

**HARDY DRAIN NORTH 2021**  
**Township of Lucan Biddulph**



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Our Job No. 220190

December 9, 2021

London, Ontario  
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## **HARDY DRAIN NORTH 2021**

### **Township of Lucan Biddulph**

To the Mayor and Council of  
The Township of Lucan Biddulph

Mayor and Council:

We are pleased to present our report on the reconstruction of the Hardy Municipal Drain serving parts of Lots 3 and 4, Concessions N.L.R. and S.L.R. in the Township of Lucan Biddulph. The total watershed area contains approximately 24 hectares.

#### **AUTHORIZATION**

This report was prepared pursuant to Section 78 of the Drainage Act. Instructions were received from your Municipality with respect to a motion of Council. The work was initiated by a request signed by some of the affected landowners.

#### **HISTORY**

The Hardy Drain was originally constructed pursuant to a report submitted by C.P. Corbett, P. Eng., dated September 27, 1952, and consisted of approximately 1,190 meters of 200mm to 250mm tile and 30 meters of open ditch. The drain extended from an outlet on the west side of Coursey Line approximately 160 meters south of Highway 4, upstream south-easterly across Lot 3 and part-way across Lot 4 to its head.

#### **EXISTING DRAINAGE CONDITIONS**

At a site meeting held with respect to the project and through later discussions, the owners reported the following:

- that the existing drain is old and undersized by today's design standard and should be replaced with a larger tile
- that a commercial development is intended in the upper portion of the watershed on the south side of Highway 4, requiring the relocation of a portion of the drain and improved capacity downstream



## EXISTING DRAINAGE CONDITIONS (cont'd)

A field investigation and survey were completed. Upon reviewing our findings, we note the following:

- that the existing tile is functioning but considerably undersized by today's standards and shallow in places
- that there is significant grade in the lower portion of the drain
- that there is a very large amount of vertical drop from Coursey Line downstream to the Ausable River which consists of a small shallow watercourse

Preliminary design, cost estimates and assessments were prepared, and an informal public meeting was held to review the findings and preliminary proposals. Further input and requests were provided by the affected owners at that time and at later dates.

## DESIGN CRITERIA AND CONSIDERATIONS

The Drainage Coefficient method contained in the "DRAINAGE GUIDE FOR ONTARIO", Publication 29 by the Ontario Ministry of Agriculture, Food, and Rural Affairs is typically used to design municipal drains. The Drainage Coefficient defines a depth of water that can be removed in a 24-hour period and is expressed in millimetres per 24 hours. The coefficient used to design this drain with respect to capacity was 38mm per 24 hrs.

We would like to point out that there have been indications of unstable soil conditions, but this region is known to have stones present. It should be noted that no formal soil investigation has been made, with this information being provided by the owners.

Due to the significant grades along the drain and downstream, stormwater management measurements in the form of 'Water and Soil Control Basins' (WASCoB's) are being considered. The upstream most WASCoB and new tile will have flows enter directly from the proposed commercial development which has its own SWM facilities to restrict release flows to pre-development levels. The WASCoBs will further reduce downstream release flows to below current levels which will also accommodate for the extended period of elevated flows from the SWMP.

All of the proposed work has been generally designed and shall be constructed in accordance with the DESIGN AND CONSTRUCTION GUIDELINES FOR WORK UNDER THE DRAINAGE ACT.

## RECOMMENDATIONS

We are therefore recommending the following:

- that the existing tile drain be replaced with a new 200mm to 375mm concrete tile and sewer pipe including related appurtenances, and that the existing tile be destroyed where possible





## RECOMMENDATIONS (cont'd)

- that the remaining existing portions of the drain be officially abandoned as municipal drains under Section 19 of the Drainage Act. The owners may maintain the intact portions as private header tiles if they so wish
- that three WASCoBs, including catchbasins, be installed at various locations on the proposed drain to allow direct surface water entry into the new drain and detour surface flows, thereby reducing surface flow and erosion

Our design includes the wrapping of tile joints with geotextile to prevent the incursion of fine soil particles into the drain. If areas of poor soil are encountered at the time of construction, it may become necessary to install the tile on crushed stone bedding wrapped with geotextile or substitute plastic filter tile through such areas. The additional costs of such work would be an extra to the project. These areas are typically identified at the time of construction but may only become apparent after construction is completed. In this case, the extra costs for removal and reinstallation on stone bedding would be an extra to the project and if already billed become a supplementary billing.

