

THIS IS EXHIBIT "I" TO THE AFFIDAVIT OF
BLAISE CHEVALIER , SWORN ON THE 2ND DAY OF
APRIL, 2024.

A COMMISSIONER, ETC.

**Linda Marie Kalp, a Commissioner, etc.
Province of Ontario, for the
Municipality of Chatham-Kent.
Expires August 31, 2026.**

EAST BRANCH OF FACEY DRAIN

TOWNSHIP OF ZONE

TODGHAM AND CASE ASSOCIATES INCORPORATED
CONSULTING ENGINEERS
CHATHAM, ONTARIO

79 10 01

TODGHAM AND CASE ASSOCIATES
INCORPORATED
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CHATHAM, ONTARIO
519/354-0400

79 10 01

To the Reeve and Council
of the Township of Zone.

Re: East Branch of Facey Drain.

Gentlemen:

In accordance with your instructions, we have made an examination and survey of the open portion and tile portion of the East Branch of the Facey Drain commencing at the outlet of the open portion into the Facey Drain in the N $\frac{1}{2}$ of Lot 3, Concession 3 and proceeding upstream along the entire length of the open and closed portions to the head of the existing tile at the westerly limit of County Road No. 23 in the S $\frac{1}{2}$ of Lot 8. We have extended our examination and survey of the tile portion of the drain across County Road No. 23, in accordance with your instructions, acting upon the drainage petition by the Kent County Engineer, for the upstream extension of the drain.

A review of the records indicates that the existing tile drain extends from its head at the west limit of County Road No. 23 in the S $\frac{1}{2}$ of Lot 8 (Station 20) to its outlet into the open portion of the drain at the line between Lots 6 and 7. The largest part of this tile drain was installed under a report by the late George A. McCubbin dated June 3, 1937. At that time approximately 150 m of 150 mm (6") diameter tile, 180 m of 180 mm (7") diameter tile and 425 m of 200 mm (8") diameter tile were installed from the west limit of County Road No. 23 to the middle of the S $\frac{1}{2}$ E $\frac{1}{2}$ of Lot 7, Concession 3 (Station 20 to Station 722). The remainder of the existing tile was installed under a report by this office dated September 23, 1969. At that time the existing tile drain was extended downstream across the remainder of Lot 7 by the installation of 350 mm (14") diameter tile. The remainder of the East Branch of the Facey Drain from the outlet of the tile drain at the line between Lots 6 and 7 downstream to its outlet into the Facey Drain in the N $\frac{1}{2}$ of Lot 3, Concession 3, consists of an open drain. A review of the records indicates that the last work of repair and improvement on the open portion of the drain was done under a report by this office dated September 23, 1969.

At that time, the open portion of the East Branch of the Facey Drain was repaired and improved from its outlet into the Facey Drain, upstream to the line between Lots 6 and 7 by carrying out a substantial deepening of the drain. The remainder of the open drain across the S½ of Lot 7 was enclosed at that time, by the installation of 350 mm (14") diameter tile. In addition, the necessary farm culvert construction was carried out throughout the length of the work.

Since the last work of repair and improvement, the open portion of the East Branch has become obstructed with brush, weeds, bars and sediment to a point where it no longer provides adequate drainage to the lands that it is intended to serve. We, therefore, recommend that the open portion of the East Branch of the Facey Drain be repaired and improved by means of deepening and widening along its entire length and the necessary farm culvert construction throughout the length of the work.

During our examination of the tile portion of the East Branch of the Facey Drain, we found that the existing 150 mm (6") diameter tile in Lot 8 was substantially filled with silt which caused considerable water pressure in the tile. In addition, we examined the location where the tile portion of the East Branch is immediately adjacent to the west limit of County Road No. 23. We found a large pond of water on each side of the road and that the road ditches were filled with water. There was no evidence that water was draining away, at all. We, therefore, recommend that the tile portion of the East Branch of the Facey Drain be repaired and improved to have a capacity to remove approximately one-half inch of runoff per acre per 24 hours from the area to be served by the tile. Due to the poor condition of the existing 150 mm (6") diameter tile in Lot 8 and the age of the 150 mm (6"), 175 mm (7") and 200 mm (8") tile installed under the report by the late George A. McCubbin, we recommend that the section of tile drain from Station 20 to Station 722 be abandoned and replaced with a new tile drain capable of conveying the entire design flow of one-half inch of runoff per acre per 24 hours. In order to achieve the recommended capacity at the gradient available, we recommend that the new tile be at least 250 mm (10") diameter from Station 20 to Station 155, 300 mm (12") diameter from Station 155 to Station 500 and 350 mm (14") diameter from Station 500 to Station 722. The existing 350 mm (14") diameter tile in the S½E½ of Lot 7, Concession 3 (Station 722 to the line between Lots 6 and 7) is of sufficient capacity and appears to be in good working order and therefore requires no work at this time. We would further recommend that the new tile be installed parallel to the existing tile but far enough away from it to avoid damaging it and that the existing tile and new tile be cross-connected near Station 500. In this manner, the maximum utilization of the existing tile drain will be achieved.

In addition, we recommend that the East Branch of the Facey Drain be extended across County Road No. 23 to its east limit by installing 300 mm (12") diameter corrugated steel pipe across the road allowance and that a catch basin be installed on each side of the road.

Attached to this report and labelled "Schedule C" is our Drawing No. 78076 which consists of a plan showing the location of the proposed work marked in a heavy solid line and the lands affected by the work outlined in a heavy dashed line, together with a profile for the work that we recommend. Also attached and labelled "Schedule B" is a specification showing the dimensions, grades, disposal of material and other particulars of the work to be carried out.

In general terms, the proposed work on the open portion of the drain involves deepening of the drain by varying amounts up to 0.39 m as well as the necessary farm culvert construction along the length of the work. The proposed work on the tile portion of the drain involves the installation of 250 mm (10"), 300 mm (12") and 350 mm (14") diameter tile, the upstream extension of the drain across County Road No. 23 and the installation of two catch basins on County Road No. 23. Upon completion, the tile portion of the drain will have the capacity to remove approximately one-half inch of runoff per acre per 24 hours from the area served by the tile. The invert of the proposed tile drain will be installed at or slightly lower than the invert of the existing tile. In addition, the tile portion of the East Branch and all private tiles entering the open portion of the drain will have at least 0.30 m of freeboard beneath their inverts.

Throughout the length of the work, the excavated material is to be disposed of as set out in the Special Specifications. In accordance with Sections 29 and 30 of The Drainage Act, we determine the amounts to be paid to the owners for damages to lands and crops (if any) occasioned by the construction of the drainage works and by the disposal of material, to be as shown in the following Schedule of Allowances under the heading "Damages".

SCHEDULE OF ALLOWANCES

<u>Con.</u>	<u>Lot</u>	<u>or</u>	<u>Part</u>	<u>Owner</u>	<u>Damages</u>
3	Pt. Lot 4 E of Rwy.				
	& Pt. Lot	3		Paul Sweet	²⁰ \$ 365.00
	Pt. Lot 4 E of Rwy.				
	& Pt. Lot	3		^{Joe Park} Shirley Properties	585.00 240.00
	Pt. W of Rwy.	5		Martin Featherstone	380.00
	S $\frac{1}{2}$ E $\frac{1}{2}$ ex. Rwy.	6		M. Stacho Croeymeersch	260.00
	N $\frac{1}{2}$ ex. cor.	6		Earl Benjamin Est.	180.00
	S $\frac{1}{2}$ E $\frac{1}{2}$ ex. cor.	7		Cleata-Elliott C. Shaw	80.00
	N $\frac{1}{2}$ E $\frac{1}{2}$	7		M. Stacho D. Vandeween	140.00
	S $\frac{1}{2}$ E $\frac{1}{2}$	8		M. Stacho D. Vandeween	55.00
					<u>\$1700.00</u>

We estimate the cost of the work that we recommend, together with the expenses incidental thereto, to be as follows:

	1900 m ³ Excavation and Levelling	\$ 5600.00
	End Walls for Culvert	450.00
443	135 m of 250 mm (10") dia. tile - Supply	425.00
	- Install	600.00 ✓
1150	345 m of 300 mm (12") dia. tile - Supply	1375.00
	- Install	1850.00 ✓
750	222 m of 350 mm (14") dia. tile - Supply	1175.00
	- Install	1425.00 ✓
	18 m of 300 mm (12") dia. CSP	
	road crossing - Supply	300.00
	- Install	750.00 ✓
	2 Catch Basins	1000.00 X
	Allowances under Sections 29 and 30	1700.00
	Survey, Plans, Report and Inspection	2725.00
	Assistance and Expenses	375.00
	Incidentals and Contingencies	750.00
		<u>\$20500.00</u>

We assess the above estimated cost against the lands and roads as shown in the attached Schedule of Assessment labelled "Schedule A".

Under the provisions of The Railway Act, the Canadian Pacific Railway has the right to carry out the work on its property within a reasonable time. If it elects to do so, it must advise the Township before the calling of tenders so that the work will be deleted from the work of the excavating contract. If the Railway elects to carry out the excavation of the East Branch

within its right-of-way and the cleaning of the concrete culvert and the steel pipe culvert on the East Branch at this Railway crossing, the municipality will pay the sum of \$150.00 to the Railway.


We have estimated the value of benefit derived by the construction of end walls on the existing culvert near Station 10 in the N $\frac{1}{2}$ of Lot 3, Concession 3. This amount is shown as a Special Benefit charged against the affected property in addition to the regular drainage assessment against this property.

We have estimated the increase in cost of the drainage works related to the installation of corrugated steel pipe and placement of granular materials across County Road No. 23 and for the repair of the asphalt roadway. Of the total estimated cost of \$20,500.00, we estimate that \$1,200.00 is directly attributable to the additional work involved in crossing the road. This increase in cost is assessed against the County of Kent as owner of County Road No. 23, under Section 26 of The Drainage Act, 1975, in addition to the normal drainage assessments against the road.

After completion, the East Branch of the Facey Drain and the farm culverts along the length of the work are to be maintained by the Township of Zone at the expense of the lands and roads herein assessed and in the same relative proportions subject, of course, to any variations that may be made under the authority of The Drainage Act. For the purpose of maintenance, the amounts assessed for Special Benefit shall be deleted from the assessment schedule.

Since most of the privately-owned lands are used for agricultural purposes and no lateral drains are involved in the work, we recommend that application be made to the Ministry of Agriculture and Food in accordance with Section 88 of The Drainage Act, for a grant payable under Section 85 of this Act, as well as for all other grants for which this work may be eligible.

Respectfully submitted,



H. H. Todgham,
B.A.Sc., O.L.S., P. Eng.

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"SCHEDULE A"
SCHEDULE OF ASSESSMENT
FACEY DRAIN EAST BRANCH
TOWNSHIP OF ZONE

1. PUBLICLY-OWNED LANDS:

(iii) Municipal:

	<u>Owner</u>	<u>Benefit</u>	<u>Special Benefit</u>	<u>Outlet</u>	<u>Total Assessment</u>
County Road No. 23	County of Kent	\$ 1150.00	\$1200.00	\$ 415.00	\$ 2765.00
5-6 Sideroad	Township of Zone	175.00	-	110.00	285.00
Total on Publicly-Owned Lands		\$ 1325.00	\$1200.00	\$ 525.00	\$ 3050.00

2. PRIVATELY-OWNED LANDS:

(i) Not used for agricultural purposes:

<u>Con.</u>	<u>Lot or Part</u>	<u>Area Affected (Acres) (Hectares)</u>	<u>Owner</u>	<u>Benefit</u>	<u>Special Benefit</u>	<u>Outlet</u>	<u>Total Assessment</u>
3	Pt. S $\frac{1}{2}$ E $\frac{1}{2}$ 7	1 0.41	L. Myers	-	-	\$ 25.00	\$ 25.00
	Pt. 3, 4 & 5	14 5.67	Canadian Pacific Railway	\$ 300.00	-	315.00	615.00
Total on Privately-Owned Non-Agricultural Lands				\$ 300.00		\$ 340.00	\$ 640.00

(ii) Used for agricultural purposes:
(Excluding A.R.D.A. Lands)

<u>Con.</u>	<u>Lot or Part</u>	<u>Area Affected (Acres) (Hectares)</u>	<u>Owner</u>	<u>Benefit</u>	<u>Special Benefit</u>	<u>Outlet</u>	<u>Total Assessment</u>
3	Pt. Lot 4 E of Rwy & Pt. Lot 3	27 10.9	Paul Sweet	\$ 325.00	\$ 225.00	\$ 65.00	\$ 330.00
	Pt. Lot 4 E of Rwy & Pt. Lot 3	31 12.5	Shirley Properties Jox Park 663	275.00	-	105.00	665.00
	Pt. W of Rwy 4	30 12.1	Harvey Shaw	135.00	-	110.00	380.00
	E $\frac{1}{2}$ 4	25 10.1	T. Snobelen Est.	100.00	-	50.00	245.00
	Pt. W of Rwy 5	63 25.5	Martin Featherstone	1200.00	-	610.00	150.00
	Pt. E of Rwy 5	30 12.1	G. McDonald	100.00	-	205.00	1810.00
	S $\frac{1}{2}$ E $\frac{1}{2}$ ex. Rwy. 6	40 16.2	Mc. Stacho Crae macrae	800.00	-	615.00	305.00
	N $\frac{1}{2}$ ex. cor. 6	35 14.2	Earl Benjamin Est.	850.00	-	675.00	1415.00
	S $\frac{1}{2}$ E $\frac{1}{2}$ ex. cor. 7	34 13.8	Cleata Elliot C. Shaw	1800.00	-	770.00	1525.00
							2570.00

