STORMWATER MANAGEMENT REPORT

In Support of Site Plan Approval

Taunton Road and Peter Matthews Drive
City of Pickering
Proposed Commercial Development

Report Prepared for:

Seaton Commercial Developments Ltd.
5400 Yonge St., Suite 300
North York, Ontario
M2N 5R5

Report Prepared by:

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Burlington, Ontario
L7L 7A9

KWA Project#: 23810

Dec 4th, 2025

This report reflects best engineering judgment based on the material available at the time of its preparation. KWA Site Development Consulting Inc. accepts no responsibility for any damages to a third party that may arise as a result of decisions made or actions taken based on this report.

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1.0 INTRODUCTION

KWA Site Development Consulting Inc. ("KWA") has been retained by Seaton Commercial Developments Ltd. ("Client") to prepare this Stormwater Management Report in support of a Site Plan Approval ("SPA") for the commercial development located at Taunton Road and Burkholder Drive in the City of Pickering, Ontario.

The area that is subject to this application (herein the "site") is approximately 6.08 hectares (ha) and is located within Block 76 and a portion of Block 188 of the Taunton Road and Taunton Road West Subdivision. The site is part of the Duffins Creek Watershed. Generally, the site is sloped northwest to southeast with elevations ranging from 176 m (in the northwest corner) to 167 m (in the southeast corner). The Trans-Northern Pipeline (TNP) Easement is located along the south boundary with Marathon Avenue and is approximately 18 m wide and 0.44 ha in area. There is also approximately 0.16 ha of site area located southwest of the TNP Easement. A private right-of-way, approximately 0.39 ha in area, is proposed along the eastern perimeter and provides connection to Taunton Road and Marathon Avenue. In addition, two other access points are proposed: one from Burkholder Drive and another from Taunton Road.

Surrounding land uses include:

- Taunton Road to the north,
- Private right-of-way (ROW) to the east,
- Marathon Avenue to the south and,
- Burkholder Drive to the west.

The site plan proposes seven (7) commercial buildings. There will be approximately 643 on-site parking spaces. Refer to the **Site Plan (A100)** developed by GetReal Architectural Services.

2.0 BACKGROUND INFORMATION

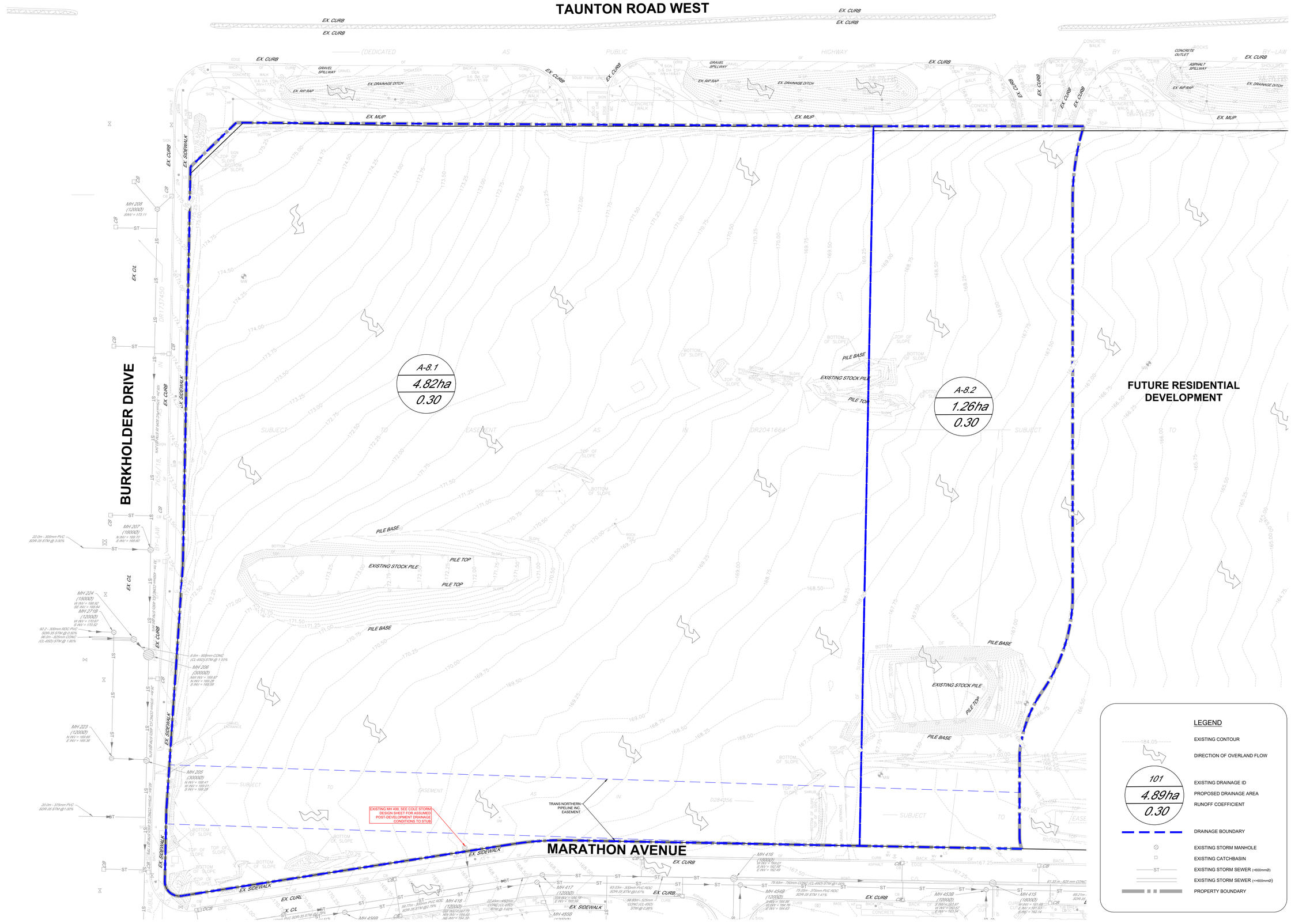
This Stormwater Management Report has been prepared in coordination and regarding the following documents and drawings:

- Architectural Site Plan prepared by GetReal Architectural Services (received Dec 2, 2025)
- Topographic Survey by J.D.Barnes Ltd (dated July 28, 2025)
- Geotechnical Investigation for Fieldgate Seaton Community Development by GEMTEC (dated September 30, 2025)
- Hydrogeological Investigation for Fieldgate Seaton Community Development by GEMTEC (dated October 22, 2025)
- Taunton Road and Taunton West Subdivision Stormwater Management Report by Cole Engineering Group Ltd., dated November 2017
- City of Pickering Storm Water Management Design Guidelines (July 2019)
- TRCA's Stormwater Management Criteria (August 2012, Version 1.0)
- TRCA and CVC's Low Impact Development Stormwater Management Planning and Design Guide (2010, Version 1.0) ["TRCA/ CVC's LID SWM Guide"]

3.0 STORMWATER MANAGEMENT

3.1 EXISTING DRAINAGE CONDITIONS

The Site is currently undeveloped. Generally, the site is sloped northwest to southeast with elevations ranging from 176 m (in the northwest corner) to 167 m (in the southeast corner). Runoff from the site currently discharges into the existing ESC pond located on the property to the east, connecting to the 750 mm storm sewer along Peter Matthews Drive and ultimately discharging to the 975 mm storm sewer along Marathon Avenue. Refer to the attached **Existing Drainage Plan (EDP)**.



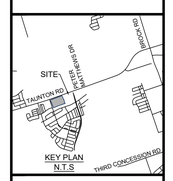
REVISION BLOCK

#	DATE	DESCRIPTION
1	04/14/23	ISSUED FOR SPA
2	12/04/25	ISSUED FOR SPA

REGISTERED PROFESSIONAL ENGINEER
B.JACKSON
100210382
DEC. 4, 2025
PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC.
2450 Lancaster Drive
Burlington, ON L7L 7A9

NORTH ARROW



KEY PLAN
N.T.S

SURVEY AND BENCHMARK NOTE

EXISTING TOPOGRAPHIC INFORMATIONS SHOWN ON THIS PLAN ARE BASED ON J.D. BARNES LTD. DRAWING (REF. NO. 25-25-390-00), DATED AUGUST 20, 2025

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING VERTICAL

METRIC SCALE
0 5 10 20
1:500

EXISTING DRAINAGE PLAN

FIELDGATE COMMERCIAL
TAUNTON RD/BURKHOLDER DR.
OPA 2025-001/P • A 06/25 : PRE 023-028/22
PICKERING, ONTARIO

CHECKED BY: BJ
DRAWN BY: RB
PROJECT No: 23810

EDP

3.1.1 ALLOWABLE RELEASE RATES

A Stormwater Management (SWM) Report, prepared by Cole Engineering (November 2017), was provided by GEI Consultants, and confirmed by the City of Pickering engineering staff. It included design of the overall subdivision development that encompasses the Site.

Cole Engineering determined the target (pre-development) flow rates by updating the hydrology analysis completed by Aquafor Beech (February 2013) with a post-development conditions scenario to establish unit storage and outflow rates for the development areas within the Seaton Development. This site is located within Block 76 (A-8.1) and a portion of Block 188 (A-8.2) as described in the Cole Engineering SWM Report. Based on the release rate criteria and the total allowable drainage area of 36.53 ha to downstream Stormwater Management Facility 2 (SWMF 2), the allowable release rates for Blocks 76 and 188 were determined as outlined in **Table 1** below. Refer to the attached **Storm Drainage Plan** by Cole Engineering (March 2015).

Table 1: Allowable Release Rates for Block 76 and 188

Storm Event	Unit Release Rate (L/s/imp. ha)	Target Flows for Block 76 (m^3/s)	Target Flows for Block 188 (m^3/s)
2-Yr Event	3.59	0.012	0.022
5-Yr Event	5.82	0.015	0.034
10-Yr Event	7.40	0.024	0.043
25-Yr Event	9.66	0.032	0.053
50-Yr Event	11.43	0.039	0.061
100-Yr Event	13.32	0.045	0.071

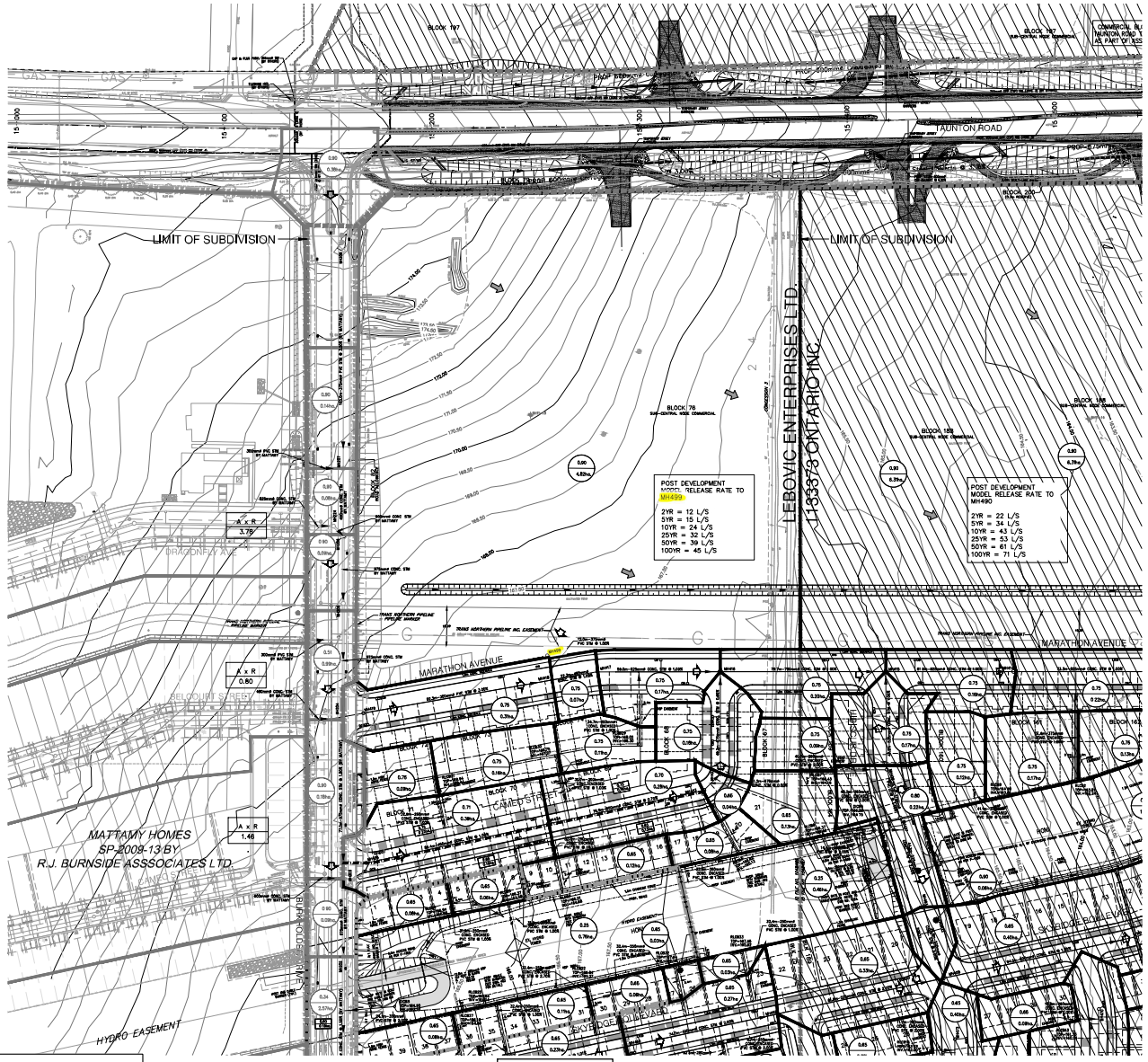
Since the subject site is fully within Block 76 (i.e., it encompasses 4.82 ha or 100% of the site) and partially within Block 188 (i.e., it encompasses 1.26 ha or 20% of the site), the flows are proportioned as presented in **Table 2** below.

Table 2: Allowable Release Rates for Site

Storm Event	100% of Block 76 Flows (m^3/s)	18% of Block 188 Flows (m^3/s)	Target Flows for Site (m^3/s)
2-Yr Event	0.012	0.004	**0.016**
5-Yr Event	0.015	0.007	**0.022**
10-Yr Event	0.024	0.009	**0.033**
25-Yr Event	0.032	0.011	**0.043**
50-Yr Event	0.039	0.012	**0.051**
100-Yr Event	0.045	0.014	**0.059**

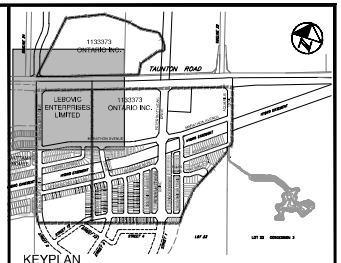
Based on the as-constructed drawings by GEI for Marathon Avenue between Station 0+000 and Station 0+227.65 and the storm sewer design sheet for Marathon Avenue, a storm servicing stub is provided for Block 76 with an allocated capacity of 45 L/s under the 100-year storm event. Provided that site stormwater discharge is limited to 45 L/s or less, no additional downstream system review is required.

Refer to **Appendix B** for the as-constructed drawing of Marathon Avenue storm sewers from Station 0+000 and Station 0+227.65 prepared by GEI for Lebovic Enterprises Ltd (SP-2009-14), and the 100-year Hydraulic Grade Line Analysis design sheet by Cole Engineering (SP-2008-17).



SEE DWG. 202

NOTE: BURKHOLDER'S DRAINAGE INFORMATION AS PER RJ BURNSIDE SEPTEMBER 2017 DEASIGN.



KEYPLAN
N.T.S.

LEGEND

- 475 — CONTOUR BY OTHERS
- STORM MANHOLE BY OTHERS
- CATCH BASIN BY OTHERS
- PROPOSED STORM MANHOLE
- PROPOSED RDC MANHOLE
- CATCH BASIN – NO ICD
- PROPOSED DOUBLE CATCH BASIN
- PROPOSED STORM SEWER
- PROPOSED DITCH OR SWALE
- PROPOSED 3:1 MAX SLOPE
- PROPOSED STORM DRAINAGE AREA BOUNDARY
- PROPOSED STORM DRAINAGE AREA SUB-BOUNDARY
- MAJOR STORM DRAINAGE AREA BOUNDARY
- EXTERNAL AREA MAJOR STORM SYSTEM FLOW DIRECTION
- BOUNDARY LIMIT
- MAJOR OVERLAND FLOW DIRECTION
- 0.50 / 0.71ha — RUN-OFF COEFFICIENT / PROP. DRAINAGE AREA (ha)
- 84 85 — PROPOSED LOT NUMBERS
- PROPOSED DRIVEWAY LOCATION
- STORM SERVICE CONNECTION (TYP.)
- PROPOSED SUPER CATCH BASIN

BENCHMARK

ELEVATIONS HEREON ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING BENCHMARK No. 2-045, HAVING A PUBLISHED ELEVATION OF 126.055m (COVD-1928:1978). BRASS TABLET SET HORIZONTALLY IN SOUTH FACE OF BRICK BUILDING, LOCATED 650m± WEST OF VALLEY ROAD AND 34m± NORTH OF THE CENTERLINE OF THIRD CONCESSION ROAD. TABLET IS LOCATED 0.47m WEST OF THE SOUTHEAST CORONER OF BUILDING AND IS 0.52m ABOVE GROUND LEVEL.

No.	DESCRIPTION	DATE	BY
	REVISIONS		
2	UPDATED STORM SEWER DESIGN	01/16/18	L.A.B.
1	ISSUED FOR CONSTRUCTION	12/20/17	A.R.

THE CORPORATION OF THE CITY OF PICKERING
Engineering Services Department

APPROVED BY: RICHARD HOLBORN, P.Eng.
ENGINEERING SERVICES DEPARTMENT
Approval to works required by the City of Pickering and As defined in the Subdivision Agreement. The City is relying on the technical skills and ability of the P.Eng. sealing and signing this drawing.
DATE: DECEMBER 18, 2017

APPROVED
Approval of the Regional Works Dept. for the purposes described in the applicable Regional Subdivision or Servicing Agreement. The Region is relying on the technical skill and ability of the P.Eng. sealing and signing this drawing.
By: _____
Date: _____

LEBOVIC ENTERPRISES LIMITED
(SP-2009-14)

ORIGINALLY SIGNED BY A.M. BARBOSA HELLING ON NOV. 17, 2017 & LAZARATION ON MAR. 29, 2018
LICENSED PROFESSIONAL ENGINEER E.A. BOBOYKO PROVINCE OF ONTARIO

STORM DRAINAGE PLAN

COLE ENGINEERING

DESIGN BY:	DRAWN BY:	PROJECT No.
A.L.	T.I.	LD12-0605
SCALE: 1:1000	DATE: MARCH 2015	DRAWING No. 201

CITY FILE No.

© 2017 Cole Engineering Group Ltd.

File: S:\2012 Projects\LD\LD12-0605 (2) 1133373ON_TauntonRd\Mkdn_PKR\405-CAD\401-CAD\South\Sheets\Lebovic Enterprises Limited\PS\LD12-0605 STM 201 – 202.dwg, Date: May 10, 2018 – 8:30am, Edit By: hkuang

3.2 PROPOSED DRAINAGE CONDITIONS

All flows (2-year through 100-year) from the 6.08 ha will be captured by the private storm sewer network and conveyed to the municipal storm network on Marathon Avenue. There are three drainage areas on site where flows are captured and conveyed to an underground infiltration and storage chamber. These chambers include oil-grit separator units for pre-treatment and a control structure on the downstream end. Controlled flows from the site will discharge into an existing manhole (MH 415) along the 825 mm storm sewer on Marathon Avenue. Refer to the attached **Proposed Drainage Plan (PDP)**.

The onsite inlets, storm sewers, and swales have been designed to capture and convey the post-development 100-year peak flows. All inlet catchments are served by single and double catch basins and catch basin manholes, sized to capture the 100-year flows while assuming 50% inlet blockage and ponding depths ranging from 0.15 to 0.30 m. For catchment DCBMH9, the 100-year peak flows exceed the capacity of the interceptor double catch basin grates; therefore, these flows are routed to the downstream catchment DCB15. The double catch basin in DCB15 has sufficient capacity to accommodate both its local drainage area and the additional flows conveyed from DCBMH9.

Swales are proposed within the landscaped areas to the south to capture and convey the 100-year peak flows from the TNP and the southern portion of the site. A trapezoidal swale with a 0.3 m depth, 0.5 m bottom width, and 3:1 side slopes is sufficient to convey the 100-year peak flows from the contributing drainage areas. The onsite storm sewers are also designed to accommodate the 100-year storm event. The Proposed Catchment Plan (PCP), inlet capacity calculations, rational method and trapezoidal calculations for the swales, and the storm sewer design sheet are included in **Appendix A**.

Refer to the **Site Servicing Plan (SSP)** in **Appendix F** for the layout and sizing of the proposed storm sewers.

3.3 STORMWATER MANAGEMENT OBJECTIVES

Based on the City's Stormwater Management Guidelines, TRCA's Stormwater Management Criteria and criteria established in the Cole Engineering SWM Report, the stormwater management objectives are:

- **Quantity Control:** Control post-development peak flows to target release rates outlined in the SWM Report completed by Cole Engineering (November 2017) for all storms up to and including the 100-year storm (i.e., 2-year through 100-year storm events).
- **Quality Control:** Enhanced protection level corresponding to the removal of 80% of total suspended solids.
- **Erosion Control:** Provide extended detention of the 25 mm rainfall event for a minimum of 120 hours.
- **Water Balance:** Infiltration volume of 10mm across site area to be provided for groundwater aquifer recharge.

3.3.1 QUANTITY CONTROL

The quantity control criteria specified for the proposed development is to control post-development peak flows to the target release rates outlined in the SWM Report completed by Cole Engineering (November 2017) for all storms up to and including the 100-year storm. The flow rates and the corresponding quantity control measures are as follows.

The proposed quantity control design divides the site into three drainage areas, each draining to a downstream underground storage chamber with flows restricted by a downstream control structure. The City's VO model was updated to incorporate the site-specific details, including assigning a stage–storage–discharge relationship to each drainage area. The model was run using the 12-hour AES storm distribution in accordance with the Duffins Creek Hydrology Update (DCHU). The resulting site outlet flows, representing the combined discharge from all three drainage areas, were ensured to be lower than the target release rates. Refer to the **Proposed Drainage Plan (PDP)** for the drainage area delineation. The results of the VO model are summarized in **Table 3** below.

TAUNTON ROAD

BURKHOLDER DRIVE

PRIVATE ROW

MARATHON AVENUE

BLDG B (±1,117 S.M.) (±12,021 S.F.) FFE =172.70

BLDG C (±725 S.M.) (±7,799 S.F.) FFE =173.90 / FFE =173.70 / FFE =173.70 / FFE =173.70

BLDG D (±650 S.M.) (±7,000 S.F.) FFE =173.90

BLDG E (±845 S.M.) (±9,096 S.F.) FFE =172.85

FFE =173.20

BLDG F (±1,368 S.M.) (±14,726 S.F.) FFE =171.70

FFE =171.10

BLDG G (±557 S.M.) (±6,000 S.F.) FFE =170.70

A4 (±1,586 S.M.) (±17,068 S.F.) FFE =171.80

A3 (±978 S.M.) (±10,528 S.F.) FFE =171.35

A3 FFE =170.90

A2 (±611 S.M.) (±6,572 S.F.) FFE =170.55

A1 (±3,585 S.M.) (±42,893 S.F.) FFE =170.00

201-1 A=1.67 C=0.90

202-1 A=1.91 C=0.90

201-2 A=0.02 C=0.25

203-1 A=2.36 C=0.53

UNC1 A=0.05 C=0.25

UNC2 A=0.07 C=0.25

FUTURE RESIDENTIAL DEVELOPMENT AREA

TRANS NORTHERN PIPELINE INC. EASEMENT

UG CHAMBER #1 FOOTPRINT=1213M² MIN SURFACE ELEVATION: 171.00 MAX GW ELEVATION 168.40 BTM OF TANK: 168.90 BTM OF STORAGE 169.10 TOP OF TANK: 170.40

UG CHAMBER #2 FOOTPRINT=1460M² MIN SURFACE ELEVATION: 168.85 MAX GW ELEVATION: 168.60 BTM OF TANK: 168.55 BTM OF STORAGE: 168.75 TOP OF TANK: 168.00

UG CHAMBER #3 FOOTPRINT=1400M² MIN SURFACE ELEVATION: 167.55 MAX GW ELEVATION 165.00 BTM OF TANK: 165.50 BTM OF STORAGE 165.70 TOP OF TANK: 167.00

BREAK/CORE INTO EXISTING SANISTORM MANHOLES, INSTALL NEW PROPOSED SANITARY/STORM SEWERS WITH DROP STRUCTURES. RE-PARGE TO SUIT

N INV=163.47 N INV =160.77 (DROP STRC PER P-10 AS SHOWN ON SDP-1)

V-NOTCH SWALE AS PER DETAIL ON SPD-2

V-NOTCH SWALE WITH SUBDRAIN AS PER DETAIL ON SPD-2

BIOSWALE AS PER DETAIL ON SPD-2

FLAT BOTTOM SWALE AS PER DETAIL ON SPD-2

FLAT BOTTOM SWALE WITH SUBDRAIN AS PER DETAIL ON SPD-2

LOADING DOCK TRENCH DRAIN AND RETAINING WALL DESIGN AND DETAILS BY OTHERS

LEGEND

- PROPOSED STORM SEWER (<750Ø)
- PROPOSED STORM SEWER (>=750Ø)
- PROPOSED STORM MANHOLE (SIZE AS SHOWN)
- PROPOSED DOUBLE CATCHBASIN MANHOLE(SIZE AS SHOWN)
- PROPOSED STORM CATCHBASIN MANHOLE (SIZE AS SHOWN)
- PROPOSED CATCHBASIN
- PROPOSED DOUBLE CATCHBASIN
- EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING STORM CATCHBASIN MANHOLE
- EXISTING CATCHBASIN
- PROPOSED SWALE BOTTOM
- PROPOSED DRAINAGE BOUNDARIES
- STORAGE / INFILTRATION ID
- TRIBUTARY AREA (HA)
- RUNOFF COEFFICIENT
- DIRECTION OF OVERLAND FLOW
- PROPOSED UNDERGROUND STORAGE

REVISION BLOCK

#	DATE	DESCRIPTION
1	04/14/23	ISSUED FOR SPA
2	12/04/25	ISSUED FOR SPA

REGISTERED PROFESSIONAL ENGINEER B.JACKSON 100210382 DEC. 4, 2025 PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC. 1415 Lasalle Blvd. Burlington, ON L7L 7A9

NORTH ARROW

KEY PLAN N.T.S

SURVEY AND BENCHMARK NOTE

EXISTING TOPOGRAPHIC INFORMATIONS SHOWN ON THIS PLAN ARE BASED ON J.D. BARNES LTD. DRAWING (REF. NO. 25-25-390-00), DATED AUGUST 20, 2025

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING VERTICAL

METRIC SCALE 0 5 10 20 1:500

PROPOSED DRAINAGE PLAN

FIELDGATE COMMERCIAL
TAUNTON RD/BURKHOLDER DR.
OPA 2025-001/P - A 06/25 ; PRE 023-026/22
PICKERING, ONTARIO

PROJECT NO: 23810 | DRAWN BY: RB | CHECKED BY: BJ

PDP

Table 3: Total Site Flows

Storm Event	Area 201 Flows (m^3/s)	Area 202 Flows (m^3/s)	Area 203 Flows (m^3/s)	Total Site Flows (m^3/s)
2-Yr Event	0.003	0.005	0.002	**0.010**
5-Yr Event	0.006	0.008	0.006	**0.020**
10-Yr Event	0.008	0.010	0.007	**0.025**
25-Yr Event	0.010	0.011	0.009	**0.030**
50-Yr Event	0.011	0.012	0.010	**0.033**
100-Yr Event	0.012	0.013	0.011	**0.036**

The dimensions of the storage chambers are based on the maximum footprint and depth available as per the proposed site layout. Also, the control structures consist of a vortex device to limit the 25 mm storm event and a 75 mm orifice plate to meet target flows for the 2-year to the 100-year storm events. The details of the chambers and control structures are provided below:

- **Area 201:** Chamber footprint of 1218 m^2, depth of 1.5 m, and maximum active storage of 1346 m^3; controlled by a 65 mm Tempest ICD at invert 169.10 m and 75 mm orifice plate at invert 169.86 m.
- **Area 202:** Chamber footprint of 1480 m^2, depth of 1.5 m, and maximum active storage of 1635 m^3; controlled by a 65 mm Tempest ICD at invert 166.70 m and 75 mm orifice plate at invert 167.10 m.
- **Area 203:** Chamber footprint of 1400 m^2, depth of 1.5 m, and maximum active storage of 1547 m^3; controlled by a 43 mm Tempest ICD at invert 165.70 m and 75 mm orifice plate at invert 166.10 m.

Tables 4 – 6 show the stage-storage-discharge for every chamber for the various storm events.

Table 4: Stage-Storage-Discharge for Chamber 1

Storm Event	Elevation (m)	Storage (m^3)	Release Rate (m^3/s)
2-Yr Event	169.62	539	0.003
5-Yr Event	169.77	695	0.006
10-Yr Event	169.87	792	0.008
25-Yr Event	169.99	918	0.010
50-Yr Event	170.08	1017	0.011
100-Yr Event	170.18	1117	0.012

Table 5: Stage-Storage-Discharge for Chamber 2

Storm Event	Elevation (m)	Storage (m^3)	Release Rate (m^3/s)
2-Yr Event	167.18	603	0.005
5-Yr Event	167.31	771	0.008
10-Yr Event	167.41	892	0.010
25-Yr Event	167.53	1046	0.011
50-Yr Event	167.63	1164	0.012
100-Yr Event	167.72	1282	0.013

Table 6: Stage-Storage-Discharge for Chamber 3

Storm Event	Elevation (m)	Storage (m^3)	Release Rate (m^3/s)
2-Yr Event	166.15	536	0.002
5-Yr Event	166.29	697	0.006
10-Yr Event	166.39	818	0.007
25-Yr Event	166.52	980	0.009
50-Yr Event	166.63	1107	0.010
100-Yr Event	166.74	1236	0.011

Tables 7 below shows that the site target flows are met for every storm event.

Table 7: Comparison of Controlled and Target Flows

Storm Event	Target Flows for Site (m^3/s)	Total Site Flows (m^3/s)
2-Yr Event	0.016	0.010
5-Yr Event	0.022	0.020
10-Yr Event	0.033	0.025
25-Yr Event	0.043	0.030
50-Yr Event	0.051	0.033
100-Yr Event	0.059	0.036

The maximum controlled discharge from the site is approximately 36 L/s in the 100-year storm event. Based on the as-constructed drawings by GEI for Marathon Avenue between Station 0+000 and Station 0+227.65, MH499 is provided on Block 76 lands and connects to MH418 on Marathon Avenue. Given the proposed private right-of-way along the eastern perimeter, site flows are now proposed to discharge to MH415 on Marathon Avenue. Approximately 45 L/s is allocated to discharge from Block 76 to the Marathon Avenue storm sewer, whereas the proposed site design reduces this discharge to 36 L/s, representing a reduction in peak flow to be conveyed by the Marathon Avenue storm sewer.

From a hydraulic standpoint, both the reduction in discharge rate and the relocation of the outlet to a more downstream manhole is beneficial. Relocating the connection downstream lowers the HGL on approximately 160 m sewer length between MH415 and MH418. Given the reduction in flows, the HGL will be lowered downstream of MH415 compared to the original design assumptions by Cole Engineering.

Refer to **Appendix B** for stage-storage-discharge curves for the three storage chambers, the Tempest ICD sizing details, and the as-constructed drawing of Marathon Avenue storm sewers from Station 0+000 and Station 0+227.65 prepared by GEI for Lebovic Enterprises Ltd (SP-2009-14). Note: the chamber sizing may be further optimized in future detailed design stages.

3.3.2 Erosion Control

The erosion control criteria is to provide extended detention of the 25 mm rainfall event for a minimum of 120 hours. The runoff volume was estimated as $250m^3$ per impervious hectare and further confirmed using the VO model. The required volume is provided within the underground chambers for each drainage area. Even with the smallest 75 mm orifice plate, peak flows cannot be sufficiently restricted to meet the required 120 hour drawdown period; therefore,

vortex flow control devices (IPEX Tempest ICDs) are specified. Refer to **Table 8** for runoff volume and peak release rates for the 25 mm storm event.

Table 8: Runoff Volume and Peak Release Rates for the 25 mm Rainfall Event

AREA	Runoff Volume Estimation		VO Model Output			Vortex Size (mm)
	Imperviousness (%)	Runoff Volume (m^3)	Runoff depth (mm)	Runoff Volume (m^3)	Peak Flow (L/s)	
Area 1 (1.69 ha)	90	380	21.09	352	2.1	65 mm
Area 2 (1.91 ha)	90	430	21.09	403	2.0	65 mm
Area 3 (2.36 ha)	50	295	13.35	315	1.3	43 mm

The hydrograph at the site outlet (i.e., combined flow for all three drainage areas) indicates that the total runoff volume of approximately 1070 m^3 in the 25 mm storm event was released over a minimum of 120 hours. See **Figure 1** below and VO model output files in **Appendix E.**

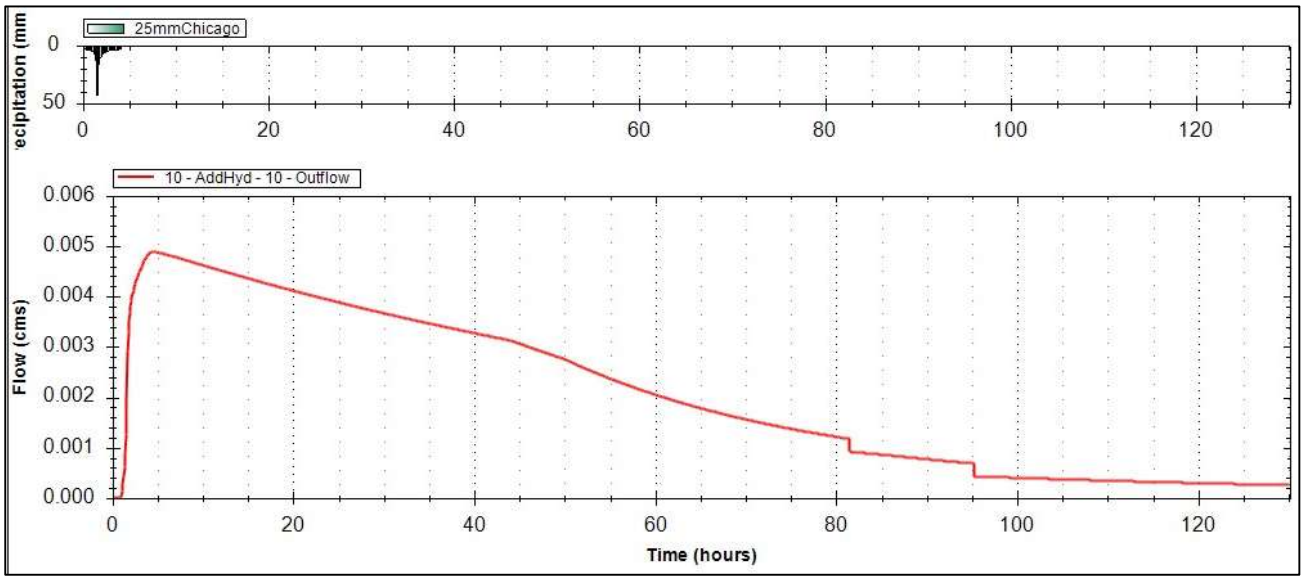


Figure 1: Hydrograph at Site Outlet for the 25 mm Storm Event

3.3.3 WATER QUALITY

The quality control objective for the proposed site is to provide an Enhanced protection level, which corresponds to the removal of **80% Total Suspended Solids (TSS)**. Oil-grit separator (OGS) units are proposed upstream of the infiltration and storage chambers. The rooftops of the 7 buildings (total of 1.26 ha) are considered clean drainage areas; however, the majority of this runoff mixes with parking lot and drive aisle runoff and is conveyed through the OGS units. Only runoff from Buildings A3 and A4 is directly connected to Chamber #1 and does not require pre-treatment. Approximately 0.40 ha of drainage area is directed to a bioswale within the northwest parking lot, which provides filtration and pre-treatment prior to discharging to Chamber #1. In addition, a landscaped area of approximately 1.10 ha located in the southern portion of the site is also considered clean drainage and does not require pre-treatment; runoff from this area is therefore routed directly to Chamber #3.

Refer to the attached **Proposed Drainage Plan (PDP)** that outlines the catchment areas that are tributary to each OGS unit. The sizing and TSS removal efficiency for the proposed OGS units is presented in **Table 9** below. Using the fine particle size distribution, **OGS units are all sized to provide more than 80% TSS removal.**

Table 9: OGS Unit Sizing

OGS Units	Treatment Area (ha)	Runoff Coefficient	OGS Unit	Removal Efficiency
OGS1	1.50	0.90	FD-4HC	81%
OGS2	0.42	0.90	FD-4HC	90%
OGS3	1.13	0.90	FD-4HC	83%
OGS4	0.66	0.90	FD-4HC	87%
OGS5	0.41	0.90	FD-4HC	90%
OGS6	0.15	0.90	FD-4HC	96%

In addition to the treatment by the OGS units, further water quality benefit is provided through infiltration. *Table 3.2 Water Quality Storage Requirements based on Receiving Waters* from the MOE Stormwater Management Planning and Design Manual (2003) states the infiltration volume required to achieve TSS removal for impervious levels ranging from 35% to 85%. Based on the highest impervious level of 85%, a storage volume of 40 m^3/ha is required to achieve Enhanced 80% long-term TSS removal. This equates to providing infiltration storage of 4 mm, whereas infiltration of the first 10 mm is proposed within the three underground chambers. Infiltration chamber details are further discussed in Section 3.3.4. The available infiltration volume is presented in **Table 10** in **Section 3.3.4**, which confirms that **80% TSS removal is provided via infiltration for all site area.**

Therefore, for the entire site, **greater than 80% TSS removal** is achieved by directing clean rooftop and landscaped area runoff directly to the chambers, having bioswales for pre-treatment, routing parking lot runoff through OGS units, and providing infiltration of the first 10 mm (100 m^3/ha) of runoff within the chambers.

Refer to **Appendix C** for OGS sizing and ETV statement.

3.3.4 WATER BALANCE

A minimum infiltration volume of 10mm across the site is proposed to be provided within the underground chambers through their open-bottom design. The infiltration volume is provided in the lower 0.20 m of each chamber, which is below the outlet to the connecting storm sewer network.

To determine suitable options and locations to maximize infiltration of clean stormwater runoff, groundwater levels must be adequately determined and compared with the proposed stormwater and grading design. Groundwater levels were measured by GEMTEC in monitoring wells on three events in August and September 2025. Measured groundwater depths ranged from approximately 1.9 m to 3.4 m below ground surface, corresponding to elevations between 164.60 m and 171.60 m. The highest groundwater levels were observed in the north-west portion of the site, with the lowest levels toward the south-east. The underground chambers have been designed with an irregular footprint to maintain the minimum required separation of 0.50 m between the chamber bottom and the high groundwater level. A reduced separation of 0.50 m is acceptable, as confirmed through discussions with the City of Pickering Water Resources Engineering staff and TRCA Hydrogeology staff, provided that the infiltration requirement for the subject site is met.

In-situ infiltration rate testing was also completed by GEMTEC at four locations using a Guelph Permeameter in September 2025. The soil is primarily silty sand till (SM) with a geometric mean infiltration rate of 35 mm/hr. The maximum depth of the infiltration chamber can be determined by multiplying the infiltration rate (adjusted to a factor of safety of 2.5) by the drawdown time of 48 hours. This provides a maximum infiltration depth of 0.67 metres (14 mm/hr * 48 hours)

The infiltration requirement is achieved in the three underground infiltration facilities. Refer to **Table 10** below for infiltration chamber details.

Table 10: Infiltration Chamber Design

Area ID	Treatment Area (ha)	Required Infiltration Volume (m^3)	Proposed Infiltration Volume (m^3)	Infiltration Depth (m)	Drawdown Time (hr)	Chamber Bottom Elevation (m)	High GW Elevation (m)
Area 201	1.69	169	207	0.20	14	168.90	168.40
Area 202	1.91	191	252	0.20	14	166.50	166.00
Area 203	2.63	236	238	0.20	14	165.50	165.00

Note that the table above does not account for the additional benefits provided by the proposed bioswale in Area 1. This bioswale filters runoff through the bioretention media and allows infiltration through a 300 mm layer of clearstone. It is designed to infiltrate the first 24 m^3 of runoff from its 0.40 ha tributary area (calculated as 67m length × 0.30 m depth × 3m width × 40% void ratio). Any runoff that exceeds the bioswale's infiltration capacity will have a further opportunity to infiltrate in Chamber #1, as indicated in Table 10.

Refer to **Appendix D** for the drawdown time calculations and excerpts from the hydrogeological investigation and SPD-2 for the bioswale detail.

3.4 Operation and Maintenance

Multiple LID practices such as OGS units, infiltration facilities, and bioswales are proposed to meet the stormwater management objectives. Their functionality and treatment capacities will only be sustained over the long term if they are adequately maintained. These LIDs are designed to retain pollutants and in the absence of maintenance, their treatment performances will decline, and they will no longer function as intended. Therefore, routine inspections and thorough maintenance programs are required.

Inspection frequencies and maintenance requirements are site specific and vary depending on pollutant loading. It is a good practice to inspect the system after major storm events and conduct surface observations such as checking for standing water, structural degradation, etc. It is recommended that inspection and maintenance of LIDs be performed by professionally trained individuals, with experience in stormwater maintenance and disposal services.

The Operation and Maintenance (O&M) Manual for the First Defense High Capacity (FD-HC) OGS units recommends the following:

- The frequency of clean out is determined in the field after installation.
- During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation.
- Floatables and sump clean out are typically conducted once a year during any season.
- Floatables and sump clean out should occur as soon as possible following a spill in the contributing drainage area.

The O&M manual also describes the procedures for cleanout as well as the equipment to be used.

Regular inspection and maintenance of the pre-treatment devices (i.e., OGS units) will ensure efficient operation of the downstream infiltration facilities. Additionally, infiltration facilities will operate as designed if they are constructed properly. Compaction and construction loading on top of the underground infiltration chambers should be minimized during construction. The underground infiltration chambers should be protected from heavy sediment loading and polluted runoff during the construction phase. A maintenance access is to be provided for all underground chambers for inspection and maintenance.

Bioswales in the landscaped areas require regular weeding, pruning, and mulching as well as the removal of trash, debris and sediment accumulated in inlets and outlets. Route inspections also include evaluating vegetation density (≥

80% coverage), damage by foot or vehicle traffic, or evidence of erosion. Seasonal considerations, such as leaf litter in fall or ice-related damage in winter, should be incorporated into inspection schedules.

4.0 EROSION & SEDIMENT CONTROL

A Site Alteration application was made on October 15, 2025 to the City of Pickering (and resubmitted on November 14, 2025) for the pre-grading of the proposed building pads and associated works as shown on ESC-1. The design includes swales to direct drainage to existing conveyance swales in Block 188 that deliver overland flow to the downstream pond facility designed by Cole Engineering. Additionally, a central swale and level spreader was also proposed to drain overland the bulk of the central site flows to the east towards the same pond in Block 188. Swale capacity for both have been reviewed and confirmed using rational method and trapezoidal calculations.

ESC-2 is an extension of ESC-1 which shows stormwater sewers and structures installed with inlet controls affixed. Existing ESC controls from ESC-1 shall be maintained to continue the safe drainage of overland flow.

In addition to the conveyance measures, the following erosion and sediment controls are proposed on site:

- A construction access (mud mat) to be provided off Burkholder Drive.
- Heavy duty silt fence to be installed around the perimeter of the site and around stock piles.
- All inlets to be protected with silt sacks.

Refer to the **Erosion & Sediment Control Plans (ESC-1 and ESC-2)** in **Appendix F.**

5.0 CONCLUSION

In summary:

Quantity Control:

- The post-development peak flows are controlled to the target release rates identified in the Cole Engineering SWM Report (November 2017) for all storms up to and including the 100-year event.
- The site is divided into three drainage areas, each discharging to a downstream underground storage chamber with controlled outlets.
- The target release rates are achieved for all storm events modelled in VO.
- The maximum site release rate is **36 L/s**, with a total storage requirement of **3635 m^3.**

Erosion Control:

- Erosion control requires extended detention of the 25 mm rainfall event for a minimum of 120 hours.
- A 75 mm orifice plate cannot sufficiently restrict peak flows to meet the 120 hour drawdown; therefore, vortex flow control devices (IPEX Tempest ICDs) are specified.
- The combined outlet hydrograph shows that approximately **1070 m^3** from the 25 mm event is released over at least 120 hours.

Quality Control:

- OGS units are provided upstream of the infiltration and storage chambers and are sized to achieve more than 80% TSS removal.
- The first 10 mm of runoff is infiltrated within the three underground chambers, contributing to 80% TSS removal.
- Overall, **the site achieves greater than 80% TSS removal** by directing clean rooftop and landscaped runoff to the chambers, treating parking lot runoff through OGS units, and infiltrating the first 10 mm (100 m^3/ha) of runoff within the chambers.

Water Balance:

- A minimum site-wide infiltration depth of 10 mm is provided within the open-bottom underground chambers, with infiltration occurring in the lower 0.20 m below the storm sewer outlet inverts.
- The infiltration system provides approximately **697 m³** of storage, which drains in approximately **14 hours.**

We trust that this report satisfactorily demonstrates that the proposed development design addresses the applicable stormwater management requirements.

Please do not hesitate to contact the undersigned if you have any questions or concerns.

Yours very truly,

KWA Site Development Consulting Inc.

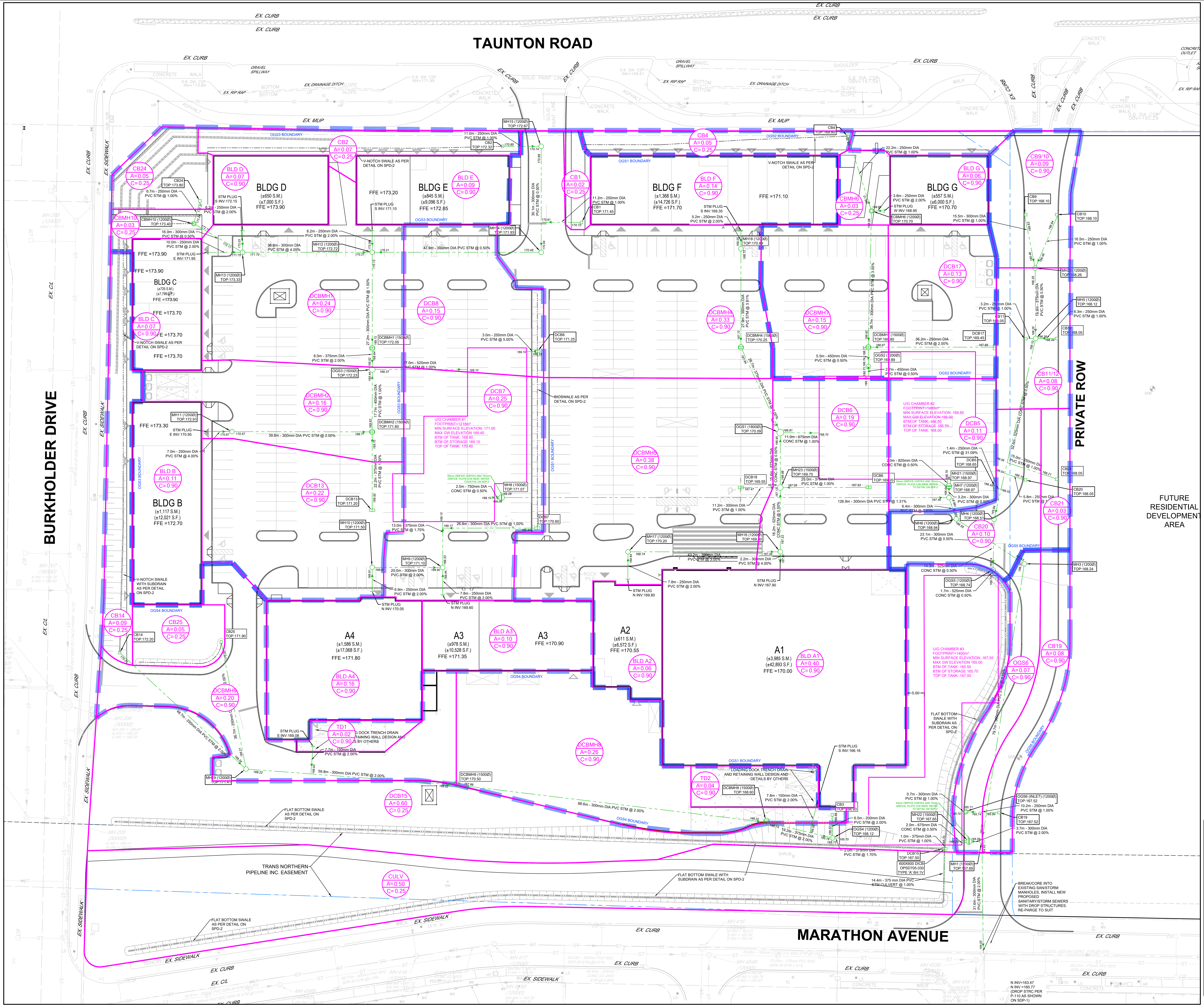
Per:

Ben Jackson, P.Eng.
(416)-984-0970

Pavneet Brar, P.Eng., MASc
(289)-259-3545

APPENDIX A

PROPOSED CATCHMENT PLAN (PCP)
CB INLET CAPACITY
STORM SEWER DESIGN SHEET



FUTURE RESIDENTIAL DEVELOPMENT AREA

LEGEND

- PROPOSED STORM SEWER
- PROPOSED STORM MANHOLE (SIZE AS SHOWN)
- PROPOSED CATCHBASIN
- EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- PROPOSED DRAINAGE BOUNDARY
- TRIBUTARY TO OGS UNITS
- DCBMH8 — PROPOSED DRAINAGE ID
- A=0.26 — PROPOSED DRAINAGE AREA
- C=0.90 — RUNOFF COEFFICIENT

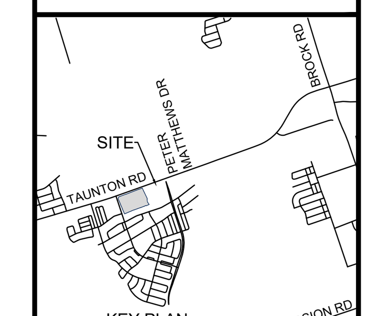
REVISION BLOCK

#	DATE	DESCRIPTION
1	04/14/23	ISSUED FOR SPA
2	12/04/25	ISSUED FOR SPA

REGISTERED PROFESSIONAL ENGINEER B.JACKSON 100210382 DEC. 4, 2025 PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC.
2453 Auckland Drive
Burlington, ON L7L 7A9

NORTH ARROW



KEY PLAN
N.T.S

SURVEY AND BENCHMARK NOTE

EXISTING TOPOGRAPHIC INFORMATIONS SHOWN ON THIS PLAN ARE BASED ON J.D. BARNES LTD. DRAWING (REF. NO. 25-25-360-00), DATED AUGUST 20, 2025

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING VERTICAL

METRIC SCALE 0 5 10 20
1:500

PROPOSED CATCHMENT PLAN

FIELDGATE COMMERCIAL
TAUNTON RD/BURKHOLDER DR.
OPA 2025-001/P ; A 06/25 ; PRE 023-026/22
PICKERING, ONTARIO

PROJECT No: 23810
DRAWN BY: RB
CHECKED BY: BJ

PCP

Inlet Capcity Analysis

Project Name: Seaton Commercial
Project Number: 23810
Location: Pickering, ON
Date: 12/1/2025

Prepared By: (Initials)
Checked By: (Initials)

Rainfall Data			
Location:	Pickering	a	2096.43
Event	(00yr)	b	6.49
		c	0.86

Drain ID	Drain Catchment Area (m^2)	Runoff Coefficient	Tc (min)	Intensity (mm/hr)	Flow (m^3/s)	Drain Type	Depth of Ponding (m)	Inlet Capacity (m^3/s)	Inlet Capacity with 50% Blockage (m^3/s)	OK with 50% Blockage?
DCBMH1	2370	0.90	10.00	186.7	0.111	Twin OPSD 400.01	0.20	0.245	0.1225	OK
DCBMH2	1695	0.90	10.00	186.7	0.079	Twin OPSD 400.01	0.15	0.17	0.085	OK
DCB13	2180	0.90	10.00	186.7	0.102	Twin OPSD 400.03	0.20	0.245	0.1225	OK
DCB7	2389	0.90	10.00	186.7	0.112	Twin OPSD 400.03	0.20	0.245	0.1225	OK
DCB8	1960	0.90	10.00	186.7	0.092	Twin OPSD 400.01	0.20	0.245	0.1225	OK
DCBMH4	3190	0.90	10.00	186.7	0.149	Twin OPSD 400.01	0.25	0.325	0.1625	OK
DCBMH5	3400	0.90	10.00	186.7	0.159	Twin OPSD 400.01	0.25	0.325	0.1625	OK
DCBMH7	1557	0.90	10.00	186.7	0.073	Twin OPSD 400.01	0.15	0.17	0.085	OK
DCB6	1776	0.90	10.00	186.7	0.083	Twin OPSD 400.01	0.15	0.17	0.085	OK
DCB5	1553	0.90	10.00	186.7	0.073	Twin OPSD 400.01	0.15	0.17	0.085	OK
DCB17	1316	0.90	10.00	186.7	0.061	Twin OPSD 400.01	0.15	0.17	0.085	OK
DCBMH8	2600	0.90	10.00	186.7	0.121	Twin OPSD 400.01	0.20	0.245	0.1225	OK
DCB15 (INCLUDES DCMH9)	12700	0.29	10.00	186.7	0.191	Twin OPSD 400.01	0.30	0.405	0.2025	OK
DCBMH9	1700	0.90	10.00	186.7	0.079	Twin OPSD 400.01	0.00	0	0	NOT OK

Rational Method

Project No:	23810
Project Name:	Pickering

Release rates to TNP and South Channel

TNP SWALE

Storm Event:		100	years
ABC's:	a	2096.43	
	b	6.49	
	c	0.86	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.30	
Site Area	A	0.49	ha
Intensity [i=a/(t+b)c] or [i=a*tb] if B=0	i	188.22	mm/hr
Flow [Q=CiA/360]	Q	0.08	m^3/s
		77	l/s

SOUTH SWALE

Storm Event:		100	years
ABC's:	a	2096.43	
	b	6.49	
	c	0.86	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.30	
Site Area	A	0.40	ha
Intensity [i=a/(t+b)c] or [i=a*tb] if B=0	i	188.22	mm/hr
Flow [Q=CiA/360]	Q	0.06	m^3/s
		63	l/s

Mannings Equation - Trapezoidal Channel (TNP)

Project Name: FG Seaton
Project Number: 23810
Location: Pickering, ON
Date: 12/1/2025
Prepared By: BJ

Target Flow Rate (Optional): 0.077 m^3/s (100 year storm event, C=0.30, Tc=10)

Parameter	Value		Units	
Flow depth	0.3		m	minimum depth
Side slope Ratio	3	:1	H:V	
Bed width	0.5		m	
Top width	2.3		m	
Area	0.420		m^2	
Wetted Perimeter	2.397		m	
Slope	0.5		%	minimum
Mannings 'n'	0.03			NORMAL
Channel Capacity	0.310		m^3/s	FLOW OK
Channel Capacity	0.738		m/s	

Mannings Equation - Trapezoidal Channel (South)

Project Name: FG Seaton
Project Number: 23810
Location: Pickering, ON
Date: 12/1/2025
Prepared By: BJ

Target Flow Rate (Optional): 0.063 m^3/s (5 year storm event, C=0.35, Tc=10)

Parameter	Value		Units	
Flow depth	0.3		m	minimum depth
Side slope Ratio	3	:1	H:V	
Bed width	0.5		m	
Top width	2.3		m	
Area	0.420		m^2	
Wetted Perimeter	2.397		m	
Slope	0.5		%	minimum
Mannings 'n'	0.03			Excavated channel no veg
Channel Capacity	0.310		m^3/s	FLOW OK
Channel Capacity	0.738		m/s	

Storm Sewer Design Sheet (Rational Method)

Project Name: Fieldgate Seaton
Project Number: 23810
Location: Pickering, ON
Date: 2025-12-04
Prepared by: BC

Rainfall Data	(Main Storm Event)	(Additional design storm events, if needed)			
	5yr	10yr	100yr		
a	1082.90		2096.43		
b	6.01		6.485		
c	0.84		0.863		