In accordance with the principals of Section 14(2) of the Drainage Act, the existing surface waterway along the route of the tile drain(s) shall be part of the drainage works for future maintenance. The width available for the waterway shall be equal to the maintenance working width as noted on the Contract Drawings.

It is recommended that basement, cellar, or crawlspace drains be directed to a sump and then discharged onto the ground surface well away from foundations and septic systems or should owners desire to connect these drains to the new outlet drain, then it is suggested that they not be directly connected to the drains. Rather it is suggested that such a connection be made by an indirect method such as by sump pump with an open-air connection such as a mini-catchbasin, crushed stone filled excavation connected to a storm P.D.C. and should include a check valve and be piped above foundation level. It is noted that there is still a risk of flooding even with indirect methods of connection and any/all responsibility shall be borne by the owner. Downspouts from eavestroughs should be directed onto the ground surface well away from foundations and septic systems and are **not** permitted to be connected to the Municipal Drain.

## ENVIRONMENTAL CONSIDERATIONS AND MITIGATION MEASURES

Based on the information available, there are no significant wetlands, sensitive areas or endangered species along the route of the drains. The proposed construction of the Hardy Drain North 2021 includes stormwater management measures which greatly help reduce the overland surface flows and any subsequent erosion. A temporary flow check of silt fencing is to be installed in the ditch downstream of the tile outlet for the duration of the construction.

## SUMMARY OF PROPOSED WORK

The proposed work consists of approximately 941 lineal meters of 200mm to 375mm concrete tile and sewer pipe, including related appurtenances.



## SCHEDULES

Four schedules are attached hereto and form part of this report, being Schedule 'A' - Allowances, Schedule 'B' - Cost Estimate, Schedule 'C' - Assessment for Construction, and Schedule 'D' - Assessment for Maintenance.

Schedule 'A' - Allowances. In accordance with Sections 29 and 30 of the Drainage Act, allowances are provided for right-of-way and damages to lands and crops along the route of the drain as defined below.

Schedule 'B' - Cost Estimate. This schedule provides for a detailed cost estimate of the proposed work which is in the amount of \$166,500.00. This estimate includes engineering and administrative costs associated with this project.

Schedule 'C' - Assessment for Construction. This schedule outlines the distribution of the total estimated cost of construction over the roads and lands which are involved.

Schedule 'D' - Assessment for Maintenance. In accordance with Section 38 of the Drainage Act, this schedule outlines the distribution of future repair and/or maintenance costs for portions of, or the entire drainage works.

Drawing No. 1, Job No. 220190 and specifications form part of this report. They show and describe in detail the location and extent of the work to be done and the lands which are affected.

## ALLOWANCES

**RIGHT-OF-WAY:** Section 29 of the Drainage Act provides for an allowance to the owners whose land must be used for the construction, repair, or future maintenance of a drainage works.

For tile drains where the owners will be able to continue to use the land, the allowance provides for the right to enter upon such lands, and at various times for the purpose of inspecting such drain, removing obstructions, and making repairs. Also, the allowance provides for the restrictions imposed on those lands to protect the right-of-way from obstruction or derogation. The amounts granted for right-of-way on tile drains is based on a percentage of the value of the land designated for future maintenance. Therefore, the amounts granted are based on \$6,750.00/ha. through cropped lands. This value is multiplied by the hectares derived from the width granted for future maintenance and the applicable lengths. No right-of-way was previously provided for any of the existing drains being replaced or twinned.

**DAMAGES:** Section 30 of the Drainage Act provides for the compensation to landowners along the drain for damages to lands and crops caused by the construction of the drain. The amount granted is based on \$3,510.00/ha. This base rate is multiplied by the hectares derived from the working widths shown on the plans and the applicable lengths.





