



STORMWATER MANAGEMENT DESIGN BRIEF

**MAYFIELD WEST PHASE 2 SECONDARY PLAN AREA
DRAFT PLAN OF SUBDIVISION 21T-16008C
RESIDENTIAL DEVELOPMENT**

**LORMEL JOINT VENTURE INC.
(SWM POND 4)**

**TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEEL**

PROJECT NO. 13952

APRIL 2019

**RAND ENGINEERING CORPORATION
5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO L4W 5B8**

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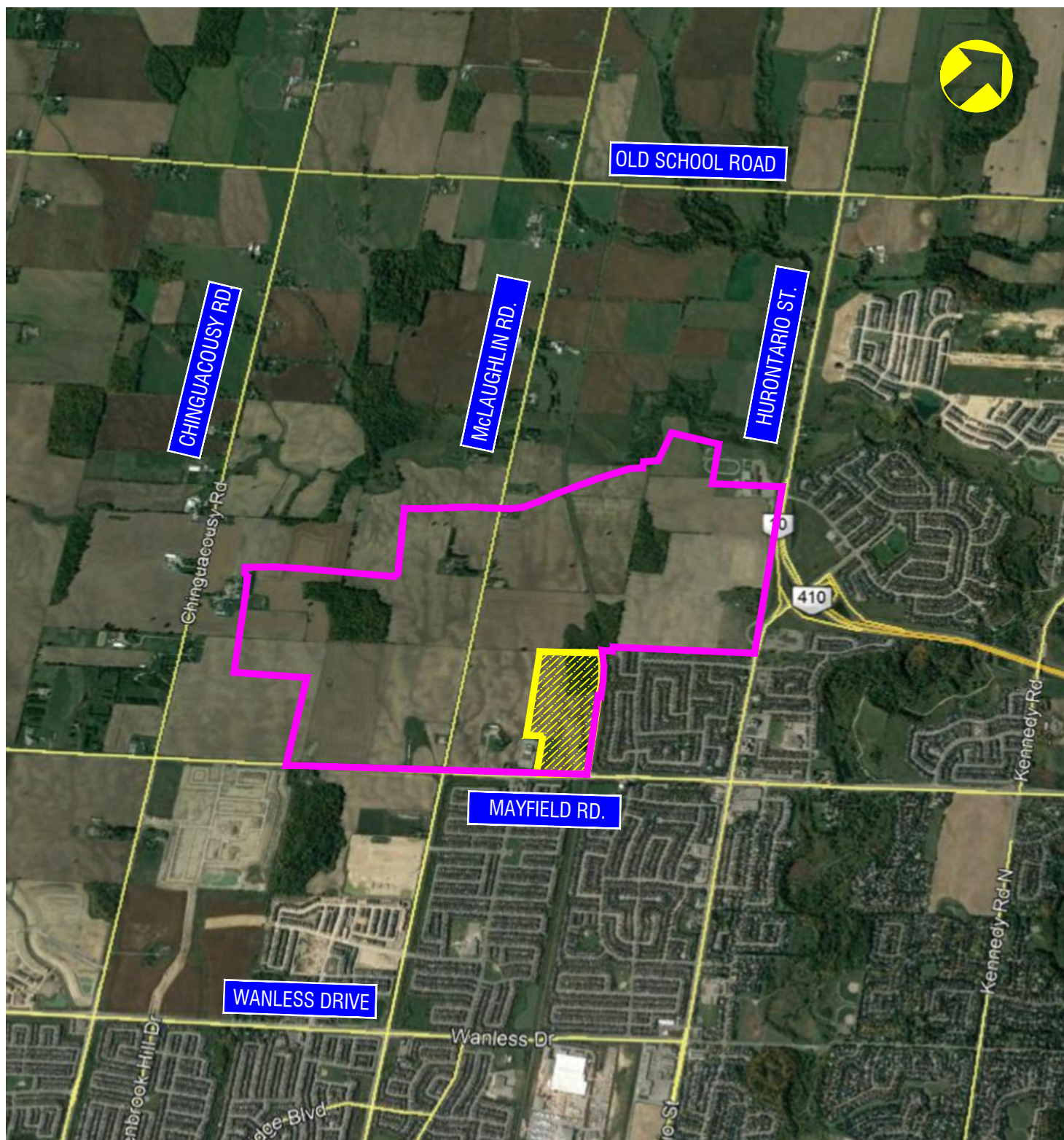
1.0 INTRODUCTION

RAND Engineering Corporation has been retained by Lormel Joint Venture Inc. to complete a Stormwater Management Design Brief, for its residential development area located within Phase 2 of the Mayfield West Secondary Plan in the Town of Caledon. The subject development encompasses 18.3 hectares and is located on Part of Lot 18, Concession 1, West of Hurontario Street (Geographic Township of Chinguacousy).

As shown in [Figure 1](#), the subject property is bounded by Mayfield Road to the south, the Orangeville Brampton Railway (OBRY) to the east, South East Wetland/Woodlot (CVC) to the northeast, a future public secondary school to the north, the proposed River's Bend Estates (A-Major Homes (Ontario) Inc.) residential development to the west and an existing church at the southwest. A strip of land along the eastern boundary of the subject property is designated for the future NHS channel. The development lies within the limits of the Credit River Watershed and is drained by an easterly tributary to the east branch of Fletcher's Creek.

The Draft Plan of Subdivision for the development was prepared by KLM Planning Partners Inc. on April 2, 2019. The general layout of the development is shown in [Figure 2](#). The proposed draft plan of subdivision generally consists of residential units (detached dwellings), a stormwater management pond (SWM Pond 4), a park block, channel block and an open space block. The land use areas are outlined in [Table A.1](#), per [Appendix A](#).

The purpose of this report is to outline the detailed SWM Plan for the development and to provide operational details for SWM Pond 4, in support of the Draft Plan Application. The recommended storm drainage plan for the development has been prepared in accordance with the May 2018 "Functional Servicing Report, Mayfield West Phase 2" (FSR) prepared by Urbantech Consulting as well as the requirements of the Town of Caledon, Credit Valley Conservation (CVC) and Ministry of the Environment, Conservation and Parks (MECP). The report supplements information included on the accompanying engineering drawings and is intended to assist CVC and the Town of Caledon in their review of the Draft Plan Application for the Lormel property.



LEGEND

- NORTH WEST BRAMPTON LANDS
- SUBJECT DEVELOPMENT

- MAYFIELD WEST PHASE 2
DRAFT STAGE 1 PLAN AREA

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LOCATION PLAN

FIGURE No. 1

NOT TO SCALE



2.0 BACKGROUND INFORMATION

2.1 Previous Studies

The stormwater management requirements for the subject lands including SWM Pond 4 were established in the May 2018 “*Functional Servicing Report, Mayfield West Phase 2*” prepared by Urbantech Consulting. Additional information pertaining to the recommended stormwater management plan for the subject lands has been obtained from the following documents:

- ❑ “*Development Staging and Sequencing Plan, Mayfield West Phase 2 Secondary Plan, 2nd Draft*”, **Glenn Schnarr & Associates Inc.**, July 11, 2017.
- ❑ “*Design Brief for Stormwater Management Pond 3 for the River’s Bend Estates*”, **David Schaeffer Engineering Ltd.** and **JFSA Water Resources and Environmental Consultants**, March 2018.
- ❑ “*Hydrogeological Assessment and Feature Based Water Budget – Mayfield West Phase 2, Caledon, ON, Draft Final Report*”, **Palmer Environmental Consulting Group**, April 27, 2018.
- ❑ “*Environmental Impact Statement / Environmental Impact Report for the Mayfield West Phase 2, Stage 1, Landowners Framework Plan*”, **Hensel Design Group**, Final Submission March 2019.

2.2 Storm Drainage Design Criteria and Requirements

The storm drainage system for the development has been designed in accordance with the standards and requirements of the Town of Caledon, CVC and the MOECP. The stormwater management criteria and requirements pertaining to the subject lands have been obtained from the May 2018 FSR prepared by Urbantech Consulting, and are summarized below:

- ❑ Storm sewer systems shall be designed to accommodate a 10-year storm where foundation drains are to be connected. For systems that do not allow for foundation drains, a 5-year design will be allowed. The minor drainage system should be designed using the Rational Method and Town of Caledon IDF curves.

- ❑ Storm sewers shall be located a minimum of one (1) metre below basement floor elevations to allow for the installation of foundation connections. In areas of no storm sewer connection, the sewers shall have a minimum frost cover of 1.5m.
- ❑ The major system should be designed to accommodate runoff exceeding the capacity of the minor system for flows up to and including the 100-year storm or Regional storm event, whichever is larger. The major system should be contained within road allowances and designated easements.
- ❑ Roof leaders must not be connected directly to the storm sewer system, and the following conditions must be complied with:
 - Roof leaders must discharge onto concrete splash pads which direct the water into side yard swales, these swales must discharge to the front of the lot, no roof leaders shall drain to the rear of the lot. Roof leaders are not permitted to discharge onto driveways or walkways. For walkouts, a note is to be added to the drawings that all roof drainage is to be directed to the front of the lot, unless otherwise approved by the Town.
 - Houses located on corner lots have roof leaders located at the corner(s) of the house, closest to the street lines.
 - Roof leader down spout locations are to be indicated on site grading plans.
- ❑ Inverts of service connections at the property line shall be surcharge free and be above the 100-year hydraulic grade line of the municipal storm sewer system.
- ❑ Foundation Drain Collector (FDC) sewers are permitted to connect by gravity to the storm sewer system provided that the elevation of the basement floor is at least 1.0 metres above the elevation of the storm sewer obvert at that point. Where provisions for gravity connection of foundation drains cannot be met, a sump pump system must be installed in the building and discharge to a location, which is satisfactory to the Town's Director of Public Works and Engineering.

Water quality, erosion and quantity control for the subject lands will be provided within SWM Pond 4 located at the south end of the subject property on the north side of Mayfield Road. The following summarizes general design criteria for the design of the SWM facility:

- ❑ The stormwater management facility should be designed as an off-line wet pond with permanent storage for water quality control in accordance with the “enhanced” protection level for the receiving watercourse as defined in the March 2003 MOE guidelines.
- ❑ In accordance with the May 2018 FSR recommendations, all SWM facilities within the Fletcher’s Creek Subwatershed shall incorporate extended detention storage for erosion control based on 250 m³ per hectare of contributing impervious area. The release rate for the ponds should be established based on 0.25 L/s per hectare of contributing drainage area.
- ❑ In accordance with the May 2018 FSR recommendations, the SWM facility should provide water quantity control for the 25-Year, 100-Year and Regional Storm events based on the following storage and release rate requirements:

<u>Return Storm</u>	<u>Storage (m³/imp ha)</u>	<u>Discharge (L/s/ha)</u>
25-Year	575	8
100-Year	1,215	80
Regional	1,225	90

- ❑ The SWM facility design should include a sediment forebay, stone outlet channel, emergency overflow spillway and a 5.0 m wide maintenance access route from a municipal road with maximum slope 12:1 and a crossfall of 2%.
- ❑ The SWM facility should be graded as follows:
 - a 7H:1V slope centered on the normal water level for 3.5m on either side;
 - internal side slopes of 4H:1V will be provided in all other locations including transition grading above the high-water level;
 - use of armour stone retaining wall is to be considered above the high-water level, if required; and
 - all other Town criteria for maximum side slopes (3H:1V) shall be used on the outer side of the pond block where necessary.

3.0 STORMWATER MANAGEMENT PLAN

The post-development storm drainage boundaries and layout of the proposed storm drainage system discharging to SWM Pond 4 are illustrated in [Figure 3](#).

SWM Pond 4's tributary drainage area is 9.25 Ha with an overall impervious level of 66%. The drainage area and imperviousness are in general compliance with the May 2018 FSR and represent negligible differences from the FSR values of 9.1 Ha and 65%, respectively.

Post-development storm drainage will be managed using a combination of minor (storm sewers) and major (overland) systems. Stormwater flows collected by the minor system will be conveyed by storm sewers sized to accommodate 10-year peak flows (minimum capacity) from the development as calculated using the Rational Method and Town of Caledon design criteria. Flows exceeding the capacity of the minor system up to and including the 100-year or Regional storm, whichever is larger, will be conveyed overland along proposed road allowances, generally following the direction of the minor system.

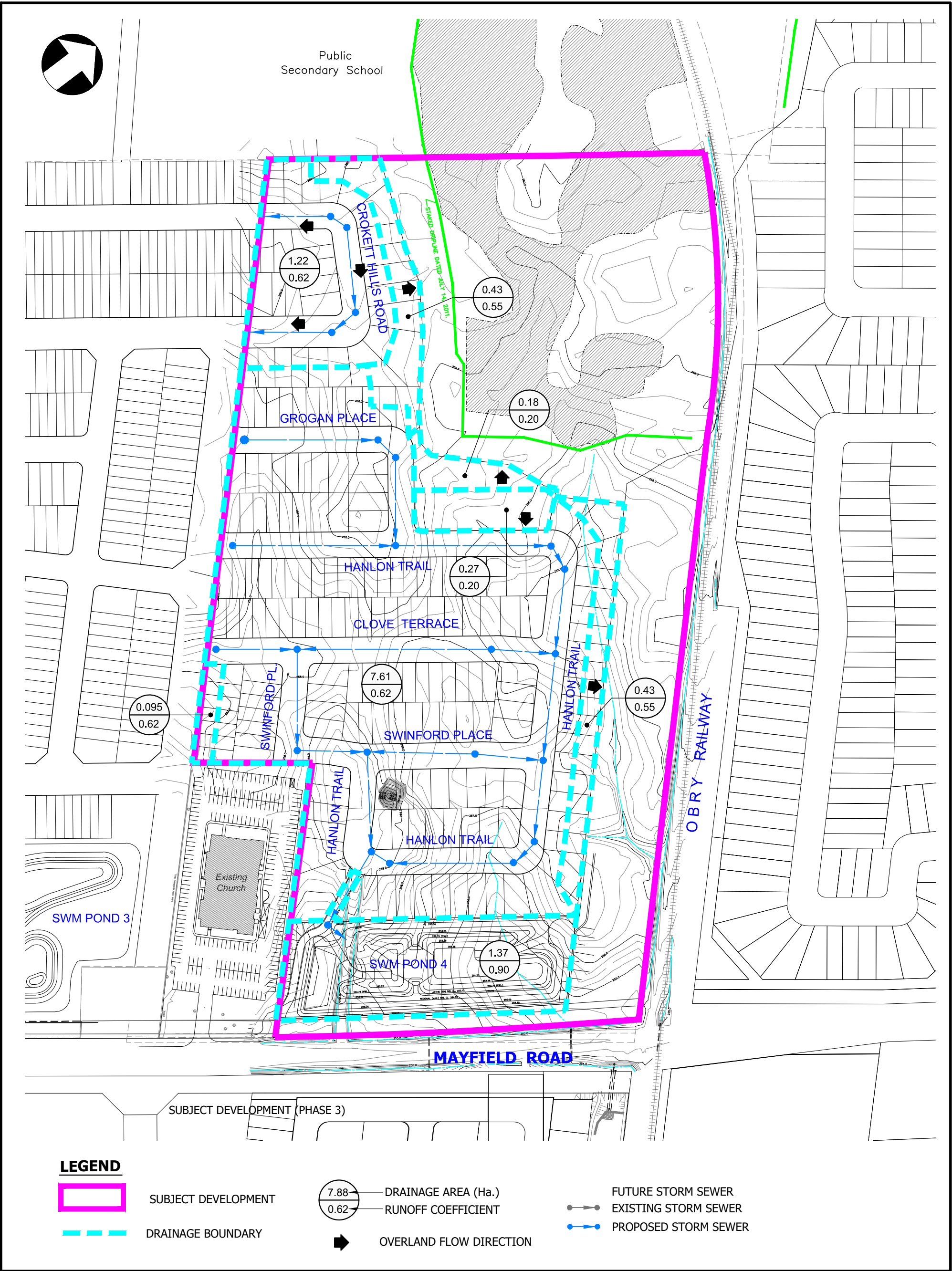
3.1 SWM Pond 4

As shown in [Figure 3](#) and outlined in [Table A.1](#) in Appendix A, SWM Pond 4 will provide drainage control for 9.25 Ha of drainage area with an average impervious level of 66%, comprised of the following lands:

- ❑ Internal residential and roads to storm drainage system (7.61 Ha)
- ❑ Park (portion draining to internal) (0.27 Ha)
- ❑ Internal SWM Facility Block (1.37 Ha)

The balance of the property (9.02 Ha) will consist of the following:

- ❑ Internal residential and roads (2.08 Ha including 1.22 Ha to Pond 3 and 0.86 ha rear lot area)
- ❑ Woodlot (4.57 Ha)
- ❑ Greenlands (1.90 Ha)
- ❑ Park (portion draining to Woodlot) (0.18 Ha)
- ❑ Mayfield Road Widening (0.28 ha)



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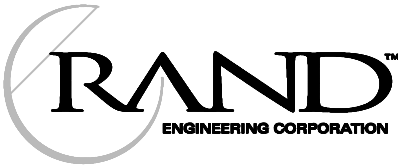
TOWN OF CALEDON

PROJECT No. 13952

FIGURE No. 3

SCALE 1:2,500

STORM DRAINAGE PLAN



Stormwater Management targets and sizing criteria for MW2 lands were established in the approved “*Mayfield West Comprehensive Environmental Impact Study (EIS) and Management Plan*” (AMEC, December 2014) and confirmed in the Urbantech FSR. The EIS and FSR work utilized a continuous hydrological model for existing and proposed conditions to establish the unit storage and flow rates. These targets are required to maintain existing peak flows for the 2-Year to 100-Year and Regional storm events and maintain existing erosion flow exceedances. Note that the EIS and FSR only provide quantity storage and release rate targets for the 25-Year, 100-Year and Regional design storms.

Accordingly, this report does not provide any hydrological modelling for erosion & return period design storms. Storage and discharge targets and compliance are demonstrated per the hydraulic and hydrologic calculations included in Appendix B per the following:

- ❑ Table B.1: Stormwater Management Facility Storage Requirements
- ❑ Table B.2: Outlet Structure Hydraulics
- ❑ Table B.3: Stage-Storage-Discharge Curve
- ❑ Table B.4: Pond Performance
- ❑ Table B.5: SWM Facility Overall Length-to-Width Ratio
- ❑ Table B.6: Sediment Forebay Sizing Calculations
- ❑ Table B.7: Sediment Accumulation and Cleanout Frequency
- ❑ Table B.8: Volumetric Turnover Analysis

3.1.1 Water Quality and Erosion Control

SWM Pond 4 is designed as an off-line wet pond with permanent storage for water quality control in accordance with the “enhanced” protection level for the receiving watercourse as defined in the 2003 MOE “*Stormwater Management Practices Planning and Design Manual*”. Based on these guidelines, 1,620 m³ of permanent storage is required. The design volume provided within the facility is 3,640 m³ at the permanent water level of 253.10 m.

In accordance with the May 2018 FSR recommendations, the required minimum extended detention volume of 1,520 m³ and a maximum discharge rate of 0.002 m³/s for erosion control is

based on the contributing drainage area. The extended detention storage volume provided within the pond is 1,520 m³, which is controlled to a maximum 0.011 m³/s release rate at a water level of 253.40 m (a depth of 0.30 m). This flow is greater than the target discharge rate due to the minimum allowable orifice sizing criteria outlined in the Town of Caledon Development Standards, Policies and Guidelines (2009) and the MOE Manual (2003). The preferred minimum orifice diameter of 100mm is recommended and is included in the proposed design. The extended detention storage will be released through the extended detention orifice installed at the permanent pool elevation of 253.10 m.

The water quality control outlet will be a bottom-draw system consisting of a 2% reverse-grade PVC outlet pipe connected to a 1500 mm diameter manhole. An orifice will be installed vertically within the manhole at the permanent water elevation, allowing the extended detention volume to drain over a period of 68 hours. The 1500 mm manhole will be connected to a manhole downstream of the quantity control (outlet) structure common to both the quality and quantity control discharge streams. Treated flows will be conveyed from the common manhole via a proposed storm sewer and concrete headwall to the future NHS channel.

3.1.2 Water Quantity Control

In accordance with the May 2018 FSR recommendations, SWM Pond 4 will provide water quantity control of post-development flows to prescribed target release rates for the 2-Year through 100-Year and Regional design storm events. The quantity control drainage area is 9.25 Ha with an imperviousness of 66%.

Flows for storm events up to and including the Regional Storm event will be controlled to target rates by a stepped weir opening installed within a 2400 mm x 2400 mm concrete box manhole, i.e. the Quantity Control Structure (QCS). The lower portion of the weir opening has an invert elevation set at the extended detention water level of 253.40 m. It has a width of 0.16 m and a height of 0.40 m. This portion of the weir opening will provide control to the target release rates, for storm events up to and including the 25-year return period. The upper portion of the weir opening has an invert elevation of 253.80 m. It has a width of 1.00 m and a height of 1.20 m extending up to the QCS top elevation of 255.00 m. This portion of the weir opening will provide control, to the target release rates, for the 50-year, 100-year and Regional Storm events. The Regional Storm design targets for quantity control storage volume (min) and release rate (max)

are 7,470 m³ and 0.832 m³/s, respectively. The proposed design is compliant with these targets as it provides for a storage volume of 7,680 m³ at a water surface level of 254.30 m and a peak release rate of 0.823 m³/s. The total quantity control storage volume is 9,310 m³ at the Emergency Overflow Spillway (EOS) invert elevation of 254.50 m. The total storage volume including the permanent pool and quantity control volume, provided up to the EOS invert level, is 13,290 m³.

The required minimum Length-to-Width ratios for the forebay and entire pond are 2:1 and 3:1, respectively, whereby the provided ratios are in compliance at 2:1 and 4.4:1, respectively.

3.1.3 Routing Flow via Emergency Spillway

For instances of temporary blockage of the quantity control outlet, flow will be conveyed by the 10 m wide emergency overflow spillway (EOS) weir located along the east side of the facility adjacent to the Greenway Corridor, at an invert elevation of 254.50 m.

The available discharge over the EOS, at a water level of 254.70 m, is 3.17 m³/s, with the EOS contributing 1.39 m³/s and operating at 0.20 m flow depth. As the top-of-pond elevation is 255.00 m, this routing of flow would be provided with a 0.30 m freeboard.

3.1.4 Summary of Pond Design Parameters and Performance Compliance

A summary of SWM Pond 4's design parameters and performance compliance is outlined in the following table.

SUMMARY of SWM POND 4 DESIGN & COMPLIANCE		
DESIGN TARGET/PARAMETER	REQUIRED	PROVIDED
Drainage Area	-	9.25 Ha
Imperviousness	-	66 %
Forebay Length	16 m (min)	52 m
Forebay Length-to-Width Ratio	2 : 1 (min)	2 : 1
Entire Pond Length-to-Width Ratio	3 : 1 (min)	4.4 : 1
Length of Berm separating Forebay & Main-bay	-	19.5 m
Permanent Storage Rating (min.)	215 m ³ /ha	-
Permanent Storage Volume	1,595 m ³ (min)	3,640 m ³
Permanent Water Level Elevation	-	253.10 m
Extended Detention Storage Rating (min.)	250 m ³ /Imp Ha	-
Extended Detention Storage Volume	1,520 m ³	1,520 m ³
Extended Detention Drawdown Time	48 hrs	68 hrs
Extended Detention Water Level Elevation	-	253.40 m
Governing Design Storm for Quantity Detention & Target Release	Regional	Regional
Quantity Detention Storage Volume for Regional Storm	7,470 m ³ (min)	7,680 m ³
Regional Storm Target "Peak" Release Rate	0.832 m ³ /s (max)	0.823 m ³ /s
Regional Storm Quantity Detention Storage Water Level Elevation	-	254.30 m
Emergency Overflow Spillway (EOS) Invert	-	254.50 m
Quantity Detention Storage at EOS Invert	-	9,310 m ³
Total Storage at EOS Invert (Permanent & Active)	-	13,290 m ³
Total Storage Depth at EOS Invert (Active only)	2.0 m (max)	1.4 m
Total Storage Depth at EOS Invert (Permanent & Active)	5.0 m (max)	3.9 m
Minimum Top-of-Pond Elevation	-	255.00 m
Minimum Freeboard Depth	0.30 m	0.50 m

3.1.5 Sediment Forebay & Sediment Accumulation

The sediment forebay is designed with a maximum depth of 1.5 m and minimum length-to-width ratio of 2:1. The forebay is separated from the main pond by a submerged berm, which is situated at an invert elevation of 252.80 m (0.30 m below the permanent water level). Refer to Table B.6, per Appendix B for calculations related to forebay sizing compliance.

The forebay has a volume of approximately 660 m³ below the forebay berm invert. The expected volume of sediment loading is approximately 19.1 m³/yr based upon a contributing drainage area of 9.25 Ha and an average level of imperviousness of 66 %. Based on a removal frequency of 10 years, sediment should be removed from the facility when it reaches a deposition elevation of approximately 252.15 m (a depth of 0.55 m in the forebay). These calculations are outlined in Table B.7, per Appendix B.

A 300 mm diameter PVC maintenance pipe with a control valve will allow for drainage of the permanent pool for maintenance activities.

To prevent sub-surface migration of water out of the facility, the bottom and side walls of the pond will be lined with clayey fill materials in accordance with recommendations from the geotechnical consultant.

3.2 Erosion and Sediment Control

Erosion and sediment control measures to be implemented during and following construction are outlined below. These measures comply with the December 2006 “*Erosion and Sediment Control Guideline for Urban Construction*” and recommendations by the CVC and Town of Caledon engineering staff. The proposed erosion and sediment control works during construction consist of the following:

- ❑ temporary silt fences,
- ❑ temporary snow fences,
- ❑ sediment traps for the catchbasins and manholes,
- ❑ mud mats at the construction access,

- temporary siltation facility, which will be sized to accommodate the required water quality control storage of 125 m³/ha (185 m³/ha if drawdown time < 48 hours or L:W ratio < 4:1) and additional extended detention storage of 125 m³/ha. The facility will detain runoff for an average 48-hour period.

4.0 CONCLUSIONS

Based on the findings of this report, it is concluded that:

1. The Stormwater Management Plan for the 18.3 Ha Lormel Joint Venture development is designed in accordance with the objectives and requirements established in the May 2018 “*Functional Servicing Report, Mayfield West Phase 2*” prepared by Urbantech Consulting.
2. Stormwater quality, erosion and quantity control for the development will be provided within SWM Pond 4, which has a total drainage area of 9.25 Ha and discharges to a tributary of the east branch of Fletcher’s Creek.

This report is being submitted to the Town of Caledon and Credit Valley Conservation for review of the Draft Plan Application for the Lormel property.

Respectfully Submitted,
RAND Engineering Corporation



Brad Kargus, B.Sc.(Eng.)



Piotr Szponar, P. Eng.

APPENDIX A – SITE STATISTICS & STORM DRAINAGE

Table A.1:

Site Statistics for Development Plan & Discretization of Receiving Drainage System

TABLE A.1
SITE STATISTICS for DEVELOPMENT PLAN
& DISCRETIZATION of RECEIVING DRAINAGE SYSTEM

PROJECT NAME:

Lormel Joint Venture

Date: March 2019

LAND USE	TOTAL AREA (Ha)	DISCRETIZATION of TRIBUTARY AREA according to RECEIVING DRAINAGE SYSTEM	
		SWM FACILITY POND 4 (Ha)	OTHER (Ha)
RESIDENTIAL (DETACHED DWELLINGS) + INTERNAL ROADS	9.687	7.606	2.081 <i>(incl. est. 1.22 ha to Pond 3)</i>
BLOCK 202 WOODLOT	4.574		4.574
SWM FACILITY (POND 4)	1.371	1.371	
PARK	0.449	0.269	0.180
GREENLANDS	1.902		1.902
OPEN SPACE	0.000		0.000
6 m SWALE	0.000		0.000
ROAD WIDENING	0.282		0.282
GRAND TOTAL	18.265	9.246	9.019

APPENDIX B – SWM POND 4

Table B.1: Stormwater Management Facility Storage Requirements

Table B.2: Outlet Structure Hydraulics

Table B.3: Stage-Storage-Discharge Curve

Table B.4: Pond Performance

Table B.5: SWM Facility Overall Length-to-Width Ratio

Table B.6: Sediment Forebay Sizing Calculations

Table B.7: Sediment Accumulation and Cleanout Frequency

Table B.8: Volumetric Turnover Analysis

TABLE B.1: STORMWATER MANAGEMENT FACILITY STORAGE REQUIREMENTS

LORMEL JOINT VENTURE INC. (MAYFIELD WEST PHASE 2) - SWM POND 4

Table 3.2 Water Quality Storage Requirements based on Receiving Waters *

Protection Level	SWMP Type	Storage Volume (m ³ /ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced	Infiltration	25	30	35	40
80% long-term S.S. removal	Wetlands	80	105	120	140
	Hybrid Wet Pond / Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal	Infiltration	20	20	25	30
70% long-term S.S. removal	Wetlands	60	70	80	90
	Hybrid Wet Pond / Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic	Infiltration	20	20	20	20
60% long-term S.S. removal	Wetlands	60	60	60	60
	Hybrid Wet Pond / Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

* reproduced from SWM Planning and Design Manual, Ministry of the Environment, March 2003.

The volumetric water quality criteria are presented in Table 3.2. The values are based on a 24-hour drawdown time and a design which conforms to the guidance provided in this manual. Requirements differ with SWMP type to reflect differences in removal efficiencies. Of the specified storage volume for wet facilities, 40 m³/ha is extended detention, while the remainder represents the permanent pool.

