Appendix B.4 Wetland Maintenance Memo

SCS consulting group ltd

Brockie, Ryan

From: Keeping, Andrea
Sent: July 25, 2025 9:47 AM
To: Tyler Lasko; Costa, Cosimo
Cc: Schaefer, Steve; David MacPherson; Christopher Marchese; Alexandra De Gasperis; Brockie, Ryan
Subject: RE: Picton - Wetland Stormwater Management Facility Information

Tyler, thank you for the confirmation. We will proceed as directed.

Regards,

Please be advised that I will be away on vacation from Friday August 1, 2025 to Monday August 11, 2025.

Andrea Keeping, P.Eng.

SCS consulting group ltd
Land Development Consultants

905 475 1900 *x2542*
416 997 4040
30 Centurian Drive, Suite 100,
Markham, ON, L3R 8B8
akeeping@scsconsultinggroup.com

CELEBRATING 20 YEARS

From: Tyler Lasko <tlasko@pecounty.on.ca>
Sent: July 24, 2025 4:10 PM
To: Keeping, Andrea <akeeping@scsconsultinggroup.com>; Costa, Cosimo <ccosta@scsconsultinggroup.com>
Cc: Schaefer, Steve <sschaefer@scsconsultinggroup.com>; David MacPherson <dmacpherson@pecounty.on.ca>; Christopher Marchese <cmarchese@decocommunities.ca>; Alexandra De Gasperis <alexandra@decocommunities.ca>; Tyler Lasko <tlasko@pecounty.on.ca>
Subject: FW: Picton - Wetland Stormwater Management Facility Information

Hi Cosimo and Andrea.

Thank you for the info supplied in the attached and further via email below. County staff have reviewed and have no objections to the Village A proposal proceeding with a proposed wet land approach within the SWM facility treatment. Samples from other areas in Ontario are appreciated. As has been discussed to date, it is expected that the updated FSSR for Village A will include these updates to the SWM approach. We suggest including the attached memo in the updated FSSR as appendix to track this adjustment in conceptual planning.

Note that Village A SWM cannot serve as precedent for future Villages within the Base31 Master Plan; let's assess and agree on approach as further development comes in the future.

If any questions then please contact me direct.

With thanks,

Tyler

Tyler Lasko, P.Eng.
Lead Engineer – Heights Development Area, Development Services
The Corporation of the County of Prince Edward
T: 613.476.2148 ext. 2039
tlasko@pecounty.on.ca

From: Keeping, Andrea <akeeping@scsconsultinggroup.com>
Sent: July 23, 2025 9:50 AM
To: Tyler Lasko <tlasko@pecounty.on.ca>
Cc: Costa, Cosimo <ccosta@scsconsultinggroup.com>; Schaefer, Steve <sschaefer@scsconsultinggroup.com>; David MacPherson <dmacpherson@pecounty.on.ca>
Subject: RE: Picton - Wetland Stormwater Management Facility Information

Hi Tyler, the only real difference with maintaining a wetland is that there will be less water in the wetland to drain/pump prior to removal of accumulated sediment. This is a benefit to PEC as it will take less time and a lower cost to maintain a wetland versus a wet pond, especially if there are rain events while maintenance is occurring. Otherwise, the maintenance of a wetland facility is not any different from maintaining a wet pond noting that MOE combines wet ponds and wetlands into one maintenance category for this reason (Chapter 6 of the MOE Manual, 2003).

Prior to assumption by PEC, the wetland facility will be drained and sediment removed just as with a wet pond. An engineering certification will then be completed to certify that the facility has been constructed in accordance with the approved engineering drawings (sufficient volume, inlet structures, overland flow route, outlet control structure design, spillway etc.).

PEC would then be required to maintain the facility per the Operations and Maintenance Manual which will provide direction on inspections, maintenance activities including garbage removal and plantings, and sediment removal frequency and methodology. The general sediment removal procedure will be as follows:

1. Install ESC measures to ensure the maintenance activities will not cause downstream erosion problems or sediment/dust problems with adjacent residences.
2. Inspect all inlets, outlets, control structure, overland flow route, spillway etc. If there are any deficiencies, maintain the infrastructure as required.

3. Drain the wetland facility. (As we work through the design details of the wetland facilities, we will look to incorporate gravity drains for the permanent pool; however, if this is not feasible, the permanent pool will need to be pumped.)
4. Remove sediment (and vegetation) via long reach backhoes. (Dependent on the frequency of maintenance and the amount of sediment accumulation, removal of sediment can be isolated to the forebay; however, it is recommended to maintain the main cell if vegetation grows to the point of impacting the available flood storage).
5. Restore vegetation as per the approved Landscape Restoration Plan.

Please don't hesitate to give me a call on my cell phone if you would like to discuss further.

Regards,

Please be advised that I will be away on vacation from Friday August 1, 2025 to Monday August 11, 2025.

Andrea Keeping, P.Eng.

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CELEBRATING 20 YEARS

From: Tyler Lasko <tlasko@pecounty.on.ca>
Sent: July 23, 2025 8:38 AM
To: Keeping, Andrea <akeeping@scsconsultinggroup.com>
Cc: Costa, Cosimo <ccosta@scsconsultinggroup.com>; Schaefer, Steve <sschaefer@scsconsultinggroup.com>; David MacPherson <dmacpherson@pecounty.on.ca>; Tyler Lasko <tlasko@pecounty.on.ca>
Subject: RE: Picton - Wetland Stormwater Management Facility Information

Hi Andrea. Thanks for following up. Discussion internally has noted we don't have a hold on how to maintain this type of facility or what to expect. Can you provide some commentary on what a wetland facility would mean from a maintenance perspective, comparative to a wet pond. This would help us.
Tyler

From: Keeping, Andrea <akeeping@scsconsultinggroup.com>
Sent: July 21, 2025 8:19 AM
To: Tyler Lasko <tlasko@pecounty.on.ca>
Cc: Costa, Cosimo <ccosta@scsconsultinggroup.com>; Schaefer, Steve <sschaefer@scsconsultinggroup.com>
Subject: RE: Picton - Wetland Stormwater Management Facility Information

You don't often get email from akeeping@scsconsultinggroup.com. Learn why this is important

Good morning, Tyler. I'm following up on your review of the wetland SWM facility letter. Did you have any questions? I'm happy to meet if you wish to discuss further.

Regards,

Please be advised that I will be away on vacation from Friday August 1, 2025 to Monday August 11, 2025.

Andrea Keeping, P.Eng.

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CELEBRATING 20 YEARS

From: Tyler Lasko <tlasko@pecounty.on.ca>
Sent: July 10, 2025 1:34 PM
To: Keeping, Andrea <akeeping@scsconsultinggroup.com>
Cc: Costa, Cosimo <ccosta@scsconsultinggroup.com>; Schaefer, Steve <sschaefer@scsconsultinggroup.com>
Subject: RE: Picton - Wetland Stormwater Management Facility Information

Received and starting review - thank you! Tyler

From: Keeping, Andrea <akeeping@scsconsultinggroup.com>
Sent: July 10, 2025 12:33 PM
To: Tyler Lasko <tlasko@pecounty.on.ca>
Cc: Costa, Cosimo <ccosta@scsconsultinggroup.com>; Schaefer, Steve <sschaefer@scsconsultinggroup.com>
Subject: Picton - Wetland Stormwater Management Facility Information

Good afternoon, Tyler. Per your recent discussions with Steve and Cosimo, we are pleased to provide a letter addressing your comments and concerns regarding wetland SWM facilities. Please don't hesitate to call me on my cell if you have any further questions or would like to discuss the specific design of the Village A facilities.

Regards,

Andrea Keeping, P.Eng.

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Land Development Consultants

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416 997 4040
30 Centurian Drive, Suite 100,
Markham, ON, L3R 8B8
akeeping@scsconsultinggroup.com

CELEBRATING 20 YEARS

File #:	**2365**
Date:	**July 10, 2025**

Mr. Tyler Lasko
Prince Edward County
332 Picton Main Street
Picton, Ontario, K0K 2T0

Dear Mr. Lasko:

Re:	**Village A, Base31 Development Area** **Picton, Prince Eward County** **Wetland Stormwater Management Facility Information**

The purpose of this letter is to provide information regarding the specification of wetland Stormwater Management (SWM) facilities to service Village A of the Base31 Development Area instead of the originally proposed wet ponds.

SCS Consulting Group has previously designed and constructed multiple wetland SWM Facilities across southern Ontario. Two recent examples of wetland SWM facilities are located in the municipalities of Woodstock and Barrie. The wetland facility in Woodstock is approximately 1.13 ha and services a total drainage area of 19.72 ha consisting of residential land uses. The wetland facility in Barrie is approximately 2.84 ha and services a drainage area of 33.80 ha, also consisting of residential land uses. Please refer to Attachment A for engineering drawings of these two wetland SWM facilities.