## ASSESSMENT DEFINITIONS

In accordance with the Drainage Act, lands that make use of a drainage works are liable for assessment for part of the cost of constructing and maintaining the system. These assessments are known as benefit, outlet liability and special benefit as set out under Sections 22 and 23 of the Act.

### SECTION 22

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

### SECTION 23

**Outlet** liability is assessed to lands or roads that may make use of a drainage works as an outlet either directly or indirectly through the medium of any other drainage works or of a swale, ravine, creek, or watercourse.

In addition, a Public Utility or Road Authority shall be assessed for and pay all the increased cost to a drainage works due to the construction and operation of the Public Utility or Road Authority. This may be shown as either benefit or special assessment.

## ASSESSMENT

A modified "Todgham Method" is typically used to calculate the assessments shown on Schedule 'C'- Assessment for Construction. This entails breaking down the costs of the drain into sections along its route. Special Assessments and Special Benefit Assessments are then extracted from each section.

The remainder is then separated into Benefit and Outlet Assessments. The Benefit is distributed to those properties receiving benefit as defined under "Assessment Definitions", with such properties usually being located along or close to the route of the drain. The Outlet is distributed to all properties within the watershed area of that section on an adjusted basis. The areas are adjusted for location along that section, and relative run-off rates. Due to their different relative run-off rates, forested lands are assessed for outlet at lower rates than cleared lands. Also, roads and residential properties are assessed for outlet at higher rates than cleared farmlands.

The actual cost of the work involving this report, with the exception of Special Assessments, is to be assessed on a pro-rata basis against the lands and roads liable for assessment for benefit and outlet as shown on Schedule 'C' - Assessment for Construction. The Special Assessments shall be levied as noted in the Section "Special Assessment".

The cost to restore water supply for any well determined to be impacted by any construction covered under this report shall become part of this report and be pro-rated with the costs provided for in this report.





## SPECIAL ASSESSMENT

In accordance with Section 26 of the Drainage Act, a Special Assessment has been made against the Township of Lucan Biddulph being the increased cost to the drainage work for installing a 375mm sewer pipe under their road, due to the construction and operation of Coursey Line. The Special Assessment shall be made up of the actual cost of this work and both the final and estimated values of the Special Assessment are to be calculated as follows:

Drain	Cost of Work	Less Equivalent Drain Cost (Fixed)	Plus Administration Cost	Plus Interest & Net H.S.T.	Special Assessment
375mm	\$5,700.00	\$480.00	\$1,950.00	\$250.00	\$7,420.00

In accordance with Section 26 of the Drainage Act, a Special Assessment has been made against Quadro Communications for the cost of locating and determining the elevation of their fibre optic telephone cable at Coursey Line, being the increased cost to the drainage works due to the construction and operation of their utilities. The Special Assessment shall be as shown on Schedule 'C'.

If any additional work is required to the drainage works due to the existence of buried utilities such as gas/water/oil pipelines, communications cables, etc. or if any of the utilities require relocation or repair, then, the extra costs incurred shall be borne by the utility involved in accordance with the provisions of Section 26 of the Drainage Act.

## GRANTS

In accordance with the provisions of Section 85 of the Drainage Act, a grant **may** be available for assessments against privately owned parcels of land which are used for agricultural purposes and eligible for the Farm Property Class Tax rate. Section 88 of the Drainage Act directs the Municipality to make application for this grant upon certification of completion of this drain. The Municipality will then deduct the grant from the assessments prior to collecting the final assessments.

## MAINTENANCE

Upon completion of construction, all owners are hereby made aware of Sections 80 and 82 of the Drainage Act which forbid the obstruction of or damage or injury to a municipal drain. This includes tree roots penetrating tiles from trees planted by owners or naturally occurring. For tiles through bush areas, we recommend the owner maintain the cleared space by either mowing (hay) or growing a crop over it. If no maintenance is completed over several years, we recommend the Municipality complete the mowing/clearing as part of maintenance at the discretion of the Drainage Superintendent.

