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July 10, 2024

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

Gentlemen and Mesdames:

Re: Walden-Hord Drain Extension (2024) DRAFT

In accordance with your instructions, R. Dobbin Engineering has undertaken an examination of the Walden-Hord Drain Extension in the Municipality of North Middlesex.

Authorization under the Drainage Act

This Engineers Report that has been prepared under Section 78 of the Drainage Act as per a request from an affected Landowner.

Under Section 78 of the Drainage Act, Council may undertake and complete the maintenance or repair of any drainage works constructed under a bylaw passed under this Act or its predecessor. Section 78 is to be used where it is considered expedient to change the course of the drainage works, or to make a new outlet for the whole or any part of the drainage works, or to construct a tile drain under the bed of the whole or any part of the drainage works as ancillary thereto, or to construct, reconstruct or extend embankments, walls, dykes, dams, reservoirs, bridges, pumping stations, or other protective works as ancillary to the drainage works, or to otherwise improve, extend to an outlet or alter the drainage works or to cover the whole or any part of it, or to consolidate two or more drainage works, the Council whose duty it is to maintain and repair the drainage works or any part thereof may, without a petition required under Section 4 but on the report of an Engineer appointed by it, undertake and complete the drainage works as set forth in such report.

Background

The Walden-Hord Drain Extension outlets into the Walden-Hord Drain on the south side of Elginfield Road in Lot 22, Concession ECR. The drain heads easterly as a tile drain to near the east limit of Lot 4, Concession 18 ECR and then generally heads southeasterly to a point approximately 235m east of Springbank Road in the center of Lot 6, Concession 18 ECR. The drain varies in size from an 18" to a 10".

Under an Engineer's Report dated November 22th, 1972 the Walden-Hord Drain Extension was constructed.

On-Site Meeting

A site meeting was held on August 31st, 2023.

The following were present at the meeting:

- Josh Warner (R. Dobbin Engineering)
- Joanne Sadler (Drainage Superintendent, Municipality of North Middlesex)
- Frank Kennes (Landowner)
- Jared Tweedle (Engineering Tech II, County of Middlesex Representative)
- Tony Willemse (Landowner)
- Wayne Mueller (Landowner)
- Dave Willemse (Landowner)

The following is a brief summary of the meeting:

- General discussion of the Drainage Act and Landowners rights under the Drainage Act.
- Landowner of the property with Roll Number 042-020-107-01 stated that their driveway washes out under large storm events and provided pictures.
- Landowners expressed concerns that the pond on the Walden-Hord Drain on the east side of Centre Road was affecting flows in the drain.
    - R. Dobbin Engineering was to investigate this as part of the report
- Landowners expressed concerns that a tile drain may not solve surface water problems. R. Dobbin Engineering was to investigate both a channel and tile drain option.
- The Landowner of the property with Roll Number 042-020-110 mentioned that they may submit a request to extend the improvements to their property.

- It was discussed that Landowners would like to see the cost of the drain designed to the 50mm/24hours, which exceeds the grantable coefficient.
- Any required excavation of the channel downstream of Elginfield Road shall have the material placed on the south side of the channel.
- With the notice, Landowners were given a plan with a preliminary drainage area. It was mentioned that should Landowners have any concerns with the drainage area as presented, they should bring it up to the engineer. No Landowners expressed any concerns with the drainage area as presented.
- No adverse soil conditions were noted at the site meeting.

Discussion

The Landowner of the properties with Roll Number 042-020-107-01, 042-020-107 and 042-020-108 requested that a tile drain be the only option considered.

The Landowner of the property with Roll Number 042-020-110 submitted a request to extend the improvements to just east of the pond on their property.

Upon investigation of the pond on the east side of Centre Road it was determined that the pond does not have any negative impact on the Walden-Hord Drain Extension. The pond elevation sits approximately 3m below the channel outlet at the Walden-Hord Drain Extension and under all storm events a sufficient outlet is achieved for the Walden-Hord Drain Extension with the pond in place.

Through our investigation it was determined there is a pipe across Elginfield Road near the east limit of Lot 4, Concession 18 ECR. This pipe drains the north side of the Elginfield Road east of this location. This area was not been previously assessed into the Walden-Hord Drain Extension.

Drain Classification

The Walden-Hord Drain and Walden-Hord Drain Extension are currently classified as a class “F” drain. This rating is according to the Department of Fisheries and Oceans (DFO) classification as presented by the Ontario Ministry of Agriculture, Food and Rural Affair’s Agricultural Information Atlas.

Class “F” drains are intermittent or ephemeral (dry for more than two consecutive months).

Approvals

The drain will require approval from the Ausable Bayfield Conservation Authority and the Department of Fisheries and Oceans. Construction cannot commence without necessary approvals.

Design

The proposed drain shall be designed to accommodate a drainage coefficient of 50mm / 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. Walden-Hord Drain Extension shall be improved with the replacement of the tile drain from Station 0+000 to 1+633. The existing 1972 Walden-Hord Drain Extension from Station 0+000 to 1+633 shall be abandoned as part of the drainage works. The Walden-Hord Drain Extension from Station 0+000 to 0+941 shall remain in place for additional capacity. The Walden-Hord Drain Extension from Station 0+941 to 1+633 shall be crushed or removed. The drain from Station 1+633 to 1+731 shall be specified for future replacement. A tile drain shall be constructed to intercept the water coming from the north side of Elginfield Road (Station 2+000 to 2+055).

2. The Walden-Hord Drain shall be cleaned in order to provide a sufficient outlet for the proposed improvements to the Walden-Hord Drain Extension.

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 $361,188, 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 with 100% of the estimated cost to work around that utility and the daylighting costs as a special benefit assessment to that utility. The Springbank Road Crossing and cost to locate and work around utilites shall be tendered separately with the actual cost plus engineering (20% of the construction cost) being assessed to the

owner of the road authority or utility as a special benefit assessment. The utility assessment shall be split as follows:

Gas Utility Assessment = 1.0176 (Net Tax) x (3/4 x (Tendered Cost to Locate and Work Around Utilities x 1.20 (For Engineering)) + $2,500 (Daylighting and Surveying Utilities))

Water Utility Assessment = 1.0176 (Net Tax) x (1/4 x (Tendered Cost to Locate and Work Around Utilities x 1.20 (For Engineering))

2. Catch Basins have generally been assessed as a benefit assessment with 50% of the estimated cost assessed to the upstream property and 50% assessed to the downstream property.

3. The open channel cleanout on the Walden-Hord Drain and the tile drain on the property with Roll Number 042-020-106 has been assessed with 30% of the cost applied as a benefit assessment to the abutting property and the remainder of the cost assessed as an outlet assessment to upstream lands and roads based on equivalent hectares.

4. The additional cost to provide a drainage coefficient above the 38mm/24hrs has been assessed to the benefitting properties as a special benefit assessment. This cost will not be eligible for grant.

