,456	19.4	1,527	0.5	45	0.5	36	0.5	83	0	0	4,216		19.8	119	19.8	51	19.8	38	208		4,424
W. & J. Ramey	-115	0.4	0.8	0.8	3	0.8	101	0	0	0	0	0	0	0	0	0	0	104		0.8	5	0.8	1	0.8	2	8		112
M. McLellan	-116	20.2	20.2	20.2	70	20.2	2,558	20.2	1,591	20.2	1,830	3.0	216	3.0	499	0	0	6,764		20.2	122	20.2	52	20.2	39	213		6,977
A. & B. Cohoe	-117	20.2	20.2	20.2	70	20.2	2,558	20.2	1,591	20.2	1,830	20.2	1,451	20.2	3,357	0	0	10,857		20.2	122	20.2	52	20.2	39	213		11,070
R. Hoekstra	-118	0.2	0.4	0.4	1	0.4	51	0.4	31	0.4	36	0.4	29	0.4	66	0	0	214		0.4	2	0.4	2	0.4	1	5		219
P., J., & G. Walker	-119	39.7	39.7	39.7	138	39.7	5,027	39.7	3,126	39.7	3,598	39.7	2,853	10.3	1,712	0	0	16,454		39.7	238	39.7	104	39.7	76	418		16,872
R. Lees & L. Coughlin	-121	0.4	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.8	5	0.8	1	0.8	2	8		8
B. & J. Slingerland	-122	1.6	1.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.6	10	1.6	4	1.6	3	17		17
A. & J. Veldhuizen	-124	31.2	29.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		29.4	177	29.4	76	29.4	56	309		309
B. Veldhuizen	-125	0.7	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.7	4	0.7	2	0.7	2	8		8
R. & K. Van Willigen	-126	0.4	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.8	5	0.8	1	0.8	2	8		8
J. & S. Lightheart	-127	0.4	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.8	5	0.8	1	0.8	2	8		8
D. & L. Roloson	-130	0.4	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.4	2	0.4	0	0.4	1	3		3
J. & N. Bennett	-131	0.7	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.7	4	0.7	2	0.7	2	8		8
D. & G. Avey	-132	1.6	1.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.6	10	1.6	4	1.6	3	17		17
	(040-020)																											
H. & M. Vanderweerd	-089	2.1	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.0	6	1.0	3	1.0	2	11		11
L. & M. Warboys	-090	6.1	6.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		6.1	37	6.1	16	6.1	12	65		65
A. & A. Farms Ltd.	-091	5.3	5.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		5.3	32	5.3	14	5.3	10	56		56
L. & M. Warboys	- 093	6.1	5.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		5.6	34	5.6	15	5.6	11	60		60
E. Maas et al	-096	1.6	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.8	5	0.8	2	0.8	2	9		9
W. & B. Dakin	-100	4.0	4.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4.0	24	4.0	10	4.0	8	42		42
K. & C. McLellan	-102	0.2	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.2	1	0.2	1	0.2	0	2		2
Lola-May Farms Limited	-104-01	11.7	11.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		11.7	71	11.7	30	11.7	22	123		123
A. & A. Farms Ltd.	-105	4.9	4.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		4.9	30	4.9	13	4.9	9	52		52
Lola-May Farms Limited	- 106	29.9	29.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		29.9	180	29.9	77	24.6	47	304		304
R. & D. Roseheart	- 108	0.7	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.7	4	0.7	2	0.0	0	6		6
H. Neville	-109	30.4	30.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		30.4	183	30.4	79	30.4	58	320		320
A. Chamber & S. Hughes	-110	23.1	23.1	6.7	23	6.7	848	6.7	527	6.7	607	6.7	481	6.7	1,113	6.7	178	3,777		23.1	139	23.1	60	23.1	44	243		4,020
R. Thompson	- 111	19.5	19.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		19.5	118	19.5	51	19.5	37	206		206
Dusty Lane Farms Ltd.	-112	25.2	24.2	4.9	17	4.9	620	4.9	386	4.9	444	4.9	352	4.9	814	4.9	131	2,764		24.2	146	24.2	63	24.2	46	255		3,019
G. & L. Buckrell	- 114	46.3	44.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		44.3	267	44.3	116	44.3	85	468		468
D. & D. Avey	- 114-01	20.0	20.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		20.0	121	20.0	52	20.0	38	211		211
A. & V. Westra	-115	19.8	19.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		19.6	118	19.6	51	19.6	38	207		207
W. Bates	-116	38.4	36.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		36.0	217	36.0	93	36.0	69	379		379
D. Wills	-117	33.6	33.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		33.6	203	33.6	87	33.6	66	356		356
P. & A. Wilson	-118	33.6	33.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		33.6	203	33.6	87	33.6	66	356		356
B. & J. Droogers Farm Ltd.	-119	26.7	26.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		26.7	161	26.7	69	26.7	51	281		281
L., M., & G Warboys	-120	10.1	9.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		9.9	60	9.9	26	9.9	19	105		105
1032281 Ontario Ltd.	-121	4.0	3.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		3.8	23	3.8	10	3.8	7	40		40
Oxford Road 14		3.2	9.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		9.6	58	9.6	25	9.6	18	101		101
1/2 Muir Line (Rd 22)		0.7	2.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2.1	13	2.1	5	0	0	18		18
Vandecar Line		1.8	4.5	1.3	4	1.3	165	1.3	102	1.3	118	1.3	93	1.3	216	1.3	35	733		4.5	27	4.5	12	4.5	9	48		781
Beaconsfield Road		7.7	19.3	8.5	29	6.8	862	6.8	535	6.8	616	6.8	489	6.8	1,130	3.4	91	3,752		19.3	116	19.3	50	19.3	37	203		3,955
(Burford)	(010-)																											
Lola-May Farms Limited	- 338-01	7.0	7.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		7.0	42	0	0	0	0	42		42
A. & M. Tune	- 421	18.6	18.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		18.6	112	9.5	25	0	0	137		137
1/2 Muir Line (Rd 129)		0.7	2.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2.1	13	2.1	5	0	0	18		18
9th Concession Rd		1.1	2.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2.8	17	0	0	0	0	17		17
Total Outlets		661.9	672.5	151.6	525	149.5	18,930	128.6	10,125	101.7	9,215	83.5	6,000	54.1	8,990	16.3	435	54,220		672.5	4,055	654	1,695	633.9	1,220	6,970		61,190

APPENDIX B - CALCULATION OF ASSESSMENTS FOR FUTURE MAINTENANCE
SIMMONS-HOPKINS DRAIN
Townships of Norwich

INTERVAL				Main Drain 842 to Tile Outlet		Main Drain Tile Outlet to Walker Drain		Main Drain Walker Drain to Branch A		Main Drain Upstream of Branch A		Branch A	
Cost Estimate				20,700		38,200		37,600		18,600		2,800	
BENEFIT ASSESSMENTS	Roll No.												
(East Oxford Township)	040-020												
Lola-May Farms Limited	- 106			2,200									
H. Neville	-109			3,400									
A. Chambers & S. Hughes	-110			1,200									
R. Thompson	- 111			1,800									
Dusty Lane Farms Ltd.	-112			1,600									
G. & L. Buckrell	- 114					12,700							
D. & D. Avey	- 114-01					8,300							
A. & V. Westra	-115							4,000					
W. Bates	-116							7,400					
D. Wills	-117							5,400					
P. & A. Wilson	-118							1,900		3,600		1,400	
B. & J. Droogers Farm Ltd.	-119									3,600			
L., M., & G Warboys	-120									2,100			
Vandecar Line				100									
Oxford County Road 14								300					
TOTAL BENEFITS & SPECIALS				10,300		19,000		19,000		9,300		1,400	
OUTLET ASSESSMENTS				10,400		19,200		18,600		9,300		1,400	
Ha. Into Interval				474		313.8		195.2		43.0		28.8	
Outlet Rate/Ha.				21.94		61.19		95.29		216.28		48.61	
Owner	Roll No.	Total ha Affected	Total ha Adjusted	Ha	$	Ha	$	Ha	$	Ha	$	Ha	$
(North Norwich)	(030-020)												
D. Lendvay	-095	0.6	0.6	0	0	0	0	0	0	0	0	0	0
Homeland Farms Ltd.	-095-10	4.7	3.7	0	0	0	0	0	0	0	0	0	0
Homeland Farms Ltd.	-100	43.4	42.4	39.3	861	0	0	0	0	0	0	0	0
C. Slenders	-107	2.0	1.0	1.0	22	1.0	61	0	0	0	0	0	0
2847906 Canada Inc.	-113	29.2	25.2	0	0	0	0	0	0	0	0	0	0
H. Neville	-114	19.8	19.8	0	0	0.0	0	0	0	0	0	0	0
W. & J. Ramey	-115	0.4	0.8	0	0	0	0	0	0	0	0	0	0
M. McLellan	-116	20.2	20.2	0	0	0	0	0	0	0	0	0	0
A. & B. Cohoe	-117	20.2	20.2	0	0	0	0	0	0	0	0	0	0
R. Hoekstra	-118	0.2	0.4	0	0	0	0	0	0	0	0	0	0
P., J., & G. Walker	-119	39.7	38.5	0.0	0	0.0	0	0	0	0	0	0	0
R. Lees & L. Coughlin	-121	0.4	0.8	0.8	18	0.8	49	0	0	0	0	0	0
B. & J. Slingerland	-122	1.6	1.6	1.6	35	1.6	98	0	0	0	0	0	0
A. & J. Veldhuizen	-124	31.2	29.4	29.4	645	29.4	1,798	0	0	0	0	0	0
B. Veldhuizen	-125	0.7	0.7	0.7	15	0.7	43	0	0	0	0	0	0
R. & K. Van Willigen	-126	0.4	0.8	0.8	18	0.8	49	0	0	0	0	0	0
J. & S. Lightheart	-127	0.4	0.8	0.8	18	0.8	49	0	0	0	0	0	0
D. & L. Roloson	-130	0.4	0.8	0.8	18	0.8	49	0	0	0	0	0	0
J. & N. Bennett	-131	0.7	0.7	0.7	15	0.7	43	0	0	0	0	0	0
D. & G. Avey	-132	1.6	1.6	1.6	35	1.6	98	0	0	0	0	0	0
	(040-020)												
H. & M. Vanderweerd	-089	2.1	1.0	1.0	22	1.0	61	1.0	95	1.0	216	0	0
L. & M. Warboys	-090	6.1	6.1	6.1	134	6.1	373	6.1	581	6.1	1,319	0	0
A. & A. Farms Ltd.	-091	5.3	5.3	5.3	116	5.3	324	5.3	505	0	0	0	0
L. & M. Warboys	- 093	6.1	5.6	5.6	123	5.6	343	5.6	534	0	0	0	0
E. Maas et al	-096	1.6	0.8	0.8	18	0.8	49	0	0	0	0	0	0
W. & B. Dakin	-100	4.0	4.0	4	88	4	245	0	0	0	0	0	0
K. & C. McLellan	-102	0.2	0.2	0.2	4	0.2	12	0	0	0	0	0	0
Lola-May Farms Limited	-104-01	11.7	11.7	11.7	257	0	0	0	0	0	0	0	0
A. & A. Farms Ltd.	-105	4.9	4.9	4.9	108	0	0	0	0	0	0	0	0
Lola-May Farms Limited	- 106	29.9	29.9	20	439	0	0	0	0	0	0	0	0
R. & D. Roseheart	- 108	0.7	0.7	0	0	0	0	0	0	0	0	0	0
H. Neville	-109	30.4	30.4	30.4	667	0	0	0	0	0	0	0	0
A. Chamber & S. Hughes	-110	23.1	23.1	16.4	360	0	0	0	0	0	0	0	0
R. Thompson	- 111	19.5	19.5	19.5	428	0	0	0	0	0	0	0	0
Dusty Lane Farms Ltd.	-112	25.2	24.2	19.3	423	3.7	226	0	0	0	0	0	0
G. & L. Buckrell	- 114	46.3	44.3	44.3	972	44.3	2,710	7.0	667	0	0	0	0
D. & D. Avey	- 114-01	20.0	20.0	20.0	439	20.0	1,224	14.0	1,334	0	0	0	0
A. & V. Westra	-115	19.8	19.6	19.6	430	19.6	1,199	14.5	1,382	0	0	0	0
W. Bates	-116	38.4	36.0	36.0	790	36.0	2,203	29.5	2,811	0	0	0	0
D. Wills	-117	33.6	33.6	33.6	737	33.6	2,056	31.6	3,011	0	0	3.8	185
P. & A. Wilson	-118	33.6	33.6	33.6	737	33.6	2,056	33.6	3,202	5.7	1,233	19.1	929
B. & J. Droogers Farm Ltd.	-119	26.7	26.7	26.7	586	26.7	1,634	26.7	2,544	16.5	3,569	5.4	262
L., M., & G Warboys	-120	10.1	9.9	9.9	217	9.9	606	9.9	943	9.9	2,141	0.5	24
1032281 Ontario Ltd.	-121	4.0	3.8	3.8	83	3.8	233	3.8	362	3.8	822	0	0
Oxford Road 14		3.2	9.6	9.6	211	9.6	587	6.6	629	0	0	0	0
1/2 Muir Line (Rd 22)		0.7	2.1	0	0	0	0	0	0	0	0	0	0
Vandecar Line		1.8	4.5	3.2	70	2.5	153	0	0	0	0	0	0
Beaconsfield Road		7.7	19.3	11.0	241	9.3	569	0	0	0	0	0	0
(Burford)	(010-)												
Lola-May Farms Limited	- 338-01	7.0	7.0	0	0	0	0	0	0	0	0	0	0
A. & M. Tune	- 421	18.6	18.6	0	0	0	0	0	0	0	0	0	0
1/2 Muir Line (Rd 129)		0.7	2.1	0	0	0	0	0	0	0	0	0	0
9th Concession Road		1.1	2.8	0	0	0	0	0	0	0	0	0	0
Total Outlets		661.9	670.9	474	10,400	313.8	19,200	195.2	18,600	43	9,300	28.8	1,400