CATCHMENT DATA

	<u>Area</u>	<u>Runoff "C"</u>	<u>Imp¹</u>	<u>Area x Imp</u>
Lot+ROW Drainage to SWM Pond 3 (Estimated)	1.217	0.62	60.0%	0.730
Lot + ROW + Park Drainage to SWM Pond 4	7.875	0.62	60.0%	4.725
Rear Lot Drainage to Woodlot and Channel	0.864	0.55	50.0%	0.432
Park Drainage to Woodlot	0.180	0.20		
Woodlot Block 197	4.574	0.25	7.1%	0.327
Greenlands / Channel Block 200	1.902	0.25	7.1%	0.136
Mayfield Road Widening	0.282	0.90	100.0%	0.282
SWM Pond drainage	1.371	0.90	100.0%	1.371
Total:	18.265	0.51	43.8%	8.00
Drainage Area to SWM Pond 4, including SWM Block:	9.246	0.66	65.9%	6.10
Drainage Area NOT to Pond:	9.019	0.35	21.1%	1.91

Note ¹: $IMP (\%) = 100 \times (C - 0.2) / 0.7$

Protection Level:	Enhanced
SWMP Type:	Wet Pond
Impervious Level (to Pond):	65.9%
Contributing Area (Total):	9.25 ha.

PERMANENT STORAGE

Total storage requirement from Table 3.2	216 m ³ /ha
- Active storage requirement	40 m ³ /ha
Permanent storage requirement	176 m ³ /ha
x Contributing Area	9.25 ha
Permanent Storage Volume	1,623 m³

TABLE B.2: OUTLET STRUCTURE HYDRAULICS

LORMEL JOINT VENTURE INC. (MAYFIELD WEST PHASE 2) - SWM POND 4

QUALITY CONTROL OUTLET - ORIFICE

Orifice Equation

$$Q_o = C_o A_o (2gh_o)^{1/2}$$

where Q_o = orifice discharge (m^3/s)

C_o = flow coefficient

A = cross-sectional area of orifice (m^2)
[calculated from orifice diameter, d_o (mm)]

g = acceleration due to gravity (m/s^2)

h_o = head above orifice (m)

also, z_o = elevation of orifice (m)

Q_o , h_o = (see Stage-Storage-Discharge curve)

C_o = 0.63

d_o = 100 mm

A_o = 0.008 m^2

g = 9.81 m/s^2

z_o = 253.10 m

QUANTITY CONTROL OUTLET #1 - WEIR, LOW LEVEL

Weir Equation

$$Q_w = C_w L_w h_w^{1.5}$$

where Q_w = weir discharge (m^3/s)

C_w = flow coefficient

L_w = weir length (m)

h_w = head above weir (m)

also, z_w = elevation of weir (m)

Q_w , h_w = (see Stage-Storage-Discharge curve)

C_w = 1.84

L_w = 0.160 m

z_w = 253.40 m

z_{TOP} = 253.80 m

A_o = 0.051 m^2

g = 9.81 m/s^2

QUANTITY CONTROL OUTLET #2 - WEIR, HIGH LEVEL

Weir Equation

$$Q_w = C_w L_w h_w^{1.5}$$

where Q_w = weir discharge (m^3/s)

C_w = flow coefficient

L_w = weir length (m)

h_w = head above weir (m)

also, z_w = elevation of weir (m)

Q_w , h_w = (see Stage-Storage-Discharge curve)

C_w = 1.84

L_w = 1.000 m

z_w = 253.80 m

z_{TOP} = 255.00 m

OVERFLOW SPILLWAY

Weir Equation

$$Q_w = C_w L_w h_w^{1.5}$$

where Q_w = weir discharge (m^3/s)

C_w = flow coefficient

L_w = weir length (m)

h_w = head above weir (m)

also, z_w = elevation of weir (m)

Q_w , h_w = (see Stage-Storage-Discharge curve)

C_w = 1.55

L_w = 10.0 m

z_w = 254.5 m

TABLE B.3: STAGE-STORAGE-DISCHARGE CURVE

LORMEL JOINT VENTURE INC. (MAYFIELD WEST PHASE 2) - SWM POND 4

Level	Elevation	Surface Area			Permanent Storage			Active Storage			Quality Control Head	Quality Control Flow	Quantity Control Outlet #1			Quantity Control Outlet #2			Overflow Spillway Head	Overflow Spillway Flow	Total Flow	Time to Empty
		Forebay	Main Cell	Total	Forebay	Main Cell	Total	Forebay	Main Cell	Total			Low Level			High Level						
													Head		Flow	Head		Flow				
	(m)	(m ²)	(m ²)	(m ²)	(m ³)	(m ³)	(m ³)	(m ³)	(m ³)	(m ³)	(m)	(m ³ /s)	(m)		Flow (m ³ /s)	(m)		Flow (m ³ /s)	(m)	(m ³ /s)	(m ³ /s)	(hrs)
	250.60		97	97																		
	250.70		121	121		11	11															
	250.80		144	144		24	24															
	250.90		168	168		40	40															
	251.00		191	191		58	58															
	251.10		215	215		78	78															
	251.20		238	238		100	100															
	251.30		262	262		125	125															
	251.40		285	285		153	153															
	251.50		309	309		182	182															
	251.60	186	332	518	19	214	224															
	251.70	243	813	1,057	40	272	303															
	251.80	301	913	1,214	67	358	416															
	251.90	358	1,013	1,371	100	454	545															
	252.00	416	1,112	1,528	139	561	690															
	252.10	473	1,212	1,685	183	677	851															
	252.20	530	1,312	1,842	234	803	1,027															
	252.30	588	1,412	2,000	289	939	1,219															
	252.40	645	1,511	2,157	351	1,085	1,427															
	252.50	703	1,611	2,314	418	1,241	1,651															
	252.60	760	1,711	2,471	492	1,408	1,890															
	252.70	930	1,951	2,881	576	1,591	2,158															
	252.80	1,100	2,191	3,292	678	1,798	2,466															
	252.90	1,271	2,432	3,702	796	2,029	2,816															
	253.00	1,441	2,672	4,113	932	2,284	3,207															
PWL	253.10	1,611	2,912	4,523	1,084	2,563	3,638															
	253.20	1,737	3,143	4,880	1,252	2,866	4,109	167	303	470	0.05	0.00									0.005	37.70
	253.30	1,862	3,374	5,236	1,432	3,192	4,614	347	629	976	0.15	0.01									0.008	54.50
EXT DET	253.40	1,988	3,605	5,593	1,624	3,541	5,156	540	978	1,517	0.25	0.01									0.011	68.30
2 Year	253.48	2,088	3,790	5,878	1,787	3,837	5,615	703	1,273	1,976	0.33	0.01	0.08	WEIR	0.01						0.019	74.54
	253.50	2,113	3,836	5,949	1,829	3,913	5,733	745	1,350	2,094	0.35	0.01	0.10	WEIR	0.01						0.022	77.95
5 Year	253.58	2,214	4,021	6,235	2,002	4,227	6,220	918	1,664	2,582	0.43	0.01	0.18	WEIR	0.02						0.037	82.53
	253.60	2,239	4,067	6,306	2,047	4,308	6,346	962	1,745	2,707	0.45	0.01	0.20	WEIR	0.03						0.041	83.33
10 Year	253.65	2,302	4,119	6,420	2,160	4,513	6,664	1,076	1,949	3,025	0.50	0.02	0.25	WEIR	0.04						0.052	84.88
	253.70	2,364	4,170	6,535				1,193	2,157	3,349	0.55	0.02	0.30	WEIR	0.05						0.065	86.70
25 Year	253.73	2,402	4,201	6,603				1,264	2,282	3,546	0.58	0.02	0.33	WEIR	0.06						0.072	87.50
	253.80	2,490	4,273	6,763				1,435	2,579	4,014	0.65	0.02	0.40	WEIR	0.07						0.092	89.08
	253.90	2,615	4,377	6,992				1,691	3,011	4,702	0.75	0.02	0.50	ORIFICE	0.10	0.1	WEIR	0.06			0.175	90.51
	254.00	2,740	4,480	7,220				1,958	3,454	5,412	0.85	0.02	0.60	ORIFICE	0.11	0.2	WEIR	0.16			0.298	91.34
50 Year	254.06	2,815	4,542	7,357				2,125	3,725	5,850	0.91	0.02	0.66	ORIFICE	0.12	0.3	WEIR	0.24			0.386	91.70
	254.10	2,865	4,583	7,449				2,239	3,907	6,146	0.95	0.02	0.70	ORIFICE	0.13	0.3	WEIR	0.30			0.450	91.90
	254.20	2,991	4,686	7,677				2,531	4,371	6,902	1.05	0.02	0.80	ORIFICE	0.14	0.4	WEIR	0.47			0.626	92.29
100 Year	254.26	3,065	4,747	7,812				2,710	4,649	7,359	1.11	0.02	0.86	ORIFICE	0.14	0.5	WEIR	0.57			0.740	92.47
Regional	254.30	3,116	4,790	7,906				2,837	4,845	7,681	1.15	0.02	0.90	ORIFICE	0.15	0.5	WEIR	0.65			0.823	92.59
	254.40	3,241	4,893	8,134				3,155	5,329	8,483	1.25	0.02	1.00	ORIFICE	0.16	0.6	WEIR	0.86			1.039	92.83
	254.50	3,367	4,996	8,363				3,485	5,823	9,308	1.35	0.03	1.10	ORIFICE	0.17	0.7	WEIR	1.08			1.272	93.02
	254.60	3,492	5,099	8,591				3,828	6,328	10,156	1.45	0.03	1.20	ORIFICE	0.18	0.8	WEIR	1.32	0.1	0.49	2.012	93.17
	254.70	3,617	5,202	8,820				4,183	6,843	11,026	1.55	0.03	1.30	ORIFICE	0.19	0.9	WEIR	1.57	0.2	1.39	3.172	93.26
	254.80	3,742	5,306	9,048				4,551	7,368	11,920	1.65	0.03	1.40	ORIFICE	0.20	1.0	WEIR	1.84	0.3	2.55	4.611	93.33
	254.90	3,868	5,409	9,277				4,932	7,904	12,836	1.75	0.029	1.500	ORIFICE	0.204	1.1	WEIR	2.12	0.4	3.92	6.277	93.37
	255.00	3,993	5,512	9,505				5,325	8,450	13,775	1.85	0.030	1.600	ORIFICE	0.211	1.2	WEIR	2.42	0.5	5.48	8.140	93.41

PERMANENT STORAGE: QUALITY CONTROL

Permanent storage requirement:	1,623	m ³
Permanent storage provided:	3,638	m ³
Forebay Bottom Elevation:	250.60	m
Main Cell Bottom Elevation:	251.60	m
Permanent Water Level:	253.10	m
Maximum Depth:	2.5	m

EXTENDED DETENTION STORAGE: EROSION & QUALITY CONTROL

Extended detention required	1,524	m ³
Extended detention provided	1,517	m ³
Extended detention level	253.40	m
Extended detention depth	0.30	m

TABLE B.4: POND PERFORMANCE

LORMEL JOINT VENTURE INC. (MAYFIELD WEST PHASE 2) - SWM POND 4

	Quality Control	Quantity Control
Drainage Area to Pond (ha):	9.25	9.25
Impervious Level (%)	65.9%	65.9%
Impervious Area (ha)	6.10	6.10

Storm Event	TARGET STORAGE / RELEASE RATES				DESIGN STORAGE / RELEASE RATES			
	Unit Storage *	Unit Discharge *	Storage	Discharge	Post-Development Peak Inflow (ESTIMATED)**	Post-Development Peak Outflow	Max. Storage	Elevation
	(m ³ /Imp ha)	(L/s/ha)	(m ³)	(m ³ /s)	(m ³ /s)	(m ³ /s)	(m ³)	(m)
Erosion / ED Quality Control								
Erosion	250	0.25	1,524	0.002	-	0.011	1,517	253.40
24 HR								
2 Year **	-	-	1,984	0.020	0.807	0.019	1,976	253.48
5 Year **	-	-	2,472	0.038	1.071	0.037	2,582	253.58
10 Year **	-	-	2,959	0.055	1.312	0.052	3,025	253.65
25 Year	575	8	3,505	0.074	1.561	0.072	3,546	253.73
50 Year **	-	-	5,363	0.400	1.764	0.386	5,850	254.06
100 Year	1215	80	7,407	0.740	1.977	0.740	7,359	254.26
Regional								
	1225	90	7,468	0.832	1.303	0.823	7,681	254.30

TABLE B.5: SWM FACILITY OVERALL LENGTH TO WIDTH RATIO

LORMEL JOINT VENTURE INC. (MAYFIELD WEST PHASE 2) - SWM POND 4

Length to width ratio has been determined as follows:

Length: The length from the inlet to the outlet, at the permanent pool elevation.

Width: The average width obtained from dividing the pond area at the permanent water level by the flow length

Area: Pond surface area at the permanent water level. Equal to area at PWL on Stage-Storage-Discharge (SSD) curve sheet

$$\text{Width} = \text{Area} / \text{Length}$$

$$= \frac{4,523 \text{ m}^2}{141 \text{ m}}$$

$$= 32 \text{ m}$$

$$\text{Length to Width} = \frac{141 \text{ m}}{32 \text{ m}}$$

$$\text{Length to Width} = 4.4 : 1$$

TABLE B.6: SEDIMENT FOREBAY SIZING CALCULATIONS
LORMEL JOINT VENTURE INC. (MAYFIELD WEST PHASE 2) - SWM POND 4

Design Parameters:

Length to width ratio of forebay:	r	2 :1
Target particle size :		150 μm
Settling velocity:	V_s	0.0003 m/s
Depth of forebay:	d	1.50 m
Desired velocity in forebay:	V_f	0.5 m/s
Peak inflow for 10-year storm (Estimated):	Q	1.312 m^3/s
Peak outflow at extended detention level:	Q_p	0.011 m^3/s

Forebay Settling Length, Dist_1 :

$$\text{Dist}_1 = ((r * Q_p) / V_s)^{0.5} = 9 \text{ m}$$

Forebay Dispersion Length, Dist_2 :

$$\text{Dist}_2 = (8 * Q) / (d * V_f) = 14 \text{ m}$$

[The larger of the two calculated lengths prevails as the design length.]

Forebay Length (minimum length required):	14 m.
Forebay Length (provided), $F_{L,PROV}$:	52 m.

* approx. distance from storm inlet to middle of forebay berm

Velocity Check:

Velocity in the sediment forebay during 10-year storm event is not to exceed 0.15 m/s.

Peak inflow for 10-year storm:	$Q_{IN,10-YR}$	1.312 m^3/s
Forebay storage volume at ext. det. water level:	$V_{FOR,10-YR STM}$	2,142 m^3
Average Sediment Forebay Cross-Section Area:	$V_{FOR,10-YR STM} / F_{L,PROV}$	41.19 m^2

Velocity in Forebay [$Q_{IN,10-YR} / A_{X-SECT}$]	0.03 m/s	< 0.15 m/s
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TABLE B.7: SEDIMENT ACCUMULATION AND CLEANOUT FREQUENCY

LORMEL JOINT VENTURE INC. (MAYFIELD WEST PHASE 2) - SWM POND 4

* Table 6.3 reproduced from SWMP Planning and Design Manual, MOEE, 2003.