Manning's Roughness Coefficient 0.013

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Description	Upstream Node	Downstream Node	Pipe Shape	Diameter OR Span (mm)	Length (m)	Slope (%)	Area (ha)	C	A x C (ha)	Accumulative A x C (ha)	Design Event	Intensity (mm/hr)	Time of Concentration (min)	Area Flow (l/s)	Other Flows	Total Flow (l/s)	Actual Diamete (m)	Pipe Area (m2)	Hydraulic Radiu (m)	Material	Pipe Capacity (l/s)	Velocity (m/s)	Time of Flow (min)	Ratio (Flow to Capacity)	OK?
UG CHAMBER #1																									
	CB24	CBMH10	Circular	250	6.7	1.00%	0.05	0.25	0.0125	0.0125	100yr	186.69	10.00	6.48	0	6.48	0.2510	0.0495	0.0628	PVC	60.10	1.21	0.09	0.11	YES
	CBMH10	MH13	Circular	300	16	0.50%	0.03	0.25	0.0075	0.02	100yr	185.80	10.09	10.32	0	10.32	0.2980	0.0697	0.0745	PVC	67.17	0.96	0.28	0.15	YES
	BLD D	MH13	Circular	250	6.2	2.00%	0.05	0.9	0.045	0.045	100yr	186.69	10.00	23.34	0	23.34	0.2510	0.0495	0.0628	PVC	85.00	1.72	0.06	0.27	YES
	BLD C	MH13	Circular	250	10	2.00%	0.07	0.9	0.063	0.063	100yr	186.69	10.00	32.67	0	32.67	0.2510	0.0495	0.0628	PVC	85.00	1.72	0.10	0.38	YES
	MH13	MH12	Circular	300	36.8	4.05%	0.00	0.9	0	0.128	100yr	183.16	10.37	65.12	0	65.12	0.2980	0.0697	0.0745	PVC	191.17	2.74	0.22	0.34	YES
	BLD E	MH12	Circular	250	6.2	2.00%	0.09	0.9	0.081	0.081	100yr	186.69	10.00	42.01	0	42.01	0.2510	0.0495	0.0628	PVC	85.00	1.72	0.06	0.49	YES
	CB2	MH15	Circular	250	11	1.00%	0.07	0.25	0.0175	0.0175	100yr	186.69	10.00	9.08	0	9.08	0.2510	0.0495	0.0628	PVC	60.10	1.21	0.15	0.15	YES
	MH15 (+CB1)	MH14	Circular	300	30.1	0.50%	0.02	0.25	0.005	0.0225	100yr	185.23	10.15	11.58	0	11.58	0.2980	0.0697	0.0745	PVC	67.17	0.96	0.52	0.17	YES
	MH14	MH12	Circular	300	47.9	0.50%	0.00	0.9	0	0.0225	100yr	180.37	10.67	11.27	0	11.27	0.2980	0.0697	0.0745	PVC	67.17	0.96	0.83	0.17	YES
	MH12	DCBMH1	Circular	300	27.2	1.54%	0.00	0.9	0	0.2315	100yr	173.17	11.50	111.36	0	111.36	0.2980	0.0697	0.0745	PVC	117.88	1.69	0.27	0.94	YES
	DCBMH1	OGS3	Circular	375	6	2.00%	0.24	0.9	0.216	0.4475	100yr	170.97	11.77	212.53	0	212.53	0.3810	0.1140	0.0953	PVC	258.68	2.27	0.04	0.82	YES
	BLD B	MH11	Circular	200	2.43	4.00%	0.11	0.9	0.099	0.099	100yr	186.69	10.00	51.34	0	51.34	0.2000	0.0314	0.0500	PVC	65.60	2.09	0.02	0.78	YES
	MH11	DCBMH2	Circular	300	39.8	2.00%	0.00	0.9	0	0.099	100yr	186.51	10.02	51.29	0	51.29	0.2980	0.0697	0.0745	PVC	134.34	1.93	0.34	0.38	YES
	DCB13	DCBMH2	Circular	375	22.2	1.00%	0.22	0.9	0.198	0.198	100yr	186.69	10.00	102.68	0	102.68	0.3810	0.1140	0.0953	PVC	182.91	1.60	0.23	0.56	YES
	DCBMH2	OGS3	Circular	450	17.7	1.00%	0.16	0.9	0.144	0.441	100yr	183.21	10.36	224.43	0	224.43	0.4480	0.1576	0.1120	PVC	281.74	1.79	0.17	0.80	YES
	OGS3	CHAMBER #1	Circular	525	27	1.00%	0.00	0.9	0	0.8885	100yr	170.62	11.81	421.09	0	421.09	0.5334	0.2235	0.1334	CONC	448.66	2.01	0.22	0.94	YES
	DCB8	CHAMBER #1	Circular	250	3	5.00%	0.15	0.9	0.135	0.135	100yr	186.69	10.00	70.01	0	70.01	0.2510	0.0495	0.0628	PVC	134.40	2.72	0.02	0.52	YES
	BLD A4	MH10	Circular	250	6.9	2.00%	0.16	0.9	0.144	0.144	100yr	186.69	10.00	74.68	0	74.68	0.2510	0.0495	0.0628	PVC	85.00	1.72	0.07	0.88	YES
	MH10	MH9	Circular	300	20	2.00%	0.00	0.9	0	0.144	100yr	186.04	10.07	74.42	0	74.42	0.2980	0.0697	0.0745	PVC	134.34	1.93	0.17	0.55	YES
	BLD A3	MH9	Circular	200	7.8	3.00%	0.10	0.9	0.09	0.09	100yr	186.69	10.00	46.67	0	46.67	0.2000	0.0314	0.0500	PVC	56.81	1.81	0.07	0.82	YES
	DCB7	MH9 TO CHAMBER #1	Circular	375	27	1.00%	0.25	0.9	0.225	0.225	100yr	186.69	10.00	116.68	0	116.68	0.3810	0.1140	0.0953	PVC	182.91	1.60	0.28	0.64	YES
	MH9	CHAMBER #1	Circular	375	13	1.75%	0.00	0.9	0	0.459	100yr	184.00	10.28	234.59	0	234.59	0.3810	0.1140	0.0953	PVC	241.97	2.12	0.10	0.97	YES
	CHAMBER #1	MH8	Circular	750	2	0.50%	0.00	0.9	0	1.4825	100yr	168.83	12.04	695.27	0	695.27	0.7620	0.4560	0.1905	CONC	821.24	1.80	0.02	0.85	YES
	MH8	MH7	Circular	300	126.9	1.31%	0.00	0.9	0	CONTROLLED	100yr	186.69	10.00			12.00	0.2980	0.0697	0.0745	PVC	108.72	1.56	1.36	0.11	YES
UG CHAMBER #2																									
	BLD F	MH18	Circular	250	5.2	2.00%	0.14	0.9	0.126	0.126	100yr	186.69	10.00	65.34	0	65.34	0.2510	0.0495	0.0628	PVC	85.00	1.72	0.05	0.77	YES
	MH18	DCBMH4	Circular	300	27.9	3.61%	0.00	0.9	0	0.126	100yr	186.20	10.05	65.17	0	65.17	0.2980	0.0697	0.0745	PVC	180.48	2.59	0.18	0.36	YES
	DCBMH4	OGS1	Circular	375	24.2	2.00%	0.33	0.9	0.297	0.423	100yr	184.47	10.23	216.76	0	216.76	0.3810	0.1140	0.0953	PVC	258.68	2.27	0.18	0.84	YES
	BLD A2	MH17	Circular	250	7.8	2.00%	0.06	0.9	0.054	0.054	100yr	186.69	10.00	28.00	0	28.00	0.2510	0.0495	0.0628	PVC	85.00	1.72	0.08	0.33	YES
	MH17	MH16	Circular	300	43.2	3.00%	0.00	0.9	0	0.054	100yr	185.96	10.08	27.89	0	27.89	0.2980	0.0697	0.0745	PVC	164.53	2.36	0.31	0.17	YES
	BLD A1	MH16	Circular	300	2.2	4.00%	0.40	0.9	0.36	0.36	100yr	186.69	10.00	186.69	0	186.69	0.2980	0.0697	0.0745	PVC	189.98	2.72	0.01	0.98	YES
	MH16	MH23	Circular	525	18.2	0.50%	0.00	0.9	0	0.414	100yr	183.05	10.38	210.51	0	210.51	0.5334	0.2235	0.1334	CONC	317.25	1.42	0.21	0.66	YES
	DCB6	MH23	Circular	375	25	1.00%	0.19	0.9	0.171	0.171	100yr	186.69	10.00	88.68	0	88.68	0.3810	0.1140	0.0953	PVC	182.91	1.60	0.26	0.48	YES
	DCB18	MH23	Circular	375	11.2	1.00%	0.38	0.9	0.342	0.342	100yr	186.69	10.00	177.36	0	177.36	0.3810	0.1140	0.0953	PVC	182.91	1.60	0.12	0.97	YES
	MH23	OGS1	Circular	675	15.6	0.50%	0.00	0.9	0	0.927	100yr	181.07	10.59	466.26	0	466.26	0.6858	0.3694	0.1715	CONC	620.09	1.68	0.15	0.75	YES
	OGS1	CHAMBER #2	Circular	675	11	1.00%	0.00	0.9	0	1.35	100yr	179.67	10.75	673.75	0	673.75	0.6858	0.3694	0.1715	CONC	876.93	2.37	0.08	0.77	YES
	CB4	CBMH6	Circular	250	22.2	1.00%	0.05	0.25	0.0125	0.0125	100yr	186.69	10.00	6.48	0	6.48	0.2510	0.0495	0.0628	PVC	60.10	1.21	0.30	0.11	YES
	BLD G	CBMH6	Circular	250	3.6	2.00%	0.06	0.9	0.054	0.054	100yr	186.69	10.00	28.00	0	28.00	0.2510	0.0495	0.0628	PVC	85.00	1.72	0.03	0.33	YES
	CBMH6	DCBMH7	Circular	300	38.7	3.00%	0.03	0.9	0.027	0.0935	100yr	183.77	10.30	47.73	0	47.73	0.2980	0.0697	0.0745	PVC	164.53	2.36	0.27	0.29	YES
	DCB17	DCBMH7	Circular	250	36.2	2.00%	0.13	0.9	0.117	0.117	100yr	186.69	10.00	60.68	0	60.68	0.2510	0.0495	0.0628	PVC	85.00	1.72	0.35	0.71	YES
	DCBMH7	OGS2	Circular	450	5.5	0.50%	0.15	0.9	0.135	0.3455	100yr	181.22	10.58	173.92	0	173.92	0.4480	0.1576	0.1120	PVC	199.22	1.26	0.07	0.87	YES
	OGS2	CHAMBER #2	Circular	450	2.7	0.50%	0.00	0.25	0	0.3455	100yr	180.56	10.65	173.29	0	173.29	0.4480	0.1576	0.1120	PVC	199.22	1.26	0.04	0.87	YES
	CHAMBER #2	MH21	Circular	825	2	0.50%	0.00	0.9	0	1.6955	100yr	178.98	10.83	842.92	0	842.92	0.8382	0.5518	0.2096	CONC	1058.89	1.92	0.02	0.80	YES
	MH21	MH7	Circular	300	3.2	0.50%	0.00	0.9	0	CONTROLLED	100yr	186.69	10.00		0	13.00	0.2980	0.0697	0.0745	PVC	67.17	0.96	0.06	0.19	YES
UG CHAMBER #3																									
	CB9	MH20	Circular	250	15.5	1.00%	0.05	0.9	0.0405	0.0405	100yr	186.69	10.00	21.00	0	21.00	0.2510	0.0495	0.0628	PVC	60.10	1.21	0.21	0.35	YES
	CB10	MH20	Circular	250	16.5	1.00%	0.05	0.9	0.0405	0.0405	100yr	186.69	10.00	21.00	0	21.00	0.2510	0.0495	0.0628	PVC	60.10	1.21	0.23	0.35	YES
	MH20	MH5	Circular	375	19.9	0.50%	0.06	0.9	0.054	0.135	100yr	184.51	10.23	69.19	0	69.19	0.3810	0.1140	0.0953	PVC	129.34	1.13	0.29	0.53	YES
	CB11	MH5	Circular	250	3.2	1.00%	0.04	0.9	0.036	0.036	100yr	186.69	10.00	18.67	0	18.67	0.2510	0.0495	0.0628	PVC	60.10	1.21	0.04	0.31	YES
	CB12	MH5	Circular	250	6.3	1.00%	0.04	0.9	0.036	0.036	100yr	186.69	10.00	18.67	0	18.67	0.2510	0.0495	0.0628	PVC	60.10	1.21	0.09	0.31	YES
	CB21	PIPE TO MH4	Circular	250	15	1.00%	0.03	0.9	0.027	0.027	100yr	186.69	10.00	14.00	0	14.00	0.2510	0.0495	0.0628	PVC	60.10	1.21	0.21	0.23	YES
	CB20	PIPE TO MH4	Circular	250	5.8	1.00%	0.10	0.9	0.09	0.09	100yr	186.69	10.00	46.67	0	46.67	0.2510	0.0495	0.0628	PVC	60.10	1.21	0.08	0.78	YES
	DCB5	PIPE TO MH4	Circular	250	1.4	31.80%	0.11	0.9	0.099	0.099	100yr	186.69	10.00	51.34	0	51.34	0.2510	0.0495	0.0628	PVC	338.94	6.85	0.00	0.15	YES
	MH5	MH4	Circular	525	52.6	0.50%	0.02	0.9	0.018	0.441	100yr	181.77	10.52	222.67	0	222.67	0.5334	0.2235	0.1334	CONC	317.25	1.42	0.62	0.70	YES
	MH4	OGS5	Circular	525	14.3	0.50%	0.09	0.9	0.081	0.522	100yr	176.26	11.14	255.57	0	255.57	0.5334	0.2235	0.1334	CONC	317.25	1.42	0.17	0.81	YES
	OGS5	CHAMBER #3	Circular	525	1.71	0.50%	0.00	0.9	0	0.522	100yr	174.82	11.30	253.49	0	253.49	0.5334	0.2235	0.1334	CONC	317.25	1.42	0.02	0.80	YES

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Description	Upstream Node	Downstream Node	Pipe Shape	Diameter OR Span (mm)	Length (m)	Slope (%)	Area (ha)	C	A x C (ha)	Accumulative A x C (ha)	Design Event	Intensity (mm/hr)	Time of Concentration (min)	Area Flow (l/s)	Other Flows	Total Flow (l/s)	Actual Diamete (m)	Pipe Area (m2)	Hydraulic Radiu (m)	Material	Pipe Capacity (l/s)	Velocity (m/s)	Time of Flow (min)	Ratio (Flow to Capacity)	OK?
	CB19	OGS6	Circular	250	10.4	1.00%	0.07	0.9	0.063	0.063	100yr	186.69	10.00	32.67	0	32.67	0.2510	0.0495	0.0628	PVC	60.10	1.21	0.14	0.54	YES
	OGS6	CHAMBER #3	Circular	300	2	0.50%	0.07	0.9	0.063	0.126	100yr	185.31	10.14	64.86	0	64.86	0.2980	0.0697	0.0745	PVC	67.17	0.96	0.03	0.97	YES
	CB14	MH9	Circular	250	48.7	2.00%	0.09	0.25	0.0225	0.0225	100yr	186.69	10.00	11.67	0	11.67	0.2510	0.0495	0.0628	PVC	85.00	1.72	0.47	0.14	YES
	CB25	MH9	Circular	250	36.7	2.00%	0.05	0.25	0.0125	0.0125	100yr	186.69	10.00	6.48	0	6.48	0.2510	0.0495	0.0628	PVC	85.00	1.72	0.36	0.08	YES
(TD1)	MH9	DCBMH9	Circular	300	59.8	2.00%	0.02	0.9	0.018	0.053	100yr	182.20	10.47	26.82	0	26.82	0.2980	0.0697	0.0745	PVC	134.34	1.93	0.52	0.20	YES
	DCBMH9	DCBMH8	Circular	300	88.6	2.00%	0.20	0.9	0.18	0.233	100yr	177.53	10.99	114.90	0	114.90	0.2980	0.0697	0.0745	PVC	134.34	1.93	0.77	0.86	YES
(TD2)	DCBMH8	OGS4	Circular	375	19.2	2.00%	0.30	0.9	0.27	0.503	100yr	171.07	11.76	239.03	0	239.03	0.3810	0.1140	0.0953	PVC	258.68	2.27	0.14	0.92	YES
(CB3)	OGS4	CHAMBER #3	Circular	375	2	1.70%	0.00	0.9	0	0.503	100yr	169.94	11.90	237.44	0	237.44	0.3810	0.1140	0.0953	PVC	238.49	2.09	0.02	1.00	YES
CULVERT	UPSTREAM	DCB15	Circular	375	14.4	1.00%	0.50	0.25	0.125	0.125	100yr	186.69	10.00	64.82	0	64.82	0.3810	0.1140	0.0953	PVC	182.91	1.60	0.15	0.35	YES
	DCB15	CHAMBER #3	Circular	375	1	1.00%	0.60	0.25	0.15	0.275	100yr	185.24	10.15	141.51	0	141.51	0.3810	0.1140	0.0953	PVC	182.91	1.60	0.01	0.77	YES
	CHAMBER #3	MH22	Circular	750	2	0.50%	0.00	0.9	0	1.426	100yr	169.81	11.91	672.65	0	672.65	0.7620	0.4560	0.1905	CONC	821.24	1.80	0.02	0.82	YES
	MH22	MH1	Circular	300	3.7	2.00%	0.00	0.9	0	CONTROLLED	100yr	186.69	10.00		0	11.00	0.2980	0.0697	0.0745	PVC	134.34	1.93	0.03	0.08	YES

APPENDIX B

CHAMBER STAGE-STORAGE-DISCHARGE
TEMPTEST ICD SIZING
AS-CONSTRUCTED DRAWING OF MARATHON AVE
100-YR HGL OF MARATHON AVE

STAGE STORAGE DISCHARGE - AREA 201

Orifice 1		Orifice 2	
$Q = (C)(A)\sqrt{2g\Delta h}$		$Q = (C)(A)\sqrt{2g\Delta h}$	
Invert	169.10	Invert	169.68
Size (mm)	65	Size (mm)	75
Area (m2)	0.0033	Area (m2)	0.0044
Type	VORTEX	Type	Plate
Cd	-	Cd	0.63

Elevation (m)	Total Storage (cu.m)	Active Storage Storage (cu.m)	Stage (Above Invert) (m)			Orifice 1 Discharge		Orifice 2 Discharge	TOTAL DISCHARGE	
170.400	1553	1346	1.30			4.2		10.2	14.4	
170.300	1449	1242	1.20			4.0		9.4	13.4	
170.200	1346	1139	1.10			3.8		8.6	12.4	
170.100	1242	1035	1.00			3.7		7.6	11.3	
170.000	1139	932	0.90			3.5		6.6	10.0	
169.900	1035	828	0.80			3.3		5.3	8.5	
169.800	932	725	0.70			3.1		3.5	6.6	
169.762	892	685	0.66			3.0		2.6	5.6	
169.730	859	652	0.63			2.9		1.4	4.3	
169.700	828	621	0.60			2.8		0.0	2.8	
169.500	621	414	0.40			2.3		0.0	2.3	
169.463	583	**380**	0.36			2.2		0.0	2.2	**Erosion volume met**
169.400	518	311	0.30			2.0		0.0	2.0	
169.300	414	207	0.20			1.6		0.0	1.6	
169.200	311	104	0.10			1.2		0.0	1.2	
169.100	**207**	0	0.00			0.0		0.0	0	**Infiltration met**
169.000	104	-104	-0.10			0.0		0.0	0	
168.900	0	-207	-0.20			0.0		0.0	0	

Storage Chamber

Area	1218	m2
Depth	1.5	m
Volume	1553	m3

Erosion Control 380 m3

Infiltration Requirement 169 m3

STAGE STORAGE DISCHARGE - AREA 202

Orifice 1		Orifice 2	
$Q = (C)(A)\sqrt{2g\Delta h}$		$Q = (C)(A)\sqrt{2g\Delta h}$	
Invert	166.7	Invert	167.10
Size (mm)	65	Size (mm)	75
Area (m2)	0.0033	Area (m2)	0.0044
Type	VORTEX	Type	Plate
Cd	-	Cd	0.63

Elevation (m)	Total Storage (cu.m)	Active Storage Storage (cu.m)	Stage (Above Invert) (m)	Orifice 1 Discharge	Orifice 2 Discharge	TOTAL DISCHARGE	
168.000	1887	1635	1.30	4.2	11.4	15.6	
167.900	1761	1510	1.20	4.0	10.8	14.8	
167.800	1635	1384	1.10	3.8	10.0	13.9	
167.700	1510	1258	1.00	3.7	9.2	12.9	
167.600	1384	1132	0.90	3.5	8.4	11.9	
167.500	1258	1006	0.80	3.3	7.4	10.7	
167.400	1132	881	0.70	3.1	6.3	9.4	
167.300	1006	755	0.60	2.8	5.0	7.8	
167.200	881	629	0.50	2.6	3.1	5.7	
167.177	852	600	0.48	2.53	2.5	5.0	
167.170	843	591	0.47	2.51	2.2	4.7	
167.160	830	579	0.46	2.48	1.8	4.3	
167.150	818	566	0.45	2.46	1.4	3.8	
167.140	805	554	0.44	2.43	0.6	3.0	
167.100	755	503	0.40	2.3	0.0	2.3	
167.042	682	**430**	0.34	2.13	0.0	2.1	**Erosion volume met**
167.000	629	377	0.30	2.0	0.0	2.0	
166.900	503	252	0.20	1.6	0.0	1.6	
166.800	377	126	0.10	1.2	0.0	1.2	
166.700	**252**	0	0.00	0.0	0.0	0	**Infiltration met**
166.600	126	-126	-0.10	0.0	0.0	0	
166.500	0	-252	-0.20	0.0	0.0	0	

Storage Chamber

Area	1480	m2
Depth	1.5	m
Volume	1887	m3

Erosion Control 430 m3

Infiltration Requirement 191 m3

STAGE STORAGE DISCHARGE - AREA 203

Orifice 1		Orifice 2	
$Q = (C)(A)\sqrt{2g\Delta h}$		$Q = (C)(A)\sqrt{2g\Delta h}$	
Invert	165.700	Invert	166.10
Size (mm)	43	Size (mm)	75
Area (m2)	0.0015	Area (m2)	0.0044
Type	VORTEX	Type	Plate
Cd	-	Cd	0.63

Elevation (m)	Total Storage (cu.m)	Active Storage Storage (cu.m)	Stage (Above Invert) (m)			Orifice 1 Discharge		Orifice 2 Discharge	TOTAL DISCHARGE	
167.000	1785	1547	1.30			1.83		11.4	13.2	
166.900	1666	1428	1.20			1.76		10.8	12.4	
166.800	1547	1309	1.10			1.68		10.0	11.6	
166.700	1428	1190	1.00			1.60		9.2	10.8	
166.600	1309	1071	0.90			1.52		8.4	9.8	
166.500	1190	952	0.80			1.43		7.4	8.8	
166.400	1071	833	0.70			1.34		6.3	7.6	
166.300	952	714	0.60			1.24		5.0	6.1	
166.200	833	595	0.50			1.13		3.1	4.2	
166.180	809	571	0.48			1.11		2.5	3.6	
166.170	797	559	0.47			1.09		2.2	3.3	
166.160	785	547	0.46			1.08		1.8	2.9	
166.150	774	536	0.45			1.07		1.4	2.4	
166.140	762	524	0.44			1.06		0.6	1.7	
166.100	714	476	0.40			1.01		0.0	1.0	
166.000	595	357	0.30			0.88		0.0	0.9	
165.948	533	295	0.25			0.80		0.0	0.8	**Erosion volume met**
165.900	476	238	0.20			0.72		0.0	0.7	
165.800	357	119	0.10			0.51		0.0	0.5	
165.700	**238**	0	0.00			0.00		0.0	0	**Infiltration met**
165.600	119	-119	-0.10			0.0		0.0	0	
165.500	0	-238	-0.20			0.0		0.0	0	

Storage Chamber

Area	1400	m2
Depth	1.5	m
Volume	1785	m3

Erosion Control 295 m3

Infiltration Requirement 236 m3

TEMPEST Product Submittal Package R1

Date: November 12, 2025

Customer: KWA

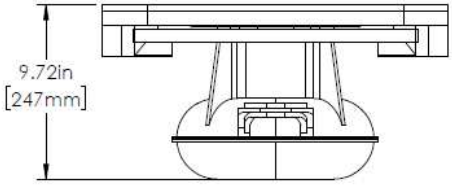
Contact: Pavneet Brar

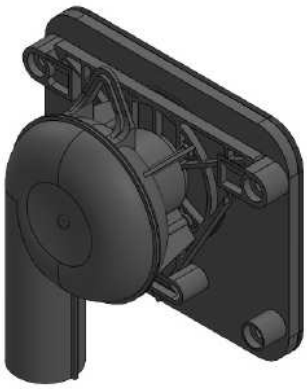
Location: Pickering

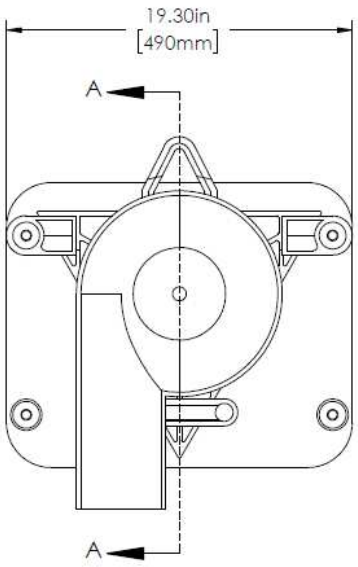
Project Name: FG Seaton

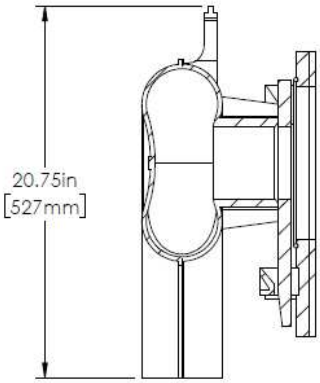
IPEX

Tempest LMF ICD Sq Shop Drawing

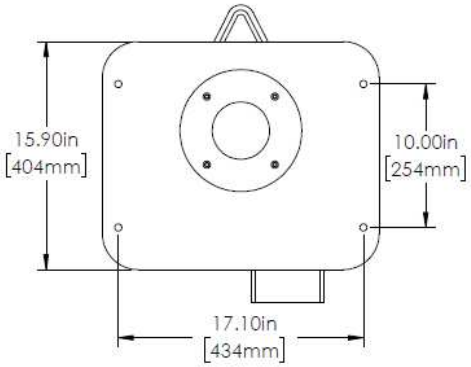








SECTION A-A
SCALE 1 : 8



0	FOR REVIEW	DATE	REVISION	CHK

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LMF SQUARE CB ASSEMBLY

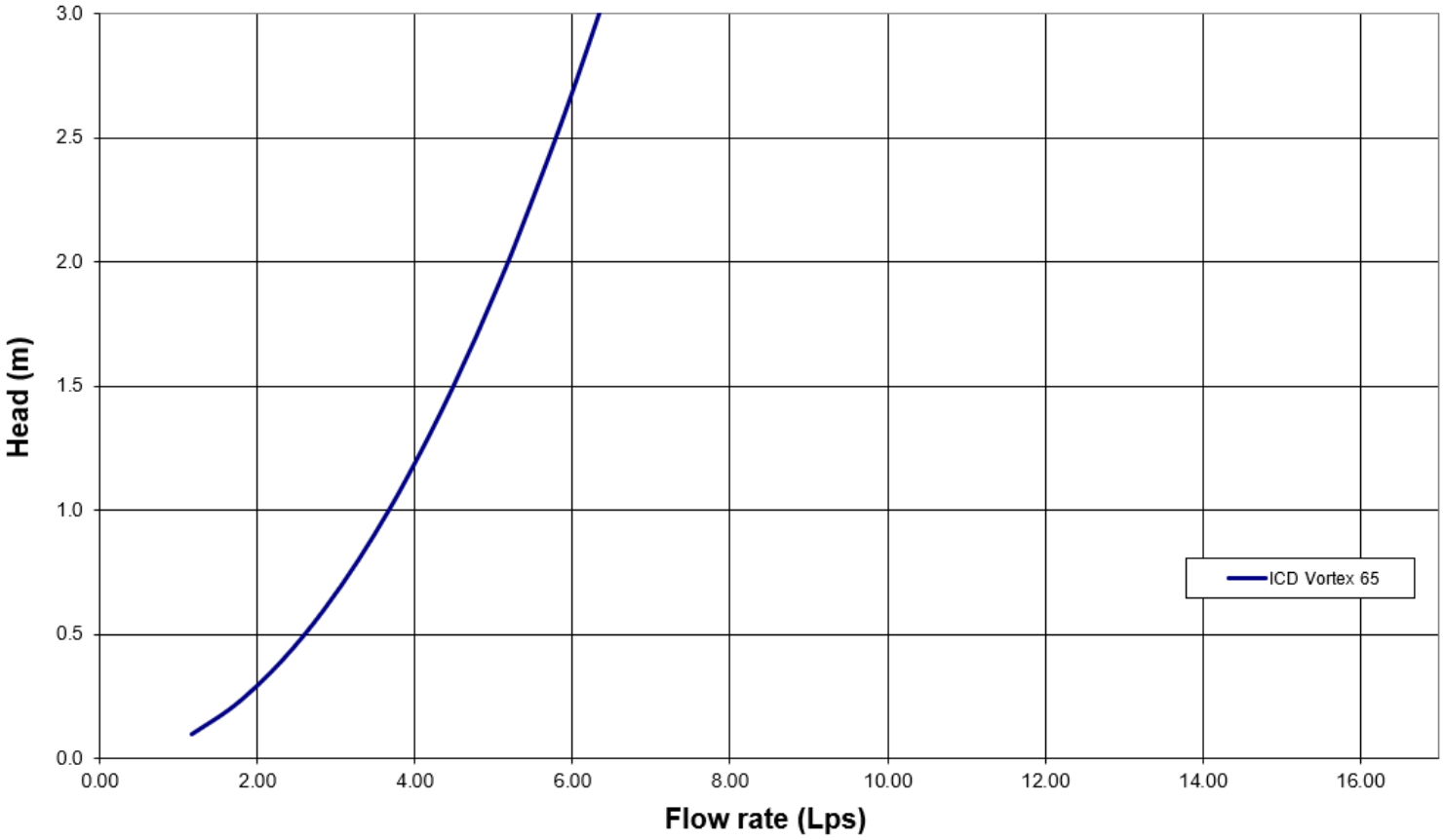
CUSTOMER

DATE	DRAWN BY	CHECKED BY	SCALE	DWG. NO.
2024-04-16	J.B.		N.T.S	N/A

IPEX

Tempest LMF ICD Flow Curve

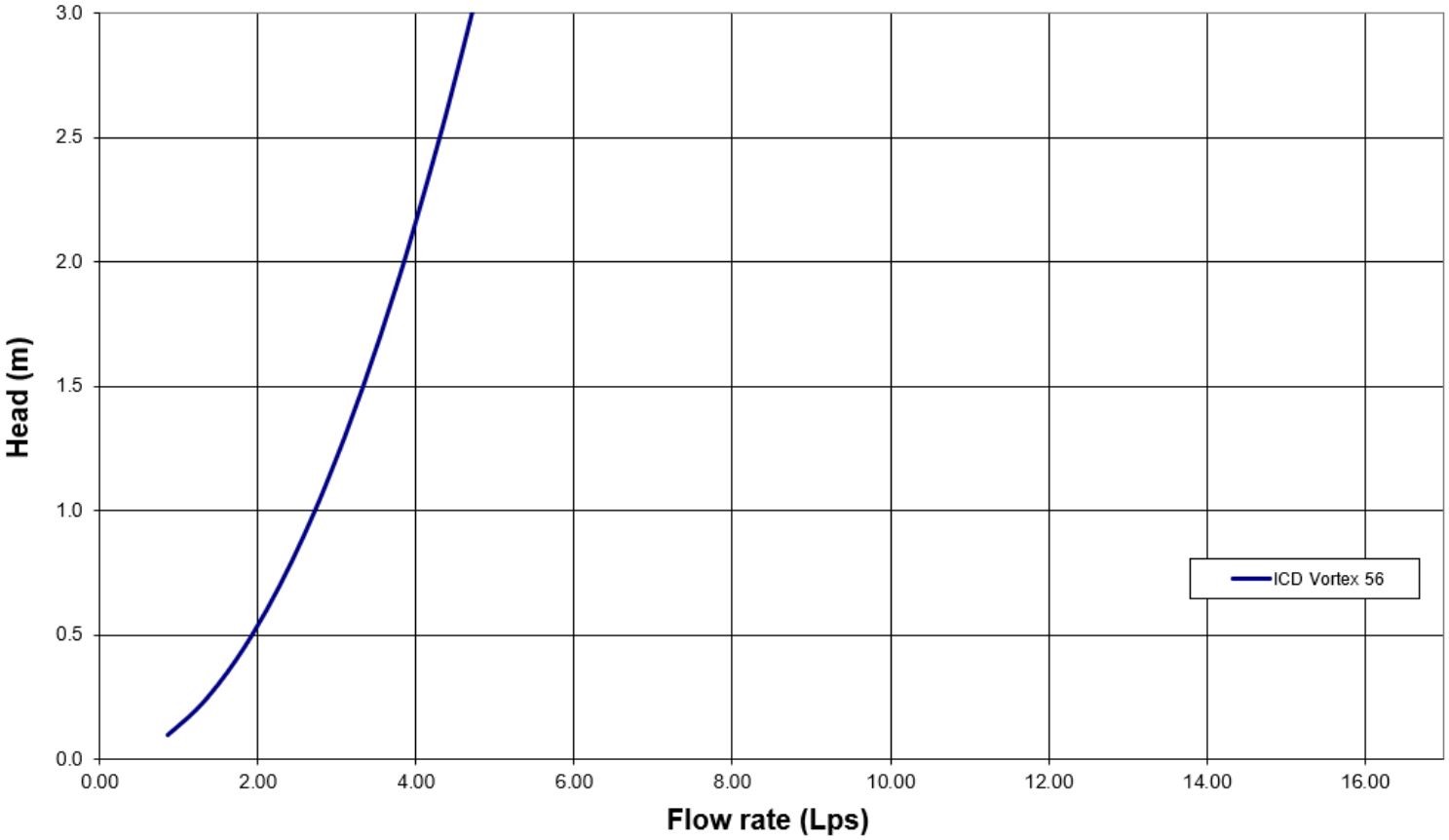
Flow: 2 L/s
Head: 0.3 m
MH



IPEX

Tempest LMF ICD Flow Curve

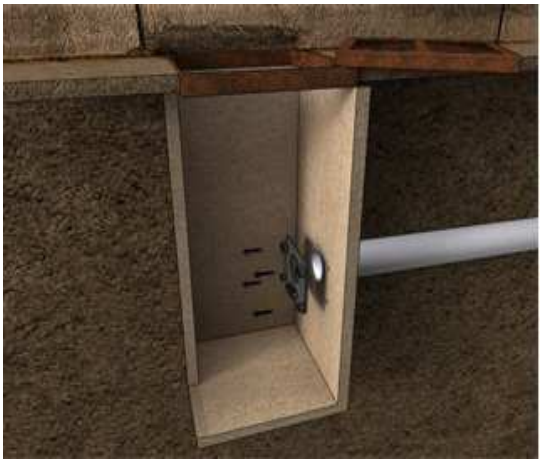
Flow: 1.5 L/s
Head: 0.3 m
MH

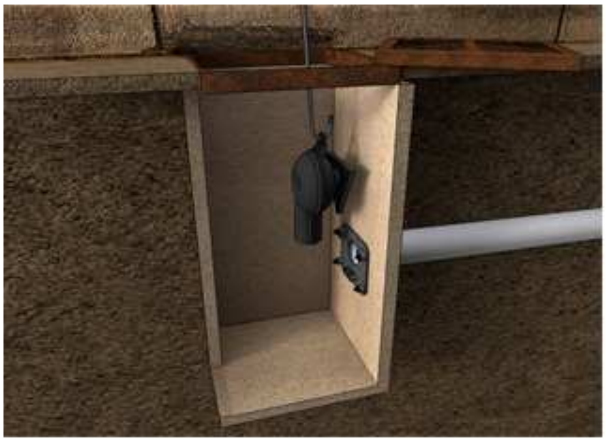


IPEX

Square CB Installation Notes:

1. Materials and tooling verification:
   - Tooling: impact drill, 3/8'' concrete bit, torque wrench for 9/16''nut, hand hammer, level, and marker.
   - Material: (4) concrete anchor 3/8x3-1/2, (4) washers, (4) nuts
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8'' concrete bit to make the four holes at a minimum of 1-1/2'' depth up to 2-1/2''. Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Put the nuts on the top of the anchors to protect the threads when you will hit the anchors with the hammer. Remove the nuts on the ends of the anchors
5. Install the wall mounting plate on the anchors and screw the nut in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the LMF device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the wall mounting plate and has created a seal.

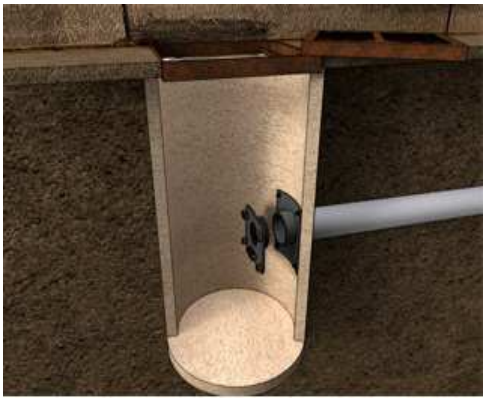




IPEX

Round CB Installation Notes: (Refer to square install notes above for steps 1 , 3, & 4)

2. Use spigot catch basin wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
5. Install the CB spigot wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lb-ft). There should be no gap between the CB spigot wall plate and the catch basin wall.
6. Apply solvent cement on the hub of the universal mounting plate and the spigot of the spigot CB wall plate. Slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the universal mounting plate hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered into the mounting plate and has created a seal.



CAUTION/WARNING/DISCLAIM:

- Verify that the inlet(s) pipe(s) is not protruding into the catch basin. If it is, cut it back so that the inlet pipe is flush with the catch basin wall.
- Any required cement in the installation must be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Please refer to the IPEX solvent cement guide to confirm required curing times or attend the IPEX **Online Solvent Cement Training Course**.
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IPEX

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ICD's must have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

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The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

TEMPEST Product Submittal Package

Date: **November 26, 2025**

Customer: **KWA**

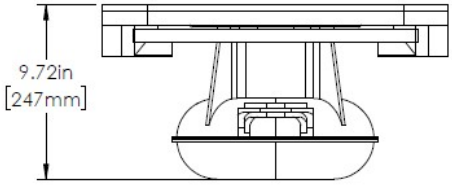
Contact: **Pavneet Brar**

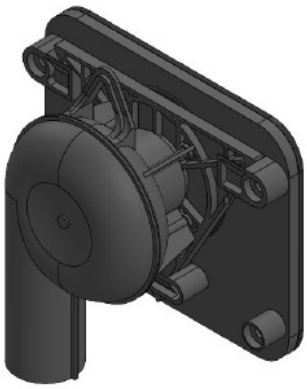
Location: **Pickering**

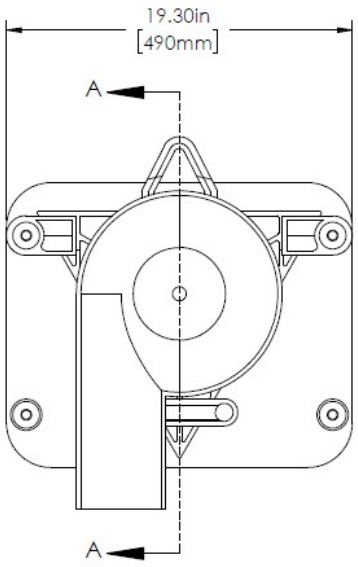
Project Name: **FG Seaton, Chamber 3**

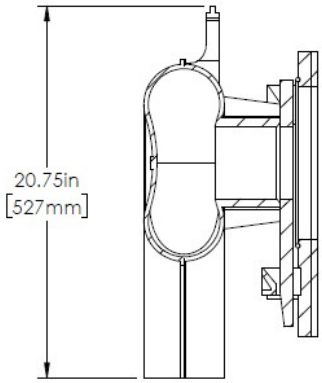
IPEX

Tempest LMF ICD Sq Shop Drawing

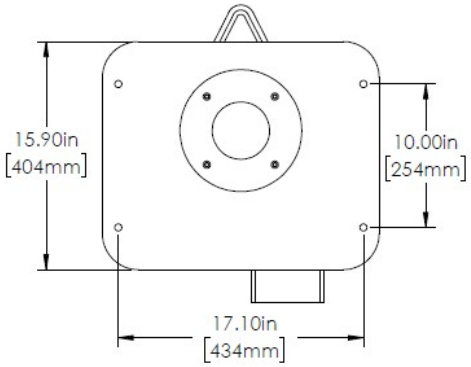








SECTION A-A
SCALE 1 : 8



0	FOR REVIEW	DATE	REVISION	CHK

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IPEX by aliaxis
INVADER BRANCH
6810 INVADER CRESCENT,
MISSISSAUGA, ONTARIO CANADA
PH: (905) 670-7676 FAX: (905) 6705295

LMF SQUARE CB ASSEMBLY

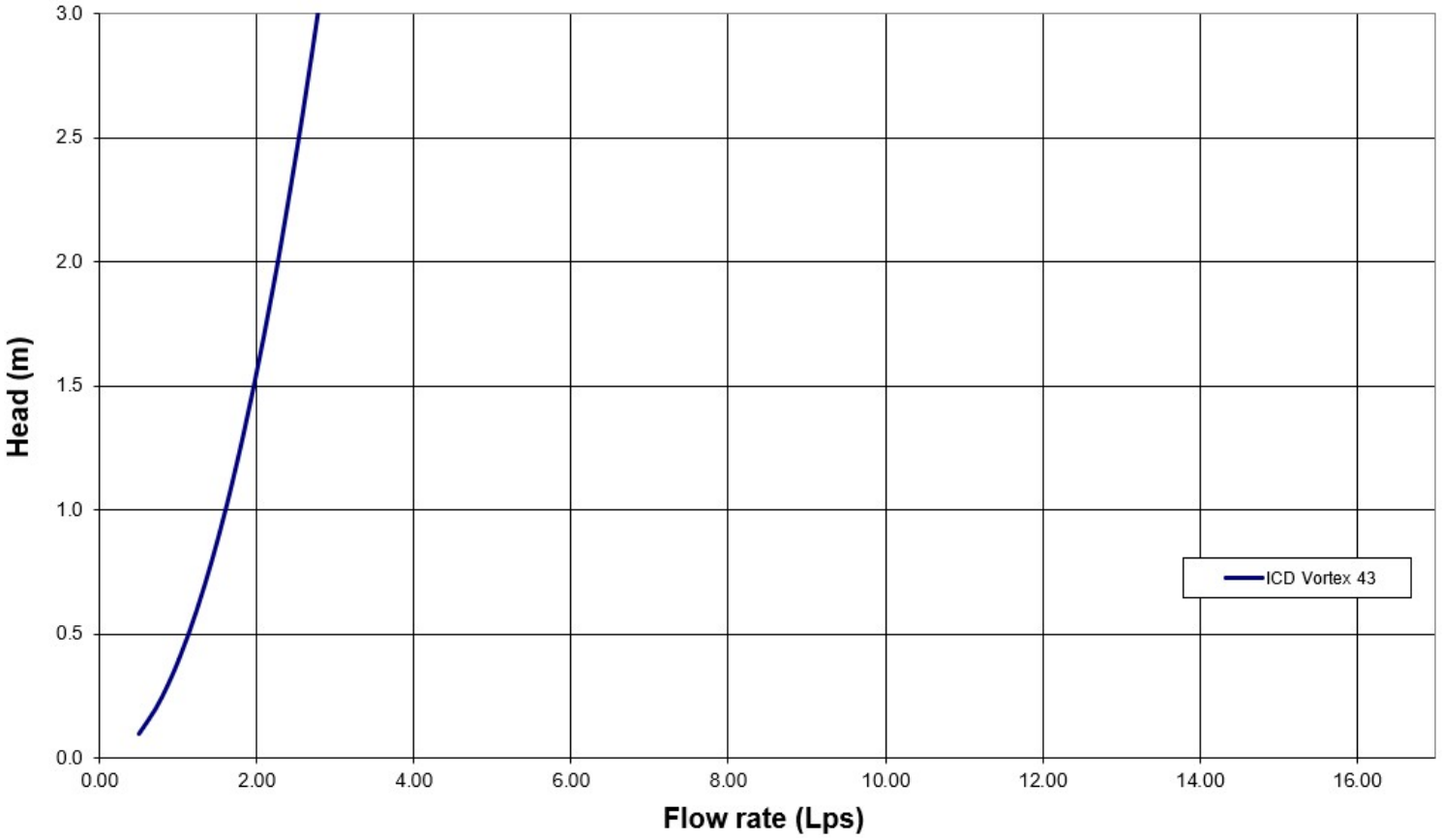
CUSTOMER

DATE	DRAWN BY	CHECKED BY	SCALE	DWG. NO.
2024-04-16	J.B.		N.T.S	N/A

IPEX

Tempest LMF ICD Flow Curve

Flow: 0.8 L/s
Head: 0.25 m
MH weir wall



IPEX

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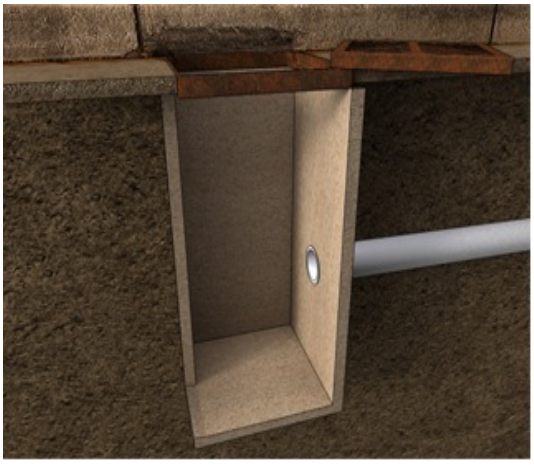

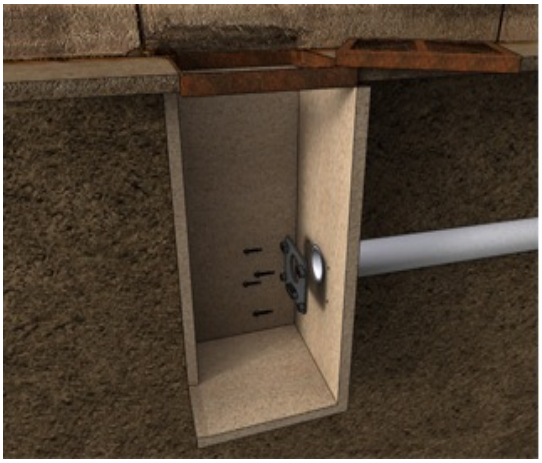

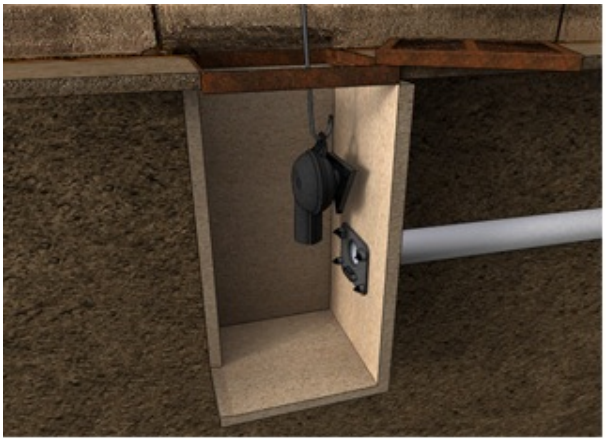

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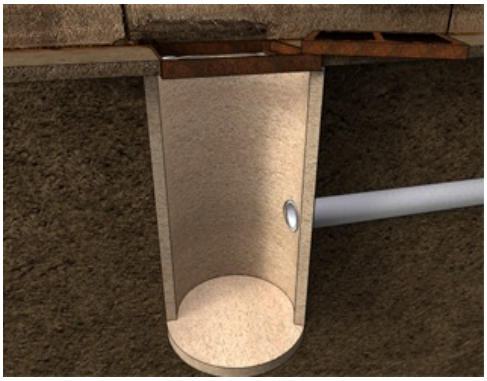

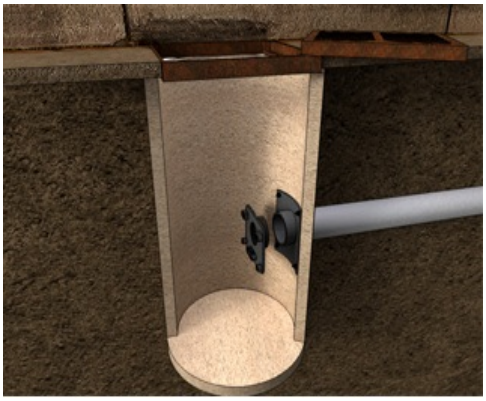

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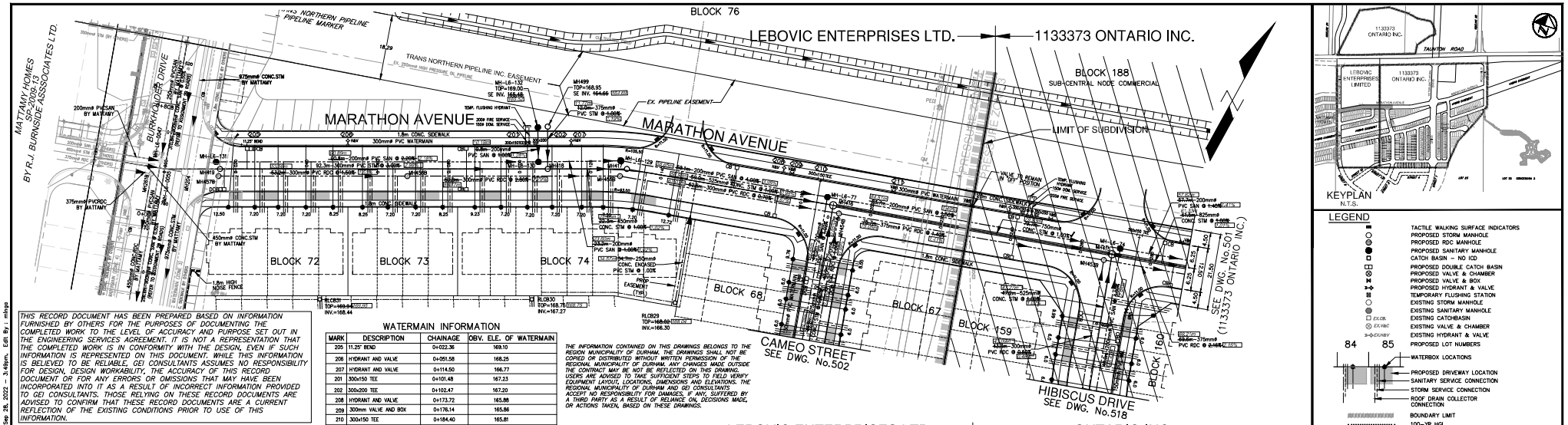


LEGEND

- TACTILE WALKING SURFACE INDICATORS
- PROPOSED STORM MANHOLE
- PROPOSED RDC MANHOLE
- PROPOSED SANITARY MANHOLE
- CATCH BASIN – NO ICD
- PROPOSED DOUBLE CATCH BASIN
- PROPOSED VALVE & CHAMBER
- PROPOSED VALVE & BOX
- PROPOSED HYDRANT & VALVE
- TEMPORARY FLUSHING STATION
- EXISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
- EXISTING CATCHBASIN
- EXISTING VALVE & CHAMBER
- EXISTING HYDRANT & VALVE
- PROPOSED LOT NUMBERS
- WATERBOX LOCATIONS
- PROPOSED DRIVEWAY LOCATION
- SANITARY SERVICE CONNECTION
- STORM SERVICE CONNECTION
- ROOF DRAIN COLLECTOR CONNECTION
- BOUNDARY LIMIT
- 100-YR HGL
- PROPOSED CHAIN LINK FENCE
- PROPOSED NOISE FENCE
- PROPOSED PRIVACY FENCE
- POST AND CABLE BARRIER REFER TO DWG 1203 FOR DETAILS
- PROPOSED BENCHMARK
- COMMUNITY MAIL BOX LOCATIONS
- EXISTING BOREHOLE LOCATION
- EXISTING GROUNDWATER MONITORING WELL
- SUMP PUMP TO GRADE

REFER TO DRAWING 100 FOR GENERAL NOTES

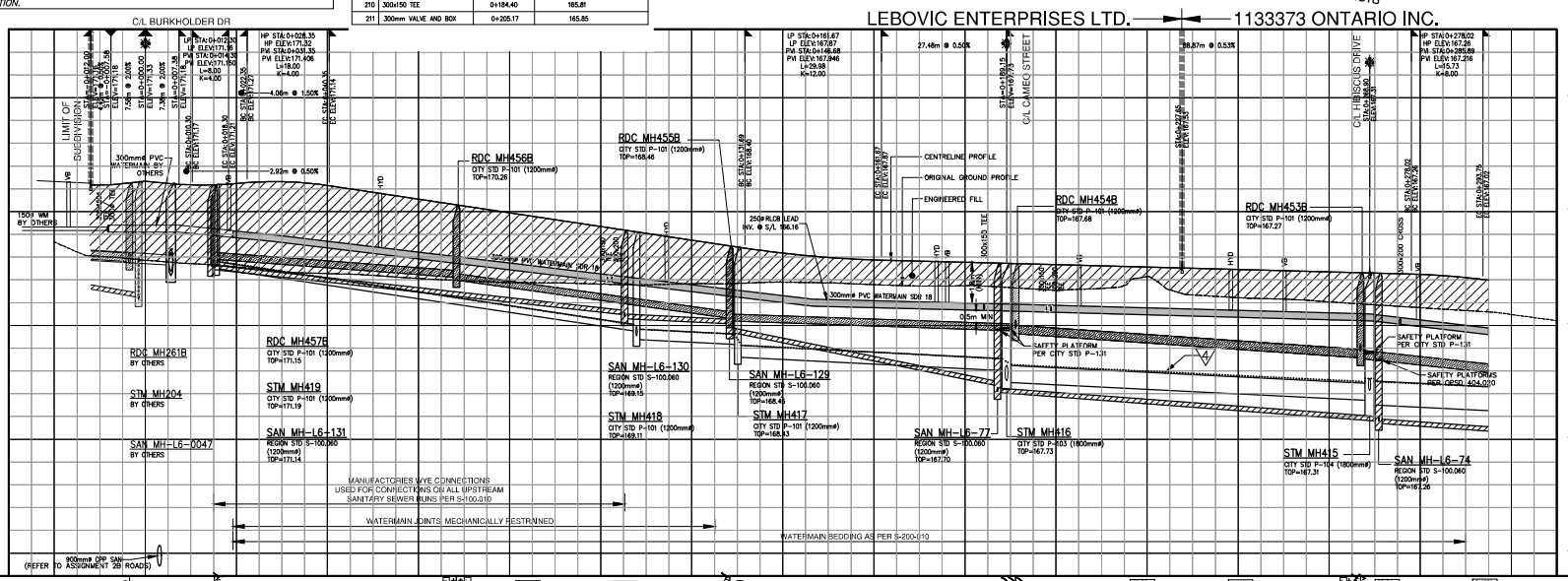
NOTES:
1. UNDERSIDE OF BASEMENT FOOTING ELEVATIONS SHALL BE MINIMUM OF 0.3m ABOVE THE 100YR HGL

THIS RECORD DOCUMENT HAS BEEN PREPARED BASED ON INFORMATION FURNISHED BY OTHERS FOR THE PURPOSES OF DOCUMENTING THE COMPLETED WORK TO THE LEVEL OF ACCURACY AND PURPOSE SET OUT IN THE ENGINEERING SERVICES AGREEMENT. IT IS NOT A REPRESENTATION THAT THE COMPLETED WORK IS IN CONFORMITY WITH THE DESIGN, EVEN IF SUCH INFORMATION IS REPRESENTED ON THIS DOCUMENT. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, GEI CONSULTANTS ASSUMES NO RESPONSIBILITY FOR DESIGN, DESIGN WORKABILITY, THE ACCURACY OF THIS RECORD DOCUMENT OR FOR ANY ERRORS OR OMISSIONS THAT MAY HAVE BEEN INCORPORATED INTO IT AS A RESULT OF INCORRECT INFORMATION PROVIDED TO GEI CONSULTANTS. THOSE RELYING ON THESE RECORD DOCUMENTS ARE ADVISED TO CONFIRM THAT THESE RECORD DOCUMENTS ARE A CURRENT REFLECTION OF THE EXISTING CONDITIONS PRIOR TO USE OF THIS INFORMATION.

WATERMAIN INFORMATION

MARK	DESCRIPTION	CHAINAGE	OBV. ELE. OF WATERMAIN
205	11.25° BEND	0+022.36	169.10
206	HYDRANT AND VALVE	0+051.58	168.25
207	HYDRANT AND VALVE	0+114.50	166.77
201	300x150 TEE	0+101.48	167.23
202	300x200 TEE	0+102.47	167.20
208	HYDRANT AND VALVE	0+173.72	165.88
209	300mm VALVE AND BOX	0+176.14	165.86
210	300x150 TEE	0+184.40	165.81
211	300mm VALVE AND BOX	0+205.17	165.85

THE INFORMATION CONTAINED ON THIS DRAWINGS BELONGS TO THE REGION MUNICIPALITY OF DURHAM. THE DRAWINGS SHALL NOT BE COPIED OR DISTRIBUTED WITHOUT WRITTEN PERMISSION OF THE REGIONAL MUNICIPALITY OF DURHAM. ANY CHANGES MADE OUTSIDE THE CONTRACT MAY BE NOT BE REFLECTED ON THIS DRAWING. USERS ARE ADVISED TO TAKE SUFFICIENT STEPS TO FIELD VERIFY EQUIPMENT LAYOUT, LOCATIONS, DIMENSIONS AND ELEVATIONS. THE REGIONAL MUNICIPALITY OF DURHAM AND GEI CONSULTANTS ACCEPT NO RESPONSIBILITY FOR DAMAGES, IF ANY, SUFFERED BY A THIRD PARTY AS A RESULT OF RELIANCE ON, DECISIONS MADE, OR ACTIONS TAKEN, BASED ON THESE DRAWINGS.



BENCHMARK

ELEVATIONS HEREON ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING BENCHMARK No. 2–045, HAVING A PUBLISHED ELEVATION OF 126.055m (COVID–1928/1978). BRASS TABLET SET HORIZONTALLY IN SOUTH FACE OF BRICK BUILDING, LOCATED 650mE WEST OF VALLEY ROAD AND 34mS NORTH OF THE CENTERLINE OF THIRD CONCESSION ROAD. TABLET IS LOCATED 0.47m WEST OF THE SOUTHEAST CORNER OF BUILDING AND IS 0.52m ABOVE GROUND LEVEL.

