KINDRED WORKS

QUEENSWOOD COMMONS
360 KENNEDY LANE EAST, OTTAWA, ON
SERVICING REPORT

FEBRUARY 28, 2025
4TH SUBMISSION

QUEENSWOOD COMMONS 360 KENNEDY LANE EAST, OTTAWA, ON

SERVICING REPORT

KINDRED WORKS

SITE PLAN AND ZONING BY-LAW AMENDMENT APPLICATION
4TH SUBMISSION

PROJECT NO.: 211-12127-00
DATE: FEBRUARY 2023

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1 GENERAL

1.1 EXECUTIVE SUMMARY

WSP was retained by Kindred Works to provide servicing and grading design services for the proposed new residential development located at 360 Kennedy Lane East, approximately 400m south of St Joseph Boulevard and 400m west of Tenth Line Road. This report outlines findings and calculations pertaining to the servicing of the proposed development with a gross lot area of 12,208m².

Currently the land proposed for the residential development is natural landscaping covered mainly by grass and trees, as well as a single storey church building and a single storey storage building with an asphalt surfaced parking area and laneway. The total study area for the site is considered to be 1.22 ha in size. The site is bounded by residential development to the north, east and west, and park land to the south. Based on the topographic survey, the site is being divided into two drainage portions, the developed areas to the west and the landscape areas to the east. The flow from the eastern portion of the site will drain toward Kennedy Lane East via parking lot and grass area; the flow from the western portion of the site will be collected by the existing on-site ditches and discharge to the park land to the south.

The City of Ottawa required that the design of a drainage and stormwater management system in this development must be prepared in accordance with the following documents:

- Sewer Design Guidelines, City of Ottawa, October 2012;
- Stormwater Management Planning and Design Manual, Ministry of the Environment, March 2003; and
- Stormwater Management Facility Design Guidelines, City of Ottawa, April 2012

This report was prepared utilizing servicing design criteria obtained from available sources, and outlines the design for water, sanitary wastewater, and stormwater facilities.

The format of this report matches that of the servicing study checklist found in Section 4 of the City of Ottawa's Servicing Study Guidelines for Development Applications, November 2009.

The following municipal services are available within Kennedy Lane East to the development as recorded from as-built drawings from City of Ottawa:

Kennedy Lane East:

- 900mm storm sewer, 250mm sanitary sewer and 200mm watermain.

It is proposed that:

- On-site stormwater management systems, employing surface storage and underground storm chambers will be provided to attenuate flow rates. Existing drainage patterns, previously established controlled flow rates and storm sewers will be maintained. Refer to the stormwater management report for details.

1.2 DATE AND REVISION NUMBER

This version of the report is the fourth revision, dated February 28, 2025.

1.3 LOCATION MAP AND PLAN

The proposed residential development is located at 360 Kennedy Lane East, in the City of Ottawa at the location shown in Figure 1-1 below.

Figure 1-1 Site Location

1.4 ADHERENCE TO ZONING AND RELATED REQUIREMENTS

The proposed property use will be submitted for ZBLA in conformance with zoning and related requirements prior to approval and construction and is understood to be in conformance with any zoning requirements.

1.5 PRE-CONSULTATION MEETINGS

A pre-consultation meeting was held with the City of Ottawa on May 19, 2021. Notes from this meeting are provided in Appendix A.

1.6 HIGHER LEVEL STUDIES

The review for servicing has been undertaken in conformance with, and utilizing information from, the following documents:

- Ottawa Sewer Design Guidelines, Second Edition, Document SDG002, October 2012, City of Ottawa including:
    - Technical Bulletin ISDTB-2012-4 (20 June 2012)
    - Technical Bulletin ISDTB-2014-01 (05 February 2014)
    - Technical Bulletin PIEDTB-2016-01 (September 6, 2018)
    - Technical Bulletin ISDTB-2018-01 (21 March 2018)
    - Technical Bulletin ISDTB-2018-04 (27 June 2018)
- Ottawa Design Guidelines – Water Distribution, July 2010 (WDG001), including:
    - Technical Bulletin ISDTB-2014-02 (May 27, 2014)
    - Technical Bulletin ISTB-2018-02 (21 March 2018)
- Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment and Climate Change, March 2003 (SMPDM).
- Design Guidelines for Drinking-Water Systems, Ontario Ministry of the Environment and Climate Change, 2008 (GDWS).
- Fire Underwriters Survey, Water Supply for Public Fire Protection (FUS), 1999.

1.7 STATEMENT OF OBJECTIVES AND SERVICING CRITERIA

The objective of the site servicing is to meet the requirements for the proposed modification of the site while adhering to the stipulations of the applicable higher-level studies and City of Ottawa servicing design guidelines.

1.8 AVAILABLE EXISTING AND PROPOSED INFRASTRUCTURE

A municipal sanitary sewer, a municipal storm sewer and a watermain are located within the Kennedy Lane East right of way. A new sanitary sewer, a new storm sewer and a new water service will be connected to the existing sewers along Kennedy Lane East from the proposed development. Quantity control is required to restrict the discharge leaving the development areas, as noted in the Stormwater Management Report. The existing boundary roads at the site will remain open.

1.9 ENVIRONMENTALLY SIGNIFICANT AREAS, WATERCOURSES AND MUNICIPAL DRAINS

As per the existing condition, the eastern portion of the site drains to various ditches which discharge into a catchbasin where flow is directed to an existing 450mm storm sewer on Mountainside Crescent. Flow is ultimately directed to the Ottawa River.

The western portion of the site is drained predominantly through existing catchbasins which discharge to the sewer on Kennedy Lane East through a 300mm storm sewer. Flow is ultimately directed to the Ottawa River.

On going flooding issue occur for the residential units east of the site. City councillor and public have highly concern to stop the runoff draining over due to the misleading design from the past. As directed by the city staff, the pre-development drainage areas should be considered as one and it goes to Kennedy Lane west of the site, and post-development to follow. Correspondence is attached on Appendix A.

1.10 CONCEPT LEVEL MASTER GRADING PLAN

A detailed grading plan has been developed, matching the existing overland flow pattern in the west of directing overflow drainage to Kennedy Lane East. In the eastern portion of the site the grading has been adjusted to direct flow towards Kennedy Lane East as opposed to allowing flow to drain south into the parkland and the residential development to the east as in existing conditions. The site topographic survey, included in Appendix A, provides evidence of direction of overland flow.

Approximately 0.069 ha of the south and east of the site and 0.020 ha of the west of the site will remain uncontrolled in terms of drainage and will maintain the existing grading.

Grading will employ smooth transitions from the new work areas to existing grades. In some grassed areas 3:1 terracing is proposed between proposed and existing grades. No changes will be made to grades at the development perimeter.

1.11 GEOTECHNICAL STUDY

A geotechnical investigation report has been prepared by Pinchin Ltd. (Geotechnical Investigation – Proposed Residential Development, October 26, 2022), and its recommendations have been taken into account in developing the engineering specifications.

2 WATER DISTRIBUTION

2.1 CONSISTENCY WITH MASTER SERVICING STUDY AND AVAILABILITY OF PUBLIC INFRASTRUCTURE

There is an existing 200mm diameter public watermain along Kennedy Lane East which will provide water to the development. A 200mm diameter private watermain will loop around the site to provide water to the development and will tie into the existing 200mm watermain on Kennedy Lane East.

Five new private fire hydrants will be required to service and provide adequate coverage to the proposed units. No changes are required to the existing City water distribution system to allow servicing for this property.

2.2 SYSTEM CONSTRAINTS AND BOUNDARY CONDITIONS

Boundary conditions have been obtained from the City of Ottawa at the 200 mm diameter watermain on Kennedy Lane East for the development, and if obtained, will be added to Appendix B. A maximum fire flow demand of 200 l/s (12,000 l/min) has been calculated for the proposed development as indicated in Section 2.4.

Table 2-1: Boundary Conditions (City of Ottawa)

BOUNDARY CONDITIONS		
SCENARIO	Head (m)	Pressure (psi)
Maximum HGL	130.2	61.1
Minimum HGL (Peak Hour)	125.8	54.9
Max Day + Fire Flow	102.5	21.7

2.3 CONFIRMATION OF ADEQUATE DOMESTIC SUPPLY AND PRESSURE

Water demands are based on Table 4.2 of the Ottawa Design Guidelines – Water Distribution. As previously noted, the development is considered as a residential development, consisting of 60 stacked town units and 21 average towns. A water demand calculation sheet is included in Appendix B, and the total water demands are summarized as follows:

WATER DEMANDS	
SCENARIO	DEMAND
Average Day	0.31 l/s
Maximum Day	0.76 l/s
Peak Hour	1.67 l/s

The 2010 City of Ottawa Water Distribution Guidelines stated that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi)
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.
Maximum Pressure	Maximum pressure at any point the distribution system shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

A water model software, WaterGEMS was used to perform the water distribution analyze for the proposed development including existing church. The minimum water pressure inside the building at the connection is determined with the minimum HGL condition, resulting in a pressure of 373 kPa for Building which exceeds the minimum requirement of 276 kPa per the guidelines. Refer to Appendix B for detail water distribution analyze output.

Table 2-2: Summary of the minimum water pressure under peak hour scenario

Peak Hour - Junction	
ID	Pressure (kPa)
J-01	376
J-02	374
J-03	375
J-04	374
J-05	374
J-06	375
J-07	373
J-08	376

2.4 CONFIRMATION OF ADEQUATE FIRE FLOW PROTECTION

The fire flow rate has been calculated using the Fire Underwriters Survey (FUS) method. The method takes into account the type of building construction, the building occupancy, the use of sprinklers and the exposures to adjacent structures. A fire flow demand of 200 l/s for the development has been calculated. Calculations are included in Appendix B.

The proposed development can be serviced through the combination of existing and proposed hydrants. There is one existing fire hydrant on Kennedy Lane East just north of the site, and five new private hydrants are proposed throughout the site. All residential units are within 35m of a private hydrant. All the proposed and existing hydrants are rated at 5700 l/min.

The proposed residential units on site will be serviced by a single 100 mm service off the 300 and 250 mm private watermain.

The boundary condition for Maximum Day and Fire Flow results the available fire flows of 184.67 l/s, 174.79 l/s and 168.00 l/s at J-02, J-03 and J-04. In the guidelines, a minimum residual pressure of 140 kPa must be maintained in the distribution system for a fire flow and maximum day event. As the available demand fire flow is achieved, the fire flow requirement is exceeded.

Table 2-3: Summary of the available fire flow under Max Day + Fire scenario

Max Day + Fire	
ID	Allowable Fire Flow (l/s)
J-01	262.67
J-02	216.30
J-03	198.83
J-04	196.16
J-05	198.48
J-06	2111.61
J-07	171.11
J-08	257.43

2.5 CHECK OF HIGH PRESSURE

High pressure is not a concern. The maximum water pressure inside the building at the connection is determined with the maximum HGL condition, resulting in a pressure of 415 kPa which is less than the 552 kPa threshold in the guideline in which pressure control is required. Based on this result, pressure control is not required for the proposed townhomes.

2.6 RELIABILITY REQUIREMENTS

DMA chamber as per city of Ottawa standard W3 and shot off valve will be provided at the study boundary from Kennedy Lane East. Water can be supplied to the private watermain from Kennedy Lane East and can be isolated. A redundancy looping is provided for the subjected site, water can be supplied from either side Kennedy Lane East. Refer to servicing plan C05 for details.

2.7 CAPABILITY OF MAJOR INFRASTRUCTURE TO SUPPLY SUFFICIENT WATER

The current infrastructure is capable of meeting the domestic demand based on City requirements and fire demand as determined by FUS requirements for the proposed residential units.

2.8 DESCRIPTION OF PROPOSED WATER DISTRIBUTION NETWORK

A combination of 250mm and 300mm private watermain are proposed to loop around the site and will distribute water to all residential units. Five private hydrants are proposed throughout the site.

2.9 OFF-SITE REQUIREMENTS

No off-site improvements to watermains, feedermains, pumping stations, or other water infrastructure are required to maintain existing conditions and service the adjacent buildings, other than the connection of the new private watermain to the City watermain in the south frontage of the site.

2.10 CALCULATION OF WATER DEMANDS

Water demands were calculated as described in Sections 2.3 and 2.4 above and is also attached in Appendix B.

2.11 MODEL SCHEMATIC

The water works consist of a private watermain looping with 250mm and 300mm watermain, five proposed private fire hydrants, and service connections to each residential unit. Additionally, the existing water service which leads to the existing one storey church building will be capped and integrated into the proposed network. A model schematic is provided with WaterGEM for this development, the results are attached in Appendix B.

3 WASTEWATER DISPOSAL

3.1 DESIGN CRITERIA

In accordance with the City of Ottawa's Sewer Design Guidelines, the following design criteria have been utilized in order to predict wastewater flows generated by the subject site and complete the sewer design.

- Minimum Velocity 0.6 m/s
- Maximum Velocity 3.0 m/s
- Manning Roughness Coefficient 0.013
- Average sanitary flow for residential use 280 L/cap/day
- Average sanitary flow for commercial use 28,000 L/Ha/day
- Commercial/Institutional Peaking Factor 1.5
- Infiltration Allowance (Total) 0.33 L/s/Ha
- Minimum Sewer Slopes – 200 mm diameter 0.32%

3.2 CONSISTENCY WITH MASTER SERVICING STUDY

The outlet for the private sanitary sewer network is the 250 mm diameter municipal sewer on Kennedy Lane East.
The Ottawa Sewer Design Guidelines provide estimates of sewage flows based on residential development. The anticipated total flow based on a development area of 1.22ha is 2.30 L/s.
A sanitary drainage area plan and the sanitary design sheet have been attached to Appendix C for reference.

3.3 DESCRIPTION OF EXISTING SANITARY SEWER

The outlet sanitary sewer is the existing 250 mm diameter sewer on Kennedy Lane East. This local sewer outlets to a sanitary trunk sewer, then discharges to a municipal wastewater treatment facility.

3.4 VERIFICATION OF AVAILABLE CAPACITY IN DOWNSTREAM SEWER

The capacity of the downstream 250 mm diameter sanitary sewer on Kennedy Lane East at 0.60% slope is 25.41 L/s, which is adequate for the flow assumptions from the proposed development. And the flow from the existing sanitary sewer upstream of 360 Kennedy Lane East has a total flow of 8.95 L/s. The downstream sanitary sewer will carry over the discharge from the subjected site and the upstream areas, a total flow of 11.04 L/s is anticipated.

A sanitary sewer design sheet is provided for both the subjected site and the upstream areas. See Appendix C for details.

3.5 DESCRIPTION OF PROPOSED SEWER NETWORK

The proposed sanitary sewer network on site will consist of 200 mm diameter private sanitary sewers with typical sanitary services for the residential units.

4 SITE STORM SERVICING

4.1 EXISTING CONDITION

The runoff from the west portion of the existing site is directed to a 900 mm diameter sewer on Kennedy Lane East. And the runoff from the east portion of the existing site is directed to the adjacent ditches next to the residential lots and park land. The overall flow from the site ultimately outlets to the Ottawa River. Drainage in excess of the minor system capacity currently flows overland to the low section within the eastern and western part of the site and overflow to the adjacent property.

4.2 ANALYSIS OF AVAILABLE CAPACITY IN PUBLIC INFRASTRUCTURE

The total controlled area of the site draining toward Kennedy Lane East is 1.131 ha. There is 0.069 ha of uncontrolled area draining toward the existing ditches along the southeast property line as per the existing condition. And 0.020 ha of uncontrolled area draining toward the Kennedy Lane ROW. The runoff from the controlled areas will discharge to a 900mm storm pipe at Kennedy Lane East which ultimately drains to the Ottawa River via the 1800mm trunk sewer.

On-site attenuation to predevelopment flow is required for the purpose of advancing use of this storm outlet. Using the Rational Method, with coefficient of 0.20 for pervious areas and 0.90 for impervious areas, and a 10-minute time of concentration, results in an estimated 2-year flow of 103.69 L/s from this area. Using utility records from the City, the slope of the existing storm sewer 900 mm diameter running north to south on Kennedy Lane East is 0.60%, which equates to a capacity in excess of 1403.68 L/s. As the proposed stormwater management works for the site will reduced the runoff rate to a peak discharge at outlet equal to 120.0 L/s, capacity in the minor system is not a concern.

As the proposed stormwater management works for the site will restricted the 100-year flow to the pre-development 5-year runoff rate, capacity in the minor system is not a concern.

The allowable release rate for the site is 120.0 L/s as calculated in the Stormwater Management Report.

4.3 DRAINAGE DRAWING

Drawing C05 shows the receiving storm sewer and site storm sewer network for the site. Drawing C04 provides proposed grading and drainage and includes existing grading information. Drawing C06 provides a post-construction drainage sub-area plan. Post site sub-area information is also provided on the storm sewer design sheet attached in Appendix D. Refer to the Stormwater Management Report for detail predevelopment drainage area info and calculation.

4.4 WATER QUANTITY CONTROL OBJECTIVE

Refer to the Stormwater Management Report for the water quantity objective for the site.

4.5 WATER QUALITY CONTROL OBJECTIVE

The designated water quality control objective is 80% TSS removal. This objective will be achieved through the use of an oil/grit separator for the runoff generated from the developed site. Refer to the Stormwater Management Report for further details.

4.6 DESIGN CRITERIA

The stormwater system was designed following the principles of dual drainage, making accommodation for both major and minor flow.
Some of the key criteria include the following:

- Design Storm (minor system) — 1:2-year return (Ottawa)
- Rational Method Sewer Sizing
- Initial Time of Concentration — 10 minutes
- Runoff Coefficients
  - Landscaped Areas — C = 0.20
  - Asphalt/Concrete — C = 0.90
  - Traditional Roof — C = 0.90
- Pipe Velocities — 0.80 m/s to 6.0 m/s
- Minimum Pipe Size — 250 mm diameter (200 mm CB Leads and service pipes)

4.7 PROPOSED MINOR SYSTEM

The detail design for this site provides a storm sewer outlet to Kennedy Lane East, and small areas of uncontrolled surface drainage entering the adjacent park towards the southeast side of the site (consistent with existing conditions).
Storage in underground tanks will be included on site to reduce surface ponding and will include flow control. Refer to the Storm Management Report for details.
The existing catchbasins and their leads, as well as the sewer connection to Kennedy Lane East will be removed. Please refer to the removals drawing C03 for details.
Weeping tile is proposed and will be connected to the main sewer without restrictions.

Using the above noted criteria, the proposed on-site storm sewers were sized accordingly. A detailed storm sewer design sheet and the associated storm sewer drainage area plan is included in Appendix D.

4.8 WATERCOURSES

The minor flow will be ultimately directed to the Ottawa River.

4.9 PRE AND POST DEVELOPMENT PEAK FLOW RATES

Pre and post development peak flow rates for the site have been noted in storm sewer design sheet as well as the Stormwater Management report.

4.10 DIVERSION OF DRAINAGE CATCHMENT AREAS

With the exception of a small uncontrolled area to the southeast of the site, the development will be regraded such that all overland flow is directed west towards Kennedy Lane East as directed by City of Ottawa.

4.11 MUNICIPAL DRAINS AND RELATED APPROVALS

There are no municipal drains on the site or associated with the drainage from the site.

5 SEDIMENT AND EROSION CONTROL

5.1 GENERAL

During construction, existing storm sewer system can be exposed to sediment loadings. Several construction techniques designed to reduce unnecessary construction sediment loadings will be used including:

- The installation of straw bales within existing drainage features surrounding the site.
- Filter cloths will remain on open surface structures such as manholes and catchbasins until these structures are commissioned and put into use.
- Installation of silt fence, where applicable, around the perimeter of the proposed work area.

During construction of the services, any trench dewatering using pumps will be fitted with a "filter sock." Thus, any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filter sock as needed including sediment removal and disposal.

All catchbasins, and to a lesser degree, manholes, convey surface water to sewers. Consequently, until the surrounding surface has been completed, these structures will be covered to prevent sediment from entering the minor storm sewer system. These measures will stay in place and be maintained during construction and build-out until it is appropriate to remove them.

During construction of any development both imported and native soils are placed in stockpiles. Mitigative measures and proper management to prevent these materials entering the sewer system are needed.

During construction of the deeper watermains and sewers, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally placed before any catchbasins are installed.

Refer to the Erosion and Sedimentation Control Plan C08 provided in Appendix E.

6 APPROVAL AND PERMIT REQUIREMENTS

6.1 GENERAL

The proposed development is subject to site plan approval, zoning by-law amendment and building permit approval.

No approvals related to municipal drains are required.

No permits or approvals are anticipated to be required from the Ontario Ministry of Transportation, National Capital Commission, Parks Canada, Public Works and Government Services Canada, or any other provincial or federal regulatory agency.

7 CONCLUSION CHECKLIST

7.1 CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the proposed development can meet all provided servicing constraints and associated requirements. It is recommended that this report be submitted to the City of Ottawa in support of the application for site plan approval.

7.2 COMMENTS RECEIVED FROM REVIEW AGENCIES

This is the fourth submission, response letter to city comments has been attached to the resubmission package.

APPENDIX

A

- PRE-CONSULTATION MEETING NOTES
- TOPOGRAPHIC SURVEY PLAN
- EMAILS FROM RVCA
- CORESPONDENCE EMAIL FROM CITY

Site Plan Pre- Application Consultation Notes

Date: Wednesday, May 19, 2021
Site Location: 360 Kennedy Lane E
Type of Development: ☒ **Residential (**☒ **townhomes,** ☒ **stacked,** ☐ **singles,** ☐ **apartments),** ☐ **Office Space,** ☐ **Commercial,** ☐ **Retail,** ☐ **Institutional,** ☐ **Industrial, Other:** N/A

Infrastructure

Water

Existing public services:

- Kennedy Lane E – 203mm DI

Watermain Frontage Fees to be paid ($190.00 per metre) on Woodroffe Avenue ☐ **Yes** ☒ **No**

Boundary conditions:
Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission.

- Water boundary condition requests must include the location of the service(s) and the expected loads required by the proposed developments. Please provide all the following information:
  - Location of service(s)
  - Type of development and the amount of fire flow required (as per FUS, 1999)
  - Average daily demand: ___ L/s
  - Maximum daily demand: ___ L/s
  - Maximum hourly daily demand: ___ L/s
- Fire protection (Fire demand, Hydrant Locations)
- Please submit sanitary demands with the water boundary conditions

General comments

- Service areas with a basic demand greater than 50 m^3/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid creation of vulnerable service area.
- A District Metering Area Chamber (DMA) is required for new services 150mm or greater in diameter.

Sanitary Sewer

Existing public services:

- Kennedy Lane E – 250mm PVC

Is a monitoring manhole required on private property? ☒ **Yes** ☐ **No**

General comments

- Please submit sanitary demands with the water boundary conditions
- For infill developments within older neighbourhoods there is not an allotment for the sanitary capacity. As part of the rezoning application the consultant is required to demonstrate that there is sufficient capacity in the pipe network and system for the proposed sanitary demands.

Storm Sewer

Existing public services:

- Kennedy Lane E – 900mm Conc R

Stormwater Management

Quality Control:

- Rideau Valley Conservation Authority to confirm quality control requirements.

Quantity Control:

- LID features are strongly encouraged as the development is going from mostly pervious to impervious.
- Time of concentration (Tc): Tc = pre-development; maximum Tc = 10 min
- Allowable run-off coefficient: 0.5
- Allowable flowrate: Allowable flowrate: Control the 100-year storm events to the 5-year storm event.

Ministry of Environment, Conservation and Parks (MECEP)

All development applications should be considered for an Environmental Compliance Approval, under MECP regulations.

a. Consultants are required to determines if an approval for sewage works under Section 53 of OWRA is required.
b. ECA applications are required to be submitted online through the MECP portal. A business account required to submit ECA application. For more information visit https://www.ontario.ca/page/environmental-compliance-approval
c. If the consultants determines the site does not meet the definition of industrial site the consultant may request the MECP to exempt the works. The following information must be provided to the City Project Manager:
   (i) is designed to service one lot or parcel of land;
   (ii) discharges into a storm sewer that is not a combined sewer;
   (iii) does not service industrial land or a structure located on industrial land; and
   (iv) is not located on industrial land.

NOTE: Site Plan Approval, or Draft Approval, is required before any Ministry of the Environment and Climate Change (MOECC) application is sent

General Service Design Comments

- Existing sewers or watermains that are not reused must be decommissioned as per City Standards.
- The City of Ottawa Standard Detail Drawings should be referenced where possible for all work within the Public Right-of-Way.

Other

Capital Works Projects within proximity to application? ☐ **Yes** ☒ **No**

References and Resources

- As per section 53 of the Professional Engineers Act, O. Reg 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.
- All required plans & reports are to be provided in *.pdf format (at application submission and for any, and all, re-submissions)
- Please find relevant City of Ottawa Links to Preparing Studies and Plans below: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#standards-policies-and-guidelines
- To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre: InformationCentre@ottawa.ca<mailto:InformationCentre@ottawa.ca> (613) 580-2424 ext. 44455
- geoOttawa http://maps.ottawa.ca/geoOttawa/

SITE PLAN APPLICATION – Municipal servicing

For information on preparing required studies and plans refer to:
http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S		1. Site Servicing Plan	2. Site Servicing Report	S	
S		3. Grade Control and Drainage Plan	4. Geotechnical Study Alternatively, existing report with memo providing recommendations for works based on current geotechnical guidelines.	S	
		5. Composite Utility Plan	6. Groundwater Impact Study		
		7. Servicing Options Report	8. Wellhead Protection Study		
		9. Community Transportation Study and/or Transportation Impact Study / Brief	10. Erosion and Sediment Control Plan / Brief	S	
S		11. Storm water Management Report	12. Hydro-geological and Terrain Analysis		
		13. Water main Analysis	14. Noise / Vibration Study	S	
		15. Roadway Modification Design Plan	16. Confederation Line Proximity Study		

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, City Planning will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the City.

Notes:

4. Geotechnical Study / Slope Stability Study – required as per Official Plan section 4.8.3. All site plan applications need to demonstrate the soils are suitable for development. A Slope Stability Study may be required with unique circumstances (Schedule K or topography may define slope stability concerns).

10. Erosion and Sediment Control Plan – required with all site plan applications as per Official Plan section 4.7.3.

11. Stormwater Management Report/Brief - required with all site plan applications as per Official Plan section 4.7.6.

REZONING APPLICATION – Municipal servicing

For information on preparing required studies and plans refer to:
http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S		1. Site Servicing Plan	2. Site Servicing Report	**S**	
S		3. Grade Control and Drainage Plan	4. Geotechnical Study Alternatively, existing report with memo providing recommendations for works based on current geotechnical guidelines.	**S**	
		5. Composite Utility Plan	6. Groundwater Impact Study		
		7. Servicing Options Report	8. Wellhead Protection Study		
		9. Community Transportation Study and/or Transportation Impact Study / Brief	10. Erosion and Sediment Control Plan / Brief	**S**	
S		11. Storm water Management Report	12. Hydro-geological and Terrain Analysis		
		13. Water main Analysis	14. Noise / Vibration Study	**S**	
		15. Roadway Modification Design Plan	16. Confederation Line Proximity Study		

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, City Planning will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the City.

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10. Erosion and Sediment Control Plan – required with all site plan applications as per Official Plan section 4.7.3.

11. Stormwater Management Report/Brief - required with all site plan applications as per Official Plan section 4.7.6.

382749, 5038085

TOPOGRAPHIC PLAN OF SURVEY OF

PART OF BLOCK 8
REGISTERED PLAN 50M-77
CITY OF OTTAWA

FARLEY, SMITH & DENIS SURVEYING LTD. 2021

Scale 1: 300

0 5 10 15 20 25 30 metres

Metric Note
Distances and coordinates on this plan are in metres and can be converted to feet by dividing by 0.3048.

Distance Note
Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.99997.

Bearing Note
Bearings hereon are grid bearings derived from the Can-Net Real Time Network and are referred to the Central Meridian of MTM Zone 9 (76°-30' West Longitude) Nad-83 (Original).

For bearing comparisons, a rotation of 0°02'00" clockwise was applied to bearings on P1, P2.

Elevation Notes
1. Elevations shown are geodetic and are referred to Geodetic Datum CGVD-1928 :1978.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

Utility Notes
1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. Underground utility data derived from City of Ottawa utility sheet reference:
4. C-33-20, C-33-26, 13441.
5. Sanitary and storm sewer grades and inverts were compiled from: Field measurement and City of Ottawa Utility Sheets.
6. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

Notes & Legend

Denotes

- □—□ = Survey Monument Planted
- ■—■ = Survey Monument Found
- SIB = Standard Iron Bar
- IB = Iron Bar
- (Wit) = Witness
- Meas = Measured
- (P1) = Plan 50R-5659
- (P2) = Plan by (AOG) dated July 22, 1998 (Job No. C-063-98)
- Acc. = Accepted
- ○ MH–ST = Maintenance Hole (Storm)
- ○ MH–S = Maintenance Hole (Sanitary)
- ○ MH = Maintenance Hole (Unidentified)
- ST —— = Underground Storm Sewer
- S —— = Underground Sanitary Sewer
- W —— = Underground Water
- P —— = Underground Hydro
- G —— = Underground Gas
- B —— = Underground Bell
- TV —— = Underground Rogers
- ○ LS = Light Standard
- □ CB = Catch Basin
- ○ FH = Fire Hydrant
- □ TB–B = Bell Terminal Box
- □ TB–C = Cable Terminal Box
- □ TB–B = Bell Terminal Box
- □ TB–C = Cable Terminal Box
- □ TB–H = Hydro Terminal Box
- □ TB = Unidentified Terminal Box
- △ S = Sign
- ○ PO–M = Metal Pole
- □ AC = Air Conditioner
- Ø = Diameter
- CLF = Chain Link Fence
- BF = Board Fence
- Inv. = Invert
- T/G = Top of Grate
- El = Elevation
- U/Eave = Underside of Eave
- TpFdn = Top of Foundation
- C/L = Centreline
- +65.00 = Location of Elevations
- +65.00 = Top of Concrete Curb Elevation
- Deciduous Tree - The Symbol shown denotes location and trunk diameter only. Size of its' root system/overhead canopy may be smaller/larger than the symbol size depicted on this plan.
- Coniferous Tree - The Symbol shown denotes location and trunk diameter only. Size of its' root system/overhead canopy may be smaller/larger than the symbol size depicted on this plan.