Catchment Imperviousness	Annual Loading (kg/ha)	Wet Density (kg/m ³)	Annual Loading (m ³ /ha)
35%	770	1,230	0.6
55%	2,300	1,230	1.9
70%	3,495	1,230	2.8
85%	4,680	1,230	3.8

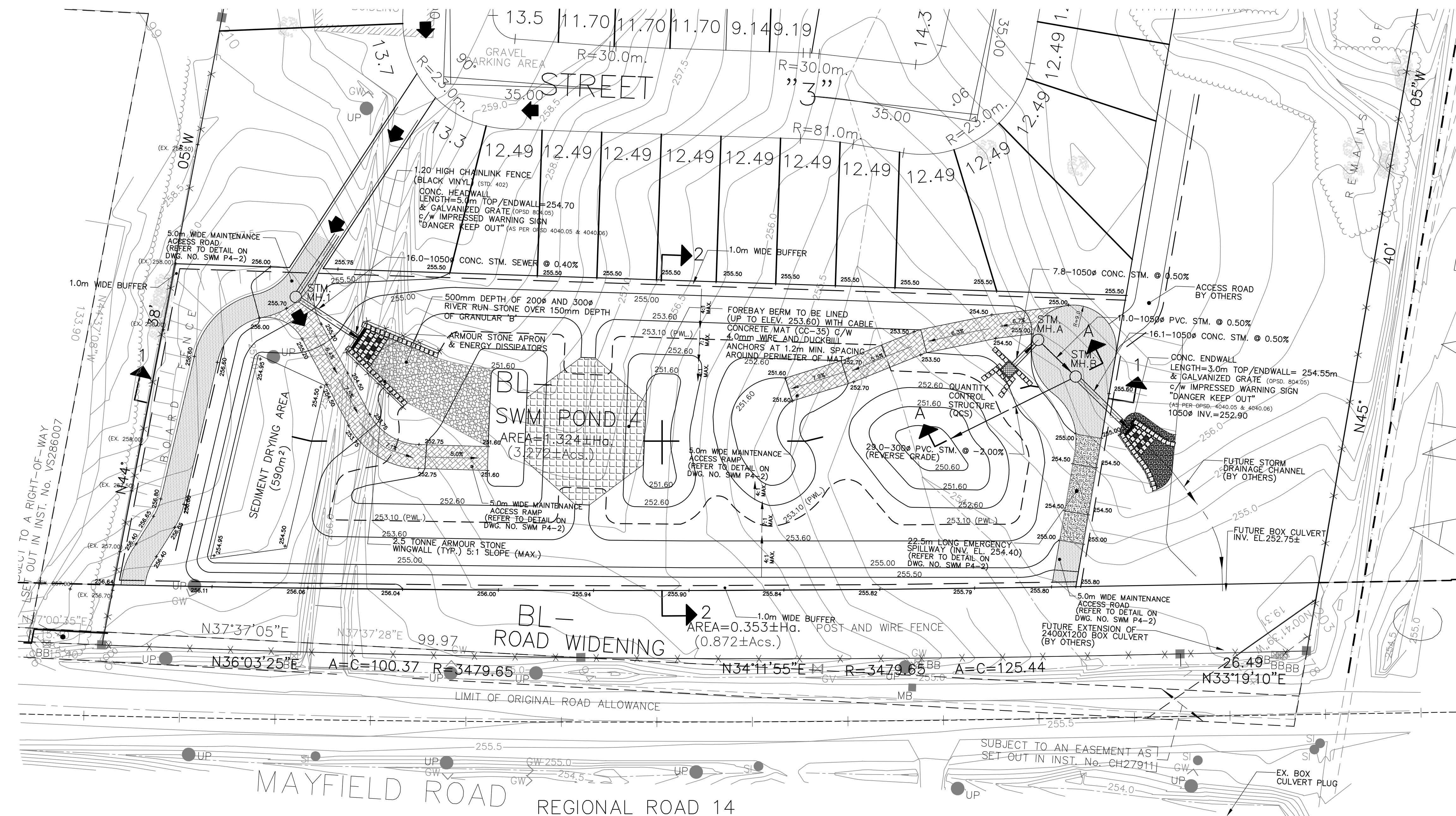
Catchment Imperviousness: 65.9%
 Sediment Loading: 2.6 m³/ha/a
 Catchment Area: 9.25 ha
 Sediment Removal Rate: 80%

 Annual Sediment Loading: 19.1 m³/a
 Removal Frequency: 10 years

 Projected sediment accumulation: 191 m³
 Projected sediment depth: 0.55 m

FOREBAY STAGE-STORAGE CURVE

	Elevation (m)	Area (m ²)	Storage (m ³)
	251.60	186	
	251.70	243	21
	251.80	301	49
	251.90	358	82
	252.00	416	120
	252.10	473	165
	252.15	503	191
	252.20	530	215
	252.30	588	271
	252.40	645	332
	252.50	703	400
	252.60	760	473
	252.70	930	558
Forebay Berm Invert	252.80	1,100	659
	252.90	1,271	778
	253.00	1,441	913
Permanent Pool Water Level	253.10	1,611	1,066
	253.20	1,737	1,233
	253.30	1,862	1,413
Extended Detention Water Level	253.40	1,988	1,606
	253.50	2,113	1,811
	253.60	2,239	2,028
10-Year Storm Water Level	253.65	2,302	2,142



(ROAD ALLOWANCE BETWEEN LOTS 17 AND 18, CONCESSION 1, WEST OF HURONTARIO STREET)
(NAMED BY BY-LAW 81-98 (UNREGISTERED))
(DESIGNATED A REGIONAL ROAD BY BY-LAW 179-83 (UNREGISTERED))
P . I . N . 1 4 2 5 2 - 0 1 2 5

- LEGEND**
- 200.00 PROPOSED ELEVATION
 - 200.00 EXISTING ELEVATION
 - 238 EXISTING CONTOUR
 - 192.50 PROPOSED CONTOUR
 - [200.00] FUTURE ELEVATION (BY OTHERS)
 - 1/8" 260.88 TOP OF BERM ELEVATION
 - > DENOTES DRAINAGE DIRECTION
 - DENOTES REGIONAL FLOODLINE
 - EXISTING MANHOLE
 - SANITARY MANHOLE
 - STORM MANHOLE
 - SINGLE CATCHBASIN
 - DOUBLE CATCHBASIN
 - +— HYDRANT & VALVE
 - VALVE & BOX
 - ➔ MAJOR OVERLAND FLOW DIRECTION
 - ➔ FUTURE MAJOR OVERLAND FLOW DIRECTION
 - ➔ EXISTING MAJOR OVERLAND FLOW DIRECTION
 - ▨ EMERGENCY SPILLWAY FOR OVERLAND FLOW

CONSTRUCTION NORTH

KEY PLAN N.T.S.

REFER TO DWG. NO. SWM P4-2 FOR SECTIONS '1-1', '2-2', 'A-A' & 'B-B'

No.	By	Date	Revision	Cone. Checked

APPROVED FOR CONSTRUCTION
THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY
THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO
DATE: _____ APPROVED BY: _____

Originally Approved By The Region of Peel

REGISTERED PROFESSIONAL ENGINEER
V. CAVALLO
PROVINCE OF ONTARIO

RAND ENGINEERING

5285 Solar Drive
Mississauga, ON
Canada, L4W 5B8
Tel: 905.625.9500

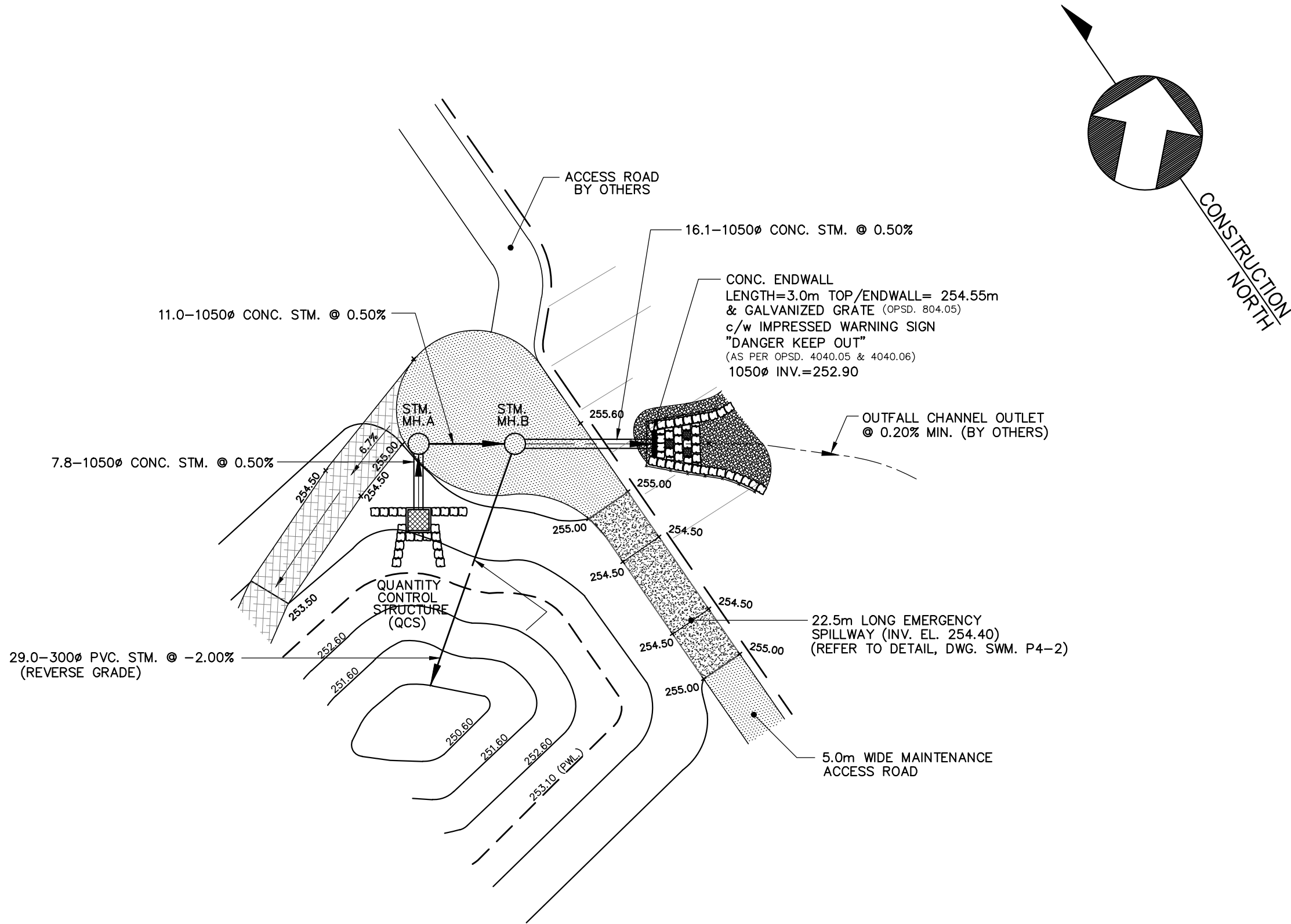
Region of Peel
Public Works

TOWN OF CALEDON

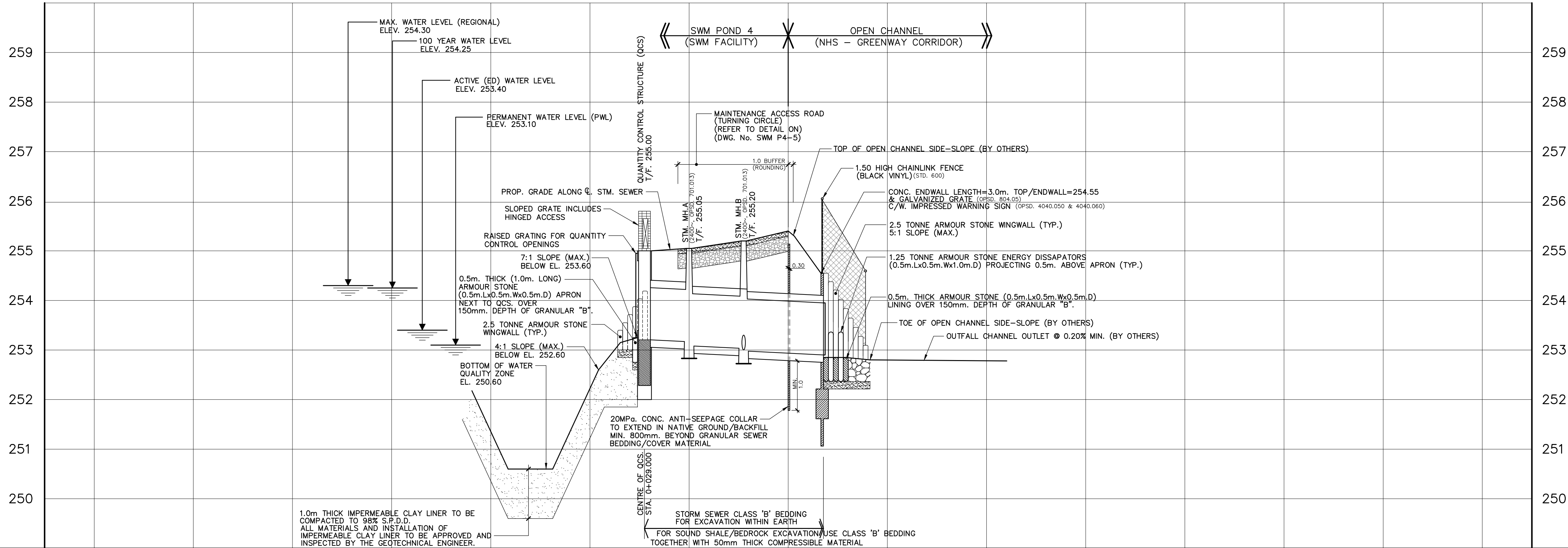
SWM FACILITY DETAILS-POND 4
(SWM FACILITY GRADING PLAN)

TOWN FILE No.		Project No.	
Scale 1:1000		21T-16008C	
Designed By	G.H.	Drawn By	ACAD
Checked By	G.H.	Date	AUGUST 2018
			Drawing No.
			SWM P4-1

R:\13\13952\952-SWM-03\Outlet Storm Sewer to Outfall.dwg | Mar 22, 2019 - 4:26pm



OUTLET STORM SEWER TO OUTFALL
SCALE 1:500



STORM INVERT	11.0-1050# CONC. STM. @ 0.50% CL.100-D	16.1-1050# CONC. STM. @ 0.50% CL.100-D	253.205	253.160	253.031	252.800	252.850	252.800	STORM INVERT
CHAINAGE	0+027.800 INSIDE WALL	0+020	0+009	0+000 PROPERTY LINE	0+007.100	0+012.100	0+016.500	0+016.500	CHAINAGE