No.	DESCRIPTION	DATE	BY
1	AS-CONSTRUCTED	09/26/22	M.L

REVISIONS

THE CORPORATION OF THE CITY OF PICKERING
Engineering Services Department

APPROVED BY
RICHARD HOLBORN, P.Eng.
ENGINEERING SERVICES DEPARTMENT
Approval to works required by the City of Pickering and As defined in the Subdivision Agreement. The City is relying on the technical skills and ability of the P.Eng. sealing and signing this drawing.
Date: DECEMBER 19, 2017

APPROVED
Approval of the Regional Works Dept. for the purposes described in the applicable Regional Subdivision or Servicing Agreement. The Region is relying on the technical skill and ability of the P.Eng. sealing and signing this drawing.
By: PAUL ALLEN
Date: DEC. 20, 2017

LEBOVIC ENTERPRISES LIMITED
(SP-2009-14)

ORIGINALLY SIGNED BY A.K. SWENSON PERSTO ONTARIO LAND SURVEYOR ON AUG. 20, 2015 AS-CONSTRUCTED DRAWINGS PREPARED BY GEI CONSULTANTS SHOWING CONTRACTOR'S AS-BUILTS

MARATHON AVENUE
STA. 0+000 TO STA. 0+227.65

GEI Consultants
75 TAUNTON COURT, UNIT 105, MARKHAM, ONTARIO L3R 4K8
905.415.2301
ONTARIO CERTIFICATE OF AUTHORIZATION 1751

DESIGN BY:	DRAWN BY:	PROJECT No.
A.L.	T.L	LD12-0605
SCALE: 1:500 (HORIZ) 1:100 (VERT)	DATE: MAY 2021	DRAWING No. 501

CITY FILE No.:

File : B:\Working\LEBOVIC ENTERPRISES LTD_General\LD12-0605 1133373ON_Taunton\Models_PKR\400-CADD\400-AeBuilt\South\City of Pickering\LEBOVIC\PKR\12-0605 501 STREET B.dwg, Date : Sep 28, 2022 - 3:49pm, Edit By : mlopo

HYDRAULIC GRADE LINE ANALYSIS
100 YEAR STORM

COLE ENGINEERING
70 Valleywood Drive, Markham, ON L3R 4T5
Phone: (905) 940-6161, Fax: (905)940-2064

DESIGN STORM :
I (100-YEAR): i= 2096.425(T+6.485)^-0.863
Manning's n= 0.013

Commercial Block's Flows from VO2 Model by adjusting C

JOB No.: LD12-0605
SUBDIVISION: Taunton Road Subdivision
DESIGNED BY: AL
CHECKED BY: AR
DATE: November 10, 2017

LOCATION, MANHOLE DATA, Runoff, Time (10 min)

Street / Laneway Name	From U/S MH	To D/S MH	U/S Invert	D/S Invert	U/S Rim Elevation	D/S MH Diameter(mm)	θ (Angle between inflow and outflow pipes)	Angle Measured in Radians	Measured Pipe Slope %	Area (A) (ha)	(R) runoff Coeff.	(A x R)	Cumm (A x R)	Sect. (min)	Accum. (min)	100yr Rainfall Intensity I (mm/hr)	Section Cumm 100yr Runoff (m3/s)
ANGORA STREET(Street L)	RLCB20	MH477	164.13	163.94	165.63	1200	90	1.57	2.00	0.05	0.65	0.03	0.03	0.09	10.09	186.69	0.02
ANGORA STREET(Street L)	RLCB17	MH477	161.98	161.68	163.48	1200	90	1.57	1.00	0.11	0.65	0.07	0.07	0.45	10.45	186.69	0.05
ANGORA STREET(Street L)	RLCB15	MH476	160.50	159.85	162.00	1200	90	1.57	2.00	0.10	0.65	0.07	0.07	0.32	10.32	186.69	0.04
ANGORA STREET(Street L)	MH477	MH476	161.17	159.53	165.89	1200	180	3.14	3.00	0.31	0.65	0.20	0.31	0.33	10.78	182.44	0.19
ANGORA STREET(Street L)	MH476	MH475	158.08	157.49	163.08	1200	140	2.44	1.00	0.29	0.65	0.19	0.56	0.55	11.33	179.42	0.35
ANGORA STREET(Street L)	MH475	MH474	157.36	157.26	161.24	1800	119	2.08	1.00	0.00	0.00	0.00	0.56	0.09	11.42	174.63	0.34
AZALEA AVE(Street F)	DICB7	MH487	158.21	157.73	160.89	1200	90	1.57	5.00	0.16	0.75	0.12	0.12	0.05	10.05	186.69	0.08
AZALEA AVE(Street F)	MH487	MH474	157.13	156.02	161.83	1800	180	3.14	3.00	0.09	0.65	0.06	0.18	0.26	10.31	186.18	0.12
AZALEA AVE(Street F)	MH474	MH471	155.42	154.02	161.21	1500	169	2.95	2.20	0.11	0.65	0.07	0.90	0.36	11.77	173.88	0.54
AZALEA AVE(Street F)	RLCB19	MH474	157.00	156.53	160.00	1800	90	1.57	5.00	0.14	0.65	0.09	0.09	0.06	10.06	186.69	0.06
HIBISCUS DR(Street D)	RLCB18	MH473	162.00	161.77	163.98	1200	90	1.57	2.00	0.09	0.65	0.06	0.06	0.11	10.11	186.69	0.04
HIBISCUS DR(Street D)	RLCB16	MH473	158.38	158.03	159.85	1200	90	1.57	1.00	0.12	0.65	0.08	0.08	0.48	10.48	186.69	0.05
HIBISCUS DR(Street D)	MH473	MH472	158.73	156.27	164.28	1200	180	3.14	2.70	0.40	0.65	0.26	0.40	0.52	10.99	182.16	0.25
HIBISCUS DR(Street D)	MH472	MH471	154.27	154.02	160.07	1500	90	1.57	0.73	0.11	0.65	0.07	0.54	0.37	11.37	177.51	0.33
HIBISCUS DR(Street D)	RLCB14	MH472	156.18	155.75	157.68	1200	90	1.57	1.25	0.11	0.65	0.07	0.07	0.43	10.43	186.69	0.05
AZALEA AVE(Street F)	MH471	MH468	153.40	152.32	159.61	1500	180	3.14	1.57	0.18	0.65	0.12	1.56	0.39	12.17	170.93	0.92
ATHENA PATH(Street E)	RLCB13	MH470	160.24	160.13	161.73	1200	90	1.57	1.00	0.09	0.65	0.06	0.06	0.15	10.15	186.69	0.04
ATHENA PATH(Street E)	RLCB34	MH470	156.32	155.67	157.85	1200	90	1.57	2.00	0.10	0.65	0.07	0.07	0.32	10.32	186.69	0.04
ATHENA PATH(Street E)	MH470	MH469	156.27	153.69	161.85	1200	180	3.14	3.50	0.37	0.65	0.24	0.36	0.41	10.73	183.67	0.23
ATHENA PATH(Street E)	RLCB35	MH469	154.16	153.84	155.69	1800	90	1.57	1.00	0.11	0.65	0.07	0.07	0.45	10.45	186.69	0.05
ATHENA PATH(Street E)	RLCB36	MH469	152.57	151.92	154.10	1500	90	1.57	2.00	0.11	0.65	0.07	0.07	0.32	10.32	186.69	0.05
ATHENA PATH(Street E)	MH469	MH468	151.79	149.46	158.26	1500	90	1.57	3.50	0.31	0.65	0.20	0.71	0.37	11.10	179.85	0.44
AZALEA AVE(Street F)	MH468	MH465	148.75	147.81	156.27	1800	180	3.14	1.40	0.18	0.65	0.12	2.38	0.37	12.54	167.82	1.39
APRICOT LANE(Street G)	RLCB12	MH456-S	156.35	156.26	157.98	1500	90	1.57	1.00	0.08	0.65	0.05	0.05	0.13	10.13	186.69	0.03
APRICOT LANE(Street G)	MH456-S	MH467	155.15	152.00	159.54	1200	180	3.14	3.50	0.29	0.70	0.20	0.26	0.59	10.72	185.43	0.16
APRICOT LANE(Street G)	MH467	MH466	151.55	150.31	155.76	1200	180	3.14	1.65	0.32	0.68	0.22	0.47	0.62	11.33	179.96	0.30
APRICOT LANE(Street G)	MH466	MH465	148.31	147.81	152.79	1800	90	1.57	1.90	0.08	0.69	0.06	0.53	0.15	11.48	174.58	0.32
AZALEA AVE(Street F)	MH465	MH461	147.21	146.82	152.71	2400	180	3.14	1.00	0.11	0.69	0.08	2.99	0.22	12.76	164.97	1.71
SOLSTICE MEWS(Lane AA)	MH464	MH463	153.74	151.69	156.15	1200	180	3.14	3.50	0.39	0.75	0.29	0.29	0.33	10.33	186.69	0.19
SOLSTICE MEWS(Lane AA)	MH463	MH462	151.62	149.10	154.01	1200	180	3.14	3.50	0.30	0.75	0.23	0.52	0.40	10.73	183.55	0.33
SOLSTICE MEWS(Lane AA)	MH462	MH461	147.52	147.31	151.36	2400	90	1.57	0.67	0.08	0.75	0.06	0.58	0.36	11.09	179.83	0.36
AZALEA AVE(Street F)	MH461	OGS-07	146.56	146.40	151.14	3000	90	1.57	0.70	0.12	0.65	0.08	3.64	0.13	12.89	163.33	2.07
AZALEA AVE(Street F)	OGS-07	MH450	146.37	146.08	150.80	1200	90	1.57	0.70	0.00	0.00	0.00	3.64	0.23	13.13	162.38	2.05
SKYRIDGE BLVD(Street C)	RLCB32	MH460	166.14	165.82	167.65	1200	90	1.57	1.00	0.03	0.65	0.02	0.02	0.45	10.45	186.69	0.01
SKYRIDGE BLVD(Street C)	RLCB33	MH460	165.92	165.60	167.45	1200	90	1.57	1.00	0.03	0.65	0.02	0.02	0.45	10.45	186.69	0.01
SKYRIDGE BLVD(Street C)	MH460	MH459	164.97	163.10	168.70	1200	180	3.14	2.50	0.27	0.65	0.18	0.25	0.44	10.89	182.43	0.16
SKYRIDGE BLVD(Street C)	RLCB21	MH460	165.28	164.96	166.82	1200	90	1.57	1.00	0.06	0.65	0.04	0.04	0.45	10.45	186.69	0.03
SKYRIDGE BLVD(Street C)	MH459	MH458	162.50	160.70	167.06	1500	180	3.14	2.20	0.33	0.65	0.21	0.47	0.46	11.35	178.45	0.29
HIBISCUS DR(Street M)	DICB5	MH427-S	164.75	164.46	166.26	1500	104	1.82	2.00	0.46	0.25	0.12	0.12	0.12	10.12	186.69	0.07
HIBISCUS DR(Street M)	MH427-S	MH483	163.43	162.55	166.35	1200	104	1.82	2.00	0.22	0.80	0.18	0.29	0.26	10.26	186.69	0.19
HIBISCUS DR(Street M)	MH483	MH458	162.00	161.28	165.43	1500	180	3.14	2.00	0.06	0.90	0.05	0.35	0.21	10.47	184.18	0.22
SKYRIDGE BLVD(Street C)	MH458	MH457	160.13	158.33	165.31	1200	173	3.02	1.90	0.40	0.65	0.26	1.07	0.53	11.87	174.45	0.65
SKYRIDGE BLVD(Street C)	MH457	MH456	157.46	156.46	161.91	1500	180	3.14	1.90	0.24	0.65	0.16	1.23	0.29	12.16	170.13	0.73
SKYRIDGE BLVD(Street C)	MH456	MH455	154.43	153.42	159.54	1500	161	2.81	1.90	0.24	0.67	0.16	1.39	0.30	12.46	167.84	0.81
SKYRIDGE BLVD(Street C)	MH455	MH454	152.46	152.10	156.61	1500	144	2.51	1.00	0.12	0.68	0.08	1.47	0.24	12.70	165.56	0.85
PETER MATTHEWS DRIVE	MH454	MH453	152.05	151.91	156.69	2400	126	2.20	1.40	0.00	0.00	0.00	1.47	0.05	12.75	163.79	0.84
PETER MATTHEWS DRIVE	DICB4	MH489	156.16	154.83	157.82	1200	94	1.64	4.50	1.15	0.25	0.29	0.29	0.17	10.17	186.69	0.19
PETER MATTHEWS DRIVE	MH491	MH489	153.38	153.08	157.78	1200	180	3.14	2.20	0.45	0.75	0.34	0.34	0.08	10.08	186.69	0.22
PETER MATTHEWS DRIVE	MH489	MH453	153.05	152.04	157.51	2400	180	3.14	2.20	0.00	0.00	0.00	0.63	0.26	10.43	185.04	0.40
PETER MATTHEWS DRIVE	MH453	MH452	151.41	150.47	156.35	1500	180	3.14	1.40	0.39	0.75	0.29	2.39	0.37	13.13	163.39	1.36
PETER MATTHEWS DRIVE	MH452	MH451	148.01	146.69	154.55	1800	148	2.58	1.20	0.72	0.75	0.54	2.93	0.62	13.75	160.69	1.63
PETER MATTHEWS DRIVE	MH451	OGS-06	146.09	145.97	151.80	3000	121	2.11	0.70	0.00	0.00	0.00	2.93	0.12	13.87	156.42	1.59
PETER MATTHEWS DRIVE	OGS-06	MH450	145.89	145.78	148.23	3000	121	2.11	1.00	0.00	0.00	0.00	2.93	0.07	13.93	155.64	1.58
DELPHINIUM TRAIL(Street I)	MH450	MH449	145.11	145.00	151.34	2400	180	3.14	0.50	0.09	0.75	0.07	6.64	0.14	14.08	155.20	3.58
SPINDLE MEWS(Lane BB)	DICB2	MH482	153.34	153.15	155.89	1200	145	2.53	1.00	0.28	0.25	0.07	0.07	0.23	10.23	186.69	0.05
SPINDLE MEWS(Lane BB)	MH482	MH481	152.97	150.77	155.58	1200	180	3.14	2.50	0.38	0.75	0.29	0.36	0.58	10.82	184.44	0.23
SPINDLE MEWS(Lane BB)	MH481	MH480	150.67	148.47	153.71	1200	180	3.14	2.50	0.29	0.75	0.22	0.57	0.52	11.34	179.05	0.36
SPINDLE MEWS(Lane BB)	MH480	OGS-04	147.93	146.27	151.46	2400	90	1.57	2.20	0.26	0.75	0.20	0.77	0.43	11.76	174.55	0.47
SPINDLE MEWS(Lane BB)	OGS-04	MH449	146.24	146.02	150.67	2400	90	1.57	2.20	0.00	0.00	0.00	0.77	0.06	11.82	171.03	0.46
DELPHINIUM TRAIL(Street I)	MH449	MH448	144.89	144.75	150.79	2400	138	2.41	0.50	0.08	0.75	0.06	7.47	0.17	14.24	154.29	4.00
DELPHINIUM TRAIL(Street I)	MH448	MH438	144.08	144.00	149.93	3000	141	2.46	0.50	0.04	0.75	0.03	7.50	0.09	14.33	153.21	3.99
DELPHINIUM TRAIL(Street I)	MH444	MH443	153.42	151.60	158.72	1200	180	3.14	3.00	0.26	0.75	0.20	0.20	0.43	10.43	186.69	0.13
DELPHINIUM TRAIL(Street I)	MH443	MH442	151.51	150.38	155.33	1200	180	3.14	2.00	0.18	0.75	0.14	0.33	0.42	10.85	182.62	0.21
DELPHINIUM TRAIL(Street I)	MH442	MH441	149.64	147.67	153.90	1200	180	3.14	2.20	0.34	0.75	0.26	0.58	0.51	11.35	178.78	0.36
DELPHINIUM TRAIL(Street I)	MH441	OGS-01	145.58	145.25	150.95	2400	180	3.14	0.50	0.21	0.75	0.16	0.74	0.74	12.09	174.39	0.45
DELPHINIUM TRAIL(Street I)	OGS-01	MH438	145.22	145.00	149.75	3000	90	1.57	2.00	0.00	0.00	0.00	0.74	0.07	12.16	168.41	0.43
DELPHINIUM TRAIL(Street I)	MH438	MH437	143.37	143.31	149.61	3000	122	2.13	0.50	0.00	0.00	0.00	8.24	0.08	14.41	152.65	4.37
Servicing Easement	MH437	MH436	143.06	142.94	149.22	3600	180	3.14	0.50	0.00	0.00	0.00	8.24	0.14	14.55	152.17	4.35
Servicing Easement	MH436	MH435	142.94	142.55	147.34	3600	169	2.95	0.50	0.00	0.00	0.00	8.24	0.46	15.01	151.31	4.33
Servicing Easement	MH435	MH434	142.48	142.07	146.96	3600	180	3.14	0.50	0.00	0.00	0.00	8.24	0.49	15.49	148.49	4.25
CHATEAU COURT(Street H)	RLCB11	MH442-E	151.31	151.02	152.76	1200	90	1.57	3.00	0.08	0.75	0.06	0.06	0.08	10.08	186.69	0.04
CHATEAU COURT(Street H)	MH442-E	MH447	150.42	149.41	153.90	1200	163	2.84	3.00	0.07	0.75	0.05	0.11	0.24	10.31	185.94	0.07
CHATEAU COURT(Street H)	MH447	MH446	149.32	148.49	152.82	1200	164	2.86	3.00	0.14	0.66	0.09	0.20	0.20	10.51	183.68	0.13
CHATEAU COURT(Street H)	MH446	MH445	148.42	147.25	151.75	1200	136	2.37	3.50	0.31	0.67	0.21	0.41	0.19	10.70	181.84	0.26
CHATEAU COURT(Street H)	MH445	OGS-03	144.07	143.52	150.54	1800	90	1.57	2.80	0.03	0.65	0.02	0.43	0.11	10.81	180.12	0.27
CHATEAU COURT(Street H)	OGS-03	MH434	143.50	143.33	149.27	3600	90	1.57	2.45	0.00	0.00	0.00	0.43	0.04	10.85	179.14	0.27
Servicing Easement	MH434	MH433	141.53	141.12	146.59	3000	133	2.32	0.50	0.00	0.00	0.00	8.67	0.49	15.98	145.66	4.38
Servicing Easement	MH433	MH402	139.25	139.06	145.59	3600	141	2.46	0.50	0.00	0.00	0.00	8.67	0.22	16.20	142.93	4.30
AQUARIUS TRAIL(Street J)	RLCB10	MH410	152.30	152.11	153.87	1200	90	1.57	2.00	0.08	0.75	0.06	0.06	0.09	10.09	186.69	0.039
AQUARIUS TRAIL(Street J)	MH410	MH405	148.59	146.32	153.97	1200	180	3.14	2.80	0.60	0.68	0.41	0.47	0.45	10.54	185.80	0.302
AQUARIUS TRAIL(Street J)	MH405	OGS-05	144.46	142.20	149.71	2400	118	2.06	2.50	0.52	0.65	0.34	0.81	0.53	11.07	181.56	0.508
AQUARIUS TRAIL(Street J)	OGS-05	MH403	142.05	141.77	145.98	3000	132	2.30	2.50	0.00	0.00	0.00	0.81	0.07	11.14	176.81	0.495
AQUARIUS TRAIL(Street J)	MH430	MH428	148.67	147.70	150.73	1500	180	3.14	1.00	0.35	0.85	0.30	0.30	1.02	11.02	186.69	0.193
BLOCK 187 - AQUARIUS TRAIL (Street J)	MH429	MH428	148.69	146.50	151.66	1500	113	1.97	1.15	4.21	0.03	0.14	0.14	0.16	10.16	186.69	0.049
AQUARIUS TRAIL(Street J)	MH428	MH406	146.36	145.84	151.24	2400	180	3.14	1.80	0.05	0.85	0.04	0.48	0.20	11.22	177.28	0.256
HIBISCUS DR(Street M)	RLCB9	MH427	163.69	163.20	165.11	1500	90	1.57	1.00	0.12	0.75	0.09	0.09	0.50	10.50	186.69	0.058
HIBISCUS DR(Street M)	RLCB8	MH427	164.48	163.52	166.37	1500	90	1.57	2.00	0.13	0.65	0.08	0.08	0.47	10.47	186.69	0.055
HIBISCUS DR(Street M)	MH427	MH426	163.04	162.80	166.35	1500	165	2.88	1.00	0.00	0.00	0.00	0.17	0.25	10.75	181.94	0.110
HIBISCUS DR(Street M)	RLCB7	MH426	164.16	163.35	166.43	1500	90	1.57	2.00	0.09	0.75	0.07	0.07	0.40	10.40	186.69	0.044
HIBISCUS DR(Street M)	MH426	MH415	162.61	162.14	166.63	1800	90	1.57	1.00	0.17	0.75	0.13	0.37	0.40	11.15	179.63	0.230
CAMEO(Street E)	RLCB6	MH425	165.88	165.27	167.01	1200	90	1.57	1.00	0.08	0.65	0.05	0.05	0.44	10.44	186.69	0.034
CAMEO(Street E)	RLCB31	MH425	168.44	168.11	169.94	1200	90	1.57	1.00	0.09	0.75	0.07	0.07	0.45	10.45	186.69	0.044
CAMEO(Street E)	MH425	MH424	164.72	163.83	170.08	1200	180	3.14	1.00	0.40	0.71	0.28	0.44	0.63	11.28	182.38	0.280
CAMEO(Street E)	RLCB5	MH425	164.59	164.27	166.37	1200	90	1.57	1.00	0.06	0.65	0.04	0.04	0.44	10.44	186.69	0.025
CAMEO(Street E)	RLCB30	MH424	167.27	166.96	168.75	1200	90	1.57	1.00	0.16	0.75	0.12	0.12	0.37	10.37	186.69	0.078
CAMEO(Street E)	RLCB4	MH424	164.68	164.36	166.02	1200	90	1.57	1.00	0.12	0.65	0.08	0.08	0.44	10.44	186.69	0.051
CAMEO(Street E)	MH424	MH423	163.60	163.06	168.82	1500	147	2.57	0.70	0.28	0.70	0.20	0.84	0.71	10.71	186.69	0.542
MARATHON AVE(Street B)	RLCB29	MH417	166.30	165.95	168.02	1200	90	1.57	1.00	0.11	0.75	0.08	0.08	0.48	10.48	186.69	0.053
CAMEO(Street E)	RLCB3	MH423	165.12	164.79	166.62	1200	90	1.57	1.00	0.08	0.65	0.05	0.05	0.46	10.46	186.69	0.034
CAMEO(Street E)	MH423	MH422	162.96	162.92	167.70	1500	135	2.36	0.50	0.04	0.65	0.03	0.91	0.11	10.82	180.06	0.572
CAMEO(Street E)	MH422	MH416	162.87	162.58	167.64	1500	90	1.57	0.60	0.17	0.75	0.13	1.04	0.45	11.27	179.06	0.648
MARATHON AVE(Street B)	MH419	MH418	167.50	164.73	171.19	1200	180	3.14	3.00	0.31	0.75	0.23	0.23	0.65	10.65	186.69	0.151
BLOCK 76 - CAMEO(Street E)	MH499	MH418	164.66	164.54	168.95	1500	90	1.57	1.00	4.82	0.03	0.13	0.13	0.13	10.13	186.69	0.045
MARATHON AVE(Street B)	MH418	MH417	164.38	164.16	169.11	1200	170	2.97	1.00	0.07	0.75	0.05	0.41	0.21	10.86	180.57	0.222
MARATHON AVE(Street B)	MH417	MH416	163.60	163.01	168.43	1500	180	3.14	1.00	0.17	0.75	0.13	0.62	0.50	11.35	178.71	0.350
MARATHON AVE(Street B)	MH416	MH415	162.50	161.70	167.73	1800	180	3.14	1.00	0.20	0.75	0.15	1.82	0.53	11.88	174.42	1.064
MARATHON AVE(Street B)	MH415	MH414	161.63	161.01	167.31	1800	180	3.14	1.00	0.16	0.75	0.12	2.31	0.38	12.26	170.09	1.326
MARATHON AVE(Street B)	RLCB2	MH414	162.16	161.65	163.79	1500	90	1.57	1.00	0.17	0.75	0.13	0.13	0.54	10.54	186.69	0.083
MARATHON AVE(Street B)	MH414	MH413	160.93	160.20	166.10	1800	169	2.95	1.00	0.22	0.75	0.17	2.60	0.46	12.72	167.09	1.473
MARATHON AVE(Street B)	RLCB1	MH413	160.00	159.11	162.02	1800	90	1.57	2.50	0.13	0.75	0.10	0.10	0.31	10.31	186.69	0.063
MARATHON AVE(Street B)	MH413	MH412	157.32	156.25	163.65	1800	179	3.12	1.10	0.28	0.65	0.18	2.88	0.54	13.26	163.67	1.601
BLOCK 188 - PETER MATTHEWS DR	MH490	MH493	155.83	155.60	159.36	1500	90	1.57	1.00	6.31	0.03	0.20	0.20	0.22	10.22	186.69	0.071
MARATHON AVE(Street B)	MH412	MH411	155.61	155.28	159.00	2400	180	3.14	1.00	0.08	0.85	0.07	2.95	0.19	13.45	159.77	1.601
PETER MATTHEWS DRIVE	MH495	MH494	157.39	156.31	159.39	1500	180	3.14	1.00	0.53	0.90	0.48	0.48	0.83	10.83	186.69	0.309
PETER MATTHEWS DRIVE	MH494	MH493	156.15	155.86	161.05	1500	175	3.05	0.50	0.21	0.90	0.19	0.67	0.56	11.39	178.94	0.414
PETER MATTHEWS DRIVE	MH493	MH492	155.51	155.38	160.15	1500	162	2.83	0.50	0.10	0.90	0.09	0.96	0.24	11.63	174.11	0.523
PETER MATTHEWS DRIVE	MH492	MH411	155.35	155.31	159.43	2400	90	1.57	0.50	0.00	0.00	0.00	0.96	0.06	11.69	172.12	0.517
MARATHON AVE(Street K)	MH411	MH409	155.06	154.70	159.20	1800	171	2.98	0.50	0.15	0.90	0.14	4.04	0.57	11.95	158.48	2.139
MARATHON AVE(Street K)	MH409	MH408	152.66	151.50	158.81	1800	180	3.14	1.00	0.23	0.85	0.20	4.23	0.64	12.27	154.69	2.192
MARATHON AVE(Street K)	MH408	MH407	148.43	147.58	154.76	1800	157	2.74	1.00	0.20	0.85	0.17	4.40	0.47	13.92	150.63	2.224
AQUARIUS TRAIL(Street J)	MH407	MH406	146.98	146.76	150.57	2400	94	1.64	1.00	0.00	0.00	0.00	4.40	0.13	14.14	147.80	2.182
AQUARIUS TRAIL(Street J)	DICB1	MH406	145.71	145.45	148.66	2400	90	1.57	2.00	0.92	0.25	0.23	0.23	0.10	14.75	186.69	0.149
AQUARIUS TRAIL(Street J)	MH406	MAXX IN	144.09	143.40	150.53	3000	94	1.64	1.00	0.21	0.85	0.18	5.29	0.38	15.51	147.06	2.592
AQUARIUS TRAIL(Street J)	MAXX IN	MAXX OUT	143.37	143.22	147.56	3000	94	1.64	0.72	0.00	0.00	0.00	5.29	0.14	10.14	144.86	2.553
AQUARIUS TRAIL(Street J)	MAXX OUT	MH403	143.19	142.98	146.66	3000	94	1.64	1.00	0.10	0.65	0.07	5.36	0.12	15.37	144.06	2.572
AQUARIUS TRAIL(Street J)	MH403	MH402	139.79	139.23	146.24	3600	126	2.20	0.90	0.00	0.00	0.00	8.16	0.35	10.35	143.42	2.962
Servicing Easement	MH402	MH401	135.26	134.70	142.41	3600	168	2.93	0.50	0.00	0.00	0.00	14.83	0.58	15.83	141.51	7.182
Site outlet	MH401	HW	134.58	134.30	138.29	3600	180	3.14	0.50	0.00	0.00	0.00	14.83	0.29	16.18	138.47	7.028

PIPE DATA, FRICTION LOSSES, MH LOSSES

Street / Laneway Name	From U/S MH	To D/S MH	1 Pipe Slope	2 HGL Downstream	3 Do (mm)	HYD RAD	4 100yr Pipe Q100 Max (m3/s)	Qcap (m3/s)	5 Lo Length of Pipe (m)	6 Vo (m/s)	7 Vo²/2g	8 Ho	9 Sfo	10 Hf	18 Strait Runs 0.05(Vo²/2g) Angled Runs 0.5(Vo²/2g)
ANGORA STREET(Street L)	RLCB20	MH477	2.00	164.19	250.00	0.06	0.021	0.08	9.69	0.43	0.01	0.01	0.13	0.01	0.005
ANGORA STREET(Street L)	RLCB17	MH477	1.00	161.91	250.00	0.06	0.046	0.06	32.40	0.94	0.05	0.05	0.61	0.20	0.023
ANGORA STREET(Street L)	RLCB15	MH476	2.00	160.10	250.00	0.06	0.042	0.08	32.40	0.86	0.04	0.04	0.50	0.16	0.019
ANGORA STREET(Street L)	MH477	MH476	3.00	159.91	375.00	0.09	0.194	0.30	54.69	1.75	0.16	0.16	1.22	0.67	0.008
ANGORA STREET(Street L)	MH476	MH475	1.00	157.94	450.00	0.11	0.348	0.28	59.05	2.19	0.24	0.24	1.49	0.88	0.122
ANGORA STREET(Street L)	MH475	MH474	1.00	157.78	525.00	0.13	0.339	0.43	10.66	1.57	0.12	0.12	0.62	0.07	0.062
AZALEA AVE(Street F)	DICB7	MH487	5.00	158.03	300.00	0.08	0.078	0.22	9.69	1.10	0.06	0.06	0.65	0.06	0.031
AZALEA AVE(Street F)	MH487	MH474	3.00	156.32	300.00	0.08	0.115	0.17	36.88	1.63	0.14	0.14	1.42	0.53	0.007
AZALEA AVE(Street F)	MH474	MH471	2.20	154.55	625.00	0.13	0.543	0.64	63.50	2.51	0.32	0.32	1.60	1.01	0.161
AZALEA AVE(Street F)	RLCB19	MH474	5.00	156.78	250.00	0.06	0.059	0.13	9.40	1.20	0.07	0.07	0.98	0.09	0.037
HIBISCUS DR(Street D)	RLCB18	MH473	2.00	162.02	250.00	0.06	0.036	0.08	11.75	0.77	0.03	0.03	0.41	0.05	0.015
HIBISCUS DR(Street D)	RLCB16	MH473	1.00	159.18	250.00	0.06	0.051	0.06	34.65	1.03	0.05	0.05	0.72	0.25	0.027
HIBISCUS DR(Street D)	MH473	MH472	2.70	158.72	450.00	0.11	0.251	0.47	91.18	1.58	0.13	0.13	0.77	0.71	0.006
HIBISCUS DR(Street D)	MH472	MH471	0.73	154.47	450.00	0.11	0.333	0.24	34.45	2.09	0.22	0.22	1.36	0.47	0.111
HIBISCUS DR(Street D)	RLCB14	MH472	1.25	156.00	250.00	0.06	0.046	0.07	34.77	0.94	0.05	0.05	0.61	0.21	0.023
AZALEA AVE(Street F)	MH471	MH468	1.57	152.99	675.00	0.17	0.924	1.05	69.25	2.58	0.34	0.34	1.21	0.84	0.017
ATHENA PATH(Street E)	RLCB13	MH470	1.00	160.38	250.00	0.06	0.038	0.06	10.91	0.77	0.03	0.03	0.41	0.04	0.015
ATHENA PATH(Street E)	RLCB34	MH470	2.00	156.64	250.00	0.06	0.042	0.08	32.40	0.86	0.04	0.04	0.50	0.16	0.019
ATHENA PATH(Street E)	MH470	MH469	3.50	154.49	375.00	0.09	0.232	0.33	73.71	2.10	0.23	0.23	1.75	1.29	0.011
ATHENA PATH(Street E)	RLCB35	MH469	1.00	154.49	250.00	0.06	0.046	0.06	32.40	0.94	0.05	0.05	0.61	0.20	0.023
ATHENA PATH(Street E)	RLCB36	MH469	2.00	154.49	250.00	0.06	0.046	0.08	32.40	0.94	0.05	0.05	0.61	0.20	0.023
ATHENA PATH(Street E)	MH469	MH468	3.50	149.84	375.00	0.09	0.442	0.33	66.67	4.01	0.82	0.82	6.37	4.25	0.409
AZALEA AVE(Street F)	MH468	MH465	1.40	148.56	750.00	0.19	1.388	1.32	67.00	3.14	0.50	0.50	1.55	1.04	0.025
APRICOT LANE(Street G)	RLCB12	MH456-S	1.00	156.51	250.00	0.06	0.034	0.06	9.51	0.69	0.02	0.02	0.32	0.03	0.012
APRICOT LANE(Street G)	MH456-S	MH467	3.50	152.84	300.00	0.08	0.164	0.18	90.00	2.32	0.27	0.27	2.88	2.59	0.014
APRICOT LANE(Street G)	MH467	MH466	1.65	150.69	375.00	0.09	0.295	0.23	75.33	2.67	0.36	0.36	2.84	2.14	0.018
APRICOT LANE(Street G)	MH466	MH465	1.90	148.41	600.00	0.15	0.320	0.85	26.50	1.13	0.07	0.07	0.27	0.07	0.033
AZALEA AVE(Street F)	MH465	MH461	1.00	147.79	975.00	0.24	1.710	2.24	39.71	2.29	0.27	0.27	0.58	0.23	0.013
SOLSTICE MEWS(Lane AA)	MH464	MH463	3.50	152.07	375.00	0.09	0.190	0.33	58.41	1.72	0.15	0.15	1.17	0.68	0.008
SOLSTICE MEWS(Lane AA)	MH463	MH462	3.50	149.48	375.00	0.09	0.330	0.33	71.97	2.99	0.45	0.45	3.54	2.55	0.023
SOLSTICE MEWS(Lane AA)	MH462	MH461	0.67	147.76	450.00	0.11	0.361	0.23	31.51	2.27	0.26	0.26	1.60	0.50	0.131
AZALEA AVE(Street F)	MH461	OGS-07	0.70	147.60	1200.00	0.30	2.065	3.26	22.57	1.83	0.17	0.17	0.28	0.06	0.085
AZALEA AVE(Street F)	OGS-07	MH450	0.70	147.28	1200.00	0.30	2.053	3.26	40.64	1.82	0.17	0.17	0.28	0.11	0.084
SKYRIDGE BLVD(Street C)	RLCB32	MH460	1.00	166.07	250.00	0.06	0.013	0.06	32.40	0.26	0.00	0.00	0.05	0.01	0.002
SKYRIDGE BLVD(Street C)	RLCB33	MH460	1.00	165.85	250.00	0.06	0.013	0.06	32.40	0.26	0.00	0.00	0.05	0.01	0.002
SKYRIDGE BLVD(Street C)	MH460	MH459	2.50	163.55	450.00	0.11	0.161	0.45	74.73	1.01	0.05	0.05	0.32	0.24	0.003
SKYRIDGE BLVD(Street C)	RLCB21	MH460	1.00	165.42	250.00	0.06	0.025	0.06	32.48	0.52	0.01	0.01	0.18	0.06	0.007
SKYRIDGE BLVD(Street C)	MH459	MH458	2.20	161.23	525.00	0.13	0.290	0.64	81.60	1.34	0.09	0.09	0.45	0.37	0.005
HIBISCUS DR(Street M)	DICB5	MH427-S	2.00	164.76	300.00	0.08	0.075	0.14	14.36	1.05	0.06	0.06	0.59	0.09	0.028
HIBISCUS DR(Street M)	MH427-S	MH483	2.00	163.07	525.00	0.13	0.189	0.61	44.07	0.87	0.04	0.04	0.19	0.08	0.019
HIBISCUS DR(Street M)	MH483	MH458	2.00	161.81	525.00	0.13	0.221	0.61	35.86	1.02	0.05	0.05	0.26	0.09	0.003
SKYRIDGE BLVD(Street C)	MH458	MH457	1.90	158.93	600.00	0.15	0.650	0.85	94.51	2.30	0.27	0.27	1.12	1.06	0.135
SKYRIDGE BLVD(Street C)	MH457	MH456	1.90	157.06	600.00	0.15	0.726	0.85	52.26	2.57	0.34	0.34	1.40	0.73	0.017
SKYRIDGE BLVD(Street C)	MH456	MH455	1.90	154.02	600.00	0.15	0.810	0.85	53.33	2.86	0.42	0.42	1.74	0.93	0.209
SKYRIDGE BLVD(Street C)	MH455	MH454	1.00	152.65	750.00	0.19	0.846	1.11	36.03	1.91	0.19	0.19	0.58	0.21	0.093
PETER MATTHEWS DRIVE	MH454	MH453	1.40	152.66	750.00	0.19	0.837	1.32	9.73	1.89	0.18	0.18	0.56	0.05	0.091
PETER MATTHEWS DRIVE	DICB4	MH489	4.50	155.13	300.00	0.08	0.186	0.21	29.70	2.64	0.35	0.35	3.71	1.10	0.177
PETER MATTHEWS DRIVE	MH491	MH489	2.20	153.60	525.00	0.13	0.219	0.64	13.65	1.01	0.05	0.05	0.26	0.04	0.003
PETER MATTHEWS DRIVE	MH489	MH453	2.20	152.56	525.00	0.13	0.402	0.64	45.93	1.86	0.18	0.18	0.87	0.40	0.009
PETER MATTHEWS DRIVE	MH453	MH452	1.40	151.22	750.00	0.19	1.355	1.32	67.05	3.07	0.48	0.48	1.48	0.99	0.024
PETER MATTHEWS DRIVE	MH452	MH451	1.20	147.52	825.00	0.21	1.634	1.57	109.62	3.06	0.48	0.48	1.30	1.42	0.238
PETER MATTHEWS DRIVE	MH451	OGS-06	0.70	146.92	900.00	0.23	1.591	1.51	16.97	2.50	0.32	0.32	0.77	0.13	0.159
PETER MATTHEWS DRIVE	OGS-06	MH450	1.00	146.68	900.00	0.23	1.583	1.81	11.21	2.49	0.32	0.32	0.76	0.09	0.158
DELPHINIUM TRAIL(Street I)	MH450	MH449	0.50	146.50	1500.00	0.38	3.577	5.00	23.87	2.02	0.21	0.21	0.26	0.06	0.010
SPINDLE MEWS(Lane BB)	DICB2	MH482	1.00	153.45	300.00	0.08	0.045	0.10	19.18	0.64	0.02	0.02	0.22	0.04	0.011
SPINDLE MEWS(Lane BB)	MH482	MH481	2.50	151.15	375.00	0.09	0.227	0.28	88.05	2.06	0.22	0.22	1.66	1.48	0.011
SPINDLE MEWS(Lane BB)	MH481	MH480	2.50	148.92	450.00	0.11	0.356	0.45	88.09	2.24	0.26	0.26	1.56	1.37	0.013
SPINDLE MEWS(Lane BB)	MH480	OGS-04	2.20	146.80	525.00	0.13	0.465	0.64	75.32	2.15	0.24	0.24	1.17	0.88	0.118
SPINDLE MEWS(Lane BB)	OGS-04	MH449	2.20	146.55	525.00	0.13	0.456	0.64	10.08	2.11	0.23	0.23	1.12	0.11	0.113
DELPHINIUM TRAIL(Street I)	MH449	MH448	0.50	146.25	1500.00	0.38	3.999	5.00	28.38	2.26	0.26	0.26	0.32	0.09	0.131
DELPHINIUM TRAIL(Street I)	MH448	MH438	0.50	145.50	1500.00	0.38	3.987	5.00	15.13	2.26	0.26	0.26	0.32	0.05	0.130
DELPHINIUM TRAIL(Street I)	MH444	MH443	3.00	151.90	300.00	0.08	0.126	0.17	60.65	1.79	0.16	0.16	1.71	1.04	0.008
DELPHINIUM TRAIL(Street I)	MH443	MH442	2.00	150.75	375.00	0.09	0.209	0.25	56.83	1.89	0.18	0.18	1.42	0.81	0.009
DELPHINIUM TRAIL(Street I)	MH442	MH441	2.20	148.20	525.00	0.13	0.363	0.64	89.54	1.68	0.14	0.14	0.71	0.64	0.007
DELPHINIUM TRAIL(Street I)	MH441	OGS-01	0.50	145.78	525.00	0.13	0.450	0.30	62.10	2.08	0.22	0.22	1.09	0.68	0.011
DELPHINIUM TRAIL(Street I)	OGS-01	MH438	2.00	145.53	525.00	0.13	0.434	0.61	11.03	2.01	0.21	0.21	1.02	0.11	0.103
DELPHINIUM TRAIL(Street I)	MH438	MH437	0.50	144.81	1500.00	0.38	4.366	5.00	12.75	2.47	0.31	0.31	0.38	0.05	0.156
Servicing Easement	MH437	MH436	0.50	144.49	1500.00	0.38	4.353	5.00	23.54	2.46	0.31	0.31	0.38	0.09	0.015
Servicing Easement	MH436	MH435	0.50	144.05	1500.00	0.38	4.328	5.00	76.42	2.45	0.31	0.31	0.37	0.29	0.153
Servicing Easement	MH435	MH434	0.50	143.57	1500.00	0.38	4.247	5.00	82.36	2.40	0.29	0.29	0.36	0.30	0.015
CHATEAU COURT(Street H)	RLCB11	MH442-E	3.00	151.27	250.00	0.06	0.039	0.10	9.73	0.79	0.03	0.03	0.43	0.04	0.016
CHATEAU COURT(Street H)	MH442-E	MH447	3.00	149.71	300.00	0.08	0.073	0.17	33.67	1.03	0.05	0.05	0.56	0.19	0.027
CHATEAU COURT(Street H)	MH447	MH446	3.00	148.79	300.00	0.08	0.131	0.17	27.98	1.85	0.17	0.17	1.83	0.51	0.087
CHATEAU COURT(Street H)	MH446	MH445	3.50	147.62	375.00	0.09	0.261	0.33	33.51	2.36	0.28	0.28	2.21	0.74	0.142
CHATEAU COURT(Street H)	MH445	OGS-03	2.80	143.97	450.00	0.11	0.270	0.48	19.66	1.70	0.15	0.15	0.90	0.18	0.074
CHATEAU COURT(Street H)	OGS-03	MH434	2.45	143.78	450.00	0.11	0.269	0.45	6.84	1.69	0.15	0.15	0.89	0.06	0.073
Servicing Easement	MH434	MH433	0.50	142.62	1500.00	0.38	4.385	5.00	82.65	2.48	0.31	0.31	0.38	0.32	0.157
Servicing Easement	MH433	MH402	0.50	140.56	1500.00	0.38	4.303	5.00	37.70	2.43	0.30	0.30	0.37	0.14	0.151
AQUARIUS TRAIL(Street J)	RLCB10	MH410	2.00	152.36	250.00	0.06	0.039	0.08	9.49	0.79	0.03	0.03	0.43	0.04	0.016
AQUARIUS TRAIL(Street J)	MH410	MH405	2.80	146.77	450.00	0.11	0.302	0.48	80.91	1.90	0.18	0.18	1.12	0.91	0.009
AQUARIUS TRAIL(Street J)	MH405	OGS-05	2.50	142.80	450.00	0.11	0.508	0.45	90.32	3.19	0.52	0.52	3.18	2.87	0.260
AQUARIUS TRAIL(Street J)	OGS-05	MH403	2.50	142.22	450.00	0.11	0.495	0.45	11.12	3.11	0.49	0.49	3.01	0.33	0.247
AQUARIUS TRAIL(Street J)	MH430	MH428	1.00	148.08	375.00	0.09	0.193	0.18	97.00	1.75	0.16	0.16	1.21	1.17	0.008
BLOCK 187 - AQUARIUS TRAIL (Street J)	MH429	MH428	1.15	146.68	375.00	0.09	0.049	0.19	16.47	0.45	0.01	0.01	0.08	0.01	0.005
AQUARIUS TRAIL(Street J)	MH428	MH406	1.80	146.34	450.00	0.11	0.256	0.38	28.64	1.61	0.13	0.13	0.81	0.23	0.007
HIBISCUS DR(Street M)	RLCB9	MH427	1.00	163.50	300.00	0.08	0.058	0.10	41.06	0.83	0.03	0.03	0.36	0.15	0.017
HIBISCUS DR(Street M)	RLCB8	MH427	2.00	163.77	250.00	0.06	0.055	0.08	48.20	1.12	0.06	0.06	0.85	0.41	0.032
HIBISCUS DR(Street M)	MH427	MH426	1.00	163.18	375.00	0.09	0.110	0.18	24.12	1.00	0.05	0.05	0.40	0.10	0.025
HIBISCUS DR(Street M)	RLCB7	MH426	2.00	163.60	250.00	0.06	0.044	0.08	40.71	0.89	0.04	0.04	0.54	0.22	0.020
HIBISCUS DR(Street M)	MH426	MH415	1.00	162.66	525.00	0.13	0.230	0.43	47.20	1.06	0.06	0.06	0.29	0.14	0.029
CAMEO(Street E)	RLCB6	MH425	1.00	165.52	250.00	0.06	0.034	0.06	31.86	0.69	0.02	0.02	0.32	0.10	0.012
CAMEO(Street E)	RLCB31	MH425	1.00	168.36	250.00	0.06	0.044	0.06	32.94	0.89	0.04	0.04	0.54	0.18	0.020
CAMEO(Street E)	MH425	MH424	1.00	164.44	450.00	0.11	0.280	0.28	89.40	1.76	0.16	0.16	0.97	0.86	0.008
CAMEO(Street E)	RLCB5	MH425	1.00	165.31	250.00	0.06	0.025	0.06	31.93	0.52	0.01	0.01	0.18	0.06	0.007
CAMEO(Street E)	RLCB30	MH424	1.00	167.26	300.00	0.08	0.078	0.10	30.71	1.10	0.06	0.06	0.65	0.20	0.031
CAMEO(Street E)	RLCB4	MH424	1.00	164.61	250.00	0.06	0.051	0.06	31.93	1.03	0.05	0.05	0.72	0.23	0.027
CAMEO(Street E)	MH424	MH423	0.70	163.77	600.00	0.15	0.536	0.51	76.90	1.89	0.18	0.18	0.76	0.59	0.091
MARATHON AVE(Street B)	RLCB29	MH417	1.00	166.20	250.00	0.06	0.053	0.06	34.65	1.09	0.06	0.06	0.81	0.28	0.030
CAMEO(Street E)	RLCB3	MH423	1.00	165.04	250.00	0.06	0.034	0.06	33.48	0.69	0.02	0.02	0.32	0.11	0.012
CAMEO(Street E)	MH423	MH422	0.50	163.65	675.00	0.17	0.572	0.69	11.17	1.60	0.13	0.13	0.46	0.05	0.065
CAMEO(Street E)	MH422	MH416	0.60	163.27	675.00	0.17	0.648	0.65	49.18	1.81	0.17	0.17	0.59	0.29	0.084
MARATHON AVE(Street B)	MH419	MH418	3.00	165.03	300.00	0.08	0.151	0.17	92.31	2.13	0.23	0.23	2.43	2.24	0.012
BLOCK 76 - CAMEO(Street E)	MH499	MH418	1.00	164.91	375.00	0.09	0.045	0.18	11.95	0.41	0.01	0.01	0.07	0.01	0.004
MARATHON AVE(Street B)	MH418	MH417	1.00	164.61	450.00	0.11	0.222	0.28	22.27	1.40	0.10	0.10	0.61	0.14	0.050
MARATHON AVE(Street B)	MH417	MH416	1.00	163.54	525.00	0.13	0.350	0.43	59.03	1.62	0.13	0.13	0.66	0.39	0.007
MARATHON AVE(Street B)	MH416	MH415	1.00	162.53	750.00	0.19	1.064	1.11	79.73	2.41	0.30	0.30	0.91	0.73	0.015
MARATHON AVE(Street B)	MH415	MH414	1.00	161.99	825.00	0.21	1.326	1.43	61.64	2.48	0.31	0.31	0.85	0.53	0.016
MARATHON AVE(Street B)	RLCB2	MH414	1.00	162.03	375.00	0.09	0.083	0.18	51.37	0.75	0.03	0.03	0.22	0.11	0.014
MARATHON AVE(Street B)	MH414	MH413	1.00	161.02	825.00	0.21	1.473	1.43	73.34	2.76	0.39	0.39	1.05	0.77	0.193
MARATHON AVE(Street B)	RLCB1	MH413	2.50	159.36	250.00	0.06	0.063	0.09	35.53	1.29	0.08	0.08	1.13	0.40	0.042
MARATHON AVE(Street B)	MH413	MH412	1.10	157.15	900.00	0.23	1.601	1.90	97.52	2.52	0.32	0.32	0.78	0.76	0.161
BLOCK 188 - PETER MATTHEWS DR	MH490	MH493	1.00	156.68	450.00	0.11	0.071	0.28	23.32	0.45	0.01	0.01	0.06	0.01	0.006
MARATHON AVE(Street B)	MH412	MH411	1.00	156.54	975.00	0.24	1.601	2.24	33.41	2.14	0.23	0.23	0.51	0.17	0.012
PETER MATTHEWS DRIVE	MH495	MH494	1.00	156.91	600.00	0.15	0.309	0.61	108.27	1.09	0.06	0.06	0.25	0.27	0.003
PETER MATTHEWS DRIVE	MH494	MH493	0.50	156.68	750.00	0.19	0.414	0.79	59.56	0.94	0.04	0.04	0.14	0.08	0.022
PETER MATTHEWS DRIVE	MH493	MH492	0.50	156.59	750.00	0.19	0.523	0.79	25.61	1.18	0.07	0.07	0.22	0.06	0.036
PETER MATTHEWS DRIVE	MH492	MH411	0.50	156.54	750.00	0.19	0.517	0.79	6.94	1.17	0.07	0.07	0.22	0.01	0.035
MARATHON AVE(Street K)	MH411	MH409	0.50	155.68	975.00	0.24	2.139	1.58	72.17	2.86	0.42	0.42	0.91	0.66	0.209
MARATHON AVE(Street K)	MH409	MH408	1.00	152.48	975.00	0.24	2.192	2.24	115.64	2.94	0.44	0.44	0.96	1.11	0.022
MARATHON AVE(Street K)	MH408	MH407	1.00	148.56	975.00	0.24	2.224	2.24	84.64	2.98	0.45	0.45	0.98	0.83	0.226
AQUARIUS TRAIL(Street J)	MH407	MH406	1.00	147.73	975.00	0.24	2.182	2.24	22.65	2.92	0.44	0.44	0.95	0.21	0.218
AQUARIUS TRAIL(Street J)	DICB1	MH406	2.00	146.34	375.00	0.09	0.149	0.25	13.24	1.35	0.09	0.09	0.72	0.10	0.046
AQUARIUS TRAIL(Street J)	MH406	MAXX IN	1.00	145.11	975.00	0.24	2.592	2.24	69.14	3.47	0.61	0.61	1.34	0.93	0.307
AQUARIUS TRAIL(Street J)	MAXX IN	MAXX OUT	0.72	144.53	975.00	0.24	2.553	1.90	21.70	3.42	0.60	0.60	1.30	0.28	0.298
AQUARIUS TRAIL(Street J)	MAXX OUT	MH403	1.00	143.95	975.00	0.24	2.572	2.24	20.78	3.44	0.60	0.60	1.32	0.27	0.302
AQUARIUS TRAIL(Street J)	MH403	MH402	0.90	140.28	1050.00	0.26	2.962	2.59	62.81	3.42	0.60	0.60	1.18	0.74	0.298
Servicing Easement	MH402	MH401	0.50	136.20	1500.00	0.38	7.182	11.69	112.65	2.00	0.20	0.20	0.25	0.28	0.101
Site outlet	MH401	HW	0.50	135.80	1500.00	0.38	7.028	11.69	56.09	2.44	0.30	0.30	0.37	0.21	0.015