The wetland facilities provide quality, erosion and quantity controls for the drainage areas contributing to the facilities. In both locations, the wetland type facility was chosen due to shallow groundwater elevations and the improved phosphorus removal achieved from a wetland SWM facility in comparison to other SWM facility options such as a wet pond. Both wetland facilities were designed in accordance with the Ministry of Environment (MOE) Stormwater Management Planning and Design Guidelines (2003).

The design of a wetland SWM facility is very similar to the design of a wet pond. The outlet design is the same between the two options. This will include a reverse slope pipe to draw cooler water from the bottom of the SWM facility for low flow events and a control structure in a maintenance hole with a combination of orifices and weirs to provide erosion control (25 mm rainfall event extended detention) and quantity control (2 through 100 year storm event post to pre) control. Both facilities will have a forebay with a minimum depth of 1 m for water quality control and an emergency spillway should the outlet become blocked.

The main difference between the two options is the depth of the facility. A wet pond requires a permanent pool with a mean depth between 1 and 2 m, whereas a wetland has an average depth between 150 mm to 300 mm with a deeper pool (1 m) only at the outlet. The side slopes differ as well, with a wet pond having 7:1 sloping at the permanent pool elevation (for safety) and 4:1 elsewhere, and a wetland having 5:1 at the permanent pool and 3:1 elsewhere. The shallower permanent pool and steeper slopes for the wetland result in less excavation into the bedrock, which is why a wetland SWM facility is being recommended at this time.

When looking further at the block size required for a wetland versus a wet pond, the two are comparable. Specific to the Village A SWM facilities, the block sizes have reduced in size since the first Draft Plan submission. There are multiple reasons for this but it is mainly due to revisiting the storm sewer and grading design to minimize deep excavation into the bedrock. The permanent pool elevations of the Phase 1 and 2 SWM facilities have been raised approximately 1 m and 0.75 m, respectively. Additionally, the inlet and outlet locations have been reconfigured, and the length to width ratio increased to elongate both SWM facilities. This has reduced the block sizes and minimized the amount of excavation required for both SWM facilities. The block sizes will be reduced in the current Draft Plan and next submission regardless as to whether the facilities will be designed as wetlands or wet ponds.

In terms of operations and maintenance of a wetland facility, regular inspections for erosion, vegetation health and sediment buildup are necessary for a wetland, but the level of effort would not be in excess of what is required for a wet pond. Vegetation health monitoring which involves controlling weeds and the removal of invasive species from the wetland area is important to ensure appropriate function.

Similar to wet ponds that provide a quality control function, the sediment accumulated within a wetland SWM facility is to be removed to ensure proper continued performance. In accordance with MOE Guidelines (2003), maintenance of a SWM facility, wetland or wet pond, is required when total suspended solids removal efficiency decreases by 5%. In the case of the Village A Phase 1 SWM facility, it will take approximately 56 years for the removal efficiency to drop to 75% for both the wetland and wet pond facility.

It is typically recommended to perform maintenance at regular 10-year intervals to reduce the amount of material to be removed. A wetland will accumulate approximately 365 m^3 of sediment in a 10-year period, compared to a wet pond, which will accumulate 350 m^3 in the same time frame. A wetland facility will therefore accumulate marginally less sediment over this timeframe; however, the real advantage to a wetland SWM facility from a maintenance perspective is that the removal of sediment from a wetland facility is easier due to shallower depths and a smaller volume of water to be drained or pumped from the facility. In both wetland and wet pond facilities, the vegetation would need to be restored after maintenance is completed.

Wetland SWM facilities are now being proposed for Village A of the Camp31 Development Area instead of wet ponds to minimize the amount of deep excavation into the bedrock. This memorandum has shown that the design, operations and maintenance of wetland SWM facilities are similar to that of wet ponds, although wetlands are generally easier to maintain due to the shallower depth and smaller permanent pool volume.

We trust that the information provided sufficiently addresses your concerns regarding wetland SWM facilities. Please provide confirmation that wetland SWM facilities are acceptable to Prince Edward County so that we can proceed with revising the FSSR with the supporting calculations and modelling, looking towards making our second submission and obtaining Draft Plan approval

Please contact the undersigned if you have any questions or require any additional information.

Sincerely,

SCS Consulting Group Ltd.

Andrea Keeping, P.Eng.
akeeping@ scsconsultinggroup.com

Attachments

Attachment A Example Engineering Drawings of Wetland SWM Facilities

P:\2365 Picton Airport - Tercot\Correspondence\Letters\Prince Edward County - 2025 07(Jul)10 - ak - Wetland SMW Facility Letter.docx

Attachment A
Example Engineering Drawings for Wetland SWM Facilities

30 Centurian Drive, Suite 100 Markham, Ontario L3R 8B8 Phone **905 475 1900** Fax **905 475 8335**
www.scsconsultinggroup.com

FOR STORMWATER MANAGEMENT POND CROSS-SECTIONS REFER TO DWGS SWM2 & SWM3

1500mmø PRECAST CONCRETE MANHOLE DDHW9057 (MH25) AS PER OPSD 701.011
TOP 261.55
S600ø INV. 259.15
E600ø INV. 259.15
N600ø INV. 260.10
325mmø ORIFICE PLATE AT INV. 259.15
390mmø ORIFICE PLATE AT INV. 260.10

8.43m–600ø CONC STM (CL.65–D) @ 0.00%

ANTI–SEEPAGE COLLAR (REFER TO DETAIL ON DWG SWM3)

600mmø PRECAST CONCRETE HEADWALL DDHW9055 (HW3) AS PER OPSD 804.030
GRATE AS PER OPSD 804.050
TOP 260.30
INV. 259.15
WITH 1.2m HIGH BLACK VINYL CHAIN LINK FENCE AS PER OPSD 972.130

13.8m²x0.675m DEEP PLUNGE POOL WITH SPLASH PAD CONSISTING OF 100–300mmø RIP–RAP PLACED 450mm DEEP OVERLYING "TERRAFIX 270R" FILTER CLOTH (OR APPROVED EQUIVALENT) REFER TO DETAIL ON DWG SWM3

LINE OF STAKES AS

7.58m–675ø CONC STM (CL.65–D) @ 2.37%

600mmø PRECAST CONCRETE HEADWALL DDHW9057 (HW5) AS PER OPDF 804.030 AS PER OPSD 804.050
TOP 261.04
S600ø INV. 259.79

7.20m–600ø CONC STM (CL.65–D) @ 0.50%

JF12–20–5 (3600mmø) JELLYFISH SYSTEM
TOP 261.55
W600mmø INV. 259.12
E600mmø INV. 258.97

6.2m–600ø CONC STM (CL.65–D) @ 5.00%

4.63m–600ø CONC STM (CL.65–D) @ 0.50%

13.8m²x0.675m DEEP PLUNGE POOL WITH SPLASH PAD CONSISTING OF 100–300mmø RIP–RAP PLACED 450mm DEEP OVERLYING "TERRAFIX 270R" FILTER CLOTH (OR APPROVED EQUIVALENT) REFER TO DETAIL ON DWG SWM3

675mmø PRECAST CONCRETE HEADWALL DDHW9056 (HW4) AS PER OPSD 804.030
GRATE AS PER OPSD 804.050
TOP 260.09
INV. 258.75
WITH 1.2m HIGH BLACK VINYL CHAIN LINK FENCE AS PER OPSD 972.130

1500mmø PRECAST CONCRETE MANHOLE DDHW9045 (MH26)
AS PER OPSD 701.011
TOP 261.55
S600ø INV. 259.03
W450ø INV. 258.93
N675ø INV. 258.93

7.17m–600ø CONC STM (CL.65–D) @ 3.00%

ANTI–SEEPAGE COLLAR (REFER TO DETAIL ON DWG SWM3)

600mmx1200mm PRECAST CONCRETE DITCH INLET TYPE A DDHW9058 (DICB1)
(OPSD 705.030 TYPE B 6H:1V
GRATE PER OPSD 403.010)
GRATE INV. 260.77
N600mmø 259.30 INV.
390ø ORIFICE PLATE AT INV. 259.30

63.2m² EROSION PROTECTION CONSISTING OF LAYFIELD VMAX(R) S200 (OR APPROVED EQUIVALENT)

ACCESS TO BE PROVIDED BY VEHICULAR CONTROL GATE AS PER CITY OF BARRIE STANDARD BSD–1215 AND BSD–1216 (REFER TO DETAIL ON DWG SWM4)

118.2m² EROSION PROTECTION CONSISTING OF LAYFIELD VMAX(R) S200 (OR APPROVED EQUIVALENT)

2400mm x 1200mm PRECAST CONCRETE HEADWALL DDHW9053 (HW1) AS PER OPSD 804.040
CHUTE BLOCKS REQUIRED
GRATE AS PER OPSD 804.050
TOP 261.35
INV. 259.15
WITH 1.2m HIGH BLACK VINYL CHAIN LINK FENCE AS PER OPSD 972.130

FOREBAY BOTTOM TO BE LINED WITH 177m³ OF 150mm DEEP 50mmø CRUSHED RUN LIMESTONE COMPACTED TO 95% SPMDD

1.0m WIDE FOREBAY DEWATERING SUMP WITH 300mmø PVC (SDR–35) WITH 25mmø HOLES SPACED 75mm C/C AND WRAPPED IN TERRAFIX '270R' FILTER FABRIC (OR APPROVED EQUIVALENT) AS PER THE DETAIL ON DWG SWM4, PERFORATED SECTION TO EXTEND FROM ELEVATION 259.25 TO 256.50.

