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STORM WATER MANAGEMENT PLAN

MIDLAND TOYOTA
806 KING STREET
TOWN OF MIDLAND

PEL PROJECT #: 25-11872M
DATE: JANUARY 22nd, 2026

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APPENDICES

1.0 INTRODUCTION

1.1 General

The owner of the property is proposing to construct an extension on the existing building at the existing Midland Toyota development located at 806 King Street in the Town of Midland. The property is approximately 1.3 hectares in size and is legally described as Part of Lot 102, Concession 1, in the Geographic Township of Tay, County of Simcoe. The property is bounded by King Street to the east, residential development to the west, commercial development to the north and the Tom Smith GMC development to the south. The site location is further illustrated on Figure 1.

The proposed development on the property includes an approximately 775 sq.m. service bay addition and 442 sq.m. drive-through showroom addition with associated new asphalt parking and driveway areas. The majority of the existing parking lot and roadway to the north of the existing building is to remain. Grading along the southern property limit and within the access easement is to be coordinated with the owner of the Tom Smith GMC development. Access to the property will continue to be provided from King Street.

Pinestone Engineering Ltd (PEL) has been retained by the property owner to prepare a Stormwater Management Brief in support of planning approvals. The report generally describes the proposed stormwater quality and quantity control strategy for the site.

1.2 Purpose and Scope

This report has been prepared in order to outline the storm water management requirements of the proposed development and provide the design details of the required quantity and quality control facilities necessary to address the SWM criteria.

This report has been prepared to satisfy the requirements of the Town of Midland, and the Ministry of the Environment, Conservation and Parks (MECP).

The following objectives have been identified in the preparation of this report:

- Determine the appropriate storm water management criteria for the subject property.
- Determine if a reduction of peak runoff flows through structural controls are required to control potential flooding downstream from the development.
- Outline an appropriate set of quality control techniques that can be implemented to meet current MECP standards for this type of development.
- Provide design details of the proposed storm water management and conveyance facilities.
- Identify methods to control sedimentation and erosion during construction and in the long term.

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MIDLAND TOYOTA

LOCATION PLAN

DATE:	SCALE:	PROJECT No.	FIGURE No.
JANUARY 2026	N.T.S.	24-11872-M	FIGURE 1

1.3 Reference Reports

The following reports and studies have been used for reference in the preparation of this Storm Water Management Plan:

i) *Ministry of the Environment and Energy's Storm Water Management Planning and Design Manual, March 2003.*

ii) *Town of Midland – Engineering Development Design Standards, December 2012*

iii) *Sediment Control Planning Central Region Group, prepared by the Ministry of Natural Resources.*

iv) *Drainage Management Manual, prepared by the Ministry of Transportation, 1997.*

2.0 EXISTING SITE CONDITIONS

2.1 General

The subject property is approximately 1.3 hectares in size and is currently a Toyota commercial development. The property is generally comprised of asphalt and gravel parking areas surrounding the Toyota dealership building.

2.2 Topography and Drainage Conditions

A topographic survey was undertaken by PEL in August 2025. Topography across the development area is gentle to moderate, generally sloping from the west to the east towards King Street at an average grade of 3.0%. No onsite flow attenuation controls exist on the site and pre-development flows from the site drain overland in the form of sheet flow, towards the storm sewer system on King Street.

2.3 Site Geology

A geotechnical investigation was completed on the site by Soil Engineers Ltd. in October 2024.

The soil stratigraphy below the pavement structure consists of a mix silty sand till. Based on auger refusal, boulders or bedrock was found at a depth of 5.2m below surface in two of the four boreholes.

Water table elevations were not encountered during the investigation. It is noted that groundwater levels fluctuate with seasons.

Based on our review of the soil descriptions outlined in the MTO Drainage Manual on Chart 1.08, we have classified the site material as a Type AB under the Soil Conservation Service, hydrologic soil group. Adjustment of the curve numbers for the pervious component of the lands have been carried out in the computer model to represent Type AB soils.

A copy of Geotechnical Report and Chart 1.08 from the MTO Drainage Manual is included in Appendix A.

3.0 PROPOSED DEVELOPMENT

The developer is proposing to construct extensions on the existing Midland Toyota dealership building with an associated proposed asphalt and gravel parking expansion. Site grading will generally match existing conditions with drainage flowing from west to east towards King Street. The majority of the existing parking area, to the north of the existing building, is to remain. The existing asphalt surface parking areas to the east and south of the building are to be re-graded to suit the building re-development works. Grading along the south property limit, and access easement, is to be coordinated with the adjacent land owner of the Tom Smith GMC facility located directly to the south of the subject property.

4.0 HYDROLOGY

A hydrologic model has been prepared for the site. The intent of the model was to provide quantitative estimates of runoff rates under both existing and proposed development conditions. These estimates can then be compared to determine the impact of the proposed development on the study area.

4.1 Model Selection

The rainfall runoff event simulation model MIDUSS (Microcomputer Interactive Design of Urban Storm Water Management Systems) was used to simulate watershed response to design rainfall events.

4.2 Design Storms

The following design storms were modelled as part of our evaluation:

- 5-year design storm
- 10-year design storm
- 25-year design storm
- 100-year design storm

Rainfall intensity - duration frequency (IDF) values, published by the Ministry of Transportation (MTO) for the Town of Midland area, were entered into an equation that expresses the time relationship intensity for specific frequency, in the form of:

$$i = \frac{a}{(t+b)^c}$$

where: i = intensity, mm/hr.

t = Time of concentration, minutes

a,b,c = constants developed to fit published IDF curves

The storm events were applied to the hydrologic model. Derivation of the design storm hyetographs were based on the "Chicago" 3-hour distribution using MTO intensity, duration, frequency (IDF) data for the Town of Midland area.

The design storm parameters utilized in the modelling, are outlined in Table 1, below:

Table 1
Design Storm Parameters
Chicago Rainfall Distribution

Rainfall Event	Parameter			Duration (min)
	A	B	C	
5Yr	1135.4	7.50	0.841	180
10Yr	1387.0	7.97	0.852	180
25Yr	1676.2	8.30	0.858	180
100Yr	2193.1	9.04	0.871	180

4.3 Drainage Catchments

One (1) pre-development and two (2) post-development catchment has been delineated for the site in order to estimate the peak runoff rate exiting the site. The pre-development catchment represents the existing condition of the property. The post- development catchment represents the proposed development and grading concept of the site.

The pre-development and post-development catchment parameters are listed in Table 2. The pre-development and post-development catchment boundaries are illustrated on Figures 2 and 3, respectively.

Table 2
Sub-catchment Parameters

Catchments	Area (ha)	Slope	% Impervious	SCS Curve No.
Pre-Development				
101	1.32	3%	68%	60.00
Post-Development				
201	0.41	2%	93%	60.00
202	0.91	3%	91%	60.00

Table 3 below outlines the calculated pre-development and post-development peak runoff rates (without SWM) during the 5 and 100-year storm events.

Table 3
Runoff Rates

	5Yr	100Yr
Total Pre-development Runoff Rate – Catchment 101 (m^3/sec)	**0.242**	**0.403**
Catchment 201	0.102	0.165
Catchment 202	0.216	0.367
Total Post Development Runoff Rate (m^3/sec)	**0.318**	**0.532**

LEGEND

DIRECTION OF OVERLAND FLOW

PRE-DEVELOPMENT CATCHMENT BOUNDARY

101 — PRE-DEVELOPMENT CATCHMENT NUMBER

0.00 | 0.00 — PRE-DEVELOPMENT IMPERVIOUS AREA(%)

PRE-DEVELOPMENT CATCHMENT AREA(HA.)

101
0.00 | 1.32

EX. SEA-CAN STORAGE AREA

EX. STEPS

EX. TOYOTA DEALERSHIP
F.F. 216.02

EX. SWALE

EXISTING ASPHALT

EDGE OF ASPHALT

EX. CONCRETE PAD

EX. FENCE

EX. CSV

EX. L.S.

EX. SIDEWALK

EX. CB
T/G 216.24

EX. CB
T/G 216.20

EXISTING BOLLARDS

ASPHALT PARKING AREA

EX. CB
T/G 215.95
(TO BE REMOVED)

GRADING TO BE COORDINATED WITH ADJACENT LAND OWNERS

EX. 300mmø PVC STORM SEWER

EX. 900mmø STORM SEWE

EX.CB#5
T/G 213.81
NW INV.212.52
SE IINV.212.52

PART 4
PLAN 51R-38621

PART 1
PLAN 51R-25443

PART 7
PLAN 51R-38621

PART 2, PLAN 51R-13275

KING STREET

217.00 | 216.50 | 216.00 | 215.50 | 215.00 | 214.50

218.00 | 217.50

T/W 218.20
B/W 216.40

T/W 217.20
B/W 216.40

SLOPE

215.79EX.

214.22EX.

214.15

216.36EX.

218.28

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MIDLAND TOYOTA

PRE-DEVELOPMENT CATCHMENT PLAN

PROJECT NO. 25-11872M

SCALE: 1:500

DATE: JANUARY 2026

FIGURE 2

LEGEND

DIRECTION OF OVERLAND FLOW

POST–DEVELOPMENT CATCHMENT BOUNDARY

201 / 0.41 — POST–DEVELOPMENT CATCHMENT NUMBER / POST–DEVELOPMENT CATCHMENT AREA(HA.)

202
0.91

201
0.41

SNOW STORAGE

SERVICE BAY ADDITION 175 m2 (PHASE 1) F.F.E. 216.02

EXISTING BUILDING 1192 m2 F.F.E. – 216.02

DRIVE–THRU + SHOWROOM ADDITION 442 m2 (PHASE 3) F.F.E. 216.02

FIRE DEPT. CONNECTION

FIRE ROUTE

WASTE BINS

TWSI

EV CHARGING

SIGN

GRADING TO BE COORDINATED WITH ADJACENT LAND OWNER

KING STREET

EX. 300mmø PVC STORM SEWER

EX. CB T/G 216.24

EX. CB T/G 216.20

EX.CB#5 T/G 213.81 NW INV.212.52 SE IINV.212.52

EX.900mmø STORM SEWER

T/W 218.20 B/W 216.40

T/W 217.20 B/W 216.40

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MIDLAND TOYOTA

POST DEVELOPMENT CATCHMENT PLAN

PROJECT NO. 25–11872M

SCALE: 1:500

DATE: JANUARY 2026

FIGURE 3

Based on the results of the hydrological modelling, an increase in stormwater runoff rates can be expected during the modelled storm events.

MIDUSS input/output calculations are included in Appendix B.

5.0 STORM WATER MANAGEMENT PLAN

5.1 Storm Water Management Criteria

For developments within the Town of Midland and County of Simcoe, both quality and quantity control of post-development storm runoff is required. As well, the Municipality requires development proponents to identify the mitigation measures that will be put in place during construction to address erosion and sediment control.

Based on the guidelines for sensitive receiving outlets outlined in the current MECP SWM Planning and Design Manual (MECP,2003), the design criteria for this site is as follows:

- Peak flow attenuation to pre-development levels for storm events up to and including the 100-year storm event based on MTO IDF data for the Town of Midland area. The grading design of the site should ensure that post-development flows from storm events in excess of the 100-year event are safely conveyed from the site.
- Water quality enhancement in accordance with a 'enhanced' receiving outlet (80% removal of total suspended solids) through the use of accepted control techniques such as extended detention storage, enhanced grass swales, level spreaders, oil grit separators, and best management practices.
- Water balance maintenance as the site is within a Well Head Protection area (WHAP-Q1&2)
- Implementation of erosion and sediment controls to mitigate impact to the natural environment.

5.2 Quantity Control

As noted in the comparison of the pre-development and post development flows, an increase in runoff will occur as a result of the proposed development of the site to construct the new building and associated asphalt surface parking areas.

To satisfy the selected design criteria, peak flow attenuation of post development flows to pre-development levels for storm events up to and including the 100-year storm event will be provided by using an underground storage tank system. Attenuated drainage will outlet to the existing storm sewer system on King Street. Post development flow rates will be attenuated to match pre-development rates.

Run-off from catchment 201 will be conveyed to a Brentwood Stormtank system (or equivalent) installed beneath the parking lot on the south side of the existing building. The 142m^3 subsurface storage tank system will consist of 588 – 25 series ST-36 modules connected in a 14 x 21 double stacked configuration. The Stormtank system will be wrapped in Terrafix 270R filter fabric and will be equipped with a 250mm dia. observation

port for inspection and maintenance.

Run-off from catchment 202 will continue to drain uncontrolled towards King Street. Run-off from storm events greater than the 100-year event will overflow towards King Street.

The stage-storage-discharge relationship of the proposed Brentwood Tank storage facility is summarized in Table 4.

Table 4
Stage-Storage-Discharge Relationship of Storage Tank

Elevation (m)	Discharge Rate (m^3/s)	Permanent Storage (m^3)	Live Storage (m^3)	Notes
212.87	0	0	0	Bottom of Tank
213.50	0	74	0	125mm dia. Orifice (628mm depth infiltration component)
213.70	0	74	24	
213.90	0.00379	74	47	
214.10	0.00731	74	71	
214.30	0.00962	74	95	
214.50	0.01148	74	119	
214.70	0.01307	74	143	Top of Tank

The location of the storm water management facilities and details are identified on the engineering plans included in Appendix D.

Table 5 summarizes the effectiveness of the proposed storm water attenuation features based on the hydrologic model results. Post development MIDUSS output files, with storm water management implemented, are included in Appendix B.

Table 5
Model Results - 3hr Chicago Distribution

	5Yr	10Yr	25Yr	100Yr
Total Pre-development Run-off rate to King Street (Catchment 101) (m^3/sec)	**0.242**	**0.282**	**0.331**	**0.403**
Catchment 201 – Underground Storage Tank Outflow (m^3/sec)	0.024	0.027	0.030	0.034
Catchment 202 – Uncontrolled Run-off to King Street	0.216	0.249	0.289	0.367
Total Post Development Run-off rate to King Street with SWM (m^3/sec)	**0.240**	**0.276**	**0.319**	**0.401**
Underground Storage Tank Elevation (m)	214.08	214.20	214.34	214.59
Storage Volume (m3)	69.4	83.1	100.4	129.8

5.3 Quality Control

The Storm Water Management Planning and Design Manual (MECP, 2003) recommends several suitable water quality enhancement techniques such as detention storage, enhanced grass swales, level spreaders, infiltration facilities, and oil/grit removers.

Quality control of post development run-off will be achieved through the implementation of a treatment train of quality control measures including:

- Installation of an Oil/Grit Treatment unit (Stormceptor or approved equivalent) sized to provide minimum 80% TSS removal
- Maintenance of existing lot line vegetation to act as a secondary filter for landscape run-off prior to discharge to adjacent lands.
- Suitable construction mitigation measures to be utilized during the site development.

A Stormceptor oil / grit separator manhole (or approved equivalent) sized for 'enhanced' quality control will be installed at the storm water outlet location prior to discharging to the proposed underground storage tank system, and ultimately to the existing storm sewer system on King Street. For catchment 201, an EFO4 unit or equivalent will be installed. The unit will provide at least 80% removal of total suspended solids in accordance with an 'enhanced' level of protection. The EFO4 unit will also provide pre-treatment of run-off conveyed to the underground storage tank system. Design calculations utilizing the manufacturer's software have been provided in Appendix C.

5.4 Water Balance

A water budget analysis was conducted in accordance with the NVCA Stormwater Technical Guide. The analysis follows the Thornthwaite and Mather approach, where surplus is estimated based on precipitation minus evapotranspiration (Steenhuis and Van Der Molen, 1986). The infiltration portion of the surplus is estimated by applying infiltration factors from Table 3.1 of the MECP SWMPD Manual. The precipitation, temperature, and evaporation data were obtained from the 1981-2010 climate normal of the Midland Water Pollution Control Plant. In the pre-development condition, land use consists of gravel, asphalt and building roof top area with a small portion of forested and landscape areas. For the post-development condition, the proposed development was broken down into impervious surfaces, and landscape land uses. Results of the annual pre-development and post-development water balance are displayed in Table 6, below.

Table 6
Water Balance Summary

Characteristic	Site			
	Pre-Development	Post-Development	Post-Development SWM	Change (Pre to Post SWM)
Inputs (Volumes)				
Precipitation (m^3/yr)	13736	13736	13736	0.0%
Run-on (m^3/yr)	0	0	0	0.0%
Other Inputs (m^3/yr)	0	0	0	0.0%
Total Inputs (m^3/yr)	13736	13736	13736	0.0%
Outputs (Volumes)				
Precipitation Surplus (m^3/yr)	11651	12171	12171	4.5%
Net Surplus (m^3/yr)	11651	12171	12171	4.5%
Evapotranspiration (m^3/yr)	2085	1565	1565	-25.0%
Infiltration (m^3/yr)	2503	587	3613	44.4%
Rooftop Infiltration (m^3/yr)	0	0	0	0.0%
Total Infiltration (m^3/yr)	2503	587	3613	44.4%
Runoff Pervious Areas (m^3/yr)	626	252	252	-59.8%
Runoff Impervious Areas (m^3/yr)	8523	11332	8307	-2.5%
Total Runoff (m^3/yr)	9148	11584	8559	-6.4%
Total Outputs (m^3/yr)	13736	13736	13736	0.0%

Based on the results of the water balance analysis, the site yields an infiltration rate of 2503m^3/year in the pre-development condition and 587m^3/year in the post-development condition, resulting in a water balance deficit of 1916 m^3/year. To mitigate this deficit, the proposed Brentwood Stormtank system will provide an 85% volumetric increase in infiltration benefit for runoff generated in the new proposed parking areas (catchment 201) in accordance with Table 4.3.2 of the TRCA LID Manual for infiltration galleries in an AB type soil. This 85% increase in infiltration benefit has been included in the water balance analysis for the post-development condition as the actual infiltration factor for the proposed parking lot surface.

The implementation of this stormwater management strategy will increase the overall site infiltration volume to 3613m^3/year, eliminating the water balance deficit and meeting pre-development infiltration rates. A copy of the water balance assessment is included in Appendix C.

6.0 EROSION AND SEDIMENT CONTROL

Sedimentation and erosion control measures are required during construction and until such a time that site development has been completed.

The use of various siltation control measures will be implemented to protect the adjacent properties and receiving waterbodies from migrating sediments.

These works include but may not be limited to:

- Installation of siltation fencing along down gradient portion of the development area.
- Installation of filter cloth under catch basin grates to protect the receiving storm sewers from sediment deposition.
- Installation of a mud mat to control vehicle debris tracking onto public roads.

6.1 During Construction

Prior to carrying out site grading the siltation barriers noted above shall be in place. Other temporary installations of silt fence or other appropriate measures may be required during grading to minimize silt migration from the site. The measures will need to be removed, replaced and relocated as required during the construction period until the site works have been completed and vegetation established. During construction all stockpiled material will be placed up-gradient of the siltation controls.

If site works are to continue through the winter and spring the engineer shall be contacted by the owner to review the measures in place with the contractor on a regular basis to ensure that the facilities are adequate and in good working order. All reasonable methods to control erosion and sedimentation are to be taken during construction.

6.2 Monitoring and Maintenance

It is the responsibility of the contractor and owner to maintain the siltation control devices until suitable cover has been established. A regular review of the facilities by the contractor shall be carried out during the construction period to ensure that the facilities are being properly maintained, and if necessary replaced.

The contractor should inspect the siltation devices immediately after each rainfall. Damaged devices should be repaired immediately, and additional devices installed if necessary. Sediment build-up should be removed from the fencing regularly when deposits are noted.

6.3 Contingency Plan

Should the erosion control measures fail, and sediment migrate beyond the limits of the control works, the following tasks are required to be completed:

- The Town of Midland and County of Simcoe should be notified of the event. The area will be assessed and cleaned up to the satisfaction of the agencies.
- The MNR should be notified if sediment reaches any environment protection areas.
- Additional sedimentation facilities be installed in the area of the migration and down gradient to contain the sediment.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are based on the information and analysis presented in this report:

1) The comparison of pre-development and post-development stormwater flowrates indicate that peak flows will increase during the modelled storm events as a result of the proposed development.
2) The use of an underground storage tank system has been proposed to attenuate post development flows to pre-development levels.
3) Stormwater quality enhancement to the receiving storm sewer system can be achieved using a “treatment train” of quality control techniques including extended detention storage in the parking lot, maintenance of existing lot line vegetation and the installation of an oil grit separator treatment device on the storm sewer outlet.
4) Suitable measures can be implemented during construction to protect the adjacent properties from migrating sediments.

It is recommended that:

1) This report and drawings be submitted to the Town of Midland and the County of Simcoe for review and approval.
2) The storm water management works shall be constructed in accordance with the design details presented in this report.
3) The construction mitigation measures outlined in this report are utilized as a guideline for construction mitigation management on this site.

We trust this is satisfactory and should you have any questions, please call.

APPENDIX A

Geotechnical Report

PINESTONE ENGINEERING LTD.

Design Chart 1.08: Hydrologic Soil Groups (Continued)

- Based on Soil Texture

Sands, Sandy Loams and Gravels	
- overlying sand, gravel or limestone bedrock, very well drained	A
- ditto, imperfectly drained	AB
- shallow, overlying Precambrian bedrock or clay subsoil	B
Medium to Coarse Loams	
- overlying sand, gravel or limestone, well drained	AB
- shallow, overlying Precambrian bedrock or clay subsoil	B
Medium Textured Loams	
- shallow, overlying limestone bedrock	B
- overlying medium textured subsoil	BC
Silt Loams, Some Loams	
- with good internal drainage	BC
- with slow internal drainage and good external drainage	C
Clays, Clay Loams, Silty Clay Loams	
- with good internal drainage	C
- with imperfect or poor external drainage	C
- with slow internal drainage and good external drainage	D

Source: U.S. Department of Agriculture (1972)

Design Chart 1.09: Soil/Land Use Curve Numbers

Land Use	Treatment or Practice	Hydrologic Condition[4]	Hydrologic Soil Group			
			A	B	C	D
Fallow	Straight row	---	77	86	91	94
Row crops	"	Poor	72	81	88	91
	"	Good	67	78	85	89
	Contoured	Poor	70	79	84	88
	"	Good	65	75	82	86
	" and terraced	Poor	66	74	8	82
	" " "	Good	62	71	78	81
Small grain	Straight row	Poor	65	76	84	88
		Good	63	75	83	87
	Contoured	Poor	63	74	82	85
		Good	61	73	81	84
	" and terraced	Poor	61	72	79	82
		Good	59	70	78	81
Close-seeded	Straight row	Poor	66	77	85	89
legumes[2]	" "	Good	58	72	81	85
or	Contoured	Poor	64	75	83	85
rotation	"	Good	55	69	78	83
meadow	" and terraced	Poor	63	73	80	83
	" and terraced	Good	51	67	76	80
Pasture		Poor	68	79	86	89
or range		Fair	49	69	79	84
	Contoured	Good	39	61	74	80
	"	Poor	47	67	81	88
	"	Fair	25	59	75	83
		Good	6	35	70	79
Meadow		Good	30	58	71	78
Woods		Poor	45	66	77	83
		Fair	36	60	73	79
		Good	25	55	70	77
Farmsteads		---	59	74	82	86
		---	72	82	87	89
		---	74	84	90	92

For average anticedent soil moisture condition (AMC II)

[2] Close-drilled or broadcast.

[4] The hydrologic condition of cropland is good if a good crop rotation practice is used; it is poor if one crop is grown continuously.

Source: U.S. Department of Agriculture (1972)

Soil Engineers Ltd.
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A REPORT TO
2055672 ONTARIO INC.

A GEOTECHNICAL INVESTIGATION FOR PROPOSED BUILDING ADDITION

MIDLAND TOYOTA
806 KING STREET

TOWN OF MIDLAND

REFERENCE NO. 2408-S160

OCTOBER 2024

DISTRIBUTION

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TABLES

ENCLOSURES

1.0 INTRODUCTION

In accordance with an email authorization on August 26, 2024 from Mr. Michael Yallowega of Yallowega Architecture Inc., on behalf of 2055672 Ontario Inc., a geotechnical investigation was carried out at Midland Toyota located at 806 King Street in the Town of Midland.

The purpose of the investigation was to reveal the subsurface conditions and determine the engineering properties of the disclosed soils for the proposed building addition for the car dealership. The geotechnical findings and recommendations for the proposed building additions are presented in this report.

2.0 SITE AND PROJECT DESCRIPTION

The Town of Midland is located on the Penetang Peninsula within the physiographic region known as Simcoe Upland which is comprised of a series of broad rolling till plains. The tills are generally sandy in composition and have been partly eroded by glacial Lake Algonquin and in places filled with glaciofluvial and lacustrine sand, silt and clay.

The investigation was carried out within the pavement area of the car dealership, at the service entrance and the south and west side of the building. The area is paved and is being used as parking.

It is understood that building additions will be constructed; however, detail design for the proposed additions are not available at the time of the report preparation.

3.0 FIELD WORK

The field work, consisting of 4 sampled boreholes extending to depths of 5.2 m, 6.3 m and 6.6 m, was carried out on September 18, 2024 at the locations shown on the Borehole Location Plan, Drawing No. 1. The borehole location were specified by Yallowega Architecture Inc.

The boreholes were advanced at intervals to the sampling depths by a truck-mounted equipment with solid stem augers and split spoon for soil sampling. Standard Penetration Tests, using the procedures described on the enclosed “List of Abbreviations and Terms”, were performed at the sampling depths. The results are recorded as the Standard Penetration Resistance (or ‘N’ values) of the subsoil. The relative density of the non-cohesive strata and

the consistency of the cohesive strata are inferred from the 'N' values. Split-spoon samples were recovered for soil classification and laboratory testing.

The field work was supervised and the findings were recorded by a Geotechnical Technician. The ground elevation at each of the borehole location was obtained using the Global Navigation Satellite System (GNSS).

4.0 SUBSURFACE CONDITIONS

Detailed descriptions of the subsurface conditions are presented on the Borehole Logs, comprising Figures 1 to 4, inclusive. The revealed stratigraphy is plotted in the Subsurface Profile on Drawing No. 2. The engineering properties of the disclosed soils are discussed herein.

The investigation has disclosed that beneath the pavement structure and in place, a layer of earth fill, the site is generally underlain by a deposit of silty sand till.

4.1 Pavement Structure

The pavement thickness at each borehole location is summarized in Table 1.

Table 1 - Revealed Pavement Structure

Borehole No.	Pavement Thickness (mm)			Subgrade Condition
	Asphaltic Concrete	Granular Fill	Total	
1	75	380	455	Silty Sand Fill
2	50	380	430	Silty Sand Till
3	50	410	460	Silty Sand Till
4	50	910	960	Silty Sand Till

The water content of the granular fill samples was determined and the results are plotted on the Borehole Logs; the values range from 2% to 6%, with a median of 4% indicating the granular fill is in a dry to moist, generally damp condition.

4.2 Earth Fill

A layer of earth fill, extending to a depth of 2.1 m below the prevailing ground surface, was encountered at Borehole 1. The fill consists of silty sand.

The obtained water content values are 9% and 11%, indicating it is in a moist condition. The obtained 'N' values are 10 and 17 blows per 30 cm of penetration, indicating that the fill was likely placed with some compaction effort.

One must be aware that the samples retrieved from the borehole may not be truly representative of the geotechnical quality of the fill.

4.3 Silty Sand Till

The silty sand till was encountered in all boreholes. It consists of a random mixture of particle sizes ranging from clay to gravel, with the sand and silt being the predominant fraction. A tactile examination of the soil samples indicated that the till is cemented, indicating a variable amount of clay. Grain size analysis was performed on a representative sample of the silty sand till, the result is plotted on Figure 5.

The relative density of the deposit is compact to very dense, as inferred from the 'N' values ranging from 11 to over 100 blows per 30 cm of penetration. Sample examination indicates that the surficial till, in place, is weathered to a depth of 0.9 to 1.2 m below the prevailing ground surface. Frequent hard resistance to augering was encountered, indicating the presence of cobbles and boulders within the till.

The natural water content of the soil samples ranges between 6% and 36%, with a median of 8%, showing damp to wet, generally moist conditions. The wet condition was restricted to the weathered zone at Borehole 2.

The engineering properties of the till deposit are listed below:

- High frost susceptibility and low water erodibility, with the sand layer being erodible.
- The till will be stable in relatively steep cuts; however, under prolonged exposure, localized sheet sliding may occur in the sand layers.

4.4 Soil Compatibility with Concrete

In order to assess the potential of concrete attack by the occurring soils, a representative soil sample was selected for testing to determine its pH value, sulphate and chloride content. The results are summarized in Table 2.

Table 2 - pH Values, Sulphate and Chloride Concentration

Borehole No.	Sample No.	Soil Description	pH Value	Sulphate Concentration (ppm)	Chloride Concentration (ppm)
1	4	Silty Sand Till	8.2	50	500

The results reveal that the tested sample have a pH value of 8.2, sulphate content of 50 ppm and chloride content of 500 ppm, disclosing that the actual sulphate and chloride concentration of the soils will be less than 1,000 ppm. Thus, it is inferred that the soils have a negligible potential to attack on concrete.