PART E

GENERAL CONDITIONS

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E. GENERAL CONDITIONS

E.1 SCOPE

The work to be done under this specification consists of supplying all labour, materials, equipment, etc., to construct the work as outlined on the accompanying drawings, in the estimate of quantities and on the form of Tender. In some municipalities, the Contractor shall supply all materials. The Instructions to Tenderers lists which materials are to be supplied by the Contractor.

E.2 TENDERS

Tenders are to be submitted on a lump sum basis for the complete works or a portion thereof, as instructed by the Municipality. A deposit of 10% of the amount of the bid in the form of a certified cheque payable to the Treasurer of the Municipality must accompany each tender as a guarantee of good faith. All certified cheques, except that of the bidder to whom the work is awarded, will be returned within 10 days of the time the contract is awarded. The certified cheque of the bidder to whom the work is awarded will be returned with the final payment on the work or will be retained until the successful tenderer furnishes a Performance Bond and/or Labour and Materials Bond for 100% of the amount of the tender or other satisfactory security, if required by the Municipality. A Performance Bond may be required to insure completion of the work and maintenance of the work for a period of one year after the date of the Completion Certificate.

E.3 EXAMINATION OF SITE, PLANS AND SPECIFICATIONS

The tenderer must examine the premises and site to compare them with the plans and specifications in order to satisfy himself of the existing conditions and the extent of the work to be done before submission of his tender. No allowances shall be made on behalf of the Contractor by reason of any error on his part.

Any estimates of quantities shown or indicated on the plan or elsewhere in the contract documents are provided for the convenience of the tender. Any use made of these quantities by the tenderer in calculating his tender shall be done at his own risk. The tenderer for his own protection should check these quantities for accuracy.

The tenderer must satisfy himself that he understands the meaning and intent of the plans and specifications before submission of his tender. In case of any inconsistency or conflict between the plans and specifications, the construction notes on the plans and the Special Provisions shall take precedence over the Standard Specifications.

E.4 PAYMENT

Progress payments in cash equal to about 80% of the value of the work done and materials incorporated in the work will be made to the Contractor monthly on the written request of the Contractor to the Engineer. An additional 17% will be paid 37 days after the final acceptance of the Engineer and 3% of the contract price may be reserved by the Municipality for one year.

E.4 PAYMENT - continued

A greater percentage of the contract price may be reserved by the Municipality for the same period if in the opinion of the Engineer, particular conditions of the contract require such greater holdback. After the completion of the work, any part of this reserve may be used to correct defects developed within that time from faulty workmanship and material and loose backfill, provided that notice shall first be given to the Contractor and that he shall have the opportunity to make good such defects, himself if he desires, and within seven (7) days if so directed by the Engineer.

E.5 INSPECTION

Final inspection by the Engineer will be made within twenty (20) days after he has received 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 will be held with the landowners directly affected by the construction of the drain. The Contractor will be requested to attend this meeting upon written notice by the Engineer.

E.6 COMMENCEMENT AND COMPLETION OF WORK

The work must commence immediately after the Contractor is notified of the acceptance of his tender or at a later date, if set out as a condition of the tender. If weather and ground conditions are unsuitable, work may be started at a later date from either of these two dates if such delay is approved by the Engineer. The work must be proceeded with 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 or in the contract documents. Failure to commence or complete the work as set out in the Form of Tender may result in a forfeiture of all or part of the Certified Cheque if the Engineer deems that damages have been sustained to the Township 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.

E.7 ALTERATIONS AND ADDITIONS

The Engineer shall have the power to make alterations in the work as shown or described in the drawings or specifications and the Contractor shall proceed to make such changes without causing delay. In every such case, the price agreed to be paid for the work under the contract shall be increased or decreased as the case may require according to a fair and reasonable evaluation of the work added or omitted. Where such changes involve work additional and similar to items in the main contract, the price agreed to be paid shall be determined after due consideration has been given to the ratio of the tendered amount to the Engineer's estimate of the contract. Such alterations and variations shall in no way render void the contract. No claims for variations or alterations in the increased or decreased price shall be valid unless done in pursuance of an order from the Engineer and notice of such claims made in writing before commencement of such work. In no case shall the Contractor commence work which he considers to be extra work before receiving the Engineer's approval.

E.8 SUPERVISION

The Contractor shall give the work his constant supervision and shall keep a competent foreman in charge at the site.

E.9 MAINTENANCE

The Contrctor shall repair and make good any damages or faults in the drain that may appear within one year after its completion (as evidenced by the final payment certificate) because of imperfect or defective work done or materials furnished if certified by the Engineer as being due to one or both of these causes; but 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 final certificate nor payment thereunder, nor any provision in the contract documents shall relieve the Contractor from this responsibility.

E.10 CONTRACTOR'S RESPONSIBILITY FOR DAMAGES

The Contractor, his agents and all workmen and persons employed by him or under his control, including Sub-Contractors, shall use due care that no person or property is injured and that no rights are infringed in the prosecution of the work, and 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 whatever 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 of his agents, workmen or persons employed by him or under his control including Sub-Constructors, and shall bear the full cost thereof and shall at his own expense 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 and the Contractor shall indemnify and save harmless the Municipality from and against all claims, demands, loss, 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 the Contractor at his own expense, to the satisfaction of the Engineer.

E.10 CONTRACTOR'S RESPONSIBILITY FOR DAMAGES - continued

Nothwithstanding 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 his 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 Muncipality 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 his 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 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.

E.11 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 in respect of any one accident to the limit of at least $1,000,000 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 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.

E.12 ACCESS TO PROPERTIES ADJOINING THE WORK

The Contractor shall provide at all times and at his own expense, 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 property owners and such interruptions shall be arranged so as to create a minimum interference to those affected.

E.13 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 on his operations under the contract on Sundays, or Statutory Holidays, without permission in writing of the Engineer.

The Engineer may, in writing, require the Contractor to cease or limit his 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 so to do.

E.14 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 God, or other mischances, shall be borne by the Contractor and shall not be the subject of a claim for additional compensation.

E.15 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.

E.16 CHARACTER AND EMPLOYMENT OF WORKMAN

The Contractor shall employ only orderly, competent and skillful men to do the work and shall give preference to available residents in the area of the contract. Whenever the Engineer shall inform him in writing that any man or men on the work are, in the opinion of the Engineer, incompetent, unfaithful, or disorderly, such a man or men shall be discharged from the work and shall not again be employed on the work without the consent in writing of the Engineer.

E.17 ROAD CROSSINGS

All road crossings may be made with an open cut unless otherwise noted. The exact location of the crossing shall be verified and approved by the Road Authority or the Engineer. A one hundred & fifty (150) millimetre depth of pit run gravel, well compacted shall be placed as a base for each pipe crossing if required on the drawings. The pipe shall be backfilled with a granular material for the width of the travelled portion plus one (1) metre on either side. The material shall be placed in lifts not exceeding three hundred (300) millimetres in depth and shall be thoroughly compacted with an approved type mechanical vibrating compactor where so required by the Engineer. The top one hundred & fifty (150) millimetres of the roadway backfill shall consist of a crushed granular material meeting the specifications of the Ministry of Transportation and Communications for Granular Base Course Class "A" (Granular "A") material. An existing asphalt or concrete pavement, if any, shall not be replaced by the Contractor unless noted differently on the plan. The Contractor shall be responsible, however, for subsequent uneven joints in the pavement due to settling of the backfill. The Contractor should arrange with a local resident to keep the crossing in repair if unable to

do such personally. A small load of Granular "A" gravel at the side of the road may be advisable so that if any settlement does occur, the local resident can add some additional gravel. All road crossings shall meet the approval of the Road Authority. For County and Regional Road crossings see "Standard Specifications for Municipal Drains Crossing County and Regional Roads". If any road crossing is not left in a safe manner at the end of the working day, such barricades, etc., shall be erected to guarantee the safety of the travelling public.

A Road Authority will supply no labour, equipment or materials for the construction of the road crossing, with the sole exception of patching an existing asphalt surface and except where metal pipe on the contract is supplied by the Municipality.

The excavated material removed from the travelled portion of the road and one (1) metre or the full width of the gravelled shoulder, whichever is greater, on each side of the travelled portion shall be removed. Excavated material may be spread on the right-of-way with consent of the Municipal Road Superintendent and the balance shall be levelled equally on the private lands on each side of the road.

If the Engineer deems a gravel road to have been damaged by the construction of a drain, either across or along the said road, the Engineer may direct the Contractor to supply and place sufficient crushed granular materials on the roadway to restore it to a safe and passable condition at no additional cost.

E.18 LANEWAYS

All pipe crossing laneways shall be backfilled with material that is clean, free of foreign material or frozen particles and readily tamped or compacted in place. Laneway culverts on open ditch projects shall be backfilled with material that also is not easily erodable while gravel laneway culverts on closed drain projects shall be backfilled such that the upper six hundred (600) millimetres of material consists of four hundred & fifty (450) millimetres of pit run granular material and one hundred & fifty (150) millimetres of crushed granular material. All backfill materials shall be thoroughly compacted if directed by the Engineer.

The backfill on access culverts (between buildings and the road) shall be surfaced with a minimum of one hundred & fifty (150) millimetres of crushed granular material. All backfill materials shall be thoroughly compacted if directed by the Engineer.