U/S HYDRAULIC GRADE LINE, HGL VS BASEMENT

Street / Laneway Name	From U/S MH	To D/S MH	19 EGL, 2+7	20 EGL, 10+18+19	21 U/S HGL EGL-7	22 US Obv	Greater HGL or Obvert	Pipe Check	Service Connections (y/n)	F.F.E.	Basement Floor (U/S) (F.F.E.-2.65m)	Basement Floor vs HGL	Basement Check Check
ANGORA STREET(Street L)	RLCB20	MH477	164.20	164.21	164.20	164.38	164.38	OK	N	166.33	163.76	-0.62	NO CONNECTION
ANGORA STREET(Street L)	RLCB17	MH477	161.95	162.17	162.13	162.23	162.23	OK	N	164.18	161.61	-0.62	NO CONNECTION
ANGORA STREET(Street L)	RLCB15	MH476	160.14	160.32	160.28	160.75	160.75	OK	N	162.70	160.13	-0.62	NO CONNECTION
ANGORA STREET(Street L)	MH477	MH476	160.06	160.74	160.58	161.55	161.55	OK	Y	166.59	164.02	2.47	OK
ANGORA STREET(Street L)	MH476	MH475	158.18	159.19	158.94	158.53	158.94	SURCHARGE	Y	163.78	161.21	2.27	OK
ANGORA STREET(Street L)	MH475	MH474	157.91	158.04	157.91	157.89	157.91	SURCHARGE	Y	161.94	159.37	1.46	OK
AZALEA AVE(Street F)	DICB7	MH487	158.09	158.19	158.12	158.51	158.51	OK	N	161.59	159.02	0.51	NO CONNECTION
AZALEA AVE(Street F)	MH487	MH474	156.46	156.99	156.85	157.43	157.43	OK	N	162.53	159.96	2.53	NO CONNECTION
AZALEA AVE(Street F)	MH474	MH471	154.87	156.04	155.72	155.94	155.94	OK	Y	161.91	159.34	3.40	OK
AZALEA AVE(Street F)	RLCB19	MH474	156.85	156.98	156.91	157.25	157.25	OK	N	160.70	158.13	0.88	NO CONNECTION
HIBISCUS DR(Street D)	RLCB18	MH473	162.05	162.11	162.08	162.25	162.25	OK	N	164.68	162.11	-0.14	NO CONNECTION
HIBISCUS DR(Street D)	RLCB16	MH473	159.24	159.52	159.46	158.63	159.46	SURCHARGE	N	160.55	157.98	-1.48	NO CONNECTION
HIBISCUS DR(Street D)	MH473	MH472	156.85	157.56	157.43	159.18	159.18	OK	Y	164.98	162.41	3.23	OK
HIBISCUS DR(Street D)	MH472	MH471	154.69	155.27	155.05	154.72	155.05	SURCHARGE	Y	160.77	158.20	3.15	OK
HIBISCUS DR(Street D)	RLCB14	MH472	156.04	156.27	156.23	156.43	156.43	OK	N	158.38	155.81	-0.62	NO CONNECTION
AZALEA AVE(Street F)	MH471	MH468	153.33	154.18	153.85	154.08	154.08	OK	Y	160.31	157.74	3.66	OK
ATHENA PATH(Street E)	RLCB13	MH470	160.41	160.47	160.44	160.49	160.49	OK	N	162.43	159.86	-0.63	NO CONNECTION
ATHENA PATH(Street E)	RLCB34	MH470	156.68	156.86	156.82	156.57	156.82	SURCHARGE	N	158.55	155.98	-0.84	NO CONNECTION
ATHENA PATH(Street E)	MH470	MH469	154.71	156.02	155.79	156.64	156.64	OK	Y	162.55	159.98	3.34	OK
ATHENA PATH(Street E)	RLCB35	MH469	154.54	154.75	154.71	154.41	154.71	SURCHARGE	N	156.39	153.82	-0.89	NO CONNECTION
ATHENA PATH(Street E)	RLCB36	MH469	154.54	154.75	154.71	152.82	154.71	SURCHARGE	N	154.80	152.23	-2.48	NO CONNECTION
ATHENA PATH(Street E)	MH469	MH468	150.65	155.31	154.49	152.17	154.49	SURCHARGE	Y	158.96	156.39	1.90	OK
AZALEA AVE(Street F)	MH468	MH465	149.06	150.13	149.63	149.50	149.63	SURCHARGE	Y	156.97	154.40	4.77	OK
APRICOT LANE(Street G)	RLCB12	MH456-S	156.53	156.57	156.55	156.60	156.60	OK	N	158.68	156.11	-0.49	NO CONNECTION
APRICOT LANE(Street G)	MH456-S	MH467	153.12	155.72	155.45	155.45	155.45	SURCHARGE	Y	160.24	157.67	2.22	OK
APRICOT LANE(Street G)	MH467	MH466	151.05	153.20	152.84	151.93	152.84	SURCHARGE	Y	156.46	153.89	1.05	OK
APRICOT LANE(Street G)	MH466	MH465	148.48	148.58	148.51	148.91	148.91	OK	Y	153.49	150.92	2.01	OK
AZALEA AVE(Street F)	MH465	MH461	148.06	148.30	148.04	148.19	148.19	OK	Y	153.41	150.84	2.65	OK
SOLSTICE MEWS(Lane AA)	MH464	MH463	152.22	152.91	152.76	154.11	154.11	OK	N	156.85	154.28	0.17	NO CONNECTION
SOLSTICE MEWS(Lane AA)	MH463	MH462	149.93	152.50	152.04	151.99	152.04	SURCHARGE	N	154.71	152.14	0.10	NO CONNECTION
SOLSTICE MEWS(Lane AA)	MH462	MH461	148.02	148.66	148.40	147.97	148.40	SURCHARGE	N	152.06	149.49	1.09	NO CONNECTION
AZALEA AVE(Street F)	MH461	OGS-07	147.77	147.92	147.75	147.76	147.76	OK	N	151.84	149.27	1.51	NO CONNECTION
AZALEA AVE(Street F)	OGS-07	MH450	147.45	147.65	147.48	147.57	147.57	OK	N	151.50	148.93	1.36	NO CONNECTION
SKYRIDGE BLVD(Street C)	RLCB32	MH460	166.07	166.09	166.08	166.39	166.39	OK	N	168.35	165.78	-0.61	NO CONNECTION
SKYRIDGE BLVD(Street C)	RLCB33	MH460	165.85	165.87	165.86	166.17	166.17	OK	N	168.15	165.58	-0.59	NO CONNECTION
SKYRIDGE BLVD(Street C)	MH460	MH459	163.60	163.84	163.79	165.42	165.42	OK	Y	169.40	166.83	1.41	OK
SKYRIDGE BLVD(Street C)	RLCB21	MH460	165.43	165.50	165.48	165.53	165.53	OK	N	167.52	164.95	-0.58	NO CONNECTION
SKYRIDGE BLVD(Street C)	MH459	MH458	161.32	161.70	161.60	163.02	163.02	OK	Y	167.76	165.19	2.17	OK
HIBISCUS DR(Street M)	DICB5	MH427-S	164.82	164.93	164.88	165.05	165.05	OK	N	166.96	164.39	-0.66	NO CONNECTION
HIBISCUS DR(Street M)	MH427-S	MH483	163.11	163.21	163.18	163.95	163.95	OK	N	167.05	164.48	0.53	NO CONNECTION
HIBISCUS DR(Street M)	MH483	MH458	161.86	161.96	161.91	162.53	162.53	OK	Y	166.13	163.56	1.03	OK
SKYRIDGE BLVD(Street C)	MH458	MH457	159.20	160.39	160.13	160.73	160.73	OK	Y	166.01	163.44	2.71	OK
SKYRIDGE BLVD(Street C)	MH457	MH456	157.40	158.15	157.81	158.06	158.06	OK	Y	162.61	160.04	1.98	OK
SKYRIDGE BLVD(Street C)	MH456	MH455	154.44	155.57	155.16	155.03	155.16	SURCHARGE	Y	160.24	157.67	2.51	OK
SKYRIDGE BLVD(Street C)	MH455	MH454	153.04	153.34	153.15	153.21	153.21	OK	Y	157.31	154.74	1.53	OK
PETER MATTHEWS DRIVE	MH454	MH453	152.85	152.99	152.81	152.80	152.81	SURCHARGE	Y	157.39	154.82	2.01	OK
PETER MATTHEWS DRIVE	DICB4	MH489	155.48	156.76	156.41	156.46	156.46	OK	N	158.52	155.95	-0.51	NO CONNECTION
PETER MATTHEWS DRIVE	MH491	MH489	153.66	153.69	153.64	153.90	153.90	OK	Y	158.48	155.91	2.01	OK
PETER MATTHEWS DRIVE	MH489	MH453	152.74	153.15	152.97	153.57	153.57	OK	Y	158.21	155.64	2.07	OK
PETER MATTHEWS DRIVE	MH453	MH452	151.70	152.72	152.24	152.16	152.24	SURCHARGE	Y	157.05	154.48	2.24	OK
PETER MATTHEWS DRIVE	MH452	MH451	147.99	149.65	149.17	148.83	149.17	SURCHARGE	Y	155.25	152.68	3.51	OK
PETER MATTHEWS DRIVE	MH451	OGS-06	147.24	147.53	147.21	146.99	147.21	SURCHARGE	Y	152.50	149.93	2.72	OK
PETER MATTHEWS DRIVE	OGS-06	MH450	147.00	147.24	146.92	146.79	146.92	SURCHARGE	Y	148.93	146.36	-0.56	SUMP PUMP
DELPHINIUM TRAIL(Street I)	MH450	MH449	146.70	146.78	146.57	146.61	146.61	OK	Y	152.04	149.47	2.86	OK
SPINDLE MEWS(Lane BB)	DICB2	MH482	153.47	153.52	153.50	153.64	153.64	OK	N	156.59	154.02	0.38	NO CONNECTION
SPINDLE MEWS(Lane BB)	MH482	MH481	151.36	152.86	152.64	153.35	153.35	OK	N	156.28	153.71	0.36	NO CONNECTION
SPINDLE MEWS(Lane BB)	MH481	MH480	149.17	150.56	150.30	151.12	151.12	OK	N	154.41	151.84	0.72	NO CONNECTION
SPINDLE MEWS(Lane BB)	MH480	OGS-04	147.03	148.03	147.80	148.45	148.45	OK	N	152.16	149.59	1.14	NO CONNECTION
SPINDLE MEWS(Lane BB)	OGS-04	MH449	146.77	147.00	146.77	146.77	146.77	SURCHARGE	N	151.37	148.80	2.03	NO CONNECTION
DELPHINIUM TRAIL(Street I)	MH449	MH448	146.51	146.73	146.47	146.39	146.47	SURCHARGE	N	151.49	148.92	2.45	NO CONNECTION
DELPHINIUM TRAIL(Street I)	MH448	MH438	145.76	145.94	145.68	145.58	145.68	SURCHARGE	Y	150.63	148.06	2.38	OK
DELPHINIUM TRAIL(Street I)	MH444	MH443	152.06	153.11	152.94	153.72	153.72	OK	Y	157.42	154.85	1.13	OK
DELPHINIUM TRAIL(Street I)	MH443	MH442	150.94	151.75	151.57	151.89	151.89	OK	Y	156.03	153.46	1.57	OK
DELPHINIUM TRAIL(Street I)	MH442	MH441	148.34	148.98	148.84	150.16	150.16	OK	Y	154.60	152.03	1.87	OK
DELPHINIUM TRAIL(Street I)	MH441	OGS-01	146.00	146.69	146.47	146.09	146.47	SURCHARGE	Y	151.65	149.08	2.61	OK
DELPHINIUM TRAIL(Street I)	OGS-01	MH438	145.73	145.94	145.74	145.75	145.75	OK	Y	150.45	147.88	2.13	OK
DELPHINIUM TRAIL(Street I)	MH438	MH437	145.12	145.32	145.01	144.87	145.01	SURCHARGE	Y	150.31	147.74	2.73	OK
Servicing Easement	MH437	MH436	144.80	144.91	144.60	144.58	144.60	SURCHARGE	N	149.92	147.35	2.75	NO CONNECTION
Servicing Easement	MH436	MH435	144.35	144.80	144.49	144.44	144.49	SURCHARGE	N	148.04	145.47	0.98	NO CONNECTION
Servicing Easement	MH435	MH434	143.87	144.18	143.88	143.98	143.98	OK	N	147.66	145.09	1.11	NO CONNECTION
CHATEAU COURT(Street H)	RLCB11	MH442-E	151.30	151.36	151.33	151.56	151.56	OK	N	153.46	150.89	-0.67	NO CONNECTION
CHATEAU COURT(Street H)	MH442-E	MH447	149.76	149.98	149.92	150.72	150.72	OK	N	154.60	152.03	1.31	NO CONNECTION
CHATEAU COURT(Street H)	MH447	MH446	148.97	149.57	149.39	149.62	149.62	OK	Y	153.52	150.95	1.33	OK
CHATEAU COURT(Street H)	MH446	MH445	147.90	148.79	148.50	148.79	148.79	OK	Y	152.45	149.88	1.09	OK
CHATEAU COURT(Street H)	MH445	OGS-03	144.12	144.37	144.22	144.52	144.52	OK	Y	151.24	148.67	4.15	OK
CHATEAU COURT(Street H)	OGS-03	MH434	143.93	144.06	143.92	143.95	143.95	OK	Y	149.97	147.40	3.45	OK
Servicing Easement	MH434	MH433	142.93	143.41	143.09	143.03	143.09	SURCHARGE	Y	147.29	144.72	1.63	OK
Servicing Easement	MH433	MH402	140.86	141.15	140.85	140.75	140.85	SURCHARGE	N	146.29	143.72	2.87	NO CONNECTION
AQUARIUS TRAIL(Street J)	RLCB10	MH410	152.39	152.45	152.42	152.55	152.55	OK	N	154.57	152.00	-0.55	NO CONNECTION
AQUARIUS TRAIL(Street J)	MH410	MH405	146.96	147.87	147.69	149.04	149.04	OK	N	154.67	152.10	3.06	NO CONNECTION
AQUARIUS TRAIL(Street J)	MH405	OGS-05	143.32	146.45	145.93	144.91	145.93	SURCHARGE	Y	150.41	147.84	1.91	OK
AQUARIUS TRAIL(Street J)	OGS-05	MH403	142.71	143.29	142.80	142.50	142.80	SURCHARGE	Y	146.68	144.11	1.31	OK
AQUARIUS TRAIL(Street J)	MH430	MH428	148.23	149.41	149.26	149.05	149.26	SURCHARGE	N	151.43	148.86	-0.40	NO CONNECTION
BLOCK 187 - AQUARIUS TRAIL (Street J)	MH429	MH428	146.89	146.90	146.89	147.06	147.06	OK	N	152.36	149.79	2.73	NO CONNECTION
AQUARIUS TRAIL(Street J)	MH428	MH406	146.47	146.71	146.58	146.81	146.81	OK	N	151.94	149.37	2.56	NO CONNECTION
HIBISCUS DR(Street M)	RLCB9	MH427	163.53	163.70	163.67	163.91	163.91	OK	N	165.81	163.24	-0.67	NO CONNECTION
HIBISCUS DR(Street M)	RLCB8	MH427	163.83	164.27	164.21	164.73	164.73	OK	N	167.07	164.50	-0.23	NO CONNECTION
HIBISCUS DR(Street M)	MH427	MH426	163.23	163.35	163.30	163.42	163.42	OK	N	167.05	164.48	1.06	NO CONNECTION
HIBISCUS DR(Street M)	RLCB7	MH426	163.64	163.88	163.84	164.41	164.41	OK	N	167.13	164.56	0.15	NO CONNECTION
HIBISCUS DR(Street M)	MH426	MH415	162.72	162.89	162.83	163.14	163.14	OK	Y	167.33	164.76	1.62	OK
CAMEO(Street E)	RLCB6	MH425	165.54	165.65	165.63	165.83	165.83	OK	N	167.71	165.14	-0.69	NO CONNECTION
CAMEO(Street E)	RLCB31	MH425	168.40	168.60	168.56	168.69	168.69	OK	N	170.64	168.07	-0.62	NO CONNECTION
CAMEO(Street E)	MH425	MH424	164.60	165.47	165.31	165.17	165.31	SURCHARGE	Y	170.78	168.21	2.90	OK
CAMEO(Street E)	RLCB5	MH425	165.33	165.39	165.38	164.84	165.38	SURCHARGE	N	167.07	164.50	-0.88	NO CONNECTION
CAMEO(Street E)	RLCB30	MH424	167.32	167.55	167.49	167.57	167.57	OK	N	169.45	166.88	-0.69	NO CONNECTION
CAMEO(Street E)	RLCB4	MH424	164.66	164.92	164.87	164.93	164.93	OK	N	166.72	164.15	-0.78	NO CONNECTION
CAMEO(Street E)	MH424	MH423	163.95	164.63	164.44	164.20	164.44	SURCHARGE	Y	169.52	166.95	2.51	OK
MARATHON AVE(Street B)	RLCB29	MH417	166.26	166.57	166.51	166.55	166.55	OK	N	168.72	166.15	-0.40	NO CONNECTION
CAMEO(Street E)	RLCB3	MH423	165.06	165.18	165.15	165.37	165.37	OK	N	167.32	164.75	-0.62	NO CONNECTION
CAMEO(Street E)	MH423	MH422	163.78	163.90	163.77	163.65	163.77	SURCHARGE	N	168.40	165.83	2.06	NO CONNECTION
CAMEO(Street E)	MH422	MH416	163.44	163.82	163.65	163.55	163.65	SURCHARGE	Y	168.34	165.77	2.12	OK
MARATHON AVE(Street B)	MH419	MH418	165.27	167.52	167.29	167.80	167.80	OK	Y	171.89	169.32	1.52	OK
BLOCK 76 - CAMEO(Street E)	MH499	MH418	164.92	164.93	164.93	165.03	165.03	OK	Y	169.65	167.08	2.05	OK
MARATHON AVE(Street B)	MH418	MH417	164.71	164.90	164.80	164.83	164.83	OK	Y	169.81	167.24	2.41	OK
MARATHON AVE(Street B)	MH417	MH416	163.67	164.07	163.93	164.13	164.13	OK	N	169.13	166.56	2.43	NO CONNECTION
MARATHON AVE(Street B)	MH416	MH415	162.83	163.57	163.27	163.25	163.27	SURCHARGE	Y	168.43	165.86	2.59	OK
MARATHON AVE(Street B)	MH415	MH414	162.30	162.84	162.53	162.45	162.53	SURCHARGE	Y	168.01	165.44	2.91	OK
MARATHON AVE(Street B)	RLCB2	MH414	162.05	162.18	162.15	162.54	162.54	OK	N	164.49	161.92	-0.62	NO CONNECTION
MARATHON AVE(Street B)	MH414	MH413	161.41	162.38	161.99	161.76	161.99	SURCHARGE	Y	166.80	164.23	2.24	OK
MARATHON AVE(Street B)	RLCB1	MH413	159.45	159.89	159.81	160.25	160.25	OK	N	162.72	160.15	-0.10	NO CONNECTION
MARATHON AVE(Street B)	MH413	MH412	157.47	158.40	158.08	158.22	158.22	OK	Y	164.35	161.78	3.56	OK
BLOCK 188 - PETER MATTHEWS DR	MH490	MH493	156.69	156.71	156.70	156.28	156.70	SURCHARGE	N	160.06	157.49	0.79	NO CONNECTION
MARATHON AVE(Street B)	MH412	MH411	156.78	156.96	156.72	156.59	156.72	SURCHARGE	N	159.70	157.13	0.41	NO CONNECTION
PETER MATTHEWS DRIVE	MH495	MH494	156.97	157.25	157.19	157.99	157.99	OK	N	160.09	157.52	-0.47	NO CONNECTION
PETER MATTHEWS DRIVE	MH494	MH493	156.73	156.83	156.79	156.90	156.90	OK	Y	161.75	159.18	2.28	OK
PETER MATTHEWS DRIVE	MH493	MH492	156.66	156.75	156.68	156.26	156.68	SURCHARGE	N	160.85	158.28	1.60	NO CONNECTION
PETER MATTHEWS DRIVE	MH492	MH411	156.61	156.66	156.59	156.10	156.59	SURCHARGE	N	160.13	157.56	0.97	NO CONNECTION
MARATHON AVE(Street K)	MH411	MH409	156.09	156.96	156.54	156.04	156.54	SURCHARGE	N	159.90	157.33	0.79	NO CONNECTION
MARATHON AVE(Street K)	MH409	MH408	152.91	154.04	153.60	153.63	153.63	OK	Y	159.51	156.94	3.31	OK
MARATHON AVE(Street K)	MH408	MH407	149.01	150.07	149.62	149.40	149.62	SURCHARGE	Y	155.46	152.89	3.27	OK
AQUARIUS TRAIL(Street J)	MH407	MH406	148.17	148.60	148.16	147.96	148.16	SURCHARGE	Y	151.27	148.70	0.54	OK
AQUARIUS TRAIL(Street J)	DICB1	MH406	146.43	146.58	146.48	146.09	146.48	SURCHARGE	N	149.36	146.79	0.31	NO CONNECTION
AQUARIUS TRAIL(Street J)	MH406	MAXX IN	145.72	146.96	146.34	145.07	146.34	SURCHARGE	Y	151.23	148.66	2.32	OK
AQUARIUS TRAIL(Street J)	MAXX IN	MAXX OUT	145.13	145.71	145.11	144.35	145.11	SURCHARGE	Y	148.26	145.69	0.58	OK
AQUARIUS TRAIL(Street J)	MAXX OUT	MH403	144.56	145.13	144.53	144.16	144.53	SURCHARGE	N	147.36	144.79	0.26	NO CONNECTION
AQUARIUS TRAIL(Street J)	MH403	MH402	140.87	141.91	141.31	140.84	141.31	SURCHARGE	N	146.94	144.37	3.06	NO CONNECTION
Servicing Easement	MH402	MH401	136.40	136.79	136.58	136.76	136.76	OK	N	143.11	140.54	3.78	NO CONNECTION
Site outlet	MH401	HW	136.10	136.33	136.02	136.08	136.08	OK	N	138.99	136.42	0.34	NO CONNECTION

BENCHMARK

ELEVATIONS HEREON ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING BENCHMARK No. 2-045, HAVING A PUBLISHED ELEVATION OF 126.055m (CGVD-1928:1978). BRASS TABLET SET HORIZONTALLY IN SOUTH FACE OF BRICK BUILDING, LOCATED 650m± WEST OF VALLEY ROAD AND 34m± NORTH OF THE CENTERLINE OF THIRD CONCESSION ROAD. TABLET IS LOCATED 0.47m WEST OF THE SOUTHEAST CORONER OF BUILDING AND IS 0.52m ABOVE GROUND LEVEL.

No.	DESCRIPTION	DATE	BY
3	UPDATED STORM SEWER	03/20/18	L.A.B.
2	UPDATED STORM SEWER	01/16/18	L.A.B.
1	ISSUED FOR CONSTRUCTION	12/20/17	A.R.

REVISIONS

THE CORPORATION OF THE CITY OF PICKERING
Engineering Services Department

APPROVED BY
RICHARD HOLBORN P.Eng.
ENGINEERING SERVICES DEPARTMENT
Approval to works required by the City of Pickering and As defined in the Subdivision Agreement. The City is relying on the technical skill and ability of the P.Eng. sealing and signing this drawing.
Date: DECEMBER 19, 2017

APPROVED
Approval of the Regional Works Dept. for the purposes described in the applicable Regional Subdivision or Servicing Agreement. The Region is relying on the technical skill and ability of the P.Eng. sealing and signing this drawing.
By:
Date:

1133373 ONTARIO INC.
(SP-2008-07)

ORIGINALLY SIGNED BY A.M. BARBOSA RIBEIRO ON NOV. 17, 2017 & L.A.BEATON ON MAR. 20, 2018

LICENSED PROFESSIONAL ENGINEER K.A. BOBECHKO 11 May 2018 PROVINCE OF ONTARIO

100-YEAR HYDRAULIC GRADE LINE ANALYSIS

COLE ENGINEERING
70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
T:416.987.6161 / 905.940.6161 F:905.940.2064

DESIGN BY: B.A.
DRAWN BY: R.M.
PROJECT No. LD12-0605
SCALE: NTS
DATE: MARCH 2015
DRAWING No. 1103
CITY FILE No.:

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File : S:\2012 Projects\LD\LD12-0605 (2) 1133373ON_TauntonWSubdn_PKR\400-CADD\401-CAD\South\Sheets\1133373 Ontario Inc\IFC\12-0605 STM DESIGN SHEETS - 1101-1103.dwg, Date :May 10, 2018 - 2:34pm, Edit By : TYuen

APPENDIX C

OGS SIZING
OGS ETV STATEMENT

Hydro First Defense® - HC

Rev. 11.1

Project Name:	**FG Seaton**	*Report Date:*	**12/4/2025**
Street:	**Marathon Ave**	*City:*	**Pickering**
Province:	**ON**	*Country:*	**Canada**
Designer:	**PB**	*email:*	

Paste

Treatment Parameters:

Structure ID:	OGS1	
TSS Goal:	80	% Removal
TSS Particle Size:	Fine	
Area:	1.5	ha
Percent Impervious:	100%	
Rational C value:	0.90	Calc. Cn
Rainfall Station:	Oshawa, ONT	MAP
Peak Storm Flow:		L/s

RESULTS SUMMARY

Model	TSS	Volume
FD-3HC	77.0%	95.6%
FD-4HC	**81.0%**	**98.2%**
FD-5HC	85.0%	98.3%
FD-6HC	87.0%	98.3%
FD-8HC	91.0%	98.3%
FD-10HC	94.0%	98.3%

Model Specification:

Model:	**FD-4HC**	
Diameter:	1200	mm
Peak Flow Capacity:	510.00	L/s
Sediment Storage:	0.54	m^3
Oil Storage:	723.00	L

Installation Configuration:

Placement:	Online		
Outlet Pipe Size:		mm	*OK*
Inlet Pipe 1 Size:		mm	*OK*
Inlet Pipe 2 Size:		mm	*OK*
Inlet Pipe 3 Size:		mm	*OK*
Rim Level:		m	Calc Invs.
Outlet Pipe Invert:		m	
Invert Pipe 1:		m	*OK!*
Invert Pipe 2:		m	
Invert Pipe 3:		m	

Designer Notes:

Net Annual Removal Model: FD-4HC

Intensity[1]	Fraction of Rainfall[1]	FD-4HC Removal Efficiency[2]	Weighted Net Annual Efficiency
(mm/hr)	(%)	(%)	(%)
0.50	7.3%	98.1%	7.2%
1.00	9.4%	92.0%	8.6%
1.50	9.6%	88.6%	8.5%
2.00	9.1%	86.2%	7.8%
2.50	6.5%	84.4%	5.5%
3.00	6.1%	83.0%	5.1%
4.00	10.0%	80.8%	8.1%
5.00	7.6%	79.2%	6.0%
6.00	6.0%	77.8%	4.7%
7.00	5.1%	76.7%	3.9%
8.00	3.6%	75.8%	2.7%
9.00	2.0%	75.0%	1.5%
10.00	3.3%	74.2%	2.4%
11.00	2.3%	73.6%	1.7%
12.00	1.9%	73.0%	1.4%
13.00	1.6%	72.4%	1.2%
15.00	4.3%	71.5%	3.1%
20.00	0.8%	69.6%	0.6%
25.00	1.3%	68.2%	0.9%
30.00	0.0%	67.0%	0.0%
35.00	0.5%	66.1%	0.3%
40.00	0.0%	65.3%	0.0%
Total Net Annual Removal Efficiency:			**81.0%**
Total Annual Runoff Volume Treated:			**98.2%**

1. Based on 16 years of historic data 1982 to 1998 from Ontario Climate Centre
2. Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution
3. Rainfall adjusted to 5 min peak intensity based on hourly average.

Hydro First Defense® - HC

Rev. 11.1

Project Name:	**FG Seaton**	*Report Date:*	**12/4/2025**
Street:	**Marathon Ave**	*City:*	**Pickering**
Province:	**ON**	*Country:*	**Canada**
Designer:	**PB**	*email:*	

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Treatment Parameters:

Structure ID:	OGS2	
TSS Goal:	80	% Removal
TSS Particle Size:	Fine	
Area:	0.42	ha
Percent Impervious:	100%	
Rational C value:	0.90	Calc. Cn
Rainfall Station:	Oshawa, ONT	MAP
Peak Storm Flow:		L/s

RESULTS SUMMARY

Model	TSS	Volume
FD-3HC	86.0%	98.3%
FD-4HC	**90.0%**	**98.3%**
FD-5HC	93.0%	98.3%
FD-6HC	95.0%	98.3%
FD-8HC	97.0%	98.3%
FD-10HC	98.0%	98.3%

Model Specification:

Model:	**FD-4HC**	
Diameter:	1200	mm
Peak Flow Capacity:	510.00	L/s
Sediment Storage:	0.54	m^3
Oil Storage:	723.00	L

Installation Configuration:

Placement:	Online		
Outlet Pipe Size:		mm	*OK*
Inlet Pipe 1 Size:		mm	*OK*
Inlet Pipe 2 Size:		mm	*OK*
Inlet Pipe 3 Size:		mm	*OK*
Rim Level:		m	Calc Invs.
Outlet Pipe Invert:		m	
Invert Pipe 1:		m	*OK!*
Invert Pipe 2:		m	
Invert Pipe 3:		m	

Designer Notes:

Net Annual Removal Model: FD-4HC

Intensity[1]	Fraction of Rainfall[1]	FD-4HC Removal Efficiency[2]	Weighted Net Annual Efficiency
(mm/hr)	(%)	(%)	(%)
0.50	7.3%	100.0%	7.3%
1.00	9.4%	100.0%	9.4%
1.50	9.6%	99.7%	9.6%
2.00	9.1%	97.1%	8.8%
2.50	6.5%	95.1%	6.2%
3.00	6.1%	93.5%	5.7%
4.00	10.0%	91.0%	9.1%
5.00	7.6%	89.1%	6.8%
6.00	6.0%	87.6%	5.3%
7.00	5.1%	86.4%	4.4%
8.00	3.6%	85.3%	3.1%
9.00	2.0%	84.4%	1.7%
10.00	3.3%	83.6%	2.8%
11.00	2.3%	82.8%	1.9%
12.00	1.9%	82.2%	1.6%
13.00	1.6%	81.5%	1.3%
15.00	4.3%	80.5%	3.5%
20.00	0.8%	78.3%	0.6%
25.00	1.3%	76.7%	1.0%
30.00	0.0%	75.4%	0.0%
35.00	0.5%	74.4%	0.4%
40.00	0.0%	73.5%	0.0%
Total Net Annual Removal Efficiency:			**90.0%**
Total Annual Runoff Volume Treated:			**98.3%**

1. Based on 16 years of historic data 1982 to 1998 from Ontario Climate Centre
2. Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution
3. Rainfall adjusted to 5 min peak intensity based on hourly average.

Hydro First Defense® - HC

Rev. 11.1

Project Name:	**FG Seaton**	*Report Date:*	**12/4/2025**
Street:	**Marathon Ave**	*City:*	**Pickering**
Province:	**ON**	*Country:*	**Canada**
Designer:	**PB**	*email:*	

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Treatment Parameters:

Structure ID:	OGS3	
TSS Goal:	80	% Removal
TSS Particle Size:	Fine	
Area:	1.13	ha
Percent Impervious:	100%	
Rational C value:	0.90	Calc. Cn
Rainfall Station:	Oshawa, ONT	MAP
Peak Storm Flow:		L/s

RESULTS SUMMARY

Model	TSS	Volume
FD-3HC	79.0%	97.3%
FD-4HC	**83.0%**	**98.3%**
FD-5HC	87.0%	98.3%
FD-6HC	89.0%	98.3%
FD-8HC	93.0%	98.3%
FD-10HC	95.0%	98.3%

Model Specification:

Model:	**FD-4HC**	
Diameter:	1200	mm
Peak Flow Capacity:	510.00	L/s
Sediment Storage:	0.54	m^3
Oil Storage:	723.00	L

Installation Configuration:

Placement:	Online		
Outlet Pipe Size:		mm	*OK*
Inlet Pipe 1 Size:		mm	*OK*
Inlet Pipe 2 Size:		mm	*OK*
Inlet Pipe 3 Size:		mm	*OK*
Rim Level:		m	Calc Invs.
Outlet Pipe Invert:		m	
Invert Pipe 1:		m	*OK!*
Invert Pipe 2:		m	
Invert Pipe 3:		m	

Net Annual Removal Model: FD-4HC

Intensity[1]	Fraction of Rainfall[1]	FD-4HC Removal Efficiency[2]	Weighted Net Annual Efficiency
(mm/hr)	(%)	(%)	(%)
0.50	7.3%	100.0%	7.3%
1.00	9.4%	94.4%	8.9%
1.50	9.6%	90.9%	8.7%
2.00	9.1%	88.5%	8.1%
2.50	6.5%	86.7%	5.6%
3.00	6.1%	85.2%	5.2%
4.00	10.0%	83.0%	8.3%
5.00	7.6%	81.3%	6.2%
6.00	6.0%	79.9%	4.8%
7.00	5.1%	78.8%	4.0%
8.00	3.6%	77.8%	2.8%
9.00	2.0%	77.0%	1.5%
10.00	3.3%	76.2%	2.5%
11.00	2.3%	75.5%	1.7%
12.00	1.9%	74.9%	1.4%
13.00	1.6%	74.4%	1.2%
15.00	4.3%	73.4%	3.2%
20.00	0.8%	71.5%	0.6%
25.00	1.3%	70.0%	0.9%
30.00	0.0%	68.8%	0.0%
35.00	0.5%	67.8%	0.3%
40.00	0.0%	67.0%	0.0%
Total Net Annual Removal Efficiency:			**83.0%**
Total Annual Runoff Volume Treated:			**98.3%**

1. Based on 16 years of historic data 1982 to 1998 from Ontario Climate Centre
2. Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution
3. Rainfall adjusted to 5 min peak intensity based on hourly average.

Designer Notes:

Hydro First Defense® - HC

Rev. 11.1

Project Name:	**FG Seaton**	*Report Date:*	**12/4/2025**
Street:	**Marathon Ave**	*City:*	**Pickering**
Province:	**ON**	*Country:*	**Canada**
Designer:	**PB**	*email:*	

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Treatment Parameters:

Structure ID:	OGS4	
TSS Goal:	80	% Removal
TSS Particle Size:	Fine	
Area:	0.66	ha
Percent Impervious:	100%	
Rational C value:	0.90	Calc. Cn
Rainfall Station:	Oshawa, ONT	MAP
Peak Storm Flow:		L/s

RESULTS SUMMARY

Model	TSS	Volume
FD-3HC	83.0%	98.2%
FD-4HC	**87.0%**	**98.3%**
FD-5HC	91.0%	98.3%
FD-6HC	92.0%	98.3%
FD-8HC	95.0%	98.3%
FD-10HC	97.0%	98.3%

Model Specification:

Model:	**FD-4HC**	
Diameter:	1200	mm
Peak Flow Capacity:	510.00	L/s
Sediment Storage:	0.54	m^3
Oil Storage:	723.00	L

Installation Configuration:

Placement:	Online		
Outlet Pipe Size:		mm	*OK*
Inlet Pipe 1 Size:		mm	*OK*
Inlet Pipe 2 Size:		mm	*OK*
Inlet Pipe 3 Size:		mm	*OK*
Rim Level:		m	Calc Invs.
Outlet Pipe Invert:		m	
Invert Pipe 1:		m	*OK!*
Invert Pipe 2:		m	
Invert Pipe 3:		m	

Net Annual Removal Model: FD-4HC

Intensity[1]	Fraction of Rainfall[1]	FD-4HC Removal Efficiency[2]	Weighted Net Annual Efficiency
(mm/hr)	(%)	(%)	(%)
0.50	7.3%	100.0%	7.3%
1.00	9.4%	99.3%	9.3%
1.50	9.6%	95.6%	9.2%
2.00	9.1%	93.1%	8.5%
2.50	6.5%	91.1%	5.9%
3.00	6.1%	89.6%	5.5%
4.00	10.0%	87.3%	8.7%
5.00	7.6%	85.5%	6.5%
6.00	6.0%	84.0%	5.0%
7.00	5.1%	82.8%	4.2%
8.00	3.6%	81.8%	2.9%
9.00	2.0%	80.9%	1.6%
10.00	3.3%	80.1%	2.6%
11.00	2.3%	79.4%	1.8%
12.00	1.9%	78.8%	1.5%
13.00	1.6%	78.2%	1.3%
15.00	4.3%	77.2%	3.3%
20.00	0.8%	75.1%	0.6%
25.00	1.3%	73.6%	1.0%
30.00	0.0%	72.3%	0.0%
35.00	0.5%	71.3%	0.4%
40.00	0.0%	70.4%	0.0%
Total Net Annual Removal Efficiency:			**87.0%**
Total Annual Runoff Volume Treated:			**98.3%**

1. Based on 16 years of historic data 1982 to 1998 from Ontario Climate Centre
2. Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution
3. Rainfall adjusted to 5 min peak intensity based on hourly average.

Designer Notes:

Hydro First Defense® - HC

Rev. 11.1

Project Name:	**FG Seaton**	*Report Date:*	**12/1/2025**
Street:	**Marathon Ave**	*City:*	**Pickering**
Province:	**ON**	*Country:*	**Canada**
Designer:	**PB**	*email:*	

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Treatment Parameters:

Structure ID:	OGS5	
TSS Goal:	80	% Removal
TSS Particle Size:	Fine	
Area:	0.41	ha
Percent Impervious:	100%	
Rational C value:	0.90	Calc. Cn
Rainfall Station:	Oshawa, ONT	MAP
Peak Storm Flow:		L/s

RESULTS SUMMARY

Model	TSS	Volume
FD-3HC	86.0%	98.3%
FD-4HC	**90.0%**	**98.3%**
FD-5HC	93.0%	98.3%
FD-6HC	95.0%	98.3%
FD-8HC	97.0%	98.3%
FD-10HC	98.0%	98.3%

Model Specification:

Model:	**FD-4HC**	
Diameter:	1200	mm
Peak Flow Capacity:	510.00	L/s
Sediment Storage:	0.54	m^3
Oil Storage:	723.00	L

Installation Configuration:

Placement:	Online		
Outlet Pipe Size:		mm	*OK*
Inlet Pipe 1 Size:		mm	*OK*
Inlet Pipe 2 Size:		mm	*OK*
Inlet Pipe 3 Size:		mm	*OK*
Rim Level:		m	Calc Invs.
Outlet Pipe Invert:		m	
Invert Pipe 1:		m	*OK!*
Invert Pipe 2:		m	
Invert Pipe 3:		m	

Net Annual Removal Model: FD-4HC

Intensity[1] (mm/hr)	Fraction of Rainfall[1] (%)	FD-4HC Removal Efficiency[2] (%)	Weighted Net Annual Efficiency (%)
0.50	7.3%	100.0%	7.3%
1.00	9.4%	100.0%	9.4%
1.50	9.6%	99.9%	9.6%
2.00	9.1%	97.3%	8.9%
2.50	6.5%	95.3%	6.2%
3.00	6.1%	93.7%	5.7%
4.00	10.0%	91.2%	9.1%
5.00	7.6%	89.3%	6.8%
6.00	6.0%	87.8%	5.3%
7.00	5.1%	86.6%	4.4%
8.00	3.6%	85.5%	3.1%
9.00	2.0%	84.6%	1.7%
10.00	3.3%	83.8%	2.8%
11.00	2.3%	83.0%	1.9%
12.00	1.9%	82.3%	1.6%
13.00	1.6%	81.7%	1.3%
15.00	4.3%	80.7%	3.5%
20.00	0.8%	78.5%	0.6%
25.00	1.3%	76.9%	1.0%
30.00	0.0%	75.6%	0.0%
35.00	0.5%	74.5%	0.4%
40.00	0.0%	73.6%	0.0%
Total Net Annual Removal Efficiency:			**90.0%**
Total Annual Runoff Volume Treated:			**98.3%**

1. Based on 16 years of historic data 1982 to 1998 from Ontario Climate Centre
2. Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution
3. Rainfall adjusted to 5 min peak intensity based on hourly average.

Designer Notes:

Hydro First Defense® - HC

Rev. 11.1

Project Name:	**FG Seaton**	*Report Date:*	**12/1/2025**
Street:	**Marathon Ave**	*City:*	**Pickering**
Province:	**ON**	*Country:*	**Canada**
Designer:	**PB**	*email:*	

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Treatment Parameters:

Structure ID:	OGS6	
TSS Goal:	80	% Removal
TSS Particle Size:	Fine	
Area:	0.15	ha
Percent Impervious:	100%	
Rational C value:	0.90	Calc. Cn
Rainfall Station:	Oshawa, ONT	MAP
Peak Storm Flow:		L/s

RESULTS SUMMARY

Model	TSS	Volume
FD-3HC	93.0%	98.3%
FD-4HC	**96.0%**	**98.3%**
FD-5HC	97.0%	98.3%
FD-6HC	98.0%	98.3%
FD-8HC	98.0%	98.3%
FD-10HC	98.0%	98.3%

Model Specification:

Model:	**FD-4HC**	
Diameter:	1200	mm
Peak Flow Capacity:	510.00	L/s
Sediment Storage:	0.54	m^3
Oil Storage:	723.00	L

Installation Configuration:

Placement:	Online		
Outlet Pipe Size:		mm	*OK*
Inlet Pipe 1 Size:		mm	*OK*
Inlet Pipe 2 Size:		mm	*OK*
Inlet Pipe 3 Size:		mm	*OK*
Rim Level:		m	Calc Invs.
Outlet Pipe Invert:		m	
Invert Pipe 1:		m	*OK!*
Invert Pipe 2:		m	
Invert Pipe 3:		m	

Net Annual Removal Model: FD-4HC

Intensity[1]	Fraction of Rainfall[1]	FD-4HC Removal Efficiency[2]	Weighted Net Annual Efficiency
(mm/hr)	(%)	(%)	(%)
0.50	7.3%	100.0%	7.3%
1.00	9.4%	100.0%	9.4%
1.50	9.6%	100.0%	9.6%
2.00	9.1%	100.0%	9.1%
2.50	6.5%	100.0%	6.5%
3.00	6.1%	100.0%	6.1%
4.00	10.0%	100.0%	10.0%
5.00	7.6%	98.1%	7.5%
6.00	6.0%	96.4%	5.8%
7.00	5.1%	95.1%	4.8%
8.00	3.6%	93.9%	3.4%
9.00	2.0%	92.9%	1.9%
10.00	3.3%	92.0%	3.0%
11.00	2.3%	91.1%	2.1%
12.00	1.9%	90.4%	1.7%
13.00	1.6%	89.7%	1.4%
15.00	4.3%	88.6%	3.8%
20.00	0.8%	86.2%	0.7%
25.00	1.3%	84.4%	1.1%
30.00	0.0%	83.0%	0.0%
35.00	0.5%	81.8%	0.4%
40.00	0.0%	80.8%	0.0%
Total Net Annual Removal Efficiency:			**96.0%**
Total Annual Runoff Volume Treated:			**98.3%**

1. Based on 16 years of historic data 1982 to 1998 from Ontario Climate Centre
2. Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution
3. Rainfall adjusted to 5 min peak intensity based on hourly average.

Designer Notes:

Verification Statement

Hydro International First Defense® HC Oil Grit Separator
Registration number: (V-2018-10-01)
Date of issue: 2018-October-15 (rev 2019-02-01)

Technology type	Oil Grit Separator
Application	Technology to remove oil, sediment, trash and debris from stormwater and snowmelt runoff as well as other pollutants that attach to sediment particles, such as nutrients and metals
Company	Hydro International
Address	94 Hutchins Drive, Portland, Maine USA 04102 **Phone** +1-207-756 6200
Website	https://www.hydro-int.com
E-mail	dscott@hydro-int.com

Verified Performance Claims

The Hydro International First Defense® High Capacity (HC) Oil Grit Separator (OGS) was tested by Good Harbour Laboratories Inc. (GHL), Mississauga, Ontario, Canada in 2018. The performance test results were verified by Toronto and Region Conservation Authority (TRCA), Vaughan, Ontario, Canada following the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol. The following performance claims were verified:

Capture test[1]:
With a false floor set to 50% of the manufacturer's recommended maximum sediment storage depth and an influent test sediment concentration of 200 mg/L, the First Defense® HC OGS device removes 67, 60, 55, 50, 45, 45, and 41 percent of influent sediment by mass at surface loading rates of 40, 80, 200, 400, 600, 1000, and 1400 L/min/m^2, respectively.

Scour test[1]:
With 10.2 cm (4 inches) of test sediment pre-loaded onto a false floor reaching 50% of the manufacturer's recommended maximum sediment storage depth, the First Defense® HC OGS device generates adjusted effluent[2] concentrations of 0, 0, 11, 2, and 0 mg/L at 5-minute duration surface loading rates of 200, 800, 1400, 2000, and 2600 L/min/m^2, respectively.

[1] The claims can be applied to other units smaller or larger than the tested unit as long as the untested units meet the scaling rule specified in the Procedure for Laboratory of Testing of Oil Grit Separators (Version 3.0, June 2014)

[2] The effluent suspended sediment concentration is adjusted based on the background concentration and the smallest 5% of particles captured during the 40 L/min/m^2 sediment capture test (see Table 2)

Technology Application

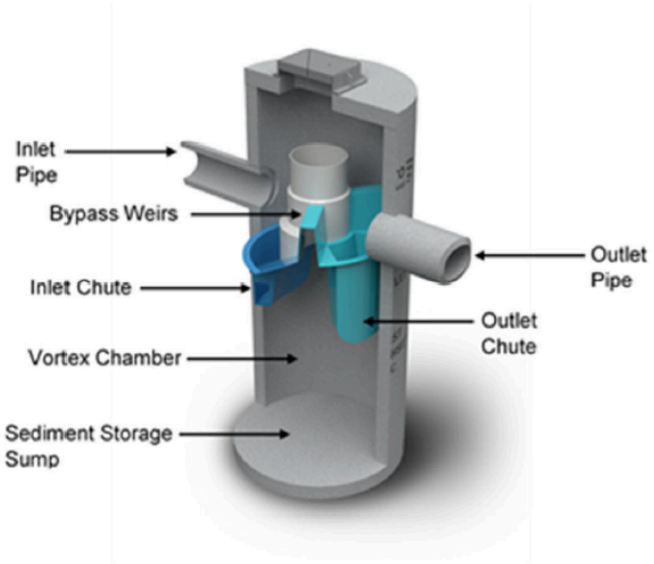
The First Defense® HC (FDHC) Oil Grit Separator can be used as a stand-alone stormwater treatment technology, depending on water quality objectives, or as a pretreatment component in a treatment train when higher TSS removals are required and polishing or volume reduction best management practices (BMPs), such as infiltration or bio-infiltration, are installed downstream. FDHC applications include: stormwater treatment at the point of entry into the drainage line; sites constrained by space, topography or drainage profiles with limited slope and depth of cover; retrofit installations where stormwater treatment is placed on or tied into an existing storm drain line; pretreatment for filters, infiltration, other sedimentation BMPs and storage.

Technology Description

The Hydro International First Defense® HC (FDHC) is an Oil Grit Separator designed to remove oil, sediment, trash and debris from stormwater and snowmelt runoff as well as other pollutants that attach to sediment particles, such as nutrients and metals. The patented flow modifying internal components are designed to be inserted into standard precast concrete manholes where they collect and treat runoff as part of the drainage system (Figure 1).

Flow entering the manhole via an inlet pipe or inlet grate is diverted into a vortex chamber beneath a separation module that includes both inlet/outlet chutes and bypass weirs. The internal bypass weirs divert flows greater than the maximum design treatment flow rate over the separation module and away from the vortex chamber where oil, sediment, debris and attached pollutants are accumulating. This function prevents high velocities from re-suspending previously captured pollutants during large storm events. The FDHC can be designed and sized to function effectively in either online or offline configurations.

Figure 1: Hydro International First Defense® HC Oil Grit Separator



The test unit was 1.2 m (4 foot) in diameter with a 1.51 m (59 5/8 inches) sump depth measured from the outlet invert to the floor of the unit. The effective treatment area (also known as the effective sedimentation area) is 1.2 m^2 (12.6 ft^2). The maximum sediment storage depth is 0.457 m (18 inches).

Description of Test Procedure

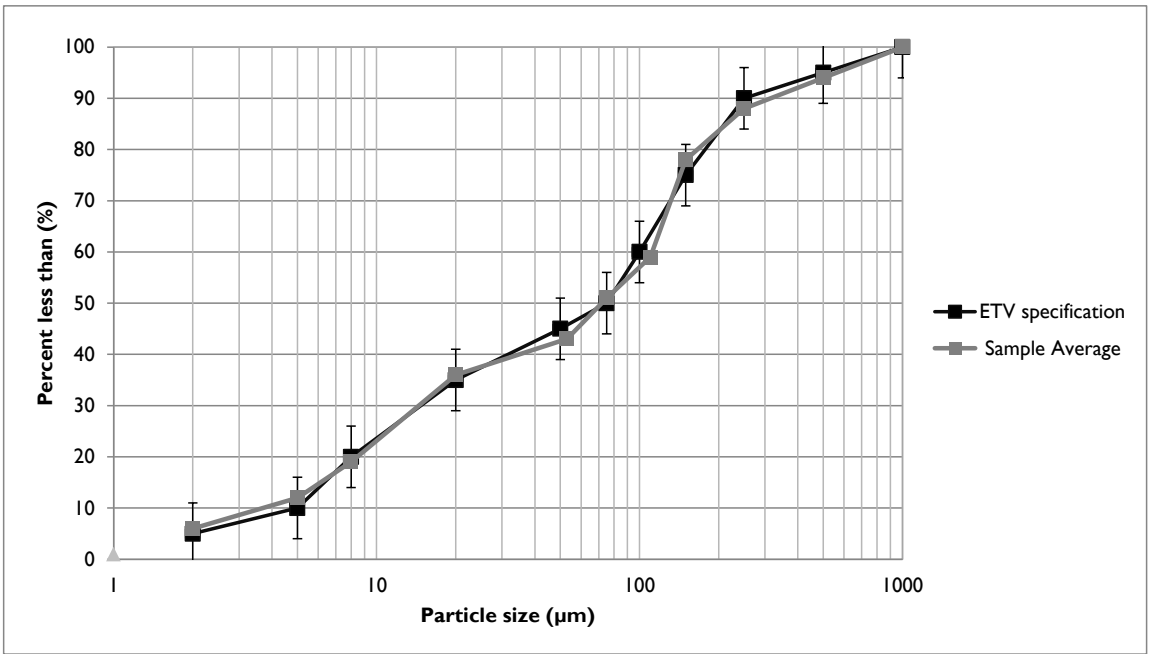
The test data and results for this verification were obtained from independent testing conducted on a 1.2 m (48 inch) diameter Hydro International First Defense® HC OGS device, in accordance with the *Procedure for Laboratory Testing of Oil-Grit Separators (Version 3.0, June 2014)*. The laboratory test procedure was originally prepared by the Toronto and Region Conservation Authority (TRCA) in association with a 31 member advisory committee from various stakeholder groups.

Verification Results

Toronto and Region Conservation Authority verified the performance test data and other information pertaining to the First Defense® HC Oil Grit Separator. A Verification Plan was prepared to guide the verification process based on the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol.

The test sediment consisted of ground silica (1 – 1000 micron) with a specific gravity of 2.65, uniformly mixed to meet the particle size distribution specified in the testing procedure. The *Procedure for Laboratory Testing of Oil Grit Separators* requires that the three sample average of the test sediment particle size distribution (PSD) meet the specified PSD percent less than values within a boundary threshold of 6%, and a median particle size no greater than 75 µm. Comparison of the individual sample and average test sediment PSD to the specified PSD shown in Figure 2 indicates that the test sediment used for the capture and scour tests met this condition. The median particle size was 73 µm. Samples from test sediment batches used for each run met the specified PSD within the required tolerance thresholds.

Figure 2 - The three sample average particle size distribution (PSD) of the test sediment used for the capture and scour test compared to the specified PSD



The capacity of the device to retain sediment was determined at seven surface loading rates using the modified mass balance method. This method involved measuring the mass and particle size distribution of the injected and retained sediment for each test run. Performance was evaluated with a false floor simulating the technology filled to 50% of the manufacturer's recommended maximum sediment storage depth. The test was carried out with clean water that maintained a sediment concentration below 20 mg/L. Based on these conditions, removal efficiencies for individual particle size classes and for the test sediment as a whole were determined for each of the tested surface loading rates (Table 1).

In some instances, the removal efficiencies were above 100% for certain particle size fractions. These discrepancies are not unique to any one test laboratory and are attributed to errors relating to the blending of sediment, collection of representative samples for laboratory submission, and laboratory analysis of PSD. Due to these errors, caution should be exercised in applying the removal efficiencies by particle size fraction for the purposes of sizing the tested device (see Bulletin # CETV 2016-11-0001). The results for "all particle sizes by mass balance" (see Table 1) are based on measurements of the total injected and retained sediment mass, and are therefore not subject to blending, sampling or PSD analysis errors.

Table 1 - Removal efficiencies (%) of the First Defence HC at specified surface loading rates

Particle size fraction (µm)	Surface loading rate (L/min/m²)						
	40	80	200	400	600	1000	1400
>500	100*	100*	100*	81	72	86	80
250 - 500	100*	97	99	100*	100*	59	88
150 - 250	100*	91	95	93	47	100*	84
105 - 150	96	89	94	89	90	70	75
75 - 105	100*	90	95	77	-20**	100	51
53 - 75	74	100*	97	62	100*	46	37
20 - 53	60	33	10	5	4	0	0
8 - 20	29	16	8	3	3	1	1
5 – 8	8	5	8	4	4	4	3
<5	5	3	0	0	0	3	3
All particle sizes By mass balance	**66.5**	**59.9**	**55.4**	**50.2**	**44.9**	**45.2**	**40.5**

* Removal efficiencies were calculated to be above 100%. Calculated values ranged between 101 and 184% (average 115%). See text and Bulletin # CETV 2016-11-0001 for more information.
** An outlier in the retained sediment sample sieve data resulted in negative removal for this size fraction. The outlier at the 75 um particle size is shown in Figure 3.

Figure 3 - Particle size distribution of sediment retained in the First Defense HC in relation to the injected test sediment average

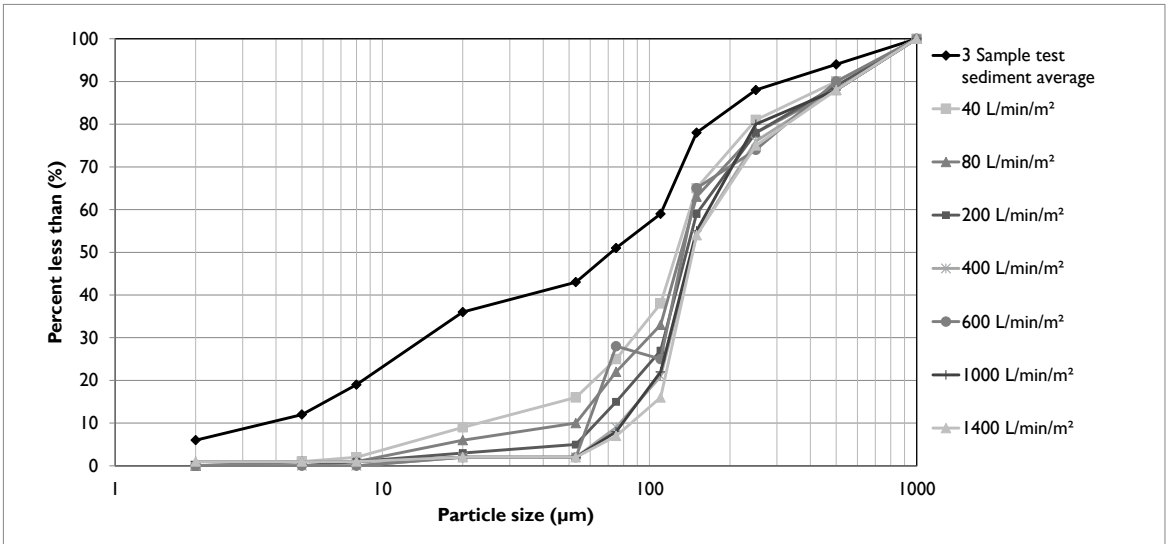


Figure 3 compares the particle size distribution (PSD) of the three sample average of the test sediment to the PSD of the sediment retained by the FDHC device at each of the tested surface loading rates. As expected, the capture efficiency for fine particles was generally found to decrease as surface loading rates increased, particularly in the 40 to 400 L/min/m² range.

Table 2 shows the results of the sediment scour and re-suspension test for the First Defense® HC unit. The scour test involved preloading 10.2 cm (4 inches) of fresh test sediment into the sedimentation sump of the device. The sediment was placed on a false floor to mimic a device filled to 50% of the maximum recommended sediment storage depth. Clean water was run through the device at five surface loading rates over a 30 minute period. Each flow rate was maintained for 5 minutes with a one minute transition time between flow rates. Effluent samples were collected at one minute sampling intervals and analyzed for Suspended Sediment Concentration (SSC) and PSD by recognized methods. The effluent samples were subsequently adjusted based on the background concentration of the influent water. The smallest 5% of particles captured during the 40 L/min/m^2 sediment capture test (13.5 μm in this case) was used to further adjust the effluent sediment concentrations, as per the method described in Bulletin # CETV 2016-09-0001. Results showed average adjusted effluent sediment concentrations below 11 mg/L at all surface loading rates. Effluent concentrations would be expected to decrease at higher flow rates since bypass over the insert bypass weirs was observed to begin at 1,032 L/min/m^2.

Table 2 - Scour test adjusted effluent sediment concentration at each surface loading rate

Run	Surface loading rate (L/min/m^2)	Run time (min)	Background sample concentration (mg/L)	Average adjusted effluent suspended sediment concentration (mg/L)*
1	200	1:00 – 6:00	0.8	0
2	800	7:00 – 12:00	1.0	0
3	1400	13:00 – 18:00	1.1	10.6
4	2000	19:00 – 24:00	2.8	2.4
5	2600	25:00 – 30:00	6.6	0

*The effluent suspended sediment concentration is adjusted based on the background concentration and the smallest 5% of particles captured during the 40 L/min/m^2 sediment capture test, as per the method described in Bulletin # CETV 2016-09-0001.

Variances from the Procedure

Minor variances from the *Procedure for Laboratory Testing of Oil-Grit Separators* used as the basis of testing for this verification were as follows:

1. The *Procedure* states that the tested device "must be a full scale commercially available device with the same configuration and components as would be typical for an actual installation." The unit tested for this verification had the same internal components as would be typical for a commercial installation, but the internal components were placed inside a structure constructed of composite materials, rather than a manhole made of concrete, the latter of which is typical for most installations. The dimensions of the structure were the same as would have been the case had the manhole been concrete. The use of alternate materials for the structure was not believed to significantly affect system performance.

2. As part of the capture test, evaluation of the 40 and 80 L/min/m^2 surface loading rate was split into 3 and 2 parts, respectively. The test was conducted in parts because of the long duration (i.e. over 10 hours) needed to feed the required minimum 11.3 kg of test sediment into the unit. At the end of the first and second parts of the test, the flow rates were gradually decreased to prevent capture of particles that would have been washed out under normal circumstances. The requirement to split the test into parts was not anticipated in the *Procedure for Laboratory Testing of Oil-Grit Separators*, but has been a common feature of testing at the 40 L/min/m^2 surface loading rate. Conducting the test in two parts for the 80 L/ min/m^2 surface loading rate is less common. The testing did not assess the significance of the breaks, however, the test laboratory and verifier do not believe that the breaks significantly affected the test results.

3. During the sediment scour test, the flow rate coefficient of variation (COV) at the 200 L/min/m^2 surface loading rate of 0.045 slightly exceeded the target COV of 0.04. The average flow rate during the test remained within ±10% of the target flow rate.

Quality assurance

Performance testing and verification of the First Defense® HC Oil Grit Separator were performed in accordance with the requirements of ISO 14034:2016 and the VerifiGlobal Performance Verification Protocol. The verifier, Toronto and Region Conservation Authority, has confirmed that quality assurance requirements were addressed throughout the performance testing process and in the generation of performance test results. This includes reviewing all data sheets and data downloads, as well as overall management of the test system, quality control and data integrity.

Verification Summary

In summary, the First Defense® HC Oil Grit Separator is designed to remove oil, sediment, trash and debris from stormwater and snowmelt runoff as well as other pollutants that attach to sediment particles, such as nutrients and metals. Verification of performance claims for the Hydro International First Defense® HC Oil Grit Separator was conducted by Toronto and Region Conservation Authority based on independent third-party performance test results provided by Good Harbour Laboratories, as well as additional information provided by Hydro International. Table 3 summarizes the verification results in relation to the technology performance parameters that were identified to determine the efficacy of the First Defense® HC Oil Grit Separator.

Table 3 - Summary of Verification Results Against Performance Parameters

Performance Parameter	Verified Performance
Sediment Removal Rate	The sediment removal rate of the FDHC is dependent upon flow rate, particle density and particle size. Removal efficiency decreased with increasing surface loading rate from 67% at 40 L/min/m^2 to 41% at 1400 L/min/m^2. The weighted average removal efficiency achieved by the unit will vary depending on the rainfall distribution of the jurisdiction in which it is installed, and site characteristics.
Sediment Scour	When pre-loaded with sediment with a particle size distribution matching that of the feed sediment used in the sediment capture test, the FDHC generated effluent suspended solids concentrations of less than 11 mg/L at surface loading rates ranging from 200 to 2600 L/min/m^2.
Bypass flow rate	The flow rate at which bypass occurs will vary based on model size. For the 1.2 m (4 foot) diameter test unit, the flow rate at which bypass occurred over the insert bypass weirs was 1238 L/min (327 gpm).
Head loss	The loss of hydraulic head across the FDHC was determined by measuring the water elevation difference between the inlet and outlet sides of the insert. Head loss may vary based on model size. For the tested unit the head loss ranged from 2 mm (0.08 inches) at 93.5 L/min (12.3 gpm) to 100 mm (3.94 inches) at 1238 L/min (327 gpm) when bypass was observed to occur. At 327 gpm, when bypass occurred, the depth of the water was 177 mm upstream and 77 mm downstream for a difference of 100 mm (3.94 inches). The highest water elevation difference was 111mm (4.37 inches) at a flow rate of 1635 L/min (431.8 gpm), after which head loss declined up to the maximum measured flow rate of 3036 L/min (801.9 gpm).

What is ISO 14034?

The purpose of environmental technology verification is to provide a credible and impartial account of the performance of environmental technologies. Environmental technology verification is based on a number of principles to ensure that verifications are performed and reported accurately, clearly, unambiguously and objectively. The International Organization for Standardization (ISO) standard for environmental technology verification (ETV) is ISO 14034, which was published in November 2016.

Benefits of ETV

ETV contributes to protection and conservation of the environment by promoting and facilitating market uptake of innovative environmental technologies, especially those that perform better than relevant alternatives. ETV is particularly applicable to those environmental technologies whose innovative features or performance cannot be fully assessed using existing standards. Through the provision of objective evidence, ETV provides an independent and impartial confirmation of the performance of an environmental technology based on reliable test data. ETV aims to strengthen the credibility of new, innovative technologies by supporting informed decision-making among interested parties.

For more information on the First Defense® HC Oil Grit Separator, contact:	For more information on VerifiGlobal, contact:
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Signed for Hydro International: *Original signed by:* *David Scott* David Scott Technical Product Manager, Americas Stormwater	Signed for VerifiGlobal: *Original signed by:* *Thomas Bruun* Thomas Bruun, Managing Director *Original signed by:* *John Neate* John Neate, Managing Director

NOTICE: Verifications are based on an evaluation of technology performance under specific, predetermined operational conditions and parameters and the appropriate quality assurance procedures. VerifiGlobal and the Verification Expert, Toronto and Region Conservation Authority, make no expressed or implied warranties as to the performance of the technology and do not certify that a technology will always operate as verified. The end user is solely responsible for complying with any and all applicable regulatory requirements. Mention of commercial product names does not imply endorsement.