4.5 Compaction Characteristics of the Revealed Soils

The obtainable degree of compaction is primarily dependent on the soil moisture and, to a lesser extent, on the type of compactor used and the effort applied. As a general guide, the typical water content values of the revealed soils for Standard Proctor compaction are presented in Table 3.

Table 3 - Estimated Water Content for Compaction of On-Site Material

Soil Type	Determined Natural Water Content (%)	Water Content (%) for Standard Proctor Compaction	
		100% (optimum)	Range for 95% or +
Earth Fill	13	11	6 to 16
Silty Sand Till	6 to 36 (median 8)	10	6 to 15

* The above values are provided as a guideline. Standard Proctor Tests must be performed on bulk samples collected from site during construction prior to backfill and compaction.

5.0 GROUNDWATER CONDITION

All boreholes remained dry on completion of the boreholes. During wet seasons, perched groundwater may occur at shallower depths within the earth fill, or in the sand or silt. The groundwater level will be subjected to seasonal fluctuation.

6.0 DISCUSSION AND RECOMMENDATIONS

The investigation has disclosed that beneath the pavement structure and a layer of earth fill in places, the site is underlain by a deposit of silty sand till.

All boreholes remained dry upon completion of the boreholes. The groundwater level will fluctuate with seasons.

The project will consist of the construction of building additions around the existing building. The geotechnical findings which warrant special consideration are presented below:

1. The existing earth fill is not suitable for supporting any structures. For structural use, it must be subexcavated, sorted free of any deleterious material, and properly compacted. If it is impractical to sort the fill, it must be wasted.
2. The sound natural soils below the earth fill and weathered till are suitable for normal spread and strip footing construction. The footing subgrade must be inspected by either a geotechnical engineer, or a geotechnical technician under the supervision of a geotechnical engineer, to ensure that its condition is compatible with the design of the foundation.
3. For slab-on-grade construction, the slab should be placed on sound natural soils or properly compacted earth fill. Prior to the slab construction, the subgrade must be proof-rolled and inspected. Any weathered or soft areas detected must be subexcavated and replaced with inorganic material compacted to 98% or + Standard Proctor dry density.
4. Excavation into the till containing boulders will require extra effort and may require the use of a heavy-duty backhoe. Boulders larger than 15 cm in size are not suitable for structural backfill and/or in the construction of engineered fill.

The recommendations appropriate for the design of the development are presented herein. One must be aware that the subsurface conditions may vary between boreholes. Should subsurface variances become apparent during construction, a geotechnical engineer must be consulted.

6.1 **Site Preparation**

The existing pavement structure should be removed. The existing earth fill and weathered soils should be subexcavated, sorted, inspected and recompacted in layers. If it is impractical to sort the soil, it must be wasted and replaced with properly completed inorganic earth fill.

6.2 Foundations

Based on the borehole findings, it is recommended that the normal spread and strip footings for the proposed project must be placed below the earth fill and weathered soils onto the sound natural native soils. The recommended soil pressures and suitable founding levels are presented in Table 4.

Table 4 - Founding Levels

Borehole No.	Recommended Maximum Allowable Soil Pressure (SLS)/ Factored Ultimate Soil Bearing Pressure (ULS) and Corresponding Founding Level	
	250 kPa (SLS)/400 kPa (ULS)	
	Depth (m)	Elevation (m)
1	2.4 or +	211.3 or -
2	1.6 or +	213.6 or -
3	1.0 or +	215.5 or -
4	1.0 or +	215.8 or -

Where engineered fill is constructed, footings founded on the engineered fill can be designed using a Maximum Allowable Soil Pressure (SLS) of 150 kPa and Factored Ultimate Soil Bearing Pressure (ULS) of 225 kPa.

The total and differential settlements of structures designed using the bearing pressure at SLS are estimated to be within 25 mm and 20 mm, respectively.

The foundations exposed to weathering and in unheated areas should have at least 1.5 m of earth cover for protection against frost action, or must be properly insulated.

To ensure that the condition of the subgrade is compatible with the foundation design requirements, the footing subgrade of the normal foundations must be inspected by either a geotechnical engineer, or a geotechnical technician under the supervision of a geotechnical engineer.

The footings should meet the requirements specified in the latest Ontario Building Code, and the building must be designed to resist a minimum earthquake force using Site Classification ‘C’ (very dense soil).

The type of foundations for the new addition and the existing building should be similar and compatible. If the new footing subgrade lies lower than adjacent existing footings, the existing footings must be underpinned. In this case, the structural engineer and geotechnical engineer for the project must be consulted.

A slip-joint should be provided at the interface of the new structure and the existing building. This is to allow for abrupt differential settlement at the interface without imposing structural distress on the existing foundations.

Where the building is to be constructed without a basement, permanent perimeter and under-floor drainage will not be required.

6.3 Slab-On-Grade Construction

For slab-on-grade construction, the earth fill and badly weathered soil must be subexcavated, sorted free of topsoil and any deleterious materials, and properly recompacted to at least 98% SPDD.

The slab should be constructed on a granular base, 20 cm thick, consisting of 19-mm Crusher-Run Limestone (CRL), or equivalent, compacted to its maximum SPDD.

A Modulus of Subgrade Reaction of 25 MPa/m is recommended for use in the design of the floor slab on compacted granular fill.

The ground around the building must be graded to direct water away from the structure.

6.4 Underground Services

The subgrade for the underground services should consist of natural soils or compacted organic-free earth fill. Where weathered or soft soils are encountered, these materials must be subexcavated and replaced with properly compacted bedding material.

A Class ‘B’ bedding, consisting of compacted 20-mm Crusher-Run Limestone, is recommended for the construction of the underground services. The sewer joints should be leak-proof or wrapped with an appropriate waterproof membrane to prevent subgrade migration.

In order to prevent pipe floatation when the sewer trench is deluged with water derived from precipitation, a soil cover with a thickness equal to the diameter of the pipe should be in place at all times after completion of the pipe installation.

Openings to subdrains and catch basins should be shielded with a fabric filter to prevent blockage by silting.

6.5 Backfilling in Trenches and Excavated Areas

The backfill in the trenches and excavated areas should consist of organic-free soil, such as the revealed silty sand till and inorganic earth fill, compacted to at least 95% SPDD. In slab-on-grade areas and in the zone within 1.0 m below the pavement subgrade, the material should be compacted to 98% SPDD, with the water content 2% to 3% drier than the optimum.

As shown in Table 1, selected on site inorganic till is generally suitable for use as trench backfill. Any dry soils encountered will require wetting prior to its use as structural backfill. The till should be sorted free of oversized boulders (over 15 cm in size) before use as backfill. The weathered till and earth fill must be screened, sorted free of topsoil and organics before reusing for structural backfill.

In normal construction practice, the problem areas of pavement settlement largely occur adjacent to manholes, catch basins, services crossings, foundation walls and columns, it is recommended that a sand backfill should be used.

The narrow trenches should be cut at 2 Horizontal (H):1 Vertical (V) or flatter so that the backfill can be effectively compacted. Otherwise, soil arching will prevent the achievement of proper compaction. The lift of each backfill layer should either be limited to a thickness of 20 cm, or the thickness should be determined by test strips.

6.6 Pavement Restoration

Upon completion of the building additions, underground services and trench backfilling, the pavement will be restored. The recommended pavement design is presented in Table 5.

Table 5 - Pavement Design

Course	Thickness (mm)	OPS Specifications
Asphalt Surface	40	HL3
Asphalt Binder	50	HL8
Granular Base	150	Granular 'A'
Granular Sub-base Parking Fire Route	 300 450	Granular 'B', Type I

Prior to the placement of the granular bases, the subgrade should be proof-rolled; any soft subgrade should be subexcavated and replaced with properly compacted organic-free material.

The subgrade within 1.0 m below the underside of the granular sub-base should be compacted to at least 98% SPDD, with water content 2% to 3% drier than its optimum.

All the granular bases should be compacted in 150 to 200 mm lifts to 100% SPDD.

At the transition between the existing pavement structure and the new pavement, the surface and binder courses must overlap the existing pavement to avoid water penetration at the pavement joint. Tack coat should be applied at the transition below the 300 mm longitudinal step joint to ensure proper transition when the new asphalt is placed.

6.6 Soil Parameters

The recommended soil parameters for the project design are given in Table 6.

Table 6 - Soil Parameters

Unit Weight and Bulk Factor			
	Unit Weight (kN/m^3)	**Estimated Bulk Factor**	
	Bulk	**Loose**	**Compacted**
Earth Fill and Weathered Till	21.0	1.20	1.00
Silty Sand Till	22.5	1.33	1.03

Table 6 - Soil Parameters (Cont'd)

Lateral Earth Pressure Coefficients			
	Active K_a	**At Rest K_o**	**Passive K_p**
Earth Fill and weathered Soil	0.40	0.50	2.50
Silty Sand Till	0.32	0.48	3.12
Effective Shear Strength Parameters	**Cohesion c' (kPa)**	**Angle of Internal Friction, ϕ'**	
Silty Sand Till	2	33°	
Compacted Earth Fill	0	30°	
Coefficient of Permeability (K) and Percolation Time (T)			
	K (cm/sec)	**T (min/cm)**	
Silty Sand Till	10^{-5}	20	
Estimated Electrical Resistivity			
Silty Sand Till	5000 ohm·cm		
Coefficients of Friction			
Between Concrete and Granular Base		0.50	
Between Concrete and Sound Native Soils		0.35	

6.7 Excavation

Excavation should be carried out in accordance with Ontario Regulation 213/91. For excavation purposes, the types of soils are classified in Table 7.

Table 7 - Classification of Soils for Excavation

Material	Type
Silty Sand Till	2
Earth Fill and weathered Silty Sand Till	3

Excavation into the till containing boulders will require extra effort and the use of a heavy-duty, properly equipped backhoe.

If encountered, the groundwater yield from the silty sand till, due to its relatively low permeability, will be small to some and can be controlled by pumping from sumps.

Prospective contractors must be asked to assess the in situ subsurface conditions for soil cuts by digging test pits to 1.0 m below the anticipated depth of excavation. These test pits should be allowed to remain open for a few hours to assess the trenching conditions.

7.0 LIMITATIONS OF REPORT

This report was prepared by Soil Engineers Ltd. for the account of 2055672 Ontario Inc. and for review by the designated consultants, financial institutions, government agencies and contractors. The material in the report reflects the judgment of Kelvin Hung, P.Eng., and Bernard Lee, P.Eng., in light of the information available to it at the time of preparation.

Use of the report is subject to the conditions and limitations of the contractual agreement. Any use which a Third Party makes of this report, and/or any reliance on decisions to be made based on it is the responsibility of such Third Parties. Soil Engineers Ltd. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

SOIL ENGINEERS LTD.

Kelvin Hung, P.Eng.

Bernard Lee, P.Eng.
KH/BL

LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

SAMPLE TYPES

AS Auger sample
CS Chunk sample
DO Drive open (split spoon)
DS Denison type sample
FS Foil sample
RC Rock core (with size and percentage recovery)
ST Slotted tube
TO Thin-walled, open
TP Thin-walled, piston
WS Wash sample

PENETRATION RESISTANCE

Standard Penetration Resistance or 'N' Value:

The number of blows of a 63.5 kg hammer falling from a height of 76 cm required to advance a 51 mm outer diameter drive open sampler 30 cm into undisturbed soil, after an initial penetration of 15 cm.

Plotted as '○'

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows per each 30 cm of penetration of a 51 mm diameter, 90° point cone driven by a 63.5 kg hammer falling from a height of 76 cm.

Plotted as '—●—'

WH Sampler advanced by static weight
PH Sampler advanced by hydraulic pressure
PM Sampler advanced by manual pressure
NP No penetration

SOIL DESCRIPTION

Cohesionless Soils:

'N' (blows/30 cm)	Relative Density
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
>50	very dense

Cohesive Soils:

Undrained Shear Strength (kPa)	'N' (blows/30 cm)	Consistency
<12	<2	very soft
12 to <25	2 to <4	soft
25 to <50	4 to <8	firm
50 to <100	8 to <15	stiff
100 to 200	15 to 30	very stiff
>200	>30	hard

Method of Determination of Undrained Shear Strength of Cohesive Soils:

x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding
△ Laboratory vane test

METRIC CONVERSION FACTORS

1 ft = 0.3048 m
1 inch = 25.4 mm
1 lb = 0.454 kg
1 ksf = 47.88 kPa

JOB NO.: 2408-S160

LOG OF BOREHOLE: 1

FIGURE NO.: 1

PROJECT DESCRIPTION: Proposed Building Addition

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 806 King Street, Town of Midland

DRILLING DATE: September 18, 2024

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) / Shear Strength (kN/m²) / Penetration Resistance (blows/30 cm)	Atterberg Limits PL LL / Moisture Content (%)	WATER LEVEL
215.7	Pavement Surface							
0.0	**75 mm ASPHALT** **380 mm GRANULAR FILL**	1	DO	24	0		4	
	Brown **EARTH FILL** silty sand	2	DO	17	1		9	
		3	DO	10			11	
213.6					2			
2.1	Brown, very dense	4	DO	50/10			8	Dry on completion
		5	DO	50/15	3		8	
	SILTY SAND TILL traces of clay and gravel occ. frequent cobbles and boulders	6	DO	50/13	4		8	
					5			
209.4		7	DO	50/8	6		7	
6.3	**END OF BOREHOLE**				7			
					8			
					9			
					10			

JOB NO.: 2408-S160

LOG OF BOREHOLE: 2

FIGURE NO.: 2

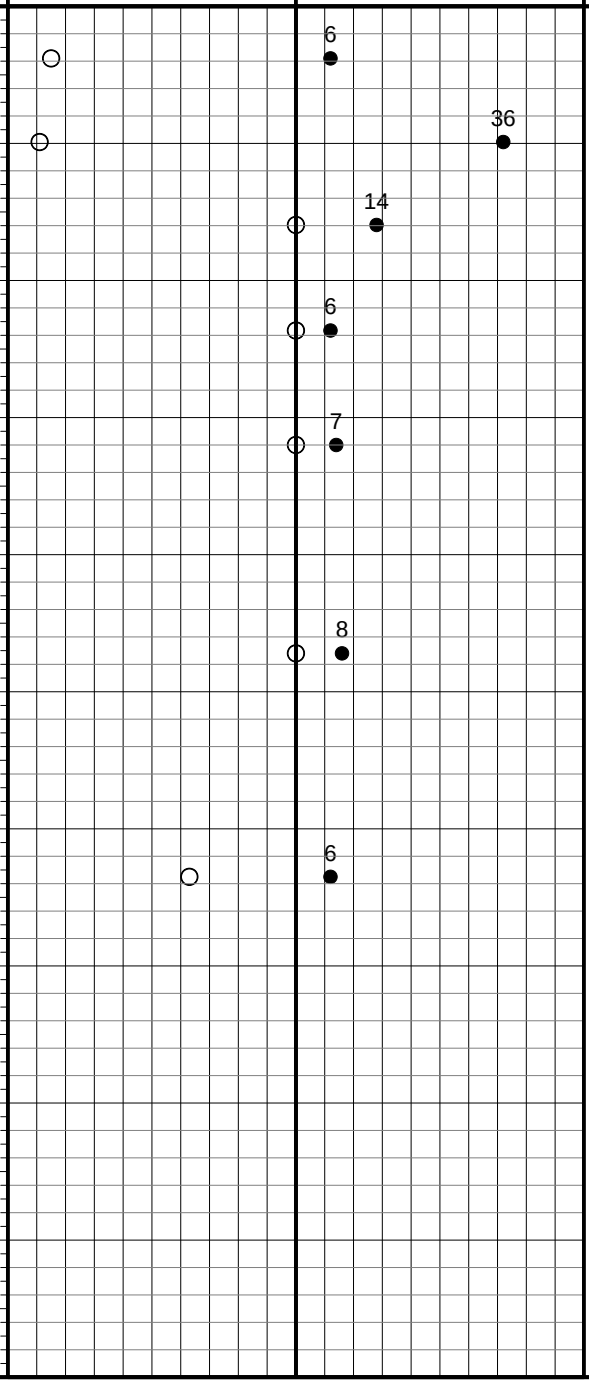
PROJECT DESCRIPTION: Proposed Building Addition

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 806 King Street, Town of Midland

DRILLING DATE: September 18, 2024

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)
215.2	Pavement Surface				
0.0	**50 mm ASPHALT** **380 mm GRANULAR FILL**				0
	Brown, very dense	1	DO	15	
	weathered	2	DO	11	1
		3	DO	50/15	
					2
	SILTY SAND TILL	4	DO	50/15	
		5	DO	50/15	3
	traces of clay and gravel occ. frequent cobbles and boulders				4
		6	DO	50/15	
	brown grey				5
					6
		7	DO	63	
208.6					
6.6	**END OF BOREHOLE**				7
					8
					9
					10



WATER LEVEL: Dry on completion

Soil Engineers Ltd.

JOB NO.: 2408-S160

LOG OF BOREHOLE: 3

FIGURE NO.: 3

PROJECT DESCRIPTION: Proposed Building Addition

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 806 King Street, Town of Midland

DRILLING DATE: September 18, 2024

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m^2) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
216.5	Pavement Surface							
0.0	**50 mm ASPHALT** **410 mm GRANULAR FILL**				0			
	Dense to very dense	1A	DO	30			2, 12	
		1B						
	weathered	2	DO	66/23	1		12	
		3	DO	50/13			7	
	SILTY SAND TILL				2			
		4	DO	50/8			7	Dry on completion
	traces of clay and gravel occ. frequent cobbles and boulders	5	DO	50/8	3		8	
	brown grey				4			
		6	DO	50/15			7	
211.3					5			
5.2	**END OF BOREHOLE** Refusal to augering, inferred boulders or bedrock				6			
					7			
					8			
					9			
					10			

Soil Engineers Ltd.

JOB NO.: 2408-S160

LOG OF BOREHOLE: 4

FIGURE NO.: 4

PROJECT DESCRIPTION: Proposed Building Addition

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 806 King Street, Town of Midland

DRILLING DATE: September 18, 2024

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
216.8	Pavement Surface							
0.0	**50 mm ASPHALT**				0			Dry on completion
	910 mm GRANULAR FILL	1	DO	42			4	
	Brown, compact to very dense	2	DO	41	1		9	
		3	DO	50/8			9	
					2			
	SILTY SAND TILL	4	DO	64/28			9	
		5	DO	25	3		10	
	traces of clay and gravel occ. frequent cobbles and boulders				4			
		6	DO	50/13			9	
211.6					5			
5.2	**END OF BOREHOLE**							
	Refusal to augering, inferred boulders or bedrock				6			
					7			
					8			
					9			
					10			

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GRAIN SIZE DISTRIBUTION

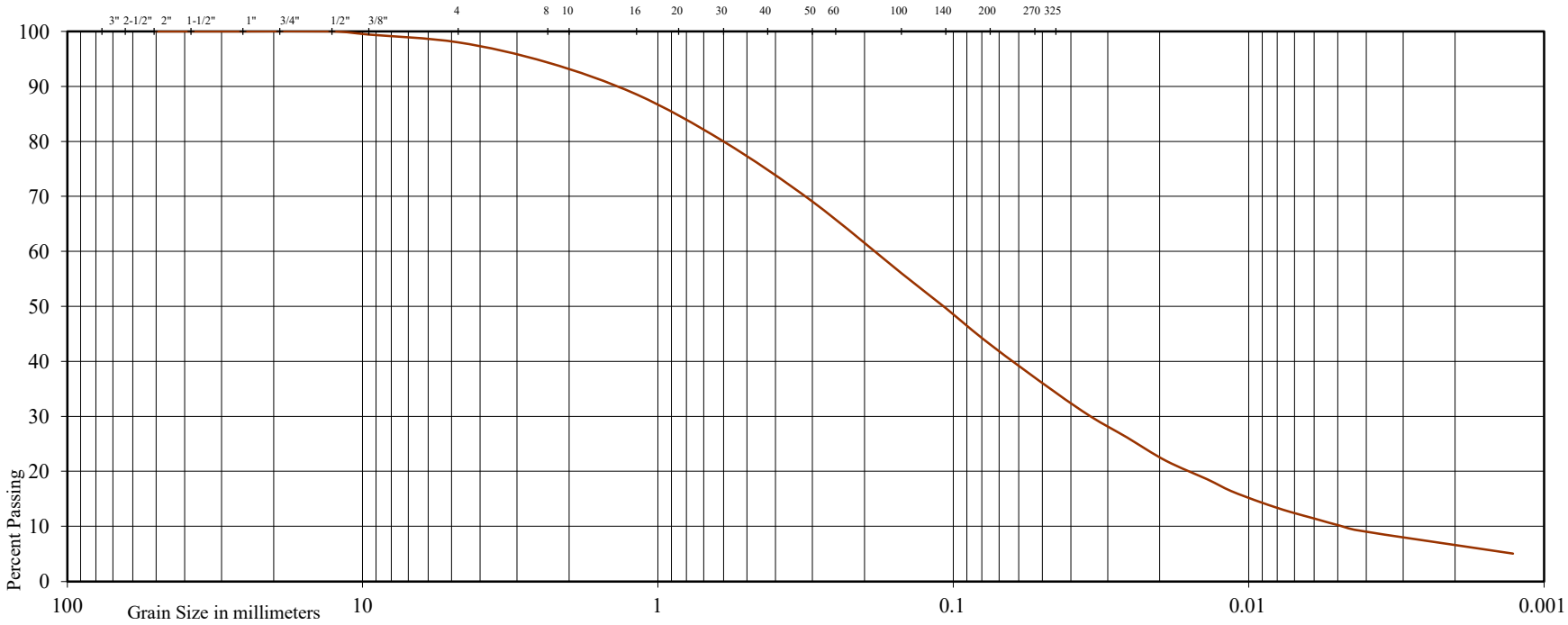
Reference No: 2408-S160

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Building Addition

Location: 806 King Street, Town of Midland

Borehole No: 4

Sample No: 2

Depth (m): 1

Elevation (m): 215.8

Liquid Limit (%) = -

Plastic Limit (%) = -

Plasticity Index (%) = -

Moisture Content (%) = 9

Estimated Permeability (cm./sec.) = 10^{-5}

Classification of Sample [& Group Symbol]: SILTY SAND TILL

traces of clay and gravel

Figure: 5

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | HYDROGEOLOGICAL | BUILDING SCIENCE
90 WEST BEAVER CREEK ROAD, SUITE #100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BOREHOLE LOCATION PLAN

SITE: 806 King Street, Town of Midland			
DESIGNED BY: -	**CHECKED BY:** -	**DWG NO.:** 1	
SCALE: 1:500	**REF. NO.:** 2408-S160	**DATE:** October 2024	**REV** -

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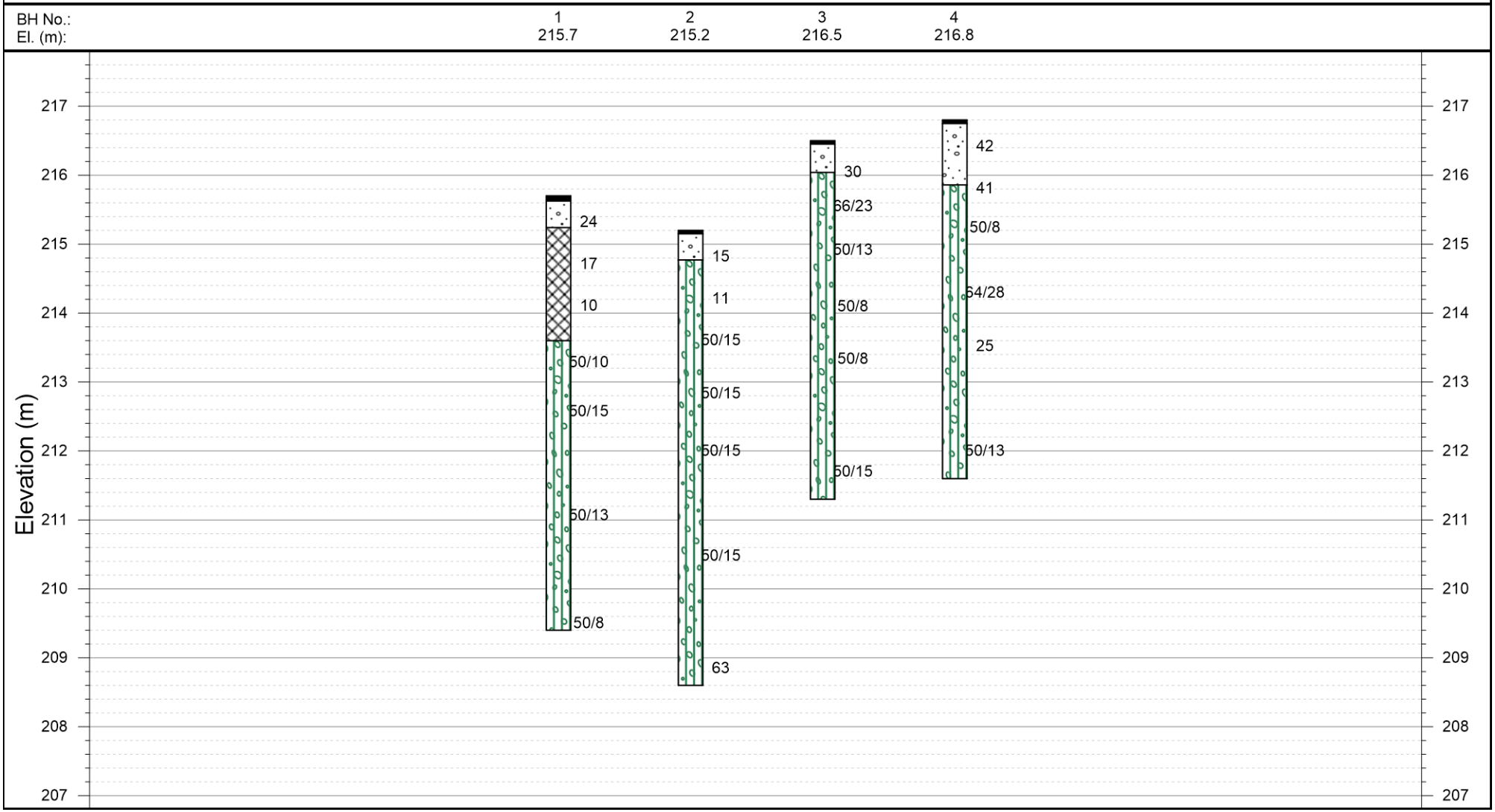
SUBSURFACE PROFILE
DRAWING NO. 2
SCALE: AS SHOWN

JOB NO.: 2407-S160
REPORT DATE: September 2024
PROJECT DESCRIPTION: Proposed Building Addition
PROJECT LOCATION: 806 King Street, Town of Midland

LEGEND
ASPHALT | GRANULAR | FILL | SILTY SAND TILL



APPENDIX B

MIDUSS Hydrological Modeling

PINESTONE ENGINEERING LTD.