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-15561

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR
In accordance with Regulation 1026, Section 29 (3).

Surveyor's Certificate

I certify that :
1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Regulations made under them.
2. The survey was completed on the 19th day of August, 2021.

Aug 25/21
Date

Daniel Robinson
Ontario Land Surveyor

FARLEY, SMITH & DENIS SURVEYING LTD.

ONTARIO LAND SURVEYORS
CANADA LAND SURVEYORS

Unit 275, 30 COLONNADE ROAD, OTTAWA, ONTARIO K2E 7J6
TEL. (613) 727-8226 E-mail: fsdsurveys@bellnet.ca

FILE No. : 446-21

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TOPO 2X36

Yang, Winston

From: Jadallah, Ayham
Sent: November 17, 2021 8:02 AM
To: O'Neill, Meaghan; Yang, Winston
Cc: Hughes, Michelle
Subject: FW: Water Quality Requirements - Site Development- 360 Kennedy Lane E

Hi,

Please find below the response from CA and note that CLI approach might be applicable.

Thanks,
Ayham

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Tuesday, November 16, 2021 9:07 PM
To: Jadallah, Ayham <Ayham.Jadallah@wsp.com>
Cc: Emma Bennett <emma.bennett@rvca.ca>
Subject: Water Quality Requirements - Site Development- 360 Kennedy Lane E

Good Evening Ayham,

Based on the distance to the downstream outlet to the Ottawa River, the water quality target would be 80% TSS removal. Any stormwater management plan must conform to the 2003 MOE Stormwater Management Planning and Design Manual and any other relevant guiding documents that may be in place at the time of the official submission. The opportunity for LID measures should be explored for any proposed stormwater management plan. Specific attention will need to be placed on water budget/balance and the items mentioned above. It should be noted that these requirements are already within the existing 2003 MOE Design Manual.

The new consolidated linear infrastructure ECA approach from the Ministry of Environment, Conservation and Parks has an implementation scheduled for summer 2021. Therefore, based on the projected timeframe for this project, it may form part of the City's ECA for which the following criteria is noted:

- Water balance or runoff volume control to the 90th percentile
- OGS units will only address 50% treatment
- Other items identified in the new consolidated linear infrastructure ECA

Therefore, the applicant is strongly encouraged to design accordingly within their stormwater management approach.

Jamie Batchelor, MCIP, RPP
Planner, ext. 1191
Jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority

3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 **F** 613-692-0831 | www.rvca.ca

Yang, Winston

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: November 8, 2021 11:12 AM
To: Yang, Winston
Subject: RE: Boundary Condition Request - Queenswood United Church PAR - 360 Kennedy Lane East

As part of the development application the site would be required to connect to Kennedy Lane E and the overland flows would also need to be directed towards the street.

Rubina

Rubina Rasool, E.I.T.
Project Manager
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review – East Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue Laurier Ouest. Ottawa (Ontario) K1P 1J1 rubina.rasool@ottawa.ca

---

From: Yang, Winston <Winston.Yang@wsp.com>
Sent: November 08, 2021 10:46 AM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Subject: RE: Boundary Condition Request - Queenswood United Church PAR - 360 Kennedy Lane East

Hi Rubina,

Please see attached pdfs for the FUS. I have also attached architectural site plan for your reference.

And I have a question for Stormwater Management. Currently the grass area of the site is draining toward the existing ditch and picked up by the existing CB located at the park south of the site.
Can I use the entire site to calculate the pre-development allowable release rate to Kennedy Lane east or only use half of the site for our consideration since half of the site is draining toward Kennedy Lane East and half of the site is draining toward the park?

Ding Bang (Winston) Yang, P.Eng.
Project Engineer
Municipal Engineering - Ottawa

T+ 1 613-690-0538
M+ 1 647-628-8108

WSP Canada Inc.
2611 Queensview Drive, Suite 300
Ottawa, Ontario,
K2B 8K2 Canada

wsp.com

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: November 8, 2021 9:24 AM
To: Yang, Winston <Winston.Yang@wsp.com>
Subject: RE: Boundary Condition Request - Queenswood United Church PAR - 360 Kennedy Lane East

Hi Winston,

I will circulate the water boundary conditions; however, I will have to take a closer look at the FUS calculations. The development is similar to a subdivision and Technical Bulletin 2018-02 (attached) allows for 10,000 L/min if minimum separation distances are provided.

Rubina

Rubina Rasool, E.I.T.
Project Manager
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review – East Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue Laurier Ouest. Ottawa (Ontario) K1P 1J1 rubina.rasool@ottawa.ca

---

From: Yang, Winston <Winston.Yang@wsp.com>
Sent: November 04, 2021 10:37 AM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Subject: Boundary Condition Request - Queenswood United Church PAR - 360 Kennedy Lane East
Importance: High

Hi Rubina,

As per the pre-consultation meeting direction, here is the water supply boundary condition request for the proposed residential development by Queenswood United Church at 360 Kennedy Lane East at Orlean.
The proposed development will be serviced from the existing 203mm diameter watermain from Kennedy Lane that as per pre-consult meeting minute where the water service from the development will be connected to the existing 203mm diameter watermain along Kennedy Lane East.

The proposed residential development consists of 21 two storey and 60 three storey Townhouse units . There are two existing public fire hydrants at Kennedy Lane East next to the subjected site. Multiple private fire hydrants will be proposed on site.

The domestic water demands were calculated using the City of Ottawa's Water Design Guidelines and fire demand were calculated using FUS 1999.
The results are summarized as follow:

Proposed development	Average Daily Demand (l/s)	Maximum Daily Demand (l/s)	Maximum Hourly Demand (l/s)	Fire Demand (l/min)
Queenswood UC PAR	0.65	1.62	3.56	16000

I have also attached the FUS calculation spreadsheet for the most fire flow required for your review. The proposed onsite water service is to be designed to connect to the existing 203mm water service pipe on the Kennedy Lane East as shown on the attached sketch for your reference. Two connections to the existing 203 W/M are required as the basic demand exceed 50 m^3/day

The sanitary total flow from the site is 2.68 L/s. The spreadsheet is attached for your reference.

If you have the report and drawings please send them to me.

Thank you,

Ding Bang (Winston) Yang, P.Eng.
Project Engineer
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APPENDIX

APPENDIX

B

- WATERMAIN BOUNDARY CONDITIONS FROM CITY OF OTTAWA
- EMAILS FROM CITY OF OTTAWA
- FIRE UNDERWRITERS SURVEY – FIRE FLOW CALCULATION
- WATER DEMAND CALCULATION
- F03 – EXPOSED DISTANCE
- WATER MODEL OUTPUT – WATERGEM

Boundary Conditions
360 Kennedy Lane East

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	39	0.65
Maximum Daily Demand	97	1.62
Peak Hour	214	3.56
Fire Flow Demand #1	15,000	250.00
Fire Flow Demand #2	16,000	266.67

Location

Results

Connection 1 – Kennedy Lane E.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.2	61.1
Peak Hour	125.8	54.9
Max Day plus Fire 1	102.5	21.7
Max Day plus Fire 2	99.3	17.1

Ground Elevation = 87.2 m

Connection 2 – Kennedy Lane E.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.2	61.1
Peak Hour	125.8	54.9
Max Day plus Fire 1	102.1	21.1
Max Day plus Fire 2	98.8	16.4

Ground Elevation = 87.2 m

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Yang, Winston

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: November 24, 2021 2:30 PM
To: Yang, Winston
Subject: RE: Boundary Condition Request - Queenswood United Church PAR - 360 Kennedy Lane East
Attachments: 360 Kennedy Lane East_22Nov2021.docx

Please find attached the water boundary conditions. Please note the 16,000 L/min does not meet the 20 psi fire requirement. We have added the 15,000 L/min which does meet the fire requirement.

Rubina

Rubina Rasool, E.I.T.
Project Manager
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review – East Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue Laurier Ouest. Ottawa (Ontario) K1P 1J1 rubina.rasool@ottawa.ca

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Queenswood UC PAR	0.65	1.62	3.56	16000

I have also attached the FUS calculation spreadsheet for the most fire flow required for your review. The proposed onsite water service is to be designed to connect to the existing 203mm water service pipe on the Kennedy Lane East as shown on the attached sketch for your reference. Two connections to the existing 203 W/M are required as the basic demand exceed 50 m^3/day

The sanitary total flow from the site is 2.68 L/s. The spreadsheet is attached for your reference.

If you have the report and drawings please send them to me.

Thank you,

Ding Bang (Winston) Yang, P.Eng.
Project Engineer
Municipal Engineering - Ottawa

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Fire Flow Design Sheet (FUS)
Queenswood United Church
360 Kennedy Lane East, City of Ottawa
WSP Project No. 211-12127-00
Date: 06-Sep-22

Block 1
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for **Type V** Wood Frame Construction
- 0.8 for **Type IV-A** Mass Timber Construction
- 0.9 for **Type IV-B** Mass Timber Construction
- 1.0 for **Type IV-C** Mass Timber Construction
- 1.5 for **Type IV-D** Mass Timber Construction
- 1.0 for **Type III** Ordinary Construction
- 0.8 for **Type II** Noncombustible Construction
- 0.6 for **Type I** Fire resistive Construction

A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 392 m^2
C = 1.5
F = 6529.5 L/min

rounded off to 7,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 7,000 = 5,950 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System 0% x 5,950 = 0 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	25	10%	north side
Side 2	8.5	20%	east side
Side 3	100	0%	south side
Side 4	40	0%	west side
		30%	(Total shall not exceed 75%)

Increase due to separation 30% x 5,950 = 1,785 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 8,000 L/min (Rounded to nearest 1000 L/min)
or **133 L/sec**
or 2,113 gpm (us)
or 1,760 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
Queenswood United Church
360 Kennedy Lane East, City of Ottawa
WSP Project No. 211-12127-00
Date: 06-Sep-22

Block 2
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for **Type V** Wood Frame Construction
- 0.8 for **Type IV-A** Mass Timber Construction
- 0.9 for **Type IV-B** Mass Timber Construction
- 1.0 for **Type IV-C** Mass Timber Construction
- 1.5 for **Type IV-D** Mass Timber Construction
- 1.0 for **Type III** Ordinary Construction
- 0.8 for **Type II** Noncombustible Construction
- 0.6 for **Type I** Fire resistive Construction

A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 692 m^2
C = 1.5
F = 8677.8 L/min

rounded off to 9,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 9,000 = 7,650 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System 0% x 7,650 = 0 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	17	15%	north side
Side 2	6	20%	east side
Side 3	100	0%	south side
Side 4	8.5	20%	west side
		55%	(Total shall not exceed 75%)

Increase due to separation 55% x 7,650 = 4,208 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 12,000 L/min (Rounded to nearest 1000 L/min)
or **200 L/sec**
or 3,170 gpm (us)
or 2,640 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
Queenswood United Church
360 Kennedy Lane East, City of Ottawa
WSP Project No. 211-12127-00
Date: 06-Sep-22

Block 3
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for **Type V** Wood Frame Construction
- 0.8 for **Type IV-A** Mass Timber Construction
- 0.9 for **Type IV-B** Mass Timber Construction
- 1.0 for **Type IV-C** Mass Timber Construction
- 1.5 for **Type IV-D** Mass Timber Construction
- 1.0 for **Type III** Ordinary Construction
- 0.8 for **Type II** Noncombustible Construction
- 0.6 for **Type I** Fire resistive Construction

A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 656 m^2
C = 1.5
F = 8448.9 L/min

rounded off to 8,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 8,000 = 6,800 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System 0% x 6,800 = 0 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	17	15%	north side
Side 2	4	20%	east side
Side 3	100	0%	south side
Side 4	6	20%	west side
		55%	(Total shall not exceed 75%)

Increase due to separation 55% x 6,800 = 3,740 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 11,000 L/min (Rounded to nearest 1000 L/min)
or **183 L/sec**
or 2,906 gpm (us)
or 2,420 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
Queenswood United Church
360 Kennedy Lane East, City of Ottawa
WSP Project No. 211-12127-00
Date: 06-Sep-22

Block 4
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for **Type V** Wood Frame Construction
- 0.8 for **Type IV-A** Mass Timber Construction
- 0.9 for **Type IV-B** Mass Timber Construction
- 1.0 for **Type IV-C** Mass Timber Construction
- 1.5 for **Type IV-D** Mass Timber Construction
- 1.0 for **Type III** Ordinary Construction
- 0.8 for **Type II** Noncombustible Construction
- 0.6 for **Type I** Fire resistive Construction

A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 495 m^2
C = 1.5
F = 7342.0 L/min

rounded off to 7,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 7,000 = 5,950 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System 0% x 5,950 = 0 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	13	15%	north side
Side 2	31	5%	east side
Side 3	100	0%	south side
Side 4	4	20%	west side
		40%	(Total shall not exceed 75%)

Increase due to separation 40% x 5,950 = 2,380 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 8,000 L/min (Rounded to nearest 1000 L/min)
or **133 L/sec**
or 2,113 gpm (us)
or 1,760 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
Queenswood United Church
360 Kennedy Lane East, City of Ottawa
WSP Project No. 211-12127-00
Date: 06-Sep-22

Block 5
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for **Type V** Wood Frame Construction
- 0.8 for **Type IV-A** Mass Timber Construction
- 0.9 for **Type IV-B** Mass Timber Construction
- 1.0 for **Type IV-C** Mass Timber Construction
- 1.5 for **Type IV-D** Mass Timber Construction
- 1.0 for **Type III** Ordinary Construction
- 0.8 for **Type II** Noncombustible Construction
- 0.6 for **Type I** Fire resistive Construction

A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 282 m^2
C = 1.5
F = 5541.6 L/min

rounded off to 6,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 6,000 = 5,100 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System 0% x 5,100 = 0 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	18	15%	north side
Side 2	16	15%	east side
Side 3	13	15%	south side
Side 4	15	15%	west side
		60%	(Total shall not exceed 75%)

Increase due to separation 60% x 5,100 = 3,060 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 8,000 L/min (Rounded to nearest 1000 L/min)
or **133 L/sec**
or 2,113 gpm (us)
or 1,760 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
Queenswood United Church
360 Kennedy Lane East, City of Ottawa
WSP Project No. 211-12127-00
Date: 06-Sep-22

Block 6
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for **Type V** Wood Frame Construction
- 0.8 for **Type IV-A** Mass Timber Construction
- 0.9 for **Type IV-B** Mass Timber Construction
- 1.0 for **Type IV-C** Mass Timber Construction
- 1.5 for **Type IV-D** Mass Timber Construction
- 1.0 for **Type III** Ordinary Construction
- 0.8 for **Type II** Noncombustible Construction
- 0.6 for **Type I** Fire resistive Construction

A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 618 m^2
C = 1.5
F = 8203.7 L/min

rounded off to 8,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 8,000 = 6,800 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System 0% x 6,800 = 0 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	14.5	15%	north side
Side 2	15	15%	east side
Side 3	14.5	15%	south side
Side 4	6	20%	west side
		65%	(Total shall not exceed 75%)

Increase due to separation 65% x 6,800 = 4,420 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 11,000 L/min (Rounded to nearest 1000 L/min)
or **183 L/sec**
or 2,906 gpm (us)
or 2,420 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
Queenswood United Church
360 Kennedy Lane East, City of Ottawa
WSP Project No. 211-12127-00
Date: 06-Sep-22

Block 7
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for **Type V** Wood Frame Construction
- 0.8 for **Type IV-A** Mass Timber Construction
- 0.9 for **Type IV-B** Mass Timber Construction
- 1.0 for **Type IV-C** Mass Timber Construction
- 1.5 for **Type IV-D** Mass Timber Construction
- 1.0 for **Type III** Ordinary Construction
- 0.8 for **Type II** Noncombustible Construction
- 0.6 for **Type I** Fire resistive Construction

A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 495 m^2
C = 1.5
F = 7342.0 L/min

rounded off to 7,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 7,000 = 5,950 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System 0% x 5,950 = 0 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	14	15%	north side
Side 2	6	20%	east side
Side 3	14.5	15%	south side
Side 4	21.5	10%	west side
		60%	(Total shall not exceed 75%)

Increase due to separation 60% x 5,950 = 3,570 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 10,000 L/min (Rounded to nearest 1000 L/min)
or **167 L/sec**
or 2,642 gpm (us)
or 2,200 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
Queenswood United Church
360 Kennedy Lane East, City of Ottawa
WSP Project No. 211-12127-00
Date: 06-Sep-22

Block 8
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
- 1.5 for **Type V** Wood Frame Construction
- 0.8 for **Type IV-A** Mass Timber Construction
- 0.9 for **Type IV-B** Mass Timber Construction
- 1.0 for **Type IV-C** Mass Timber Construction
- 1.5 for **Type IV-D** Mass Timber Construction
- 1.0 for **Type III** Ordinary Construction
- 0.8 for **Type II** Noncombustible Construction
- 0.6 for **Type I** Fire resistive Construction

A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 413 m^2
C = 1.5
F = 6702.3 L/min

rounded off to 7,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 7,000 = 5,950 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System 0% x 5,950 = 0 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	10.5	15%	north side
Side 2	20.5	10%	east side
Side 3	13.5	15%	south side
Side 4	20.5	10%	west side
		50%	(Total shall not exceed 75%)

Increase due to separation 50% x 5,950 = 2,975 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.

The fire flow requirement is 9,000 L/min (Rounded to nearest 1000 L/min)
or **150 L/sec**
or 2,378 gpm (us)
or 1,980 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Fire Flow Design Sheet (FUS)
Queenswood United Church
360 Kennedy Lane East, City of Ottawa
WSP Project No. 211-12127-00
Date: 06-Sep-22

Exising Church
Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

1. An estimate of the Fire Flow required for a given fire area may be estimated by: $F = 220\ C\ \sqrt{A}$

F = required fire flow in litres per minute
C = coefficient related to the type of construction
1.5 for **Type V** Wood Frame Construction
0.8 for **Type IV-A** Mass Timber Construction
0.9 for **Type IV-B** Mass Timber Construction
1.0 for **Type IV-C** Mass Timber Construction
1.5 for **Type IV-D** Mass Timber Construction
1.0 for **Type III** Ordinary Construction
0.8 for **Type II** Noncombustible Construction
0.6 for **Type I** Fire resistive Construction
A =2-b) The single largest Floor Area plus 25% of each of the two immediately adjoining floors

A = 198 m^2
C = 1.5
F = 4643.5 L/min

rounded off to 5,000 L/min (min value of 2000 L/min)

2. The value obtained in 1. may be reduced by as much as 25% for occupancies having a low contents fire hazard.

Non-combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Reduction due to low occupancy hazard -15% x 5,000 = 4,250 L/min

3. The value obtained in 2. may be reduced by as much as 50% for buildings equipped with automatic sprinkler protection.

Adequate Sprinkler confirms to NFPA13	-30%
Water supply common for sprinklers & fire hoses	-10%
Fully supervised system	-10%
No Automatic Sprinkler System	0%

Reduction due to Sprinkler System 0% x 4,250 = 0 L/min

4. The value obtained in 2. is increased for structures exposed within 45 metres by the fire area under consideration.

Separation	Charge
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
30.1 to 45 m	0%

Side 1	11.5	15%	north side
Side 2	42.5	5%	east side
Side 3	14	15%	south side
Side 4	20.5	10%	west side
		45%	(Total shall not exceed 75%)

Increase due to separation 45% x 4,250 = 1,913 L/min

5. The flow requirement is the value obtained in 2., minus the reduction in 3., plus the addition in 4.
The fire flow requirement is 6,000 L/min (Rounded to nearest 1000 L/min)
or **100 L/sec**
or 1,585 gpm (us)
or 1,320 gpm (uk)

Based on method described in:
"Water Supply for Public Fire Protection - A Guide to Recommended Practice", 2020
by Fire Underwriters Survey

Water Demand Calculation Sheet

Project:	**Queenswood United Church**	**Date:**	**2023-02-27**
Location:	**City of Ottawa**	**Design:**	**WY**
WSP Project No.	**211-12127-00**	**Page:**	**1 of 1**

Proposed Buildings	Residential				Non-Residentail			Average Daily			Maximum Daily			Maximum Hourly			Fire
	Units			Pop.	Industrial	Institutional	Commercial	Demand (l/s)			Demand (l/s)			Demand (l/s)			Demand
	SF	APT	TH		(ha)	(ha)	(ha)	Res.	Non-Res.	Total	Res.	Non-Res.	Total	Res.	Non-Res.	Total	(l/s)
Proposed Residential																	
Block 1		2	2	9				0.03		0.03	0.07		0.07	0.16		0.16	133
Block 2		3	4	16				0.05		0.05	0.13		0.13	0.29		0.29	200
Block 3		2	5	17				0.06		0.06	0.14		0.14	0.30		0.30	183
Block 4		4		7				0.02		0.02	0.06		0.06	0.13		0.13	133
Block 5			4	11				0.04		0.04	0.09		0.09	0.19		0.19	133
Block 6		5		9				0.03		0.03	0.07		0.07	0.16		0.16	183
Block 7		4		7				0.02		0.02	0.06		0.06	0.13		0.13	167
Block 8			6	16				0.05		0.05	0.13		0.13	0.29		0.29	150
Ex. Church						0.02			0.01	0.01	0.01		0.01	0.02		0.02	100
Total		20	21	93						0.31			0.76			1.67	

Population Densities

Single Family	3.4	person/unit
Semi-Detached	2.7	person/unit
Duplex	2.3	person/unit
Townhome (Row)	2.7	person/unit
Bachelor Apartment	1.4	person/unit
1 Bedroom Apartment	1.4	person/unit
2 Bedroom Apartment	2.1	person/unit
3 Bedroom Apartment	3.1	person/unit
4 Bedroom Apartment	4.1	person/unit
Avg. Apartment	1.8	person/unit

Average Daily Demand

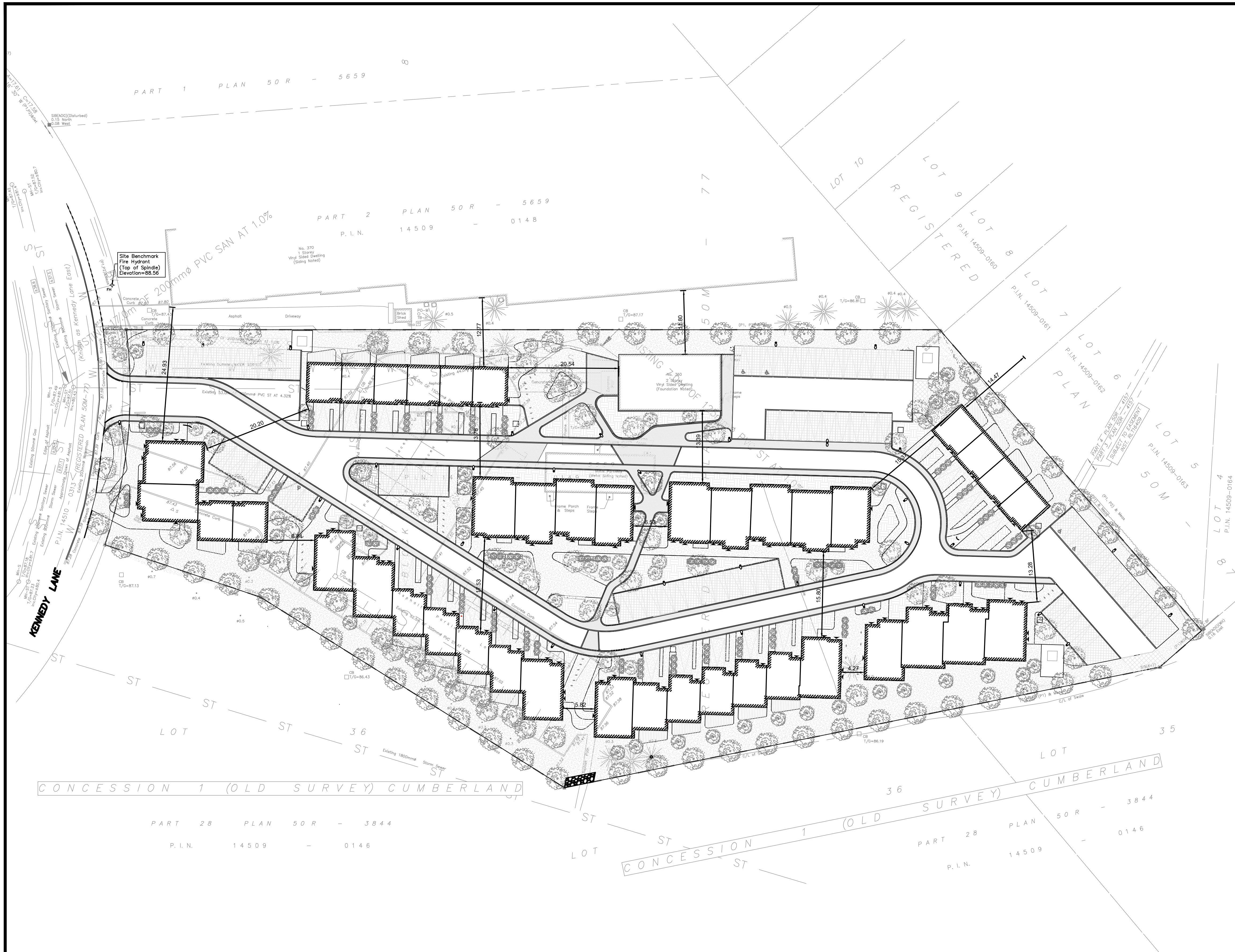
Residentail	280	l/cap/day
Industrial	35000	l/ha/day
Institutional	28000	l/ha/day
Commercial	28000	l/ha/day

Maximum Daily Demand

Residential	2.5	x avg. day
Industrial	1.5	x avg. day
Institutional	1.5	x avg. day
Commercial	1.5	x avg. day

Maximum Hourly Demand

Residential	2.2	x max. day
Industrial	1.8	x max. day
Institutional	1.8	x max. day
Commercial	1.8	x max. day



WSP

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CLIENT:

KINDRED WORKS

CLIENT REF. #:

PROJECT:

QUEENSWOOD COMMONS

LEGEND

PROJECT NO:	DATE:
211-12127-00	FEBRUARY 2023
ORIGINAL SCALE: 1:750	IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE. 25mm
DESIGNED BY: E.B.	
DRAWN BY: J.T.	
CHECKED BY: D.Y.	

