

# ENGINEERING REPORT

For

**NICKLAS DRAIN 2025**

**Township of Wilmot**

Region of Waterloo

Date: February 28, 2025

File No. 20-328



**K. SMART ASSOCIATES LIMITED**  
CONSULTING ENGINEERS & PLANNERS

85 McIntyre Drive  
Kitchener, ON N2R 1H6

Tel: 519-748-1199  
Fax: 519-748-6100

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SCHEDULE A – SCHEDULE OF ASSESSMENTS

SCHEDULE B – SCHEDULE OF ASSESSMENTS FOR MAINTENANCE

SCHEDULE C – SCHEDULE FOR ACTUAL COST BYLAW

APPENDIX A – CALCULATION OF ASSESSMENTS

SPECIAL PROVISIONS

STANDARD SPECIFICATIONS (Not Included. Hard copy specifications available upon request)

- Section 200 - General Conditions
- Section 300 - Special Provisions (See Drawings 12-13)
- Section 400 - Standard Specifications for Construction of Drains
- Section 410 - Standard Specifications for Open Drains
- Section 420 - Standard Specifications for Tile Drains

DRAWINGS 1 TO 13

### Definitions:

“Act” means The Drainage Act RSO 1990  
“CSP” means corrugated steel pipe  
“Drain” means Delton Reibling Municipal Drain  
“Grant” means grant paid under the Agricultural Drainage Infrastructure Program  
“HDPE” means high-density polyethylene  
“Township” means Township of Wilmot and/or Township of East Zorra-Tavistock  
“Region” means Region of Waterloo  
“County” means Oxford County  
“OMAFRA” means the Ontario Ministry of Agriculture, Food and Rural Affairs  
“GRCA” means Grand River Conservation Authority  
“DFO” means Fisheries and Oceans Canada  
“Tribunal” or “Drainage Tribunal” means Agriculture, Food and Rural Affairs Appeal Tribunal  
“ø” means diameter

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### NICKLAS DRAIN 2025

### TOWNSHIP OF WILMOT

## 1 EXECUTIVE SUMMARY

This report is prepared pursuant to Section 78 and 4 of the Drainage Act RSO 1990.

On September 8, 2020 the Township received a request for improvement under the Act from Karen Wagler for improvements to the Nicklas Drain in Pt. Lot 32, Concession 3, Block A. Pursuant to Section 8 of the Act, on November 18, 2020, K. Smart Associates Limited was appointed by resolution of Council to prepare a report on the Nicklas Drain under Section 78.

Subsequent to the original Section 78 appointment, the Township later received four (4) petitions under Section 4 of the Act: Zehr Farms Ltd./Douglas & Dolores Geisler, Kevin & Tracey Erb, Trustees of Grace Mennonite Fellowship Church, and finally Quiet Oak Dairy Farms and K. & K. Hunsberger.

To address the request for improvement and subsequent petitions, this report recommends the following highlights:

### **Main Drain, Branch 1, and Branch 2**

- 55m of existing open ditch deepening
- Enclosure of 227m of existing open ditch with 750mmø concrete tile
- 3,876m of 750mmø to 200mmø closed drain (concrete tile with the exception of 175m of solid plastic pipe through residential yards)
- One (1) - 1200x1200mm concrete JB, eight (8) - 900x1200mm concrete CBs, and twenty (20) – 600x600mm concrete CBs, including six (6) berms
- Six (6) paved road crossings by trenchless methods, and two (2) gravel road crossings by open cut

The estimated cost of this project is **\$830,000.**

The watershed served is approximately 136.9 hectares (338 acres).

Assessment schedules attached detail the construction and future maintenance of the drainage works.

- Schedule A shows the assessment of the total estimated cost
- Schedule B is for prorating future maintenance cost
- Schedule C is for levying the final cost of the Drain.
- Appendix A shows the calculations for assessments in Schedules A and B.

## **2 BACKGROUND**

On September 8, 2020 the Township received a request for improvement under the Act from Karen Wagler for improvements to the Nicklas Drain in Pt. Lot 32, Concession 3, Block A. Pursuant to Section 8 of the Act, on November 18, 2020, K. Smart Associates Limited was appointed by resolution of Council to prepare a report on the Nicklas Drain under Section 78.

Following discussions at the on-site meeting and the first public meeting, several petitions were signed and received by the Township for upstream extensions to the existing Nicklas Drain. The following outlines the total petitions received and dates appointments were made:

1. On January 25, 2021 the Township received a petition under Section 4 from Zehr Farms Ltd./ Douglas & Dolores Geisler to construct a new tile drain along an existing private drain (N.S. Roth Award Drain) servicing lands in the N1/2 Lot 31, Concession 3, Block A, Township of Wilmot. On February 28, 2021, K. Smart Associates Limited was appointed by resolution of Council to prepare a report on the petition received.
2. On July 4, 2024 the Township received a second petition under Section 4 from Kevin & Tracey Erb to construct new tile drains to service lands in Lot 31, Concession 2, Block A, Township of Wilmot. On July 29, 2024, K. Smart Associates Limited was appointed by resolution of Council.
3. On November 13, 2024 the Township received a third petition under Section 4 from the Trustees of Grace Mennonite Fellowship Church to service lands upstream of the *Branch Drain* in Part Lot 30, Concession 3, Block A, Township of Wilmot. On November 25, 2024, K. Smart Associates Limited was appointed by resolution of Council.
4. Finally, on January 28, 2025 the Township received a fourth petition under Section 4 signed jointly by John Van Bergeijk, President of Quiet Oak Dairy Farms, and Kevin & Karolyn Hunsberger for the extension of the *Main Drain* to service lands in Lot 30, Concession 2, Block A, Township of Wilmot. On February 3, 2025, K. Smart Associates Limited was appointed by resolution of Council.

In the case of each resolution, the Township instructed the Engineer to complete one report with respect to all petitions and the original Section 78 appointment.

## **3 DRAINAGE HISTORY**

The Nicklas Drain was originally established in accordance with a report by John B. Dodd, O.L.S. of Jewitt, Dodd and Vallee, dated November 16, 1964. The Drain originally consisted of a *Main Drain* and a *Branch Drain*. The *Main Drain* commenced on the west side of the Oxford-Waterloo boundary line (now referred to as Oxford Road 5) in Lot 33, Concession 19, East Zorra. The drain began as a 6" ø field tile heading west into Concession 18, then southerly into Lot 32 and 31, increasing in size to 8", 10" and then 12" ø tiles. In Lot 31, Concession 18, the *Main*

*Drain* merged with the *Branch Drain* and continued 850 feet as a 16" ø tile to an open ditch. The final 755 feet of open ditch continued southerly to its outlet at the Kuntze Drain, at what is now referred to as the Maplewood Sideroad.

The *Branch Drain* commenced at the 31/32 Lot line, Concession 3 Block A in the Township of Wilmot as a 10" ø field tile heading west, across the Oxford-Waterloo boundary (Oxford Road 5), into Lot 32, Concession 18, East Zorra, then southerly to its junction with the *Main Drain*.

Upstream of this *Branch Drain*, and prior to the construction of the Nicklas Drain, supplemental records outline a drain referred to as the N.S. Roth Award Drain, constructed in 1936 by the Award of Engineer, Herbert Johnston. The N.S. Roth Award Drain commenced at the west limits of Lot 30, Concession 2 Block A in the Township of Wilmot as an 8" ø tile, crossing what is now referred to as Diamond Road, into Lot 31, then across Bean Road and ending part way through Lot 31, Concession 3 Block A, Township of Wilmot. The N.S. Roth Award Drain connected into an existing 8" ø tile that proceeded the remaining distance across Lot 31 to an open ditch at the location that is now the top end of the *Branch Drain*.

#### **4 ON-SITE MEETING**

On December 17, 2020, an on-site meeting was held in accordance with Section 9(1) and 9(2) of the Act. Notice of the meeting was sent to the landowners most affected by the drain as well as affected agencies. The following attended the on-meeting: Gary Wagler, Bruce Bender, Rodrick Bender, Gary Zehr, Andrew Zehr, John Kuntze (Drainage Superintendent) and Curtis MacIntyre (Engineer).

The following input was provided by those in attendance:

##### **Gary Wagler (Roll No. 001-05300)**

Mr. Wagler explained that he experiences too much surface water crossing through his farm in the vicinity of the Branch Drain from upstream lands. He mentioned that he has previously fixed blow outs on the Branch Drain tile. He felt as though an improved tile should be extended past his farm up to at least Bean Road, if not Diamond Road.

He recalled that Oxford County had recently completed work at the location of the Branch Drain crossing on Oxford Road 5. He thought this may have been a new 450mm diameter (18") plastic pipe crossing on the Branch Drain.

Gary stated that the majority of his farm was tile drained and provided a map.

##### **Rodrick Bender (Roll No. 060-13800)**

Mr. Bender stated that he does occasionally notice washing out due to overland flow, but did not recall any blow outs of the tile. He understood that improvement to the Branch Drain would have to continue down through his farm, but stated no concerns with the drain in its current condition on his property.

**Bruce Bender (Roll No. 060-13700)**

Similar to Rodrick Bender, Bruce also occasionally noticed washing out of soils due to overland flow, but did not recall any blow outs of the tile on his farm either. Again, he understood that improvement to the Branch Drain would have to continue down through his farm.

Bruce also asked what the costs to his property may be if this short section of open ditch were to be enclosed into a tile drain. The engineer said they would survey the open ditch and prepare a cost for him.

Both Bender properties asked if the existing Branch Drain tile could remain intact and become private.

**Gary Zehr (Roll No. 001-05400)**

Gary agreed that the *Branch* of the Nicklas Drain should likely be extended through his property to improve the existing N.S. Roth Award Drain tile. He stated he would sign a petition for the extension.

**Andrew Zehr – Grace Mennonite Fellowship (Roll No. 001-05500)**

Andrew explained that the church has recently been looking to improve their drainage outlet. He said that they have found and run a camera through a 5" clay tile from the church property that heads northerly across Bean Road in the Diamond Road allowance in the direction of the top end of the N.S. Roth Award Drain adjacent to the Lichti farm (Roll No. 001-09900). He felt that this tile drain was approximately 4.5 feet below ground.

It was again noted that a petition under Section 4 would be required for this extension. Andrew expressed an interest in filing a petition on behalf of the church.

## **5 AUTHORITY FOR REPORT**

### **5.1 Section 78**

Section 78 of the Drainage Act provides for the repair and improvement of an existing drain constructed under the Drainage Act through a new Engineer's report. The Nicklas Drain was constructed under the Drainage Act, and it was determined from the on-site meeting and site examination that the Drain requires improvement. Therefore, this report is properly initiated under Section 78 of the Drainage Act. Under a Section 78, there can be no upstream extensions of the existing Drain.

### **5.2 Section 4**

Section 4 of the Drainage Act provides for the construction of new drainage works for an area requiring drainage.

#### **5.2.1 Zehr Farms Ltd./Geisler & Erb Petitions**

The official on-site meeting for the Zehr Farms Ltd./Geisler & Erb Petitions was jointly conducted during the information meeting on October 4, 2024. Discussions



from the meeting are later described in *Section 8 MEETINGS AND CONSULTATION* of this report.

In the vicinity of the *Branch Drain* watershed, the area requiring drainage was determined to be the approximate southeast 1/3 of the Erb property (Lot 31, Concession 2 Block A) for the purpose of surface water control and subsurface tile drainage, and the north half of the Zehr/Geisler farm (north ¼ of Lot 31, Concession 3 Block A) for the purpose of subsurface tile drainage. At the time of filing of this report, the Zehr/Geisler property is now jointly owned by Zehr/Hunsberger. In the case of both petitions, the signatures on the petitions represent greater than 60% of the hectareage in the area requiring drainage; thus, the petition is valid under Section 4(1)(b) of the Act.

At the on-site meeting for the petition, the Erb family expressed a desire to also obtain outlets for subsurface drainage at the north end (upstream of the *Main Drain*) and the southwest corners of their farm. The area requiring drainage was determined to be the approximate 1.5 and 10.8 hectares of land on the property with Roll No. 001-09600 for the purpose of subsurface tile drainage. In each case, the signature on the petition represents greater than 60% of the hectareage in the area requiring drainage; thus, the petition is valid under Section 4(1)(b) of the Act. As later described below in *Section 7 RECOMMENDED WORK*, to service the 10.8 hectares of land in the southwest corner of the Erb property, a new branch, referred to as **Branch 2** has been proposed. From this time on, the existing *Branch Drain* will be referred to as **Branch 1**.

#### 5.2.2 Trustees of Grace Mennonite Fellowship Church & Quiet Oak Dairy Farms/Hunsberger Petitions

The official on-site meeting for the Trustees of Grace Mennonite Fellowship Church and the Quiet Oak Dairy Farms/Hunsberger petitions were jointly conducted during the second information meeting on February 27, 2025.

For the Church petition, the area requiring drainage is the church building containing a high perimeter groundwater table and routinely running sump pump. A legal, and deeper, outlet is also required for the church to consider any basement improvements in the future. The signatures on the petition represent the majority in number of owners in the area requiring drainage; thus, the petition is valid under Section 4(1)(a) of the Act.

Additionally, in regards to the final petition, the area requiring drainage is the approximate 6.8 hectares of land, located west of the bush on Lot 30, Concession 2 Block A of property with Roll No. 001-09500, and the approximate 2.4 hectares of untilled land on property with Roll No. 001-10001, for the purpose of subsurface drainage. The signatures on the petition represent greater than 60% of the hectareage in the area requiring drainage; thus, this petition is also valid under Section 4(1)(b) of the Act.

## 6 INVESTIGATION

### 6.1 Site Examination and Survey

The route of the existing *Branch Drain* was examined after the on-site meeting. Topographic survey was completed in February 2021 of the *Branch Drain* and upstream extension to address the supplemental petitions. Additional survey was completed along Diamond Road to determine the split of the watershed boundary with the neighbouring *Delton Reibling Municipal Drain*.

Following the first public meeting where the owners indicated an interest in pursuing the *Main Drain* improvement, the full route of the *Main Drain* as examined by the engineer, with a topographic GPS survey following in December 2024.

Individual examinations were held at the Grace Mennonite Fellowship Church property and Quiet Oak/Hunsberger farms at the time the petitions were signed by the owners.

### 6.2 Watershed Description

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

The Nicklas Drain 2025 watershed is neighboured by the *Delton Reibling Municipal Drain* to the southeast, which recently underwent a new report under Section 78 of the Act, by the undersigned engineer, dated February 7, 2023. Additionally, the Nicklas Drain 2025 is neighboured by the *Nicklas Branch of the Kuntze Drain* to the west. As described by the Quiet Oak/Hunsberger petition, a portion of lands originally in the *Nicklas Branch of the Kuntze Drain* watershed is proposed to be connected to this Nicklas Drain 2025.

The watershed area of the Nicklas Drain 2025 is predominantly agricultural lands.

## 7 RECOMMENDED WORK

Major work items are listed below on a property by property basis. Further detail regarding the construction and maintenance of the Drain can be found in the Special Provisions and Drawings.

### K. Wagler (001-05300)

- 124m of 450mmø concrete tile
- 600x600mm catchbasin and 15m long berm on east property line and a 600x600mm catchbasin on the east side of Oxford Road 5

### J. & R. Hunsberger and Zehrs Farms Ltd. (001-05400)

- 435m of 350mmø and 300mmø concrete tile
- 600x600mm ditch inlet catchbasin on south side of Bean Road and a 600x600mm catchbasin on the west property line

Trustees of Grace Mennonite Fellowship Church (001-05500)

- 600x600mm catchbasin with cast iron grate, on south side of Bean Road

Quiet Oak Dairy Farms (001-09500)

- 216m of 200mmø concrete tile
- 600x600mm catchbasins on both property lines and a 17m long berm on the north property line

K. & T. Erb (001-09600)

- **Main Drain**
  - 75m of 250mmø concrete tile
  - 600x600mm ditch inlet catchbasin and 15m long berm on north property line, and a 600x600mm catchbasin on the east side of Oxford Road 5
- **Branch 1**
  - 65m of 300mmø concrete tile
  - 68m of 300mmø solid plastic pipe through yard
  - 600x600mm ditch inlet catchbasin on the north side of Bean Road and a 600x600mm catchbasin on the west side of Diamond Road
- **Branch 2**
  - 600x600mm catchbasin on the east side of Oxford Road 5

F. Becker (001-09700)

- 73m of 250mmø concrete tile
- 600x600mm ditch inlet catchbasin on south property line and a 600x600mm catchbasin on the west side of Diamond Road

R. & C. Lichti (001-09900)

- **Main Drain**
  - 115m of 200mmø concrete tile
  - 600x600mm catchbasin on north property line and a 600x600mm catchbasin on the east side of Diamond Road
- **Branch 1**
  - 78m of 250mmø concrete tile
  - 600x600mm catchbasins on east side of Diamond Road and north side of Bean Road

K. & K. Hunsberger (001-10001)

- 600x600mm catchbasin on south property line

S. Nickolas (060-12400 & 060-14000)

- 295m of 350mmø and 300mmø concrete tile through field west of yard (060-12400 property)

- 600x600mm catchbasin near west limits of barnyard (north of driveshed)
- 94m of 300mmø solid plastic pipe through yard
- 600x600mm catchbasins on the east and west sides of 19<sup>th</sup> Line (060-12400 and 060-14000 properties)
- 195m of 200mmø concrete tile (060-14000 property)
- 600x600mm catchbasin on the west side of Oxford Road 5

B. & E. Bender (060-13700)

- **Main Drain**
  - 55m of ditch deepening for section of existing ditch alongside Maplewood Sideroad
  - Permanent stilling basin with a 3m long x 1.5m wide bottom at the outlet of proposed new tile drain
  - 6m of 750mmø solid plastic pipe at outlet and 221m of 750mmø concrete tile along length of existing open ditch. Backfill of existing ditch.
  - 267m of 750mmø concrete tile to junction point with Branch 1
  - 189m of 525mmø concrete tile
  - 900x1200mm catchbasin and a 15m long berm on the north property line
- **Branch 1**
  - 227m of 525mmø concrete tile
  - 900x1200mm catchbasin on the north property line

R. & R. Bender (060-13800)

- **Main Drain**
  - 707m of 525mmø and 400mmø concrete tile
  - 900x1200mm catchbasins on both north and south property lines and a 900x1200mm ditch inlet catchbasin at the midpoint of the lot (on the tree/field line). 20m long berm on the north property line and restoration of the existing berm at the midpoint of the lot to existing conditions.
- **Branch 1**
  - 184m of 450mmø concrete tile
  - 900x1200mm catchbasins on the south property line and west side of Oxford Road 5
- **Branch 2**
  - 330m of 250mmø concrete tile
  - 600x600mm catchbasin on the west side of 19<sup>th</sup> Line at the road crossing location, north of 19<sup>th</sup> Line and Oxford Road 5 intersection, and a second 600x600mm catchbasin offset to capture surface water from the existing Oxford Road 5 culvert, south of 19<sup>th</sup> Line intersection.

*L. & L. Roth (001-060-13900)*

- 13m of 300mmø solid plastic pipe through southern corner of yard (north of spruce/cedar trees)
- 600x600mm catchbasin on the west side of Oxford Road 5

*Bean Road (Township of Wilmot)*

- **Branch 1**
  - 18m of 300mmø steel casing/HDPE pipe across road (between Diamond Road and Oxford Road 5) via trenchless methods. 600x600mm ditch inlet catchbasins on each side of road.
  - 16m of 300mmø steel casing/HDPE pipe across road (approx. 30m east of Diamond Road intersection) via trenchless methods. 600x600mm catchbasins on each side of road.

*Diamond Road (Township of Wilmot)*

- **Main Drain**
  - 16m of 300mmø steel casing/HDPE pipe across road (approx. 175m south of Oxford Road 5 intersection) via trenchless methods. 600x600mm catchbasins on each side of road.
- **Branch 1**
  - *Existing 300mmø solid plastic pipe across road to be incorporated (approx. 60m north of Bean Road intersection). 600x600mm catchbasins on each side of road.*

*19<sup>th</sup> Line (Township of East Zorra-Tavistock)*

- **Main Drain**
  - 15m of 300mmø solid plastic pipe across road (approx. 500m north of Oxford Road 5 intersection) by open cut. 600x600mm catchbasin on the west side of the road, and a 900x1200mm catchbasin on the east.
- **Branch 2**
  - 12m of 300mmø solid plastic pipe across road (approx. 75m north of Oxford Road 5 intersection) by open cut. 600x600mm catchbasin on west side of road only.

*Oxford Road 5 (County of Oxford/ Region of Waterloo)*

- **Main Drain**
  - 20m of 300mmø steel casing/HDPE pipe across road (approx. 525m north of Bean Road intersection) via trenchless methods. 600x600mm catchbasins on each side of road.
- **Branch 1**
  - 20m of 300mmø steel casing/HDPE pipe across road (approx. 350m south of Bean Road intersection) via trenchless methods. 900x1200mm catchbasins on each side of road

- **Branch 2**
  - 22m of 300mmø steel casing/HDPE pipe across road (approx. 20m north of Bean Road intersection) via trenchless methods. 600x600mm catchbasins on each side of road

## 8 MEETINGS AND CONSULTATION

### 8.1 First Public Information Meeting (& On-Site Meeting for New Petitions)

Attendees:

Gary Wagler	Larry Roth
Susan Nickolas	Dirk Heeg
Kevin & Tracey Erb	Gary Roth & Brian Cressman (Grace Mennonite)
Bruce Bender	Sam Jenson
Don Bender	John Scherer (Drainage Manager – EZT)
Gary Zehr & Justin Hunsberger	John Kuntze (Drainage Superintendent - Wilmot)
John Van Bergeijk	Curtis MacIntyre (K. Smart Associates)
Mike Oswald	

On October 4, 2024 a meeting was held at the Nickolas property to address the additional petitions received, provide draft costing and assessments for the proposed Branch Drain work, and determine the full scope of work for the project. The engineer briefly explained the history to date and the proposed tile sizes along the Branch Drain and potential Main Drain reconstruction.

Owners in attendance were in general favor with moving ahead with the full project and no stated concerns were made to the engineer regarding draft assessments. In addition, several more upstream owners expressed interest in signing petitions to extend the Drain to provide outlets to their lands. Generalized comments from all attendees are listed below:

#### G. Zehr & J. Hunsberger (001-05400) (Petitioner)

- Gary explained he signed the petition in order to replace the old failing N.S. Roth Drain across his farm and capture the surface water flowing across Bean Road at northern limits of the farm.
- Justin described an area behind the building, near the solar panel, that often expels water out of the ground to the surface during large storm events.

#### K. & T. Erb (001-09600) (Petitioner)

- Kevin and Tracey explained that they signed the petition after talking to the engineers and their farmland tenant, Gary Wagler, regarding improved outlets to their farm.
- The farm primarily drains to three (3) separate locations, none of which contain legal outlets. The SE corner of the property is served by the N. S. Roth Drain (now a private drain), the north portion is a private tile across Oxford Road 5 to the top end of the Main Drain, and the SW corner is served

by a private tile across Oxford Road 5 and 19<sup>th</sup> Line, into the R. & R. Bender farm.

- Gary has attempted to fix the outlets in the north and SW corners. Gary stated that the private tile across Oxford Road 5 at the north end of the farm is likely only a 4" tile. A couple weeks prior, Gary dug up the private tile at the SW corner. The tile was tracked half way across Oxford Road 5 to a point they could no longer push a camera. The dug hole filled up with water without much evidence of it draining away.
- Kevin recalled re-constructing approx. 200 feet of the N.S. Roth Drain from Diamond Road westerly through their yard to the approximate fire pit location. The work was done at two (2) times, the newest section about 5 years ago, the original work approx. 15 years ago.
- Overall, the Erbs were in favour of the work to provide new outlets at the locations of the Branch Drain and Main Drain.
- In a separate discussion with the engineer and the farmland tenant, it was agreed that the engineer could give them an estimate to include an additional branch across Oxford Road 5 toward the Main Drain to service the SW corner. After receiving this estimate, the Erbs elected to proceed with the additional new branch (**Branch 2**), under their current petition.

#### D. Bender (060-13800) and B. Bender (060-13700)

- Don provided the engineer with a tile plan for the farm following the meeting.
- Bruce said he no longer requires the concrete culvert over the surface swale located just upstream of the tile outlet. It could be removed by himself or as a part of the project.
- Don and Bruce Bender asked if the engineer could review the separation of the Branch and Main Drain tiles from the junction to the outlet. The engineer agreed to doublecheck the capacities of the two contributing tiles at the junction (proposed as 525mmø's) against the capacity of the 675mm, as well as the cost to separate the drains and run parallel to the outlet.
- As briefly mentioned in *Section 10 ENVIRONMENTAL CONSIDERATIONS* the topic of enclosing the bottom end of the Main Drain ditch from the existing tile outlet to the Kuntze Drain was re-visited.
  - Additional discussions on these topics are outlined in Section 8.2 *Follow-up Meeting with Bruce & Don Bender*, below.

#### G. Roth & B. Cressman (Grace Mennonite Fellowship Church – 001-05500)

- In discussion with the engineer and Township of Wilmot Drainage Superintendent, Gary and Brian believed it may be most beneficial at this time to petition for an outlet for the church, while the larger Nicklas Drain project is being undertaken.

#### J. Van Bergeijk (001-09500)

- John mentioned they were looking to tile their field at the corner of Diamond Road and Oxford Road 5. They had a contractor look at the farm, but nothing

progressed. John would be interested in signing a petition to get the Main Drain extended to his farm.

*J. Hunsberger (home farm north of Nicklas Drain watershed)*

- Justin explained there is a portion of his family's home farm located to the north of the Nicklas Drain watershed that is not tiled and they would like to tile it.
  - Field investigation following the meeting showed that the surface water from this farm and the north portion of the Quiet Oak Dairy Farms property should naturally drain across Oxford Road 5 to the west, across the north part of the Nickolas farm located between 19<sup>th</sup> Line and Oxford Road 5, then toward the *Nicklas Branch of the Kuntze Drain 1998* (R. J. Burnside, 1998). A review of the watershed for that report agreed.
  - The engineer said that in the survey for the Main Drain this additional extension could be reviewed.

*M. Oswald (001-09800)*

- Mike described the water he receives from a tile across Diamond Road in periods of heavy storms. The engineer believed this situation may be alleviated if the Main Drain is indeed extended upstream, on the east side of Diamond Road, to the Quiet Oak Dairy Farms property.

*Remaining Owners Present*

- The remaining owners present at the meeting, including S. Nickolas and G. Wagler, stated no concerns with the proposed work.

*R. Lichti (Roll No. 001-09900)*

- The engineer met Randy Lichti following the meeting and explained the highlights, as he could not make the original meeting time.
- Regarding the southern portion of his farm and the Branch Drain, Randy agreed that the Township had somewhat recently replaced the crossing of Diamond Road on the N.S. Roth Drain and that part of his field does experience some flooding of water coming out of the bush.
- Regarding the north portion, Randy explained the two locations that culverts cross Diamond Road from his property to the west. The first is located south of the buildings/laneway, while the second is in the yard, immediately north of the driveway. This second location catches water from his field and the Quiet Oak Dairy Farms field to the north. Randy believed there are two locations that water flows off of the Quiet Oak Dairy Farms field. The first is near Diamond Road and the second is half way from Diamond Road to the bush.

**8.2 Follow-up Meeting with Bruce & Don Bender**

An additional meeting was held on October 11<sup>th</sup>, 2024 with Bruce & Don Bender to review, in greater detail, the specifics of proposed work, tile size, tile plans for private systematic drainage, and the existing open ditch on their properties. The



result of the meeting was to propose an increase in tile size for the bottom end of the drain (proposed 675mmø to 750mmø) to better convey max flow at the Main Drain and Branch Drain junction, considering additional upstream extensions are now likely to occur. The engineer also agreed to re-initiate communication with the Department of Fisheries, Oceans for the enclosure of the open ditch of the Nicklas Drain.

### **8.3 Final Public Information Meeting (& On-Site Meeting for new Petitions)**

Attendees:

Gary Wagler	Gary Roth (Grace Mennonite)
Tracey Erb	Chad Woodhouse (Public Works Manager – Wilmot)
Bruce Bender	April Rooke (L & C Coordinator – Wilmot)
Don & Rod Bender	Claire Ohrling (Drainage Superintendent – EZT)
Gary Zehr	John Scherer (Drainage Coordinator – EZT)
Justin & Kevin Hunsberger	John Kuntze (Drainage Superintendent - Wilmot)
John Van Bergeijk	Curtis MacIntyre (K. Smart Associates)
Randy Lichti	

On February 27, 2025 a meeting was held at the Haysville Community Centre to address the additional petitions received (Trustees of Grace Mennonite Fellowship Church and Quiet Oak Dairy Farms & K. & K. Hunsberger), and review the final proposed work, costs and assessments with owners.

#### **Gary Roth (Representative for 001-05500) (Petitioner)**

- Though Mr. Roth is not on the Board of Trustees for the Grace Mennonite Fellowship Church, he was in attendance at a previous meeting with the Engineer, Drainage Superintendent, and Board members when the church property's drainage issues were discussed and the petition was signed. Mr. Roth confirmed the engineer's statement that the Church's petition was to obtain an improved and legal outlet for the church building's high groundwater table issues.

#### **John Van Bergeijk (001-09500) and Justin & Kevin Hunsberger (001-10001) (Petitioners)**

- Both owners confirmed that they signed a petition in order to extend the proposed Main Drain to their properties for the purpose of future private subsurface tile drainage.

With the exception of a few minor design changes requested, those present at the meeting were in general agreement with the proposed work.

## **9 DESIGN CONSIDERATIONS**

### **9.1 Drain Capacity**

The size of the proposed tile drain was determined using the Drainage Coefficient Method outlined in the *Drainage Guide for Ontario*, published by OMAFRA. The

drainage coefficient is a measure of the amount of runoff that a closed drain can remove from an upstream watershed in a 24-hour period.

Based on our watershed examination and landowner discussions, the proposed tile drains on this project have been designed for a 38mm (1.5") drainage coefficient.

### **9.1 Sufficient Outlet**

Section 15 of the Act requires that the proposed work be continued downstream to a sufficient outlet. Section 1 of the Act defines sufficient outlet as "a point at which water can be discharged safely so that it will do no damage to lands or roads." For this project the outlet of the Main Drain (entire Nicklas Drain 2025 watershed) will discharge into the open ditch of the Kuntze Drain. The Kuntze Drain open ditch provides for a sufficient outlet.