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                                    February 7, 2010"
"           10   Units used:                                              ie METRIC"
"                Job folder:                                 Z:\Project Documents\"
"                                                11872M - Midland Toyota\SWM\MIDUSS"
"                Output filename:                                        5YR_PRE.out"
"                Licensee name:                                    Lauren Trividic"
"                Company                                                       PEL"
"                Date & Time last used:                  2025-11-25 at 2:44:33 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1135.400   Coefficient A"
"        7.500   Constant B"
"        0.841   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           135.721    mm/hr"
"             Total depth                  41.752    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          101   101 - EXISTING SITE CONDITION"
"       68.000   % Impervious"
"        1.320   Total Area"
"      150.000   Flow length"
"        3.000   Overland Slope"
"        0.422   Pervious Area"
"       50.000   Pervious length"
"        3.000   Pervious slope"
"        0.898   Impervious Area"
"      150.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.076   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.870   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.242     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.422      0.898      1.320      hectare"
"             Time of concentration  44.748     4.674      6.256      minutes"
"             Time to Centroid       158.871    93.566     96.144     minutes"
"             Rainfall depth         41.752     41.752     41.752     mm"
"             Rainfall volume        176.36     374.76     551.12     c.m"
"             Rainfall losses        38.581     5.447      16.050     mm"
"             Runoff depth           3.171      36.304     25.702     mm"
"             Runoff volume          13.40      325.87     339.26     c.m"
"             Runoff coefficient     0.076      0.870      0.616      "
"             Maximum flow           0.002      0.242      0.242      c.m/sec"
" 38          START/RE-START TOTALS "
"            3   Runoff Totals on EXIT"
"             Total Catchment area                      0.000    hectare"
"             Total Impervious area                     0.000    hectare"
"             Total % impervious                        0.000"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                                    February 7, 2010"
"           10   Units used:                                              ie METRIC"
"                Job folder:                                 Z:\Project Documents\"
"                                                11872M - Midland Toyota\SWM\MIDUSS"
"                Output filename:                                       5YR_POST.out"
"                Licensee name:                                    Lauren Trividic"
"                Company                                                       PEL"
"                Date & Time last used:                  2025-12-03 at 11:09:08 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1135.400   Coefficient A"
"        7.500   Constant B"
"        0.841   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           135.721    mm/hr"
"             Total depth                  41.752    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          201   201 - SITE DEVELOPMENT AREA TO UNDERGROUND STORAGE TANK"
"       93.000   % Impervious"
"        0.410   Total Area"
"      100.000   Flow length"
"        2.000   Overland Slope"
"        0.029   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.381   Impervious Area"
"      100.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.076   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.866   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.102     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.029      0.381      0.410      hectare"
"             Time of concentration  19.240     4.138      4.237      minutes"
"             Time to Centroid       129.962    92.766     93.010     minutes"
"             Rainfall depth         41.752     41.752     41.752     mm"
"             Rainfall volume        11.98      159.20     171.18     c.m"
"             Rainfall losses        38.586     5.584      7.894      mm"
"             Runoff depth           3.166      36.168     33.858     mm"
"             Runoff volume          0.91       137.91     138.82     c.m"
"             Runoff coefficient     0.076      0.866      0.811      "
"             Maximum flow           0.000      0.102      0.102      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.102     0.102     0.000     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.102     0.000     0.000     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          202   202 - SITE AREA UNCONTROLLED TO KING STREET (EXISTING CONDITION)"
"       91.000   % Impervious"
"        0.910   Total Area"
"      100.000   Flow length"
"        3.000   Overland Slope"
"        0.082   Pervious Area"
"       10.000   Pervious length"
"        3.000   Pervious slope"
"        0.828   Impervious Area"
"      100.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.076   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.858   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.216     0.000     0.000     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.082      0.828      0.910      hectare"
"             Time of concentration  17.037     3.664      3.780      minutes"
"             Time to Centroid       127.453    92.113     92.420     minutes"
"             Rainfall depth         41.752     41.752     41.752     mm"
"             Rainfall volume        34.19      345.75     379.94     c.m"
```

```
"             Rainfall losses        38.586     5.930      8.869      mm"
"             Runoff depth           3.166      35.822     32.883     mm"
"             Runoff volume          2.59       296.64     299.23     c.m"
"             Runoff coefficient     0.076      0.858      0.788      "
"             Maximum flow           0.001      0.216      0.216      c.m/sec"
" 38          START/RE-START TOTALS 202"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.410    hectare"
"             Total Impervious area                       0.381    hectare"
"             Total % impervious                         93.000"
" 19          EXIT"
```

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"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                                    February 7, 2010"
"           10   Units used:                                                ie METRIC"
"                Job folder:                                 Z:\Project Documents\"
"                                                 11872M - Midland Toyota\SWM\MIDUSS"
"                Output filename:                                        5YR_SWM.out"
"                Licensee name:                                    Lauren Trividic"
"                Company                                                       PEL"
"                Date & Time last used:                    2025-12-03 at 3:32:32 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1135.400   Coefficient A"
"        7.500   Constant B"
"        0.841   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           135.721    mm/hr"
"             Total depth                  41.752    mm"
"            6   005hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          201   201 - SITE DEVELOPMENT AREA TO UNDERGROUND STORAGE TANK"
"       93.000   % Impervious"
"        0.410   Total Area"
"      100.000   Flow length"
"        2.000   Overland Slope"
"        0.029   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.381   Impervious Area"
"      100.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.076   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.866   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.102     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.029      0.381      0.410      hectare"
"             Time of concentration  19.240     4.138      4.237      minutes"
"             Time to Centroid       129.962    92.766     93.010     minutes"
"             Rainfall depth         41.752     41.752     41.752     mm"
"             Rainfall volume        11.98      159.20     171.18     c.m"
"             Rainfall losses        38.586     5.584      7.894      mm"
"             Runoff depth           3.166      36.168     33.858     mm"
"             Runoff volume          0.91       137.91     138.82     c.m"
"             Runoff coefficient     0.076      0.866      0.811      "
"             Maximum flow           0.000      0.102      0.102      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.102     0.102     0.000     0.000"
" 54          POND DESIGN"
"        0.102   Current peak flow    c.m/sec"
"        0.045   Target outflow    c.m/sec"
"        138.8   Hydrograph volume    c.m"
"           7.   Number of stages"
"      213.500   Minimum water level    metre"
"      214.700   Maximum water level    metre"
"      213.500   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                213.500     0.000     0.000"
"                213.700   0.01170    23.803"
"                213.900   0.01927    47.606"
"                214.100   0.02462    71.409"
"                214.300   0.02899    95.212"
"                214.500   0.03279   119.015"
"                214.700   0.03619   142.818"
"           1.   ORIFICES"
"                Orifice   Orifice   Orifice Number of"
"                 invert coefficie  diameter  orifices"
"                213.500     0.630    0.1250     1.000"
"             Peak outflow                  0.024    c.m/sec"
"             Maximum level                214.083    metre"
"             Maximum storage               69.425    c.m"
"             Centroidal lag                 2.227   hours"
"                  0.102     0.102     0.024     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.102     0.024     0.024     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.102     0.000     0.024     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            3   Specify values"
```

```
"            1   SCS method"
"          202   202 - SITE AREA UNCONTROLLED TO KING STREET (EXISTING CONDITION)"
"       91.000   % Impervious"
"        0.910   Total Area"
"      100.000   Flow length"
"        3.000   Overland Slope"
"        0.082   Pervious Area"
"       10.000   Pervious length"
"        3.000   Pervious slope"
"        0.828   Impervious Area"
"      100.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.076   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.858   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.216     0.000     0.024     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.082      0.828      0.910      hectare"
"             Time of concentration  17.037     3.664      3.780      minutes"
"             Time to Centroid       127.453    92.113     92.420     minutes"
"             Rainfall depth         41.752     41.752     41.752     mm"
"             Rainfall volume        34.19      345.75     379.94     c.m"
"             Rainfall losses        38.586     5.930      8.869      mm"
"             Runoff depth           3.166      35.822     32.883     mm"
"             Runoff volume          2.59       296.64     299.23     c.m"
"             Runoff coefficient     0.076      0.858      0.788      "
"             Maximum flow           0.001      0.216      0.216      c.m/sec"
" 38          START/RE-START TOTALS 202"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.410    hectare"
"             Total Impervious area                       0.381    hectare"
"             Total % impervious                         93.000"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                                    February 7, 2010"
"           10   Units used:                                                ie METRIC"
"                Job folder:                                 Z:\Project Documents\"
"                                                11872M - Midland Toyota\SWM\MIDUSS"
"                Output filename:                                        10YR_PRE.out"
"                Licensee name:                                       Lauren Trividic"
"                Company                                                         PEL"
"                Date & Time last used:                    2025-11-25 at 2:49:01 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1387.000   Coefficient A"
"        7.970   Constant B"
"        0.852   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           156.261    mm/hr"
"             Total depth                  48.048    mm"
"            6   010hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          101   101 - EXISTING SITE CONDITION"
"       68.000   % Impervious"
"        1.320   Total Area"
"      150.000   Flow length"
"        3.000   Overland Slope"
"        0.422   Pervious Area"
"       50.000   Pervious length"
"        3.000   Pervious slope"
"        0.898   Impervious Area"
"      150.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.101   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.883   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.282     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.422      0.898      1.320      hectare"
"             Time of concentration  36.810     4.397      6.045      minutes"
"             Time to Centroid       147.321    92.583     95.367     minutes"
"             Rainfall depth         48.048     48.048     48.048     mm"
"             Rainfall volume        202.95     431.28     634.23     c.m"
"             Rainfall losses        43.219     5.636      17.662     mm"
"             Runoff depth           4.829      42.412     30.386     mm"
"             Runoff volume          20.40      380.69     401.09     c.m"
"             Runoff coefficient     0.101      0.883      0.632      "
"             Maximum flow           0.004      0.282      0.282      c.m/sec"
" 38          START/RE-START TOTALS "
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.000    hectare"
"             Total Impervious area                       0.000    hectare"
"             Total % impervious                          0.000"
" 19          EXIT"
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```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                                    February 7, 2010"
"           10   Units used:                                              ie METRIC"
"                Job folder:                                 Z:\Project Documents\"
"                                                11872M - Midland Toyota\SWM\MIDUSS"
"                Output filename:                                      10YR_POST.out"
"                Licensee name:                                      Lauren Trividic"
"                Company                                                       PEL"
"                Date & Time last used:                  2025-12-03 at 11:10:21 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1387.000   Coefficient A"
"        7.970   Constant B"
"        0.852   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           156.261    mm/hr"
"             Total depth                  48.048    mm"
"            6   010hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          201   201 - SITE DEVELOPMENT AREA TO UNDERGROUND STORAGE TANK"
"       93.000   % Impervious"
"        0.410   Total Area"
"      100.000   Flow length"
"        2.000   Overland Slope"
"        0.029   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.381   Impervious Area"
"      100.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.100   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.877   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.118     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.029      0.381      0.410      hectare"
"             Time of concentration  15.827     3.893      3.995      minutes"
"             Time to Centroid       123.293    91.858     92.127     minutes"
"             Rainfall depth         48.048     48.048     48.048     mm"
"             Rainfall volume        13.79      183.21     197.00     c.m"
"             Rainfall losses        43.227     5.908      8.521      mm"
"             Runoff depth           4.821      42.139     39.527     mm"
"             Runoff volume          1.38       160.68     162.06     c.m"
"             Runoff coefficient     0.100      0.877      0.823      "
"             Maximum flow           0.000      0.118      0.118      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.118     0.118     0.000     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.118     0.000     0.000     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          202   202 - SITE AREA UNCONTROLLED TO KING STREET (EXISTING CONDITION)"
"       91.000   % Impervious"
"        0.910   Total Area"
"      100.000   Flow length"
"        3.000   Overland Slope"
"        0.082   Pervious Area"
"       10.000   Pervious length"
"        3.000   Pervious slope"
"        0.828   Impervious Area"
"      100.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.100   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.875   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.249     0.000     0.000     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.082      0.828      0.910      hectare"
"             Time of concentration  14.015     3.447      3.566      minutes"
"             Time to Centroid       121.240    91.177     91.514     minutes"
"             Rainfall depth         48.048     48.048     48.048     mm"
"             Rainfall volume        39.35      397.88     437.24     c.m"
```

```
"             Rainfall losses        43.232     6.011      9.361      mm"
"             Runoff depth           4.816      42.037     38.687     mm"
"             Runoff volume          3.94       348.10     352.05     c.m"
"             Runoff coefficient     0.100      0.875      0.805      "
"             Maximum flow           0.001      0.249      0.249      c.m/sec"
" 38          START/RE-START TOTALS 202"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.410    hectare"
"             Total Impervious area                       0.381    hectare"
"             Total % impervious                         93.000"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                                    February 7, 2010"
"           10   Units used:                                              ie METRIC"
"                Job folder:                                 Z:\Project Documents\"
"                                                 11872M - Midland Toyota\SWM\MIDUSS"
"                Output filename:                                       10YR_SWM.out"
"                Licensee name:                                      Lauren Trividic"
"                Company                                                        PEL"
"                Date & Time last used:                    2025-12-03 at 3:33:40 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1387.000   Coefficient A"
"        7.970   Constant B"
"        0.852   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           156.261    mm/hr"
"             Total depth                  48.048    mm"
"            6   010hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          201   201 - SITE DEVELOPMENT AREA TO UNDERGROUND STORAGE TANK"
"       93.000   % Impervious"
"        0.410   Total Area"
"      100.000   Flow length"
"        2.000   Overland Slope"
"        0.029   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.381   Impervious Area"
"      100.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.100   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.877   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.118     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.029      0.381      0.410      hectare"
"             Time of concentration  15.827     3.893      3.995      minutes"
"             Time to Centroid       123.293    91.858     92.127     minutes"
"             Rainfall depth         48.048     48.048     48.048     mm"
"             Rainfall volume        13.79      183.21     197.00     c.m"
"             Rainfall losses        43.227     5.908      8.521      mm"
"             Runoff depth           4.821      42.139     39.527     mm"
"             Runoff volume          1.38       160.68     162.06     c.m"
"             Runoff coefficient     0.100      0.877      0.823      "
"             Maximum flow           0.000      0.118      0.118      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.118     0.118     0.000     0.000"
" 54          POND DESIGN"
"        0.118   Current peak flow    c.m/sec"
"        0.045   Target outflow    c.m/sec"
"        162.1   Hydrograph volume    c.m"
"           7.   Number of stages"
"      213.500   Minimum water level    metre"
"      214.700   Maximum water level    metre"
"      213.500   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                213.500     0.000     0.000"
"                213.700   0.01170    23.803"
"                213.900   0.01927    47.606"
"                214.100   0.02462    71.409"
"                214.300   0.02899    95.212"
"                214.500   0.03279   119.015"
"                214.700   0.03619   142.818"
"           1.   ORIFICES"
"                Orifice   Orifice   Orifice Number of"
"                 invert coefficie  diameter  orifices"
"                213.500     0.630    0.1250     1.000"
"             Peak outflow                  0.027    c.m/sec"
"             Maximum level                214.198    metre"
"             Maximum storage               83.069    c.m"
"             Centroidal lag                 2.251   hours"
"                  0.118     0.118     0.027     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.118     0.027     0.027     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.118     0.000     0.027     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            3   Specify values"
```

```
"            1   SCS method"
"          202   202 - SITE AREA UNCONTROLLED TO KING STREET (EXISTING CONDITION)"
"       91.000   % Impervious"
"        0.910   Total Area"
"      100.000   Flow length"
"        3.000   Overland Slope"
"        0.082   Pervious Area"
"       10.000   Pervious length"
"        3.000   Pervious slope"
"        0.828   Impervious Area"
"      100.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.100   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.875   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.249     0.000     0.027     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.082      0.828      0.910      hectare"
"             Time of concentration  14.015     3.447      3.566      minutes"
"             Time to Centroid       121.240    91.177     91.514     minutes"
"             Rainfall depth         48.048     48.048     48.048     mm"
"             Rainfall volume        39.35      397.88     437.24     c.m"
"             Rainfall losses        43.232     6.011      9.361      mm"
"             Runoff depth           4.816      42.037     38.687     mm"
"             Runoff volume          3.94       348.10     352.05     c.m"
"             Runoff coefficient     0.100      0.875      0.805      "
"             Maximum flow           0.001      0.249      0.249      c.m/sec"
" 38          START/RE-START TOTALS 202"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.410    hectare"
"             Total Impervious area                       0.381    hectare"
"             Total % impervious                         93.000"
" 19          EXIT"
```

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"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                                    February 7, 2010"
"           10   Units used:                                                ie METRIC"
"                Job folder:                                 Z:\Project Documents\"
"                                                 11872M - Midland Toyota\SWM\MIDUSS"
"                Output filename:                                        25YR_PRE.out"
"                Licensee name:                                       Lauren Trividic"
"                Company                                                         PEL"
"                Date & Time last used:                    2025-11-25 at 2:49:58 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1676.200   Coefficient A"
"        8.300   Constant B"
"        0.858   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           181.996    mm/hr"
"             Total depth                  56.186    mm"
"            6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          101   101 - EXISTING SITE CONDITION"
"       68.000   % Impervious"
"        1.320   Total Area"
"      150.000   Flow length"
"        3.000   Overland Slope"
"        0.422   Pervious Area"
"       50.000   Pervious length"
"        3.000   Pervious slope"
"        0.898   Impervious Area"
"      150.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.131   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.895   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.331     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.422      0.898      1.320      hectare"
"             Time of concentration  30.706     4.119      5.836      minutes"
"             Time to Centroid       137.797    91.692     94.670     minutes"
"             Rainfall depth         56.186     56.186     56.186     mm"
"             Rainfall volume        237.33     504.32     741.65     c.m"
"             Rainfall losses        48.805     5.887      19.620     mm"
"             Runoff depth           7.381      50.299     36.565     mm"
"             Runoff volume          31.18      451.48     482.66     c.m"
"             Runoff coefficient     0.131      0.895      0.651      "
"             Maximum flow           0.008      0.330      0.331      c.m/sec"
" 38          START/RE-START TOTALS "
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.000    hectare"
"             Total Impervious area                       0.000    hectare"
"             Total % impervious                          0.000"
" 19          EXIT"
```

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"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                                    February 7, 2010"
"           10   Units used:                                                ie METRIC"
"                Job folder:                                 Z:\Project Documents\"
"                                                11872M - Midland Toyota\SWM\MIDUSS"
"                Output filename:                                      25YR_POST.out"
"                Licensee name:                                      Lauren Trividic"
"                Company                                                        PEL"
"                Date & Time last used:                  2025-12-03 at 11:11:52 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1676.200   Coefficient A"
"        8.300   Constant B"
"        0.858   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           181.996    mm/hr"
"             Total depth                  56.186    mm"
"            6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          201   201 - SITE DEVELOPMENT AREA TO UNDERGROUND STORAGE TANK"
"       93.000   % Impervious"
"        0.410   Total Area"
"      100.000   Flow length"
"        2.000   Overland Slope"
"        0.029   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.381   Impervious Area"
"      100.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.131   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.886   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.137     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.029      0.381      0.410      hectare"
"             Time of concentration  13.203     3.647      3.752      minutes"
"             Time to Centroid       117.870    91.043     91.338     minutes"
"             Rainfall depth         56.186     56.186     56.186     mm"
"             Rainfall volume        16.13      214.24     230.36     c.m"
"             Rainfall losses        48.826     6.387      9.358      mm"
"             Runoff depth           7.360      49.799     46.828     mm"
"             Runoff volume          2.11       189.88     191.99     c.m"
"             Runoff coefficient     0.131      0.886      0.833      "
"             Maximum flow           0.001      0.137      0.137      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.137     0.137     0.000     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.137     0.000     0.000     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          202   202 - SITE AREA UNCONTROLLED TO KING STREET (EXISTING CONDITION)"
"       91.000   % Impervious"
"        0.910   Total Area"
"      100.000   Flow length"
"        3.000   Overland Slope"
"        0.082   Pervious Area"
"       10.000   Pervious length"
"        3.000   Pervious slope"
"        0.828   Impervious Area"
"      100.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.131   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.890   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.289     0.000     0.000     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.082      0.828      0.910      hectare"
"             Time of concentration  11.691     3.229      3.351      minutes"
"             Time to Centroid       116.103    90.361     90.730     minutes"
"             Rainfall depth         56.186     56.186     56.186     mm"
"             Rainfall volume        46.02      465.27     511.29     c.m"
```

```
"             Rainfall losses        48.813     6.176      10.013     mm"
"             Runoff depth           7.372      50.010     46.173     mm"
"             Runoff volume          6.04       414.13     420.17     c.m"
"             Runoff coefficient     0.131      0.890      0.822      "
"             Maximum flow           0.002      0.289      0.289      c.m/sec"
" 38          START/RE-START TOTALS 202"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.410    hectare"
"             Total Impervious area                       0.381    hectare"
"             Total % impervious                         93.000"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
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"                MIDUSS created                                    February 7, 2010"
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"                                                 11872M - Midland Toyota\SWM\MIDUSS"
"                Output filename:                                        25YR_SWM.out"
"                Licensee name:                                       Lauren Trividic"
"                Company                                                         PEL"
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" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     1676.200   Coefficient A"
"        8.300   Constant B"
"        0.858   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           181.996    mm/hr"
"             Total depth                  56.186    mm"
"            6   025hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          201   201 - SITE DEVELOPMENT AREA TO UNDERGROUND STORAGE TANK"
"       93.000   % Impervious"
"        0.410   Total Area"
"      100.000   Flow length"
"        2.000   Overland Slope"
"        0.029   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.381   Impervious Area"
"      100.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.131   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.886   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.137     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.029      0.381      0.410      hectare"
"             Time of concentration  13.203     3.647      3.752      minutes"
"             Time to Centroid       117.870    91.043     91.338     minutes"
"             Rainfall depth         56.186     56.186     56.186     mm"
"             Rainfall volume        16.13      214.24     230.36     c.m"
"             Rainfall losses        48.826     6.387      9.358      mm"
"             Runoff depth           7.360      49.799     46.828     mm"
"             Runoff volume          2.11       189.88     191.99     c.m"
"             Runoff coefficient     0.131      0.886      0.833      "
"             Maximum flow           0.001      0.137      0.137      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.137     0.137     0.000     0.000"
" 54          POND DESIGN"
"        0.137   Current peak flow    c.m/sec"
"        0.045   Target outflow    c.m/sec"
"        192.0   Hydrograph volume    c.m"
"           7.   Number of stages"
"      213.500   Minimum water level    metre"
"      214.700   Maximum water level    metre"
"      213.500   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                213.500     0.000     0.000"
"                213.700   0.01170    23.803"
"                213.900   0.01927    47.606"
"                214.100   0.02462    71.409"
"                214.300   0.02899    95.212"
"                214.500   0.03279   119.015"
"                214.700   0.03619   142.818"
"           1.   ORIFICES"
"                Orifice   Orifice   Orifice Number of"
"                 invert coefficie  diameter  orifices"
"                213.500     0.630    0.1250     1.000"
"             Peak outflow                  0.030    c.m/sec"
"             Maximum level                214.344    metre"
"             Maximum storage              100.448    c.m"
"             Centroidal lag                 2.286   hours"
"                  0.137     0.137     0.030     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.137     0.030     0.030     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.137     0.000     0.030     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            3   Specify values"
```

```
"            1   SCS method"
"          202   202 - SITE AREA UNCONTROLLED TO KING STREET (EXISTING CONDITION)"
"       91.000   % Impervious"
"        0.910   Total Area"
"      100.000   Flow length"
"        3.000   Overland Slope"
"        0.082   Pervious Area"
"       10.000   Pervious length"
"        3.000   Pervious slope"
"        0.828   Impervious Area"
"      100.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.131   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.890   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.289     0.000     0.030     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.082      0.828      0.910      hectare"
"             Time of concentration  11.691     3.229      3.351      minutes"
"             Time to Centroid       116.103    90.361     90.730     minutes"
"             Rainfall depth         56.186     56.186     56.186     mm"
"             Rainfall volume        46.02      465.27     511.29     c.m"
"             Rainfall losses        48.813     6.176      10.013     mm"
"             Runoff depth           7.372      50.010     46.173     mm"
"             Runoff volume          6.04       414.13     420.17     c.m"
"             Runoff coefficient     0.131      0.890      0.822      "
"             Maximum flow           0.002      0.289      0.289      c.m/sec"
" 38          START/RE-START TOTALS 202"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.410    hectare"
"             Total Impervious area                       0.381    hectare"
"             Total % impervious                         93.000"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                                    February 7, 2010"
"           10   Units used:                                                ie METRIC"
"                Job folder:                                  Z:\Project Documents\"
"                                                11872M - Midland Toyota\SWM\MIDUSS"
"                Output filename:                                       100YR_PRE.out"
"                Licensee name:                                       Lauren Trividic"
"                Company                                                         PEL"
"                Date & Time last used:                    2025-11-25 at 2:51:45 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     2193.100   Coefficient A"
"        9.040   Constant B"
"        0.871   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           219.635    mm/hr"
"             Total depth                  68.439    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 101"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          101   101 - EXISTING SITE CONDITION"
"       68.000   % Impervious"
"        1.320   Total Area"
"      150.000   Flow length"
"        3.000   Overland Slope"
"        0.422   Pervious Area"
"       50.000   Pervious length"
"        3.000   Pervious slope"
"        0.898   Impervious Area"
"      150.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.175   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.905   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.403     0.000     0.000     0.000 c.m/sec"
"             Catchment 101          Pervious   Impervious Total Area "
"             Surface Area           0.422      0.898      1.320      hectare"
"             Time of concentration  23.953     3.805      5.488      minutes"
"             Time to Centroid       128.754    90.629     93.814     minutes"
"             Rainfall depth         68.439     68.439     68.439     mm"
"             Rainfall volume        289.08     614.31     903.39     c.m"
"             Rainfall losses        56.435     6.482      22.467     mm"
"             Runoff depth           12.003     61.956     45.971     mm"
"             Runoff volume          50.70      556.12     606.82     c.m"
"             Runoff coefficient     0.175      0.905      0.672      "
"             Maximum flow           0.015      0.398      0.403      c.m/sec"
" 38          START/RE-START TOTALS "
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.000    hectare"
"             Total Impervious area                       0.000    hectare"
"             Total % impervious                          0.000"
" 19          EXIT"
```

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"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                                    February 7, 2010"
"           10   Units used:                                              ie METRIC"
"                Job folder:                                 Z:\Project Documents\"
"                                                11872M - Midland Toyota\SWM\MIDUSS"
"                Output filename:                                    100YR_POST.out"
"                Licensee name:                                    Lauren Trividic"
"                Company                                                       PEL"
"                Date & Time last used:                  2025-12-03 at 11:12:38 AM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     2193.100   Coefficient A"
"        9.040   Constant B"
"        0.871   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           219.635    mm/hr"
"             Total depth                  68.439    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          201   201 - SITE DEVELOPMENT AREA TO UNDERGROUND STORAGE TANK"
"       93.000   % Impervious"
"        0.410   Total Area"
"      100.000   Flow length"
"        2.000   Overland Slope"
"        0.029   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.381   Impervious Area"
"      100.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.175   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.905   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.165     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.029      0.381      0.410      hectare"
"             Time of concentration  10.299     3.369      3.468      minutes"
"             Time to Centroid       112.516    89.957     90.280     minutes"
"             Rainfall depth         68.439     68.439     68.439     mm"
"             Rainfall volume        19.64      260.96     280.60     c.m"
"             Rainfall losses        56.484     6.526      10.023     mm"
"             Runoff depth           11.954     61.912     58.415     mm"
"             Runoff volume          3.43       236.07     239.50     c.m"
"             Runoff coefficient     0.175      0.905      0.854      "
"             Maximum flow           0.002      0.164      0.165      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.165     0.165     0.000     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.165     0.000     0.000     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          202   202 - SITE AREA UNCONTROLLED TO KING STREET (EXISTING CONDITION)"
"       91.000   % Impervious"
"        0.910   Total Area"
"      100.000   Flow length"
"        3.000   Overland Slope"
"        0.082   Pervious Area"
"       10.000   Pervious length"
"        3.000   Pervious slope"
"        0.828   Impervious Area"
"      100.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.175   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                    0.367     0.000     0.000     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.082      0.828      0.910      hectare"
"             Time of concentration  9.119      2.983      3.098      minutes"
"             Time to Centroid       111.092    89.346     89.753     minutes"
"             Rainfall depth         68.439     68.439     68.439     mm"
"             Rainfall volume        56.05      566.74     622.79     c.m"
```

```
"             Rainfall losses        56.488     6.394      10.903     mm"
"             Runoff depth           11.950     62.045     57.536     mm"
"             Runoff volume          9.79       513.79     523.58     c.m"
"             Runoff coefficient     0.175      0.907      0.841      "
"             Maximum flow           0.005      0.366      0.367      c.m/sec"
" 38          START/RE-START TOTALS 202"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.410    hectare"
"             Total Impervious area                       0.381    hectare"
"             Total % impervious                         93.000"
" 19          EXIT"
```

```
"                MIDUSS Output ------------------------------------------------>"
"                MIDUSS version                              Version 2.25  rev. 473"
"                MIDUSS created                                    February 7, 2010"
"           10   Units used:                                                ie METRIC"
"                Job folder:                                 Z:\Project Documents\"
"                                                 11872M - Midland Toyota\SWM\MIDUSS"
"                Output filename:                                      100YR_SWM.out"
"                Licensee name:                                      Lauren Trividic"
"                Company                                                        PEL"
"                Date & Time last used:                    2025-12-03 at 3:37:20 PM"
" 31          TIME PARAMETERS"
"        5.000   Time Step"
"      180.000   Max. Storm length"
"     1500.000   Max. Hydrograph"
" 32          STORM Chicago storm"
"            1   Chicago storm"
"     2193.100   Coefficient A"
"        9.040   Constant B"
"        0.871   Exponent C"
"        0.400   Fraction R"
"      180.000   Duration"
"        1.000   Time step multiplier"
"             Maximum intensity           219.635    mm/hr"
"             Total depth                  68.439    mm"
"            6   100hyd   Hydrograph extension used in this file"
" 33          CATCHMENT 201"
"            1   Triangular SCS"
"            3   Specify values"
"            1   SCS method"
"          201   201 - SITE DEVELOPMENT AREA TO UNDERGROUND STORAGE TANK"
"       93.000   % Impervious"
"        0.410   Total Area"
"      100.000   Flow length"
"        2.000   Overland Slope"
"        0.029   Pervious Area"
"       10.000   Pervious length"
"        2.000   Pervious slope"
"        0.381   Impervious Area"
"      100.000   Impervious length"
"        2.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.175   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.905   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
```