All granular surface materials shall be placed to the full width of the travelled portions.

Any settling of backfill material shall be repaired by or at the expense of the Contractor during the warranty period of the project and as soon as required. Any existing bituminous pavement on laneways shall be replaced to its original condition by the Contractor at no additional cost. No less than a fifty (50) millimetre thickness of Hot Mix Asphalt shall be applied.

E.19 FENCES

No earth is to be placed against fences and all fences removed by a Contractor are to be replaced by him in as good a condition as existing materials permit. Where practical and where required by the landowner, the Contractor shall take down a new existing fence or fences in good condition, at the nearest anchor post and roll it back rather than cutting the fence and attempting to patch it. The replacement of the fences shall be done to the satisfaction of the Engineer or Superintendent. Any fences found in such poor condition that replacement is not necessary shall be noted and verified with the Engineer or Superintendent prior to commencement of work. Where directed by the Engineer, additional steel posts shall be placed to adequately support a fence upon re-erection. All fences shall be properly stretched and fastened. Where the Engineer directs that new fencing material be erected, 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 shall be removed, and rebuilt by the landowner at his own expense. If such parallel fences are line fences they shall be removed and rebuilt by the Contractor.

E.20 LIVESTOCK, ETC.

If any construction will be within a fenced field containing livestock or other customary farm animals or fowl, (hereafter referred to as livestock, etc.) that are evident or have been made known to the Contractor, the Contractor shall notify the owner or attendant of the field or livestock, etc., thirty-six (36) hours in advance of his entrance into the field. Thereafter, the owner or attendant shall be responsible for the protection and damage to all livestock, etc., on said property during construction and shall also be liable for any damages caused by such livestock, etc. Where the owner or attendant so directs or where the Contractor has failed to reach the owner or attendant, the Contractor shall adequately re-erect all fences at the end of each working day and shall have any open trench backfilled within seventy-two (72) hours including weekends and statutory holidays. In all cases the trench shall be backfilled within seven (7) days. Failure of the Contractor to notify or to attempt to notify the owner or attendant, or failure of the Contractor to erect the fencing or to backfill the trench as described in this paragraph shall render the Contractor responsible for the protection of or damage to livestock, etc., on the property and the damage they may cause.

Where livestock may be encountered on any property the Contractor shall notify the Engineer promptly so that arrangements may be made to inspect the drainage works before the time required for backfilling.

E.21 STANDING CROPS

The Contractor shall not be held responsible for damages to standing crops along the course of the drain with the exception of those crops ready to be harvested or salvaged, that are damaged by the placing and levelling of soil from an open drain and about which the Contractor has failed to, or has not attempted to, notify the owner forty-eight (48) hours prior to commencement of the excavation on that portion.

E.22 SURPLUS GRAVEL

If as a result of any work granular gravel or crushed stone is required and not all the gravel or crushed stone is used in the construction of the works, the Contractor shall haul away such surplus gravel or stone. This does not apply to a road crossing where surplus gravel is to be left to allow for building up the trench after a settlement occurs.

E.23 PERMITS, NOTICES, LAWS AND RULES

The Contractor shall apply and pay for all necessary permits or licenses required for the execution of the work (but 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.

E.24 LOCATIONS OF EXISTING UTILITIES

The position of pole lines, conduits, watermains, sewers and other underground and overground utilities and structures is not necessarily shown on the Contract plans and drawings, and, where shown, the accuracy of the position of such utilities and structures is not guaranteed. Before starting work, the Contractor shall inform himself of the exact location of all such utilities and structures, and shall assume all liability for damage to them. Unless otherwise specified, the Contractor shall support all such utilities and structures, or temporarily remove them and restore them, to the satisfaction of the owners of the utilities and structures.

E.25 RAILWAYS, HIGHWAYS AND UTILITIES

A minimum of forty-eight (48) hours notice in writing to any Railway's Division Engineer, the M.T.C.'s District Engineer, or any Utility Company, exclusive of Saturdays, Sundays, and Holidays, is required by the Contractor prior to any work being performed on or affecting the applicable property and in the case of a pipe being installed by open cutting or boring, a minimum of seventy-two (72) hours notice is required.

Copies of all plans are submitted to any affected telephone company by the Engineer prior to Contract Award. It is the Contractor's responsibility to obtain and review these plans from the Engineer.

E.26 TERMINATION OF CONTRACT BY THE MUNICIPALITY

If the Contractor should be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency or if he 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

E.26 TERMINATION OF CONTRACT BY THE MUNICIPALITY - continued

supply such additional workmen or materials in order to commence or complete the works, or if he should fail to make prompt payment to sub-contractors or for materials or labour or persistently disregard laws, ordinances, or instruction of the Engineer, or otherwise be guilty of a substantial violation of the provisions of the contract, then the Owner, upon Certificate of the Engineer that sufficient cause exists to justify such action, may without prejudice to any other right or remedy, by giving the Contractor written notice, 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 Owner 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 his 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 certified cheque deposit as provided for by E.2, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner, as herein provided, shall be certified by the Engineer.

If the contract is terminated by the Owner due to the Contractor's failure to properly commence the works, the Contractor shall forfeit the certified cheque bid deposit 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 certified cheque 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 grow due to the Contractor from the Municipality.

E.27 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 on his own shall be done at his own risk. Any additional cost incurred by the Contractor to remedy a wrong decision on his part shall be borne by the Contractor.

The Engineer shall make the alteration necessary to correct errors or to adjust for unusual conditions. The contract amount shall be adjusted in accordance with a fair evaluation of the work added or deleted.

E.28 EXCESS TILE

If the tile is supplied by the Municipality, the Contractor shall stockpile all excess tile in one readily accessible location for pickup by the Municipality at the end of the job. If the tile is supplied by the Contractor he shall remove all excess tile from the job site.

E.29 REPLACEMENT OF STAKES

The Contractor shall be held liable for the cost of replacing any stakes or bench marks destroyed during the course of construction. The drainage area shall be liable for the cost of replacing stakes prior to construction.

E.30 DRAINAGE SUPERINTENDENT

Where a Drainage Superintendent is appointed by the Municipality, the Drainage Superintendent will act as the Engineer's representative. The Superintendent shall have the power to direct the execution of the work and to make any necessary minor adjustments.

Any instructions given by the Superintendent, which changes considerably the proposed work or with which the Contractor does not agree, shall be referred to the Engineer for his decision.

E.31 TESTS

The cost of testing materials, supplied to the job by the Contractor, shall be borne by the Contractor. The cost of testing materials, supplied to the job by the Municipality, shall be borne by the Municipality. The Engineer reserves the right to subject any lengths of any tile or pipe to a competent testing laboratory to ensure the adequacy of the tile. If any tile or pipe supplied by the Contractor is determined to be inadequate to meet the applicable A.S.T.M. Standards, the Contractor shall bear full repsonsibility to remove and/or replace all such inadequate tile or pipe on the contract with tile or pipe capable of meeting the A.S.T.M. Standards.

E.32 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 good shall be borne by the Contractor and should the Engineer find the work opened up to be in an acceptance condition, such expense will be borne by the Owner, unless the Contractor has been obligated by any specification to leave the work open for the Engineer's inspection.

E.33 ONTARIO MUNICIPAL BOARD

The Contractor shall prior to starting work, determine from the Clerk of the Municipality that Ontario Municipal Board approval, where required, has been obtained.

E.34 NOTICES RE COMMENCEMENT OF WORK

The Contractor shall give the Engineer and Superintendent a minimum of twenty-four (24) hours advance notice before commencement of work on any municipal drain. If the Contractor leaves the job site for a period of time after initiation of work, he shall give the Engineer and Superintendent a minimum of twenty-four (24) hours advance notice prior to returning to the contract. If any work is commenced without the advance

E.34 NOTICES RE COMMENCEMENT OF WORK - continued

notice the Contractor shall be fully responsible for all such work undertaken prior to such notification and shall make good any works or materials used 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.

E.35 OWNER, CORPORATION, MUNICIPALITY, TOWNSHIP

The words Owner, Corporation, Municipality or Township all mean the same and wherever either appears it may be replaced by any of the other.

E.36 DEFINITIONS

i) M.T.C. means the Ministry of Transportation and Communications.
ii) A.S.T.M. means the American Society for Testing Materials.
iii) C.S.A. means the Canadian Standard Association.

E.37 COLD WEATHER

When work is permitted or ordered by the Engineer to be done in cold weather, the Contractor shall provide suitable means for heating and protection, and all the materials shall be heated and protected. Unless the Engineer directs otherwise, all work such as masonry, concrete and painting that may be injured by frost, and which cannot be satisfactorily completed, shall be put in a proper and satisfactory condition, and shall be protected from damage by frost. Unless otherwise specified, the cost of such protection shall be borne by the Contractor. 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.

E.38 WORKING AREA

Where any part of the drain is on a road allowance, the road allowance shall be the working area. On a closed drain the working area is to be a width of eighteen (18) metres. On an open drain the working area shall be eighteen (18) metres on the side of levelling and six (6) metres on the opposite side unless additional width is required to windrow cleared materials or to level the materials to a three hundred (300) millimetre thickness. 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. On most projects the working area is described in detail on the drawings.

E.39 ACCESS

Each landowner on whose property any significant part of the drainage works is to be constructed has to make a reasonable means of access available to the Contractor. The Contractor shall not enter in any other lands without the written permission of the landowner and he shall make good any damages caused by such entry.

E.40 CLEANING UP BEFORE ACCEPTANCE

Before any work shall be finally accepted by the Municipality, the Contractor shall make such replacements of improper materials and such corrections of faulty workmanship as have been directed by the Engineer and do such trimming and disposal of rubbish and surplus materials as to leave the work neat and presentable.

E.41 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 Documents, damage will be sustained by the Municipality and that it is and 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 and the parties hereto agree that the Contractor will pay to the Municipality a sum, if any is set out in the Form of Tender and Agreement for liquidated damages for each and every calendar day's delay, including Saturdays, Sundays and Statutory Holidays, in finishing the work in excess of the number of working days prescribed, and it is agreed that this 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 paragraph from any monies that may be due or payable to the Contractor on any account whatsoever. The liquidated damages payable under this paragraph 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 God, 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 General Conditions, the number of working days shall be increased or decreased as determined by the Engineer.

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

F.1

STANDARD SPECIFICATIONS

FOR

OPEN DRAINS

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F.1 STANDARD SPECIFICATIONS FOR OPEN DRAINS

F.1.1 DESCRIPTION

Work under this item shall include the supplying of all labour, tools, equipment and materials beyond those to be supplied by the Township, required for the clearing of all trees, roots, bush debris, the excavation of all open channels, the levelling or disposal as directed of all spoil, the cutting and re-erection of all fences, the construction of all roadway and laneway crossings required, the reconstruction of all intercepted drains as required, the supply and placement of all riprap protection required and all other items indicated in the Estimate of Quantities or shown on the drawings as being part of the Open Portion.

F.1.2 MATERIALS

A) Corrugated Metal Pipe

Corrugated Metal Pipe shall comply with AASHO Specification M-36 and shall be to the U.S. Standard Gauges indicated on the drawings. Unless otherwise specified, the pipe shall have a standard sixty gram galvanized coating.

B) Concrete

Concrete shall be twenty (20) mega Pascal (mpa) concrete premixed.

C) Stone for Riprap

Average stone weight shall be no less than fifteen to twenty (15-20) kilograms and shall be hard stone free of earth materials.