5. The remaining cost of the drainage works has generally been assessed with 60% of the cost applied as a benefit assessment and the remainder applied as outlet assessment to the upstream lands and roads based on equivalent hectares.

All final costs included in the cost estimate of this report, except as identified above, shall be pro-rated based on the Schedule of Assessment. Any additional costs shall be assessed in a manner as determined by the Engineer in accordance with the Drainage Act.

Allowances

Under Section 29 of the Drainage Act, the Engineer in his report shall estimate and allow in money to the Owner 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 $50,000.00 per hectare ($20,000.00 per acre). Allowances for crop loss are based on $2,000.00 per hectare for the first year and $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 Elginfield Road and Springbank Road. 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 25m along the length of the drainage works normally centred on the proposed tile drain. The working area for the channel improvements to the Walden-Hord Drain shall be 10m wide and shall generally be along the west/south side of the channel.

Restrictions

No trees and shrubs shall be planted nor shall permanent structures be erected within 10m 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.

Maintenance

The Walden-Hord Drain Extension, except for the Springbank Road crossing, shall be repaired and maintained in the same proportions as contained in the Schedule of Assessment, less special benefit assessments and the assessment to the property with Roll Number 042-020-152. The Walden-Hord Drain may be cleaned out in order to provide a sufficient outlet for the Walden-Hord Drain Extension as outlined in this report. This shall be assessed with 30% assessed to the property with Roll Number 042-020-152 and

the remainder assessed to upstream lands and roads based on equivalent hectares contained in the Schedule of Assessment.

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. Therefore, the road crossing on Springbank Road (Station 1+493 to 1+511, excluding basins) shall be maintained and repaired at the expense of the road authority.

The cost of an asphalt surface across a driveway shall be assessed to the benefitting property.

Yours truly,

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

Walden-Hord Drain Extension
Municipality of North Middlesex
July 10, 2024

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 ($) (R.O.W)	Section 30 ($) Damages	Total ($)
ECR	Lot 22	042-020-106	P. & C. Bax	-	900	900
	Lot 23	042-020-152	Willemse Baling Enterprises	200	390	590
18 ECR	Lot 3	042-020-107	F. Kennes & Sennek Farms Ltd	-	2,460	2,460
	Pt. Lot 3	042-020-107-01	Sennek Farms Ltd	-	550	550
	Lot 4	042-020-108	F. Kennes & Sennek Farms Ltd	-	3,530	3,530
	Lot 5	042-020-109	BNS Will Farms Inc	-	4,140	4,140
	Lot 6	042-020-110	D. & K. Willemse	-	900	900
			TOTAL ALLOWANCES	200	12,870	13,070

Estimate of Cost

	Quantity	Unit	Unit Cost	Total Cost
Pre-Construction Meeting	1	LS	300	300
Benchmark Loop	1	LS	500	500
Brushing and Tree Removal	1	LS	1,000	1,000
Strip and Level Topsoil and Gravel for Tile Drain	1670	m	6	10,020
Remove existing Catch Basins (Stations 1+493 and 1+511)	2	ea	400	800
Locate and Abandon existing Municipal Drain as Described	1	LS	2,500	2,500
Open Channel Excavation and Levelling (Station 1+087 to 1+241 on Walden-Hord Drain)	154	m	10	1,540
Straw Matting and Hydroseeding of Open Channel	154	m	4	616
900mmø HDPE Pipe	16	m	500	8,000
Rodent Grate at Outlet Pipe (Station 0+000)	1	LS	600	600
Rip Rap at Outlet (Station 0+000) and Basins	50	tonne	120	6,000
900mmø Concrete Tile	104	m	150	15,600
675mmø Concrete Tile	777	m	100	77,700
750mmø HDPE Pipe	44	m	400	17,600
600mmø Concrete Tile	552	m	90	49,680
450mmø Concrete Tile	122	m	75	9,150
350mmø Concrete Tile	55	m	60	3,300

	Quantity	Unit	Unit Cost	Total Cost
Concrete Collar at Station 0+344	1	LS	400	400
Springbank Road Crossing				
Traffic Control	1	LS	800	800
Remove Existing Culvert for Re-Use, Remove Existing Tile and Dispose of Unsuitable Backfill Material	1	LS	1,500	1,500
525mmø HDPE Smooth Wall Pipe (Open Cut) c/w Bedding	18	m	400	7,200
Reinstall Existing 900mmø CSP	12	m	100	1,200
Supply and Install 3/4" Clear Stone Bedding	50	tonne	40	2,000
Supply and Install Granular "A" Backfill	100	tonne	30	3,000
Supply and Install 100% Crushed Granular "M" Dolomite	25	tonne	35	875
Restoration and Ditch Grading	1	LS	800	800
JB #1 (900mm x 1200mm)	1	LS	3,000	3,000
JB #2 (900mm x 1200mm)	1	LS	3,000	3,000
CB #3 (900 x 1200mm) c/w Connections	1	LS	3,000	3,000
CB #4 (750mmø with Cast Iron Grate) c/w Connections	1	LS	2,500	2,500
CB #5 (900 x 1200mm) c/w Connections and Berm	1	LS	3,500	3,500
CB #6 (900 x 1200mm) c/w Connections and Berm	1	LS	3,500	3,500
CB #7 (900 x 1200mm) c/w Connections	1	LS	3,200	3,200
CB #8 (900 x 1200mm) c/w Connections and Berm	1	LS	3,500	3,500
CB #9 (900 x 1200mm) c/w Connections	1	LS	3,000	3,000
Locate and Connect Existing Field Tile	80	each	150	12,000
Silt Fence	1	LS	400	400
Locate and Work Around Utilities	1	LS	2,000	2,000
Restoration/Seeding	1	LS	1,500	1,500
Miscellaneous/Contingency				12,700

Sub Total	$279,481
Allowances	$13,070
Engineering	$44,440
Daylighting and Surveying Utilities	$2,500
Estimate for Tendering, Contract Administration and Inspection	$15,000
ABCA Fee	$450
Sub Total	**$354,941**
Non-Recoverable HST (1.76%)	$6,247
Total Estimate	**$361,188**