```
"                    0.165     0.000     0.000     0.000 c.m/sec"
"             Catchment 201          Pervious   Impervious Total Area "
"             Surface Area           0.029      0.381      0.410      hectare"
"             Time of concentration  10.299     3.369      3.468      minutes"
"             Time to Centroid       112.516    89.957     90.280     minutes"
"             Rainfall depth         68.439     68.439     68.439     mm"
"             Rainfall volume        19.64      260.96     280.60     c.m"
"             Rainfall losses        56.484     6.526      10.023     mm"
"             Runoff depth           11.954     61.912     58.415     mm"
"             Runoff volume          3.43       236.07     239.50     c.m"
"             Runoff coefficient     0.175      0.905      0.854      "
"             Maximum flow           0.002      0.164      0.165      c.m/sec"
" 40          HYDROGRAPH Add Runoff "
"            4   Add Runoff "
"                    0.165     0.165     0.000     0.000"
" 54          POND DESIGN"
"        0.165   Current peak flow    c.m/sec"
"        0.045   Target outflow    c.m/sec"
"        239.5   Hydrograph volume    c.m"
"           7.   Number of stages"
"      213.500   Minimum water level    metre"
"      214.700   Maximum water level    metre"
"      213.500   Starting water level    metre"
"            0   Keep Design Data: 1 = True; 0 = False"
"                  Level Discharge    Volume"
"                213.500     0.000     0.000"
"                213.700   0.01170    23.803"
"                213.900   0.01927    47.606"
"                214.100   0.02462    71.409"
"                214.300   0.02899    95.212"
"                214.500   0.03279   119.015"
"                214.700   0.03619   142.818"
"           1.   ORIFICES"
"                Orifice   Orifice   Orifice Number of"
"                 invert coefficie  diameter  orifices"
"                213.500     0.630    0.1250     1.000"
"             Peak outflow                  0.034    c.m/sec"
"             Maximum level                214.590    metre"
"             Maximum storage              129.763    c.m"
"             Centroidal lag                 2.344   hours"
"                  0.165     0.165     0.034     0.000 c.m/sec"
" 40          HYDROGRAPH Next link "
"            5   Next link "
"                    0.165     0.034     0.034     0.000"
" 40          HYDROGRAPH Start - New Tributary"
"            2   Start - New Tributary"
"                    0.165     0.000     0.034     0.000"
" 33          CATCHMENT 202"
"            1   Triangular SCS"
"            3   Specify values"
```