TITLE:

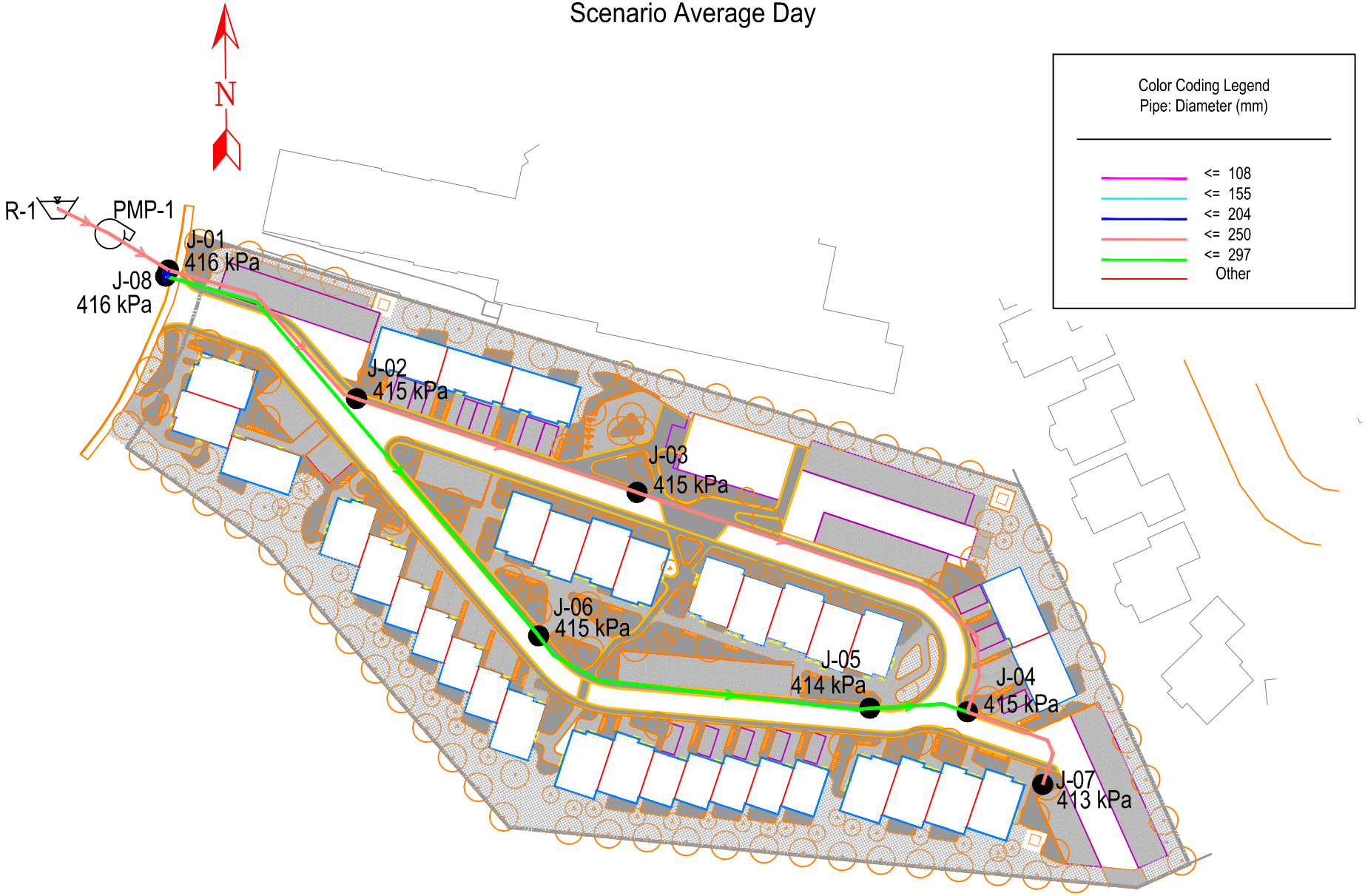
EXPOSURE DISTANCE

SHEET NUMBER:

F3

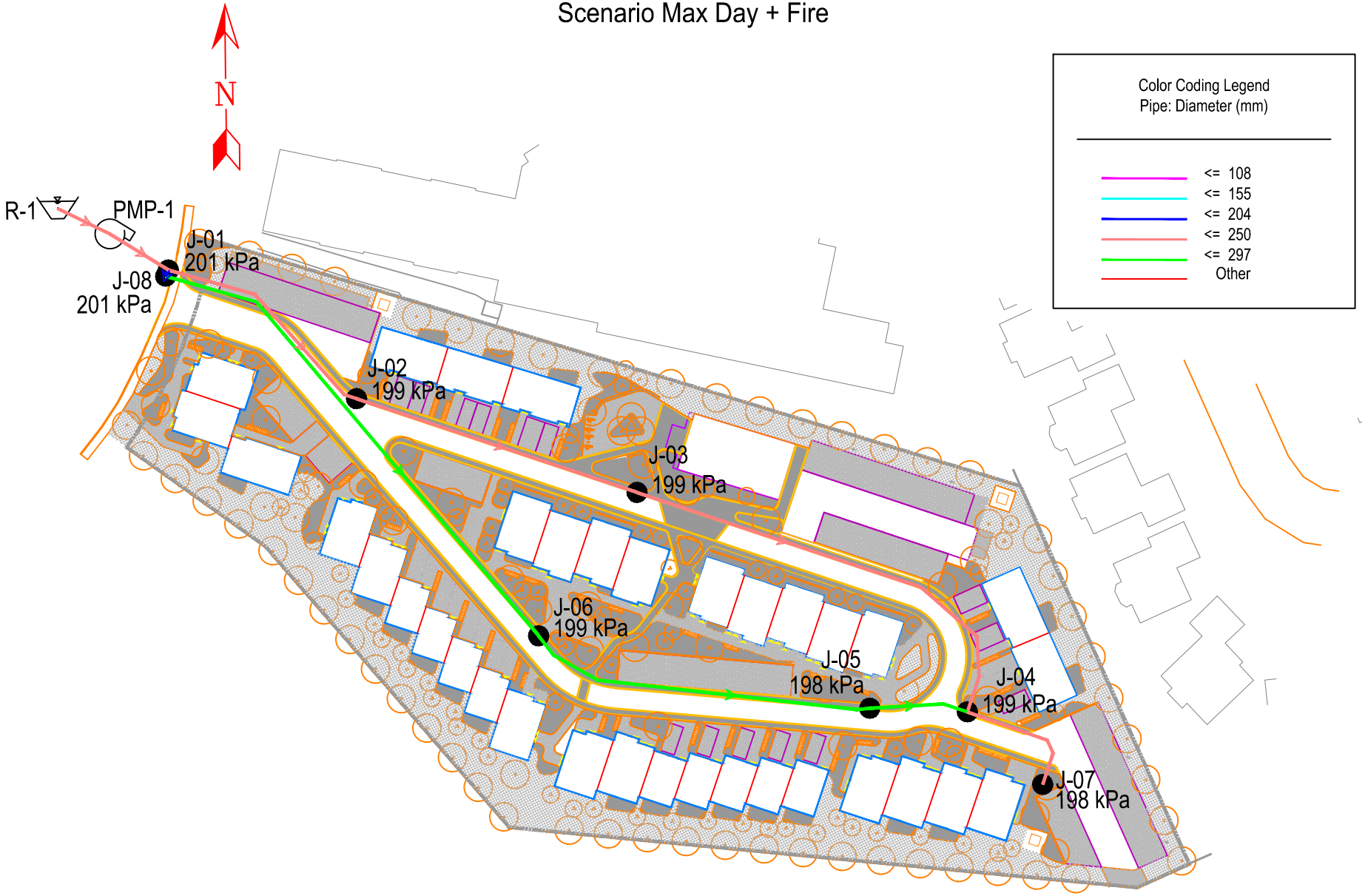
V:\10-13 ME 2021 Projects\211-12127-00 Queenswood United Church\3. Drawings\Sketches and Figures\211-12127-00_F3.dwg Feb 28, 2023-3:42pm BY:(CAJT074512)

360 Kennedy Lane East
WaterCAD Hydraulic Model
Scenario Average Day

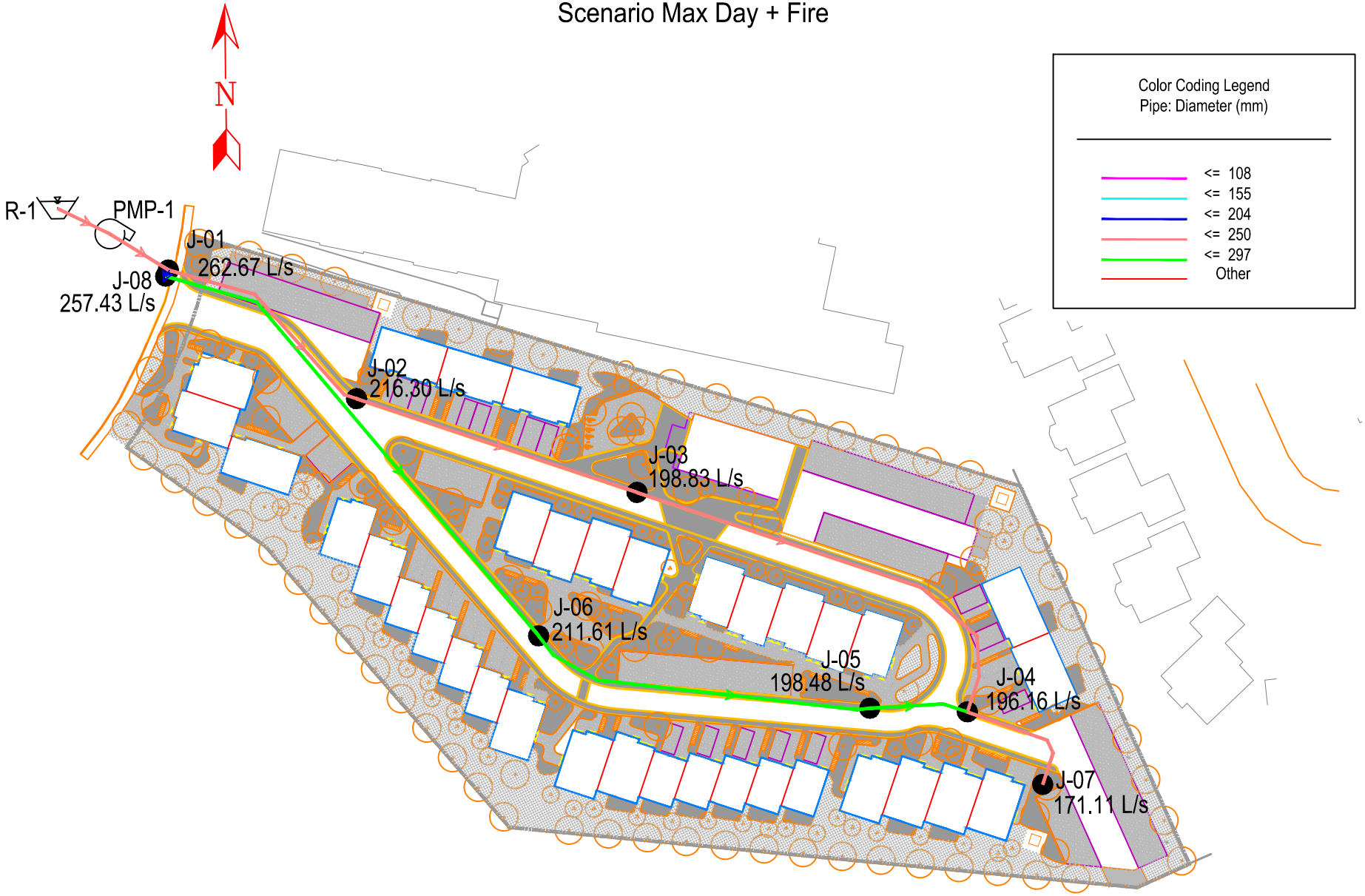


360 Kennedy Lane East
WaterCAD Hydraulic Model
Junction

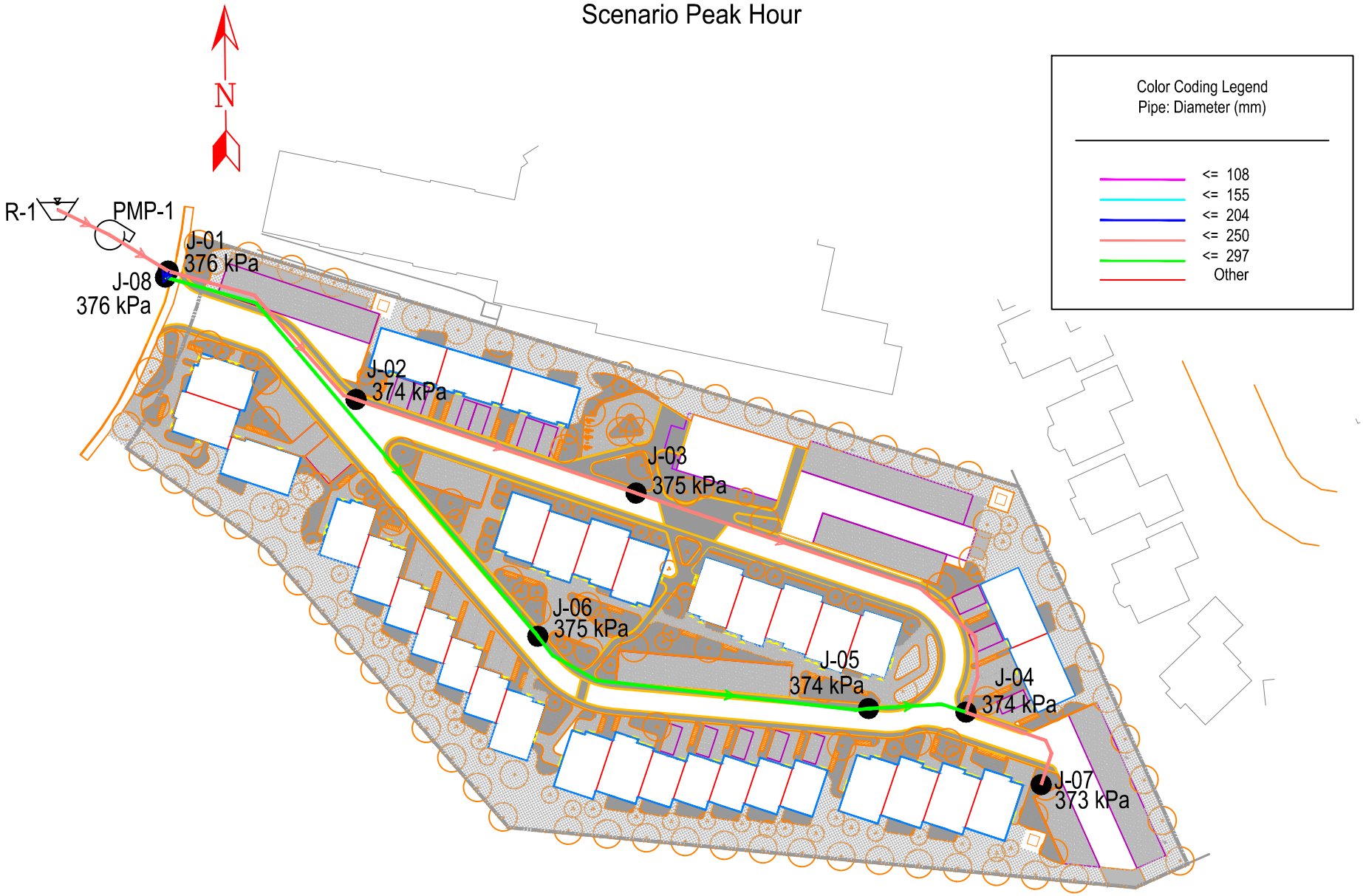
360 Kennedy Lane East
WaterCAD Hydraulic Model
Scenario Max Day + Fire



360 Kennedy Lane East
WaterCAD Hydraulic Model
Scenario Max Day + Fire



360 Kennedy Lane East
WaterCAD Hydraulic Model
Scenario Peak Hour

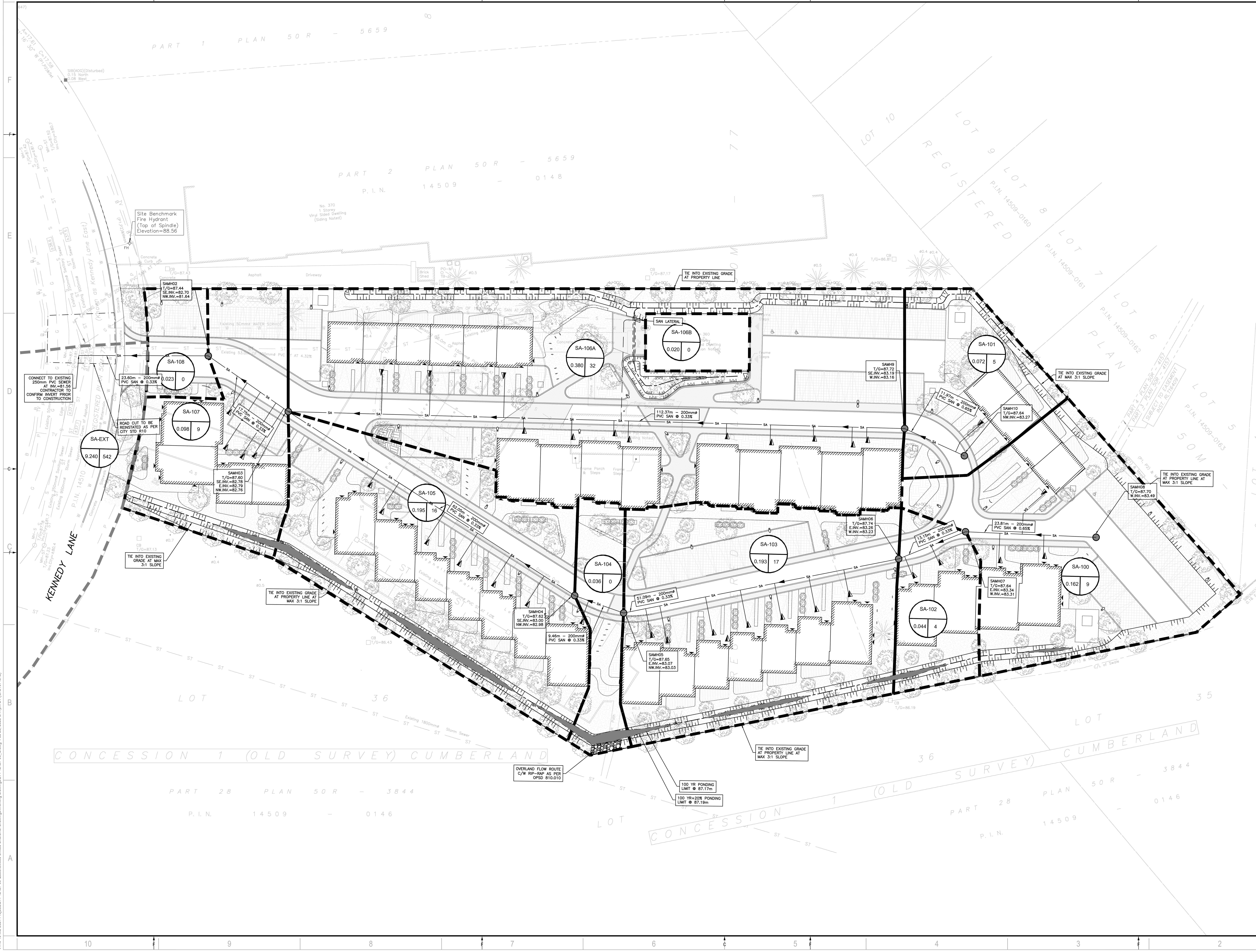


APPENDIX

APPENDIX

C

- C07 –SANITARY DRAIANGE AREA PLAN
- F01 – OVERALL SANITARY DRAINAGE AREA PLAN
- SANITARY SEWER DESIGN SHEET



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100230568
2023-02-27
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NORTH

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KINDRED WORKS

CLIENT REF. #:

PROJECT:

QUEENSWOOD COMMONS

KEY PLAN:

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IS	RE	DATE	DESCRIPTION
3		2023-02-28	RE-ISSUED FOR SPA AND ZBLA
2		2022-10-14	RE-ISSUED FOR SPA AND ZBLA
1		2021-11-30	ISSUED FOR SPA AND ZBLA

PROJECT NO: 211-12127-00
DATE: FEBRUARY 2023
ORIGINAL SCALE: 1:300
DESIGNED BY: DY
DRAWN BY: JT
CHECKED BY: DY

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25mm

DISCIPLINE: CIVIL

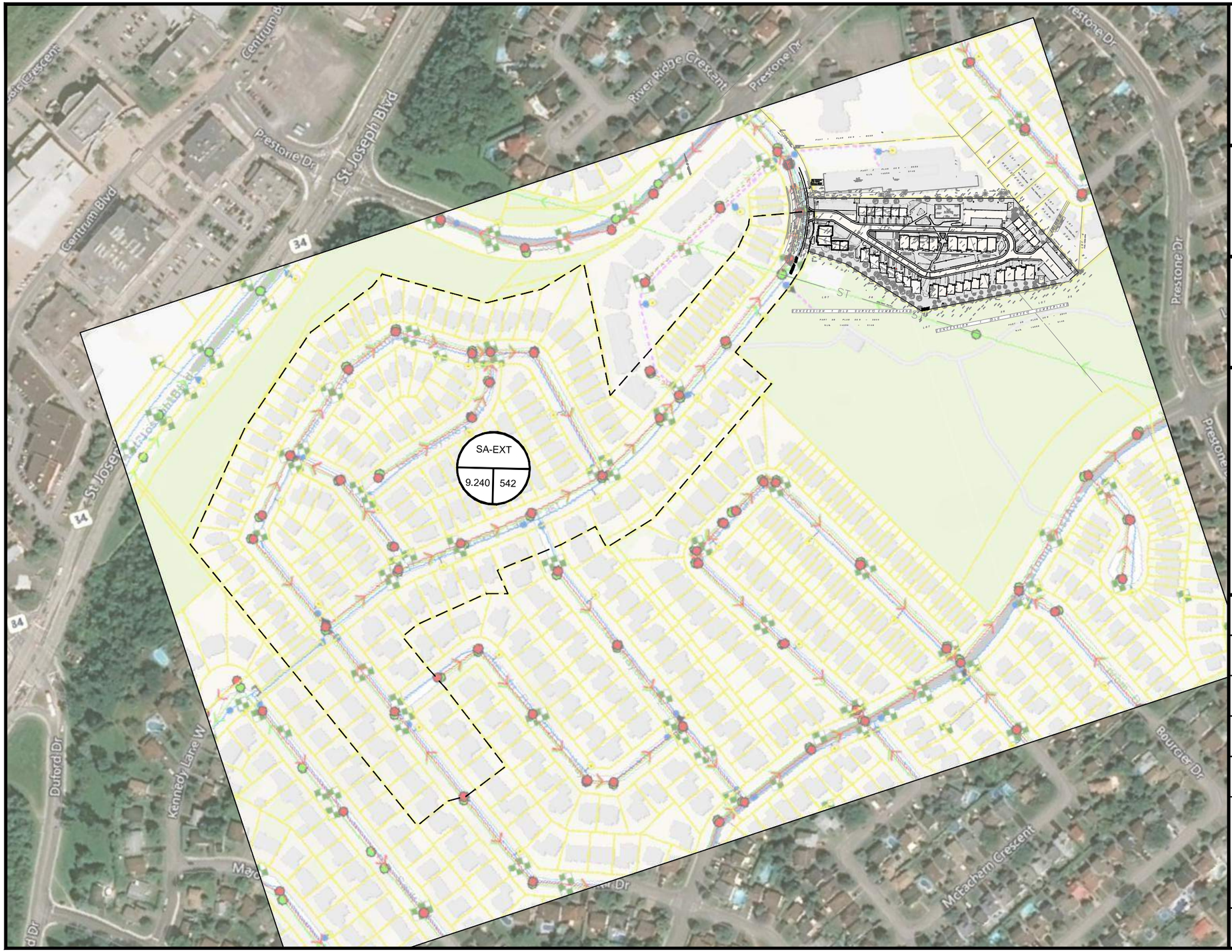
TITLE: SANITARY DRAINAGE AREA PLAN

SHEET NUMBER: C07
SHEET #: 7 OF 8

ISSUE: RE-ISSUED FOR SPA AND ZBLA
DATE OF: 2023-02-28
REV #: 0

D07-12-22-0002

#18692



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CLIENT REF. #:

PROJECT:

QUEENSWOOD COMMONS

LEGEND

I.D. / AREA | POP

I.D. DENOTES SANITARY DRAINAGE AREA ID

AREA DENOTES SANITARY DRAINAGE AREA

POP DENOTES POPULATION

SANITARY DRAINAGE BOUNDARY

PROJECT NO: 211-12127-00	DATE: FEBRUARY 2023
ORIGINAL SCALE: 1:3000	IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
DESIGNED BY: E.B.	
DRAWN BY: J.T.	
CHECKED BY: D.Y.	25mm

TITLE:

EXTERNAL SANITARY DRAINAGE AREA

SHEET NUMBER:

F1

SANITARY SEWER DESIGN SHEET
Queenswood Commons
360 Kennedy Lane East - Residential Development
Ottawa, ON
Project: 211-12127-00
Date: February 2023

LOCATION				RESIDENTIAL AREA AND POPULATION												INDUSTRIAL					COMMERCIAL		INSTITUTIONAL		I+C+I	INFILTRATION			TOTAL	PIPE					
LOCATION	FROM M.H.	TO M.H.	SANITARY DRAINAGE AREA ID	INDV AREA (ha)	ACCU AREA (ha)	NUMBER OF UNITS						POPULATION		PEAK FACT.	PEAK FLOW (l/s)	GROSS AREA (ha)	DEVEL. AREA (ha)	ACCU. AREA (ha)	PEAK FACTOR	INDIV AREA (ha)	ACCU. AREA (ha)	INDIV AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	INDIV AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	LENGTH (m)	DIA. (mm)	SLOPE (%)	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)	AVAIL. CAP. (%)
						SINGLES	SEMIS	AVG TOWNS	STACKED TOWNS	2-BED APT.	3-BED APT.	INDIV POP.	ACCU POP.																					
TO KEENEDY LANE EAST																																		
BLOCK 4 & 5	SANMH08	SANMH07	SA-100	0.162	0.162			2.00	2.00			9	9	3.74	0.11										0.162	0.16	0.05	**0.16**	23.81	200	0.65	26.44	0.84	**99.39%**
BLOCK 4	SANMH07	SANMH06	SA-102	0.044	0.206				2.00			4	13	3.72	0.15										0.044	0.21	0.07	**0.22**	13.15	200	0.33	18.84	0.60	**98.83%**
BLOCK 3	SANMH06	SANMH05	SA-103	0.193	0.399			5.00	2.00			17	30	3.68	0.35										0.193	0.40	0.13	**0.49**	51.09	200	0.33	18.84	0.60	**97.42%**
	SANMH05	SANMH04	SA-104	0.036	0.435							0	30	3.68	0.35										0.036	0.44	0.14	**0.50**	9.46	200	0.33	18.84	0.60	**97.36%**
BLOCK 2	SANMH04	SANMH03	SA-105	0.195	0.630			4.00	3.00			16	46	3.66	0.54										0.195	0.63	0.21	**0.75**	62.05	200	0.33	18.84	0.60	**96.01%**
BLOCK 5	SANMH10	SANMH09	SA-101	0.072	0.072			2.00				5	5	3.75	0.07										0.072	0.07	0.02	**0.09**	11.97	200	0.65	26.44	0.84	**99.66%**
BLOCK 6 TO 8, EX. CHURCH	SANMH09	SANMH03	SA-106A, SA-106B	0.380	0.452			6.00	9.00			32	38	3.67	0.45							0.02	0.02	0.01	0.400	0.47	0.16	**0.61**	112.37	200	0.33	18.84	0.60	**96.75%**
BLOCK 1	SANMH03	SANMH02	SA-107	0.098	1.180			2.00	2.00			9	93	3.60	1.08								0.02	0.01	0.098	1.20	0.40	**1.48**	17.75	200	0.33	18.84	0.60	**92.12%**
ENTRANCE	SANMH02	*EX. SAN*	SA-108	0.023	1.203							0	93	3.60	1.08								0.02	0.01	0.023	1.22	0.40	**1.49**	23.60	200	0.33	18.84	0.60	**92.08%**
UPSTREAM OF 360 KEENEDY LANE EAST																																		
SA-EXT	*EX SANMH*	*EX SANMH*		9.240	9.240	141	2	21.00				542	542	3.36	5.90										9.240	9.24	3.05	**8.95**	*38.00*	*250*	*0.60*	25.41	0.81	**64.76%**
DOWNSTREAM OF 360 KEENEDY LANE EAST																																		
	EX SANMH	*EX SANMH*			10.443							0	634	3.34	6.85								0.02	0.01	0.000	10.46	3.45	**10.31**	*36.90*	*250*	*0.60*	25.41	0.81	**59.41%**

DESIGN PARAMETERS

RESIDENTIAL AVG. DAILY FLOW =	280	l/cap/day	COMMERCIAL PEAK FACTOR =	1.5	(WHEN AREA > 20%)	PEAK POPULATION FLOW, (l/s) =	P*q*M/86400	UNIT TYPE	PERSONS/UNIT		
COMMERCIAL AVG. DAILY FLOW =	28,000	l/ha/day		1.0	(WHEN AREA < 20%)	PEAK EXTRANEOUS FLOW, (l/s) =	I*Ac	SINGLES	3.4		
	0.324	l/ha/s				RESIDENTIAL PEAKING FACTOR, M =	1+(14/(4+P^0.5))*K	SEMI-DETACHED	2.7		
INSTITUTIONAL AVG. DAILY FLOW =	28,000	l/ha/day	INSTITUTIONAL PEAK FACTOR =	1.5	(WHEN AREA > 20%)	Ac = CUMULATIVE AREA (ha)		TOWNHOMES	2.7		
	0.324	l/ha/s		1.0	(WHEN AREA < 20%)	P = POPULATION (THOUSANDS)		WALK UP TOWNS	1.8		
LIGHT INDUSTRIAL FLOW =	35,000	l/ha/day						2-BED APT. UNIT	2.1		
	0.405	l/ha/s	RESIDENTIAL CORRECTION FACTOR, K =	0.80		SEWER CAPACITY, Qcap (l/s) =	1/N S^(1/2) R^(2/3) Ac	3-BED APT. UNIT	3.1		
HEAVY INDUSTRIAL FLOW =	55,000	l/ha/day	MANNING N =	0.013		(MANNING'S EQUATION)					
	0.637	l/ha/s	PEAK EXTRANEOUS FLOW, I (l/s/ha) =	0.33							

DESIGNED:	NO.	REVISION	DATE
D.B.Y	1.	City Submission No.1	2021-11-30
CHECKED:	2.	City Submission No.2	2022-09-13
D.B.Y	3.	City Submission No.3	2023-02-27
PROJECT:			
Queenswood United Church			
Residential Development			
LOCATION:			
Ottawa, Ontario			
PAGE NO:	**FILE & DWG. REFERENCE:**		
1 of 1	C07		

APPENDIX

APPENDIX

D

- STORM SEWER DESIGN SHEET
- POST-DEVELOPMENT STORM DRAINAGE AREA PLAN C06
- GRADING PLAN C04
- SERVICING PLAN C05
- STORMTECH CHAMBERS DESIGN
- STORMCEPTOR

STORM SEWER DESIGN SHEET

Queenswood Commons
Residential Development
Project: 211-12127-00
Date: February 2023