After completion, the Hardy Drain North 2021 from Sta.0+000 to Sta.0+783 excluding the WASCoBs shall be maintained by the Township of Lucan Biddulph at the expense of all upstream lands and roads assessed in Schedule 'D' - Assessment for Maintenance and in the same relative proportions until such time as the assessment is changed under the Drainage Act. From Sta. 0+783 to Sta. 0+941 the drain shall be maintained by the Township of Lucan Biddulph at the sole expense of the property identified by roll number 001-328-A (Westdell Development Corp.) until such time as the assessment is changed under the Drainage Act.



**MAINTENANCE** (cont'd)

Special Assessments shall **not** be pro-rated for future maintenance purposes but shall be applied as an actual cost special if part of the maintenance.

Repairs or improvements to any road sub-surface road crossing shall be the responsibility of the applicable Road Authority, entirely at their cost.

For maintenance of the WASCoBs at Sta. 0+023 and Sta. 0+354, due to the purpose of their construction, the costs shall be pro-rated over the entire Schedule 'D' regardless of where on the drain the maintenance work is completed. The WASCoB facility at Sta. 0+774 shall be maintained by the Township of Lucan Biddulph at the expense of the adjacent property.

Respectfully submitted,

SPRIET ASSOCIATES LONDON LIMITED

M.P. DeVos, P. Eng.



MPD:bv





## SCHEDULE 'A' - ALLOWANCES

## Hardy Drain North 2021

## Township of Lucan Biddulph

In accordance with Sections 29 and 30 of the Drainage Act, we determine the allowances payable to owners entitled thereto as follows:

CON.	LOT	ROLL NUMBER (Owner)	Section 29 Right-of-Way	Section 30 Damages	TOTALS
<i>Geographic Bosanquet</i>					
SLR	Pt.2	010-190-04 (D. Hodgins & J. DeVree)	\$ 50.00	\$ 50.00	\$ 100.00
SLR	Pt.3	010-194 (Marvelous Mark's Transport)	3,480.00	2,750.00	6,230.00
SLR	Pt.3&4	001-328 (P. & S. Manders)	3,580.00	3,030.00	6,610.00
SLR	Pt.4	001-328-A(Westdell Development Corp.)	1,170.00	1,220.00	2,390.00
SLR	Pt.4	001-329 (F. & P. Wilson)	50.00	50.00	100.00
Total Allowances			\$ 8,330.00	\$ 7,100.00	\$ 15,430.00
<b>TOTAL ALLOWANCES ON THE Hardy Drain North 2021</b>			<b>\$ <u>15,430.00</u></b>		

## SCHEDULE 'B' - COST ESTIMATE

## Hardy Drain North 2021

## Township of Lucan Biddulph

We have made an estimate of the cost of the proposed work which is outlined in detail as follows:

**CONSTRUCTION**

Mobilization of equipment		\$	1,000.00
Supply & install 3 meters of 375mm dia., H.D.P.E. plastic sewer pipe including rodent gate and quarry stone rip-rap protection around pipe and end of ditch (Approximately 3m <sup>3</sup> quarry stone req'd)		\$	1,270.00
Installation of the following concrete field tile and sewer pipe (with rubber gaskets) including supply & installation of geotextile around tile joints (approx. 770m req'd), supply, installation and compaction of bedding for sewer pipe			
50 meters of 200mm dia. 2400-D concrete tile		\$	930.00
201 meters of 200mm dia. sewer pipe		\$	13,870.00
620 meters of 300mm dia. concrete tile		\$	11,760.00
52 meters of 350mm dia. concrete tile		\$	1,080.00
Supply of the above listed tile/pipe		\$	17,940.00
Contingency Allowance for stony conditions (18 pull outs)		\$	4,100.00
Contingency Allowance to install the new tile immediately adjacent to the existing tile and destroying the existing tile with a rubber tired backhoe afterwards (See General Notes on Drawings) (Approx. 725 meters)		\$	2,540.00
Destroy existing tile from sta. 0+725 to 0+935		\$	740.00
Strip, stockpile and relevel topsoil from tile trench and adjacent working area (4m wide) specified on drawings (approx. 718m)		\$	4,310.00
15.0 meters of 375mm sewer pipe			
Supply		\$	450.00
Installation under Coursey Line by open cut		\$	5,250.00
Supply and install one 200mm hickenbottom including prefabricated fittings		\$	800.00
Exposing and locating existing tile drains	(construction)	\$	1,200.00
Exposing and locating existing utilities	(report)	\$	430.00
	(construction)	\$	600.00
Construct worked WASCoB (Berm) @ Sta.0+023 using on-site native material strip, stockpile, and relevel topsoil (approx. 940m <sup>2</sup> )		\$	1,900.00
construct berm using adjacent on-site material including compaction (140 m <sup>3</sup> )		\$	2,800.00
supply & install one 250mm dia. "Hickenbottom" C.B. including 3m lead		\$	1,000.00
seed berm upon completion		\$	400.00