Furthermore, both of the proposed Branches 1 and 2 are to connect into the proposed Main Drain at Sta.'s 0+557 and 1+121, respectively. As outlined above, the Main Drain has been sized for a 38mm (1.5") drainage coefficient and therefore will be a sufficient outlet for both Branches.

### **9.2 Soil Conditions**

A review of the 1996 reports titled: *"Upgrade of Soil Survey Information for Oxford County"* and *"State of the Resources: Improving the Land Resource Data Base – The Regional Municipality of Waterloo Soil Information Upgrade"* indicate that the soils adjacent to the Drain are predominantly Perth Clay Loam for the portions of the Main Drain, Branch 2 and lower end of Branch 1 within Oxford County, and primarily Maplewood Loam (40%), with a mixture of Tavistock and Bennington Loams (30% each) for the upper end of the watershed within the Region of Waterloo. According to the reports, the drainage classifications for the majority of the above soils are considered to be poor to imperfectly drained. The Perth Clay Loam soils are described to contain slight surface stoniness.

Based on available information and the existence of many subsurface drainage systems in the watershed, adverse subsurface conditions are not expected on this project, and the use of conventional construction equipment is anticipated. Refer to the Standard Specifications for drain construction procedures when adverse subsurface conditions are encountered.

## **10 ENVIRONMENTAL CONSIDERATIONS**

### **10.1 Agency Notification**

Contact was made with the Grand River Conservation Authority and DFO during the process of preparing this report.

## **10.2 Agency Responses**

### **10.2.1 Grand River Conservation Authority**

The Grand River Conservation Authority did not request an environmental appraisal under Section 6 of the Act. A virtual meeting was held with the Conservation Authority on January 13, 2021. A comment letter from the Conservation Authority was received/dated January 18, 2021.

### **10.2.2 DFO**

A Request for Review was submitted to DFO along with a project description, photographs, and a drawing package for a potential enclosure of the open ditch portion of the Nicklas Drain. Following the submission a virtual meeting was held with the reviewing biologist on February 17, 2022. At that time the proposal was revised by the engineer and a “Letter of Advice” response was received from DFO dated April 22, 2022. Following the first Public Information Meeting on October 4, 2024, the owner of the property indicated they wished to re-pursue the open ditch enclosure. Discussions with the DFO biologist were re-initiated with current photographs of the generally dry bottom open ditch provided. On November 12, 2024 a subsequent “Letter of Advice” was received from DFO indicating the proposed works were not likely to result in serious harm to fish, provided a series of measures were undertaken. Highlights of said measures include:

- Protective timing window for the area of this project is March 15<sup>th</sup> - July 15<sup>th</sup>;
- Incorporate a rock plunge pool stilling basin at the enclosure outlet.
- Install three sections of 5m long gravel pockets in the bottom of the remaining open ditch to be deepened.

## **11 CONSTRUCTION CONSIDERATIONS**

### **11.1 Pre-Construction Approvals**

Before starting work, the Contractor shall ensure all public utilities are located and shall contact all landowners along the proposed drain route to determine the location of any private utilities. Permits are not required for the proposed work.

### **11.2 Construction Scheduling**

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

The letter provided by DFO require in-water work to be completed outside the March 15<sup>th</sup> – July 15<sup>th</sup> protective timing window.

### **11.3 Minor Adjustments During Construction**

Changes to the drain requested by landowners, agencies or other authorities after the bylaw is passed cannot be undertaken unless the report is amended.

Section 84.1 of the Act and the associated regulation, O. Reg. 500/21, now provide a process to amend this report if design changes are required during construction.

Design changes must: arise from unforeseen circumstances encountered during construction, comply with existing agency approvals, not increase the total project cost more than 133% of the tendered amount, and not impact the drain capacity. If design changes meet these criteria and are approved by the engineer, the report can be amended after construction with the as-constructed design before passing the Actual Cost Bylaw.

Additional work desired by the landowner(s) which is not part of the drainage works may be arranged with the Contractor provided the cost of the work is paid by the landowner(s), and the engineer reviews the additional work in advance. Such additional work is not part of the drainage works for future maintenance. If a substantial alteration is required, a revised report can be prepared and processed through the Act, or an application can be made under the Act to the Drainage Tribunal to recognize the substantial alteration. The applicant to the Tribunal must occur before final costs are levied.

#### **11.4 Alignment of Drains**

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

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

## **12 DRAWINGS AND SPECIFICATIONS**

### **12.1 Drawings**

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

The profiles and details for the Drain are on Drawing No.'s 2 to 11. The profiles show the depth and grade for proposed work and future maintenance.

Drawing No.'s 12 and 13 contain the Special Provisions.

### **12.2 Specifications**

This report incorporates the General Conditions, Standard Specifications and Special Provisions listed in the Table of Contents, which govern the construction and maintenance of the Drain.

### **13 COST ESTIMATE**

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

#### **13.1 Allowances**

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

##### **13.1.1 Section 29 – Right-of-Way**

Section 29 provides for payment of an allowance to landowners for the right-of-way required for the Drain. This allowance compensates the owners for land to accommodate the Drain, access routes to the Drain and for a corridor along the Drain for construction and maintenance purposes. Current agricultural land valuation reports were reviewed to establish the average value of land (considered to be approximately \$85,000/ha for this area). Due to the nature of the proposed Nicklas Drain 2025 being a closed pipe drain through mostly agricultural farm fields, this rate has been reduced to 1/10<sup>th</sup> of the land value (\$8,500/ha) for the purpose of computing right-of-way allowances. Section 29 allowances are based on an average right-of-way width of 6m, except in the case of the open ditch deepening (and widening) on the B. & E. Bender property from Sta. 0+003 to Sta. 0+063 where 1m width was used and no 1/10<sup>th</sup> reduction of land value.

##### **13.1.2 Section 30 - Damages**

Section 30 provides for payment of an allowance to landowners along the Drain for damages caused by the construction of the Drain. In agricultural areas, crop damages are computed based on published crop values and declining productivity loss in the years following construction. The allowance for damage to land and crops was calculated using the following rates:

\$3,750/hectare	- for access routes through cultivated lands
\$3,750/hectare	- for ditch bottom cleanout work along cultivated lands
\$2,250/hectare	- for tile drain construction along cultivated lands (including continual access along drain during construction)

Rates above are applied to an anticipated working area. For this project, 6m wide corridors are considered for ditch bottom cleanout work and access routes. A 25m wide corridor along the drain is used for the tile drain construction component. There is a minimum Section 30 allowance of \$100.

##### **13.1.3 Summary of Allowances**

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

Table 13.1-1 – Summary of Allowances

Roll Number	NICKLAS DRAIN 2025			Total
	Sec.29	Sec.30		
	R.O.W.	Damages		
	Tile Drain/Ditch	Tile Drain/Ditch	Access	
				(\$)
001-05300	650	700	900	2,250
001-05400	2,200	2,450	250	4,900
001-09500	1,100	1,200		2,300
001-09600				2,000
Main Drain	400	400		
Branch 1	700	350	50	
Branch 2		100		
001-09700	350	400		750
001-09900				2,200
Main Drain	600	600		
Branch 1	400	450	150	
001-10001		100		100
060-12400	2,000	1,650		3,650
060-13700				9,750
Main Drain	2,800	4,250	250	
Branch 1	1,150	1,300		
001-13800				13,850
Main Drain	3,600	3,950	350	
Branch 1	950	1,050	250	
Branch 2	1,700	1,900	100	
060-13900	50			50
060-14000	1,000	1,100	500	2,600
TOTAL ALLOWANCES:	19,650	21,950	2,800	44,400

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

### **13.2 Construction Cost Estimate**

The estimated cost for Labour, Equipment and Materials to construct the proposed Drain is outlined in detail in Estimated Costs Summary in Table 13.6-1 - Estimated Cost Summary. The construction cost estimate is based on recent costs for comparable work. A contingency amount is included to cover additional work that may be required due to field conditions or minor alterations to the project.

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



### **13.3 Engineering Cost Estimate**

Engineering costs include report preparation and attending the Council meeting to consider the report and the Court of Revision. Costs incurred during the consultation with environmental agencies (GRCA and DFO) have been separately identified for the purpose of OMAFRA tracking during the “Report Back Form” phase of the grant process. These costs include meetings, the collection and preparation of photo logs, Request for Review Form process, etc.

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

The cost for report preparation is usually not altered at the conclusion of a project unless the report is referred back or the report is appealed to the Drainage Tribunal, which would result in additional costs. The amount shown for meetings is an estimate. The final cost will be based on the actual time required for meetings. The estimate shown for construction phase services is based on experience and assumes good construction conditions and a Contractor who efficiently completes the construction. The final cost for the construction phase will vary as per the actual time spent during and following drain construction. Engineering costs are summarized in Table 13.6-1 - Estimated Cost Summary.

### **13.4 Estimate of Section 73 Costs**

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

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

Grant policy indicates that municipal cost for photo-copying and mailing required to carry out the required procedures under the Act can be included in the final drain cost. Section 73 costs are summarized in Table 13.6-1 - Estimated Cost Summary.

### **13.5 Harmonized Sales Tax**

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

**13.6 Estimated Cost Summary****Table 13.6-1 - Estimated Cost Summary**

DESCRIPTION				TOTAL
ALLOWANCES:				\$44,400
CONSTRUCTION COST ESTIMATE				
Item	Stations	Description	Cost	
i) MAIN DRAIN				
M1	0+000 to 0+003	No Work.	0	
M2	0+003	Construct temporary straw bale check dam.	500	
M3	0+003 to 0+058	55m of existing ditch deepening, 0.9m bottom width, 1.5:1 side slopes. Includes three (3) - 5m long gravel deposits in bottom of deepened ditch at approx. 0+005, 0+025, and 0+050 for Northern Pike spawning habitat.	2,800	
M4	0+058 to 0+063	Construct permanent stilling basin with 3m long x 1.5m wide bottom (~30m³ of excavation), and 20m² of new riprap on geotextile at outlet.	4,500	
M5	0+063 to 0+069	6m of 750mm dia. solid plastic pipe with rodent gate at outlet.	2,500	
M6	0+069 to 0+290	221m of 750mm dia. concrete tile with joint wrap.	34,300	
M7	0+063 to 0+290	227m of existing ditch to be backfilled and graded into overflow swale (1m bottom, graded to 12.5m each side of ditch centre)	6,600	
M8	0+290 to 0+557	267m of 750mm dia. concrete tile with joint wrap. Includes break up and abandoning existing 450mm conc. tile (1964).	41,400	
M9	0+557	1200x1200mm concrete JB, including connections and concrete lid. Also includes remove and disposal of existing 600x600mm JB.	5,000	
M10	0+557 to 0+746	189m of 525mm dia. concrete tile with joint wrap (parallel existing 300mm conc. tile (1964)).	17,400	
M11	0+745	Construct 15m long new berm as per detail. Seed berm.	1,300	
M12	0+746	900x1200mm concrete CB, including connections, birdcage grate and marker. Also includes remove and disposal of existing 600x600mm CB.	3,600	
M13	0+746 to 1+121	375m of 525mm dia. concrete tile with joint wrap (parallel existing 300mm conc. tile (1964)).	34,500	
M14	1+120	Restore berm to existing conditions as per detail. Seed berm.	800	
M15	1+121	900x1200mm concrete DICB, including connections, birdcage grate and marker. Also includes remove and disposal of existing 600x600mm DICB.	3,500	
M16	1+121 to 1+453	332m of 400mm dia. concrete tile with joint wrap (parallel existing 250mm conc. tile (1964)).	24,900	
M17	1+452	Construct 20m long new berm as per detail. Seed berm.	1,500	
M18	1+453	900x1200mm concrete CB, including connections, birdcage grate and marker. Also includes remove and disposal of existing 600x600mm CB.	3,500	
M19	1+453 to 1+628	175m of 350mm dia. concrete tile with joint wrap (parallel existing 200mm conc. tile (1964)).	11,400	
M20	1+628	600x600mm concrete CB, including connections, birdcage grate and marker.	2,300	
M21	1+628 to 1+748	120m of 300mm dia. concrete tile with joint wrap (parallel existing 200mm conc. tile (1964)).	7,200	



M22	1+748	600x600mm concrete CB, including connections, birdcage grate and marker.	2,400
M23	1+748 to 1+842	94m of 300mm dia. solid plastic pipe through yard to be installed via wheel trencher. Includes break up and abandoning existing 150mm clay/conc. tile (1964). Compaction of trench backfill around pipe and levelling topsoil. Hand seed disturbed grassed lawn areas.	12,200
M24	1+842	600x600mm concrete CB, including connections, birdcage grate and marker. Also includes remove and disposal of existing 600x600mm CB.	2,300
M25	1+842 to 1+857	15m of 300mm diameter solid plastic pipe across 19th Line by open cut. Includes remove and disposal of existing 150mm diameter conc. tile (1964). Includes restoration of road with full granular backfill and compaction.	11,000
M26	1+845 to 1+856	Remove and dispose of existing 450mm CSP. Install 11m of 375mm HDPE culvert, parallel to new drain, by open cut. Includes restoration of road with full granular backfill and compaction.	4,000
M27	1+857	900x1200mm concrete DICB, including connections, birdcage grate and marker. Also includes remove and disposal of existing 600x600mm CB.	3,200
M28	1+857 to 2+052	195m of 250mm dia. concrete tile with joint wrap (parallel existing 150mm conc. tile (1964)).	9,800
M29	2+052	600x600mm concrete CB, including connections, birdcage grate and marker. Also includes remove and disposal of existing 600x600mm CB.	2,400
M30	2+052 to 2+072	20m of 300mm dia. steel casing or HDPE pipe to be installed by trenchless methods.	18,000
M31	2+072	600x600mm concrete CB, including connections, birdcage grate and marker.	2,300
M32	2+072 to 2+147	75m of 250mm dia. concrete tile with joint wrap.	3,800
M33	2+147	600x600mm concrete CB, including connections, birdcage grate, and marker.	2,300
M34	2+146	Construct 10m long new berm as per detail. Seed berm.	1,500
M35	2+147 to 2+220	73m of 250mm dia. concrete tile with joint wrap.	3,700
M36	2+220	600x600mm concrete CB, including connections, birdcage grate, and marker.	2,300
M37	2+220 to 2+236	16m of 300mm dia. steel casing or HDPE pipe to be installed by trenchless methods.	18,000
M38	2+236	600x600mm concrete CB, including connections, birdcage grate, and marker.	2,300
M39	2+236 to 2+351	115m of 200mm dia. concrete tile with joint wrap.	5,200
M40	2+351	600x600mm concrete CB, including connections, birdcage grate, and marker.	2,300
M41	2+351 to 2+567	216m of 200mm dia. concrete tile with joint wrap.	9,700
M42	2+567	600x600mm concrete CB, including connections, birdcage grate, and marker.	2,500
M43	2+566	Construct 17m long new berm as per detail. Seed berm.	1,500
<b>Sub Total Part i)</b>			<b>332,200</b>

<b>ii) BRANCH 1</b>			
A1	0+557 to 0+784	227m of 525mm dia. concrete tile with joint wrap (parallel existing 250mm conc. tile (1964)).	20,900
A2	0+784	900x1200mm concrete CB, including connections, birdcage grate, and marker.	4,000
A3	0+784 to 0+968	184m of 450mm dia. concrete tile with joint wrap. Includes break up and abandoning existing 250mm clay/conc. tile (1964).	14,700
A4	0+968	900x1200mm concrete CB, including connections, birdcage grate, and marker. Also includes remove and disposal of existing 600x600mm CB.	3,500
A5	0+968 to 0+988	20m of 300mm dia. steel casing or HDPE pipe to be installed by trenchless methods.	18,000
A6	0+988	900x1200mm concrete CB, including connections, birdcage grate, and marker. Also includes remove and disposal of existing 600x600mm CB.	3,500
A7	0+988 to 1+112	124m of 450mm dia. concrete tile with joint wrap (parallel existing 250mm conc. tile (1964)).	9,900
A8	1+112	900x1200mm concrete CB, including connections, birdcage grate, and marker. Also includes remove and disposal of existing 600x600mm CB.	3,000
A9	1+111	Construct 15m long new berm as per detail. Seed berm.	1,500
A10	1+112 to 1+257	145m of 350mm dia. concrete tile with joint wrap. Includes break up and abandoning existing 200mm clay/conc. tile (date unknown).	9,400
A11	1+257 to 1+547	290m of 300mm dia. concrete tile with joint wrap. Includes break up and abandoning existing 200mm clay/conc. tile (1936).	17,400
A12	1+547	600x600mm concrete DICB, including connections, birdcage grate, and marker. Also includes remove and disposal of existing 600x600mm CB.	2,300
A13	1+547 to 1+565	16m of 300mm dia. steel casing or HDPE pipe to be installed by trenchless methods. Includes grouting of approx. 12m of existing 200mm CSP left under road.	18,000
A14	1+565	Construct 600x600mm DICB, including connections, birdcage grate, and marker. Also includes remove and disposal of existing 600x600mm CB.	2,300
A15	1+565 to 1+630	65m of 300mm dia. concrete tile with joint wrap. Includes break up and abandoning existing 200mm clay/conc. tile (1936).	3,900
A16	1+630 to 1+698	68m of 300mm dia. solid plastic pipe through yard to be installed via wheel trencher. Includes break up and abandoning any existing 200mm clay/conc. tile (1936) located in yard. Compaction of trench backfill around pipe and levelling topsoil. Hand seed disturbed grassed lawn areas.	8,800
A17	1+698	Construct 600x600mm CB, including connections, birdcage grate, and marker. Also includes remove and disposal of existing 600mm dia. CB.	2,300
A18	1+719	Construct 600x600mm CB, including connections, birdcage grate, and marker. Includes removal of existing hickenbottom.	2,300
A19	1+719 to 1+797	78m of 250mm dia. concrete tile with joint wrap.	3,900
A20	1+797	Construct 600x600mm CB, including connections, birdcage grate, and marker.	2,300
A21	1+797 to 1+813	16m of 300mm dia. steel casing or HDPE pipe to be installed by trenchless methods. Includes grouting of approx. 10m of existing 250mm CSP left under road.	18,000
A22	1+813	Construct 600x600mm CB, incl. connections, and CAST IRON, SQUARE FRAME GRATE WITH OPENINGS (OPSD 400.100 or similar)	2,800
<b>Sub Total Part ii)</b>			<b>172,700</b>

iii) BRANCH 2			
B1	0+000 to 0+330	330m of 250mm dia. concrete tile with joint wrap.	16,300
B2	0+300	Install offset 600x600mm CB to existing 375mm HDPE culvert on 19th Line with 18m of 200mm solid plastic pipe and tee connection on new Branch 2.	5,000
B3	0+330	Construct 600x600mm CB, including connections, birdcage grate, and marker.	2,300
B4	0+330 to 0+342	12m of 300mm diameter solid plastic pipe across 19th Line by open cut. Includes restoration of road with full granular backfill and compaction.	10,000
B5	0+342 to 0+355	13m of 300mm dia. solid plastic pipe through yard to proposed CB on Oxford Road 5. Compaction of trench backfill around pipe and levelling topsoil. Hand seed disturbed grassed lawn areas.	1,700
B6	0+355	Construct 600x600mm CB, including connections, birdcage grate, and marker.	2,300
B7	0+355 to 0+374	22m of 300mm dia. steel casing or HDPE pipe to be installed by trenchless methods.	18,000
B8	0+374	Construct 600x600mm CB, including connections, birdcage grate, and marker.	2,300
Sub Total Part iii)			57,900
iv) Contingencies			
C1	Increased costs to install 350m of tile by backhoe in stony conditions, where authorized and with thin bedding of clear crushed stone. (If required and authorized, would be in paid in addition to regular bid item above).		17,500
C2	Increased costs to install 200m of tile by backhoe in stony conditions, where authorized and with thin bedding of clear crushed stone. (Contingency is intended to be independent of tile size. If required and authorized, would be in paid in addition to regular bid item above).		6,000
C3	Contingency allowance for lift-outs of wheel machine to allow for stone removal, including the stone removal and restarting/continuing the wheel machine (based on 5 @ \$300/lift-out).		1,500
C4	Tile Connections (based on 20 @ \$200/connection).		4,000
C5	Hydroseed disturbed lawn areas on properties with Roll No.'s 060-12400 and 001-09600 (in lieu of hand seeding, item #'s M23 & A16) (based on 3,100m <sup>2</sup> at 5/m <sup>2</sup> )		15,500
C6	Lump sum contingency allowance		11,900
Sub Total Part iv)			56,400
Net HST (1.76%)			10,905
TOTAL CONSTRUCTION COST ESTIMATE:			\$630,105
ENGINEERING COSTS			
Report Preparation			
Engineering/Design			77,000
Agency Consultation (DFO/GRCA)			3,000
Total Report Preparation			80,000
Consideration of Report Meeting			1,500
Court of Revision			1,500
Construction Phase Services			55,000
Net HST (1.76%)			2,695
TOTAL ENGINEERING COSTS:			\$140,695
TOTAL SECTION 73 COSTS:			\$14,800
TOTAL ESTIMATED COST:			\$830,000

## 14 ASSESSMENTS

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

### 14.1 Calculation of Assessments

Appendix A in this report shows the method of calculating the assessments for the Drain. Appendix A divides the Drain into intervals. The estimated cost for each interval is then determined. For each interval, the first step in the assessment calculation is to determine the benefit assessment to the affected lands and roads, then special assessments to roads and utilities are determined, where applicable. After deducting the total benefit and special assessments from the interval cost, the balance of the cost is then assessed as outlet liability on a per hectare basis to all lands and roads in the watershed.

#### 14.1 Benefit Assessments (Section 22 and 24)

Benefit assessments are listed in Schedule A – Schedule of Assessments and shown on a per interval basis in Appendix A – Calculation of Assessments.

Section 22 benefits represent the estimated value provided to the property by the works based on the following benefit categories: Direct Outlet (typ. \$3,000 and is defined as the ability of a property to connect directly to the new drain), Improved Drainage (range of \$35 to \$90/m and is the improved drainage along the length of the drain crossing a property), and Subsurface Service Area (typ. \$750/tile-able hectare and is the size of land area that is or could be directly connected via subsurface tile drains).

#### 14.2 Outlet Liability Assessments (Section 23)

Section 23(3) of the Drainage Act states that outlet liability assessment is to be based on the volume and rate of the water artificially caused to flow. Therefore the lands and roads in the watershed are assessed on a per hectare basis, with adjustments made to recognize the different amount of runoff generated by different land uses. The basis for the adjustments is 1 hectare of cleared agricultural land contributing both surface and subsurface water to the Drain. Land uses with a different runoff rate are adjusted by the factors given in Table 14.2-1 - Runoff Factors Table.

Table 14.2-1 - Runoff Factors Table

Land Use	Runoff factor
Agricultural	1
Forest	0.5
Lands Tiled In/Away	0.5
Paved Roads	3
Gravel Roads	2

### **14.3 Assessment Schedules**

For all assessment schedules, each parcel of land assessed has been identified by the municipal assessment roll number at the time of the preparation of this report. The size of each parcel was established using the assessment roll information. If an "F" is shown in the first column, it denotes lands with current Farm Property Tax Class designation that may qualify for Grant. For convenience only, each parcel is also identified by the owner name(s) from the last revised assessment roll.

#### **14.3.1 Schedule A- Schedule of Assessments**

The estimated cost for the drainage works in this report is distributed among lands, roads and utilities, as shown in Schedule A, the Schedule of Assessments for Construction.

#### **14.3.2 Schedule B -Schedule of Assessments for Maintenance**

In accordance with Section 74 of the Act, the Drain shall be maintained by the Township, and the cost of maintenance shall be assessed to lands and roads upstream of the maintenance location, pro rata with the amounts in Schedule B. The \$ amounts in Schedule B are listed solely for calculating percentages (share of future maintenance costs) and will not be levied with the final cost of the Drain.

Schedule B in this report also includes the remainder of the "A" Drain tile portion, not proposed for improvement at this time.

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

#### **14.3.3 Schedule C – Schedule for Actual Cost Bylaw**

After the construction of the Drain is certified, complete by the Engineer, the Township will determine the actual cost of the Drain. Actual assessments will be determined by prorating the actual cost of the Drain using Schedule C. Schedule C illustrates the estimated net assessments after deducting allowances and grants from the total assessments shown in Schedule A. Eligibility for the grant will be confirmed by the Township at the time the actual cost is levied. Actual assessments in Schedule C will be levied to the owner of the identified parcel at the time the Actual Cost Bylaw is passed.

## **15 GRANT**

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

Property Tax Class are identified with an 'F' in the first column of the assessment schedules.

Section 88 of the Act provides for the Township to apply for this grant after the construction of the Drain is certified complete by the Engineer. The Township must confirm the Farm Property Tax Class on the assessed parcels at the time the grant application is completed and submitted to OMAFRA. OMAFRA has the authority to determine grant eligibility regardless of the designation herein.

If any portion of the drainage works is not eligible for the grant, those ineligible costs have been separately identified in Schedule A and Appendix A. For this project, the \$43,400 ditch enclosure work shown under **Main Drain (Interval 1)** have been identified as non-grantable items (Item #'s M5, M6, and M7).

## **16 PRIVACY OF LANDS**

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

## **17 MAINTENANCE**

### **17.1 General**

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

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

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

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

### **17.1 The Drain For Future Maintenance**

The Nicklas Drain 2025, for the purpose of future maintenance, will include all concrete tile, catchbasins, road crossings, berms, and stilling pools as defined and constructed in accordance with the drawings and special provisions of this report.

In accordance with Section 19 of the Act, the entirety of the existing Nicklas Drain (1964) will be hereby abandoned of status under the Drainage Act, and for the portions that remain, shall become private drains for the owners to maintain on their own lands.

### **17.2 Updating Future Maintenance Schedules**

To ensure future maintenance assessments are equitable, the assessments provided in this report should be reapportioned under Section 65 when severances or amalgamations occur when new lands are connected to the Drain or when a land-use change occurs that can be accommodated by the existing Drain. If a future land-use change will cause the drain capacity to be exceeded, a report under Section 4 or 78 may be required to provide increased capacity.

## **18 BYLAW**

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

All of which is respectfully submitted,

K. SMART ASSOCIATES LTD.

Curtis MacIntyre, P. Eng.