No.	By	Date	Revision	Cons. Checked

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DATE: _____ APPROVED BY: _____

Originally Approved By The
Region of Peel

V. CAVALLO
REGISTERED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

RAND
ENGINEERING

5285 Solar Drive
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Region of Peel
Public Works

TOWN OF CALEDON

SWM FACILITY DETAILS-POND 4
(OUTLET STORM SEWER TO OUTFALL - PLAN/PROFILE)

TOWN FILE No. 21T-16008C

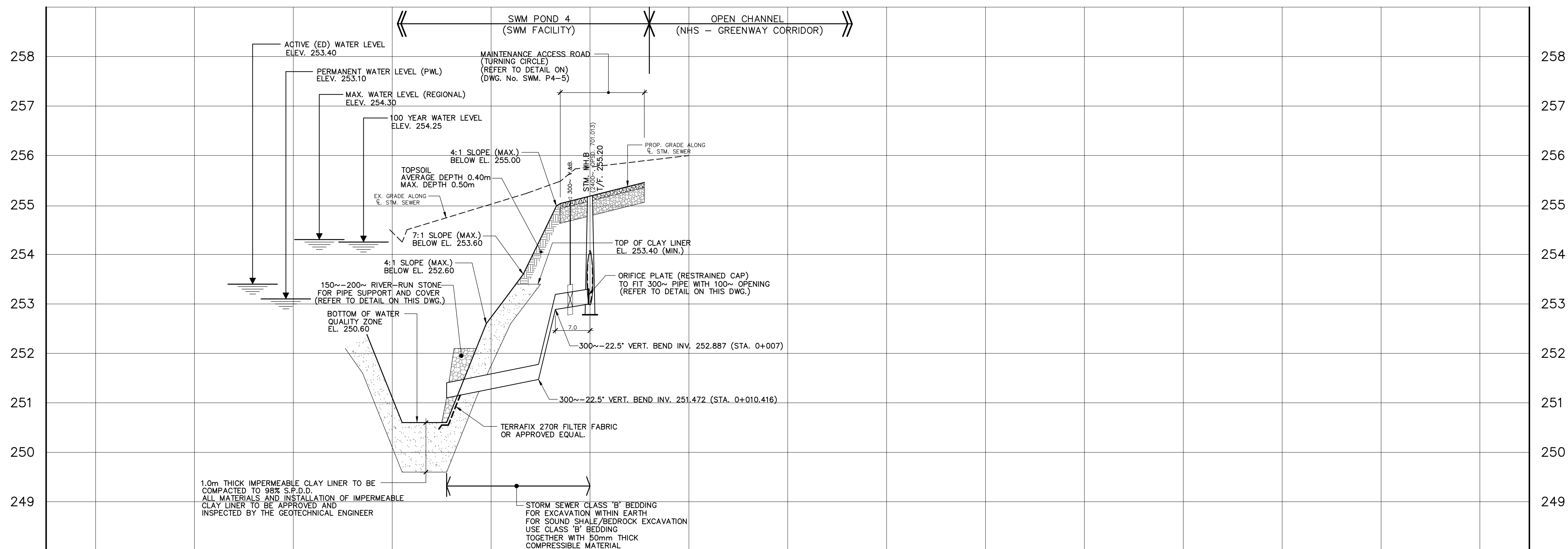
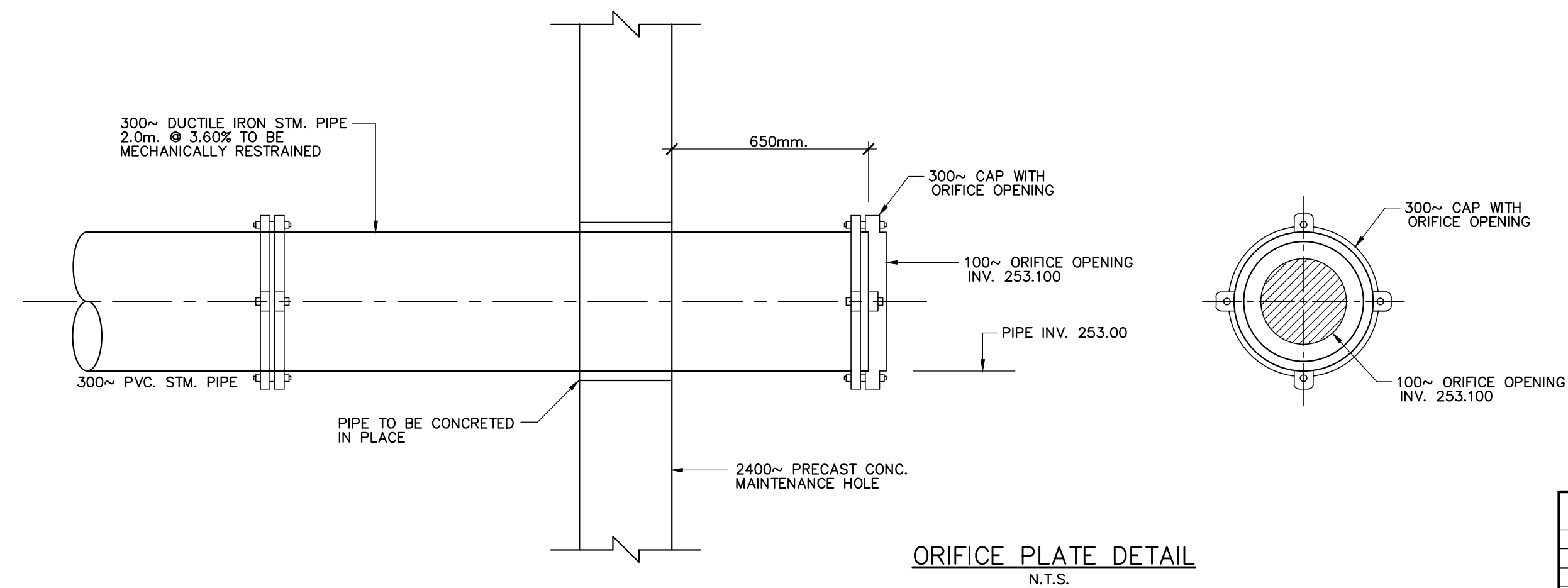
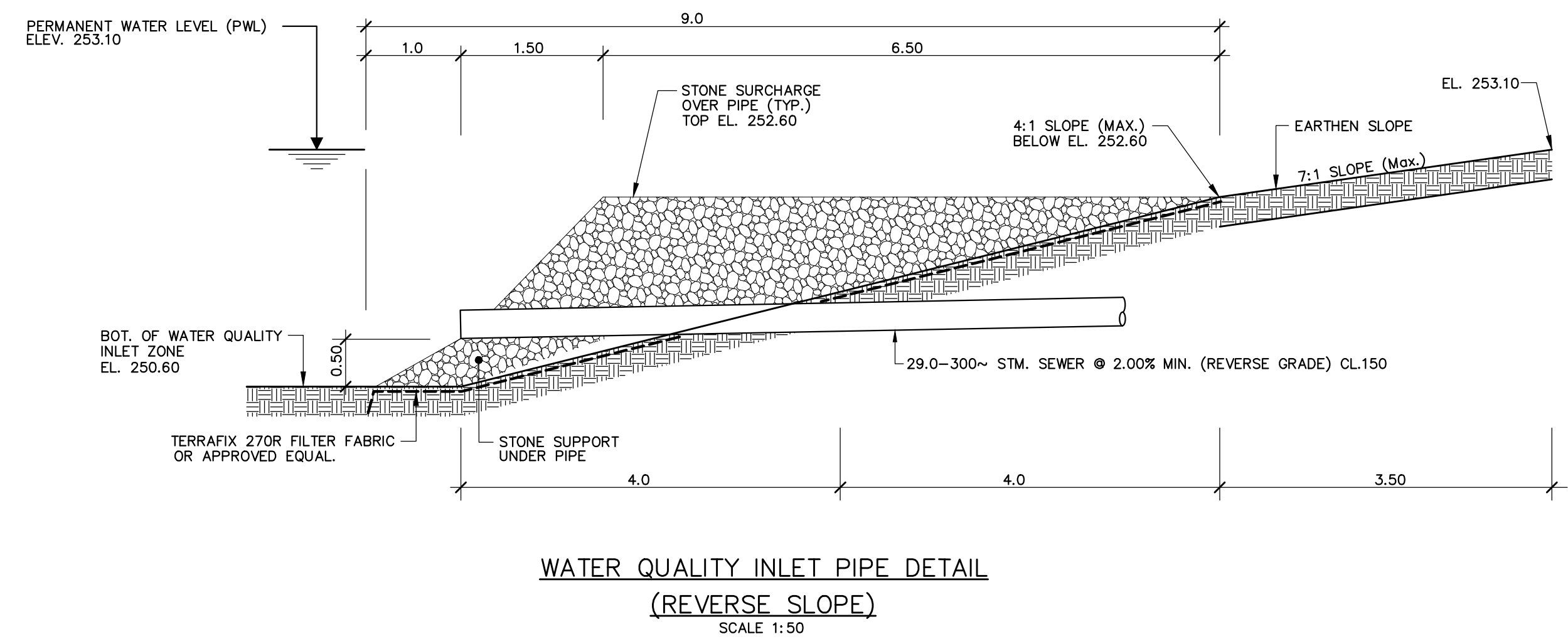
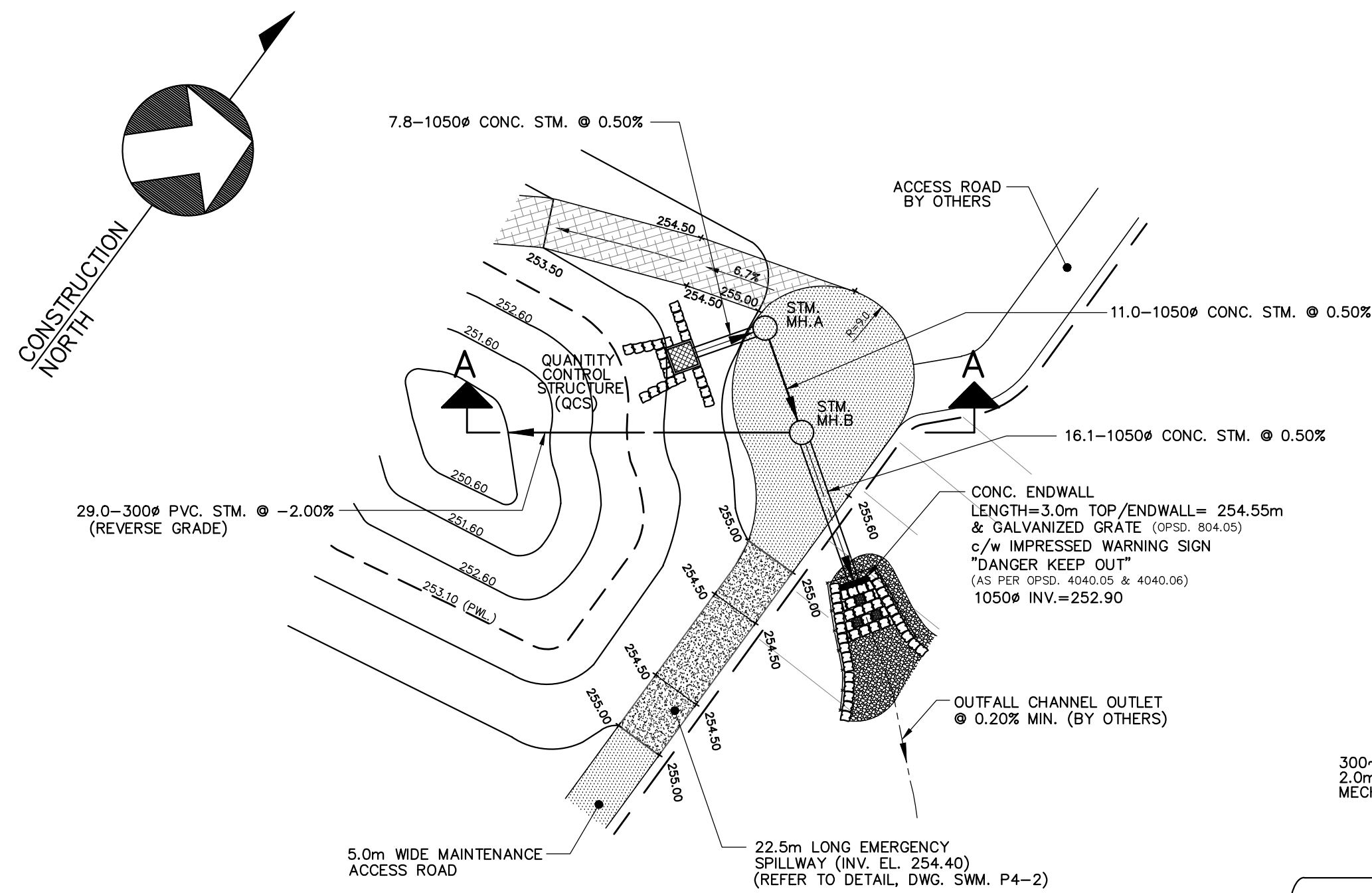
Scale V. 1:50, H. 1:500

Project No. 13952

Designed By G.H. Drawn By ACAD

Checked By G.H. Date AUGUST 2018

Drawing No. SWM P4-3

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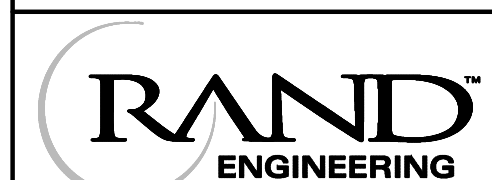
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Originally Approved By The
Region of Peel



