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February 14, 2024

The Mayor and Council
Municipality of North Middlesex
229 Parkhill Main Street
Parkhill, ON
N0M 2K0

Gentlemen and Mesdames:

**Re: Van Aert Drain No. 2**

In accordance with your instructions, R. Dobbin Engineering has undertaken an examination with regards to providing a municipal drain to service the property with Roll Numbers 042-030-021 in the Municipality of North-Middlesex.

Authorization under the Drainage Act

This Engineers Report that has been prepared under Section 4 of the Drainage Act as per a petition from affected Landowners.

R. Dobbin Engineering Inc. was appointed by council on May 17th, 2023.

A petition for the drainage by means of a drainage works of an area requiring drainage as described in the petition may be filed with the Clerk of the local Municipality in which the area is situate by,

(a) the majority in number of the owners, as shown by the last revised assessment roll of lands in the area, including the owners of any roads in the area;

(b) the owner or owners, as shown by the last revised assessment roll, of lands in the area representing at least 60 per cent of the hectarage in the area;

(c) where a drainage works is required for a road or part thereof, the engineer, road superintendent or person having jurisdiction over such road or part, despite subsection 61(5);

(d) where a drainage works is required for the drainage of lands used for agricultural purposes, the Director. R.S.O. 1990, c.D.17, s.4(1).

The petition was determined to be valid based on Section 4 (1) (a) and (b).

## Existing Conditions

The property with Roll Number 042-030-021 is looking to tile their property and as such requires a municipal drain to serve as an outlet for the north portion of their property. The property currently has 18.41 Ha assessed into the Galbraith Drain which is north of Elm Tree Drive.

## On-Site Meeting

A site meeting was held on August 10th, 2023.

The following were present at the meeting:

- Josh Warner (R. Dobbin Engineering)
- Joanne Sadler (Municipality of North Middlesex)
- Joe Van Aert (Landowner)
- Mark Thomson (Landowner)

The following is a brief summary of the meeting:

- General discussion of the Drainage Act and Landowners rights under the Drainage Act.
- The Landowner requested that R. Dobbin Engineering reach out to their tile contractor for any required information.
- It was discussed that the drain shall be sized to the 38mm/24hrs as per the current grantable standard by Ontario Ministry of Agriculture, Food and Rural Affairs Mapping (OMAFRA).
- No adverse soil conditions were noted at the site meeting.

## Discussion

R. Dobbin Engineering reached out to the tile contractor and was able to receive a map with the proposed areas. The areas do not exceed the 18.41 Ha that has been assessed to the Galbraith Drain. The tile contractor requested that the tile be 4.5 to 5 feet deep to the invert at the property line.

## Draft Report

A draft report, dated January 17, 2024 was sent to all the affected Landowners and a meeting was held on February 12, 2024 to go over the report and address any questions and concerns related to the draft report. The following were present at the meeting:

- Josh Warner (R. Dobbin Engineering)
- Joanne Sadler (Municipality of North Middlesex)

As no Landowners attended the meeting, we reached out the owner of the property with Roll Number 042-030-021. The Landowner stated that they would like to proceed with the report as presented.

## Approvals

The drain will require approval from the Ausable Bayfield Conservation Authority. Provided the work is completed in a dry condition approval from the Department of Fisheries and Oceans is not required. Construction cannot commence without necessary approvals.

## Design

The proposed tile drain shall be designed to accommodate a drainage coefficient of 38mm/24 hours. Tile design criteria includes a minimum tile depth of 760mm.

## Recommendations

It is therefore recommended that the following work be carried out:

1. A tile drain known as the Van Aert Drain No. 2 shall be constructed from the Galbraith Drain to the south side of Elm Tree Drive.

## Estimate of Cost

It is recommended that the work be carried out in accordance with the accompanying Specification of Work and Profile that forms part of this Report. There has been prepared an Estimate of Cost in the amount of $72,184, including engineering of the report, attending the Meeting to Consider the Report, attending the Court of Revision, and an estimate for tendering, contract administration and inspection. Appearances before appeal bodies have not been included in the cost estimate.

A plan has been prepared showing the location of the work and the approximate drainage area. A profile is included showing the depths and grades of the proposed work.

## Assessment

As per Section 21 of the Drainage Act, the Engineer in their Report shall assess for benefit and outlet for each parcel of land and road liable for assessment. Lands, roads, buildings, utilities, or other structures that are increased in value or are more easily maintained as a result of the construction, improvement, maintenance, or repair of a drainage works may be assessed for benefit. (Section 22)

Lands and roads that use a drainage works as an outlet, or for which, when the drainage works is constructed or improved, an improved outlet is provided either directly or indirectly through the medium of any other drainage works or of a swale, ravine, creek,

or watercourse may be assessed for outlet. The assessment for outlet shall be based on the volume and rate of flow of the water artificially caused to flow into the drainage works from the lands and roads liable for such assessments. (Section 23)

The Engineer may assess for special benefit any lands for which special benefits have been provided by the drainage works. (Section 24)

A Schedule of Assessment for the lands and roads affected by the work and therefore liable for the cost thereof will be prepared as per the Drainage Act. Also, assessments may be made against any public utility or road authority, as per Section 26 of the Drainage Act, for any increased cost for the removal or relocation of any of its facilities and plant that may be necessitated by the construction or maintenance of the drainage works.

The cost of any approvals, permits or any extra work, beyond that specified in this Report that is required by any utility, government ministry or organization (federal or provincial), or road authority shall be assessed to that organization requiring the permit, approval, or extra work.