VerifiGlobal and the Verification Expert, Toronto and Region Conservation Authority, provide the verification services solely on the basis of the information supplied by the applicant or vendor and assume no liability thereafter. The responsibility for the information supplied remains solely with the applicant or vendor and the liability for the purchase, installation, and operation (whether consequential or otherwise) is not transferred to any other party as a result of the verification.

APPENDIX D

INFILTRATION DRAWDOWN TIME
EXCERPTS FROM HYDROGEOLOGICAL REPORT

LID Design - Infiltration Chamber #1

Infiltration Requirement

Drainage Area	1.67	ha
Infiltration Depth	10	mm
Infiltration Volume	167	m3

Infiltration Conditions

Infiltration Rate (Geometric Mean)	35	mm/hr	As per hydroG Investigation by EXP (Nov 2023)
Safety Factor	2.5		
Design Infiltration Rate	14	mm/hr	

Infiltration Gallery

Maximum Depth Calculation

Void Ratio	1	(if within chamber)
Max Time to Drain (typ. 48 hr)	48	
Max Allowable Depth	672	mm

Actual Draw Down Time Calculation

Water Quality Volume	207	m3
Selected Chamber Depth	0.2	m

Drawdown Time	**14**	hours	TIME OK

Notes:
Drawdown time only considers the bottom footprint of the infiltration facility

LID Design - Infiltration Chamber #2

Infiltration Requirement

Drainage Area	1.91	ha	
Infiltration Depth	10	mm	
Infiltration Volume	191	m3	

Infiltration Conditions

Infiltration Rate (Geometric Mean)	35	mm/hr	As per hydroG Investigation by EXP (Nov 2023)
Safety Factor	2.5		
Design Infiltration Rate	14	mm/hr	

Infiltration Gallery

Maximum Depth Calculation

Void Ratio	1	(if within chamber)
Max Time to Drain (typ. 48 hr)	48	
Max Allowable Depth	672	mm

Actual Draw Down Time Calculation

Water Quality Volume	252	m3	
Selected Chamber Depth	0.2	m	
Drawdown Time	**14**	hours	TIME OK

Notes:
Drawdown time only considers the bottom footprint of the infiltration facility

LID Design - Infiltration Chamber #2

Infiltration Requirement

Drainage Area	2.36	ha	
Infiltration Depth	10	mm	
Infiltration Volume	236	m3	

Infiltration Conditions

Infiltration Rate (Geometric Mean)	35	mm/hr	As per hydroG Investigation by EXP (Nov 2023)
Safety Factor	2.5		
Design Infiltration Rate	14	mm/hr	

Infiltration Gallery

Maximum Depth Calculation

Void Ratio	1	(if within chamber)
Max Time to Drain (typ. 48 hr)	48	
Max Allowable Depth	672	mm

Actual Draw Down Time Calculation

Water Quality Volume	238	m3	
Selected Chamber Depth	0.2	m	
Drawdown Time	**14**	hours	TIME OK

Notes:
Drawdown time only considers the bottom footprint of the infiltration facility

The estimated hydraulic conductivities of the glacial till ranged from approximately 7 x 10^{-9} m/s to 1 x 10^{-7} m/s, with a geometric mean of 3 x 10^{-8} m/s (n=5). These hydraulic conductivity values are generally within or slightly lower than the expected literature range for till of 10^{-8} m/s to 10^{-6} m/s (Fetter, 1994).

5.3 Infiltration Rate Test Results

In-situ infiltration rate testing was completed at four locations using a Guelph Permeameter. The resulting K_{fs} values from the infiltration rate testing were converted to infiltration rates based on *Figure C11: Approximate Relationship Between Infiltration Rate and Hydraulic Conductivity* presented in Toronto and Region Conservation Authority (2012) *Stormwater Management Criteria – Version 1.0*. The estimated K_{fs} values and corresponding estimated infiltration rates, are summarized in Table 5.2 below.

Table 5.2 – Estimated Infiltration Rates

Test Location	Depth (m bgs)	Soil Type	Estimated K_{fs} (m/s)	Estimated Infiltration Rate (mm/hr)[1]
GP25-1	0.31	(SM) Silty Sand Till	2.0 x 10^{-6}	56
GP25-2	0.18	(SM) Silty Sand Till	3.4 x 10^{-7}	35
GP25-3	0.22	(SM) Silty Sand Till	6.8 x 10^{-7}	42
GP25-4	0.30	(SM) Silty Sand Till	3.1 x 10^{-8}	18

Notes:
1. Source: *Figure C11 Approximate relationship between infiltration rate and hydraulic conductivity*. Toronto and Region Conservation Authority (TRCA). 2012. *Stormwater Management Criteria. Version 1.0*. Toronto, Ontario.

The subsurface conditions at locations other than the test locations may vary from the conditions encountered both laterally and with depth. The estimated infiltration rates for the (SM) silty sand till ranged from 18 mm/hr to 56 mm/hr, with a geometric mean rate of 35 mm/hr (n=4). The estimated K_{fs} value and corresponding infiltration rate for the silty sand till are mostly within the literature range for (SM) soils of 10^{-7} m/s to 10^{-5} m/s, but slightly below the range at GP25-4 (MMAH, 2012).

As discussed in Section 3.0, estimated infiltration rates for the locations tested by GEI ranged from approximately 19 mm/hr to 25 mm/hr. These results were generally lower than those observed by GEMTEC in similar material.

For the design of subsurface low impact development (LID) measures and in accordance with the *Stormwater Management Criteria. Version 1.0* (TRCA, 2012), a correction factor of 2.5 is considered reasonable to account for LID features completed in the till (i.e., the ratio of mean measured infiltration rates is less than one). The safety correction factor is based on the ratio of mean measured infiltration rates, which incorporates the least permeable layer within 1.5 m below

DRAFT

Legend

BH # BOREHOLE ID
XX.XX GROUNDWATER ELEVATIONS, (m amsl) (SEPTEMBER 3, 2025)

- GROUNDWATER CONTOUR
- INFERRED GROUNDWATER FLOW DIRECTION
- MONITORING WELL LOCATION (GEMTEC, CURRENT INVESTIGATION)
- MONITORING WELL LOCATION (GEI, 2022)
- SITE BOUNDARY

DRAFT

NOTES:
1. All locations approximate.
2. Coordinate system: NAD 1983 UTM Zone 17N.
3. Geographic dataset source: Ontario GeoHub.
4. Contains information licensed under the Open Government Licence – Ontario.
5. Borehole Locations were surveyed using Trimble DA2, on September 4, 2025.
6. Concept Plan provided by Petroff Partnership Architects (February 25, 2025).
7. m amsl = metres above mean sea level.
8. Service Layer Credits: World Imagery: Maxar, Microsoft.

Scale:
1:1,500
0 20 40 80 120 Meters

Drawing: GROUNDWATER FLOW (SEPTEMBER 3, 2025)

Client: SEATON COMMERCIAL DEVELOPMENTS LTD. C/O FIELDGATE COMMERCIAL

Project: HYDROGEOLOGICAL INVESTIGATION, FIELDGATE SEATON COMMUNITY DEVELOPMENT, PICKERING, ONTARIO

Drwn By:	M.Y.	Chkd By:	A.W.
Project No.	102491.035	Revision No.	0
Date	OCTOBER 2025		**FIGURE B-5**

GEMTEC
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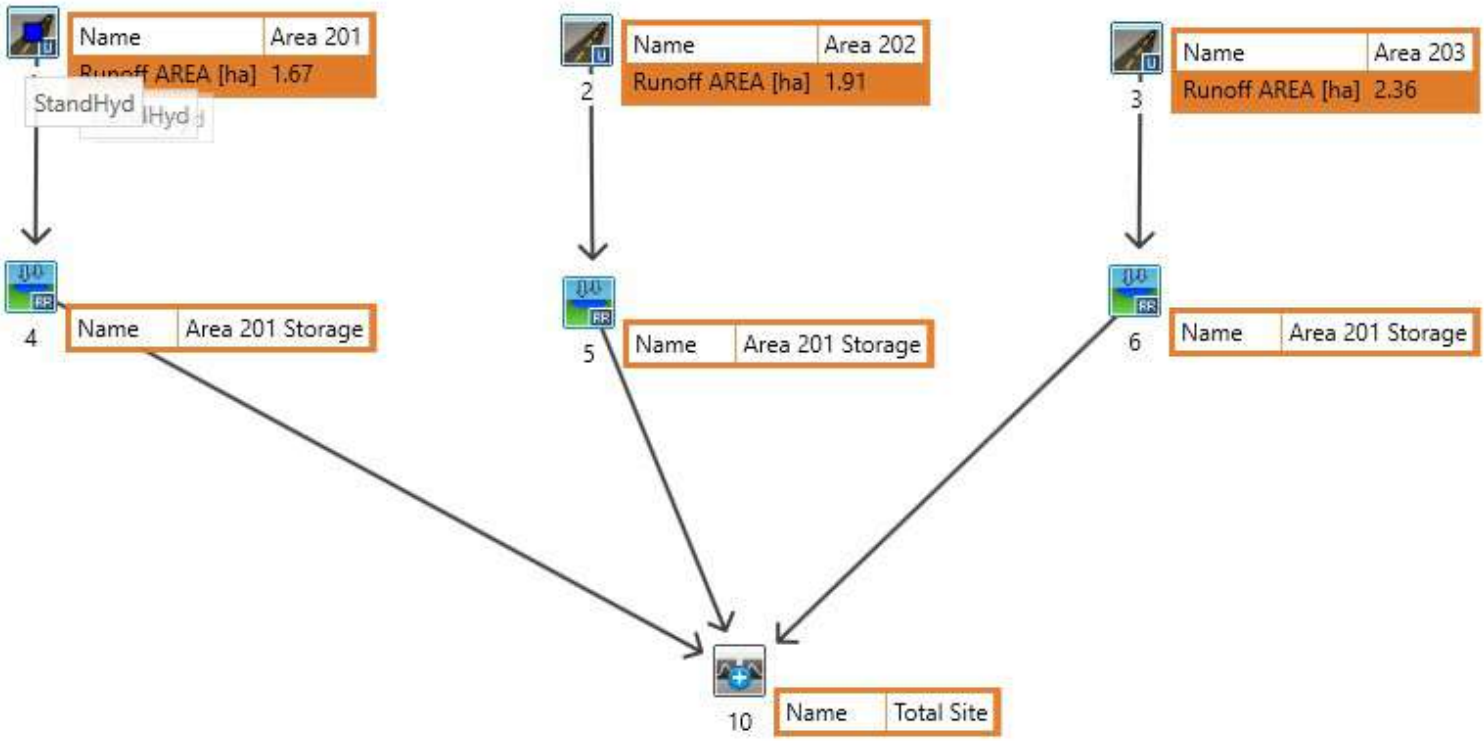
Folder: N:\Projects\102400\102491.035\06_Civil Drafting\Design\HydroG\

APPENDIX E

VO MODEL OUTPUT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Name
Area 201 Storage
6
Name
Area 201 Storage
10
Name
Total Site

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================================================================================================
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        V  V    I     SS    U   U  AAAAA  L
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         VV     I    SSSSS  UUUUU  A   A  LLLLL

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       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


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  Summary filename: C:\Users\ffisl\AppData\Local\Civica\VH5\0f5859ab-324b-4b31-92f0-
2f702bb46f33\111bd002-4602-481f-ab95-f69117ee22d8\scenar

DATE: 11-28-2025                          TIME: 05:22:29

USER:


COMMENTS: _____________________________________________________

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  ************************************************
  ** SIMULATION : 002YR 12HR AES.txt            **
  ************************************************


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|    READ STORM    |    Filename: C:\Users\ffisl\AppD
|                  |              ata\Local\Temp\
|                  |              69f96a00-fd99-4ec9-98e2-d95667762c7e\439eac13
| Ptotal= 41.10 mm |    Comments: 2YR 12HR AES.txt
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	6.99	6.50	2.88	9.75	0.41
0.25	0.41	3.50	6.99	6.75	2.88	10.00	0.41
0.50	0.41	3.75	6.99	7.00	2.88	10.25	0.41
0.75	0.41	4.00	6.99	7.25	1.64	10.50	0.41
1.00	0.41	4.25	18.91	7.50	1.64	10.75	0.41
1.25	0.41	4.50	18.91	7.75	1.64	11.00	0.41
1.50	0.41	4.75	18.91	8.00	1.64	11.25	0.41
1.75	0.41	5.00	18.91	8.25	0.82	11.50	0.41
2.00	0.41	5.25	5.34	8.50	0.82	11.75	0.41
2.25	2.47	5.50	5.34	8.75	0.82	12.00	0.41
2.50	2.47	5.75	5.34	9.00	0.82		
2.75	2.47	6.00	5.34	9.25	0.41		
3.00	2.47	6.25	2.88	9.50	0.41		

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--------------------
| CALIB            |
| STANDHYD (  0001)|   Area     (ha)=   1.67
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.50	0.17
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	105.51	40.00
Mannings n	=	0.013	0.250

```
NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.47	6.250	5.34	9.33	0.41
0.167	0.00	3.250	2.47	6.333	2.88	9.42	0.41
0.250	0.00	3.333	6.99	6.417	2.88	9.50	0.41
0.333	0.41	3.417	6.99	6.500	2.88	9.58	0.41
0.417	0.41	3.500	6.99	6.583	2.88	9.67	0.41
0.500	0.41	3.583	6.99	6.667	2.88	9.75	0.41
0.583	0.41	3.667	6.99	6.750	2.88	9.83	0.41
0.667	0.41	3.750	6.99	6.833	2.88	9.92	0.41
0.750	0.41	3.833	6.99	6.917	2.88	10.00	0.41
0.833	0.41	3.917	6.99	7.000	2.88	10.08	0.41
0.917	0.41	4.000	6.99	7.083	2.88	10.17	0.41
1.000	0.41	4.083	6.99	7.167	2.88	10.25	0.41
1.083	0.41	4.167	6.99	7.250	2.88	10.33	0.41
1.167	0.41	4.250	6.99	7.333	1.64	10.42	0.41
1.250	0.41	4.333	18.91	7.417	1.64	10.50	0.41
1.333	0.41	4.417	18.91	7.500	1.64	10.58	0.41
1.417	0.41	4.500	18.91	7.583	1.64	10.67	0.41
1.500	0.41	4.583	18.91	7.667	1.64	10.75	0.41
1.583	0.41	4.667	18.91	7.750	1.64	10.83	0.41
1.667	0.41	4.750	18.91	7.833	1.64	10.92	0.41
1.750	0.41	4.833	18.91	7.917	1.64	11.00	0.41
1.833	0.41	4.917	18.91	8.000	1.64	11.08	0.41
1.917	0.41	5.000	18.91	8.083	1.64	11.17	0.41
2.000	0.41	5.083	18.91	8.167	1.64	11.25	0.41
2.083	0.41	5.167	18.91	8.250	1.64	11.33	0.41
2.167	0.41	5.250	18.91	8.333	0.82	11.42	0.41
2.250	0.41	5.333	5.34	8.417	0.82	11.50	0.41
2.333	2.47	5.417	5.34	8.500	0.82	11.58	0.41
2.417	2.47	5.500	5.34	8.583	0.82	11.67	0.41
2.500	2.47	5.583	5.34	8.667	0.82	11.75	0.41
2.583	2.47	5.667	5.34	8.750	0.82	11.83	0.41
2.667	2.47	5.750	5.34	8.833	0.82	11.92	0.41
2.750	2.47	5.833	5.34	8.917	0.82	12.00	0.41
2.833	2.47	5.917	5.34	9.000	0.82	12.08	0.41
2.917	2.47	6.000	5.34	9.083	0.82	12.17	0.41
3.000	2.47	6.083	5.34	9.167	0.82	12.25	0.41
3.083	2.47	6.167	5.34	9.250	0.82		

Max.Eff.Inten.	(mm/hr)=	18.91	6.33	
over	(min)	5.00	30.00	
Storage Coeff.	(min)=	5.14 (ii)	26.42 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	30.00	
Unit Hyd. peak	(cms)=	0.21	0.04	
				TOTALS
PEAK FLOW	(cms)=	0.08	0.00	0.081 (iii)
TIME TO PEAK	(hrs)=	5.25	5.50	5.25
RUNOFF VOLUME	(mm)=	39.10	10.40	36.22
TOTAL RAINFALL	(mm)=	41.10	41.10	41.10
RUNOFF COEFFICIENT	=	0.95	0.25	0.88

```
   (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
       CN*  =  74.0    Ia = Dep. Storage  (Above)
  (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
       THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| RESERVOIR(  0004)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000      0.0000  |    0.0056      0.0685
                          0.0012      0.0104  |    0.0066      0.0725
                          0.0016      0.0207  |    0.0085      0.0828
                          0.0020      0.0311  |    0.0100      0.0932
                          0.0022      0.0376  |    0.0113      0.1035
                          0.0023      0.0414  |    0.0124      0.1139
                          0.0028      0.0621  |    0.0134      0.1242
                          0.0043      0.0652  |    0.0144      0.1346
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	1.670	0.081	5.25	36.22
OUTFLOW: ID= 1 (0004)	1.670	0.003	9.33	34.90

PEAK FLOW REDUCTION [Qout/Qin](%)= 3.22
TIME SHIFT OF PEAK FLOW (min)=245.00
MAXIMUM STORAGE USED (ha.m.)= 0.0539

CALIB STANDHYD (0002) | ID= 1 DT= 5.0 min	Area (ha)= 1.91 Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.72	0.19
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	112.84	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.47	6.250	5.34	9.33	0.41
0.167	0.00	3.250	2.47	6.333	2.88	9.42	0.41
0.250	0.00	3.333	6.99	6.417	2.88	9.50	0.41
0.333	0.41	3.417	6.99	6.500	2.88	9.58	0.41
0.417	0.41	3.500	6.99	6.583	2.88	9.67	0.41
0.500	0.41	3.583	6.99	6.667	2.88	9.75	0.41
0.583	0.41	3.667	6.99	6.750	2.88	9.83	0.41
0.667	0.41	3.750	6.99	6.833	2.88	9.92	0.41
0.750	0.41	3.833	6.99	6.917	2.88	10.00	0.41
0.833	0.41	3.917	6.99	7.000	2.88	10.08	0.41
0.917	0.41	4.000	6.99	7.083	2.88	10.17	0.41
1.000	0.41	4.083	6.99	7.167	2.88	10.25	0.41
1.083	0.41	4.167	6.99	7.250	2.88	10.33	0.41
1.167	0.41	4.250	6.99	7.333	1.64	10.42	0.41
1.250	0.41	4.333	18.91	7.417	1.64	10.50	0.41
1.333	0.41	4.417	18.91	7.500	1.64	10.58	0.41
1.417	0.41	4.500	18.91	7.583	1.64	10.67	0.41
1.500	0.41	4.583	18.91	7.667	1.64	10.75	0.41
1.583	0.41	4.667	18.91	7.750	1.64	10.83	0.41
1.667	0.41	4.750	18.91	7.833	1.64	10.92	0.41
1.750	0.41	4.833	18.91	7.917	1.64	11.00	0.41
1.833	0.41	4.917	18.91	8.000	1.64	11.08	0.41
1.917	0.41	5.000	18.91	8.083	1.64	11.17	0.41
2.000	0.41	5.083	18.91	8.167	1.64	11.25	0.41
2.083	0.41	5.167	18.91	8.250	1.64	11.33	0.41
2.167	0.41	5.250	18.91	8.333	0.82	11.42	0.41
2.250	0.41	5.333	5.34	8.417	0.82	11.50	0.41
2.333	2.47	5.417	5.34	8.500	0.82	11.58	0.41
2.417	2.47	5.500	5.34	8.583	0.82	11.67	0.41
2.500	2.47	5.583	5.34	8.667	0.82	11.75	0.41
2.583	2.47	5.667	5.34	8.750	0.82	11.83	0.41
2.667	2.47	5.750	5.34	8.833	0.82	11.92	0.41
2.750	2.47	5.833	5.34	8.917	0.82	12.00	0.41
2.833	2.47	5.917	5.34	9.000	0.82	12.08	0.41
2.917	2.47	6.000	5.34	9.083	0.82	12.17	0.41
3.000	2.47	6.083	5.34	9.167	0.82	12.25	0.41
3.083	2.47	6.167	5.34	9.250	0.82		

Max.Eff.Inten.(mm/hr)=		18.91	6.33	
over (min)		5.00	30.00	
Storage Coeff. (min)=		5.35 (ii)	26.63 (ii)	
Unit Hyd. Tpeak (min)=		5.00	30.00	
Unit Hyd. peak (cms)=		0.21	0.04	
				TOTALS
PEAK FLOW	(cms)=	0.09	0.00	0.092 (iii)
TIME TO PEAK	(hrs)=	5.25	5.50	5.25
RUNOFF VOLUME	(mm)=	39.10	10.40	36.22
TOTAL RAINFALL	(mm)=	41.10	41.10	41.10
RUNOFF COEFFICIENT	=	0.95	0.25	0.88

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0005) | IN= 2---> OUT= 1 | DT= 5.0 min	OVERFLOW IS OFF

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0050	0.0600
0.0012	0.0126	0.0057	0.0629
0.0016	0.0252	0.0078	0.0755
0.0020	0.0377	0.0094	0.0881
0.0021	0.0430	0.0107	0.1006
0.0023	0.0503	0.0119	0.1132
0.0030	0.0554	0.0129	0.1258
0.0038	0.0566	0.0139	0.1384
0.0043	0.0579	0.0148	0.1510
0.0047	0.0591	0.0156	0.1635

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	1.910	0.092	5.25	36.22
OUTFLOW: ID= 1 (0005)	1.910	0.005	8.42	34.83

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.50
TIME SHIFT OF PEAK FLOW (min)=190.00
MAXIMUM STORAGE USED (ha.m.)= 0.0603

CALIB STANDHYD (0003) | ID= 1 DT= 5.0 min	Area (ha)= 2.36 Total Imp(%)= 50.00 Dir. Conn.(%)= 50.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.18	1.18
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	125.43	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	2.47	6.250	5.34	9.33	0.41
0.167	0.00	3.250	2.47	6.333	2.88	9.42	0.41
0.250	0.00	3.333	6.99	6.417	2.88	9.50	0.41
0.333	0.41	3.417	6.99	6.500	2.88	9.58	0.41
0.417	0.41	3.500	6.99	6.583	2.88	9.67	0.41
0.500	0.41	3.583	6.99	6.667	2.88	9.75	0.41
0.583	0.41	3.667	6.99	6.750	2.88	9.83	0.41
0.667	0.41	3.750	6.99	6.833	2.88	9.92	0.41
0.750	0.41	3.833	6.99	6.917	2.88	10.00	0.41
0.833	0.41	3.917	6.99	7.000	2.88	10.08	0.41
0.917	0.41	4.000	6.99	7.083	2.88	10.17	0.41
1.000	0.41	4.083	6.99	7.167	2.88	10.25	0.41
1.083	0.41	4.167	6.99	7.250	2.88	10.33	0.41
1.167	0.41	4.250	6.99	7.333	1.64	10.42	0.41
1.250	0.41	4.333	18.91	7.417	1.64	10.50	0.41
1.333	0.41	4.417	18.91	7.500	1.64	10.58	0.41
1.417	0.41	4.500	18.91	7.583	1.64	10.67	0.41
1.500	0.41	4.583	18.91	7.667	1.64	10.75	0.41
1.583	0.41	4.667	18.91	7.750	1.64	10.83	0.41
1.667	0.41	4.750	18.91	7.833	1.64	10.92	0.41
1.750	0.41	4.833	18.91	7.917	1.64	11.00	0.41
1.833	0.41	4.917	18.91	8.000	1.64	11.08	0.41
1.917	0.41	5.000	18.91	8.083	1.64	11.17	0.41
2.000	0.41	5.083	18.91	8.167	1.64	11.25	0.41
2.083	0.41	5.167	18.91	8.250	1.64	11.33	0.41
2.167	0.41	5.250	18.91	8.333	0.82	11.42	0.41
2.250	0.41	5.333	5.34	8.417	0.82	11.50	0.41
2.333	2.47	5.417	5.34	8.500	0.82	11.58	0.41

2.417	2.47	5.500	5.34	8.583	0.82	11.67	0.41
2.500	2.47	5.583	5.34	8.667	0.82	11.75	0.41
2.583	2.47	5.667	5.34	8.750	0.82	11.83	0.41
2.667	2.47	5.750	5.34	8.833	0.82	11.92	0.41
2.750	2.47	5.833	5.34	8.917	0.82	12.00	0.41
2.833	2.47	5.917	5.34	9.000	0.82	12.08	0.41
2.917	2.47	6.000	5.34	9.083	0.82	12.17	0.41
3.000	2.47	6.083	5.34	9.167	0.82	12.25	0.41
3.083	2.47	6.167	5.34	9.250	0.82		

				TOTALS
Max.Eff.Inten.(mm/hr)=	18.91	6.33		
over (min)	5.00	30.00		
Storage Coeff. (min)=	5.70 (ii)	26.98 (ii)		
Unit Hyd. Tpeak (min)=	5.00	30.00		
Unit Hyd. peak (cms)=	0.20	0.04		
PEAK FLOW (cms)=	0.06	0.01	0.075 (iii)	
TIME TO PEAK (hrs)=	5.25	5.50	5.25	
RUNOFF VOLUME (mm)=	39.10	10.40	24.74	
TOTAL RAINFALL (mm)=	41.10	41.10	41.10	
RUNOFF COEFFICIENT =	0.95	0.25	0.60	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0006)| OVERFLOW IS OFF				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0036	0.0571
	0.0005	0.0119	0.0042	0.0595
	0.0007	0.0238	0.0061	0.0714
	0.0008	0.0295	0.0076	0.0833
	0.0009	0.0357	0.0088	0.0952
	0.0010	0.0476	0.0098	0.1071
	0.0017	0.0524	0.0108	0.1190
	0.0024	0.0536	0.0116	0.1309
	0.0029	0.0547	0.0124	0.1428
	0.0033	0.0559	0.0132	0.1547

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0003)	2.360	0.075	5.25	24.74
OUTFLOW: ID= 1 (0006)	2.360	0.002	9.83	20.46

PEAK FLOW REDUCTION [Qout/Qin](%)= 3.19
TIME SHIFT OF PEAK FLOW (min)=275.00
MAXIMUM STORAGE USED (ha.m.)= 0.0536

ADD HYD (0010)|				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0004):	1.67	0.003	9.33	34.90
+ ID2= 2 (0005):	1.91	0.005	8.42	34.83
ID = 3 (0010):	3.58	0.008	8.42	34.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)|				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0010):	3.58	0.008	8.42	34.86
+ ID2= 2 (0006):	2.36	0.002	9.83	20.46
ID = 1 (0010):	5.94	0.010	9.33	29.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\ffisl\AppData\Local\Civica\VH5\0f5859ab-324b-4b31-92f0-2f702bb46f33\fb45341c-a81c-439c-aaf9-871673c83cfc\scenar
Summary filename: C:\Users\ffisl\AppData\Local\Civica\VH5\0f5859ab-324b-4b31-92f0-2f702bb46f33\fb45341c-a81c-439c-aaf9-871673c83cfc\scenar

DATE: 11-28-2025 TIME: 05:22:29

USER:

COMMENTS: _____

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  ************************************************
  ** SIMULATION : 005YR 12HR AES.txt            **
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READ STORM | Ptotal= 53.18 mm	Filename: C:\Users\ffisl\AppData\Local\Temp\69f96a00-fd99-4ec9-98e2-d95667762c7e\cf9e3039 Comments: 5YR 12HR AES.txt							
TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	9.04	6.50	3.72	9.75	0.53
0.25	0.53	3.50	9.04	6.75	3.72	10.00	0.53
0.50	0.53	3.75	9.04	7.00	3.72	10.25	0.53
0.75	0.53	4.00	9.04	7.25	2.13	10.50	0.53
1.00	0.53	4.25	24.47	7.50	2.13	10.75	0.53
1.25	0.53	4.50	24.47	7.75	2.13	11.00	0.53
1.50	0.53	4.75	24.47	8.00	2.13	11.25	0.53
1.75	0.53	5.00	24.47	8.25	1.06	11.50	0.53
2.00	0.53	5.25	6.92	8.50	1.06	11.75	0.53
2.25	3.19	5.50	6.92	8.75	1.06	12.00	0.53
2.50	3.19	5.75	6.92	9.00	1.06		
2.75	3.19	6.00	6.92	9.25	0.53		
3.00	3.19	6.25	3.72	9.50	0.53		

CALIB | STANDHYD (0001) | ID= 1 DT= 5.0 min	Area (ha)= 1.67 Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00		
		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.50	0.17
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	105.51	40.00

Mannings n = 0.013 0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.19	6.250	6.92	9.33	0.53
0.167	0.00	3.250	3.19	6.333	3.72	9.42	0.53
0.250	0.00	3.333	9.04	6.417	3.72	9.50	0.53
0.333	0.53	3.417	9.04	6.500	3.72	9.58	0.53
0.417	0.53	3.500	9.04	6.583	3.72	9.67	0.53
0.500	0.53	3.583	9.04	6.667	3.72	9.75	0.53
0.583	0.53	3.667	9.04	6.750	3.72	9.83	0.53
0.667	0.53	3.750	9.04	6.833	3.72	9.92	0.53
0.750	0.53	3.833	9.04	6.917	3.72	10.00	0.53
0.833	0.53	3.917	9.04	7.000	3.72	10.08	0.53
0.917	0.53	4.000	9.04	7.083	3.72	10.17	0.53
1.000	0.53	4.083	9.04	7.167	3.72	10.25	0.53
1.083	0.53	4.167	9.04	7.250	3.72	10.33	0.53
1.167	0.53	4.250	9.04	7.333	2.13	10.42	0.53
1.250	0.53	4.333	24.47	7.417	2.13	10.50	0.53
1.333	0.53	4.417	24.47	7.500	2.13	10.58	0.53
1.417	0.53	4.500	24.47	7.583	2.13	10.67	0.53
1.500	0.53	4.583	24.47	7.667	2.13	10.75	0.53
1.583	0.53	4.667	24.47	7.750	2.13	10.83	0.53
1.667	0.53	4.750	24.47	7.833	2.13	10.92	0.53
1.750	0.53	4.833	24.47	7.917	2.13	11.00	0.53
1.833	0.53	4.917	24.47	8.000	2.13	11.08	0.53
1.917	0.53	5.000	24.47	8.083	2.13	11.17	0.53
2.000	0.53	5.083	24.47	8.167	2.13	11.25	0.53
2.083	0.53	5.167	24.47	8.250	2.13	11.33	0.53
2.167	0.53	5.250	24.47	8.333	1.06	11.42	0.53
2.250	0.53	5.333	6.92	8.417	1.06	11.50	0.53
2.333	3.19	5.417	6.92	8.500	1.06	11.58	0.53
2.417	3.19	5.500	6.92	8.583	1.06	11.67	0.53
2.500	3.19	5.583	6.92	8.667	1.06	11.75	0.53
2.583	3.19	5.667	6.92	8.750	1.06	11.83	0.53
2.667	3.19	5.750	6.92	8.833	1.06	11.92	0.53
2.750	3.19	5.833	6.92	8.917	1.06	12.00	0.53
2.833	3.19	5.917	6.92	9.000	1.06	12.08	0.53
2.917	3.19	6.000	6.92	9.083	1.06	12.17	0.53
3.000	3.19	6.083	6.92	9.167	1.06	12.25	0.53
3.083	3.19	6.167	6.92	9.250	1.06		

Max.Eff.Inten.	(mm/hr)=	24.47	10.44	
over	(min)	5.00	25.00	
Storage Coeff.	(min)=	4.63 (ii)	22.06 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	25.00	
Unit Hyd. peak	(cms)=	0.22	0.05	
				TOTALS
PEAK FLOW	(cms)=	0.10	0.00	0.106 (iii)
TIME TO PEAK	(hrs)=	5.25	5.42	5.25
RUNOFF VOLUME	(mm)=	51.18	16.89	47.74
TOTAL RAINFALL	(mm)=	53.18	53.18	53.18
RUNOFF COEFFICIENT	=	0.96	0.32	0.90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0004)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0056	0.0685
	0.0012	0.0104	0.0066	0.0725
	0.0016	0.0207	0.0085	0.0828
	0.0020	0.0311	0.0100	0.0932
	0.0022	0.0376	0.0113	0.1035
	0.0023	0.0414	0.0124	0.1139
	0.0028	0.0621	0.0134	0.1242
	0.0043	0.0652	0.0144	0.1346

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	1.670	0.106	5.25	47.74
OUTFLOW: ID= 1 (0004)	1.670	0.006	8.42	46.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.54
TIME SHIFT OF PEAK FLOW (min)=190.00
MAXIMUM STORAGE USED (ha.m.)= 0.0695

CALIB	
STANDHYD (0002)	Area (ha)= 1.91
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.72	0.19
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	112.84	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.19	6.250	6.92	9.33	0.53
0.167	0.00	3.250	3.19	6.333	3.72	9.42	0.53
0.250	0.00	3.333	9.04	6.417	3.72	9.50	0.53
0.333	0.53	3.417	9.04	6.500	3.72	9.58	0.53
0.417	0.53	3.500	9.04	6.583	3.72	9.67	0.53
0.500	0.53	3.583	9.04	6.667	3.72	9.75	0.53
0.583	0.53	3.667	9.04	6.750	3.72	9.83	0.53
0.667	0.53	3.750	9.04	6.833	3.72	9.92	0.53
0.750	0.53	3.833	9.04	6.917	3.72	10.00	0.53
0.833	0.53	3.917	9.04	7.000	3.72	10.08	0.53
0.917	0.53	4.000	9.04	7.083	3.72	10.17	0.53
1.000	0.53	4.083	9.04	7.167	3.72	10.25	0.53
1.083	0.53	4.167	9.04	7.250	3.72	10.33	0.53
1.167	0.53	4.250	9.04	7.333	2.13	10.42	0.53
1.250	0.53	4.333	24.47	7.417	2.13	10.50	0.53
1.333	0.53	4.417	24.47	7.500	2.13	10.58	0.53
1.417	0.53	4.500	24.47	7.583	2.13	10.67	0.53
1.500	0.53	4.583	24.47	7.667	2.13	10.75	0.53
1.583	0.53	4.667	24.47	7.750	2.13	10.83	0.53
1.667	0.53	4.750	24.47	7.833	2.13	10.92	0.53
1.750	0.53	4.833	24.47	7.917	2.13	11.00	0.53
1.833	0.53	4.917	24.47	8.000	2.13	11.08	0.53
1.917	0.53	5.000	24.47	8.083	2.13	11.17	0.53
2.000	0.53	5.083	24.47	8.167	2.13	11.25	0.53
2.083	0.53	5.167	24.47	8.250	2.13	11.33	0.53
2.167	0.53	5.250	24.47	8.333	1.06	11.42	0.53
2.250	0.53	5.333	6.92	8.417	1.06	11.50	0.53
2.333	3.19	5.417	6.92	8.500	1.06	11.58	0.53
2.417	3.19	5.500	6.92	8.583	1.06	11.67	0.53
2.500	3.19	5.583	6.92	8.667	1.06	11.75	0.53
2.583	3.19	5.667	6.92	8.750	1.06	11.83	0.53
2.667	3.19	5.750	6.92	8.833	1.06	11.92	0.53
2.750	3.19	5.833	6.92	8.917	1.06	12.00	0.53
2.833	3.19	5.917	6.92	9.000	1.06	12.08	0.53
2.917	3.19	6.000	6.92	9.083	1.06	12.17	0.53
3.000	3.19	6.083	6.92	9.167	1.06	12.25	0.53
3.083	3.19	6.167	6.92	9.250	1.06		

Max.Eff.Inten.	(mm/hr)=	24.47	10.44	
over	(min)	5.00	25.00	
Storage Coeff.	(min)=	4.82 (ii)	22.25 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	25.00	
Unit Hyd. peak	(cms)=	0.22	0.05	
				TOTALS
PEAK FLOW	(cms)=	0.12	0.00	0.121 (iii)
TIME TO PEAK	(hrs)=	5.25	5.42	5.25
RUNOFF VOLUME	(mm)=	51.18	16.89	47.75
TOTAL RAINFALL	(mm)=	53.18	53.18	53.18
RUNOFF COEFFICIENT	=	0.96	0.32	0.90

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| RESERVOIR(0005)| OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 5.0 min |

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0050	0.0600
0.0012	0.0126	0.0057	0.0629
0.0016	0.0252	0.0078	0.0755
0.0020	0.0377	0.0094	0.0881
0.0021	0.0430	0.0107	0.1006
0.0023	0.0503	0.0119	0.1132
0.0030	0.0554	0.0129	0.1258
0.0038	0.0566	0.0139	0.1384
0.0043	0.0579	0.0148	0.1510
0.0047	0.0591	0.0156	0.1635

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	1.910	0.121	5.25	47.75
OUTFLOW: ID= 1 (0005)	1.910	0.008	8.33	46.35

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.62
TIME SHIFT OF PEAK FLOW (min)=185.00
MAXIMUM STORAGE USED (ha.m.)= 0.0771

| CALIB |
| STANDHYD (0003)| Area (ha)= 2.36
|ID= 1 DT= 5.0 min | Total Imp(%)= 50.00 Dir. Conn.(%)= 50.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.18	1.18
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	125.43	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.19	6.250	6.92	9.33	0.53
0.167	0.00	3.250	3.19	6.333	3.72	9.42	0.53
0.250	0.00	3.333	9.04	6.417	3.72	9.50	0.53
0.333	0.53	3.417	9.04	6.500	3.72	9.58	0.53
0.417	0.53	3.500	9.04	6.583	3.72	9.67	0.53
0.500	0.53	3.583	9.04	6.667	3.72	9.75	0.53
0.583	0.53	3.667	9.04	6.750	3.72	9.83	0.53
0.667	0.53	3.750	9.04	6.833	3.72	9.92	0.53
0.750	0.53	3.833	9.04	6.917	3.72	10.00	0.53
0.833	0.53	3.917	9.04	7.000	3.72	10.08	0.53
0.917	0.53	4.000	9.04	7.083	3.72	10.17	0.53
1.000	0.53	4.083	9.04	7.167	3.72	10.25	0.53
1.083	0.53	4.167	9.04	7.250	3.72	10.33	0.53
1.167	0.53	4.250	9.04	7.333	2.13	10.42	0.53
1.250	0.53	4.333	24.47	7.417	2.13	10.50	0.53
1.333	0.53	4.417	24.47	7.500	2.13	10.58	0.53
1.417	0.53	4.500	24.47	7.583	2.13	10.67	0.53
1.500	0.53	4.583	24.47	7.667	2.13	10.75	0.53
1.583	0.53	4.667	24.47	7.750	2.13	10.83	0.53
1.667	0.53	4.750	24.47	7.833	2.13	10.92	0.53
1.750	0.53	4.833	24.47	7.917	2.13	11.00	0.53
1.833	0.53	4.917	24.47	8.000	2.13	11.08	0.53
1.917	0.53	5.000	24.47	8.083	2.13	11.17	0.53
2.000	0.53	5.083	24.47	8.167	2.13	11.25	0.53
2.083	0.53	5.167	24.47	8.250	2.13	11.33	0.53
2.167	0.53	5.250	24.47	8.333	1.06	11.42	0.53
2.250	0.53	5.333	6.92	8.417	1.06	11.50	0.53
2.333	3.19	5.417	6.92	8.500	1.06	11.58	0.53
2.417	3.19	5.500	6.92	8.583	1.06	11.67	0.53
2.500	3.19	5.583	6.92	8.667	1.06	11.75	0.53
2.583	3.19	5.667	6.92	8.750	1.06	11.83	0.53
2.667	3.19	5.750	6.92	8.833	1.06	11.92	0.53
2.750	3.19	5.833	6.92	8.917	1.06	12.00	0.53
2.833	3.19	5.917	6.92	9.000	1.06	12.08	0.53
2.917	3.19	6.000	6.92	9.083	1.06	12.17	0.53
3.000	3.19	6.083	6.92	9.167	1.06	12.25	0.53
3.083	3.19	6.167	6.92	9.250	1.06		

				TOTALS
Max.Eff.Inten.(mm/hr)=	24.47	10.44		
over (min)	5.00	25.00		
Storage Coeff. (min)=	5.14 (ii)	22.57 (ii)		
Unit Hyd. Tpeak (min)=	5.00	25.00		
Unit Hyd. peak (cms)=	0.21	0.05		
PEAK FLOW (cms)=	0.08	0.03	0.105 (iii)	
TIME TO PEAK (hrs)=	5.25	5.42	5.25	
RUNOFF VOLUME (mm)=	51.18	16.89	34.03	
TOTAL RAINFALL (mm)=	53.18	53.18	53.18	
RUNOFF COEFFICIENT =	0.96	0.32	0.64	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| RESERVOIR(0006)| OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 5.0 min |

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0036	0.0571
0.0005	0.0119	0.0042	0.0595
0.0007	0.0238	0.0061	0.0714
0.0008	0.0295	0.0076	0.0833
0.0009	0.0357	0.0088	0.0952
0.0010	0.0476	0.0098	0.1071
0.0017	0.0524	0.0108	0.1190
0.0024	0.0536	0.0116	0.1309
0.0029	0.0547	0.0124	0.1428
0.0033	0.0559	0.0132	0.1547

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0003)	2.360	0.105	5.25	34.03
OUTFLOW: ID= 1 (0006)	2.360	0.006	9.08	29.09

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.55
TIME SHIFT OF PEAK FLOW (min)=230.00
MAXIMUM STORAGE USED (ha.m.)= 0.0697

| ADD HYD (0010)|
| 1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0004):	1.67	0.006	8.42	46.43
+ ID2= 2 (0005):	1.91	0.008	8.33	46.35
ID = 3 (0010):	3.58	0.014	8.33	46.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0010)|
| 3 + 2 = 1 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0010):	3.58	0.014	8.33	46.39
+ ID2= 2 (0006):	2.36	0.006	9.08	29.09

ID = 1 (0010): 5.94 0.020 8.42 39.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

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V V I SSSSS U U A L (v 6.2.2022)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\ffisl\AppData\Local\Civica\VH5\0f5859ab-324b-4b31-92f0-2f702bb46f33\65d0b76d-70cd-4f91-a9c5-71faa6edb8aa\scenar
Summary filename: C:\Users\ffisl\AppData\Local\Civica\VH5\0f5859ab-324b-4b31-92f0-2f702bb46f33\65d0b76d-70cd-4f91-a9c5-71faa6edb8aa\scenar

DATE: 11-28-2025 TIME: 05:22:29

USER:

COMMENTS: _____

** SIMULATION : 010YR 12HR AES.txt **

| READ STORM | Filename: C:\Users\ffisl\AppD
| | ata\Local\Temp\
| | 69f96a00-fd99-4ec9-98e2-d95667762c7e\4da9532b
| Ptotal= 61.29 mm | Comments: 10YR 12HR AES.txt

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	10.42	6.50	4.29	9.75	0.61
0.25	0.61	3.50	10.42	6.75	4.29	10.00	0.61
0.50	0.61	3.75	10.42	7.00	4.29	10.25	0.61
0.75	0.61	4.00	10.42	7.25	2.45	10.50	0.61
1.00	0.61	4.25	28.20	7.50	2.45	10.75	0.61
1.25	0.61	4.50	28.20	7.75	2.45	11.00	0.61
1.50	0.61	4.75	28.20	8.00	2.45	11.25	0.61
1.75	0.61	5.00	28.20	8.25	1.23	11.50	0.61
2.00	0.61	5.25	7.97	8.50	1.23	11.75	0.61
2.25	3.68	5.50	7.97	8.75	1.23	12.00	0.61
2.50	3.68	5.75	7.97	9.00	1.23		
2.75	3.68	6.00	7.97	9.25	0.61		
3.00	3.68	6.25	4.29	9.50	0.61		

| CALIB |

| STANDHYD (0001)| Area (ha)= 1.67
|ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.50	0.17
Dep. Storage (mm)=	2.00	5.00
Average Slope (%)=	1.00	2.00
Length (m)=	105.51	40.00
Mannings n =	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.68	6.250	7.97	9.33	0.61
0.167	0.00	3.250	3.68	6.333	4.29	9.42	0.61
0.250	0.00	3.333	10.42	6.417	4.29	9.50	0.61
0.333	0.61	3.417	10.42	6.500	4.29	9.58	0.61
0.417	0.61	3.500	10.42	6.583	4.29	9.67	0.61
0.500	0.61	3.583	10.42	6.667	4.29	9.75	0.61
0.583	0.61	3.667	10.42	6.750	4.29	9.83	0.61
0.667	0.61	3.750	10.42	6.833	4.29	9.92	0.61
0.750	0.61	3.833	10.42	6.917	4.29	10.00	0.61
0.833	0.61	3.917	10.42	7.000	4.29	10.08	0.61
0.917	0.61	4.000	10.42	7.083	4.29	10.17	0.61
1.000	0.61	4.083	10.42	7.167	4.29	10.25	0.61
1.083	0.61	4.167	10.42	7.250	4.29	10.33	0.61
1.167	0.61	4.250	10.42	7.333	2.45	10.42	0.61
1.250	0.61	4.333	28.20	7.417	2.45	10.50	0.61
1.333	0.61	4.417	28.20	7.500	2.45	10.58	0.61
1.417	0.61	4.500	28.20	7.583	2.45	10.67	0.61
1.500	0.61	4.583	28.20	7.667	2.45	10.75	0.61
1.583	0.61	4.667	28.20	7.750	2.45	10.83	0.61
1.667	0.61	4.750	28.20	7.833	2.45	10.92	0.61
1.750	0.61	4.833	28.20	7.917	2.45	11.00	0.61
1.833	0.61	4.917	28.20	8.000	2.45	11.08	0.61
1.917	0.61	5.000	28.20	8.083	2.45	11.17	0.61
2.000	0.61	5.083	28.20	8.167	2.45	11.25	0.61
2.083	0.61	5.167	28.20	8.250	2.45	11.33	0.61
2.167	0.61	5.250	28.20	8.333	1.23	11.42	0.61
2.250	0.61	5.333	7.97	8.417	1.23	11.50	0.61
2.333	3.68	5.417	7.97	8.500	1.23	11.58	0.61
2.417	3.68	5.500	7.97	8.583	1.23	11.67	0.61
2.500	3.68	5.583	7.97	8.667	1.23	11.75	0.61
2.583	3.68	5.667	7.97	8.750	1.23	11.83	0.61
2.667	3.68	5.750	7.97	8.833	1.23	11.92	0.61
2.750	3.68	5.833	7.97	8.917	1.23	12.00	0.61
2.833	3.68	5.917	7.97	9.000	1.23	12.08	0.61
2.917	3.68	6.000	7.97	9.083	1.23	12.17	0.61
3.000	3.68	6.083	7.97	9.167	1.23	12.25	0.61
3.083	3.68	6.167	7.97	9.250	1.23		

			TOTALS
Max.Eff.Inten.(mm/hr)=	28.20	13.92	
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.38 (ii)	9.24 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.23	0.12	
PEAK FLOW (cms)=	0.12	0.01	0.124 (iii)
TIME TO PEAK (hrs)=	5.17	5.25	5.25
RUNOFF VOLUME (mm)=	59.29	21.77	55.54
TOTAL RAINFALL (mm)=	61.29	61.29	61.29
RUNOFF COEFFICIENT =	0.97	0.36	0.91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| RESERVOIR(0004)| OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT= 5.0 min | OUTFLOW STORAGE | OUTFLOW STORAGE

	(cms)	(ha.m.)		(cms)	(ha.m.)
	0.0000	0.0000		0.0056	0.0685
	0.0012	0.0104		0.0066	0.0725
	0.0016	0.0207		0.0085	0.0828
	0.0020	0.0311		0.0100	0.0932
	0.0022	0.0376		0.0113	0.1035
	0.0023	0.0414		0.0124	0.1139
	0.0028	0.0621		0.0134	0.1242
	0.0043	0.0652		0.0144	0.1346

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	1.670	0.124	5.25	55.54
OUTFLOW: ID= 1 (0004)	1.670	0.008	8.33	54.22

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.32
TIME SHIFT OF PEAK FLOW (min)=185.00
MAXIMUM STORAGE USED (ha.m.)= 0.0792

CALIB
STANDHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 1.91
Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.72	0.19
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	112.84	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.68	6.250	7.97	9.33	0.61
0.167	0.00	3.250	3.68	6.333	4.29	9.42	0.61
0.250	0.00	3.333	10.42	6.417	4.29	9.50	0.61
0.333	0.61	3.417	10.42	6.500	4.29	9.58	0.61
0.417	0.61	3.500	10.42	6.583	4.29	9.67	0.61
0.500	0.61	3.583	10.42	6.667	4.29	9.75	0.61
0.583	0.61	3.667	10.42	6.750	4.29	9.83	0.61
0.667	0.61	3.750	10.42	6.833	4.29	9.92	0.61
0.750	0.61	3.833	10.42	6.917	4.29	10.00	0.61
0.833	0.61	3.917	10.42	7.000	4.29	10.08	0.61
0.917	0.61	4.000	10.42	7.083	4.29	10.17	0.61
1.000	0.61	4.083	10.42	7.167	4.29	10.25	0.61
1.083	0.61	4.167	10.42	7.250	4.29	10.33	0.61
1.167	0.61	4.250	10.42	7.333	2.45	10.42	0.61
1.250	0.61	4.333	28.20	7.417	2.45	10.50	0.61
1.333	0.61	4.417	28.20	7.500	2.45	10.58	0.61
1.417	0.61	4.500	28.20	7.583	2.45	10.67	0.61
1.500	0.61	4.583	28.20	7.667	2.45	10.75	0.61
1.583	0.61	4.667	28.20	7.750	2.45	10.83	0.61
1.667	0.61	4.750	28.20	7.833	2.45	10.92	0.61
1.750	0.61	4.833	28.20	7.917	2.45	11.00	0.61
1.833	0.61	4.917	28.20	8.000	2.45	11.08	0.61
1.917	0.61	5.000	28.20	8.083	2.45	11.17	0.61
2.000	0.61	5.083	28.20	8.167	2.45	11.25	0.61
2.083	0.61	5.167	28.20	8.250	2.45	11.33	0.61
2.167	0.61	5.250	28.20	8.333	1.23	11.42	0.61
2.250	0.61	5.333	7.97	8.417	1.23	11.50	0.61
2.333	3.68	5.417	7.97	8.500	1.23	11.58	0.61
2.417	3.68	5.500	7.97	8.583	1.23	11.67	0.61
2.500	3.68	5.583	7.97	8.667	1.23	11.75	0.61
2.583	3.68	5.667	7.97	8.750	1.23	11.83	0.61
2.667	3.68	5.750	7.97	8.833	1.23	11.92	0.61
2.750	3.68	5.833	7.97	8.917	1.23	12.00	0.61
2.833	3.68	5.917	7.97	9.000	1.23	12.08	0.61
2.917	3.68	6.000	7.97	9.083	1.23	12.17	0.61
3.000	3.68	6.083	7.97	9.167	1.23	12.25	0.61
3.083	3.68	6.167	7.97	9.250	1.23		

Max.Eff.Inten.(mm/hr)=	28.20	13.92	
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.56 (ii)	9.42 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.23	0.12	
			TOTALS
PEAK FLOW (cms)=	0.13	0.01	0.142 (iii)
TIME TO PEAK (hrs)=	5.25	5.25	5.25
RUNOFF VOLUME (mm)=	59.29	21.77	55.54
TOTAL RAINFALL (mm)=	61.29	61.29	61.29
RUNOFF COEFFICIENT =	0.97	0.36	0.91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0005)	OVERFLOW IS OFF
IN= 2---> OUT= 1	
DT= 5.0 min	

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0050	0.0600
0.0012	0.0126	0.0057	0.0629
0.0016	0.0252	0.0078	0.0755
0.0020	0.0377	0.0094	0.0881
0.0021	0.0430	0.0107	0.1006
0.0023	0.0503	0.0119	0.1132
0.0030	0.0554	0.0129	0.1258
0.0038	0.0566	0.0139	0.1384
0.0043	0.0579	0.0148	0.1510
0.0047	0.0591	0.0156	0.1635

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	1.910	0.142	5.25	55.54
OUTFLOW: ID= 1 (0005)	1.910	0.010	8.33	54.14

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.72
TIME SHIFT OF PEAK FLOW (min)=185.00
MAXIMUM STORAGE USED (ha.m.)= 0.0892

CALIB
STANDHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 2.36
Total Imp(%)= 50.00 Dir. Conn.(%)= 50.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.18	1.18
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	125.43	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.68	6.250	7.97	9.33	0.61
0.167	0.00	3.250	3.68	6.333	4.29	9.42	0.61
0.250	0.00	3.333	10.42	6.417	4.29	9.50	0.61
0.333	0.61	3.417	10.42	6.500	4.29	9.58	0.61
0.417	0.61	3.500	10.42	6.583	4.29	9.67	0.61
0.500	0.61	3.583	10.42	6.667	4.29	9.75	0.61
0.583	0.61	3.667	10.42	6.750	4.29	9.83	0.61
0.667	0.61	3.750	10.42	6.833	4.29	9.92	0.61
0.750	0.61	3.833	10.42	6.917	4.29	10.00	0.61
0.833	0.61	3.917	10.42	7.000	4.29	10.08	0.61
0.917	0.61	4.000	10.42	7.083	4.29	10.17	0.61
1.000	0.61	4.083	10.42	7.167	4.29	10.25	0.61
1.083	0.61	4.167	10.42	7.250	4.29	10.33	0.61
1.167	0.61	4.250	10.42	7.333	2.45	10.42	0.61
1.250	0.61	4.333	28.20	7.417	2.45	10.50	0.61
1.333	0.61	4.417	28.20	7.500	2.45	10.58	0.61
1.417	0.61	4.500	28.20	7.583	2.45	10.67	0.61

1.500	0.61	4.583	28.20	7.667	2.45	10.75	0.61
1.583	0.61	4.667	28.20	7.750	2.45	10.83	0.61
1.667	0.61	4.750	28.20	7.833	2.45	10.92	0.61
1.750	0.61	4.833	28.20	7.917	2.45	11.00	0.61
1.833	0.61	4.917	28.20	8.000	2.45	11.08	0.61
1.917	0.61	5.000	28.20	8.083	2.45	11.17	0.61
2.000	0.61	5.083	28.20	8.167	2.45	11.25	0.61
2.083	0.61	5.167	28.20	8.250	2.45	11.33	0.61
2.167	0.61	5.250	28.20	8.333	1.23	11.42	0.61
2.250	0.61	5.333	7.97	8.417	1.23	11.50	0.61
2.333	3.68	5.417	7.97	8.500	1.23	11.58	0.61
2.417	3.68	5.500	7.97	8.583	1.23	11.67	0.61
2.500	3.68	5.583	7.97	8.667	1.23	11.75	0.61
2.583	3.68	5.667	7.97	8.750	1.23	11.83	0.61
2.667	3.68	5.750	7.97	8.833	1.23	11.92	0.61
2.750	3.68	5.833	7.97	8.917	1.23	12.00	0.61
2.833	3.68	5.917	7.97	9.000	1.23	12.08	0.61
2.917	3.68	6.000	7.97	9.083	1.23	12.17	0.61
3.000	3.68	6.083	7.97	9.167	1.23	12.25	0.61
3.083	3.68	6.167	7.97	9.250	1.23		

Max.Eff.Inten.(mm/hr)=	28.20	13.35	
over (min)	5.00	25.00	
Storage Coeff. (min)=	4.86 (ii)	20.65 (ii)	
Unit Hyd. Tpeak (min)=	5.00	25.00	
Unit Hyd. peak (cms)=	0.22	0.05	
			TOTALS
PEAK FLOW (cms)=	0.09	0.03	0.126 (iii)
TIME TO PEAK (hrs)=	5.25	5.42	5.25
RUNOFF VOLUME (mm)=	59.29	21.77	40.53
TOTAL RAINFALL (mm)=	61.29	61.29	61.29
RUNOFF COEFFICIENT =	0.97	0.36	0.66

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0006)|	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0036	0.0571
	0.0005	0.0119	0.0042	0.0595
	0.0007	0.0238	0.0061	0.0714
	0.0008	0.0295	0.0076	0.0833
	0.0009	0.0357	0.0088	0.0952
	0.0010	0.0476	0.0098	0.1071
	0.0017	0.0524	0.0108	0.1190
	0.0024	0.0536	0.0116	0.1309
	0.0029	0.0547	0.0124	0.1428
	0.0033	0.0559	0.0132	0.1547

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0003)	2.360	0.126	5.25	40.53
OUTFLOW: ID= 1 (0006)	2.360	0.007	8.83	35.21

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.90
TIME SHIFT OF PEAK FLOW (min)=215.00
MAXIMUM STORAGE USED (ha.m.)= 0.0818

ADD HYD (0010)|	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0004):	1.67	0.008	8.33	54.22
+ ID2= 2 (0005):	1.91	0.010	8.33	54.14
ID = 3 (0010):	3.58	0.017	8.33	54.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)|	AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0010):	3.58	0.017	8.33	54.18
+ ID2= 2 (0006):	2.36	0.007	8.83	35.21
ID = 1 (0010):	5.94	0.025	8.33	46.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\ffisl\AppData\Local\Civica\VH5\0f5859ab-324b-4b31-92f0-2f702bb46f33\99644f56-44dd-46dd-99a2-80d6e44e0437\scenar
Summary filename: C:\Users\ffisl\AppData\Local\Civica\VH5\0f5859ab-324b-4b31-92f0-2f702bb46f33\99644f56-44dd-46dd-99a2-80d6e44e0437\scenar