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Tel: 905.625.9500**

Region of Peel
Public Works

SWM FACILITY DETAILS—POND 4

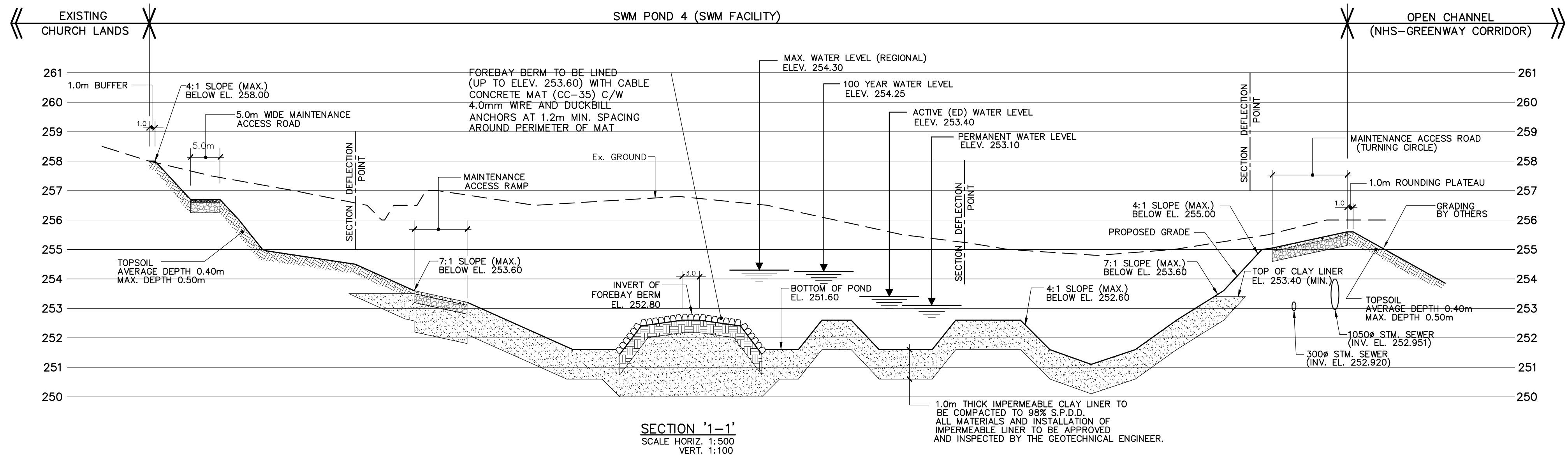
(STORM SEWER TO QUALITY CONTROL STRUCTURE - PLAN/PROFILE)

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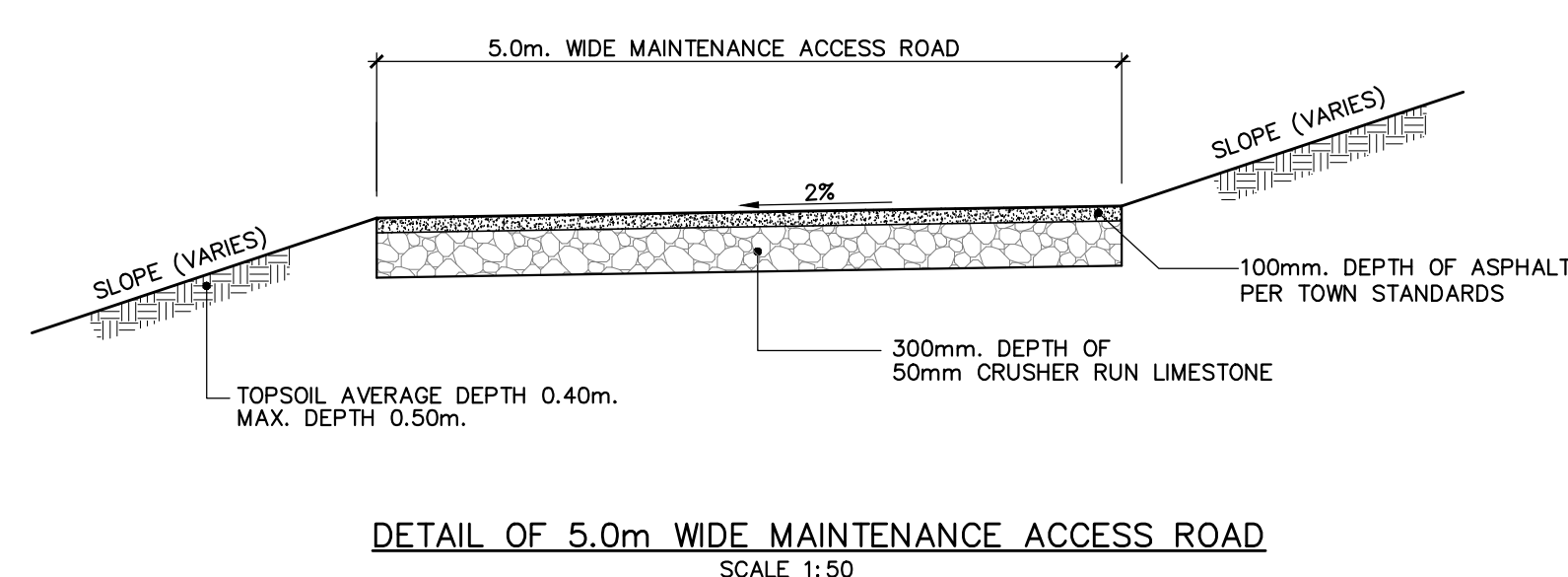
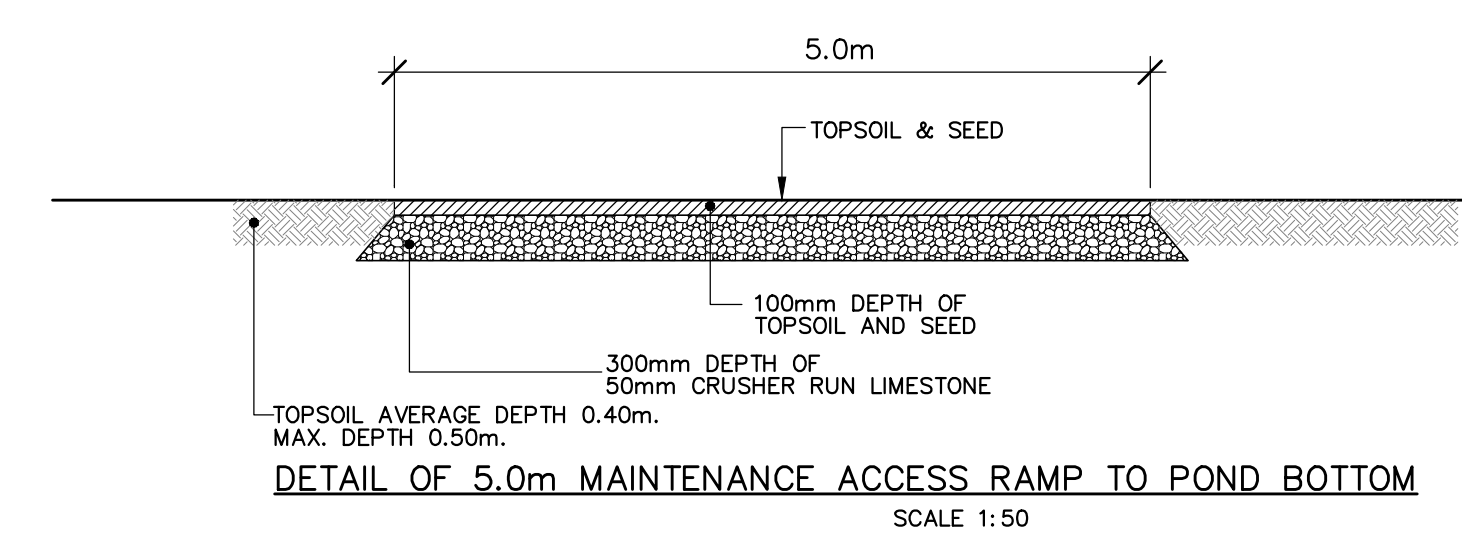
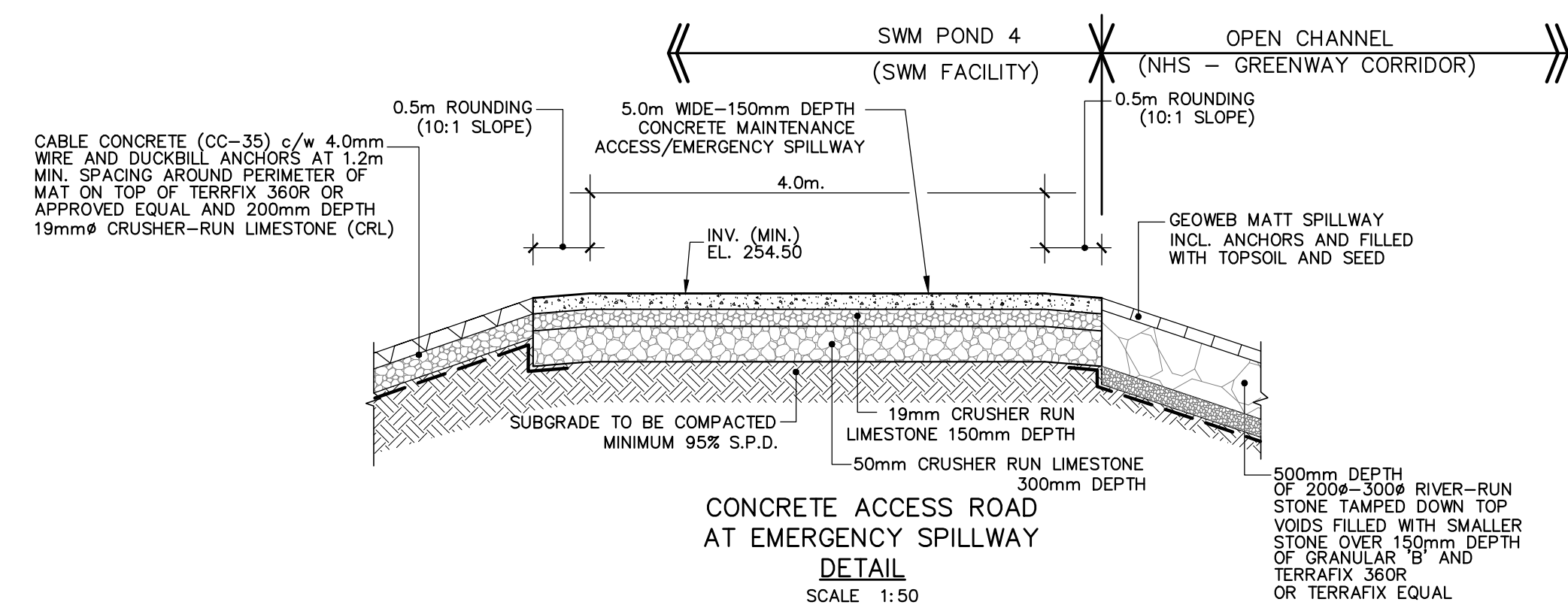
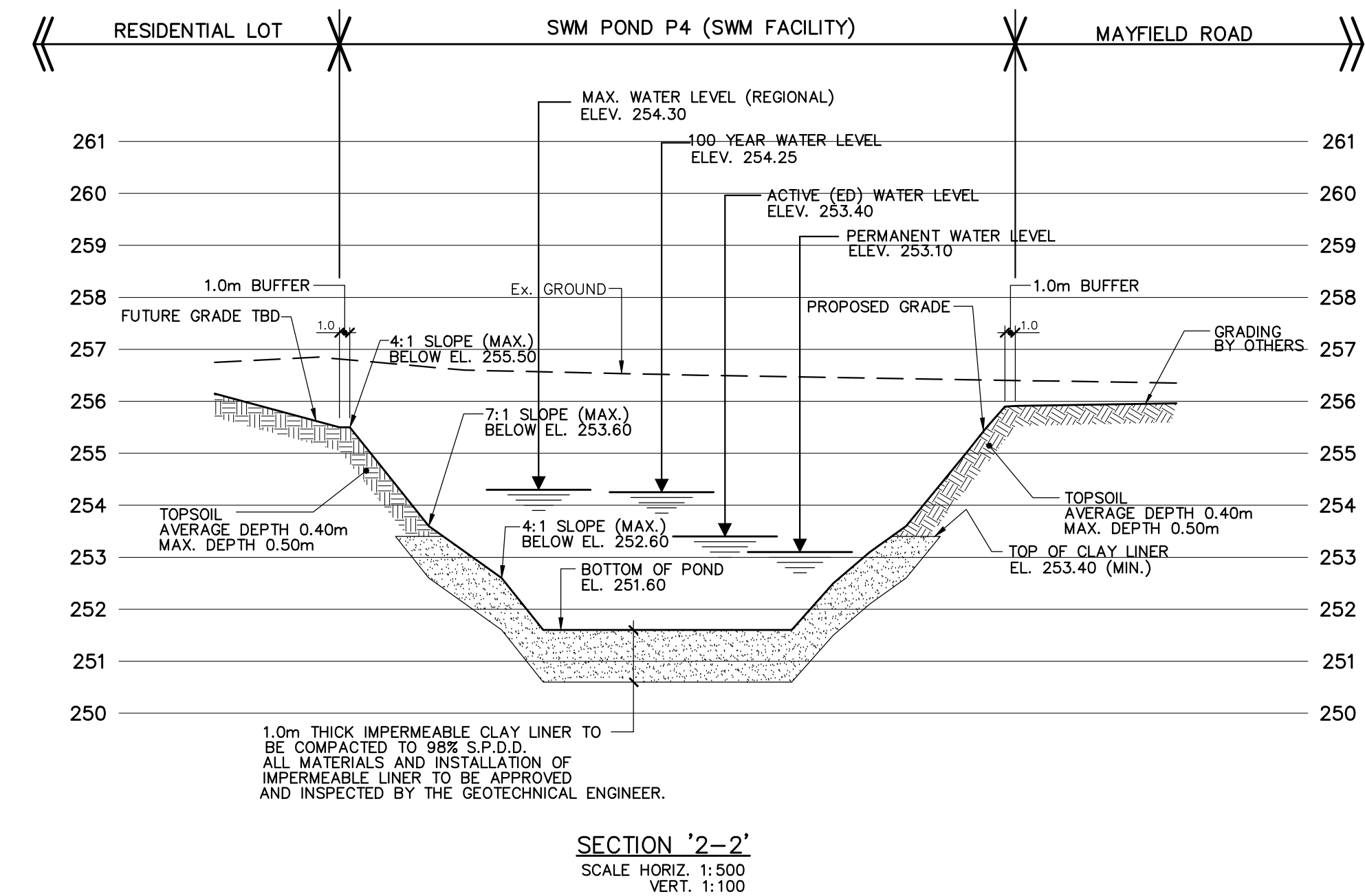
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Scale	V. 1:50, H. 1:500	Project No.	13050

Designed By		G.H.		Drawn By		ACAD		13952	
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Checked By	Date	Drawing No.
		SWM B1-1



REFER TO DWG. NO. SWM P4-1
FOR LOCATION OF SECTIONS '1-1' & '2-2'