The estimated cost of the drainage works has been assessed in the following manner:

1. As per Section 26 of the Drainage Act, the roads and utilities have been assessed the increased cost of the drainage works caused by the existence of the works of the public utility or road. The road crossings, with the exception of the extra cost to locate and work around utilities, has been assessed with 100% of the estimated cost assessed as a special benefit assessment to the road authority. The utilities have been assessed 100% of the estimated cost to work around that utility and the daylighting and surveying costs as a special benefit assessment to that utility.

2. The remaining cost of the drainage works has generally been assessed with 20% of the cost applied as a benefit assessment and the remainder applied as an outlet assessment to the upstream lands and roads based on equivalent hectares.

All final costs included in the cost estimate of this report shall be pro-rated based on the Schedule of Assessment. Any additional costs shall be assessed in a manner as determined by the Engineer.

Allowances

Under Section 29 of the Drainage Act, the Engineer in his Report shall estimate and allow in money to the Landowner of any land that it is necessary to use for the construction or improvement of a drainage works or for the disposal of material removed from drainage works. This shall be considered an allowance for right-of-way.

Under Section 30 of the Drainage Act, the Engineer shall determine the amount to be paid to persons entitled thereto for damage, if any, to ornamental trees, lawns, fences,

land and crops occasioned by the disposal of material removed from a drainage works. This shall be considered an allowance for damages.

Allowances have been made, where appropriate, as per Section 29 of the Drainage Act for right-of-way and as per Section 30 of the Drainage Act for damages to lands and crops. Allowances for right of way are based on a land value of $35,000.00 per hectare. Allowances for crop loss are based on $2,000.00 per hectare for the first year, $1,000.00 for the second year ($3,000.00 per hectare total).

Access and Working Area

Access to the work site for construction and future maintenance shall be from Elm Tree Drive and along the length of the drainage works. Access shall generally be restricted to a width of 6 metres.

The working area for the construction and future maintenance of the proposed tile drain shall be restricted to a width of 20m along the length of the drainage works normally centred on the proposed tile drain. The working area shall extend 10m past the extents of the drain to allow for trucks to turn around.

Restrictions

No trees and shrubs shall be planted nor shall permanent structures be erected within 20m of either side of the proposed drain without prior written permission of Council.

Attention is also drawn to Sections 80 and 82 of the Drainage Act, which refer to the removal of obstructions in a drain and damage caused to a drain.

Agricultural Grant

If available, it is recommended that application for subsidy be made for eligible agricultural properties. Any assessments against non-agricultural properties are shown separately in the Schedule of Assessment.

Existing Private Drainage

All existing subsurface drainage encountered during the construction of the proposed tile drain or open channel shall be reconnected to the proposed tile drain or open channel. Any drains cut off by the proposed drainage works shall be plugged and sealed to the satisfaction of the Drainage Superintendent.

Maintenance

Upon completion of the work, the drainage works, shall be repaired and maintained as per the Schedule of Assessment, less any Special Benefit Assessments, unless otherwise altered under provisions of the Drainage Act. The road crossing, from Station 0+274 to

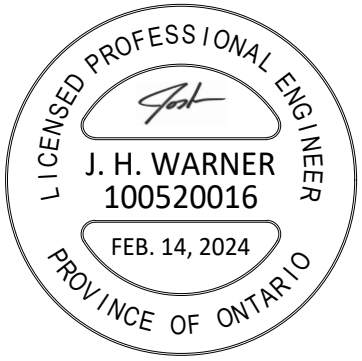
0+286, excluding the basins, shall be maintained and repaired at the expense of the owner of Elm Tree Drive.

The drainage works shall be maintained as per the specifications and grades as shown on the Profile contained in this Engineers Report.

The additional costs as a result of a road or utility shall be assessed to the owner of the road or utility as per Section 26 of the Drainage Act.

Yours truly,

Josh Warner, P. Eng.
R. Dobbin Engineering Inc.



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## ALLOWANCES

Allowances have been made as per Sections 29 & 30 of the Drainage Act for Right of Way and damages to lands and crops.

| Conc. | Lot or part | Roll No. | Owner | Section 29 ($) | Section 30 ($) | Total ($) |
|---|---|---|---|---|---|---|
| ECR | Lot 6 | 042-030-021 | 2173884 Ontario Ltd. | - | 100 | 100 |
| | Lot 7 | 042-030-020 | Thomson Acres Limited | 2,900 | 2,710 | 5,610 |
| | | | TOTAL ALLOWANCES | $2,900 | $2,810 | $5,710 |