2. PRIVATELY-OWNED LANDS: Continued

(ii) Used for agricultural purposes:
(Excluding A.R.D.A. Lands)

Con.	Lot or Part		Area Affected (Acres) (Hectares)		Owner	Benefit	Special Benefit	Outlet	Total Assessment
3	N $\frac{1}{2}$ E $\frac{1}{2}$	7	40	16.2	M. Stacho D. Vandeween	\$ 2900.00	-	\$ 1440.00	\$ 4340.00
	S $\frac{1}{2}$ E $\frac{1}{2}$	8	20	8.1	M. Stacho D. Vandeween	1550.00	-	985.00	2535.00
4	W $\frac{1}{2}$	8	10	4.0	H. Case	400.00	-	520.00	920.00
Total on Privately-Owned Agricultural Lands						\$10435.00	\$ 225.00	\$ 6150.00	\$16810.00
Total on Privately-Owned Lands.						\$10735.00	\$ 225.00	\$ 6490.00	\$17450.00
TOTAL ASSESSMENT.						<u>\$12060.00</u>	<u>\$1425.00</u>	<u>\$ 7015.00</u>	<u>\$20500.00</u>

Estimated amount of grant under Section 85 of The Drainage Act \$5603.33

Chatham, Ontario,
79 10 01

H. H. Todgham

H. H. Todgham,
B.A.Sc., O.L.S., P. Eng.



"SCHEDULE B"

SPECIFICATION FOR THE REPAIR, IMPROVEMENT AND EXTENSION
OF THE EAST BRANCH OF THE FACEY DRAIN
IN THE TOWNSHIP OF ZONE

This specification and the report, plan and profile bearing the same date, apply to and govern the installation of approximately 135 m of 250 mm, 345 m of 300 mm, and 222 m of 350 mm diameter tile together with the repair and improvement of approximately 2466 m of open drain and the necessary farm culvert construction along the length of the open portion of the drain. Also included is the upstream extension of the tile portion of the drain across County Road No. 23 and the installation of 2 catch basins.

DESCRIPTION
OF WORK

The General Specification for Tile Drains and the General Specification for Open Drains both of which are attached hereto form part of this specification and are to be read with it. Where there is any difference between the requirements of the General Specifications and those of the Special Provisions which follow, the Special Provisions shall govern. The section numbers shown in the Special Provisions which follow refer to the sections having the same numbers contained in the General Specifications.

GENERAL
SPECIFICA-
TIONS

SPECIAL PROVISIONS - TILE PORTION

Stakes are set at 25 m intervals commencing at Station 0 on the east limit of County Road No. 23 and proceeding downstream along the course of the work.

SECTION 2
STAKES

Throughout the length of the work, the tile is to be installed on one side or the other of the existing tile drain. The new tile is to be installed parallel to the existing tile but far enough away from it to avoid damaging it. The final alignment shall be satisfactory to the Commissioner in charge. At the downstream end, the Contractor shall gradually swing the alignment of the new tile over to connect to the existing 350 mm diameter tile at Station 722.

SECTION 3
ALIGNMENT

The design grade line of the tile is set to match the invert elevation of the existing 350 mm tile at Station 722. The Contractor will use extreme care to ensure that no reverse grade occurs when connecting to the existing 350 mm tile.

SECTION 4
PROFILE

SECTION 11
CONNECTIONS

After the Tile Contractor has connected the outlet end of the new tile into the existing 350 mm diameter tile near Station 722, he will be required to connect the existing 200 mm diameter municipal tile which is abandoned under this report, into the new main as well as all intercepted private lateral tiles. This work will be performed in accordance with Section 11 of the General Specification for Tile Drains.

SECTION 12
CONSTRUCTION
IN SANDY
SOILS

Where fine sandy soil is encountered, the Commissioner shall supply at the expense of the drain, a suitable type of synthetic filter material to be used to wrap the tile in order to prevent fine soils from entering the drain. The Contractor shall install this filter material as part of his work.

SECTION 16
ROAD CROSS-
ING

Where the new drain crosses County Road No. 23, the Contractor will be required to install 18 m of 300 mm (12") diameter corrugated steel pipe, 16 gauge, between the catch basins at Station 0 and Station 20. The Commissioner will supply, as an expense to the drain, all necessary pipe and granular materials for bedding and backfill. The Contractor will install the pipe and restore the road, complete as specified herein, as part of his work.

The Contractor will carefully cut the pavement where the drain crosses the County Road in order to minimize damage to it. The foundation bed shall be excavated true to line and grade with the trench width 0.6 m wider than the diameter of the pipe and the side walls excavated vertically. The new pipe shall be installed on a 0.10 m bed of Granular "B" material. The Contractor will then backfill the trench for the full width of the pavement plus 1.25 m on each side, using Granular "B" material. The granular material is to be placed in layers not exceeding 0.30 m in thickness and is to be thoroughly compacted with a mechanical vibrating compactor. The top 0.30 m of the trench for the width of the pavement plus 1.25 m on each side is to be filled with Granular "A" material. It is to be placed in layers not greater than 0.15 m in depth and is to be thoroughly compacted with a vibrating compactor. All granular material required for backfill shall meet the gradation and physical requirements of M.T.C. Specification Form 314.

The excavated material from the trench beyond a point 1.25 m from the edge of the pavement may be used for backfilling purposes for these sections of trench. This material is to be placed in layers not

greater than 0.30 m in thickness and is to be compacted either by hand tamping or by the use of a vibrating compactor.

Following the work of backfilling the trench across the pavement and shoulders, the Contractor will place a patch using a cold mix asphalt of a standard acceptable to the County, for the full width of the pavement. This patch is to be at least 0.10 m in thickness and is to be carefully placed and tamped so that it will be as level as possible with the adjoining pavement.

The Contractor will be required to provide suitable warning signs and he shall make every effort to keep the road open to traffic by use of a flagman to direct vehicles around the site of the work. If it is necessary to close the road to through traffic, the Contractor shall provide for an adequately signed detour route.

The Contractor shall notify in writing the Engineer of the County at least 7 days prior to commencement of any work on the County Road Allowance. No labour, equipment or materials for the construction of the road crossings will be supplied by the County.

The Commissioner will arrange for the construction of a catch basin at Station 0 along the east limit of County Road No. 23 and near Station 20 along the west limit of County Road No. 23. The catch basins shall be constructed within the limits of the County Road Allowance and immediately adjacent to the road limits. The catch basins shall be 2'x2' Ministry of Transportation and Communications Style Ditch Inlet Catch Basin Standard DD-716-A or approved equal.

SECTION 19
NEW CATCH
BASINS

From Station 20 to Station 722, the designated working corridor for the tile contractor's equipment shall be restricted to an area which is 10 m wide centred along the proposed final alignment of the tile. In addition, the Commissioner, in consultation with the owner of the S½ E½ of Lot 7, Concession 3, shall designate in the field an access corridor for use by the Contractor. This access corridor, having a width of 6 m, shall provide access from the downstream limit of the tile work to the head of the open drain (Station 722 of the tile to the line between Lots 6 and 7).

SECTION 25
WORKING
CORRIDOR

SPECIAL PROVISIONS - OPEN PORTION

SECTION 2
STAKES

Stakes are set at 25 m intervals along the course of the open portion of the East Branch of the Facey Drain. The stakes commence at Station 0 at the outlet of the drain into the Facey Drain in the N $\frac{1}{2}$ of Lot 3, Concession 3 and proceed upstream to Station 2466 at the head of the open portion of the drain at the line between Lots 6 and 7.

SECTION 4
PROFILE

The design grade line of the East Branch is such that it is at or slightly above the invert elevations of the farm culverts at Stations 10 and 1925, the culvert beneath the 5-6 Sideroad and the steel pipe culvert beneath the Canadian Pacific Railway tracks. The Excavation Contractor shall take extreme care in excavating the drain upstream of these culverts so that over-excavation of the drain does not take place which would result in ponding of water upstream of these culverts.

SECTION 5
BOTTOM WIDTH
AND SIDE
SLOPES

Where the existing bottom widths and side slopes of the drain are sufficient to permit the specified deepening of the drain without disturbing the existing banks above the present drain bottom, the Contractor shall take extreme care to avoid any unnecessary disturbance to the existing drain banks.

SECTION 8
DISPOSAL OF
MATERIAL

From Station 0 to Station 2075, the excavated material is to be deposited and spread on the immediately adjacent farm lands on either or both sides of the drain as directed by the Commissioner in consultation with the owners. No excavated material shall be placed on the Railway property.

From Station 2075 to Station 2150, the excavated material is to be deposited and spread on the immediately adjacent farm lands to the south.

From Station 2150 to Station 2466, the excavated material is to be deposited and spread on the immediately adjacent farm lands on either or both sides of the drain as directed by the Commissioner in consultation with the owners.

Where excavated material is deposited in bush, it shall be deposited and levelled in the form of a spoil bank in accordance with the General Specifications for Open Drains, but in no case shall the top of this spoil bank be more than 0.60 m above the natural ground level. Where there is an existing spoil bank along the

side of the drain on which the excavated material is to be disposed of, the excavated material shall be deposited and spread on the side of the spoil bank farthest away from the drain.

Where the East Branch crosses beneath the 5-6 Sideroad at Station 1700, the Contractor will be required to clean the existing 36 inch diameter culvert to its full cross-sectional area using care to avoid damaging it in the process.

SECTION 10
ROAD
CROSSING

The Contractor will perform the following culvert construction in accordance with Sections 11 and 12 of the General Specifications.

SECTION 11
FARM CULVERTS

At Station 10 - The existing 34 foot length of 54 inch diameter corrugated steel pipe is of sufficient depth and capacity and therefore only requires cleaning by the Contractor.

At Station 1925 - The existing 30 foot length of 36 inch diameter corrugated steel pipe is of sufficient depth and capacity and therefore only requires cleaning by the Contractor.

At Station 2280 - The Contractor is required to lower the existing 32 foot length of 36 inch diameter corrugated steel pipe using extreme care to avoid damaging it in the process. The Contractor will carefully remove the pipe, clean it to its full cross-sectional area and replace it in the drain with its invert 4 inches below the design grade line of the drain.

Unless otherwise directed by the Commissioner, the Excavation Contractor will be required to clean to their full cross-sectional areas, the existing concrete culvert and the 30 inch diameter steel pipe culvert beneath the Canadian Pacific Railway tracks at Station 995 of the East Branch. The Contractor shall take extreme care in working through or around these structures to avoid causing damage of any kind to them in the process of cleaning them out.

SECTION 14
RAILWAY

The Commissioner will arrange for the construction of end walls on the existing farm culvert at Station 10. The culvert end walls are to be built from bags of cement and sand mixed in the proportions of one part cement to five parts sand. Any alternative products for end wall construction must be approved by the Engineer prior to installation. The walls are to be placed as shown on the standard

SECTION 19
CULVERT END
WALLS

drawing labelled "Farm Culvert Installation Standard Circular and Pipe-Arch Corrugated Steel Pipe" which is attached to this specification.

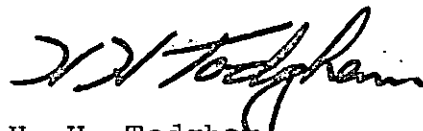
SECTION 20
WORKING
CORRIDOR

From Station 0 to Station 2075, the designated working corridor for the Contractor's equipment shall be on the same side of the drain on which the excavated material is to be disposed of. The width of the corridor measured from the adjacent finished top of drain bank shall be restricted to the specified spreading width of the excavated material on that side of the drain plus 2 m. In any event, the minimum width of the working corridor measured from the adjacent finished top of drain bank shall be 8 m.

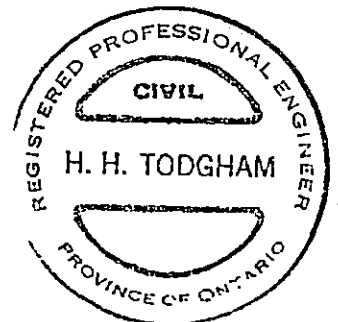
From Station 2075 to Station 2150, the designated working corridor for the Contractor's equipment shall be on the same side of the drain on which the excavated material is to be disposed of. The width of the corridor measured from the centre line of Lot 6 shall be restricted to the specified spreading width of the excavated material on that side of the drain plus 2 m. In any event, the minimum width of the working corridor measured from the centreline of Lot 6 shall be 8 m.