Walden-Hord Drain Extension
Municipality of North Middlesex
July 10, 2024

SCHEDULE OF ASSESSMENT

Conc.	Lot or Part	Affected Hect.	Roll No.	Owner	Special Benefit ($)	Benefit ($)	Outlet ($)	Total ($)	Equivalent Ha.
Utilities									
Gas Utility				Enbridge	4,300		-	4,300	0.00
Water Utility				Municipality of North Middlesex	600	-	-	600	0.00
					4,900	-	-	4,900	
Agricultural Lands									
ECR	Lot 22	4.04	042-020-106	P. & C. Bax	1,200	9,942	815	11,957	4.04
	Lot 23	0.00	042-020-152	Willemse Baling Enterprises		743	-	743	0.00
18 ECR	Lot 3	8.64	042-020-107	F. Kennes & Sennek Farms Ltd	3,280	29,967	4,253	37,500	8.64
	Pt. Lot 3	1.48	042-020-107-01	Sennek Farms Ltd	1,460	24,425	646	26,531	1.48
	Lot 4	9.71	042-020-108	F. Kennes & Sennek Farms Ltd	4,200	38,592	7,756	50,548	9.71
	Lot 5	20.23	042-020-109	BNS Will Farms Inc	5,520	48,278	23,013	76,811	20.23
	Lot 6	26.30	042-020-110	D. & K. Willemse	1,220	15,059	32,173	48,452	26.30
	Lot 7	30.35	042-020-111	M. Mueller		-	37,417	37,417	30.35
	Lot 8	12.14	042-020-112	Michael J. Godts Farms Ltd.		-	14,967	14,967	12.14
					16,880	167,006	121,040	304,926	
Municipal Lands									
Springbank Road		1.21		Municipality of North-Middlesex	20,855	4,817	4,129	29,801	3.63
Elginfield Road		4.45		County of Middlesex		10,816	10,745	21,561	17.80
		118.55							
					20,855	15,633	14,874	51,362	

Total - Utilities	4,900
Total - Agricultural Lands	304,926
Total - Municipal Lands	51,362
Total Assessment	$361,188

ESTIMATED NET ASSESSMENT

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

Conc.		Owner	Assessment	Estimated Grant	Allowances	**Estimated Net Net Assessmnet ($)**
Agricultural Lands						
Gas Utility		Enbridge	4,300	-	-	4,300
Water Utility		Municipality of North Middlesex	600	-	-	600
Agricultural Lands						
ECR	042-020-106	P. & C. Bax	11,957	3,586	900	7,471
	042-020-152	Willemse Baling Enterprises	743	248	590	(95)
18 ECR	042-020-107	F. Kennes & Sennek Farms Ltd	37,500	11,407	2,460	23,633
	042-020-107-01	Sennek Farms Ltd	26,531	8,357	550	17,624
	042-020-108	F. Kennes & Sennek Farms Ltd	50,548	15,449	3,530	31,569
	042-020-109	BNS Will Farms Inc	76,811	23,764	4,140	48,907
	042-020-110	D. & K. Willemse	48,452	15,744	900	31,808
	042-020-111	M. Mueller	37,417	12,472		24,945
	042-020-112	Michael J. Godts Farms Ltd.	14,967	4,989		9,978
Municipal Lands						
Springbank Road		Municipality of North-Middlesex	29,801			29,801
Elginfield Road		County of Middlesex	21,561			21,561
		Total	$361,188	$96,016	$13,070	$252,102

Walden-Hord Drain Extension
Municipality of North Middlesex
July 10, 2024

SPECIFICATION OF WORK

1. Location

The work in this specification is located in Lot 22, Concession ECR and Lots 3 to 6, Concession 18 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:

- 1,688m of proposed tile drain replacement and 98m of future tile drain replacement c/w catch basins, junction boxes and Springbank Road Crossing Replacement
- 154m of open channel deepening on the Walden-Hord Drain

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 and Engineer who may vary these specifications as to minor details but in no way decrease the proposed capacity of the drain.

All excess material shall be disposed offsite at the expense of the Contractor.

4. Plans and Specifications

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. Utilities

The Contractor is responsible for organizing locates and exposing all the utilities along the length of the drainage works. If any utilities interfere with the proposed drainage works in a manner not shown on the accompanying Estimate of Cost or profile the Contractor shall notify the Drainage Superintendent and Engineer.

The Contractor is responsible for coordinating the replacement of additional utilities with the utility company if they interfere with the proposed drain. All costs for the utility to replace their services will be outside of this report and shall be borne by the utility as per Section 26 of the Drainage Act.

All additional costs to work around and organize replacement of the utilities not included in the estimate shall be tracked separately and the cost plus a portion of the engineering (20% of the cost) shall be borne by that utility.

7. 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. The Traffic Plan must be approved by the Municipality prior to the commencement of any road closures.

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.

8. 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.

9. Access and Working Area

Access to the work site for construction and future maintenance shall be from Elginfield Road and Springbank Road. 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 25m along the length of the drainage works normally centred on the proposed tile drain. The working area for the channel improvements to the Walden-Hord Drain shall be 10m wide and shall generally be along the west/south side of the channel.

10. 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.

11. Removals

The culverts, catch basins, unsuitable or not required excavated material, etc. shall be removed in their entirely and shall be disposed offsite at the expense of the Contractor. Tile under road crossings shall be removed in their entirety.

12. Brushing and Tree Removal

For the tile drain all brush, trees, woody vegetation, stumps etc. shall be removed for a width of 15 metres normally centered on the proposed tile drain. They shall be removed in their entirety including stumps.

A mechanical grinder attached to an excavator shall 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.

13. Excavation of Open Channel

The open channel shall be excavated and maintained to the depths and grades as per the profile and drawings as contained in this Engineers Report. The channel shall be excavated to the proper depth using a laser or similar approved device with a labourer onsite to ensure correctness of grade and to confirm location of tile ends.

The excavated material shall generally be cast on the side it is being excavated from, except across finished lawns where the excavated material shall be trucked. Excavated material shall be cast at least 1.5 metres clear of the bank. Excavated material shall not be placed in low runs or swales out letting surface water to the channel. The excavated material shall be levelled to a maximum depth of 150mm and left in a condition suitable for cultivation. This shall include the removal of any rocks larger then 10cm in diameter and any debris/wood that could damage or plug farm equipment. Leveling shall occur when the material is dry enough to do so as determined by the Drainage Superintendent or Engineer. All high spots above grade shall be removed. The sediment shall be removed leaving a rounded bottom with the intent not to undercut the existing side slopes. All material unfit for placing on farmlands shall be disposed of offsite by the Contractor.

Where determined by the Drainage Superintendent, the banks are unstable the banks shall be re-sloped to 2:1.

14. Locate and Abandon Existing Drain

The existing tile drain shall be exposed at the discretion of the Drainage Superintendent or Engineer and Contractor in order to adequately determine the proposed alignment. The proposed tile drain shall generally run up the existing tile with the existing drain being removed or crushed from Station 0+941 to 1+633. Downstream of Station 0+941 the proposed drain shall run south of the existing drain and south of the utility poles until

Station 0+016. The existing drain from Station 0+000 to 0+941 shall be left in place and will be a private drain.

15. 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.

16. 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.

HDPE pipe shall be CSA Approved smooth wall gasketed pipe with bell and spigot joints (320 kPa) and shall include clear stone bedding to the spring line under gravel driveways and accesses. Under roadways, the road crossing specification shall be used.

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 (HDPE 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.