SCHEDULE A - SCHEDULE OF ASSESSMENTS FOR CONSTRUCTION  
NICKLAS DRAIN 2025  
TOWNSHIP OF WILMOT /  
TOWNSHIP OF EAST ZORRA - TAVISTOCK

			MAIN DRAIN							BRANCH 1					BRANCH 2					Gross Total Assessment					
Con	Lot	Roll No. (Owner)	Total ha affected	Benefit (Sec. 22)	Benefit Non-Grant	Special (Sec. 26)	Outlet (Sec. 23)	Outlet Non-Grant	Total	Total ha affected	Benefit (Sec. 22)	Special (Sec. 26)	Outlet (Sec. 23)	Total	Total ha affected	Benefit (Sec. 22)	Special (Sec. 26)	Outlet (Sec. 23)	Total	Total Benefits	Benefit Non-Grant	Total Special	Total Outlets	Outlet Non-Grant	TOTAL
Township of Wilmot (Roll No. 20-18-010-)																									
F 3 Blk A	Pt. 32 & 33	001-05300 (K. Wagler)	10.1	2,000	0	0	4,289	1,145	7,434	4.7	14,600	0	2,530	17,130	0.0	0	0	0	0	16,600	0	0	6,819	1,145	24,564
F 3 Blk A	Pt. 31	001-05400 (J. & R. Hunsberger and Zehr Farms Ltd.)	18.7	0	0	0	7,940	2,120	10,060	18.7	38,800	0	16,140	54,940	0.0	0	0	0	0	38,800	0	0	24,080	2,120	65,000
3	Pt. 30	001-05500 (Trustees of Grace Mennonite Fellowship Church)	0.3	0	0	0	127	34	161	0.3	3,200	0	699	3,899	0.0	0	0	0	0	3,200	0	0	826	34	4,060
3	Pt. 30	001-05505 (Bethel Chapel and Cemetery Board)	0.1	0	0	0	42	11	53	0.1	0	0	233	233	0.0	0	0	0	0	0	0	0	275	11	286
3	Pt. 30	001-05600 (S. & E. Hughes)	1.4	0	0	0	594	159	753	1.4	0	0	3,265	3,265	0.0	0	0	0	0	0	0	0	3,859	159	4,018
F 2	Pt. 29 & 30	001-09500 (Quiet Oak Dairy Farms)	5.8	14,800	0	0	17,413	488	32,701	0.0	0	0	0	0	0.0	0	0	0	0	14,800	0	0	17,413	488	32,701
F 2	Pt. 31	001-09600 (K. & T. Erb)	17.4	7,100	0	0	16,517	1,973	25,590	5.1	15,200	0	5,132	20,332	10.8	11,100	0	13,249	24,349	33,400	0	0	34,898	1,973	70,271
2	Pt. 31	001-09700 (F. Becker)	0.8	3,900	0	0	2,337	91	6,328	0.0	0	0	0	0	0.0	0	0	0	0	3,900	0	0	2,337	91	6,328
2	Pt. 31	001-09800 (M. & N. Oswald)	0.3	0	0	0	877	34	911	0.0	0	0	0	0	0.0	0	0	0	0	0	0	0	877	34	911
F 2	Pt. 30	001-09900 (R. & C. Licht)	17.2	11,300	0	0	21,153	1,848	34,301	11.5	13,300	0	10,666	23,966	0.0	0	0	0	0	24,600	0	0	31,819	1,848	58,267
2	Pt. 30	001-09901 (S. & R. Jensen)	1.4	0	0	0	297	79	376	1.4	0	0	704	704	0.0	0	0	0	0	0	0	0	1,001	79	1,080
F 2	Pt. 30	001-10001 (K. & K. Hunsberger)	2.4	4,800	0	0	9,718	272	14,790	0.0	0	0	0	0	0.0	0	0	0	0	4,800	0	0	9,718	272	14,790
Subtotal (Lands):			75.9	43,900	0	0	81,304	8,254	133,458	43.2	85,100	0	39,369	124,469	10.8	11,100	0	13,249	24,349	140,100	0	0	133,922	8,254	282,276
Bean Road (Township of Wilmot)			1.5	0	0	0	2,360	510	2,870	1.2	9,000	50,080	5,483	64,563	0.3	0	0	818	818	9,000	0	50,080	8,661	510	68,251
Diamond Road (Township of Wilmot)			1.8	750	0	25,135	7,687	612	34,184	1.0	3,000	0	2,935	5,935	0.1	0	0	368	368	3,750	0	25,135	10,990	612	40,487
1/2 Oxford Road 5 (Township of Wilmot)			1.4	2,250	0	12,720	4,128	476	19,574	0.4	1,500	12,975	646	15,121	0.4	1,500	12,210	1,472	15,182	5,250	0	37,905	6,246	476	49,877
Subtotal (Roads):			4.7	3,000	0	37,855	14,175	1,598	56,628	2.6	13,500	63,055	9,064	85,619	0.8	1,500	12,210	2,658	16,368	18,000	0	113,120	25,897	1,598	158,615
Total Assessment Township of Wilmot:			80.6	46,900	0	37,855	95,479	9,852	190,086	45.8	98,600	63,055	48,433	210,088	11.6	12,600	12,210	15,907	40,717	158,100	0	113,120	159,819	9,852	440,891
Township of East Zorra-Tavistock (Roll No. 32-38-010-)																									
F 18	S Pt. 33	060-12400 (S. Nickolas)	8.3	31,100	0	0	17,168	941	49,209	0.0	0	0	0	0	0.0	0	0	0	0	31,100	0	0	17,168	941	49,209
F 18	Pt. 33 & 34	060-12500 (Highaven Holsteins Inc.)	2.0	0	0	0	4,137	227	4,364	0.0	0	0	0	0	0.0	0	0	0	0	0	0	0	4,137	227	4,364
F 18	E Pt. 31	060-13700 (B. & E. Bender)	10.5	38,600	26,800	0	3,864	1,032	70,296	0.0	15,900	0	0	15,900	0.0	0	0	0	0	54,500	26,800	0	3,864	1,032	86,196
F 18	E Pt. 32	060-13800 (R. & R. Bender)	24.5	67,600	0	0	28,280	2,789	98,669	3.3	15,000	0	1,776	16,776	0.0	9,800	0	0	9,800	92,400	0	0	30,056	2,789	125,245
F 19	32	060-13900 (L. & L. Roth)	1.2	0	0	0	1,108	136	1,244	0.0	0	0	0	0	1.2	500	0	1,091	1,591	500	0	0	2,199	136	2,835
F 19	33	060-14000 (S. Nickolas)	6.9	15,000	0	0	14,439	782	30,221	0.0	0	0	0	0	1.3	0	0	1,182	1,182	15,000	0	0	15,621	782	31,403
Subtotal (Lands):			53.4	152,300	26,800	0	68,996	5,907	254,003	3.3	30,900	0	1,776	32,676	2.5	10,300	0	2,273	12,573	193,500	26,800	0	73,045	5,907	299,252
19TH Line (Township of East Zorra-Tavistock)			1.3	3,000	0	16,180	4,003	296	23,479	0.0	0	0	0	0	0.0	3,000	14,650	0	17,650	6,000	0	30,830	4,003	296	41,129
1/2 Oxford Road 5 (Oxford County)			1.6	2,250	0	12,720	4,382	545	19,897	0.4	1,500	12,975	646	15,121	0.0	1,500	12,210	0	13,710	5,250	0	37,905	5,028	545	48,728
Subtotal (Roads):			2.9	5,250	0	28,900	8,385	841	43,376	0.4	1,500	12,975	646	15,121	0.0	4,500	26,860	0	31,360	11,250	0	68,735	9,031	841	89,857
Total Assessment Township of East Zorra-Tavistock:			56.3	157,550	26,800	28,900	77,381	6,748	297,379	3.7	32,400	12,975	2,422	47,797	2.5	14,800	26,860	2,273	43,933	204,750	26,800	68,735	82,076	6,748	389,109
TOTAL ASSESSMENTS NICKLAS DRAIN 2025:			136.9	204,450	26,800	66,755	172,860	16,600	487,465	49.5	131,000	76,030	50,855	257,885	14.1	27,400	39,070	18,180	84,650	362,850	26,800	181,855	241,895	16,600	830,000

Notes:

- Lands noted with an "F" are classified as agricultural and according to current OMAFRA policy qualify for the 1/3 grant  
Eligibility for the 1/3 grant will be confirmed at the time the final cost is levied.
- Section 21 of the Drainage Act, RSO 1990 requires that assessments be shown opposite each parcel of land and road affected.  
The affected parcels of land have been identified using the roll number from the last revised assessment roll for the County/Township.  
For convenience the owner's names as shown by the last revised assessment roll have also been included.



SCHEDULE B - SCHEDULE OF ASSESSMENTS FOR FUTURE MAINTENANCE  
NICKLAS DRAIN 2025  
TOWNSHIP OF WILMOT /  
TOWNSHIP OF EAST ZORRA - TAVISTOCK

Con			MAIN DRAIN												BRANCH 1								BRANCH 2			
			Interval 1		Interval 2		Interval 3		Interval 4		Interval 5		Interval 6		Interval 1		Interval 2		Interval 3		Interval 4		Interval 1		Interval 2	
			0+000 to 0+557		0+557 to 1+121		1+121 to 1+857		1+857 to 2+072		2+072 to 2+236		2+236 to 2+567		0+557 to 0+988		0+988 to 1+547		1+547 to 1+698		1+698 to 1+813		0+000 to 0+330		0+330 to 0+374	
Lot			\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%	\$	%
Township of Wilmot (Roll No. 20-18-010-)																										
3 Blk A	Pt. 32 & 33	001-05300 (K. Wagler)	5,289	6.58	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	5,780	11.74	12,350	29.52	0	0.00	0	0.00	0	0.00	0	0.00
3 Blk A	Pt. 31	001-05400 (J. & R. Hunsberger and Zehr Farms Ltd.)	8,940	11.12	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	9,350	19.00	14,974	35.80	0	0.00	0	0.00	0	0.00	0	0.00
3	Pt. 30	001-05500 (Trustees of Grace Mennonite Fellowship Church)	127	0.16	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	261	0.53	797	1.91	532	3.60	3,263	31.00	0	0.00	0	0.00
3	Pt. 30	001-05505 (Bethel Chapel and Cemetery Board)	42	0.05	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	54	0.11	32	0.08	14	0.09	133	1.26	0	0.00	0	0.00
3	Pt. 30	001-05600 (S. & E. Hughes)	594	0.74	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	754	1.53	455	1.09	200	1.35	1,856	17.63	0	0.00	0	0.00
2	Pt. 29 & 30	001-09500 (Quiet Oak Dairy Farms)	1,826	2.27	2,144	3.37	5,425	6.84	1,271	8.48	3,190	19.18	8,072	40.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2	Pt. 31	001-09600 (K. & T. Erb)	7,888	9.82	6,132	9.64	2,718	3.43	2,743	18.30	5,044	30.32	0	0.00	2,745	5.58	4,107	9.82	5,914	40.00	0	0.00	11,461	45.00	3,205	50.00
2	Pt. 31	001-09700 (F. Becker)	340	0.42	399	0.63	916	1.16	236	1.57	2,396	14.40	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2	Pt. 31	001-09800 (M. & N. Oswald)	127	0.16	150	0.24	344	0.43	89	0.59	167	1.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2	Pt. 30	001-09900 (R. & C. Lich)	6,921	8.61	2,842	4.47	6,528	8.23	1,734	11.57	2,928	17.60	5,877	29.12	5,706	11.59	5,243	12.53	4,294	29.04	3,157	30.00	0	0.00	0	0.00
2	Pt. 30	001-09901 (S. & R. Jensen)	297	0.37	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	377	0.77	227	0.54	100	0.68	0	0.00	0	0.00	0	0.00
2	Pt. 30	001-10001 (K. & K. Hunsberger)	1,019	1.27	1,197	1.88	3,249	4.10	709	4.73	1,738	10.45	5,106	25.30	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Total Assessments on Lands:			33,410	41.57	12,864	20.23	19,180	24.19	6,782	45.24	15,463	92.95	19,055	94.42	25,027	50.85	38,185	91.29	11,054	74.76	8,409	79.89	11,461	45.00	3,205	50.00
Bean Road (Township of Wilmot)			1,911	2.38	449	0.70	0	0.00	0	0.00	0	0.00	0	0.00	1,938	3.94	2,670	6.38	1,887	12.76	2,116	20.11	818	3.21	0	0.00
Diamond Road (Township of Wilmot)			2,293	2.85	1,197	1.88	2,405	3.03	621	4.14	1,171	7.04	375	1.86	1,616	3.28	975	2.33	1,844	12.48	0	0.00	273	1.07	95	1.49
1/2 Oxford Road 5 (Township of Wilmot)			1,784	2.22	1,046	1.64	1,031	1.30	1,016	6.78	1	0.01	375	1.86	1,396	2.84	0	0.00	0	0.00	0	0.00	1,090	4.28	1,132	17.66
Total Assessments on Roads:			5,988	7.45	2,692	4.22	3,436	4.33	1,637	10.92	1,172	7.05	750	3.72	4,950	10.06	3,645	8.71	3,731	25.24	2,116	20.11	2,181	8.56	1,227	19.15
Total Assessments Township of Wilmot:			39,398	49.02	15,556	24.45	22,616	28.52	8,419	56.16	16,635	100.00	19,805	98.14	29,977	60.91	41,830	100.00	14,785	100.00	10,525	100.00	13,642	53.56	4,432	69.15
Township of East Zorra-Tavistock (Roll No. 32-38-010-)																										
18	S Pt. 33	060-12400 (S. Nickolas)	3,524	4.38	4,138	6.50	20,056	25.30	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18	Pt. 33 & 34	060-12500 (Highaven Holsteins Inc.)	849	1.06	997	1.57	2,291	2.89	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18	E Pt. 31	060-13700 (B. & E. Bender)	14,564	18.12	14,295	22.46	0	0.00	0	0.00	0	0.00	0	0.00	8,368	17.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
18	E Pt. 32	060-13800 (R. & R. Bender)	15,446	19.22	22,274	35.00	20,165	25.44	0	0.00	0	0.00	0	0.00	9,474	19.25	0	0.00	0	0.00	0	0.00	7,430	29.17	0	0.00
19	32	060-13900 (L. & L. Roth)	510	0.63	598	0.94	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1,466	5.76	1,228	19.15
19	33	060-14000 (S. Nickolas)	2,930	3.65	3,440	5.41	10,014	12.63	5,555	37.06	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1,432	5.62	0	0.00
Total Assessments on Lands:			37,823	47.06	45,742	71.88	52,526	66.26	5,555	37.06	0	0.00	0	0.00	17,842	36.25	0	0.00	0	0.00	0	0.00	10,328	40.55	1,228	19.15
19TH Line (Township of East Zorra-Tavistock)			1,105	1.38	1,296	2.03	3,102	3.91	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1,500	5.89	0	0.00
1/2 Oxford Road 5 (Oxford County)			2,039	2.54	1,046	1.64	1,031	1.31	1,016	6.78	0	0.00	375	1.86	1,396	2.84	0	0.00	0	0.00	0	0.00	0	0.00	750	11.70
Total Assessments on Roads:			3,144	3.92	2,342	3.67	4,133	5.22	1,016	6.78	0	0.00	375	1.86	1,396	2.84	0	0.00	0	0.00	0	0.00	1,500	5.89	750	11.70
Total Assessments Township of East Zorra-Tavistock:			40,967	50.98	48,084	75.55	56,659	71.48	6,571	43.84	0	0.00	375	1.86	19,238	39.09	0	0.00	0	0.00	0	0.00	11,828	46.44	1,978	30.85
TOTAL ASSESSMENTS:			80,365	100.00	63,640	100.00	79,275	100.00	14,990	100.00	16,635	100.00	20,180	100.00	49,215	100.00	41,830	100.00	14,785	100.00	10,525	100.00	25,470	100.00	6,410	100.00

Note:  
1. Agricultural designation not included as grant eligibility has to be confirmed at the time of maintenance cost levy.  
2. \$ amounts above are listed solely for calculating percentages (share of future maintenance costs) and will nto be levied with the final cost of the drainage works.

**SCHEDULE C - SCHEDULE FOR ACTUAL COST BYLAW  
NICKLAS DRAIN 2025  
TOWNSHIP OF WILMOT /  
TOWNSHIP OF EAST ZORRA - TAVISTOCK**

Con	Lot	Roll No. (Owner)	Ha. Affected	Estimated Gross Assessment	Actual Gross Assessment <sup>2</sup>	Grant- Eligible Portion	1/3 Grant	Allowances	Estimated NET Assessment	Actual NET Assessment <sup>3</sup>
<b>Township of Wilmot (Roll No. 20-18-010-)</b>										
F	3 Blk A	Pt. 32 & 33 001-05300 (K. Wagler)	10.1	24,564		23,419	7,806	2,250	14,508	
F	3 Blk A	Pt. 31 001-05400 (J. & R. Hunsberger and Zehr Farms Ltd.)	18.7	65,000		62,880	20,960	4,900	39,140	
	3	Pt. 30 001-05500 (Trustees of Grace Mennonite Fellowship Church)	0.3	4,060		4,026	0		4,060	
	3	Pt. 30 001-05505 (Bethel Chapel and Cemetery Board)	0.1	286		275	0		286	
	3	Pt. 30 001-05600 (S. & E. Hughes)	1.4	4,018		3,859	0		4,018	
F	2	Pt. 29 & 30 001-09500 (Quiet Oak Dairy Farms)	5.8	32,701		32,213	10,738	2,300	19,663	
F	2	Pt. 31 001-09600 (K. & T. Erb)	17.4	70,271		68,298	22,766	2,000	45,505	
	2	Pt. 31 001-09700 (F. Becker)	0.8	6,328		6,237	0	750	5,578	
	2	Pt. 31 001-09800 (M. & N. Oswald)	0.3	911		877	0		911	
F	2	Pt. 30 001-09900 (R. & C. Lichti)	17.2	58,267		56,419	18,806	2,200	37,261	
	2	Pt. 30 001-09901 (S. & R. Jenson)	1.4	1,080		1,001	0		1,080	
F	2	Pt. 30 001-10001 (K. & K. Hunsberger)	2.4	14,790		14,518	4,839	100	9,851	
<b>Subtotal (Lands):</b>			<b>75.9</b>	<b>282,276</b>		<b>274,022</b>	<b>85,915</b>	<b>14,500</b>	<b>181,861</b>	
		Bean Road (Township of Wilmot)	1.5	68,251		67,741	0		68,251	
		Diamond Road (Township of Wilmot)	1.8	40,487		39,875	0		40,487	
		1/2 Oxford Road 5 (Township of Wilmot)	1.4	49,877		49,401	0		49,877	
<b>Subtotal (Roads):</b>			<b>4.7</b>	<b>158,615</b>		<b>157,017</b>	<b>0</b>	<b>0</b>	<b>158,615</b>	
<b>Total Assessment Township of Wilmot:</b>			<b>80.6</b>	<b>440,891</b>		<b>431,039</b>	<b>85,915</b>	<b>14,500</b>	<b>340,476</b>	
<b>Township of East Zorra-Tavistock (Roll No. 32-38-010-)</b>										
F	18	S Pt. 33 060-12400 (S. Nickolas)	8.3	49,209		48,268	16,089	3,650	29,470	
F	18	Pt. 33 & 34 060-12500 (Highaven Holsteins Inc.)	2.0	4,364		4,137	1,379		2,985	
F	18	E Pt. 31 060-13700 (B. & E. Bender)	10.5	86,196		58,364	19,455	9,750	56,991	
F	18	E Pt. 32 060-13800 (R. & R. Bender)	24.5	125,245		122,456	40,819	13,850	70,576	
F	19	32 060-13900 (L. & L. Roth)	1.2	2,835		2,699	900	50	1,885	
F	19	33 060-14000 (S. Nickolas)	6.9	31,403		30,621	10,207	2,600	18,596	
<b>Subtotal (Lands):</b>			<b>53.4</b>	<b>299,252</b>		<b>266,545</b>	<b>88,849</b>	<b>29,900</b>	<b>180,503</b>	
		19TH Line (Township of East Zorra-Tavistock)	1.3	41,129		40,833	0		41,129	
		1/2 Oxford Road 5 (Oxford County)	1.6	48,728		48,183	0		48,728	
<b>Subtotal (Roads):</b>			<b>2.9</b>	<b>89,857</b>		<b>89,016</b>	<b>0</b>	<b>0</b>	<b>89,857</b>	
<b>Total Assessment Township of East Zorra-Tavistock:</b>			<b>56.3</b>	<b>389,109</b>		<b>355,561</b>	<b>88,849</b>	<b>29,900</b>	<b>270,360</b>	
<b>TOTAL ASSESSMENTS NICKLAS DRAIN 2025:</b>			<b>136.9</b>	<b>830,000</b>		<b>786,600</b>	<b>174,764</b>	<b>44,400</b>	<b>610,836</b>	

## Notes:

1. Lands noted with an "F" are classified as agricultural and according to current OMAFRA policy qualify for the 1/3 grant. Eligibility for the 1/3 grant will be confirmed at the time the final cost is levied.
2. Actual Gross Assessment is determined based on the final actual costs, following construction.
3. Actual Net Assessment will be the amount levied to the owner of the parcel at the end of the project.  
(Net Assessments subtract Allowances and an anticipated 1/3 Grant from the Gross Assessment)

APPENDIX A - Calculation of Assessments  
NICKLAS DRAIN 2025  
TOWNSHIP OF WILMOT /  
TOWNSHIP OF EAST ZORRA - TAVISTOCK

		MAIN DRAIN																																		
		Interval 1				Interval 2				Interval 3				Interval 4				Interval 5				Interval 6				MAIN DRAIN TOTAL										
		Station	0+ to	0+557		Station	0+557 to	1+121		Station	1+121 to	1+857		Station	1+857 to	2+072		Station	2+072 to	2+236		Station	2+236 to	2+567												
ESTIMATED COST	Allowances			5,300				6,350				7,200				2,600				1,550				3,600								26,600				
	Construction (Non-Grantable)			43,400																												43,400				
	Construction (Total)			107,400				67,200				94,500				35,800				37,300				23,300							365,500					
	Engineering			14,500				7,500				12,000				4,800				5,000				3,000							46,800					
	Construction Supervision			9,900				5,500				8,000				3,300				3,300				2,000							32,000					
	Administration			2,500				1,600				2,300				900				900				400							8,600					
Net HST			2,365				1,440				2,055				780				820				505							7,965						
Total (Non-Grantable) TOTAL				43,400				141,965				89,590				126,055				48,180				32,805							487,465					
Roll No. (Owner)	Total Ha Affected	Run-off Factor	Total ha Adjusted	Benefit (Sec. 22)	Benefit Non-Grant	Special (Sec. 26)	Adj Ha	Outlet (Sec. 23)	Outlet Non-Grant	Benefit (Sec. 22)	Benefit Non-Grant	Special (Sec. 26)	Adj Ha	Outlet (Sec. 23)	Outlet Non-Grant	Benefit (Sec. 22)	Benefit Non-Grant	Special (Sec. 26)	Adj Ha	Outlet (Sec. 23)	Outlet Non-Grant	Benefit (Sec. 22)	Benefit Non-Grant	Special (Sec. 26)	Adj Ha	Outlet (Sec. 23)	Outlet Non-Grant	Total Benefit	Benefit Non-Grant	Total Special	Total Outlet	Outlet Non-Grant	Total			
Township of Wilmot (Roll No. 20-18-010-)																																				
001-05300 (K. Wagler)	10.1	1.0	10.1	2,000			10.1	4,289	1,145			0.0	0		0.0	0			0.0	0			0.0	0			0.0	0	2,000	0	0	4,289	1,145	7,434		
001-05400 (J. & R. Hunsberger and Zehr Farms Ltd.)	18.7	1.0	18.7				18.7	7,940	2,120			0.0	0		0.0	0			0.0	0			0.0	0			0.0	0	0	0	7,940	2,120	10,060			
001-05500 (Trustees of Grace Mennonite Fellowship Church)	0.3	1.0	0.3				0.3	127	34			0.0	0		0.0	0			0.0	0			0.0	0			0.0	0	0	0	127	34	161			
001-05505 (Bethel Chapel and Cemetery Board)	0.1	1.0	0.1				0.1	42	11			0.0	0		0.0	0			0.0	0			0.0	0			0.0	0	0	0	42	11	53			
001-05600 (S. & E. Hughes)	1.4	1.0	1.4				1.4	594	159			0.0	0		0.0	0			0.0	0			0.0	0			0.0	0	0	0	594	159	753			
001-09500 (Quiet Oak Dairy Farms)	5.8	0.7	4.3				4.3	1,826	488			4.3	2,144			4.3	4,925			4.3	1,271	2,200		4.3	2,398	12,600		4.3	4,849	14,800	0	0	17,413	488	32,701	
001-09600 (K. & T. Erb)	17.4	1.0	17.4				17.4	7,388	1,973			12.3	6,132			1.5	1,718	2,600		1.5	443	4,500		1.5	836			4,500	1.5	836	7,100	0	0	16,517	1,973	25,590
001-09700 (F. Becker)	0.8	1.0	0.8				0.8	340	91			0.8	399			0.8	916			0.8	236	3,900		0.8	446			3,900	0.8	446	3,900	0	0	2,337	91	6,328
001-09800 (M. & N. Oswald)	0.3	1.0	0.3				0.3	127	34			0.3	150			0.3	344			0.3	89			0.3	167			0	0	0	877	34	911			
001-09900 (R. & C. Licht)	17.2	0.9	16.3				16.3	6,921	1,848			5.7	2,842			5.7	6,528	2,100		5.7	1,684	3,600		5.7	3,178	5,600		5.7	3,178	11,300	0	0	21,153	1,848	34,301	
001-09901 (S. & R. Jenson)	1.4	0.5	0.7				0.7	297	79			0.0	0		0.0	0			0.0	0			0.0	0			0.0	0	0	0	297	79	376			
001-10001 (K. & K. Hunsberger)	2.4	1.0	2.4				2.4	1,019	272			2.4	1,197			2.4	2,749			2.4	709			2.4	1,338	4,800		2.4	2,706	4,800	0	0	9,718	272	14,790	
Subtotal (Lands):	75.9	11.2	72.8	2,000	0	0	72.8	30,910	8,254	0	0	25.8	12,864	0	0	15.0	17,180	4,700	0	15.0	4,432	14,200	0	15.0	8,363	23,000	0	6.7	7,555	43,900	0	81,304		133,458		
Bean Road (Township of Wilmot)	1.5	3.0	4.5				4.5	1,911	510			0.9	449			0.0	0			0.0	0			0.0	0			0.0	0	0	0	2,360	510	2,870		
Diamond Road (Township of Wilmot)	1.8	3.0	5.4				5.4	2,293	612			2.4	1,197			2.1	2,405			2.1	621			25,135	2.1	1,171	750		0.0	0	750	0	25,135	7,687	612	34,184
1/2 Oxford Road 5 (Township of Wilmot)	1.4	3.0	4.2				4.2	1,784	476			2.1	1,046			0.9	1,031	1,500	12,720	0.9	266			0.0	1	750		0.0	0	2,250	0	12,720	4,128	476	19,574	
Subtotal (Roads):	4.7	9.0	14.1	0	0	0	14.1	5,988	1,598	0	0	5.4	2,692	0	0	3.0	3,436	1,500	12,720	3.0	887	0	25,135	2.1	1,172	1,500	0	0.0	0	3,000	0	37,855	14,175	1,598	56,628	
Total Assessment Township of Wilmot:	80.6	20.2	86.9	2,000	0	0	86.9	36,898	9,852	0	0	31.2	15,556	0	0	18.0	20,616	6,200	12,720	18.0	5,319	14,200	25,135	17.1	9,535	24,500	0	6.7	7,555	46,900	0	37,855	95,479	1,598	190,086	
Township of East Zorra-Tavistock (Roll No. 32-38-010-)																																				
060-12400 (S. Nickolas)	8.3	1.0	8.3				8.3	3,524	941			8.3	4,138	31,100	8.3	9,506			0.0	0			0.0	0			0.0	0	31,100	0	0	17,168	941	49,209		
060-12500 (Highaven Holsteins Inc.)	2.0	1.0	2.0				2.0	849	227			2.0	997			2.0	2,291			0.0	0			0.0	0			0.0	0	0	0	4,137	227	4,364		
060-13700 (B. & E. Bender)	10.5	0.9	9.1	25,400	26,800		9.1	3,864	1,032	13,200	0.0	0			0.0	0			0.0	0			0.0	0			0.0	0	38,600	26,800	0	3,864	1,032	70,296		
060-13800 (R. & R. Bender)	24.5	1.0	24.6	9,000			24.6	10,446	2,789	38,700	21.3	10,619			19,900	6.3	7,215			0.0	0			0.0	0			0.0	0	67,600	0	0	28,280	2,789	98,669	
060-13900 (L. & L. Roth)	1.2	1.0	1.2				1.2	510	136			1.2	598			0.0	0			0.0	0			0.0	0			0.0	0	0	0	1,108	136	1,244		
060-14000 (S. Nickolas)	6.9	1.0	6.9				6.9	2,930	782			6.9	3,440	7,200	5.6	6,414			7,800	5.6	1,655			0.0	0			0.0	0	15,000	0	0	14,439	782	30,221	
Subtotal (Lands):	53.4	5.9	52.1	34,400	26,800	0	52.1	22,123	5,907	51,900	0	39.7	19,792	58,200	0	22.2	25,426	7,800	0	5.6	1,655	0	0	0.0	0	0	0	0	0	152,300	26,800	0	68,996	5,907	254,003	
19TH Line (Township of East Zorra-Tavistock)	1.3	2.0	2.6				2.6	1,105	296			2.6	1,296	3,000	16,180	1.4	1,602			0.0	0			0.0	0			0.0	0	3,000	0	16,180	4,003	296	23,479	
1/2 Oxford Road 5 (Oxford County)	1.6	3.0	4.8				4.8	2,039	545			2.1	1,046			0.9	1,031	1,500	12,720	0.9	266			0.0	0	750		0.0	0	2,250	0	12,720	4,382	545	19,897	
Subtotal (Roads):	2.9	5.0	7.4	0	0	0	7.4	3,144	841	0	0	4.7	2,342	3,000	16,180	2.3	2,633	1,500	12,720	0.9	266	0	0	0.0	0	750	0	0.0	0	5,250	0	28,900	8,385	841	43,376	
Total Assessment Township of East Zorra-Tavistock:	56.3	10.9	59.5	34,400	26,800	0	59.5	25,267	6,748	51,900	0	44.4	22,134	61,200	16,180	24.5	28,059	9,300	12,720	6.5	1,921	0	0	0.0	0	750	0	0.0	0	157,550	26,800	28,900	77,381	6,748	297,379	
TOTAL ASSESSMENTS NICKLAS DRAIN 2025:	136.9	31.1	146.4	36,400	26,800	0	146.4	62,165	16,600	51,900	0	75.6	37,690	61,200	16,180	42.5	48,675	15,500	25,440	24.5	7,240	14,200	25,135	17.1	9,535	25,250	0	6.7	7,555	204,450	26,800	66,755	172,860	8,346	487,465	