**Estimate of Cost**

| Item Description (Supply and Install New) | Quantity | Unit | Unit Cost ($) | Total ($) |
|---|---|---|---|---|
| Pre-Construction Meeting | 1 | LS | 200 | 200 |
| Brushing and Tree Removal | 1 | LS | 1,000 | 1,000 |
| Locate Existing Tile Drains | 1 | LS | 1,000 | 1,000 |
| Strip and Level Topsoil for Tile Drain | 274 | m | 6 | 1,644 |
| 400mmø Concrete Tile | 268 | m | 65 | 17,420 |
| 450mmø HDPE Outlet Pipe c/w Rodent Grate | 6 | m | 300 | 1,800 |
| Rip Rap at Outlet | 15 | tonne | 150 | 2,250 |
| Locate and Connect Existing Field Tile | 2 | ea | 150 | 300 |
| Silt Fence | 1 | LS | 200 | 200 |
| Elm Tree Drive | | | | |
| Traffic Control | 1 | LS | 1,000 | 1,000 |
| Locate and Work Around Utilties | 1 | LS | 500 | 500 |
| Remove Existing Culvert and Unsuitable Backfill | 1 | LS | 1,500 | 1,500 |
| Catch Basin #1 (600mm x 600mm) | 1 | LS | 2,000 | 2,000 |
| Catch Basin #2 (600mm x 600mm) c/w Connection | 1 | LS | 2,000 | 2,000 |
| 375mmø HDPE Smooth Wall Pipe (Open Cut) c/w Bedding | 12 | m | 300 | 3,600 |
| 400mmø CSP (Open Cut) | 10 | m | 300 | 3,000 |
| Granular "A" Backfill | 100 | tonne | 30 | 3,000 |
| 100% Crushed Granular "A" | 25 | tonne | 40 | 1,000 |
| Rip Rap for End Walls and Around Basins | 25 | tonne | 150 | 3,750 |
| Restoration/Seeding and Ditch Grading | 1 | LS | 1,000 | 1,000 |
| Contingency | | | | 2,420 |

| | |
|---|---|
| Sub Total | 50,584 |
| Allowances | 5,710 |
| Engineering | 8,450 |
| Daylight and Survey Utilities | 1,400 |
| Estimate for Tendering, Inspection and Contract Administration | 4,500 |
| SCRCA Fee | 400 |
| **Total Estimate excluding HST** | **71,044** |
| Non-Recoverable HST (1.76%) | 1,140 |
| **Total Estimate** | **$ 72,184** |

## SCHEDULE OF ASSESSMENT

| Conc. | Lot or Part | Affected Hecatares | Roll No. | Owner | Special Benefit ($) | Benefit ($) | Outlet ($) | Total ($) |
|---|---|---|---|---|---|---|---|---|
| **Public Lands** | | | | | | | | |
| Centre Road | | 0.35 | | County of Middlesex | | - | 1,984 | 1,984 |
| Elm Tree Drive | | 0.86 | | Municipality of North Middlesex | 23,750 | 2,659 | 4,875 | 31,284 |
| | | | | | 23,750 | 2,659 | 6,859 | 33,268 |
| **Agricultural Lands** | | | | | | | | |
| ECR | Lot 6 | 18.41 | 042-030-021 | 2173884 Ontario Ltd. | | 1,330 | 26,089 | 27,419 |
| | Lot 7 | | 042-030-020 | Thomson Acres Limited | | 9,567 | - | 9,567 |
| | | | | | - | 10,897 | 26,089 | 36,986 |
| **Utilities** | | | | | | | | |
| Telecom Utility | | | | Bell Telecom | 1,930 | - | - | 1,930 |
| | | | | | 1,930 | - | - | 1,930 |
| | | | | Total - Utilities | 1,930 | | | |
| | | | | Total - Agricultural Lands | 36,986 | | | |
| | | | | Total - Public Lands | 33,268 | | | |
| | | | | Total Assessment | $72,184 | | | |

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**Estimated Net Assessment**

Net assessment subject to OMAFRA ADIP Policy and actual construction costs.

| Conc. | Lot or Part | Affected Hecatares | Roll No. | Owner | Total Assessment ($) | Estimated Grant ($) | Allowances ($) | Estimated Net Assessment ($) |
|---|---|---|---|---|---|---|---|---|
| **Public Lands** | | | | | | | | |
| Centre Road | | 0.35 | | County of Middlesex | 1,984 | | | 1,984 |
| Elm Tree Drive | | 0.86 | | Municipality of North Middlesex | 31,284 | | | 31,284 |
| **Agricultural Lands** | | | | | | | | |
| ECR | Lot 6 | 18.41 | 042-030-021 | 2173884 Ontario Ltd. | 27,419 | 9,140 | 100 | 18,179 |
| | Lot 7 | 0.00 | 042-030-020 | Thomson Acres Limited | 9,567 | 3,189 | 5,610 | 768 |
| **Utilities** | | | | | | | | |
| Telecom Utility | | | | Bell Telecom | 1,930 | | | 1,930 |
| | | | | | 72,184 | 12,329 | 5,710 | 54,145 |

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# SPECIFICATION OF WORK

## 1. Location

The Van Aert Drain is to be located in Lot 7, Concession ECR in The Municipality of North Middlesex.

## 2. Scope of Work

The work included in this specification includes, but is not limited to, the following:

- Road pipe replacement.
- Supply and installation of concrete, CSP and HDPE pipe.
- Supply and installation of catch basin structures

## 3. General

Each tenderer must inspect the site prior to submitting their tender and satisfy themselves by personal examination as to the local conditions that may be encountered during this project. The Contractor shall make allowance in their tender for any difficulties which they may encounter. Quantities or any information supplied by the Engineer is not guaranteed and is for reference only.

All work and materials shall be to the satisfaction of the Drainage Superintendent who may vary these specifications as to minor details but in no way decrease the proposed capacity of the drain.

The Contractor shall be responsible for the notification of all utilities prior to the start of construction.

Measurement for Payment Clauses have not been included in these specifications and will be part of the Construction document. If the Construction document has not identified Measurement for Payment Clauses, the Contractor must notify the Municipality of North Middlesex and request clarification 2 days prior to pricing the project.