LOCATION				AREA (Ha)						RATIONAL DESIGN FLOW												PROPSOED SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.35	C= 0.50	C= 0.60	C= 0.75	C= 0.90	IND 2.78AC	CUM 2.78 AC	INLET (min)	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (100) (mm/hr)	BLDG FLOW (L/s)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	CONTROLLED FLOW (L/s)	DESIGN FLOW (L/s)	MODIFIED DESIGN FLOW (L/s)	MATERIAL PIPE	SIZE (mm)	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME IN PIPE	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
POST-DEVELOPMENT																														
To Kennedy Lane																														
Access Road South	S-017	CB01	TANK G	0.005					0.046	0.118	0.118	10.00	10.00	76.81	104.19	178.56		9.05				9.05		REFER TO STORMTECH DESIGN								
		TANG G	CBMH01							0.000	0.118	10.00	10.00	76.81	104.19	178.56		9.05				9.05		REFER TO STORMTECH DESIGN								
		CBMH01	STMH02							0.000	0.118	10.00	10.53	76.81	104.19	178.56		9.05				9.05		PVC DR-35	250	0.45	25.85	39.93	0.81	0.53	30.88	77.33%
		STMH02	STMH03							0.000	0.118	10.53	10.80	74.83	101.47	173.85		8.82				8.82		PVC DR-35	250	0.45	12.95	39.93	0.81	0.27	31.11	77.91%
	S-014	CB02	CB03	0.010					0.074	0.191	0.191	10.00	10.07	76.81	104.19	178.56		14.65				14.65		PVC DR-35	200	1.00	4.40	32.83	1.04	0.07	18.18	55.39%
	S-015	CB03	TANK F	0.004					0.035	0.090	0.281	10.07	10.07	76.54	103.82	177.92		21.47				21.47		REFER TO STORMTECH DESIGN								
	S-013	CB04	TANK F	0.011					0.017	0.049	0.049	10.00	10.15	76.81	104.19	178.56		3.74				3.74		PVC DR-35	200	1.00	9.15	32.83	1.04	0.15	29.09	88.62%
Swale 1 & 2													20.00																	
	S-018	RYCB01	STMH04	0.115					0.090	0.289	0.289	20.00	20.27	52.03	70.25	119.95		15.04				15.04		PVC DR-35	250	1.00	19.55	59.53	1.21	0.27	44.48	74.73%
		STMH04	CBMH05							0.000	0.289	20.27	20.50	51.60	69.67	118.94		14.92				14.92		PVC DR-35	250	0.45	11.25	39.93	0.81	0.23	25.01	62.64%
	S-012	CB05	CBMH05	0.006					0.017	0.046	0.046	10.00	10.12	76.81	104.19	178.56		3.52				3.52		PVC DR-35	200	1.00	7.65	32.83	1.04	0.12	29.31	89.27%
	S-011	CB06	CBMH05	0.010					0.066	0.171	0.171	10.00	10.13	76.81	104.19	178.56		13.11				13.11		PVC DR-35	200	1.00	8.25	32.83	1.04	0.13	19.72	60.07%
		CBMH05	TANK F							0.000	0.506	20.50	20.59	51.24	69.17	118.09		25.91				25.91		PVC DR-35	250	0.45	4.60	39.93	0.81	0.09	14.02	35.11%
		TANK F	CBMH06							0.000	1.026	20.59	20.67	51.09	68.97	117.75		52.40				52.40		PVC DR-35	250	1.00	5.40	59.53	1.21	0.07	7.13	11.97%
		CBMH06	STMH03-STMH07							0.000	1.026	20.67	20.71	50.98	68.82	117.48		52.28				52.28		PVC DR-35	250	1.00	3.00	59.53	1.21	0.04	7.24	12.17%
		STMH03	STMH07							0.000	1.143	20.71	21.70	50.92	68.73	117.33		58.22				58.22		PVC DR-35	375	0.30	51.65	96.13	0.87	0.99	37.91	39.44%
		STMH07	STMH08							0.000	1.143	21.70	21.89	49.45	66.73	113.88		56.54				56.54		PVC DR-35	375	0.30	10.05	96.13	0.87	0.19	39.59	41.18%
		STMH08	STMH20							0.000	1.143	21.89	23.08	49.17	66.35	113.24		56.23				56.23		PVC DR-35	375	0.30	61.85	96.13	0.87	1.19	39.90	41.51%
Access Road North	S-016	CB07	TANK D	0.021					0.084	0.222	0.222	10.00	10.07	76.81	104.19	178.56		17.04				17.04		PVC DR-35	200	1.00	4.10	32.83	1.04	0.07	15.79	48.10%
		TANK D	CBMH10							0.000	0.222	10.07	10.07	76.55	103.85	177.96		16.98				16.98		REFER TO STORMTECH DESIGN								
		CBMH10	STMH09-STMH11							0.000	0.222	10.07	10.10	76.55	103.85	177.96		16.98				16.98		PVC DR-35	200	1.00	2.35	32.83	1.04	0.04	15.85	48.27%
		STMH09	STMH11							0.000	0.222	10.10	10.29	76.41	103.65	177.62		16.95				16.95		PVC DR-35	250	0.70	11.65	49.80	1.01	0.19	32.85	65.96%
	S-006	CB08	TANK C	0.010					0.051	0.133	0.133	10.00	10.14	76.81	104.19	178.56		10.23				10.23		PVC DR-35	200	1.00	9.00	32.83	1.04	0.14	22.60	68.85%
	S-008	CB09	CBMH12						0.030	0.075	0.075	10.00	10.11	76.81	104.19	178.56		5.76				5.76		PVC DR-35	200	1.00	7.10	32.83	1.04	0.11	27.07	82.44%
		CBMH12	TANK C							0.000	0.075	10.11	10.11	76.37	103.60	177.53		5.73				5.73		REFER TO STORMTECH DESIGN								
Swale 3 & 4													20.00																	
	S-009	RYCB02	CBMH13	0.070					0.026	0.104	0.104	20.00	20.02	52.03	70.25	119.95		5.41				5.41		PVC DR-35	250	1.00	1.50	59.53	1.21	0.02	54.12	90.91%
	S-007	CBMH13	CBMH14						0.028	0.070	0.174	20.00	20.20	52.03	70.25	119.95		9.05				9.05		PVC DR-35	250	0.45	9.65	39.93	0.81	0.20	30.88	77.32%
		CBMH14	TANK C							0.000	0.174	20.20	20.20	51.72	69.82	119.21		9.00				9.00		REFER TO STORMTECH DESIGN								
		TANK C	CBMH15							0.000	0.382	20.20	20.20	51.72	69.82	119.21		19.77				19.77		REFER TO STORMTECH DESIGN								
		CBMH15	STMH11-STMH20							0.000	0.382	20.20	20.42	51.72	69.82	119.21		19.77				19.77		PVC DR-35	250	0.45	10.80	39.93	0.81	0.22	20.16	50.50%
	S-005	CB11	CBMH16	0.008					0.013	0.037	0.037	10.00	10.20	76.81	104.19	178.56		2.84				2.84		PVC DR-35	200	1.00	12.55	32.83	1.04	0.20	29.99	91.35%
	S-003	CB10	CBMH16	0.011					0.049	0.129	0.129	10.00	10.09	76.81	104.19	178.56		9.89				9.89		PVC DR-35	200	1.00	5.70	32.83	1.04	0.09	22.95	69.89%
		CBMH16	TANK B							0.000	0.166	10.20	10.26	76.04	103.15	176.75		12.60				12.60		PVC DR-35	200	0.60	2.90	25.43	0.81	0.06	12.83	50.46%
	S-004	CB12	TANK B	0.006					0.018	0.048	0.048	10.00	10.00	76.81	104.19	178.56		3.72				3.72		REFER TO STORMTECH DESIGN								
		TANK B	CBMH17							0.000	0.214	10.26	10.26	75.82	102.84	176.22		16.23				16.23		REFER TO STORMTECH DESIGN								
		CBMH17	STMH11-STMH20							0.000	0.214	10.26	10.38	75.82	102.84	176.22		16.23				16.23		PVC DR-35	250	0.45	5.80	39.93	0.81	0.12	23.70	59.36%
	S-010	CB13	CBMH18	0.014					0.048	0.128	0.128	10.00	10.08	76.81	104.19	178.56		9.82				9.82		PVC DR-35	200	1.00	4.85	32.83	1.04	0.08	23.01	70.08%
	S-002	CB14	CBMH18	0.007					0.043	0.111	0.111	10.00	10.10	76.81	104.19	178.56		8.56				8.56		PVC DR-35	200	1.00	6.25	32.83	1.04	0.10	24.27	73.92%
		CBMH18	TANK E							0.000	0.239	10.10	10.17	76.42	103.67	177.65		18.29				18.29		PVC DR-35	250	0.45	3.55	39.93	0.81	0.07	21.64	54.19%
		TANK E	CBMH19							0.000	0.239	10.17	10.17	76.15	103.29	177.00		18.23				18.23		REFER TO STORMTECH DESIGN								
		CBMH19	STMH11-STMH20							0.000	0.239	10.17	10.22	76.15	103.29	177.00		18.23				18.23		PVC DR-35	250	0.45	2.25	39.93	0.81	0.05	21.71	54.36%
		STMH11	STMH20							0.000	1.058	20.42	22.58	51.37	69.34	118.39		54.32				54.32		PVC DR-35	375	0.30	112.55	96.13	0.87	2.16	41.81	43.49%
Access Road Merge	S-001	DCB15	CBMH21	0.017					0.072	0.190	0.190	10.00	10.11	76.81	104.19	178.56		14.56				14.56		PVC DR-35	200	1.00	6.65	32.83	1.04	0.11	18.27	55.65%
		CBMH21	TANK A							0.000	0.190	10.11	10.11	76.40	103.64	177.59		14.49				14.49		REFER TO STORMTECH DESIGN								
		TANK A	CBMH22							0.000	0.190	10.11	10.11	76.40	103.64	177.59		14.49				14.49		REFER TO STORMTECH DESIGN								
		CBMH22	STMH20-STMH23							0.000	0.190	10.11	10.30	76.40	103.64	177.59		14.49				14.49		PVC DR-35	250	0.45	9.25	39.93	0.81	0.19	25.45	63.73%
		STMH20	STMH23							0.000	2.391	23.08	23.35	47.55	64.15	109.44		113.68				113.68		PVC DR-35	375	0.80	23.00	156.98	1.42	0.27	43.30	27.58%
		STMH23	*Ex. MH-ST*							0.000	2.391	23.35	23.44	47.20	63.67	108.62		112.84				112.84		PVC DR-35	375	4.00	16.70	351.01	3.17	0.09	238.18	67.85%

Definition:
Q=2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall Intensity in millimeters per hour (mm/hr)
i = 732.951/(TC+6.199)^0.810 — 2 Year
i = 1174.184/(TC+6.014)^0.816 — 5 Year
i = 1735.688/(TC+6.014)^0.820 — 100 Year

Notes:
1. Mannings coefficient (n) = 0.013

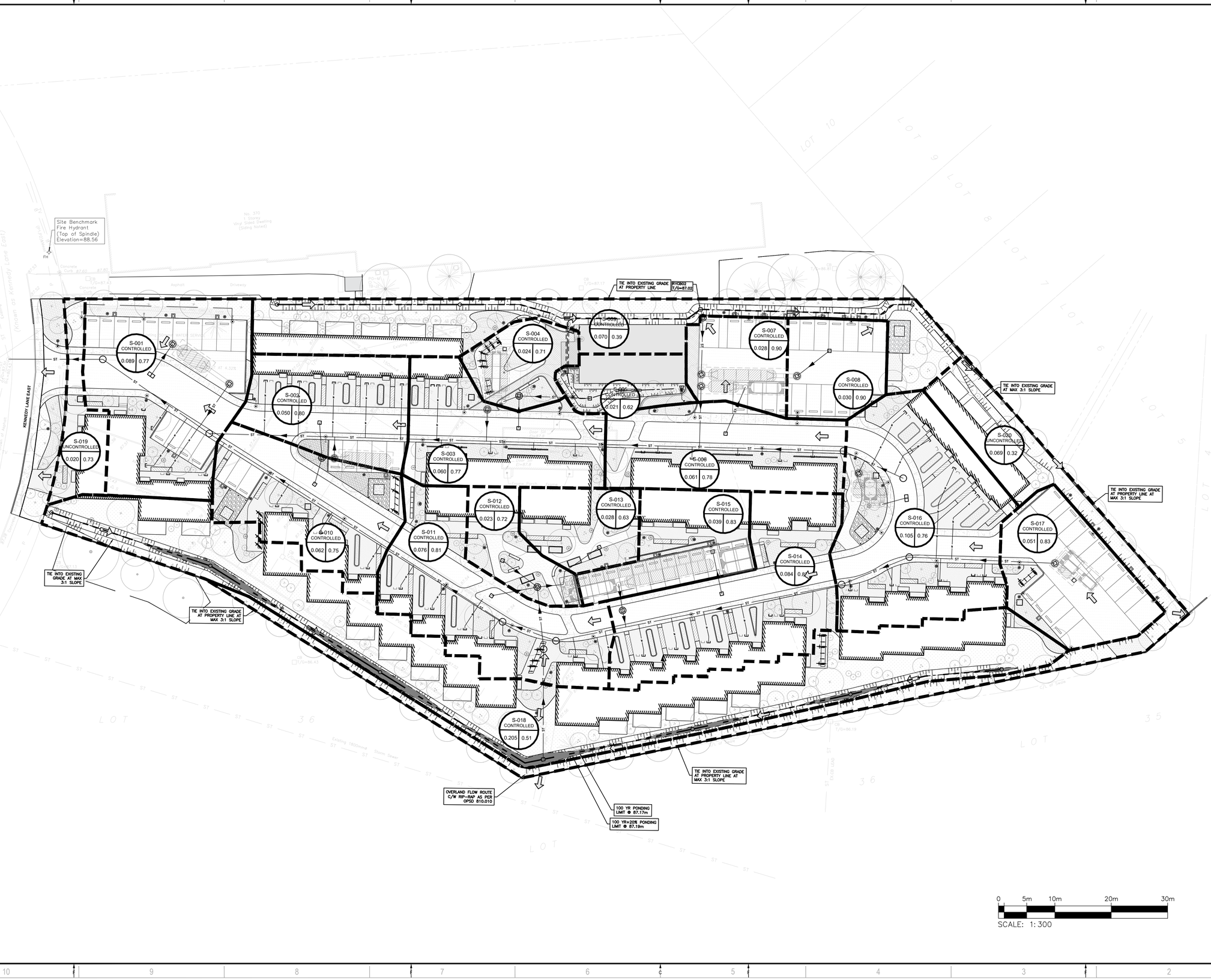
Time-of-Concentration in the Swale
FAA Equation: t (min) = 3.258 [(1.1 - C) L^0.5 / S^.33]
Where: Longest Watercourse Length, L (m). S (%)

No.	L (m)	S %	C	Tc (min)
1	98	1.50	0.50	20.00
2	83	1.30	0.50	20.00
3	76	1.00	0.40	20.00
4	51	1.00	0.40	20.00

Designed: D.B.Y.
Checked: D.B.Y.
Dwg. Reference: C06

No.	Revision	Date
1.	City Submission No. 1	2021-11-30
2.	City Submission No. 2	2022-09-20
3.	City Submission No. 3	2023-02-27

File Reference:	Date:	Sheet No:
211-12127-00	2023-02-27	1 of 1



wsp
2011 QUEENSVIEW DR.
OTTAWA, ONTARIO
CANADA K2B 8K2
T: 613-829-2800
F: 613-829-8299
WWW.WSP.COM

ARCHITECT:
KPMB ARCHITECTS
351 KING STREET EAST, SUITE 1200
TORONTO, ONTARIO
CANADA M5A 0L6
T: 416-977-5104

SEAL:
LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2025-02-28
PROVINCE OF ONTARIO

NORTH

CLIENT:
KINDRED WORKS

CLIENT REF. #:

PROJECT:
QUEENSWOOD COMMONS

KEY PLAN:

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
6		2025-02-28	RE-ISSUED FOR SPA
5		2025-02-10	ISSUED FOR BUILDING PERMIT
4		2024-11-05	RE-ISSUED FOR SPA AND ZBLA
3		2023-02-28	RE-ISSUED FOR SPA AND ZBLA
2		2022-10-14	RE-ISSUED FOR SPA AND ZBLA
1		2021-11-30	ISSUED FOR SPA AND ZBLA

PROJECT NO.: 211-12127-00
DATE: FEBRUARY 2025
ORIGINAL SCALE: 1:300
DESIGNED BY: DY
DRAWN BY: JT
CHECKED BY: DY
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm

DISCIPLINE: CIVIL

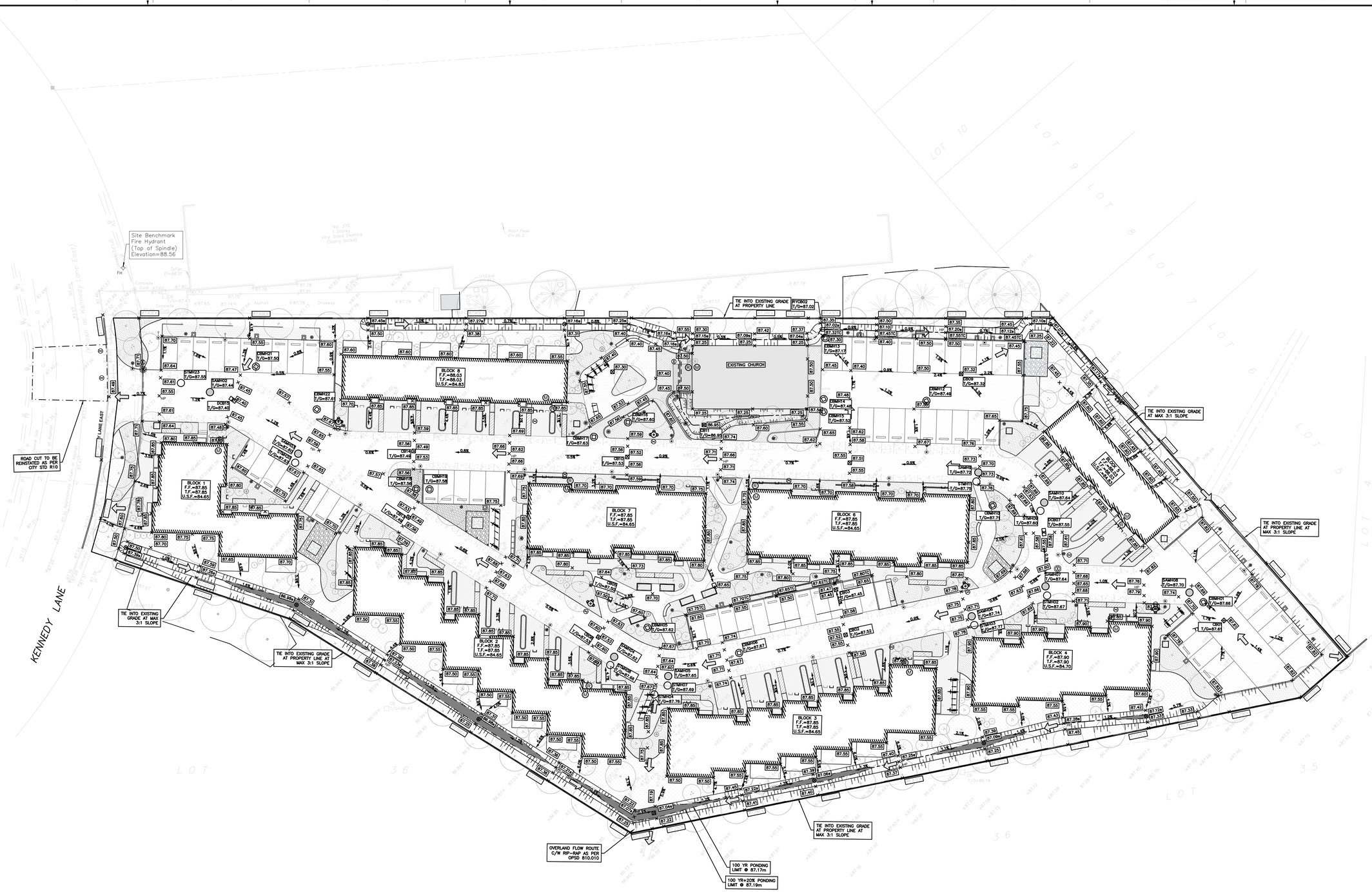
TITLE: DRAWING AREA PLAN

SHEET NUMBER: C06
SHEET #: 6 OF 8

ISSUE: RE-ISSUED FOR SPA
DATE OF: 2025-02-28
REV #: 0

D07-12-22-0002

#18692



wsp
2011 QUEENSVIEW DR.
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ARCHITECT:
KPMB ARCHITECTS
351 KING STREET EAST, SUITE 1200
TORONTO, ONTARIO
CANADA M5A 0L6
T: 416-977-5104

SEAL:
LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2025-02-28
PROVINCE OF ONTARIO

NORTH

CLIENT:
KINDRED WORKS

CLIENT REF. #:

PROJECT:
QUEENSWOOD COMMONS

KEY PLAN:

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
6		2025-02-28	RE-ISSUED FOR SPA
5		2025-02-10	ISSUED FOR BUILDING PERMIT
4		2024-11-05	RE-ISSUED FOR SPA AND ZBLA
3		2023-02-28	RE-ISSUED FOR SPA AND ZBLA
2		2022-10-14	RE-ISSUED FOR SPA AND ZBLA
1		2021-11-30	ISSUED FOR SPA AND ZBLA

PROJECT NO.: 211-12127-00
DATE: FEBRUARY 2025
ORIGINAL SCALE: 1:300
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm
DESIGNED BY: DY
DRAWN BY: JT
CHECKED BY: DY

DISCIPLINE: CIVIL

TITLE: GRADING PLAN

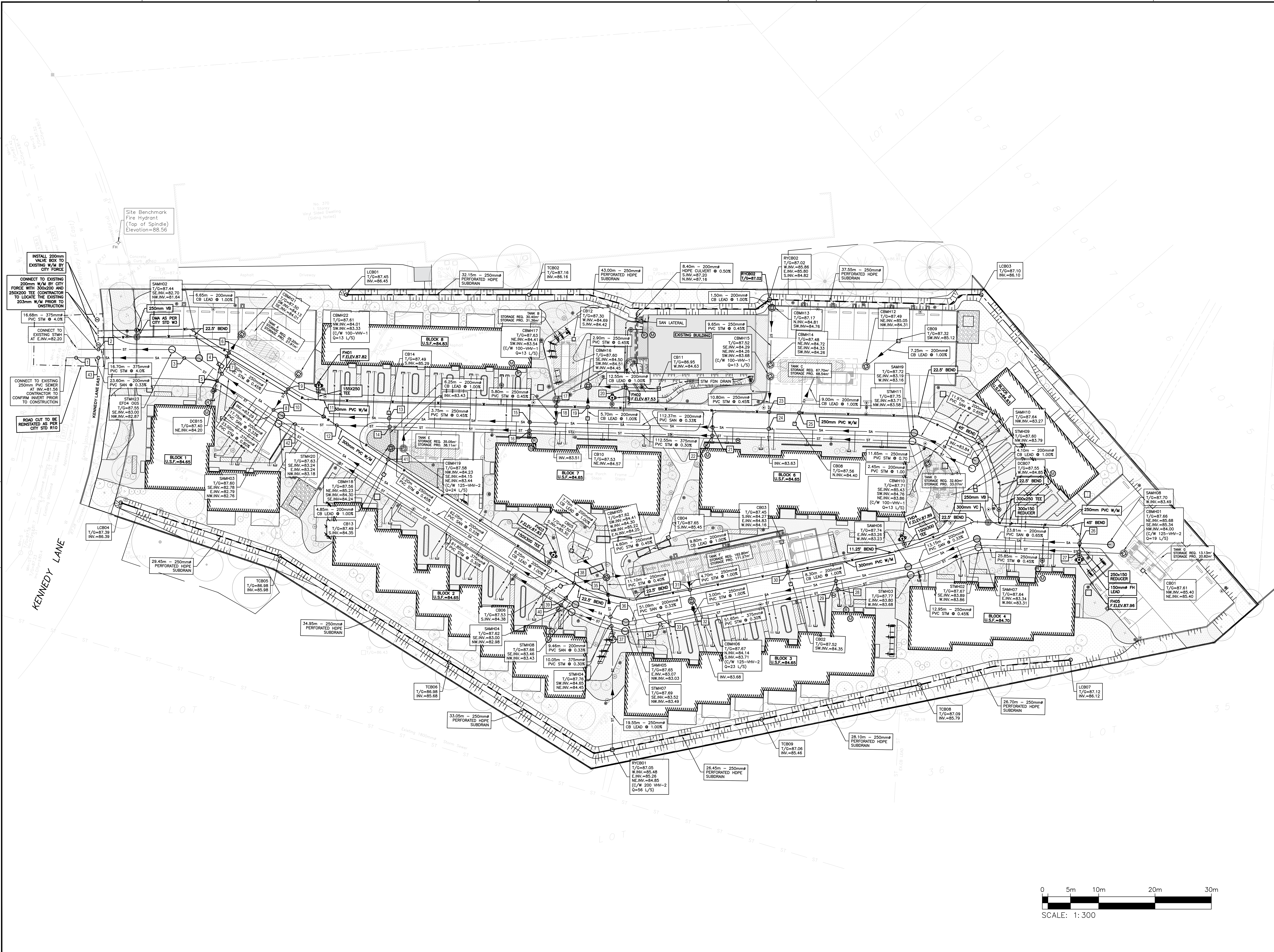
SHEET NUMBER: C04
SHEET #: 4 OF 8

ISSUE: RE-ISSUED FOR SPA
DATE OF: 2025-02-28
REV #: 0

V:\10-1\ME 2021 Projects\211-12127-00 Queenswood United Church\3. Drawings\Working drawings\211-12127-00_C.dwg Feb 28, 2025-2:36pm BY (CA\JT074512)

D07-12-22-0002

#18692



wsp

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LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2025-02-28
PROVINCE OF ONTARIO

NORTH

CLIENT:

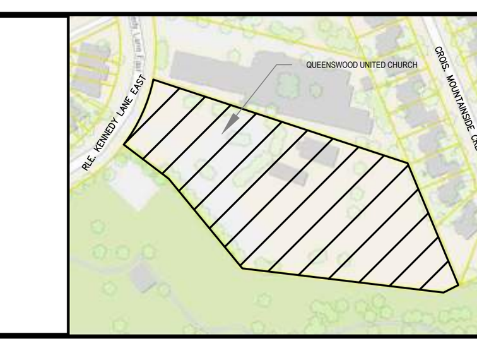
KINDRED WORKS

CLIENT REF. #:

PROJECT:

QUEENSWOOD COMMONS

KEY PLAN:



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ISSUED FOR - REVISION:

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6		2025-02-28	RE-ISSUED FOR SPA
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PROJECT NO: 211-12127-00
DATE: FEBRUARY 2025
ORIGINAL SCALE: 1:300
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm
DESIGNED BY: DY
DRAWN BY: JT
CHECKED BY: DY

DISCIPLINE: CIVIL

TITLE:

SERVICING PLAN

SHEET NUMBER: C05
SHEET #: 5 OF 8

ISSUE: RE-ISSUED FOR SPA
DATE OF: 2025-02-28
REV #: 0

D07-12-22-0002

#18692

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER:	HAIDER NASRULLAH 647-850-9417 HAIDER.NASRULLAH@ADSPIPE.COM
ADS SALES REP:	HASSAN ELMI +1 416 985 9757 HASSAN.ELMI@ADSPIPE.COM
PROJECT NO:	S315753
ADS SITE COORDINATOR:	RYAN RUBENSTEIN 519-710-3687 RYAN.RUBENSTEIN@ADS-PIPE.COM

Advanced Drainage Systems, Inc.