No.	By	Date	Revision	Cons. Checked

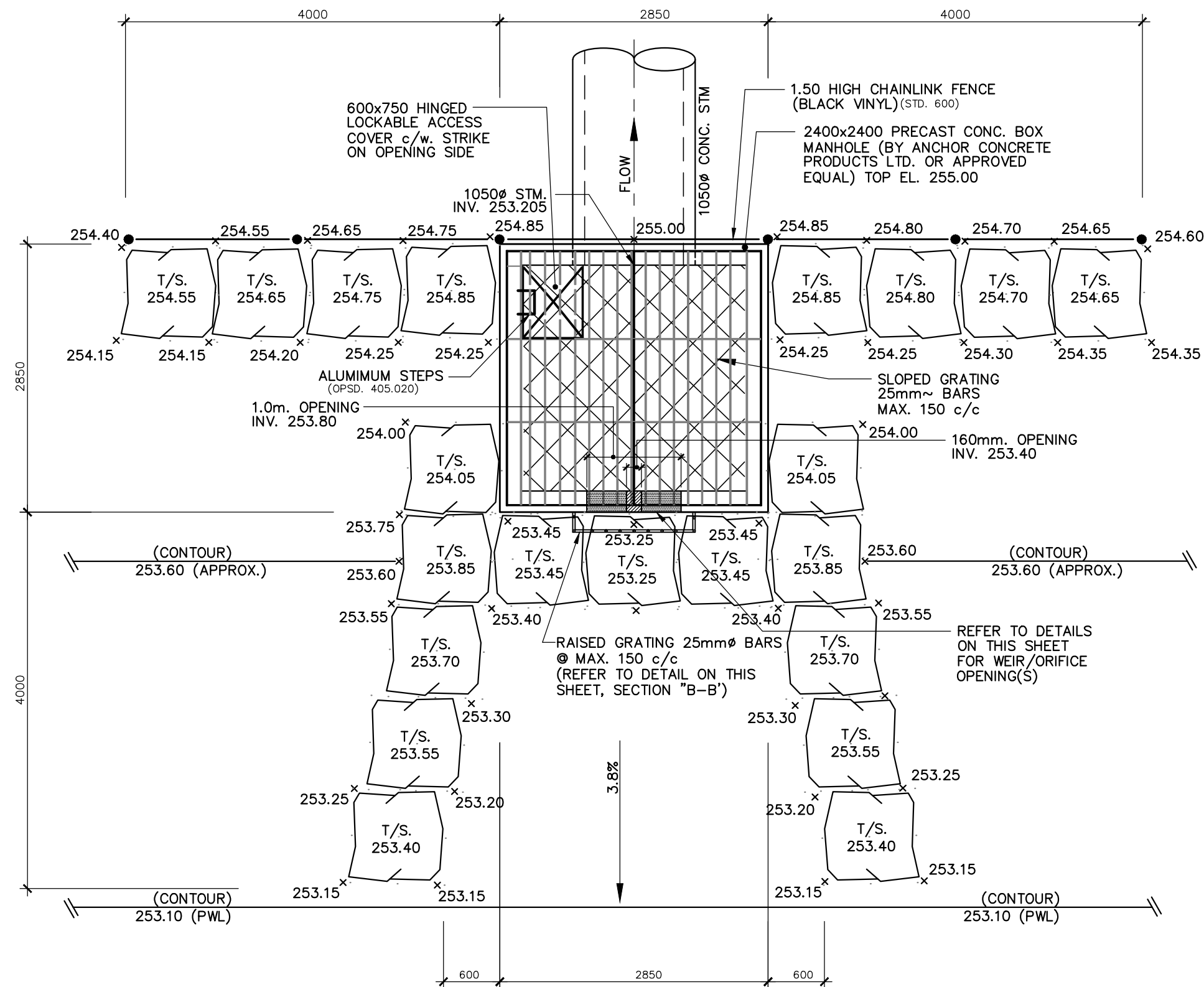
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DATE: _____ APPROVED BY: _____

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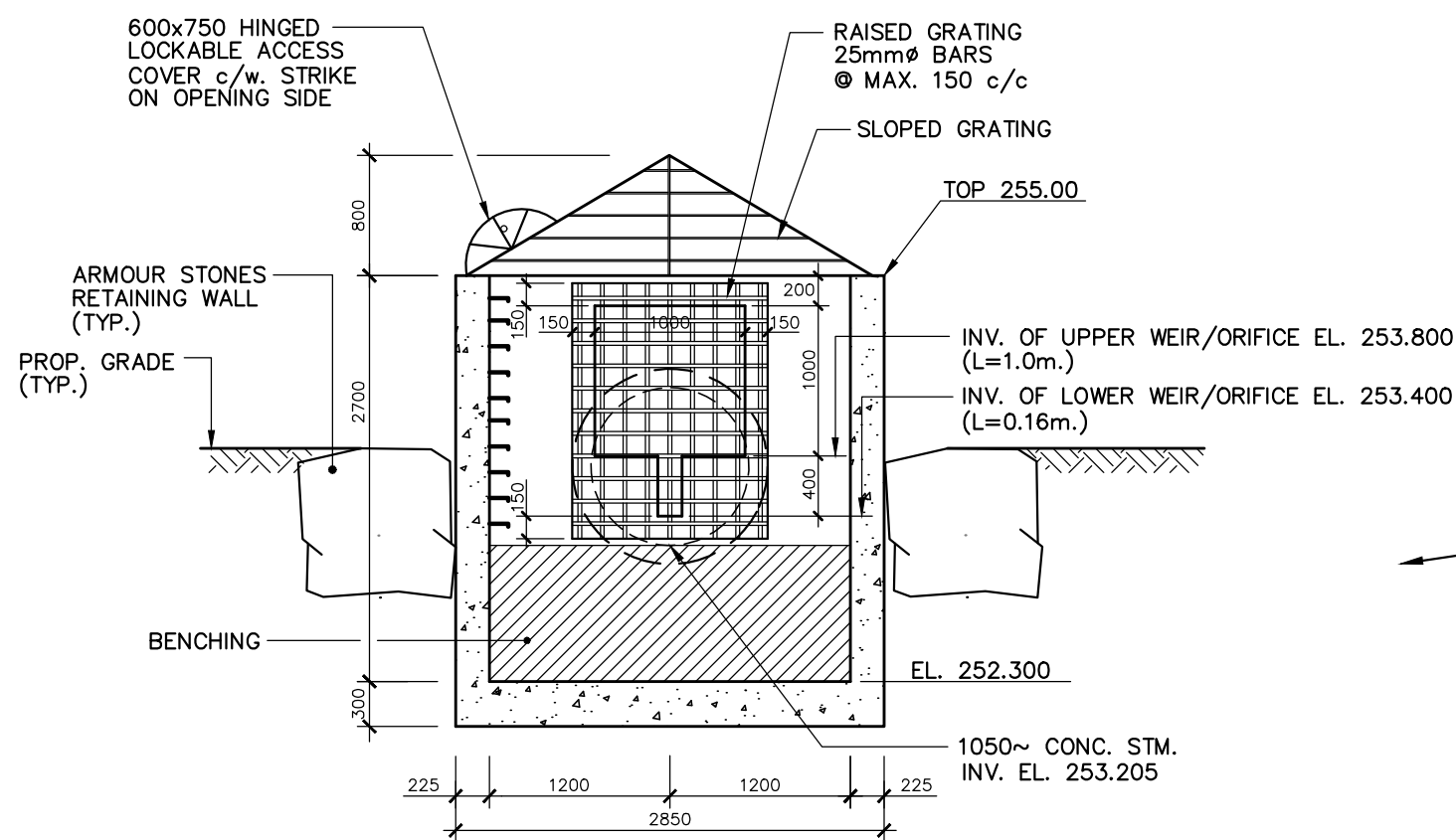
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Tel: 905.625.9500

SWM FACILITY DETAILS-POND 4
(SWM FACILITY GRADING SECTIONS)

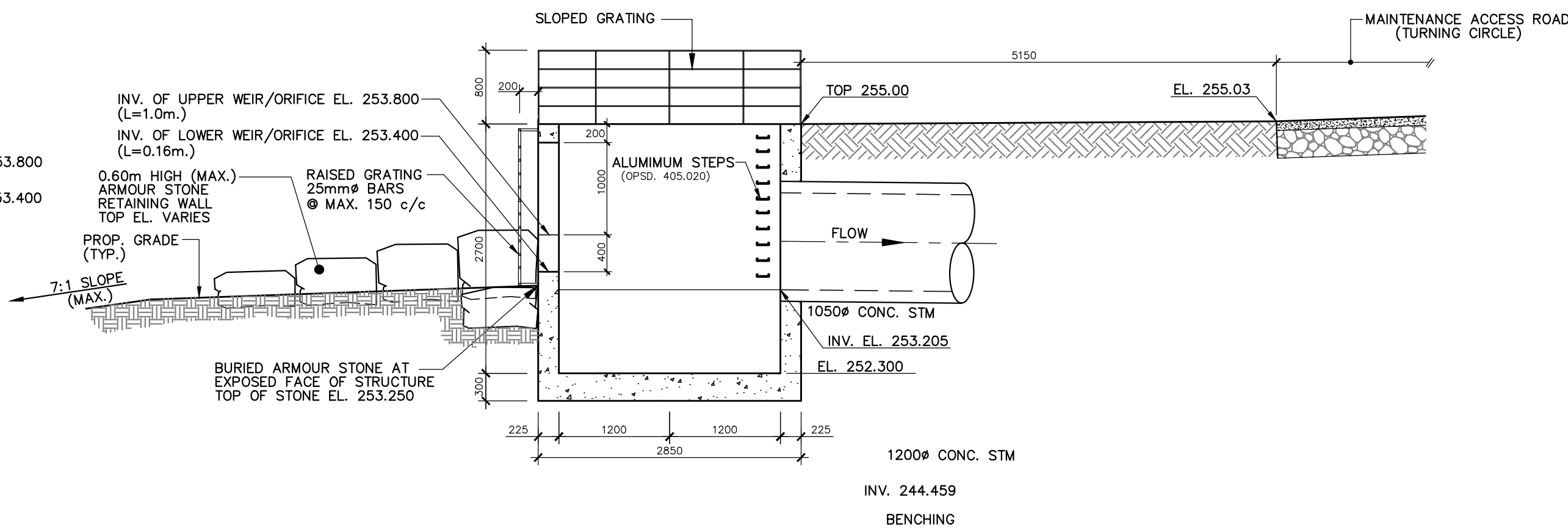
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Drawn By ACAD
Date AUGUST 2018
Project No. 13952
Drawing No. SWM P4-5



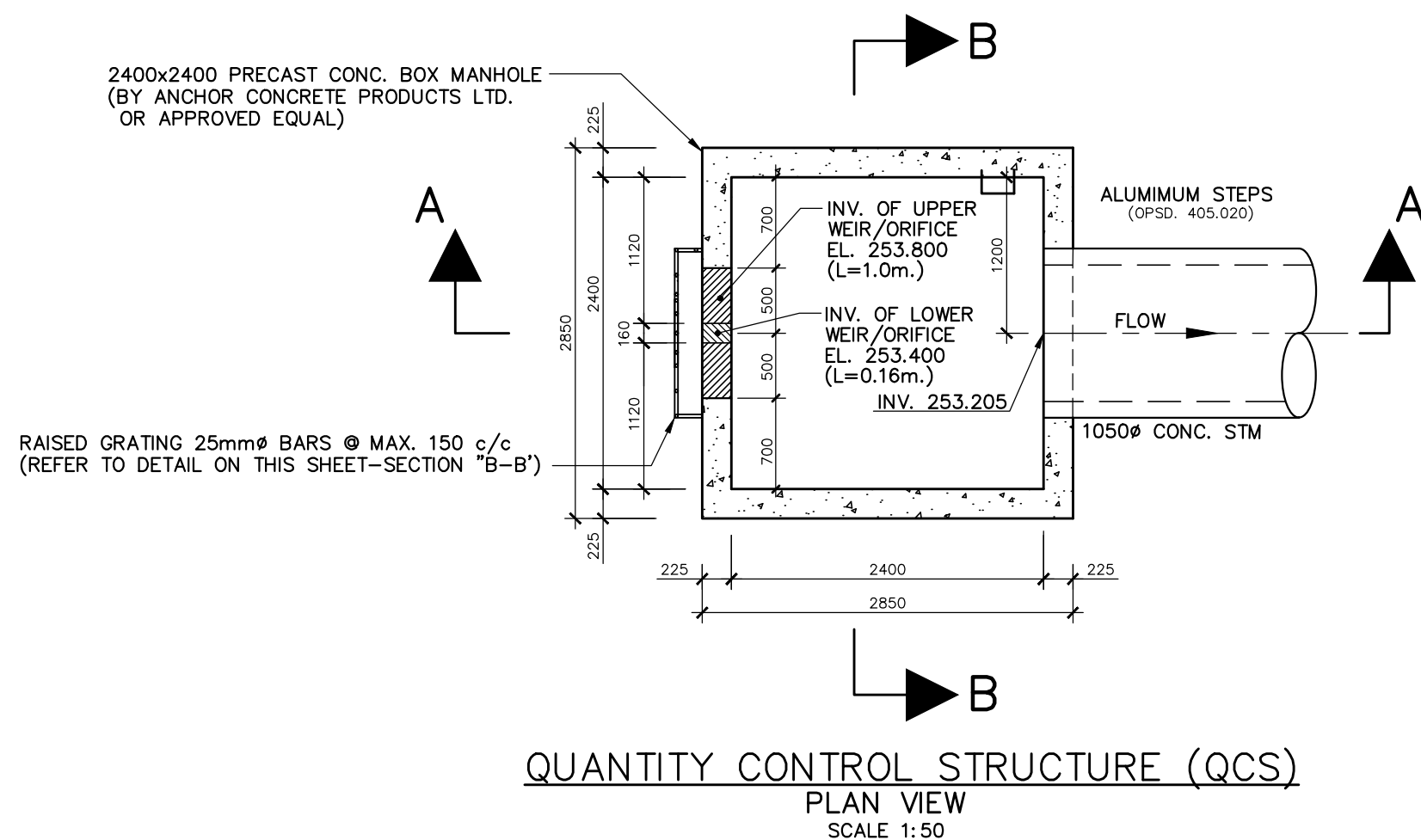
QUANTITY CONTROL STRUCTURE
GRATING FRAMING PLAN
SCALE 1:50



SECTION 'B-B'
SCALE 1:50



SECTION 'A-A'
SCALE 1:50



QUANTITY CONTROL STRUCTURE (QCS)
PLAN VIEW
SCALE 1:50

NOTES:

- ALL HEADWALLS AND OTHER EXPOSED CONCRETE STRUCTURES SHALL BE TREATED FINISHED WITH A SMOOTH PATTERNLESS CONCRETE FINISH. WHERE POSSIBLE, ARMOUR STONE COURSING SHALL BE USED AT THE BOTTOM OF HEAD OR WING WALLS IN ORDER TO REDUCE EXPOSED CONCRETE AREAS.
- THE DEVELOPER SHALL SUPPLY A PAD LOCK ON THE CONTROL OUTLET HATCH AND PROVIDE KEYS TO WORKS AND TRANSPORTATION AT THE TIME OF INSTALLATION.
- ALL SWM BLOCKS REQUIRE THE PLACEMENT OF PERMANENT STORM WATER MANAGEMENT FACILITIES WARNING SIGNS AS PER THE CITY OF BRAMPTON'S SPECIFICATIONS. MINIMUM 5 SIGNS AROUND POND.
- ALL CORRUGATED METAL SIDES OF HICKENBOTTOM RISERS ARE TO BE COVERED WITH 50mm. TO 500mm. DIA. WASHED RIVER STONE ABOVE PERMANENT WATER LEVEL PORTION OF STONE JACKET IN LIEU OF RIP RAP. BELOW PERMANENT WATER LEVEL 200mm. RIP RAP IS ACCEPTABLE.
- REFER TO DWG. NO.SWM FB-5 FOR NOTES RELATED TO CONSTRUCTION OF ENGINEERED FILL BERMS FOR SWM POND
- REFER TO GEOTECHNICAL INVESTIGATION AND SWM POND BERM STABILITY REPORTS AS PREPARED BY DS CONSULTANTS LTD.