```
"            1   SCS method"
"          202   202 - SITE AREA UNCONTROLLED TO KING STREET (EXISTING CONDITION)"
"       91.000   % Impervious"
"        0.910   Total Area"
"      100.000   Flow length"
"        3.000   Overland Slope"
"        0.082   Pervious Area"
"       10.000   Pervious length"
"        3.000   Pervious slope"
"        0.828   Impervious Area"
"      100.000   Impervious length"
"        3.000   Impervious slope"
"        0.250   Pervious Manning 'n'"
"       60.000   Pervious SCS Curve No."
"        0.175   Pervious Runoff coefficient"
"        0.100   Pervious Ia/S coefficient"
"       16.933   Pervious Initial abstraction"
"        0.015   Impervious Manning 'n'"
"       98.000   Impervious SCS Curve No."
"        0.907   Impervious Runoff coefficient"
"        0.100   Impervious Ia/S coefficient"
"        0.518   Impervious Initial abstraction"
"                     0.367     0.000     0.034     0.000 c.m/sec"
"             Catchment 202          Pervious   Impervious Total Area "
"             Surface Area           0.082      0.828      0.910      hectare"
"             Time of concentration  9.119      2.983      3.098      minutes"
"             Time to Centroid       111.092    89.346     89.753     minutes"
"             Rainfall depth         68.439     68.439     68.439     mm"
"             Rainfall volume        56.05      566.74     622.79     c.m"
"             Rainfall losses        56.488     6.394      10.903     mm"
"             Runoff depth           11.950     62.045     57.536     mm"
"             Runoff volume          9.79       513.79     523.58     c.m"
"             Runoff coefficient     0.175      0.907      0.841      "
"             Maximum flow           0.005      0.366      0.367      c.m/sec"
" 38          START/RE-START TOTALS 202"
"            3   Runoff Totals on EXIT"
"             Total Catchment area                        0.410    hectare"
"             Total Impervious area                       0.381    hectare"
"             Total % impervious                         93.000"
" 19          EXIT"
```

APPENDIX C

Design Calculations

PINESTONE ENGINEERING LTD.

MIDLAND TOYOTA

Town of Midland
County of Simcoe

Project Number: 24-11872-M
Date: December 10, 2025
Design By: LT
Checked By: JHV
File: Z:\Project Documents\11872M - Midland Toyota\SWM\11872 Storm Sewer Design Sheet (Midland IDF).xls

STORM SEWER DESIGN SHEET

ENGINEERING AND PUBLIC WORKS

Drainage Area Plan No: N/A

Design Parameters

100 YEAR STORM

Q=kAIR, k=0.00278
Intensity (I) = a/(tc+b)^{c}
a = 2193.1
b = 9.04
c = 0.871

Manning's "n" 0.013
Min. Velocity 0.800 m/s
Max. Velocity 6.000 m/s

PINESTONE ENGINEERING LTD.

LOCATION				STORMWATER FLOW 5 YEAR STORM								DESIGN					
STREET	AREA NUMBER	MANHOLE LOCATION FROM MH	MANHOLE LOCATION TO MH	AREA (A)	RUNOFF COEFF. (C)	A x C	CUMUL. A x C	CONCENTRATION TIME TOTAL	CONCENTRATION TIME IN PIPE	RAIN INTENSITY (I)	FLOW (Q)	PIPE SIZE	LENGTH	SLOPE	CAPACITY	FULL FLOW VELOCITY	ACTUAL VELOCITY
				ha		*ha*	*ha*	*min*	*min*	*mm/hr*	*L/s*	*mm*	*m*	*%*	*L/s*	*m/s*	*m/s*
	307	CB1	CBMH1	0.070	0.90	0.0630	0.0630	10.0000	0.3238	168.44903	29.39604	250	18.0	0.50	42.04989	0.8566	0.9265
	305	CBMH1	CBMH2	0.060	0.90	0.0540	0.1170	10.3238	0.3734	165.99285	53.79662	300	24.0	0.50	68.37776	0.9673	1.0713
	304	CBMH2	OGS	0.070	0.90	0.0630	0.1800	10.6972	0.2923	163.25445	81.39867	375	21.0	0.50	123.97713	1.1225	1.1975
	301	CB2	CBMH3	0.090	0.90	0.0810	0.0810	10.0000	0.3637	168.44903	37.79491	250	28.0	1.00	59.46753	1.2115	1.2831
	302	CBMH3	OGS	0.070	0.90	0.0630	0.1440	10.3637	0.3069	165.69551	66.09263	375	21.0	0.50	123.97713	1.1225	1.1403
	303	OGS	TANK	0.040	0.90	0.0360	0.3600	10.6706	0.1418	163.44586	162.98821	450	12.0	0.50	201.60049	1.2676	1.4108
		TANK	STMMH1								34.00000	300	2.0	0.50	68.37776	0.9673	0.9660
		STMH1	CBMH4								34.00000	300	13.0	0.50	68.37776	0.9673	0.9660
		CBMH4	CBMH5								34.00000	300	64.0	0.50	68.37776	0.9673	0.9660

Stormceptor®

Stormceptor® EF Sizing Report

Rinker MATERIALS™

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

12/03/2025

Province:	Ontario
City:	Midland
Nearest Rainfall Station:	BARRIE-ORO
Climate Station Id:	6117700
Years of Rainfall Data:	14

Site Name:	

Drainage Area (ha):	0.41
% Imperviousness:	93.00

Runoff Coefficient 'c': 0.85

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	11.46
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	424
Estimated Average Annual Sediment Volume (L/yr):	345

Project Name:	Midland Toyota
Project Number:	11872
Designer Name:	Joe Voisin
Designer Company:	PEL
Designer Email:	jvoisin@pel.ca
Designer Phone:	705-645-8853
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	87
EFO5	91
EFO6	94
EFO8	98
EFO10	99
EFO12	100

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 87

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

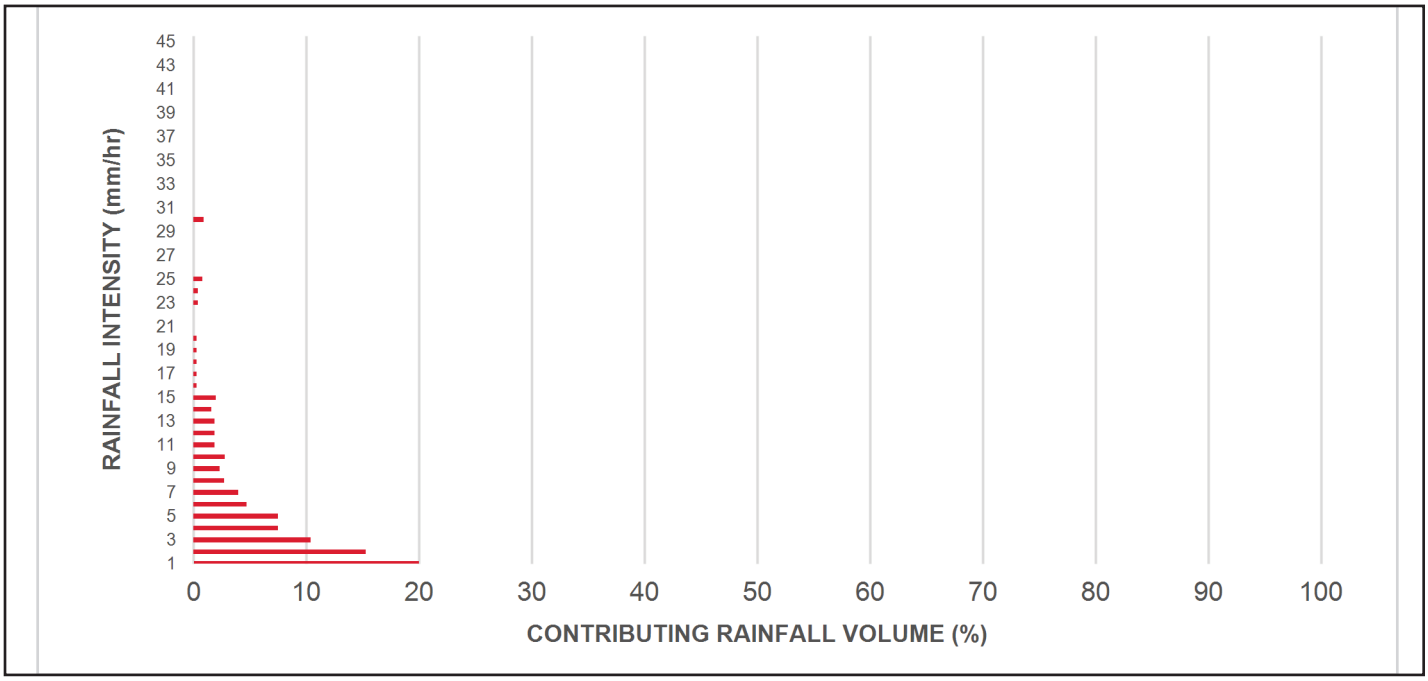
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

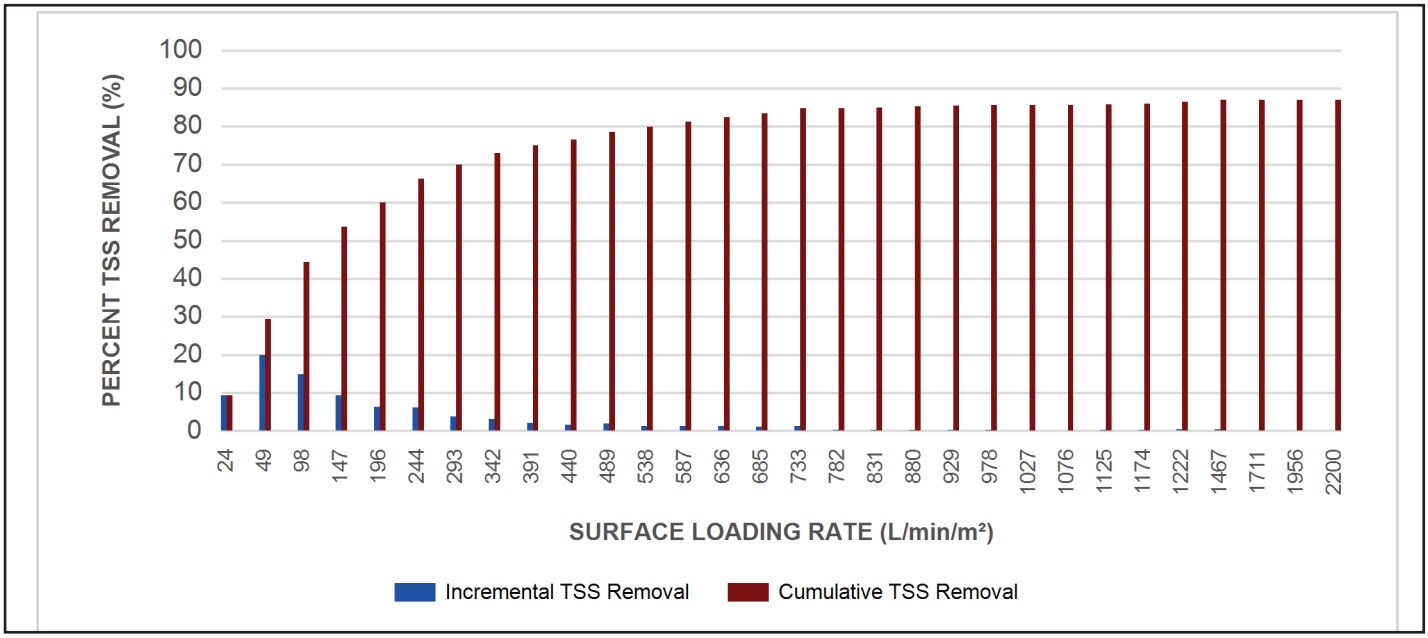
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	9.4	9.4	0.49	29.0	24.0	100	9.4	9.4
1.00	20.0	29.4	0.98	59.0	49.0	100	20.0	29.4
2.00	15.3	44.7	1.96	117.0	98.0	97	14.9	44.3
3.00	10.4	55.1	2.93	176.0	147.0	91	9.4	53.7
4.00	7.5	62.6	3.91	235.0	196.0	84	6.3	60.1
5.00	7.5	70.1	4.89	293.0	244.0	81	6.1	66.2
6.00	4.7	74.9	5.87	352.0	293.0	79	3.7	69.9
7.00	4.0	78.8	6.85	411.0	342.0	77	3.1	72.9
8.00	2.7	81.6	7.82	469.0	391.0	74	2.0	75.0
9.00	2.3	83.9	8.80	528.0	440.0	72	1.7	76.6
10.00	2.8	86.6	9.78	587.0	489.0	70	1.9	78.6
11.00	1.9	88.6	10.76	645.0	538.0	68	1.3	79.9
12.00	1.9	90.5	11.74	704.0	587.0	66	1.3	81.2
13.00	1.9	92.4	12.71	763.0	636.0	64	1.2	82.4
14.00	1.6	94.0	13.69	821.0	685.0	64	1.0	83.4
15.00	2.0	96.0	14.67	880.0	733.0	64	1.3	84.7
16.00	0.3	96.3	15.65	939.0	782.0	63	0.2	84.8
17.00	0.3	96.6	16.63	998.0	831.0	63	0.2	85.0
18.00	0.3	96.9	17.60	1056.0	880.0	62	0.2	85.2
19.00	0.3	97.2	18.58	1115.0	929.0	62	0.2	85.4
20.00	0.3	97.5	19.56	1174.0	978.0	62	0.2	85.6
21.00	0.0	97.5	20.54	1232.0	1027.0	61	0.0	85.6
22.00	0.0	97.5	21.51	1291.0	1076.0	60	0.0	85.6
23.00	0.4	97.9	22.49	1350.0	1125.0	59	0.2	85.8
24.00	0.4	98.3	23.47	1408.0	1174.0	58	0.2	86.0
25.00	0.8	99.1	24.45	1467.0	1222.0	56	0.5	86.5
30.00	0.9	100.0	29.34	1760.0	1467.0	50	0.5	87.0
35.00	0.0	100.0	34.23	2054.0	1711.0	43	0.0	87.0
40.00	0.0	100.0	39.12	2347.0	1956.0	38	0.0	87.0
45.00	0.0	100.0	44.01	2640.0	2200.0	33	0.0	87.0
Estimated Net Annual Sediment (TSS) Load Reduction =								**87 %**

Climate Station ID: 6117700 *Years of Rainfall Data*: 14

RAINFALL DATA FROM BARRIE-ORO RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

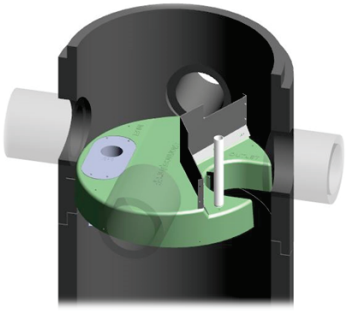
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

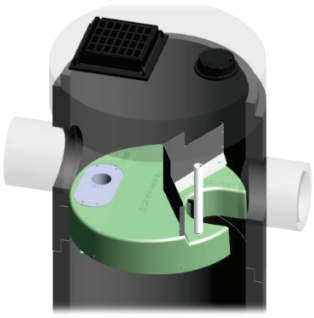
DESIGN FLEXIBILITY

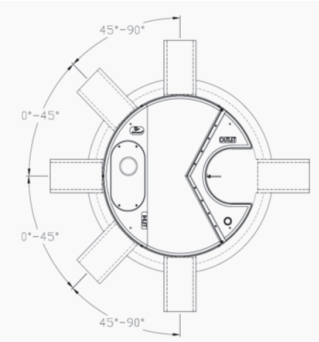
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid

Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

MIDLAND TOYOTA

IMPERVIOUS SURFACE CALCULATIONS

Midland, Ontario

Project Number: 24-11872M
Date: November 25, 2025
Design By: LT

PINESTONE ENGINEERING LTD.

PRE-DEVELOPMENT	Surface Area (m²)	% Impervious	SCS Curve Number
Building Rooftop	1600	12.12%	(98.00)
Asphalt Parking	7000	53.03%	(98.00)
Gravel Parking	500	3.03%	60.00
Woods / Landscape area	4100	0.00%	60.00
TOTAL	**13200**	**68.18%**	**60.00**

POST DEVELOPMENT	Surface Area (m²)	% Impervious	SCS Curve Number
Building Rooftop	2100	15.91%	(98.00)
Asphalt Parking	10000	75.76%	(98.00)
Woods / Landscape area	1100	0.00%	60.00
TOTAL	**13200**	**91.67%**	**60.00**

MIDLAND TOYOTA

CLIMATIC WATER BUDGET: CLIMATE NORMALS 1981-2010 (Midland): Potential Evapotranspiration

Midland, Ontario

Project Number: 24-11872M

Date: November 4, 2025

Design By: LT

Calculations Based on Thornthwaite-Mather Approach (1957)														
Month	**Mean Temperature (°C)**	**Heat Index "i"**	**"α"**	**PET - Potential Evapo-transpiration non corrected (mm)**	**Daylight Correction Factor (L/12)**	**Number of Days per Month (N)**	**PTE - Potential Evapo-transpiration corrected (mm)**	**Total Precipitation (mm)**	**P-PE (mm)**	**APWL (mm)**	**ST (mm)**	**ΔST (mm)**	**AE (mm)**	**SURPLUS (mm)**
January	-8.5	0.00	0.49	0.0	0.78	31	0.0	109.8	109.8	0.0	150.0	0.0	0.0	109.8
February	-6.4	0.00	0.49	0.0	0.88	28	0.0	69.9	69.9	0.0	150.0	0.0	0.0	69.9
March	-1.9	0.00	0.49	0.0	0.99	31	0.0	65.7	65.7	0.0	150.0	0.0	0.0	65.7
April	5.8	1.25	0.51	25.6	1.12	30	28.7	65.1	36.4	0.0	150.0	0.0	28.7	36.4
May	12.2	3.86	0.56	57.9	1.22	31	72.9	92.8	19.9	0.0	150.0	0.0	72.9	19.9
June	18.1	7.01	0.61	89.1	1.28	30	114.0	89.5	-24.5	-24.5	176.7	26.7	62.8	26.7
July	20.8	8.66	0.64	103.7	1.25	31	134.0	72.7	-61.3	-85.9	265.9	89.2	-16.5	89.2
August	19.9	8.10	0.63	98.8	1.15	31	117.5	77.9	-39.6	-125.4	346.1	80.2	-2.3	80.2
September	15.9	5.76	0.59	77.3	1.04	30	80.4	99.1	18.7	0.0	150.0	-196.1	80.4	18.7
October	9.3	2.56	0.54	43.0	0.92	31	40.9	90.1	49.2	0.0	150.0	0.0	40.9	49.2
November	3.2	0.51	0.50	13.4	0.80	30	10.7	103.6	92.9	0.0	150.0	0.0	10.7	92.9
December	-3.1	0.00	0.49	0.0	0.76	31	0.0	104.4	104.4	0.0	150.0	0.0	0.0	104.4
Totals		**37.7**	**1.09**				**599.1**	**1040.6**	**441.5**				**277.6**	**763.0**

Annual Heat Index I = 37.7

Notes:

1) Water budget adjusted for latitude and daylight

2) (°C) Represents calculated mean of daily temperatures for the month

3) Precipitation and Temperature data from the Midland Water Pollution Control Plant station at lattitude 44° 45' 28.056" N, longitude 79° 52' 31.014" W, elevation 180.00m ASL.

4) Total water surplus is calculated as total precipitation minus potential evapotranspiration

5) Water Holding Capacity of Native Soil is 150mm in accordance with Table 3.1 of the MOE SWM Manual 2003

6) Soil Moisture Retention Values Obtained from Table 26 of the Instructions and Tables For Computing Potential Evapotranspiration and The Water Balance (Thornthwaite and Mathers, 1957)

7) APWL, accumulated potential water loss; ST, soil retention storage; ΔST, change in soil moisture retention; AE, actual evapotranspiration

MIDLAND TOYOTA

WATER BUDGET PRE-DEVELOPMENT

Midland, Ontario

Project Number: 24-11872M

Date: November 4, 2025

Design By: LT

Catchment Designation	Pre-Development Condition				
	Woodlands	**Lawn**	**Gravel**	**Impervious**	**Totals**
Area(m2)	0	4100	500	8600	13200
Pervious Area (m2)	0	4100	0	0	4100
Impervious Area (m2)	0	0	500	8600	9100
Infiltration Factors					
Topography Infiltration Factor	0.2	0.2	0	0	
Soil Infiltration Factor	0.4	0.4	0	0	
Land Cover Infiltration Factor	0.2	0.2	0	0	
MOE Infiltration Factor (Sum)	***0.8***	***0.8***	***0***	***0***	
Actual Infiltration Factor	0.8	0.8	0	0	
Run-off Coefficient	0.2	0.1	0	0	
Run-off from impervious surfaces*	0	0	0.9	0.9	
Inputs (per Unit Area)					
Precipitation (mm/yr)	1041	1041	1041	1041	1041
Run-on (mm/yr)	0	0	0	0	0
Other inputs (mm/yr)	0	0	0	0	0
Total inputs (mm/yr)	**1041**	**1041**	**1041**	**1041**	**1041**
Outputs (per Unit Area)					
Precipitation Surplus (mm/yr)	763	763	937	937	883
Net Surplus (mm/yr)	763	763	937	937	883
Evapotranspiration (mm/yr)	278	278	104	104	158
Infiltration (mm/yr)	610	610	0	0	190
Rooftop Infiltration (mm/yr)	0	0	0	0	0
Total Infiltration (mm/yr)	610	610	0	0	190
Runoff Pervious Areas (mm/yr)	153	153	0	0	47
Runoff Impervious Areas (mm/yr)	0	0	937	937	646
Total Runoff (mm/yr)	153	153	937	937	693
Total Outputs (mm/yr)	**1041**	**1041**	**1041**	**1041**	**1041**
Difference (Inputs - Outputs)	**0**	**0**	**0**	**0**	**0**
Inputs (Volumes)					
Precipitation (m3/yr)	0	4266	520	8949	13736
Run-on (m3/yr)	0	0	0	0	0
Other inputs (m3/yr)	0	0	0	0	0
Total Inputs (m3/yr)	**0**	**4266**	**520**	**8949**	**13736**
Outputs (Volumes)					
Precipitation Surplus (m3/yr)	0	3128	468	8054	11651
Net Surplus (m3/yr)	0	3128	468	8054	11651
Evapotranspiration (m3/yr)	0	1138	52	895	2085
Infiltration (m3/yr)	0	2503	0	0	2503
Rooftop Infiltration (m3/yr)	0	0	0	0	0
Total Infiltration (m3/yr)	0	2503	0	0	2503
Runoff Pervious Areas (m3/yr)	0	626	0	0	626
Runoff Impervious Areas (m3/yr)	0	0	468	8054	8523
Total Runoff (m3/yr)	0	626	468	8054	9148
Total Outputs (m3/yr)	**0**	**4266**	**520**	**8949**	**13736**
Difference (Inputs - Outputs)	**0**	**0**	**0**	**0**	**0**

* Evaporation from impervious areas was assumed to be 10% of precipitation value

MIDLAND TOYOTA

WATER BUDGET POST DEVELOPMENT WITHOUT MITIGATION

Midland, Ontario

Project Number: 24-11872M

Date: November 4, 2025

Design By: LT

Catchment Designation	Post Development Condition				
	Woodlands	Lawn	Impervious	Building	Totals
Area(m2)	0	1100	12100	0	13200
Pervious Area (m2)	0	1100	0	0	1100
Impervious Area (m2)	0	0	12100	0	12100
Infiltration Factors					
Topography Infiltration Factor	0.2	0.2	0	0	
Soil Infiltration Factor	0.4	0.4	0	0	
Land Cover Infiltration Factor	0.2	0.1	0	0	
MOE Infiltration Factor (Sum)	***0.8***	***0.7***	***0***	***0***	
Actual Infiltration Factor	0.8	0.7	0	0	
Run-off Coefficient	0.2	0.1	0	0	
Run-off from impervious surfaces*	0	0	0.9	0.9	
Inputs (per Unit Area)					
Precipitation (mm/yr)	1041	1041	1041	1041	1041
Run-on (mm/yr)	0	0	0	0	0
Other inputs (mm/yr)	0	0	0	0	0
Total inputs (mm/yr)	**1041**	**1041**	**1041**	**1041**	**1041**
Outputs (per Unit Area)					
Precipitation Surplus (mm/yr)	763	763	937	937	922
Net Surplus (mm/yr)	763	763	937	937	922
Evapotranspiration (mm/yr)	278	278	104	104	119
Infiltration (mm/yr)	610	534	0	0	45
Rooftop Infiltration (mm/yr)	0	0	0	0	0
Total Infiltration (mm/yr)	610	534	0	0	45
Runoff Pervious Areas (mm/yr)	153	229	0	0	19
Runoff Impervious Areas (mm/yr)	0	0	937	937	858
Total Runoff (mm/yr)	153	229	937	937	878
Total Outputs (mm/yr)	**1041**	**1041**	**1041**	**1041**	**1041**
Difference (Inputs - Outputs)	**0**	**0**	**0**	**0**	**0**
Inputs (Volumes)					
Precipitation (m3/yr)	0	1145	12591	0	13736
Run-on (m3/yr)	0	0	0	0	0
Other inputs (m3/yr)	0	0	0	0	0
Total Inputs (m3/yr)	**0**	**1145**	**12591**	**0**	**13736**
Outputs (Volumes)					
Precipitation Surplus (m3/yr)	0	839	11332	0	12171
Net Surplus (m3/yr)	0	839	11332	0	12171
Evapotranspiration (m3/yr)	0	305	1259	0	1565
Infiltration (m3/yr)	0	587	0	0	587
Rooftop Infiltration (m3/yr)	0	0	0	0	0
Total Infiltration (m3/yr)	0	587	0	0	587
Runoff Pervious Areas (m3/yr)	0	252	0	0	252
Runoff Impervious Areas (m3/yr)	0	0	11332	0	11332
Total Runoff (m3/yr)	0	252	11332	0	11584
Total Outputs (m3/yr)	**0**	**1145**	**12591**	**0**	**13736**
Difference (Inputs - Outputs)	**0**	**0**	**0**	**0**	**0**

* Evaporation from impervious areas was assumed to be 10% of precipitation value

MIDLAND TOYOTA

WATER BUDGET POST DEVELOPMENT WITH MITIGATION

Midland, Ontario

Project Number: 24-11872M

Date: November 4, 2025

Design By: LT

Catchment Designation	Post Development Condition with Mitigation				
	Woodlands	Lawn	Impervious to Tank	Impervious Uncontrolled	Totals
Area(m2)	0	1100	3800	8300	13200
Pervious Area (m2)	0	1100	0	0	1100
Impervious Area (m2)	0	0	3800	8300	12100
Infiltration Factors					
Topography Infiltration Factor	0.2	0.2	0	0	
Soil Infiltration Factor	0.4	0.4	0	0	
Land Cover Infiltration Factor	0.2	0.1	0	0	
MOE Infiltration Factor (Sum)	***0.8***	***0.7***	***0***	***0***	
Actual Infiltration Factor*	0.8	0.7	0.85	0	
Run-off Coefficient	0.2	0.1	0	0	
Run-off from impervious surfaces**	0	0	0.9	0.9	
Inputs (per Unit Area)					
Precipitation (mm/yr)	1041	1041	1041	1041	1041
Run-on (mm/yr)	0	0	0	0	0
Other inputs (mm/yr)	0	0	0	0	0
Total inputs (mm/yr)	**1041**	**1041**	**1041**	**1041**	**1041**
Outputs (per Unit Area)					
Precipitation Surplus (mm/yr)	763	763	937	937	922
Net Surplus (mm/yr)	763	763	937	937	922
Evapotranspiration (mm/yr)	278	278	104	104	119
Infiltration (mm/yr)	610	534	796	0	274
Rooftop Infiltration (mm/yr)	0	0	0	0	0
Total Infiltration (mm/yr)	610	534	796	0	274
Runoff Pervious Areas (mm/yr)	153	229	0	0	19
Runoff Impervious Areas (mm/yr)	0	0	140	937	629
Total Runoff (mm/yr)	153	229	140	937	648
Total Outputs (mm/yr)	**1041**	**1041**	**1041**	**1041**	**1041**
Difference (Inputs - Outputs)	**0**	**0**	**0**	**0**	**0**
Inputs (Volumes)					
Precipitation (m3/yr)	0	1145	3954	8637	13736
Run-on (m3/yr)	0	0	0	0	0
Other inputs (m3/yr)	0	0	0	0	0
Total Inputs (m3/yr)	**0**	**1145**	**3954**	**8637**	**13736**
Outputs (Volumes)					
Precipitation Surplus (m3/yr)	0	839	3559	7773	12171
Net Surplus (m3/yr)	0	839	3559	7773	12171
Evapotranspiration (m3/yr)	0	305	395	864	1565
Infiltration (m3/yr)	0	587	3025	0	3613
Rooftop Infiltration (m3/yr)	0	0	0	0	0
Total Infiltration (m3/yr)	0	587	3025	0	3613
Runoff Pervious Areas (m3/yr)	0	252	0	0	252
Runoff Impervious Areas (m3/yr)	0	0	534	7773	8307
Total Runoff (m3/yr)	0	252	534	7773	8559
Total Outputs (m3/yr)	**0**	**1145**	**3954**	**8637**	**13736**
Difference (Inputs - Outputs)	**0**	**0**	**0**	**0**	**0**

* Brentwood Tanks infiltration component will provide 60% infiltration potential

** Evaporation from impervious areas was assumed to be 10% of precipitation value.

MIDLAND TOYOTA

WATER BUDGET SUMMARY

Midland, Ontario

Project Number: 24-11872M

Date: November 4, 2025

Design By: LT

Characteristic	Site				
	Pre-Development	Post Development	Change (Pre to Post)	Post Devlopment with Mitigation	Change (Pre to Post with Mitigation)
Inputs (Volumes)					
Precipitation (m3/yr)	13736	13736	0.0%	13736	0.0%
Run-on (m3/yr)	0	0	0.0%	0	0.0%