From Station 2150 to Station 2466, the designated working corridor for the Contractor's equipment shall be on the same side of the drain on which the excavated material is to be disposed of. The width of the corridor measured from the adjacent finished top of drain bank shall be restricted to the specified spreading width of the excavated material on that side of the drain plus 2 m. In any event, the minimum width of the working corridor measured from the adjacent finished top of drain bank shall be 8 m.

Chatham, Ontario,
79 10 01



H. H. Todgham
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GENERAL SPECIFICATION FOR TILE DRAINS

(1) Tenders will be received and contracts awarded only in the form of a lump sum for the completion of the whole work or of specified sections thereof in accordance with the plan, profile and specification. No bid will be considered, nor will any contract be awarded, on the basis of classification or of unit prices. Contractors must estimate for themselves the quantity and value of the work required. They are expected to examine the locality and also the plan, profile and specification; they will be at liberty, before bidding, to examine any data in the possession of the Municipality or of the Engineer.

SECTION 1 GENERAL CONDITIONS

(2) All the work included in any contract must be completed on or before the date fixed at the time of letting and must, at the time of completion and final inspection, be in first class condition and comply fully with the specification. Final inspection will be made by the Commissioner or Engineer within twenty days after the Commissioner has received notice in writing from the Contractor that the work is completed, or as soon thereafter as weather conditions permit.

(3) Contractors will be held liable for any damages or expenses occasioned by their failure to complete the work on time and for any expenses of inspecting, superintending, reletting or restaking due to their neglect or failure to prosecute the work satisfactorily or to do it properly, also for any damages occasioned by leaving fences open or by any negligence in carrying on the work. Any such expenses or damages may be deducted by the Commissioner from the amount of the contract or may be recovered by the Municipality from the Contractor and his sureties.

(1) Stakes are set one hundred feet apart along the course of the work, numbered consecutively 0, 1, 2, 3, etc. The depths of the drain, as shown on the profile, are measured from the surface of the ground beside the stakes to the invert of the tile.

SECTION 2 STAKES

(2) Contractors will be held responsible for the preservation of stakes in their original positions during the progress of the work and also for seeing that bench marks are not destroyed, defaced, or covered with excavated material.

(1) The tile will follow the course shown on the plan and marked on the ground by the numbered stakes.

SECTION 3 ALIGNMENT

- (2) Unless changes in direction are made at catch basins, manholes, or by the use of manufactured bends or fittings, they shall be made by a smooth curve in the trench on a radius of curvature so that the trenching machine can dig and still maintain grade.
- (3) The alignment of the finished work must be satisfactory to the Commissioner in charge.

SECTION 4
PROFILE

- (1) The tile is to be laid so that its invert will be at the grade line shown on the profile, which grade line is governed by the bench marks. The profile shows, for the convenience of Contractors and others, the approximate depths to be measured from the surface of the ground to the invert of the tile, at each of the numbered stakes, as observed at the time of survey, but bench marks govern.
- (2) The "as-constructed" grade shall be such that each part of the completed drain will provide the capacity required for the area which it drains.
- (3) No reverse grade shall be allowed.
- (4) A variation in grade may be tolerated where the actual capacity of the drain exceeds the required capacity. "As-constructed" grade shall not deviate from the grade line more than 15% of the internal diameter for drain sizes 8 inches or less, or 10% of the internal diameter for sizes greater than 8 inches. These deviations are allowable, provided they are gradual over a distance of not less than 30 feet.

SECTION 5
OBSTRUC-
TIONS

- (1) All brush, timber, logs, stumps, stones or other obstructions in the course of the drain are to be removed to a sufficient distance to be clear of the work.

SECTION 6
BRUSH &
TREES

- (1) All brush and small trees having a diameter less than 6 inches, growing within 15 feet on each side of the drain are to be cut off flush with the ground surface and all of their roots within 10 feet of the tile are to be grubbed out.
- (2) All brush, trees and stumps that are removed are to be put into piles by the Contractor, in locations where they can be safely burned, and are to be burned by him. If, in the opinion of the Commissioner, any of the piles are too wet or green to be burned, he will so advise the Contractor who may then arrange, to the Commissioner's satisfaction, an agreement with the owners where the piles are located, for them to burn the material when dry enough.
- (3) Since the trees and brush that are cut off flush with the earth surface may sprout new growth later, it is strongly recommended that the Township make arrangements for spraying this new growth at the appropriate time so as to kill the trees and brush.

SECTION 7
FENCES

- (1) Where the Contractor finds it necessary to remove any fences in order to permit the installation of the drain or the removal of brush and the grubbing of roots, he will be required to use reasonable care in handling the fencing material and will re-construct the fences in as good condition as that in which they are found, or as the old material permits.
- (2) The Contractor is not to leave any fences open when he is not at work in the immediate vicinity.

SECTION 8
TILE

- (1) Unless otherwise specified, all tile is to be furnished at the site of the work, by the Municipality, and its cost charged as part of the cost of the drain.
- (2) It is to be first class agricultural tile, either clay or cement. Cracked, chipped or uneven tile will not be acceptable and are to be discarded by the Contractor.
- (3) Standard Clay Drain Tile shall meet all American Society for Testing and Materials specifications as set out in Designation C4-62 (Clay Drain Tile).
- (4) Concrete Drain Tile shall meet the specifications as set out in American Society for Testing Materials Designation C412-65.

SECTION 9
EXCAVATION
OF TRENCH

- (1) Construction of the trench shall normally start at the outlet and proceed upgrade.
- (2) Minimum width of trench, measured at the top of the tile, shall be equal to the outside diameter of the tile plus approximately 6 inches, to permit proper soil placement around the tile, or the tile shall be embedded in a 120° circular groove.
- (3) The bottom of the trench shall be cut accurately to the grade line. It shall be smooth with a groove along the bottom center line to guide tile alignment. If a circular groove is used, it shall conform closely in shape to the outside diameter of the tile.
- (4) If the trench is excavated below grade for any reason, it shall be filled above the grade line with gravel or well-pulverized soil, tamped to provide a firm foundation. Then, the bottom of the trench shall be reshaped to the proper grade line.
- (5) When rock is encountered at grade level, the trench shall be excavated approximately 3 inches below grade level and filled to the proper grade line as described in paragraph (4).

- (6) Where the depth of the drain exceeds the working depth of the trenching machine, the Contractor shall excavate the top portion of the trench to a suitable depth and width so that the trenching machine can be operated within its depth range. The top-soil is to be separated from the sub-soil and during the backfilling operation it shall be replaced as the top layer.

SECTION 10
LAYING
PIPE

- (1) When the trench bottom is unstable, a stabilizing material shall be placed before laying the tile.
- (2) Laying of tile shall normally begin at the lower end of the drain and progress upgrade. It is preferable that the tile be laid inside the shoe casting of the drainage machine during the trenching operation.
- (3) Tiles shall be laid in the groove with close joints on a firm bed, free of loose soil and to the grade line of the profile.
- (4) All soil or debris in the tiles shall be removed before installation.
- (5) All tiles shall be free from clinging wet or frozen material that would hinder the laying of the tile on grade.
- (6) The upper end of all tile runs shall be closed tightly with an end plug.
- (7) Before work is suspended for the day, all tiles laid in trenches shall be blinded and any open tile ends closed.

SECTION 11
CONNECTIONS

- (1) Intercepted lateral tiles shall connect with the main drain tiles so that their center lines intersect.
- (2) Existing drains shall be inspected by the Commissioner and if found to be in working order, they shall be connected to the new system. Drains containing very little sediment shall be directly connected and drains containing substantial quantities of sediment shall be indirectly connected through filter material.
- (3) Drains carrying sewage or farmstead wastes shall not be connected to the drainage system.
- (4) Plastic tubing connections to rigid drain tile shall be made with manufactured plastic adaptors.
- (5) Manufactured "T", "Y", or elbow fittings shall be used for connections at the junction of two drains.
- (6) All connections will be made by the Contractor as part of his work in installing the drain.

SECTION 12
CONSTRUCTION
IN SANDY
SOILS

- (1) In fine sandy soil all joints shall be covered with glass fiber sheet, or other durable material, to prevent fine soil from entering the drain.
- (2) In fine sandy soil where the trench bottom is unstable, (e.g. quicksand) extreme care shall be taken to keep soil from entering the drain and to provide a firm foundation for the tile. One or more of the following recommended practices shall be used:

Construct the drain when the soil is in the driest condition.

Construct a trench and allow the area to drain.

Backfill the trenches and lay pipe in a new trench.

Use stabilizing material under the pipe, such as coarse gravel or stone or timber planks.

Use a filter material, such as glass fiber sheet, to cover the water inlet area.

Use perforated continuous pipe.

- (3) Drainpipes shall be laid in the trench and the trench backfilled as quickly as possible.
- (4) These special construction requirements are considered to be extra work and the Commissioner will make arrangements with the Contractor to have them carried out.

- (1) As the laying of tile progresses, the tiles shall be blinded by placing crumbly soil, preferably topsoil, around the tiles to a minimum depth of 3 inches above the top of the tiles. Where the tiles may be subject to frost before being backfilled, the minimum depth of blinding shall be 6 inches.

SECTION 13
BLINDING

- (2) Large stones and frozen lumps of soil will not be permitted in the blinding material.
- (3) On steep grades, or where the topsoil contains fine sand, loam or clay soil (if available from the sides of the trench) shall be used as blinding material.
- (4) Where nondegradable filter material is unavailable, vegetative material such as grass, hay, straw or ground corn cobs may be used.

- (1) After the Commissioner has inspected the laying of the tile, earth excavated from the trench shall be used as backfill material and shall be heaped above the trench to avoid depressions following settlement.

SECTION 14
BACKFILLING

- (2) Large stones, roots, broken tile and other material likely to impede or damage field equipment shall be removed from the backfill and placed in a suitable disposal area.
- (3) To avoid the danger of damaging the tile, large stones and frozen lumps of soil shall not be dropped into the trench.
- (4) Surplus soil shall be spread over the adjacent field.
- (5) Except at laneways and road crossings, backfill material shall not be compacted; compaction should be allowed to occur naturally.

SECTION 15
LANE AND
DRIVEWAY
CROSSINGS

- (1) When called for in the Special Provisions, the Commissioner will supply, at the expense of the drain, corrugated steel pipe in place of tile for installation beneath farm lanes and private driveways. The Contractor will place the pipe as part of his work.
- (2) The pipe shall be laid in the trench with its invert at the grade line of the drain. Each end will be connected to the tile in a water-tight manner.
- (3) Unless otherwise specified, the bedding and backfill to the pipe will be native earth from the excavation. However, where driveways have a gravel surface, the Commissioner will supply granular materials for the Contractor to place as the upper layer of backfill to restore the driveway to its original condition.
- (4) The backfill will be carefully placed in the trench so as not to disturb the pipe. It will be carried to the top of the trench in thoroughly compacted 8" layers.

SECTION 16
ROAD
CROSSING

- (1) At road crossings, the Commissioner will supply, at the expense of the drain, corrugated steel pipe in place of tile for installation beneath the travelled part of the road. The Commissioner will also supply, at the expense of the drain, all necessary granular materials for bedding and backfill. The Contractor will install the pipe, complete, as part of his work.
- (2) The trench shall be excavated true to line and grade having a maximum width of 2 feet wider than the outside diameter of the pipe with vertical side walls. It shall be excavated to a depth to provide for 4 inches of granular bedding below the bottom of the pipe.
- (3) The pipe shall be laid with its invert at the grade line of the drain and with the inside circumferential laps pointing downstream. The supplied lengths of pipe shall be joined by means of "Standard Coupler Bands" installed to provide a water-tight connection.

- (4) Granular backfill will be placed in the trench below the travelled portion of the road, with excavated material used for backfill across the ditch areas. The granular material shall be placed in 6 inch layers up to the level of the adjoining roadway. Each layer shall be compacted to 100% proctor density before the succeeding layer is placed.

- (1) Where the new tile follows the course of an existing tile drain, the Contractor will locate the existing tile, before commencing work and will clearly mark it. He will then exercise reasonable care to avoid disturbing this existing tile.

SECTION 17
EXISTING
TILE DRAIN

- (1) Where a drain discharges into an open outlet, the Contractor will install a length of steel pipe supplied by the Commissioner at the expense of the drain, in place of tile. The Commissioner will also supply for installation by the Contractor a removable wire mesh grating to be attached to the end of the pipe. Grate openings shall not exceed 1 inch.

SECTION 18
TILE
OUTLET

- (2) The outlet pipe shall be installed as soon as the trench is excavated and shall extend to the toe of the slope of the open ditch.

- (3) Backfill for the outlet pipe shall be suitable excavated material placed and compacted in 6 inch layers up to the level of the adjoining ground.

