

SITE SERVICING AND STORMWATER MANAGEMENT REPORT

Project Address – 1592 Tenth Line Road, Orleans On

Owner/Client: Bridor Developments
Address: 996-B St-Augustin Rd, Embrun ON
City file Number:

By Blanchard Letendre Engineering Ltd.
Revision Date – June 14, 2022
Our File Reference: 20-261

First Submission
November 19, 2020

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3.0 STORM WATER MANAGEMENT

3.1 Existing Site Condition

The existing site currently has an existing residential home with an access driveway off Tenth Line. The existing property has a split drainage where half the property drains towards Tenth Line and the other portion towards Phoenix Crescent. The property is bounded by residential homes and a commercial development east of Tenth Line. Refer to BL Engineering drawing C400 for the pre-development drainage area and existing grading showing the current drainage of the site.

3.2 Proposed Storm Water Management

The development of the site will consist of adding two residential apartment building which will combine a total of thirty (27) residential units with a connecting underground parking garage. The site will be modified by adding a total of 566 square meter building, asphalt area and amenities. As the runoff coefficient will increase due to addition of hard surfaces, post-development stormwater quantity and quality will be implemented.

The site stormwater management has been prepared in correlation with the existing site grading and proposed underground parking garage. The property has a split drainage where a portion drains east towards Tenth Line whereas the west portion drains west towards Phoenix Crescent. The affected area stormwater management will outlet to City storm sewer on Phoenix Crescent and the overland flow route was designed to convey the storm runoff towards the city right away.

The stormwater generated by the new hard surfaces will be directed to a series of catchbasins which will capture and convey the water runoff to the existing city storm sewer on Phoenix Crescent. The catchment areas have been delineated as per the proposed grading plan. Refer to Appendix 'A', for the catchment area and runoff coefficient. In order to respect the 5 year pre-development allowable release rate, the outlets will be controlled by an orifice plate installed in the downstream storm pipe in CBMH03 and limit the flow outletting to City storm sewer on Phoenix. By throttling the flow, stormwater retention will be completed with the use of underground pipe storage which was designed to hold the 100 year storm event. Refer to Appendix 'A' for the stormwater flow and storage calculations.

3.3 Proposed Storm Water Management

The pre-development flow of the 5-year storm was calculated using a 5-year storm and a 10-minute time of concentration for the affected area. The pre-development flow of the 100-year storm was calculated using a 5-year storm and a 10-minute time of concentration for the affected area. From the intensity duration curves established for the Ottawa area, the intensity was evaluated at of 104.2 mm/hr for the 5yr predevelopment flow and 178.6mm/hr for the 100-year predevelopment flow.

A run-off coefficient of 0.50 was used as per the city of Ottawa design Guidelines, see Appendix 'A' – Pre-Development Drainage Area table.

Using the Rational Method and considering the tributary areas of the affected area by the proposed (see Appendix 'A'), the pre-development allowable release rate for the site was evaluated at **21.52 L/s**. See also the Storm Sewer Design Sheet in Appendix 'A'.

$$\begin{aligned}\text{Allowable Release Rate (Q)} &= 2.78CIA \text{ (L/s)} \\ I_s &= 998.071 / (T_c + 6.053)^{0.814} \\ C &= 0.50 \\ I &= 104.2 \text{ mm/hr} \\ T_c &= 10 \text{ min} \\ \text{Total} &= 0.149 \text{ ha} \\ \text{Allowable Release Rate} &= 21.52 \text{ L/s}\end{aligned}$$

3.4 Proposed Stormwater Quantity Control

The proposed stormwater management for the site will be achieved primarily through the use of underground chambers storage. As most of the site will be covered with the underground parking area that will connect both buildings, a portion of the stormwater will be in the underground parking and the balance will be around the building foundation footprint. The grading of the site has been designed to direct the stormwater towards the series of catchbasins connected to the underground stormwater sewers before outletting west into the 300mm diameter storm city sewer on Phoenix Crescent. The proposed underground stormwater sewers and catchbasins are shown on the attached drawings in Appendix 'E'.

The proposed site affected area has been graded to outlet overland onto Tenth Line and Phoenix Crescent. As the site has a split drainage and that the front and rear of the property are facing city right of ways, the grades have been adjusted to suit this profile to minimize the grade raise of the site. All catchment areas were designed to direct the stormwater overland to the nearest city right of way and will be captured through a series of catchbasins.

