

DRAINAGE REPORT

FOR THE

CLARK DRAIN

IN THE

MUNICIPALITY OF LEAMINGTON

BRUCE D. CROZIER ENGINEERING INC.

CONSULTING ENGINEER

99 QUEENS AVENUE, SUITE 1

LEAMINGTON, ONTARIO

N8H 3H1

PROJECT REFERENCE BC-09-044

January 11, 2010

Mayor and Municipal Council
Corporation of the Municipality of Leamington
38 Erie Street North
Leamington, Ontario
N8H 2Z3

Mayor Adams and Councillors

**SUBJECT: Drainage Report
For the Clark Drain**
In the Municipality of Leamington
Our Project Reference BC-09-044

1.0 AUTHORIZATION

Pursuant to Section 78 of the Drainage Act, 1990 the Corporation of the Municipality of Leamington accepted a request for the repair and improvements to the Clark Drain. The Corporation of the Municipality of Leamington, acting as the initiating Municipality subsequently appointed the firm of Bruce D. Crozier Engineering Inc., to make an examination and to prepare a report under the provisions of "The Drainage Act, 1990."

As requested by Council I have therefore made a survey and examination of the drain situated within Lot 19, Concession B in the Municipality of Leamington and I report thereon as follows.

2.0 PURPOSE OF REPORT

The intent of the report is to provide for the repair and improvements to the Clark Drain being an existing Municipal Drain. The repair and improvements will primarily be the removal of existing tile and catch water basins and the cleaning of the open drain.

3.0 ORDER OF PROCEDURE UNDER THE DRAINAGE ACT

A) SECTION 78 DRAIN

The following is the general order of procedure that is followed to repair and improve a municipal drainage system pursuant to Section 78 of The Drainage Act.

- a) Council determines that repair and improvements are required.
- b) Council appoints an engineer.
- c) Engineer conducts on site meeting.
- d) Engineer conducts survey of the drain.
- e) Need for preparation of a Preliminary Report is decided.
- f) Engineer completes and provides Preliminary Report.

- g) Council considers Preliminary Report at a public meeting with affected landowners and decides on option(s) with which to proceed.
- h) Engineer prepares Final Drainage Report and provides copy to the Municipality.
- i) Council considers drainage report at a public meeting with the affected landowners.
- j) At the meeting for consideration the Municipal Council may adopt the Drainage Report. If adopted the Municipal Clerk prepares a provisional by-law for the recommended work and sends copies of the by-law to affected parties and arranges a second meeting of Council for the Court of Revision.
- k) The Court of Revision is held at a subsequent meeting with the affected landowners to discuss any disputes regarding assessment of cost to lands and roads.
- l) Council passes by-law for construction of the work after statutory waiting periods and appeal periods expire.
- m) Tenders are received by the Municipality to perform the recommended work and construction is carried out. Inspection of the construction work may be provided by the Town Drainage Superintendent or by an inspector from the engineering office.
- n) Upon completion of construction the Municipal Clerk will finalize all applicable costs and submit grant applications to the Ministry of Agriculture, Food and Rural Affairs, if applicable. The clerk will then send a final net assessment to the affected landowners.

4.0 SITE MEETING

On Friday, October 16, 2009 at 9:00 a.m. an on site meeting was held. We explained the purpose for calling the site meeting and further explained applicable provisions of the Drainage Act in relation to this project.

The following people attended the meeting:

Mr. Ken Hamm, Ms. Lu-Ann Barreto from the Municipality of Leamington and Mr. Bruce D. Crozier, P.Eng from Bruce D. Crozier Engineering Inc.

Mr. Crozier stated the existing open drain and underlying tile drain were in disrepair. Mr. Hamm requested that the existing tile be removed and replaced with an open drain that would accommodate existing field tile. He also requested that any excess material not be spread on adjacent agricultural land but be removed from site.

Mr. Crozier further stated that he would be producing a report that will be forwarded to the Town. The Town Council will consider the report at a regular Council meeting at which all property owners affected by the report will be invited to attend.

When the report is approved by Council another meeting will be scheduled which is called a Court of Revision. This meeting primarily deals with assessments to affected properties. All affected property owners will be invited to attend the Court of Revision and express their concerns, if any.

5.0 CURRENT DRAINAGE REPORT

The current drain report on file for the Clark Drain is one dated February 26, 1958 and was prepared by C.G.R Armstrong, P.Eng.

6.0 EXAMINATION

We commenced our survey at the upper end of the drain at a point approximately four hundred and ninety two metres south of Mersea Road B. The survey continued southerly along the drain to its outlet at Mersea Road C.

7.0 EXISTING SITE CONDITIONS

The open portion of the drain is overgrown with vegetation. The tile beneath the open drain is exposed in areas and in poor condition. The existing catch water basins are clogged with sediment.