382.9m² EROSION PROTECTION CONSISTING OF LAYFIELD VMAX(R) S200 (OR APPROVED EQUIVALENT)

5.0m WIDE MULTI–USE PATH/MAINTENANCE ACCESS ROAD (REFER TO DETAILS ON DWG SWM3)

54.0m² EROSION PROTECTION CONSISTING OF 100–300mmø RIP–RAP PLACED 450mm DEEP OVERLYING "TERRAFIX 270R" FILTER CLOTH (OR APPROVED EQUIVALENT)

SEDIMENT DRYING AREA B2 – ACCESS ROAD – 30m³

131.9m² EROSION PROTECTION CONSISTING OF 100–300mmø RIP–RAP PLACED 450mm DEEP OVERLYING "TERRAFIX 270R" FILTER CLOTH (OR APPROVED EQUIVALENT)

1.0m WIDE FOREBAY DEWATERING SUMP WITH 300mmø PVC (SDR–35) WITH 25mmø HOLES SPACED 75mm C/C AND WRAPPED IN TERRAFIX '270R' FILTER FABRIC (OR APPROVED EQUIVALENT) AS PER THE DETAIL ON DWG SWM4, PERFORATED SECTION TO EXTEND FROM ELEVATION 259.25 TO 256.85.

FOREBAY BOTTOM TO BE LINED WITH 103.70m³ OF 150mm DEEP 50mmø CRUSHED RUN LIMESTONE COMPACTED TO 95% SPMDD

SEDIMENT DRYING AREA B1 – EAST FOREBAY – 114m³

95.8m² EROSION PROTECTION CONSISTING OF 100–300mmø RIP–RAP PLACED 450mm DEEP OVERLYING "TERRAFIX 270R" FILTER CLOTH (OR APPROVED EQUIVALENT)

975mm PRECAST CONCRETE HEADWALL DDHW9054 (HW2) AS PER OPSD 804.040
CHUTE BLOCKS REQUIRED
GRATE AS PER OPSD 804.050
TOP 260.56
INV. 259.15
WITH 1.2m HIGH BLACK VINYL CHAIN LINK FENCE AS PER OPSD 972.130

22.9m–975ø CONC STM (CL.65–D) @ 0.90%

SEDIMENT DRYING AREA A – WEST FOREBAY – 759m³

BLOCK 19 (NATURAL HERITAGE BUFFER)

BLOCK 20 (SWM POND)

BLOCK 21

KNEESHAW DRIVE

METROLINX RAILWAY CORRIDOR

WOODSDALE CRESCENT

WARNING SIGNAGE AS PER CITY OF BARRIE STANDARD BSD–83 (REFER TO DETAIL ON DWG SWM4)

19.3m–2400x1200 CONC BOX STM @ 0.60%

196.36m² EROSION PROTECTION CONSISTING OF 100–300mmø RIP–RAP PLACED 450mm DEEP OVERLYING "TERRAFIX 270R" FILTER CLOTH (OR APPROVED EQUIVALENT)

1.0m WIDE FOREBAY DEWATERING SUMP WITH 300mmø PVC (SDR–35) WITH 25mmø HOLES SPACED 75mm C/C AND WRAPPED IN TERRAFIX '270R' FILTER FABRIC (OR APPROVED EQUIVALENT) AS PER THE DETAIL ON DWG SWM4, PERFORATED SECTION TO EXTEND FROM ELEVATION 259.25 TO 256.35.

94.4m² EROSION PROTECTION CONSISTING OF 100–300mmø RIP–RAP PLACED 450mm DEEP OVERLYING "TERRAFIX 270R" FILTER CLOTH (OR APPROVED EQUIVALENT)

30.08m @ 1.50%

92.75m @ 0.50%

87.49m @ 1.50%

1.50m CONC. SIDEWALK

ACCESS TO BE PROVIDED BY VEHICULAR CONTROL GATE AS PER CITY OF BARRIE STANDARD BSD–1215 AND BSD–1216 (REFER TO THE DETAIL ON DWG SWM4)

WARNING SIGNAGE AS PER CITY OF BARRIE STANDARD BSD–83 (REFER TO DETAIL ON DWG SWM4)

0.0m @ 0.50%

KEY PLAN
NOT TO SCALE

SITE

MAPLEVIEW DRIVE EAST

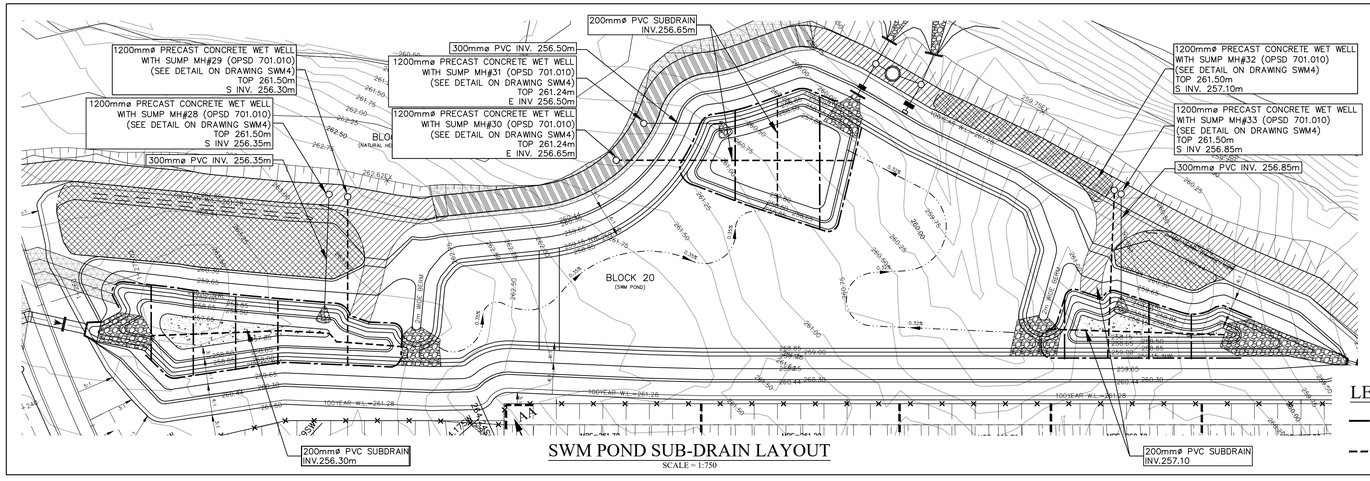
MADELAINE DRIVE

WOODSDALE CRESCENT

LOCKHART ROAD

GENERAL NOTES:

1. THIS STORMWATER FACILITY DESIGN IS TO BE REVIEWED IN CONJUNCTION WITH THE REPORT ENTITLED "750 LOCKHART ROAD, BALLYMORE SWM REPORT" DATED JULY 2023, PREPARED BY SCS CONSULTING GROUP LIMITED.
2. ALL SUBSTITUTIONS IN MATERIAL SPECIFICATIONS TO BE APPROVED BY ENGINEER PRIOR TO USE.
3. ALL DIMENSIONS SHOWN IN METRES (m) UNLESS OTHERWISE NOTED.
4. REFER TO DRAWINGS SWM2 AND SWM3 FOR POND DETAILS.
5. REGULAR CONSTRUCTION MONITORING BY THE GEOTECHNICAL ENGINEER SHOULD BE CARRIED OUT DURING POND CONSTRUCTION.
6. EROSION CONTROL BLANKETS AND TURF REINFORCEMENT MATS TO BE INSTALLED AS PER MANUFACTURER'S GUIDELINES.
7. RESTORATION, SEED MIX AND PLANTING TO BE CARRIED OUT AS PER LANDSCAPE RESTORATION DRAWINGS PREPARED BY THE LANDSCAPE ARCHITECT.
8. TOPSOIL RESTORATION DEPTH 0.30 m FOR ALL AREAS EXTENDING 3.0m INTO THE PERMANENT POOL.
9. GEOTECHNICAL CONSULTANT TO CERTIFY POND CONSTRUCTION AND FILL MATERIAL PLACEMENT.
10. POND SIDES SLOPES TO BE COMPACTED TO THE APPROVAL OF THE GEOTECHNICAL ENGINEER.