**APPENDIX A - Calculation of Assessments  
NICKLAS DRAIN  
TOWNSHIP OF WILMOT /  
TOWNSHIP OF EAST ZORRA - TAVISTOCK**

	BRANCH 1																BRANCH 2																GRAND TOTAL									
	Interval 1				Interval 2				Interval 3				Interval 4				BRANCH 1 TOTAL				Interval 1				Interval 2				BRANCH 2 TOTAL													
	Station	0+557	to	0+988	Station	0+988	to	1+547	Station	1+547	to	1+698	Station	1+698	to	1+813				Station	0+000	to	0+330	Station	0+330	to	0+374															
ESTIMATED COST		4,700				7,150				1,100				1,000				13,950					3,700				150				3,850				44,400							
		71,100				47,900				38,800				32,200				190,000					26,000				37,700				63,700				619,200							
		9,800				7,700				5,900				4,300				27,700					3,500				5,000				8,500				83,000							
		6,500				4,500				3,500				2,800				17,300					2,300				3,400				5,700				55,000							
		1,700				1,200				1,000				800				4,700					600				900				1,500				14,800							
		1,565				1,080				885				705				4,235					570				830				1,400				13,600							
	95,365				69,530				51,185				41,805				257,885				36,670				47,980				84,650				830,000									
Roll No. (Owner)	Benefit (Sec. 22)	Special (Sec. 26)	Adj Ha	Outlet (Sec. 23)	Benefit (Sec. 22)	Special (Sec. 26)	Adj Ha	Outlet (Sec. 23)	Benefit (Sec. 22)	Special (Sec. 26)	Adj Ha	Outlet (Sec. 23)	Benefit (Sec. 22)	Special (Sec. 26)	Adj Ha	Outlet (Sec. 23)	Total Benefit	Total Special	Total Outlet	Total	Benefit (Sec. 22)	Special (Sec. 26)	Adj Ha	Outlet (Sec. 23)	Benefit (Sec. 22)	Special (Sec. 26)	Adj Ha	Outlet (Sec. 23)	Total Benefit	Total Special	Total Outlet	Total	Total Benefits	Benefit Non-Grant	Total Special	Total Outlets	Outlet Non-Grant	TOTAL				
Township of Wilmot (Roll No. 20-18-010-)																																										
001-05300 (K. Wagler)	6,500	4.7	2,530		8,100	0.0	0			0.0	0						14,600	0	2,530	17,130																						
001-05400 (J. & R. Hunsberger and Zehr Farms Ltd.)	18.7	10,066			38,800	18.7	6,074			0.0	0						38,800	0	16,140	54,940																						
001-05500 (Trustees of Grace Mennonite Fellowship Church)	0.3	161				0.3	97			0.3	43	3,200					3,200	0	699	3,899																						
001-05505 (Bethel Chapel and Cemetery Board)	0.1	54				0.1	32			0.1	14		0.1	133			0	0	233	233																						
001-05600 (S. & E. Hughes)	1.4	754				1.4	455			1.4	200		1.4	1,856			0	0	3,265	3,265																						
001-09500 (Quiet Oak Dairy Farms)	0.0	0				0.0	0			0.0	0						0	0	0	-																						
001-09600 (K. & T. Erb)	5.1	2,745			1,900	5.1	1,657	13,300		5.1	730						15,200	0	5,132	20,332					1,750	10.8	3,433															
001-09700 (F. Becker)	0.0	0				0.0	0			0.0	0						0	0	0	-																						
001-09800 (M. & N. Oswald)	0.0	0				0.0	0			0.0	0						0	0	0	-																						
001-09900 (R. & C. Lichti)	10.6	5,706			3,600	10.6	3,443	3,600		10.6	1,517	6,100					13,300	0	10,666	23,966																						
001-09901 (S. & R. Jenson)	0.7	377				0.7	227			0.7	100						0	0	704	704																						
001-10001 (K. & K. Hunsberger)	0.0	0				0.0	0			0.0	0						0	0	0	-																						
Subtotal (Lands):	6,500	0	41.6	22,393	52,400	0	36.9	11,985	16,900	0	18.2	2,604	9,300	0	1.8	2,387	85,100	0	39,369	124,469					9,350	0	10.8	9,816	1,750	0	10.8	3,433	11,100	0	13,249	24,349	140,100	0	0	133,922	8,254	282,276
Bean Road (Township of Wilmot)	3.6	1,938			3,000	3.6	1,170	3,000	24,950	2.7	387	3,000	25,130	9,000	50,080	5,483	64,563																									
Diamond Road (Township of Wilmot)	3.0	1,616				3.0	975	3,000		2.4	344			3,000	0	2,935	5,935																									
1/2 Oxford Road 5 (Township of Wilmot)	1,500	12,975	1.2	646			0.0	0			0.0	0					1,500	12,975	646	15,121																						
Subtotal (Roads):	1,500	12,975	7.8	4,200	3,000	0	6.6	2,145	6,000	24,950	5.1	731	3,000	25,130	1.5	1,988	13,500	63,055	9,064	85,619					0	0	2.4	2,181	1,500	12,210	1.5	477	1,500	12,210	2,658	16,368	18,000	0	113,120	25,897	1,598	158,615
Total Assessment Township of Wilmot:	8,000	12,975	49.4	26,593	55,400	0	43.5	14,130	22,900	24,950	23.3	3,335	12,300	25,130	3.3	4,375	98,600	63,055	48,433	210,088					9,350	0	13.2	11,997	3,250	12,210	12.3	3,910	12,600	12,210	15,907	40,717	158,100	0	113,120	159,819	9,852	440,891
Township of East Zorra-Tavistock (Roll No. 32-38-010-)																																										
060-12400 (S. Nickolas)	0.0	0				0.0	0			0.0	0			0	0	0	0	-																								
060-12500 (Highaven Holsteins Inc.)	0.0	0				0.0	0			0.0	0			0	0	0	0	-																								
060-13700 (B. & E. Bender)	15,900	0.0	0			0.0	0			0.0	0			15,900	0	0	15,900																									
060-13800 (R. & R. Bender)	15,000	3.3	1,776			0.0	0			0.0	0			15,000	0	1,776	16,776																									
060-13900 (L. & L. Roth)	0.0	0				0.0	0			0.0	0			0	0	0	0	-																								
060-14000 (S. Nickolas)	0.0	0				0.0	0			0.0	0			0	0	0	0	-																								
Subtotal (Lands):	30,900	0	3.3	1,776	0	0	0.0	0	0	0	0.0	0	0	0	0	0.0	30,900	0	1,776	32,676					10,050	0	2.5	2,273	250	0	0.0	0	10,300	0	2,273	12,573	193,500	26,800	0	73,045	5,907	299,252
19TH Line (Township of East Zorra-Tavistock)	0.0	0				0.0	0			0.0	0			0	0	0	0	-																								
1/2 Oxford Road 5 (Oxford County)	1,500	12,975	1.2	646			0.0	0			0.0	0					1,500	12,975	646	15,121																						
Subtotal (Roads):	1,500	12,975	1.2	646	0	0	0.0	0	0	0	0.0	0	0	0	0	0.0	1,500	12,975	646	15,121																						
Total Assessment Township of East Zorra-Tavistock:	32,400	12,975	4.5	2,422	0	0	0.0	0	0	0	0.0	0	0	0	0	0.0	32,400	12,975	2,422	47,797					13,050	0	2.5	2,273	1,750	26,860	0.0	0	14,800	26,860	2,273	43,933	204,750	26,800	68,735	82,076	6,748	389,109
TOTAL ASSESSMENTS NICKLAS DRAIN 2025:	40,400	25,950	53.9	29,015	55,400	0	43.5	14,130	22,900	24,950	23.3	3,335	12,300	25,130	3.3	4,375	131,000	76,030	50,855	257,885					22,400	0	15.7	14,270	5,000	39,070	12.3	3,910	27,400	39,070	18,180	84,650	362,850	26,800	181,855	241,895	16,600	830,000

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**200 GENERAL CONDITIONS****200.1 SCOPE**

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

**200.2 ORDER OF PRECEDENCE**

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

**200.3 MUNICIPALITY**

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

**200.4 TENDERS AND CONTRACT SECURITY**

Tenders are to be submitted for the complete works or a portion thereof, as instructed by the Municipality. The Schedule of Tender Prices must be completed and provided with the Contractor's tender.

A Tender Deposit in the form of a certified cheque, bank draft, bonding, or other security acceptable to the Municipality must accompany each tender as a guarantee of good faith. The Tender Deposit shall name the Municipality as the payee. Refer to the Instructions to Tenderers for additional Tender Deposit information and Contract Security requirements.

**200.5 EXAMINATION OF SITE, PLANS AND SPECIFICATIONS**

Prior to the submission of the Tender, the Tenderer must examine the premises and site to compare them with the Drawings and Specifications in order to be satisfied with the existing conditions and the extent of the work to be done. If site examination requires entry onto privately owned lands, the Tenderer shall contact the Drainage Superintendent at least one week prior to the tender closing date to arrange site examination with the Drainage Superintendent.

The Tenderer must ensure that the meaning and intent of the drawings, estimated quantities and specifications is clearly understood before submission of the Tender. No allowances shall be made on behalf of the Contractor by reason of any error made in the preparation of the tender submission.

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

**200.6 COMMENCEMENT AND COMPLETION OF WORK**

The work must commence immediately after the Tenderer is notified of the contract award or at a later date, where specified in the tender/contract document. If weather and ground conditions are unsuitable,

work may be started at a later date from either of the above two dates if such delay is approved by the Engineer.

Refer to Standard Specifications 400.2, 400.11, 400.20, 400.21, 400.25 and 400.26 for notification requirements related to the *PRE-CONSTRUCTION MEETING, BENCHMARKS AND LAYOUT, WORKING IN ROAD ALLOWANCES, LANEWAYS AND ACCESS CROSSINGS, LIVESTOCK, AND STANDING CROPS*.

The work must proceed in such manner as to ensure its completion at the earliest possible date consistent with first class workmanship and within the time limit set out in the tender/contract document. Failure to commence or complete the work as set out in the tender/contract document may result in a forfeiture of all or part of the Contract Security if the Engineer determines that damages have been sustained by the Municipality or any landowner because of the non-commencement or non-completion of the contract as awarded and that the failure to meet the specified dates has been the fault of the Contractor.

#### **200.7 NOTICE FOR RESUMPTION OF WORK**

If the Contractor leaves the job site for a period of time after initiation of work, a minimum of 2 working days advance notice shall be given to the Engineer and the Municipality before returning to the job site to resume work. If any work is resumed without the advance notice, the Contractor shall be fully responsible for all such work undertaken prior to said notification and shall make good any works or materials judged to be inadequate.

#### **200.8 PERMITS, NOTICES, LAWS AND RULES**

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

#### **200.9 HEALTH AND SAFETY**

Contractor must comply with the *Occupational Health and Safety Act (OHSA)* and the associated *Regulations for Construction Projects*, including, but not limited to the requirements related to hazardous materials, physical agents and designated substances. Contractor must also follow any site-specific safety and training requirements of the Municipality, agencies, utility companies or other authorities.

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

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

#### **200.10 LIMITATIONS OF OPERATIONS**

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

#### **200.11 SUPERVISION**

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

#### **200.12 CHARACTER AND EMPLOYMENT OF WORKERS**

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

#### **200.13 SUB-CONTRACTORS**

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

#### **200.14 PAYMENT**

Progress payments equal to the value of the work completed to date, less applicable holdbacks, will be made to the Contractor monthly or at the completion of the work. The Contractor may be required to provide a Proper Invoice for the progress payment amount. In accordance with the *Construction Act, R.S.O. 1990*, sixty (60) days after certification of substantial performance, the 10% Statutory Holdback will be released. Warranty Holdback of 3% of the contract value, unless specified otherwise in the tender/contract documents, may be reserved by the Municipality for one year after certification of substantial performance.

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

After certification of substantial performance, the Warranty Holdback may be used by the Municipality to correct defects from faulty construction and/or materials, provided that notice shall first be given by the Engineer in writing to the Contractor stating that the Contractor has seven (7) days to remedy the defect in construction and/or materials.

Where alterations to the work are authorized by the Engineer, the Engineer's evaluation of payment for such changes shall consider the tendered price for similar work item(s). See Specification 400.8 – *Alterations to Work*.

#### **200.15 TERMINATION OF CONTRACT BY THE MUNICIPALITY**

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

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

then the Municipality, upon Certificate of the Engineer that sufficient cause exists to justify such action, may without prejudice to any other right or remedy, give written notice to the Contractor to terminate the employment of the Contractor and take possession of the premises, and of all materials, tools and appliances thereon, and may finish the work by whatever method the Municipality may deem expedient,



but without undue delay or expense. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price will exceed the expense of finishing the work including compensation to the Engineer for additional services and including other damages of every name and nature, such excess shall be paid to the Contractor. If such expense will exceed such unpaid balance including the Contract Security, the Contractor shall pay the difference to the Municipality. The expense incurred by the Municipality, as herein provided, shall be certified by the Engineer. If the contract is terminated by the Municipality due to the Contractor's failure to properly commence the works, the Contractor shall forfeit the Contract Security and furthermore shall pay to the Municipality an amount to cover the increased costs, if any, associated with a new tender for the contract being terminated.

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

#### **200.16 LIQUIDATED DAMAGES**

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

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

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

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

If the tender/contract document does not show an amount for Liquidated Damages then Liquidated Damages do not apply for this contract.

#### **200.17 CONTRACTOR'S LIABILITY**

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

traffic in any railway or any public or private road entrance or sidewalk and to secure to all persons and corporations the uninterrupted enjoyment of all their rights, in and during the performance of the work. The Contractor shall indemnify and save harmless the Municipality and the Engineer from and against all claims, demands, losses, costs, damages, actions, suits or other proceedings by whomsoever made, brought or prosecuted in any manner based upon, occasioned by, or attributed to any such damage, injury or infringement.

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

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

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

#### **200.18            LIABILITY INSURANCE**

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

#### **200.19            LOSSES DUE TO ACTS OF NATURE, ETC.**

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

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**400 STANDARD SPECIFICATIONS FOR CONSTRUCTION OF DRAINS****400.1 ABBREVIATIONS**

- i) MTO means the Ministry of Transportation of Ontario
- ii) ASTM means the American Society for Testing Materials
- iii) CSA means the Canadian Standard Association
- iv) OPSD means Ontario Provincial Standard Drawings
- v) OPSS means Ontario Provincial Standard Specifications
- vi) DFO means Fisheries and Oceans Canada
- vii) MNRF means Ministry of Natural Resources and Forestry
- viii) MECP means Ministry of Environment, Conservation and Parks

**400.2 PRE-CONSTRUCTION MEETING**

The Contractor shall arrange a pre-construction meeting with the Engineer, Municipality, and affected landowners prior to commencement of construction. The Contractor shall provide at least ten working days advance notice of the pre-construction meeting. Construction shall not commence less than five working days after the pre-construction meeting to allow time for layout and crop salvage.

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

The cost to coordinate and attend the pre-construction meeting, including any follow-up meetings, is considered incidental and shall be included in the price of other tender items.

**400.3 COLD WEATHER**

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

**400.4 WORKING AREA**

Unless otherwise specified on the Drawings, the working area is defined as follows:

- Where any part of the drain is on a road allowance, the road allowance shall be the working area.
- If any part of the drain is close to a property line, then the property line shall be one of the limits of the working area.
- For a closed drain, the working area shall not exceed 25 metres. A 10m x 10m working area exists around any catchbasin, junction box or access point.
- For an open drain, the working area shall be 17 metres wide on the side for leveling and 3 metres wide on the opposite side.
- A 10m wide working area shall exist for any overflow swale or grassed waterway.

**400.5 PROPERTY BARS AND MONUMENTS**

All property bars and monuments shall be protected. If a property bar or monument is shown on the Drawings with a note “***to be protected***”, or similar, and is damaged by the Contractor, the damaged bar(s) shall be reinstated by an Ontario Land Surveyor at the Contractor's expense.

**400.6 ACCESS**

The Contractor shall have access to the drain by entering the working area directly from road allowances or along access routes shown on the Drawings. No other access routes shall be used unless first approved by the Engineer and the affected landowner. The Contractor shall notify each landowner prior to using the designated access routes. Standard Specifications 400.24 - *FENCES*, 400.25 - *LIVESTOCK*, and 400.26 - *STANDING CROPS* also apply to access routes. The Contractor shall make good any damages caused by using the designated access routes. Costs to restore access routes to existing conditions shall be borne by the Contractor.

**400.7 ACCESS TO PROPERTIES ADJOINING THE WORK**

The Contractor shall provide at all times and at no additional cost, access to private properties adjoining the work, unless otherwise authorized by the Engineer. Where interruptions to access have been authorized by the Engineer, a minimum of 48 hours written notice shall be given by the Contractor to the affected landowners and such interruptions shall be arranged to minimize interference to those affected.

**400.8 ALTERATIONS TO WORK**

Design changes determined by the Engineer (alteration, additions, and deletions) shall be implemented by the Contractor without delay and shall in no way render the contract void.

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

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

**400.9 ERRORS AND UNUSUAL CONDITIONS**

The Contractor shall notify the Engineer immediately of any “*errors or unusual conditions*” which may be found. Any attempt by the Contractor to correct an “*error*” without notice to the Engineer is at the Contractor's risk and expense. The Engineer shall determine necessary steps to correct errors or address unusual conditions. The contract amount shall be adjusted through a fair evaluation of documentation for the work added, deleted, or adjusted.

**400.10 TESTS**

The Engineer reserves the right to subject any materials to a competent testing laboratory for compliance with applicable Provincial and/or Municipal standards. If any materials supplied by the Contractor fail to meet the applicable standards, the Contractor shall bear full responsibility to remove all rejectable materials and replace with acceptable materials.

**400.11 BENCHMARKS AND LAYOUT**

The Engineer will layout the location of the proposed work unless otherwise provided in the Contract.

It is the Contractor's responsibility to confirm the location and elevation of benchmarks and layout stakes prior to construction and notify the Engineer immediately of any discrepancies.

The Contractor shall be liable for the cost of replacing any benchmarks or layout stakes destroyed during construction. The Contractor shall also be liable for the cost of additional layout if the Contractor's schedule delay requires replacement of original layout stakes.

**400.12 INSPECTION OF UNDERGROUND WORK**

The Contractor shall not cover up any work without providing the Engineer two working days notice and opportunity for carrying out an inspection.

If inspection does not occur as the work proceeds, inspection points shall be provided, with no additional payment, at the following locations: 50m intervals, tile connections, grade changes, junction boxes, fittings and pipe diameter/material transitions. If no inspection points are provided, the Engineer reserves the right to require the Contractor to expose the buried work for inspection purposes.

No additional payment will be made if the Engineer requires additional inspection points or exposure of covered work in other locations.

**400.13 FINAL INSPECTION**

Final inspection by the Engineer will occur after receiving written notice from the Contractor that work is complete. All the work included in the contract shall, at the time of final inspection, be completed to the dimensions and cross-sections shown on the Drawings.

Prior to issuing the certificate of substantial performance, a final inspection meeting may be held by the Engineer with landowners directly affected by the construction of the drain. The Contractor shall attend this meeting upon notice by the Engineer.

If there is no final inspection meeting with the Engineer, the Contractor shall obtain from each landowner a written statement indicating that the work has been performed to the landowner's satisfaction. If the Contractor is unable to obtain a written statement from the landowner, the Engineer will determine if further work is required prior to issuing the certificate of substantial performance.

The cost of attending the final inspection meeting and/or obtaining written statements from landowners, including any follow-up meetings, is considered incidental and shall be included in price of other tender items.

**400.14 WARRANTY**

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

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

Before final acceptance by the Municipality and release of Warranty Holdback, the Contractor shall complete all work as directed by the Engineer, remove all debris and surplus materials, and leave the work neat and presentable.

**400.15 PIPE MATERIALS****400.15.1 Concrete Drain Tile**

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

The minimum nominal length of concrete drain tile shall be 1200mm.

All tile shall be of good quality, free from distortions and cracks and shall meet the standards specified. The ends shall be smooth and free from cracks. The Engineer reserves the right to reject unacceptable tiles. All rejected tiles are to be immediately removed from the site at the Contractor's expense.

**400.15.2 Corrugated Plastic Tubing**

Corrugated plastic tubing shall conform to the current version of the *Land Improvement Contractors of Ontario Standard Specification for Corrugated Plastic Drainage Tubing*.

Type of material (solid or perforated) and need for filter sock will be specified on the Drawings or in the description of the work in the Special Provisions. Filter sock, where specified, shall be a standard synthetic filter material as provided by a recognized plastic tubing manufacturer unless noted differently on the contract drawings or elsewhere in the contract document. The Contractor shall protect coils of plastic tubing from damage and deformation.

**400.15.3 Smooth Wall Plastic Tubing**

Smooth wall plastic tubing shall be dual-wall, high density polyethylene and conform to the requirements of the most recent ASTM 3390 specification for "*lined flexible corrugated polyethylene pipe*" for land drainage applications.

Type of material (solid or perforated) and need for filter sock will be specified on the Drawings or in the description of the work in the Special Provisions. Filter sock where specified shall be a standard synthetic filter material as provided by a recognized plastic tubing manufacturer unless noted differently on the contract drawings or elsewhere in the contract document. The Contractor shall protect coils of smooth wall plastic tubing from damage and deformation.

**400.15.4 Corrugated Steel Pipe**

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

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

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

**400.15.5 HDPE Pipe**

Material indicated as "HDPE Pipe" or "Solid Plastic Pipe" shall be a high density polyethylene, dual-wall corrugated pipe with smooth inner wall, solid with no perforations, and minimum pipe stiffness at 320 kPa at 5% deflection certified to CSA B182.8, in accordance with OPSS.MUNI 1840.

When HDPE pipe is installed under a road right-of-way, private laneways or parking areas, the pipe joints shall be bell and spigot with rubber gaskets (CSA 182.8, Type 1) so that joints are watertight.

When HDPE pipe is specified for use on private lands, acceptable joints may be bell and spigot with rubber gaskets, or snap-on or split couplers (CSA 182.8, Type 3) so that joints are soil tight.

All fittings shall be injection molded HDPE.

#### **400.15.6 Concrete Sewer Pipe**

Concrete sewer pipe shall be in accordance with OPSS 1820.

Concrete sewer pipe shall be reinforced circular concrete pipe according to CSA A257.2 with joints and gaskets according to CSA A257.3.

Where specified, reinforced elliptical concrete sewer pipe, joints and gaskets shall be according to ASTM C 507M.

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

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

#### **400.16 RIPRAP**

All riprap is to be placed on a geotextile underlay, unless directed otherwise in the Drawings. Geotextile material shall be as specified in Specification 400.17 - *GEOTEXTILE*, with the upstream edge of the geotextile keyed down 300mm below the bottom of riprap. The riprap is to be graded heavy angular stone (quarry stone is recommended) and shall meet gradation requirements for R-50 riprap per OPSS.MUNI 1004 Table 8 (averaging in size from 210mm to 305mm) and is to be placed at 300mm thickness, unless otherwise specified. Smaller particles may be included to fill voids. The finished top of riprap shall be at design cross-section, at design elevation or flush with existing ground.

#### **400.17 GEOTEXTILE**

Geotextile to be non-woven fabric that is rot proof, non-biodegradable, chemically resistant to acidic and alkaline soils and is dimensionally stable under different hydraulic conditions (Terrafix 360R or equal). Alternative geotextile materials shall be submitted to the Engineer prior to construction. The primary function of geotextile is to act as a highly permeable, non-clogging barrier between different materials. The Contractor shall follow the manufacturer's recommendations for cutting, installation and precautions necessary to avoid damage to the geotextile.

#### **400.18 BACKFILL**

Where sufficient clean on-site material is not available, the Contractor shall import material for backfill. Any imported material shall be approved by the Engineer in advance of supply & placement. Imported material shall be free of deleterious material and shall satisfy the requirements of O. Reg. 406/19 for use in the location proposed. If requested by the Engineer, the Contractor shall provide test results at no additional cost to demonstrate conformance with project requirements. If non-conforming materials are rejected by the Engineer, they shall be removed at no additional cost.

If the work is being performed during winter months, frozen material shall not be used as backfill under roads or any other areas where settlement could negatively affect the surface above the work area.

#### **400.19 NOTIFICATION OF ROAD AUTHORITIES, UTILITIES AND RAILROADS**

The Contractor shall notify any Road Authority, Utility, or Railroad at least two working days in advance regarding work to be performed on their property or affecting their infrastructure. Where a Road Authority, Utility or Railroad has specific notification requirements, those requirements shall apply. The notice will be in writing and is exclusive of Saturdays, Sundays and Holidays. The Contractor is responsible to determine, understand and comply with the requirements of all authorities that may place restrictions upon the performance of the work, including without limitation, MTO, local utilities and railway authorities. In



submitting the tender, the Contractor represents that they have made all necessary inquiries to all authorities, as required, to carry out the proposed work.

#### **400.20 WORKING IN ROAD ALLOWANCES**

##### **400.20.1 General**

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

##### **400.20.2 Maintenance of Traffic**

Unless directed otherwise on the drawings or in the specifications, the Contractor shall keep roads open to traffic at all times. The Contractor shall provide suitable warning signs and/or flagging per OTM Book 7 requirements to the satisfaction of the Road Authority and the Engineer. Where specified in the Contract or when requested by the Engineer, the Contractor shall provide a Traffic Control Plan to the satisfaction of the Road Authority and the Engineer at no additional cost.

If road closure is required, the Contractor shall submit a Detour Plan for approval by the Road Authority and Engineer. The Contractor shall provide all signage for the detour route per OTM Book 7 and undertake all notifications required for the road closure in consultation with the Municipality.

##### **400.20.3 Road Crossings**

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

###### **General/Pre-Construction Phase**

- A Road Authority will supply no labour, equipment, or materials for the construction of the road crossing.
- The Contractor shall not commence road crossing work until any required permits have been obtained.
- The Contractor shall notify the Road Authority, per the Road Authority's notification requirements, in advance of any construction in the road allowance. If the Road Authority has no notification requirements, at least 3 working days written notice shall be given.
- At least 2 working days prior to starting road crossing work, the Contractor shall confirm with the Municipality that EMS, OPP and Fire Department have been properly notified of any detours or road closures.

###### **Construction Phase**

- Exact location of the crossing shall be verified with the Road Authority and the Engineer.
- Pipe bedding shall be a minimum 150mm depth of Granular A, shaped for the pipe and compacted to 98% SPMDD.
- Pipe cover shall be Granular B, compacted to 98% SPMDD and extend 300mm above the top of the pipe.
- Trench shall be backfilled with acceptable native material for the base width of the road base. Trench backfill material shall be placed in lifts not exceeding 300mm in depth and shall be thoroughly compacted to 95% SPMDD. Trench backfill (subgrade) shall be inspected and approved by the Engineer prior to the placement of road base granular material.
- Road base granular material shall be placed in lifts not exceeding 300mm in depth and shall be compacted to 100% SPMDD. Unless otherwise specified, road base shall consist of minimum 450mm of Granular B and minimum 150mm of Granular A.
- Any surplus excavated material within the road allowance shall be disposed of per the Road Authority's requirements.
- The Contractor shall restore the road surface to the satisfaction of the Engineer and Road Authority requirements.

###### **Warranty Phase**

- The Contractor shall be responsible for correcting any backfill settlement during construction and during the warranty period. Upon approval of the Road Authority, surplus gravel shall be stockpiled near gravel road crossings to provide backfill for future trench settlement.

- If any road crossing is not left in a safe manner at the end of the working day, barricades and warning signs shall be erected to guarantee the safety of the travelling public per OTM Book 7 requirements.
- If the Engineer deems a road surface to have been damaged by the construction of a drain, either across or along the road, the Engineer may direct the Contractor to restore the road surface to existing or better condition, at no additional cost.
- All road crossings shall meet the final approval of the Road Authority at the end of the warranty period.

#### **400.21 LANEWAYS AND ACCESS CROSSINGS**

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

##### **General/Pre-Construction Phase**

- The Contractor shall notify the landowner(s) at least 1 working day prior to impacting laneway access.

##### **Construction Phase**

- Pipe shall be on suitable, undisturbed, native material. If native material is deemed unsuitable by the Engineer, pipe shall be placed on 300mm depth of 19mm clear stone, wrapped in geotextile.
- Pipe bedding, cover and trench backfill shall be suitable native material placed in lifts not exceeding 300mm in depth and shall be thoroughly compacted to 95% SPMDD.
- Top 450mm of laneway backfill shall consist of minimum 300mm depth of Granular B and minimum 150mm depth of Granular A, compacted to 98% SPMDD, and shall be placed in lifts not exceeding 300mm in depth.
- Where pipe cover is minimal, laneway backfill may consist of minimum 300mm depth of Granular A, compacted to 98% SPMDD, subject to approval by the Engineer.
- Unless otherwise specified, the Contractor shall restore the laneway surface and dimensions to existing conditions, to the satisfaction of the Engineer.

##### **Warranty Period Phase**

- The Contractor shall be responsible for correcting any backfill settlement during construction and warranty period.

#### **400.22 LOCATIONS OF EXISTING UTILITIES**

The position of pole lines, conduits, watermains, sewers and other underground and overhead utilities are not necessarily shown on the Contract Drawings, and, where shown, the accuracy of the position of such utilities and structures is not guaranteed. Before starting work, the Contractor shall have all public and private utilities located.

Upon the request of the Utility owner or the Engineer, utilities shall be exposed to confirm there are no utility conflicts and adequate clearance is provided between existing utilities and the proposed work. In the case of utility conflict(s) or inadequate clearance(s), the Contractor shall notify the Engineer immediately. The Engineer may change the proposed design in accordance with Specification 400.8 - *ALTERATIONS TO WORK*.

Unless otherwise provided in the tender, the cost of exposing utilities, including the use of hydrovac methods, shall be included in the price of other tender items. Additional payment will be allowed for relocation of utilities if conflicts are encountered.

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

**400.23 EXISTING CROSSING CLEANOUT**

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

**400.24 FENCES**

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

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

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

No excavated or cleared material shall be placed against fences.

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

**400.25 LIVESTOCK**

If any construction is within a fenced field containing livestock that are evident or have been made known to the Contractor, the Contractor shall notify the owner at least two working days in advance of accessing the field. Thereafter, the owner shall be responsible for the protection of the livestock in the field during construction and shall also be liable for any damage to or by the livestock.

The Contractor shall adequately re-erect all fences at the end of each working day, unless the owner provides written approval for the fences to remain open until construction is complete. No field containing livestock shall have a trench left open at the end of the working day, unless the trench has been adequately protected with fencing. Failure of the Contractor to comply with this paragraph shall render the Contractor liable for any damage to or by the livestock.

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

**400.26 STANDING CROPS**

The Contractor shall not be held responsible for damages to standing crops within the working area and designated access routes for the drain. However, the Contractor shall notify the owner of upcoming work that will damage/destroy crops at least two working days prior to commencement of construction to allow the owner an opportunity to harvest or salvage the crop within the drain working area. If this advance notice is not given, the Contractor may be held liable for the loss of the standing crops if harvest could have reasonably been achieved by the owner if proper notice had been given by the Contractor.

**400.27 CLEARING VEGETATION****400.27.1 General**

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

**400.27.2 Trees to Remain**

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

**400.27.3 Incidental Clearing**

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

**400.27.4 Power Brushing**

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

**400.27.5 Close-Cut Clearing**

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

**400.27.6 Clearing And Grubbing**

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

**400.27.7 Disposal of Cleared Vegetation****400.27.7.1 In Bush Areas**

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

**400.27.7.2 In Field Areas**

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

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

**400.27.8 Landowner Requested Salvage**

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

**400.27.9 Clearing by Landowner**

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

**400.28 TOPSOIL**

The Contractor shall strip, stockpile and salvage all existing topsoil within the disturbance limit of construction activities. The salvaged topsoil shall then be used to restore disturbed areas to the satisfaction of the Engineer. Disposal of excess topsoil shall be approved by the Engineer, and shall be disposed of at an approved disposal site.

Unless specified otherwise, the cost to remove, handle, haul, stockpile, salvage, dispose, supply and place topsoil, including all labour, material and equipment, shall be included in the price of other tender items.

**400.29 BEDROCK REMOVAL****400.29.1 General**

This section applies to bedrock and boulders that are greater than one-half cubic meter in size and that require blasting or hoe-ram removal. Bedrock or boulders that can be removed with an excavator bucket are not considered bedrock removal for the purposes of this section.

**400.29.2 Blasting Requirements**

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

**400.29.3 Typical Sections and Pay Limits**

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

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

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

**400.29.4 Disposal of Bedrock**

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

Where approved by the Engineer, excavated bedrock may be used in place of imported riprap in compliance with Specification *400.16 - RIPRAP*.

**400.30 SURFACE RESTORATION****400.30.1 General**

The Contractor shall be responsible for re-seeding as necessary for uniform catch during warranty period.

Areas that remain grassed after construction may not need to be seeded, unless directed otherwise by the Engineer.

**400.30.2 Seeding**

All disturbed ditch banks, berms and other grassed areas are to be seeded at the end of the day.

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

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

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

**400.30.3 Hydroseeding**

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

**400.30.4 Lawns**

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

**400.30.5 Sod**

Where sod is specified, sod is to be commercial grade turfgrass nursery sod, Kentucky Bluegrass placed on 150mm of topsoil. Fertilizer shall be 5-20-20 applied at 10kg/ha. Place sod in accordance with supplier instructions. The Contractor is responsible for saturating the sod with water on the day of sod placement. Subsequent watering is the responsibility of the landowner.