8.0 RECOMMENDATIONS

- a) We would recommend that the existing 250 mm and 300 mm diameter tiles be removed and the existing open drain be cleaned.
- b) We would recommend that the existing 600 mm diameter CSP culvert be removed and replaced with a new 600 mm diameter CSP culvert.
- c) We would recommend that there be gabion stone erosion protection (rock chutes) installed at the drain outlet and at the north and south ends of the 600 mm diameter CSP culvert.

9.0 DRAWINGS AND SPECIFICATIONS

Attached to this report is drawing No. BC-09-044 Sheets 1 and 2 which shows the location of the proposed work and the lands affected by the work, together with the plans, profiles and details of the recommended work. Specifications are included in the report which shows the dimensions, grades, disposal of materials, working area for construction and future maintenance and other particulars of the recommended work.

10.0 WORKING AREAS AND ACCESS

The area available to the Contractor to be used for the purpose of constructing the recommended works of this particular report and for future maintenance as provided for under Section 63 of the Drainage Act 1990 are described herein and form a part of this report.

11.0 PROPOSED WORK

In general the proposed work will involve the removal of the 250 mm and 300 mm inline tiles and catch water basins in the existing enclosed drain. The existing access culvert will be replaced. The open drain is to be cleaned.

12.0 ESTIMATE OF COST

Our estimate of the total cost of this work, including all incidental expenses, is the sum of TWENTY SEVEN THOUSAND, TWO HUNDRED DOLLARS-----00/100 (\$27,200.00) made up as follows:

CONSTRUCTION

1.	2.0	Existing 600 mm diameter precast concrete catch water basins to be removed and disposed of offsite complete at \$ <u>300.00</u> each.	\$	600.00
2.	LS	Brushing and grubbing along both banks and bottom of the open drain including removal and disposal of brush and trees from site to a location determined by the contractor complete at \$ <u>4,000.00</u> lump sum.	\$	4,000.00
3.	1,000.0	Cubic metres of drain excavation including the removal and disposal of existing 250 mm and 300 mm tile offsite complete at \$ <u>10.00</u> per cubic metre.	\$	10,000.00
4.	15.0	Square metres of gabion stone (300 mm thick) supplied and laid on Terrafix 270R filter fabric at drain outlet and each end of 600 mm diameter CSP culvert complete at \$ <u>45.00</u> per square metre.	\$	675.00
5.	6.0	Metres of existing 600 mm diameter CSP pipe to be removed and disposed of offsite complete at \$ <u>25.00</u> per metre.	\$	150.00
6.	2.0	Existing headwalls to be removed and disposed of offsite complete at \$150.00 each.	\$	300.00
7.	12.0	Metres of 600 mm diameter 14 gauge CSP pipe with 68 x 130 mm corrugations supplied and set with granular 'A' bedding material as per O.P.S.S 1010, complete at \$ <u>75.00</u> per metre.	\$	900.00
8.	20.0	Tonnes of Granular 'B' as per O.P.S.S. 1010 to be supplied, placed and compacted as covering and backfill material as per O.P.S.S 1010 across the culvert at \$ <u>21.00</u> per tonne.	\$	420.00

9.	5.0	Tonnes of Granular 'A' as per O.P.S.S. 1010 to be supplied, placed and compacted across the lane at \$ <u>28.00</u> per tonne.	\$	140.00
10.	LS	Supply and place seed and mulch on all excavated portions of the open drain side slopes complete at \$ <u>3,000.00</u> lump sum.	\$	3,000.00
				=====
		SUB-TOTAL FOR CONSTRUCTION	\$	20,185.00
		G.S.T. PAYABLE (Municipality Receives a 100% Rebate)		0.00
				=====
		TOTAL ESTIMATED CONSTRUCTION COST	\$	20,185.00
				=====
INCIDENTALS				
		Survey, report, estimates and specifications.	\$	3,500.00
		Assistants and expenses, typing report and preparing drawings.	\$	1,500.00
		O.M.B. Fee	\$	125.00
		Preparation of tender documents	\$	400.00
		Preparing Progress Payment Certificates and Final Inspection of Construction	\$	500.00
		Supervisions of Construction (Approximately 1 days at \$500.00/day, if required)	\$	500.00
		Contingency Allowance (If Required)	\$	490.00
				=====
		TOTAL FOR INCIDENTALS	\$	7,015.00
		G.S.T. ON INCIDENTALS (Municipality receives a 100% rebate)	\$	0.00
		TOTAL FOR CONSTRUCTION (brought forward).	\$	20,185.00
				=====
		TOTAL ESTIMATE	\$	27,200.00
				=====

I would recommend that all of the cost of this work be assessed to the landowners in accordance with the accompanying Schedule of Assessment.

When the construction of this project has been completed and the cost of the project has been determined the town clerk will proportionate the actual costs according to the Schedule of Assessment and invoice the property owners.

Also the property owners should be made aware that according to Section 59(1) and Section 59(2) of the Drainage Act 1990, the council may proceed with the project if the construction tender price does not exceed 133 % of the engineer's estimated construction cost. If the construction tender price is higher than 133 % of the engineer's estimated cost, council will schedule a public meeting with the property owners to discuss whether the project should proceed to construction.