ADS SiteAssist™
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360 KENNEDY LANE EAST

OTTAWA, ON

MC-4500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-4500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 75 mm (3").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-4500 CHAMBER SYSTEM

1. STORMTECH MC-4500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 230 mm (9") SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE WELL GRADED BETWEEN ¾" AND 2" (20-50 mm).
9. STONE SHALL BE BROUGHT UP EVENLY AROUND CHAMBERS SO AS NOT TO DISTORT THE CHAMBER SHAPE. STONE DEPTHS SHOULD NEVER DIFFER BY MORE THAN 300 mm (12") BETWEEN ADJACENT CHAMBER ROWS.
10. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
11. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIAL BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
12. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-4500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-4500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

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MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 75 mm (3").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE WELL GRADED BETWEEN ¾" AND 2" (20-50 mm)..
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

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SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 20-50 mm (3/4-2").
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT - TANK A

4	STORMTECH MC-4500 CHAMBERS
2	STORMTECH MC-4500 END CAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
40	% STONE VOID
26.0	**INSTALLED SYSTEM VOLUME (m^3) BELOW ELEVATION 85.63 (PERIMETER STONE INCLUDED)**
23.5	SYSTEM AREA (m^2)
20.9	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS - TANK A

87.660	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):
86.288	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):
86.136	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):
86.136	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):
86.136	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):
85.831	TOP OF STONE:
85.526	TOP OF MC-4500 CHAMBER:
84.060	600 mm ISOLATOR ROW PLUS INVERT:
84.002	BOTTOM OF MC-4500 CHAMBER:
83.773	BOTTOM OF STONE:

NOTES

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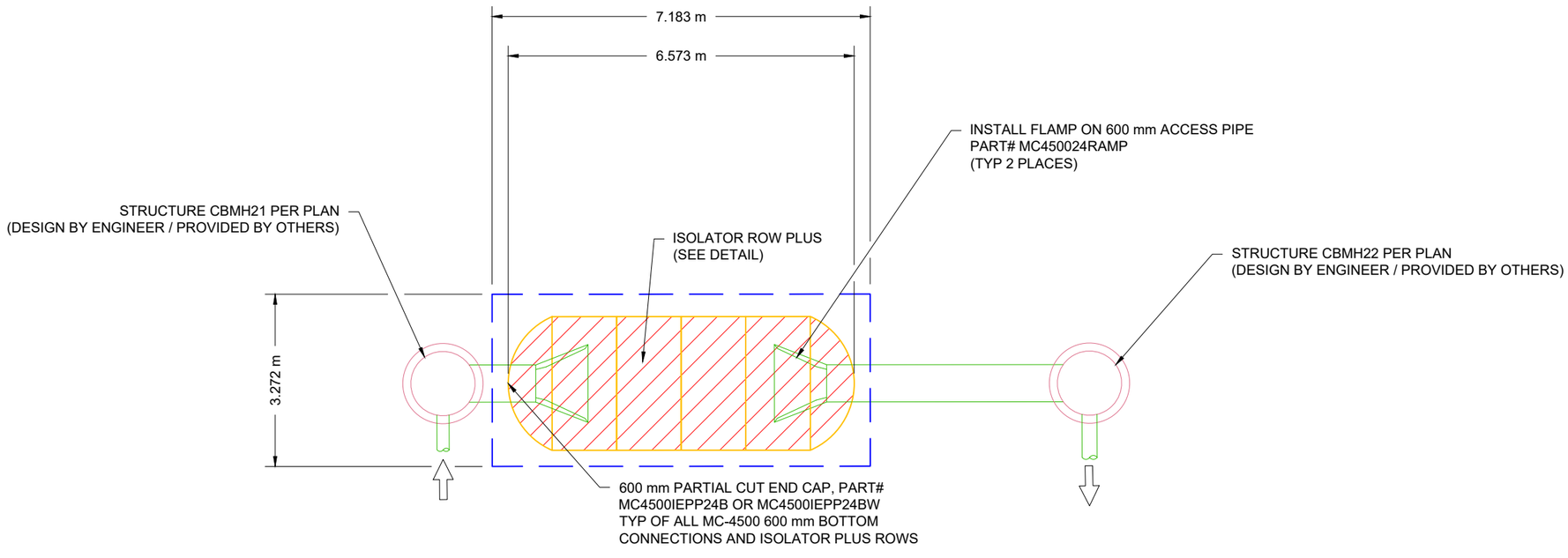

360 KENNEDY LANE EAST
OTTAWA, ON

DATE: 1-13-23 | DRAWN: BRE
PROJECT #: S315753 | CHECKED: JMQ

DATE	DRWN	CHKD	DESCRIPTION
02/24/23	RCT	RCT	REVISED PER MARKED UP NEW PLAN

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Chamber System
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4640 TRUEMAN BLVD
HILLIARD, OH 43026

SCALE = 1 : 100

PROPOSED LAYOUT - TANK B

10	STORMTECH SC-740 CHAMBERS
6	STORMTECH SC-740 END CAPS
350	STONE ABOVE (mm)
152	STONE BELOW (mm)
40	% STONE VOID
31.3	**INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED)**
46.4	SYSTEM AREA (m²)
30.5	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS - TANK B

87.575	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):
85.747	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):
85.594	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):
85.594	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):
85.594	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):
85.487	TOP OF STONE:
85.137	TOP OF SC-740 CHAMBER:
84.692	300 mm TOP MANIFOLD INVERT:
84.415	450 mm BOTTOM CONNECTION INVERT:
84.378	600 mm ISOLATOR ROW PLUS INVERT:
84.375	BOTTOM OF SC-740 CHAMBER:
84.223	BOTTOM OF STONE:

NOTES

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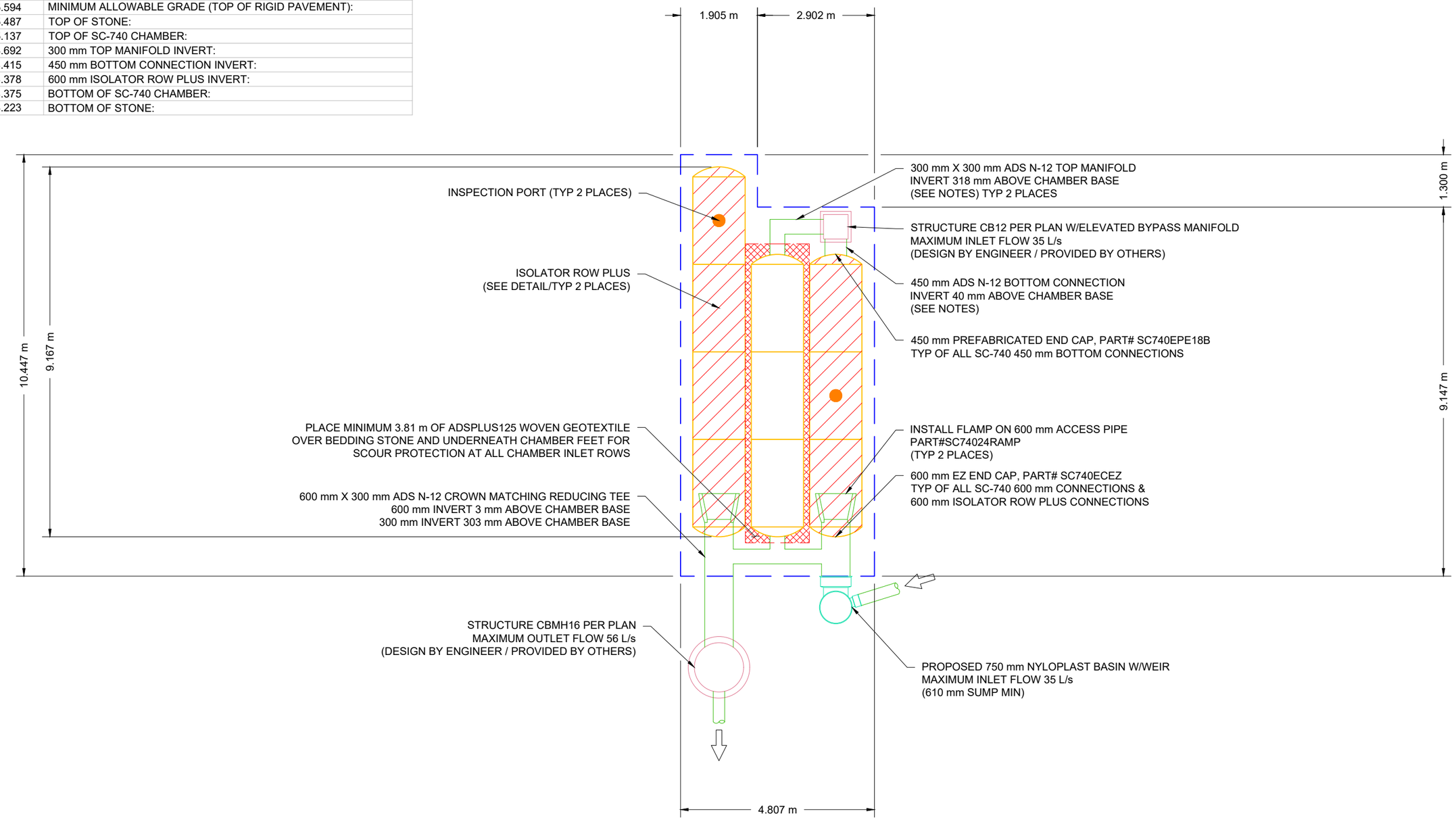

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PROPOSED LAYOUT - TANK C

9	STORMTECH MC-3500 CHAMBERS
6	STORMTECH MC-3500 END CAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
40	% STONE VOID
68.5	**INSTALLED SYSTEM VOLUME (m³) BELOW ELEVATION 85.85 (PERIMETER STONE INCLUDED)**
74.9	SYSTEM AREA (m²)
41.2	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS - TANK C

87.839	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):
86.011	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):
85.858	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):
85.858	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):
85.858	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):
85.706	TOP OF STONE:
85.401	TOP OF MC-3500 CHAMBER:
84.929	300 mm TOP MANIFOLD / CONNECTION INVERT:
84.644	300 mm CUSTOM INVERT MANIFOLD:
84.310	600 mm ISOLATOR ROW PLUS INVERT:
84.292	300 mm BOTTOM CONNECTION INVERT:
84.258	BOTTOM OF MC-3500 CHAMBER:
84.029	BOTTOM OF STONE:

NOTES

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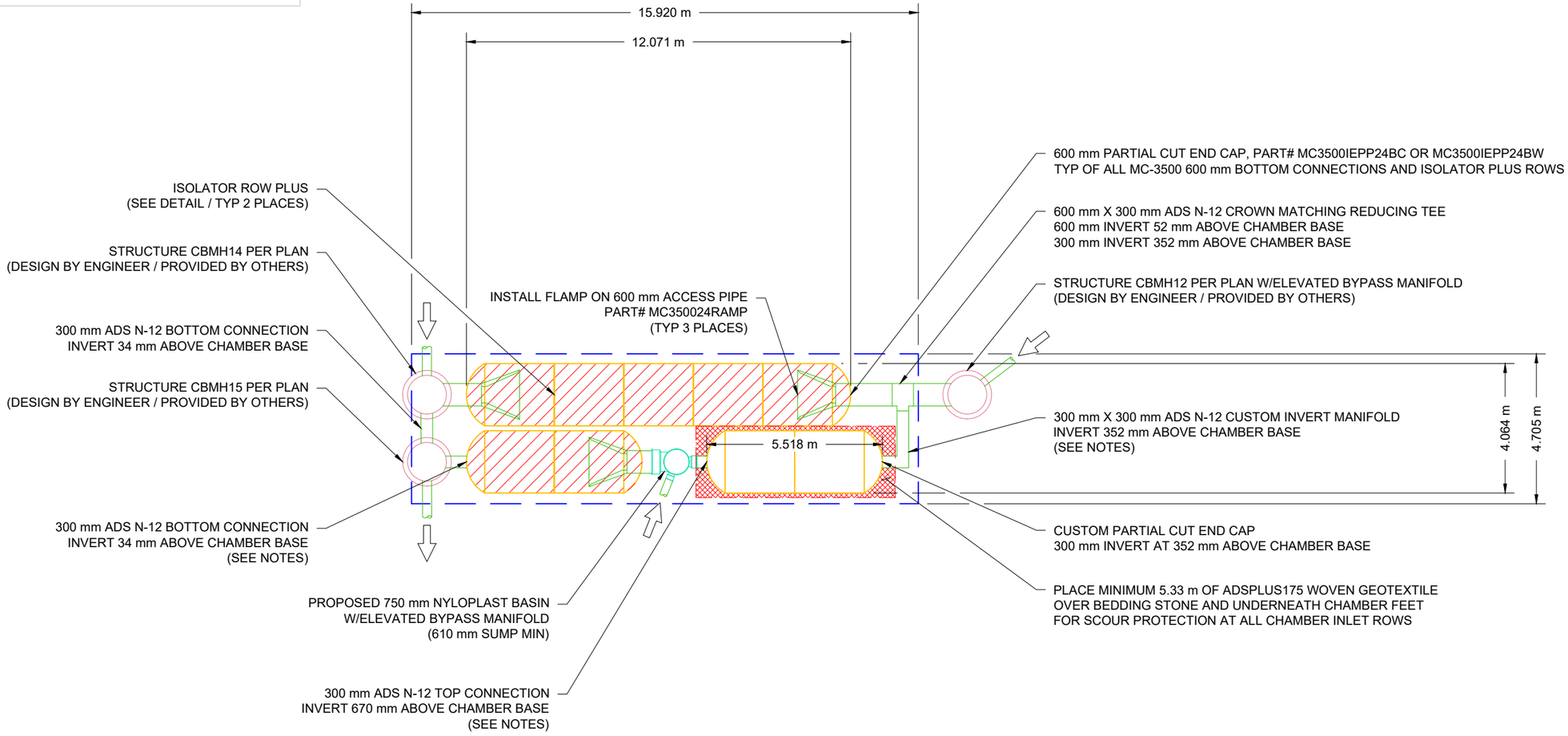

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SCALE = 1 : 150

PROPOSED LAYOUT - TANK D

3	STORMTECH MC-3500 CHAMBERS
6	STORMTECH MC-3500 END CAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
40	% STONE VOID
33.1	**INSTALLED SYSTEM VOLUME (m³) BELOW ELEVATION 86.37 (PERIMETER STONE INCLUDED)**
38.7	SYSTEM AREA (m²)
26.7	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS - TANK D

88.339	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):
86.511	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):
86.358	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):
86.358	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):
86.358	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):
86.206	TOP OF STONE:
85.901	TOP OF MC-3500 CHAMBER:
85.429	300 mm TOP MANIFOLD INVERT:
84.810	600 mm ISOLATOR ROW PLUS INVERT:
84.758	BOTTOM OF MC-3500 CHAMBER:
84.529	BOTTOM OF STONE:

NOTES

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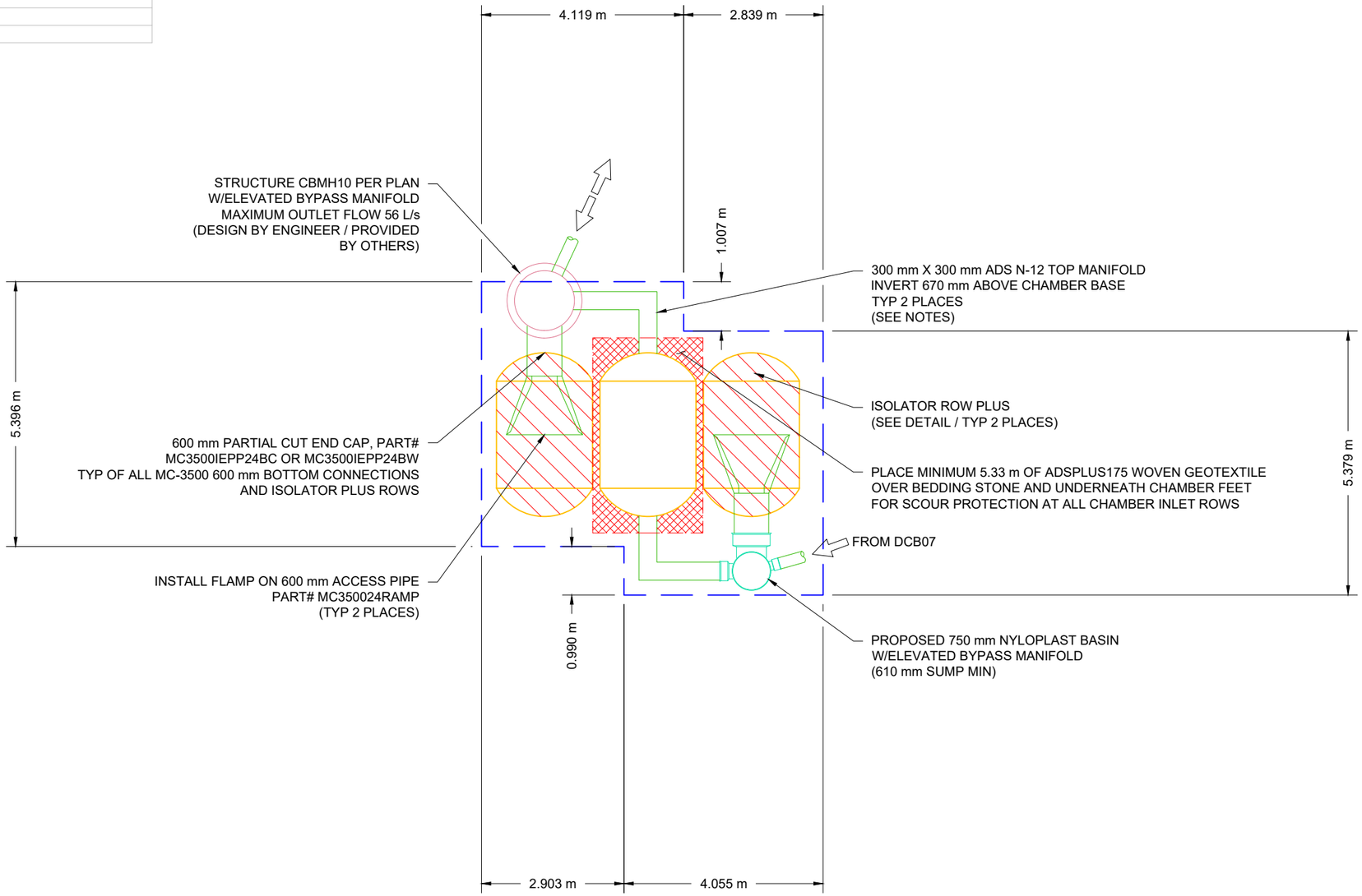

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PROPOSED LAYOUT - TANK E

6	STORMTECH MC-4500 CHAMBERS
2	STORMTECH MC-4500 END CAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
40	% STONE VOID
35.1	**INSTALLED SYSTEM VOLUME (m^3) BELOW ELEVATION 85.74 (PERIMETER STONE INCLUDED)**
31.5	SYSTEM AREA (m^2)
25.8	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS - TANK E

87.810	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):
86.438	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):
86.286	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):
86.286	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):
86.286	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):
85.981	TOP OF STONE:
85.676	TOP OF MC-4500 CHAMBER:
84.210	600 mm ISOLATOR ROW PLUS INVERT:
84.152	BOTTOM OF MC-4500 CHAMBER:
83.923	BOTTOM OF STONE:

NOTES

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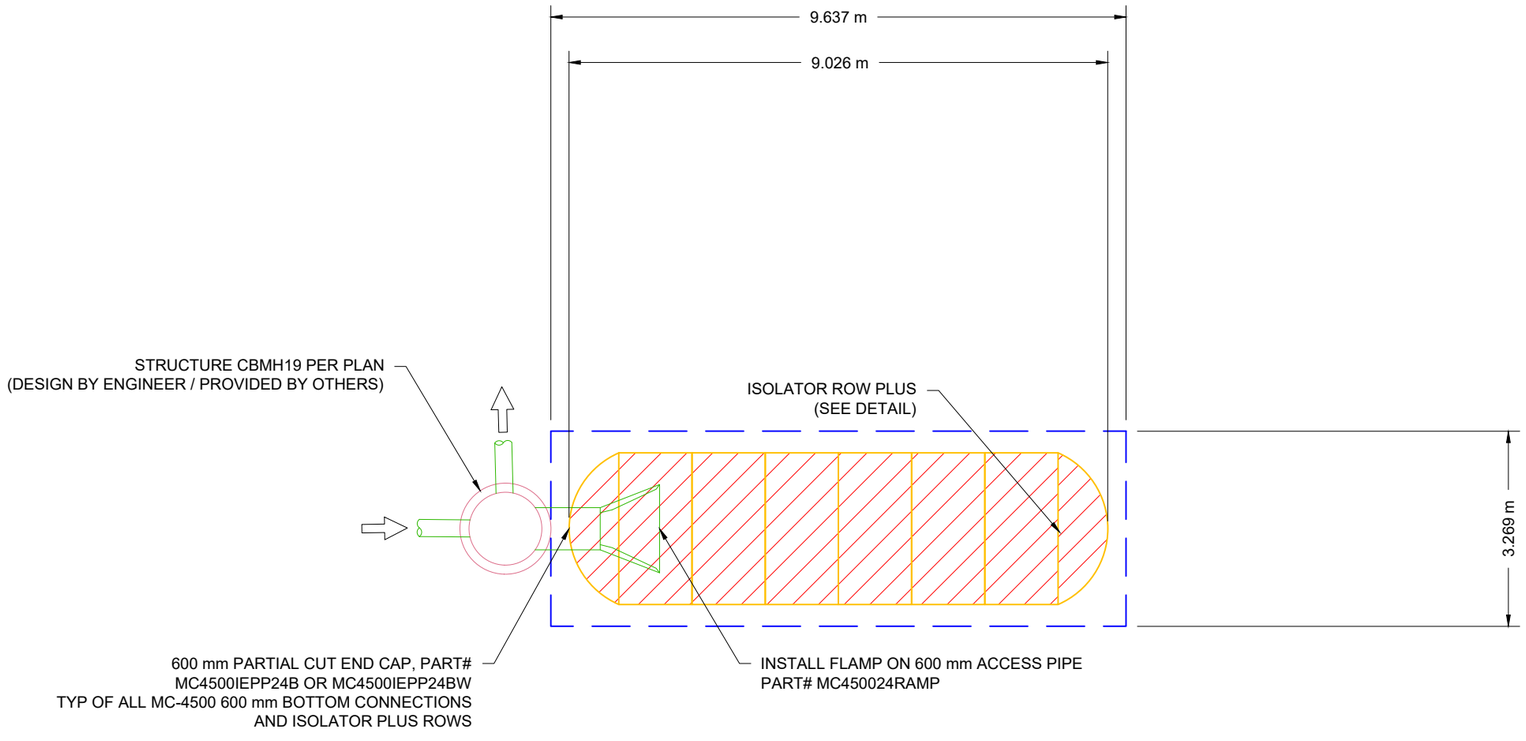

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PROPOSED LAYOUT - TANK F

27	STORMTECH MC-3500 CHAMBERS
10	STORMTECH MC-3500 END CAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
40	% STONE VOID
171.3	**INSTALLED SYSTEM VOLUME (m³) BELOW ELEVATION 85.69 (PERIMETER STONE INCLUDED)**
176.5	SYSTEM AREA (m²)
87.1	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS - TANK F

87.738	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):
85.910	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):
85.757	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):
85.757	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):
85.757	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):
85.605	TOP OF STONE:
85.300	TOP OF MC-3500 CHAMBER:
84.828	300 mm TOP MANIFOLD INVERT:
84.209	600 mm ISOLATOR ROW PLUS INVERT:
84.191	300 mm BOTTOM CONNECTION INVERT:
84.157	BOTTOM OF MC-3500 CHAMBER:
83.928	BOTTOM OF STONE:

NOTES

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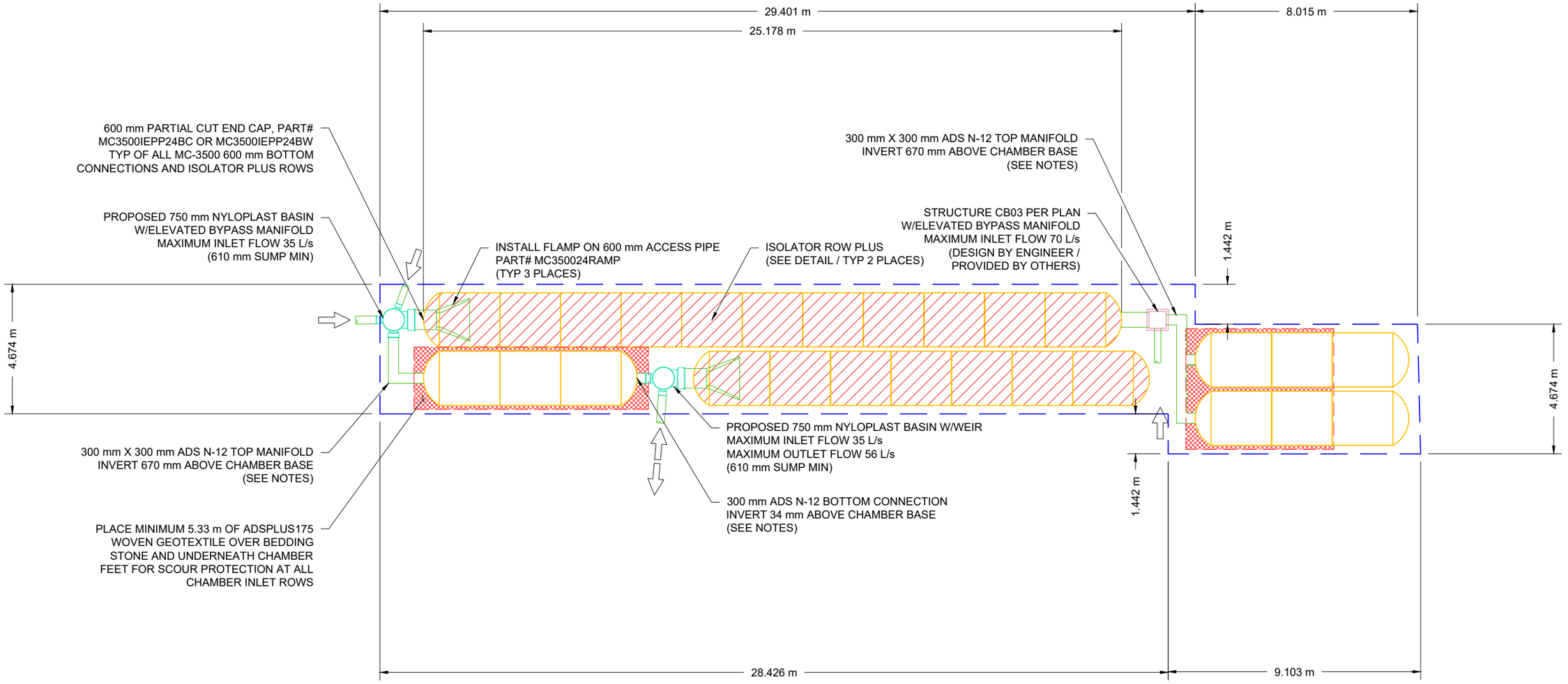

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PROPOSED LAYOUT - TANK G

6	STORMTECH SC-740 CHAMBERS
8	STORMTECH SC-740 END CAPS
152	STONE ABOVE (mm)
152	STONE BELOW (mm)
40	% STONE VOID
20.8	**INSTALLED SYSTEM VOLUME (m³) (PERIMETER STONE INCLUDED)**
37.8	SYSTEM AREA (m²)
27.3	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS - TANK G

88.557	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):
86.729	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):
86.576	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):
86.576	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):
86.576	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT):
86.271	TOP OF STONE:
86.119	TOP OF SC-740 CHAMBER:
85.674	300 mm TOP MANIFOLD INVERT:
85.397	450 mm BOTTOM CONNECTION INVERT:
85.360	600 mm ISOLATOR ROW PLUS INVERT:
85.357	BOTTOM OF SC-740 CHAMBER:
85.205	BOTTOM OF STONE:

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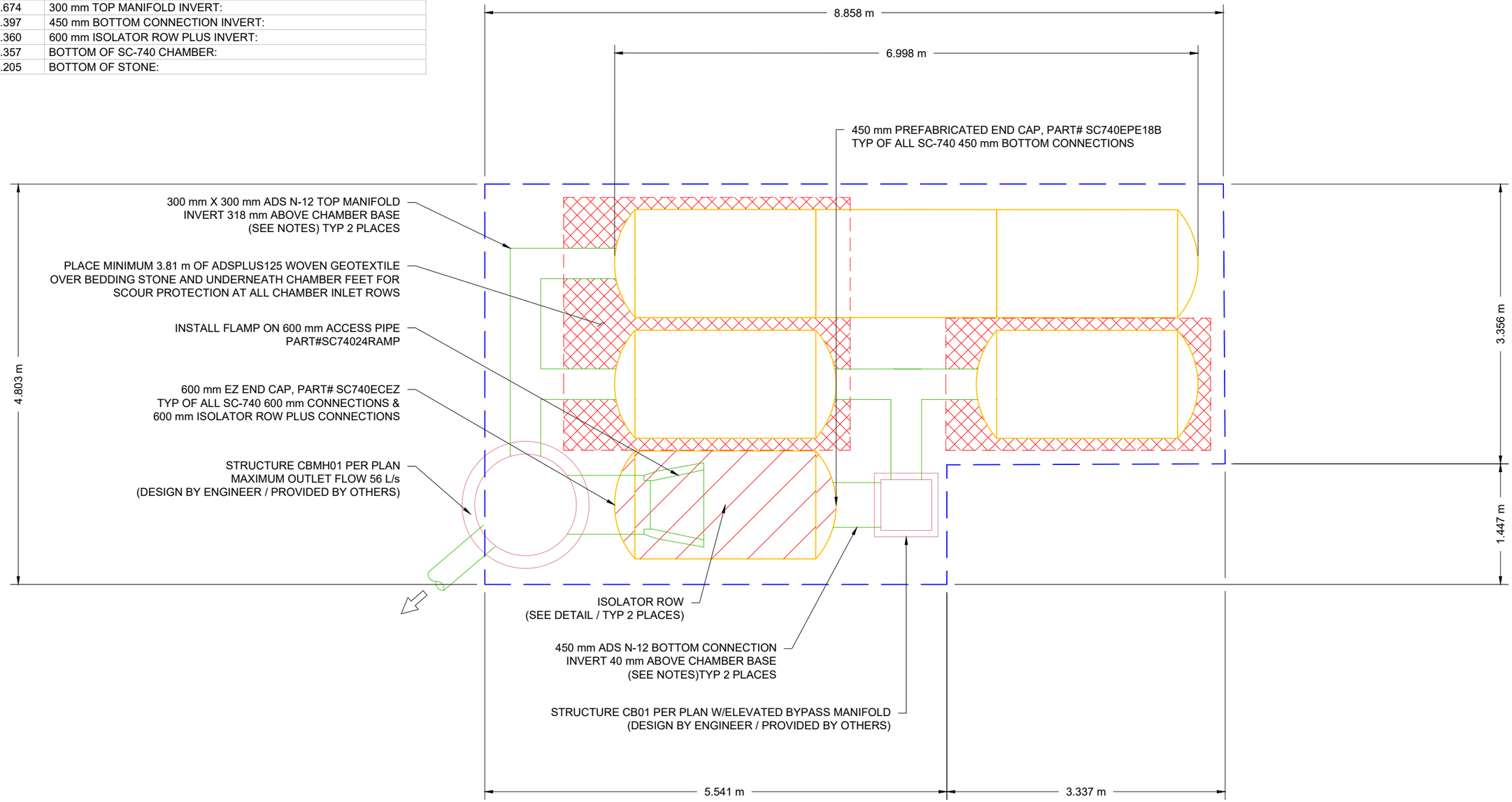