## 4. Plans and Specifications

These specifications shall apply and be part of the Contract along with the General Specifications for Closed Drains and the General Specifications for Open Drains. This Specification of Work shall take precedence over all plans and general conditions pertaining to the Contract. The Contractor shall provide all labour, equipment, and supervision necessary to complete the work as shown in the Plans and described in these

specifications. Any work not described in these specifications shall be completed according to the Ontario Provincial Standard Specifications and Standard Drawings.

## 5. Health and Safety

The Contractor at all times shall be responsible for health and safety on the worksite including ensuring that all employees wear suitable personal protective equipment including safety boots and hard hats.

When applicable the Contractor shall be responsible for traffic control as per the Ontario Traffic Manual Book 7 – Temporary Conditions (latest revision).

The Contractor shall be responsible to ensure that all procedures are followed under the Occupational Health and Safety Act to ensure that work sites are safe and that accidents are prevented. In the event of a serious or recurring problem, a notice of non-compliance will be issued. The Contractor will be responsible for reacting immediately to any deficiency and correcting any potential health and safety risk. Continuous disregard for any requirement of the Occupational Health and Safety Act could be cause for the issuance of a stop work order or even termination of the Contract.

The Contractor shall also ensure that only competent workers are employed onsite and that appropriate training and certification is supplied to all employees.

## 6. Pre-Construction Meeting

There is a requirement for a pre-construction meeting to be held prior to any construction taking place. The meeting shall be scheduled by the Contractor. The Landowners, Engineer, and the Municipality of North-Middlesex shall be notified of the pre-construction meeting at least 48 hours prior.

## 7. Benchmarks

The benchmarks are based on geodetic elevations. Elevations are available at the locations shown on the Plan and Profile drawings. Where these elevations are on existing structures to be replaced, they shall be transferred by the Contractor prior to the removal.

## 8. Traffic Control

Access and driveways to private properties shall not be obstructed longer than the minimum time necessary for the work and shall be reinstated as soon as possible all to the satisfaction of the Engineer. The contractor shall schedule any obstruction of existing driveways with the owners at least two full working days in advance. All obstructions and diversions of traffic must be approved by the Engineer or Drainage Superintendent and Roads Superintendent at least two (2) full working days in advance.

a) The Contractor shall supply, erect and maintain all detour signs and special signs necessary for detours to divert traffic from the area under construction as directed by the Road Superintendent or Engineer. All this work shall be at the Contractor's expense.

b) The Contractor shall be responsible for supplying, erecting and maintaining all signs, supports, barricades, flashers, cones, etc. in the construction area and at the boundaries of the work as part of the above detours, all to the satisfaction of the Engineer or Drainage Superintendent. All this work shall be done by the Contractor at their own expense.

c) The Contractor shall not be allowed to proceed with construction activities unless proper signage and flagmen are present. Flagging procedures, signage and detours shall conform to the recommendations of Book 7, Temporary Conditions, Ontario Traffic Manual, issued by the Ministry of Transportation. Conformance shall be enforced by the Ministry of Labour Inspector.

**9. Access and Working Area**

Access to the work site for construction and future maintenance shall be from Elm Tree Drive and along the length of the drainage works. Access shall generally be restricted to a width of 6 metres.

The working area for the construction and future maintenance of the proposed tile drain shall be restricted to a width of 20m along the length of the drainage works normally centred on the proposed tile drain. The working area shall extend 10m past the extents of the drain to allow for trucks to turn around.

**10. Removals**

The existing culverts, pipes and catch basins, where specified, shall be removed in their entirety. The culvert and the concrete rubble shall be disposed offsite at the expense of the Contractor. Suitable backfill shall be stockpiled adjacent to the site for reuse during installation of the proposed culvert. Any broken concrete or rip rap (concrete bags) from the existing structures shall be disposed offsite at the expense of the Contractor.

**11. Brushing and Tree Removal**

All brush, trees, woody vegetation, stumps etc. shall be removed for a width of 15 metres along the tile drain. They shall be removed in their entirety including stumps.

A mechanical grinder attached to an excavator be used for the removal of brush and trees. Any brush and trees too large to grind shall be close cut. The Contractor shall stockpile the trees and brush in a single pile on the property in which they were removed or dispose

of the trees and brush offsite. The Contractor is responsible for the burning of the trees and brush. The Contractor is responsible for obtaining all necessary permits for any disposal sites. Burning of the trees and brush is subject to local bylaws and guidelines of the Ministry of the Environment Conservation and Parks.

Certain trees may be left in place at the direction of the Drainage Superintendent.

**12. Expose Existing Drain**

The existing tile drains shall be exposed at the discretion of the Drainage Superintendent or Engineer and Contractor in order to adequately determine the proposed alignment.

**13. Strip and Place Topsoil**

The Contractor shall strip the topsoil for a width of 6m normally centered on the proposed drain. The topsoil shall be stockpiled at the edge of the working allowance for the duration of the tile installation. Once the tile is installed, the Contractor shall level the topsoil over the drain to their pre-construction condition.

**14. Installation of Tile**

The Contractor shall supply, install, and backfill the specified sizes of tile and pipe to the depths and grades as shown on the drawings.

Concrete tile shall conform to ASTM C412, extra quality. Tile shall have a circular interior and exterior shape.

Where the concrete tile depth is greater than 2.5m the tile shall be 2000D concrete tile and shall be bedded to the spring line with clear stone. The estimated length of 2000D concrete tile required has been shown as a separate item. Clear stone bedding to the spring line shall be included as part of this item.