14.0 MAINTENANCE

We would further recommend that the future maintenance cost be assessed to the affected properties proportionate to the accompanied Schedule of Assessment.

15.0 GRANTS

In accordance with the provisions of Sections 85, 86 and 87 of "The Drainage Act, 1990" a grant possibly in the amount of 33 -1/3% of the assessment eligible for a grant, may be made in respect of the assessment made in this report, upon privately owned lands used for agricultural purposes. We would further recommend that an application be made by the Town upon completion of the project, to the Ministry of Agriculture, Food and Rural Affairs in accordance with Section 88 of "The Drainage Act, 1990" for this grant, if applicable.

All of which is respectfully submitted.

**BRUCE D. CROZIER ENGINEERING INC.
CONSULTING ENGINEER
99 QUEENS AVENUE SUITE #1.
LEAMINGTON, ONTARIO
N8H 3H1**

Bruce D. Crozier, P.Eng.

SPECIAL PROVISIONS
CLARK DRAIN
IN THE
MUNICIPALITY OF LEAMINGTON
PROJECT REFERENCE BC-09-044

1.0 **EXCAVATION**

The drain shall follow in general the course of the present drain and shall be of the form, size, depth, etc. as shown on the accompanying plan and profile.

When completed the drain shall have a uniform bottom and in no case shall such bottom project above the grade line as shown on the accompanying drawing and as determined from the bench mark. The open sections of the drain shall have sideslopes and bottom widths as indicated on the profile.

2.0 **QUARRIED ROCK PROTECTION**

The Contractor shall place quarried rock protection at the areas indicated on the accompanying plans. The quarried rock shall be graded in size from a minimum size of 100 mm (4") to a maximum size of 230 mm (9"). The quarried rock shall be placed 300 mm (12") in thickness on a layer of geotextile filter fabric placed on the bottom of the excavation. The filter fabric shall be "Terrafix 270-R" or equal. The Contractor shall excavate for the quarried rock so that the top of the completed quarried rock protection is level with the adjacent ground.

The Contractor shall remove all trees, brush and debris from the area on which the quarried rock is to be placed. The quarried rock shall be carefully placed by the Contractor at the locations and to the dimensions as shown on the accompanying specifications. The specified filter cloth shall be hand laid and have an overlap of 600 mm (24") and all quarried rock that is to be placed over the filter cloth shall be carefully hand or machine placed so that it does not damage the filter cloth. The filter cloth shall extend up the sides of the trench excavated to accept the quarried rock and the quarried rock shall extend 300 mm (12") above the top of the surface inlet pipe where applicable.

3.0 **SEEDING**

The Contractor shall place seeding and mulching to all excavated portions of the drain sideslopes, grassed buffer strips and all areas backfilled, restored, excavated or disturbed in accordance with General Specifications Item Number 15.0, Page GS-4.

4.0 **LOCATION OF DRAIN**

The location of the drain shall follow the course of the present watercourse.

5.0 **DISPOSAL OF MATERIAL**

For the purpose of constructing this drain and for future maintenance as provided for under Section 16 of "The Drainage Act, 1990" the Contractor shall dispose of excavated material as follows: Where the

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material is specified to be disposed of the Contractor shall load and haul the surplus excavated material to a location to be determined by him and at his expense.

6.0 WORKING AREA

For the purpose of constructing this drain and for future maintenance as provided for under Section 63 of "The Drainage Act, 1990" the Contractor shall be allowed to use the working area for which the landowners have previously received an allowance for damages and land taken.

7.0 DRAIN ENCLOSURE

O.P.S.S. Forms 410 and 421 shall apply and govern as amended or extended herein.

8.0 BEDDING AND BACKFILL

Where the pipe is installed in a confined trench condition the Contractor shall provide Granular "A" bedding for all newly installed drain pipe. The bedding shall extend from 150 mm (6") below the bottom of the pipe. The backfill material shall consist of select native excavated material within the boulevard areas, and Granular "B" across all roadways and driveways. All roadways and driveways shall further be restored by supplying 300 mm (12") thickness of Granular "A" to the top of the trench area. The minimum trench width shall be equal to the outer diameter of the pipe plus 500 mm and the maximum trench width allowed shall equal the outer diameter of the pipe plus 750 mm.

In general all granular materials placed as bedding or backfill shall be compacted to 100% Standard Proctor Density. All native backfill material placed underneath grass areas shall be compacted to 95% Standard Proctor Density. The Contractor shall utilize approved compaction equipment to achieve the above noted compaction requirements and his methods and equipment shall be approved prior to the start of construction by the Town Drainage Commissioner and or Engineer. The Contractor shall take extra precautions in placing and compacting the backfill material so that the pipe is not distorted or damaged in any way. If there is evidence of deflection or damage in the drain pipe as a result of the backfilling and compaction operations, the drain may be televised as provided for by General Specifications item GSSD No. 10.

9.0 CATCH WATER BASINS (NOT REQUIRED)

The Contractor shall install catch water basins at the locations shown on the accompanying plan and in accordance with the accompanying catch water basin detail.