F.1.3 CONSTRUCTION

A) Stakes

Stakes are set along the course of the drain at intervals of twenty-five (25) metres. The Contractor shall ensure that the stakes are not disturbed unless approval is obtained from the Engineer. If the Contractor is unable to locate any stakes along the drain, the Contractor shall clear, if necessary, a path for re-staking and contact the Engineer with regard to re-staking the drain.

B) Excavation

The bottom width and the side slopes of the ditch shall be those shown on the profile drawing. Side slopes are normally one and one-half metre horizontal to one metre vertical unless otherwise noted on the profile drawing. Bottom widths will vary with the size of the drain. Where the width of the bottom of the existing ditch is sufficient to permit the required width, depth and bank slopes for the new ditch to be constructed without destructing existing banks, such banks will be left as is, subject to the clearing of brush required and described in Section F.1.3.1.

C) Profile

The profile drawing shows the depth of cuts from the ground beside the stake to the final invert of the ditch in metres and decimals of a metre and also the approximate depth of cuts from the bottom of the existing ditch to the final invert of the ditch. These cuts are established for the convenience of the Contractor; however, bench marks (established along the course of the drain) will govern the final elevation of the drain. The location and elevations of the bench marks are given on the profile drawing.

D) Line

The drain shall be constructed in a straight line and shall follow the course of the present drain or water run except where necessary to straighten any unnecessary bends or irregularities in alignment. Where there are such unnecessary bends or irregularities on the existing course of the drain, the Contractor shall contact the Engineer before commencing work to verify the manner in which such irregularities or bends shall be removed from the drain. All curves shall be made with a minimum radius of fifteen (15) metres. A uniform grade shall be maintained between stakes in accordance with the profile drawing. The Contractor shall over dig the bottom by one hundred to one hundred and fifty (100-150) millimetres in depth to allow for silting in from fresh bank cuts. A variation of twenty-five (25) millimetres from the required profile plus over digging shall be sufficient to require the Contractor to remedy this discrepancy.

E) Excavated Material

Excavated material shall be deposited on either or both sides of the drain as directed by the Engineer. In general, the material shall be dumped on the low side of the drain or opposite trees and fences. No excavated material shall be placed in tributary drains, depressions, or low areas which direct or channel water into the ditch so that no water will be trapped behind the spoilbank. Beyond the berm, the excavated material shall be

placed and levelled to a maximum depth of three hundred (300) millimetres; unless otherwise instructed. The edge of the spoilbank away from the ditch shall be feathered down to the existing ground, the edge of the spoilbank nearest the ditch shall have a maximum slope of 2 to 1. The material shall be levelled such that it may be cultivated with ordinary equipment without causing undue hardship on farm machinery and farm personnel. Wherever clearing at the area was necessary prior to the levelling of the materials, the Contractor shall remove all roots unless he obtains the landowners permission in advance to leave same in place and to cover same with spoil. No excavated material shall cover any logs, brush or rubbish of any kind. Large stones or boulders heavier than fifteen (15) kilograms shall be moved to and be left along the edge of the spoilbank nearest to the ditch but in general no closer than one (1) metre to the ditch bank. A berm no less than six hundred (600) millimetres shall be left along the top edges of the drain.

Where it is necessary to straighten any unnecessary bends or irregularities in the alignment of the ditch or to relocate any portion of all of an existing ditch, the excavation from the new cut shall be used for backfilling the original drain. Regardless of the distance between the new ditch and old ditch, no extra compensation will be allowed for this work and it must be included in the Contractor's lump sum price for the open work.

A written statement from the owners indicating their complete satisfaction with the levelling of the spoilbank is sufficient to comply with this specification. The final decision, with respect to levelling of the spoilbank, shall be made by the Engineer. The Engineer may require the Contractor to obtain written statements from any or all of the landowners.

If the Contractor obtains a statement in writing, signed by the owner of lands affected that he does not wish the spoil to be levelled, the Engineer may release the Contractor from obligation in that regard, and a sum of money based on the price of ten (10) cents per cubic metre of material left shall be deducted from the Contractor's payment and be paid to the owner affected.

F) Excavation at Bridge Sites

The Contractor shall excavate the drain to the full specified depth under all bridges and to the full width between abutments. Temporary bridges may be carefully removed and left on the bank of the drain. Permanent bridges must, if at all possible be left intact. All necessary care and precautions shall be taken to protect the structure. The Contractor shall notify the owner if excavation will expose the footings or otherwise cause the structure to undermine or collapse such that the owner may make provision for repair of the bridge.

Where the invert of any culvert is above the grade line, the Contractor will be required to dig up the culvert, clean and relay it, so that the invert of the culvert is one hundred and fifty (150) millimetres below grade for the bottom of the finished drain at this location.

G) Bridges and Culverts

Any farm bridges constructed or reconstructed shall have a minimum span of two (2) metres or twice the bottom width, whichever is the greatest. Metal culverts shall have a minimum diameter of twelve hundred (1200) millimetres or a diameter not less than three hundred (300) millimetres greater than the specified bottom width of the drain up to a bottom width of twelve hundred (1200) millimetres and a diameter not less than six hundred (600) millimetres greater than the specified bottom width for widths in excess of twelve hundred (1200) millimetres whichever is greater. These are minimum sizes and will be increased where required. Dimensions of Arch Culverts shall be confirmed by the Engineer prior to construction or reconstruction.

If an owner at the time of construction has furnished a suitable culvert at the site, the Contractor shall install it as part of the work, with the invert one hundred and fifty (150) millimetres below the grade of the drain, and with a suitable earth backfill such that a crossing with normal farm machinery can be made. Final grading, shaping or riprapping of the backfill shall be the responsibility of the landowner(s) involved. A minimum of three hundred (300) millimetres of cover shall be placed over each culvert.

All culverts installed as part of the contract shall be installed one hundred and fifty (150) millimetres below grade, have three hundred (300) millimetres minimum cover and have a minimum platform width of six (6) metres unless directed otherwise by the drawings or by the Engineer.

Where multi-plate culverts are assembled by the Contractor the manufacturers instructions re hoisting of any length, torsion of all bolts and backfilling shall be observed by the Contractor.

H) Riprap Protection for Culverts

Where riprap protection is called for at either or both ends of a new culvert, such riprap shall be sacked concrete or old concrete pieces and/or stone, grouted with a cement mortar if required. The riprap shall extend one hundred and fifty (150) millimetres below the culvert invert for the full ditch bottom width and six hundred (600) millimetres into undisturbed soil along the banks adjacent to the culvert and shall extend to the level of the finished roadway or laneway over the culvert. Maximum slopes for riprap shall be 1/4:1 or as directed by the Engineer. The Contractor shall be responsible for any defects or damages that may develop in the riprap or the earth behind the riprap that the Engineer deems to have been fully or partially caused by faulty workmanship or materials for a period of one year from the time of the final payment certificate. Wherever a nine (9) metre culvert is installed, and where elsewhere called for, existing field sods shall be placed along the laneway slopes, from the bottom of the ditch level up to the springline of the pipe. Lane slopes shall not be steeper than 1:1 in such situations. Any long culvert installed that replaces an existing culvert shall be riprapped as well as with any stones that formerly existed around the old culvert. The cost of all riprap work discussed herein shall be deemed as part of the contract.

I) Obstructions

All brush, bushes, fallen timber and debris shall be moved from the banks of the drain and to such a distance on each side to eliminate any interference with the spreading of the spoilbank. The slopes shall be cleared only, whether or not they are affected directly by the excavation. 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, the brush, limbs, etc. may be pushed into piles and rows back out of the way. All dead elms or other dead trees alongside 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 prior to excavation and put in piles, unless directed otherwise by the Engineer.

J) Moving Drains off Roads

Where an open drain is being removed from a road allowance, it must be reconstructed wholly on the adjacent farm land with a minimum berm width of one (1) metre on the roadway side of the ditch, unless otherwise noted on the drawings. The excavated material shall be used to fill the existing open ditch and any excess excavated material shall be placed and levelled on the adjacent farm land. Any work done on the road allowance, with respect to excavation, disposal of materials, installation of

culverts, cleaning under bridges, etc., shall be to the satisfaction of the Road Authority. If it is necessary to haul materials away, additional payment will be provided unless described on the plan.

K) New Road and Access Lane Crossings

Refer to the General Conditions, Specification No. E.17.

L) Tile Outlets and Existing Ditches

All tile outlets in existing ditches shall be noted by the Contractor prior to excavation. If any tile outlet is damaged during or altered due to construction, the Contractor shall repair or replace the damaged or altered outlet. In general, if the existing outlet is tile only, the new outlet shall consist of undamaged lengths of tile. If the existing outlet is a metal pipe with or without a rodent gate, such outlet shall either be relocated to adjust to the new banks or shall be repaired if damaged. If any outlet becomes plugged as a result of construction, the Contractor shall be obligated to free such outlet of any impediments. Where stone or concrete riprap protection exists at any existing tile outlet such protection shall be moved as necessary to protect the outlet after reconstruction of the channel. Where any damage results to tile leading to and upstream of the outlet, as a consequence of such construction, the Engineer may direct the Contractor to repair such tile and shall determine a fair compensation to be paid to the Contractor for performing the work.

If a Contractor has verified the location of all tile outlets with the landowner prior to construction and then, subsequently encounters an outlet not made known to him whether metal, clay or other, he shall only be responsible for ensuring that the outlet consists of undamaged lengths of tile.

M) Completion

At the time of completion and final inspection, all work in the contract shall have the full dimensions and cross-sections specified in addition to any allowance for caving of the banks or sediment in the bottom.

F.2 STANDARD SPECIFICATIONS

FOR

TILE DRAINS

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F.2 STANDARD SPECIFICATIONS FOR TILE DRAINS

F.2.1 DESCRIPTION

Work under the above items will consist of supplying, laying and backfilling clay and concrete drain tile in the location shown on the drawings. This location may be adjusted or changed by the Engineer before or during construction, for which no claim for damages or extra compensation will be allowed. Invert grade will be supplied by the Engineer.

The work shall include the supplying of all labour, tools, equipment and extra materials required for the furnishing and laying 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 or junctions shall be used or an approved method of sealing joints with a stiff mix cement mortar. The Contractor shall also construct stand-pipes and junction boxes 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 plugged up for a distance of three hundred (300) millimetres with suitable concrete or mortar to the full satisfaction of the Engineer.

F.2.2 MATERIALS

A) CONCRETE DRAIN TILE

Concrete drain tile shall conform to the requirements of the most recent ASTM Specification C 412, extra quality and clay drain tile shall conform to the most recent ASTM Specification C 4 extra quality. All tile furnished shall be subject to the approval of the Engineer.

The minimum nominal lengths of the tile shall be three hundred (300) millimetres for one hundred and fifty and two hundred (150 & 200) millimetre diameter tile, six hundred (600) millimetres for two hundred and fifty to three hundred and fifty (250 to 350) millimetre diameter tile and twelve hundred (1200) millimetres for four hundred to six hundred and eighty-five (400 to 685) millimetre diameter tile.

A) CONCRETE DRAIN TILE - cont'd

Manufactured connections or junctions may be used for connecting laterals to the main line. All tile should be of good quality and meet the standards specified. They should be free from distortions and cracks. 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 fifty (50) millimetre square openings.

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

B) CORRUGATED METAL PIPE

Corrugated metal pipe shall comply with AASHO Specification M-36 and shall be to the U.S. Standard gauges indicated on the drawings. Unless otherwise specified, the pipe shall have a standard 60 gram galvanized coating.