17. Outlet Works

The outlet works for the drain shall consist 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. 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 Springbank 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 shall extend 150mm below the bottom of the tile 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 300mm above the proposed tile. Care shall be taken to ensure that the backfill on either side of the culvert does not differ by more than 300mm so that the pipe is not displaced. Within the road allowance the pipe shall be backfilled 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 “M” Dolomite. Granular “A” and “M” shall be mechanically compacted to 100% modified standard proctor density.

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 “M”.

19. Catch Basins

Structure	Station	Type (mm)	Inlet Elev. (m)	Outlet Pipe Elev. (m)	Inlet Pipe Elev. (m)
CB #3	0+300	900x1200	214.97	213.21 (W) 675	213.22 (E) 750
CB #4	0+322	750mm dia.	215.42	213.34 (W) 750	213.35 (E) 750
CB #5 c/w Berm	0+941 = 2+055	900x1200	218.78	207.05 (W) 675	207.10 (E) / 217.19 (N) 600 / 350
CB #6 c/w Berm	1+493	900x1200	225.31	223.67 (W) 600	223.76 (E) 525
CB #7	1+511	900x1200	225.52	224.98 (W) 525	224.09 (E) 450
CB #8 c/w Berm	1+633	900x1200	228.18	225.89 (W) 450	225.92 (E) 450
CB #9	2+055	900x1200	218.08	217.30 (S) 350	

The 750mm dia. HDPE basin shall be constructed using a manufactured tee, a length of 750mm dia. HDPE pipe extending vertically and a cast iron frame and grate.

The remaining catch basins shall be square precast concrete structures as noted above and shall have a birdcage type grate. The ditch inlet catch basins (denoted DICB) 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. If more material is required it shall be supplied at the expense of the drainage works.

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 as determined by the Drainage Superintendent or Engineer. 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.

20. Junction Boxes

The junction boxes shall be installed to the elevations and in the locations shown on the drawings as follows:

Structure	Station	Type (mm)	Top Elev. (m)	Outlet Pipe Elev. (m)	Inlet Pipe Elev. (m)
JB #1	0+016	900x1200	212.90	211.70 (N) 900	211.71 (E) 900
JB #2	0+120	900x1200	213.10	211.90 (W) 900	212.13 (E) 675

The junction boxes shall be square precast concrete structures as noted above.

The junction boxes 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. The top of junction boxes shall be set a minimum of 600mm below grade to accommodate farm tillage practices.

The junction boxes shall be set on a layer of clear stone. The clear stone shall be extended up to the top of the inlet and outlet pipe connections

The tile at the connection to the junction boxes 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.

The Drainage Superintendent may change a concrete lid on a junction box to a birdcage type grate creating a catch basin at the request of a Landowner.

21. Seeding/Restoration

All areas disturbed by construction shall be restored to their pre-construction state.

All grass areas disturbed by construction, shall be restored with 100mm of screened topsoil and hydro seeded. The timing of the seeding shall be approved by the Drainage Superintendent or Engineer.

All disturbed side slopes of the channel shall be restored with straw matting and hydroseed.

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.

22. Subsurface Drainage

All existing subsurface drains encountered during construction shall be reconnected to the open channel and tile drain unless otherwise noted on the drawings or as directed by the Drainage Superintendent.

A suitable length of equivalent sized PE agricultural tubing shall be used to connect the drain to the open channel and tile drain. 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.

23. Environmental Considerations

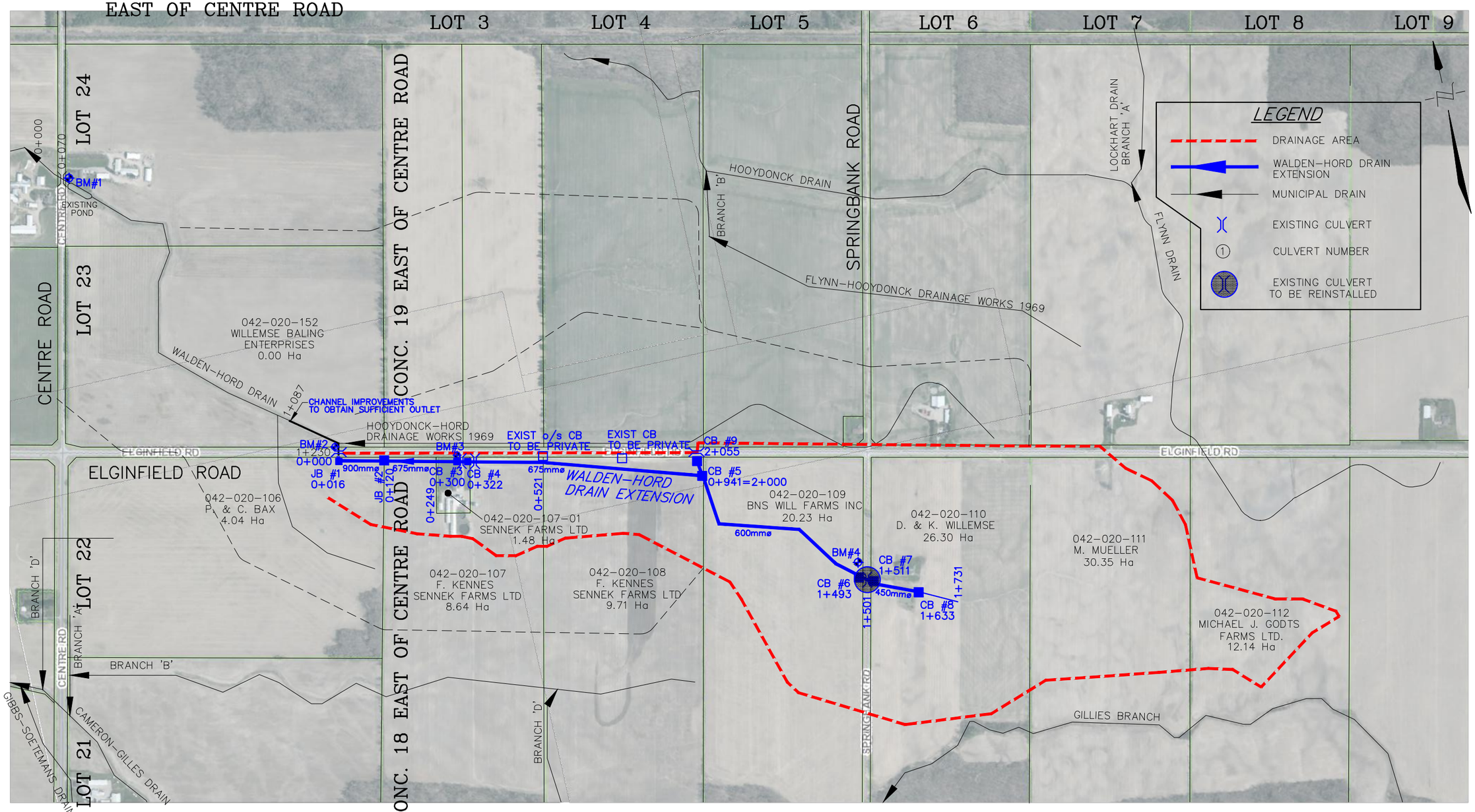
The Contractor shall take care to adhere to the following considerations.