- (4) The joint between the tile and the outlet pipe shall be sealed with concrete in a water-tight manner.

- (1) The Commissioner will arrange for the construction of concrete catch basins, at the expense of the drain, at the locations shown on the plan and profile and set out in the Special Provisions.

SECTION 19
NEW CATCH
BASINS

- (2) Concrete used for the catch basins is to be made from clean, well-graded gravel and fresh cement in the proportions of 5 parts of gravel to 1 part of cement. If ready-mix concrete is used, the class of concrete shall be 3,000 p.s.i. Clean water only is to be used and the concrete is to be well mixed before being placed in the forms.

- (3) The catch basin builder will provide and install removable steel or cast iron grating covers having an opening at least 24 inches square.

- (4) The elevation of the top surface of the catch basin cover is to be determined by the Commissioner and is to be such as to permit the entry of surface water into the basin, unless otherwise specified.

- (5) The connections of the drain into the catch basin are to be made in a neat and workmanlike manner and they are to be sufficiently tight as to allow no water to pass through around the outside of the drain.
- (6) Unless otherwise specified, cast-in-place catch basins are to measure 24 inches square inside the walls. They shall have 6 inch thick walls and floors with the floors being at least 2 feet below the bottom of the tile.
- (7) If, in the opinion of the Commissioner, a precast concrete catch basin will be less expensive and will be equally as satisfactory as one that is cast-in-place, the Commissioner may arrange for the substitution of a precast catch basin so long as it generally complies with this specification.

SECTION 20 UTILITIES

- (1) Before commencing work, the Contractor will investigate the location of any and all utility lines, pipes or cables which may interfere with the installation of the tile or the construction of the catch basins.
- (2) He shall take all necessary steps to avoid damaging these and, should any damage result to them from his operations, he will be completely responsible for these damages, and will save harmless the Township and the Engineer from any legal actions which may arise as a result of such damage.

SECTION 21 PROTECTION OF PUBLIC

- (1) Where the Contractor is working on or adjoining a travelled roadway, he will erect the necessary barricades to protect the travelling public against accident and he shall keep these lighted from dusk to dawn.
- (2) When he is installing a road crossing, he will arrange for the detouring of traffic around the construction site.
- (3) The Contractor will use all reasonable means to avoid damage claims as a result of his carelessness or negligence and, should any claims arise, he will save harmless the Township and the Engineer from any legal actions resulting from them.

SECTION 22 CLEAN-UP

- (1) On completion of his work, the Contractor will clean up the site, removing all debris and waste material and leaving the site in a neat and tidy condition.
- (2) He shall pick up any large pieces of broken tile or any other debris resulting from his work and will dispose of it away from the site. He is not to bury any of this material in the course of backfilling the trench.

- (1) Where the word "Commissioner" is used in this specification, it shall mean the person or persons appointed by the Council of the Municipality having jurisdiction, to superintend the work.

SECTION 23
COMMISSIONER

- (2) The Commissioner will be permitted to make minor variations in the work so long as these variations will result in either a more satisfactory drain or a more economical one. These variations, however, must not be such as to change the intent of the work to be performed nor are they to reduce the standard of quality.

- (1) The part of the Specification 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.

SECTION 24
SPECIAL
PROVISIONS

TODGHAM AND CASE LIMITED
CONSULTING ENGINEERS
280 GRAND AVENUE EAST,
CHATHAM, ONTARIO.

GENERAL SPECIFICATION FOR OPEN DRAINS

(REVISED MARCH 1, 1975)

SECTION 1 GENERAL CONDITIONS

- (1) Tenders will be received and contracts awarded only in the form of a lump sum for the completion of the whole work or of specified sections thereof in accordance with the plan, profile and specification. No bid will be considered, nor will any contract be awarded, on the basis of classification or of unit prices. Contractors must estimate for themselves the quantity and value of the work required. They are expected to examine the locality and also the plan, profile and specification; they will be at liberty, before bidding, to examine any data in the possession of the Municipality or of the Engineer.
- (2) All the work included in any contract must be completed on or before the date fixed at the time of letting and must, at the time of completion and final inspection, be in first class condition and comply fully with the specification. Final inspection will be made by the Commissioner or Engineer within twenty days after the Commissioner has received notice in writing from the Contractor that the work is completed, or as soon thereafter as weather conditions permit.
- (3) Contractors will be held liable for any damage or expenses occasioned by their failure to complete the work on time and for any expenses of inspecting, superintending, reletting or retaking due to their neglect or failure to prosecute the work satisfactorily and for any damages occasioned by leaving fences open or by any negligence in carrying on the work. Any such expenses or damages may be deducted by the Commissioner from the amount of the contract or may be recovered by the Municipality from the Contractor and his sureties.

SECTION 2 STAKES

- (1) Stakes are set one hundred feet apart along the course of the work, numbered consecutively, 0, 1, 2, 3, etc. The depths to which the drain is to be dug, as shown on the profile, are measured from the surface of the ground beside the stakes.
- (2) Contractors will be held responsible for the preservation of stakes in their original positions during the progress of the work and also for seeing that bench marks are not destroyed, defaced, or covered with excavated material.

SECTION 3 ALIGNMENT

- (1) Except where specified otherwise, the excavation will follow as nearly as possible the course of the existing drain. Wherever sharp or irregular bends occur, all sloping and widening is to be done on that side of the drain that will tend to flatten the bends and improve the flow of water in the drain.
- (2) Where one drain bank adjoins the travelled part of any road or laneway, all sloping and widening is to be done on that side of the drain farthest from the roadway.
- (3) Where one drain bank adjoins a fence line (except where the travelled part of a road or laneway adjoins the other bank) all required sloping and widening is to be done on that side of the drain farthest from the fence line, unless there is sufficient room between the ditch bank and the fence to permit widening on the fence side without disturbing the fence itself.
- (4) Where the drain is to be moved off a road allowance and onto the adjoining lands the top edge of the nearest finished drain bank is to be not closer than 2 feet to the limit of the road allowance. The centre line of the drain is to be kept as straight as possible even though this 2 foot dimension may be exceeded in places.
- (5) Where a new drain is being constructed, its centre line will be as straight as possible and any changes in direction shall be in the form of smooth regular bends. Where a new drain will adjoin an existing fence line, the Contractor will lay out a suitable centre line such that the top edge of the adjacent drain bank, at its widest point, will not be closer than 3 feet to the fence and the Contractor will use this centre line to establish the drain location.
- (6) The alignment of the finished work must be satisfactory to the Commissioner in charge.

SECTION 4 PROFILE

- (1) The excavation of the drain must be made at least to the depth intended by the grade line 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 depths from the surface of the ground at the points where the numbered stakes are set, as well as the amount of deepening required, as observed at the time of survey, but bench marks govern.

SECTION 5 BOTTOM WIDTH AND SIDE SLOPES

- (1) The bottom widths and the side slopes of the various sections of the finished drain are to be true to line and grade as shown on the profile. The sides of the excavation are to be sloped so that the top width of the finished excavation will exceed the bottom width by twice the slope times the depth, at all places.
- (2) Contractors will not be restricted to the exact dimensions specified but must excavate clear of the specified cross sections and may excavate such additional depth or width as may be required to accommodate the use of suitable excavating equipment or to allow for sediment or caving prior to final inspection, provided that at no place is the surface of the Excavation to be steeper than the slope specified on the profile. The Contractor is not to excavate so much deeper than the grade line as to result in the formation of pockets in the drain bottom that will cause water to stand in pools along the drain.

SECTION 6 OBSTRUCTIONS

- (1) All brush, timber, logs, stumps, stones, or other obstructions in the course of the drain are to be removed by the Contractor. Timber, logs and stumps are to be dealt with in the same manner as specified for brush and trees. Large stones and similar materials are to be disposed of away from the site.

SECTION 7 BRUSH AND TREES

- (1) Where the existing bottom widths and side slopes of the drain are sufficient to permit the specified deepening of the drain without disturbing the existing banks above the present drain bottom, the Contractor will be required to cut the brush and trees on the sloping banks flush with the surface of the banks but he will not be required to remove their roots and stumps unless they will obviously create obstructions to the flow of water in the drain.
- (2) Where it is necessary to widen the drain and excavate material from the sloping bank, all brush and trees within the course of the drain are to be cut and those roots and stumps in the bottom of the drain and on the bank or banks where the widening takes place are to be removed.
- (3) Throughout the length of the work, the Contractor will cut off flush with the ground surface all brush and trees having a diameter less than 6 inches, and all dead Elm trees, within 10 feet of the top edge of the finished drain banks and within the disposal area covered by the excavated material. Where there is a fence adjoining the drain, he will be required to cut the brush on the opposite side of the fence only if excavated material is to be placed there.
- (4) Should the Contractor find it necessary to remove trees other than those specified above, in order to permit the excavation of the drain or the disposal of material, he will be at liberty to do so only on permission of the Commissioner in charge.
- (5) All trees over 8 inches in diameter that are cut are to be trimmed of branches, and the trunks, along with the branches over 8 inches in diameter, are to be cut up into log lengths and piled for the use of the adjoining owner unless the owner advises the Commissioner he does not want them, in which case they are to be disposed of by the Contractor along with the other brush. Small branches and limbs are to be disposed of by the Contractor along with the other brush. Tree stumps may be burned by the Contractor where permitted; otherwise, they shall be disposed of by him away from the site of the work.
- (6) Following completion of the work, the Contractor is to trim up any broken or damaged limbs on trees which remain standing, disposing of the branches cut off along with other brush and leaving the trees in a neat and tidy condition.
- (7) Brush and trees removed from the drain and banks thereof and from the disposal area are to be put into piles by the Contractor, in locations where they can be safely burned, and are to be burned by him. If, in the opinion of the Commissioner, any of the piles are too wet or green to be burned, he will so advise the Contractor who may then arrange, to the Commissioner's satisfaction, an agreement with the owners where the piles are located, for them to burn the material when dry enough.
- (8) Prior to and during the course of burning operations the Contractor shall comply with the guidelines prepared by the Air Quality Branch of the Ontario Ministry of the Environment and shall ensure that the Environmental Protection Act is not violated.
- (9) In no case will brush or trees be buried in the spoil bank or within the excavated material.

SECTION 8 DISPOSAL OF MATERIAL

- (1) Where a part of the drain is being relocated, the Contractor will strip the topsoil from the new course and stockpile it for re-use, following the completion of the subsoil operations. Subsoil excavated from the new course is to be used first of all to fill the existing course which is being abandoned. Where the Contractor can conveniently do so, he may deposit the material in the old course as he excavates it from the new course but where the distance separating the new course from the old course is too great to permit this, he shall move the material to the old course with trucks. He will pack the material as much as is reasonably possible considering the equipment he is using but he need not carry out any special compaction procedures. Where there is more than enough material to fill the old course, the Contractor is to mound up the excavated material slightly to allow for settlement and he is then to bring the surface of the excavated material to a reasonably smooth and uniform contour. Where there is insufficient material to fill the old course, he is to grade the surface of the material so as to eliminate any holes that would collect water.
- (2) Material not required to fill the part of the existing course that is being abandoned and material excavated from the remainder of the drain is to be deposited on the immediately adjoining farm lands in the locations set out in the Special Specifications. It is to be kept at least 6 feet clear of the top edge of the drain and 3 feet clear of all fences and, beyond these distances, it is to be placed as evenly as is conveniently possible in view of the type of excavating equipment used.

- (3) Where the excavated material is deposited in bush land, it is to be spread and levelled in the form of a spoil bank over at least the full width of the strip that has been cleared to permit the passage of excavating equipment but in no case is the top surface to be left more than 2 feet above the natural ground level even though this may require additional clearing to produce a sufficient disposal area. On completion, the spoil bank is to be left so that it is smooth enough to drive an ordinary farm vehicle along it.
- (4) Where the adjoining land is sufficiently clear to permit cultivation, the Contractor is to spread the excavated material over a sufficiently great width that, after spreading, the excavated material will generally have a thickness of not more than 6 inches. However, the Contractor will not be required to spread the material over a width greater than 60 feet even though this results in a depth of material in excess of 6 inches.
- (5) After the excavated material has been levelled any stockpiled topsoil is to be spread over it and the adjoining land to a depth of not over 4 inches.
- (6) No excavated material is to be placed on lawns or ornamental shrubbery but is to be deposited on either or both sides, on the lands of the same owner.
- (7) In no case is the topsoil or any excavated material to be deposited in ditches, tiles, or depressions intended to conduct water into the drain.
- (8) The Commissioner in charge will be the sole judge as to the proper disposal of material under the contract and this specification.