Other Inputs (m3/yr)	0	0	0.0%	0	0.0%
Total Inputs (m3/yr)	13736	13736	**0.0%**	13736	**0.0%**
Output (volumes)					
Precipitation Surplus (m3/yr)	11651	12171	4.5%	12171	4.5%
Net Surplus (m3/yr)	11651	12171	4.5%	12171	4.5%
Evapotranspiration (m3/yr)	2085	1565	-25.0%	1565	-25.0%
Infiltration (m3/yr)	2503	587	-76.5%	3613	44.4%
Rooftop Infiltration (m3/yr)	0	0	0.0%	0	0.0%
Total Infiltration (m3/yr)	2503	587	-76.5%	3613	44.4%
Runoff Pervious Areas (m3/yr)	626	252	-59.8%	252	-59.8%
Runoff Impervious Areas (m3/yr)	8523	11332	33.0%	8307	-2.5%
Total Runoff (m3/yr)	9148	11584	26.6%	8559	-6.4%
Total Outputs (m3/yr)	13736	13736	**0.0%**	13736	0.0%

Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196

Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.

* *This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.*

Topography	Flat Land, average slope < 0.6 m/km	0.3
	Rolling Land, average slope 2.8 m to 3.8 m/km	0.2
	Hilly Land, average slope 28 m to 47 m/km	0.1
Soils	Tight impervious clay	0.1
	Medium combinations of clay and loam	0.2
	Open Sandy loam	0.4
Cover	Cultivated Land	0.1
	Woodland	0.2

Brentwood Stormtank System Design Calculations

The following is a list of parameters and design criteria for the infiltration component of the Brentwood Stormtank system to capture and treat runoff generated from a portion of the site area.

- The capacity to treat runoff from a 4100m^2 impervious surface area.
- A rainfall depth of 20mm - According to the MECP Stormwater Management Planning and Design Manual (2003), the target storage volume should be 20mm over the surface area since 90% of all daily rainfall depths are less than this amount.
- An overall runoff coefficient of 0.90 for asphalt surface.
- A recommended drawdown time of 24-48 hours per the LID Manual.
- A void ratio of 0.97 for the ST-36 unit.
- A design infiltration rate 10mm/hr for sandy loam type soils

$$Runoff\ Volume = C * i * A$$

where: *C* = *surface runoff coefficient*
i = *intensity, mm/hr.*
A = *runoff catchment area, m^2*

$$Runoff\ Volume = (0.90)(0.02m)(4100m^2) = 73.8m^3$$

Storage Depth – A deep stone reservoir on a highly permeable soil can cause soil compaction and loss of permeability from the mass of overlying stone and stored water. Therefore, an additional calculation should be conducted to determine the maximum allowable stone reservoir depth while maintaining a target water drawdown time of 24-48 hours. As per the Low Impact Development Stormwater Management Planning and Design Guide (2010):

$$d_{s\ max} = \frac{i * t_s}{V_r}$$

where: $d_{s\ max}$ = *maximum stone reservoir depth, mm*
i = *design infiltration rate of native soil, mm/hr.*
t_s = *drawdown time, hr*
V_r = *void space ratio for reservoir*

$$d_{s\ max} = \frac{10.0 * 48}{0.40} = 1200mm = 1.20m\ (48\ hours)$$
$$d_{s\ min} = \frac{10.0 * 24}{0.40} = 600mm = 0.600m\ (24\ hours)$$

The proposed Brentwood Stormtanks (ST-36) will have a reservoir depth of 0.628m which

exceeds the minimum depth requirement of 0.600m to achieve a drawdown time of 24 hours.

To calculate the required number of Brentwood storage tank (ST-24) units for the infiltration component:

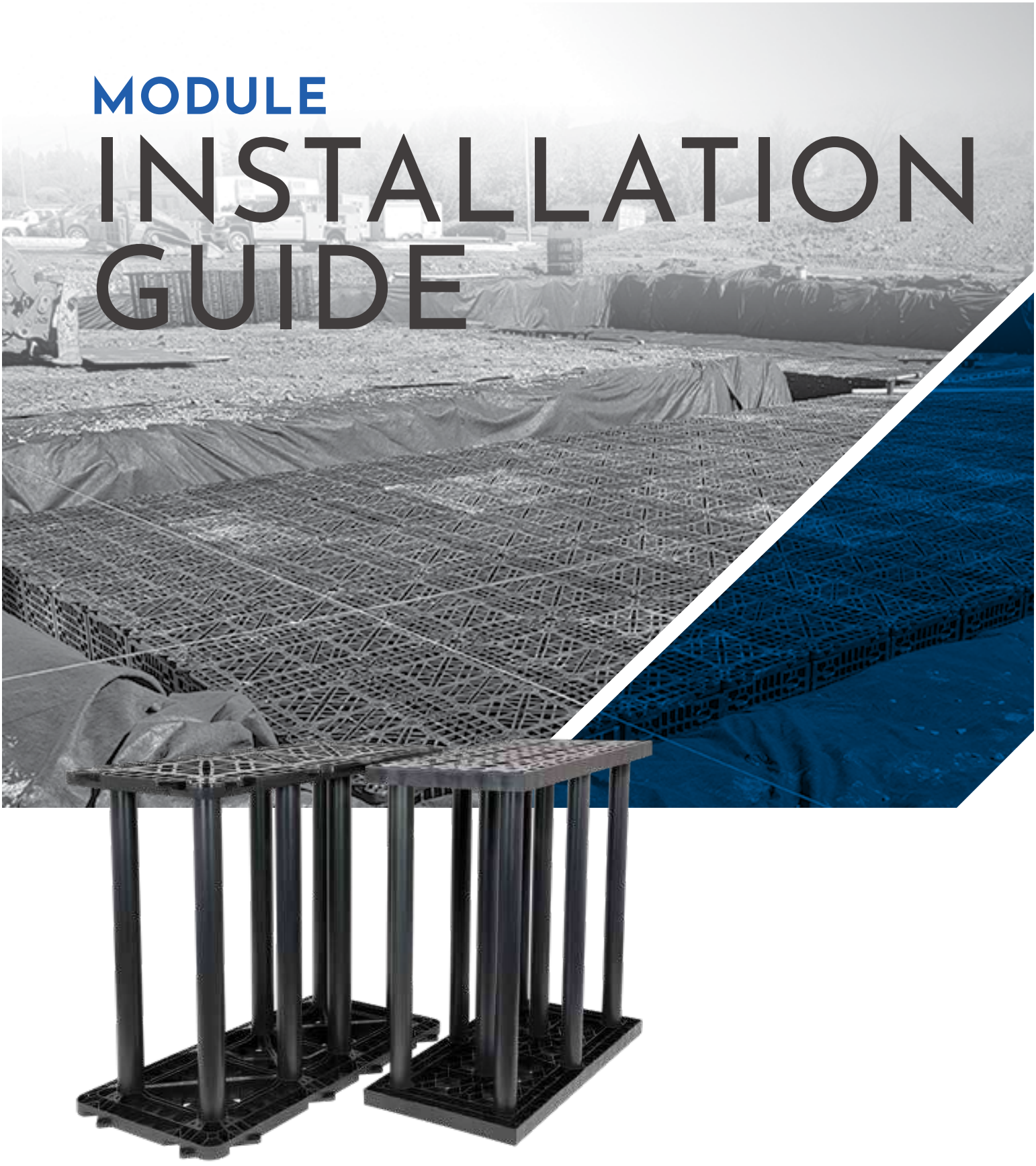
Required Dead Storage Volume = 73.8 cu.m.
Dead Storage provided by 1 unit (0.628m depth) = 0.254 cu.m.
Number of units = 294units (294x0.254 = 74.7 cu.m.)
Unit dimensions = 18”x36”
Total footprint area = 123 sq.m.

Debris Row Calculations:

StormTank Module Count = Q / (F * 0.059933)
Q = Treatment Flow Rate (CFS)
F = Module Footprint (s.f.)

Module Count = 3.6 / (4.5 * 0.059933) = 14 units

MODULE INSTALLATION GUIDE



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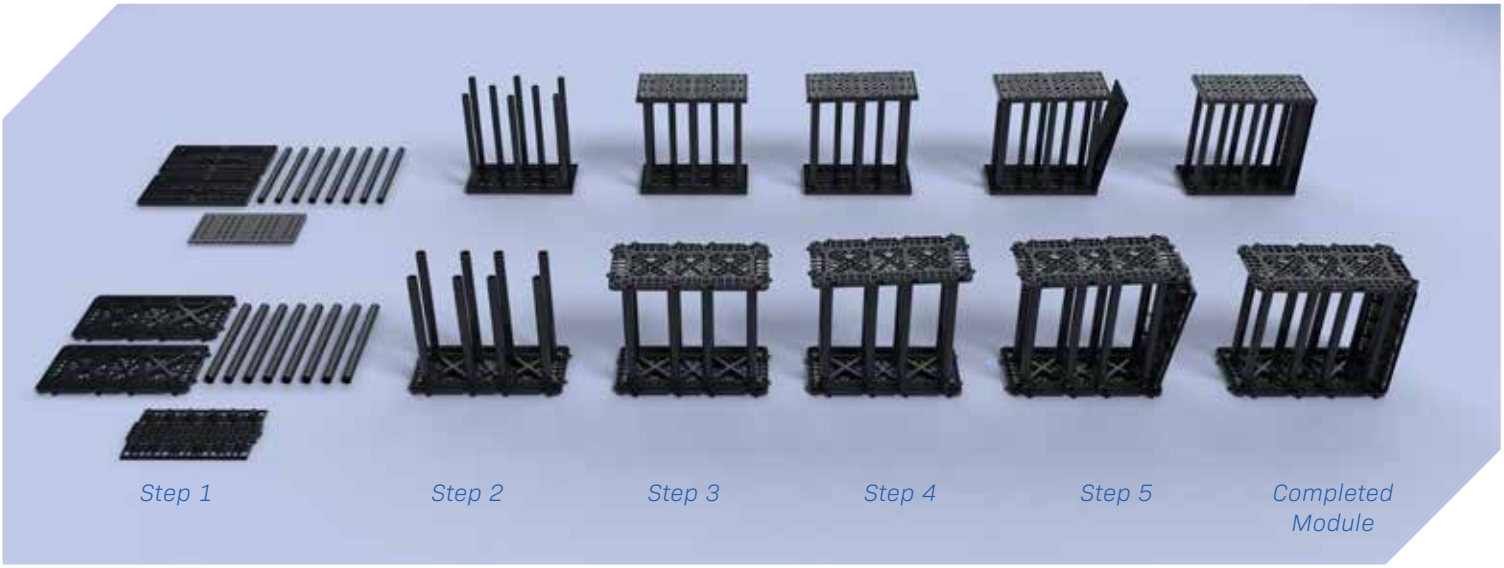
CONTENT

GENERAL NOTES

1. Review installation procedures and coordinate the installation with other construction activities, such as grading, excavation, utilities, construction access, erosion control, etc.
2. Engineered drawings supersede all provided documentation, as the information furnished in this document is based on a typical installation.
3. Coordinate the installation with manufacturer's representative/distributor to be on-site to review installation instructions.
4. Components shall be unloaded, handled and stored in an area protected from traffic in a manner to prevent damage and UV degradation.
5. Assembled modules may be walked on, but vehicular traffic is prohibited until backfilled per Manufacturer's requirements.
6. Ensure all construction occurs in accordance with Federal, State and Local Laws, Ordinances, Regulations and Safety Requirements.
7. Extra care and caution should be taken when temperatures are at or below 40° F (4.4° C).
8. Check for any damaged material, report damage to a StormTank® Representative. All plastic wrap should be removed to prevent damage from heat or UV.
9. The StormTank® Module carries a Limited Warranty, which can be accessed at *www.stormtank.com*.

1.0 MODULE ASSEMBLY



Step 1:

Prepare the material to be assembled. Required materials include (2) Platens, (8) Columns, (1) Side Panel. (1) 1lb. Rubber Mallet. Note: Side panels only required on perimeter modules, refer to your project's layout drawings for perimeter module locations.

Step 2:

Place a platen on a firm level surface and insert the (8) columns into the platen receiver cups. Firmly tap each column with a rubber mallet to ensure the column is seated.

Step 3:

Install the top platen by aligning the reciever cups with the columns, or flip the previously assembled components upside down onto the second platen, aligning the columns into the platen receiver cups.

Step 4:

Once aligned, seat the top assembly by alternating taps, with a rubber mallet at each structural column until all columns are firmly seated.

Step 5:

If side panels are required, Prior to seating the edge column into the recieveing cups, insert the side panel into the bottom platen.

Step 6:

Align the top of the side panel with the top platen and firmly seat the top platen utilizing a rubber mallet.

Completed Module

A completed module can support vehicular loading when installed per manufacturer recommendations.

2.0 EXCAVATION

1. Stake out and excavate, in accordance with OSHA regulations, to elevations per approved plans. Excavation Requirements:
    a. Reccomended Sub-grade excavation is a minimum of 6" (152 mm) below designed Module invert.
        I. A 4" (102 mm) leveling bed may be acceptable, contact your StormTank Representative for further details.
    b. The excavation should extend a minimum of 12" (305 mm) beyond the module unit's dimensions in each length and width to allow for adequate placement of side backfill material.
    c. Remove objectionable material encountered within the excavation, including protruding material from the walls.

3.0 SUB-GRADE PREPARATION

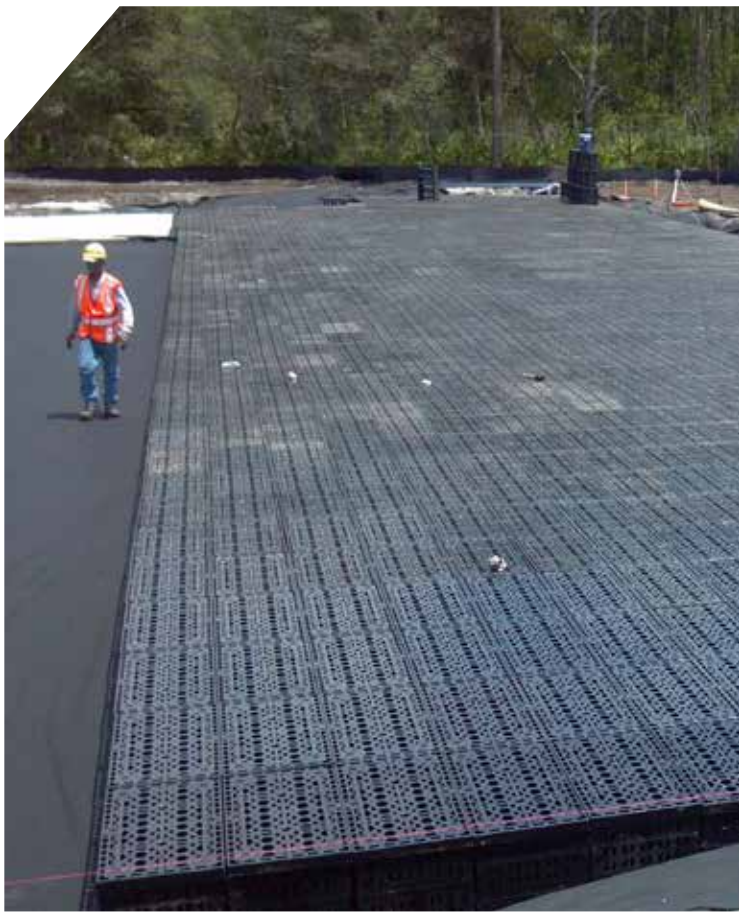
1. Unstable, unsuitable and/or compromised areas should be brought to the Engineer's attention and mitigating efforts determined. Sub-grade shall be unfrozen, free of lumps or debris and contain no standing water or mud.
2. Sub-grade must be prepared, per the Engineer of Record, to provide a minimum bearing capacity and prevent settlement.
    a. Maximum applicable settlements cannot exceed long-term 1/2" (12.7 mm) differential settlement between any two adjaent units within the system.
    b. Sub-grade must be designed to ensure soil bearing capacity is maintained throughout all soil saturation levels.

4.0 LEVELING BED INSTALLATION

1. **OPTIONAL**: A layer of geotextile fabric is recommended around the excavation to prevent material migration
    a. Geotextile fabric shall be placed per geotextile fabric manufacturer's recommendations.
    b. An impermeable liner may be incorporated to prevent infiltration. If specified, the liner must be installed per liner manufacturer recommendations.
2. Place a Leveling Bed per engineer plans.
    a. Material should meet Appendix C – Acceptable Fill Material.
    b. Material should be free of voids, lumps, debris, sharp objects and compacted.

5.0 STORMTANK® MODULE PLACEMENT

1. Install geotextile fabric and liner material (if required), as specified.
    a. Geotextile fabric shall be placed per geotextile fabric manufacturer's recommendations.
    b. An impermeable liner may be incorporated to prevent infiltration. If specified, the liner must be installed per liner manufacturer recommendations.
2. Mark the footprint of the modules for placement.
    a. Ensure module starting point is square prior to Module placement, this will ensure proper layout of units.
    b. Care should be taken to note any connections, ports, debris rows or other irregular units to be placed.
3. Install the individual modules by hand, as detailed below.
    a. The modules should be installed as shown in the StormTank submittal drawings with the short side of perimeter modules facing outward, except as otherwise required.
    b. Make sure the top/bottom platens are in alignment in all directions.
    c. For double stack configurations (25 Series ONLY):
        I. Install the bottom module first. DO NOT INTERMIX VARIOUS MODULE HEIGHTS ACROSS LAYERS.
        II. Insert stacking pins (2 per module) into the top platen of the bottom module.
        III. Place the upper module directly on top of the bottom module in the same direction, making sure to engage the pins.
4. Install the modules to completion, taking care to avoid damage to the geotextile and/or liner material.



5.0 STORMTANK® MODULE PLACEMENT

5. Locate any ports or other penetration of the Modules.

   5.1. For Observation Ports:

   a. Layout and cut opening into the top platen per standard Observation Port Detail.

   b. Place port into opening, (Module 25 Series Only: use stacking pins to locate flange plate).

   c. If port is along the perimeter, cut the flange plate flush with the edge of the end Module.

   5.2. For Connections:

   a. Locate and mark the connection opening in the side panels.

   b. Remove side panels and cut opening.

   c. Reinstall side panels.

   d. Install pipe (slip fit)

   Note: When performing lateral connections to the Module system, the platens and columns are not to be modified/cut as to not compromise the integrity of the system.

6. Upon completion of module installation, wrap the modules in geotextile fabric and/or liner.

6.0 SIDE BACKFILL

1. Inspect all geotextile, ensuring that no damage exists; which will allow sediment into the module system.
2. Once the geotextile is secured, begin to place the Side Backfill.
   a. Material should meet Appendix C - Acceptable Fill Material.
   b. Backfill sides "evenly" around the perimeter without exceeding single 12" (305 mm) lifts.
   c. Place material utilizing an excavator, dozer, or conveyor boom from the native soil surrounding the excavation, do not directly access the system during side backfilling.
   d. Compact the backfill material to settle the stone and provide a uniform distribution.

Modules are to be backfilled evenly in 12" (305mm) lifts.

Correctly Backfilled

Incorrectly Backfilled

Modules unevenly backfilled can shift and compromise the overall installation of the system.

7.0 TOP BACKFILL

1. Begin to place the top backfill.
    a. Material should meet Appendix C – Acceptable Fill Material.
    b. Place material utilizing a low ground pressure (LGP) equipment, dozer (Maximum D5 LGP or similar) or preferably a conveyor boom. DO NOT DRIVE OR DUMP FROM DUMP TRUCKS DIRECTLY ONTO THE MODULES. DO NOT DRIVE ON THE MODULES WITHOUT A MINIMUM 12" (305 mm) COVER.
    c. Compact as required by engineer of record.
        I. Utilize a static roller producing less than 10 psi per roller, unless otherwise approved, while ensuring a minimum 12" (305 mm) of cover. To do so, a minimum 15" (381 mm) layer of material may be required to account for compaction.
        II. Sheep foot rollers are not permitted.
2. Upon completion of top backfilling, if specified, wrap the system in geotextile fabric and/or liner per the material manufacturer's recommendations.
3. **OPTIONAL**: Install metallic tape around the perimeter of the system to mark the area for future utility detection.

8.0 SUITABLE COMPACTABLE FILL

Non-Vehicular Areas

1. The minimum total cover allowable is 12” (305 mm).
    a. This may decrease the depth of top backfill to allow for soil placement.
    b. By installing less cover, the system is not designed to support vehicular traffic.
    c. The maximum installation depth shall be based on lateral load calculations using the Rankine Theory and compared to StormTank Module testing results.
2. Finish to the surface and complete with vegetative cover.

Vehicular Traffic Area

1. Place fill onto the geotextile.
    a. Maximum 12” (305 mm) lifts compacted to meet the Engineer of Record’s specification.
    b. Sub-base materials should be referenced by the approved Engineering Drawings.
    c. The minimum top cover to finished grade should not be less than 24” (610 mm) for the following load ratings.
        I. For fully factored HS-20 Loads (Module 20 Series)
        II. For fully factored HS-25 Loads (Module 25 Series)
        Note: Lower cover depths are acceptable depending on loading criteria. Contact your local StormTank representative for more information.
    d. The maximum installation depth shall be based on lateral load calculations using the Rankine Theory and compared to StormTank Module testing results.
2. Finish to the surface and complete with asphalt, concrete, etc.

Fill and Surface Material Placement

Material Location	Placement Methods	Tired Equiptment Limitations	Tracked Equiptment Limitations	Roller Limitations
Finished Surface	Material dumping onto system should be limited to paving materials in paver equipment.	Equipment size is limited to ground pressure generated, most standard paving equipment is acceptable. Calculations must be performed to determine maximum allowable equipment.		
Suitable Compactable Fill	Utilize LGP equipment or a conveyor, to place material.	No tired equipment unless approved by the engineer of record.	Low ground pressure equipment, larger equipment must be verified before use.	Static rollers with a maximum pressure of 15 psi, unless verified before use.

Notes:

1. Storage of materials such as construction materials, equipment, soils, etc. over the module system is strictly prohibited.
2. Please contact a Brentwood representative prior to utilization of any equipment not listed above.

APPENDIX A - BEARING CAPACITY CALCULATION

Applicable bearing capacity calculations are per the AASHTO LRFD for Bridge Design. The calculation considers a dead load, based on cover, with a dead load factor of 1.95. In addition, it applies a live load, with a multiple presence factor of 1.2 and a live load factor of 1.75, which is distributed at a 1.15 factor (for aggregate) through the cover depth. If the cover material is soil, this factor is reduced to 1.00.

The following are two examples of that calculation:

1. HS-25 with 24" aggregate and asphalt cover

   DL = Density * depth * DL Factor = 140.00 pcf * 2.00' * 1.95 = 546.00 psf

   LL = P * DLA * MP * LL Factor = 20,000 lbs * 1 * 1.2 * 1.75 / ((20" + 24" * 1.15) * (10" + 24" * 1.15) / 144)
   LL = 3,379.22 psf

   TL = Required Bearing Capacity = 546.00 + 3,379.22 = 3,925.22 psf

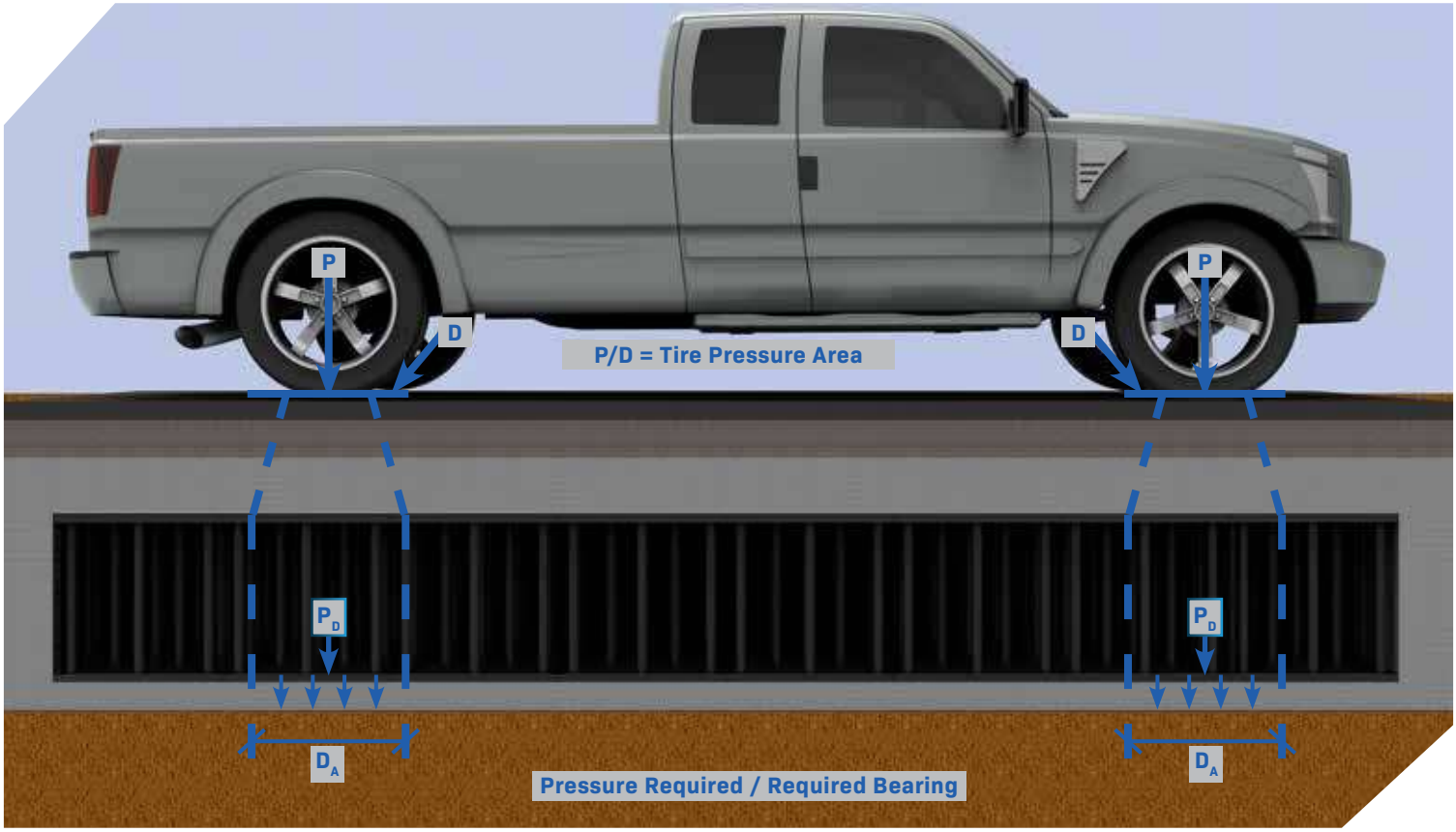
2. HS-20 with 48" aggregate and asphalt cover

   DL = Density * depth * DL Factor = 140.00 pcf * 4.00' * 1.95 = 1,092.00 psf

   LL = P * DLA * MP * LL Factor = 16,000 lbs * 1 * 1.2 * 1.75 / ((20" + 48" * 1.15) * (10" + 48" * 1.15) / 144)
   LL = 986.82 psf

   TL = Required Bearing Capacity = 1,092.00 + 986.82 = 2,078.82 psf

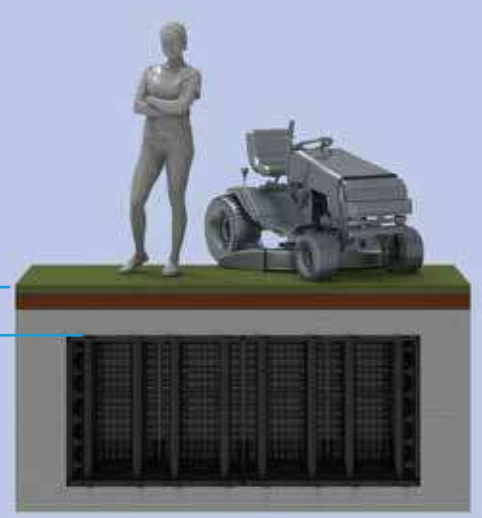
Note: All depths of cover greater than 32" require a minimum bearing capacity of 3.0 ksf.



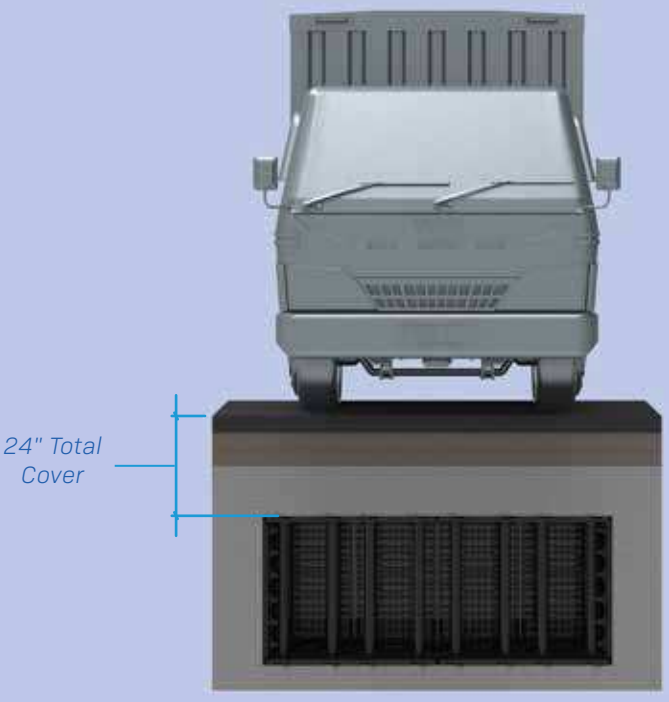
APPENDIX B - MODULE 20 SERIES LOAD RATING

The Module 20 Series has been designed to resist loads calculated in accordance with the American Association of State Highway and Transportation Official's (AASHTO) Load and Resistance Factor Design (LRFD) Bridge Design manual. Below are examples of various load ratings the Module 20 Series can achieve with the appropriate cover.

Pedestrian Loads



HS-20 Loads

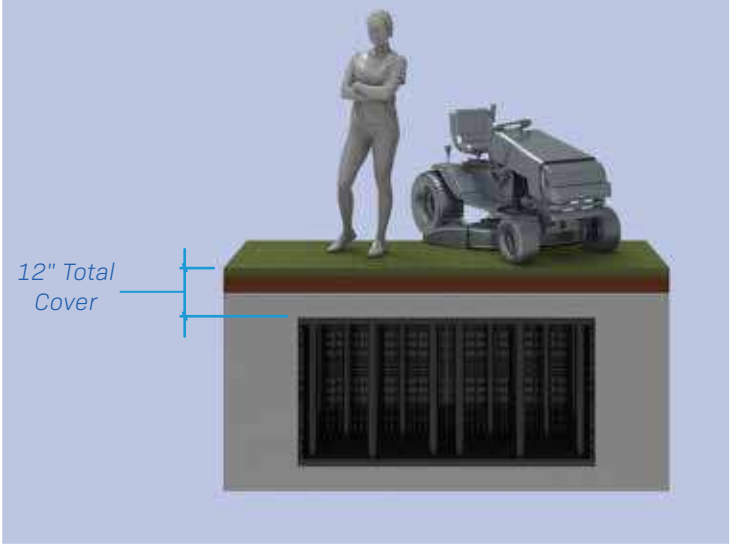


Model 2036 *Model 2024* *Model 2018*

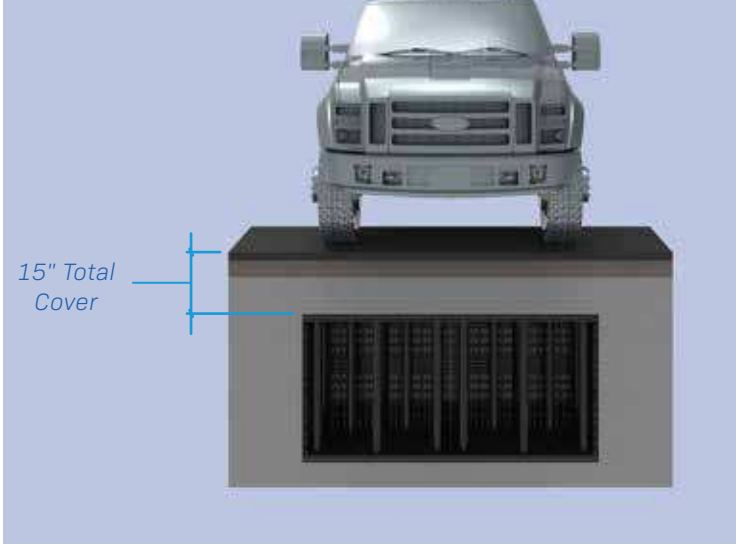
APPENDIX B - MODULE 25 SERIES LOAD RATING

The Module 25 Series has been designed to resist loads calculated in accordance with the American Association of State Highway and Transportation Official's (AASHTO) Load and Resistance Factor Design (LRFD) Bridge Design manual. Below are examples of various load ratings the Module 25 Series can achieve with the appropriate cover.

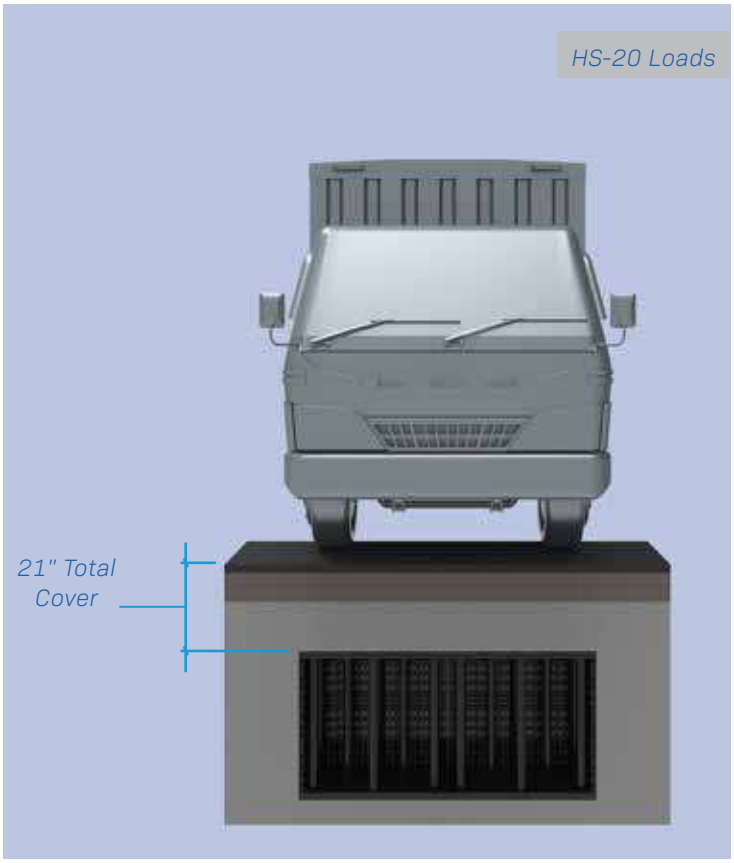
Pedestrian Loads



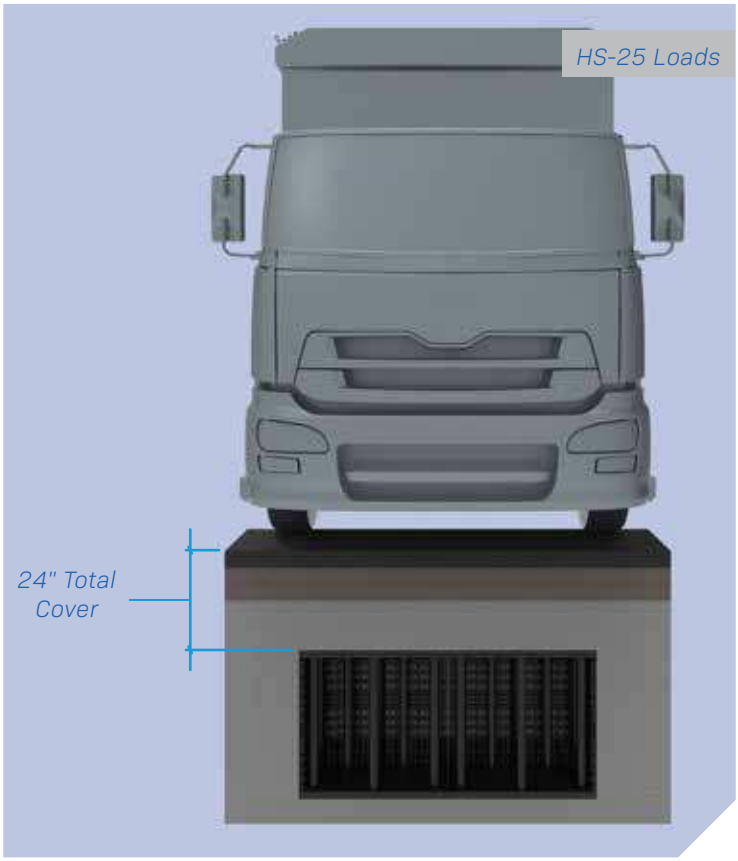
H-10 Loads



HS-20 Loads

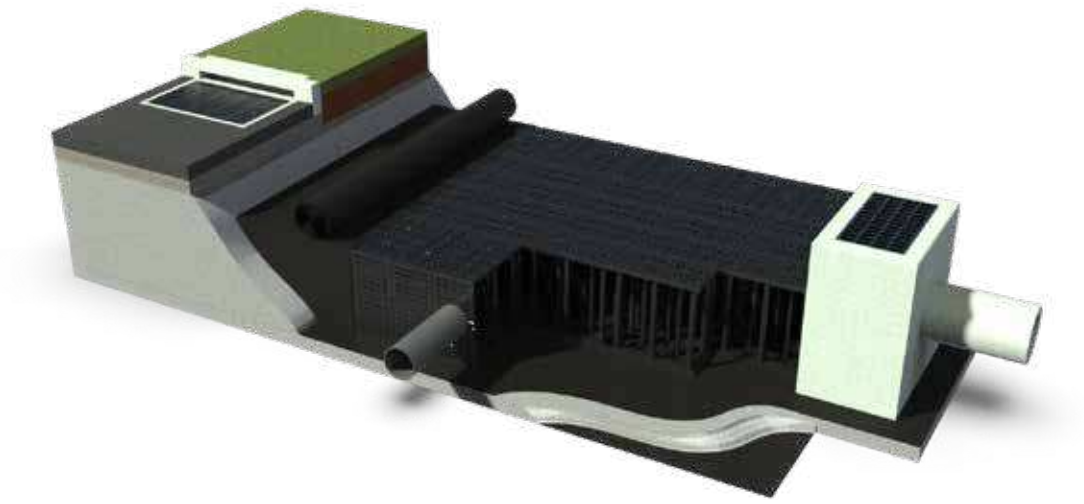


HS-25 Loads



APPENDIX C - ACCEPTABLE FILL MATERIALS

Material Location	Description	AASHTO M43 Designation	ASTM D2321 Class	Compaction/Density
Finished Surface	Topsoil, hardscape, stone, concrete, or asphalt per Engineer of Record	N/A	N/A	Prepare per engineered plans