**400.31 EROSION AND SEDIMENT CONTROL****400.31.1 General**

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

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

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

**400.31.2 Silt Fence**

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

**400.31.3 Erosion Control Blankets**

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

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

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

#### **400.31.4 Flow Check Dams**

##### *400.31.4.1 Temporary Straw Bale Flow Check Dam*

The straw bale flow check dam shall consist of a minimum of 3 bales. Each bale is to be embedded at least 75mm into the channel bottom and shall be anchored in place with two (2) - 1.2m wooden stakes, driven through the bale and 600mm below ground.

Accumulated sediments shall be excavated and levelled prior to demobilization from the site after initial construction and at the end of the warranty period. Straw bales are to be removed at the end of the warranty period.

##### *400.31.4.2 Temporary Rock Flow Check Dam*

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

Accumulated sediments shall be excavated and levelled prior to demobilization from the site after initial construction and at the end of the warranty period. Temporary rock flow check dams are to be removed at the end of the warranty period.

##### *400.31.4.3 Permanent Rock Flow Check Dam*

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

#### **400.31.5 Sediment Traps**

##### *400.31.5.1 General*

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

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

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

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

A permanent rock sediment trap shall include a permanent sediment trap and a rock flow check dam.

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

#### **400.31.6 Turbidity Curtains**

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

Turbidity curtains shall be in accordance with OPSP 219.260, OPSS 805 and installed per manufacturer's instructions.

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

Turbidity curtains are to remain functional until work in the enclosed area is completed. Prior to relocating or removing turbidity curtains, accumulated sediment is to be removed from the drain and levelled. Where a turbidity curtain remains in place for more than two weeks it shall be inspected for damage or clogging and replaced, repaired, or cleaned as required. No additional payment shall be made for the replacement and maintenance of turbidity curtains during construction.

#### **400.32 GRASSED WATERWAYS AND OVERFLOW SWALES**

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

All grassed waterways are to be permanently vegetated. Grassed waterways shall be seeded with the seed mixture specified in Specification **Error! Reference source not found.** – *SURFACE RESTORATION - Seeding*.

Overflow swales in field areas which are not designated as grassed waterways shall not be seeded.

#### **400.33 BUFFER STRIPS**

Open drains shall include minimum 3m wide, permanently vegetated, buffer strips on each side of the drain, unless alternative dimensions are specified on the Drawings. Catchbasins shall include a minimum 1m vegetated buffer around the catchbasin, unless riprap is placed for sediment control.

#### **400.34 POLLUTION**

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

#### **400.35 SPECIES AT RISK**

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

#### **400.36 SITE CLEANUP**

The Contractor shall remove all surplus materials from the job site at the end of the project prior to demobilization. The Contractor shall locate the disposal site for all materials to be disposed of. Disposal of materials shall comply with applicable regulations. Unless specified otherwise, the cost to dispose of all surplus materials shall be included in the price of other tender items.

#### **400.37 MAINTENANCE CORRIDOR**

The maintenance corridor along the route of the drain, as defined in the report, Drawings, and Specification 400.4 - *WORKING AREA* and 400.6 - *ACCESS*, shall be kept free of obstructions, ornamental vegetation and structures. When future maintenance is undertaken, the cost of removing such items from the corridor shall be assessed to the landowner.



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**410 STANDARD SPECIFICATION FOR OPEN DRAINS****410.1 DESCRIPTION**

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

**410.2 MATERIALS**

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

**410.3 CONSTRUCTION****410.3.1 Excavation**

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

**410.3.2 Low Flow Channels**

Unless specified otherwise in the Special Provisions, all intermittent open drains with a bottom width greater than 1.8m and a grade less than 0.07%, shall have a low flow channel. The bottom of the low flow channel shall be the grade shown on the profiles, and shall have a U-shaped cross-section with an average top width of 0.5m and a minimum depth of 0.3m. The low flow channel will not be seeded and may meander along the main channel bottom provided it remains at least 0.3m from the toe of the main channel bank slope.

**410.3.3 Line**

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

**410.3.4 Grade Control**

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

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

**410.3.5 Variation from Design Grade**

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

**410.3.6 Excavated Material**

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

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

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

Lateral channels that outlet into the drain shall be tapered over a distance of 10m to match the grade of drain excavation. No additional payment will be made for this work. Where the elevation difference between the lateral channel and the drain is greater than 450mm, a rock chute or similar bank protection approved by the Engineer shall be provided. Additional payment may be allowed for this work.

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

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

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

**410.3.7 Excavation at Existing Bridge and Culvert Sites**

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

The Contractor shall clean through all pipe culverts to the grade line and width specified on the profile. The Contractor shall immediately contact the Engineer after a culvert cleanout if it is found that the culvert bottom is above the grade line or where the structural integrity of the culvert is questionable. Material resulting from cleanout through bridges or culverts shall be levelled on the adjacent private lands or hauled offsite at the expense of the bridge/culvert owner.

#### **410.3.8 Bridges and Culverts**

The size and material for any new ditch crossings shall be as outlined in the Special Provisions. For culvert installation instructions, refer to **400 Standard Specifications for Construction of Drains**, the Drawings, and the Special Provisions.

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

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

For backfill and surface restoration, refer to **400 Standard Specifications for Construction of Drains**, the Drawings, and the Special Provisions.

Any crossings assembled on-site shall be assembled in accordance with the manufacturer's specifications. Installation of private crossings during construction must be approved by the Engineer.

#### **410.3.9 Obstructions**

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

#### **410.3.10 Tile Outlets**

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

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

#### **410.3.11 Completion**

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

**STANDARD SPECIFICATIONS****FOR****TILE DRAINS****TABLE OF CONTENTS**

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**420 STANDARD SPECIFICATIONS FOR TILE DRAINS****420.1 GENERAL**

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

The work shall include the supplying of all labour, tools, equipment and materials required for the installation of the tile including the following associated tasks: excavation and backfilling of the trenches; trench dewatering; hauling, handling, placing and compaction of the excavated material for backfill; loading, hauling, handling and disposal of surplus excavated material; and stripping, handling and replacing of topsoil and sod.

All existing laterals crossed by the new drain alignment shall be reconnected in an approved manner. Either special manufactured connections shall be used or another method of sealing connections as approved by the Engineer.

The Contractor shall also supply and install catchbasins, junction boxes and other structures where directed by the Engineer. Refer to Specifications 420.3.8, 420.3.10, and 420.3.11 for specifics on tile connections and catchbasin/junction box details.

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

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

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

**420.2 MATERIALS**

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

**420.3 CONSTRUCTION****420.3.1 Outlet**

A tile drain outlet into a ditch or creek shall be protected using a 6m length of rigid pipe with a hinged grate for rodent protection. Maximum spacing between bars on the rodent grate shall be 50mm. Material for rigid pipe will be specified in the Special Provisions. If not otherwise specified, material shall be assumed to be plastic pipe as per Specification 400.15.5 – *HDPE Pipe* (dual wall high density polyethylene). The joint between the rigid pipe and the tile drain shall be wrapped with filter fabric. All outlets will be protected with rock riprap to protect the bank cut and as a splash apron. In some locations riprap may also be required on the bank opposite the outlet. The quantity of riprap required will be specified in the Special Provisions. A marker stake as approved by the Engineer shall be placed at each tile outlet.

**420.3.2 Alignment & Pre-Location of Existing Drains**

The Engineer will designate the general location of the new drain. When the proposed drain is generally parallel to existing drains, the Contractor shall pre-locate the existing drains.

For pre-locates, cross trenches are to be dug along the entire length of the new drain route at 100m to 200m intervals (minimum), prior to construction, to confirm the alignment of the new drain. The frequency of pre-locating will depend on the alignment of the existing drains. More pre-locates will be necessary for a meandering drain route.

The Contractor shall exercise care to not disturb any existing tile drains which parallel the new drain and are intended to remain. The alignment of the new drain shall be offset approximately four to six metres from the existing drain to minimize disturbance of the existing drain. Where an existing tile is disturbed or damaged the Contractor shall perform the necessary correction or repair with no additional compensation.

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

#### **420.3.3 Grade Control**

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

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

#### **420.3.4 Variation from Design Grade**

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

#### **420.3.5 Installation**

##### *420.3.5.1 General*

For installation of closed drains by wheel trencher or excavator and corrugated plastic tubing by drainage plow, topsoil shall be stripped, stockpiled separately and replaced after the trench is backfilled. Topsoil stripping extents shall account for the width of the trench and include adequate space for subsoil stockpiles.

At each work stoppage, the exposed end of the tile shall be covered by a tight-fitting board or metal plate. No installed tile shall be left exposed overnight.

Any tile damaged or plugged during construction shall be replaced or repaired at the Contractor's expense.

Restoration requirements are provided in Specification 400.30 - *Surface Restoration*.

##### *420.3.5.2 Installation of Concrete Tile*

The standard method for concrete tile installation is by wheel machine. Installation of concrete tile by backhoe/excavator is subject to the Engineer's approval and shall meet the requirements at the end of this section.

Trench excavation shall begin at the outlet and proceed upstream. The location and grade shall be as shown on the Drawings but may be revised by the Engineer on site with no additional payment, except where the change requires increased depth of cut beyond the limitation of the wheel trencher in use at the time of the change.

Where the depth for the tile installation exceeds the depth capacity of the wheel trencher, the Contractor shall excavate a trench of sufficient depth so that the wheel trencher can install the tile at the correct depth and grade. The tender price shall include the cost of the additional excavation, material handling, backfilling and stripping and replacing topsoil over the trench.

The trench width measured at the top of the tile should be at least 150mm greater than the tile diameter. The bottom of the trench is to be cut accurately to grade and shaped so that 10% of the tile diameter is embedded in undisturbed soil. If the trench is overcut below the proposed grade, it is to be backfilled with 19mm clear crushed stone material to the correct grade.

The inside and ends of the tile are to be kept clean during installation. All soil and debris should be removed before the next tile is installed. All concrete tile joints and connections with other pipe materials are to be fully and tightly wrapped with a minimum 300mm width of geotextile drain wrap. A 150mm minimum overlap on top is also required. No additional payment will be made for joint wrapping.

On straight runs, ensure tile joints are aligned, joint wrap is flat and covers the joint evenly, and maximum space between tiles is 3mm. On curved runs, ensure tile joints are touching on one side with a maximum gap of 12mm (1/2") on the opposite side. Where the maximum gap of 12mm cannot be achieved on a curved run, tiles shall be bevel cut or elbow fittings (maximum 45°) shall be used.

#### Additional Requirements for Excavator Installation

For installation of concrete tile by backhoe/excavator, concrete tile shall be installed on a minimum of 100mm of 19mm clear, crushed stone, shaped for 10% of the tile diameter. The cost to supply and place stone bedding shall be included in the tendered price for the concrete tile item.

#### **420.3.5.3**      *Installation of Corrugated Plastic Tubing*

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

For all installation methods:

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

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

#### **420.3.5.4**      *Installation of Concrete Sewer Pipe or Plastic Pipe*

The Contractor shall shape the bottom of the trench to receive and support the pipe and bell over 10% of its diameter. In field and lawn areas, stone bedding is not required unless otherwise specified on the Drawings or directed by the Engineer.

#### **420.3.6**      **Stony Conditions and Bedrock**

The Contractor shall immediately contact the Engineer if stony conditions or bedrock is encountered such that installation by wheel trencher or drainage plow cannot continue. Upon approval of the Engineer, the Contractor shall continue with drain installation using excavator/backhoe methods, as described in Specification 420.3.5.2 - *Installation of Concrete Tile*. If not already established in the Tender, additional payment may be approved by the Engineer in consultation with the Contractor. All reasonable effort by the Contractor shall be made to continue with the wheel trencher, or return to use of the wheel trencher after the stony area has been passed.



Stones greater than 300mm in diameter that are pulled to the surface during excavation shall be disposed of by the Contractor at an on-site location acceptable to the landowner. No additional payment for excavating or hauling these stones will be provided.

#### **420.3.7 Unstable Subsoils**

The Contractor shall immediately contact the Engineer if unstable subsoil conditions are encountered during tile installation. Upon approval of the Engineer, the tile shall be installed on a 300mm layer of 19mm clear crushed stone. In locations with non-cohesive, fine-grained soils, the Engineer may require the clear crushed stone to be wrapped in geotextile to prevent migration of fines into the clear stone. In exceptional circumstances (e.g. muck soils), the Engineer may require the Contractor to subexcavate unsuitable materials and backfill with clear stone, as required to support pipe bedding.

If not already established in the Tender, additional payment will be considered by the Engineer including: the cost to supply and place the additional stone, geotextile, and the increased cost for installation.

#### **420.3.8 Tile Connections**

All lateral drains encountered along the route of the new tile drain are to be connected to the new drain if the intercepted tile are clean and do not contain polluted water. The Contractor shall obtain direction from the Engineer for lateral drains that are full of sediment or contain polluted water.

All lateral drains are to be connected to the new tile using a pipe material and size that will provide the same flow capacity. Corrugated plastic tubing may be used for all tile connections, unless specified otherwise by the Engineer. Tubing may be solid or perforated. Filter sock is not required.

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

Tile connections will be paid in accordance with the Schedule of Tender Prices and shall include the cost for all fittings, tubing, stone, equipment and labour required.

#### **420.3.9 Backfilling**

All tile shall be blinded by the end of the day's work to protect and hold them in place against disturbance. After the tile is inspected, it shall be initially backfilled with a minimum cover of 300mm. For blinding and initial backfilling, use clean native soil with no organic matter. Initial backfill shall be tamped around the pipe by backhoe bucket or similar, if directed by the Engineer.

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

#### **420.3.10 Catchbasins**

##### **420.3.10.1 General**

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

#### 420.3.10.2 *Materials*

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

Precast, reinforced concrete catchbasins shall be manufactured by Coldstream Concrete or approved equal. The joints between precast catchbasin sections shall be protected with geotextile to prevent soil material from entering into the catchbasin. Joint protection using mortar or water tight barrier is also acceptable. Grates are to be birdcage grates as manufactured by Coldstream Concrete or approved equal, unless specified otherwise on the Drawings. All grates to be secured with corrosion resistant hardware.

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

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

#### 420.3.10.3 *Installation*

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

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

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

#### **420.3.11 Junction Boxes**

Junction boxes shall be precast concrete to the same specification as above for catchbasins, except that the junction box shall have a solid concrete lid, unless specified otherwise on the Drawings. The lid shall be a minimum of 125mm thick with welded wire reinforcement and 2 lifting handles. Junction boxes shall have minimum cover of 450mm.





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

- NOTES:**
- ALL ROLL NUMBERS IN TOWNSHIP OF WILMOT BEGIN WITH: 30-18-010-
  - ALL ROLL NUMBERS IN TOWNSHIP OF EAST ZORRA-TAVISTOCK BEGIN WITH: 32-38-010-

**PLAN LEGEND**

- MAJOR WATERSHED
- SUB WATERSHED
- PROPOSED WORK OR INCORPORATION
- EXISTING DRAIN
- DITCH OR WATERCOURSE
- COUNTY/TOWNSHIP BOUNDARY
- ACCESS
- DENOTES PROPERTY OWNERSHIP ON BOTH SIDES OF LOT LINE
- 5.2 ha. - HECTARES OWNED
- 001-04900 - ASSESSMENT ROLL NUMBER
- BUSH
- SUBSURFACE DRAINAGE ONLY TO NICKLAS DRAIN. SURFACE WATERS DRAIN TO WEST.

DESIGNED BY: C.J.M.  
CHECKED BY: J.W.K.  
DRAWN BY: A.M.P.  
CHECKED BY: J.W.K.




**SCALE**

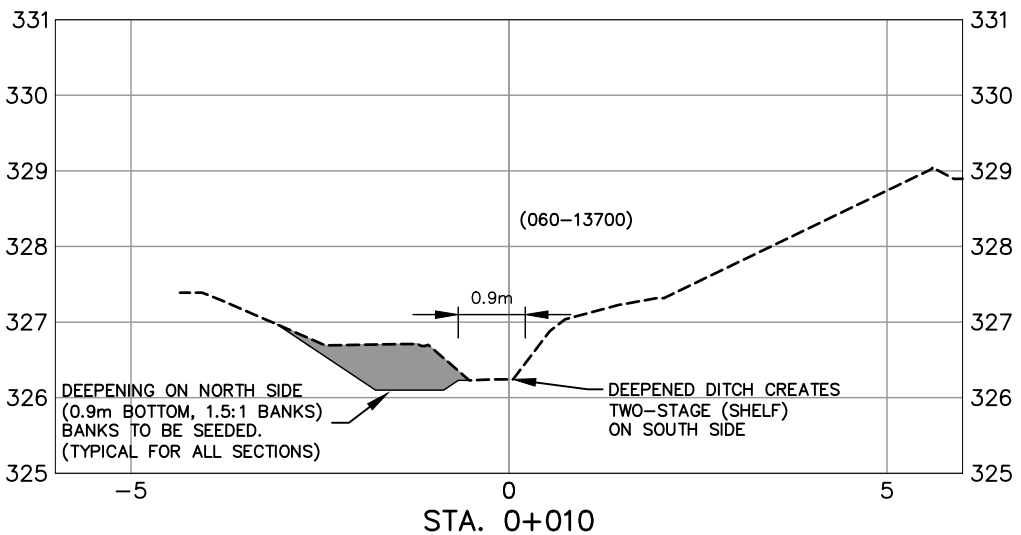
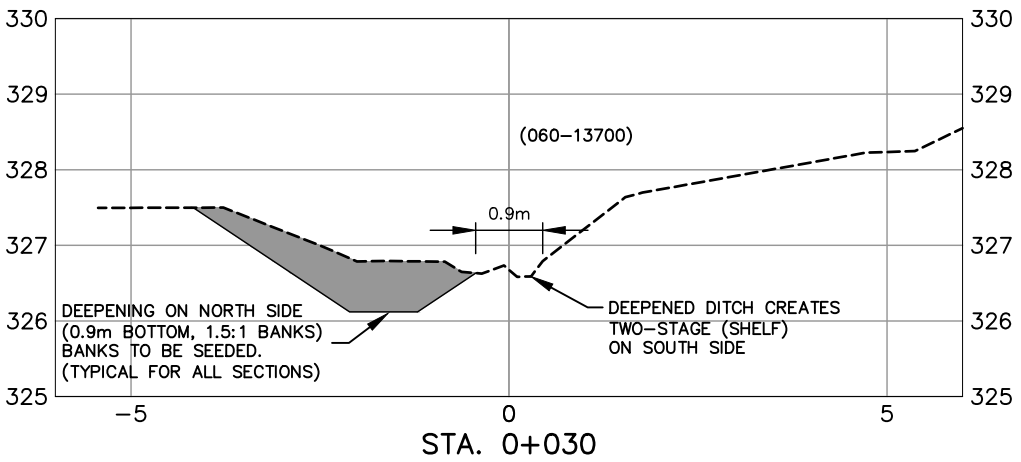
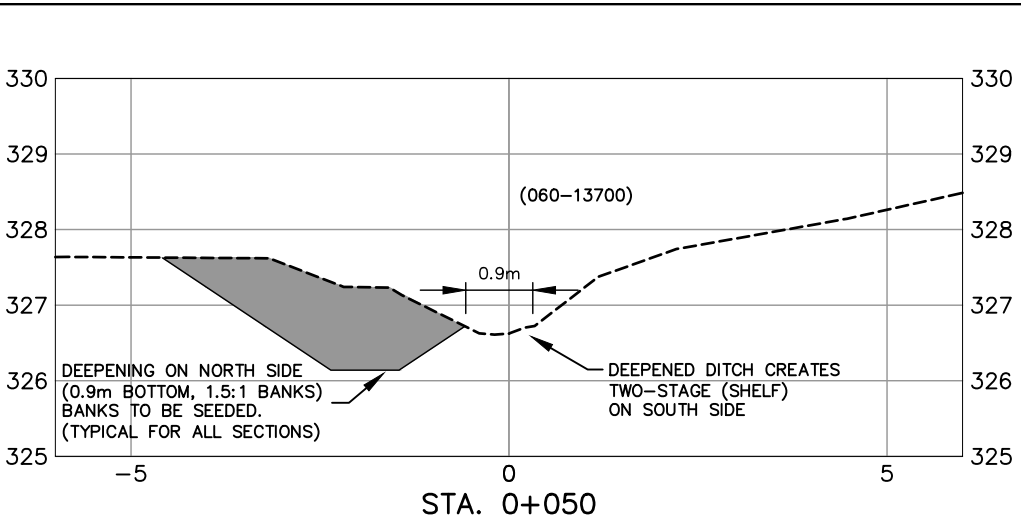
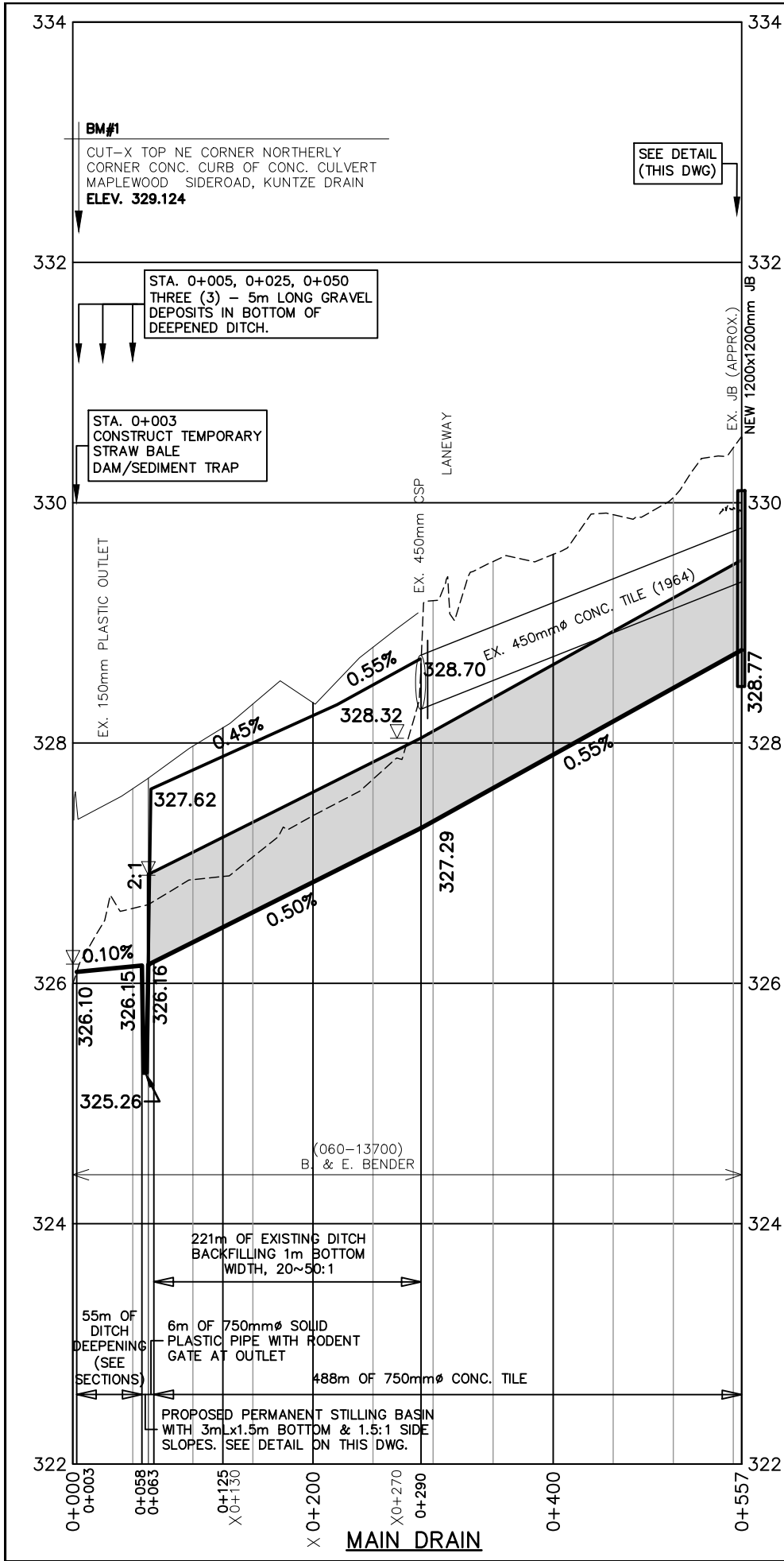
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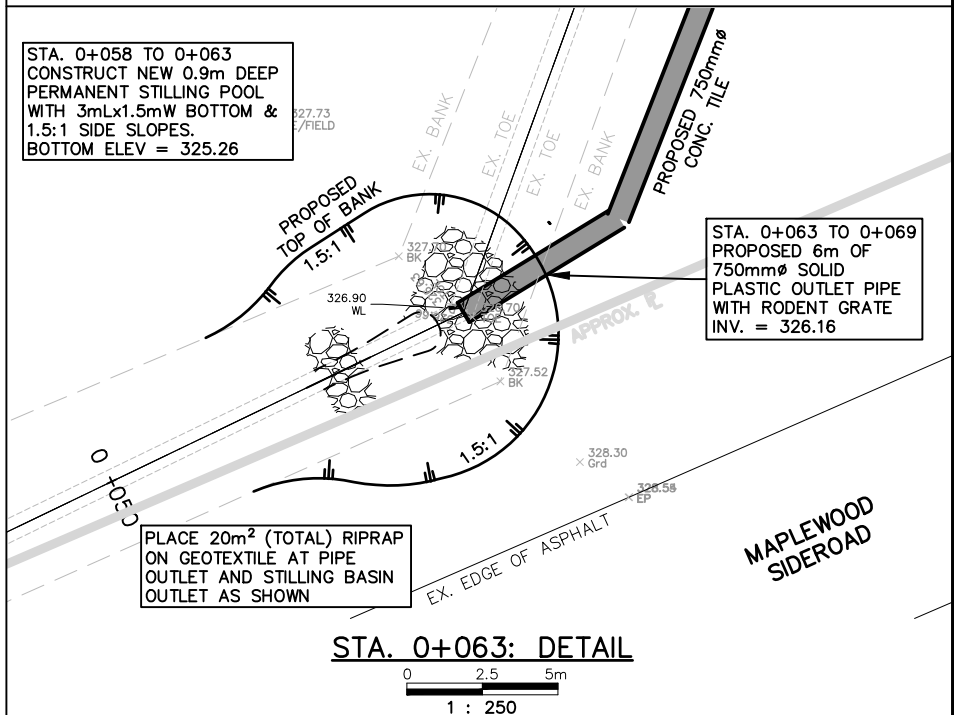
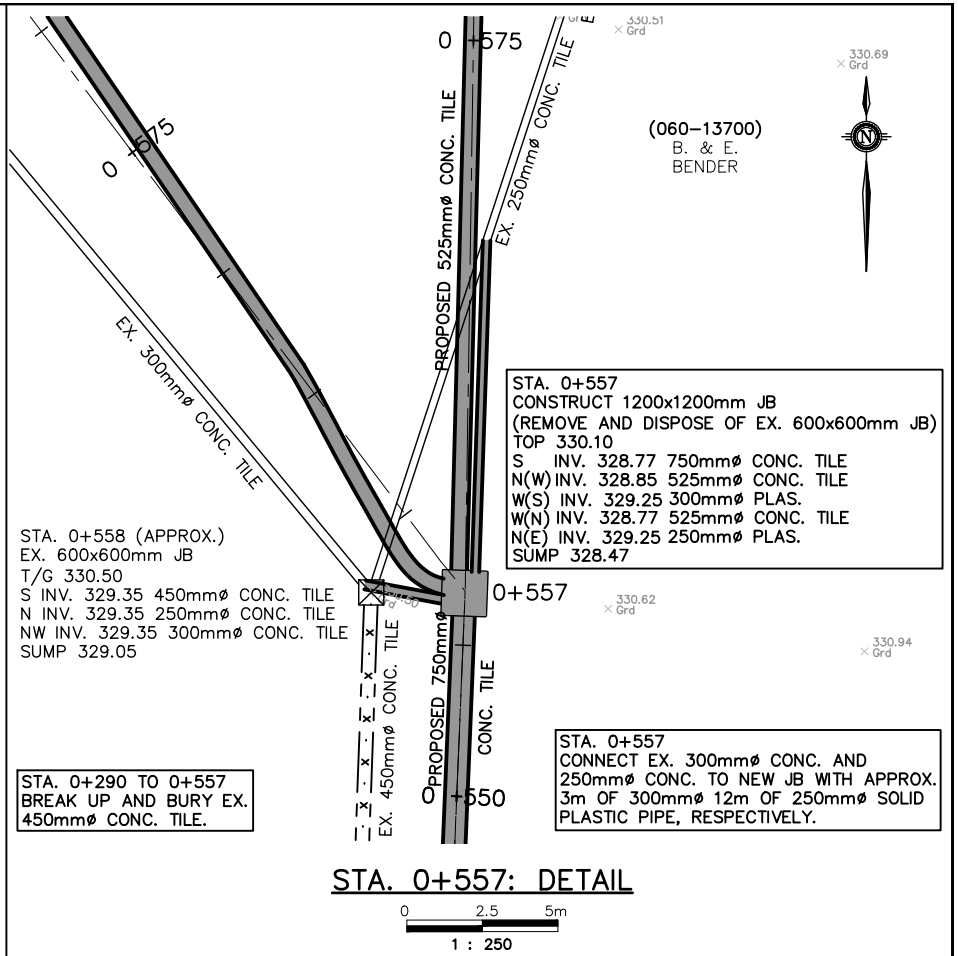
NICKLAS DRAIN 2025	
REGION OF WATERLOO OXFORD COUNTY	TOWNSHIP OF WILMOT TOWNSHIP OF EAST ZORRA-TAVISTOCK
WATERSHED PLAN	FEB. 28, 2025
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: <b>20-328</b>
	DRAWING <b>1 OF 13</b>





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(ON 11"x17")