DATE: 11-28-2025 TIME: 05:22:29

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : 025YR 12HR AES.txt            **
  ************************************************
```

READ STORM | Ptotal= 71.38 mm	Filename: C:\Users\ffisl\AppData\Local\Temp\69f96a00-fd99-4ec9-98e2-d95667762c7e\138b136e Comments: 25YR 12HR AES.txt

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	12.14	6.50	5.00	9.75	0.71
0.25	0.71	3.50	12.14	6.75	5.00	10.00	0.71
0.50	0.71	3.75	12.14	7.00	5.00	10.25	0.71
0.75	0.71	4.00	12.14	7.25	2.86	10.50	0.71
1.00	0.71	4.25	32.84	7.50	2.86	10.75	0.71
1.25	0.71	4.50	32.84	7.75	2.86	11.00	0.71
1.50	0.71	4.75	32.84	8.00	2.86	11.25	0.71
1.75	0.71	5.00	32.84	8.25	1.43	11.50	0.71
2.00	0.71	5.25	9.28	8.50	1.43	11.75	0.71
2.25	4.28	5.50	9.28	8.75	1.43	12.00	0.71
2.50	4.28	5.75	9.28	9.00	1.43		
2.75	4.28	6.00	9.28	9.25	0.71		
3.00	4.28	6.25	5.00	9.50	0.71		

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| CALIB            |
| STANDHYD (  0001)|   Area     (ha)=   1.67
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.50         0.17
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     105.51        40.00
     Mannings n           =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.28	6.250	9.28	9.33	0.71
0.167	0.00	3.250	4.28	6.333	5.00	9.42	0.71
0.250	0.00	3.333	12.14	6.417	5.00	9.50	0.71
0.333	0.71	3.417	12.14	6.500	5.00	9.58	0.71
0.417	0.71	3.500	12.14	6.583	5.00	9.67	0.71
0.500	0.71	3.583	12.14	6.667	5.00	9.75	0.71
0.583	0.71	3.667	12.14	6.750	5.00	9.83	0.71
0.667	0.71	3.750	12.14	6.833	5.00	9.92	0.71
0.750	0.71	3.833	12.14	6.917	5.00	10.00	0.71
0.833	0.71	3.917	12.14	7.000	5.00	10.08	0.71
0.917	0.71	4.000	12.14	7.083	5.00	10.17	0.71
1.000	0.71	4.083	12.14	7.167	5.00	10.25	0.71
1.083	0.71	4.167	12.14	7.250	5.00	10.33	0.71
1.167	0.71	4.250	12.14	7.333	2.86	10.42	0.71
1.250	0.71	4.333	32.84	7.417	2.86	10.50	0.71
1.333	0.71	4.417	32.84	7.500	2.86	10.58	0.71
1.417	0.71	4.500	32.84	7.583	2.86	10.67	0.71
1.500	0.71	4.583	32.84	7.667	2.86	10.75	0.71
1.583	0.71	4.667	32.84	7.750	2.86	10.83	0.71
1.667	0.71	4.750	32.84	7.833	2.86	10.92	0.71
1.750	0.71	4.833	32.84	7.917	2.86	11.00	0.71
1.833	0.71	4.917	32.84	8.000	2.86	11.08	0.71
1.917	0.71	5.000	32.84	8.083	2.86	11.17	0.71
2.000	0.71	5.083	32.84	8.167	2.86	11.25	0.71
2.083	0.71	5.167	32.84	8.250	2.86	11.33	0.71
2.167	0.71	5.250	32.84	8.333	1.43	11.42	0.71
2.250	0.71	5.333	9.28	8.417	1.43	11.50	0.71
2.333	4.28	5.417	9.28	8.500	1.43	11.58	0.71
2.417	4.28	5.500	9.28	8.583	1.43	11.67	0.71
2.500	4.28	5.583	9.28	8.667	1.43	11.75	0.71
2.583	4.28	5.667	9.28	8.750	1.43	11.83	0.71
2.667	4.28	5.750	9.28	8.833	1.43	11.92	0.71
2.750	4.28	5.833	9.28	8.917	1.43	12.00	0.71
2.833	4.28	5.917	9.28	9.000	1.43	12.08	0.71
2.917	4.28	6.000	9.28	9.083	1.43	12.17	0.71
3.000	4.28	6.083	9.28	9.167	1.43	12.25	0.71
3.083	4.28	6.167	9.28	9.250	1.43		

```
     Max.Eff.Inten.(mm/hr)=      32.84        17.87
               over (min)        5.00        10.00
     Storage Coeff.  (min)=     4.12 (ii)    8.69 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.24         0.12
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.14         0.01          0.145 (iii)
     TIME TO PEAK    (hrs)=       5.17         5.25           5.25
     RUNOFF VOLUME    (mm)=      69.38        28.31          65.27
     TOTAL RAINFALL   (mm)=      71.38        71.38          71.38
     RUNOFF COEFFICIENT   =       0.97         0.40           0.91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
```

```
--------------------
| RESERVOIR(  0004)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                        0.0000      0.0000    |   0.0056      0.0685
                        0.0012      0.0104    |   0.0066      0.0725
                        0.0016      0.0207    |   0.0085      0.0828
                        0.0020      0.0311    |   0.0100      0.0932
                        0.0022      0.0376    |   0.0113      0.1035
                        0.0023      0.0414    |   0.0124      0.1139
                        0.0028      0.0621    |   0.0134      0.1242
                        0.0043      0.0652    |   0.0144      0.1346

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (  0001)     1.670     0.145      5.25      65.27
     OUTFLOW: ID= 1 (  0004)     1.670     0.010      8.33      63.96

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  6.76
                    TIME SHIFT OF PEAK FLOW          (min)=185.00
                    MAXIMUM  STORAGE   USED        (ha.m.)=  0.0918
```

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--------------------
| CALIB            |
| STANDHYD (  0002)|   Area     (ha)=   1.91
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.72         0.19
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     112.84        40.00
     Mannings n           =      0.013        0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.28	6.250	9.28	9.33	0.71
0.167	0.00	3.250	4.28	6.333	5.00	9.42	0.71
0.250	0.00	3.333	12.14	6.417	5.00	9.50	0.71
0.333	0.71	3.417	12.14	6.500	5.00	9.58	0.71
0.417	0.71	3.500	12.14	6.583	5.00	9.67	0.71
0.500	0.71	3.583	12.14	6.667	5.00	9.75	0.71
0.583	0.71	3.667	12.14	6.750	5.00	9.83	0.71
0.667	0.71	3.750	12.14	6.833	5.00	9.92	0.71
0.750	0.71	3.833	12.14	6.917	5.00	10.00	0.71
0.833	0.71	3.917	12.14	7.000	5.00	10.08	0.71
0.917	0.71	4.000	12.14	7.083	5.00	10.17	0.71
1.000	0.71	4.083	12.14	7.167	5.00	10.25	0.71
1.083	0.71	4.167	12.14	7.250	5.00	10.33	0.71
1.167	0.71	4.250	12.14	7.333	2.86	10.42	0.71
1.250	0.71	4.333	32.84	7.417	2.86	10.50	0.71
1.333	0.71	4.417	32.84	7.500	2.86	10.58	0.71
1.417	0.71	4.500	32.84	7.583	2.86	10.67	0.71
1.500	0.71	4.583	32.84	7.667	2.86	10.75	0.71
1.583	0.71	4.667	32.84	7.750	2.86	10.83	0.71
1.667	0.71	4.750	32.84	7.833	2.86	10.92	0.71
1.750	0.71	4.833	32.84	7.917	2.86	11.00	0.71
1.833	0.71	4.917	32.84	8.000	2.86	11.08	0.71
1.917	0.71	5.000	32.84	8.083	2.86	11.17	0.71
2.000	0.71	5.083	32.84	8.167	2.86	11.25	0.71
2.083	0.71	5.167	32.84	8.250	2.86	11.33	0.71
2.167	0.71	5.250	32.84	8.333	1.43	11.42	0.71
2.250	0.71	5.333	9.28	8.417	1.43	11.50	0.71
2.333	4.28	5.417	9.28	8.500	1.43	11.58	0.71
2.417	4.28	5.500	9.28	8.583	1.43	11.67	0.71
2.500	4.28	5.583	9.28	8.667	1.43	11.75	0.71
2.583	4.28	5.667	9.28	8.750	1.43	11.83	0.71
2.667	4.28	5.750	9.28	8.833	1.43	11.92	0.71
2.750	4.28	5.833	9.28	8.917	1.43	12.00	0.71
2.833	4.28	5.917	9.28	9.000	1.43	12.08	0.71
2.917	4.28	6.000	9.28	9.083	1.43	12.17	0.71
3.000	4.28	6.083	9.28	9.167	1.43	12.25	0.71
3.083	4.28	6.167	9.28	9.250	1.43		

Max.Eff.Inten.(mm/hr)=	32.84	17.87	
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.29 (ii)	8.86 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.23	0.12	
			TOTALS
PEAK FLOW (cms)=	0.16	0.01	0.166 (iii)
TIME TO PEAK (hrs)=	5.17	5.25	5.25
RUNOFF VOLUME (mm)=	69.38	28.31	65.27
TOTAL RAINFALL (mm)=	71.38	71.38	71.38
RUNOFF COEFFICIENT =	0.97	0.40	0.91

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0005)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0050	0.0600
	0.0012	0.0126	0.0057	0.0629
	0.0016	0.0252	0.0078	0.0755
	0.0020	0.0377	0.0094	0.0881
	0.0021	0.0430	0.0107	0.1006
	0.0023	0.0503	0.0119	0.1132
	0.0030	0.0554	0.0129	0.1258
	0.0038	0.0566	0.0139	0.1384
	0.0043	0.0579	0.0148	0.1510
	0.0047	0.0591	0.0156	0.1635

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	1.910	0.166	5.25	65.27
OUTFLOW: ID= 1 (0005)	1.910	0.011	8.33	63.87

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.68
TIME SHIFT OF PEAK FLOW (min)=185.00
MAXIMUM STORAGE USED (ha.m.)= 0.1046

CALIB				
STANDHYD (0003)	Area (ha)= 2.36			
ID= 1 DT= 5.0 min	Total Imp(%)= 50.00	Dir. Conn.(%)= 50.00		
	IMPERVIOUS	PERVIOUS (i)		
Surface Area (ha)=	1.18	1.18		
Dep. Storage (mm)=	2.00	5.00		
Average Slope (%)=	1.00	2.00		
Length (m)=	125.43	40.00		
Mannings n =	0.013	0.250		

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.28	6.250	9.28	9.33	0.71
0.167	0.00	3.250	4.28	6.333	5.00	9.42	0.71
0.250	0.00	3.333	12.14	6.417	5.00	9.50	0.71
0.333	0.71	3.417	12.14	6.500	5.00	9.58	0.71
0.417	0.71	3.500	12.14	6.583	5.00	9.67	0.71
0.500	0.71	3.583	12.14	6.667	5.00	9.75	0.71
0.583	0.71	3.667	12.14	6.750	5.00	9.83	0.71
0.667	0.71	3.750	12.14	6.833	5.00	9.92	0.71
0.750	0.71	3.833	12.14	6.917	5.00	10.00	0.71
0.833	0.71	3.917	12.14	7.000	5.00	10.08	0.71
0.917	0.71	4.000	12.14	7.083	5.00	10.17	0.71
1.000	0.71	4.083	12.14	7.167	5.00	10.25	0.71
1.083	0.71	4.167	12.14	7.250	5.00	10.33	0.71
1.167	0.71	4.250	12.14	7.333	2.86	10.42	0.71
1.250	0.71	4.333	32.84	7.417	2.86	10.50	0.71
1.333	0.71	4.417	32.84	7.500	2.86	10.58	0.71
1.417	0.71	4.500	32.84	7.583	2.86	10.67	0.71
1.500	0.71	4.583	32.84	7.667	2.86	10.75	0.71
1.583	0.71	4.667	32.84	7.750	2.86	10.83	0.71
1.667	0.71	4.750	32.84	7.833	2.86	10.92	0.71
1.750	0.71	4.833	32.84	7.917	2.86	11.00	0.71
1.833	0.71	4.917	32.84	8.000	2.86	11.08	0.71
1.917	0.71	5.000	32.84	8.083	2.86	11.17	0.71
2.000	0.71	5.083	32.84	8.167	2.86	11.25	0.71
2.083	0.71	5.167	32.84	8.250	2.86	11.33	0.71
2.167	0.71	5.250	32.84	8.333	1.43	11.42	0.71
2.250	0.71	5.333	9.28	8.417	1.43	11.50	0.71
2.333	4.28	5.417	9.28	8.500	1.43	11.58	0.71
2.417	4.28	5.500	9.28	8.583	1.43	11.67	0.71
2.500	4.28	5.583	9.28	8.667	1.43	11.75	0.71
2.583	4.28	5.667	9.28	8.750	1.43	11.83	0.71
2.667	4.28	5.750	9.28	8.833	1.43	11.92	0.71
2.750	4.28	5.833	9.28	8.917	1.43	12.00	0.71
2.833	4.28	5.917	9.28	9.000	1.43	12.08	0.71
2.917	4.28	6.000	9.28	9.083	1.43	12.17	0.71
3.000	4.28	6.083	9.28	9.167	1.43	12.25	0.71
3.083	4.28	6.167	9.28	9.250	1.43		

Max.Eff.Inten.(mm/hr)=	32.84	17.54	
over (min)	5.00	20.00	
Storage Coeff. (min)=	4.57 (ii)	18.73 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.23	0.06	
			TOTALS
PEAK FLOW (cms)=	0.11	0.05	0.154 (iii)
TIME TO PEAK (hrs)=	5.25	5.33	5.25
RUNOFF VOLUME (mm)=	69.38	28.31	48.84
TOTAL RAINFALL (mm)=	71.38	71.38	71.38
RUNOFF COEFFICIENT =	0.97	0.40	0.68

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0006)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0036	0.0571
	0.0005	0.0119	0.0042	0.0595
	0.0007	0.0238	0.0061	0.0714
	0.0008	0.0295	0.0076	0.0833
	0.0009	0.0357	0.0088	0.0952
	0.0010	0.0476	0.0098	0.1071
	0.0017	0.0524	0.0108	0.1190
	0.0024	0.0536	0.0116	0.1309
	0.0029	0.0547	0.0124	0.1428
	0.0033	0.0559	0.0132	0.1547

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0003)	2.360	0.154	5.25	48.84
OUTFLOW: ID= 1 (0006)	2.360	0.009	8.67	43.10

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.86
TIME SHIFT OF PEAK FLOW (min)=205.00
MAXIMUM STORAGE USED (ha.m.)= 0.0980

ADD HYD (0010)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0004):	1.67	0.010	8.33	63.96
	+ ID2= 2 (0005):	1.91	0.011	8.33	63.87

```
       ================================================
       ID = 3 (  0010):     3.58   0.021     8.33    63.91

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0010)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0010):     3.58   0.021     8.33    63.91
     + ID2= 2 (  0006):     2.36   0.009     8.67    43.10
       ================================================
       ID = 1 (  0010):     5.94   0.030     8.33    55.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
================================================================================
============

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\ffisl\AppData\Local\Civica\VH5\0f5859ab-324b-4b31-92f0-
2f702bb46f33\6fa9228c-b378-46d6-bbcb-a16833bfbd6c\scenar
  Summary filename: C:\Users\ffisl\AppData\Local\Civica\VH5\0f5859ab-324b-4b31-92f0-
2f702bb46f33\6fa9228c-b378-46d6-bbcb-a16833bfbd6c\scenar


DATE: 11-28-2025                          TIME: 05:22:29

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 050YR 12HR AES.txt           **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\ffisl\AppD
|                  |              ata\Local\Temp\
|                  |              69f96a00-fd99-4ec9-98e2-d95667762c7e\a2fc5121
| Ptotal= 79.00 mm |    Comments: 50YR 12HR AES.txt
--------------------
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs   mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                0.00    0.00 |  3.25   13.43 |  6.50    5.53 |  9.75    0.79
                0.25    0.79 |  3.50   13.43 |  6.75    5.53 | 10.00    0.79
                0.50    0.79 |  3.75   13.43 |  7.00    5.53 | 10.25    0.79
                0.75    0.79 |  4.00   13.43 |  7.25    3.16 | 10.50    0.79
                1.00    0.79 |  4.25   36.34 |  7.50    3.16 | 10.75    0.79
                1.25    0.79 |  4.50   36.34 |  7.75    3.16 | 11.00    0.79
                1.50    0.79 |  4.75   36.34 |  8.00    3.16 | 11.25    0.79
                1.75    0.79 |  5.00   36.34 |  8.25    1.58 | 11.50    0.79
                2.00    0.79 |  5.25   10.27 |  8.50    1.58 | 11.75    0.79
                2.25    4.74 |  5.50   10.27 |  8.75    1.58 | 12.00    0.79
                2.50    4.74 |  5.75   10.27 |  9.00    1.58 |
                2.75    4.74 |  6.00   10.27 |  9.25    0.79 |
                3.00    4.74 |  6.25    5.53 |  9.50    0.79 |
--------------------------------------------------------------------------------

--------------------
| CALIB            |
| STANDHYD (  0001)|   Area     (ha)=   1.67
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.50          0.17
     Dep. Storage     (mm)=       2.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     105.51         40.00
     Mannings n           =      0.013         0.250

        NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs   mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                0.083    0.00 | 3.167    4.74 | 6.250   10.27 |  9.33    0.79
                0.167    0.00 | 3.250    4.74 | 6.333    5.53 |  9.42    0.79
                0.250    0.00 | 3.333   13.43 | 6.417    5.53 |  9.50    0.79
                0.333    0.79 | 3.417   13.43 | 6.500    5.53 |  9.58    0.79
                0.417    0.79 | 3.500   13.43 | 6.583    5.53 |  9.67    0.79
                0.500    0.79 | 3.583   13.43 | 6.667    5.53 |  9.75    0.79
                0.583    0.79 | 3.667   13.43 | 6.750    5.53 |  9.83    0.79
                0.667    0.79 | 3.750   13.43 | 6.833    5.53 |  9.92    0.79
                0.750    0.79 | 3.833   13.43 | 6.917    5.53 | 10.00    0.79
                0.833    0.79 | 3.917   13.43 | 7.000    5.53 | 10.08    0.79
                0.917    0.79 | 4.000   13.43 | 7.083    5.53 | 10.17    0.79
                1.000    0.79 | 4.083   13.43 | 7.167    5.53 | 10.25    0.79
                1.083    0.79 | 4.167   13.43 | 7.250    5.53 | 10.33    0.79
                1.167    0.79 | 4.250   13.43 | 7.333    3.16 | 10.42    0.79
                1.250    0.79 | 4.333   36.34 | 7.417    3.16 | 10.50    0.79
                1.333    0.79 | 4.417   36.34 | 7.500    3.16 | 10.58    0.79
                1.417    0.79 | 4.500   36.34 | 7.583    3.16 | 10.67    0.79
                1.500    0.79 | 4.583   36.34 | 7.667    3.16 | 10.75    0.79
                1.583    0.79 | 4.667   36.34 | 7.750    3.16 | 10.83    0.79
                1.667    0.79 | 4.750   36.34 | 7.833    3.16 | 10.92    0.79
                1.750    0.79 | 4.833   36.34 | 7.917    3.16 | 11.00    0.79
                1.833    0.79 | 4.917   36.34 | 8.000    3.16 | 11.08    0.79
                1.917    0.79 | 5.000   36.34 | 8.083    3.16 | 11.17    0.79
                2.000    0.79 | 5.083   36.34 | 8.167    3.16 | 11.25    0.79
                2.083    0.79 | 5.167   36.34 | 8.250    3.16 | 11.33    0.79
                2.167    0.79 | 5.250   36.34 | 8.333    1.58 | 11.42    0.79
                2.250    0.79 | 5.333   10.27 | 8.417    1.58 | 11.50    0.79
                2.333    4.74 | 5.417   10.27 | 8.500    1.58 | 11.58    0.79
                2.417    4.74 | 5.500   10.27 | 8.583    1.58 | 11.67    0.79
                2.500    4.74 | 5.583   10.27 | 8.667    1.58 | 11.75    0.79
                2.583    4.74 | 5.667   10.27 | 8.750    1.58 | 11.83    0.79
                2.667    4.74 | 5.750   10.27 | 8.833    1.58 | 11.92    0.79
                2.750    4.74 | 5.833   10.27 | 8.917    1.58 | 12.00    0.79
                2.833    4.74 | 5.917   10.27 | 9.000    1.58 | 12.08    0.79
                2.917    4.74 | 6.000   10.27 | 9.083    1.58 | 12.17    0.79
                3.000    4.74 | 6.083   10.27 | 9.167    1.58 | 12.25    0.79
                3.083    4.74 | 6.167   10.27 | 9.250    1.58 |

     Max.Eff.Inten.(mm/hr)=      36.34         20.98
               over (min)        5.00         10.00
     Storage Coeff.  (min)=      3.96 (ii)     8.35 (ii)
     Unit Hyd. Tpeak (min)=      5.00         10.00
     Unit Hyd. peak  (cms)=      0.24          0.12
                                                          *TOTALS*
     PEAK FLOW       (cms)=      0.15          0.01          0.161 (iii)
     TIME TO PEAK    (hrs)=      5.17          5.25          5.25
     RUNOFF VOLUME    (mm)=     77.00         33.55         72.65
     TOTAL RAINFALL   (mm)=     79.00         79.00         79.00
     RUNOFF COEFFICIENT   =      0.97          0.42          0.92

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

      (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
          CN*  =  74.0    Ia = Dep. Storage  (Above)
     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
```

THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0004) | IN= 2---> OUT= 1 | DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0056	0.0685
	0.0012	0.0104	0.0066	0.0725
	0.0016	0.0207	0.0085	0.0828
	0.0020	0.0311	0.0100	0.0932
	0.0022	0.0376	0.0113	0.1035
	0.0023	0.0414	0.0124	0.1139
	0.0028	0.0621	0.0134	0.1242
	0.0043	0.0652	0.0144	0.1346

OVERFLOW IS OFF

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	1.670	0.161	5.25	72.65
OUTFLOW: ID= 1 (0004)	1.670	0.011	8.33	71.34

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.88
TIME SHIFT OF PEAK FLOW (min)=185.00
MAXIMUM STORAGE USED (ha.m.)= 0.1017

CALIB | STANDHYD (0002) |ID= 1 DT= 5.0 min	Area (ha)= 1.91	Total Imp(%)= 90.00	Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.72	0.19
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	112.84	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.74	6.250	10.27	9.33	0.79
0.167	0.00	3.250	4.74	6.333	5.53	9.42	0.79
0.250	0.00	3.333	13.43	6.417	5.53	9.50	0.79
0.333	0.79	3.417	13.43	6.500	5.53	9.58	0.79
0.417	0.79	3.500	13.43	6.583	5.53	9.67	0.79
0.500	0.79	3.583	13.43	6.667	5.53	9.75	0.79
0.583	0.79	3.667	13.43	6.750	5.53	9.83	0.79
0.667	0.79	3.750	13.43	6.833	5.53	9.92	0.79
0.750	0.79	3.833	13.43	6.917	5.53	10.00	0.79
0.833	0.79	3.917	13.43	7.000	5.53	10.08	0.79
0.917	0.79	4.000	13.43	7.083	5.53	10.17	0.79
1.000	0.79	4.083	13.43	7.167	5.53	10.25	0.79
1.083	0.79	4.167	13.43	7.250	5.53	10.33	0.79
1.167	0.79	4.250	13.43	7.333	3.16	10.42	0.79
1.250	0.79	4.333	36.34	7.417	3.16	10.50	0.79
1.333	0.79	4.417	36.34	7.500	3.16	10.58	0.79
1.417	0.79	4.500	36.34	7.583	3.16	10.67	0.79
1.500	0.79	4.583	36.34	7.667	3.16	10.75	0.79
1.583	0.79	4.667	36.34	7.750	3.16	10.83	0.79
1.667	0.79	4.750	36.34	7.833	3.16	10.92	0.79
1.750	0.79	4.833	36.34	7.917	3.16	11.00	0.79
1.833	0.79	4.917	36.34	8.000	3.16	11.08	0.79
1.917	0.79	5.000	36.34	8.083	3.16	11.17	0.79
2.000	0.79	5.083	36.34	8.167	3.16	11.25	0.79
2.083	0.79	5.167	36.34	8.250	3.16	11.33	0.79
2.167	0.79	5.250	36.34	8.333	1.58	11.42	0.79
2.250	0.79	5.333	10.27	8.417	1.58	11.50	0.79
2.333	4.74	5.417	10.27	8.500	1.58	11.58	0.79
2.417	4.74	5.500	10.27	8.583	1.58	11.67	0.79
2.500	4.74	5.583	10.27	8.667	1.58	11.75	0.79
2.583	4.74	5.667	10.27	8.750	1.58	11.83	0.79
2.667	4.74	5.750	10.27	8.833	1.58	11.92	0.79
2.750	4.74	5.833	10.27	8.917	1.58	12.00	0.79
2.833	4.74	5.917	10.27	9.000	1.58	12.08	0.79
2.917	4.74	6.000	10.27	9.083	1.58	12.17	0.79
3.000	4.74	6.083	10.27	9.167	1.58	12.25	0.79
3.083	4.74	6.167	10.27	9.250	1.58		

				TOTALS
Max.Eff.Inten.(mm/hr)=	36.34	20.98		
over (min)	5.00	10.00		
Storage Coeff. (min)=	4.12 (ii)	8.51 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.24	0.12		
PEAK FLOW (cms)=	0.17	0.01	0.184 (iii)	
TIME TO PEAK (hrs)=	5.17	5.25	5.25	
RUNOFF VOLUME (mm)=	77.00	33.54	72.65	
TOTAL RAINFALL (mm)=	79.00	79.00	79.00	
RUNOFF COEFFICIENT =	0.97	0.42	0.92	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0005) | IN= 2---> OUT= 1 | DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0050	0.0600
	0.0012	0.0126	0.0057	0.0629
	0.0016	0.0252	0.0078	0.0755
	0.0020	0.0377	0.0094	0.0881
	0.0021	0.0430	0.0107	0.1006
	0.0023	0.0503	0.0119	0.1132
	0.0030	0.0554	0.0129	0.1258
	0.0038	0.0566	0.0139	0.1384
	0.0043	0.0579	0.0148	0.1510
	0.0047	0.0591	0.0156	0.1635

OVERFLOW IS OFF

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	1.910	0.184	5.25	72.65
OUTFLOW: ID= 1 (0005)	1.910	0.012	8.33	71.25

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.60
TIME SHIFT OF PEAK FLOW (min)=185.00
MAXIMUM STORAGE USED (ha.m.)= 0.1164

CALIB | STANDHYD (0003) |ID= 1 DT= 5.0 min	Area (ha)= 2.36	Total Imp(%)= 50.00	Dir. Conn.(%)= 50.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.18	1.18
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	125.43	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.74	6.250	10.27	9.33	0.79
0.167	0.00	3.250	4.74	6.333	5.53	9.42	0.79
0.250	0.00	3.333	13.43	6.417	5.53	9.50	0.79
0.333	0.79	3.417	13.43	6.500	5.53	9.58	0.79
0.417	0.79	3.500	13.43	6.583	5.53	9.67	0.79
0.500	0.79	3.583	13.43	6.667	5.53	9.75	0.79
0.583	0.79	3.667	13.43	6.750	5.53	9.83	0.79
0.667	0.79	3.750	13.43	6.833	5.53	9.92	0.79
0.750	0.79	3.833	13.43	6.917	5.53	10.00	0.79

0.833	0.79	3.917	13.43	7.000	5.53	10.08	0.79
0.917	0.79	4.000	13.43	7.083	5.53	10.17	0.79
1.000	0.79	4.083	13.43	7.167	5.53	10.25	0.79
1.083	0.79	4.167	13.43	7.250	5.53	10.33	0.79
1.167	0.79	4.250	13.43	7.333	3.16	10.42	0.79
1.250	0.79	4.333	36.34	7.417	3.16	10.50	0.79
1.333	0.79	4.417	36.34	7.500	3.16	10.58	0.79
1.417	0.79	4.500	36.34	7.583	3.16	10.67	0.79
1.500	0.79	4.583	36.34	7.667	3.16	10.75	0.79
1.583	0.79	4.667	36.34	7.750	3.16	10.83	0.79
1.667	0.79	4.750	36.34	7.833	3.16	10.92	0.79
1.750	0.79	4.833	36.34	7.917	3.16	11.00	0.79
1.833	0.79	4.917	36.34	8.000	3.16	11.08	0.79
1.917	0.79	5.000	36.34	8.083	3.16	11.17	0.79
2.000	0.79	5.083	36.34	8.167	3.16	11.25	0.79
2.083	0.79	5.167	36.34	8.250	3.16	11.33	0.79
2.167	0.79	5.250	36.34	8.333	1.58	11.42	0.79
2.250	0.79	5.333	10.27	8.417	1.58	11.50	0.79
2.333	4.74	5.417	10.27	8.500	1.58	11.58	0.79
2.417	4.74	5.500	10.27	8.583	1.58	11.67	0.79
2.500	4.74	5.583	10.27	8.667	1.58	11.75	0.79
2.583	4.74	5.667	10.27	8.750	1.58	11.83	0.79
2.667	4.74	5.750	10.27	8.833	1.58	11.92	0.79
2.750	4.74	5.833	10.27	8.917	1.58	12.00	0.79
2.833	4.74	5.917	10.27	9.000	1.58	12.08	0.79
2.917	4.74	6.000	10.27	9.083	1.58	12.17	0.79
3.000	4.74	6.083	10.27	9.167	1.58	12.25	0.79
3.083	4.74	6.167	10.27	9.250	1.58		

Max.Eff.Inten.(mm/hr)=	36.34	20.63	
over (min)	5.00	20.00	
Storage Coeff. (min)=	4.39 (ii)	17.66 (ii)	
Unit Hyd. Tpeak (min)=	5.00	20.00	
Unit Hyd. peak (cms)=	0.23	0.06	
			TOTALS
PEAK FLOW (cms)=	0.12	0.06	0.175 (iii)
TIME TO PEAK (hrs)=	5.17	5.33	5.25
RUNOFF VOLUME (mm)=	77.00	33.54	55.27
TOTAL RAINFALL (mm)=	79.00	79.00	79.00
RUNOFF COEFFICIENT =	0.97	0.42	0.70

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0006)		OVERFLOW IS OFF			
IN= 2---> OUT= 1					
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	
	0.0000	0.0000	0.0036	0.0571	
	0.0005	0.0119	0.0042	0.0595	
	0.0007	0.0238	0.0061	0.0714	
	0.0008	0.0295	0.0076	0.0833	
	0.0009	0.0357	0.0088	0.0952	
	0.0010	0.0476	0.0098	0.1071	
	0.0017	0.0524	0.0108	0.1190	
	0.0024	0.0536	0.0116	0.1309	
	0.0029	0.0547	0.0124	0.1428	
	0.0033	0.0559	0.0132	0.1547	

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0003)	2.360	0.175	5.25	55.27
OUTFLOW: ID= 1 (0006)	2.360	0.010	8.67	49.23

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.77
TIME SHIFT OF PEAK FLOW (min)=205.00
MAXIMUM STORAGE USED (ha.m.)= 0.1107

ADD HYD (0010)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
ID1= 1 (0004):	1.67	0.011	8.33	71.34	
+ ID2= 2 (0005):	1.91	0.012	8.33	71.25	
ID = 3 (0010):	3.58	0.023	8.33	71.29	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0010)					
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
ID1= 3 (0010):	3.58	0.023	8.33	71.29	
+ ID2= 2 (0006):	2.36	0.010	8.67	49.23	
ID = 1 (0010):	5.94	0.033	8.33	62.53	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2022)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\ffisl\AppData\Local\Civica\VH5\0f5859ab-324b-4b31-92f0-2f702bb46f33\b0df2073-2814-4007-965f-90d7513fbcbb\scenar
Summary filename: C:\Users\ffisl\AppData\Local\Civica\VH5\0f5859ab-324b-4b31-92f0-2f702bb46f33\b0df2073-2814-4007-965f-90d7513fbcbb\scenar

DATE: 11-28-2025 TIME: 05:22:29

USER:

COMMENTS: _____

****
** SIMULATION : 100YR 12HR AES.txt **
****

READ STORM	Filename: C:\Users\ffisl\AppData\Local\Temp\69f96a00-fd99-4ec9-98e2-d95667762c7e\4deb551e
Ptotal= 86.48 mm	Comments: 100YR 12HR AES.txt

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	3.25	14.71	6.50	6.06	9.75	0.86
0.25	0.86	3.50	14.71	6.75	6.06	10.00	0.86
0.50	0.86	3.75	14.71	7.00	6.06	10.25	0.86
0.75	0.86	4.00	14.71	7.25	3.46	10.50	0.86
1.00	0.86	4.25	39.79	7.50	3.46	10.75	0.86
1.25	0.86	4.50	39.79	7.75	3.46	11.00	0.86

1.50	0.86	4.75	39.79	8.00	3.46	11.25	0.86
1.75	0.86	5.00	39.79	8.25	1.73	11.50	0.86
2.00	0.86	5.25	11.24	8.50	1.73	11.75	0.86
2.25	5.19	5.50	11.24	8.75	1.73	12.00	0.86
2.50	5.19	5.75	11.24	9.00	1.73		
2.75	5.19	6.00	11.24	9.25	0.86		
3.00	5.19	6.25	6.06	9.50	0.86		

CALIB			
STANDHYD (0001)	Area (ha)= 1.67		
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00	Dir. Conn.(%)= 90.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.50	0.17
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	105.51	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.19	6.250	11.24	9.33	0.86
0.167	0.00	3.250	5.19	6.333	6.06	9.42	0.86
0.250	0.00	3.333	14.71	6.417	6.06	9.50	0.86
0.333	0.86	3.417	14.71	6.500	6.06	9.58	0.86
0.417	0.86	3.500	14.71	6.583	6.06	9.67	0.86
0.500	0.86	3.583	14.71	6.667	6.06	9.75	0.86
0.583	0.86	3.667	14.71	6.750	6.06	9.83	0.86
0.667	0.86	3.750	14.71	6.833	6.06	9.92	0.86
0.750	0.86	3.833	14.71	6.917	6.06	10.00	0.86
0.833	0.86	3.917	14.71	7.000	6.06	10.08	0.86
0.917	0.86	4.000	14.71	7.083	6.06	10.17	0.86
1.000	0.86	4.083	14.71	7.167	6.06	10.25	0.86
1.083	0.86	4.167	14.71	7.250	6.06	10.33	0.86
1.167	0.86	4.250	14.71	7.333	3.46	10.42	0.86
1.250	0.86	4.333	39.79	7.417	3.46	10.50	0.86
1.333	0.86	4.417	39.79	7.500	3.46	10.58	0.86
1.417	0.86	4.500	39.79	7.583	3.46	10.67	0.86
1.500	0.86	4.583	39.79	7.667	3.46	10.75	0.86
1.583	0.86	4.667	39.79	7.750	3.46	10.83	0.86
1.667	0.86	4.750	39.79	7.833	3.46	10.92	0.86
1.750	0.86	4.833	39.79	7.917	3.46	11.00	0.86
1.833	0.86	4.917	39.79	8.000	3.46	11.08	0.86
1.917	0.86	5.000	39.79	8.083	3.46	11.17	0.86
2.000	0.86	5.083	39.79	8.167	3.46	11.25	0.86
2.083	0.86	5.167	39.79	8.250	3.46	11.33	0.86
2.167	0.86	5.250	39.79	8.333	1.73	11.42	0.86
2.250	0.86	5.333	11.24	8.417	1.73	11.50	0.86
2.333	5.19	5.417	11.24	8.500	1.73	11.58	0.86
2.417	5.19	5.500	11.24	8.583	1.73	11.67	0.86
2.500	5.19	5.583	11.24	8.667	1.73	11.75	0.86
2.583	5.19	5.667	11.24	8.750	1.73	11.83	0.86
2.667	5.19	5.750	11.24	8.833	1.73	11.92	0.86
2.750	5.19	5.833	11.24	8.917	1.73	12.00	0.86
2.833	5.19	5.917	11.24	9.000	1.73	12.08	0.86
2.917	5.19	6.000	11.24	9.083	1.73	12.17	0.86
3.000	5.19	6.083	11.24	9.167	1.73	12.25	0.86
3.083	5.19	6.167	11.24	9.250	1.73		

Max.Eff.Inten.	(mm/hr)=	39.79	24.14	
	over (min)	5.00	10.00	
Storage Coeff.	(min)=	3.81 (ii)	8.05 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.25	0.13	
				TOTALS
PEAK FLOW	(cms)=	0.17	0.01	0.177 (iii)
TIME TO PEAK	(hrs)=	5.08	5.25	5.25
RUNOFF VOLUME	(mm)=	84.48	38.89	79.92
TOTAL RAINFALL	(mm)=	86.48	86.48	86.48
RUNOFF COEFFICIENT	=	0.98	0.45	0.92

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0004)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0056	0.0685
	0.0012	0.0104	0.0066	0.0725
	0.0016	0.0207	0.0085	0.0828
	0.0020	0.0311	0.0100	0.0932
	0.0022	0.0376	0.0113	0.1035
	0.0023	0.0414	0.0124	0.1139
	0.0028	0.0621	0.0134	0.1242
	0.0043	0.0652	0.0144	0.1346

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0001)	1.670	0.177	5.25	79.92
OUTFLOW: ID= 1 (0004)	1.670	0.012	8.33	78.60

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.88
TIME SHIFT OF PEAK FLOW (min)=185.00
MAXIMUM STORAGE USED (ha.m.)= 0.1117

CALIB			
STANDHYD (0002)	Area (ha)= 1.91		
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00	Dir. Conn.(%)= 90.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.72	0.19
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	112.84	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.19	6.250	11.24	9.33	0.86
0.167	0.00	3.250	5.19	6.333	6.06	9.42	0.86
0.250	0.00	3.333	14.71	6.417	6.06	9.50	0.86
0.333	0.86	3.417	14.71	6.500	6.06	9.58	0.86
0.417	0.86	3.500	14.71	6.583	6.06	9.67	0.86
0.500	0.86	3.583	14.71	6.667	6.06	9.75	0.86
0.583	0.86	3.667	14.71	6.750	6.06	9.83	0.86
0.667	0.86	3.750	14.71	6.833	6.06	9.92	0.86
0.750	0.86	3.833	14.71	6.917	6.06	10.00	0.86
0.833	0.86	3.917	14.71	7.000	6.06	10.08	0.86
0.917	0.86	4.000	14.71	7.083	6.06	10.17	0.86
1.000	0.86	4.083	14.71	7.167	6.06	10.25	0.86
1.083	0.86	4.167	14.71	7.250	6.06	10.33	0.86
1.167	0.86	4.250	14.71	7.333	3.46	10.42	0.86
1.250	0.86	4.333	39.79	7.417	3.46	10.50	0.86
1.333	0.86	4.417	39.79	7.500	3.46	10.58	0.86
1.417	0.86	4.500	39.79	7.583	3.46	10.67	0.86
1.500	0.86	4.583	39.79	7.667	3.46	10.75	0.86
1.583	0.86	4.667	39.79	7.750	3.46	10.83	0.86
1.667	0.86	4.750	39.79	7.833	3.46	10.92	0.86
1.750	0.86	4.833	39.79	7.917	3.46	11.00	0.86
1.833	0.86	4.917	39.79	8.000	3.46	11.08	0.86
1.917	0.86	5.000	39.79	8.083	3.46	11.17	0.86
2.000	0.86	5.083	39.79	8.167	3.46	11.25	0.86
2.083	0.86	5.167	39.79	8.250	3.46	11.33	0.86
2.167	0.86	5.250	39.79	8.333	1.73	11.42	0.86
2.250	0.86	5.333	11.24	8.417	1.73	11.50	0.86
2.333	5.19	5.417	11.24	8.500	1.73	11.58	0.86
2.417	5.19	5.500	11.24	8.583	1.73	11.67	0.86

2.500	5.19	5.583	11.24	8.667	1.73	11.75	0.86
2.583	5.19	5.667	11.24	8.750	1.73	11.83	0.86
2.667	5.19	5.750	11.24	8.833	1.73	11.92	0.86
2.750	5.19	5.833	11.24	8.917	1.73	12.00	0.86
2.833	5.19	5.917	11.24	9.000	1.73	12.08	0.86
2.917	5.19	6.000	11.24	9.083	1.73	12.17	0.86
3.000	5.19	6.083	11.24	9.167	1.73	12.25	0.86
3.083	5.19	6.167	11.24	9.250	1.73		

Max.Eff.Inten.(mm/hr)=	39.79	24.14		
over (min)	5.00	10.00		
Storage Coeff. (min)=	3.97 (ii)	8.21 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.24	0.13		
			TOTALS	
PEAK FLOW (cms)=	0.19	0.01	0.202 (iii)	
TIME TO PEAK (hrs)=	5.17	5.25	5.25	
RUNOFF VOLUME (mm)=	84.48	38.89	79.92	
TOTAL RAINFALL (mm)=	86.48	86.48	86.48	
RUNOFF COEFFICIENT =	0.98	0.45	0.92	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0005)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0050	0.0600
	0.0012	0.0126	0.0057	0.0629
	0.0016	0.0252	0.0078	0.0755
	0.0020	0.0377	0.0094	0.0881
	0.0021	0.0430	0.0107	0.1006
	0.0023	0.0503	0.0119	0.1132
	0.0030	0.0554	0.0129	0.1258
	0.0038	0.0566	0.0139	0.1384
	0.0043	0.0579	0.0148	0.1510
	0.0047	0.0591	0.0156	0.1635

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	1.910	0.202	5.25	79.92
OUTFLOW: ID= 1 (0005)	1.910	0.013	8.33	78.52

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.47
TIME SHIFT OF PEAK FLOW (min)=185.00
MAXIMUM STORAGE USED (ha.m.)= 0.1282

CALIB			
STANDHYD (0003)	Area (ha)= 2.36		
ID= 1 DT= 5.0 min	Total Imp(%)= 50.00	Dir. Conn.(%)= 50.00	
	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	1.18	1.18	
Dep. Storage (mm)=	2.00	5.00	
Average Slope (%)=	1.00	2.00	
Length (m)=	125.43	40.00	
Mannings n =	0.013	0.250	

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.19	6.250	11.24	9.33	0.86
0.167	0.00	3.250	5.19	6.333	6.06	9.42	0.86
0.250	0.00	3.333	14.71	6.417	6.06	9.50	0.86
0.333	0.86	3.417	14.71	6.500	6.06	9.58	0.86
0.417	0.86	3.500	14.71	6.583	6.06	9.67	0.86
0.500	0.86	3.583	14.71	6.667	6.06	9.75	0.86
0.583	0.86	3.667	14.71	6.750	6.06	9.83	0.86
0.667	0.86	3.750	14.71	6.833	6.06	9.92	0.86
0.750	0.86	3.833	14.71	6.917	6.06	10.00	0.86
0.833	0.86	3.917	14.71	7.000	6.06	10.08	0.86
0.917	0.86	4.000	14.71	7.083	6.06	10.17	0.86
1.000	0.86	4.083	14.71	7.167	6.06	10.25	0.86
1.083	0.86	4.167	14.71	7.250	6.06	10.33	0.86
1.167	0.86	4.250	14.71	7.333	3.46	10.42	0.86
1.250	0.86	4.333	39.79	7.417	3.46	10.50	0.86
1.333	0.86	4.417	39.79	7.500	3.46	10.58	0.86
1.417	0.86	4.500	39.79	7.583	3.46	10.67	0.86
1.500	0.86	4.583	39.79	7.667	3.46	10.75	0.86
1.583	0.86	4.667	39.79	7.750	3.46	10.83	0.86
1.667	0.86	4.750	39.79	7.833	3.46	10.92	0.86
1.750	0.86	4.833	39.79	7.917	3.46	11.00	0.86
1.833	0.86	4.917	39.79	8.000	3.46	11.08	0.86
1.917	0.86	5.000	39.79	8.083	3.46	11.17	0.86
2.000	0.86	5.083	39.79	8.167	3.46	11.25	0.86
2.083	0.86	5.167	39.79	8.250	3.46	11.33	0.86
2.167	0.86	5.250	39.79	8.333	1.73	11.42	0.86
2.250	0.86	5.333	11.24	8.417	1.73	11.50	0.86
2.333	5.19	5.417	11.24	8.500	1.73	11.58	0.86
2.417	5.19	5.500	11.24	8.583	1.73	11.67	0.86
2.500	5.19	5.583	11.24	8.667	1.73	11.75	0.86
2.583	5.19	5.667	11.24	8.750	1.73	11.83	0.86
2.667	5.19	5.750	11.24	8.833	1.73	11.92	0.86
2.750	5.19	5.833	11.24	8.917	1.73	12.00	0.86
2.833	5.19	5.917	11.24	9.000	1.73	12.08	0.86
2.917	5.19	6.000	11.24	9.083	1.73	12.17	0.86
3.000	5.19	6.083	11.24	9.167	1.73	12.25	0.86
3.083	5.19	6.167	11.24	9.250	1.73		

Max.Eff.Inten.(mm/hr)=	39.79	23.76		
over (min)	5.00	20.00		
Storage Coeff. (min)=	4.23 (ii)	16.77 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.24	0.06		
			TOTALS	
PEAK FLOW (cms)=	0.13	0.07	0.196 (iii)	
TIME TO PEAK (hrs)=	5.17	5.33	5.25	
RUNOFF VOLUME (mm)=	84.48	38.89	61.68	
TOTAL RAINFALL (mm)=	86.48	86.48	86.48	
RUNOFF COEFFICIENT =	0.98	0.45	0.71	

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0006)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0036	0.0571
	0.0005	0.0119	0.0042	0.0595
	0.0007	0.0238	0.0061	0.0714
	0.0008	0.0295	0.0076	0.0833
	0.0009	0.0357	0.0088	0.0952
	0.0010	0.0476	0.0098	0.1071
	0.0017	0.0524	0.0108	0.1190
	0.0024	0.0536	0.0116	0.1309
	0.0029	0.0547	0.0124	0.1428
	0.0033	0.0559	0.0132	0.1547

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0003)	2.360	0.196	5.25	61.68
OUTFLOW: ID= 1 (0006)	2.360	0.011	8.75	55.36

PEAK FLOW REDUCTION [Qout/Qin](%)= 5.66
TIME SHIFT OF PEAK FLOW (min)=210.00
MAXIMUM STORAGE USED (ha.m.)= 0.1236

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--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0004):     1.67   0.012     8.33    78.60
      + ID2= 2 (  0005):     1.91   0.013     8.33    78.52
        ================================================
        ID = 3 (  0010):     3.58   0.025     8.33    78.56

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0010)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0010):     3.58   0.025     8.33    78.56
      + ID2= 2 (  0006):     2.36   0.011     8.75    55.36
        ================================================
        ID = 1 (  0010):     5.94   0.036     8.33    69.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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================================================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.2.2022)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
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                  *****  D E T A I L E D   O U T P U T *****


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
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DATE: 11-28-2025                          TIME: 05:22:29

USER:


COMMENTS: _____________________________________________________

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  ***********************************************
  ** SIMULATION : 25mmChicago                  **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\ffisl\AppD
|                  |              ata\Local\Temp\
|                  |              69f96a00-fd99-4ec9-98e2-d95667762c7e\aba56b38
| Ptotal= 25.02 mm |    Comments: 25mmChicago
--------------------
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs   mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
                0.00    0.00 |  1.17     6.20 |  2.33     4.80 |  3.50     2.62
                0.17    2.17 |  1.33    12.18 |  2.50     4.21 |  3.67     2.47
                0.33    2.38 |  1.50    41.67 |  2.67     3.78 |  3.83     2.35
                0.50    2.66 |  1.67    15.28 |  2.83     3.45 |  4.00     2.23
                0.67    3.03 |  1.83     9.22 |  3.00     3.18 |
                0.83    3.58 |  2.00     6.88 |  3.17     2.95 |
                1.00    4.47 |  2.17     5.62 |  3.33     2.76 |

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| CALIB            |
| STANDHYD (  0001)|   Area     (ha)=   1.67
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------

                             IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.50         0.17
     Dep. Storage     (mm)=       2.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     105.51        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                 hrs   mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
               0.083    0.00 | 1.167     4.47 | 2.250     5.62 |  3.33     2.95
               0.167    0.00 | 1.250     6.20 | 2.333     5.62 |  3.42     2.76
               0.250    2.17 | 1.333     6.20 | 2.417     4.80 |  3.50     2.76
               0.333    2.17 | 1.417    12.18 | 2.500     4.80 |  3.58     2.62
               0.417    2.38 | 1.500    12.18 | 2.583     4.21 |  3.67     2.62
               0.500    2.38 | 1.583    41.67 | 2.667     4.21 |  3.75     2.47
               0.583    2.66 | 1.667    41.67 | 2.750     3.78 |  3.83     2.47
               0.667    2.66 | 1.750    15.28 | 2.833     3.78 |  3.92     2.35
               0.750    3.03 | 1.833    15.28 | 2.917     3.45 |  4.00     2.35
               0.833    3.03 | 1.917     9.22 | 3.000     3.45 |  4.08     2.23
               0.917    3.58 | 2.000     9.22 | 3.083     3.18 |  4.17     2.23
               1.000    3.58 | 2.083     6.88 | 3.167     3.18 |
               1.083    4.47 | 2.167     6.88 | 3.250     2.95 |

     Max.Eff.Inten.(mm/hr)=      41.67         3.95
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.74 (ii)    7.90 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.25         0.13
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.17         0.00          0.166 (iii)
     TIME TO PEAK    (hrs)=       1.67         1.75           1.67
     RUNOFF VOLUME    (mm)=      23.02         3.67          21.09
     TOTAL RAINFALL   (mm)=      25.02        25.02          25.02
     RUNOFF COEFFICIENT   =       0.92         0.15           0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  74.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0004)|     OVERFLOW IS OFF
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000      0.0000   |   0.0056      0.0685
                         0.0012      0.0104   |   0.0066      0.0725
                         0.0016      0.0207   |   0.0085      0.0828
                         0.0020      0.0311   |   0.0100      0.0932
                         0.0022      0.0376   |   0.0113      0.1035
                         0.0023      0.0414   |   0.0124      0.1139
                         0.0028      0.0621   |   0.0134      0.1242
                         0.0043      0.0652   |   0.0144      0.1346

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0001)    1.670     0.166     1.67       21.09
   OUTFLOW: ID= 1 (  0004)    1.670     0.002     4.25       19.77
```

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.24
TIME SHIFT OF PEAK FLOW (min)=155.00
MAXIMUM STORAGE USED (ha.m.)= 0.0333

CALIB			
STANDHYD (0002)	Area (ha)= 1.91		
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00	Dir. Conn.(%)= 90.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.72	0.19
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	112.84	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.167	4.47	2.250	5.62	3.33	2.95
0.167	0.00	1.250	6.20	2.333	5.62	3.42	2.76
0.250	2.17	1.333	6.20	2.417	4.80	3.50	2.76
0.333	2.17	1.417	12.18	2.500	4.80	3.58	2.62
0.417	2.38	1.500	12.18	2.583	4.21	3.67	2.62
0.500	2.38	1.583	41.67	2.667	4.21	3.75	2.47
0.583	2.66	1.667	41.67	2.750	3.78	3.83	2.47
0.667	2.66	1.750	15.28	2.833	3.78	3.92	2.35
0.750	3.03	1.833	15.28	2.917	3.45	4.00	2.35
0.833	3.03	1.917	9.22	3.000	3.45	4.08	2.23
0.917	3.58	2.000	9.22	3.083	3.18	4.17	2.23
1.000	3.58	2.083	6.88	3.167	3.18		
1.083	4.47	2.167	6.88	3.250	2.95		

Max.Eff.Inten.	(mm/hr)=	41.67	3.95	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	3.90 (ii)	8.06 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.25	0.13	
				TOTALS
PEAK FLOW	(cms)=	0.19	0.00	0.189 (iii)
TIME TO PEAK	(hrs)=	1.67	1.75	1.67
RUNOFF VOLUME	(mm)=	23.02	3.67	21.09
TOTAL RAINFALL	(mm)=	25.02	25.02	25.02
RUNOFF COEFFICIENT	=	0.92	0.15	0.84

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0005)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0050	0.0600
	0.0012	0.0126	0.0057	0.0629
	0.0016	0.0252	0.0078	0.0755
	0.0020	0.0377	0.0094	0.0881
	0.0021	0.0430	0.0107	0.1006
	0.0023	0.0503	0.0119	0.1132
	0.0030	0.0554	0.0129	0.1258
	0.0038	0.0566	0.0139	0.1384
	0.0043	0.0579	0.0148	0.1510
	0.0047	0.0591	0.0156	0.1635

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0002)	1.910	0.189	1.67	21.09
OUTFLOW: ID= 1 (0005)	1.910	0.002	4.33	19.69

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.07
TIME SHIFT OF PEAK FLOW (min)=160.00
MAXIMUM STORAGE USED (ha.m.)= 0.0384

CALIB			
STANDHYD (0003)	Area (ha)= 2.36		
ID= 1 DT= 5.0 min	Total Imp(%)= 50.00	Dir. Conn.(%)= 50.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.18	1.18
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	125.43	40.00
Mannings n	=	0.013	0.250

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.167	4.47	2.250	5.62	3.33	2.95
0.167	0.00	1.250	6.20	2.333	5.62	3.42	2.76
0.250	2.17	1.333	6.20	2.417	4.80	3.50	2.76
0.333	2.17	1.417	12.18	2.500	4.80	3.58	2.62
0.417	2.38	1.500	12.18	2.583	4.21	3.67	2.62
0.500	2.38	1.583	41.67	2.667	4.21	3.75	2.47
0.583	2.66	1.667	41.67	2.750	3.78	3.83	2.47
0.667	2.66	1.750	15.28	2.833	3.78	3.92	2.35
0.750	3.03	1.833	15.28	2.917	3.45	4.00	2.35
0.833	3.03	1.917	9.22	3.000	3.45	4.08	2.23
0.917	3.58	2.000	9.22	3.083	3.18	4.17	2.23
1.000	3.58	2.083	6.88	3.167	3.18		
1.083	4.47	2.167	6.88	3.250	2.95		

Max.Eff.Inten.	(mm/hr)=	41.67	2.88	
over	(min)	5.00	35.00	
Storage Coeff.	(min)=	4.15 (ii)	33.32 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	35.00	
Unit Hyd. peak	(cms)=	0.24	0.03	
				TOTALS
PEAK FLOW	(cms)=	0.13	0.01	0.128 (iii)
TIME TO PEAK	(hrs)=	1.67	2.42	1.67
RUNOFF VOLUME	(mm)=	23.02	3.67	13.34
TOTAL RAINFALL	(mm)=	25.02	25.02	25.02
RUNOFF COEFFICIENT	=	0.92	0.15	0.53

***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 74.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR(0006)	OVERFLOW IS OFF			
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0036	0.0571
	0.0005	0.0119	0.0042	0.0595
	0.0007	0.0238	0.0061	0.0714
	0.0008	0.0295	0.0076	0.0833
	0.0009	0.0357	0.0088	0.0952
	0.0010	0.0476	0.0098	0.1071
	0.0017	0.0524	0.0108	0.1190
	0.0024	0.0536	0.0116	0.1309
	0.0029	0.0547	0.0124	0.1428
	0.0033	0.0559	0.0132	0.1547

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0003)	2.360	0.128	1.67	13.34
OUTFLOW: ID= 1 (0006)	2.360	0.001	5.17	10.77

```
                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.64
                  TIME SHIFT OF PEAK FLOW         (min)=210.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0304

--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0010)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0004):     1.67   0.002     4.25    19.77
      + ID2= 2 (  0005):     1.91   0.002     4.33    19.69
        ====================================================
        ID = 3 (  0010):     3.58   0.004     4.25    19.73

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------

--------------------
| ADD HYD  (  0010)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0010):     3.58   0.004     4.25    19.73
      + ID2= 2 (  0006):     2.36   0.001     5.17    10.77
        ====================================================
        ID = 1 (  0010):     5.94   0.005     4.33    16.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
```

APPENDIX F

DRAWINGS

TAUNTON ROAD

MARATHON AVENUE

BURKHOLDER DRIVE

PRIVATE ROAD

FUT. RESIDENTIAL DEVELOPMENT

BLDG B (±1,117 S.M.) (±12,021 S.F.) FFE =172.70

BLDG C (±720 S.M.) (±7,799 S.F.) FFE =173.90

BLDG D (±650 S.M.) (±7,000 S.F.) FFE =173.50

BLDG E (±845 S.M.) (±9,096 S.F.) FFE =172.70

BLDG F (±1,368 S.M.) (±14,726 S.F.) FFE =171.70

BLDG G (±557 S.M.) (±6,000 S.F.) FFE =170.70

A1 (±3,995 S.M.) (±42,893 S.F.) FFE =170.00

A2 (±611 S.M.) (±6,572 S.F.) FFE =170.55

A3 FFE =170.90

A3 (±978 S.M.) (±10,528 S.F.) FFE =171.35

A4 (±1,586 S.M.) (±17,068 S.F.) FFE =171.80

MATCH TO EXISTING PAVEMENT STRUCTURE ON TAUNTON ROAD AS PER THE REGIONAL MUNICIPALITY OF DURHAM DRAWING SET (CONTRACT NO. 1797-2B-01), PREPARED BY COLE ENGINEERING, DATED JUNE 14, 2019:
- 40mm SP12.5 FC (PG 64-28)
- 130mm SP 19 (PG 64-28) 2-LIFTS
  - 250mm GRAN 'A'
  - 600mm GRAN 'B'

MATCH TO EXISTING PAVEMENT STRUCTURE ON TAUNTON ROAD AS PER THE REGIONAL MUNICIPALITY OF DURHAM DRAWING SET (CONTRACT NO. 1797-2B-01), PREPARED BY COLE ENGINEERING, DATED JUNE 14, 2019:
- 40mm SP12.5 FC (PG 64-28)
- 130mm SP 19 (PG 64-28) 2-LIFTS
  - 250mm GRAN 'A'
  - 600mm GRAN 'B'

U/G CHAMBER #1 FOOTPRINT=1215m² TOP OF TANK: 170.40

U/G CHAMBER #2 FOOTPRINT=1400m² TOP OF TANK: 168.00

U/G CHAMBER #3 FOOTPRINT=1400m² TOP OF TANK: 167.00

TRANS NORTHERN PIPELINE INC. EASEMENT

APPROX. OUTLINE OF FUTURE SIDEWALK

MECHANICAL ROOM FOR A2, A3, AND A4

LOADING DOCK TRENCH DRAIN AND RETAINING WALL DESIGN AND DETAILS BY OTHERS

TOE WALL AS PER OPSD 3120.100 OR APPROVED EQUIVALENT, VEHICLE GUARD RAIL TO BE INSTALLED BEHIND WALL

20cm MAX HEIGHT HIGH CURB/TOE WALL

20cm HIGH CURB

450mm THICK, 200mm DIA. RIP-RAP ON TERRAFIX 402R FILTER CLOTH

14.4m - 375mm DIA PVC @ STM CULVERT @ 2.00% CONNECTED TO CB15 AT INV 166.70

REMOVE CURB, ASPHALT, ETC. IN ORDER TO COMPLETE SERVICE CONNECTIONS. MATCH TO EXISTING ASPHALT WITH STEP JOINT.