The trenching and laying of the concrete tile shall be done by wheel machine. An excavator must be used in areas of soil instability, unless approved by the Engineer. All tile joints shall be wrapped with a minimum 300mm width of Mirafi P150 (or approved equal) filter fabric. The filter fabric shall be overlapped by 450mm at the top of the tile. The tile shall be laid in straight lines or on smooth gradual curves with a minimum radius or 25m.

Where approved by the Engineer (or specified) concrete tile may be laid in tighter curves by saw cutting joints. The maximum deflection of one concrete tile joint shall be 22 degrees. Turns of greater than 22 degrees shall require the use of manufactured bends (PE smooth wall).

Laser control shall be used to ensure proper grades. The grades calculated on the Profile are to the invert of the tile and pipe with allowances to be made by the Contractor for the wall thickness of the tile and pipe. The depths shown and figured are from ground level to the invert of the pipe along the line of the proposed drain. Should an error appear in the figured depth at any station or stations, the grade shall be made to correspond with that shown on the Profile without extra charge.

Wheel Machine

A wheel machine shall be used to excavate the trench to allow for a round bottom. Prior to backfilling, the tile shall be covered manually to a depth of approx. 100mm over the pipe to ensure that the tile and pipe are not displaced by large clumps of earth. The trench shall be backfilled with excavated material free of stones, broken tile or other deleterious material. All stones larger than 100mm in diameter evident immediately after construction shall be picked up by the Contractor and disposed offsite. The Landowners are responsible for stones after that. The material shall be left windrowed over the trench to allow for settlement.

Excavator

When concrete tile is installed with an excavator, the tile must be installed as per the manufacturer's recommendations **complete with bedding to the spring line**. Prior to backfilling, the tile shall be covered manually to a depth of approx. 100mm over the pipe to ensure that the tile and pipe are not displaced by large clumps of earth. The trench shall be backfilled with excavated material free of stones, broken tile or other deleterious material. All stones larger than 100mm in diameter evident immediately after construction shall be picked up by the Contractor and disposed offsite. The Landowners are responsible for stones after that. The material shall be left windrowed over the trench to allow for settlement.

If the land level must be lowered in order to carry out trenching operations, then it is up to the Contractor to determine if it is necessary and include any extra cost involved. They shall first strip the topsoil to its full depth and stockpile it along one side of the working width and then grade the area to allow the trenching to be carried out. All excavated material shall be windrowed on the side opposite the trench that the topsoil is stockpiled. After trenching and backfilling operations are complete, the topsoil shall be spread to its original depth.

All areas disturbed by construction, except the material windrowed over the trench, shall be left in a condition suitable for cultivation.

The Contractor shall not operate any trenching or backfill equipment, delivery trucks or equipment, pickup trucks or other vehicles along or over the trench during or after construction. The Contractor shall be responsible for any damage caused by any

equipment or vehicles operated over the trench. If the Contractor must cross the trench, he will do so in one area.

The Landowners are also warned not to operate farm equipment over the trench or along the length of the trench for 1 year after construction in order to protect the tile.

Future replacements shall conform to these specifications.

**15. Catch Basins**

| Structure | Station | Type (mm) | Inlet Elev. (m) | Outlet Pipe Elev. (m) | Inlet Pipe Elev. (m) |
|---|---|---|---|---|---|
| CB #1 | 0+274 | 600x600 | 236.12 | 234.84 (N)<br>400 | 234.86 (E)<br>375 |
| CB #2 | 0+286 | 600x600 | 236.20 | 234.96 (N)<br>375 | 235.42 (S)<br>250 |

The catch basins shall be square precast concrete structures as noted above and shall have a birdcage type grate. The ditch inlet catch basins shall have a 2:1 sloped top. The direction in the inlet elevation column denotes the direction the low side of the ditch inlet catch basins shall face. The catch basins shall be located with the backside at the property line and at the locations identified on the Plans. The catch basin elevations shall be 50mm above grade. When specified the catch basins shall have a berm constructed on the downstream end. The top of the berm shall be 0.60m above the inlet elevation. The berm shall have a 2:1 front slope and 5:1 back slope with a 1m wide top. The height and back slopes can be increased under the direction of the Drainage Superintendent in order to reduce erosion and facilitate farming. Care shall be taken to ensure this does not negatively impact upstream lands. The berms shall be constructed using excess materials on site.

The catch basins shall be made with the top sections separate from the base sections in order to allow riser sections to be installed or removed as necessary (i.e. the base section shall not extend for more than 150mm above the top of the highest opening in the base section). The wall thickness of all structures shall be 115mm and each shall have a 300mm sump. Birdcage grates shall be manufactured with a bar spacing no larger than 50mm.

The catch basins shall be set at the final elevations as directed by the Drainage Superintendent. The catch basins shall be set on a layer of clear stone. The clear stone shall be extended up to the spring line of the inlet and outlet pipe connections.

The tile at the connection to the catch basins shall be concreted on both the inside and outside prior to backfilling. Any pipe or tile shall not protrude more than 50mm inside the wall.

As part of this item the Contractor shall grade the area in the vicinity of the basin to ensure proper drainage. Rip rap shall be installed around the basins. The rip rap shall be 150mmx300mm c/w filter fabric. The area to receive the rip rap shall first be graded to allow the placement of the rip rap to a depth of 400mm below finished grade. After grading, a layer of filter fabric (Mirafi P150 or approved equal) is to be placed with any joints overlapped a minimum of 600mm. Rip rap shall then be placed with the smaller pieces placed in the gaps and voids to give it a uniform appearance

The Drainage Superintendent or Engineer may change a birdcage type grate on a catch basin to a concrete lid or sloped birdcage grate at the request of a Landowner.