C) CONCRETE SEWER PIPE

i) Non-reinforced concrete sewer pipe shall be used up to three hundred and seventy-five (375) millimetres in diameter and shall comply with ASTM Specification C 14, extra strength.

ii) Reinforced concrete sewer pipe shall be used for sewers three hundred and seventy-five (375) millimetres and larger and shall comply with ASTM Specification C 76, with "B" wall. Classes shall be as shown on the contract drawings and as described in the Form of Tender. No eliptical reinforcing will be permitted.

iii) For storm sewers, rubber-type gasket joints shall comply with ASTM Specification C 443 and be designed to meet the test requirements specified by the supplier.

iv) Unless indicated on the drawings otherwise, all concrete sewer pipe used on Municipal Drainage Works should be Mortar Joint pipe with no mortar or gaskets.

v) Where concrete sewer pipe "seconds" are permitted the pipe should exhibit no damages or cracks on the barrel section and shall be capable of satisfying the crushing strength requirements for No. 1, Pipe Specifications (C 14 or C 76). The pipe may contain cracks or chips in the bell or spigot which could be serious enough to prevent the use of rubber gaskets but which are not so severe that the joint could not be mortared conventionally.

F.2.3 CONSTRUCTION METHOD

A) SETTING GRADE STAKES AND TARGETS

Grade stakes are to be put every twenty-five (25) metres by the Contractor. The Engineer will establish benchmarks as shown on the Contract Drawings and will set sufficient stakes to give general horizontal location of the drain. The Contractor shall at all times set at least three (3) targets. It is the Contractor's responsibility to furnish sufficient boning rods of proper length and to take sufficient measurements to lay the tile to proper grade and alignment. If a laser is used in lieu of grade stakes, the tile elevations should be checked every fifty (50) metres by a level.

B) LINE

The drain shall run in as straight a line as possible throughout its length except that at intersections of other watercourses or at sharp corners, it shall run on a curve of at least fifteen (15) metre radius. A new tile drain shall be constructed at an offset from and parallel with any ditch or defined watercourse in order that fresh backfill in the trench will not be eroded by the flow of surface water.

The Contractor shall exercise care not to disturb any existing tile drain or drains which parallel the course of the new drain, particularly where the new and existing tile act together to provide the necessary capacity. Where any such existing tile is disturbed or damaged the Contractor shall perform the necessary correction or repair at his expense. The Engineer will designate the general location of the new drain, but the landowner may indicate the exact location if approval is given by the Engineer.

C) EXCAVATION

Digging of the trench shall start at the outlet end and proceed upgrade. 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 cost allowed except where the change involves the use of dozer work. The trench width measured at the top of the tile should be at least one hundred and fifty (150) millimetres greater than the tile diameter.

The bottom of the trench is to be cut accurately to grade and shape. Where hard shale, boulders or other unsuitable bedding material is encountered, the trench shall be excavated to seventy-five (75) millimetres below grade and backfilled with well pulverized topsoil and compacted to a firm foundation. If the trench is cut below grade, it is to be backfilled with either graded gravel or well pulverized soil and tamped sufficiently to provide a firm foundation. Where excavation is over front lawns, the sods shall be cut, lifted and replaced in a workmanlike manner.

C) EXCAVATION - cont'd

Where required, the Contractor shall strip off the top layer of earth in order that a tiling machine may trench to the correct depths. His tender price shall include the cost of stripping the topsoil, bulldozing of subsoil to depth required and subsequent replacing of subsoil and topsoil.

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.

D) BED OF TILE

The bottom of the trench should be rounded so that the tile will be embedded in undisturbed soil or in a compacted bed at least for ten (10) percent of its overall height.

E) LAYING TILE

All tile shall be laid to a true line and grade. Tile laying should begin at the lowest end of the lines and progress upgrade. In sand or fine silt, the joints in tile should be as tight as possible. In clay or heavy soil the spacing between tile should be about three (3) millimetres. All gaps between tile greater than six (6) millimetres must be covered by broken tile or another similar device.

The Contractor is to erect cross-arm sights and use a boning rod in the laying of the tile. The tiles are to be bevelled, if necessary, to ensure close joints on all bends. Rather than bevelling the tile on flat bends, the Contractor may wrap the joints with a one hundred and fifty (150) millimetre wide band of sixty-five (65) Newton felt building paper. All joints with a gap greater than six (6) millimetres are to be wrapped with plastic at no extra cost. The inside of the tile is to be kept clean when laid.

Where soil conditions warrant, the Engineer may require that the upper part of the tile be wrapped with a fabric wrapping such as Texel #7612 distributed by Tillsonburg Shoe Supply or approved equal or plastic. (The Engineer may also require in unfavourable soils that the tile be laid on a plastic underlay throughout, the width of the underlay required will be given by the Engineer). Any such work shall be considered as an extra to the contract unless otherwise provided for. The Contractor shall submit with his tender the extra cost for wrapping the tiles, if required.

E) LAYING TILE - cont'd

Any side drain encountered in the course of the drain is to be carefully taken up by the Contractor and placed clear of the excavated earth. If the drain encountered is clean or reasonably clean, it shall be connected into the new drain. Where existing drains are full of sediment, the decision to connect or not to connect to the new drain shall be left to the Engineer or Commissioner. The Contractor shall be paid for each tributary drain hook-up as outlined in the Tender Form. Where the Contractor is requested by the Engineer or Commissioner to hook-up an existing tile which is not encountered, in the course of the drain, the cost of such work shall constitute an extra and the basis of payment shall be determined by the Form of Tender when possible or by a time and materials basis. The joint against the old tile shall be done in accordance with these specifications.

All side drains encountered or constructed are to be connected to the new tile by a manufactured junction tile or an approved connection encased in a stiff mix cement mortar. All side drains are to be connected to the new tile in the same size as the tile encountered.

Concrete or metal pipe should be used where the cover is less than four hundred and fifty (450) millimetres or where traffic passes over the drain. All entrance crossings shall be concrete or metal pipe of the same diameter and shall be backfilled immediately to avoid disrupting traffic.

Care should be taken to avoid dirt or other objects from entering the tile. At each work stoppage, the exposed end of the tile shall be covered by a tight fitting board or metal plate. No tile laid shall be left exposed overnight but should have a minimum of one hundred and fifty (150) millimetres of topsoil for blinding. Any tile damaged, plugged or laid not true to line or grade during construction shall be replaced or repaired at the Contractor's expense.

Where drainage tile drains into an open ditch or creek, the last six (6) metres shall be corrugated metal pipe connected to the drains pipe in an approved manner. The joint between the metal pipe and the field tile shall be sealed with mortar. A sacked concrete protection, unless otherwise specified, shall be built around corrugated pipe and extended downstream a minimum distance of one (1) metre. The protection shall extend to the top of the backfilled trench and shall also extend one half (1/2) metre into undisturbed soil on either side of the backfilled trench. Where the outlet occurs at the end of the open ditch the above sacked concrete riprap protection will extend all around the end of the ditch and to a point one (1) metre downstream on either side.

Where heavy overflow is likely to occur, sufficient additional riprap shall be placed as directed by the Engineer to prevent the water cutting around the protection. A concrete structure may be required to protect against heavy overflow if so indicated on the drawings in the report. The corrugated metal pipe shall have a hinged metal grate on the outlet end to prevent the entry of small animals. Maximum spacing between bars shall be fifty (50) millimetres.

F) BACKFILLING

As soon as tile are placed and inspected, they shall be blinded by covering them to a depth of one hundred and fifty to three hundred (150-300) millimetres with loose topsoil shaved by hand from the top of the trench. This topsoil shall be tamped to sides of the tile to retain alignment. All tile should be blinded by the end of the day's work to protect and hold them in place against disturbances. On steep grades or where the topsoil contains fine sand, use heavier soil from the sides of the trenches in blinding. No sand or sandy soil shall be placed directly on or around tile.

Backfilling of the trench should be completed soon after tile are blinded but not until tile have been inspected by the Engineer. All earth removed from trench shall be returned and heaped above trench except under access laneways and roadways where the top six hundred (600) millimetres of backfill shall be approved granular material. The upper three hundred (300) millimetres shall be crushed gravel.

The tile shall be backfilled such that a sufficient mound of backfill is placed over the trench to ensure that no depression remains after settling occurs in the backfill.

G) STONES AND ROCK

The Contractor shall immediately contact the Engineer if boulders of sufficient size and number are encountered such that the Contractor cannot continue trenching with a tiling machine, where the contract was bid on the basis of a tiling machine. The Engineer or Commissioner may direct the Contractor to use some other method of excavating to install the drain. The basis of payment for such extra work shall be determined by the Engineer.

For all large stones or boulders, heavier than fifteen (15) kilograms, exposed - on any project the Contractor shall either excavate a hole to bury same adjacent to the drain or he shall haul same to a nearby bush, or fence line, or such other convenient location as approved by the landowner. No additional payment for excavating, burying, or hauling this rock will be provided.

H) BRUSH, TREES AND DEBRIS

The contract is to include the removal of all excavation of whatever nature, disposal of materials, removal and cutting of all brush, removal of roots, supplying of all labour and completing the whole work in accordance with the plan, profile and this specification. Any trees, necessarily removed, are to be left for the owner of the property on which they are found. Additional payment will be made for sawing up and brushing of scattered trees where required by the Engineer. Where, in the opinion of the Engineer, the drain or proposed location of the drain is heavily overgrown with trees and brush the Contractor will use a bulldozer or other equipment to clear a minimum width of thirty (30) metres. The resulting debris shall be placed in a windrow where directed by the Engineer and left for disposal by the owner. Where roots may interfere with the new drain all such roots shall be grubbed and placed in a separate windrow or pile convenient for disposal by the owner. If the drawings require grubbing in this width all roots will be removed in the thirty (30) metre width as well. No additional payment will be made for such work.

I) QUICKSAND

The Contractor shall immediately contact the Engineer or Commissioner if quicksand is encountered. The Engineer or Commissioner may direct the Contractor to lay the tile on plank or to construct a temporary open drain to lower the water table, or to lay the tile on a crushed stone mat, or to use plastic underlays and overlays, or to take such action as may appear to be necessary. The basis of payment for such extra work shall be determined by the Engineer.

J) BROKEN OR DAMAGED TILE

The Contractor shall either bury in the trench or remove all damaged tile or pipe not required elsewhere. No tile should be left on the grounds for the landowner to dispose of.

K) FENCES

No earth is to be placed against the fences and all fences removed by the Contractor are to be replaced by him in as good condition as found as far as existing materials permit. Where practical and where requested by the landowner, the Contractor shall take down new existing fences or fences in good condition, at the nearest anchor post and roll it back rather than cutting the fence and attempting to patch it. The replacement of the fences shall be done to the satisfaction of the Engineer or Commissioner. Any fences found in such poor condition that replacement is not necessary shall be noted and verified with the Engineer or Commissioner prior to commencement of work. The unit price bid shall include all fence costs.

L) ALLOWANCE VARIATION FROM PLANNED GRADE

The constructed grade should be such that the drain as constructed will provide the capacity required for the drainage area. A small variation in grade can be tolerated where the actual capacity of the drain exceeds the required capacity. No reverse grade will be allowed. Constructed grade should not deviate from planned grade more than 15% of the internal diameter for drain sizes greater than two hundred (200) millimetres. These deviations are allowable, provided they are gradual over a distance of not less than ten (10) metres.

M) EXCESS TILE

All excess tile shall be removed from the job site.

N) CONCRETE SEWER PIPE

Where the contract requires the use of concrete sewer pipe the Contractor shall place same by either excavating the trench with a tiling machine and recessing the bells or by excavating the trench with a backhoe and shaping by hand the bottom of the trench to receive and support the pipe and barrel over 50% of its diameter. Where backhoe methods are used, topsoils shall be stripped, saved and replaced separately. Loose materials used for blinding concrete tile drains shall also be used as bedding around the sewer pipe and to one hundred and fifty (150) millimetres above it. This loose backfill shall be tamped around the pipe by backhoe bucket or similar if directed by the Engineer. Backfill above the blinding materials is to be done in accordance with the Backfilling Specifications included herein.