SWM POND SUB-DRAIN LAYOUT

SCALE = 1:750

	SWM FACILITY SUMMARY: SWM POND (2.27ha)				
	VOLUME (m³)		ELEVATION (m)	FREEBOARD (m)	OUTLET FLOW (Q) (m³/s)
	REQUIRED	PROVIDED			
PERMANENT POOL	3,310	3,917	259.15	2.45	–
Extended Detention	5,841	5,876	259.80	1.80	0.166
2 YEAR	N/R	9,753	260.16	1.44	0.223
5 YEAR	N/R	14,033	260.51	1.09	0.430
10 YEAR	N/R	17,046	260.73	0.87	0.524
25 YEAR	N/R	20,353	260.96	0.64	0.894
50 YEAR	N/R	22,901	261.13	0.47	1.124
100 YEAR	N/R	25,222	261.28	0.32	1.187

N/R – NOT REQUIRED

BENCH MARKS

TOPOGRAPHIC SURVEY PROVIDED BY JD BARNES LIMITED (DATE: 12–DEC–2017)
ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM BENCHMARK No. 03120110025. HAVING A PUBLISHED ELEVATION OF 266.687 METRES.
CITY OF BARRIE CONTROL MONUMENTS:
1. MONUMENT No.: 03120110014 – LOCATED ON YONGE STREET ON THE WEST SIDE OF THE STREET, APPROXIMATELY 75m NORTH OF THE LOCKHART ROAD AND YONGE INTERSECTION
VERTICAL AND HORIZONTAL
N: 4910284.662 E: 609772.678 EL: 268.680
2. MONUMENT No.: 03120110025 – LOCATED ON LOCKHART ROAD ON THE NORTH SIDE OF THE BOULEVARD, APPROXIMATELY 410m EAST OF THE THE LOCKHART ROAD AND YONGE INTERSECTION
VERTICAL AND HORIZONTAL
N: 4910364.775 E: 610203.171 EL: 266.687

LEGEND:
- 100mmø SUBDRAIN 1.3m BELOW POND BOTTOM IN DRAINAGE BLANKET
- SUBDRAIN AT CONSTANT ELEVATION

SCALE 5 0 10 20 30 40

LEGEND

- LIMIT OF SUBDIVISION
- LIMIT OF PHASE
- PROPOSED STORM MANHOLE/SEWER
- SINGLE/DOUBLE CATCHBASIN WITH NO ICD AND WITH CB SHIELD (SEE DETAIL ON DWG. DET3)
- 300.25 EXISTING CONTOUR AND ELEVATION
- ×223.23 PROPOSED GRADE ELEVATION
- ×223.23FUT FUTURE GRADE ELEVATION
- ×229.66Ex EXISTING GRADE ELEVATION
- OVERLAND FLOW DIRECTION
- PROPOSED EMBANKMENT (MAX 3:1 SLOPE UNLESS OTHERWISE NOTED)
- RIP–RAP
- SPILLWAY MULTI–USE PATH/ MAINTENANCE ACCESS ROAD
- MULTI–USE PATH/MAINTENANCE ACCESS ROAD
- NORMAL WATER LEVEL
- EROSION MATTING HATCH
- SEDIMENT DRYING AREA
- 1.0m THICK CLAY LINER
- BH16 BOREHOLE LOCATION
- BLACK VINYL 9 GAUGE CHAIN LINK FENCE AS PER CITY OF BARRIE STANDARD BSD–1211
- 217.60 PROPOSED CONTOUR AND POND ELEVATION
- 218.65 100 YEAR WATER LEVEL AND ELEVATION
- LOW FLOW CHANNEL
- 60 LOT NUMBER

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475–1900
FAX: (905) 475–8335

Ballymore HOMES
12840 YONGE STREET
SUITE 200
RICHMOND HILL, ON. L4E 4H1
TEL: (905) 773–1048

BALLYMORE BUILDING (BARRIE) CORPORATION

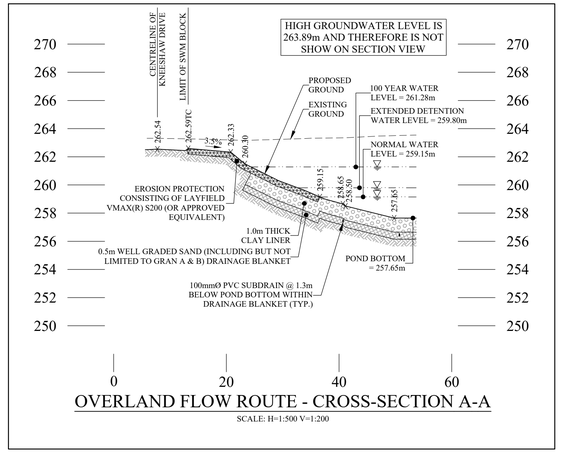
750 LOCKHART ROAD

STORMWATER MANAGEMENT FACILITY PLAN

Barrie
ENGINEERING DEPARTMENT

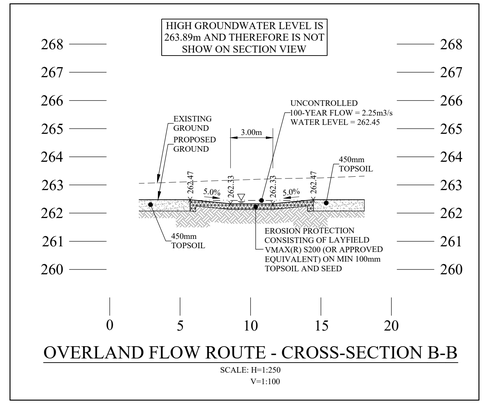
SCALE	1:500	CONTRACT NO.	1964
DESIGN	M.G.V.	DRAWN M.J.O.	SHEET NO. SWM1
REVIEWED	J.M.P.	DATE OCTOBER 2024	

File: P:\1964 750 Lockhart Road – Ballymore – Barrie\Drawings\Phase 1\Swm\1964D–SWMN–SWM1.dwg – Revised by <AWANG> : Wed, Apr 24 2024 – 10:12am