The 600 mm diameter corrugated steel pipe catch water basins shall be placed in general as directed by the Town Drainage Superintendent. Upon completion of the installation of the main drain and catch water basins, the area over top of the drain shall be graded so that surface water is directed to the catch water basins as directed by the Drainage Superintendent or Engineer.

10.0 PRIVATE SERVICE CONNECTIONS (NOT REQUIRED)

New private service connections will not be provided to each individual property as part of this project.

All private storm service connections or storm drain tile encountered along the work and that are connected to the existing drain shall be reconnected to the new enclosed drain using similar materials as the existing private drain and approved couplers or connections as directed by the Drainage Superintendent or Engineer.

11.0 RESTORATION

The Contractor will be fully responsible for the restoration of all areas disturbed by his operations in the carrying out of this work. The Contractor shall excavate and set aside sufficient topsoil from the trench excavation or supply additional topsoil so that he can place a minimum of 100 mm in depth of topsoil over the backfilled trench as detailed on the drawings. Any depressions in any lawn caused by equipment or due to the movement of materials shall be backfilled with topsoil and satisfactorily levelled and raked in place on all lawn areas to be restored. The Contractor shall seed and mulch said areas in accordance to General Specification Item No. 17.0, Page GS-4 and the Contractor shall also spread fertilizer prior to seeding as specified.

Where the Contractor has installed the drain across any driveway or roadway or road shoulder the backfill material as specified herein shall be placed for the full width of the driveway, roadway or road shoulder and for the full width of the excavated area and the Contractor shall restore the finished surface of the driveway, roadway, or road shoulder with materials of the same quality and thickness as the existing surface. The Contractor will be further required to properly sawcut the full depth of any paved driveways or roadways which are to be restored, so as to have a straight edge parallel to the drain trench.

12.0 EXISTING UTILITIES

All utilities or private services crossing under the drain are to be hand excavated and exposed prior to commencement of construction. Any such utilities or services found to be less than 600 mm below the new drain gradeline are to be reported to the inspector. Should it be necessary to lower said services the Contractor shall coordinate his work with the utilities.

13.0 TRAFFIC CONTROL (NOT REQUIRED)

The Contractor shall exercise all due care and attention in working within the road allowances. The Contractor shall comply to all current safety regulations, and to signing requirements according to Division 5, Temporary Conditions, of the M.T.O. Manual of Uniform Traffic Control Devices. The Contractor shall provide sufficient flag persons while working within the allowances to ensure safety to workers and the public in general.

The Ontario Traffic Manual Book 7 Temporary Conditions shall be utilized to apply traffic control devices in temporary construction, maintenance and utility work zones, to ensure worker safety, motorist safety, and motorist mobility. The plan is to be prepared and submitted prior to construction illustrating the appropriate signing and channelization required for any roadway work operations.

14.0 GRADE CONTROL

The Contractor will be required to provide laser grade control to perform the drain excavation and culvert work. The grade shall be set on the laser by qualified personnel by the Contractor. The grade shall be determined from the bench marks provided and shall be periodically checked by the Contractor during the course of performing the excavation work. The Contractor shall also assist the Engineer and or Drainage Superintendent in checking the laser set up or the elevation of any part of the excavated drain.

15.0 LIQUIDATED DAMAGES

Liquidated damages, consisting of additional costs incurred by the Engineer or Town, may be charged to the Contractor if the work is not completed within the specified Time of Completion.

Additional costs incurred by the Engineer or Town to inspect or re-check corrective work, resulting from faulty work by the Contractor, may be charged to the Contractor.

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16.0 TAXES

The Contractor shall include all applicable taxes in his tender submission.

SPECIFICATIONS
ENVIRONMENTAL PROTECTION SPECIAL PROVISIONS
FOR THE
CLARK DRAIN
IN THE
MUNICIPALITY OF LEAMINGTON
PROJECT REFERENCE BC-09-044

1.0 GENERAL

These Environmental Protection Special Provisions shall apply and form part of this Contract. All costs associated to conforming with these Special Provisions shall be included in the Tender prices bid.

2.0 FIRES

Fires and burning of rubbish on site will be permitted only with special approval from the Town.

3.0 DISPOSAL OF WASTES

The Contractor shall not bury rubbish and waste materials on site unless approved by the Engineer and all applicable approving authorities. The site shall be maintained free of accumulated waste and rubbish. All waste materials should be disposed of in a legal manner at a site approved by all local approving authorities and the Engineer.

The Contractor shall not allow deleterious substances, waste or volatile materials such as mineral spirits, or paint thinner, to enter into waterways, storm or sanitary sewers.

The disposal of dredge material where applicable shall be in accordance with the above.

4.0 POLLUTION CONTROL

The Contractor shall maintain under this Contract temporary erosion, sediment and pollution control features installed.

The Contractor shall control emissions from equipment and plant to local authorities emission requirements.