Suitable Compactable Fill	Well-graded granular soil/aggregate, typically road base or earthen fil (maximum 4" particle size)	56, 57, 6, 67, 68	I & II III (Earth Only)	Place in maximum 12" lifts to a minimum 90% standard proctor density
Top Backfill	Crushed angular stone placed between Modules and road base or earthen fill	56, 57, 6, 67, 68	I & II	Plate vibrate to provide evenly distributed layers
Side Backfill	Crushed angular stone placed between earthen wall and Modules	56, 57, 6, 67, 68	I & II	Place and plate vibrate in uniform 12" lifts around the system
Leveling Bed	Crushed angular stone placed to provide level surface for installation of Modules	56, 57, 6, 67, 68	I & II	Plate vibrate to achieve level surface

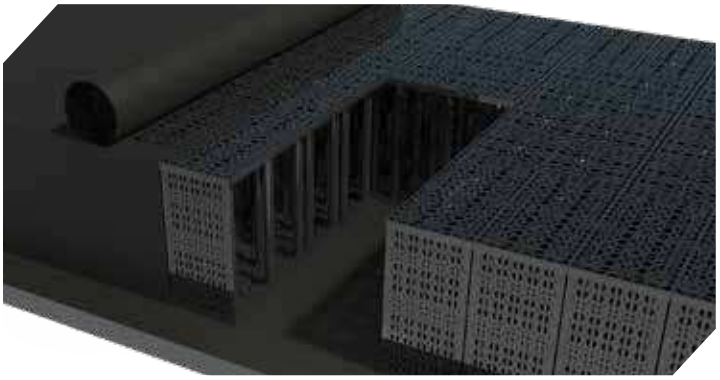


Notes:

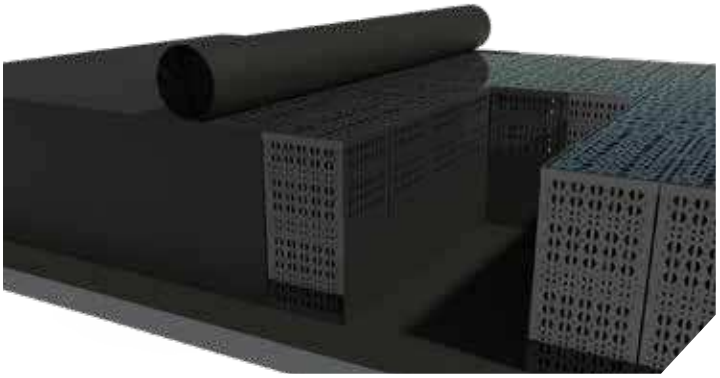
1. All stone must be angular stone meeting ASTM D2321. Recycled concrete may be utilized when meeting acceptable gradation and ASTM standards.
2. Storage of materials such as construction materials, equipment, soils, etc. over the module system is strictly prohibited.
3. Please contact a Geotechnical Engineer and the Brentwood representative prior to utilization of any material not listed above.

APPENDIX D - MODULE 25 SERIES DEBRIS ROW

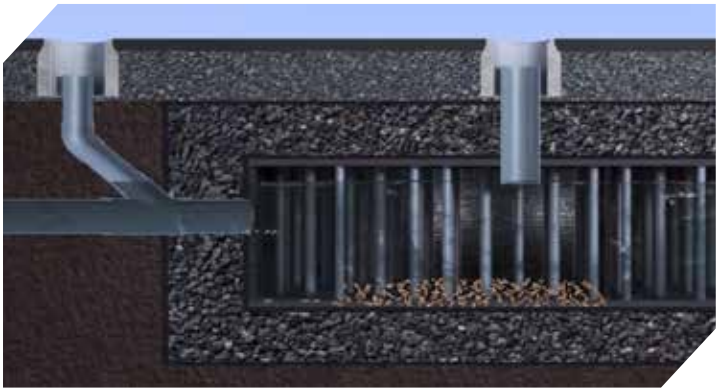
The optional StormTank Module Debris Row provides a solution to trapping sediment. Observation/cleanout ports are to be installed with a minimum of one port at the inflow pipe location. Based upon Debris Row size and shape, additonal ports may be required. See the approved submittals for debris row size and location.

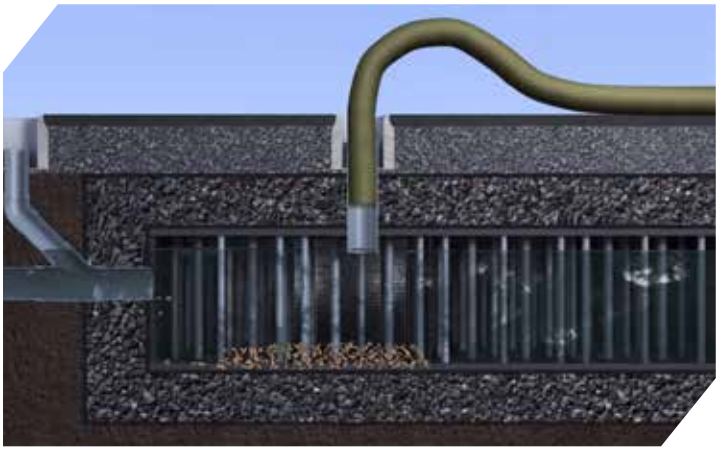


1. Install Debris Row side panels in the modules adjacent to the Debris row, per the approved plans.
2. Install a layer of geotextile accross the bottom of the Debris Row, extending up the side panels of the adjacent modules. Geotextile Fabric is to be installed to the height specified by the hydrograph elevation of the selected storm (per the engineer of record's plans), or a minimum of 12" (304.8mm), whichever is greater. Secure the geotextile fabric to the side panels with zip ties.
3. Place and install the Debris Row Modules in the appropriate location per the approved StormTank submittal drawings
4. Finally, make any necessary connections and complete the system installation per the StormTank installation instructions.



Note: For Module 20 Series contact a StormTank Representative





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SM021-07_20-20_EN

STORMWATER TREATMENT

DEBRIS ROW

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CONTENT

GENERAL NOTES

1. Brentwood recommends that the installing contractor contact either Brentwood or the local distributor prior to installation of the system to schedule a pre-construction meeting. This meeting will ensure that the installing contractor has a firm understanding of the installation instructions.
2. All systems must be designed and installed to meet or exceed Brentwood's minimum requirements. Although Brentwood offers support during the design, review, and construction phases of the Module system, it is the ultimate responsibility of the Engineer of Record to design the system in full compliance with all applicable engineering practices, laws, and regulations.
3. Brentwood requires a minimum cover of 24" (610 mm) and/or a maximum Module invert of 11' (3.35 m). Additionally, a minimum 6" (152 mm) leveling bed, 12" (305 mm) side backfill, and 12" (305 mm) top backfill are required on every system.
4. Brentwood recommends a minimum bearing capacity and subgrade compaction for all installations. If site conditions are found not to meet any design requirements during installation, the Engineer of Record must be contacted immediately.
5. All installations require a minimum two layers of geotextile fabric. One layer is to be installed around the Modules, and another layer is to be installed between the stone/soil interfaces.
6. Stone backfilling is to follow all requirements of the most current installation instructions.
7. The installing contractor must apply all protective measures to prevent sediment from entering the system during and after installation per local, state, and federal regulations.
8. The StormTank® Module carries a Limited Warranty, which can be accessed at *www.stormtank.com*.

1.0 DEBRIS ROW SIZING

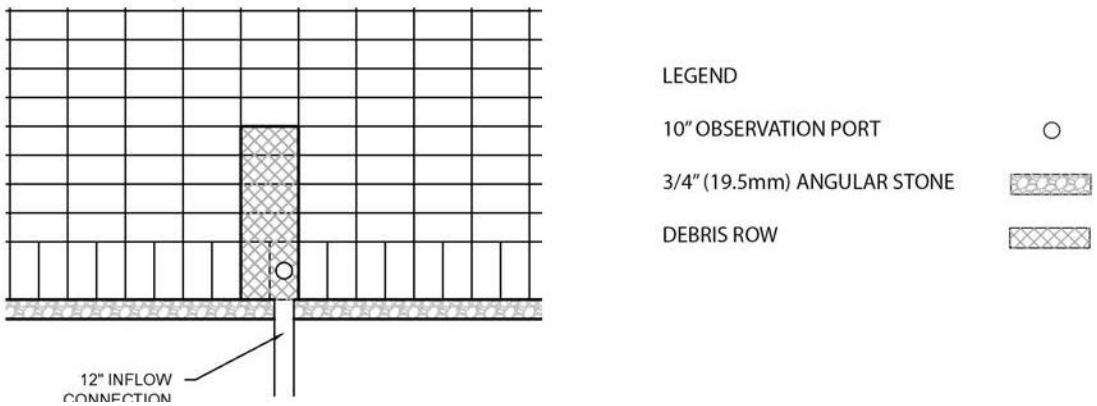
The Debris Row gathers debris and sediment in a section of modules. The Debris Row size is determined by the flow rate of the inflow connection to the system. Observation/cleanout ports are to be installed with a minimum of one port at the inflow pipe location. Based upon Debris Row size and shape, additonal ports may be required.

StormTank Module Count = Q / (F * 0.059933)

Q = Treatment Flow Rate
F = Module Footprint = 4.5 sf

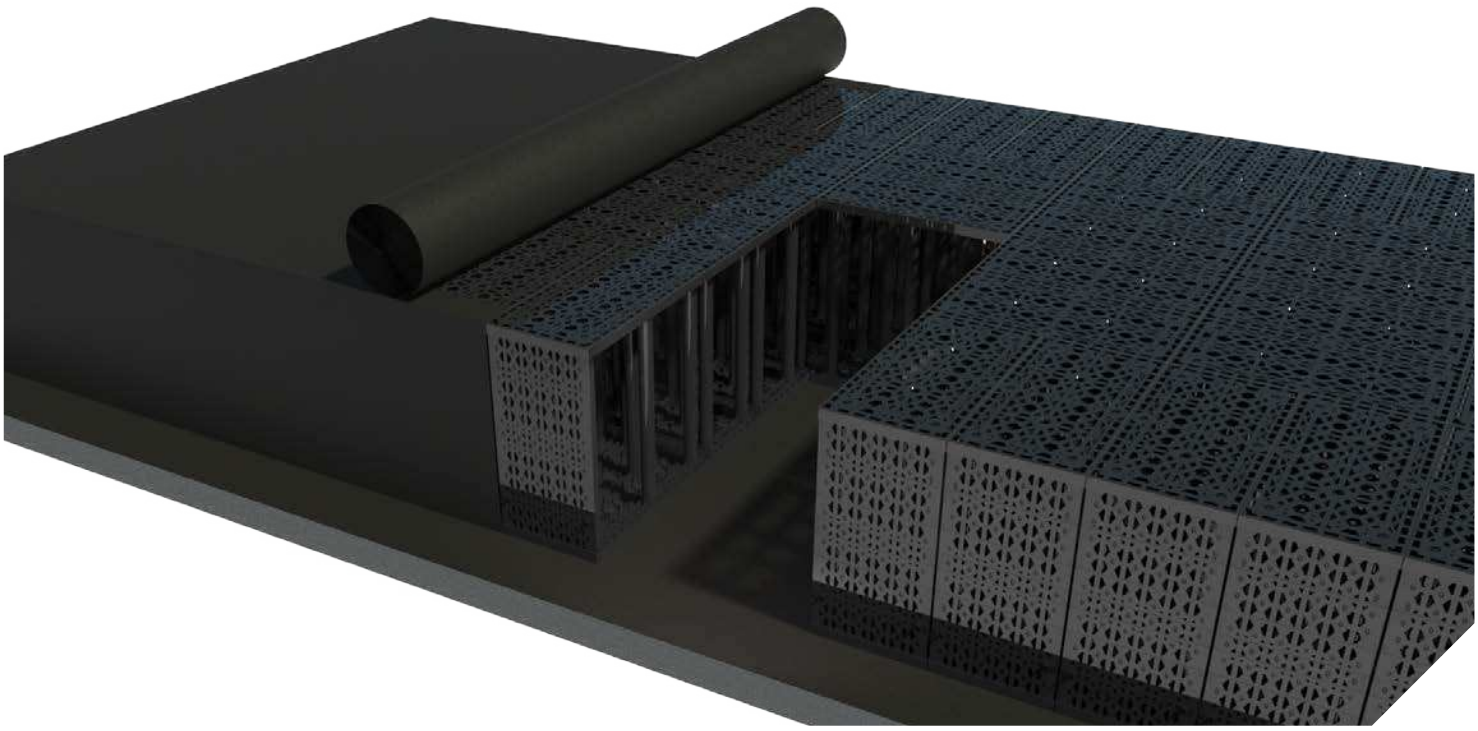
EXAMPLE:
5.5618 Modules = 1.5 CFS / (4.5*0.059933)

StormTank Module Count = 6 Modules



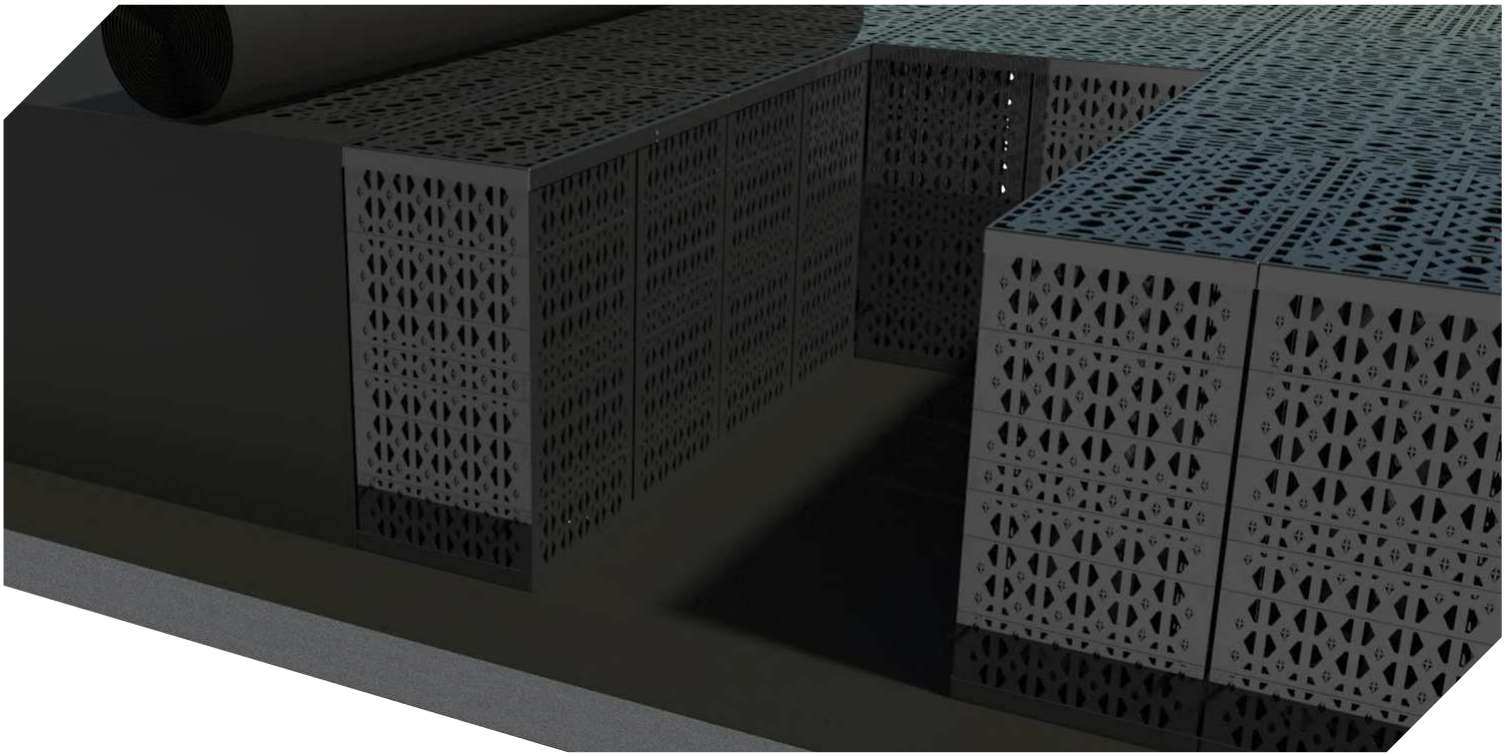
2.0 STORMTANK INSTALLATION

Install StormTank Modules per the approved StormTank submittal drawings. Do not include the Debris Row Modules.



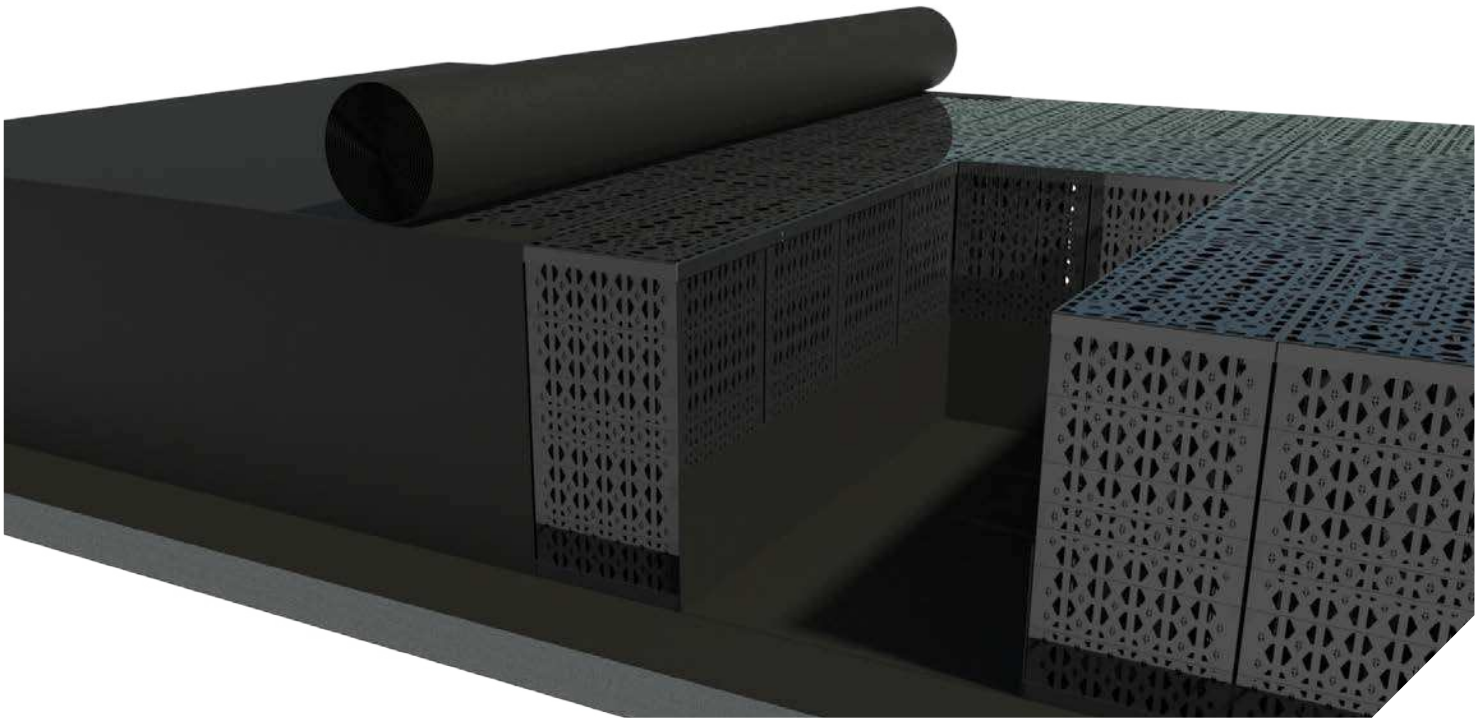
2.1 SIDE PANEL INSTALLATION

Install Debris Row side panels in the Modules adjacent to the Debris Row, per the approved plans.



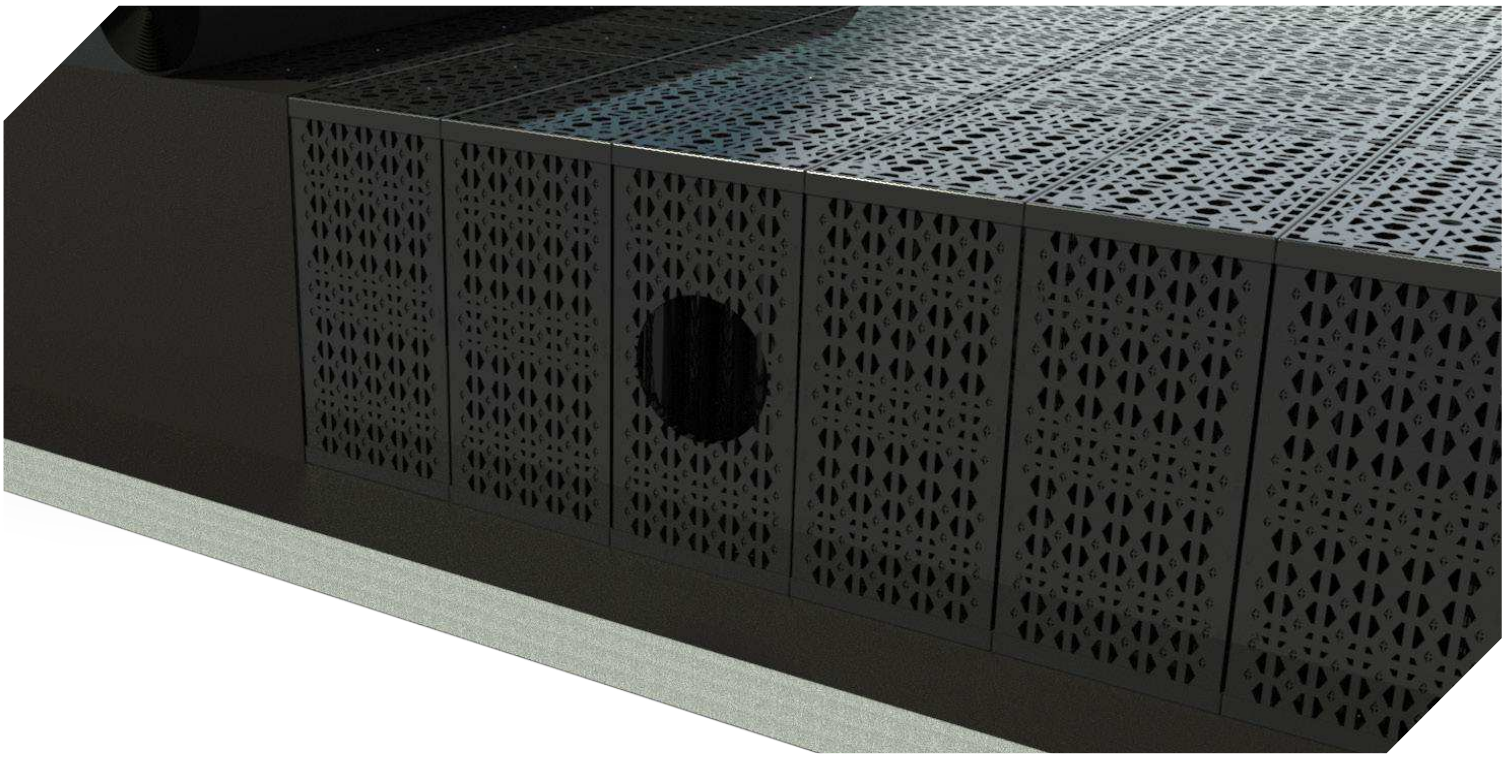
2.2 GEOTEXTILE INSTALLATION

Install a layer of geotextile across the bottom of the Debris Row, extending up the side panels of the adjacent Modules. Geotextile Fabric is to be installed to the height specified by the hydrograph elevation of the selected storm (per the engineer of record's plans), or a minimum of 12" (304.8mm), whichever is greater. Secure the geotextile fabric to the side panels with zip ties.



2.3 DEBRIS ROW MODULE PLACEMENT

Place and install the Debris Row Modules in the appropriate location per the approved StormTank submittal drawings.



2.4 COMPLETE SYSTEM INSTALLATION

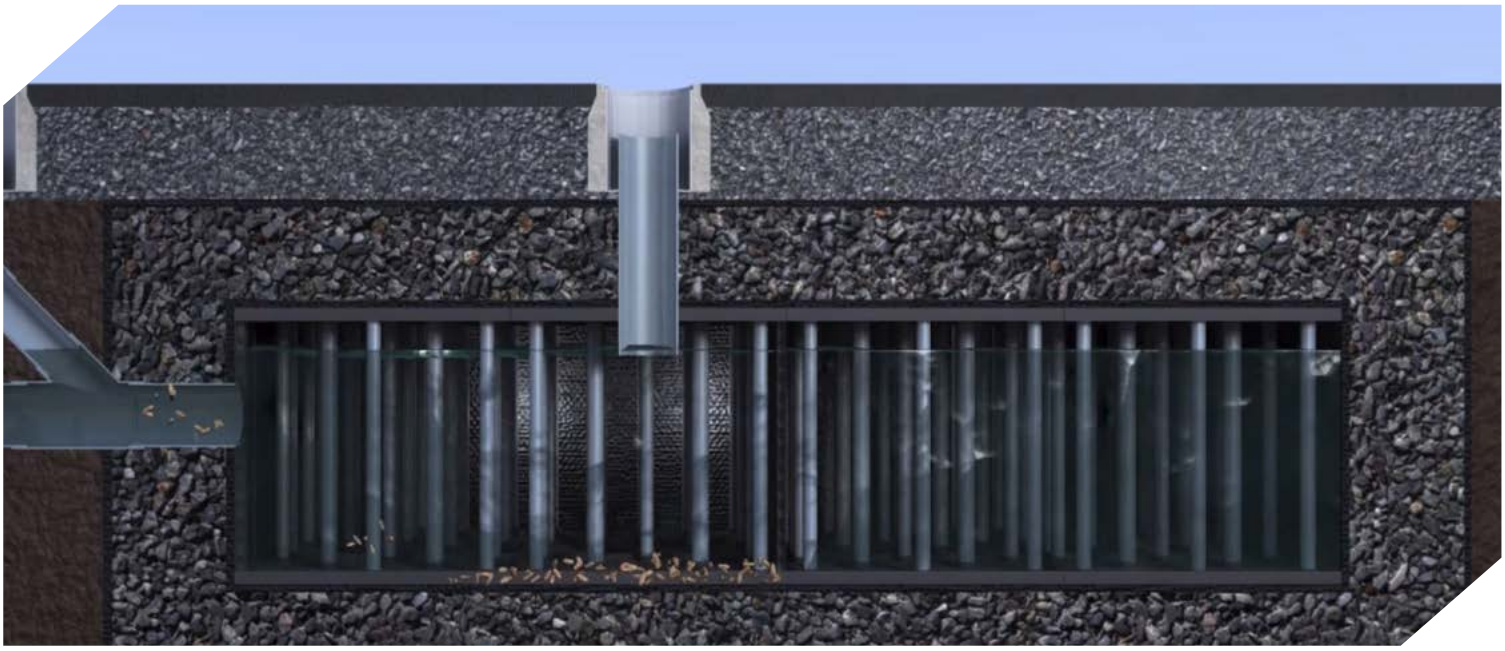
Finally, make any necessary connections and complete the system installation per the StormTank installation instructions.

3.0 OPERATIONS & MAINTENANCE

The Debris Row design and operation make maintaining the system easier by containing debris and sediment. The StormTank Module Debris Row is an inexpensive way to provide stormwater treatment, removing suspended solids from stormwater as well as other checmicals and nutrients that have bonded to the solids. The Debris Row provides a means of containing debris to a smaller, more manageable section of an overall storage system.

3.1 OPERATION

Designed to capture the first flush, the Debris Row provides full retention of large floatables. To do this, the Debris Row utilizes a layer of geotextile fabric around the lower perimeter of the cells. As stormwater enters the containment area, it passes through the geotextile, providing filtration of the stormwater. Internally located side panels are used to ensure retention of the debris by preventing large flow bypass and dispersion of captured material as the water elevation rises throughout the basin.



3.2 INSPECTION

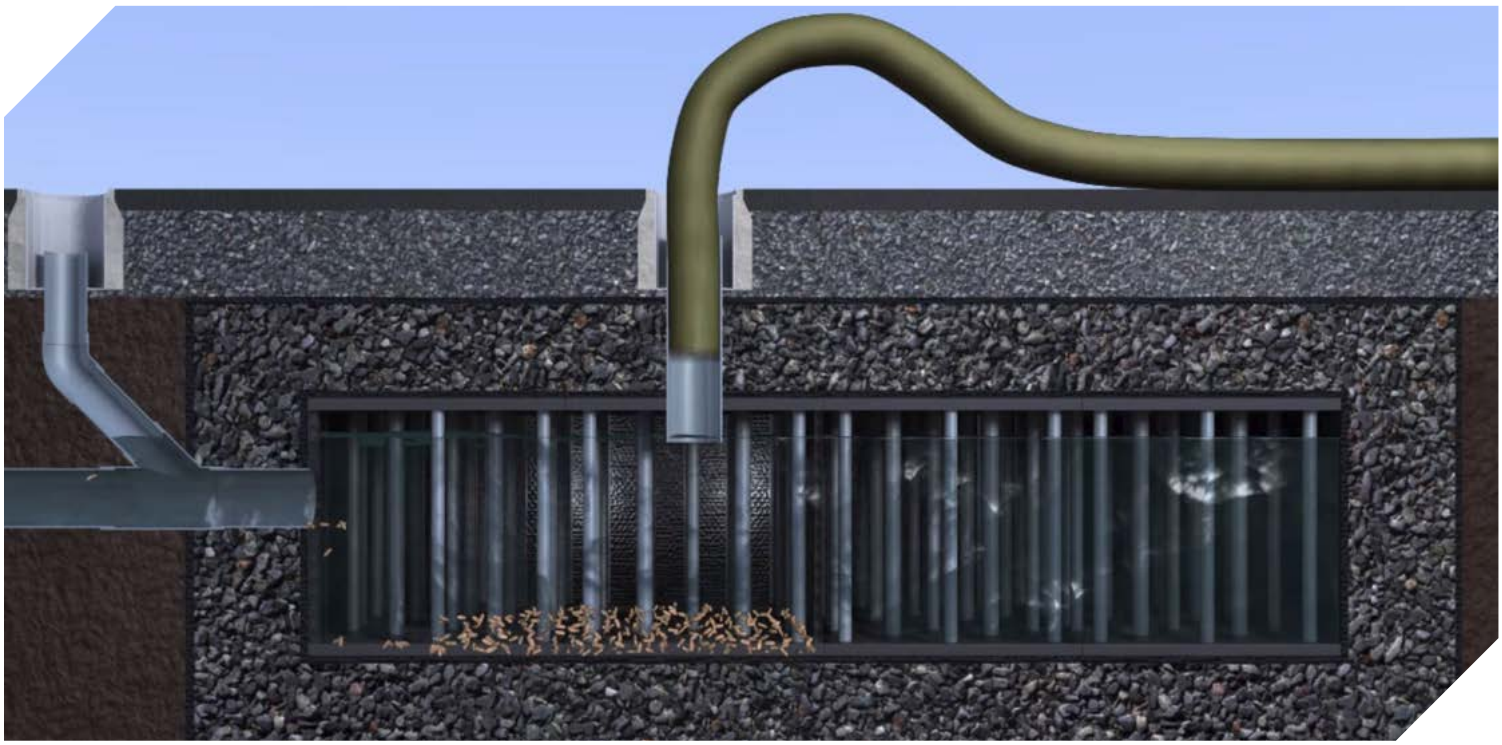
Although frequency is site-specific and dependent upon criteria like land use, pollutant load, and climate, it is recommended that the Debris Row be inspected, at a minimum, every six months. The system is inspected through access ports located in every Debris Row. To inspect the system, remove/open the access port lid.

Using a flashlight, complete a visual inspection to evaluate debris accumulation. If the area cannot be fully observed, insert a closed-circuit camera into the system to perform inspection. If accumulation is noted, record the depth of debris. If the debris accumulation is greater than three inches, proceed to maintenance of the Debris Row. If not, record all data and inspection results and close all access lids.

3.3 CLEANOUT

Designed to reduce maintenance time and cost, the Debris Row provides a contained area for sediment and debris within the larger stormwater storage basin. If inspection has determined maintenance is necessary, access is provided through the inflow connection and any access ports within the Debris Row.

Maintenance is accomplished using a high-pressure nozzle to loosen and suspend debris that can then be removed with a vacuum hose. Once debris has been removed, remove any equipment and close any open ports. Be sure to inspect and vacuum any upslope catch basins and manholes as necessary. Most municipalities and private companies have vacuum equipment with the combined capability to both loosen and remove the accumulated debris.



STORMTANK
Expect Results

STORMTANK.COM

info@stormtank.com
+1.610.374.5109

SM020-11_05-20_EN

APPENDIX D

Drawings

PINESTONE ENGINEERING LTD.

MIDLAND TOYOTA
KING STREET
MIDLAND, ONTARIO

Dwg.No.	Description
	TITLE PAGE
EX-1	EXISTING CONDITIONS PLAN
EC-1	EROSION CONTROL AND CONSTRUCTION MITIGATION PLAN
SERV-1	SITE SERVICING PLAN
GP-1	SITE GRADING PLAN
STM-1	STORM CATCHMENT DRAINAGE PLAN
DET-1	CONSTRUCTION NOTES AND DETAILS
DET-2	STANDARD DETAILS

SITE LOCATION

PUBLIC WORKS DEPARTMENT

TOWN OF MIDLAND
575 DOMINION AVE
MIDLAND, ONTARIO
L4R 1R2

DEVELOPER

MIDLAND TOYOTA
806 KING ST.
MIDLAND, ONTARIO
L4R 0B8

DEVELOPER'S ENGINEER

PINESTONE ENGINEERING LTD.
110 KIMBERLEY AVENUE, UNIT 1
BRACEBRIDGE, ONTARIO
P1L 1Z8

PEL
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FOR APPROVAL

JANUARY 2026
25-11872-M

KEYMAP

NOTES

1. TOPOGRAPHIC SURVEY BY PINESTONE ENGINEERING, OCTOBER 2025.

LEGEND

- 221.0 — CONTOUR
- EXISTING HYDRO POLE
- EXISTING TREELINE
- EXISTING DITCH CENTERLINE
- GAS — EXISTING GAS LINE
- EXISTING SIGN
- EXISTING LIGHT STANDARD
- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EXISTING HYDRANT
- EXISTING SANITARY MANHOLE
- EXISTING CATCHBASIN MANHOLE
- EXISTING CATCHBASIN
- DIRECTION OF OVERLAND FLOW

EX. GRAVEL AREA
SHED
TWO-STORY BRICK
EX. CONCRETE PAD
FUEL TANK PAD
EX. FENCE
EDGE OF ASPHALT
EX. CSV
EX. L.S.
SIGN
EX. SIDEWALK
EX. 200mmø AC SANITARY SEWER
EX. CB T/G 216.24
EX. CB T/G 216.20
EX. 300mmø A.C. WATERMAIN
EX. GRAVEL DRIVEWAY
EX. SANMH#69 T/G 215.74
EX. 32mmø WATER SERVICE
EX. V&B
EX. PAVED DRIVEWAY
EXISTING ASPHALT
EX. SEA-CAN STORAGE AREA
EX. STEPS
EX. SWALE
EX. TOYOTA DEALERSHIP F.F. 216.02
PART 4 PLAN 51R-38621
PART 1 PLAN 51R-25443
PART 7 PLAN 51R-38621
EX. 300mmø PVC STORM SEWER
EX. 200mmø AC SANITARY SEWER
KING STREET
EXISTING BOLLARDS
EX. 32mmø WATER SERVICE (DECOMMISSIONED)
EX. TRANSFORMER PAD
ASPHALT PARKING AREA
EX. CB T/G 215.93 (TO BE REMOVED)
STORAGE CONTAINERS
1 STOREY STUCCO AND METAL SIDED (TOM SMITH MOTORS) #824 KING STREET
PART 1, PLAN 51R-13275, 0053 (LT), P.I.N. 58463
CONCRETE STAIRS
CONCRETE RETAINING WALL TOP OF WALL = 215.87
CONCRETE PAD
EX. CB#5 T/G 213.81 NW INV.212.52 SE INV.212.52
EX. WATER SERVICE
50mmø WATER SERVICE
EX. STMMH T/G 214.22
EX. 900mmø STORM SEWER
EX. CB#6 T/G 213.79 W INV.212.38 E INV. 212.38
EX. WATER VALVE CHAMBER
EX. WATER SERVICE
EX. CSV
EX. STMMH T/G 214.41
EX. 1.0mø
EX. SANMH#506 T/G 214.15 N INV. 209.52 E INV. 208.84 N INV. 209.08
EX. 400mmø AC SANITARY SEWER
CABLE VAULT PAD
CHAIN LINK FENCE
EDGE OF GRAVEL
SLOPE
TOP OF SLOPE
EDGE OF ASPHALT
STORAGE CONTAINERS
IB (840)
SSIB (41752)
N57°14'30"E 60.96 (51R-13275 & Meas.)
N57°14'30"E 39.58 (51R-13275 & Meas.)
N32°45'30"W 65.78 (51R-14294 & Meas.)
N32°45'30"W 24.38 (51R-14294 & Meas.)
N57°14'30"E 80.22 (51R-13275 & Meas.)
N57°14'30"E
0057 (LT)
58463
P.I.N.
PART 2, PLAN 51R-13275
PART 1, PLAN 51R-13275
0053 (LT)
216.00
216.50
217.00
217.50
215.50
215.00

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BENCHMARK

BM#1 TOP NUT OF HYDRANT ELEVATION

SEAL

LICENSED PROFESSIONAL ENGINEER
L M TRIVIDIC
100220753
JAN 2026
PROVINCE OF ONTARIO

DRAWN BY:	CHECKED BY:
G.N.	J.V.
DESIGNED BY:	
L.T.	
SCALE:	DATE:
1:300	JANUARY 2026

NO.	YY.MM.DD	REVISION	BY

NORTH ARROW

PROJECT: MIDLAND TOYOTA

DRAWING: EXISTING CONDITIONS

PROJECT No. : 24-11872-M

DRAWING No. EX-1

KEYMAP

LEGEND

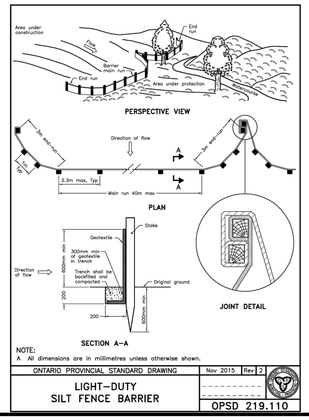
- EXISTING SANITARY MANHOLE
- EXISTING HYDRANT
- EXISTING WATER VALVE
- PROPOSED CATCHBASIN
- PROPOSED STORM CATCH BASIN MAHNHOLE
- PROPOSED STORM MANHOLE
- PROPOSED OIL/GRIT SEPERATOR
- PROPOSED SANITARY MANHOLE
- PROPOSED VALVE AND BOX
- PROPOSED HYDRANT
- 318.00 PROPOSED ELEVATION
- (318.00) PROPOSED SWALE ELEVATION
- 318.00 EX. EXISTING ELEVATION
- 318.00 T/C TOP OF CURB
- 318.00 T/W TOP OF RETAINING WALL
- 318.00 FUTURE PROPOSED GRADE
- DIRECTION OF OVERLAND FLOW
- 3.0% FLOW AND GRADIENT
- S —— S SILT FENCE
- SWALE/DITCH CENTERLINE
- LIGHT STANDARD
- PROPOSED ASPHALT
- PROPOSED GRAVEL

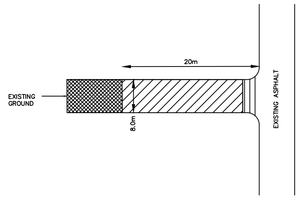
NOTES

1. TOPOGRAPHIC SURVEY BY PINESTONE ENGINEERING, OCTOBER 2025.
2. SITE PLAN PROVIDED BY ISM ARCHITECTS INC.

EROSION CONTROL NOTES:

1. All silt fencing to be installed prior to any grading or excavation.
2. Erosion control fencing to be installed around the base of all stockpiles.
3. Additional erosion control measures may be required as site development progresses. Contractor to provide all additional erosion control structures.
4. Pinestone Engineering Ltd. to monitor erosion control structures to ensure fencing is installed and maintenance is performed to town requirements.
5. Erosion control structures to be monitored regularly and any damage repaired immediately. Sediments to be removed when accumulations reach a maximum of 1/2 the height of the fence.
6. All erosion control structures to remain in place until all disturbed ground has been restablized either by paving or restoration of vegetative ground cover.
7. No alternate methods of erosion protection shall be permitted unless approved by Pinestone Engineering Ltd. and the Town Midland Department of Public Works.
8. Contractor is responsible for municipal roadway to be cleared of all sediments from vehicular tracking etc. at the end of each day.





STONE SIZE

- THE STONE PAD SHALL BE A MIN. 150mm THICK. USE 50mm# STONE OR RECLAIMED CONCRETE EQUIVALENT FOR FIRST 10m FROM ADJACENT ROAD AND 150mm# STONE FOR REMAINDER OF STONE PAD.

LENGTH

- AS REQUIRED BUT NOT LESS THAN 20m

WIDTH

- 8m WIDTH

GEOTEXTILE FABRIC

- GEOTEXTILE FABRIC (TERRAFIX 270R OR EQUIVALENT) WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE

SURFACE WATER

- ALL SURFACE WATER FLOWING OR DIRECTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.

MAINTENANCE

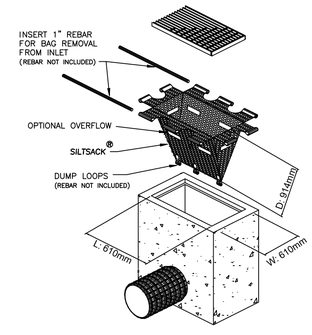
- THE CONTRACTOR SHALL MAINTAIN THE ENTRANCE IN A CONDITION WHICH WILL PREVENT TRACKING OF FLOWING OF SEDIMENT ONTO PUBLIC RIGHT–OF–WAY. THIS MAY REQUIRE PERIODIC DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT OF WAY MUST BE REMOVED IMMEDIATELY BY THE CONTRACTOR. UPON OBSERVATION OF CONTINUOUS MUD TRACKING ONTO ADJACENT STREETS, THE MAT IS TO BE FULLY REPLACED.

WASHING

- WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT OF WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AND APPROVED SEDIMENT TRAPPING DEVICE
- INSPECTION AND REQUIRED MAINTENANCE AFTER EACH RAIN SHALL BE PROVIDED BY THE CONTRACTOR.

20m x 8m STONE MUDMAT DETAIL

N.T.S.



TYPICAL SILT SACK CONSTRUCTION TYPE B

N.T.S.

The position of existing above ground and underground utilities and facilities are not necessarily shown on the drawings, and where shown, the accuracy of the position of such utilities and facilities is not guaranteed. Before starting work, the contractor shall confirm the exact location of all existing utilities and facilities, and shall assume all liability for damage to them

Drawings shall not be used for construction unless sealed and signed. All work to be performed in accordance with the Occupational Health & Safety Act 1990.

Any errors and/or omissions shall be reported to Pinestone Engineering Ltd. without delay.

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LICENSED PROFESSIONAL ENGINEER
L M TRIVIDIC
100220753
JAN 2026
PROVINCE OF ONTARIO

DRAWN BY:	CHECKED BY:
G.N.	J.V.
DESIGNED BY:	
L.T.	
SCALE:	DATE:
1: 300	JANUARY 2026

NO.	YY.MM.DD	REVISION	BY

NORTH ARROW

PROJECT: MIDLAND TOYOTA

DRAWING: EROSION CONTROL AND CONSTRUCTION MITIGATION PLAN

PROJECT No. : 24-11872-M

DRAWING No. EC-1

KEYMAP

LEGEND

- EXISTING SANITARY MANHOLE
- EXISTING HYDRANT
- EXISTING WATER VALVE
- PROPOSED CATCHBASIN
- PROPOSED STORM CATCH BASIN MAHNHOLE
- PROPOSED STORM MANHOLE
- PROPOSED OIL/GRIT SEPERATOR
- PROPOSED SANITARY MANHOLE
- PROPOSED VALVE AND BOX
- PROPOSED HYDRANT
- METER ROOM
- LIGHT STANDARD

NOTES

1. TOPOGRAPHIC SURVEY BY PINESTONE ENGINEERING, OCTOBER 2025.
2. SITE PLAN PROVIDED BY ISM ARCHITECTS INC.

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DESIGNED BY: L.T.	
SCALE: 1:300	DATE: JANUARY 2026

NO.	YY.MM.DD	REVISION	BY

NORTH ARROW

PROJECT: MIDLAND TOYOTA

DRAWING: SITE SERVICING PLAN

PROJECT No.: 24-11872-M

DRAWING No. SERV-1

KEYMAP

NOTES

1. TOPOGRAPHIC SURVEY BY PINESTONE ENGINEERING, OCTOBER 2025.
2. SITE PLAN PROVIDED BY ISM ARCHITECTS INC.

LEGEND

- EXISTING SANITARY MANHOLE
- EXISTING HYDRANT
- EXISTING WATER VALVE
- PROPOSED CATCHBASIN
- PROPOSED STORM CATCH BASIN MAHNHOLE