If any connection is to be made to the concrete sewer pipe the method of connections provided elsewhere in this specification shall also apply.

If any joints due to cracks, chips or due to alignment irregularities are sufficiently open that, in the opinion of the Engineer or Commissioner, grounds could enter the drain, the Contractor shall seal the joint with mortar, plastic or broken tile as directed by the Engineer.

O) CATCHBASINS

Cast-in-place catchbasins shall be constructed, using a minimum twenty (20) mega Pascal concrete with inside dimensions six hundred (600) millimetres square, walls and floors one hundred and fifty (150) millimetres thick and the bottom four hundred and fifty (450) millimetres below the invert of the tile. Catchbasins may be constructed of a six hundred (600) millimetre diameter concrete sewer pipe placed on a one hundred and fifty (150) millimetre slab of concrete or pre-cast catchbasin and manholes may be used if prior approval is given by the Engineer.

O) CATCHBASINS (Continued)

Minimum wall thickness permitted for catchbasins without reinforcement is one hundred and fifty (150) millimetres and with reinforcement one hundred (100) millimetres, provided that either is acceptable to the Road Authority. All pre-cast catchbasins shall have a minimum inside dimension of six hundred (600) millimetres square. Where a catchbasin is located on a road allowance, the type of catchbasin and grate to be used and its proposed elevation shall be subject to the approval of the Road Engineer or Road Superintendent. Catchbasins may be offset from the drain, where practical and shall have two hundred (200) millimetre concrete tile or metal pipe leads unless specified differently on the drawings. Catchbasin leads shall have a minimum of six hundred (600) millimetres of cover.

The joints between sectional pre-cast catchbasins shall be fully mortared and such mortar shall be applied to each lower section before the upper section is added on. All tile or pipe connected to the catchbasin shall be mortared in place so that no gaps remain in the wall. Mortar is to be applied from outside the walls.

Cast in place catchbasins located on Highways shall be capable of meeting OPSD 700.01 or OPSD 705.02 for pre-cast catchbasins. OPSD 705.04 shall apply for ditch inlet catchbasins. The catchbasin top shall be as specified on the drawings. (If required, contact the Engineer for the applicable standards).

All catchbasins located on Highways, Count Roads and Township Roads shall be backfilled with porous backfill placed to a minimum thickness of three hundred (300) millimetres on all sides where directed by the Engineer. The backfill material shall be satisfactorily tamped. If settling occurs after construction, the Contractor shall supply and place sufficient granular material to maintain the backfill level flush with adjacent ground as part of the contract.

Catchbasin grates for standard or ditch inlet, six hundred (600) millimetre square or nine hundred (900) millimetre by twelve hundred (1200) millimetre catchbasins may be fabricated out of angle iron and reinforcing steel. Any grate used is subject to the Engineer's approval and it is suggested prior approval be obtained.

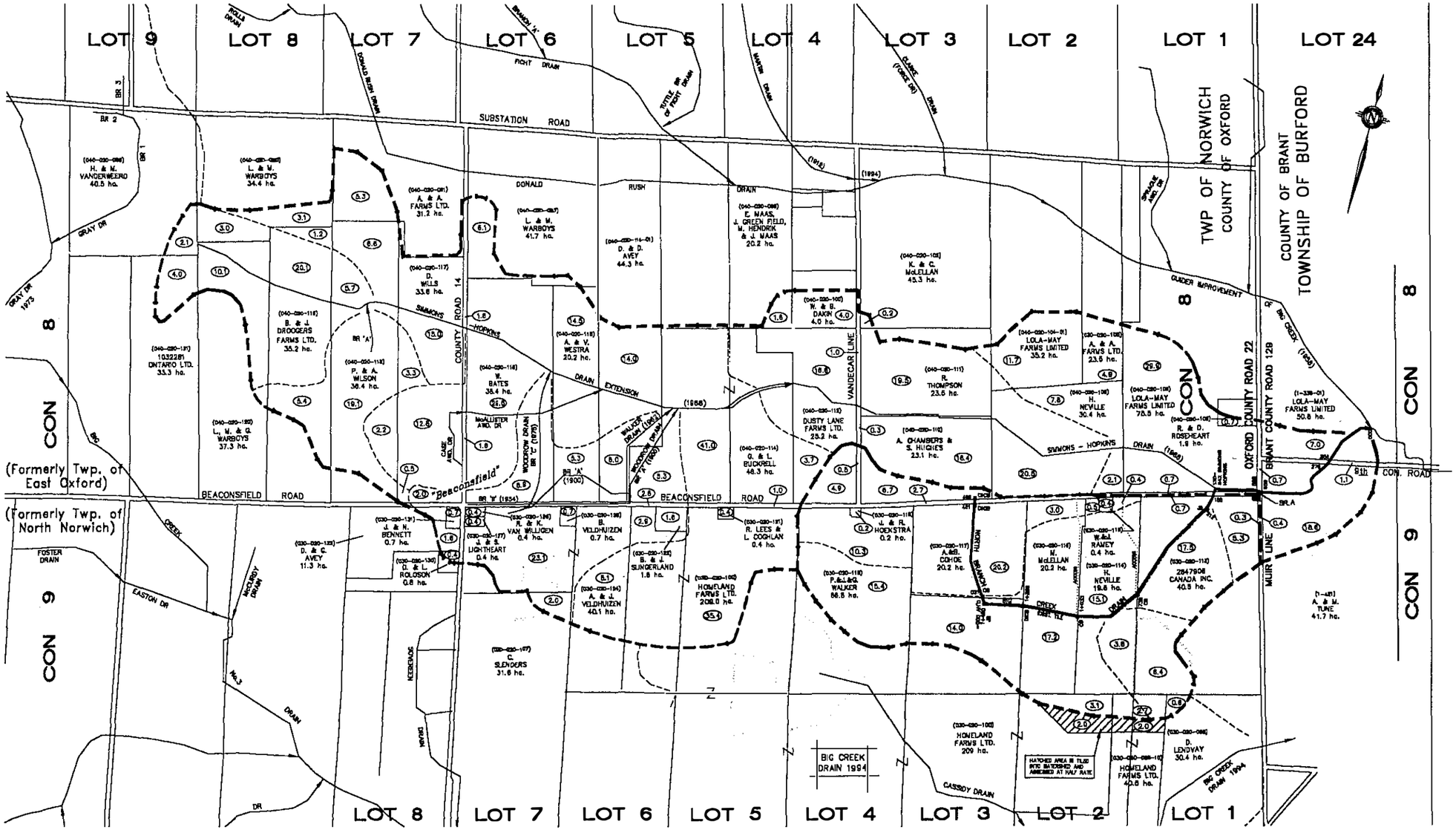
P) JUNCTION BOXES

Junction boxes shall be constructed of concrete mix one (1) part cement to five (5) parts clean pit run gravel. The sides and bottom shall be one hundred (100) millimetres thick. The inside dimensions of the box shall be a minimum of three hundred (300) millimetres by three hundred (300) millimetres wide and three hundred (300) millimetres high but in no instance shall they be less than one hundred (100) millimetres larger than the diameter of the largest tile being connected. The top of the junction box should have a minimum ground cover of four hundred and fifty (450) millimetres. The cover shall be a minimum of one hundred and twenty-five (125) millimetres thick with wire mesh reinforcement and 2 lifting handles.

Q) RECOMMENDED PRACTICE FOR CONSTRUCTION OF SUBSURFACE DRAINAGE SYSTEM

Drainage Guide for Ontario, Ministry of Agriculture and Food Publication Number 29 and its amendments, dealing with the construction of Subsurface Drainage Systems, Sections 4 and 5 inclusive, shall be the guide to all methods and materials to be used in the construction of tile drains except where superseded by other specifications of this contract.

The requirements of licensing of operators, etc. which apply to the installation of closed drains under the Tile Drainage Act shall also be applicable to this contract in full unless approval otherwise is given in advance by the Engineer.



PLAN LEGEND

- MAJOR WATERSHED
- INTERMEDIATE WATERSHED
- PROPOSED DRAIN AND CATCHBASIN OR JUNCTION BOX
- EXISTING DRAIN TO REMAIN
- OTHER DRAINS
- BUSH
- DENOTES PROPERTY OWNERSHIP ON BOTH SIDES OF LOT LINE
- (2.4) APPROXIMATE HECTARES IN WATERSHED
- (030-020-116) ASSESSMENT ROLL NUMBER
- ACCESS ROUTE

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NORTH BRANCH BIG CREEK DRAIN 1998
SIMMONS-HOPKINS DRAIN 1998

TOWNSHIP OF NORWICH AND TOWNSHIP OF BURFORD

WATERSHED PLAN

No.	REVISION	DATE

DESIGNED BY: J.K.
CHECKED BY: J.K.
DRAWN BY: R.A.M.
CHECKED BY: J.K.
FIELD BOOK: 97115

SCALE
PLAN
200m 0 200m
(1:10,000)