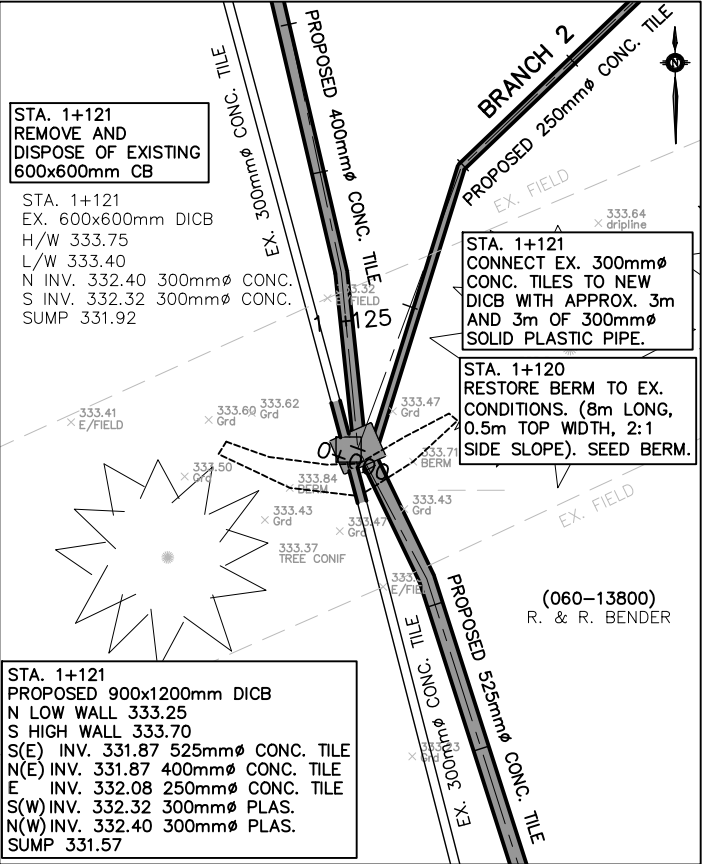
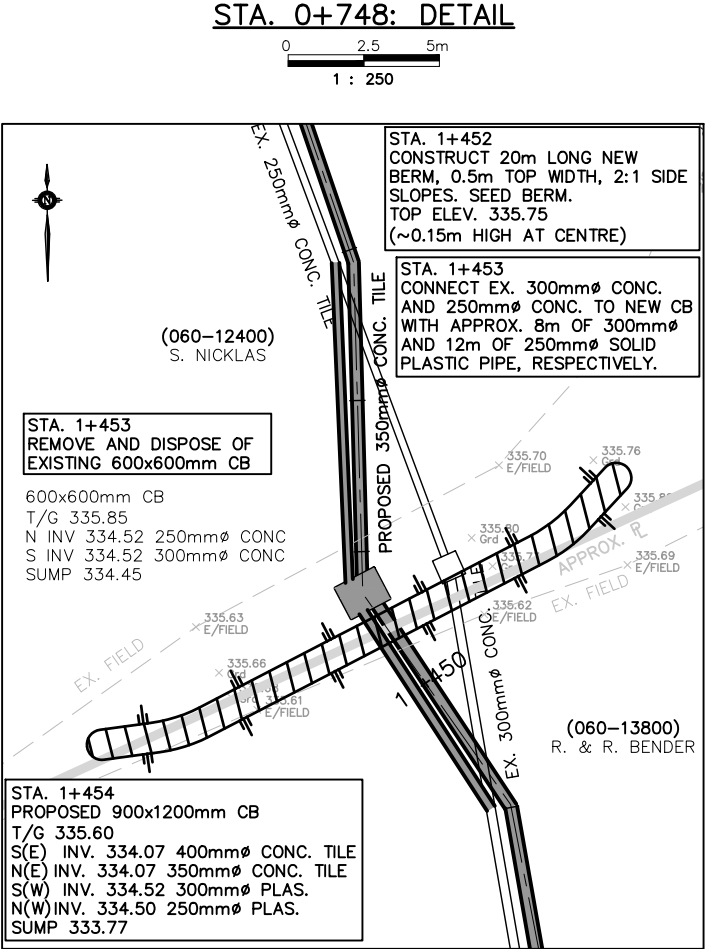
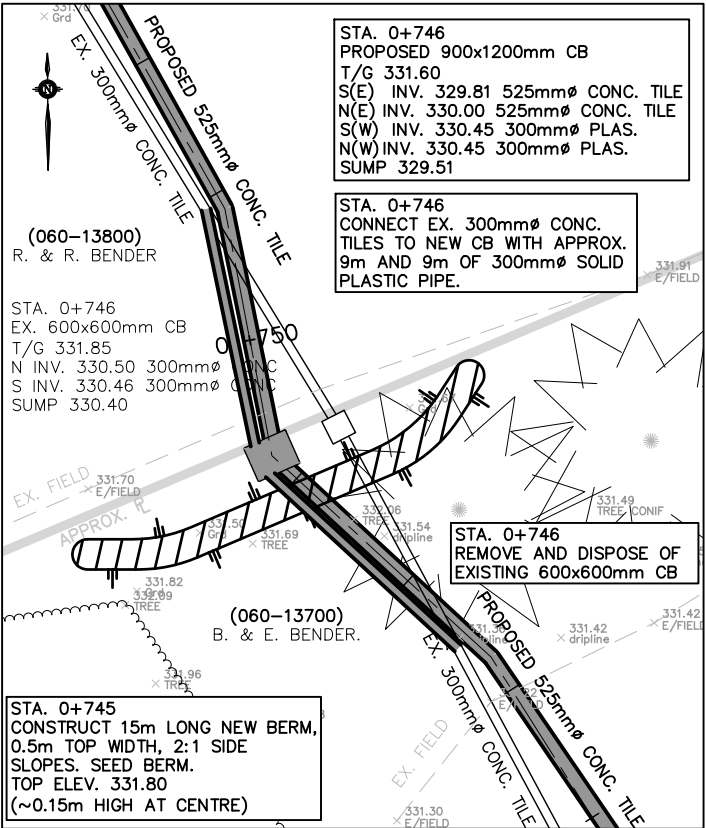
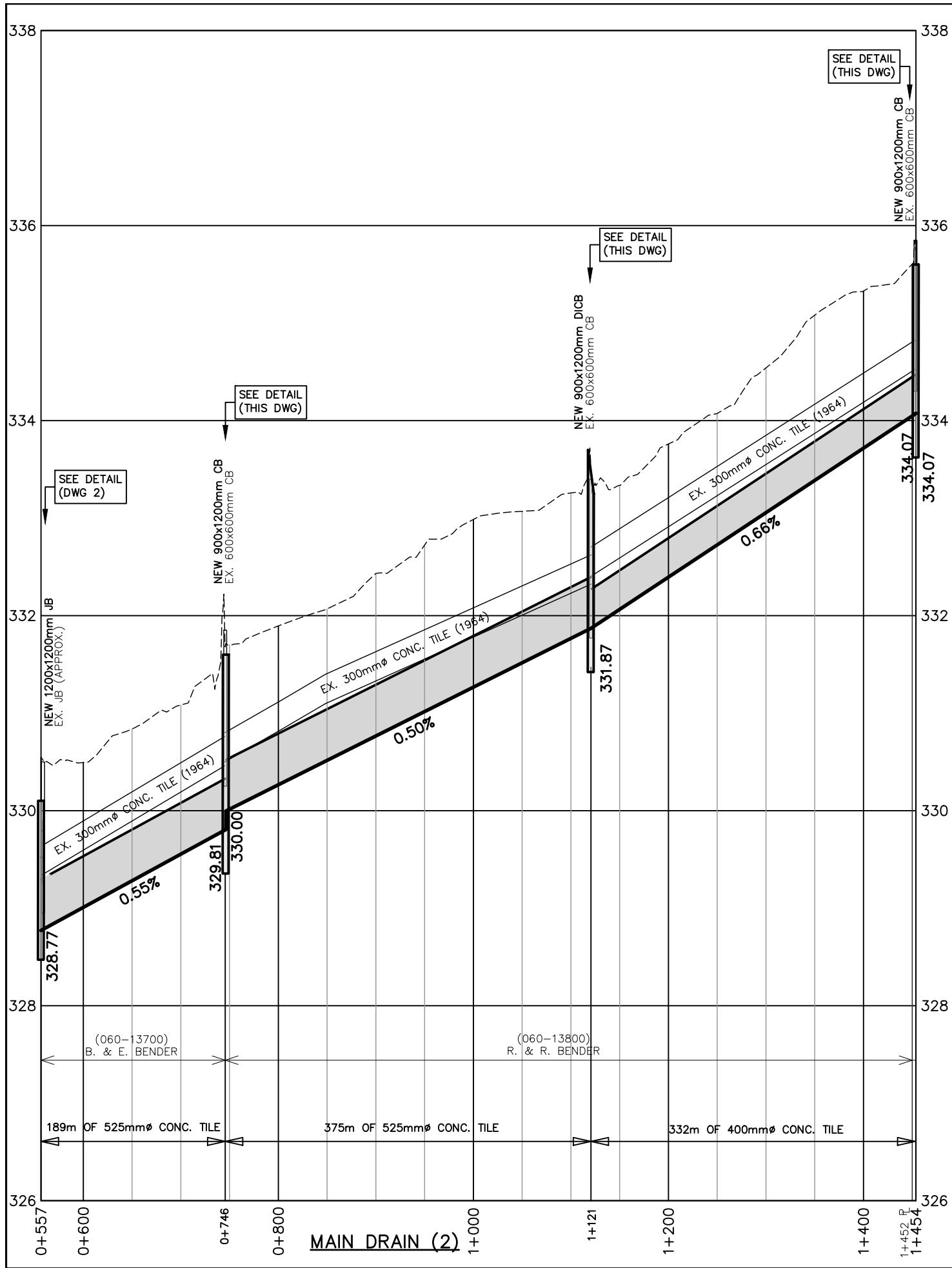
DESIGNED BY: C.J.M.  
CHECKED BY: J.W.K.  
DRAWN BY: M.C.J.  
CHECKED BY: J.W.K.



**PROFILE SCALE**  
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1 : 50 (VERT.)  
(ON 11"x17")

<b>NICKLAS DRAIN 2025</b>	
REGION OF WATERLOO TOWNSHIP OF WILMOT OXFORD COUNTY TOWNSHIP OF EAST ZORRA-TAVISTOCK	
<b>NICKLAS DRAIN PROFILE, CROSS SECTIONS, DETAILS</b>	
FEB. 28, 2025	
REVISED:	
JOB NUMBER: 20-328	
DRAWING	
2 OF 13	


<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY
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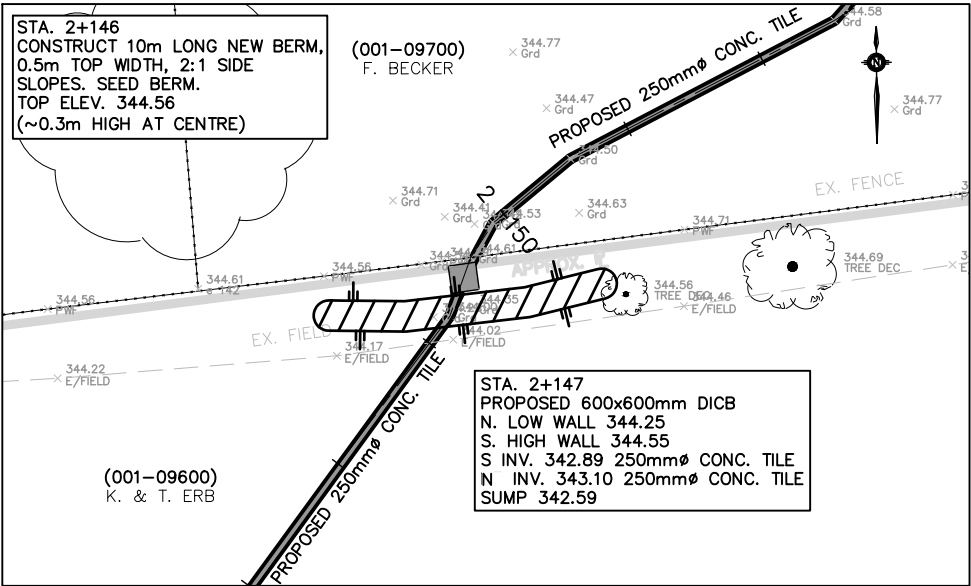
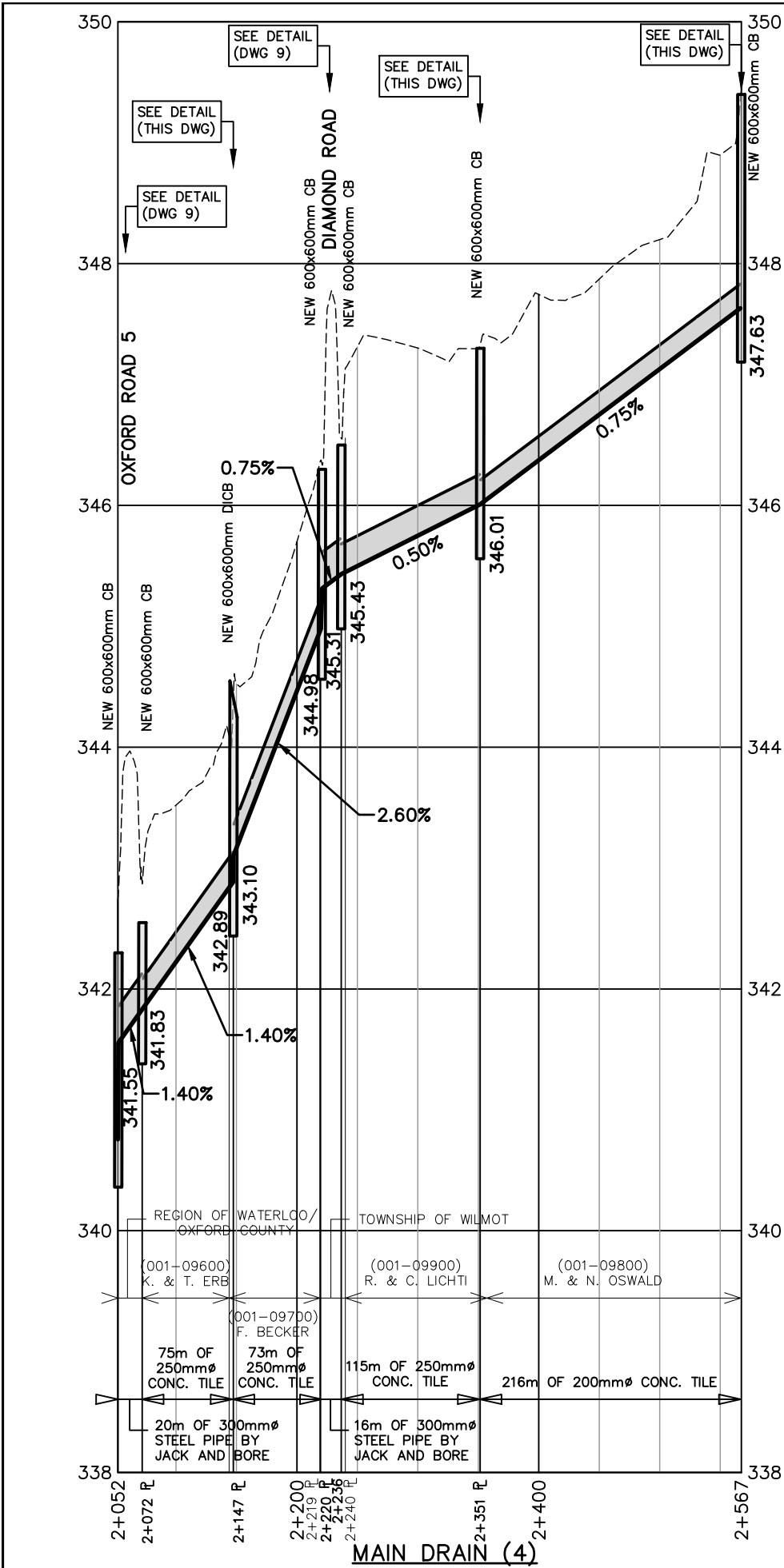
DESIGNED BY: C.J.M.  
CHECKED BY: J.W.K.  
DRAWN BY: M.C.J.  
CHECKED BY: J.W.K.



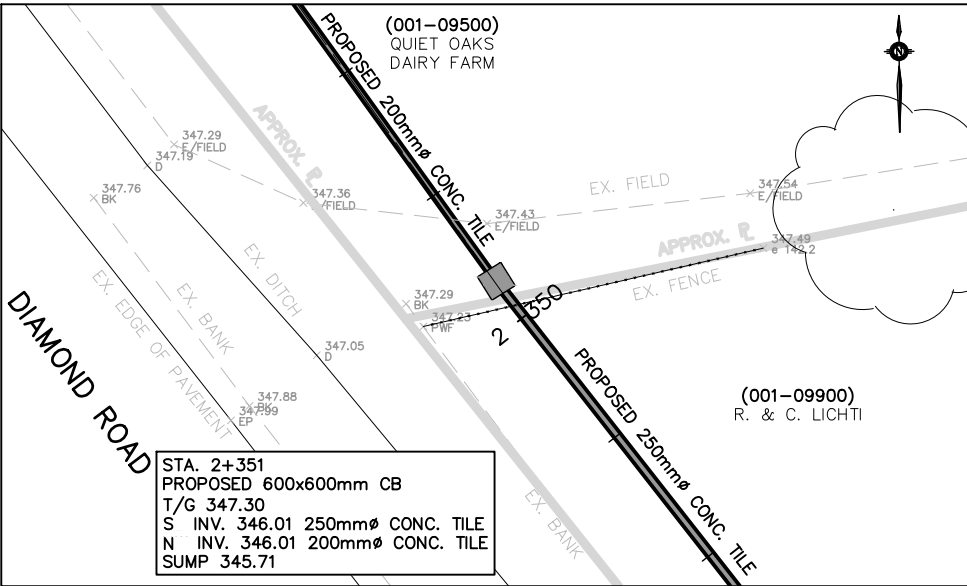
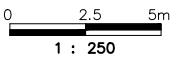
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(ON 11"x17")

<b>NICKLAS DRAIN 2025</b>	
REGION OF WATERLOO TOWNSHIP OF WILMOT OXFORD COUNTY TOWNSHIP OF EAST ZORRA-TAVISTOCK	
<b>MAIN DRAIN PROFILE</b>	<b>FEB. 28, 2025</b>
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: <b>20-328</b>
	DRAWING <b>3 OF 13</b>

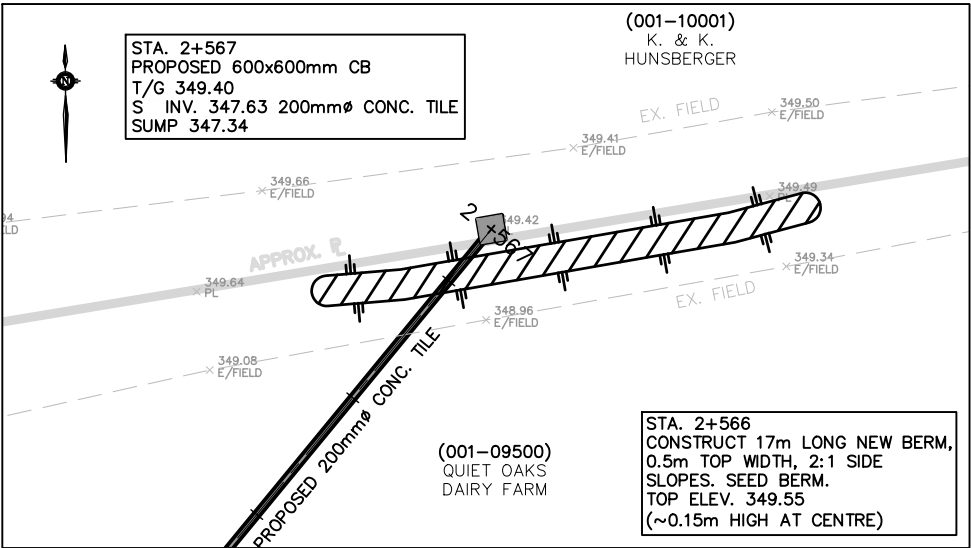
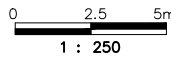




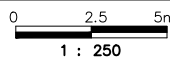
STA. 2+147: DETAIL



STA. 2+351: DETAIL



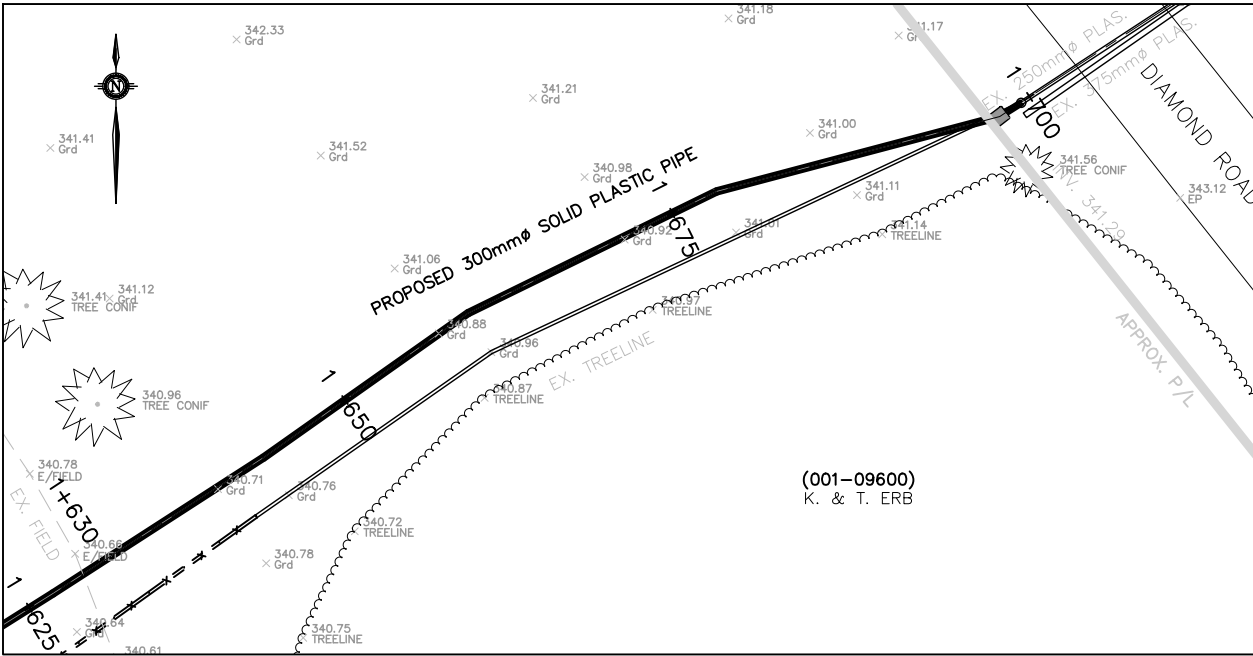
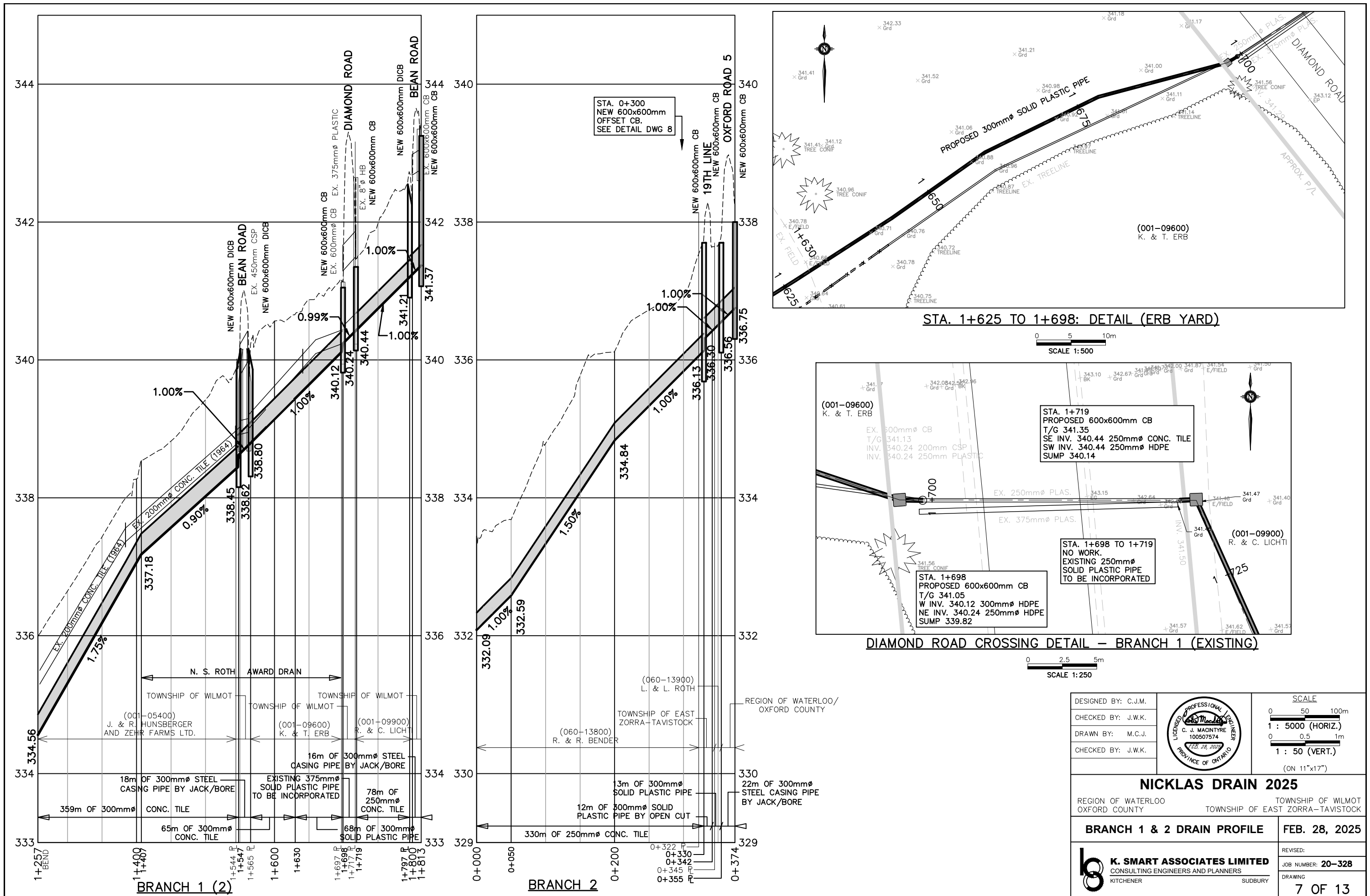
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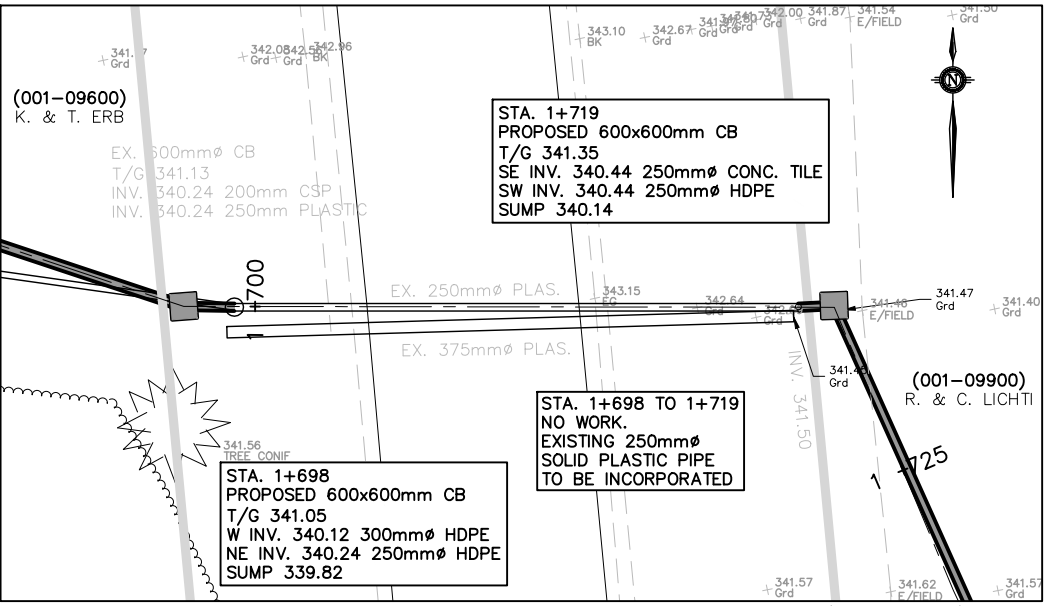
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DRAWN BY: M.C.J.		1 : 5000 (HORIZ.)	
CHECKED BY: J.W.K.		0 0.5 1m	
		1 : 50 (VERT.)	
		(ON 11"x17")	
<b>NICKLAS DRAIN 2025</b>			
REGION OF WATERLOO OXFORD COUNTY		TOWNSHIP OF WILMOT TOWNSHIP OF EAST ZORRA-TAVISTOCK	
<b>MAIN DRAIN PROFILE</b>		<b>FEB. 28, 2025</b>	
	<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED:
			JOB NUMBER: <b>20-328</b>
			DRAWING
		<b>5 OF 13</b>	