PROPOSED ELEVATIONS ALONG PROPERTY LINE, 2% TO EXISTING MUP

PROPOSED ELEVATIONS ALONG PROPERTY LINE, 2% TO EXISTING TOP OF CURB

PROPOSED ELEVATIONS ALONG PROPERTY LINE, 2% TO EXISTING CONC. S/W

PROPOSED TRANSFORMER PAD ELEV=171.00 REFER TO ELECTRICAL DRAWINGS

PROPOSED TRANSFORMER PAD ELEV=173.30 REFER TO ELECTRICAL DRAWINGS

PROPOSED TRANSFORMER PAD ELEV=173.35 REFER TO ELECTRICAL DRAWINGS

PROPOSED BIOSWALE WITH RAISED CATCHBASIN LID AS PER SDP-2

DCB LID RAISED 6" HIGHER THAN ADJACENT SWALE AS PER DETAIL ON SDP-2

CURB CUTS SPACED AS SHOWN

V-NOTCH SWALE AS PER DETAIL ON SDP-2

FLAT BOTTOM SWALE AS PER DETAIL ON SDP-2

SWALE WITH SUBDRAIN AS PER DETAIL ON SDP-2

FLAT BOTTOM SWALE WITH SUBDRAIN AS PER DETAIL ON SDP-2

V-NOTCH SWALE WITH SUBDRAIN AS PER DETAIL ON SDP-2

0.3m HIGH R/W AS PER DETAILS BY MBTW

0.3m HIGH R/W AS PER DETAILS BY MBTW

0.5m HIGH RETAINING WALL AS PER PLANS BY MBTW

0.4m HIGH RETAINING WALL AS PER PLANS BY MBTW

3 RISERS @ 0.15m

1 X 0.15m RISERS

3 X 0.15m RISERS

REMOVE EXISTING SIDEWALK, REGRADE ENTRANCE, AND INSTALL NEW CONCRETE SIDEWALK TO PROPOSED ELEVATION. MATCH TO LOCATIONS AS SHOWN

MECHANICALLY CUT EXISTING CURB ALONG PROPOSED ENTRANCE TO CREATE MOUNTABLE CURB.

MATCH TO EXISTING SIDEWALK

MATCH TO EXISTING ELEVATIONS

MATCH TO EXISTING CURB

MATCH TO EXISTING ELEVATION AT PROPERTY LINE

MATCH TO EXISTING CURB

PROPOSED RETAINING WALL AS PER LANDSCAPE DESIGNS AND DETAILS

PROPOSED TOP OF DEPRESSED CURB ELEVATION

PROPOSED EDGE OF GUTTER ELEVATION

PROPOSED SWALE ELEVATION

PROPOSED PROPERTY LINE ELEVATION

PROPOSED ELEVATION

EX. CURB

EX. SIDEWALK

EX. MUP

EX. DRAINAGE DITCH

EX. RIP RAP

GRAVEL SPILLWAY

EX. CL

ASPHALT

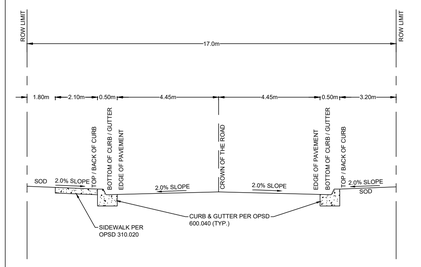
CONCRETE

LANDSCAPING

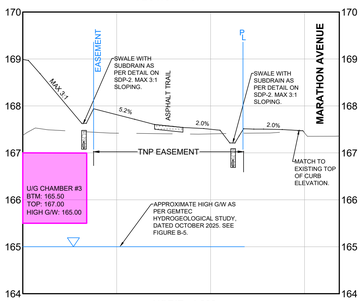
PAVERS

CONC. S/W

TYPICAL PRIVATE ROAD CROSS SECTION (N.T.S.)



SECTION 1-1



HORIZ.: 1:300
VERT.: 1:60

LEGEND

× 100.00	PROPOSED ELEVATION
× 100.00 (SW)	PROPOSED SWALE ELEVATION
× (100.00)	PROPOSED PROPERTY LINE ELEVATION
× 100.00 (TC)	TOP OF CURB ELEVATION
× 100.00 (TW)	TOP OF WALL ELEVATION
× 100.00 (BW)	BOTTOM OF WALL ELEVATION
× 100.00 (G)	PROPOSED EDGE OF GUTTER ELEVATION
× 100.00 (TDC)	PROPOSED TOP OF DEPRESSED CURB ELEVATION
× 100.00 (EX)	EXISTING ELEVATION
	PROPOSED CATCHBASIN
	MAXIMUM 3:1 SLOPE (UNLESS OTHERWISE NOTED)
	PROPOSED STORM MANHOLE
	PROPOSED CATCHBASIN MANHOLE
	PROPOSED DOUBLE CATCHBASIN
100.00	PROPOSED DOUBLE CATCHBASIN MANHOLE
	PROPOSED SANITARY MANHOLE
	PROPOSED VALVE AND BOX
	PROPOSED HYDRANT
	EXISTING CONTOUR
	PROPOSED BOTTOM OF SWALE
	EMERGENCY OVERLAND FLOW ROUTE
	PROPERTY LINE
	PROPOSED RETAINING WALL AS PER LANDSCAPE DESIGNS AND DETAILS
	PROPOSED TRANSFORMER
	EXISTING STORM MANHOLE
	EXISTING CATCH BASIN

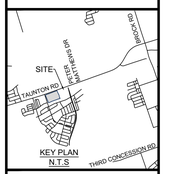
REVISION BLOCK

#	DATE	DESCRIPTION
1	04/14/23	ISSUED FOR SPA
2	12/04/25	ISSUED FOR SPA

REGISTERED PROFESSIONAL ENGINEER — B.JACKSON 100210382 — DEC. 4, 2025 — PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC. 1-1882 Ironoak Way Burlington, ON L7L 7A9

NORTH ARROW



SURVEY AND BENCHMARK NOTE

EXISTING TOPOGRAPHIC INFORMATIONS SHOWN ON THIS PLAN ARE BASED ON J.D. BARNES LTD. DRAWING (REF. NO. 25-25-360-00), DATED AUGUST 20, 2025

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING VERTICAL

METRIC SCALE

0 5 10 20

1:500

SITE GRADING PLAN

FIELDGATE COMMERCIAL
TAUNTON RD/BURKHOLDER DR.
OPA 2025-001/P · A 06/25 ; PRE 023-108/22
PICKERING, ONTARIO

CHECKED BY: BJ
DRAWN BY: RB
PROJECT No: 23810

SGP

TAUNTON ROAD

BURKHOLDER DRIVE

PRIVATE ROW

MARATHON AVENUE

EX. CURB

EX. SIDEWALK

EX. MUP

GRAVEL SPILLWAY

EX. DRAINAGE DITCH

EX. RIP RAP

BLDG D (±650 S.M.) (±7,000 S.F.) FFE =173.90

BLDG E (±845 S.M.) (±9,096 S.F.) FFE =172.85

FFE =173.20

BLDG F (±1,368 S.M.) (±14,726 S.F.) FFE =171.70

FFE =171.10

BLDG G (±557 S.M.) (±6,000 S.F.) FFE =170.70

BLDG C (±725 S.M.) (±7,799 S.F.) FFE =173.90

FFE =173.70

FFE =173.70

FFE =173.70

BLDG B (±1,117 S.M.) (±12,021 S.F.) FFE =172.70

A4 (±1,586 S.M.) (±17,068 S.F.) FFE =171.80

A3 (±978 S.M.) (±10,528 S.F.) FFE =171.35

A3 FFE =170.90

A2 (±611 S.M.) (±6,572 S.F.) FFE =170.55

A1 (±3,985 S.M.) (±42,893 S.F.) FFE =170.00

FUTURE RESIDENTIAL DEVELOPMENT AREA

U/G CHAMBER #1 FOOTPRINT=1,128m² MIN SURFACE ELEVATION: 171.00 MAX GW ELEVATION 168.40 BTM OF TANK: 168.90 BTM OF STORAGE: 169.10 TOP OF TANK: 170.40

U/G CHAMBER #2 FOOTPRINT=1,140m² MIN SURFACE ELEVATION: 168.85 MAX GW ELEVATION: 168.60 BTM OF TANK: 166.55 BTM OF STORAGE: 167.75 TOP OF TANK: 168.00

U/G CHAMBER #3 FOOTPRINT=1400m² MIN SURFACE ELEVATION: 167.55 MAX GW ELEVATION 165.00 BTM OF TANK: 165.50 BTM OF STORAGE 165.70 TOP OF TANK: 167.00

TRANS NORTHERN PIPELINE INC. EASEMENT

BIOSWALE AS PER DETAIL ON SPD-2

FLAT BOTTOM SWALE AS PER DETAIL ON SPD-2

FLAT BOTTOM SWALE WITH SUBDRAIN AS PER DETAIL ON SPD-2

V-NOTCH SWALE AS PER DETAIL ON SPD-2

V-NOTCH SWALE WITH SUBDRAIN AS PER DETAIL ON SPD-2

LOADING DOCK TRENCH DRAIN AND RETAINING WALL DESIGN AND DETAILS BY OTHERS

MECHANICAL ROOM FOR A2, A3, AND A4

CONNECT TO EXISTING 150Ø AND 200Ø WATERMAIN AND EXTEND WITH PROPOSED 150Ø AND 200Ø WATERMAIN

BREAK/CORE INTO EXISTING SANSTORM MANHOLES. INSTALL NEW PROPOSED SANITARY/STORM SEWERS WITH DROP STRUCTURES. RE-PARGE TO SUIT

CROSSING TABLE

1 300 STM INV=171.62 200 SAN OBV=171.28 VERTICAL SEP=0.34m	6 300 STM INV=168.02 525 STM OBV=167.665 525 STM OUTER OBV=167.765 VERTICAL SEP=0.255m
2 300 STM INV=170.22 200 SAN OBV=169.88 VERTICAL SEP=0.34m	9 300 STM INV=167.21 200 SAN OBV=166.85 VERTICAL SEP=0.36m
3 300 STM INV=170.09 200 SAN OBV=169.78 VERTICAL SEP=0.31m	10 300 STM INV=166.49 525 STM OBV=166.305 525 STM OUTER OBV=166.405 VERTICAL SEP=0.085m
4 300 STM INV=168.62 200 SAN OBV=168.32 VERTICAL SEP=0.30m	11 300 STM INV=165.76 200 SAN OBV=165.36 VERTICAL SEP=0.40m
5 200 SAN INV=168.38 300 STM OBV=167.97 VERTICAL SEP=0.41m	12 200 SAN INV=166.31 300 STM OBV=165.17 VERTICAL SEP=1.14m
6 300 STM INV=169.21 200 SAN OBV=168.80 VERTICAL SEP=0.41m	13 250 STM INV=165.80 300 STM OBV=165.14 VERTICAL SEP=0.66m
7 300 STM INV=168.64 200 SAN OBV=167.50 VERTICAL SEP=1.14m	14 250 STM INV=165.83 200 SAN OBV=164.36 VERTICAL SEP=1.47m
	15 300 STM INV=164.04 EX.200 SAN OBV=161.02 VERTICAL SEP=3.02m

LEGEND

- PROPOSED STORM SEWER (<750Ø)
- PROPOSED STORM SEWER (>=750Ø)
- PROPOSED STORM MANHOLE (OPSD 701.010 - 701.012) (SIZE AS SHOWN)
- PROPOSED DOUBLE CATCHBASIN MANHOLE (OPSD 701.010) (SIZE AS SHOWN)
- PROPOSED STORM CATCHBASIN MANHOLE(OPSD 701.011 / 703.021) (SIZE AS SHOWN)
- PROPOSED CATCHBASIN (OPSD 705.010)
- PROPOSED DOUBLE CATCHBASIN (OPSD 705.020)
- EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING STORM CATCHBASIN MANHOLE
- EXISTING CATCHBASIN
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY MANHOLE (OPSD 701.010) (SIZE AS SHOWN)
- EXISTING SANITARY SEWER
- EXISTING SANITARY MANHOLE
- PROPOSED WATERMAIN
- PROPOSED HYDRANT AND VALVE
- PROPOSED VALVE AND BOX
- EXISTING WATERMAIN
- EXISTING HYDRANT
- EXISTING VALVE AND BOX
- PROPOSED SUBDRAIN BENEATH SWALE AS PER DETAILS ON SDP-2
- PROPOSED SWALE BOTTOM
- PIPE CROSSING

REVISION BLOCK

#	DATE	DESCRIPTION
1	04/14/23	ISSUED FOR SPA
2	12/04/25	ISSUED FOR SPA

REGISTERED PROFESSIONAL ENGINEER — B.JACKSON 100210382 — DEC. 4, 2025 — PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC. 1415 Plains Rd E Burlington, ON L7L 7A9

NORTH ARROW

KEY PLAN N.T.S — SITE — TAUNTON RD — BURKHOLDER DR — THIRD CONCESSION RD

SURVEY AND BENCHMARK NOTE

EXISTING TOPOGRAPHIC INFORMATIONS SHOWN ON THIS PLAN ARE BASED ON J.D. BARNES LTD. DRAWING (REF. NO. 25-25-360-00), DATED AUGUST 20, 2025

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING VERTICAL

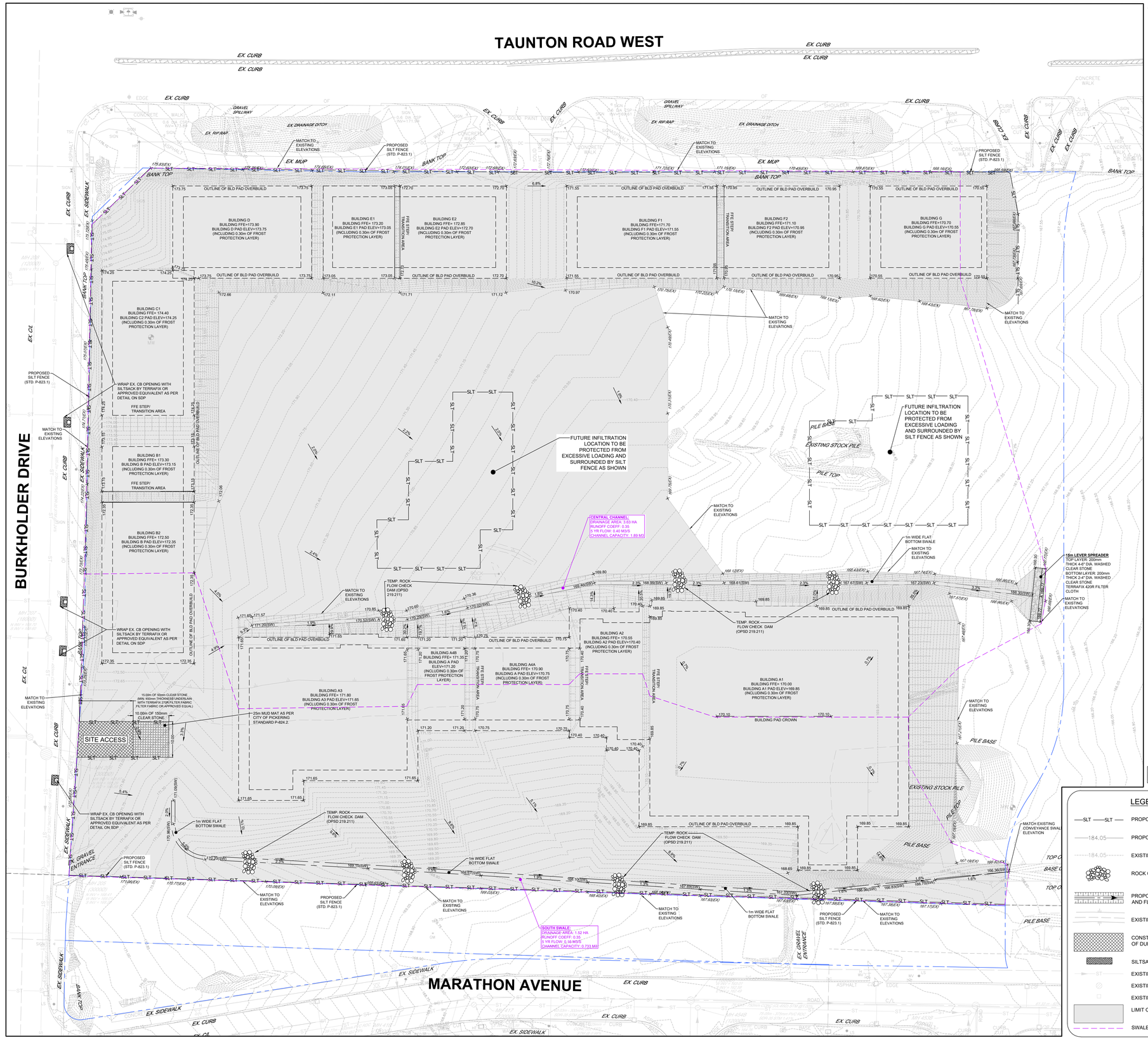
METRIC SCALE 0 5 10 20 — 1:500

SITE SERVICING PLAN

FIELDGATE COMMERCIAL
TAUNTON RD/BURKHOLDER DR.
OPA 2025-001/P - A 06/25 - PRE 023-026/22
PICKERING, ONTARIO

CHECKED BY: BJ
DRAWN BY: RB
PROJECT No: 23810

SSP



EROSION & SEDIMENT CONTROL NOTES

1. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED PRIOR TO THE COMMENCEMENT OF WORK, MAINTAINED THROUGHOUT CONSTRUCTION, AND ONLY REMOVED UPON STABILIZATION OF THE DISTURBED AREAS.
2. SEDIMENT CONTROLS SHOULD BE INSPECTED ON A REGULAR BASIS WITH A MINIMUM FREQUENCY OF:
   - 2.1. ON A WEEKLY BASIS
   - 2.2. BEFORE AND AFTER EVERY RAINFALL EVENT (>12mm)
   - 2.3. AFTER SIGNIFICANT SNOWMELT EVENTS
   - 2.4. MONTHLY DURING INACTIVE PERIODS (> 30 DAYS), AND
   - 2.5. DAILY DURING EXTENDED RAIN OR SNOWMELT PERIODS.
3. REPAIRS TO ESC MEASURES MUST BE COMPLETED IN A TIMELY MANNER TO PREVENT SEDIMENT MIGRATION.
4. ADDITIONAL MATERIALS SUCH AS CLEAR STONE (12mm OR GREATER), FILTER FABRIC, PUMPS, HOSES AND SILTSOXX TO BE KEPT ONSITE AT ALL TIMES FOR CONDUCTING REPAIRS TO SEDIMENT CONTROL MEASURES.
5. ALL DISTURBED AREAS THAT WILL BE LEFT INACTIVE FOR MORE THAN THIRTY (30) DAYS ARE TO BE STABILIZED WITH THE EXCEPTION OF THE PREGRADED AREAS WHERE DRAINAGE IS COLLECTED IN AN APPROPRIATE EROSION CONTROL SYSTEM (IE. POND, SEDIMENT BASIN).
6. ENGINEERED CHANGES TO THE ESC MEASURES MAY BE NEEDED AS SITE CONDITIONS CHANGE THROUGHOUT THE CONSTRUCTION PROCESS. THESE UPDATES MUST REFLECT BEST MANAGEMENT PRACTICES TO CONTROL SEDIMENT CONTROL AND EROSION ONSITE AND SHOULD BE COMPLETED BASED ON DIRECTION FROM THE SITE ENGINEER. ADDITIONAL MEASURES MAY BE REQUIRED AS DIRECTED BY AN ENGINEER THROUGHOUT THE CONSTRUCTION PROCESS.
7. REFUELING IS TO TAKE PLACE ONLY WITHIN DESIGNATED AREAS AND SHALL BE A MINIMUM OF THIRTY METRES FROM ANY WATERCOURSE OR ENVIRONMENTALLY SENSITIVE AREA.
8. SILT CLEANUP EQUIPMENT SUCH AS ABSORPTIVE MEDIA IS TO BE MAINTAINED ON-SITE FOR IMMEDIATE USE IN THE EVENT OF A SPILL.
9. THE CONTRACTOR WILL BE RESPONSIBLE FOR CLEAN-UP AND RESTORATION, INCLUDING ALL COSTS, DUE TO THE RELEASE OF SEDIMENT FROM THE SITE.
10. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS (EG. ROAD OCCUPANCY PERMIT, ACCESS PERMIT, ETC).
11. SPILLED OR TRACKED MATERIALS FROM THE CONTRACTOR'S HAULING VEHICLES ON ROADS WILL BE CLEANED UP AND THE SITE WILL BE LEFT IN A NEAT CONDITION AT THE END OF EACH WORKING DAY. THE CONTRACTOR WILL ARRANGE FOR OFF-SITE DISPOSAL OF ALL WASTE MATERIAL AND RUBBISH IN A MANNER THAT COMPLIES WITH ALL LAWS AND REGULATIONS.
12. SECONDARY CONTAINMENT IS REQUIRED FOR ALL STATIONARY NON-SELF-PROPELLED PETROLEUM FILLED EQUIPMENT (I.E. PUMPS, GENERATORS, ETC.)
13. THE CONTRACTOR WILL KEEP THE SITE FREE FROM ACCUMULATIONS OF WASTE MATERIALS, SURPLUS FILL, TOPSOIL AND ALL DEBRIS SUCH AS BOULDERS, BROKEN ASPHALT, BROKEN CONCRETE OR UNSUITABLE EARTH MATERIALS.
14. PROVIDE TERRAFIX SILT SACK (OR APPROVED EQUIVALENT) ON ANY EXISTING OR PROPOSED CATCH BASINS / CATCHBASIN MANHOLES WITHIN THE INFLUENCE OF THE CONSTRUCTION REFER TO DETAIL ON SD..
15. SEDIMENT TO BE REMOVED FROM THE SEDIMENT BASINS BEFORE IT IS 25% FULL AND FROM SILT FENCE BEFORE IT IS 33% FULL.
16. SLOPE TRACKING TO BE USED AS NEEDED WHERE EROSIVE ACTIVITIES ARE OBSERVED AND ON SLOPES IN EXCESS OF 3:1. SEE TRACKING DETAIL ON DWG SDP. MULCHING, SEEDING, OR EROSION BLANKETS MAY BE REQUIRED FOR FURTHER STABILIZATION.
17. ALL STOCKPILE AREAS LEFT EXPOSED FOR MORE THAN 30 DAYS SHALL BE STABILIZED WITH APPROPRIATE NON-INVASIVE SPECIES. WINTER CONTINGENCY MEASURES SHALL BE IMPLEMENTED AS EROSION CONTROL FOR APPROPRIATE STABILIZATION OUTSIDE THE GROWING SEASON.
18. DUST CONTROL IS TO BE PROVIDED AS REQUIRED THROUGHOUT THE DURATION OF THE PROJECT TO PREVENT SIGNIFICANT DUST WITHIN THE AIR DURING CONSTRUCTION.
19. GOOD HOUSEKEEPING PRACTICES ARE TO BE FOLLOWED ON SITE DURING CONSTRUCTION AND MONITORED ON A DAILY BASIS. THIS INCLUDES, BUT IS NOT LIMITED TO:
   - 19.1. APPROPRIATE STORAGE AND DISPOSAL OF CONSTRUCTION MATERIALS,
   - 19.2. APPROPRIATE STORAGE AND DISPOSAL OF GARBAGE AND DEBRIS,
   - 19.3. APPROPRIATE DISPOSAL OF CONCRETE WASTE TO AN APPROVED DISPOSAL FACILITY, AND
   - 19.4. SECONDARY CONTAINMENT OF PETROLEUM-BASED PRODUCTS (JERRY CANS, OIL, ETC.).

CITY OF PICKERING - EROSION AND SEDIMENT CONTROL GENERAL NOTES

1. PRIOR TO COMMENCEMENT OF ANY ON-SITE WORK/TOPSOIL STRIPPING, EROSION AND SEDIMENT CONTROL (ESC) MEASURERS, AS PER APPROVED EROSION & SEDIMENT CONTROL PLAN, MUST BE INSTALLED TO PREVENT SURFACE RUNOFF FROM LEAVING THE SITE "UNTREATED". ALL ESC MEASURES ARE TO BE MAINTAINED UNTIL THE SITE HAS BEEN STABILIZED.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER INSTALLATION, MAINTENANCE AND REMOVAL OF ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES DURING CONSTRUCTION, AS DIRECTED BY THE ENGINEER OR CITY OF PICKERING.
3. SEDIMENT CONTROL FENCE TO USE GEOTEXTILE WITH WEAVE DENSITY OF 270R TERRAFIX OR EQUIVALENT.
4. ALL EXPOSED SOIL SHALL BE IMMEDIATELY STABILIZED AS DIRECTED BY THE ENGINEER OR CITY OF PICKERING.
5. CHECK DAMS ARE TO BE USED IN ANY TEMPORARY DRAINAGE SWALES REQUIRED DURING CONSTRUCTION PERIOD.
6. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MAY BE REQUIRED AND SHALL BE DETERMINED BY THE ENGINEER OR CITY OF PICKERING.
7. ALL SWALES ARE TO BE STABILIZED PRIOR TO USE.
8. INSPECTION OF THE PROPOSED EROSION AND SEDIMENT CONTROL MEASURES WILL OCCUR ON A WEEKLY BASIS, AFTER RAINFALL EVENTS EXCEEDING 10mm OR AFTER RAPID SNOW MELT EVENTS AND DAILY DURING EXTENDED RAIN OR SNOW MELT PERIODS. THE SILT CONTROL FENCE MUST BE INSPECTED FOR RIPS OR TEARS, BROKEN STAKES, BLOW OUTS AND ACCUMULATION OF SEDIMENT. THE SILT CONTROL FENCE MUST BE FIXED AND/OR REPLACED IMMEDIATELY WHEN DAMAGED. ACCUMULATED SEDIMENT MUST BE REMOVED FROM THE SILT CONTROL FENCE WHEN ACCUMULATION REACHES 50% OF THE HEIGHT OF THE FENCE.
9. ROCK CHECK DAMS ARE O BE CLEANED OF ALL ACCUMULATED SEDIMENT AS SOON AS SEDIMENT HAS ACCUMULATED TO A DEPTH GREATER THAN 50% OF ALL THE UPSTREAM CHECK DAMS.
10. CLEANING AND REPAIR OF MUD MATS AND ANY OTHER TEMPORARY SEDIMENT CONTROL MEASURES SHALL BE DONE AS NECESSARY THROUGH REGULAR INSPECTION OR AS DIRECTED BY THE ENGINEER OR CITY OF PICKERING. ALL DAMAGED ESC MEASURERS SHALL BE REPAIRED AND/OR REPLACED WITHIN 48 HOURS OF INSPECTION.
11. MATERIAL TO REPAIR DAMAGED ESC MEASURES MUST BE KEPT ON-SITE AT ALL TIMES.
12. THE ESC STRATEGIES ON THESE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO PREVENT SEDIMENT RELEASES. FAILED ESC MEASURES MUST BE REPAIRED IMMEDIATELY.
13. NO CONSTRUCTION ACTIVITY OR MACHINERY SHALL INTRUDE BEYOND THE SITE CONTROL FENCE OR LIMIT OF DEVELOPMENT. ALL CONSTRUCTION VEHICLES SHALL LEAVE THE SITE AT DESIGNATED LOCATION(S) AS SHOWN ON THE PLAN. ALL MATERIALS AND EQUIPMENT SHALL BE STORED ON SITE IN A DESIGNATED AREA. NO MATERIAL OR EQUIPMENT SHALL BE STORED ON THE MUNICIPAL RIGHT OF WAY. NO CONSTRUCTION VEHICLES WILL PARK ON MUNICIPAL ROADS.
14. SERVICING OF CONSTRUCTION EQUIPMENT ON SITE IS PROHIBITED.
15. THE CONTRACTOR MUST CLEAN ADJACENT ROADS ON A REGULAR BASIS. THE ROAD SHALL BE, AT A MINIMUM SCRAPED DAILY AND FLUSHED (IF NECESSARY) ON FRIDAY EVENINGS OR SATURDAY MORNINGS.
16. DUST CONTROL TO BE REVIEWED DAILY. WATER TRUCK OR CALCIUM CHLORIDE IS TO BE PROVIDED ON-SITE AND HAUL ROADS/WORKING AREAS ARE TO BE TREATED AS REQUIRED TO ENSURE THAT DUST IS CONTROLLED ON-SITE.
17. AT THE END OF CONSTRUCTION PERIOD, ACCUMULATED SEDIMENT IS TO BE REMOVED OFF SITE PRIOR TO THE REMOVAL OF SILT FENCE.
18. ALL LITTER AND DEBRIES SHALL BE MONITORED AND DISPOSED OF DAILY OR AS NECESSARY THROUGH REGULAR INSPECTION.
19. ALL TOPSOIL STOCKPILES SHALL BE SURROUNDED WITH SEDIMENT CONTROL FENCE AND STABILIZED WITH SEED MIX AS PER THIS DRAWING.
20. DISTURBED AREAS ARE TO BE MINIMIZED TO THE EXTEND POSSIBLE AND STABILIZED AS THE WORK PROGRESSES. ANY AREA EXPOSED FOR MORE THAN 30 DAYS WILL BE STABILIZED.

TRCA - STANDARD NOTES

1. EROSION AND SEDIMENT CONTROL (ESC) MEASURES WILL BE IMPLEMENTED PRIOR TO, AND MAINTAINED DURING THE CONSTRUCTION PHASES, TO PAVEMENT ENTRY OF SEDIMENT INTO THE WATER . ALL DAMAGED EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE PREPAID AND/OR REPLACED WITHIN 48 HOURS OF THE INSPECTION.
2. DISTURBED AREAS WILL BE MINIMIZED TO THE EXTENT POSSIBLE. ANY AREAS LEFT UNDISTURBED FOR A PERIOD LONGER THAN 30 DAYS TO BE TEMPORARILY OR PERMANENTLY STABILIZED AND RESTORED AS THE WORK PROGRESSES , UTILIZING TERRASEEDING.
3. ALL IN-WATER AND NEAR WATER WORKS WILL BE CONDUCTED IN DRY WITH APPROPRIATE EROSION AND SEDIMENT CONTROLS.
4. THE EROSION AND SEDIMENT CONTROL STRATEGIES OUTLINED ON THE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO MINIMIZE SEDIMENT LADEN RUNOFF FROM LEAVING THE WORK AREAS. IF THE PRESCRIBED MEASURES ON THE PLANS ARE NOT EFFECTIVE IN PREVENTING THE RELEASE OF A DELETERIOUS SUBSTANCE, INCLUDING SEDIMENT, THEN ALTERNATIVE MEASURES MUST BE IMPLEMENTED IMMEDIATELY TO MINIMIZE POTENTIAL ECOLOGICAL IMPACTS. TRCA ENFORCEMENT OFFICER SHOULD BE IMMEDIATELY CONTACTED. ADDITIONAL ESC MEASURES TO BE KEPT ON SITE AND USED AS NECESSARY.
5. AN ENVIRONMENTAL MONITOR WILL ATTEND THE SITE TO INSPECT ALL NEW CONTROLS, AS WELL AS ON A REGULAR BASIS, OR FOLLOWING RAIN/SNOWMELT EVENT, TO MONITOR ALL WORKS RELATED TO EROSION AND SEDIMENT CONTROL, DEWATERING OR UNWATERING RESTORATION AND IN- OR NEAR-WATER WORKS. SHOULD CONCERNS ARISE ON THE SITE THE ENVIRONMENTAL MONITOR WILL CONTACT THE TRCA ENFORCEMENT OFFICER AS WELL AS AS THE PROPONENT.
6. ALL ACTIVITIES INCLUDING MAINTENANCE PROCEDURES, WILL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER. VEHICULAR REFUELING AND MAINTENANCE WILL BE CONDUCTED A MINIMUM OF 30 METERS FROM WATER.
7. THE PROPONENT/ CONTRACTOR SHALL MONITOR THE WEATHER SEVERAL DAYS IN ADVANCE OF THE ONSET OF THE PROJECT TO ENSURE THAT THE WORKS WILL BE CONDUCTED DURING FAVORABLE WEATHER CONDITIONS. SHOULD AND UNEXPECTED STORM ARISE, THE CONTRACTOR WILL REMOVE ALL UNFIXED ITEMS FROM THE REGIONAL STORM FLOOD PLAIN THE WOULD HAVE THE POTENTIAL TO CAUSE A SPILL OR AS OBSTRUCTION TO FLOW, E.G., FUEL TANKS, PORTA-POTTIES, MACHINERY, EQUIPMENT, CONSTRUCTION MATERIALS, ETC.
8. ALL DEWATERING/UNWATERING SHALL BE TREATED AND RELEASED TO THE ENVIRONMENT AT LEAST 30 METERS FROM A WATERCOURSE OR WETLAND AND ALLOWED TO DRAIN THROUGH A WELL VEGETATED AREAS. NO DEWATERING EFFLUENT SHALL BE SENT DIRECTLY TO ANY WATERCOURSE, WETLAND OR FOREST, OR ALLOWED TO DRAIN ONTO DISTURBED SOILS WITH THE WORK AREA. THESE CONTROL MEASURES SHALL BE MONITORED FOR THE EFFECTIVENESS AND MAINTAINED OR REVISED TO MEET THE OBJECTIVE OF PREVENTING THE RELEASE OF SEDIMENT LADEN WATER.
9. IN ORDER TO COMPLY WITH THE MIGRATORY BIRDS CONVICTION ACT, TRCA RECOMMENDS THAT TREE REMOVALS BE COMPLETED BETWEEN AUGUST 1 AND APRIL 1.
10. PLEASE NOTIFY TRCA ENFORCEMENT OFFICER AND TRCA PROJECT MANAGER 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
11. AN ENVIRONMENTAL MONITOR WILL BE ON SITE, AND PROVIDE ADVICE, TO ENSURE THAT ACTIVITIES THAT SHOULD HAVE A NEGATIVE IMPACT TO THE NATURAL ENVIRONMENT ARE EFFECTIVELY MITIGATED AS CONSTRUCTION PROCEEDS. THE ENVIRONMENTAL MONITOR SHALL NOTIFY THE TRCA ENFORCEMENT OFFICER AND PROJECT MANAGER IF AN ISSUE ARISE.

SEQUENCE OF MAJOR CONSTRUCTION ACTIVITIES

1. INSTALL SILT FENCING AROUND THE SITE PERIMETER AS SHOWN ON THIS PLAN PER CITY OF PICKERING STANDARD DETAIL P-823.1 AS WELL AS THE SEDIMENT PROTECTION MEASURES AS SHOWN ON THIS PLAN.
2. INSTALL TEMPORARY CONSTRUCTION MUDMAT AT NORTHWEST CORNER OF SITE AS PER DETAIL ON SDP.
3. BUILD TEMPORARY BERM ALONG EAST SIDE OF THE SITE TO PROPOSED GRADES SHOWN ON THIS PLAN.
4. BUILDING 1m WIDE FLAT BOTTOM CUT-OFF SWALES WITH ROCK CHECK DAMS AT PROPOSED GRADES SHOWN ON THIS PLAN.
5. PLACE APPROVED FILL AND COMPACT BUILDING PAD TO SUBGRADE ELEVATIONS SHOWN ON THIS PLAN. CONFIRM FULLY TESTED CERTIFICATION OF BUILDING BY GEOTECHNICAL ENGINEER OF RECORD.
6. GRADE THE REST OF THE SITE AS SHOWN ON THIS PLAN AND MONITOR EROSION AND SEDIMENT TRAPS REGULARLY TO ENSURE THEIR FUNCTIONS ARE MAINTAINED.
7. COMPLETE AS-BUILT SURVEY WORK.

PERMIT CONDITIONS

1. ALL PERMIT HOLDERS SHALL:
   - A) NOTIFY THE DIRECTOR, OR HIS/HER DESIGNATE A MINIMUM OF TWO BUSINESS DAYS PRIOR TO THE COMMENCEMENT OR RECOMMENCEMENT OF ANY LAND DISTURBING ACTIVITY;
   - B) OBTAIN PERMISSION IN WRITING FROM THE DIRECTOR OR HIS/HER DESIGNATE PRIOR TO MODIFYING ANY ELEMENT OF THE EROSION AND SEDIMENT CONTROL PLAN;
   - C) INSTALL ALL CONTROL MEASURES AS IDENTIFIED IN THE APPROVED EROSION AND SEDIMENT CONTROL PLAN;
   - D) MAINTAIN ALL ROAD DRAINAGE SYSTEMS, STORMWATER DRAINAGE SYSTEMS, CONTROL MEASURES AND OTHER FACILITIES IDENTIFIED IN THE EROSION AND SEDIMENT CONTROL PLAN;
   - E) PROMPTLY REPAIR ANY SILTATION OR EROSION DAMAGE TO ADJOINING SURFACES AND DRAINAGE WAYS RESULTING FROM LAND DEVELOPING OR DISTURBING ACTIVITIES;
   - F) INSPECT THE SEDIMENTATION CONTROL MEASURES AT LEAST ONCE PER WEEK AND AFTER EACH RAINFALL OF AT LEAST ONE CENTIMETER AND MAKE NEEDED REPAIRS;
   - G) ALLOW CITY OFFICERS OR AGENTS OF THE CITY TO ENTER THE SITE FOR THE PURPOSE OF INSPECTING FOR COMPLIANCE WITH THE EROSION AND SEDIMENT CONTROL PLAN OR PERFORMING ANY WORK NECESSARY TO BRING THE SITE INTO COMPLIANCE WITH THE EROSION AND SEDIMENT CONTROL PLAN;
   - H) MAINTAIN A COPY OF THE PERMIT ON THE SITE;
   - I) NOTIFY ALL SUB-CONTRACTORS AND SUPPLIERS OF APPROVED ACCESS ROUTES TO THE SITE AND ENSURE COMPLIANCE WITH THESE INSTRUCTIONS;
   - J) MAINTAIN ALL ROADS IN SAME OR BETTER CONDITION THAN EXISTED PRIOR TO THE COMMENCEMENT OF THE WORK AND KEEP ALL ROADS FREE FROM ANY MATERIALS OR EQUIPMENT FROM THE WORK SET OUT IN THE PERMIT; AND
   - K) ENSURE THAT NO CONSTRUCTION MACHINERY IS OPERATED IN CONTRAVENTION OF BY-LAW NUMBER 3621, AS AMENDED, (NOISE BY-LAW) OR ANY SUCCESSOR THERETO.
2. THE CITY:
   - A) UPON THE FAILURE BY THE PERMIT HOLDER TO COMPLETE ALL OR PART OF THE WORKS IN THE TIME STIPULATED IN THE EROSION AND SEDIMENT CONTROL PLAN, THE CITY MAY DRAW THE APPROPRIATE AMOUNT FROM THE SECURITIES POSTED AND USE THE FUNDS TO ARRANGE FOR THE COMPLETION OF THE SAID WORKS, OR ANY PART THEREOF;
   - B) UPON FAILURE BY THE PERMIT HOLDER TO INSTALL, REPAIR OR MAINTAIN A SPECIFIC PART OF THE WORKS AS REQUESTED BY THE CITY, AND IN THE TIME REQUESTED, THE CITY MAY AT ANY TIME AUTHORIZE THE USE OF ALL OR PART OF THE SECURITIES TO PAY THE COST OF ANY PART OF THE WORKS IT MAY IN ITS OR THEIR ABSOLUTE DISCRETION DEEM NECESSARY; AND
   - C) IN THE CASE OF EMERGENCY REPAIRS OR CLEAN-UP, THE CITY MAY UNDERTAKE THE NECESSARY WORKS AT THE EXPENSE OF THE PERMIT HOLDER AND REIMBURSE ITSELF OUT OF SECURITIES POSTED BY THE APPLICANT.

24 HOUR CONTACTS:
GIANMARCO TAVANIELLO 416-989-8104
BRIAN TILLEY (416)717-8319

LEGEND

- SLT SLT — PROPOSED SILT FENCE
- 184.05 — PROPOSED CONTOUR
- 184.05 — EXISTING CONTOUR
- ROCK CHECK DAM
- PROPOSED INTERCEPTOR SWALE AND FLOW DIRECTION AS PER (OPSD 219.211)
- EXISTING SWALE TO REMAIN
- CONSTRUCTION ENTRANCE AS PER REGION OF DURHAM STANDARD S-301.050
- SILTSACK INLET SEDIMENT CONTROL DEVICE
- EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING CATCH BASIN
- LIMIT OF REGRADING
- SWALE TRIBUTARY BOUNDARY

REVISION BLOCK

#	DATE	DESCRIPTION
1	04/14/25	ISSUED FOR SPA
2	12/04/25	ISSUED FOR SPA

REGISTERED PROFESSIONAL ENGINEER
B.JACKSON
100210382
DEC. 4, 2025
PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC.
1235 North Service Rd. #271
Burlington, ON L7L 7A9

NORTH ARROW

SURVEY AND BENCHMARK NOTE

EXISTING TOPOGRAPHIC INFORMATIONS SHOWN ON THIS PLAN ARE BASED ON J.D. BARNES LTD. DRAWING (REF. NO. 25-25-360-00), DATED AUGUST 20, 2025

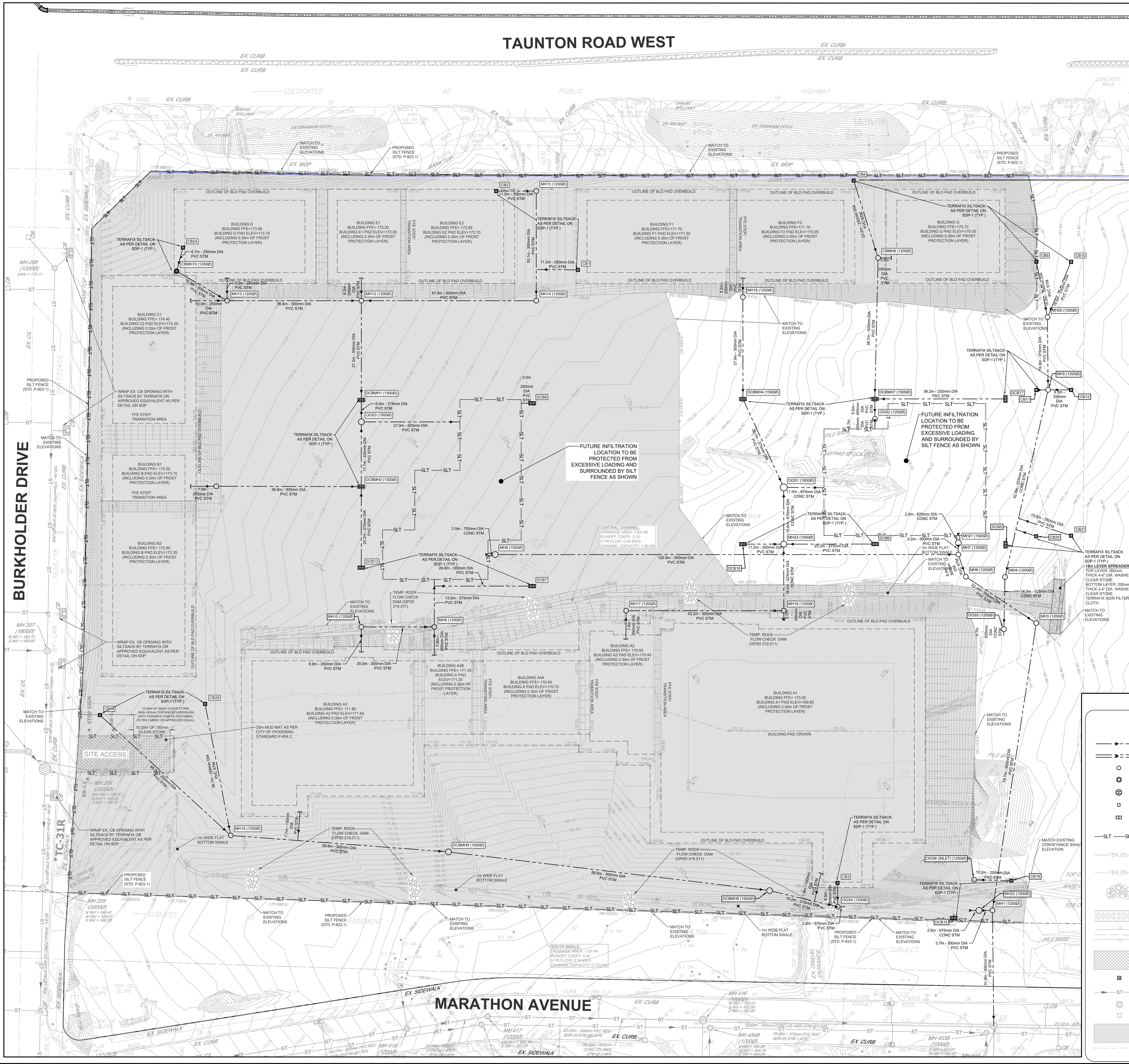
ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING VERTICAL

METRIC SCALE
0 5 10 20
1:500

EROSION AND SEDIMENT CONTROL PLAN - 1
FIELDGATE COMMERCIAL
TAUNTON RD/BURKHOLDER DR.
OPA 2025-001/P - A 06/25 - PRE 023-02622
PICKERING, ONTARIO CITY OF PICKERING FILE: FB 01-2025

PROJECT No: 23810 | DRAWN BY: RB | CHECKED BY: BJ

ESC-1



LEGEND

- PROPOSED STORM SEWER (<750Ø)
- PROPOSED STORM SEWER (>=750Ø)
- PROPOSED STORM MANHOLE
- PROPOSED DOUBLE CATCHBASIN MANHOLE
- PROPOSED STORM CATCHBASIN MANHOLE
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- PROPOSED CONTOUR
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3. REPAIRS TO ESC MEASURES MUST BE COMPLETED IN A TIMELY MANNER TO PREVENT SEDIMENT MIGRATION.
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5. ALL DISTURBED AREAS THAT WILL BE LEFT INACTIVE FOR MORE THAN THIRTY (30) DAYS ARE TO BE STABILIZED WITH THE EXCEPTION OF THE PREGRADED AREAS WHERE DRAINAGE IS COLLECTED IN AN APPROPRIATE EROSION CONTROL SYSTEM (IE. POND, SEDIMENT BASIN).
6. ENGINEERED CHANGES TO THE ESC MEASURES MAY BE NEEDED AS SITE CONDITIONS CHANGE THROUGHOUT THE CONSTRUCTION PROCESS. THESE UPDATES MUST REFLECT BEST MANAGEMENT PRACTICES TO CONTROL SEDIMENT CONTROL AND EROSION ONSITE AND SHOULD BE COMPLETED BASED ON DIRECTION FROM THE SITE ENGINEER. ADDITIONAL MEASURES MAY BE REQUIRED AS DIRECTED BY AN ENGINEER THROUGHOUT THE CONSTRUCTION PROCESS.
7. REFUELING IS TO TAKE PLACE ONLY WITHIN DESIGNATED AREAS AND SHALL BE A MINIMUM OF THIRTY METRES FROM ANY WATERCOURSE OR ENVIRONMENTALLY SENSITIVE AREA.
8. SILT CLEANUP EQUIPMENT SUCH AS ABSORPTIVE MEDIA IS TO BE MAINTAINED ON-SITE FOR IMMEDIATE USE IN THE EVENT OF A SPILL.
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11. SPILLED OR TRACKED MATERIALS FROM THE CONTRACTOR'S HAULING VEHICLES ON ROADS WILL BE CLEANED UP AND THE SITE WILL BE LEFT IN A NEAT CONDITION AT THE END OF EACH WORKING DAY. THE CONTRACTOR WILL ARRANGE FOR OFF-SITE DISPOSAL OF ALL WASTE MATERIAL AND RUBBISH IN A MANNER THAT COMPLIES WITH ALL LAWS AND REGULATIONS.
12. SECONDARY CONTAINMENT IS REQUIRED FOR ALL STATIONARY NON-SELF-PROPELLED PETROLEUM FILLED EQUIPMENT (I.E. PUMPS, GENERATORS, ETC.)
13. THE CONTRACTOR WILL KEEP THE SITE FREE FROM ACCUMULATIONS OF WASTE MATERIALS, SURPLUS FILL, TOPSOIL AND ALL DEBRIS SUCH AS BOULDERS, BROKEN ASPHALT, BROKEN CONCRETE OR UNSUITABLE EARTH MATERIALS.
14. PROVIDE TERRAFIX SILT SACK (OR APPROVED EQUIVALENT) ON ANY EXISTING OR PROPOSED CATCH BASINS / CATCHBASIN MANHOLES WITHIN THE INFLUENCE OF THE CONSTRUCTION REFER TO DETAIL ON SD..
15. SEDIMENT TO BE REMOVED FROM THE SEDIMENT BASINS BEFORE IT IS 25% FULL AND FROM SILT FENCE BEFORE IT IS 33% FULL.
16. SLOPE TRACKING TO BE USED AS NEEDED WHERE EROSIVE ACTIVITIES ARE OBSERVED AND ON SLOPES IN EXCESS OF 3:1. SEE TRACKING DETAIL ON DWG SDP. MULCHING, SEEDING, OR EROSION BLANKETS MAY BE REQUIRED FOR FURTHER STABILIZATION.
17. ALL STOCKPILE AREAS LEFT EXPOSED FOR MORE THAN 30 DAYS SHALL BE STABILIZED WITH APPROPRIATE NON-INVASIVE SPECIES. WINTER CONTINGENCY MEASURES SHALL BE IMPLEMENTED AS EROSION CONTROL FOR APPROPRIATE STABILIZATION OUTSIDE THE GROWING SEASON.
18. DUST CONTROL IS TO BE PROVIDED AS REQUIRED THROUGHOUT THE DURATION OF THE PROJECT TO PREVENT SIGNIFICANT DUST WITHIN THE AIR DURING CONSTRUCTION.
19. GOOD HOUSEKEEPING PRACTICES ARE TO BE FOLLOWED ON SITE DURING CONSTRUCTION AND MONITORED ON A DAILY BASIS. THIS INCLUDES, BUT IS NOT LIMITED TO:
   - 19.1. APPROPRIATE STORAGE AND DISPOSAL OF CONSTRUCTION MATERIALS,
   - 19.2. APPROPRIATE STORAGE AND DISPOSAL OF GARBAGE AND DEBRIS,
   - 19.3. APPROPRIATE DISPOSAL OF CONCRETE WASTE TO AN APPROVED DISPOSAL FACILITY, AND
   - 19.4. SECONDARY CONTAINMENT OF PETROLEUM-BASED PRODUCTS (JERRY CANS, OIL, ETC.).

CITY OF PICKERING - EROSION AND SEDIMENT CONTROL GENERAL NOTES

1. PRIOR TO COMMENCEMENT OF ANY ON-SITE WORK/TOPSOIL STRIPPING, EROSION AND SEDIMENT CONTROL (ESC) MEASURERS, AS PER APPROVED EROSION & SEDIMENT CONTROL PLAN, MUST BE INSTALLED TO PREVENT SURFACE RUNOFF FROM LEAVING THE SITE "UNTREATED". ALL ESC MEASURES ARE TO BE MAINTAINED UNTIL THE SITE HAS BEEN STABILIZED.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER INSTALLATION, MAINTENANCE AND REMOVAL OF ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES DURING CONSTRUCTION, AS DIRECTED BY THE ENGINEER OR CITY OF PICKERING.
3. SEDIMENT CONTROL FENCE TO USE GEOTEXTILE WITH WEAVE DENSITY OF 270R TERRAFIX OR EQUIVALENT.
4. ALL EXPOSED SOIL SHALL BE IMMEDIATELY STABILIZED AS DIRECTED BY THE ENGINEER OR CITY OF PICKERING.
5. CHECK DAMS ARE TO BE USED IN ANY TEMPORARY DRAINAGE SWALES REQUIRED DURING CONSTRUCTION PERIOD.
6. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MAY BE REQUIRED AND SHALL BE DETERMINED BY THE ENGINEER OR CITY OF PICKERING.
7. ALL SWALES ARE TO BE STABILIZED PRIOR TO USE.
8. INSPECTION OF THE PROPOSED EROSION AND SEDIMENT CONTROL MEASURES WILL OCCUR ON A WEEKLY BASIS, AFTER RAINFALL EVENTS EXCEEDING 10mm OR AFTER RAPID SNOW MELT EVENTS AND DAILY DURING EXTENDED RAIN OR SNOW MELT PERIODS. THE SILT CONTROL FENCE MUST BE INSPECTED FOR RIPS OR TEARS, BROKEN STAKES, BLOW OUTS AND ACCUMULATION OF SEDIMENT. THE SILT CONTROL FENCE MUST BE FIXED AND/OR REPLACED IMMEDIATELY WHEN DAMAGED. ACCUMULATED SEDIMENT MUST BE REMOVED FROM THE SILT CONTROL FENCE WHEN ACCUMULATION REACHES 50% OF THE HEIGHT OF THE FENCE.
9. ROCK CHECK DAMS ARE O BE CLEANED OF ALL ACCUMULATED SEDIMENT AS SOON AS SEDIMENT HAS ACCUMULATED TO A DEPTH GREATER THAN 50% OF ALL THE UPSTREAM CHECK DAMS.
10. CLEANING AND REPAIR OF MUD MATS AND ANY OTHER TEMPORARY SEDIMENT CONTROL MEASURES SHALL BE DONE AS NECESSARY THROUGH REGULAR INSPECTION OR AS DIRECTED BY THE ENGINEER OR CITY OF PICKERING. ALL DAMAGED ESC MEASURERS SHALL BE REPAIRED AND/OR REPLACED WITHIN 48 HOURS OF INSPECTION.
11. MATERIAL TO REPAIR DAMAGED ESC MEASURES MUST BE KEPT ON-SITE AT ALL TIMES.
12. THE ESC STRATEGIES ON THESE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO PREVENT SEDIMENT RELEASES. FAILED ESC MEASURES MUST BE REPAIRED IMMEDIATELY.
13. NO CONSTRUCTION ACTIVITY OR MACHINERY SHALL INTRUDE BEYOND THE SITE CONTROL FENCE OR LIMIT OF DEVELOPMENT. ALL CONSTRUCTION VEHICLES SHALL LEAVE THE SITE AT DESIGNATED LOCATION(S) AS SHOWN ON THE PLAN. ALL MATERIALS AND EQUIPMENT SHALL BE STORED ON SITE IN A DESIGNATED AREA. NO MATERIAL OR EQUIPMENT SHALL BE STORED ON THE MUNICIPAL RIGHT OF WAY. NO CONSTRUCTION VEHICLES WILL PARK ON MUNICIPAL ROADS.
14. SERVICING OF CONSTRUCTION EQUIPMENT ON SITE IS PROHIBITED.
15. THE CONTRACTOR MUST CLEAN ADJACENT ROADS ON A REGULAR BASIS. THE ROAD SHALL BE, AT A MINIMUM SCRAPED DAILY AND FLUSHED (IF NECESSARY) ON FRIDAY EVENINGS OR SATURDAY MORNINGS.
16. DUST CONTROL TO BE REVIEWED DAILY. WATER TRUCK OR CALCIUM CHLORIDE IS TO BE PROVIDED ON-SITE AND HAUL ROADS/WORKING AREAS ARE TO BE TREATED AS REQUIRED TO ENSURE THAT DUST IS CONTROLLED ON-SITE.
17. AT THE END OF CONSTRUCTION PERIOD, ACCUMULATED SEDIMENT IS TO BE REMOVED OFF SITE PRIOR TO THE REMOVAL OF SILT FENCE.
18. ALL LITTER AND DERBIES SHALL BE MONITORED AND DISPOSED OF DAILY OR AS NECESSARY THROUGH REGULAR INSPECTION.
19. ALL TOPSOIL STOCKPILES SHALL BE SURROUNDED WITH SEDIMENT CONTROL FENCE AND STABILIZED WITH SEED MIX AS PER THIS DRAWING.
20. DISTURBED AREAS ARE TO BE MINIMIZED TO THE EXTEND POSSIBLE AND STABILIZED AS THE WORK PROGRESSES. ANY AREA EXPOSED FOR MORE THAN 30 DAYS WILL BE STABILIZED.