SECTION 9 FENCES

- (1) Where the Contractor finds it necessary to remove any fences in order to permit the excavation of the drain or the disposal of material, he will handle the fencing carefully. Unless otherwise specified, the Contractor will be required to re-construct the fences following the completion of the work of excavation and levelling in as good a condition as that in which they are found or as the old material permits.
- (2) Except as hereinafter specified the Contractor is not to leave any fences open when he is not at work in the immediate vicinity. Where it is necessary to remove a fence paralleling the drain to excavate the drain or dispose of material, the Contractor is not to take it down more than 1 week before he starts work in that field and he is to replace it within 2 weeks after he finishes work there. The landowners and not the Contractor will be responsible for the control of livestock in the adjoining fields, so long as the Contractor adheres to these time limits.
- (3) Any fences that are constructed or re-constructed along the course of the drain are to be kept at least 3 feet clear of the top edge of the drain bank.

SECTION 10 ROAD CROSSINGS

- (1) Where the drain crosses the travelled part of a road through a bridge, the Contractor will excavate the drain to its specified dimensions through the bridge opening, using care to avoid damaging it. If after the drain has been excavated at any bridge structure it appears to the Commissioner that repairs or replacement may be required, he shall so advise the Road Authority having jurisdiction over the particular bridge.
- (2) Where a new bridge is required or where any underpinning, strengthening or repairs are rendered necessary by the work, it is to be carried out by the Road Authority at its own expense.
- (3) Where the drain crosses the travelled part of a road through a pipe that does not have to be replaced or lowered, the Contractor will clean the pipe to its full cross-sectional area using care to avoid damaging it.
- (4) Where the existing pipe is of sufficient size and is in a good state of repair, but requires to be lowered, the Contractor will carefully remove it, clean it to its full cross-sectional area, and replace it in the drain at the proper elevation.
- (5) Where the existing pipe must be replaced, the Contractor will carefully remove it from the drain, clean it to its full cross-sectional area, and leave it beside the drain for removal by the Road Authority. He will then install the new culvert supplied by the Road Authority.
- (6) Under roadways, new pipes and those that are lowered are to be set with their inverts 4 inches below the grade line when the pipe is 42 inches in diameter or less and 6 inches below when it is over 42 inches in diameter.
- (7) Trenches across the travelled part of the roadways are to be back-filled with compactable granular material supplied by the Road Authority.
- (8) The Contractor will notify the Road Authority at least 3 working days before starting work on any road crossing.

SECTION 11 FARM AND ACCESS CULVERTS

- (1) Where a farm or access bridge or pipe does not have to be replaced or lowered, the Contractor will clean it to its full cross-sectional area using care to avoid damaging it.
- (2) Where the culvert is a pipe that must be lowered, the Contractor will carefully remove it, clean it to its full cross-sectional diameter, and replace it in the drain with its invert 4 inches below the grade line.
- (3) Where a pipe culvert must be replaced, the Contractor will carefully remove it from the drain, clean it to its full cross-sectional area, and leave it beside the drain for disposal by the Drainage Commissioner. Any salvage value from the sale of the pipe shall be credited to the drain. Where a wooden or concrete bridge must be replaced, the Contractor will remove it, disposing of the material away from the site. If a new pipe is to be installed, it will be supplied by the Commissioner at the site, at the expense of the drain. The Contractor will then install it with its invert 4 inches below the grade line.

- (4) The Contractor will backfill around each pipe either with compactable granular material supplied by the Commissioner at the expense of the drain or with material excavated from the drain, as directed by the Commissioner.
- (5) Where a new culvert is to be installed, the owner may request the Commissioner to have it placed in a different location from the existing one and this will be permitted so long as the relocation does not result in an increase in the area draining through the culvert. Adequate notice of the change must be given to the Contractor. In no case may the existing culvert be left in the drain when it has been specified that it is to be removed.
- (6) Should the owner wish to construct end walls, he may do so but both the construction and maintenance of such end walls will be the responsibility of the owner concerned and not of the drain.

SECTION 12 PIPE CULVERT INSTALLATION

- (1) The Commissioner will supply to the Contractor the corrugated pipe in lengths of approximately 20 feet (with couplers, where required), in a prefabricated condition. The cost of such prefabrication will be charged as part of the cost of the drain. Any further fabricating or connecting will be the Contractor's responsibility.
- (2) Pipe culverts will be supplied on trucks and are to be unloaded, installed and back-filled by the Contractor as part of his work.
- (3) Following the placing of the pipe, the Contractor will backfill around it, placing and compacting the backfill material in 9 inch layers, equally on each side of the pipe up to the level of the adjoining ground. At the ends of the pipe, the backfill material is to be sloped 1½ feet horizontally to 1 foot vertically. Where clay material is readily available, the ends of the backfill are to be covered with clay to minimize erosion.

SECTION 13 TILE OUTLETS

- (1) Where existing tile outlet pipes of cast iron, asbestos cement, corrugated steel or other rigid material are encountered along the course of the drain, and where they will be removed or rendered useless by the work, the Contractor, as part of his work, shall re-install the outlet pipes in the re-graded drain bank. Any new materials required for this work shall be supplied by the Commissioner as an expense to the drain. The outlet pipes shall be joined to the tile in a water-tight manner and shall be properly set into the sloping drain bank so as to prevent the outlet pipe from collapsing.

SECTION 14 UTILITIES, RAILWAYS, ETC.

- (1) Before commencing work, the Contractor will investigate the location of any and all railways, utility lines, wires, pipes, poles, towers or cables which may interfere with the excavation of the drain. He will take all necessary steps to avoid damaging these and should any damage result to them from his operations, he will be completely responsible for these damages, and will save harmless the Township and the Engineer from any legal actions which may arise as a result of such damage.
- (2) If permits are required to allow the work to be carried out on or adjacent to any utilities, pipelines, railways, etc., the Contractor shall obtain these at his own expense.
- (3) All work on or adjacent to any utility, pipeline, railway, etc., is to be carried out in accordance with the requirements of the utility, pipeline, railway, or other, as the case may be, and its specifications for such work are to be followed as if they were part of this specification.

SECTION 15 PROTECTION OF PUBLIC

- (1) Where the Contractor is working on or adjoining a travelled roadway, he will erect the necessary barricades to protect the travelling public against accident and he shall keep these lighted from dusk to dawn. When he is installing a road crossing, he will arrange for the detouring of traffic around the construction site. The Contractor will use all reasonable means to avoid damage claims as a result of his carelessness or negligence and, should any claims arise, he will save harmless the Township and the Engineer from any legal actions resulting from them.

SECTION 16 CLEAN-UP

- (1) On completion of his work, the Contractor will clean up the site, removing all debris and waste materials and leaving the site in a neat and tidy condition.

SECTION 17 COMMISSIONER

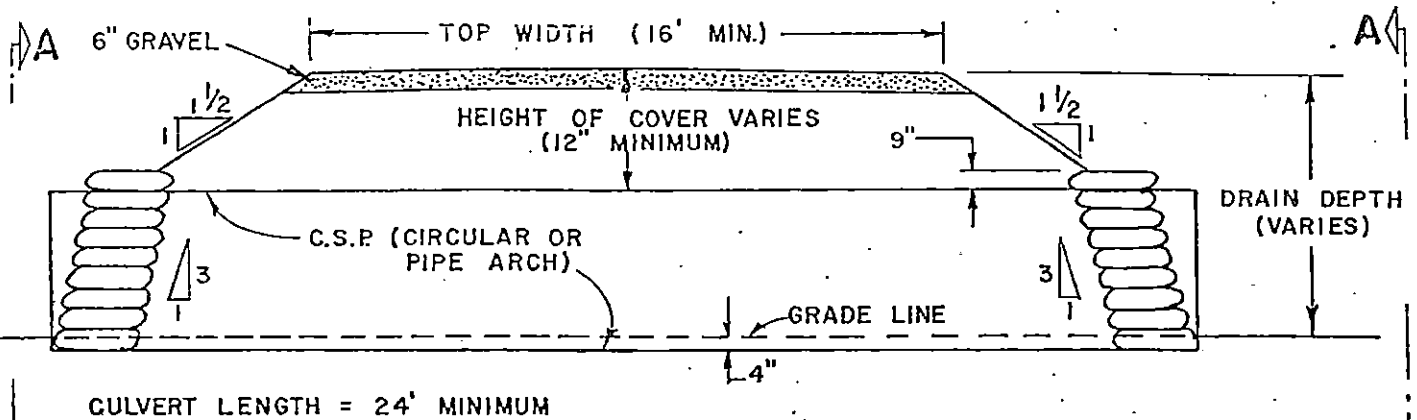
- (1) Where the word "Commissioner" is used in this specification, it shall mean the person or persons appointed by the Council of the Township having jurisdiction, to superintend the work.
- (2) The Commissioner will be permitted to make minor variations in the work so long as these variations will result in either a more satisfactory drain or a more economical one. These variations, however, must not be such as to change the intent of the work performed nor are they to reduce the standard of quality.

SECTION 18 SPECIAL PROVISIONS

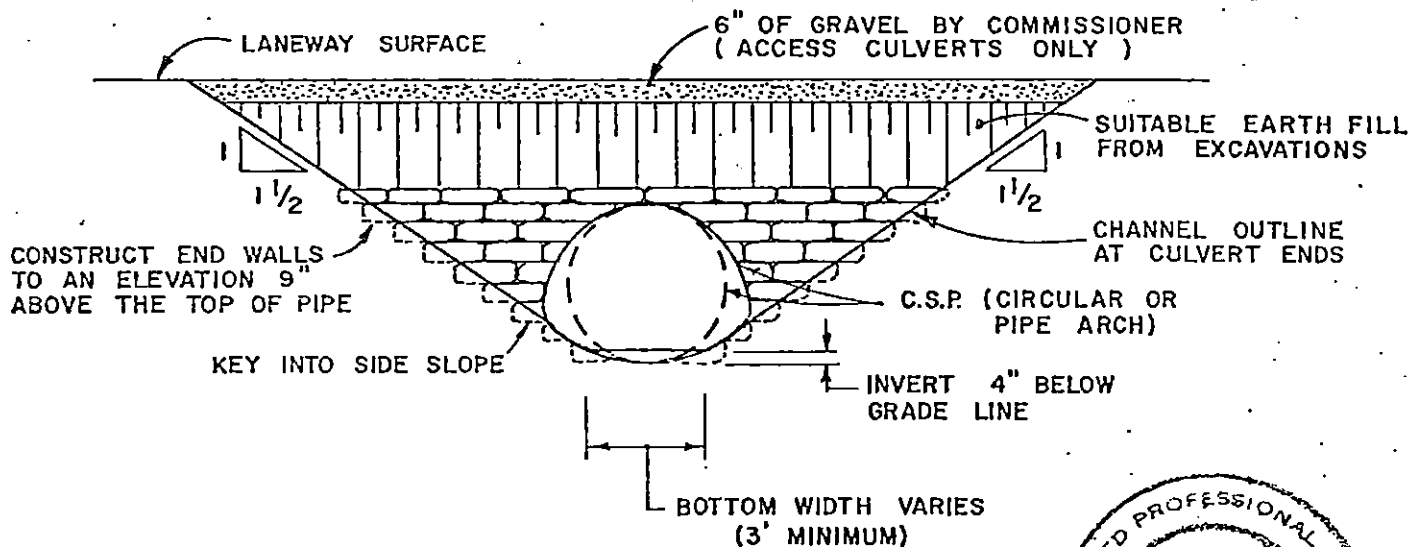
- (1) The Part of the Specifications headed "Special Provisions" which is attached hereto forms part of this Specification and is to be read with it. Where there is any difference between the requirements of this General Specification and those of the Special Provisions, the Special Provisions shall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

H. H. TODGHAM

TODGHAM AND CASE LIMITED
CONSULTING ENGINEERS
CHATHAM, ONTARIO



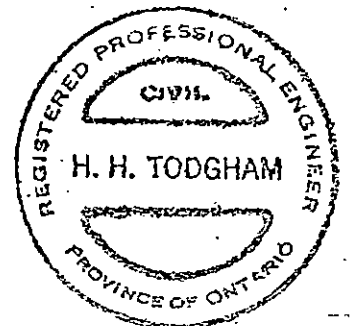
LONGITUDINAL SECTION



ELEVATION A-A

CONSTRUCTION NOTES

1. INSTALLATION AND ASSEMBLY OF C.S.P. MATERIALS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS.
2. BACKFILL MATERIAL SHALL BE PLACED IN 9" LAYERS EQUALLY ON EACH SIDE OF THE PIPE. EACH LAYER SHALL BE COMPACTED TO 95% PROCTOR DENSITY.
3. END WALLS TO BE CONSTRUCTED WITH BAGS FILLED WITH 5 PARTS SAND TO 1 PART CEMENT IN AN INTERLOCKING MANNER KEYED INTO THE SIDE SLOPES OF THE DRAIN.