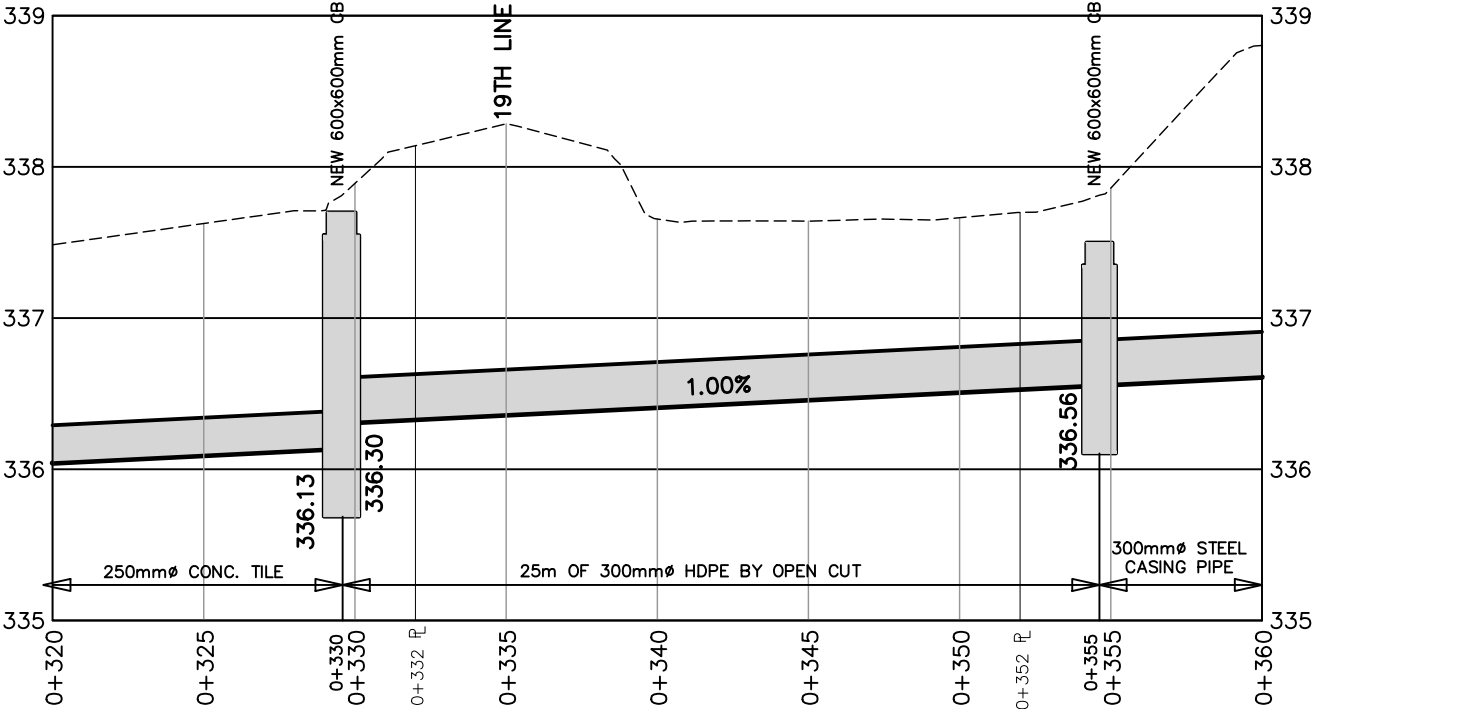
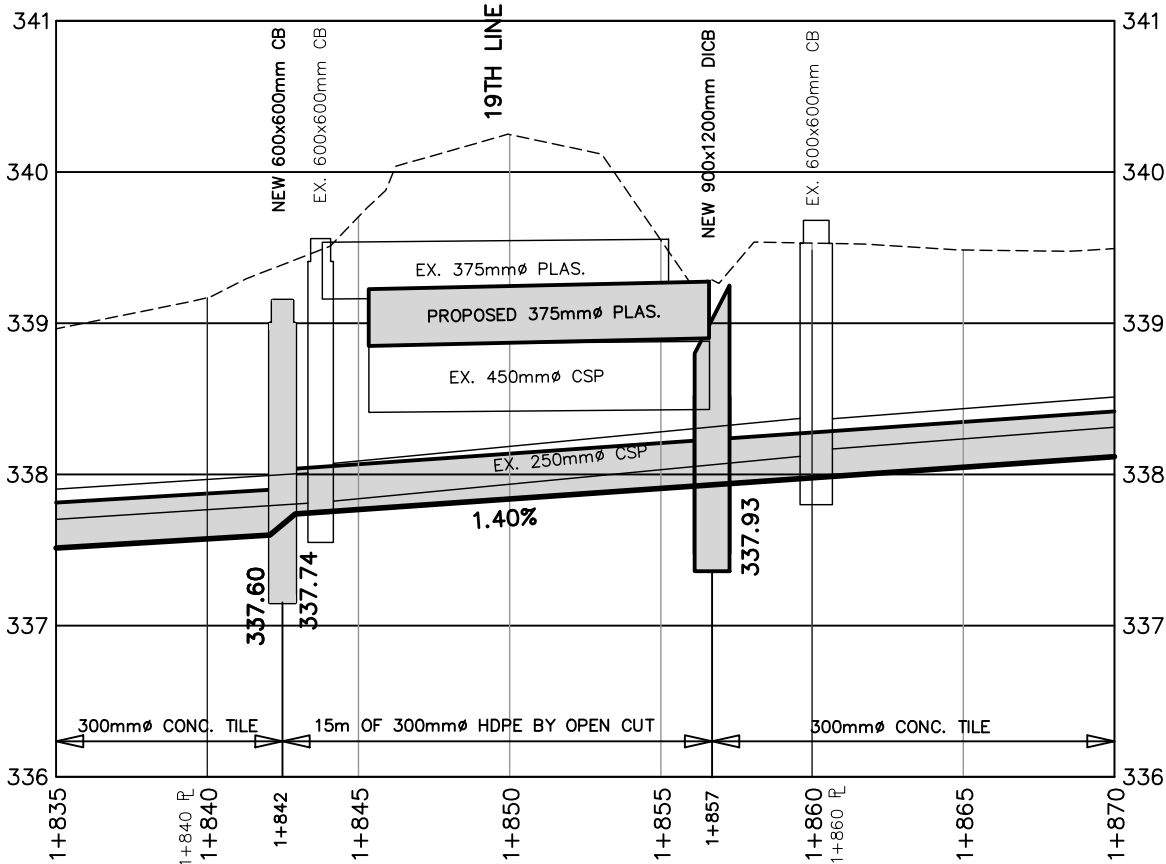
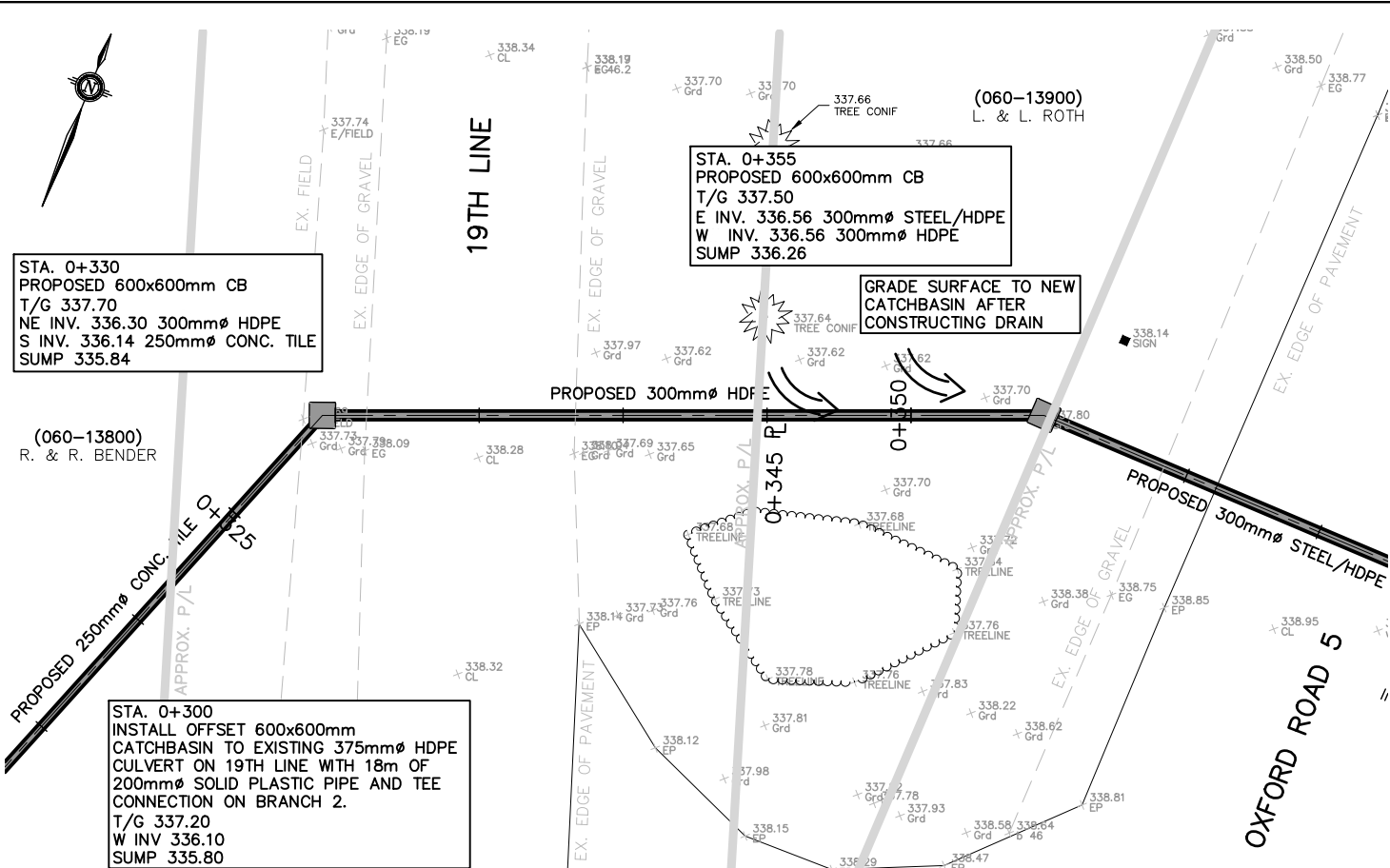
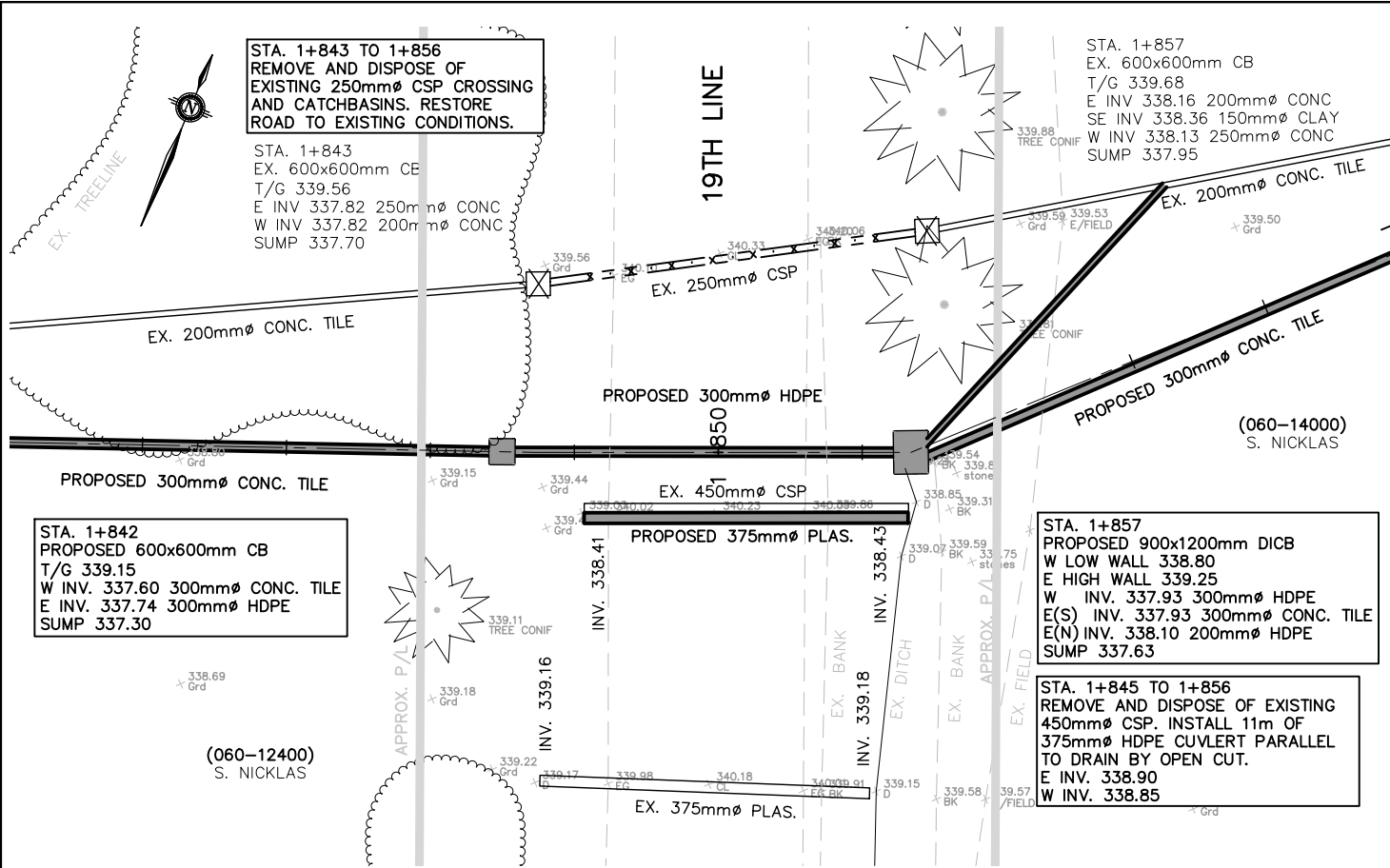


STA. 1+625 TO 1+698: DETAIL (ERB YARD)



DIAMOND ROAD CROSSING DETAIL - BRANCH 1 (EXISTING)

DESIGNED BY: C.J.M.		SCALE	
CHECKED BY: J.W.K.		0 50 100m	
DRAWN BY: M.C.J.		1 : 5000 (HORIZ.)	
CHECKED BY: J.W.K.		0 0.5 1m	
		1 : 50 (VERT.)	
		(ON 11"x17")	
<b>NICKLAS DRAIN 2025</b>			
REGION OF WATERLOO OXFORD COUNTY		TOWNSHIP OF WILMOT TOWNSHIP OF EAST ZORRA-TAVISTOCK	
<b>BRANCH 1 &amp; 2 DRAIN PROFILE</b>		<b>FEB. 28, 2025</b>	
	REVISED:		<b>7 OF 13</b>
	JOB NUMBER: <b>20-328</b>		
	DRAWING		



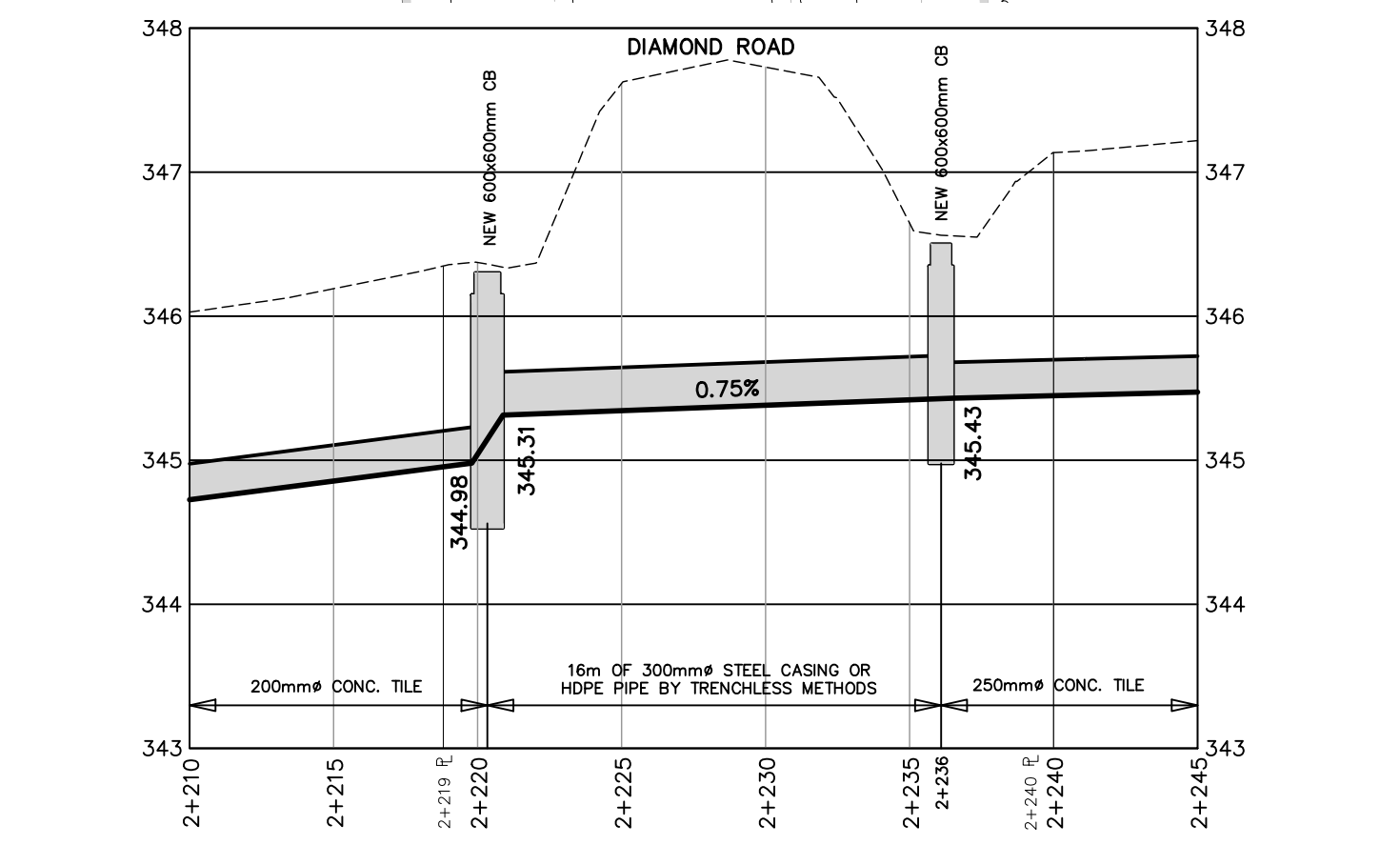
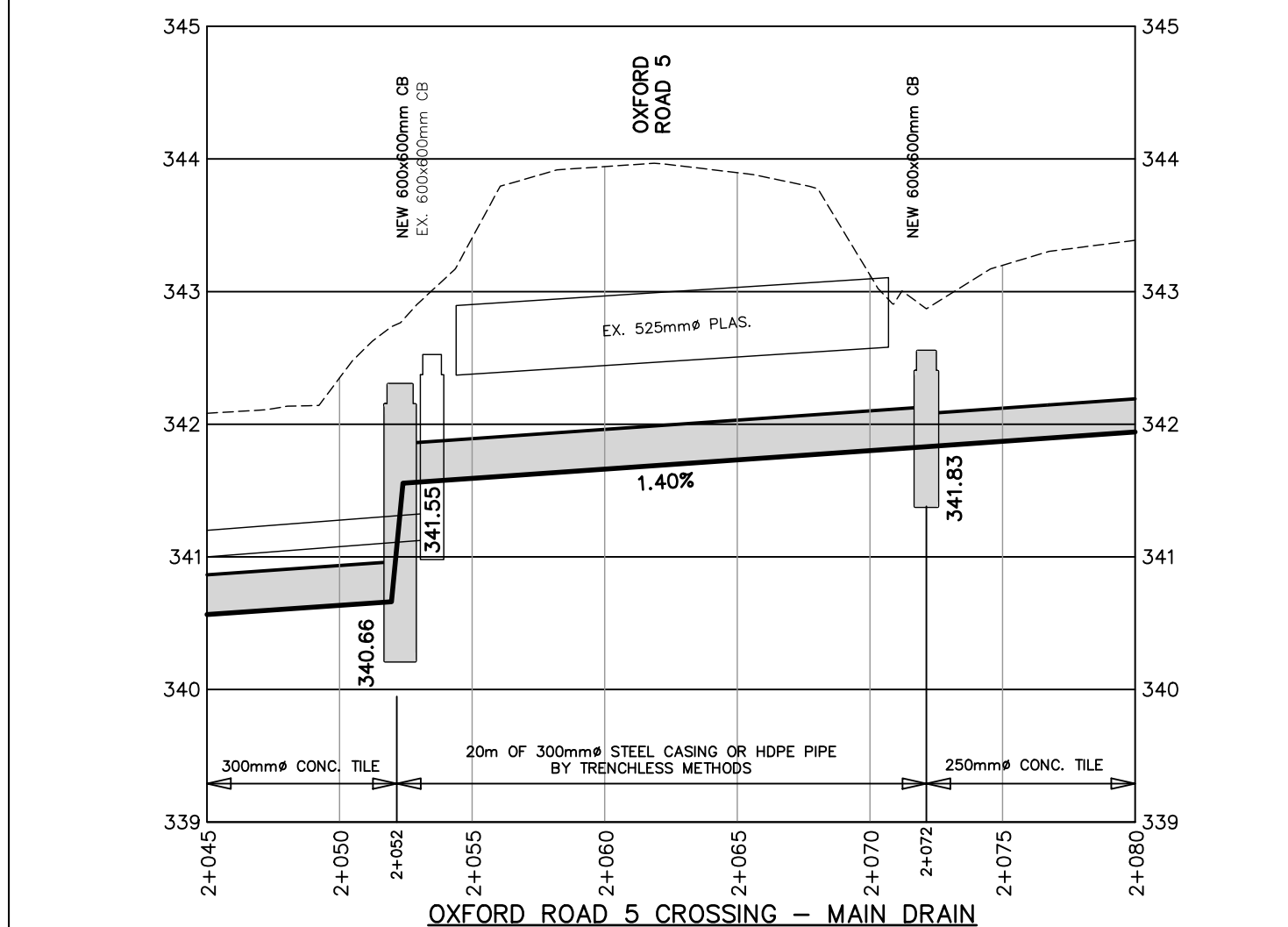
DESIGNED BY: C.J.M.  
CHECKED BY: J.W.K.  
DRAWN BY: M.C.J.  
CHECKED BY: J.W.K.

PLAN & PROFILE  
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1 : 250 (HORIZ.)  
0 2m  
1 : 50 (VERT.)  
(ON 11"x17")



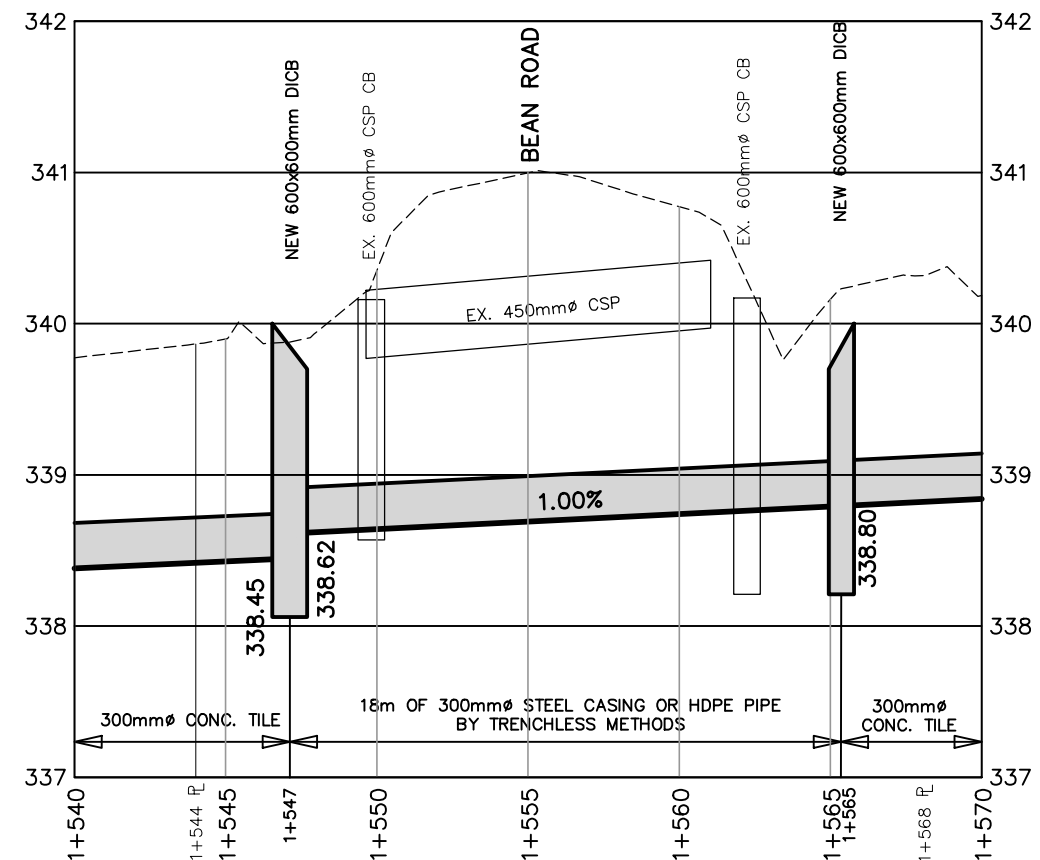
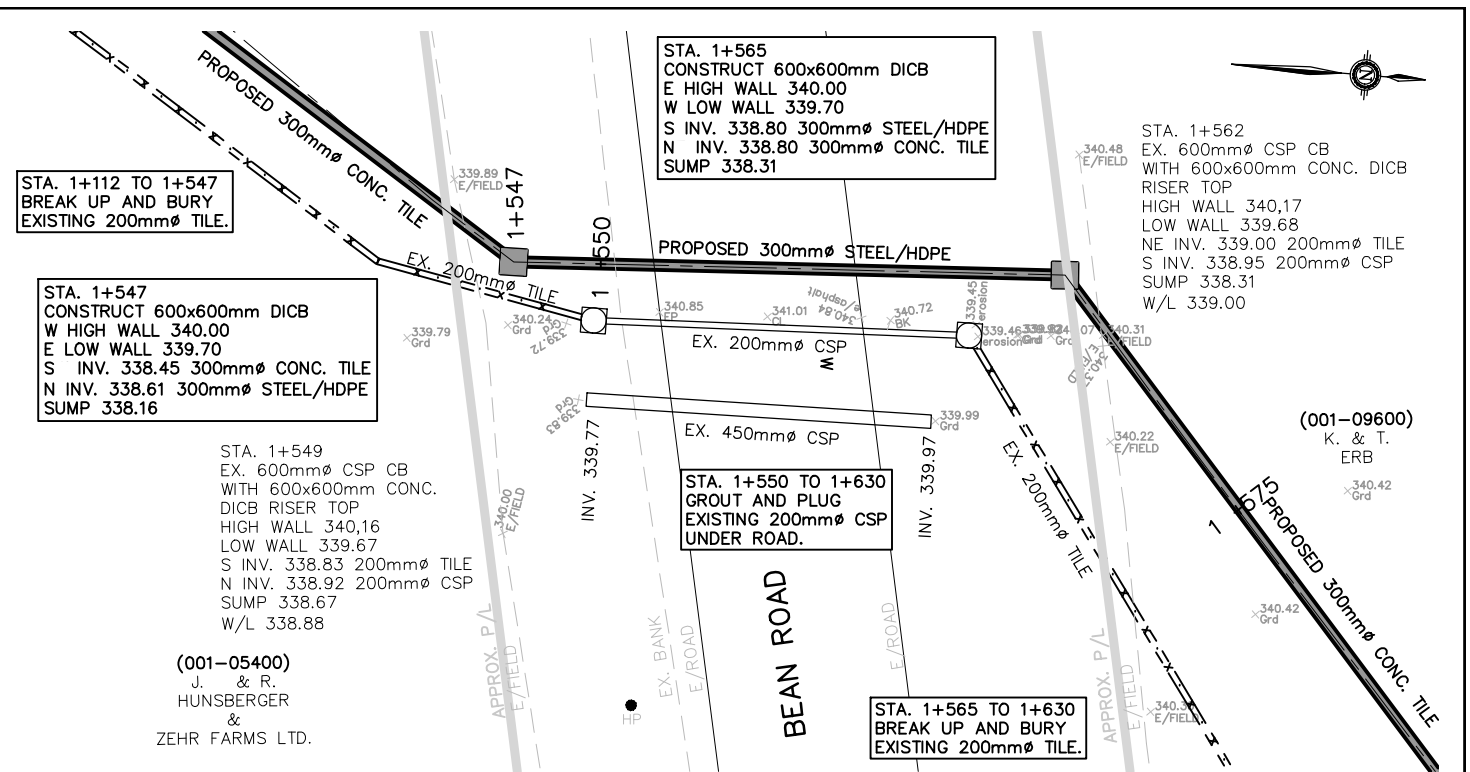
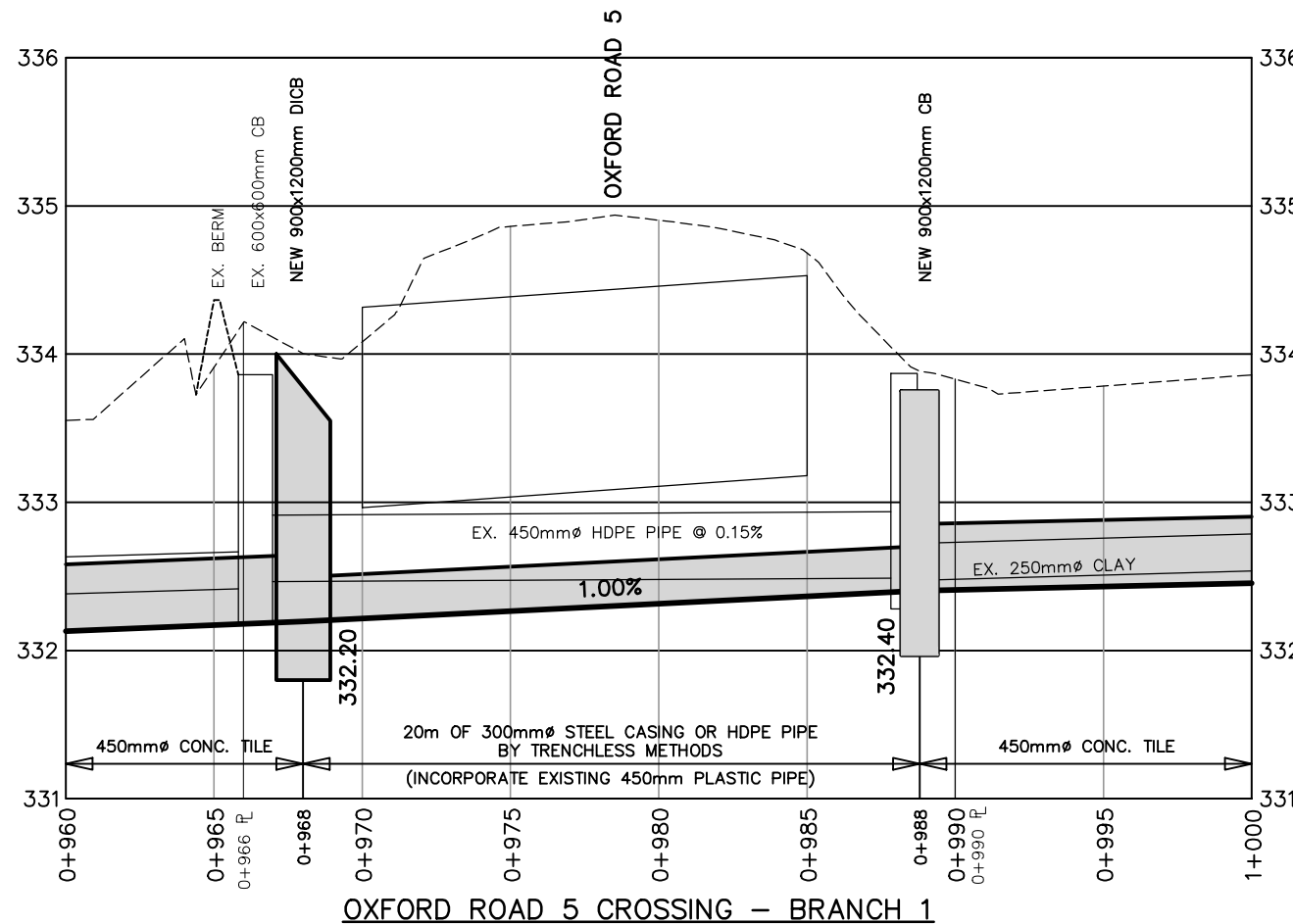
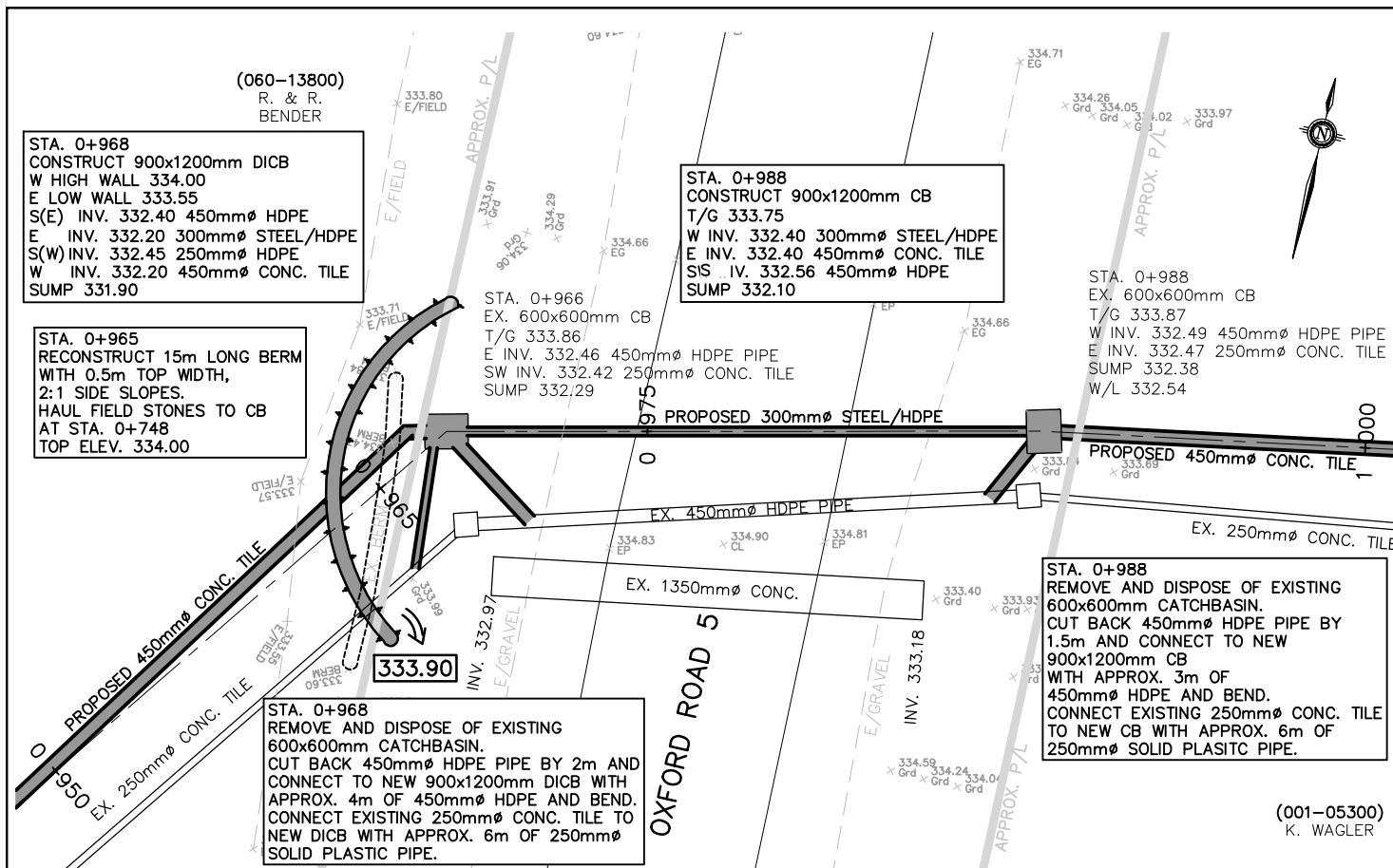
**NICKLAS DRAIN 2025**  
REGION OF WATERLOO  
OXFORD COUNTY  
TOWNSHIP OF WILMOT  
TOWNSHIP OF EAST ZORRA-TAVISTOCK