- PROPOSED STORM MANHOLE
- PROPOSED OIL/GRIT SEPERATOR
- PROPOSED SANITARY MANHOLE
- PROPOSED VALVE AND BOX
- PROPOSED HYDRANT
- 318.00 PROPOSED ELEVATION
- (318.00) PROPOSED SWALE ELEVATION
- 318.00 EX. EXISTING ELEVATION
- 318.00 T/C TOP OF CURB
- 318.00 T/W TOP OF RETAINING WALL
- 318.00 FUTURE PROPOSED GRADE
- 3.0% DIRECTION OF OVERLAND FLOW
- S —— S SILT FENCE
- SWALE/DITCH CENTERLINE
- LIGHT STANDARD
- PROPOSED ASPHALT
- PROPOSED GRAVEL

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DESIGNED BY:	
L.T.	
SCALE:	DATE:
1: 300	JANUARY 2026

NO.	YY.MM.DD	REVISION	BY

NORTH ARROW

PROJECT: MIDLAND TOYOTA

DRAWING: SITE GRADING PLAN

PROJECT No. : 24-11872-M

DRAWING No. GP-1

KEYMAP

LEGEND

- EXISTING SANITARY MANHOLE
- EXISTING HYDRANT
- EXISTING WATER VALVE
- PROPOSED CATCHBASIN
- PROPOSED STORM CATCH BASIN MAHNHOLE
- PROPOSED STORM MANHOLE
- PROPOSED OIL/GRIT SEPERATOR
- CATCHMENT BOUNDARY
- 301 / 0.09 / 0.90 — CATCHMENT NUMBER / RUN-OFF COEFFICIENT / STORM CATCHMENT AREA (ha)

NOTES

1. TOPOGRAPHIC SURVEY BY PINESTONE ENGINEERING, OCTOBER 2025.
2. SITE PLAN PROVIDED BY ISM ARCHITECTS INC.

The position of existing above ground and underground utilities and facilities are not necessarily shown on the drawings, and where shown, the accuracy of the position of such utilities and facilities is not guaranteed. Before starting work, the contractor shall confirm the exact location of all existing utilities and facilities, and shall assume all liability for damage to them

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NORTH ARROW

PROJECT: MIDLAND TOYOTA

DRAWING: STORM DRAINAGE CATCHMENT PLAN

PROJECT No. : 24-11872-M

DRAWING No. STM-1

GENERAL NOTES

1. All standards in accordance with current Ontario Provincial Standard Drawings (OPSD) and Ontario Provincial Standard Specifications (OPSS) unless otherwise noted.
2. All works shall conform to The Town of Midland Engineering Design Criteria and Standards Manual.
3. All dimensions are in metres. Pipe sizes in millimetres unless otherwise noted.
4. Notify Bell Canada, Union Gas, Water and Sewer, Hydro and Cable Departments (where applicable) 72 hours prior to commencement for locates.
5. The Contractor shall coordinate the works with the Engineer who shall oversee the project on behalf of the owner.
6. All construction to be completed to the satisfaction of the Engineer.
7. All services and utilities to be supported as per OPSD–1007.01.
8. All trenching to be in accordance with the Occupational Health and Safety Act.
9. All traffic control and signage to be in accordance with M.T.O. Book 7 requirements.
10. Town of Midland and Engineer to be notified at least 72 hours prior to construction.
11. Wherever pipes are passing through uncompacted fill areas, the bedding trench shall be excavated to the undisturbed ground level and backfilled with Granular 'A' compacted to 95% standard proctor density or as otherwise shown on the drawings.
12. Maintain a minimum cover of 1.8m for watermains or as otherwise shown on the drawings with insulation.
13. Perform all blasting in accordance with the specification. Undertake pre–blast survey and provide copy to Engineer prior to commencement of blasting operations.
14. The location of underground and above ground utilities and structures shown on drawings is approximate only and may not be complete. The exact location of all utilities and structures shall be determined by consulting the Town authorities and Utilities companies concerned. The contractor shall prove the exact location of all utilities and structures before construction and shall be responsible for adequately protecting them against damage, assuming all liabilities for damage of such.
15. The Contractor must check and verify dimensions, obtain all utility locates, and obtain all required permits and licenses and verify existing service elevations before proceeding with any work.
16. Latest approved drawings to be used for construction and all discrepancies reported to the Engineer.
17. Drawings are not to be scaled.
18. All materials to be used on this project shall be lead free.
19. Pipe length as labeled is measured horizontally along pipe centre line and may differ from baseline chainage where baseline is not parallel to pipe.
20. Utilize erosion and siltation controls as necessary during construction to control sediment/silt runoff from the site.
21. Ensure accessibility to existing residential driveways at all times.
22. Ensure adequate protection to all culverts.
23. Building storm outlets are not to connect to the sanitary lateral and are to discharge to grade.

RESTORATION NOTES

1) Reinstate roads to previous condition or better, where disturbed by construction activity.
2) Contractor to restore driveways and ditch work in areas disturbed by construction to equal or better conditions.
3) Minimum gravel driveway restoration to be 150mm, Granular 'A'. Asphalt Driveway restoration to be 50mm of HL3. existing gravel subgrade.
4) All grassed areas disturbed during construction shall be restored with 100mm topsoil and sod or hydro mulched as per OPSS 507. Maintain until established.
5) All restoration work to be completed to the satisfaction of the Engineer.

WATERMAIN NOTES

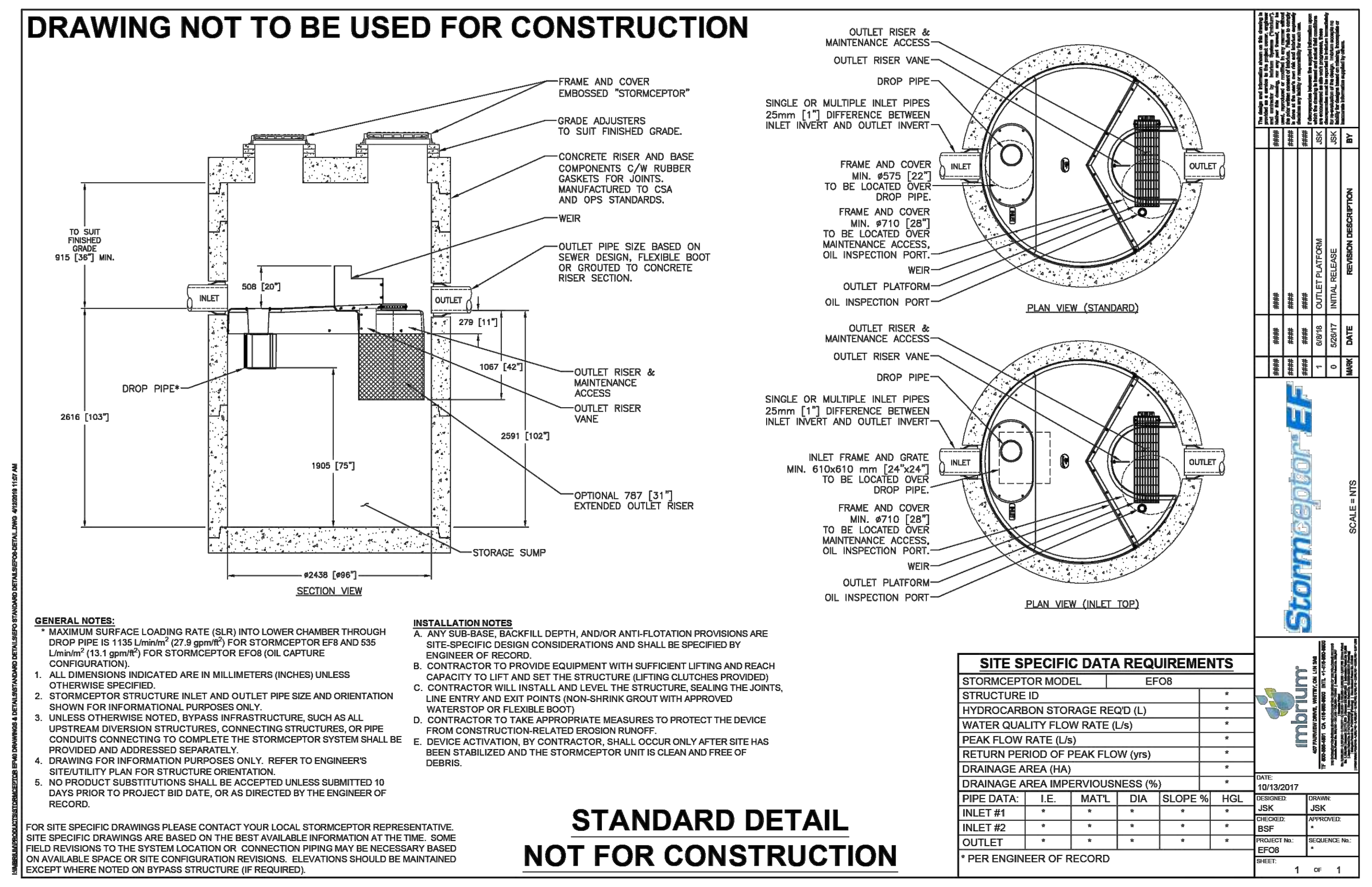
1. Work shall conform to OPSS. 441.
2. Install coated No. 12 TWU stranded copper tracer wire on all watermains as per Town Standards.
3. All watermains to have 1.8m minimum cover as shown on the drawings.
4. Unless noted otherwise, all watermains to be Class 235(DR 18) PVC material in accordance with AWWA C–900 Standard. Exterior of all uncoated D.I. fittings, valves, mechanical joint restraints & associated connections shall have denso petrolatum mastic corrosion protection.
5. All dimensions are in metres. Pipe sizes are in millimetres unless otherwise noted.
6. Exact horizontal and vertical alignment of existing watermain at point of connection to be determined in the field.
7. Valve and Valve boxes to be installed accordance with OPSS. 441
8. Vertical bend distances are not indicated on drawings and are to be installed as required. All watermain fittings tee's, bends, end caps etc, must comply with approved products list for the Town of Midland. Watermains located in fill shall have mechanically restrained joints and be bedded on compacted Granular 'A' founded on native ground. Granular 'A' to be compacted to 95% SPD.
9. Pressure testing of all new water systems will be completed by the Town's Representative and shall be undertaken in accordance with OPSS 701.07.22.01. Watermains must be pressure tested (1035 kPa), chlorinated, and pigged with foam swabs as directed by the Engineer. Hydrostatic testing as per AWWA standard C651. Bacteriological testing as per AWWA Standard C651.
10. All gate valves shall be resilient seat type to AWWA C–509 Standards.
11. All water services to be 25mm dia. HDPE series 160 unless otherwise noted. Provide 1.8m cover for water services at ditch crossings. Service saddles shall be all stainless steel double bolt, fully galvanized, Robar 2616 Boss Pad, or Cambridge Brass 8403 PG. Pipe embedment and backfill shall conform to OPSD 802.010 and 802.013. Pipe embedment material to springline shall consist of Granular "A" or 19mm diameter clear stone. Embedment from springline to 300mm above pipe shall consist of sand. Trench backfill to road subgrade elevation shall consist of approved native material compacted to 95% SPD.
12. Watermain bedding shall be Granular 'A' to OPSD–802.010.
13. Vertical and horizontal bends in watermain to be achieved by manufactured bends only.
14. Hydrants shall meet the requirements of AWWA standard C–502.
15. Watermains with gradients 4:1 or greater to be anchored. Shop drawings to be submitted for approval.
16. All curb stops shall be ball type with compression joint inlet and outlet, non draining, no lead or brass construction, with blow out proof stainless steel stems and unfiled Teflon seats, rated for 300psi conforming to ANSI/AWWA C800–05 and NSF/ANSI 61, drinking water system components–Health Effects. Connections of newly constructed watermains to existing watermains in accordance with AWWA standard C651.
17. All watermain fittings shall have cathodic protection which includes zinc caps and anodes on each fitting.
18. Cathodic protection on all watermain fittings, including zinc caps and anodes.

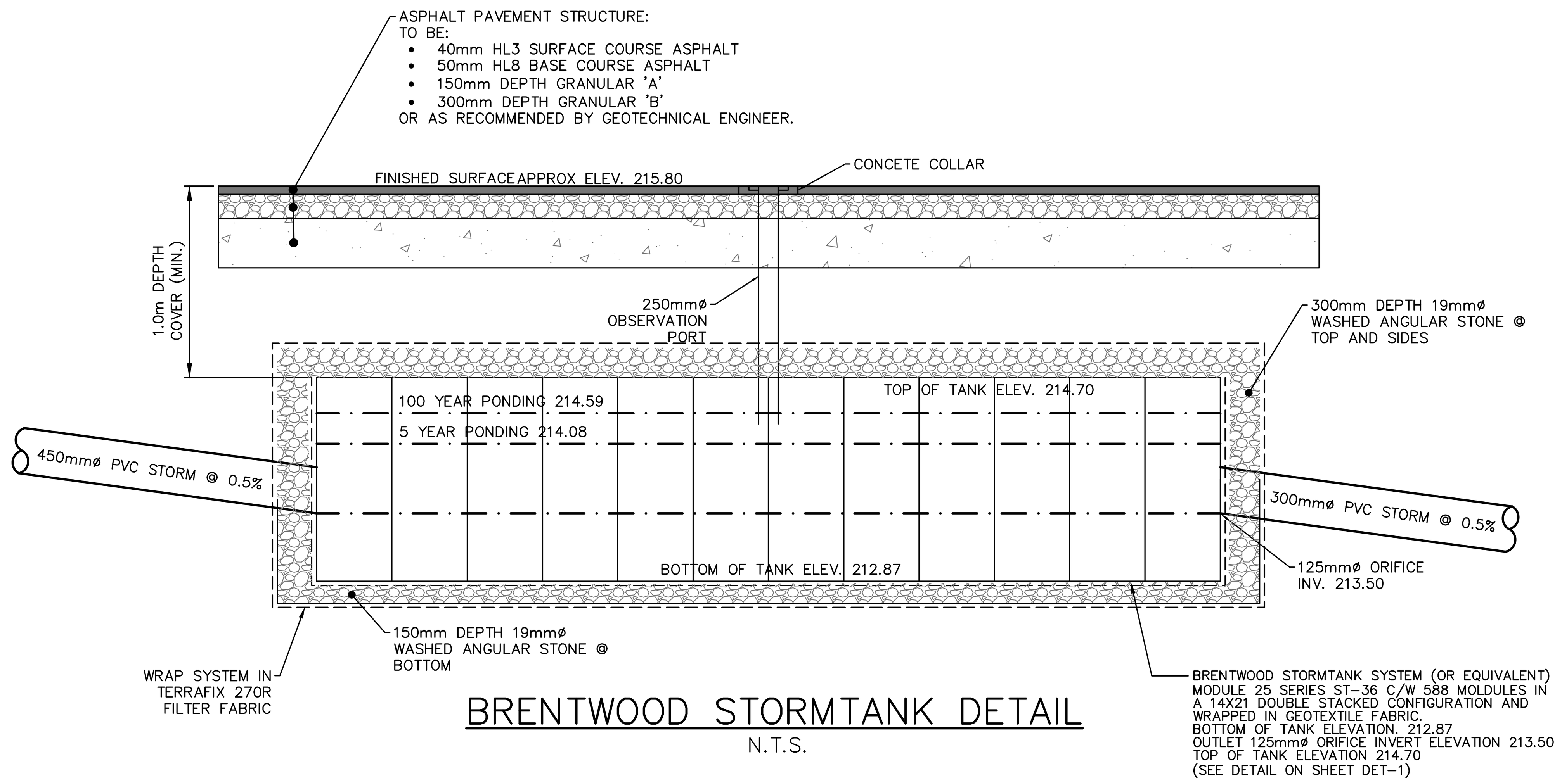
SANITARY SEWERS

1. Work shall conform to OPSS.410 and the Ontario Building Code. Pipe embedment and backfill shall conform to OPSD 802.010 and 802.013. Pipe embedment material to springline shall consist of Granular "A" or 19mm diameter clear stone. Embedment from springline to 300mm above pipe shall consist of sand. Backfill to be approved native material or select material.
2. Sanitary sewer to be PVC SDR 35 200mmø. Trench backfill to road subgrade elevation shall consist of approved native material compacted to 95% SPD.
3. Sanitary sewer services to be PVC SDR 28 125mmø.
4. All manholes to be minimum 1200mm dia. precast with aluminum rungs at 300mm centers per OPSD.701.010
5. Provide water tight boot pipe–to–manholes connectors in sanitary manholes.
6. All manholes to be benched per OPSD 701.021
7. Manhole at property line shall have waterproofing membrane (mel–rol or approved equivalent) at a minimum of 300mmø at each section of the manhole.
8. Sanitary sewers to be tested in accordance with OPSS 409 & 411. Pipes to be cleaned and flushed prior to the video inspection.
9. All frames/lids for manhole in roadways shall be 3 piece adjustable units such as Bibby(Autostable) C–50M–ONT, Meuller adjustable AJ633 or approved equivalent.
10. Sanitary sewers to be video inspected providing dvd recording copy in triplicate (3) and report of inspection to the Engineer. Sewers are to be inspected once at initial acceptance and once at final assumption without defect.
11. Frost straps to be installed as per OPSD 701.100.
12. The complete sewer system including service connection to the property line and manholes shall be tested in accordance with OPS. Approximately one year prior to the expiration of the maintenance period the complete system shall be inspected by an approved video camera testing company and the Director of Public Works shall be provided with a copy of the appropirte data prior to final approval.

STORM SEWERS, CULVERTS, AND SUBDRAINS

1. Storm sewers shall be smooth wall 320KPa HDPE per BOSS 2000 with bell & spigot joint or PVC Ultra Rib. Pipe embedment and backfill shall conform to OPSD 802.010 and 802.013. Pipe embedment material to springline shall consist of Granular "A" or 19mm diameter clear stone. Embedment from springline to 300mm above pipe shall consist of sand. Trench backfill to road subgrade elevation shall consist of approved native material compacted to 95% SPD.
2. All catch basin manholes to be precast with aluminum rungs at 300mm centers per OPSD.701.010 AND 701.011.
3. Frost tapers at culverts to be per OPSD 803.030.
4. Pipe subdrain shall be 150mmø corrugated HDPE pipe, 210 kpa pipe stiffness, c/w filter sock and shall be connected to storm structures.
5. Storm sewers to be video inspected providing dvd Sewers are to be inspected once at initial acceptance and once at final assumption without defect.
6. Frost straps to be installed as per OPSD 701.100.
7. 30 days prior to both initial and final inspection, a video inspection and report shall be completed and presented to town staff.
8. Catchbasin and Catchbasin Manholes frame and grate to be per OPSD 400.100.
9. Waterproofing mambrane at al manhole joints. 300mm min. at each joint with mel–rol or approved equivalent.





BRENTWOOD STORMTANK DETAIL

N.T.S.

The position of existing above ground and underground utilities and facilities are not necessarily shown on the drawings, and where shown, the accuracy of the position of such utilities and facilities is not guaranteed. Before starting work, the contractor shall confirm the exact location of all existing utilities and facilities, and shall assume all liability for damage to them

Drawings shall not be used for construction unless sealed and signed. All work to be performed in accordance with the Occupational Health & Safety Act 1990.

Any errors and/or omissions shall be reported to Pinestone Engineering Ltd. without delay.

PEL PINESTONE ENGINEERING LIMITED | www.pel.ca

BENCHMARK

SEAL

LICENSED PROFESSIONAL ENGINEER L M FRIVIDIC 100220753 JAN 2026 PROVINCE OF ONTARIO

DRAWN BY:	CHECKED BY:
G.N.	J.V.
DESIGNED BY: L.T.	
SCALE: 1:300	DATE: JANUARY 2026

NO.	YY.MM.DD	REVISION	BY

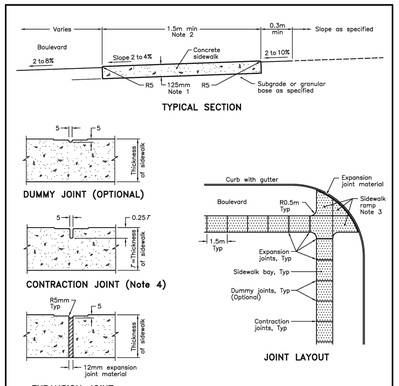
NORTH ARROW

PROJECT: MIDLAND TOYOTA

DRAWING: CONSTRUCTION NOTES AND DETAILS

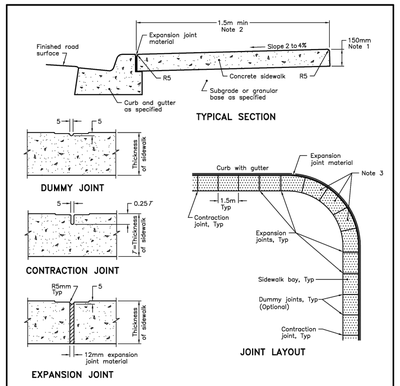
PROJECT No. : 24-11872-M

DRAWING No. DET-1



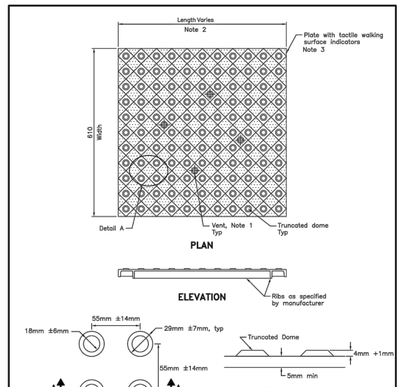
NOTES:
1 Sidewalk thickness at residential driveways and adjacent to curb shall be 150mm. At commercial and industrial driveways, the thickness shall be 200mm.
2 Sidewalk width shall be wider when specified.
3 This OPSD shall be read in conjunction with OPSD 310.030, 310.031, 310.033, and 310.039.
4 Contraction Joint may be tooled or sawcut.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 3
CONCRETE SIDEWALK		
	OPSD 310.010	



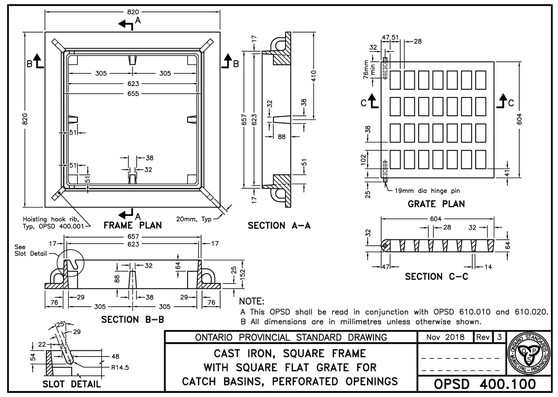
NOTES:
1 At commercial and industrial driveways, the thickness shall be 200mm.
2 Sidewalk width shall be wider when specified.
3 This OPSD shall be read in conjunction with OPSD 310.030, 310.031, 310.033, and 310.039.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 3
CONCRETE SIDEWALK ADJACENT TO CURB WITH GUTTER		
	OPSD 310.020	



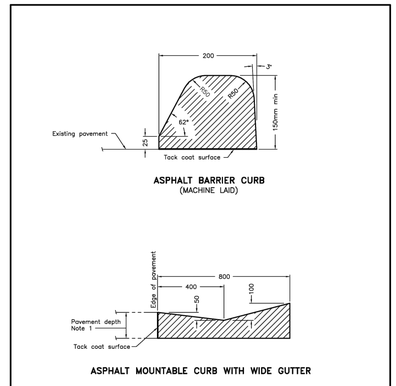
NOTES:
1 Vents shall be as specified by the manufacturer.
2 Length of plate may be increased to suit the curb depression width.
3 Material of plate shall be as specified in Contract Documents.
A Adjacent cast iron plates shall be permanently connected using a locking mechanism and any hardware shall be hot dipped galvanized.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 1
CONCRETE SIDEWALK RAMPS TACTILE WALKING SURFACE INDICATORS COMPONENT		
	OPSD 310.039	



NOTE:
A This OPSD shall be read in conjunction with OPSD 610.010 and 610.020.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 3
CAST IRON, SQUARE FRAME WITH SQUARE FLAT GRATE FOR CATCH BASINS, PERFORATED OPENINGS		
	OPSD 400.100	



NOTES:
1 Depth of asphalt curb with gutter at pavement edge shall equal depth of new pavement, but in no case less than 130mm.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev 2
ASPHALT CURB AND ASPHALT CURB WITH GUTTER		
	OPSD 601.010	

NOTES:
1 When sidewalk is continuously adjacent, the dropped curb at entrances shall be reduced to 75mm.
2 For slipforming procedure a 5% batter is acceptable.
A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with guide rail where it shall be according to the OPSD 900 Series.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev 2
CONCRETE BARRIER CURB		
	OPSD 600.110	

NOTES:
A This drawing shall be read in conjunction with OPSD 701.031 and 701.032.
B Centre reinforcing steel in riser ±20mm. All other reinforcing steel shall have 25mm minimum cover.
C Steps shall be according to OPSD 405.010 or 405.020.
D All dimensions are nominal.
E All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 4
PRECAST CONCRETE MAINTENANCE HOLE COMPONENTS 1200mm DIAMETER TAPERED TOP AND FLAT CAP		
	OPSD 701.030	

NOTES:
1 Depth of frost strap shall be as specified.
A Frost straps shall be placed so they do not interfere with sewer pipe openings and the steps.
B Frost straps shall be placed when specified.
C Galvanizing shall be according to CAN/CSA G164.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2024	Rev 4
EXTERNAL FROST STRAP INSTALLATION		
	OPSD 701.100	

ALTERNATE STANDARD HEIGHTS	
ALTERNATIVE	DIMENSION
A	1980
B	1830
C	1520
D	1380

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 All concrete thrust blocks shall be poured against undisturbed ground.
2 When specified, for watermains 400mm and less, locate valve within 1.0m of centreline of watermain. Retaining and restraining devices shall be utilized. For watermains 600mm and over, bolt valve with flanged end directly to flanged tee.
3 Retaining and restraining devices shall be as specified.
A Bond breaker shall be used between the concrete and the fittings and appurtenances.
B Bolts and nuts for buried flange to flange connections shall be stainless steel.
C When required, flange of standpipe extensions shall not be in frost zone.
D This OPSD shall be read in conjunction with OPSD 1103.010 and 1103.020.
E Backfill material within 500mm of service box shall be native or imported, as specified.
F Tracer wire shall be installed as specified.
G All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 3
HYDRANT INSTALLATION		
	OPSD 1105.010	

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100220753
JAN 2026
PROVINCE OF ONTARIO

DRAWN BY: G.N.	CHECKED BY: J.V.
DESIGNED BY: L.T.	
SCALE: N.T.S.	DATE: JANUARY 2026

NO.	YY.MM.DD	REVISION	BY

NORTH ARROW

PROJECT: MIDLAND TOYOTA

DRAWING: STANDARD DETAILS PLAN

PROJECT No. : 24-11872-M

DRAWING No. DET-2