**16. Subsurface Drainage**

All existing subsurface drains encountered during construction of the tile drain shall be connected to the proposed tile drain unless otherwise noted on the drawings or as directed by the Drainage Superintendent. The downstream end shall be plugged to the satisfaction of the Drainage Superintendent.

For 100mm and 150mm subsurface drains, the upstream end of the subsurface drain shall be connected to the tile drain at a 45-degree angle. A suitable length of equivalent sized PE agricultural tubing shall be used to connect the drains. Manufactured fittings shall connect the PE tile to the existing drain and to the concrete tile. The connections shall be carefully backfilled to ensure there is adequate support under the pipe and large clumps of clay do not displace the tile. It is recommended that clear stone be used under the connections at the tile drain.

**17. Outlet Works**

The outlet works for the drain shall consist of 6m of HDPE smooth wall pipe as shown on the profile (320 kPa) with a manufactured rodent rotating grate. It shall be installed at the outlet to the open channel.

Erosion protection made up of rip rap and filter fabric shall be installed on the channel side slope from the bottom of the channel to the top of the bank and for a distance of 1m on either side of the outlet. This item shall include the required grading within the vicinity of the outlet pipes in order to install the rip rap. Rip rap shall be made up of 150mm to 300mm quarry stone or approved equal. The area to receive the rip rap shall first be graded to allow the placement of the rip rap to a depth of 400mm below finished grade. After grading, a layer of filter fabric (Mirafi P150 or approved equal) is to be placed with any joints overlapped a minimum of 600mm. Rip rap shall then be placed with the smaller pieces placed in the gaps and voids to give it a uniform appearance.

## 18. Installation of Road Crossing

Where High Density Polyethylene Pipe is specified, the Contractor shall supply, install, and backfill the HPDE smooth wall gasketed pipe with bell and spigot joints (320 KPa) or approved equivalent under road crossings. Future culvert replacements shall be to the same specifications.

Where corrugated steel pipe (CSP) is specified, the Contractor shall supply, install, and backfill aluminized CSP with a minimum wall thickness of 2.8mm in all cases. All corrugation profiles shall be of helical lockseam manufacture using 68 x 13mm corrugations for 1600mm dia. pipe and smaller and 125 x 25mm corrugations for 1800mm dia. pipe and larger. Pipe with 125 x 25mm corrugations shall be used if 68 x 13mm corrugations are not available. Future culvert replacements shall be to the same specifications.

The proposed culverts shall be installed in the same general location as the existing culverts, unless otherwise stated on the drawings or in the specification. The location of the culvert may be moved a short distance if approved by the Engineer or Drainage Superintendent.

The bottom of the excavation for both the culvert and tile shall be excavated to the required depth with any over excavation backfilled with ¾" clear stone material. When the tile has been installed to the proper grade and depth, the excavation shall be backfilled with ¾" clear stone from the bottom of the excavation to the spring line of the tile. Care shall be taken to ensure that the backfill on either side of the pipe does not differ by more than 300mm so that the pipe is not displaced. Within the road allowance the pipe shall be backfilled above the spring line to 150mm below finished grade with OPS Granular "A". Outside the road allowance excavated material can be used. The top 150mm within the road shall be 100% crushed Granular "A". Granular "A" shall be mechanically compacted to 100% modified standard proctor density and filter fabric shall be placed between the changes in bedding and backfill in all cases.

It is the Contractors responsibility to locate and expose any utilities prior to the installation of any tile. If there is a conflict with the tile elevation the Contractor is required to notify the Engineer. Any permits that are required by the Road Authority are the responsibility of the Contractor.

The ditch shall be graded to ensure the surface water is collected to the catch basins on all road crossings.

The Contractor shall be responsible for maintenance of the pipes for a period of one year after their installation. This will include repairing any settlement areas on the travel surface with granular "A".

## 19. Seeding/Restoration

All areas disturbed by construction shall be returned to their pre-constructions state. The road right of way, finished lawns and all areas where disturbed by construction, shall be topped with 100mm of screened topsoil and hydroseeded following construction in accordance with the seed mixture, fertilizer and application rate as shown below. Spreading of the seed shall be by use of a mechanical spreader.

Seed mixture, fertilizer and application rates are as follows:

- Canada Wild Rye (Elymus Canadensis), Virginia Wild Rye (Elymus virginicus), or Indian grass (Sorghastrum nutans)
- Fertilizer (300 kg/ha.) consisting of 8-32-16.
- Hydraulic mulch (2,999 kg/ha.) type “B” and water (52,700 litres/ha.) in accordance with OPSS 572 (hydroseed).

The above seed mixture shall apply unless otherwise approved by the Drainage Superintendent or Engineer.

## 20. Environmental Considerations

The Contractor shall take care to adhere to the following considerations.