## SCHEDULE 'B' - COST ESTIMATE (cont'd)

**Hardy Drain North 2021**  
**Township of Lucan Biddulph**
**CONSTRUCTION (cont'd)**

Construct worked WASCoB (Berm) @ Sta.0+354 using on-site native material strip, stockpile, and relevel topsoil (approx. 470m <sup>2</sup> )	\$ 900.00
construct berm using adjacent on-site material including compaction (70 m <sup>3</sup> )	\$ 1,400.00
supply & install one 250mm dia. "Hickenbottom" C.B. including 3m lead	\$ 1,000.00
seed berm upon completion	\$ 400.00
 Construct WASCoB erosion and quantity storage area.	
Strip, stockpile, and relevel topsoil (approx. 3250m <sup>2</sup> )	\$ 8,130.00
Excavation including construction of slopes / banks (approx. 900m <sup>3</sup> )	\$ 9,000.00
Backfill area adjacent to WASCoB	\$ 3,250.00
Hauling and disposal of excess material (approx. 250m <sup>3</sup> )	\$ 2,000.00
Seeding upon completion	\$ 2,200.00
Construct turf reinforcement mat overflow chute	\$ 800.00
Construct quarry stone rock chute (approx. 3 m <sup>3</sup> )	\$ 800.00
Supply and install one 600mm x 600mm standard catchbasin including, grates and connections	\$ 2,200.00
 Tile connections as noted on plan	\$ 300.00
 Contract security financing	\$ 1,600.00
 Tile connections and contingencies	\$ 5,000.00
 Allowances under Sections 29 & 30 of the Drainage Act	\$ 15,430.00

**ADMINISTRATION**

Conservation Authority Review Fee	\$ 300.00
Interest and Net Harmonized Sales Tax	\$ 5,200.00
Survey, Plan and Final Report	\$ 23,940.00
Expenses	\$ 1,280.00
Supervision and Final Inspection	\$ <u>7,000.00</u>

<b>TOTAL ESTIMATED COST</b>	<b>\$ <u><u>166,500.00</u></u></b>
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## SCHEDULE 'C' - ASSESSMENT FOR CONSTRUCTION

## Hardy Drain North 2021

## Township of Lucan Biddulph

Job No. 220190

December 9, 2021

\* = Non-agricultural

CON.	LOT	HECTARES AFFECTED	ROLL No. (OWNER)	BENEFIT	OUTLET	TOTAL
<i>Geographic Bosanquet</i>						
NLR	EPt.3	2.4	010-136 (W. Hardy)	\$	\$ 3,132.00	\$ 3,132.00
NLR	Pt.4	0.8	001-327 (2219260 Ontario Inc.)		679.00	679.00
SLR	Pt .3	5.2	010-194 (Marvelous Mark's Transport)	21,200.00	5,363.00	26,563.00
SLR	Pt.3&4	9.3	001-328 (P. & S. Manders)	19,060.00	18,098.00	37,158.00
SLR	Pt.4	3.2	001-328-A(Westdell Development Corp.)	69,120.00	7,518.00	76,638.00
SLR	Pt.4	0.6	001-329 (F. & P. Wilson)	610.00	2,053.00	2,663.00
SLR	Pt.4	0.26	001-330 (J. & B. Porter)		628.00	628.00
TOTAL ASSESSMENT ON LANDS				\$ 109,990.00	\$ 37,471.00	\$ 147,461.00
Richmond Street				\$	\$ 5,033.00	\$ 5,033.00
Richmond Street					3,211.00	3,211.00
Coursey Line				1,350.00	445.00	1,795.00
TOTAL ASSESSMENT ON ROADS				\$ 1,350.00	\$ 8,689.00	\$ 10,039.00
<b>SPECIAL ASSESSMENT</b> against the Township of Lucan Biddulph for the increased cost of installing 375mm smooth wall pipe under Coursey Line						\$ 7,420.00
<b>SPECIAL ASSESSMENT</b> against Quadro Communications for the increased of locating and exposing their fibre optic along Coursey Line						\$ 1,580.00
<b>TOTAL ASSESSMENT ON THE HARDY DRAIN NORTH 2021</b>						<b>\$ 166,500.00</b>