FARM CULVERT

INSTALLATION STANDARD

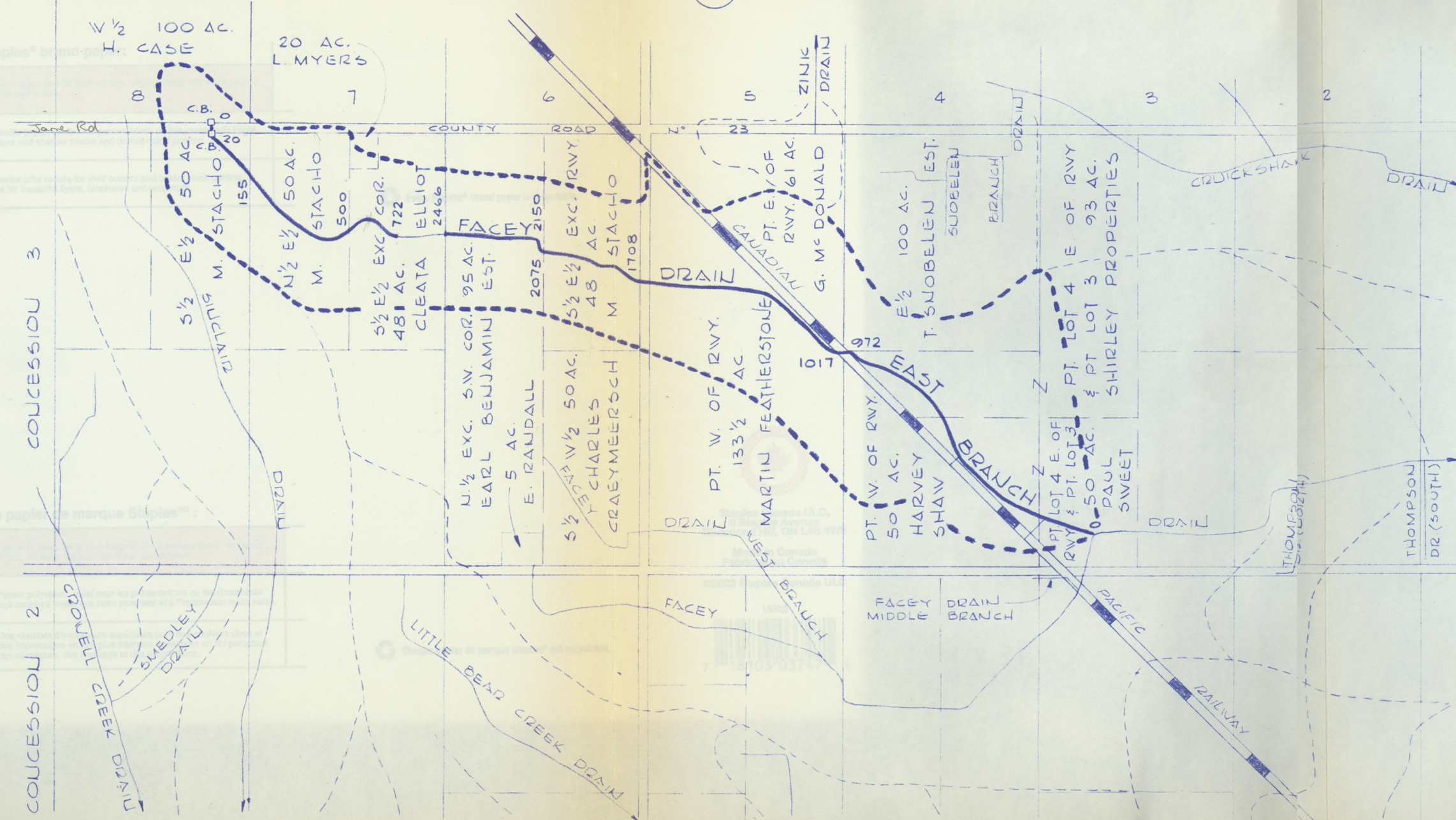
CIRCULAR & PIPE ARCH

CORRUGATED STEEL PIPE

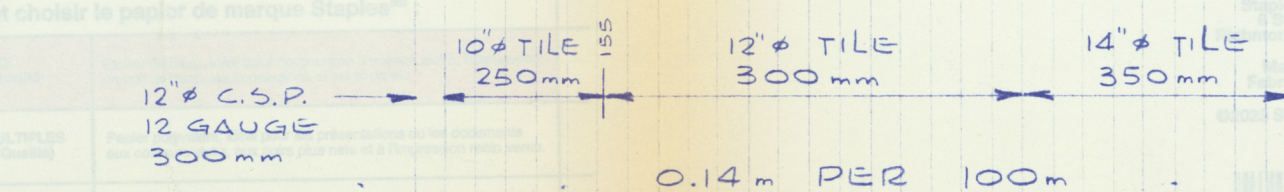
TODGHAM AND CASE
ASSOCIATES INCORPORATED
 CONSULTING CIVIL ENGINEERS
 CHATHAM ONTARIO

DATE - 79 10 01

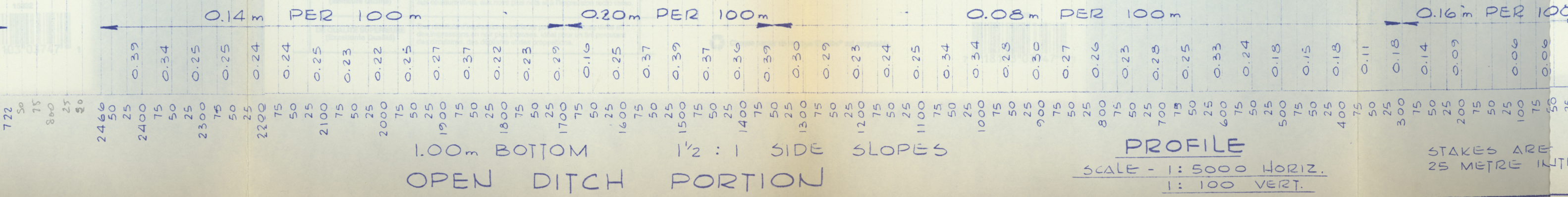
JOB N° - 78076



PLAN
SCALE - 1:12,500



TILE PORTION



OPEN DITCH PORTION

PROFILE
SCALE - 1:5000 HORIZ.
1:100 VERT.

STAKES ARE SET AT
25 METRE INTERVALS

DEPTH FROM
GROUND BESIDE
STAKE IN METRES

DEPTH OF
EXCAVATION
IN METRES



CHATHAM, ONTARIO
OCTOBER 1, 1979
H. H. Todgham
B.A. SC. O.E.S. P. ENG.

SCHEDULE 'C'
PLAN & PROFILE OF THE
FACEY DRAIN EAST BRANCH
TOWNSHIP OF ZONE

TODGHAM AND CASE
ASSOCIATES INCORPORATED
consulting civil engineers
chatham ontario

SCALE AS SHOWN	BOOK N° 1115
DATE OCT 1, 1979	
DRAWN BY R.H.	78076
CHECKED BY D.R. M.C.	

CORPORATION OF THE TOWNSHIP OF ZONE

BY-LAW 28-79

Facey Drain, East Branch

A by-law to provide for a drainage works in the Township of Zone in the County of Kent.

Whereas the requisite number of owners have petitioned the Council of the Township of Zone in the County of Kent in accordance with the provisions of the Drainage Act 1975 requesting that the following lands and roads be drained by a drainage works;

And whereas the Council of the Township of Zone in the County of Kent has procured a report made by H.H. Todgham and the report is as follows;

And whereas the estimated total cost of constructing the drainage works is \$20500.00

And Whereas \$20500.00 is the amount to be contributed by the municipality for construction of the Drainage works.

And Whereas \$ is being assessed in the of in the County of

And Whereas the council is of the opinion that the drainage of the area is desirable.

Therefore the council of the Township of Zone pursuant to the Drainage Act. 1975, enacts as follows;

1. The report is hereby adopted and the drainage works as therein indicated and set forth is hereby authorized and shall be completed in accordance therewith.
2. (1) The Corporation of the Township of Zone may borrow on the credit of the Corporation the amount of \$20500.00 being the amount to be contributed by the municipality for construction of the drainage works less the total amount of,
 - (a) grants received under section 85 of the Act; and
 - (b) commuted payments made in respect of the lands and roads assessed.(2) The Corporation may issue debentures for the amount borrowed and such debentures shall be made payable within 5 years from the date of the debenture and shall bear interest at a rate not higher than the rate charged by the Ontario Municipal Improvement Corporation on the date of sale of such debentures.
3. (1) For paying the amount of \$20215.00 being,
 - (a) the amount assessed upon the lands and roads, except the lands and roads belonging to or controlled by the municipality and
 - (b) the amount required to pay interest on the portion of the amount borrowed, represented by the amount in clause a. less the total amount of
 - (c) grants received under section 85 of the Act;
 - (d) moneys paid pursuant to subsection 3 of section 61 of the Act;

and

(e) commuted payments made in respect of the lands and roads assessed.

A special rate shall be levied upon lands and roads as set forth in the Schedule to be collected in the same manner and at the same time as other taxes are collected.

(2) The amount of the special rate levied upon each parcel of land or part thereof shall be divided into 5 equal amounts and one such amount shall be collected in each year for 5 years after the passing of this by-law

4. For paying the amount of \$285.00 being.

(a) the amount assessed upon the lands and roads belonging to or controlled by the municipality; and

(b) the amount required to pay interest on the portion of the amount borrowed represented by the amount in clause a.

a special rate shall be levied upon the whole rateable property in the Township of Zone in each year for 5 years after the passing of this by-law to be collected in the same manner and at the same time as the other taxes are collected.

5. All assessments of \$200.00 or less are payable in the first year in which the assessment is imposed.

6. This by-law comes into force on the passing thereof and may be cited as "Facey Br. East Br. By-Law".

FIRST READING

SECOND READING

Provisionally adopted this 16 day of October 1979.

Douglas Meredith
Reeve

Kymnora Revell
Clerk

THIRD READING

Enacted this 12 day of Nov. 1979.

Douglas Meredith
Reeve

Kymnora Revell
Clerk

Schedule of Assessment - Facey Drain, East Branch

Roll	Con.	Lot or Part	Owner	Benefit Outlet	Estimated Grant	Balance of Assessment
Publically-Owned Lands						
Municipal						
		County Road 23	County of Kent	2765.00		
		5-6 Sideroad	Township of Zone	285.00		
		Total Publically-Owned Land		<u>3050.00</u>		
Privately-Owned Lands						
Not used for Agricultural Purposes						
1-116	3	Pt. S $\frac{1}{2}$ E $\frac{1}{2}$ 7	L. Myers	25.00		
		Pt. 3,4,&5	C.P.R.	<u>615.00</u>		
		Total Privately-owned, Non agricultural Used for Agricultural Purposes		<u>640.00</u>		
1-92	3	Pt. L.3&4	P. Sweet	615.00	205.00	410.00
1-111	5	Pt. L.3&4	Shirley Prop.	380.00	126.66	253.34
1-93		Pt. 4 W of CPRH.	Shaw	245.00	81.66	163.34
1-112		E $\frac{1}{2}$ 4	T. Snobelen Est.	150.00	50.00	100.00
1-94		Pt. 5 W of CPRM.	Featherstone	1810.00	603.35	1206.65
1-113		Pt. 5 E of CPRG.	McDonald	305.00	101.66	203.34
1-114		S $\frac{1}{2}$ E $\frac{1}{2}$ 6	M. Stacho	1415.00	471.66	943.34
1-96		N $\frac{1}{2}$ ex Cor 6	E. Benjamin Est.	1525.00	508.35	1016.65
1-115		S $\frac{1}{2}$ E $\frac{1}{2}$ ex cor	7C. Elliott	2570.00	856.66	1713.34
1-117		N $\frac{1}{2}$ E $\frac{1}{2}$ 7	M. Stacho	4340.00	1446.66	2893.34
1-117		S $\frac{1}{2}$ E $\frac{1}{2}$ 8	M. Stacho	2535.00	845.00	1690.00
2-39	4	W $\frac{1}{2}$ 8	H. Case	<u>920.00</u>	<u>306.66</u>	<u>613.34</u>
		Total on Agricultural land		<u>16810.00</u>	<u>5603.32</u>	<u>11206.68</u>
Total Assessment						20500.00

TODDHAM AND CASE ASSOCIATES

INCORPORATED

CONSULTING CIVIL ENGINEERS

280 GRAND AVE. EAST
P.O. BOX 1326 N7M 3R9

CHATHAM, ONTARIO
519/364-0400

79 10 01

To the Reeve and Council
of the Township of Zone.

Re: East Branch of Facey Drain.

Gentlemen:

In accordance with your instructions, we have made an examination and survey of the open portion and tile portion of the East Branch of the Facey Drain commencing at the outlet of the open portion into the Facey Drain in the N $\frac{1}{2}$ of Lot 3, Concession 3 and proceeding upstream along the entire length of the open and closed portions to the head of the existing tile at the westerly limit of County Road No. 23 in the S $\frac{1}{2}$ of Lot 8. We have extended our examination and survey of the tile portion of the drain across County Road No. 23, in accordance with your instructions, acting upon the drainage petition by the Kent County Engineer, for the upstream extension of the drain.