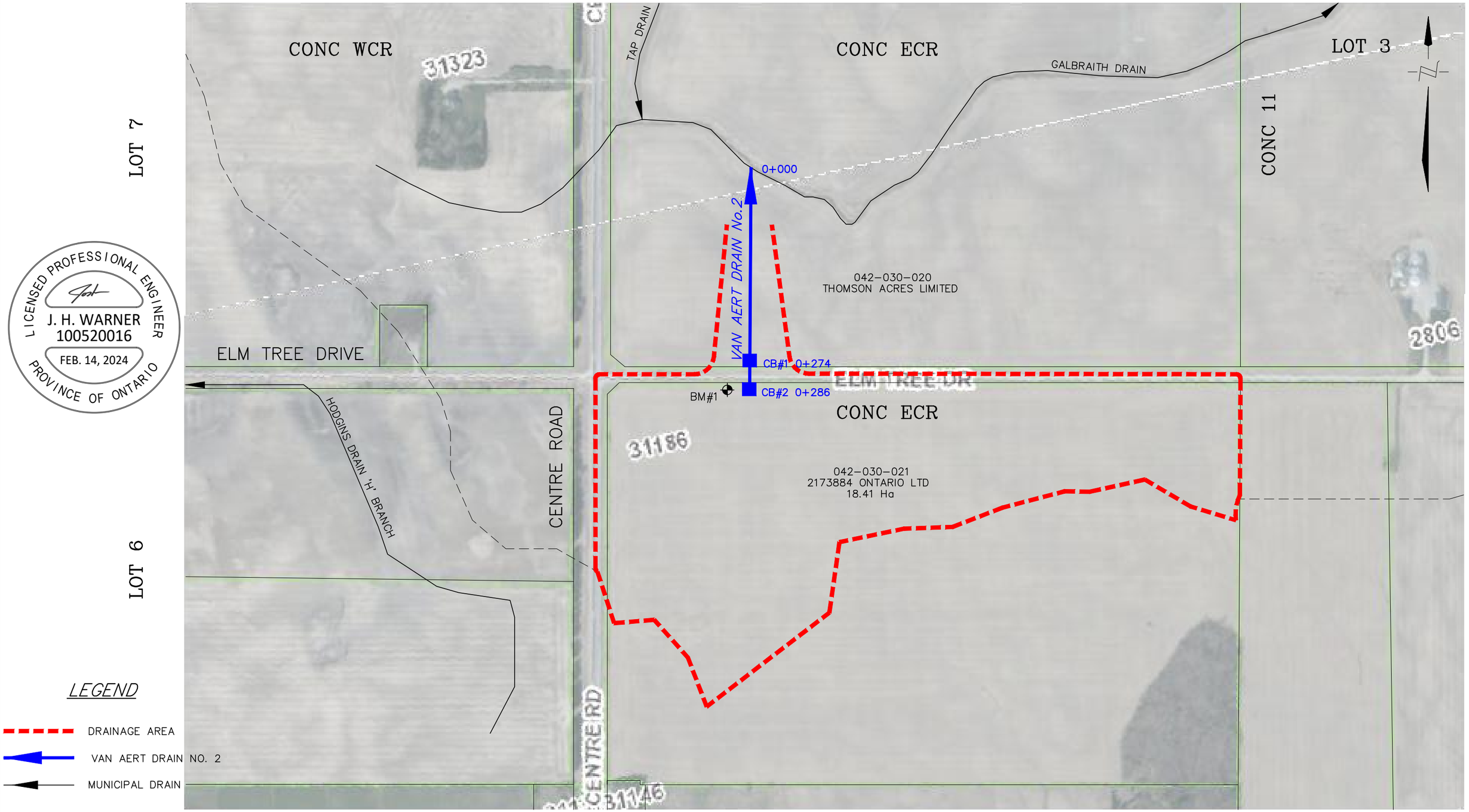
- Operate machinery in a manner that minimizes disturbance to the banks of the watercourse.
- Erosion and sediment control measures must be installed prior to construction to prevent sediment from entering the water body.
- Material shall not be in areas regulated by the Conservation Authority or Ministry of Natural Resources.
- All granular and erosion control materials shall be stockpiled a minimum of 3.0m from the top of the bank or excavation. Material shall not be placed in surface water runs or open inlets that enter the channel.
- All activities, including maintenance procedures, shall be controlled to prevent the entry of petroleum products, debris, rubble, concrete, or other deleterious substances into the water. Vehicle and equipment refuelling and maintenance shall be conducted away from the channel, any surface water runs, or open inlets. All waste materials shall be stockpiled well back from the top of the bank and all surface water runs and open inlets that enter the drain.
- When possible, all construction within the open channel shall be carried out during periods of low flow or in dry conditions.
- The Contractor shall conduct regular inspections and maintain erosion and sediment control measures and structures during the course of construction.
- The Contractor shall repair erosion and sediment control measures and structures if damage occurs.

- The Contractor shall remove non-biodegradable erosion and sediment control materials once site is stabilized.
- Remove all construction materials from site upon project completion.

**21. Silt Fence**

Light duty silt fencing shall be installed down-gradient of the work for the duration of construction.

The light duty silt fencing shall be supplied and installed in accordance with OPSS 577 and OPSD 219.110. The light duty silt fencing shall be removed once the disturbed area has been re-vegetated.




LICENSED PROFESSIONAL ENGINEER
J. H. WARNER
100520016
FEB. 14, 2024
PROVINCE OF ONTARIO

Dobbin Engineering Inc.