The Contractor shall not cause excessive turbidity when performing in-water work. The Contractor shall not allow any debris, fill or other foreign matter to enter into the waterway. The Contractor shall remove from the waterway, all extraneous materials resulting from in-water work.

The Contractor shall abide by local noise By-Laws for the duration of the Contract.

Spills of deleterious substances into waterways and on land shall be immediately contained by the Contractor and the Contractor shall cleanup in accordance with Provincial regulatory requirements. All spills shall be reported to the Ontario Spills Action Centre (1-800-268-6060), local authorities having jurisdiction and the Engineer. To reduce the risk of fuel entering the waterway, refuelling of machinery must take place a safe distance from the

waterway. The Contractor shall note that the Engineer or the Owner takes no responsibility for spills, this shall be the sole responsibility of the Contractor.

5.0 WHMIS

The Contractor shall comply with the requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials and regarding labelling and the provision of material safety data sheets acceptable to Labour Canada.

6.0 DRAINAGE

The Contractor shall not pump water containing suspended materials into waterways, sewers or drainage systems. The Contractor shall be solely responsible for the control, disposal or runoff of water containing suspended materials or other harmful substances in accordance with these specifications, and local authority requirements. The Contractor shall provide temporary drainage and pumping as necessary to keep excavations and site free from water.

The Contractor shall install and maintain sediment control devices as indicated on the Contract Drawing and as directed by the Engineer.

7.0 PROTECTION OF VEGETATION

The Contractor shall exercise the utmost caution to ensure that existing trees and plants on-site and on adjacent properties are not damaged or disturbed unless noted otherwise in the Removals Special Provisions of this Contract. The Contractor shall restrict tree removal to areas indicated on the Contract Drawings and/or designated on-site. No trees or shrubs shall be removed without the approval of the Engineer.

8.0 DUST CONTROL

The Contractor will be solely responsible for controlling dust nuisance resulting from his operations, both on the site and within adjacent right-of-ways.

Water and calcium chloride shall be applied to areas on or adjacent to the site as authorized by the Engineer as being necessary and unavoidable for the prevention of dust nuisance or hazard to the public. No payment will be made for dust control unless otherwise specified in the Special Provisions.

9.0 RESTRICTIONS FOR IN-WATER WORKS

The Contractor shall only perform in-water works during times when conditions permit reasonable production rates to be achieved. The Contractor shall be required to adopt good house keeping practices that minimize disturbance to the site and the adjacent waterway.

The Contractor shall note that this Project is subject to approval from the Essex Region Conservation Authority and as such, any possible turbidity caused by the construction of the shore protection works is of key importance.

The Contractor shall minimize the turbidity (sedimentation) produced by any in-water works construction or operations. The Contractor will be ordered to cease operations if, in the opinion of the Engineer or authorities having jurisdiction, the in-water work is producing unacceptable amounts of turbidity in the waterway. Based on this, the Contractor shall either adjust his operation(s) to produce

lower turbidity levels, wait for more favourable conditions before operations will be allowed to continue, or undertake approved mitigating measures (e.g. sediment control, etc.). All costs associated with the above will be the sole responsibility of the Contractor, and no claims for extras or delays will be considered.

10.0 FISH HABITAT

No work shall be undertaken when there is likelihood of adverse effects on fish spawning or fish habitat in downstream waters.

GENERAL SPECIFICATIONS
FOR CONSTRUCTION OF OPEN DRAINS
FOR THE
CLARK DRAIN
IN THE
MUNICIPALITY OF LEAMINGTON
PROJECT REFERENCE BC-09-044

1.0 EXAMINATION OF SITE, PLANS AND SPECIFICATIONS

Each tenderer must visit the site and review the plans and specifications before submitting his tender and must satisfy himself as to the extent of the work and local conditions to be met during the construction period. He is not to claim at any time after submission of his tender that there was any misunderstanding of the terms and conditions of the contract relating to site conditions. The quantities shown as indicated on the drawings or in the report are estimates only and are for the sole purpose of indicating to the tenderers the general magnitude of the work. The tenderer is responsible for checking quantities for accuracy prior to submitting his tender.

2.0 SUPPLY OF MATERIALS

The Contractor shall supply all labour, equipment and materials necessary for the proper completion of the project.

3.0 PROFILE

The excavation of the drain must be at least to the depth intended by the grade line as shown on the profile, which grade line is governed by the bench marks. The profile shows, for the convenience of the Contractors and others, the approximate depth of cut from the surface of the ground at the points where the numbered stakes are set to the final invert of the channel and also the approximate depth of cut from the bottom of the existing channel to the final invert of the channel. Bench marks which have been established along the course of the drain, shall govern the final elevation of the drain. The location and elevation of the bench marks are shown on the profile.

4.0 ALIGNMENT

The alignment of the drain throughout shall be to the full satisfaction of the Commissioner in charge. The whole of the work shall be done in a neat, thorough and workmanlike manner to the full satisfaction of the Commissioner in charge. The bottom widths and side slopes of the various sections of the finished drain are to be true to line and grade as shown on the profile. When completed the drain shall have a uniform and even bottom and in no case shall such bottom project above the grade line as shown on the accompanying drawing, and as determined from the bench mark.