- 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.

A 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 construction is complete.



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

DRAWING NAME: Walden – Hord Drain Extension Plan

PROJECT No. 2023-1546

APPROVED J. WARNER

CHECKED B. VAN RUITENBURG

DRAWN C. SAUNDERS

NO.	REVISIONS	DATE	BY
1	FINAL REPORT	JULY 10, 2024	CS

SCALE 1:10,000
0 80 160 240m

MUNICIPALITY of NORTH - MIDDLESEX

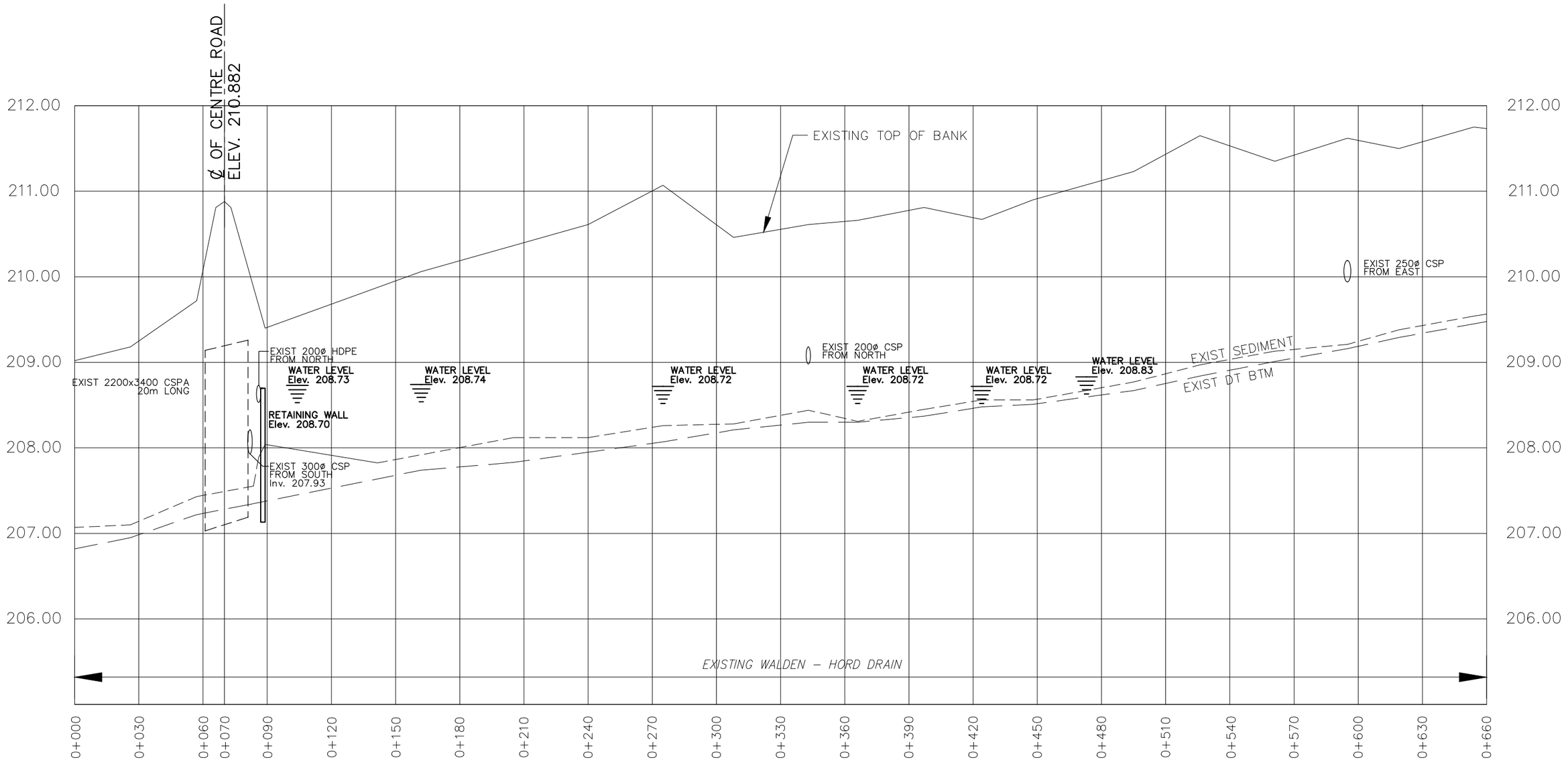
WALDEN - HORD DRAIN EXTENSION PLAN

1 OF 6

Last Updated: May 27, 2024

GENERAL NOTES

1. BENCHMARK No.1 ELEV. 209.261
   TOP EAST END OF EXISTING 2200x3400 CSPA
   CROSSING CENTRE ROAD STATION 0+070 (WALDEN–HORD DRAIN)
2. UPPER NUMBERS ARE DEPTH FROM TOP OF
   BANK TO FUTURE CHANNEL BOTTOM.



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DRAWING NAME:
Walden–Hord Drain Extension Profile 1