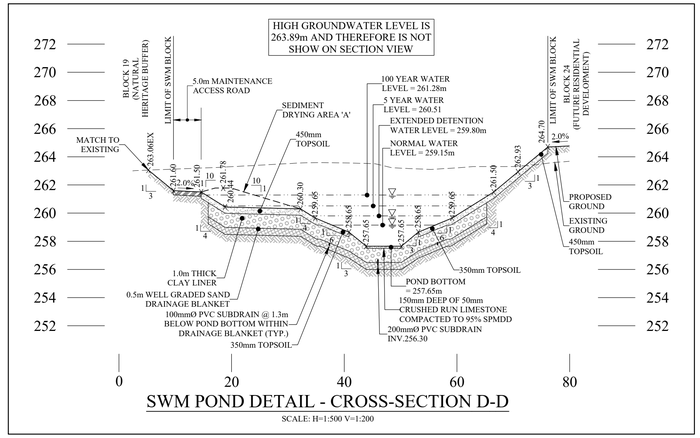
OVERLAND FLOW ROUTE - CROSS-SECTION A-A

SCALE: H=1:500 V=1:200



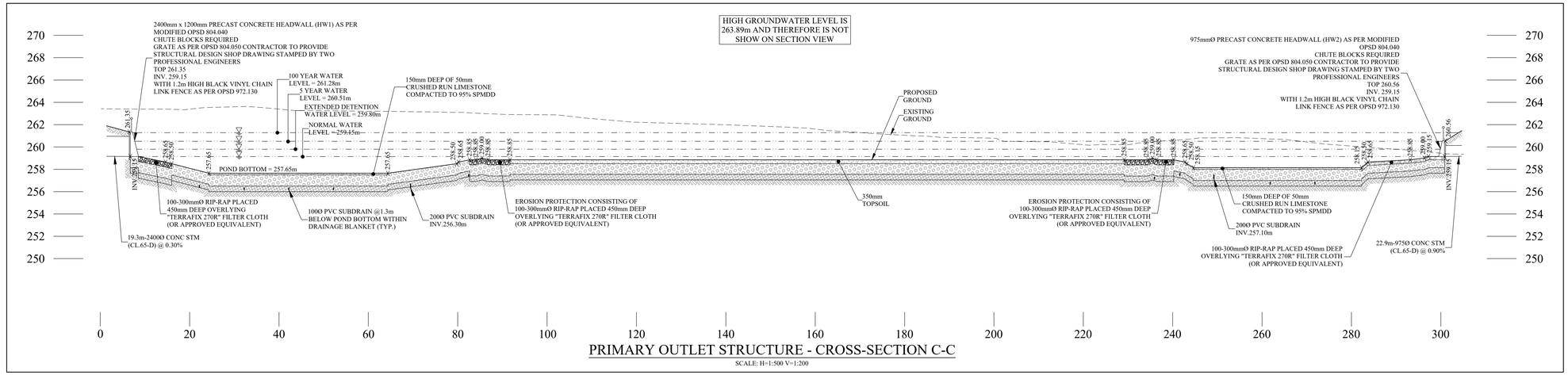
OVERLAND FLOW ROUTE - CROSS-SECTION B-B

SCALE: H=1:250
V=1:100



SWM POND DETAIL - CROSS-SECTION D-D

SCALE: H=1:500 V=1:200



PRIMARY OUTLET STRUCTURE - CROSS-SECTION C-C

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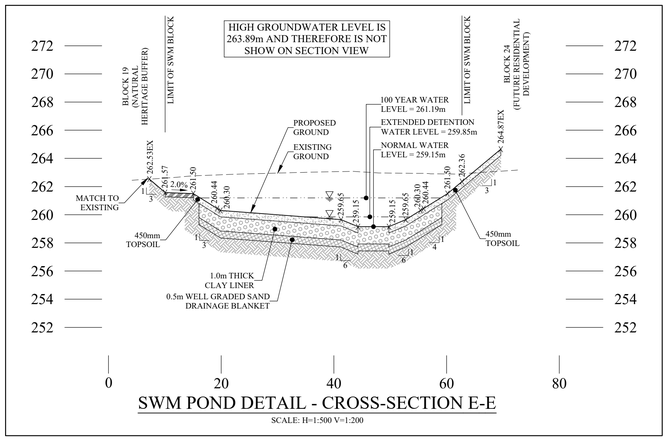
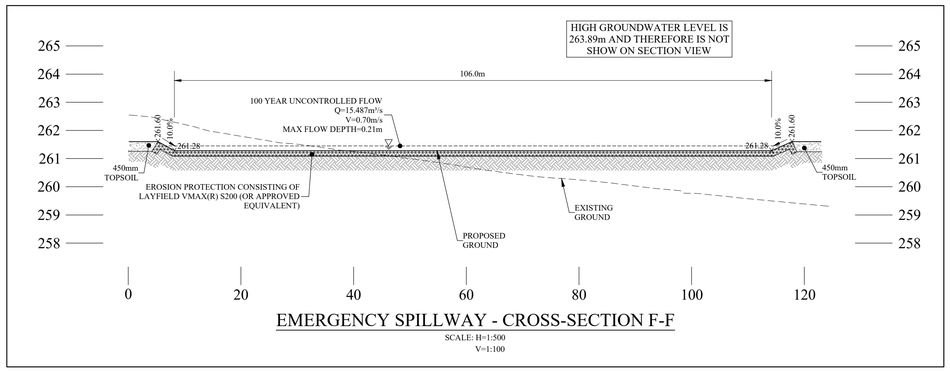


SWM POND DETAIL - CROSS-SECTION E-E

SCALE: H=1:500 V=1:200



EMERGENCY SPILLWAY - CROSS-SECTION F-F

SCALE: H=1:500
V=1:100

GENERAL NOTES

REFER TO CURRENT CITY OF BARRIE STANDARDS FOR APPLICABLE GENERAL NOTES.

BENCH MARKS

TOPOGRAPHIC SURVEY PROVIDED BY JD BARNES LIMITED (DATE: 12-DEC-2017)
ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM BENCHMARK No. 03120110025. HAVING A PUBLISHED ELEVATION OF 266.687 METRES

CITY OF BARRIE CONTROL MONUMENTS:

1. MONUMENT No.: 03120110014 – LOCATED ON YONGE STREET ON THE WEST SIDE OF THE STREET, APPROXIMATELY 75m NORTH OF THE LOCKHART ROAD AND YONGE INTERSECTION
   VERTICAL AND HORIZONTAL
   N: 4910284.662 E: 609772.678 EL: 268.680
2. MONUMENT No.: 03120110025 – LOCATED ON LOCKHART ROAD ON THE NORTH SIDE OF THE BOULEVARD, APPROXIMATELY 410m EAST OF THE THE LOCKHART ROAD AND YONGE INTERSECTION
   VERTICAL AND HORIZONTAL
   N: 4910364.775 E: 610203.171 EL: 266.687

NO.	REVISIONS	DATE	APPROVED
1.	FIRST SUBMISSION	FEB. 2022	
1.	SECOND SUBMISSION	NOV. 2022	
1.	THIRD SUBMISSION	JUL. 2023	

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

Ballymore HOMES
12840 YONGE STREET
SUITE 200
RICHMOND HILL, ON. L4E 4H1
TEL: (905) 773-1048

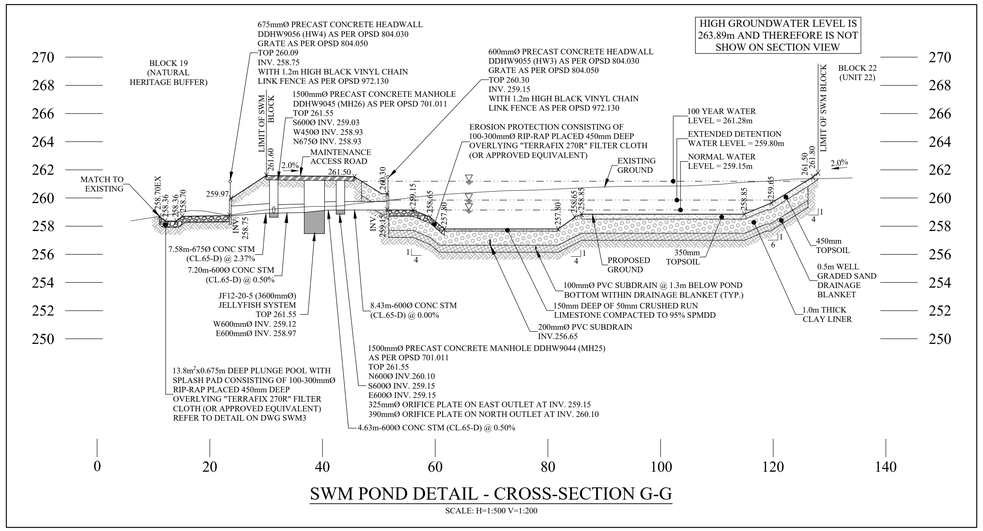
BALLYMORE BUILDING (BARRIE) CORPORATION

750 LOCKHART ROAD

STORMWATER MANAGEMENT FACILITY CROSS SECTIONS 1

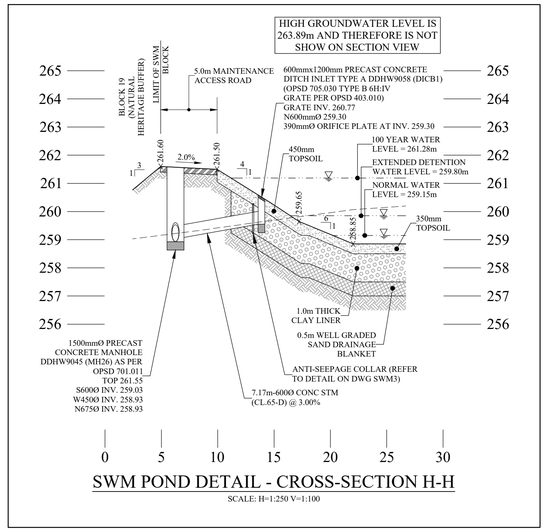
Barrie
ENGINEERING DEPARTMENT

SCALE HOR.	AS SHOWN		CONTRACT NO. 1964
DESIGN	M.G.V.	DRAWN M.J.O.	SHEET NO. SWM2
REVIEWED	J.M.P.	DATE OCTOBER 2024	



SWM POND DETAIL - CROSS-SECTION G-G

SCALE: H=1:500 V=1:200



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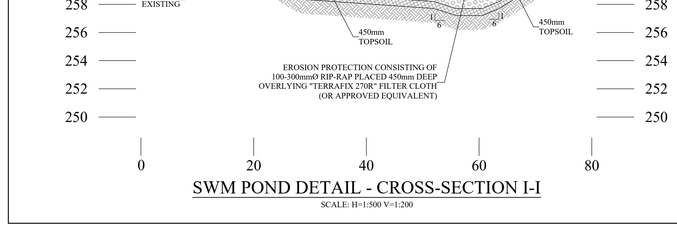
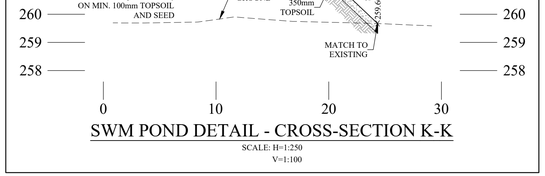


SWM POND DETAIL - CROSS-SECTION I-I

SCALE: H=1:500 V=1:200



SWM POND DETAIL - CROSS-SECTION K-K

SCALE: H=1:250
V=1:100

GENERAL NOTES

REFER TO CURRENT CITY OF BARRIE STANDARDS FOR APPLICABLE GENERAL NOTES.