A review of the records indicates that the existing tile drain extends from its head at the west limit of County Road No. 23 in the S $\frac{1}{2}$ of Lot 8 (Station 20) to its outlet into the open portion of the drain at the line between Lots 6 and 7. The largest part of this tile drain was installed under a report by the late George A. McCubbin dated June 3, 1937. At that time approximately 150 m of 150 mm (6") diameter tile, 180 m of 180 mm (7") diameter tile and 425 m of 200 mm (8") diameter tile were installed from the west limit of County Road No. 23 to the middle of the S $\frac{1}{2}$ E $\frac{1}{2}$ of Lot 7, Concession 3 (Station 20 to Station 722). The remainder of the existing tile was installed under a report by this office dated September 23, 1969. At that time the existing tile drain was extended downstream across the remainder of Lot 7 by the installation of 350 mm (14") diameter tile. The remainder of the East Branch of the Facey Drain from the outlet of the tile drain at the line between Lots 6 and 7 downstream to its outlet into the Facey Drain in the N $\frac{1}{2}$ of Lot 3, Concession 3, consists of an open drain. A review of the records indicates that the last work of repair and improvement on the open portion of the drain was done under a report by this office dated September 23, 1969.

H. H. TODDHAM, B.A.Sc., O.L.S., P.ENG.

G. WM. CASE, M.A.Sc., P.ENG.

In addition, we recommend that the East Branch of the Facey Drain be extended across County Road No. 23 to its east limit by installing 300 mm (12") diameter corrugated steel pipe across the road allowance and that a catch basin be installed on each side of the road.

Attached to this report and labelled "Schedule C" is our Drawing No. 78076 which consists of a plan showing the location of the proposed work marked in a heavy solid line and the lands affected by the work outlined in a heavy dashed line, together with a profile for the work that we recommend. Also attached and labelled "Schedule B" is a specification showing the dimensions, grades, disposal of material and other particulars of the work to be carried out.

In general terms, the proposed work on the open portion of the drain involves deepening of the drain by varying amounts up to 0.39 m as well as the necessary farm culvert construction along the length of the work. The proposed work on the tile portion of the drain involves the installation of 250 mm (10"), 300 mm (12") and 350 mm (14") diameter tile, the upstream extension of the drain across County Road No. 23 and the installation of two catch basins on County Road No. 23. Upon completion, the tile portion of the drain will have the capacity to remove approximately one-half inch of runoff per acre per 24 hours from the area served by the tile. The invert of the proposed tile drain will be installed at or slightly lower than the invert of the existing tile. In addition, the tile portion of the East Branch and all private tiles entering the open portion of the drain will have at least 0.30 m of freeboard beneath their inverts.

Throughout the length of the work, the excavated material is to be disposed of as set out in the Special Specifications. In accordance with Sections 29 and 30 of The Drainage Act, we determine the amounts to be paid to the owners for damages to lands and crops (if any) occasioned by the construction of the drainage works and by the disposal of material, to be as shown in the following Schedule of Allowances under the heading "Damages".

SCHEDULE OF ALLOWANCES

<u>Con.</u>	<u>Lot</u>	<u>or</u>	<u>Part</u>	<u>Owner</u>	<u>Damages</u>
3	Pt. Lot 4 E of Rwy.				
	& Pt. Lot	3		Paul Sweet	\$ 365.00
	Pt. Lot 4 E of Rwy.				
	& Pt. Lot	3		Shirley Properties	240.00
	Pt. W of Rwy.	5		Martin Featherstone	380.00
	S $\frac{1}{2}$ E $\frac{1}{2}$ ex. Rwy.	6		M. Stacho	260.00
	N $\frac{1}{2}$ ex. cor.	6		Earl Benjamin Est.	180.00
	S $\frac{1}{2}$ E $\frac{1}{2}$ ex. cor.	7		Cleata Elliot	80.00
	N $\frac{1}{2}$ E $\frac{1}{2}$	7		M. Stacho	140.00
	S $\frac{1}{2}$ E $\frac{1}{2}$	8		M. Stacho	55.00
					<u>\$1700.00</u>

We estimate the cost of the work that we recommend, together with the expenses incidental thereto, to be as follows:

1900 m ³ Excavation and Levelling	\$ 5600.00
End Walls for Culvert	450.00
135 m of 250 mm (10") dia. tile - Supply	425.00
- Install	600.00
345 m of 300 mm (12") dia. tile - Supply	1375.00
- Install	1850.00
222 m of 350 mm (14") dia. tile - Supply	1175.00
- Install	1425.00
18 m of 300 mm (12") dia. CSP road crossing - Supply	300.00
- Install	750.00
2 Catch Basins	1000.00
Allowances under Sections 29 and 30	1700.00
Survey, Plans, Report and Inspection	2725.00
Assistance and Expenses	375.00
Incidentals and Contingencies	750.00
<u>\$20500.00</u>	

We assess the above estimated cost against the lands and roads as shown in the attached Schedule of Assessment labelled "Schedule A".

Under the provisions of The Railway Act, the Canadian Pacific Railway has the right to carry out the work on its property within a reasonable time. If it elects to do so, it must advise the Township before the calling of tenders so that the work will be deleted from the work of the excavating contract. If the Railway elects to carry out the excavation of the East Branch

within its right-of-way and the cleaning of the concrete culvert and the steel pipe culvert on the East Branch at this Railway crossing, the municipality will pay the sum of \$150.00 to the Railway.

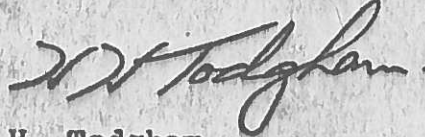
We have estimated the value of benefit derived by the construction of end walls on the existing culvert near Station 10 in the NW of Lot 3, Concession 3. This amount is shown as a Special Benefit charged against the affected property in addition to the regular drainage assessment against this property.

We have estimated the increase in cost of the drainage works related to the installation of corrugated steel pipe and placement of granular materials across County Road No. 23 and for the repair of the asphalt roadway. Of the total estimated cost of \$20,500.00, we estimate that \$1,200.00 is directly attributable to the additional work involved in crossing the road. This increase in cost is assessed against the County of Kent as owner of County Road No. 23, under Section 26 of The Drainage Act, 1975, in addition to the normal drainage assessments against the road.

After completion, the East Branch of the Facey Drain and the farm culverts along the length of the work are to be maintained by the Township of Zone at the expense of the lands and roads herein assessed and in the same relative proportions subject, of course, to any variations that may be made under the authority of The Drainage Act. For the purpose of maintenance, the amounts assessed for Special Benefit shall be deleted from the assessment schedule.

Since most of the privately-owned lands are used for agricultural purposes and no lateral drains are involved in the work, we recommend that application be made to the Ministry of Agriculture and Food in accordance with Section 88 of The Drainage Act, for a grant payable under Section 85 of this Act, as well as for all other grants for which this work may be eligible.

Respectfully submitted,



H. H. Todgham,
B.A.Sc., O.L.S., P. Eng.

12



"SCHEDULE A"

SCHEDULE OF ASSESSMENT
FACEY DRAIN EAST BRANCH
TOWNSHIP OF ZONE

1. PUBLICLY-OWNED LANDS:

(iii) Municipal:	Owner	Benefit	Special Benefit	Outlet	Total Assessment
County Road No. 23	County of Kent	\$ 1150.00	\$1200.00	\$ 415.00	\$ 2765.00
5-6 Sideroad	Township of Zone	175.00	-	110.00	285.00
Total on Publicly-Owned Lands		\$ 1325.00	\$1200.00	\$ 525.00	\$ 3050.00

2. PRIVATELY-OWNED LANDS:

(i) Not used for agricultural purposes: Area Affected (Acres) (Hectares)	Owner	Benefit	Special Benefit	Outlet	Total Assessment
3 Pt. 3, 4 & 5	0.41 L. Myers	\$ 300.00	-	\$ 25.00	\$ 25.00
14	5.67 Canadian Pacific Railway	\$ 300.00	-	315.00	615.00
Total on Privately-Owned Non-Agricultural Lands		\$ 300.00	-	\$ 340.00	\$ 640.00

(ii) Used for agricultural purposes:
(Excluding A.R.D.A. Lands)

Con. Lot or Part	Area Affected (Acres) (Hectares)	Owner	Benefit	Special Benefit	Outlet	Total Assessment
3 Pt. Lot 4 E of Rwy/Pt. Lot 3	27	Paul Sweet	\$ 325.00	\$ 225.00	\$ 65.00	\$ 615.00
Pt. Lot 4 E of Rwy/Pt. Lot 3	31	Shirley Properties	275.00	-	105.00	380.00
Pt. Lot 4 E of Rwy/Pt. Lot 3	30	Harvey Shaw	135.00	-	110.00	245.00
Pt. W of Rwy 4	25	T. Snobelen Est.	100.00	-	50.00	150.00
E 2	25	Martin Featherstone	1200.00	-	610.00	1810.00
Pt. W of Rwy 5	63	G. McDonald	100.00	-	205.00	305.00
Pt. E of Rwy 5	30	M. Stacho	800.00	-	615.00	1415.00
S 2 E 2 ex. Rwy. 6	40	Earl Benjamin Est.	850.00	-	675.00	1525.00
N 2 ex. cor. 6	35	Cleata El 11 lot	1800.00	-	770.00	2570.00
S 2 E 2 ex. cor. 7	34					

2. PRIVATELY-OWNED LANDS: Continued

(If) Used for agricultural purposes:
(Excluding A.R.D.A. Lands)

Con.	Lot or Part	Area Affected		Owner	Benefit	Special Benefit	Outlet	Total Assessment
		(Acres)	(Hectares)					
3	N $\frac{1}{2}$ E $\frac{1}{2}$ S $\frac{1}{2}$ E $\frac{1}{2}$	7 8	40 20	16.2 M. Stacho 8.1 M. Stacho	\$ 2900.00 1550.00	- -	\$ 1440.00 985.00	\$ 4340.00 2535.00
4	W $\frac{1}{2}$	8	10	4.0 H. Case	400.00	-	520.00	920.00
Total on Privately-Owned Agricultural Lands					\$10435.00	\$ 225.00	\$ 6150.00	\$16810.00
Total on Privately-Owned Lands					\$10735.00	\$ 225.00	\$ 6490.00	\$17450.00
TOTAL ASSESSMENT					\$12060.00	\$1425.00	\$ 7015.00	\$20500.00

Estimated amount of grant under Section 85 of The Drainage Act \$5603.33

Chatham, Ontario,
79 10 01

H. H. Todgham
H. H. Todgham,
B.A.Sc., O.L.S., P. Eng.



"SCHEDULE B"

SPECIFICATION FOR THE REPAIR, IMPROVEMENT AND EXTENSION
OF THE EAST BRANCH OF THE FACEY DRAIN
IN THE TOWNSHIP OF ZONE

This specification and the report, plan and profile bearing the same date, apply to and govern the installation of approximately 135 m of 250 mm, 345 m of 300 mm, and 222 m of 350 mm diameter tile together with the repair and improvement of approximately 2466 m of open drain and the necessary farm culvert construction along the length of the open portion of the drain. Also included is the upstream extension of the tile portion of the drain across County Road No. 23 and the installation of 2 catch basins.

DESCRIPTION
OF WORK

The General Specification for Tile Drains and the General Specification for Open Drains both of which are attached hereto form part of this specification and are to be read with it. Where there is any difference between the requirements of the General Specifications and those of the Special Provisions which follow, the Special Provisions shall govern. The section numbers shown in the Special Provisions which follow refer to the sections having the same numbers contained in the General Specifications.

GENERAL
SPECIFICA-
TIONS

SPECIAL PROVISIONS - TILE PORTION

Stakes are set at 25 m intervals commencing at Station 0 on the east limit of County Road No. 23 and proceeding downstream along the course of the work.

SECTION 2
STAKES

Throughout the length of the work, the tile is to be installed on one side or the other of the existing tile drain. The new tile is to be installed parallel to the existing tile but far enough away from it to avoid damaging it. The final alignment shall be satisfactory to the Commissioner in charge. At the downstream end, the Contractor shall gradually swing the alignment of the new tile over to connect to the existing 350 mm diameter tile at Station 722.

SECTION 3
ALIGNMENT

The design grade line of the tile is set to match the invert elevation of the existing 350 mm tile at Station 722. The Contractor will use extreme care to ensure that no reverse grade occurs when connecting to the existing 350 mm tile.

SECTION 4
PROFILE

SECTION 11
CONNECTIONS

After the Tile Contractor has connected the outlet end of the new tile into the existing 350 mm diameter tile near Station 722, he will be required to connect the existing 200 mm diameter municipal tile which is abandoned under this report, into the new main as well as all intercepted private lateral tiles. This work will be performed in accordance with Section 11 of the General Specification for Tile Drains.