PROJECT No.
2023–1546

APPROVED
J. WARNER

CHECKED
B. VAN RUITENBURG

DRAWN
C. SAUNDERS

NO.	REVISIONS	DATE	BY
1	FINAL REPORT	JULY 10, 2024	CS

SCALE: 1:2,000
0 20 40 60m

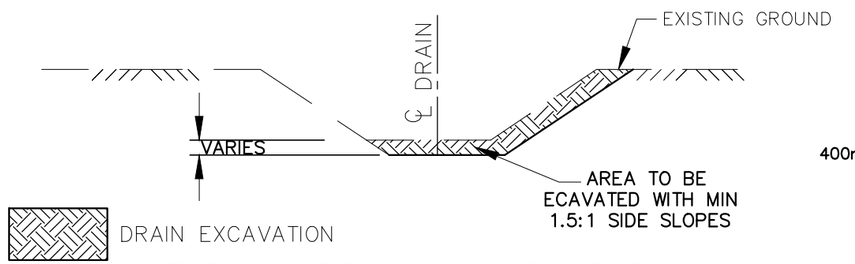
MUNICIPALITY of NORTH MIDDLESEX

WALDEN - HORD DRAIN EXTENSION
PROFILE

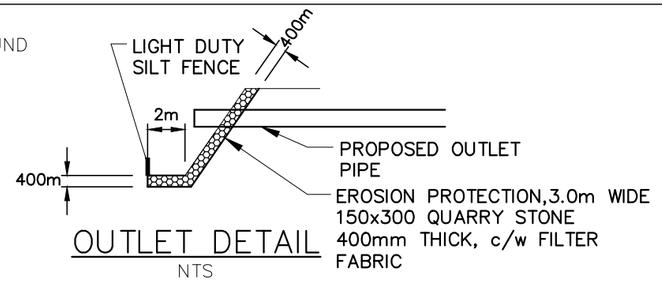
Last Updated: May 27, 2024

GENERAL NOTES

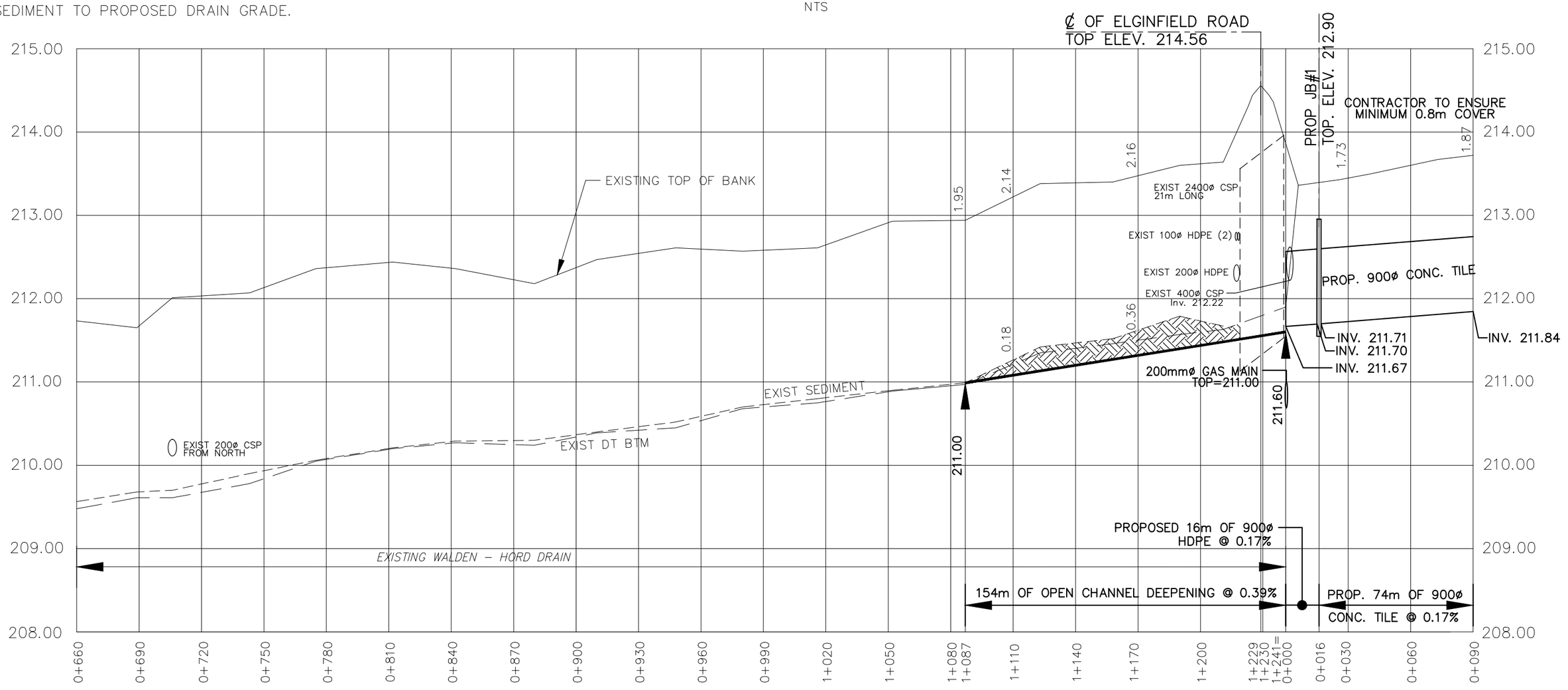
1. BENCHMARK No.2 ELEV. 213.562
   TOP NORTH END OF EXISTING 2400ø CSP
   CROSSING ELGINFIELD ROAD STATION 1+230 (WALDEN–HORD DRAIN)
2. UPPER NUMBERS ARE DEPTH FROM TOP OF
   BANK TO CHANNEL BOTTOM. (WALDEN–HORD DRAIN)
   UPPER NUMBERS ARE DEPTH FROM GROUND
   TO INVERT OF PROPOSED TILE. (WALDEN–HORD EXTENSION DRAIN)
3. LOWER NUMBERS ARE DEPTH FROM TOP OF
   SEDIMENT TO PROPOSED DRAIN GRADE.



TYPICAL DRAIN CROSS SECTION
NTS



OUTLET DETAIL
NTS



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DRAWING NAME: Walden–Hord Drain Extension Profile 2
PROJECT No. 2023–1546

APPROVED	NO.	REVISIONS	DATE	BY
J. WARNER				
CHECKED	1	FINAL REPORT	JULY 10, 2024	CS
B. VAN RUITENBURG				
DRAWN	SCALE: 1:2,000			
C. SAUNDERS	0 20 40 60m			