J. W. KUNTZE
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

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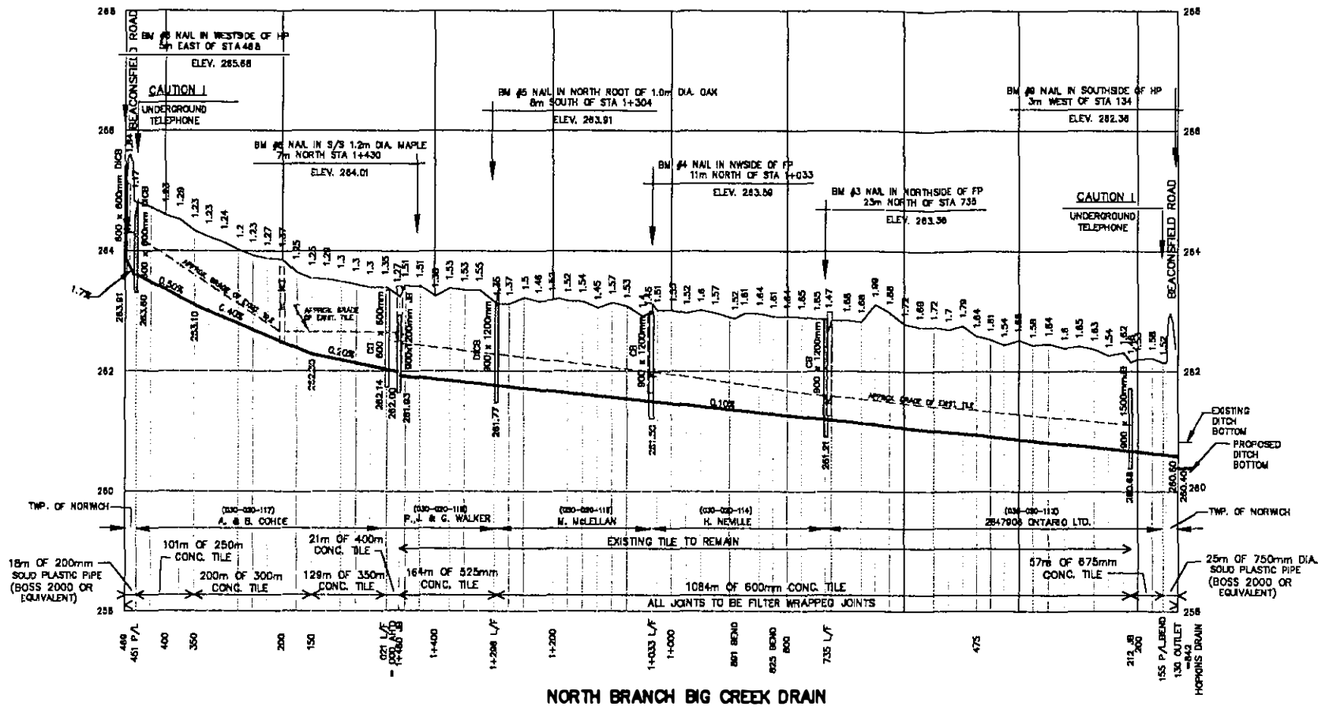
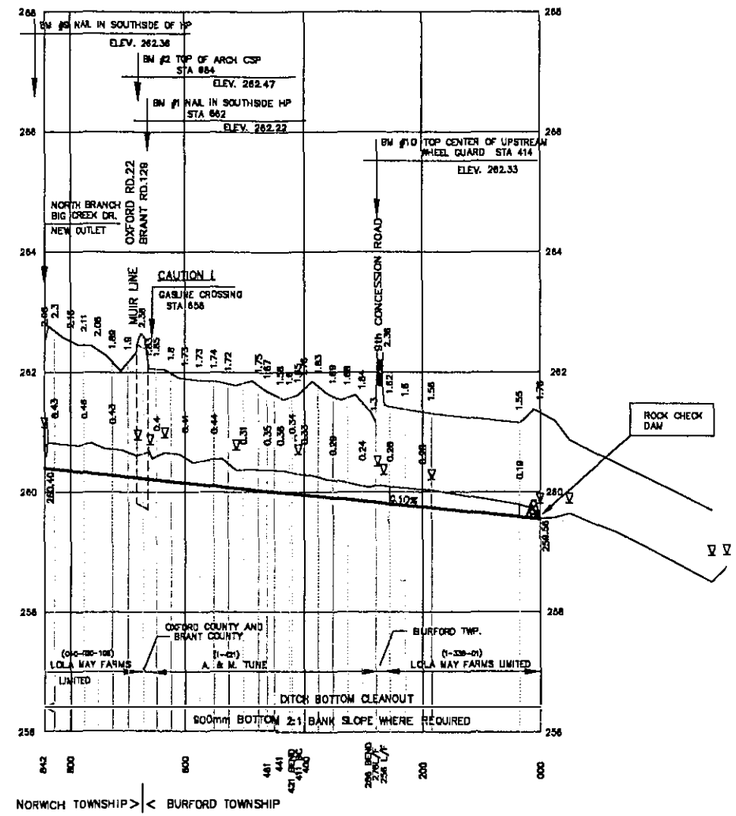
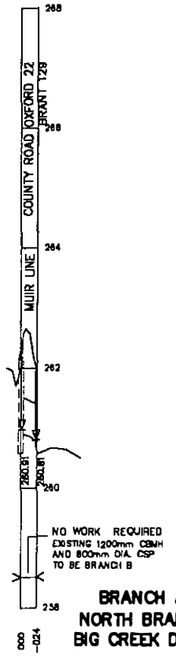
K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
85 McINTYRE DRIVE
KITCHENER, ONTARIO N2R 1H6

JOB NUMBER 97115
DATE AUG. 18, 1998
DRAWING NUMBER 1 OF 3







GENERAL NOTES

1. Working Area
Ditch – 12m± on bank for work

Tile – 10m width on each side of the new tile or any combination not to exceed 20m.
– At terminal points a 20m radius. 2. Access –

2. Access – General Condition E.39
The Contractor shall have access to the drain along the routes shown on the plan. All specifications governing fences, livestock and crops during drain construction shall apply to access routes except where superseded by notes on the drawings. No other access routes shall be used unless first approved by the Engineer and affected landowner. The contractor shall also contact each owner prior to using designated accesses.
Telephone numbers for contact are (all 519 area code):
– 2847908 Canada Inc. (Charlie Eden) 456-5262
– Leigh and Bonnie Cohoe 424-9156
– Marion McLellan 424-9798
– Helen Neville 424-9220
– Lola-May Farms Limited 424-9728
– Glenn Walker
– Howard & Margaret Tune 424-9308
– Brant County
– David Valentine – Engineer/Road Supt. 448-2451
– Township of Norwich
– Doug Wilson – Drainage Supar. 879-6566
– Ron Smith – Road Superintendent
– Township of Burford
– Reg Goss – Road Superintendent 449-2434
– Keith Still – Drainage Super. 428-4694
– Union Gas Simcoe Area
– Ron Smoke 426-4626
– John Kuntze, P. Eng. Engineer, K. Smart Associates Ltd. 748-1199 or 654-2495

3. Pre-Construction Meeting
The Contractor is required to attend a pre-construction site meeting with the Engineer and landowners before starting work.

4. Ditch Cleanout
Excavation to be done using a ditching or grade-all bucket. Banks to remain undisturbed if possible. Minimum bottom width 900mm. If new bank is required bank slopes to be 2:1 and is to be seeded at conclusion of excavation. Scattered clearing and grubbing will be required throughout. Trees and brush growing in channel bottom to be cleared and grubbed. Trees and brush on bank slopes to be cut using chainsaw or brush cutter. Stump and root removal not required. Some clearing required along top of bank to permit excavation and levelling. Stump and root removal not required. All cleared and grubbed material shall be piled in one location on each property. Location to be determined at time of construction.

5. New Tile
Tile to be installed by tiling machine. All tile joints to be wrapped with filter fabric.

6. Joint WrappingThe contractor shall use a 300 to 400mm width of filter fabric (Mirafi P150 is suggested) to fully and tightly wrap all joints. A 150mm overlap on top is required. No additional payment will be allowed for this joint wrapping.

7. Solid Plastic Pipe
Installation may be by backhoe. Manufacturers' recommendations re: bedding and joints to be followed. Pipe to be solid Big "O" Boss 2000 or equivalent with split couplers.

8. Setting Line for New Tile
Prior to stringing tile, all old tile drains must be prelocated as indicated in these specifications. Also, the Contractor is to review any tile plans that are available (contact the Engineer, landowner or Township Drainage Superintendent). As well, the Contractor shall review the proposed alignment with the Engineer and landowner after above reviews are completed. This contract requires the old drain to be left intact but cross-connected to the new drain.

9. Subsoil Instability
If poor soil conditions are encountered an attempt shall be made to install the drain by wheel trencher with a continuous filter underlay in the trench (in addition to the joint wrapping). The cost of the underlay will be negotiated. If the continuous underlay is not sufficient, use of stone bedding and backhoe methods may be necessary. If approved the work will be paid at the unit price evident from the form of tender. The unit price shall include the costs of topsoil stripping and replacing, and supply and placement of 19mm clear, crushed stone. The contingency price will only apply if a trenching machine is being used when unstable bottom conditions are encountered. If a backhoe is in use, then only the material cost of the stone will be paid as an extra. (All stone costs to be supported by weigh tickets and suppliers invoice.)

10. Tile Connections
All subsurface drainage tile encountered along the route of the proposed tile drains are to be connected up to the new drain or connected to a new header which in turn is to be connected to the new drain. The intercepted tile are to be clean and not contain polluted water. Tile which are full of sediments or which contain polluted waters will be connected back together across the trench. In some instances, this may be approved even if the tile are clean. The contractor will be paid $35.00/connection for labour, equipment and material on connections up to 150mm in diameter and up to 3 metres in length). Connections over 3 metres and greater than 150mm in diameter will be paid at $8.00 per metre of connection with material cost extra. (Specified connections in specific notes are considered to be as part of contract.)
Header tile prices will be negotiated as approved. The contractor must provide a form listing all connections in order to qualify for payment. This form 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. All tile connections approved for payment will form part of the final cost of the drain and will be prorated against all assessments. The estimated cost contains a contingency allowance which may be applied in part for tile connections.

11. Catchbasins
Backfill around all new catchbasins is recommended to be 19mm clear crushed stone to avoid future settlements and Contractor obligations to repair such. All catchbasins sumps to be fully cleaned by the Contractor after completion of drain installation and backfilling. Ditch inlet tops to have 2:1 slopes. All catchbasins to have birdcage grates as manufactured by Coldstream Concrete or approved equal. All grates to be secured with non corrosive fasteners. Marker stakes as supplied by Coldstream Concrete or equal are to be placed beside each catchbasin.

12. Utilities
The Contractor shall arrange with North Norwich Telephone and Union Gas and/or Ontario Hydro to verify the location of all utilities within road allowances or on private lands. All utilities shall be exposed to the satisfaction of the utility company to verify that their elevations will not conflict with the construction of the project at the specified elevations, or that provisions for protection and relocation of such utilities may be undertaken if conflicts should occur.

13. Open Cut Road Crossings
Township to be given 48 hours notice of construction within their right-of-way. Proper signing in accordance with MTO signing manual to be used where Township roads are closed. Contractor is responsible to repair any settlement which occurs within warranty period. The location of the road crossing shall be confirmed with the engineer and Road Superintendent prior to excavation. Invert elevations are evident on the drawings. The trench detail on the drawings and the special construction notes shall also apply. If the Township requires granular rather than native material backfill where native is allowed on the trench detail, additional payment will be allowed. Where granular is required, such is to be included. All surplus materials are to be hauled away. In the boulevards, topsoils shall be separately stripped and replaced. Seeding is required. The road may be closed provided that adequate detour signs are put up. All backfill to be compacted to 95% S.P.D.

14. Geotextile Filter Fabric
To be non-woven fabric, rot proof, non-biodegradable, chemically resistant to acidic or alkaline soils, dimensionally stable under different hydraulic conditions and is to be a material whose primary function is a high permeable non-clogging soil separator for fine soils. Where used under riprap, extra strength fabric is required. Contractor is to avail himself of manufacturer's recommendations for installation, cutting and precautions necessary to avoid damage to fabric. Mirafi filter material is available from:
– Coldstream Concrete Ltd.
Ilderton, Ontario (519) 666-0804
Other approved equals will also be considered by the Engineer. Approval must be obtained prior to construction.

15. Riprap
All riprap is to be placed on a filter fabric underlay (Mirafi P250 is suggested) unless directed otherwise on the Plan. 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. The riprap is to be graded angular heavy stone (quarry stone is suggested) with particles averaging in size from 225mm to 300mm and is to be placed at a 300mm thickness. Wherever riprap is used, it is to be recessed into the bank or bottom. If a new channel it is to be overdug so that finished top of riprap is at design cross-section, at design elevation or flush with existing ground.

16. Fences
All fences are to both removed and re-erected by contractor unless described other wise by notes on the drawings.
– Refer to General Specification E.19.
– Refer to General Specification E.20 re: livestock and fences.

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No.	REVISION	DATE

DESIGNED BY: J.K.
CHECKED BY: J.K.
DRAWN BY: R.A.M.
CHECKED BY: J.K.
FIELD BOOK: 97118

SCALE
0 100 200m
(1:5,000) HORZ.
0 1 2m
(1:50) VERT.