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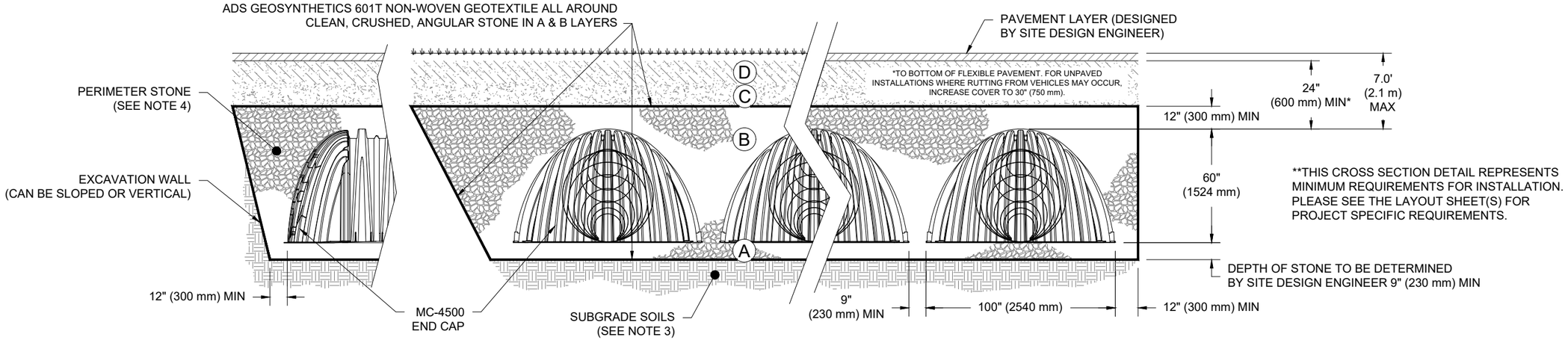
SHEET 10 OF 19

ACCEPTABLE FILL MATERIALS: STORMTECH MC-4500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 60x101
2. MC-4500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

360 KENNEDY LANE EAST
OTTAWA, ON

DATE: 1-13-23 | DRAWN: BRE
PROJECT #: S315753 | CHECKED: JMQ

DATE	DRWN	CHKD	DESCRIPTION
02/24/23	RCT	RCT	REVISED PER MARKED UP NEW PLAN

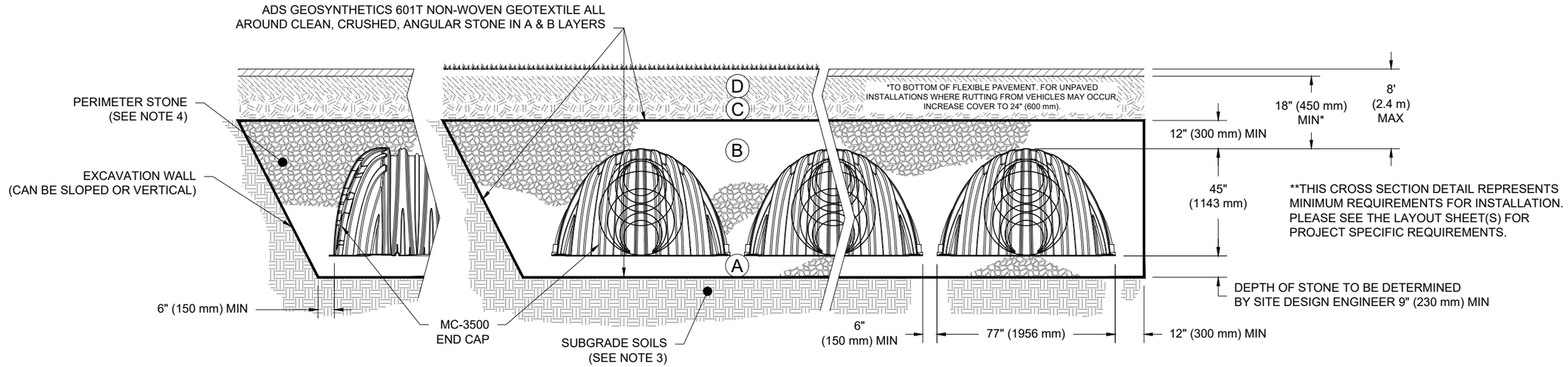
StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

360 KENNEDY LANE EAST
OTTAWA, ON

DATE: 1-13-23 | DRAWN: BRE
PROJECT #: S315753 | CHECKED: JMQ

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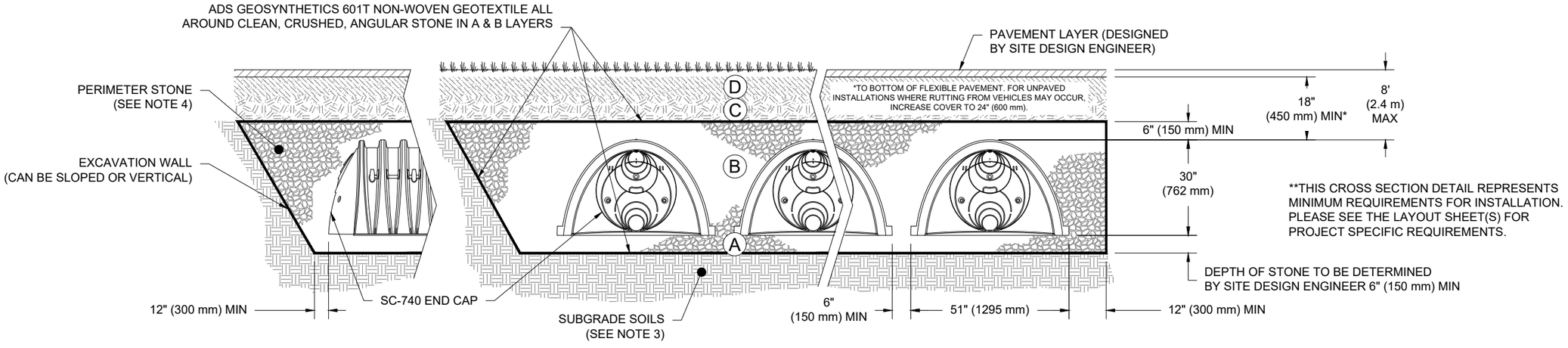
StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
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   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

360 KENNEDY LANE EAST
OTTAWA, ON

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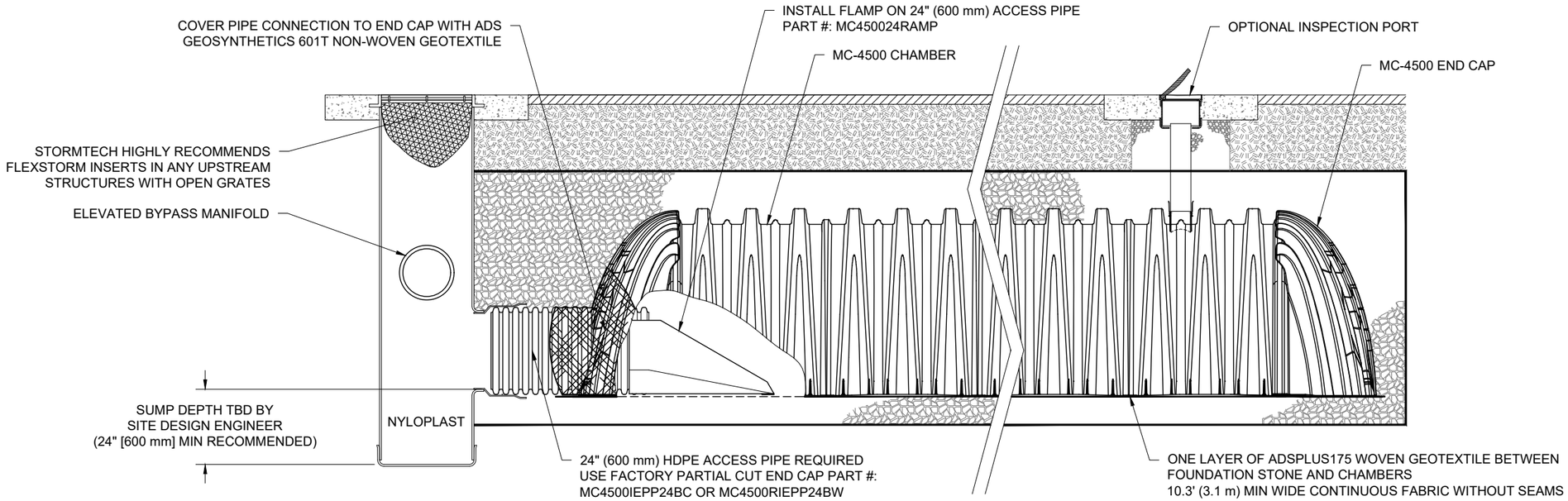
4640 TRUEMAN BLVD
HILLIARD, OH 43026

THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.



MC-4500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

360 KENNEDY LANE EAST
OTTAWA, ON

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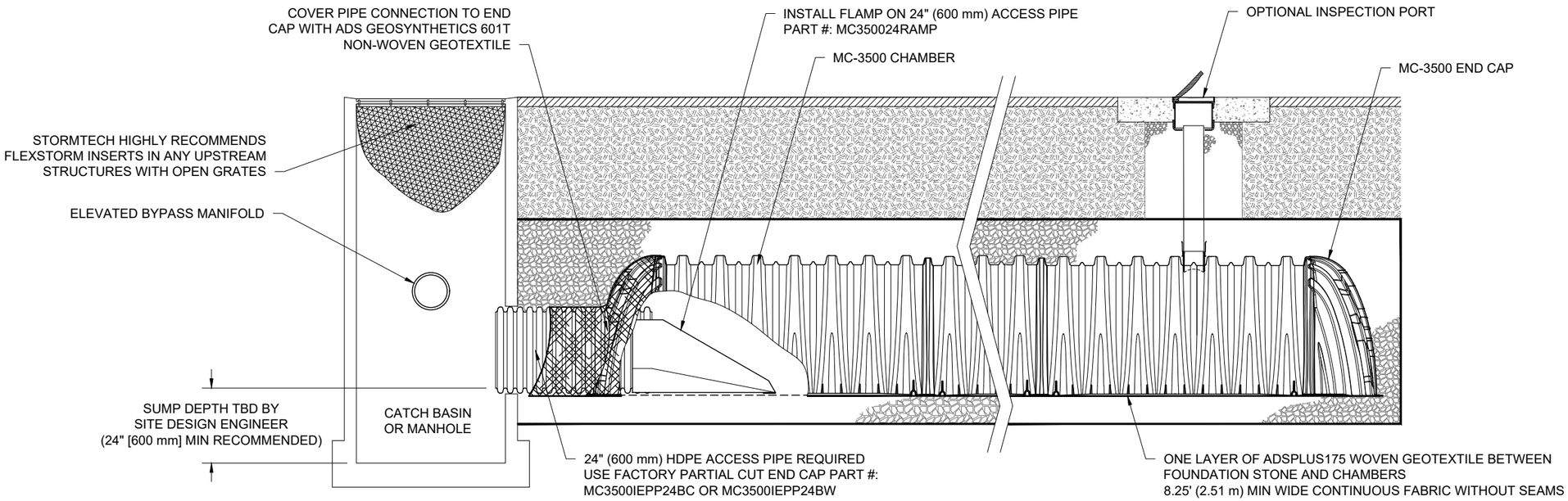

MC-3500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

360 KENNEDY LANE EAST
OTTAWA, ON

DATE: 1-13-23 | DRAWN: BRE
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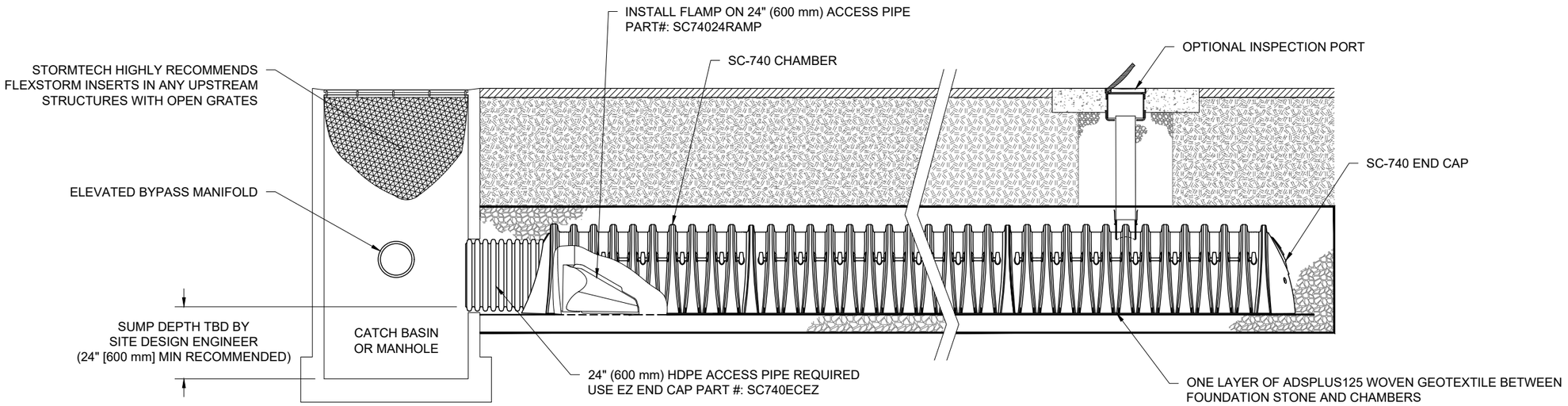


SC-740 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

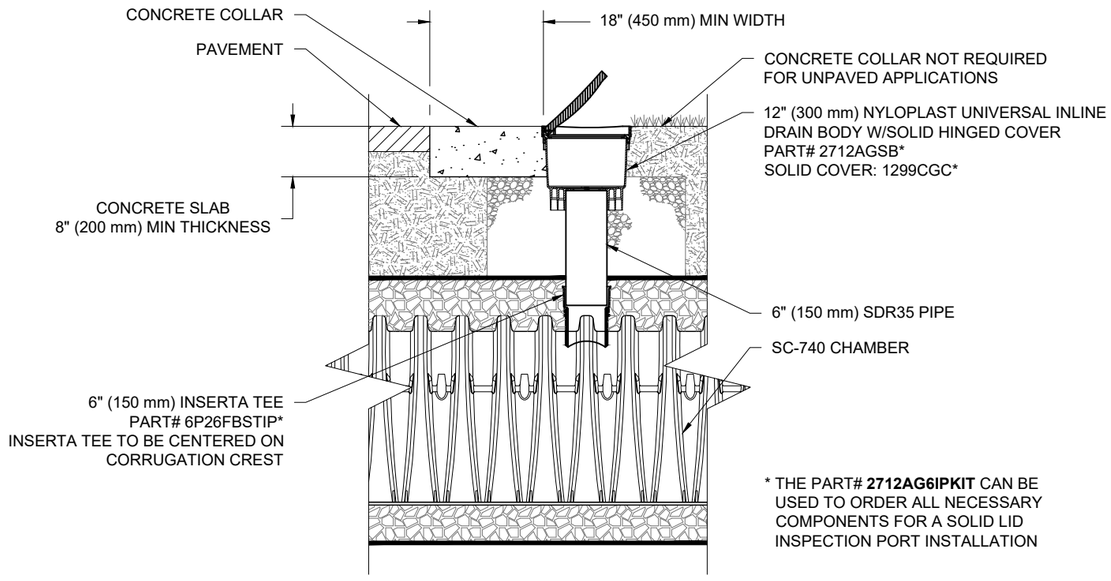
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



SC-740 6" (150 mm) INSPECTION PORT DETAIL
NTS

360 KENNEDY LANE EAST
OTTAWA, ON

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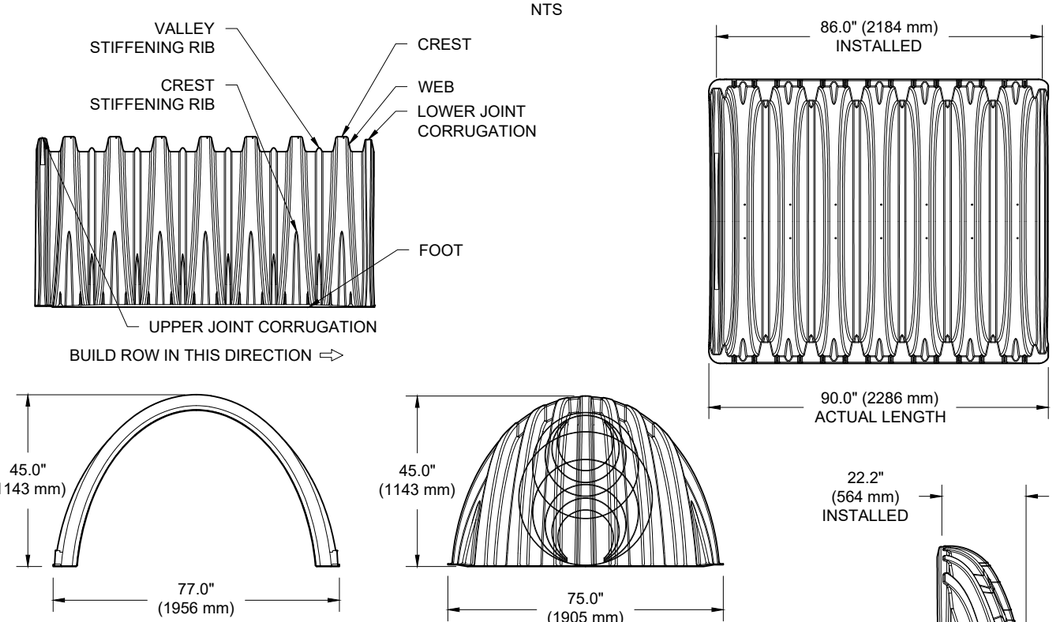
HILLIARD, OH 43026

MC-3500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m³)
WEIGHT	134 lbs.	(60.8 kg)

NOMINAL END CAP SPECIFICATIONS

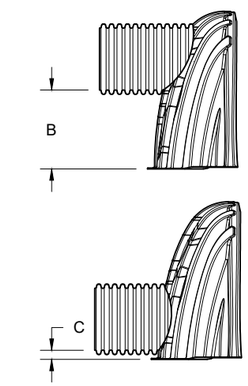
SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" (152 mm) STONE BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW			
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP18BW			
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW			
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP24BW			
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

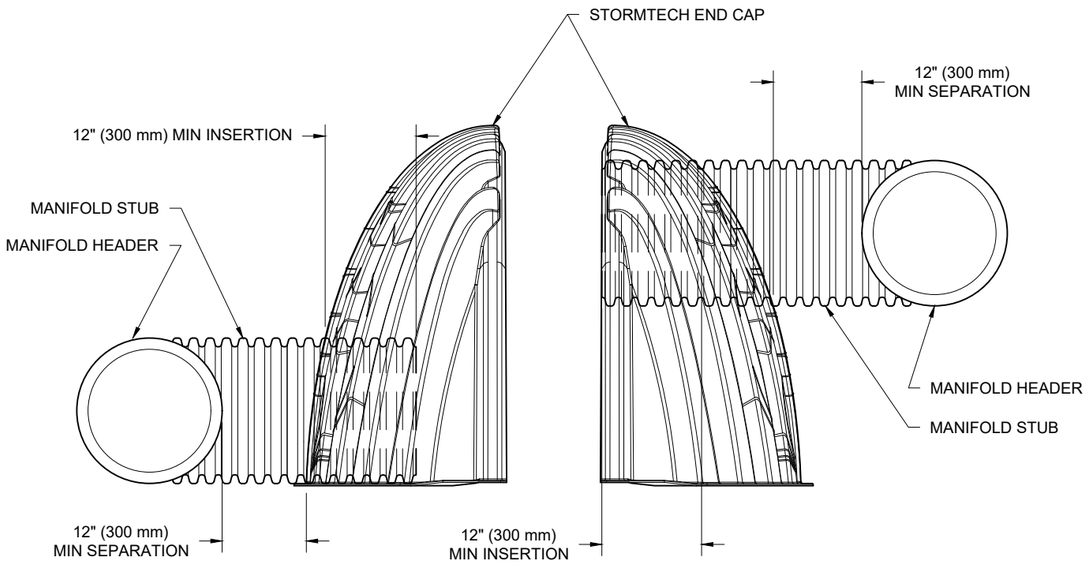
NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PARTIAL CUT INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

MC-SERIES END CAP INSERTION DETAIL

NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

360 KENNEDY LANE EAST
OTTAWA, ON

DATE: 1-13-23 | DRAWN: BRE
PROJECT #: S315753 | CHECKED: JMQ

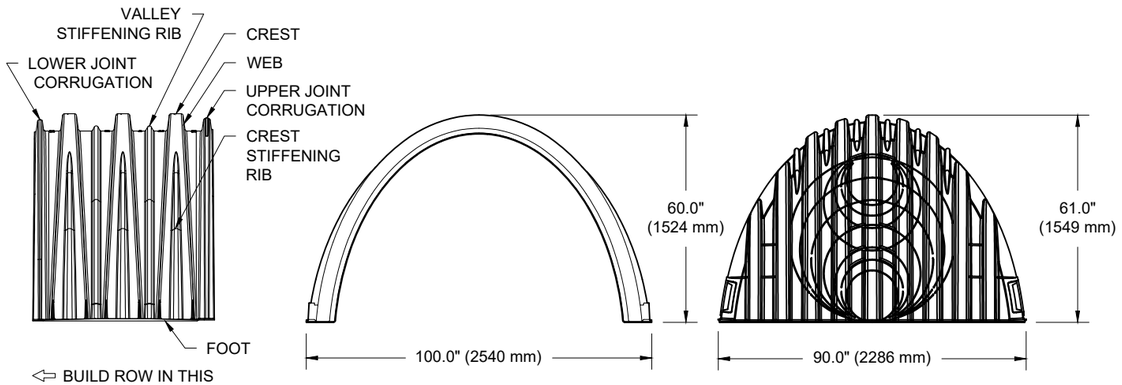
DATE	DRWN	CHKD	DESCRIPTION
02/24/23	RCT	RCT	REVISED PER MARKED UP NEW PLAN

StormTech® Chamber System
888-892-2694 | WWW.STORMTECH.COM

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026

MC-4500 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	100.0" X 60.0" X 48.3"	(2540 mm X 1524 mm X 1227 mm)
CHAMBER STORAGE	106.5 CUBIC FEET	(3.01 m³)
MINIMUM INSTALLED STORAGE*	162.6 CUBIC FEET	(4.60 m³)
WEIGHT (NOMINAL)	125.0 lbs.	(56.7 kg)

NOMINAL END CAP SPECIFICATIONS

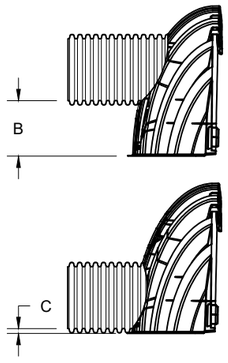
SIZE (W X H X INSTALLED LENGTH)	90.0" X 61.0" X 32.8"	(2286 mm X 1549 mm X 833 mm)
END CAP STORAGE	39.5 CUBIC FEET	(1.12 m³)
MINIMUM INSTALLED STORAGE*	115.3 CUBIC FEET	(3.26 m³)
WEIGHT (NOMINAL)	90 lbs.	(40.8 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION AND BETWEEN CHAMBERS, 12" (305 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY.

PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC4500IEPP06T	6" (150 mm)	42.54" (1081 mm)	---
MC4500IEPP06B		---	0.86" (22 mm)
MC4500IEPP08T	8" (200 mm)	40.50" (1029 mm)	---
MC4500IEPP08B		---	1.01" (26 mm)
MC4500IEPP10T	10" (250 mm)	38.37" (975 mm)	---
MC4500IEPP10B		---	1.33" (34 mm)
MC4500IEPP12T	12" (300 mm)	35.69" (907 mm)	---
MC4500IEPP12B		---	1.55" (39 mm)
MC4500IEPP15T	15" (375 mm)	32.72" (831 mm)	---
MC4500IEPP15B		---	1.70" (43 mm)
MC4500IEPP18T	18" (450 mm)	29.36" (746 mm)	---
MC4500IEPP18TW			
MC4500IEPP18B		---	1.97" (50 mm)
MC4500IEPP18BW			
MC4500IEPP24T	24" (600 mm)	23.05" (585 mm)	---
MC4500IEPP24TW			
MC4500IEPP24B		---	2.26" (57 mm)
MC4500IEPP24BW			
MC4500IEPP30BW	30" (750 mm)	---	2.95" (75 mm)
MC4500IEPP36BW	36" (900 mm)	---	3.25" (83 mm)
MC4500IEPP42BW	42" (1050 mm)	---	3.55" (90 mm)

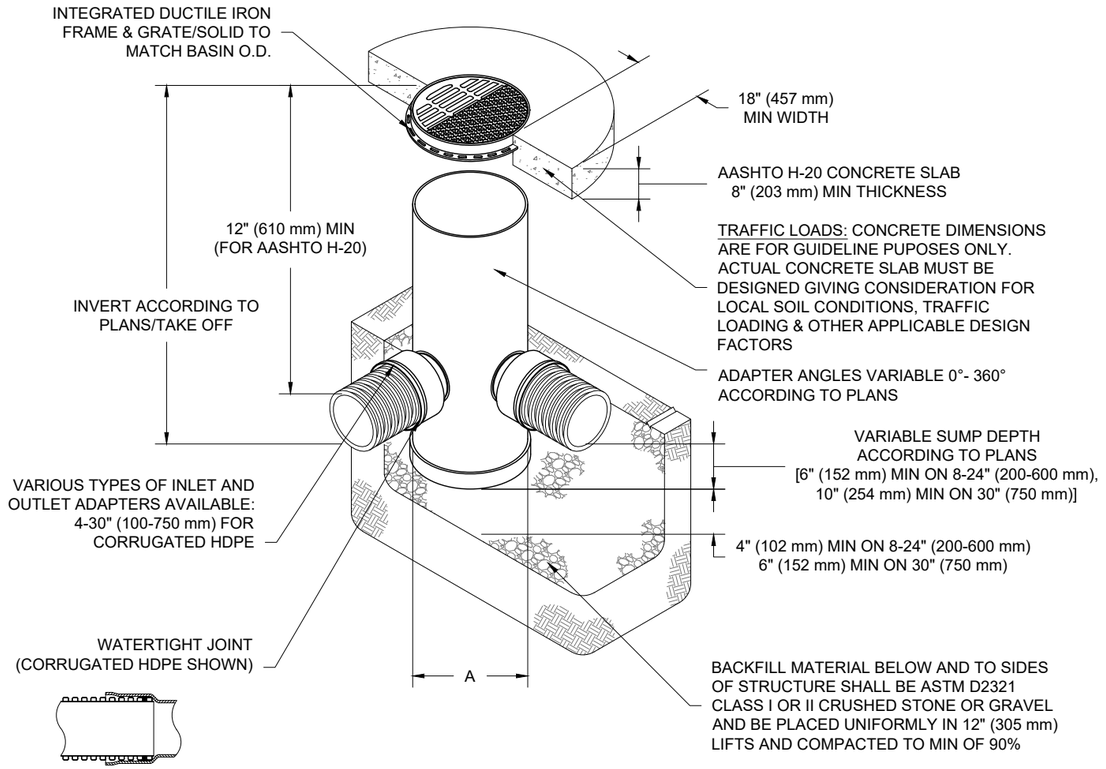
NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PREFABRICATED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-4500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

NYLOPLAST DRAIN BASIN

NTS



NOTES

1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

360 KENNEDY LANE EAST
OTTAWA, ON

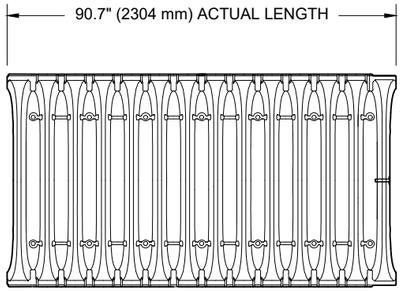
DATE: 1-13-23 | DRAWN: BRE
PROJECT #: S315753 | CHECKED: JMQ

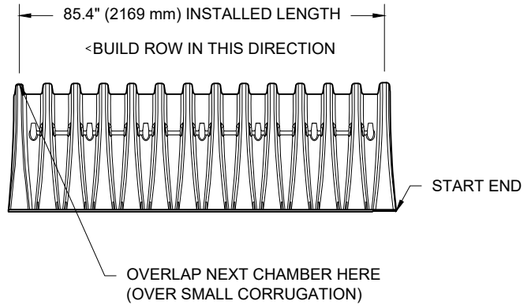
DATE	DRWN	CHKD	DESCRIPTION
02/24/23	RCT	RCT	REVISED PER MARKED UP NEW PLAN

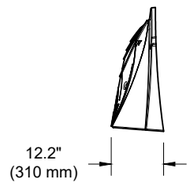
Nyloplast®
770-932-2443 | WWW.NYLOPLAST-US.COM
4640 TRUEMAN BLVD
HILLIARD, OH 43026
ADS

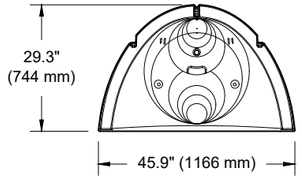
SC-740 TECHNICAL SPECIFICATION

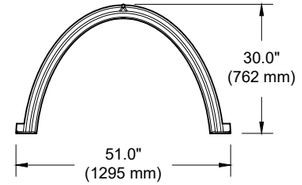
NTS







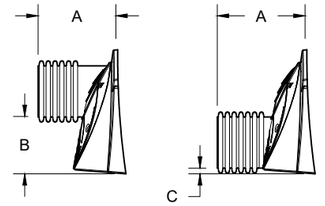




NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE-CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T /SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740ECEZ*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740ECEZ THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