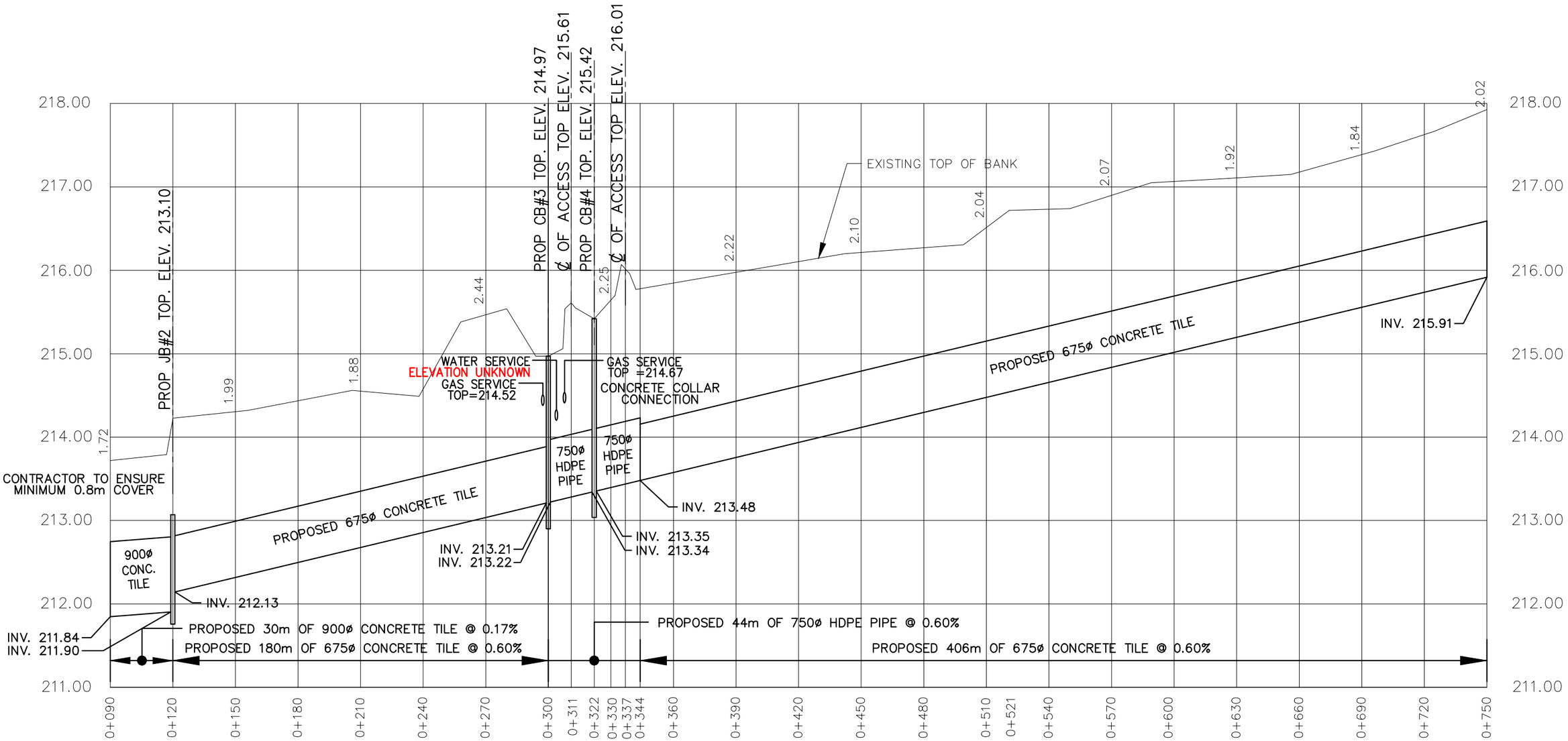
MUNICIPALITY of NORTH MIDDLESEX

WALDEN - HORD DRAIN EXTENSION
PROFILE

Last Updated: May 27, 2024

GENERAL NOTES

1. BENCHMARK No.3 ELEV. 215.037
   TOP WEST END OF EXISTING 600ø CSP
   ON WESTERLY ACCESS FOR MN# 2799 ELGINFIELD ROAD
2. UPPER NUMBERS ARE DEPTH FROM GROUND
   TO INVERT OF PROPOSED TILE.



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DRAWING NAME: Walden–Hord Drain Extension Profile 3

PROJECT No. 2023–1546

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DRAWN				
C. SAUNDERS				

SCALE: 1:2,000
0 20 40 60m

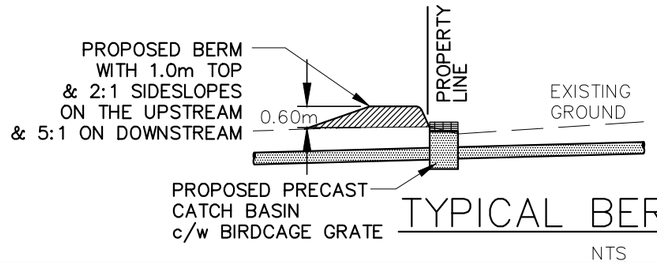
MUNICIPALITY of NORTH MIDDLESEX

WALDEN - HORD DRAIN EXTENSION
PROFILE

Last Updated: May 27, 2024

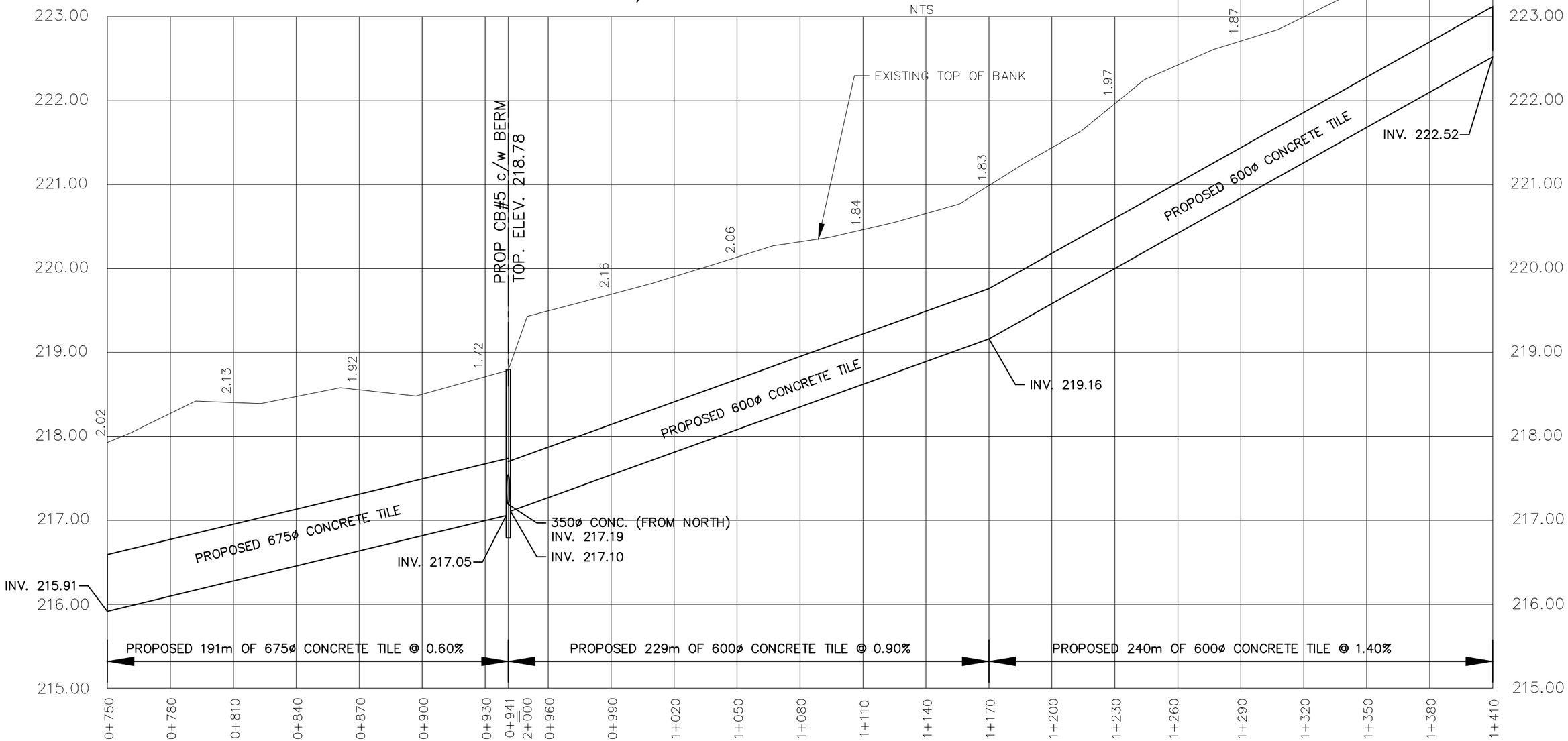
GENERAL NOTES

1. BENCHMARK No.4 ELEV. 226.276
   TOP WEST END OF EXISTING 900ø CSP
   CROSSING SPRINGBANK ROAD STATION 1+501
2. UPPER NUMBERS ARE DEPTH FROM GROUND
   TO INVERT OF PROPOSED TILE.