SECTION 12
CONSTRUCTION
IN SANDY
SOILS

Where fine sandy soil is encountered, the Commissioner shall supply at the expense of the drain, a suitable type of synthetic filter material to be used to wrap the tile in order to prevent fine soils from entering the drain. The Contractor shall install this filter material as part of his work.

SECTION 16
ROAD CROSS-
ING

Where the new drain crosses County Road No. 23, the Contractor will be required to install 18 m of 300 mm (12") diameter corrugated steel pipe, 16 gauge, between the catch basins at Station 0 and Station 20. The Commissioner will supply, as an expense to the drain, all necessary pipe and granular materials for bedding and backfill. The Contractor will install the pipe and restore the road, complete as specified herein, as part of his work.

The Contractor will carefully cut the pavement where the drain crosses the County Road in order to minimize damage to it. The foundation bed shall be excavated true to line and grade with the trench width 0.6 m wider than the diameter of the pipe and the side walls excavated vertically. The new pipe shall be installed on a 0.10 m bed of Granular "B" material. The Contractor will then backfill the trench for the full width of the pavement plus 1.25 m on each side, using Granular "B" material. The granular material is to be placed in layers not exceeding 0.30 m in thickness and is to be thoroughly compacted with a mechanical vibrating compactor. The top 0.30 m of the trench for the width of the pavement plus 1.25 m on each side is to be filled with Granular "A" material. It is to be placed in layers not greater than 0.15 m in depth and is to be thoroughly compacted with a vibrating compactor. All granular material required for backfill shall meet the gradation and physical requirements of M.T.C. Specification Form 314.

The excavated material from the trench beyond a point 1.25 m from the edge of the pavement may be used for backfilling purposes for these sections of trench. This material is to be placed in layers not

greater than 0.30 m in thickness and is to be compacted either by hand tamping or by the use of a vibrating compactor.

Following the work of backfilling the trench across the pavement and shoulders, the Contractor will place a patch using a cold mix asphalt of a standard acceptable to the County, for the full width of the pavement. This patch is to be at least 0.10 m in thickness and is to be carefully placed and tamped so that it will be as level as possible with the adjoining pavement.

The Contractor will be required to provide suitable warning signs and he shall make every effort to keep the road open to traffic by use of a flagman to direct vehicles around the site of the work. If it is necessary to close the road to through traffic, the Contractor shall provide for an adequately signed detour route.

The Contractor shall notify in writing the Engineer of the County at least 7 days prior to commencement of any work on the County Road Allowance. No labour, equipment or materials for the construction of the road crossings will be supplied by the County.

The Commissioner will arrange for the construction of a catch basin at Station 0 along the east limit of County Road No. 23 and near Station 20 along the west limit of County Road No. 23. The catch basins shall be constructed within the limits of the County Road Allowance and immediately adjacent to the road limits. The catch basins shall be 2'x2' Ministry of Transportation and Communications Style Ditch Inlet Catch Basin Standard DD-716-A or approved equal.

SECTION 19
NEW CATCH
BASINS

From Station 20 to Station 722, the designated working corridor for the tile contractor's equipment shall be restricted to an area which is 10 m wide centred along the proposed final alignment of the tile. In addition, the Commissioner, in consultation with the owner of the S $\frac{1}{2}$ E $\frac{1}{2}$ of Lot 7, Concession 3, shall designate in the field an access corridor for use by the Contractor. This access corridor, having a width of 6 m, shall provide access from the downstream limit of the tile work to the head of the open drain (Station 722 of the tile to the line between Lots 6 and 7).

SECTION 25
WORKING
CORRIDOR

- (2) Unless changes in direction are made at catch basins, manholes, or by the use of manufactured bends or fittings, they shall be made by a smooth curve in the trench on a radius of curvature so that the trenching machine can dig and still maintain grade.
- (3) The alignment of the finished work must be satisfactory to the Commissioner in charge.

SECTION 4
PROFILE

- (1) The tile is to be laid so that its invert will be at the grade line shown on the profile, which grade line is governed by the bench marks. The profile shows, for the convenience of Contractors and others, the approximate depths to be measured from the surface of the ground to the invert of the tile, at each of the numbered stakes, as observed at the time of survey, but bench marks govern.
- (2) The "as-constructed" grade shall be such that each part of the completed drain will provide the capacity required for the area which it drains.
- (3) No reverse grade shall be allowed.
- (4) A variation in grade may be tolerated where the actual capacity of the drain exceeds the required capacity. "As-constructed" grade shall not deviate from the grade line more than 15% of the internal diameter for drain sizes 8 inches or less, or 10% of the internal diameter for sizes greater than 8 inches. These deviations are allowable, provided they are gradual over a distance of not less than 30 feet.

SECTION 5
OBSTRUC-
TIONS

- (1) All brush, timber, logs, stumps, stones or other obstructions in the course of the drain are to be removed to a sufficient distance to be clear of the work.

SECTION 6
BRUSH &
TREES

- (1) All brush and small trees having a diameter less than 6 inches, growing within 15 feet on each side of the drain are to be cut off flush with the ground surface and all of their roots within 10 feet of the tile are to be grubbed out.
- (2) All brush, trees and stumps that are removed are to be put into piles by the Contractor, in locations where they can be safely burned, and are to be burned by him. If, in the opinion of the Commissioner, any of the piles are too wet or green to be burned, he will so advise the Contractor who may then arrange, to the Commissioner's satisfaction, an agreement with the owners where the piles are located, for them to burn the material when dry enough.
- (3) Since the trees and brush that are cut off flush with the earth surface may sprout new growth later, it is strongly recommended that the Township make arrangements for spraying this new growth at the appropriate time so as to kill the trees and brush.

SECTION 7
FENCES

- (1) Where the Contractor finds it necessary to remove any fences in order to permit the installation of the drain or the removal of brush and the grubbing of roots, he will be required to use reasonable care in handling the fencing material and will re-construct the fences in as good condition as that in which they are found, or as the old material permits.
- (2) The Contractor is not to leave any fences open when he is not at work in the immediate vicinity.

SECTION 8
TILE

- (1) Unless otherwise specified, all tile is to be furnished at the site of the work, by the Municipality, and its cost charged as part of the cost of the drain.
- (2) It is to be first class agricultural tile, either clay or cement. Cracked, chipped or uneven tile will not be acceptable and are to be discarded by the Contractor.
- (3) Standard Clay Drain Tile shall meet all American Society for Testing and Materials specifications as set out in Designation C4-62 (Clay Drain Tile).
- (4) Concrete Drain Tile shall meet the specifications as set out in American Society for Testing Materials Designation C412-65.

SECTION 9
EXCAVATION
OF TRENCH

- (1) Construction of the trench shall normally start at the outlet and proceed up grade.
- (2) Minimum width of trench, measured at the top of the tile, shall be equal to the outside diameter of the tile plus approximately 6 inches, to permit proper soil placement around the tile, or the tile shall be embedded in a 120° circular groove.
- (3) The bottom of the trench shall be cut accurately to the grade line. It shall be smooth with a groove along the bottom center line to guide tile alignment. If a circular groove is used, it shall conform closely in shape to the outside diameter of the tile.
- (4) If the trench is excavated below grade for any reason, it shall be filled above the grade line with gravel or well-pulverized soil, tamped to provide a firm foundation. Then, the bottom of the trench shall be reshaped to the proper grade line.
- (5) When rock is encountered at grade level, the trench shall be excavated approximately 3 inches below grade level and filled to the proper grade line as described in paragraph (4).

- (6) If the depth of the drain exceeds the working depth of the trenching machine, the Contractor shall excavate the top portion of the trench to a suitable depth and width so that the trenching machine can be operated within its depth range. The top-soil is to be separated from the sub-soil and during the backfilling operation it shall be replaced as the top layer.

SECTION 10 LAYING PIPE

- (1) When the trench bottom is unstable, a stabilizing material shall be placed before laying the tile.
- (2) Laying of tile shall normally begin at the lower end of the drain and progress up grade. It is preferable that the tile be laid inside the shoe casting of the drainage machine during the trenching operation.
- (3) Tiles shall be laid in the groove with close joints on a firm bed, free of loose soil and to the grade line of the profile.
- (4) All soil or debris in the tiles shall be removed before installation.
- (5) All tiles shall be free from clinging wet or frozen material that would hinder the laying of the tile on grade.
- (6) The upper end of all tile runs shall be closed tightly with an end plug.
- (7) Before work is suspended for the day, all tiles laid in trenches shall be blinded and any open tile ends closed.

SECTION 11 CONNECTIONS

- (1) Intercepted lateral tiles shall connect with the main drain tiles so that their center lines intersect.
- (2) Existing drains shall be inspected by the Commissioner and if found to be in working order, they shall be connected to the new system. Drains containing very little sediment shall be directly connected and drains containing substantial quantities of sediment shall be indirectly connected through filter material.
- (3) Drains carrying sewage or farmstead wastes shall not be connected to the drainage system.
- (4) Plastic tubing connections to rigid drain tile shall be made with manufactured plastic adaptors.
- (5) Manufactured "T", "Y", or elbow fittings shall be used for connections at the junction of two drains.
- (6) All connections will be made by the Contractor as part of his work in installing the drain.

- (2) Large stones, roots, broken tile and other material likely to impede or damage field equipment shall be removed from the backfill and placed in a suitable disposal area.
- (3) To avoid the danger of damaging the tile, large stones and frozen lumps of soil shall not be dropped into the trench.
- (4) Surplus soil shall be spread over the adjacent field.
- (5) Except at laneways and road crossings, backfill material shall not be compacted; compaction should be allowed to occur naturally.

SECTION 15
LANE AND
DRIVEWAY
CROSSINGS

- (1) When called for in the Special Provisions, the Commissioner will supply, at the expense of the drain, corrugated steel pipe in place of tile for installation beneath farm lanes and private driveways. The Contractor will place the pipe as part of his work.
- (2) The pipe shall be laid in the trench with its invert at the grade line of the drain. Each end will be connected to the tile in a water-tight manner.
- (3) Unless otherwise specified, the bedding and backfill to the pipe will be native earth from the excavation. However, where driveways have a gravel surface, the Commissioner will supply granular materials for the Contractor to place as the upper layer of backfill to restore the driveway to its original condition.
- (4) The backfill will be carefully placed in the trench so as not to disturb the pipe. It will be carried to the top of the trench in thoroughly compacted 8" layers.

SECTION 16
ROAD
CROSSING

- (1) At road crossings, the Commissioner will supply, at the expense of the drain, corrugated steel pipe in place of tile for installation beneath the travelled part of the road. The Commissioner will also supply, at the expense of the drain, all necessary granular materials for bedding and backfill. The Contractor will install the pipe, complete, as part of his work.
- (2) The trench shall be excavated true to line and grade having a maximum width of 2 feet wider than the outside diameter of the pipe with vertical side walls. It shall be excavated to a depth to provide for 4 inches of granular bedding below the bottom of the pipe.
- (3) The pipe shall be laid with its invert at the grade line of the drain and with the inside circumferential laps pointing downstream. The supplied lengths of pipe shall be joined by means of "Standard Coupler Bands" installed to provide a water-tight connection.

- (4) Granular backfill will be placed in the trench below the travelled portion of the road, with excavated material used for backfill across the ditch areas. The granular material shall be placed in 6 inch layers up to the level of the adjoining roadway. Each layer shall be compacted to 100% proctor density before the succeeding layer is placed.

SECTION 17
EXISTING
TILE DRAIN

- (1) Where the new tile follows the course of an existing tile drain, the Contractor will locate the existing tile, before commencing work and will clearly mark it. He will then exercise reasonable care to avoid disturbing this existing tile.

SECTION 18
TILE
OUTLET

- (1) Where a drain discharges into an open outlet, the Contractor will install a length of steel pipe supplied by the Commissioner at the expense of the drain, in place of tile. The Commissioner will also supply for installation by the Contractor a removable wire mesh grating to be attached to the end of the pipe. Grate openings shall not exceed 1 inch.
- (2) The outlet pipe shall be installed as soon as the trench is excavated and shall extend to the toe of the slope of the open ditch.
- (3) Backfill for the outlet pipe shall be suitable excavated material placed and compacted in 6 inch layers up to the level of the adjoining ground.
- (4) The joint between the tile and the outlet pipe shall be sealed with concrete in a water-tight manner.

SECTION 19
NEW CATCH
BASINS

- (1) The Commissioner will arrange for the construction of concrete catch basins, at the expense of the drain, at the locations shown on the plan and profile and set out in the Special Provisions.
- (2) Concrete used for the catch basins is to be made from clean, well-graded gravel and fresh cement in the proportions of 5 parts of gravel to 1 part of cement. If ready-mix concrete is used, the class of concrete shall be 3,000 p.s.i. Clean water only is to be used and the concrete is to be well mixed before being placed in the forms.
- (3) The catch basin builder will provide and install removable steel or cast iron grating covers having an opening at least 24 inches square.
- (4) The elevation of the top surface of the catch basin cover is to be determined by the Commissioner and is to be such as to permit the entry of surface water into the basin, unless otherwise specified.