360 KENNEDY LANE EAST
OTTAWA, ON

DATE: 1-13-23 | DRAWN: BRE
PROJECT #: S315753 | CHECKED: JMQ

DATE	DRWN	CHKD	DESCRIPTION
02/24/23	RCT	RCT	REVISED PER MARKED UP NEW PLAN

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026

TANK A

TANK B

TANK C

FD-4HC

TANK D

TANK E

TANK G

TANK F

Project: 360 Kennedy-TANK A

Chamber Model -	MC-4500	
Units -	**Metric**	
Number of Chambers -	4	
Number of End Caps -	2	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	83.77	m
Amount of Stone Above Chambers -	305	mm
Amount of Stone Below Chambers -	229	mm
	23.5	sq.meters

Min. Area - 19.89 sq.meters

☑ Include Perimeter Stone in Calculations

☐ Click for Stage Area Data

☐ Click to Invert Stage Area Data

Click Here for Imperial

StormTech MC-4500 Cumulative Storage Volumes

Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Single End Cap (cubic meters)	Incremental Chambers (cubic meters)	Incremental End Cap (cubic meters)	Incremental Stone (cubic meters)	Incremental Ch, EC and Stone (cubic meters)	Cumulative System (cubic meters)	Elevation (meters)
2057	0.00	0.00	0.00	0.00	0.239	0.24	27.91	85.83
2032	0.00	0.00	0.00	0.00	0.239	0.24	27.67	85.81
2007	0.00	0.00	0.00	0.00	0.239	0.24	27.43	85.78
1981	0.00	0.00	0.00	0.00	0.239	0.24	27.20	85.75
1956	0.00	0.00	0.00	0.00	0.239	0.24	26.96	85.73
1930	0.00	0.00	0.00	0.00	0.239	0.24	26.72	85.70
1905	0.00	0.00	0.00	0.00	0.239	0.24	26.48	85.68
1880	0.00	0.00	0.00	0.00	0.239	0.24	26.24	85.65
1854	0.00	0.00	0.00	0.00	0.239	0.24	26.00	85.63
1829	0.00	0.00	0.00	0.00	0.239	0.24	25.76	85.60
1803	0.00	0.00	0.00	0.00	0.239	0.24	25.53	85.58
1778	0.00	0.00	0.00	0.00	0.239	0.24	25.29	85.55
1753	0.00	0.00	0.00	0.00	0.236	0.24	25.05	85.53
1727	0.00	0.00	0.01	0.00	0.233	0.25	24.81	85.50
1702	0.00	0.00	0.02	0.00	0.230	0.25	24.56	85.47
1676	0.01	0.00	0.02	0.00	0.228	0.26	24.31	85.45
1651	0.01	0.00	0.03	0.00	0.225	0.26	24.05	85.42
1626	0.01	0.00	0.05	0.01	0.216	0.27	23.79	85.40
1600	0.02	0.00	0.08	0.01	0.205	0.29	23.52	85.37
1575	0.02	0.00	0.09	0.01	0.199	0.30	23.23	85.35
1549	0.03	0.01	0.10	0.01	0.193	0.31	22.93	85.32
1524	0.03	0.01	0.11	0.01	0.188	0.31	22.63	85.30
1499	0.03	0.01	0.12	0.01	0.184	0.32	22.31	85.27
1473	0.03	0.01	0.13	0.02	0.180	0.33	21.99	85.25
1448	0.03	0.01	0.14	0.02	0.176	0.33	21.66	85.22
1422	0.04	0.01	0.15	0.02	0.172	0.34	21.33	85.20
1397	0.04	0.01	0.15	0.02	0.169	0.34	20.99	85.17
1372	0.04	0.01	0.16	0.02	0.166	0.35	20.65	85.14
1346	0.04	0.01	0.17	0.02	0.163	0.35	20.30	85.12
1321	0.04	0.01	0.17	0.02	0.160	0.36	19.95	85.09
1295	0.04	0.01	0.18	0.03	0.157	0.36	19.59	85.07
1270	0.05	0.01	0.18	0.03	0.154	0.37	19.23	85.04
1245	0.05	0.01	0.19	0.03	0.151	0.37	18.86	85.02
1219	0.05	0.02	0.19	0.03	0.149	0.37	18.49	84.99
1194	0.05	0.02	0.20	0.03	0.147	0.38	18.12	84.97
1168	0.05	0.02	0.20	0.03	0.144	0.38	17.74	84.94
1143	0.05	0.02	0.21	0.03	0.142	0.38	17.36	84.92
1118	0.05	0.02	0.21	0.04	0.140	0.39	16.98	84.89
1092	0.05	0.02	0.22	0.04	0.138	0.39	16.59	84.87
1067	0.05	0.02	0.22	0.04	0.136	0.39	16.20	84.84
1041	0.06	0.02	0.22	0.04	0.134	0.40	15.81	84.81
1016	0.06	0.02	0.23	0.04	0.132	0.40	15.42	84.79
991	0.06	0.02	0.23	0.04	0.130	0.40	15.02	84.76
965	0.06	0.02	0.23	0.04	0.128	0.40	14.62	84.74
940	0.06	0.02	0.24	0.04	0.127	0.41	14.21	84.71
914	0.06	0.02	0.24	0.05	0.125	0.41	13.80	84.69
889	0.06	0.02	0.24	0.05	0.123	0.41	13.40	84.66
864	0.06	0.02	0.24	0.05	0.122	0.41	12.98	84.64
838	0.06	0.02	0.25	0.05	0.120	0.42	12.57	84.61
813	0.06	0.02	0.25	0.05	0.119	0.42	12.15	84.59
787	0.06	0.03	0.25	0.05	0.118	0.42	11.74	84.56
762	0.06	0.03	0.25	0.05	0.116	0.42	11.32	84.54
737	0.06	0.03	0.26	0.05	0.115	0.42	10.89	84.51
711	0.06	0.03	0.26	0.05	0.114	0.43	10.47	84.48
686	0.07	0.03	0.26	0.05	0.113	0.43	10.04	84.46
660	0.07	0.03	0.26	0.05	0.112	0.43	9.62	84.43
635	0.07	0.03	0.27	0.05	0.111	0.43	9.19	84.41
610	0.07	0.03	0.27	0.06	0.109	0.43	8.76	84.38
584	0.07	0.03	0.27	0.05	0.109	0.43	8.32	84.36
559	0.07	0.03	0.27	0.06	0.108	0.44	7.89	84.33
533	0.07	0.03	0.27	0.06	0.107	0.44	7.46	84.31
508	0.07	0.03	0.27	0.06	0.106	0.44	7.02	84.28
483	0.07	0.03	0.28	0.06	0.105	0.44	6.58	84.26
457	0.07	0.03	0.28	0.06	0.104	0.44	6.14	84.23
432	0.07	0.03	0.28	0.06	0.104	0.44	5.70	84.20
406	0.07	0.03	0.28	0.06	0.103	0.44	5.26	84.18
381	0.07	0.03	0.28	0.06	0.103	0.44	4.82	84.15
356	0.07	0.03	0.28	0.06	0.102	0.44	4.38	84.13
330	0.07	0.03	0.28	0.06	0.101	0.44	3.93	84.10
305	0.07	0.03	0.28	0.06	0.101	0.45	3.49	84.08
279	0.07	0.03	0.28	0.06	0.100	0.45	3.04	84.05
254	0.07	0.03	0.29	0.06	0.099	0.45	2.60	84.03
229	0.00	0.00	0.00	0.00	0.239	0.24	2.15	84.00
203	0.00	0.00	0.00	0.00	0.239	0.24	1.91	83.98
178	0.00	0.00	0.00	0.00	0.239	0.24	1.67	83.95
152	0.00	0.00	0.00	0.00	0.239	0.24	1.43	83.93
127	0.00	0.00	0.00	0.00	0.239	0.24	1.19	83.90
102	0.00	0.00	0.00	0.00	0.239	0.24	0.95	83.87
76	0.00	0.00	0.00	0.00	0.239	0.24	0.72	83.85
51	0.00	0.00	0.00	0.00	0.239	0.24	0.48	83.82
25	0.00	0.00	0.00	0.00	0.239	0.24	0.24	83.80

26m^3 below elevation 85.63

Project: **360 Kennedy Lane Tank B Rev1**

Chamber Model -	SC-740	
Units -	**Metric**	
Number of chambers -	10	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	84.22	m
Amount of Stone Above Chambers -	350	mm
Amount of Stone Below Chambers -	152	mm
	46.4	sq.meters

Min. Area - 31.4 sq.meters

StormTech SC-740 Cumulative Storage Volumes

Height of System *(mm)*	Incremental Single Chamber *(cubic meters)*	Incremental Total Chamber *(cubic meters)*	Incremental Stone *(cubic meters)*	Incremental Ch & St *(cubic meters)*	Cumulative Chamber *(cubic meters)*	Elevation *(meters)*
1270	0.00	0.00	0.47	0.47	31.357	85.49
1245	0.00	0.00	0.47	0.47	30.886	85.47
1219	0.00	0.00	0.47	0.47	30.415	85.44
1194	0.00	0.00	0.47	0.47	29.944	85.42
1168	0.00	0.00	0.47	0.47	29.473	85.39
1143	0.00	0.00	0.47	0.47	29.002	85.37
1118	0.00	0.00	0.47	0.47	28.531	85.34
1092	0.00	0.00	0.47	0.47	28.060	85.32
1067	0.00	0.00	0.47	0.47	27.589	85.29
1041	0.00	0.00	0.47	0.47	27.118	85.26
1016	0.00	0.00	0.47	0.47	26.647	85.24
991	0.00	0.00	0.47	0.47	26.176	85.21
965	0.00	0.00	0.47	0.47	25.705	85.19
940	0.00	0.00	0.47	0.47	25.234	85.16
914	0.00	0.02	0.46	0.48	24.763	85.14
889	0.00	0.05	0.45	0.50	24.283	85.11
864	0.01	0.08	0.44	0.52	23.784	85.09
838	0.02	0.17	0.40	0.57	23.265	85.06
813	0.02	0.23	0.38	0.61	22.692	85.04
787	0.03	0.27	0.36	0.63	22.084	85.01
762	0.03	0.30	0.35	0.65	21.452	84.99
737	0.03	0.33	0.34	0.67	20.798	84.96
711	0.04	0.36	0.33	0.69	20.127	84.93
686	0.04	0.38	0.32	0.70	19.441	84.91
660	0.04	0.41	0.31	0.72	18.740	84.88
635	0.04	0.43	0.30	0.73	18.021	84.86
610	0.04	0.45	0.29	0.74	17.291	84.83
584	0.05	0.47	0.28	0.75	16.552	84.81
559	0.05	0.48	0.28	0.76	15.802	84.78
533	0.05	0.50	0.27	0.77	15.042	84.76
508	0.05	0.51	0.27	0.78	14.273	84.73
483	0.05	0.53	0.26	0.79	13.496	84.71
457	0.05	0.54	0.26	0.79	12.709	84.68
432	0.05	0.55	0.25	0.80	11.917	84.65
406	0.06	0.56	0.25	0.81	11.117	84.63
381	0.06	0.57	0.24	0.81	10.311	84.60
356	0.06	0.58	0.24	0.82	9.498	84.58
330	0.06	0.59	0.24	0.82	8.680	84.55
305	0.06	0.60	0.23	0.83	7.856	84.53
279	0.06	0.60	0.23	0.83	7.028	84.50
254	0.06	0.61	0.23	0.84	6.194	84.48
229	0.06	0.62	0.22	0.84	5.357	84.45
203	0.06	0.62	0.22	0.84	4.517	84.43
178	0.06	0.63	0.22	0.85	3.672	84.40
152	0.00	0.00	0.47	0.47	2.826	84.38
127	0.00	0.00	0.47	0.47	2.355	84.35
102	0.00	0.00	0.47	0.47	1.884	84.32
76	0.00	0.00	0.47	0.47	1.413	84.30
51	0.00	0.00	0.47	0.47	0.942	84.27
25	0.00	0.00	0.47	0.47	0.471	84.25

Project: 360 Kennedy-TANK C

Chamber Model -	MC-3500	
Units -	**Metric**	
Number of Chambers -	9	
Number of End Caps -	6	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	84.03	m
Amount of Stone Above Chambers -	305	mm
Amount of Stone Below Chambers -	229	mm

74.9 sq.meters Min. Area - 50.49 sq.meters

☑ Include Perimeter Stone in Calculations

☐ Click for Stage Area Data

☐ Click to Invert Stage Area Data

Click Here for Imperial

StormTech MC-3500 Cumulative Storage Volumes

Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Single End Cap (cubic meters)	Incremental Chambers (cubic meters)	Incremental End Cap (cubic meters)	Incremental Stone (cubic meters)	Incremental Ch, EC and Stone (cubic meters)	Cumulative System (cubic meters)	Elevation (meters)
1676	0.00	0.00	0.00	0.00	0.761	0.76	68.54	85.71
1651	0.00	0.00	0.00	0.00	0.761	0.76	67.78	85.68
1626	0.00	0.00	0.00	0.00	0.761	0.76	67.02	85.65
1600	0.00	0.00	0.00	0.00	0.761	0.76	66.25	85.63
1575	0.00	0.00	0.00	0.00	0.761	0.76	65.49	85.60
1549	0.00	0.00	0.00	0.00	0.761	0.76	64.73	85.58
1524	0.00	0.00	0.00	0.00	0.761	0.76	63.97	85.55
1499	0.00	0.00	0.00	0.00	0.761	0.76	63.21	85.53
1473	0.00	0.00	0.00	0.00	0.761	0.76	62.45	85.50
1448	0.00	0.00	0.00	0.00	0.761	0.76	61.69	85.48
1422	0.00	0.00	0.00	0.00	0.761	0.76	60.93	85.45
1397	0.00	0.00	0.00	0.00	0.761	0.76	60.17	85.43
1372	0.00	0.00	0.01	0.00	0.755	0.77	59.41	85.40
1346	0.01	0.00	0.05	0.00	0.739	0.79	58.64	85.38
1321	0.01	0.00	0.07	0.01	0.728	0.81	57.85	85.35
1295	0.01	0.00	0.10	0.01	0.716	0.83	57.04	85.32
1270	0.02	0.00	0.18	0.01	0.686	0.87	56.21	85.30
1245	0.03	0.00	0.26	0.01	0.650	0.93	55.34	85.27
1219	0.04	0.00	0.32	0.02	0.626	0.96	54.41	85.25
1194	0.04	0.00	0.36	0.02	0.607	0.99	53.45	85.22
1168	0.04	0.00	0.40	0.02	0.590	1.02	52.46	85.20
1143	0.05	0.00	0.44	0.03	0.576	1.04	51.44	85.17
1118	0.05	0.01	0.47	0.03	0.562	1.06	50.40	85.15
1092	0.05	0.01	0.49	0.03	0.549	1.08	49.34	85.12
1067	0.06	0.01	0.52	0.04	0.538	1.09	48.27	85.10
1041	0.06	0.01	0.54	0.04	0.527	1.11	47.17	85.07
1016	0.06	0.01	0.57	0.04	0.517	1.13	46.06	85.05
991	0.07	0.01	0.59	0.05	0.507	1.14	44.93	85.02
965	0.07	0.01	0.61	0.05	0.498	1.15	43.79	84.99
940	0.07	0.01	0.63	0.05	0.490	1.17	42.64	84.97
914	0.07	0.01	0.64	0.05	0.482	1.18	41.47	84.94
889	0.07	0.01	0.66	0.05	0.474	1.19	40.30	84.92
864	0.08	0.01	0.68	0.06	0.467	1.20	39.11	84.89
838	0.08	0.01	0.69	0.06	0.460	1.21	37.90	84.87
813	0.08	0.01	0.71	0.06	0.454	1.22	36.69	84.84
787	0.08	0.01	0.72	0.06	0.447	1.23	35.47	84.82
762	0.08	0.01	0.73	0.07	0.441	1.24	34.24	84.79
737	0.08	0.01	0.75	0.07	0.436	1.25	33.00	84.77
711	0.08	0.01	0.76	0.07	0.430	1.26	31.75	84.74
686	0.09	0.01	0.77	0.07	0.425	1.26	30.50	84.71
660	0.09	0.01	0.78	0.07	0.420	1.27	29.23	84.69
635	0.09	0.01	0.79	0.07	0.415	1.28	27.96	84.66
610	0.09	0.01	0.80	0.08	0.411	1.29	26.68	84.64
584	0.09	0.01	0.81	0.08	0.407	1.29	25.40	84.61
559	0.09	0.01	0.82	0.08	0.402	1.30	24.11	84.59
533	0.09	0.01	0.82	0.08	0.399	1.30	22.81	84.56
508	0.09	0.01	0.83	0.08	0.395	1.31	21.51	84.54
483	0.09	0.01	0.84	0.08	0.391	1.31	20.20	84.51
457	0.09	0.01	0.85	0.09	0.388	1.32	18.88	84.49
432	0.09	0.01	0.85	0.09	0.385	1.32	17.56	84.46
406	0.10	0.01	0.86	0.09	0.382	1.33	16.24	84.44
381	0.10	0.01	0.86	0.09	0.379	1.33	14.91	84.41
356	0.10	0.02	0.87	0.09	0.376	1.34	13.58	84.38
330	0.10	0.02	0.88	0.09	0.373	1.34	12.24	84.36
305	0.10	0.02	0.88	0.09	0.371	1.35	10.90	84.33
279	0.10	0.02	0.89	0.09	0.368	1.35	9.55	84.31
254	0.10	0.02	0.89	0.10	0.363	1.36	8.20	84.28
229	0.00	0.00	0.00	0.00	0.761	0.76	6.85	84.26
203	0.00	0.00	0.00	0.00	0.761	0.76	6.08	84.23
178	0.00	0.00	0.00	0.00	0.761	0.76	5.32	84.21
152	0.00	0.00	0.00	0.00	0.761	0.76	4.56	84.18
127	0.00	0.00	0.00	0.00	0.761	0.76	3.80	84.16
102	0.00	0.00	0.00	0.00	0.761	0.76	3.04	84.13
76	0.00	0.00	0.00	0.00	0.761	0.76	2.28	84.11
51	0.00	0.00	0.00	0.00	0.761	0.76	1.52	84.08
25	0.00	0.00	0.00	0.00	0.761	0.76	0.76	84.05

Project: 360 Kennedy-TANK D

Chamber Model -	MC-3500	
Units -	**Metric**	
Number of Chambers -	3	
Number of End Caps -	6	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	84.53	m
Amount of Stone Above Chambers -	305	mm
Amount of Stone Below Chambers -	229	mm

38.7 sq.meters Min. Area - 22.87 sq.meters

☑ Include Perimeter Stone in Calculations

☐ Click for Stage Area Data

☐ Click to Invert Stage Area Data

Click Here for Imperial

StormTech MC-3500 Cumulative Storage Volumes

Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Single End Cap (cubic meters)	Incremental Chambers (cubic meters)	Incremental End Cap (cubic meters)	Incremental Stone (cubic meters)	Incremental Ch, EC and Stone (cubic meters)	Cumulative System (cubic meters)	Elevation (meters)
1676	0.00	0.00	0.00	0.00	0.393	0.39	33.07	86.21
1651	0.00	0.00	0.00	0.00	0.393	0.39	32.67	86.18
1626	0.00	0.00	0.00	0.00	0.393	0.39	32.28	86.15
1600	0.00	0.00	0.00	0.00	0.393	0.39	31.89	86.13
1575	0.00	0.00	0.00	0.00	0.393	0.39	31.49	86.10
1549	0.00	0.00	0.00	0.00	0.393	0.39	31.10	86.08
1524	0.00	0.00	0.00	0.00	0.393	0.39	30.71	86.05
1499	0.00	0.00	0.00	0.00	0.393	0.39	30.32	86.03
1473	0.00	0.00	0.00	0.00	0.393	0.39	29.92	86.00
1448	0.00	0.00	0.00	0.00	0.393	0.39	29.53	85.98
1422	0.00	0.00	0.00	0.00	0.393	0.39	29.14	85.95
1397	0.00	0.00	0.00	0.00	0.393	0.39	28.74	85.93
1372	0.00	0.00	0.00	0.00	0.391	0.40	28.35	85.90
1346	0.01	0.00	0.02	0.00	0.385	0.41	27.95	85.88
1321	0.01	0.00	0.02	0.01	0.380	0.41	27.55	85.85
1295	0.01	0.00	0.03	0.01	0.376	0.42	27.14	85.82
1270	0.02	0.00	0.06	0.01	0.365	0.43	26.72	85.80
1245	0.03	0.00	0.09	0.01	0.352	0.45	26.28	85.77
1219	0.04	0.00	0.11	0.02	0.343	0.47	25.83	85.75
1194	0.04	0.00	0.12	0.02	0.336	0.48	25.36	85.72
1168	0.04	0.00	0.13	0.02	0.330	0.49	24.88	85.70
1143	0.05	0.00	0.15	0.03	0.324	0.50	24.40	85.67
1118	0.05	0.01	0.16	0.03	0.319	0.50	23.90	85.65
1092	0.05	0.01	0.16	0.03	0.314	0.51	23.39	85.62
1067	0.06	0.01	0.17	0.04	0.309	0.52	22.88	85.60
1041	0.06	0.01	0.18	0.04	0.304	0.53	22.36	85.57
1016	0.06	0.01	0.19	0.04	0.300	0.53	21.84	85.55
991	0.07	0.01	0.20	0.05	0.297	0.54	21.30	85.52
965	0.07	0.01	0.20	0.05	0.293	0.54	20.77	85.49
940	0.07	0.01	0.21	0.05	0.289	0.55	20.22	85.47
914	0.07	0.01	0.21	0.05	0.286	0.55	19.68	85.44
889	0.07	0.01	0.22	0.05	0.283	0.56	19.12	85.42
864	0.08	0.01	0.23	0.06	0.280	0.56	18.56	85.39
838	0.08	0.01	0.23	0.06	0.277	0.57	18.00	85.37
813	0.08	0.01	0.24	0.06	0.274	0.57	17.44	85.34
787	0.08	0.01	0.24	0.06	0.272	0.57	16.86	85.32
762	0.08	0.01	0.24	0.07	0.269	0.58	16.29	85.29
737	0.08	0.01	0.25	0.07	0.267	0.58	15.71	85.27
711	0.08	0.01	0.25	0.07	0.264	0.59	15.13	85.24
686	0.09	0.01	0.26	0.07	0.262	0.59	14.54	85.21
660	0.09	0.01	0.26	0.07	0.260	0.59	13.95	85.19
635	0.09	0.01	0.26	0.07	0.258	0.60	13.36	85.16
610	0.09	0.01	0.27	0.08	0.256	0.60	12.77	85.14
584	0.09	0.01	0.27	0.08	0.254	0.60	12.17	85.11
559	0.09	0.01	0.27	0.08	0.252	0.60	11.57	85.09
533	0.09	0.01	0.27	0.08	0.251	0.61	10.96	85.06
508	0.09	0.01	0.28	0.08	0.249	0.61	10.35	85.04
483	0.09	0.01	0.28	0.08	0.247	0.61	9.75	85.01
457	0.09	0.01	0.28	0.09	0.246	0.61	9.13	84.99
432	0.09	0.01	0.28	0.09	0.244	0.62	8.52	84.96
406	0.10	0.01	0.29	0.09	0.243	0.62	7.90	84.94
381	0.10	0.01	0.29	0.09	0.242	0.62	7.29	84.91
356	0.10	0.02	0.29	0.09	0.241	0.62	6.67	84.88
330	0.10	0.02	0.29	0.09	0.239	0.62	6.04	84.86
305	0.10	0.02	0.29	0.09	0.238	0.63	5.42	84.83
279	0.10	0.02	0.30	0.09	0.237	0.63	4.80	84.81
254	0.10	0.02	0.30	0.10	0.233	0.63	4.17	84.78
229	0.00	0.00	0.00	0.00	0.393	0.39	3.54	84.76
203	0.00	0.00	0.00	0.00	0.393	0.39	3.14	84.73
178	0.00	0.00	0.00	0.00	0.393	0.39	2.75	84.71
152	0.00	0.00	0.00	0.00	0.393	0.39	2.36	84.68
127	0.00	0.00	0.00	0.00	0.393	0.39	1.96	84.66
102	0.00	0.00	0.00	0.00	0.393	0.39	1.57	84.63
76	0.00	0.00	0.00	0.00	0.393	0.39	1.18	84.61
51	0.00	0.00	0.00	0.00	0.393	0.39	0.79	84.58
25	0.00	0.00	0.00	0.00	0.393	0.39	0.39	84.55

Project: 360 Kennedy-TANK E

Chamber Model -	MC-4500	
Units -	**Metric**	
Number of Chambers -	6	
Number of End Caps -	2	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	83.92	m
Amount of Stone Above Chambers -	305	mm
Amount of Stone Below Chambers -	229	mm

31.5 sq.meters Min. Area - 26.69 sq.meters

☑ Include Perimeter Stone in Calculations

☐ Click for Stage Area Data

☐ Click to Invert Stage Area Data

Click Here for Imperial

StormTech MC-4500 Cumulative Storage Volumes

Height of System (mm)	Incremental Single Chamber (cubic meters)	Incremental Single End Cap (cubic meters)	Incremental Chambers (cubic meters)	Incremental End Cap (cubic meters)	Incremental Stone (cubic meters)	Incremental Ch, EC and Stone (cubic meters)	Cumulative System (cubic meters)	Elevation (meters)
2057	0.00	0.00	0.00	0.00	0.320	0.32	38.11	85.98
2032	0.00	0.00	0.00	0.00	0.320	0.32	37.79	85.96
2007	0.00	0.00	0.00	0.00	0.320	0.32	37.47	85.93
1981	0.00	0.00	0.00	0.00	0.320	0.32	37.15	85.90
1956	0.00	0.00	0.00	0.00	0.320	0.32	36.83	85.88
1930	0.00	0.00	0.00	0.00	0.320	0.32	36.51	85.85
1905	0.00	0.00	0.00	0.00	0.320	0.32	36.19	85.83
1880	0.00	0.00	0.00	0.00	0.320	0.32	35.87	85.80
1854	0.00	0.00	0.00	0.00	0.320	0.32	35.55	85.78
1829	0.00	0.00	0.00	0.00	0.320	0.32	35.23	85.75
1803	0.00	0.00	0.00	0.00	0.320	0.32	34.91	85.73
1778	0.00	0.00	0.00	0.00	0.320	0.32	34.59	85.70
1753	0.00	0.00	0.01	0.00	0.317	0.32	34.27	85.68
1727	0.00	0.00	0.02	0.00	0.311	0.33	33.95	85.65
1702	0.00	0.00	0.03	0.00	0.308	0.34	33.62	85.62
1676	0.01	0.00	0.04	0.00	0.304	0.34	33.28	85.60
1651	0.01	0.00	0.05	0.00	0.300	0.35	32.93	85.57
1626	0.01	0.00	0.08	0.01	0.287	0.37	32.58	85.55
1600	0.02	0.00	0.11	0.01	0.272	0.39	32.21	85.52
1575	0.02	0.00	0.14	0.01	0.262	0.41	31.82	85.50
1549	0.03	0.01	0.15	0.01	0.254	0.42	31.41	85.47
1524	0.03	0.01	0.17	0.01	0.247	0.43	31.00	85.45
1499	0.03	0.01	0.18	0.01	0.240	0.44	30.57	85.42
1473	0.03	0.01	0.20	0.02	0.235	0.45	30.13	85.40
1448	0.03	0.01	0.21	0.02	0.229	0.46	29.68	85.37
1422	0.04	0.01	0.22	0.02	0.224	0.46	29.22	85.35
1397	0.04	0.01	0.23	0.02	0.219	0.47	28.76	85.32
1372	0.04	0.01	0.24	0.02	0.215	0.48	28.29	85.29
1346	0.04	0.01	0.25	0.02	0.210	0.48	27.81	85.27
1321	0.04	0.01	0.26	0.02	0.206	0.49	27.33	85.24
1295	0.04	0.01	0.27	0.03	0.202	0.50	26.84	85.22
1270	0.05	0.01	0.28	0.03	0.198	0.50	26.34	85.19
1245	0.05	0.01	0.28	0.03	0.195	0.51	25.84	85.17
1219	0.05	0.02	0.29	0.03	0.191	0.51	25.33	85.14
1194	0.05	0.02	0.30	0.03	0.188	0.52	24.82	85.12
1168	0.05	0.02	0.30	0.03	0.185	0.52	24.30	85.09
1143	0.05	0.02	0.31	0.03	0.182	0.53	23.78	85.07
1118	0.05	0.02	0.32	0.04	0.179	0.53	23.25	85.04
1092	0.05	0.02	0.32	0.04	0.176	0.54	22.72	85.02
1067	0.05	0.02	0.33	0.04	0.173	0.54	22.19	84.99
1041	0.06	0.02	0.33	0.04	0.171	0.54	21.65	84.96
1016	0.06	0.02	0.34	0.04	0.168	0.55	21.10	84.94
991	0.06	0.02	0.34	0.04	0.165	0.55	20.55	84.91
965	0.06	0.02	0.35	0.04	0.163	0.56	20.00	84.89
940	0.06	0.02	0.35	0.04	0.161	0.56	19.45	84.86
914	0.06	0.02	0.36	0.05	0.158	0.56	18.89	84.84
889	0.06	0.02	0.36	0.05	0.156	0.57	18.33	84.81
864	0.06	0.02	0.37	0.05	0.154	0.57	17.76	84.79
838	0.06	0.02	0.37	0.05	0.152	0.57	17.19	84.76
813	0.06	0.02	0.37	0.05	0.151	0.57	16.62	84.74
787	0.06	0.03	0.38	0.05	0.148	0.58	16.05	84.71
762	0.06	0.03	0.38	0.05	0.147	0.58	15.47	84.69
737	0.06	0.03	0.39	0.05	0.145	0.58	14.89	84.66
711	0.06	0.03	0.39	0.05	0.143	0.58	14.31	84.63
686	0.07	0.03	0.39	0.05	0.142	0.59	13.72	84.61
660	0.07	0.03	0.40	0.05	0.140	0.59	13.14	84.58
635	0.07	0.03	0.40	0.05	0.139	0.59	12.55	84.56
610	0.07	0.03	0.40	0.06	0.137	0.59	11.96	84.53
584	0.07	0.03	0.40	0.05	0.136	0.60	11.36	84.51
559	0.07	0.03	0.41	0.06	0.135	0.60	10.77	84.48
533	0.07	0.03	0.41	0.06	0.133	0.60	10.17	84.46
508	0.07	0.03	0.41	0.06	0.132	0.60	9.57	84.43
483	0.07	0.03	0.41	0.06	0.131	0.60	8.97	84.41
457	0.07	0.03	0.42	0.06	0.130	0.60	8.37	84.38
432	0.07	0.03	0.42	0.06	0.129	0.61	7.76	84.35
406	0.07	0.03	0.42	0.06	0.128	0.61	7.16	84.33
381	0.07	0.03	0.42	0.06	0.128	0.61	6.55	84.30
356	0.07	0.03	0.42	0.06	0.127	0.61	5.94	84.28
330	0.07	0.03	0.42	0.06	0.126	0.61	5.33	84.25
305	0.07	0.03	0.43	0.06	0.125	0.61	4.72	84.23
279	0.07	0.03	0.43	0.06	0.124	0.61	4.11	84.20
254	0.07	0.03	0.43	0.06	0.123	0.62	3.49	84.18
229	0.00	0.00	0.00	0.00	0.320	0.32	2.88	84.15
203	0.00	0.00	0.00	0.00	0.320	0.32	2.56	84.13
178	0.00	0.00	0.00	0.00	0.320	0.32	2.24	84.10
152	0.00	0.00	0.00	0.00	0.320	0.32	1.92	84.08
127	0.00	0.00	0.00	0.00	0.320	0.32	1.60	84.05
102	0.00	0.00	0.00	0.00	0.320	0.32	1.28	84.02
76	0.00	0.00	0.00	0.00	0.320	0.32	0.96	84.00
51	0.00	0.00	0.00	0.00	0.320	0.32	0.64	83.97
25	0.00	0.00	0.00	0.00	0.320	0.32	0.32	83.95