SPECIAL NOTE FOR QUANTITY CONTROL STRUCTURE:

ALL METEL PARTS INCLUDING GRATES, BARS, ETC., SHALL BE GALVANIZED UNLESS OTHERWISE NOTED.

No.	By	Date	Revision	Cons. Checked

APPROVED FOR CONSTRUCTION

THIS APPROVAL CONSTITUTES A GENERAL REVIEW AND DOES NOT CERTIFY DIMENSIONAL ACCURACY

THIS APPROVAL IS SUBJECT TO THE FURTHER CERTIFICATION OF THE "AS CONSTRUCTED" WORKS BY A REGISTERED PROFESSIONAL ENGINEER OF THE PROVINCE OF ONTARIO

DATE: _____ APPROVED BY: _____

Originally Approved By The
Region of Peel



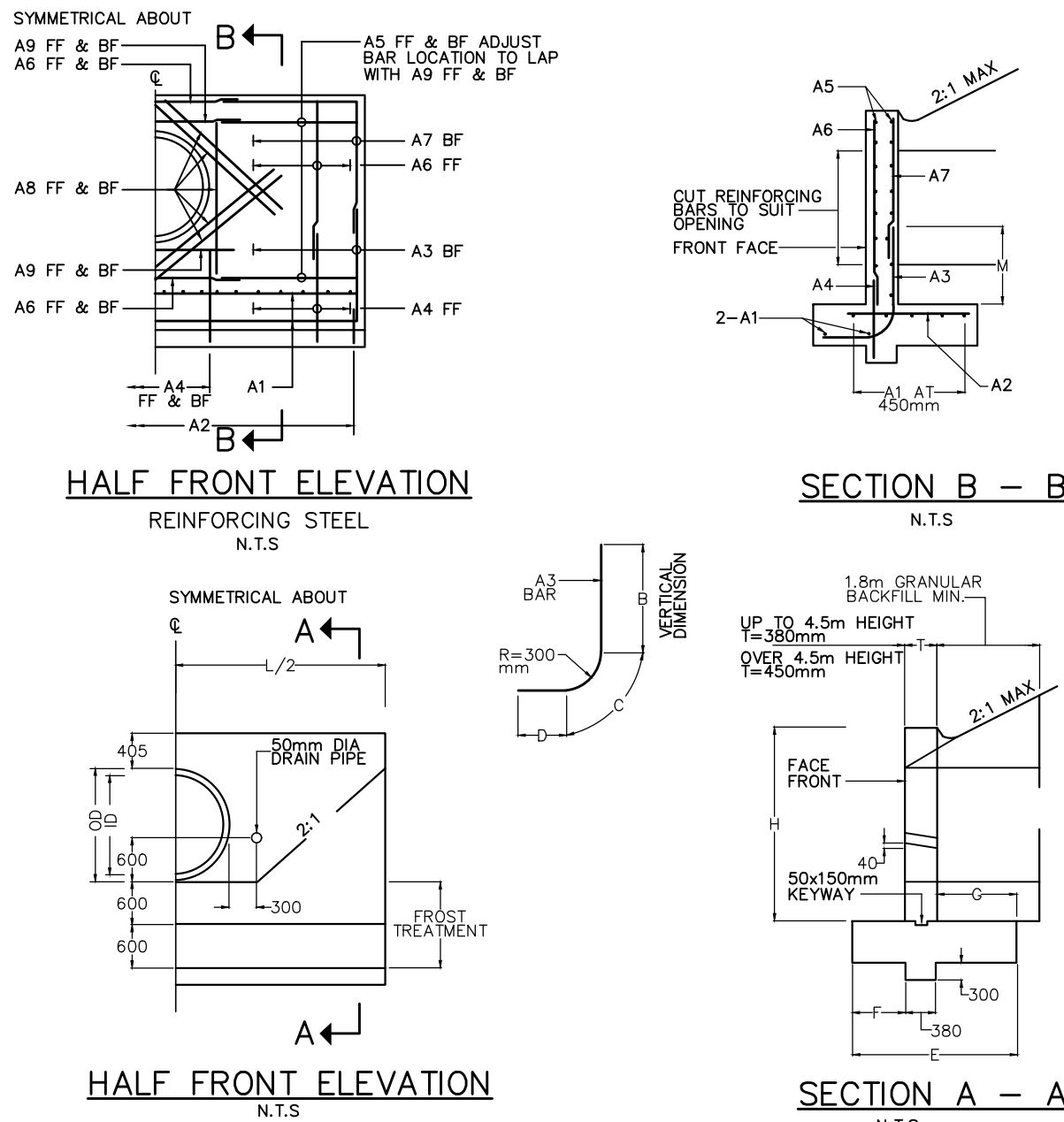
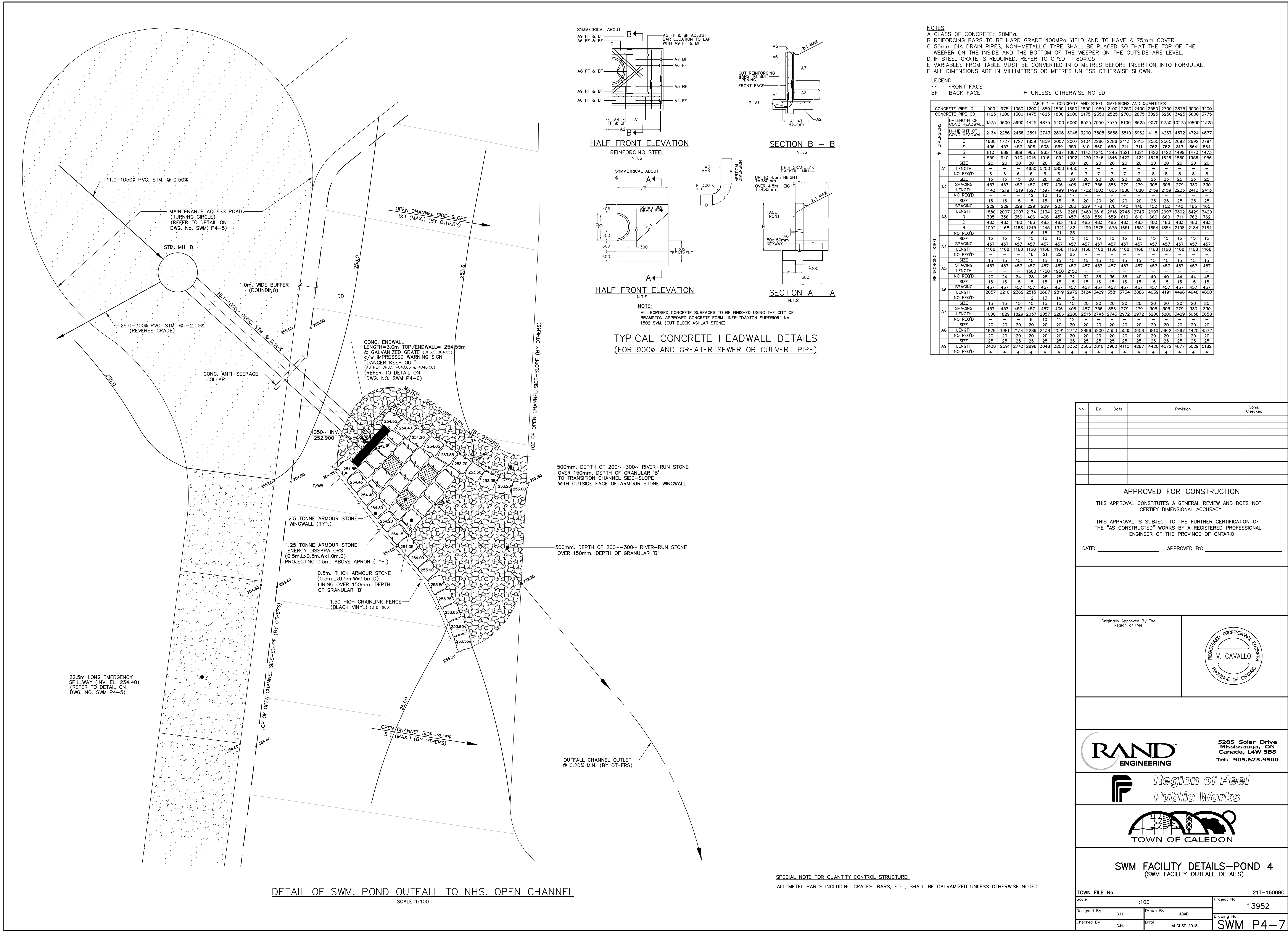
5285 Solar Drive
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Region of Peel
Public Works



SWM FACILITY DETAILS-POND 4
(QUANTITY CONTROL STRUCTURE DETAILS)

TOWN FILE No.	21T-16008C
Scale	1:1000
Designed By	G.H.
Drawn By	ACAD
Checked By	G.H.
Date	AUGUST 2018
Project No.	13952
Drawing No.	SWM P4-6



NOTES

A CLASS OF CONCRETE: 20MPa.

B REINFORCING BARS TO BE HARD GRADE 400MPa YIELD AND TO HAVE A 75mm COVER.

C 50mm DIA DRAIN PIPES, NON-METALLIC TYPE SHALL BE PLACED SO THAT THE TOP OF THE WEEPER ON THE INSIDE AND THE BOTTOM OF THE WEEPER ON THE OUTSIDE ARE LEVEL.

D IF STEEL GRATE IS REQUIRED, REFER TO OPSD - 804.05

E VARIABLES FROM TABLE MUST BE CONVERTED INTO METRES BEFORE INSERTION INTO FORMULAE.

F ALL DIMENSIONS ARE IN MILLIMETRES OR METRES UNLESS OTHERWISE SHOWN.

LEGEND
FF - FRONT FACE
BF - BACK FACE
* UNLESS OTHERWISE NOTED

TABLE 1 - CONCRETE AND STEEL DIMENSIONS AND QUANTITIES

CONCRETE PIPE ID	900	975	1050	1200	1350	1500	1650	1800	1950	2100	2250	2400	2550	2700	2875	3000	3200
CONCRETE PIPE OD	1125	1200	1300	1475	1625	1800	2000	2175	2350	2525	2700	2875	3025	3250	3425	3600	3775
L-LENGTH OF CONC HEADWALL	3375	3600	3900	4425	4875	5400	6000	6525	7050	7575	8100	8625	9075	9750	10275	10800	11325
H-HEIGHT OF CONC HEADWALL	2134	2286	2438	2591	2743	2896	3048	3200	3350	3505	3658	3810	3962	4115	4267	4572	4877
F	1600	1727	1727	1859	1859	2007	2007	2134	2286	2286	2413	2413	2565	2565	2692	2692	2794
G	406	457	457	508	508	559	559	610	660	660	711	711	762	762	813	864	864
M	559	940	940	1016	1016	1092	1092	1270	1346	1346	1422	1422	1626	1626	1880	1956	1956
SIZE	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
LENGTH	-	-	-	4850	5250	5850	6450	-	-	-	-	-	-	-	-	-	-
A1	NO REQ'D	6	6	6	6	6	6	7	7	7	7	7	8	8	8	8	8
SIZE	15	15	15	20	20	20	20	20	20	20	20	20	25	25	25	25	25
A2	SPACING	457	457	457	457	457	406	406	457	457	457	457	457	457	457	457	457
LENGTH	1143	1219	1219	1397	1397	1499	1499	1702	1803	1803	1880	1880	2159	2159	2235	2413	2413
NO REQ'D	-	-	-	12	13	15	17	-	-	-	-	-	-	-	-	-	-
SIZE	15	15	15	15	15	15	15	20	20	20	20	20	25	25	25	25	25
A3	SPACING	229	229	229	229	229	203	203	229	178	178	140	140	152	152	140	165
LENGTH	1880	2007	2007	2134	2134	2261	2261	2489	2616	2616	2743	2743	2987	2987	3302	3429	3429
D	305	356	356	406	406	457	457	508	559	559	610	610	660	660	711	762	762
C	483	483	483	483	483	483	483	483	483	483	483	483	483	483	483	483	483
B	1092	1168	1168	1245	1245	1321	1321	1499	1575	1575	1651	1651	1854	1854	2108	2184	2184
NO REQ'D	-	-	-	16	18	21	23	-	-	-	-	-	-	-	-	-	-
SIZE	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
A4	SPACING	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457
LENGTH	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168	1168
NO REQ'D	-	-	-	18	21	22	25	-	-	-	-	-	-	-	-	-	-
SIZE	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
A5	SPACING	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457
LENGTH	-	-	-	1500	1750	1950	2150	-	-	-	-	-	-	-	-	-	-
NO REQ'D	20	24	24	28	28	28	32	32	36	36	36	40	40	40	44	44	48
SIZE	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
A6	SPACING	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457
LENGTH	2057	2210	2362	2515	2667	2819	2972	3124	3429	3581	3734	3886	4039	4191	4496	4648	4800
NO REQ'D	-	-	-	12	13	14	15	-	-	-	-	-	-	-	-	-	-
SIZE	15	15	15	15	15	15	15	20	20	20	20	20	20	20	20	20	20
A7	SPACING	457	457	457	457	457	406	406	457	457	457	457	457	457	457	457	457
LENGTH	1600	1829	1829	2057	2057	2286	2286	2515	2743	2743	2972	2972	3200	3200	3429	3658	3658
NO REQ'D	-	-	-	9	10	11	12	-	-	-	-	-	-	-	-	-	-
SIZE	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
A8	LENGTH	1829	1981	2134	2286	2438	2591	2743	2896	3200	3353	3505	3658	3810	3962	4267	4420
SIZE	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
NO REQ'D	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
A9	LENGTH	2438	2591	2743	2896	3048	3200	3353	3505	3610	3962	4115	4267	4420	4572	4877	5029
NO REQ'D	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

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DATE: _____ APPROVED BY: _____

Originally Approved By The Region of Peel

RAND ENGINEERING

5285 Solar Drive
Mississauga, ON
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Tel: 905.625.9500

Region of Peel
Public Works

TOWN OF CALEDON

SWM FACILITY DETAILS-POND 4
(SWM FACILITY OUTFALL DETAILS)

TOWN FILE No.	21T-16008C
Scale	1:100
Project No.	13952
Designed By	G.H.
Drawn By	ACAD
Checked By	G.H.
Date	AUGUST 2018
Drawing No.	SWM P4-7

SPECIAL NOTE FOR QUANTITY CONTROL STRUCTURE:
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