**OPEN CUT CROSSING DETAILS (19TH LINE)**  
**FEB. 28, 2025**  
K. SMART ASSOCIATES LIMITED  
CONSULTING ENGINEERS AND PLANNERS  
KITCHENER SUDBURY  
REVISED:  
JOB NUMBER: **20-328**  
DRAWING  
**8 OF 13**



## DIAMOND ROAD CROSSING – MAIN DRAIN

DESIGNED BY: C.J.M. CHECKED BY: J.W.K. DRAWN BY: M.C.J. CHECKED BY: J.W.K.		<p><u>PLAN &amp; PROFILE</u></p>		<h2 style="text-align: center;">NICKLAS DRAIN 2025</h2> <p style="text-align: center;">REGION OF WATERLOO                      TOWNSHIP OF WILMOT          OXFORD COUNTY                      TOWNSHIP OF EAST ZORRA-TAVISTOCK</p>	
				<h3 style="text-align: center;">BORED ROAD CROSSING DETAILS MAIN DRAIN</h3>	<h3 style="text-align: center;">FEB. 28, 2025</h3>
				<h3 style="text-align: center;">K. SMART ASSOCIATES LIMITED</h3> <p style="text-align: center;">CONSULTING ENGINEERS AND PLANNERS</p> <p style="text-align: center;">KITCHENER                      SUDBURY</p>	REVISED: JOB NUMBER: <b>20-328</b> DRAWING <h2 style="text-align: center;">9 OF 13</h2>



BEAN ROAD CROSSING - BRANCH 1

NICKLAS DRAIN 2025

REGION OF WATERLOO TOWNSHIP OF WILMOT  
OXFORD COUNTY TOWNSHIP OF EAST ZORRA-TAVISTOCK

BORED ROAD CROSSING DETAILS (2)  
BRANCH 1

FEB. 28, 2025

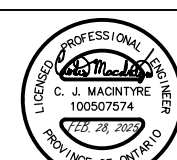
K. SMART ASSOCIATES LIMITED  
CONSULTING ENGINEERS AND PLANNERS  
KITCHENER SUDBURY

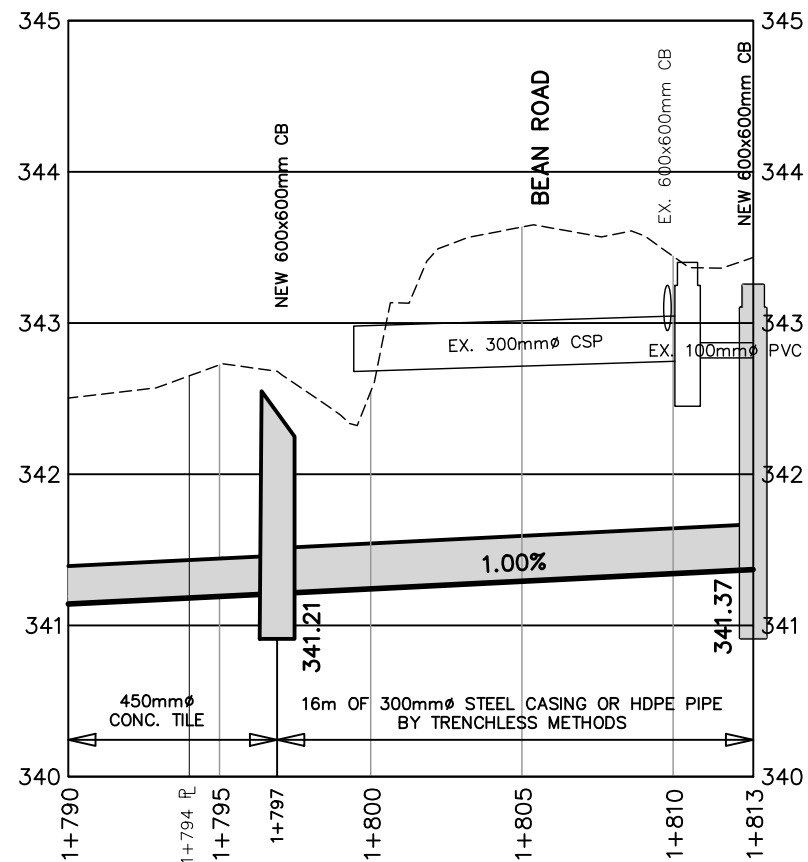
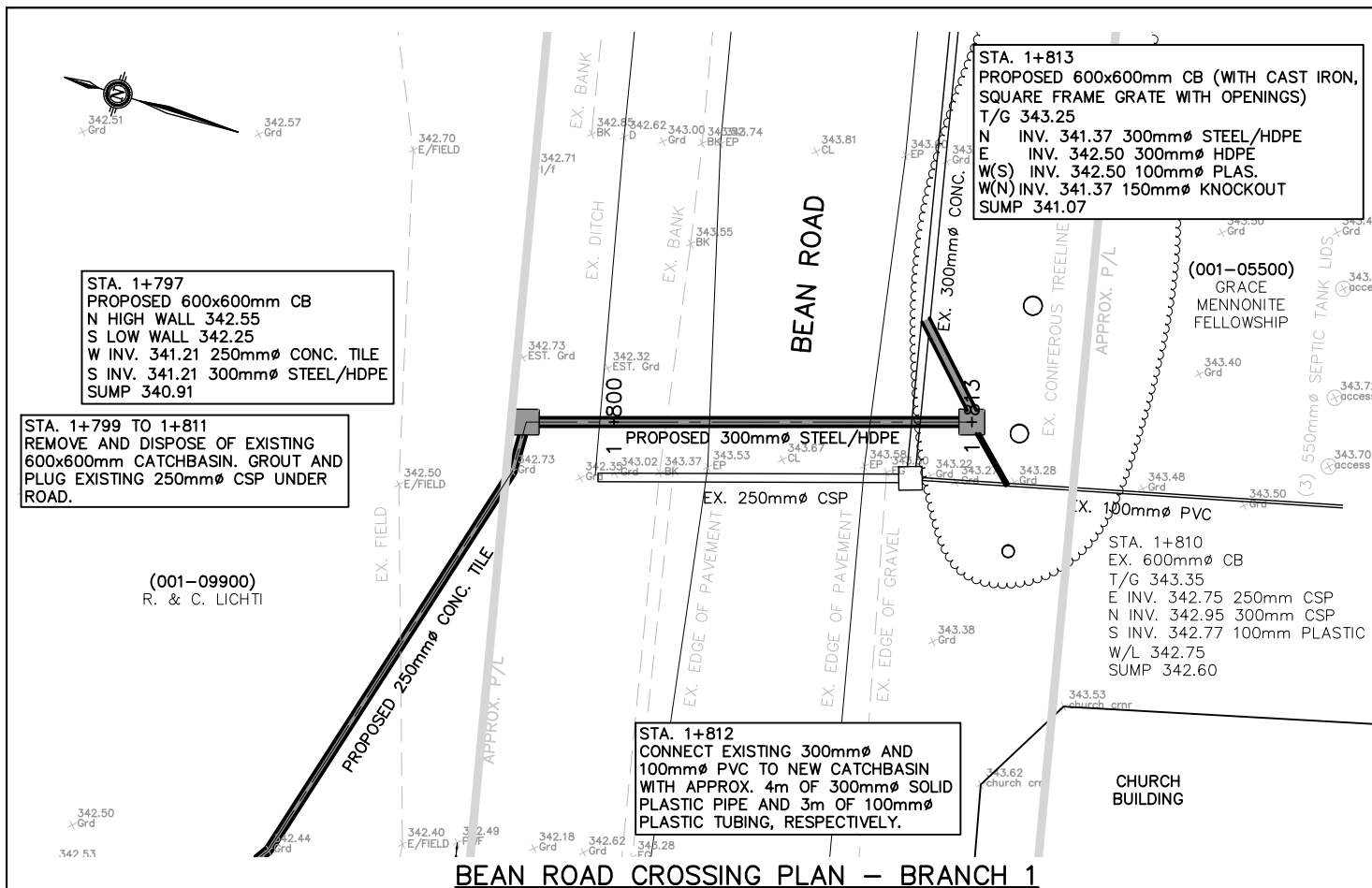
REVISED:  
JOB NUMBER: 20-328

DRAWING  
10 OF 13

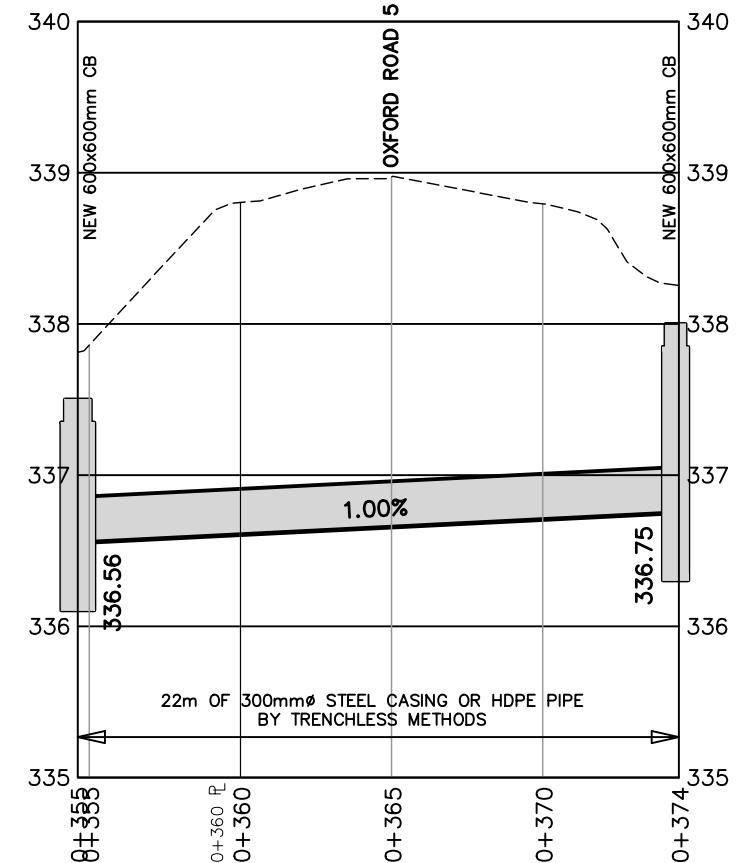
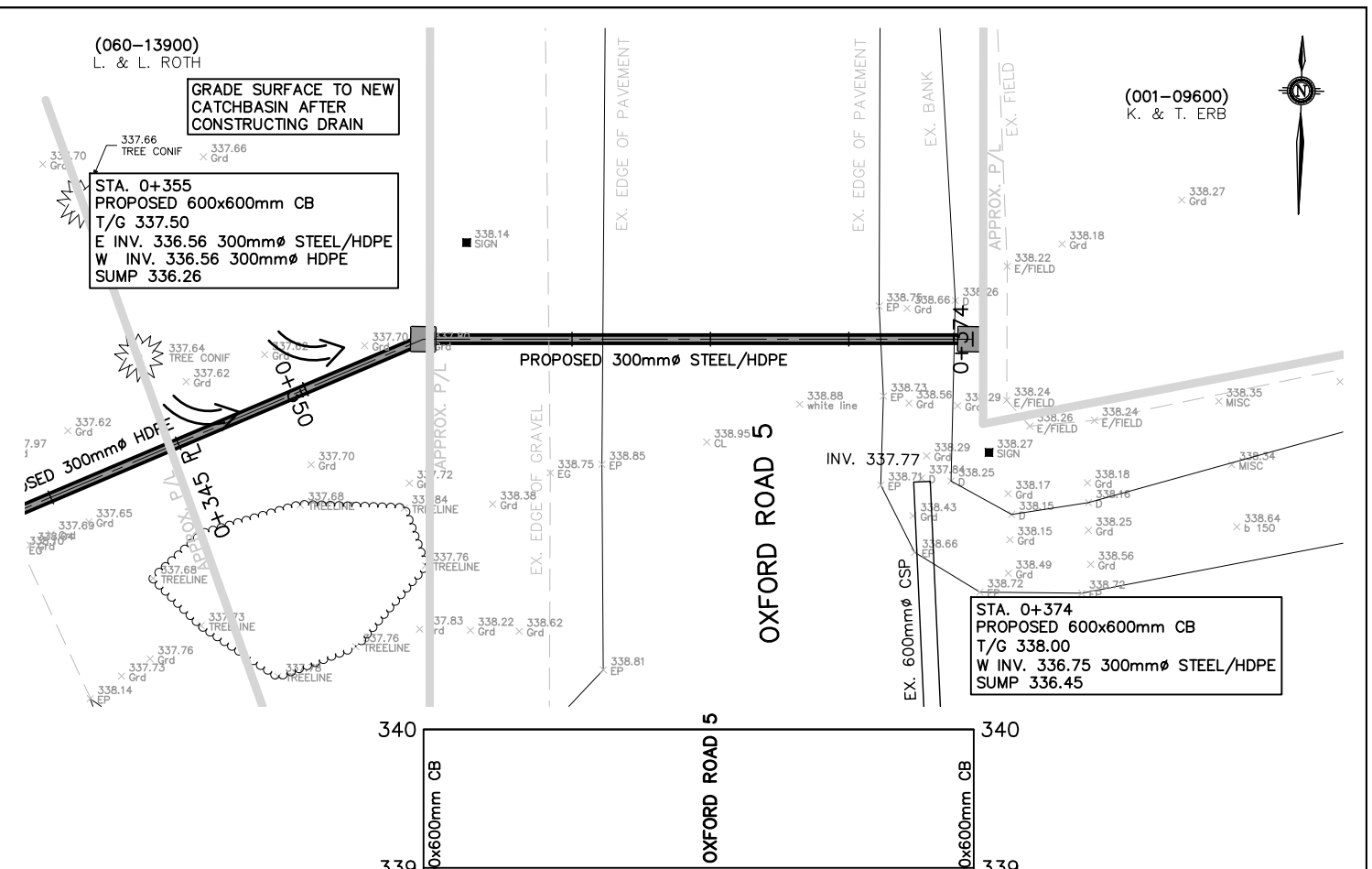
DESIGNED BY: C.J.M.  
CHECKED BY: J.W.K.  
DRAWN BY: M.C.J.  
CHECKED BY: J.W.K.

PLAN & PROFILE  
0 5 10m  
1 : 250 (HORIZ.)  
0 2m  
1 : 50 (VERT.)  
(ON 11"x17")





BEAN ROAD CROSSING PROFILE – BRANCH 1



OXFORD ROAD 5 CROSSING – BRANCH 2

DESIGNED BY: C.J.M.  
CHECKED BY: J.W.K.  
DRAWN BY: M.C.J.  
CHECKED BY: J.W.K.

PLAN & PROFILE  
0 5 10m  
1 : 250 (HORIZ.)  
0 2m  
1 : 50 (VERT.)  
(ON 11"x17")



NICKLAS DRAIN 2025	
REGION OF WATERLOO OXFORD COUNTY	
TOWNSHIP OF WILMOT TOWNSHIP OF EAST ZORRA-TAVISTOCK	
BORED ROAD CROSSING DETAILS (3) BRANCH 1 & BRANCH 2	
FEB. 28, 2025	
REVISED:	
JOB NUMBER: 20-328	
DRAWING	
11 OF 13	

K. SMART ASSOCIATES LIMITED  
CONSULTING ENGINEERS AND PLANNERS  
KITCHENER SUDBURY

300) CONSTRUCTION NOTES (SPECIAL PROVISIONS)

300.1) CONSTRUCTION SPECIFICATIONS - SPECIFIC NOTES

*The majority of construction notes required for constructing the Nicklas Drain 2025 can be found on the profiles and details at all catchbasins, junction boxes, and road crossings from Dwg.'s 2 to 11. Supplemental Specific Notes, not described on the drawings, have been detailed below:*

- i) MAIN DRAIN**  
B. & E. Bender (Roll No. 060-13700)
- 0+003 to 0+058 - **“55m of existing ditch deepening, 0.9m bottom width, 1.5:1 side slopes. Includes three (3) - 5m long gravel deposits in bottom of deepened ditch at approx. 0+005, 0+025, and 0+050 for Northern Pike spawning habitat.”**
    - Complete work from existing north bank.
    - Material removed for deepening, if suitable, shall be used for backfill of existing open ditch from Sta. 0+069 to 0+290.
    - Seed banks of ditch.
  - 0+069 to 0+290 - **“221m of existing ditch to be backfilled and graded into overflow swale (1m bottom, graded to 12.5m each side of ditch centre)”**
    - Backfill existing open ditch by knocking in banks and grading out into field in both directions.
    - Prior to backfilling, strip topsoil from ditch, banks and field for proposed grading limits.
    - Spread existing topsoil over filled ditch and grade swale to approximate grade line on profile (1m bottom width, 20 ~ 50:1 side slopes)

- S. Nickolas (Roll No. 060-12400)
- 1+748 to 1+842 - **“94m of 300mm dia. solid plastic pipe through yard to be installed via wheel trencher. Includes break up and abandoning existing 150mm clay/conc. tile (1964). Compaction of trench backfill around pipe and levelling topsoil. Hand seed disturbed grassed lawn areas.**
    - Refer to detail on Dwg. 4 for proposed work through S. Nickolas yard.
    - After trench backfill and compaction, topsoil to be fine graded, level with existing ground, and smooth, prior to seeding.
    - Hand seed disturbed grassed lawn areas (approx. 1,800m²). See Specification – General Notes #12.

- ii) BRANCH 1**  
K. & T. Erb (Roll No. 001-09600)
- 1+630 to 1+698 - **“68m of 300mm dia. solid plastic pipe through yard to be installed via wheel trencher. Includes break up and abandoning any existing 200mm clay/conc. tile (1936) located in yard. Compaction of trench backfill around pipe and levelling topsoil. Hand seed disturbed grassed lawn areas.”**
    - Refer to detail on Dwg. 7 for proposed work through K. & T. Erb yard.
    - After trench backfill and compaction, topsoil to be fine graded, level with existing ground, and smooth, prior to seeding.
    - Hand seed disturbed grassed lawn areas (approx. 1,300m²). See Specification – General Notes #12.

300.2) CONSTRUCTION SPECIFICATIONS - GENERAL NOTES

**1. Working Area for Construction**  
For a closed drain the working area shall be a 12.5m width on either side of the trench or any combination not exceeding 25m.  
For an open drain the working area shall be an approximate 30m width, except in locations of fence lines. See Sections on Dwg. 7 for details.

After the drain is constructed, the working area for the purpose of future maintenance shall be as specified in S.S. 400.4 of this report.

**2. Access**  
Access to the working area shall be from road allowances and as designated on the drawings and/or specific notes. No other access routes shall be used unless first approved by the Engineer and the affected landowner. Specifications related to construction will apply to the access routes. Contractor shall make good any damages caused by using the designated access routes.

**3. Pre and Post Construction Meetings**  
The Contractor may be required to attend pre-and post-construction site meetings with the Engineer and landowners before starting and after finishing the work if requested.

**4. Pre-locates**  
Cross trenches to be dug along entire length of the Main Drain and Branch 1 route at 100 to 200m intervals (minimum) prior to commencing construction so that true alignment of new drains may be established alongside existing drain, without cutting off private lateral tiles. The frequency of pre-locating will depend on the alignment of the existing drains. More pre-locates will be necessary in a meandering route than in a route that is consistently straight.

**5. Tile Drain Work**  
Refer to Specific Notes and 420 – Standard Specifications for Tile Drains.

**TYPICAL NOTES FOR EACH NEW TILE LENGTH**

1. Maintain all existing headers. Locate as part of “4. Pre-locates”
2. Ensure any connections to the old drain are connected/outletted to the new drain. All intercepted lateral tile are to be flagged so the Engineer can GPS.
3. On straight runs, ensure tile joints are parallel (maximum 12mm (½”) gap), and tile wrap is flat, covers joint evenly and has overlap.
4. On curved runs, ensure tile joints are touching on one side with maximum gap of 12mm (½”) on opposite side. Bevel cut tile or use elbow sections where curves are greater. Tile wrap to be flat, cover joints evenly and have overlap.

**6. Concrete Tile Installation**  
New tile to be installed by tiling (wheel) machine with joints tightly wrapped and topsoils to be separately stripped and replaced to width of machine plus width of spoil pile. For further materials information, refer to Standard Specification for Construction of Drains, Section 400.15.1. For information regarding installation procedure of concrete tile, refer to Standard Specification for Tile Drains, Section 420.3.5.1.

If backhoe methods are approved by engineer, the following shall be attended to: additional topsoils may need to be stripped and replaced, a shaped bottom to be provided and careful tamping around the tile is necessary. Final excavation to grade to be by hand and a shaped bottom to be provided. The Engineer may require a thin lift of stone bedding also as part of usage of backhoe if the native ground/shaped bottom is not satisfactory for long term integrity of the tile.

**7. Solid Plastic Pipe or High Density Polyethylene Pipe (HDPE)**  
Solid plastic pipe to be high density polyethylene (HDPE) double wall (corrugated on the outside and smooth wall on the inside), such as BOSS 2000 Series 320 kPa or equal.

Pipe material shall conform to CSA B182.8. Refer to Standard Specification for Tile Drains, Section 420.3.5.3 for installation on plastic pipe.

**8. Tile Connections**  
The Contractor is to verify with each owner prior to starting, any systematic drainage scheme existing on each property and is to make provisions for connecting all headers and laterals.

All subsurface drainage tile encountered along the route of the proposed closed drain are to be connected up to the new drain if the intercepted tile are clean and do not contain polluted water.

All tile connections are to be flagged by the Contractor so the Engineer can GPS the location for future reference. The payment for connections is to be as set out in the tender form.

Refer to Standard Specification of Tile Drains, Section 420.3.7 for further information on tile connections.

**9. Catchbasins and Junction Boxes**  
Catchbasins shall have secured grates and marker stakes. Grates are to be birdcage grates as manufactured by Coldstream Concrete or approved equal, unless otherwise specified in the Specific Notes. All grates are to be secured with non-corrosive fasteners. Marker stakes as supplied by Coldstream Concrete or equal are to be placed beside each catchbasin. Backfill around all new catchbasins and junction boxes is recommended to be compacted 19mm clear crushed stone to avoid future settlements and Contractor obligations to repair such and to ensure connected tile has granular backfill.  
All catchbasin sumps to be fully cleaned by the Contractor after completion of drain installation and backfilling.

Refer to Standard Specification for Tile Drains, Section 420.3.13 and 420.3.14 for more details.

**10. Utilities**  
The Contractor shall arrange with all local utility companies (telephone, gas, hydro) to verify the location of all utilities within road allowances and on private lands. All utilities shall be exposed to the satisfaction of the utility company to verify that their elevations will not conflict with the construction of the drain at the specified elevations. Provisions for protection and relocation of utilities that conflict with the drain as designed will be determined at the time of construction.

**11. Seeding of Non-Lawn Areas**  
For seeding use mechanical (cyclone) spreader (or approved equal) and the following shall apply:  
Seed mixture to be applied at 60kg/ha and to be as follows:  
i) Ditch banks and roadside ditches

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

To provide temporary cover for late fall planting add as additional 10 kg/ha of rye or winter wheat. Areas that remain grassed after excavation may not need to be seeded as directed by the Engineer.  
Contractor responsible for additional seeding to provide uniform catch during one year maintenance period.





12. Seeding of Disturbed Green/Lawn Areas

Seed mixture shall be an approved residential lawn mixture (Canada No. 1). Contractor shall arrange for watering new seed with owners. Contractor responsible for re-seeding as necessary for uniform catch during warranty period. Also to be in accordance with OPSD 572 (seeding and mulching).

13. Open Cut Road Crossings (19<sup>th</sup> Line)

The Road Authority is to be given 72 hours' notice of construction within their right-of-way. Proper detour signing in accordance with MTO signing manual to be used where roads are closed or restricted. Contractor is responsible to repair any settlement which occurs within warranty period. The location of the road crossing shall be confirmed with the Engineer and Road Authority prior to excavation. The Trench Detail on this drawing and the special construction notes shall also apply. If the Road Authority requires granular rather than native material backfill where native is allowed on the Trench Detail, additional payment will be allowed. Where granular is shown to be required, such is to be included as part of the tender. All surplus materials are to be hauled away. In the boulevards, topsoils shall be separately stripped and replaced. Seeding is required. All backfill to be compacted to 98% SPMDD. Pipe materials are to be as noted in the specific construction notes. All old crossings are to be located, removed and disposed of. If so noted, some may remain but are to be fully sealed with pumped concrete as part of the tender.

14. Trenchless Road Crossings (Oxford Rd 5, Bean Road, & Diamond Road)

At the time of tendering and/or construction, should the Municipality elect to complete the six (6) trenchless road crossings using steel casing pipe via. jack and boring methods, the K. Smart Associates Limited *Standard Specification for Jacking and Boring* shall apply. For any alternative method, a separate specification shall be prepared.

15. Subsoil Instability

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