BENCH MARKS

TOPOGRAPHIC SURVEY PROVIDED BY JD BARNES LIMITED (DATE: 12-DEC-2017)
ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM BENCHMARK No. 03120110025, HAVING A PUBLISHED ELEVATION OF 266.687 METRES
CITY OF BARRIE CONTROL MONUMENTS:

1. MONUMENT No.: 03120110014 – LOCATED ON YONGE STREET ON THE WEST SIDE OF THE STREET, APPROXIMATELY 75m NORTH OF THE LOCKHART ROAD AND YONGE INTERSECTION
   VERTICAL AND HORIZONTAL
   N: 4910284.662 E: 609772.678 EL: 268.680
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   VERTICAL AND HORIZONTAL
   N: 4910364.775 E: 610203.171 EL: 266.687

NO.	REVISIONS	DATE	APPROVED
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1.	THIRD SUBMISSION	JUL. 2023	

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RICHMOND HILL, ON. L4E 4H1
TEL: (905) 773-1048

BALLYMORE BUILDING (BARRIE) CORPORATION
750 LOCKHART ROAD

STORMWATER MANAGEMENT FACILITY CROSS SECTIONS 2

Barrie
ENGINEERING DEPARTMENT

SCALE HOR.	AS SHOWN		CONTRACT NO. 1964
DESIGN	M.G.V.	DRAWN M.J.O.	
REVIEWED	J.M.P.	DATE OCTOBER 2024	SHEET NO. SWM3

File: P:\1964 750 Lockhart Road – Ballymore – Barrie\Drawings\Phase 1\Swm\19640-SWMN-SWM3.dwg – Revised by <DDILAY> : Fri, Jul 21 2023 – 1:43pm

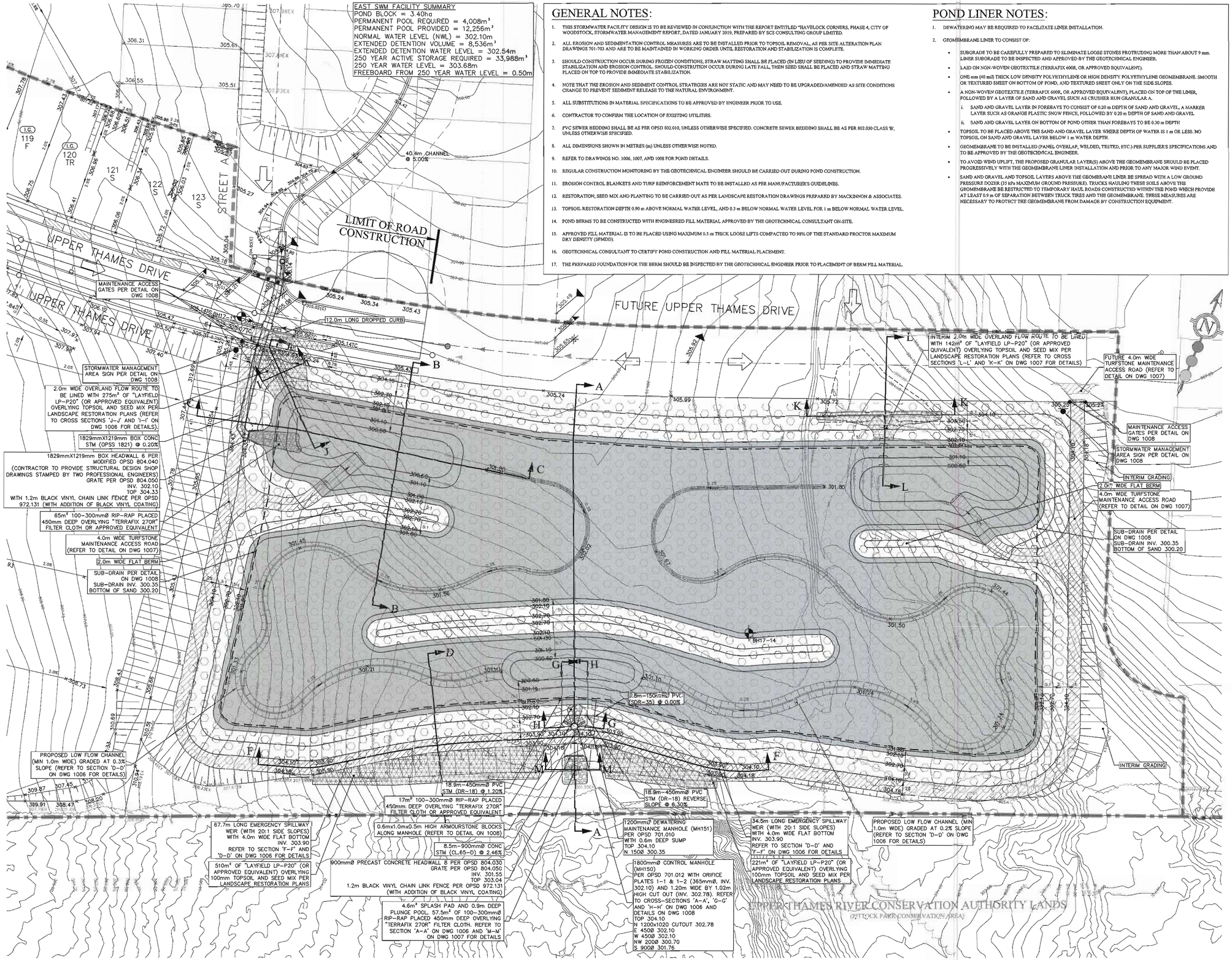
EAST SWM FACILITY SUMMARY
POND BLOCK = 3.40ha
PERMANENT POOL REQUIRED = 4,008m³
PERMANENT POOL PROVIDED = 12,256m³
NORMAL WATER LEVEL (NWL) = 302.10m
EXTENDED DETENTION VOLUME = 8,536m³
EXTENDED DETENTION WATER LEVEL = 302.54m
250 YEAR ACTIVE STORAGE REQUIRED = 33,988m³
250 YEAR WATER LEVEL = 303.68m
FREEBOARD FROM 250 YEAR WATER LEVEL = 0.50m

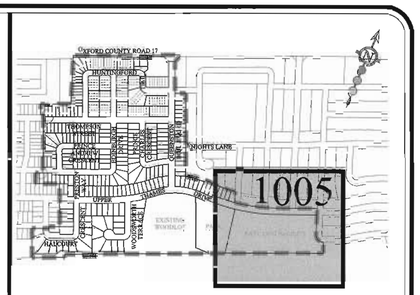
GENERAL NOTES:

1. THIS STORMWATER FACILITY DESIGN IS TO BE REVIEWED IN CONJUNCTION WITH THE REPORT ENTITLED "HAVELOCK CORNERS, PHASE 4, CITY OF WOODSTOCK, STORMWATER MANAGEMENT REPORT, DATED JANUARY 2019, PREPARED BY SCS CONSULTING GROUP LIMITED.
2. ALL EROSION AND SEDIMENTATION CONTROL MEASURES ARE TO BE INSTALLED PRIOR TO TOPSOIL REMOVAL, AS PER SITE ALTERATION PLAN DRAWINGS 701-703 AND ARE TO BE MAINTAINED IN WORKING ORDER UNTIL RESTORATION AND STABILIZATION IS COMPLETE.
3. SHOULD CONSTRUCTION OCCUR DURING FROZEN CONDITIONS, STRAW MATTING SHALL BE PLACED (IN LIEU OF SEEDING) TO PROVIDE IMMEDIATE STABILIZATION AND EROSION CONTROL. SHOULD CONSTRUTION OCCUR DURING LATE FALL, THEN SEED SHALL BE PLACED AND STRAW MATTING PLACED ON TOP TO PROVIDE IMMEDIATE STABILIZATION.
4. NOTE THAT THE EROSION AND SEDIMENT CONTROL STRATEGIES ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO PREVENT SEDIMENT RELEASE TO THE NATURAL ENVIRONMENT.
5. ALL SUBSTITUTIONS IN MATERIAL SPECIFICATIONS TO BE APPROVED BY ENGINEER PRIOR TO USE.
6. CONTRACTOR TO CONFIRM THE LOCATION OF EXISTING UTILITIES.
7. PVC SEWER BEDDING SHALL BE AS PER OPSD 802.010, UNLESS OTHERWISE SPECIFIED. CONCRETE SEWER BEDDING SHALL BE AS PER 802.030 CLASS 'B', UNLESS OTHERWISE SPECIFIED.
8. ALL DIMENSIONS SHOWN IN METRES (m) UNLESS OTHERWISE NOTED.
9. REFER TO DRAWINGS NO. 1006, 1007, AND 1008 FOR POND DETAILS.
10. REGULAR CONSTRUCTION MONITORING BY THE GEOTECHNICAL ENGINEER SHOULD BE CARRIED OUT DURING POND CONSTRUCTION.
11. EROSION CONTROL BLANKETS AND TURF REINFORCEMENT MATS TO BE INSTALLED AS PER MANUFACTURER'S GUIDELINES.
12. RESTORATION, SEED MIX AND PLANTING TO BE CARRIED OUT AS PER LANDSCAPE RESTORATION DRAWINGS PREPARED BY MACKINNON & ASSOCIATES.
13. TOPSOIL RESTORATION DEPTH 0.90 m ABOVE NORMAL WATER LEVEL, AND 0.3 m BELOW NORMAL WATER LEVEL FOR 1 m BELOW NORMAL WATER LEVEL.
14. POND BERMS TO BE CONSTRUCTED WITH ENGINEERED FILL MATERIAL APPROVED BY THE GEOTECHNICAL CONSULTANT ON-SITE.
15. APPROVED FILL MATERIAL IS TO BE PLACED USING MAXIMUM 0.3 m THICK LOOSE LIFTS COMPACTED TO 98% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD).
16. GEOTECHNICAL CONSULTANT TO CERTIFY POND CONSTRUCTION AND FILL MATERIAL PLACEMENT.
17. THE PREPARED FOUNDATION FOR THE BERM SHOULD BE INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACEMENT OF BERM FILL MATERIAL.