TYPICAL BERM DETAIL

NTS



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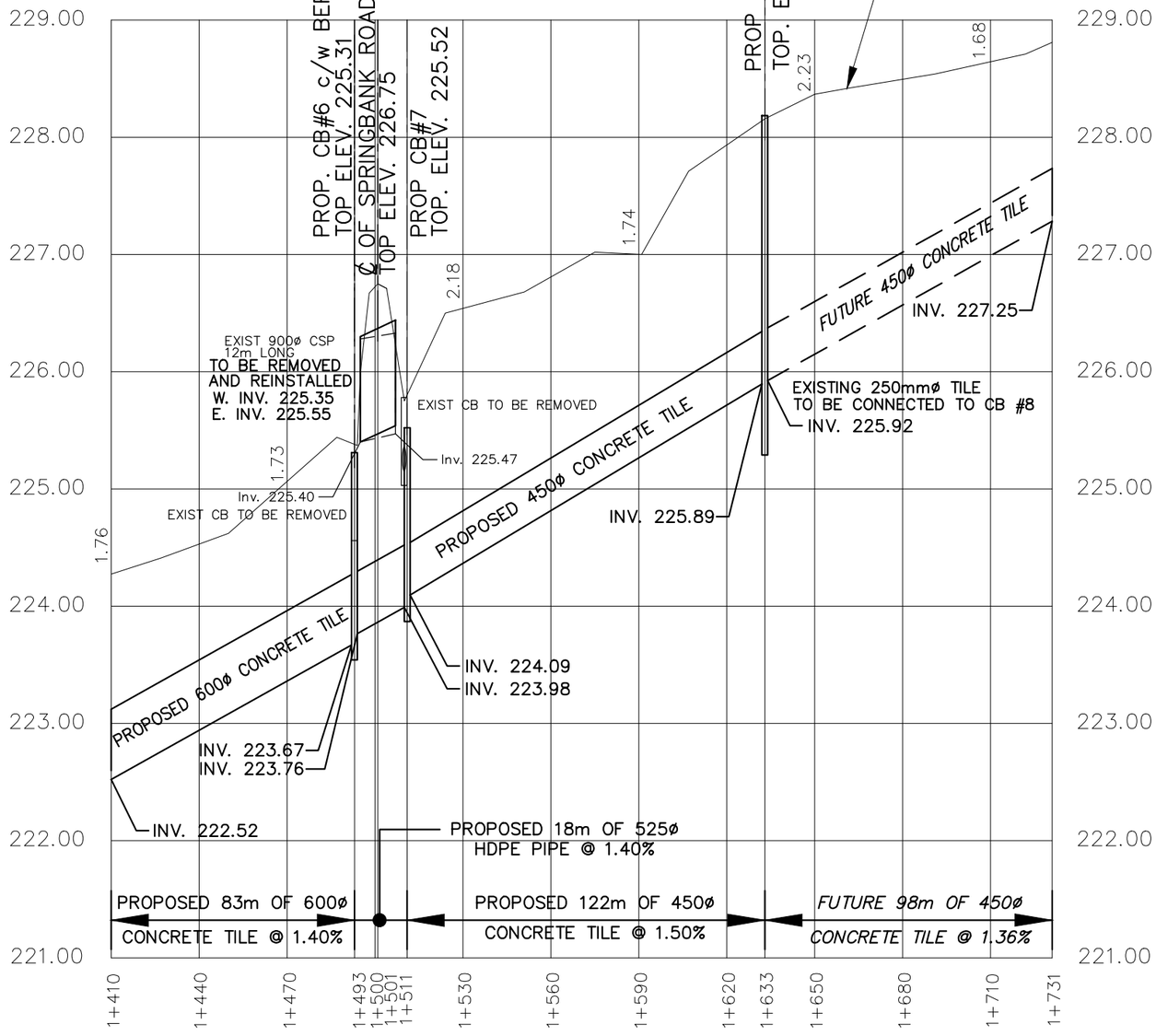

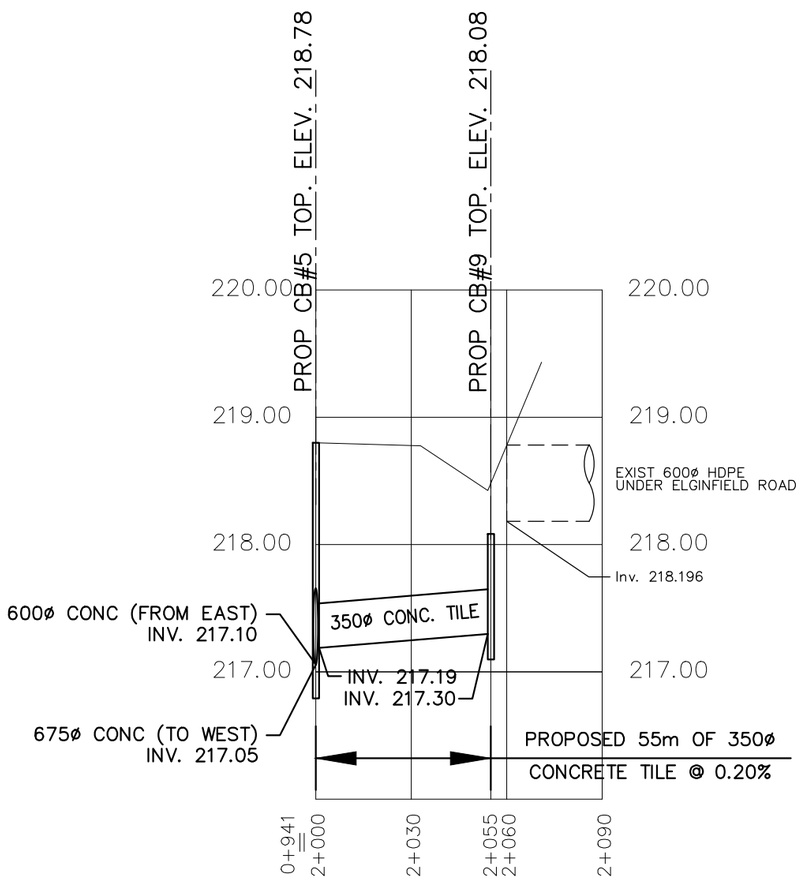

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WALDEN - HORD DRAIN EXTENSION
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