5.0 BRUSHING AND GRUBBING

Where there is any brush or rubbish in the course of the drain, including both side slopes of the drain, or where the earth is to be spread or on that strip of land between where the earth is to be spread and the edge of the drain, all such brush or rubbish shall be grubbed out and close cut and the whole to be

burned (with Town approval) or removed from the drain, hauled away and disposed of by the Contractor.

Existing select hardwood trees greater than 200 mm (8") in diameter situated in the drain bank within 1.0 metre from the top of the bank may be selectively left standing if the Township Drainage Superintendent considers the trees will not adversely affect the flow of water within the drain. Prior to removing any trees the Contractor shall meet at the site with the drainage superintendent to review if any vegetation or select trees are environmentally significant for preservation.

6.0 SPREADING EXCAVATED EARTH

The excavated material where specified to be cast onto the adjoining land shall be well and evenly spread over a sufficient area so that no portion of the excavated earth is more than 100 mm in depth or as otherwise specified and kept at least 1.2 metres clear from the finished edge of the drain, care being taken not to fill up any existing tiles, ditches, furrows or drains with the excavated material. The excavated material to be spread upon the lands shall be free from rocks, boulders, stumps, rubble, rubbish or other similar material and other materials if encountered, shall be hauled away by the Contractor and disposed of at a site to be obtained by him at his expense.

Where the drain crosses any lawn, garden, orchard or driveway, etc. the excavated material for the full width of the above mentioned areas, shall be hauled away by the Contractor and disposed of upon the adjacent lands and spread as previously specified.

7.0 FENCING

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

8.0 LOCATION OF STRUCTURES AND UTILITIES

The Contractor shall satisfy himself as to the exact location, nature and extent of any existing structure, utility or other object which he may encounter during the course of the work. The Contractor shall indemnify and save harmless, the Town and the Engineer for any damages which he may cause or sustain during the progress of the work. He shall not hold the Town or the Engineer liable for any legal action arising out of any claims brought about by such damage caused by him.

9.0 ACCESS BRIDGES

The Contractor shall satisfactorily clean through all existing access bridges to the grade line as shown on the accompanying drawing.

10.0 BACKFILL FOR CULVERTS

Where specified and after the corrugated steel pipe has been set, the Contractor shall backfill the pipe with granular "B" material, O.P.S.S. Spec. 1010 with the exception of the top 30 cm (12") of the backfill over the top and ends of the corrugated steel pipe. The top 30 cm of the backfill for the full width of the excavated area (between each side slope of the drain) and for the top width of the driveway, shall be granular "A" material, O.P.S.S. Spec. 1010. The granular backfill shall be compacted in place to a Standard Proctor Density of 100% by means of mechanical compactors. The equipment and method of compacting the backfill material shall be to the full satisfaction of the Drainage Superintendent or Engineer.

11.0 BAGGED HEADWALLS AND ROCK PROTECTION FOR CULVERTS

a) Bagged Concrete Headwalls (NOT APPLICABLE)

Where specified and after the Contractor has set in place the new pipe, he shall completely backfill the same and install new concrete jute bag headwalls at the locations indicated on the drawing. When constructing the concrete jute bag headwalls, the Contractor shall place the bags so that the completed headwall will have a slope inward from the bottom of the pipe to the top of the finished headwall, the slope of the headwall shall be one unit horizontal to five units vertical. The Contractor shall completely backfill in behind the new concrete jute bag headwalls with granular material, Granular "A" and "B" per O.P.S.S. 1010 and as additionally specified under Special Provisions Item No. 11.0 and the granular material shall be compacted in place with a standard proctor density of 100%. The placing of the jute bag headwalls and the backfilling shall be performed in lifts simultaneously. The granular backfill shall be placed and compacted in lifts not to exceed 300 mm (12 inches) in thickness.

The concrete jute bag headwalls shall be constructed by filling jute bags with concrete. All concrete used to fill the jute bags shall have a minimum compressive strength of 20.7 MPa in 28 days and shall be provided and placed only as a wet mix, under no circumstance, shall the concrete to be used for filling the jute bags, be placed as a dry mix. The jute bags, before being filled with concrete, shall have a dimension of 460 mm X 660 mm (18" X 26"). The jute bags shall be filled with concrete so that when they are laid flat, they will be approximately 100 mm (4") thick, 300 mm (12") to 380 mm (15") wide and 460 mm (18") long. The concrete jute bag headwall to be provided at the end of the pipe shall be of single bag wall construction or as specified otherwise. The concrete filled bags shall be laid so that the 460 mm (18") dimension is parallel with the length of the new pipe. The concrete filled bags shall be laid on a footing of plain concrete being 460 mm (18") wide, extending for the full length of the wall, and from 300 mm (12") below the bottom of the corrugated pipe to the bottom of the culvert pipe. All concrete used for the footing shall have a minimum compressive strength of 20.7 MPa in 28 days. The completed jute bag headwalls shall be securely embedded a minimum of 500 mm (20") into the side slopes of the drain.