TRCA - STANDARD NOTES

1. EROSION AND SEDIMENT CONTROL (ESC) MEASURES WILL BE IMPLEMENTED PRIOR TO, AND MAINTAINED DURING THE CONSTRUCTION PHASES, TO PAVEMENT ENTRY OF SEDIMENT INTO THE WATER . ALL DAMAGED EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE PREPAID AND/OR REPLACED WITHIN 48 HOURS OF THE INSPECTION.
2. DISTURBED AREAS WILL BE MINIMIZED TO THE EXTENT POSSIBLE. ANY AREAS LEFT UNDISTURBED FOR A PERIOD LONGER THAN 30 DAYS TO BE TEMPORARILY OR PERMANENTLY STABILIZED AND RESTORED AS THE WORK PROGRESSES , UTILIZING TERRASEEDING.
3. ALL IN-WATER AND NEAR WATER WORKS WILL BE CONDUCTED IN DRY WITH APPROPRIATE EROSION AND SEDIMENT CONTROLS.
4. THE EROSION AND SEDIMENT CONTROL STRATEGIES OUTLINED ON THE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITIONS CHANGE TO MINIMIZE SEDIMENT LADEN RUNOFF FROM LEAVING THE WORK AREAS. IF THE PRESCRIBED MEASURES ON THE PLANS ARE NOT EFFECTIVE IN PREVENTING THE RELEASE OF A DELETERIOUS SUBSTANCE, INCLUDING SEDIMENT, THEN ALTERNATIVE MEASURES MUST BE IMPLEMENTED IMMEDIATELY TO MINIMIZE POTENTIAL ECOLOGICAL IMPACTS. TRCA ENFORCEMENT OFFICER SHOULD BE IMMEDIATELY CONTACTED. ADDITIONAL ESC MEASURES TO BE KEPT ON SITE AND USED AS NECESSARY.
5. AN ENVIRONMENTAL MONITOR WILL ATTEND THE SITE TO INSPECT ALL NEW CONTROLS, AS WELL AS ON A REGULAR BASIS, OR FOLLOWING RAIN/SNOWMELT EVENT, TO MONITOR ALL WORKS RELATED TO EROSION AND SEDIMENT CONTROL, DEWATERING OR UNWATERING RESTORATION AND IN- OR NEAR-WATER WORKS. SHOULD CONCERNS ARISE ON THE SITE THE ENVIRONMENTAL MONITOR WILL CONTACT THE TRCA ENFORCEMENT OFFICER AS WELL AS THE PROPONENT.
6. ALL ACTIVITIES INCLUDING MAINTENANCE PROCEDURES, WILL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER. VEHICULAR REFUELING AND MAINTENANCE WILL BE CONDUCTED A MINIMUM OF 30 METERS FROM WATER.
7. THE PROPONENT/ CONTRACTOR SHALL MONITOR THE WEATHER SEVERAL DAYS IN ADVANCE OF THE ONSET OF THE PROJECT TO ENSURE THAT THE WORKS WILL BE CONDUCTED DURING FAVORABLE WEATHER CONDITIONS. SHOULD AND UNEXPECTED STORM ARISE, THE CONTRACTOR WILL REMOVE ALL UNFIXED ITEMS FROM THE REGIONAL STORM FLOOD PLAIN THE WOULD HAVE THE POTENTIAL TO CAUSE A SPILL OR AS OBSTRUCTION TO FLOW, E.G., FUEL TANKS, PORTA-POTTIES, MACHINERY, EQUIPMENT, CONSTRUCTION MATERIALS, ETC.
8. ALL DEWATERING/UNWATERING SHALL BE TREATED AND RELEASED TO THE ENVIRONMENT AT LEAST 30 METERS FROM A WATERCOURSE OR WETLAND AND ALLOWED TO DRAIN THROUGH A WELL VEGETATED AREAS. NO DEWATERING EFFLUENT SHALL BE SENT DIRECTLY TO ANY WATERCOURSE, WETLAND OR FOREST, OR ALLOWED TO DRAIN ONTO DISTURBED SOILS WITHIN THE WORK AREA. THESE CONTROL MEASURES SHALL BE MONITORED FOR THE EFFECTIVENESS AND MAINTAINED OR REVISED TO MEET THE OBJECTIVE OF PREVENTING THE RELEASE OF SEDIMENT LADEN WATER.
9. IN ORDER TO COMPLY WITH THE MIGRATORY BIRDS CONVICTION ACT, TRCA RECOMMENDS THAT TREE REMOVALS BE COMPLETED BETWEEN AUGUST 1 AND APRIL 1.
10. PLEASE NOTIFY TRCA ENFORCEMENT OFFICER AND TRCA PROJECT MANAGER 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
11. AN ENVIRONMENTAL MONITOR WILL BE ON SITE, AND PROVIDE ADVICE, TO ENSURE THAT ACTIVITIES THAT SHOULD HAVE A NEGATIVE IMPACT TO THE NATURAL ENVIRONMENT ARE EFFECTIVELY MITIGATED AS CONSTRUCTION PROCEEDS. THE ENVIRONMENTAL MONITOR SHALL NOTIFY THE TRCA ENFORCEMENT OFFICER AND PROJECT MANAGER IF AN ISSUE ARISE.

SEQUENCE OF MAJOR CONSTRUCTION ACTIVITIES

1. INSTALL SILT FENCING AROUND THE SITE PERIMETER AS SHOWN ON THIS PLAN PER CITY OF PICKERING STANDARD DETAIL P-823.1 AS WELL AS THE SEDIMENT PROTECTION MEASURES AS SHOWN ON THIS PLAN.
2. INSTALL TEMPORARY CONSTRUCTION MUDMAT AT NORTHWEST CORNER OF SITE AS PER DETAIL ON SDP.
3. BUILD TEMPORARY BERM ALONG EAST SIDE OF THE SITE TO PROPOSED GRADES SHOWN ON THIS PLAN.
4. BUILDING 1m WIDE FLAT BOTTOM CUT-OFF SWALES WITH ROCK CHECK DAMS AT PROPOSED GRADES SHOWN ON THIS PLAN.
5. PLACE APPROVED FILL AND COMPACT BUILDING PAD TO SUBGRADE ELEVATIONS SHOWN ON THIS PLAN. CONFIRM FULLY TESTED CERTIFICATION OF BUILDING BY GEOTECHNICAL ENGINEER OF RECORD.
6. GRADE THE REST OF THE SITE AS SHOWN ON THIS PLAN AND MONITOR EROSION AND SEDIMENT TRAPS REGULARLY TO ENSURE THEIR FUNCTIONS ARE MAINTAINED.
7. COMPLETE AS-BUILT SURVEY WORK.

PERMIT CONDITIONS

1. ALL PERMIT HOLDERS SHALL:
   - A) NOTIFY THE DIRECTOR, OR HIS/HER DESIGNATE A MINIMUM OF TWO BUSINESS DAYS PRIOR TO THE COMMENCEMENT OR RECOMMENCEMENT OF ANY LAND DISTURBING ACTIVITY;
   - B) OBTAIN PERMISSION IN WRITING FROM THE DIRECTOR OR HIS/HER DESIGNATE PRIOR TO MODIFYING ANY ELEMENT OF THE EROSION AND SEDIMENT CONTROL PLAN;
   - C) INSTALL ALL CONTROL MEASURES AS IDENTIFIED IN THE APPROVED EROSION AND SEDIMENT CONTROL PLAN;
   - D) MAINTAIN ALL ROAD DRAINAGE SYSTEMS, STORMWATER DRAINAGE SYSTEMS,, CONTROL MEASURES AND OTHER FACILITIES IDENTIFIED IN THE EROSION AND SEDIMENT CONTROL PLAN;
   - E) PROMPTLY REPAIR ANY SILTATION OR EROSION DAMAGE TO ADJOINING SURFACES AND DRAINAGE WAYS RESULTING FROM LAND DEVELOPING OR DISTURBING ACTIVITIES;
   - F) INSPECT THE SEDIMENTATION CONTROL MEASURES AT LEAST ONCE PER WEEK AND AFTER EACH RAINFALL OF AT LEAST ONE CENTIMETER AND MAKE NEEDED REPAIRS;
   - G) ALLOW CITY OFFICERS OR AGENTS OF THE CITY TO ENTER THE SITE FOR THE PURPOSE OF INSPECTING FOR COMPLIANCE WITH THE EROSION AND SEDIMENT CONTROL PLAN OR PERFORMING ANY WORK NECESSARY TO BRING THE SITE INTO COMPLIANCE WITH THE EROSION AND SEDIMENT CONTROL PLAN;
   - H) MAINTAIN A COPY OF THE PERMIT ON THE SITE;
   - I) NOTIFY ALL SUB-CONTRACTORS AND SUPPLIERS OF APPROVED ACCESS ROUTES TO THE SITE AND ENSURE COMPLIANCE WITH THESE INSTRUCTIONS;
   - J) MAINTAIN ALL ROADS IN SAME OR BETTER CONDITION THAN EXISTED PRIOR TO THE COMMENCEMENT OF THE WORK AND KEEP ALL ROADS FREE FROM ANY MATERIALS OR EQUIPMENT FROM THE WORK SET OUT IN THE PERMIT; AND
   - K) ENSURE THAT NO CONSTRUCTION MACHINERY IS OPERATED IN CONTRAVENTION OF BY-LAW NUMBER 3821, AS AMENDED, (NOISE BY-LAW) OR ANY SUCCESSOR THERETO.
2. THE CITY:
   - A) UPON THE FAILURE BY THE PERMIT HOLDER TO COMPLETE ALL OR PART OF THE WORKS IN THE TIME STIPULATED IN THE EROSION AND SEDIMENT CONTROL PLAN, THE CITY MAY DRAW THE APPROPRIATE AMOUNT FROM THE SECURITIES POSTED AND USE THE FUNDS TO ARRANGE FOR THE COMPLETION OF THE SAID WORKS, OR ANY PART THEREOF;
   - B) UPON FAILURE BY THE PERMIT HOLDER TO INSTALL, REPAIR OR MAINTAIN A SPECIFIC PART OF THE WORKS AS REQUESTED BY THE CITY, AND IN THE TIME REQUESTED, THE CITY MAY AT ANY TIME AUTHORIZE THE USE OF ALL OR PART OF THE SECURITIES TO PAY THE COST OF ANY PART OF THE WORKS IT MAY IN ITS OR THEIR ABSOLUTE DISCRETION DEEM NECESSARY; AND
   - C) IN THE CASE OF EMERGENCY REPAIRS OR CLEAN-UP, THE CITY MAY UNDERTAKE THE NECESSARY WORKS AT THE EXPENSE OF THE PERMIT HOLDER AND REIMBURSE ITSELF OUT OF SECURITIES POSTED BY THE APPLICANT.

24 HOUR CONTACTS:
GIANMARCO TAVANIELLO 416-989-8104
BRIAN TILLEY (416)717-8319

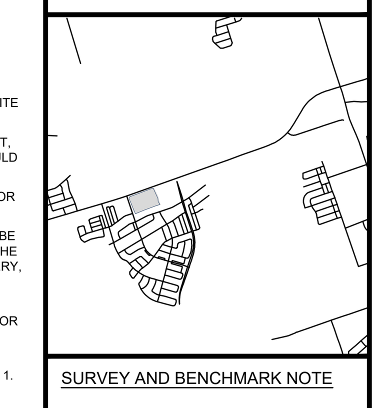
REVISION BLOCK

#	DATE	DESCRIPTION
1	04/14/23	ISSUED FOR SPA
2	12/04/25	ISSUED FOR SPA

REGISTERED PROFESSIONAL ENGINEER
B.JACKSON
100210382
DEC. 4, 2025
PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC.
2453 Auckland Drive
Burlington, ON L7L 7A9

NORTH ARROW



SURVEY AND BENCHMARK NOTE

EXISTING TOPOGRAPHIC INFORMATIONS SHOWN ON THIS PLAN ARE BASED ON J.D. BARNES LTD. DRAWING (REF. NO. 25-25-360-00), DATED AUGUST 20, 2025

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING VERTICAL

METRIC SCALE
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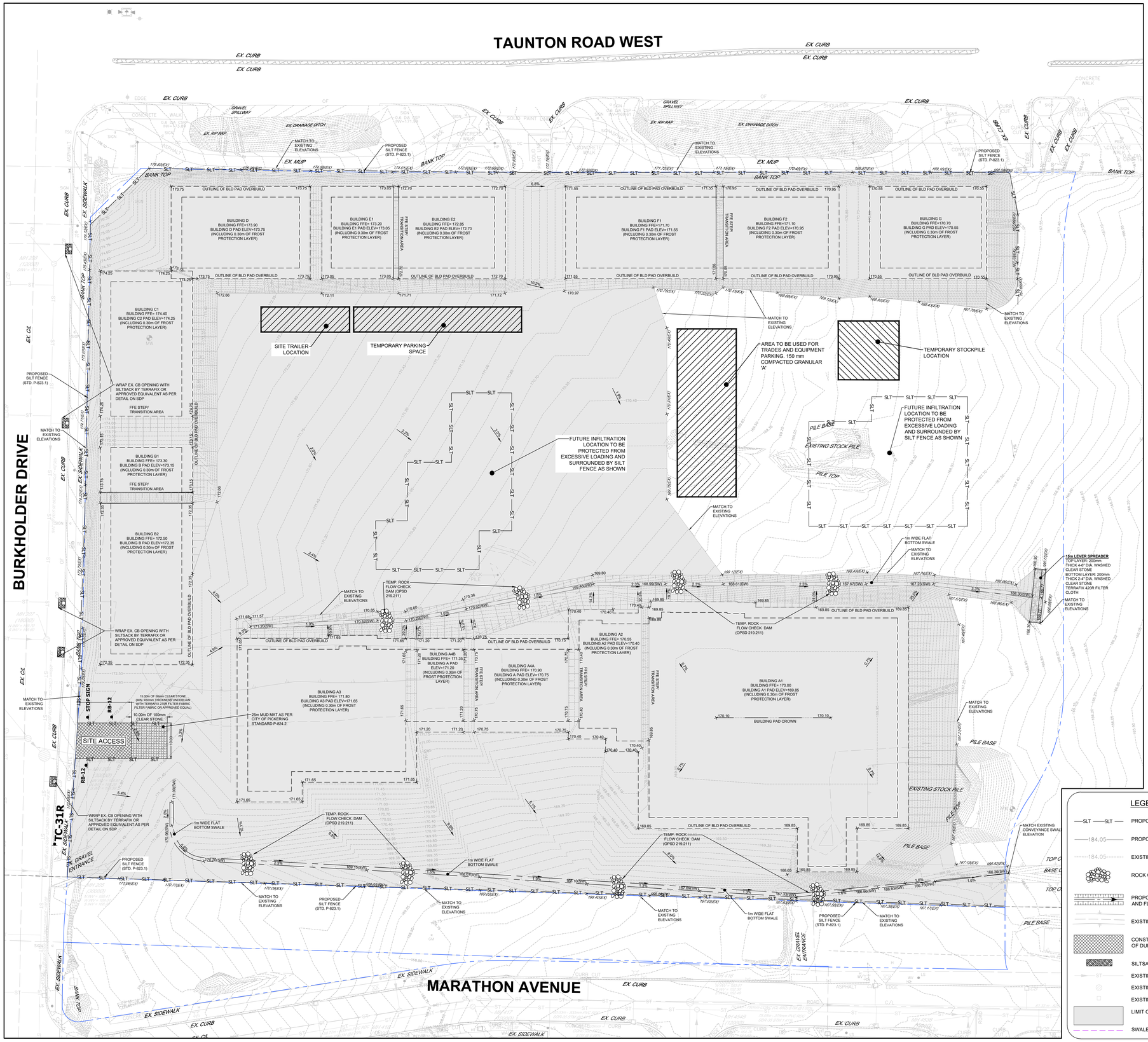
EROSION AND SEDIMENT CONTROL PLAN - 2

FIELDGATE COMMERCIAL
TAUNTON RD/BURKHOLDER DR.
OPA 2025-001/P ; A 06/25 ; PRE 023-026/22
PICKERING, ONTARIO
CITY OF PICKERING FILE: FB 01-2025
PROJECT No: 23810
DRAWN BY: RB
CHECKED BY: BJ

ESC-2



GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE CITY OF PICKERING AND REGION OF DURHAM STANDARDS, ONTARIO PROVINCIAL STANDARD DRAWINGS AND SPECIFICATIONS (OPSD & OPSS), THE WATER RESOURCES ACT, AND THE APPLICABLE ENVIRONMENTAL PROTECTION ACTS. WHERE A TOWN OR REGION STANDARD EXISTS, IT SHALL BE USED IN PLACE OF THE PROVINCIAL STANDARD. ALL WORK SHALL CONFORM TO THE APPLICABLE HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
2. INFORMATION REGARDING ALL EXISTING UNDERGROUND UTILITIES AND SERVICES SHOWN ON THE DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS AND/OR AVAILABLE HISTORICAL DRAWINGS. THE ACCURACY OF THIS INFORMATION HAS NOT BEEN CONFIRMED BY KWA SITE DEVELOPMENT CONSULTING AND ALL UNDERGROUND INFORMATION NEEDS TO BE VERIFIED IN THE FIELD PRIOR TO BIDDING AND CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE TO ACQUIRE ALL UTILITY LOCATES PRIOR TO CONSTRUCTION AND TO NOTIFY THE ENGINEER OF ANY DISCREPANCIES. ANY LOST TIME DUE TO FAILURE TO IDENTIFY DISCREPANCIES OR NOTIFY THE ENGINEER SHALL BE AT THE CONTRACTOR'S EXPENSE.
3. THIS PLAN SHOULD BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANT'S PLANS AND ANY DISCREPANCIES REPORTED TO THE ENGINEER PRIOR TO CONSTRUCTION.
4. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION AND ANY DISCREPANCIES REPORTED TO THE ENGINEER. INFORMATION REGARDING PRIVATE ROADS, PARKING LOT CURBS, BUILDING LOCATIONS, AND SETBACKS SHALL BE TAKEN FROM THE SITE PLAN.
5. NO SUBSTITUTIONS SHALL BE ALLOWED WITHOUT ENGINEERS APPROVAL.
6. ALL DISTURBED AREAS SHALL BE REPAIRED TO ORIGINAL CONDITION OR BETTER AND TO THE SATISFACTION OF THE ENGINEER.
7. THE CONTRACTOR IS ADVISED THAT WORKS BY OTHERS MAY BE ONGOING AT THE SAME TIME AS THIS CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES AND PREVENT CONSTRUCTION CONFLICTS.
8. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL PERMITS INCLUDING ROAD OCCUPANCY PERMITS AND THIRD PARTY UTILITY COSTS.
9. THE CONTRACTOR IS RESPONSIBLE FOR ALL TRAFFIC AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING ALL NECESSARY SIGNALS, SIGNS, DELINEATORS, MARKERS AND BARRIERS. ALL TRAFFIC AND SAFETY MEASURES SHALL CONFORM TO CITY STANDARDS AND THE ONTARIO TRAFFIC MANUAL, BOOK 7 - TEMPORARY CONDITIONS, LATEST EDITION.
10. THE CONTRACTOR SHALL COORDINATE ALL REQUIRED INSPECTIONS WITH THE CITY AND THE REGION AND ANY OTHER REGULATORY AGENCIES. ALL WORK ON TOWN OR REGION RIGHT-OF-WAY AND EASEMENTS, SEWER WORK, AND WATERMAIN WORK SHALL BE INSPECTED BY THE TOWN OR REGION (AS REQUIRED) PRIOR TO BACKFILLING.
11. THE CONTRACTOR SHALL COORDINATE ALL REQUIRED INSPECTIONS WITH THE GEOTECHNICAL ENGINEER THROUGHOUT ENTIRE DURATION OF THE PROJECT.
12. THE CONTRACTOR IS RESPONSIBLE TO INSTALL AND MAINTAIN EROSION AND SEDIMENT CONTROLS AS REQUIRED BY THIS CONTRACT AND TOWN AND PROVINCIAL STANDARDS.
13. CONTRACTOR RESPONSIBLE TO SUPPLY AND INSTALL ALL NECESSARY CONSTRUCTION FENCING.
14. CONTRACTOR TO PROVIDE WEEKLY REDLINE LINE AS-BUILT SURVEY TO THE ENGINEER FOR REVIEW. AS-BUILT TO SHOW PIPE INVERT, PIPE SIZE, AND PIPE MATERIAL.
15. CONTRACTOR TO PROVIDE AS-BUILT SURVEY OF COMPLETED SERVICING AND GRADING WORKS; INCLUDING INVERTS, ALL ABOVE GROUND WORKS AND SPOT ELEVATIONS AT MAXIMUM 15M GRID INTERVAL. SURVEY TO BE PREPARED BY LICENSED ONTARIO LAND SURVEYOR.
16. DRAWING TO BE READ IN CONJUNCTION WITH THE GEOTECHNICAL INVESTIGATION REPORT PREPARED BY GEMTEC, DATED SEPTEMBER 30, 2025 AND ALL APPLICABLE ADDENDUMS.
17. NO QUEUING AND IDLING WILL BE ALLOWED.
18. MATERIAL WILL NOT BE BROUGHT TO THE SITE OR LEAVE THE SITE THROUGH RESIDENTIAL AREAS AND ALL DISPOSAL MATERIAL WILL BE BROUGHT TO APPROVED AND LICENSED FACILITIES. DELIVERIES SHALL ARRIVE USING PROVINCIAL HIGHWAYS AND REGIONAL ROADS, AND STAGING SHALL BE DONE INTERNAL TO SITE WITHIN THE FUTURE PHASE LANDS AND WITHOUT IDLING OR QUEUING ON EXTERNAL ROADS.

SPILL MANAGEMENT NOTES:

1. NO STORAGE OF BULK FUELS OR CHEMICALS IS ALLOWED ON THE SUBJECT SITE.
2. A SPILL CLEAN-UP PLAN MUST BE IN PLACE AND ALL SPILLS BE REPORTED TO THE MINISTRY OF OF ENVIRONMENT AND CLIMATE CHANGE SPILLS ACTION CENTER.
3. AN ON-SITE MANAGER SHALL BE DESIGNATED AS THE SPILL COORDINATOR AND SHALL CONDUCT REGULAR VISUAL INSPECTION TO IDENTIFY AREAS WITH OILY STAINING OR OTHER EVIDENCE OF ENVIRONMENTAL CONCERN (I.E. POOLS OF LIQUID, ODOURS, VAPOUR,ETC.)
4. A SPILL KIT SHALL BE LOCATED WITHIN THE SITE TRAILER AND IN KEY VEHICLES CONTAINING ITEMS FOR PERSONAL PROTECTION AND SMALL SPILL CLEANUP. THE SPILL KIT SHALL ONLY BE USED BY TRAINED PERSONNEL AND THE SPILL MANAGER SHALL COMPLETE A KIT INVENTORY MONTHLY.
5. IF A SPILL IS DETECTED THAT CANNOT BE CONTAINED SAFELY UTILIZING THE ONSITE SPILL KIT, AN EVACUATION MUST TAKE PLACE AND THE SPILL COORDINATOR MUST CONTACT PICKERING FIRE SERVICES (AND THE OTHER EMERGENCY CONTACTS FOUND BELOW) IMMEDIATELY.
6. SILT LADEN RUN OFF LEAVING THE SITE IS A REPORTABLE SPILL UNDER THE REGION OF DURHAM SEWER USE BY-LAW 55-2013, AS AMENDED, IN ADDITION TO PROVINCIAL AND FEDERAL LEGISLATION. ALL SILT SPILLS THAT IMPACT A SEWER SYSTEM, WATERCOURSE, OR CITY PROPERTY, MUST BE IMMEDIATELY REPORTED TO THE SPILLS ACTION CENTRE (1-800-268-6060).
7. ALL SPILL MONITORING, INCIDENTS, AND CLEANUP SHALL BE DOCUMENTED INCLUDING (BUT NOT LIMITED TO): NAMES, DATES, TIME, LOCATION, DURATION (IF KNOWN), TYPE AND QUANTITY, SOURCE, ENVIRONMENTAL CONDITIONS, ACTIONS TAKEN, AGENCIES CONTACTED, AND FOLLOWUP COMPLETED.
8. ANY AREAS OF CONCERN IDENTIFIED SHALL BE INVESTIGATED AS WOULD ANY SPILL BEFORE CONTACTING THE EMERGENCY CONTACTS LISTED BELOW.
9. PRIOR TO DISCHARGE TO MUNICIPAL SEWERS FOR DE-WATERING A DISCHARGE AGREEMENT MUST BE APPROVED BY ENVIRONMENTAL SERVICES AS PER THE SEWER USE BY-LAW 55-2013.
10. VEHICLE MAINTENANCE SHALL BE COMPLETED A MINIMUM OF 15m AWAY FROM ANY FUTURE INFILTRATION AREAS AND THE PROPOSED ESC POND.

LEGEND

- PROPOSED SILT FENCE
- PROPOSED CONTOUR
- EXISTING CONTOUR
- ROCK CHECK DAM
- PROPOSED INTERCEPTOR SWALE AND FLOW DIRECTION AS PER (OPSD 219.211)
- EXISTING SWALE TO REMAIN
- CONSTRUCTION ENTRANCE AS PER REGION OF DURHAM STANDARD S-301.050
- SILTSACK INLET SEDIMENT CONTROL DEVICE
- EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING CATCH BASIN
- LIMIT OF REGRADING
- SWALE TRIBUTARY BOUNDARY

EMERGENCY CONTACTS	
FIRE/POLICE/ AMBULANCE	911
CLIMATE CHANGE SPILL ACTION CENTER	1-800-268-6060
MECP-SPILLS ACTION CENTRE	1 (416) 325-3000
CANUTEC (CANADIAN EMERGENCY CENTRE)	1 (613) 966-6666

24 HOUR CONTACTS:
GIANMARCO TAVANIELLO 416-989-8104
BRIAN TILLEY (416)717-8319

REVISION BLOCK

#	DATE	DESCRIPTION
1	04/14/25	ISSUED FOR SPA
2	12/04/25	ISSUED FOR SPA

REGISTERED PROFESSIONAL ENGINEER
B.JACKSON
100210382
DEC. 4, 2025
PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC.
1235 North Service Rd. W.
Burlington, ON L7L 7A9

NORTH ARROW

SURVEY AND BENCHMARK NOTE

EXISTING TOPOGRAPHIC INFORMATIONS SHOWN ON THIS PLAN ARE BASED ON J.D. BARNES LTD. DRAWING (REF. NO. 25-25-360-00), DATED AUGUST 20, 2025

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING VERTICAL

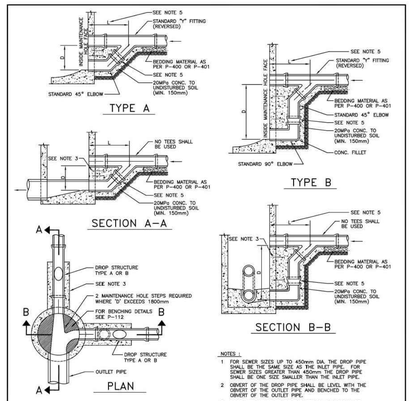
METRIC SCALE
0 5 10 20
1:500

CONSTRUCTION MANAGEMENT PLAN

FIELDGATE COMMERCIAL
TAUNTON RD/BURKHOLDER DR.
OPA 2025-001/P - A 06/25 ; PRE 023-02822
PICKERING, ONTARIO

CITY OF PICKERING FILE: FB 01-2025
PROJECT No: 23810
DRAWN BY: RB
CHECKED BY: BJ

CMP



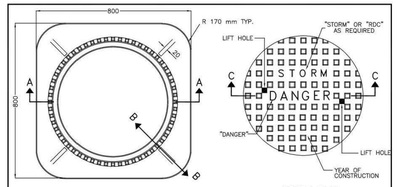
NOTES :

1. FOR SEWER SIZES UP TO 450mm DIA. THE DROP PIPE SHALL BE THE SAME SIZE AS THE INLET PIPE. FOR SEWER SIZES GREATER THAN 450mm, THE DROP PIPE SHALL BE ONE SIZE SMALLER THAN THE INLET PIPE.
2. OBVERT OF THE DROP PIPE SHALL BE LEVEL WITH THE OBVERT OF THE INLET PIPE AND BENCHED TO THE OBVERT OF THE OUTLET PIPE.
3. DROP STRUCTURE TO BE ENCASED IN A MINIMUM OF 150mm OF 20MPA CONCRETE. MAINTENANCE HOLE STEPS TO BE PROVIDED ON THE OUTSIDE FACE OF THE MAINTENANCE HOLE. REINFORCING BARS TO BE STRAPPED TO THE STEPS WITH STAINLESS STEEL BANDS.
4. MAXIMUM VELOCITIES SHOWN IN THE TABLE INDICATE THE MAXIMUM FLOW VELOCITY IN INCOMING PIPE WITHOUT OVERSHOOTING.
5. ADJUSTMENT IN "D" AND "L" TO BE MADE THROUGH THIS SECTION OF PIPE.
6. ALL CONCRETE IN THE DROP STRUCTURE TO BE 20MPa AT 28 DAYS.
7. MINIMUM DIMENSIONS BASED ON USE OF THE STANDARD CONCRETE FITTINGS.

TABLE OF MINIMUM DIMENSIONS AND MAXIMUM VELOCITIES					
DROP PIPE DIAMETER	TYPE "A" "D"	"L"	TYPE "B" "D"	"L"	MAX. VELOCITY (m/s)
200	600	750	1200	1050	1.43
250	636	825	1275	1050	1.50
300	689	900	1425	1125	1.70
375	800	1125	1875	1350	1.92
450	975	1200	2025	1275	2.19
525	1050	1275	2175	1425	2.36
600	1125	1350	2400	1500	2.53
675	1200	1425	2475	1575	2.69
750	1275	1500	2625	1650	2.83

All dimensions are in millimetres unless otherwise noted.

City of Pickering	Engineering Services Department	
DRAWN: P. NEUMAN	DROP STRUCTURES FOR MAINTENANCE HOLES	REVISION NO.: 2
APPROVED: R. W. HOLBORN		DATE: JULY 2003
DATE: JANUARY 1993		P–110

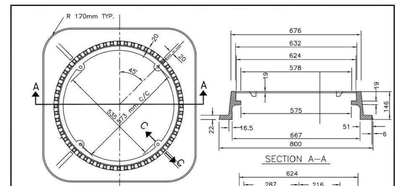


NOTES :

1. THE INITIALS OR MARK OF THE MANUFACTURER AND YEAR ARE TO BE DISTINCTLY CAST IN RAISED LETTERS ON BOTH FRAME AND COVER.
2. THE COVER IS TO HAVE "STORM" OR "ROC" DISTINCTLY CAST IN RAISED LETTERS AS REQUIRED.
3. THE COVER IS TO HAVE "DANGER" DISTINCTLY CAST IN RAISED LETTERS.

All dimensions are in millimetres unless otherwise noted.

City of Pickering	Engineering Services Department	
DRAWN: J. BARKER	MAINTENANCE HOLE FRAME AND CLOSED COVER	REVISION NO.: 4
APPROVED: R. STARR		DATE: JULY 2019
DATE: APRIL 2011		P–120

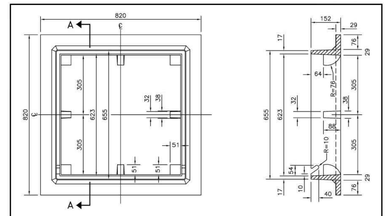


NOTES :

1. THE INITIALS OR MARK OF THE MANUFACTURER AND YEAR ARE TO BE DISTINCTLY CAST IN RAISED LETTERS ON BOTH FRAME AND COVER.
2. THE COVER IS TO HAVE "STORM" OR "ROC" DISTINCTLY CAST IN RAISED LETTERS AS REQUIRED.
3. THE COVER IS TO HAVE "DANGER" DISTINCTLY CAST IN RAISED LETTERS.
4. WATERTIGHT FRAME AND COVER TO BE SUPPLIED COMPLETE WITH STAINLESS STEEL BOLTS AND RUBBER GASKETS.

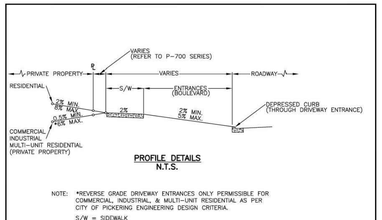
All dimensions are in millimetres unless otherwise noted.

City of Pickering	Engineering Services Department	
DRAWN: J. BARKER	WATERTIGHT MAINTENANCE HOLE FRAME WITH BOLT DOWN COVER	REVISION NO.: 4
APPROVED: R. STARR		DATE: MAY 2019
DATE: APRIL 2011		P–121



All dimensions are in millimetres unless otherwise noted.

City of Pickering	Engineering Services Department	
DRAWN: P. NEUMAN	BEEHIVE CATCH BASIN FRAME & COVER	REVISION NO.: 1
APPROVED: S. A. VOKES		DATE: JULY 2003
DATE: JANUARY 1993		P–215



PROFILE DETAILS
N.T.S.

NOTE: *REVERSE GRADE DRIVEWAY ENTRANCES ONLY PERMISSIBLE FOR COMMERCIAL, INDUSTRIAL & MULTI–UNIT RESIDENTIAL AS PER CITY OF PICKERING ENGINEERING DESIGN CRITERIA.
S/W = SIDEWALK

RESIDENTIAL DRIVEWAYS – MINIMUM REQUIREMENTS			
DRIVEWAY MATERIAL	EXCAVATION (mm)	GRANULAR 'A' (mm)	SURFACE MATERIAL (mm)
ASPHALT	200	150	50 (HL3)

COMMERCIAL/INDUSTRIAL/INSTITUTIONAL DRIVEWAYS – MINIMUM REQUIREMENTS					
DRIVEWAY MATERIAL	EXCAVATION (mm)	GRANULAR 'B' (mm)	GRANULAR 'A' (mm)	BASE MATERIAL (mm)	SURFACE MATERIAL (mm)
ASPHALT	700	450	150	50 (HL8)	50 (HL3)

NOTE: 1. MATERIAL DEPTHS FOR RESIDENTIAL DRIVEWAYS MAY NEED TO BE INCREASED WHERE SOIL CONDITIONS WARRANT OR WHERE MATCHING EXISTING CONDITIONS.
2. COMMERCIAL/INDUSTRIAL/MULTI–UNIT RESIDENTIAL – MATERIAL DEPTHS SHALL CONFORM TO SOILS REPORT RECOMMENDATIONS TO MEET DESIGN REQUIREMENTS FOR EXPECTED TRAFFIC VOLUME & VEHICULAR TYPE USE IF FOUND TO BE ABOVE THE MINIMUM STANDARD.

All dimensions are in millimetres unless otherwise noted.

City of Pickering	Engineering Services Department	
DRAWN: D. POLAK	DRIVEWAY SECTION	REVISION NO.:
APPROVED: P. HELGESEN		DATE:
DATE: JULY 2019		P–607

All dimensions are in millimetres unless otherwise noted.

City of Pickering	Engineering Services Department	
DRAWN: P. NEUMAN	TYPE "C" BEDDING FOR CONCRETE PIPE	REVISION NO.: 2
APPROVED: S. A. VOKES		DATE: NOVEMBER 2019
DATE: JANUARY 1993		P–400

NOTES :

1. BEDDING MATERIALS SHALL BE FULLY EXTENDED AND COMPACTED AGAINST TRENCH WALLS. BEDDING MATERIALS SHALL BE PLACED IN 150mm LAYERS.
2. NO MECHANICAL COMPACTION EQUIPMENT SHALL BE USED ON TOP OF THE PIPE PRIOR TO PLACING A MINIMUM COVER OF 300mm.
3. THE PIPE SHALL BE BEDDED TO PROPOSED LINE AND GRADE WITH UNIFORM AND CONTINUOUS SUPPORT FROM THE BEDDING. BLOCKING WITH ANY HARD OBJECT SHALL NOT USED TO BRING THE THE PIPE TO GRADE.
4. CONCRETE SHALL NOT BE USED IN THE EMBEDMENT ZONE.
5. FILTER FABRIC SHALL BE USED IF THE GROUND WATER TABLE IS ABOVE THE TRENCH BED OR IF GROUND WATER IS FLOWING INTO THE TRENCH THROUGH THE EMBEDMENT ZONE.

All dimensions are in millimetres unless otherwise noted.

City of Pickering	Engineering Services Department	
DRAWN: P. NEUMAN	TYPE "P" BEDDING FOR P.V.C. & H.D.P.E. PIPE	REVISION NO.: 2
APPROVED: S. A. VOKES		DATE: NOVEMBER 2019
DATE: JANUARY 1993		P–401

WIDTH (W)	MEDIUM/HIGH DEN. RESIDENTIAL	COMMERCIAL	INDUSTRIAL
ONE WAY	6.0 (MIN.)	6.0–7.5	6.0–9.0
TWO WAY	6.5–12.0	7.2–12.0	9.0–12.0
RADIUS (R)	7.5–9.0	7.5–12.0	9.0–12.0

NOTES :

1. FOR DRIVEWAY CORNER CLEARANCES, REFER TO THE TRANSPORTATION ASSOCIATION OF CANADA (TAC) – GEOMETRIC DESIGN GUIDE FOR CANADIAN ROADS FIG. 3.2.5.1 AND FIG. 3.2.9.3.
2. SIDEWALK REINFORCING AS PER P–610.1 THROUGH ALL COMMERCIAL/INDUSTRIAL DRIVEWAYS.
3. PROPOSED DRIVEWAYS SHALL BE DESIGNED TO ACCOMMODATE THE ANTICIPATED VEHICULAR TRAFFIC WITHOUT CAUSING UNDUE INTERFERENCE WITH THE TRAFFIC FLOW ON THE STREET.

All dimensions are in metres unless otherwise noted.

City of Pickering	Engineering Services Department	
DRAWN: D. POLAK	MEDIUM TO HIGH DENSITY RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL DRIVEWAY ACCESS	REVISION NO.: 1
APPROVED: P. HELGESEN		DATE: NOVEMBER 2019
DATE: JULY 2019		P–605

Typical Siltsack® Construction - Type B

SIZE OF DROP PIPE	
SEWER ID	DROP PIPE ID
200	200
250	200
300	250
375	300

NOTES:
1 Concrete shall be placed to undisturbed ground and the outside face of the maintenance hole, but there shall be a minimum of 150mm of 15MPa concrete around the drop pipe.
2 Concrete shall be secured to the maintenance hole with 450mm long, 13mm diameter threaded rods and drilled expansion anchors down either side of the drop pipe at 300mm centres.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev 3
CAST–IN–PLACE MAINTENANCE HOLE DROP STRUCTURE WYE		
		OPSD 1003.020

NOTES:
1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, or 701.032.
C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.
D Pipe support according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		
		OPSD 701.010

NOTES:
1 Outlet hole size 525mm diameter maximum, location as required.
2 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
A Centre reinforcing in base slab and walls ±20mm.
B Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
C Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
D Pipe support shall be according to OPSD 708.020.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov. 2019	Rev 4
PRECAST CONCRETE CATCH BASIN 600x600mm		
		OPSD 705.010

NOTES :

1. TEMPORARY "TRUCK ENTRANCE" SIGNS SHALL BE INSTALLED ON THE SHOULDER, 150 m IN ADVANCE OF THE ACCESS.(NOTE: SEE DETAILS ON THE USE OF THESE SIGNS IN THE ONTARIO TRAFFIC MANUAL BOOK 7). THE APPLICANT WILL BE RESPONSIBLE FOR THE COST OF OBTAINING, ERECTING AND MAINTAINING THESE SIGNS.
2. TEMPORARY CONSTRUCTION ACCESS SHALL BE REMOVED FROM THE ROAD ALLOWANCE AND ALL DISTURBED AREAS SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION.

TC 31L TC 31R

All dimensions are in millimetres unless otherwise noted.

City of Pickering	Engineering Services Department	
DRAWN: J. McMULLEN	MUD MAT FOR TEMPORARY CONSTRUCTION ACCESS (URBAN CROSS–SECTION)	REVISION NO.: 1
APPROVED: R. STARR		DATE: NOVEMBER 2019
DATE: OCTOBER 2007		P–824.2

All dimensions are in millimetres unless otherwise noted.

City of Pickering	Engineering Services Department	
DRAWN: J. McMULLEN	SILT FENCE	REVISION NO.: 2
APPROVED: R. STARR		DATE: NOVEMBER 2019
DATE: FEBRUARY 2003		P–823.1

NOTES:

1. EXPANSION JOINTS ARE REQUIRED WHERE THE SIDEWALK ABUTS OTHER CONCRETE STRUCTURES, WALKS, CURBS, UTILITY POLES, HYDRANTS, MANHOLES AND AT ANY OTHER LOCATION AT THE DISCRETION OF THE ENGINEER.
2. CONTRACTION JOINTS TO BE SAW CUT WITHIN 24 HOURS OF CONCRETE PLACEMENT. DUST FROM SAW CUTTING TO BE MINIMIZED.
3. CONCRETE TO CONFORM TO OPSS 1350, 32 MPa., 5%–8% AIR CONTENT & A MAXIMUM SLUMP OF 80mm.
4. CONSTRUCTION TO CONFORM TO OPSS 351.
5. TESTING IN ACCORDANCE WITH CITY OF PICKERING MINIMUM TESTING REQUIREMENTS.
6. 102x102 MW13.3xMW13.3 WELDED WIRE FABRIC TO BE PLACED 50mm ABOVE THE BOTTOM SURFACE OF THE SIDEWALK IN INDUSTRIAL AND COMMERCIAL DRIVEWAYS ONLY.

All dimensions are in millimetres unless otherwise noted.

City of Pickering	Engineering Services Department	
DRAWN: P.HELGESEN	STANDARD SIDEWALK	REVISION NO.: 1
APPROVED: R. STARR		DATE: NOVEMBER 2019
DATE: MAY 2012		P–610

REVISION BLOCK

#	DATE	DESCRIPTION
1	04/14/23	ISSUED FOR SPA
2	12/04/25	ISSUED FOR SPA

REGISTERED PROFESSIONAL ENGINEER
B.JACKSON
100210382
DEC. 4, 2025
PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC.
1 Hunter Street East, Suite 211, Burlington, ON L7L 7A9

NORTH ARROW

SURVEY AND BENCHMARK NOTE

EXISTING TOPOGRAPHIC INFORMATIONS SHOWN ON THIS PLAN ARE BASED ON J.D. BARNES LTD. DRAWING (REF. NO. 25-25-350-00), DATED AUGUST 20, 2025

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING VERTICAL

METRIC SCALE
N.T.S.

SITE DETAILS PLAN 1

FIELDGATE COMMERCIAL
TAUNTON RD/BURKHOLDER DR.
OPA 2025-001/P · A 06/25 : PRE 023-028/22
PICKERING, ONTARIO

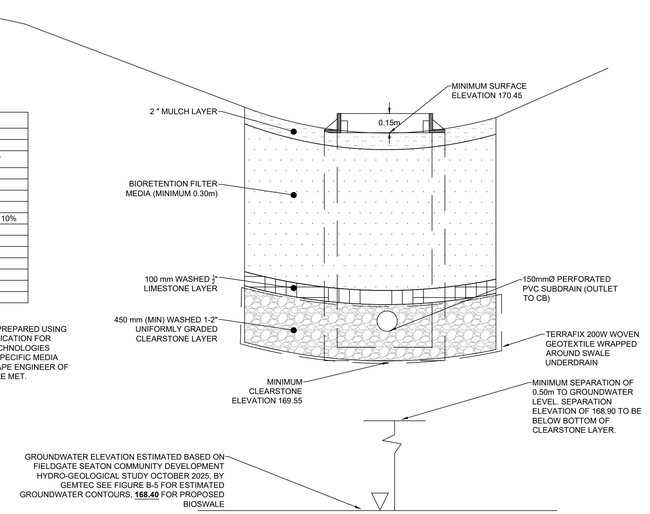
CHECKED BY: BJ
DRAWN BY: RB
PROJECT No: 23810

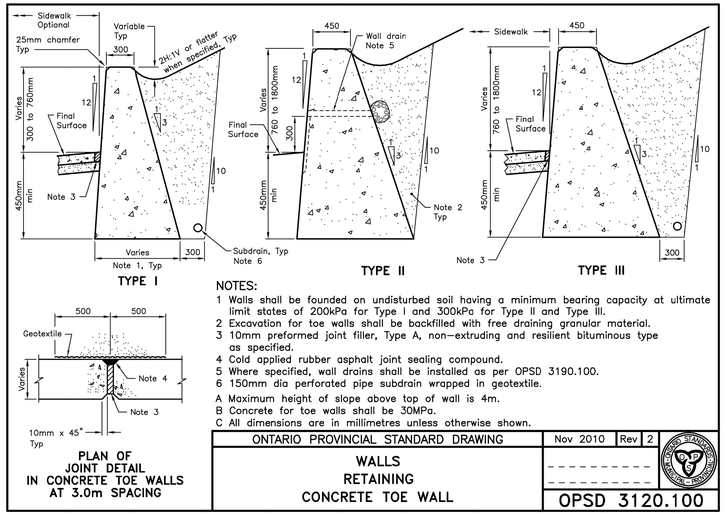
SDP - 1

ELEVATED CATCHBASIN IN BIOSWALE

BIORETENTIONMIX	
TOPSOIL	2 PARTS TOPSOIL
	3 PARTS SAND
	1 PART ORGANIC SOIL CONPONENTS
SOIL PARTICLE SIZE DISTRIBUTION	
SAND	75-90%
SILT	7-22%
CLAY	3-15%
GRAVEL	LESS THAN OR EQUAL TO 10%
PH	6.0-8.0
PLANT AVAILABLE NUTRIENT LEVELS	
PHOSPHORUS	
POTASSIUM	10-40
CALCIUM	80-250
MAGNESIUM	<5000
% ORGANIC	100-300

THE ABOVE BIORETENTION MIXED HAS BEEN PREPARED USING THE CITY OF TORONTO CONTRUCTION SPECIFICATION FOR GROWING MEDIUM AND THE SUSTAINABLE TECHNOLOGIES BIORETENTION: FILTER MEDIA GUIDE. A SITE SPECIFIC MEDIA DESIGN SHALL BE PROVIDED BY THE LANDSCAPE ENGINEER OF RECORD TO ENSURE ALL SITE OBJECTIVES ARE MET.





NOTES:
1 Walls shall be founded on undisturbed soil having a minimum bearing capacity at ultimate limit states of 200kPa for Type I and 300kPa for Type II and Type III.
2 Excavation for toe walls shall be backfilled with free draining granular material.
3 10mm preformed joint filler, Type A, non-extruding and resilient bituminous type as specified.
4 Cold applied rubber asphalt joint sealing compound.
5 Where specified, wall drains shall be installed as per OPSD 3190.100.
6 150mm dia perforated pipe subdrain wrapped in geotextile.
A Maximum height of slope above top of wall is 4m.
B Concrete for toe walls shall be 30MPa.
C All dimensions are in millimetres unless otherwise shown.

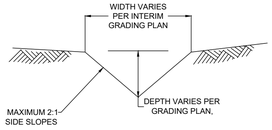
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2010	Rev 2
WALLS RETAINING CONCRETE TOE WALL		OPSD 3120.100

Tc-31R & Tc-31L

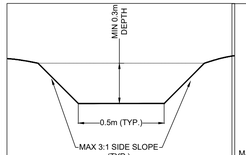
Rb-12 (600x600)mm

SIGN MOUNT LEGEND:
ALL SIGNS ARE SHOWN IN APPROXIMATE LOCATIONS AND TO BE DETERMINED ON SITE. SIGNS MUST BE VISIBLE TO DRIVER AND NOT OBSTRUCTED.

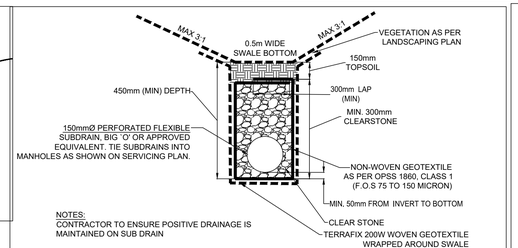
PROPOSED POST



TYPICAL V-NOTCH SWALE

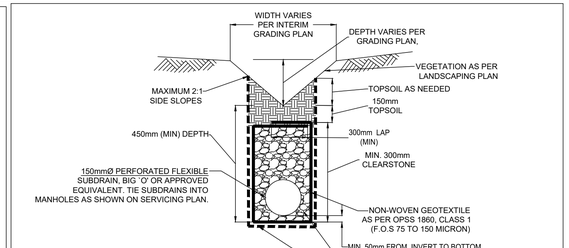


TYPICAL FLAT-BOTTOM SWALE



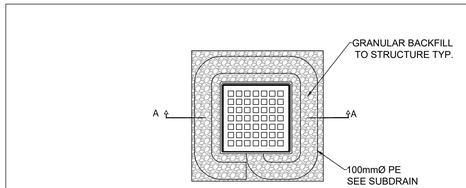
NOTES:
CONTRACTOR TO ENSURE POSITIVE DRAINAGE IS MAINTAINED ON SUB DRAIN

SWALE UNDERDRAIN FOR FLAT BOTTOM SWALE



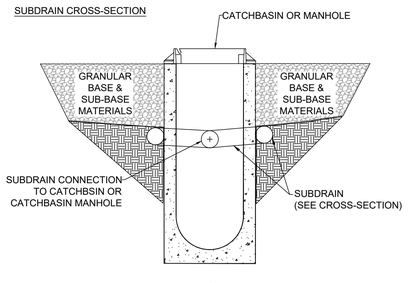
NOTES:
CONTRACTOR TO ENSURE POSITIVE DRAINAGE IS MAINTAINED ON SUB DRAIN

SWALE UNDERDRAIN FOR V-NOTCH SWALE



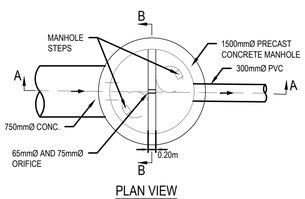
PLAN VIEW

SUBDRAIN CROSS-SECTION

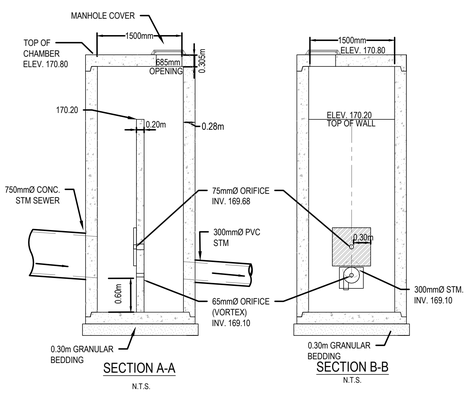


SECTION A-A

SUBDRAIN AT CATCHBASINS & CATCHBASIN MANHOLES



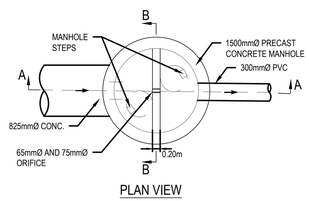
PLAN VIEW
N.T.S.



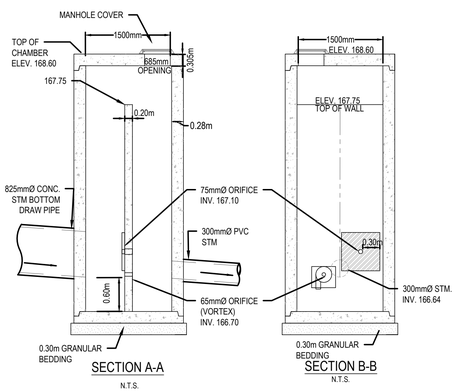
SECTION A-A
N.T.S.

SECTION B-B
N.T.S.

OUTLET CONTROL MANHOLE 8 DETAIL
N.T.S.



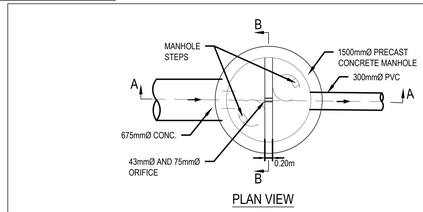
PLAN VIEW
N.T.S.



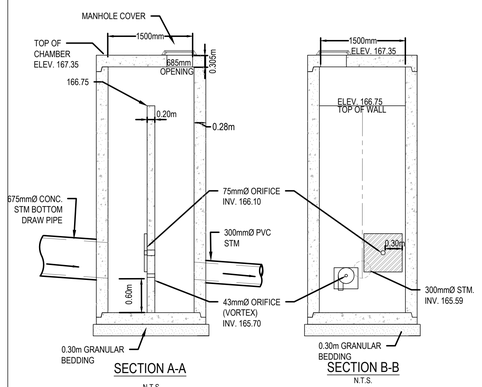
SECTION A-A
N.T.S.

SECTION B-B
N.T.S.

OUTLET CONTROL MANHOLE 21 DETAIL
N.T.S.



PLAN VIEW
N.T.S.



SECTION A-A
N.T.S.

SECTION B-B
N.T.S.

OUTLET CONTROL MANHOLE 22 DETAIL
N.T.S.

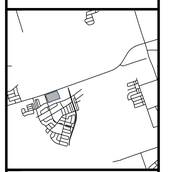
REVISION BLOCK

#	DATE	DESCRIPTION
1	04/14/23	ISSUED FOR SPA
2	12/04/25	ISSUED FOR SPA

REGISTERED PROFESSIONAL ENGINEER
B.JACKSON
100210382
DEC. 4, 2025
PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC.
2455 Lakeshore Rd W
Burlington, ON L7L 7A9

NORTH ARROW



SURVEY AND BENCHMARK NOTE

EXISTING TOPOGRAPHIC INFORMATIONS SHOWN ON THIS PLAN ARE BASED ON J.D. BARNES LTD. DRAWING (REF. NO. 25-25-360-00), DATED AUGUST 20, 2025

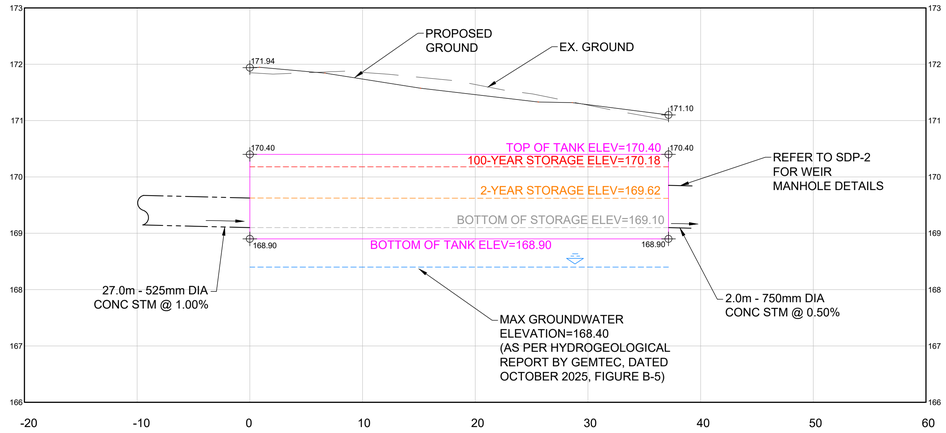
ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING VERTICAL

METRIC SCALE
N.T.S.

SITE DETAILS PLAN 2
FIELDGATE COMMERCIAL
TAUNTON RD/BURKHOLDER DR.
OPA 2025-001/P - A 06/25 - PRE 023-026/22
PICKERING, ONTARIO
PROJECT No: 23810
DRAWN BY: RB
CHECKED BY: BJ

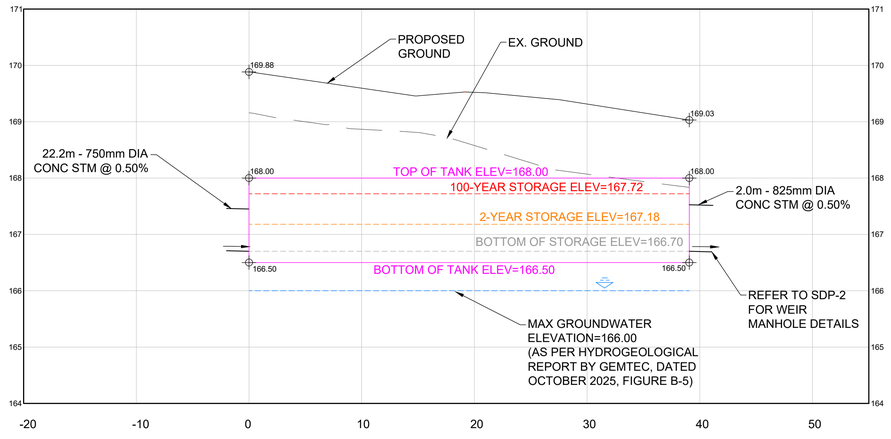
SDP - 2

CHAMBER #1

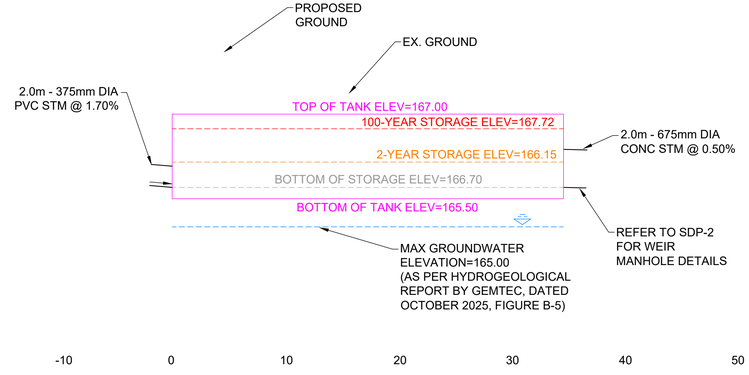


HORIZONTAL SCALE = 1:250
VERTICAL SCALE = 1:50

CHAMBER #2



HORIZONTAL SCALE = 1:250
VERTICAL SCALE = 1:50



HORIZONTAL SCALE = 1:250
VERTICAL SCALE = 1:50

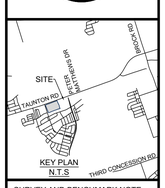
REVISION BLOCK

#	DATE	DESCRIPTION
1	04/14/23	ISSUED FOR SPA
2	12/04/25	ISSUED FOR SPA

REGISTERED PROFESSIONAL ENGINEER
B.JACKSON
100210382
DEC. 4, 2025
PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC.
2450 Lakeshore Road West
Burlington, ON L7L 7A9

NORTH ARROW



KEY PLAN
N.T.S

SURVEY AND BENCHMARK NOTE

EXISTING TOPOGRAPHIC INFORMATIONS SHOWN ON THIS PLAN ARE BASED ON J.D. BARNES LTD. DRAWING (REF. NO. 25-25-360-00), DATED AUGUST 20, 2025

ELEVATIONS ARE GEODETIC AND ARE REFERRED TO CITY OF PICKERING VERTICAL

METRIC SCALE

AS NOTED

CHAMBER CROSS SECTIONS

FIELDGATE COMMERCIAL
TAUNTON RD/BURKHOLDER DR.
OPA 2025-001P - A 06/25 ; PRE 023-026/22
PICKERING, ONTARIO

PROJECT No: 23810 | DRAWN BY: RB | CHECKED BY: BJ

XSEC