POND LINER NOTES:

1. DEWATERING MAY BE REQUIRED TO FACILITATE LINER INSTALLATION.
2. GEOMEMBRANE LINER TO CONSIST OF:
   - SUBGRADE TO BE CAREFULLY PREPARED TO ELIMINATE LOOSE STONES PROTRUDING MORE THAN ABOUT 9 mm. LINER SUBGRADE TO BE INSPECTED AND APPROVED BY THE GEOTECHNICAL ENGINEER.
   - LAID ON NON-WOVEN GEOTEXTILE (TERRAFIX 600R, OR APPROVED EQUIVALENT).
   - ONE mm (40 mil) THICK LOW DENSITY POLYETHYLENE OR HIGH DENSITY POLYETHYLENE GEOMEMBRANE. SMOOTH OR TEXTURED SHEET ON BOTTOM OF POND, AND TEXTURED SHEET ONLY ON THE SIDE SLOPES.
   - A NON-WOVEN GEOTEXTILE (TERRAFIX 600R, OR APPROVED EQUIVALENT), PLACED ON TOP OF THE LINER, FOLLOWED BY A LAYER OF SAND AND GRAVEL SUCH AS CRUSHER RUN GRANULAR A.
     i. SAND AND GRAVEL LAYER IN FOREBAYS TO CONSIST OF 0.20 m DEPTH OF SAND AND GRAVEL, A MARKER LAYER SUCH AS ORANGE PLASTIC SNOW FENCE, FOLLOWED BY 0.20 m DEPTH OF SAND AND GRAVEL
     ii. SAND AND GRAVEL LAYER ON BOTTOM OF POND OTHER THAN FOREBAYS TO BE 0.30 m DEPTH
   - TOPSOIL TO BE PLACED ABOVE THE SAND AND GRAVEL LAYER WHERE DEPTH OF WATER IS 1 m OR LESS. NO TOPSOIL ON SAND AND GRAVEL LAYER BELOW 1 m WATER DEPTH.
   - GEOMEMBRANE TO BE INSTALLED (PANEL OVERLAP, WELDED, TESTED, ETC.) PER SUPPLIER'S SPECIFICATIONS AND TO BE APPROVED BY THE GEOTECHNICAL ENGINEER.
   - TO AVOID WIND UPLIFT, THE PROPOSED GRANULAR LAYER(S) ABOVE THE GEOMEMBRANE SHOULD BE PLACED PROGRESSIVELY WITH THE GEOMEMBRANE LINER INSTALLATION AND PRIOR TO ANY MAJOR WIND EVENT.
   - SAND AND GRAVEL AND TOPSOIL LAYERS ABOVE THE GEOMBRANE LINER BE SPREAD WITH A LOW GROUND PRESSURE DOZER (55 kPa MAXIMUM GROUND PRESSURE). TRUCKS HAULING THESE SOILS ABOVE THE GEOMEMBRANE BE RESTRICTED TO TEMPORARY HAUL ROADS CONSTRUCTED WITHIN THE POND WHICH PROVIDE AT LEAST 0.9 m OF SEPARATION BETWEEN TRUCK TIRES AND THE GEOMEMBRANE. THESE MEASURES ARE NECESSARY TO PROTECT THE GEOMEMBRANE FROM DAMAGE BY CONSTRUCTION EQUIPMENT.





KEY PLAN
N.T.S.

BENCHMARK: No.00119663385 ELEV. 299.824m

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO THE GEODETIC SURVEY OF CANADA FIRST-ORDER BENCHMARK No. 00119663385 HAVING AN ELEVATION OF 299.824 METRES LOCATED NORTHEAST CORNER OF THE INTERSECTION OF VANSITTART AVENUE AND DEVON SHIRE AVENUE IN WOODSTOCK, ONTARIO. BENCHMARK IS APPROXIMATELY 22.2m NORTHEAST OF THE INTERSECTION OF CNETRELINE OF THE AVENUE, 4.7m SOUTH OF THE SOUTHWEST CORNER OF VANSITTART MANOR, 15.3m SOUTHWEST OF THE SOUTHEAST CORNER OF THE SAMS MANOR, 40.2m WSW OF THE SW CORNER OF VAN DEVON MANOR AND 4.6m NORTH OF A LIGHT POLE MARKED BY A BROWN TABLET SET IN A CONCRETE MONUMENT.

LEGEND:

- LIMIT OF DEVELOPMENT
- LIMIT OF PHASE
- PROPOSED SANITARY MANHOLE/SEWER
- PROPOSED STORM MANHOLE/SEWER
- PROPOSED FUTURE SANITARY MANHOLE/SEWER
- PROPOSED SUB-DRAIN
- × 303.90 PROPOSED GRADE
- × 305.15TC PROPOSED TOP OF CURB GRADE
- × 304.89(G) PROPOSED GUTTER GRADE
- × 305.99 INT PROPOSED INTERIM GRADE
- × 304.67EX EXISTING GRADE
- 304.10 PROPOSED ULTIMATE CONTOUR AND ELEVATION
- 304.10 PROPOSED INTERIM CONTOUR AND ELEVATION
- 301 EXISTING CONTOUR AND ELEVATION
- OVERLAND FLOW DIRECTION
- GEOMEMBRANE LINER
- TURFSTONE MAINTENANCE ACCESS ROAD
- RIP-RAP
- TURF REINFORCEMENT MATTING
- PROPOSED SLOPING (MAX 3:1)
- PROPOSED 1.5m HIGH CHAIN LINK FENCE
- BH17-14 APPROXIMATE BOREHOLE LOCATION
- CURB CUT

REVISIONS

No.	DESCRIPTION	DATE	BY	APPROVED

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

City of Woodstock
500 DUNDAS STREET
WOODSTOCK, ONTARIO N4S 0A7
TEL: (519) 539-1291

THAMES DEVELOPMENTS INC.

HAVELOCK CORNERS WOODSTOCK PHASE 4

EAST STORMWATER MANAGEMENT FACILITY

DATE: JANUARY 2019	DESIGNED BY: E.S.D.	CHECKED BY: S.E.K.
SCALE: 1:500	DRAWN BY: E.S.D.	CHECKED BY: M.R.C.

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF SCS CONSULTING GROUP AS TO DESIGN AND SPECIFICATION.

Harold de Haan, P.Eng., City Engineer — Date

PROJECT No: 1344

DRAWING No: 1005

LICENSED PROFESSIONAL ENGINEER — E.T.C. KNECHTEL — 100157433 — PROVINCE OF ONTARIO

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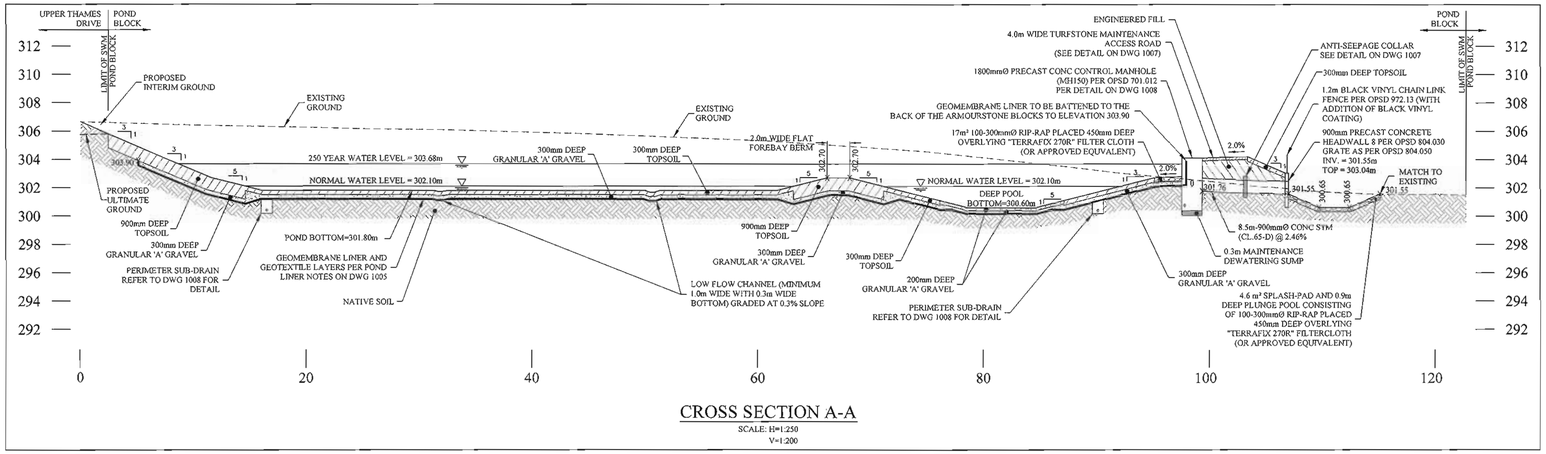