4218 Oil Heritage Road
Petrolia Ontario, N0N 1R0
Phone: (519) 882-0032 Fax: (519) 882-2233

DRAWING NAME:
Van Aert Drain No.2 Plan

PROJECT No.
2023–1518

APPROVED
J. WARNER

CHECKED
B. VAN RUITENBURG

DRAWN
C. SAUNDERS

| NO. | REVISIONS | DATE | BY |
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| 1 | FINAL REPORT | FEB. 14, 2024 | CS |

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# MUNICIPALITY of NORTH MIDDLESEX

## VAN AERT DRAIN No.2

## PLAN

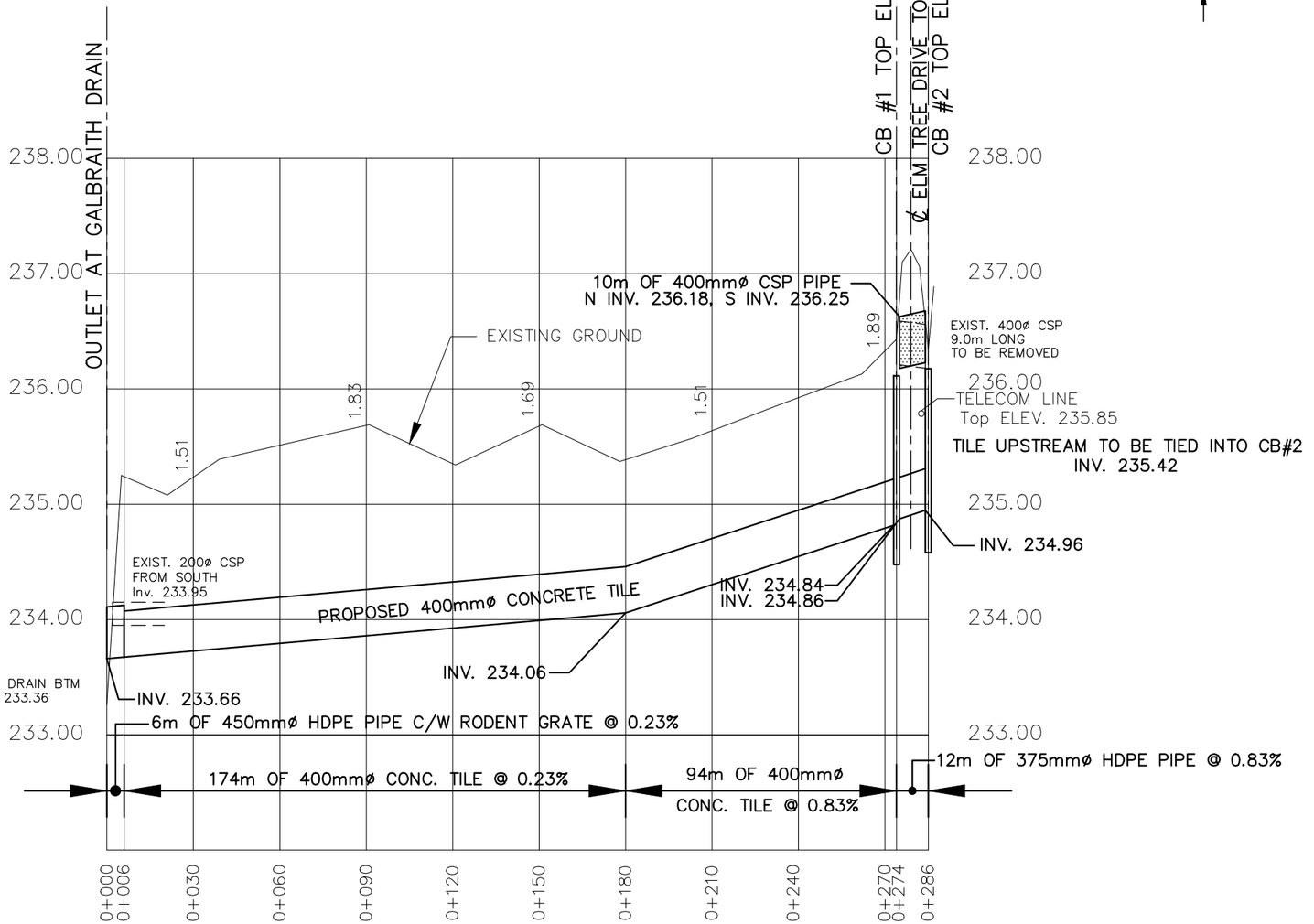
1
OF 2

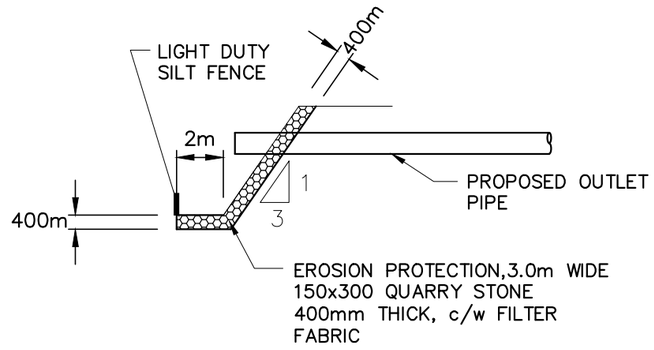
Last Updated: January 12, 2023

# GENERAL NOTES

1. BENCHMARK No.1 ELEV. 237.115
   NAIL IN UTILITY POLE LOCATED WEST OF ROAD CROSSING AT ELM TREE DRIVE.

2. UPPER NUMBERS ARE DEPTH FROM GROUND TO INVERT OF CONCRETE TILE.




## OUTLET DETAIL
NTS

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DRAWING NAME: Van Aert Drain No.2 Profile

PROJECT No. 2023-1518

APPROVED J. WARNER

CHECKED B. VAN RUITENBURG

DRAWN C. SAUNDERS

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# MUNICIPALITY of NORTH MIDDLESEX

## VAN AERT DRAIN No.2
## PROFILE

2 OF 2

Last Updated: February 14, 2024