Upon completion of the jute bag headwall the Contractor shall cap the top row of concrete filled bags with a layer of plain concrete, 150 mm (6") thick, and hand trowelled to obtain a pleasing appearance. The Contractor shall fill all voids between the concrete filled jute bags and the corrugated steel pipe with concrete, particular care being taken underneath the pipe haunches to fill all voids.

As an alternate to constructing a concrete filled jute bag headwall, the Contractor may construct a grouted concrete rip rap headwall. The specifications for the installation of a concrete filled jute bag headwall shall be followed with the exception that broken sections of concrete may be substituted for the jute bags. The concrete rip rap shall be approximately 18" square and four inches thick and shall have two flat parallel sides. The rip rap shall be fully mortared in place using a mixture composed of three

parts of clean, sharp sand to one part of Portland Cement.

b) Quarried Rock End Protection

The backfill over the ends of the corrugated steel pipe shall be set on a slope of 1½ metres horizontal to 1 metre vertical from the bottom of the corrugated steel pipe to the top of each side slope and between both side slopes. The top 30 cm (12") in thickness of the backfill over the ends of the corrugated steel pipe shall be quarried rock. The quarried rock shall be placed on a slope of 1½ metres horizontal to 1 metre vertical from the bottom of the corrugated steel pipe to the top of each side slope of the drain and between both side slopes. The quarried rock shall have a minimum dimension of 100 mm (4") and a maximum dimension of 225 mm (9"). Prior to placing quarried rock end protection over the granular material, the Contractor shall lay a non woven geotextile filter fabric equal to a "Terrafix 270R" or approved equal. The geotextile filter fabric shall extend from the bottom of the corrugated steel pipe to the top of each side slope of the drain and between both side slopes of the drain. The Contractor shall take extreme care not to damage the geotextile filter fabric when placing the quarried rock on top of the filter fabric.

12.0 PLACING OF CORRUGATED STEEL PIPE

When specified the Contractor shall install all culvert bridges in the location directed by the Commissioner. The excavation for placing the culvert, the type and class of bedding and backfill and culvert end treatment shall be carried out to the width, depth and alignment as specified herein. The surface on which the culvert is to be laid shall be true to grade and alignment and shaped to accept the materials to be placed. The pipe shall be laid to the alignment and grade shown in the report but may not be placed on a bed containing frozen materials. The Contractor shall carefully place the bedding and backfill material so damage to or movement of the pipe is avoided. Backfill and cover materials shall be placed in layers not exceeding 250 mm (10") in thickness, loose measurement. Each layer shall be thoroughly compacted before the next layer is placed. Backfill on each side of the pipe shall be placed simultaneously and at no time shall the levels on each side of the pipe differ by more than 250 mm. Where native backfill is approved to be used the material shall not contain boulders larger than 150 mm or other deleterious material. The Contractor will be required to fully restore all paved driveways with materials of similar type and depths. The Contractor shall neatly saw cut all paved driveways at a distance of 300 mm beyond the edge of the excavated trench and this shall be done immediately prior to final restoration of the paved driveway.

When an access culvert or bridge does not have to be lowered or replaced, the Contractor shall clean it to its full cross sectional area using care to avoid causing damage to it in the process. Where a pipe culvert is to be reset to a new grade, the Contractor shall carefully remove it, clean it to its full cross sectional area and replace it in the drain as specified herein. Where a culvert is to be replaced, the Contractor shall carefully remove the existing pipe from the drain, clean it to its full cross sectional area and leave it on the drain bank unless otherwise specified. Should either the property owner or the Commissioner in charge not require the salvaged pipe then the Contractor shall dispose of the pipe at the Contractors expense.

The helical corrugated steel pipe, when specified shall be installed so that the helix angle is constant for the total length of the installation and each pipe section shall be installed next to the previous section such that the lock seam forms a continuous helix. Riveted corrugated steel pipe, when specified, shall be laid with the inside circumferential laps pointing in the direction of flow. The longitudinal laps shall be located in the upper half of the pipe. Corrugated steel pipe sections shall be joined together by means of a plant manufactured steel coupler. The couplers shall be installed to lap approximately equal portions of pipe sections being connected, such that the corrugations or projections of the coupler properly engage the pipe corrugations.

The Contractor if using a batter board system for establishing the grade of the culvert pipe, shall utilize a minimum of three batter board stakes for each culvert. The Contractor shall ensure that the batter board stakes placed on the grade stakes shall line up, this being done prior to any excavation taking place for the proposed culvert.

Where pipes are scheduled to be moved or replaced the Contractor shall confirm the new location of the culvert pipe with the owner prior to installation. Where the Contractor has excavated a culvert pipe which has been scheduled to be cleaned and reinstalled and it is found that the condition of the existing culvert pipe is not satisfactory to be reused, the Contractor shall immediately notify the Commissioner in charge who will verify the condition of the existing pipe and may instruct the Contractor to supply a new length of corrugated steel pipe.