CROSS SECTION A-A

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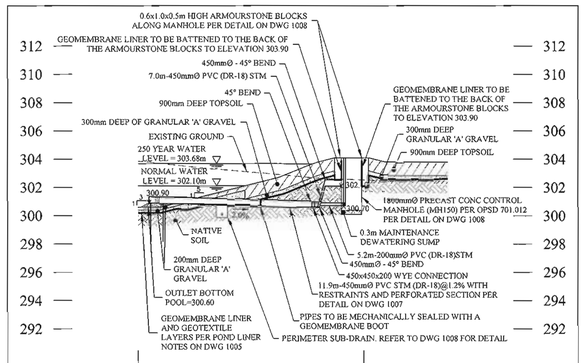

CROSS SECTION G-G

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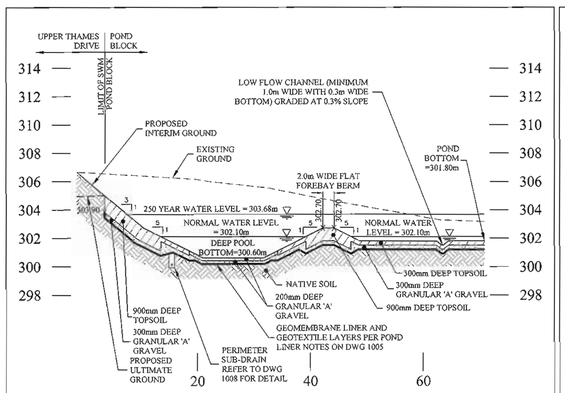

CROSS SECTION B-B

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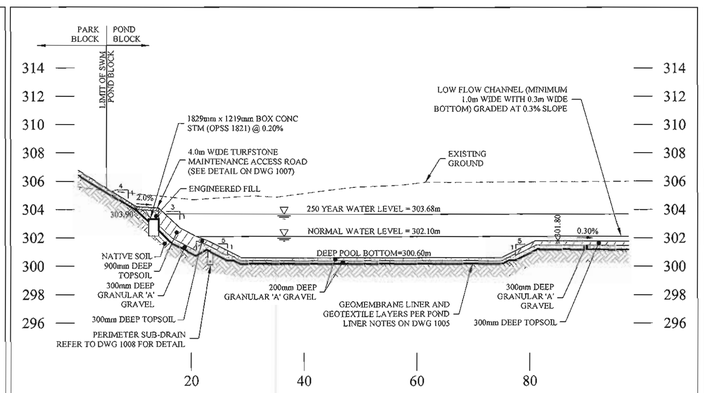

CROSS SECTION C-C

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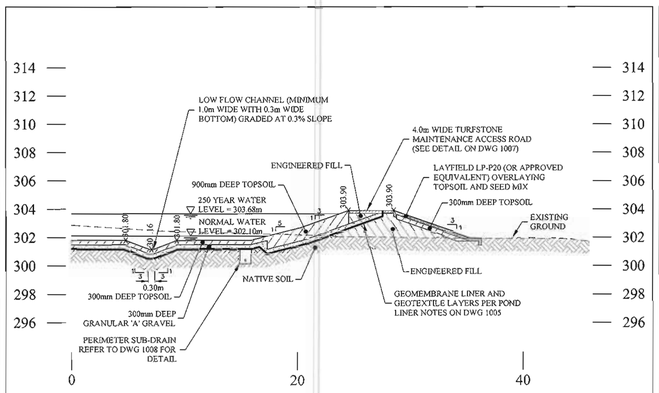

CROSS SECTION D-D

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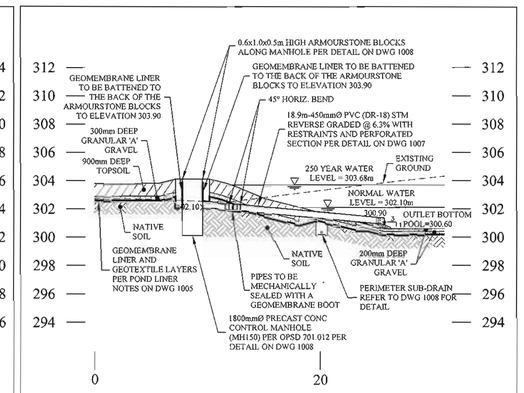

CROSS SECTION H-H

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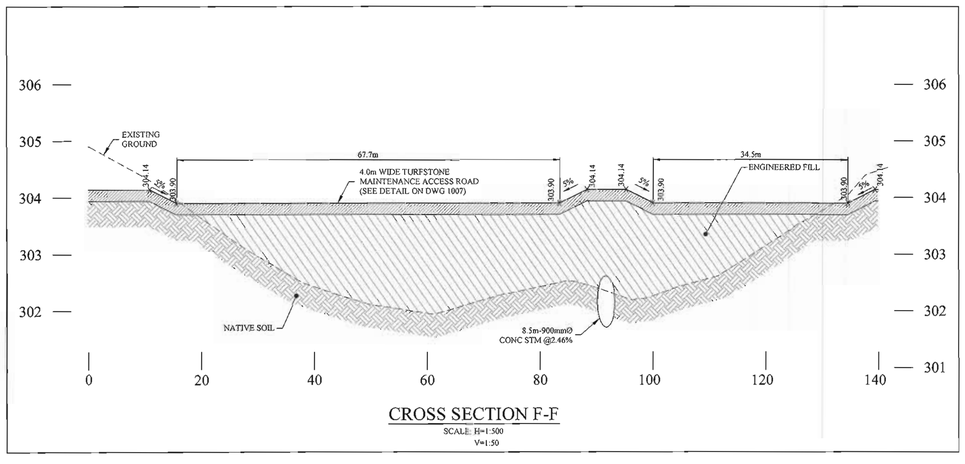
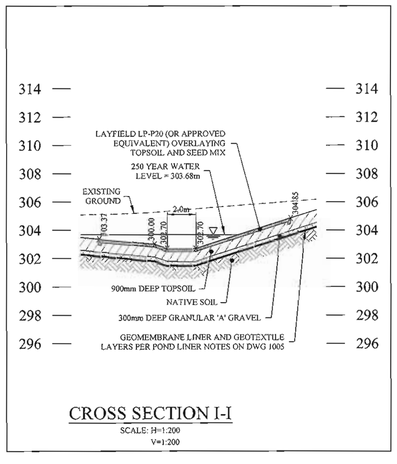


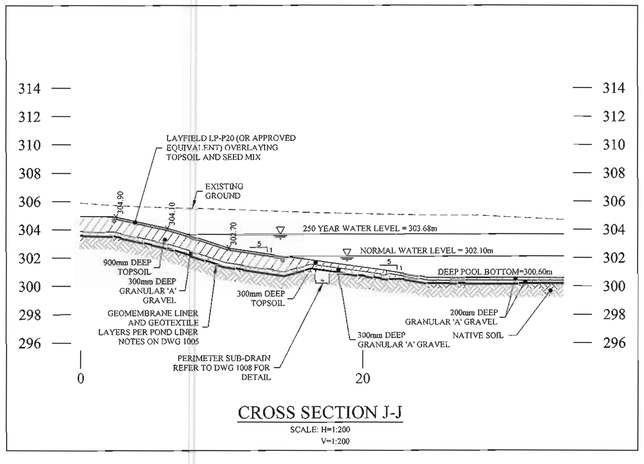
CROSS SECTION F-F

SCALE: H=1:500
V=1:50



CROSS SECTION I-I

SCALE: H=1:200
V=1:200



CROSS SECTION J-J

SCALE: H=1:200
V=1:200

REVISIONS

No.	DESCRIPTION	DATE	BY	APPROVED

scs consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

City of Woodstock
500 DUNDAS STREET
WOODSTOCK, ONTARIO N4S 0A7
TEL: (519) 539-1291

THAMES DEVELOPMENTS INC.

HAVELOCK CORNERS WOODSTOCK PHASE 4

EAST STORMWATER MANAGEMENT FACILITY SECTIONS AND DETAILS 1

LICENSED PROFESSIONAL ENGINEER
Nov 15/19
E.T.C. KWECHTEL
100157435
PROVINCE OF ONTARIO

DATE: JANUARY 2019	DESIGNED BY: E.K./E.S.D.	CHECKED BY: S.E.K.
SCALE: AS SHOWN	DRAWN BY: D.M.D.	CHECKED BY: M.R.C.

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF SCS CONSULTING GROUP AS TO DESIGN AND SPECIFICATION.

Harold de Haan, P.Eng., City Engineer — Date

PROJECT No: 1344

DRAWING No: 1006

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