## SCHEDULE 'D' - ASSESSMENT FOR MAINTENANCE

## Hardy Drain North 2021

## Township of Lucan Biddulph

Job No. 220190

December 9, 2021

\* = Non-agricultural

CON.	LOT	HECTARES AFFECTED	ROLL No. (OWNER)	BENEFIT	OUTLET	TOTAL
<b>STA. 0+000 to STA. 0+783</b>						
<i>Geographic Bosanquet</i>						
NLR	EPt.3	2.4	010-136 (W. Hardy)	%	3.40 %	3.40 %
NLR	Pt.4	0.8	001-327 (2219260 Ontario Inc.)		0.70	0.70
SLR	Pt .3	5.2	010-194 (Marvelous Mark's Transport)	23.80	5.80	29.60
SLR	Pt.3&4	9.3	001-328 (P. & S. Manders)	21.40	19.60	41.00
SLR	Pt.4	3.2	001-328-A(Westdell Development Cor	2.60	8.10	10.70
SLR	Pt.4	0.6	001-329 (F. & P. Wilson)	0.70	2.20	2.90
SLR	Pt.4	0.3	001-330 (J. & B. Porter)		0.70	0.70
TOTAL ASSESSMENT ON LANDS				48.50 %	40.50 %	89.00 %
Richmond Street		1.1	Ministry of Transportation	%	5.50 %	5.50 %
Richmond Street		0.8	Township of Lucan Biddulph		3.50	3.50
Coursey Line		0.3	Township of Lucan Biddulph	1.50	0.50	2.00
TOTAL ASSESSMENT ON ROADS				1.50 %	9.50 %	11.00 %
<b>TOTAL ASSESSMENT ON THE HARDY DRAIN NORTH 2021</b>						<b><u>100.00</u> %</b>

SCHEDULE OF NET ASSESSMENT

Hardy Drain North 2021

Township of Lucan Biddulph

(FOR INFORMATION PURPOSES ONLY)

Job No. 220190

December 9, 2021

\* = Non-agricultural

ROLL NUMBER (OWNER)	TOTAL ASSESSMENT	GRANT	ALLOWANCES	APPROX. NET
<i>Geographic Bosanquet</i>				
* 010-190-04 (D. Hodgins & J. DeVre	\$	\$	100.00	\$ -100.00
010-136 (W. Hardy)	3,132.00	1,044.00		2,088.00
001-327 (2219260 Ontario Inc.)	679.00	226.00		453.00
010-194 (Marvelous Mark's Transport)	26,563.00	8,854.00	6,230.00	11,479.00
001-328 (P. & S. Manders)	37,158.00	12,386.00	6,610.00	18,162.00
* 001-328-A(Westdell Development Cor	76,638.00		2,390.00	74,248.00
* 001-329 (F. & P. Wilson)	2,663.00		100.00	2,563.00
001-330 (J. & B. Porter)	628.00	209.00		419.00
* HWY 4 - MTO	\$ 5,033.00	\$	\$	\$ 5,033.00
* Richmond St. L.B.	3,211.00			3,211.00
* Coursey Line	1,795.00			1,795.00
Special Assessment	7,420.00			7,420.00
Quadro Communications				
Special Assessment	1,580.00			1,580.00
<b>TOTALS</b>	<b>\$ 166,500.00</b>	<b>\$ 22,719.00</b>	<b>\$ 15,430.00</b>	<b>\$ 128,351.00</b>