Where pipes are scheduled to be cleaned and flushed only, the material which is removed from the culvert pipe is to be loaded and hauled away. Over digging of the drain at the downstream end of the culvert to accommodate material flushed from a culvert pipe will not be allowed.

13.0 CUTS

The cuts as shown on the accompanying drawing are to be taken from the ground beside the stakes to the bottom of the finished drain, unless otherwise noted on the drawing.

14.0 DAMAGE TO TRAVELLED PORTION OF MUNICIPAL ROAD

The Contractor will be responsible for any damage caused by him to any portion of the municipal road system, especially to the travelled portion. When excavation work is being carried out and the excavation equipment is placed on the travelled portion of a road, the travelled portion shall be protected by having the excavation equipment placed on satisfactory timber planks or timber pads. If any parts of the travelled portion of the road is damaged by the Contractor, the Municipality shall have the right to have the necessary repair work done by its employees and the cost of all labour and materials used to carry out the repair work shall be deducted from the Contractor's contract and credited to the Municipality.

15.0 SEEDING AND MULCHING

The Contractor shall fine grade the finished surfaces and shall apply hydroseeding and mulch. The seeding and mulching operation shall be carried out according to O.P.S.S. Spec. 572 or as amended herein and the operation shall include the supplying and placing of the following:

- A) Seed Mixture - Creeping Red Fescue - 50%
 - Red Top - 20%
 - Canada Blue Grass - 15%
 - Kentucky Blue Grass - 15%
- B) Nurse Crop - Oats if seeding and mulching is performed during May or June.
 - Annual Rye Grass if seeding and mulching is performed during Sept. or Oct.
- C) Fertilizer - 5-20-10 mixture
- D) Mulch - Wood Cellulose Fibre or Straw
- E) Adhesive - Asphalt Emulsion if straw mulch used
 - Liquid Polyvinyl Acetate if wood fibre mulch used

The application rates shall be as follows:

- A) Grass Seed Mixture - 90 lbs./acre
- B) Fertilizer - 350 lbs./acre
- C) Nurse Crop Seed - 55 lbs./acre
- D) Mulch - 1300 lbs./acre if wood fibre used
- 1" to 2" depth if straw used
- E) Adhesive - 200 imp.gal/acre for Asphalt Emulsion
- 205 lbs./acre for Liquid Polyvinyl Acetate

The seeding and mulching operation shall be only carried out as weather conditions permit during the months of May and June in the Spring, and September and October in the Fall. If the excavation work is carried out during the months of May and June, or September or October, the Contractor has the option of contacting the Drainage Superintendent and if the Contractor receives his written permission, the seed mixture as above specified, may be placed on the excavated side slopes by the Contractor by hand, daily, at the completion of his daily excavation operation. If the Contractor has been given written permission by the Drainage Superintendent to place the seeding mixture by hand daily, at the completion of his daily excavation operation, the Contractor shall be responsible to give the side slopes a rough, harrowed texture prior to placing the seed mixture.

16.0 QUARRIED ROCK

The Contractor shall place quarried rock protection at the areas indicated on the accompanying plans. The quarried rock shall be graded in size from a minimum size of 100 mm (4") to a maximum size of 230 mm (9"). The quarried rock shall be placed 300 mm (12") in thickness on a layer of geotextile filter fabric placed on the bottom of the excavation. The filter fabric shall be "Terrafix 270-R" or equal. The Contractor shall excavate for the quarried rock so that the top of the completed quarried rock protection is level with the adjacent ground.

The Contractor shall remove all trees, brush and debris from the area on which the quarried rock is to be placed. The quarried rock shall be carefully placed by the Contractor at the locations and to the dimensions as shown on the accompanying specifications. The specified filter cloth shall be hand laid and have an overlap of 600 mm (24") and all quarried rock that is to be placed over the filter cloth shall be carefully hand or machine placed so that it does not damage the filter cloth. The filter cloth shall extend up the sides of the trench excavated to accept the quarried rock and the quarried rock shall extend 300 mm (12") above the top of the surface inlet pipe where applicable.

17.0 MAINTAINING FLOW AND EXISTING SEWERS

The Contractor shall support and maintain the flow and existing sewers and house connections and any other drainage works encountered in the progress of the work and at no expense to the owner. The Contractor shall obtain written approval from the engineer to stop up any drain, and if necessary, provide pumping equipment, build necessary by-passes, etc. at no expense to the owner.

18.0 SPECIAL PROVISIONS

The part of the Specifications headed "Special Provisions" which is attached hereto forms part of this Specification and is to be read with it. Where there is any difference between the requirements of this General Specification and those of the Special Provisions, the Special Provisions shall govern.

19.0 REMOVAL OF TREES

Whenever practical, existing trees not scheduled for removal will be preserved. The Contractor shall exercise the utmost caution to ensure that the trees are not damaged or disturbed.

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NOTE: The above General Conditions pertain to the final Contract for construction and will be included in the Tender Documents in their entirety.