35.07m^3 below elevation 85.74

Project: 360 kENNEDY Lane Tank F Rev1

Chamber Model -	MC-3500	
Units -	**Metric**	
Number of Chambers -	27	
Number of End Caps -	10	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	83.93	m
Amount of Stone Above Chambers -	305	mm
Amount of Stone Below Chambers -	229	mm

176.5 sq.meters Min. Area - 139.4 sq.meters

StormTech MC-3500 Cumulative Storage Volumes

Height of System *(mm)*	Incremental Single Chamber *(cubic meters)*	Incremental Single End Cap *(cubic meters)*	Incremental Chambers *(cubic meters)*	Incremental End Cap *(cubic meters)*	Incremental Stone *(cubic meters)*	Incremental Ch, EC and Stone *(cubic meters)*	Cumulative System *(cubic meters)*	Elevation *(meters)*
1676	0.00	0.00	0.00	0.00	1.792	1.79	171.27	85.60
1651	0.00	0.00	0.00	0.00	1.792	1.79	169.48	85.58
1626	0.00	0.00	0.00	0.00	1.792	1.79	167.69	85.55
1600	0.00	0.00	0.00	0.00	1.792	1.79	165.90	85.53
1575	0.00	0.00	0.00	0.00	1.792	1.79	164.10	85.50
1549	0.00	0.00	0.00	0.00	1.792	1.79	162.31	85.48
1524	0.00	0.00	0.00	0.00	1.792	1.79	160.52	85.45
1499	0.00	0.00	0.00	0.00	1.792	1.79	158.73	85.43
1473	0.00	0.00	0.00	0.00	1.792	1.79	156.93	85.40
1448	0.00	0.00	0.00	0.00	1.792	1.79	155.14	85.38
1422	0.00	0.00	0.00	0.00	1.792	1.79	153.35	85.35
1397	0.00	0.00	0.00	0.00	1.792	1.79	151.56	85.33
1372	0.00	0.00	0.04	0.00	1.775	1.82	149.76	85.30
1346	0.01	0.00	0.15	0.01	1.730	1.89	147.95	85.27
1321	0.01	0.00	0.22	0.01	1.698	1.93	146.06	85.25
1295	0.01	0.00	0.31	0.01	1.663	1.99	144.13	85.22
1270	0.02	0.00	0.53	0.02	1.575	2.12	142.14	85.20
1245	0.03	0.00	0.79	0.02	1.468	2.28	140.02	85.17
1219	0.04	0.00	0.96	0.03	1.398	2.38	137.74	85.15
1194	0.04	0.00	1.09	0.04	1.343	2.47	135.36	85.12
1168	0.04	0.00	1.20	0.04	1.295	2.54	132.89	85.10
1143	0.05	0.00	1.31	0.05	1.252	2.60	130.35	85.07
1118	0.05	0.01	1.40	0.05	1.213	2.66	127.75	85.05
1092	0.05	0.01	1.48	0.06	1.177	2.72	125.09	85.02
1067	0.06	0.01	1.56	0.06	1.143	2.77	122.37	84.99
1041	0.06	0.01	1.63	0.07	1.113	2.81	119.61	84.97
1016	0.06	0.01	1.70	0.07	1.084	2.86	116.80	84.94
991	0.07	0.01	1.76	0.08	1.057	2.90	113.94	84.92
965	0.07	0.01	1.82	0.08	1.031	2.93	111.04	84.89
940	0.07	0.01	1.88	0.08	1.007	2.97	108.11	84.87
914	0.07	0.01	1.93	0.09	0.984	3.00	105.14	84.84
889	0.07	0.01	1.98	0.09	0.963	3.04	102.14	84.82
864	0.08	0.01	2.03	0.09	0.942	3.07	99.10	84.79
838	0.08	0.01	2.08	0.10	0.923	3.10	96.03	84.77
813	0.08	0.01	2.12	0.10	0.904	3.12	92.93	84.74
787	0.08	0.01	2.16	0.11	0.886	3.15	89.81	84.72
762	0.08	0.01	2.20	0.11	0.869	3.18	86.66	84.69
737	0.08	0.01	2.24	0.11	0.853	3.20	83.48	84.66
711	0.08	0.01	2.27	0.12	0.838	3.22	80.28	84.64
686	0.09	0.01	2.30	0.12	0.824	3.25	77.06	84.61
660	0.09	0.01	2.33	0.12	0.810	3.27	73.81	84.59
635	0.09	0.01	2.37	0.12	0.796	3.29	70.55	84.56
610	0.09	0.01	2.39	0.13	0.784	3.31	67.26	84.54
584	0.09	0.01	2.42	0.13	0.772	3.32	63.95	84.51
559	0.09	0.01	2.45	0.13	0.761	3.34	60.63	84.49
533	0.09	0.01	2.47	0.14	0.750	3.36	57.29	84.46
508	0.09	0.01	2.49	0.14	0.740	3.37	53.94	84.44
483	0.09	0.01	2.52	0.14	0.730	3.39	50.56	84.41
457	0.09	0.01	2.54	0.14	0.720	3.40	47.18	84.39
432	0.09	0.01	2.56	0.15	0.711	3.41	43.78	84.36
406	0.10	0.01	2.58	0.15	0.703	3.43	40.36	84.33
381	0.10	0.01	2.59	0.15	0.695	3.44	36.94	84.31
356	0.10	0.02	2.61	0.15	0.687	3.45	33.50	84.28
330	0.10	0.02	2.63	0.15	0.680	3.46	30.05	84.26
305	0.10	0.02	2.64	0.16	0.673	3.47	26.59	84.23
279	0.10	0.02	2.66	0.16	0.666	3.48	23.11	84.21
254	0.10	0.02	2.68	0.17	0.653	3.50	19.63	84.18
229	0.00	0.00	0.00	0.00	1.792	1.79	16.13	84.16
203	0.00	0.00	0.00	0.00	1.792	1.79	14.34	84.13
178	0.00	0.00	0.00	0.00	1.792	1.79	12.55	84.11
152	0.00	0.00	0.00	0.00	1.792	1.79	10.75	84.08
127	0.00	0.00	0.00	0.00	1.792	1.79	8.96	84.06
102	0.00	0.00	0.00	0.00	1.792	1.79	7.17	84.03
76	0.00	0.00	0.00	0.00	1.792	1.79	5.38	84.00
51	0.00	0.00	0.00	0.00	1.792	1.79	3.58	83.98
25	0.00	0.00	0.00	0.00	1.792	1.79	1.79	83.95

Project: **360 Kennedy Lane Tank G Rev1**

Chamber Model -	SC-740	
Units -	**Metric**	
Number of chambers -	6	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	85.21	m
Amount of Stone Above Chambers -	152	mm
Amount of Stone Below Chambers -	152	mm
	37.8	sq.meters

Min. Area - 18.84 sq.meters

StormTech SC-740 Cumulative Storage Volumes

Height of System *(mm)*	Incremental Single Chamber *(cubic meters)*	Incremental Total Chamber *(cubic meters)*	Incremental Stone *(cubic meters)*	Incremental Ch & St *(cubic meters)*	Cumulative Chamber *(cubic meters)*	Elevation *(meters)*
1067	0.00	0.00	0.38	0.38	20.819	86.27
1041	0.00	0.00	0.38	0.38	20.435	86.25
1016	0.00	0.00	0.38	0.38	20.051	86.22
991	0.00	0.00	0.38	0.38	19.667	86.20
965	0.00	0.00	0.38	0.38	19.283	86.17
940	0.00	0.00	0.38	0.38	18.898	86.14
914	0.00	0.01	0.38	0.39	18.514	86.12
889	0.00	0.03	0.37	0.40	18.124	86.09
864	0.01	0.05	0.37	0.41	17.724	86.07
838	0.02	0.10	0.34	0.45	17.311	86.04
813	0.02	0.14	0.33	0.47	16.865	86.02
787	0.03	0.16	0.32	0.48	16.399	85.99
762	0.03	0.18	0.31	0.49	15.918	85.97
737	0.03	0.20	0.30	0.50	15.424	85.94
711	0.04	0.22	0.30	0.51	14.920	85.92
686	0.04	0.23	0.29	0.52	14.407	85.89
660	0.04	0.25	0.29	0.53	13.884	85.87
635	0.04	0.26	0.28	0.54	13.352	85.84
610	0.04	0.27	0.28	0.55	12.812	85.81
584	0.05	0.28	0.27	0.55	12.267	85.79
559	0.05	0.29	0.27	0.56	11.715	85.76
533	0.05	0.30	0.27	0.56	11.158	85.74
508	0.05	0.31	0.26	0.57	10.595	85.71
483	0.05	0.32	0.26	0.57	10.027	85.69
457	0.05	0.32	0.26	0.58	9.454	85.66
432	0.05	0.33	0.25	0.58	8.877	85.64
406	0.06	0.34	0.25	0.59	8.295	85.61
381	0.06	0.34	0.25	0.59	7.710	85.59
356	0.06	0.35	0.25	0.59	7.121	85.56
330	0.06	0.35	0.24	0.60	6.528	85.54
305	0.06	0.36	0.24	0.60	5.932	85.51
279	0.06	0.36	0.24	0.60	5.334	85.48
254	0.06	0.37	0.24	0.60	4.732	85.46
229	0.06	0.37	0.24	0.61	4.129	85.43
203	0.06	0.37	0.23	0.61	3.522	85.41
178	0.06	0.38	0.23	0.61	2.914	85.38
152	0.00	0.00	0.38	0.38	2.305	85.36
127	0.00	0.00	0.38	0.38	1.921	85.33
102	0.00	0.00	0.38	0.38	1.537	85.31
76	0.00	0.00	0.38	0.38	1.152	85.28
51	0.00	0.00	0.38	0.38	0.768	85.26
25	0.00	0.00	0.38	0.38	0.384	85.23

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

02/09/2023

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20
Site Name:	
Drainage Area (ha):	1.14
Runoff Coefficient 'c':	0.71
Particle Size Distribution:	CA ETV
Target TSS Removal (%):	50.0

Project Name:	Queenswood
Project Number:	211-12127-00
Designer Name:	Kathryn Kerker
Designer Company:	WSP
Designer Email:	kathryn.kerker@wsp.com
Designer Phone:	613-690-1206
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	26.12
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	100.00
Peak Conveyance (maximum) Flow Rate (L/s):	100.00
Site Sediment Transport Rate (kg/ha/yr):	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	50
EFO6	58
EFO8	62
EFO10	65
EFO12	68

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 50

Water Quality Runoff Volume Capture (%): > 90

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.

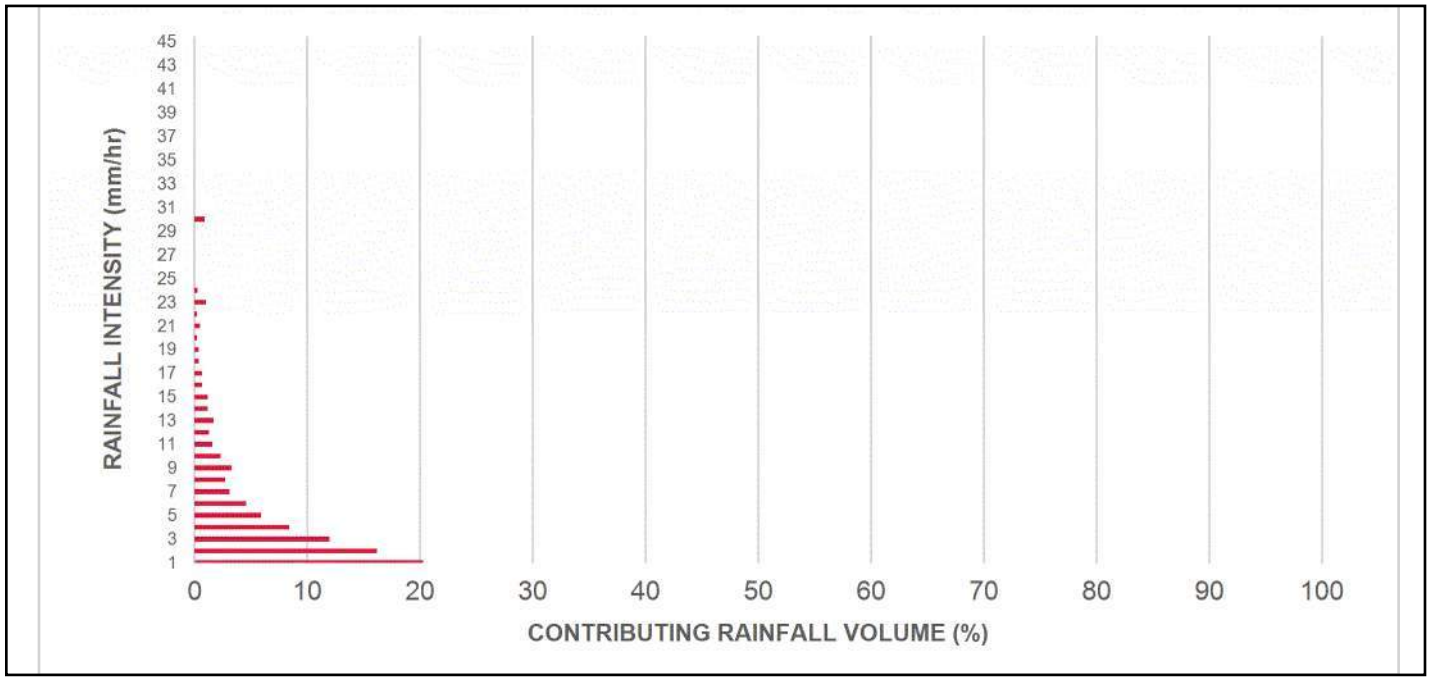
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

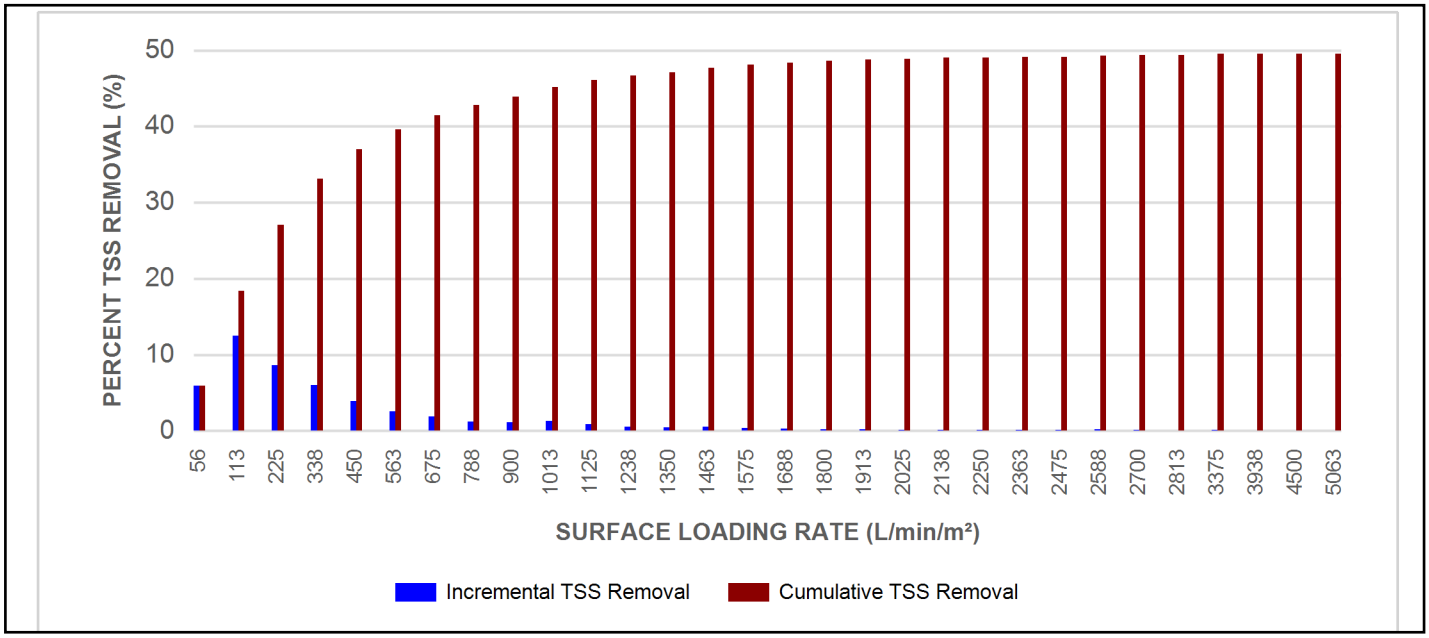
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.5	8.6	8.6	1.13	68.0	56.0	69	5.9	5.9
1	20.3	29.0	2.25	135.0	113.0	62	12.5	18.4
2	16.2	45.2	4.50	270.0	225.0	53	8.7	27.1
3	12.0	57.2	6.75	405.0	338.0	50	6.0	33.1
4	8.4	65.6	9.00	540.0	450.0	47	3.9	37.0
5	5.9	71.6	11.25	675.0	563.0	43	2.6	39.6
6	4.6	76.2	13.50	810.0	675.0	42	1.9	41.5
7	3.1	79.3	15.75	945.0	788.0	41	1.3	42.8
8	2.7	82.0	18.00	1080.0	900.0	41	1.1	43.9
9	3.3	85.3	20.25	1215.0	1013.0	40	1.3	45.2
10	2.3	87.6	22.50	1350.0	1125.0	38	0.9	46.1
11	1.6	89.2	24.75	1485.0	1238.0	37	0.6	46.7
12	1.3	90.5	27.00	1620.0	1350.0	35	0.5	47.1
13	1.7	92.2	29.25	1755.0	1463.0	33	0.6	47.7
14	1.2	93.5	31.50	1890.0	1575.0	30	0.4	48.1
15	1.2	94.6	33.75	2025.0	1688.0	28	0.3	48.4
16	0.7	95.3	36.00	2160.0	1800.0	26	0.2	48.6
17	0.7	96.1	38.25	2295.0	1913.0	25	0.2	48.8
18	0.4	96.5	40.50	2430.0	2025.0	24	0.1	48.9
19	0.4	96.9	42.75	2565.0	2138.0	22	0.1	49.0
20	0.2	97.1	45.00	2700.0	2250.0	21	0.0	49.0
21	0.5	97.5	47.25	2835.0	2363.0	20	0.1	49.1
22	0.2	97.8	49.50	2970.0	2475.0	19	0.0	49.1
23	1.0	98.8	51.75	3105.0	2588.0	18	0.2	49.3
24	0.3	99.1	54.00	3240.0	2700.0	18	0.0	49.4
25	0.9	100.0	56.25	3375.0	2813.0	17	0.2	49.5
30	0.9	100.9	67.50	4050.0	3375.0	14	0.1	49.7
35	-0.9	100.0	78.75	4725.0	3938.0	12	N/A	49.6
40	0.0	100.0	90.01	5400.0	4500.0	11	0.0	49.6
45	0.0	100.0	100.00	6000.0	5000.0	10	0.0	49.6
Estimated Net Annual Sediment (TSS) Load Reduction =								**50 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS 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
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

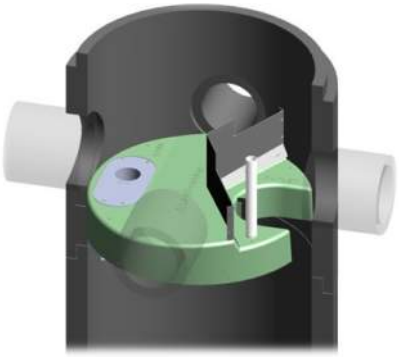
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test 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.

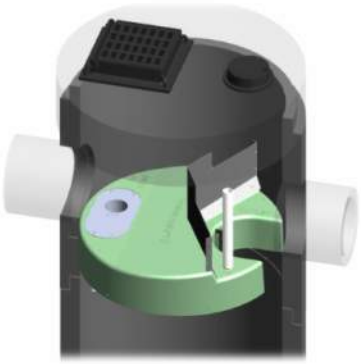
DESIGN FLEXIBILITY

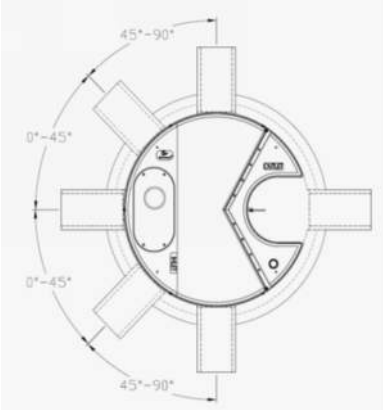
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EFO

SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL
1	70	660	42	1320	35	1980	24
30	70	690	42	1350	35	2010	24
60	67	720	41	1380	34	2040	23
90	63	750	41	1410	34	2070	23
120	61	780	41	1440	33	2100	23
150	58	810	41	1470	32	2130	22
180	56	840	41	1500	32	2160	22
210	54	870	41	1530	31	2190	22
240	53	900	41	1560	31	2220	21
270	52	930	40	1590	30	2250	21
300	51	960	40	1620	29	2280	21
330	50	990	40	1650	29	2310	21
360	49	1020	40	1680	28	2340	20
390	48	1050	39	1710	28	2370	20
420	47	1080	39	1740	27	2400	20
450	47	1110	38	1770	27	2430	20
480	46	1140	38	1800	26	2460	19
510	45	1170	37	1830	26	2490	19
540	44	1200	37	1860	26	2520	19
570	43	1230	37	1890	25	2550	19
600	42	1260	36	1920	25	2580	18
630	42	1290	36	1950	24		

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT 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** S**eparators**

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
	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.

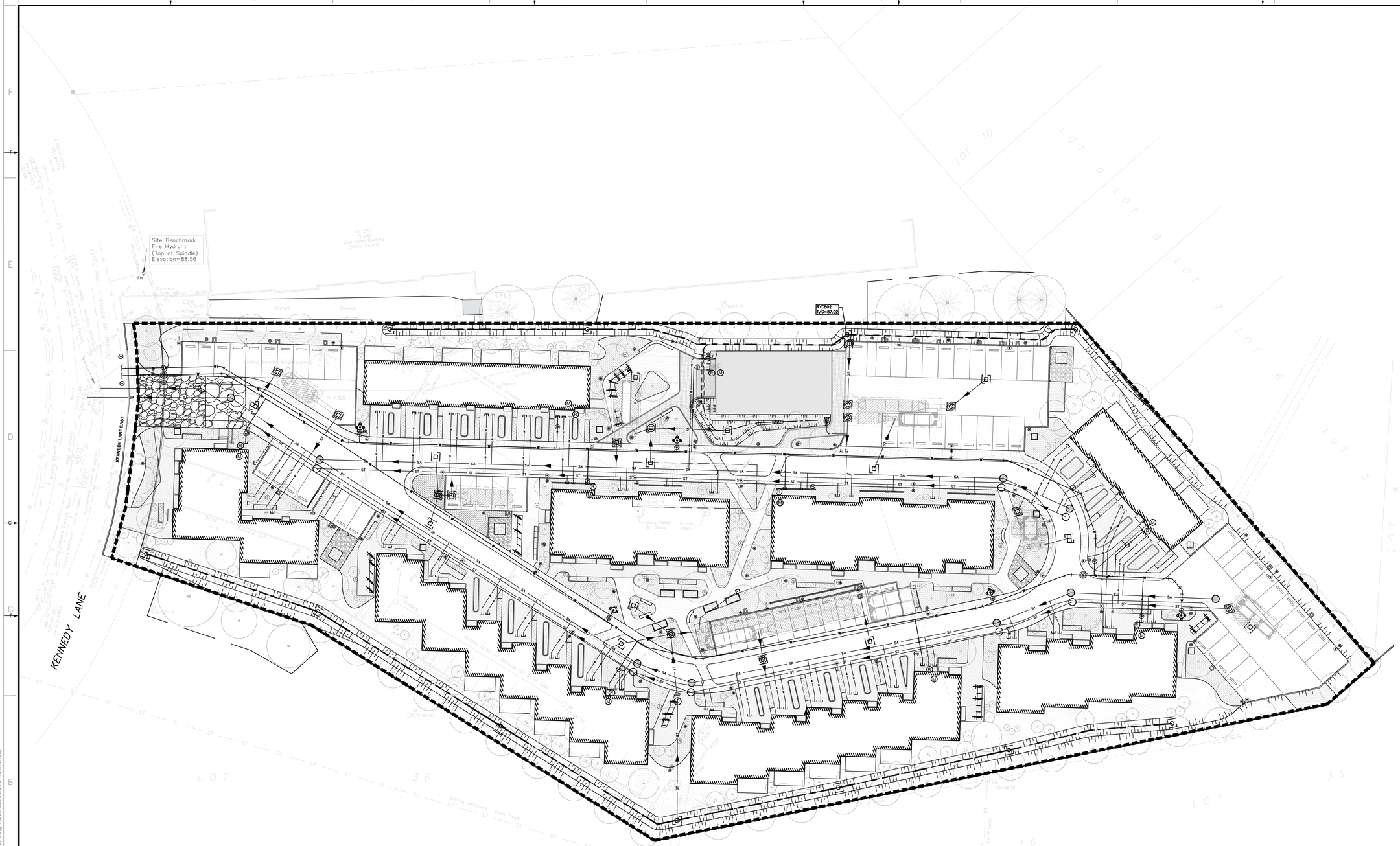
3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five 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.

APPENDIX

APPENDIX

E

- EROSION AND SEDIMENTATION CONTROL PLAN C08



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2025-02-28
PROVINCE OF ONTARIO

NORTH

CLIENT:

KINDRED WORKS

CLIENT REF. #:

PROJECT:

QUEENSWOOD COMMONS

KEY PLAN:

ISSUED FOR - REVISION:

IS	RE	DATE	DESCRIPTION
6		2025-02-28	RE-ISSUED FOR SPA
5		2025-02-10	ISSUED FOR BUILDING PERMIT
4		2024-11-05	RE-ISSUED FOR SPA AND ZBLA
3		2023-02-28	RE-ISSUED FOR SPA AND ZBLA
2		2022-10-14	RE-ISSUED FOR SPA AND ZBLA
1		2021-11-30	ISSUED FOR SPA AND ZBLA

PROJECT NO.: 211-12127-00
DATE: FEBRUARY 2025
ORIGINAL SCALE: 1:300
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
DESIGNED BY: DY
DRAWN BY: JT
CHECKED BY: DY
25mm

DISCIPLINE: CIVIL

TITLE:

EROSION AND SEDIMENT CONTROL PLAN

SHEET NUMBER: C08
SHEET #: 8 OF 8

ISSUE: RE-ISSUED FOR SPA
DATE OF: 2025-02-28
REV #: 0

D07-12-22-0002

#18692

V:\10-13 ME 2021 Projects\211-12127-00 Queenswood United Church\3. Drawings\Working drawings\211-12127-00_C.dwg Feb 28, 2025-3:37pm BY (JAUTOINT4512)

APPENDIX