LICENSED PROFESSIONAL ENGINEER J. W. KUNTZE PROVINCE OF ONTARIO

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NOTE : METRIC CONVERSION
1. TO CONVERT FEET TO METRES MULTIPLY FEET BY 0.3048.
2. TO CONVERT METRES TO FEET DIVIDE METRES BY 0.3048.
3. TILE SIZE EQUIVALENTS ARE AS FOLLOWS :

4" – 100 mm	18" – 450 mm	54" – 1350 mm	
6" – 150 mm	18" – 450 mm	60" – 1500 mm	
8" – 200 mm	21" – 525 mm	66" – 1650 mm	
10" – 250 mm	24" – 600 mm	72" – 1800 mm	
12" – 300 mm	27" – 675 mm	78" – 1950 mm	
14" – 350 mm	30" – 750 mm		
16" – 375 mm	36" – 900 mm		

4. TO CONVERT ACRES TO HECTARES MULTIPLY ACRES BY 0.4047
5. TO CONVERT HECTARES TO ACRES DIVIDE HECTARES BY 0.4047

NORTH BRANCH BIG CREEK DRAIN 1998
SIMMONS–HOPKINS DRAIN 1998
TOWNSHIP OF NORWICH AND TOWNSHIP OF BURFORD

PROFILES AND CONSTUCTION NOTES

JOB NUMBER 97115
DATE AUG. 1998
DRAWING NUMBER **2 OF 3**

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
85 McINTYRE DRIVE
KITCHENER, ONTARIO N2R 1H6

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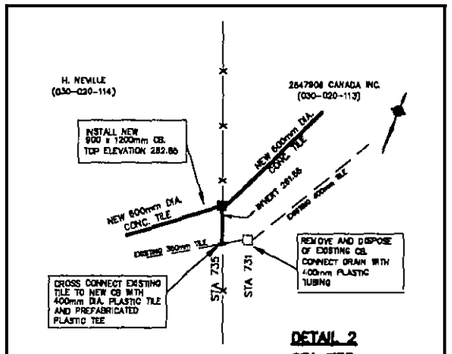
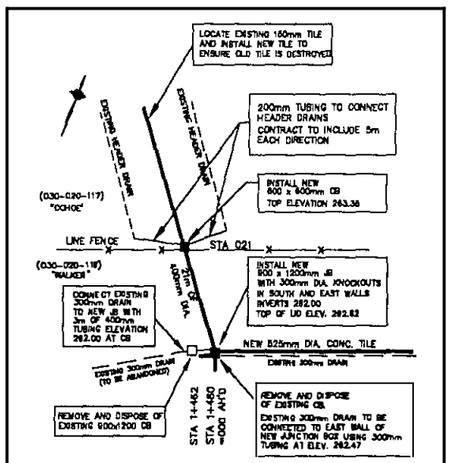
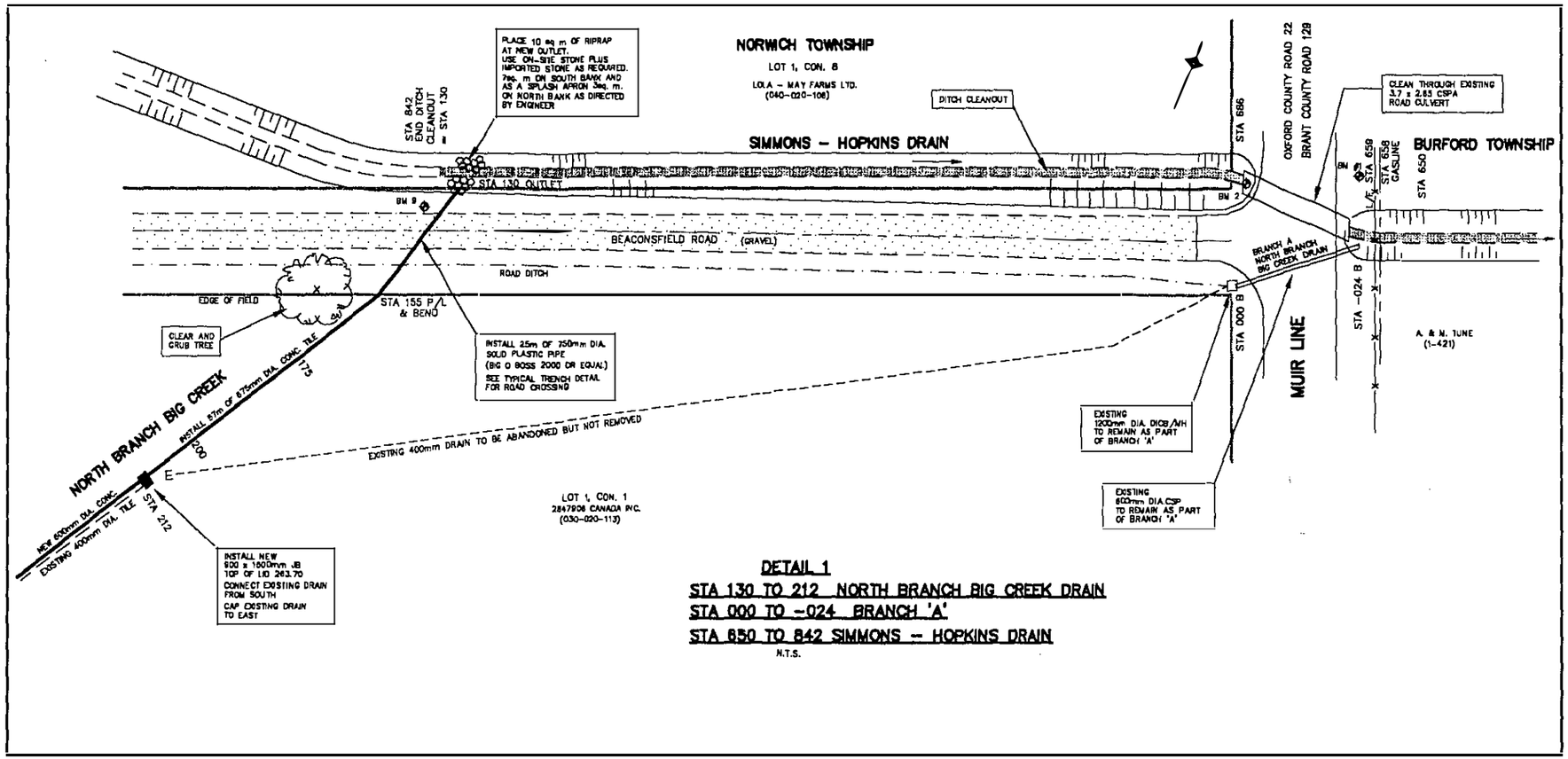


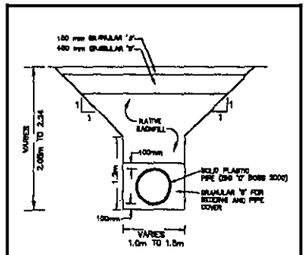
DETAIL 2
STA 735
NORTH BRANCH BIG CREEK
N.T.S.



DETAIL 3
STA 1+460
NORTH BRANCH BIG CREEK DRAIN
N.T.S.



DETAIL 1
STA 130 TO 212 NORTH BRANCH BIG CREEK DRAIN
STA 000 TO -024 BRANCH 'A'
STA 650 TO 842 SIMMONS -- HOPKINS DRAIN
N.T.S.



TYPICAL ROAD CROSSING
TRENCH DETAIL
N.T.S.

NOTES:

FOR TRAVELED PORTION OF ROAD, MECHANICAL COMPACTION REQUIRED ON ALL BACKFILL.

OUTSIDE TRAVELED PORTION USE GRANULAR FOR BEDDING AND BACKFILL TO SPRING LINE OF PIPE. REMAINING MATERIAL TO BE NATIVE MATERIAL.

TOPSOIL TO BE STRIPPED, SAVED, REPLACED AND SEEDED.

ALL SURPLUS EXCAVATED MATERIAL TO BE HAULED AWAY.

SPECIFIC CONSTRUCTION NOTES
NORTH BRANCH BIG CREEK DRAIN

130 to 212 — See detail on Drawing 3.

212 to 735 — Place 523m of 600mm diameter concrete tile with filter wrapped joints.
Prelocate existing tile and install new tile on northwest side of existing tile.
Confirm location of existing lateral or header drains and try to minimize disruption to existing drains.

731 to 735 — See detail on Drawing 3

735 to 1+033 — 298m of 600mm concrete tile with filter wrapped joints on north side of existing tile.

1+033 — Remove and dispose of existing catchbasin
Construct 900 x 1200 mm. concrete catchbasin with birdcage grate
Top elevation 263.00
South invert (400mm) elev. 261.95
Cross-connect existing tile with 400mm diameter solid plastic tubing. Use 400mm tee on existing drain

1+033 to 1+298 — 263m of 600mm diameter concrete tile with filter wrapped joint.

1+298 — Construct 900 x 1200mm concrete ditch inlet catchbasin with birdcage grate
High wall to be on fence line with low wall facing west. Low wall Elev. 263.00
Saucer-shaped area upstream from low wall.
Berm along linefence to match high wall of catchbasin

1+298 to 1+460 — Place 164m of 525mm diameter concrete tile with filter wrapped joints to north of existing tile
Clear and grub along course of drain (15m either side of drain).

1+460 = 000 to 021 — See detail on Drawing 3

021 to 150 — 129m of 350mm concrete tile with filter wrapped joints

150 to 350 — 200m of 300mm concrete tile with filter wrapped joints including disposal of existing catchbasin

350 to 451 — 101m of 250mm concrete tile with filter wrapped joints

451 to 469 — 18m of 200mm diameter solid plastic pipe (Big O Boss 2000 or equivalent) by open cut

468 — Remove and dispose of existing catchbasin

451 & 469 — Construct 2 - 600 x 600mm concrete ditch inlet catchbasins with birdcage grate.
Regrade 10m of road ditch each side to direct flow of surface water into DICB's
High wall to be constructed on property lines with low wall facing the traveled portion of the roads

451 — Low wall - Elev. 264.60

469 — Low wall - Elev. 265.10
Catchbasin to have 200mm stubs in west and north walls

SIMMONS-HOPKINS DRAIN

Burford Township
Lola-May Farms Limited
010 — Place rock check dam for temporary sediment trap. Top to be 300mm above ditch bottom with 3:1 slope upstream and downstream. Rock to be 50 to 250mm angular particles with smaller particles to fill voids. Engineer will direct when rock check dam is to be removed. Accumulated sediments are to be removed and levelled on ditch bank at end of construction.

000 to 256 — 258m of ditch bottom cleanout.
Side for leveling to be determined at time of construction.

9th Concession Road
256 to 276 — Clean through culvert as required. Level with ditch spoil upstream and/or downstream.

A. & M. Tune
276 to 659 — 383m of ditch bottom cleanout, numerous tile outlets into ditch.
276 to 441 — Side for levelling to be determined at time of construction
276 to 316 — Trees on west bank
441 to 659 — Fence on south bank. Level on north bank.
658 — Caution - gas line crossing

Muir Line (Oxford Road 22/Brant Road 129)
659 to 686 — Clean through culvert as required. Level with ditch spoil upstream and/or downstream

Norwich Township
Lola-May Farms Limited
668 to 842 — 158m of ditch bottom clean out. Level on north bank.

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No.	REVISION	DATE

DESIGNED BY: J.K.
CHECKED BY: J.K.
DRAWN BY: R.A.M.
CHECKED BY: J.K.
FIELD BOOK: 97118

SCALE
AS SHOWN

LICENCED PROFESSIONAL ENGINEER
J. W. KUNTZE
PROVINCE OF ONTARIO

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12" - 300 mm	27" - 680 mm		
14" - 350 mm	30" - 750 mm		
16" - 375 mm	32" - 800 mm		

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NORTH BRANCH BIG CREEK DRAIN 1998
SIMMONS-HOPKINS DRAIN 1998
TOWNSHIP OF NORWICH AND TOWNSHIP OF BURFORD

DETAILS AND CONSTRUCTION NOTES

JOB NUMBER 97115

DATE AUG. 1998

DRAWING NUMBER 3 OF 3

K. SMART ASSOCIATES LIMITED
CONSULTING ENGINEERS AND PLANNERS
85 McINTYRE DRIVE
KITCHENER, ONTARIO N2R 1H6

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R.J. Burnside & Associates Limited