The stormwater generated from site affected area will be discharged to the existing storm sewer on Phoenix Crescent and be controlled using an orifice plate of 64mm diameter which will throttle the flow direct to the municipal sewer. The proposed 250mm diameter pipe will release a total of **15.05 L/s** with a maximum head of 1.70m (HWL = 87.40) during the 100 year event. As the flow will be restricted, 26.62m³ of stormwater storage will be required for this area. This storage will be provided with underground stormwater chambers. The underground chamber, model MC-3500 chambers designed by ADS Pipe were designed to hold up to 37.10 m³ with a HWL of 87.40.

The ramp to the underground parking will drain into the underground parking (WS-07) catchbasins and will therefore drain uncontrolled. This uncontrolled area will generate a total flow of **6.45L/s** under the 100 year event conditions. Therefore with the outlet restriction and the provided

stormwater storage, the post-development will meet the pre-development flow to the city main storm sewer on Phoenix Crescent.

3.4.1 Roof Drainage

The proposed roofs are flat roof with roof drains. Drain and scuppers will be installed to drain the water into the storm pipes located in the underground garage.

3.4.1 Underground Parking Garage

The proposed underground parking will be drain using a series of catchbasin that will be connected to the sanitary pipe of the building. The flow that will be generated from the underground parking will consist of the ramps area hard surface and the snow/water accumulation on the cars. This flow will be direct to the sewers using and sump pump.

3.5 Proposed Stormwater Quality Control

A water quality control requirement of 80% TSS removal was set by the City of Ottawa. In order to meet the requirements, a storm treatment unit will be installed and the downstream end of the system. Using the Stormceptor sizing software, the EF04 was selected. The software generated report has been attached (See Appendix "D").

4.0 SANITARY SEWER DESIGN

4.1 Existing Site Conditions

The existing site is currently being service by an existing 135mm diameter service that is connected to the existing sanitary main on Tenth Line. The existing connection will be abandoned whereas the new connection will be completed off Phoenix Crescent that will service the new building.

4.2 Existing Site Conditions

The new apartment building, will discharge to the city via a new 150mm diameter sanitary service. The service will be located on the west side of the buildings and will discharge to the existing 250mm diameter city sewer running along Phoenix Crescent. The proposed 150mm diameter service will be installed at a minimum of 1.00% slope directly to the city sewer. A monitoring manhole is proposed for the new connections which will be installed at the property line. Refer to drawing C300 – Site Servicing Plan for the proposed sanitary service.

Based on the City of Ottawa Sanitary Design Guidelines, the sanitary peak loads were evaluated at **1.27 L/s**. As per the City specific design parameters, the sanitary flow was evaluated based on

the residential unit counts, new building footprint and the total site area. Refer to Appendix 'B' for the sanitary sewer design calculation and design parameters set by the City of Ottawa.

5.0 WATER CONNECTION DESIGN

5.1 Existing Site Conditions

The existing site is currently being service by a 19mm diameter home service which services the existing house and is connected to the existing 254mm diameter watermain on Tenth Line. The existing connection will be abandoned and capped at main, whereas the new connection will be completed off Phoenix Crescent which will service the new building. There is currently one (1) city fire hydrant on the west side of Tenth Line and two (2) fire hydrants on the west side of Phoenix that are all within the 90m radius from the building main entrance. Refer to drawing C300 – Site Servicing Plan for the existing and proposed water services and city existing infrastructure.

5.2 Proposed Domestic Water Service

The new residential apartment buildings water services were sized based on the City of Ottawa Design Guidelines and the AWWA Standards. Based on the number of fixtures proposed and on the average water demand for residential developments, the daily water consumption was evaluated for the proposed building. As per the city guidelines, the average water demand per person of **350L/p/d** was applied to the population of the new building. The daily and hourly peak factor of **2.5** and **2.2** respectively were applied to the water demand as stated in the City of Ottawa guideline. By using the average demand and peaking factors, the daily water demand for the new buildings were evaluated as follow:

| | | UNITS |
|------------------------|--------|-------|
| Average Water Demand = | 9.19 | L/min |
| Maximum Daily = | 22.96 | L/min |
| Maximum Hourly = | 50.53 | L/min |
| <hr/> | | |
| Total Domestic Flow = | 0.84 | L/s |
| Total Fire Flow = | 130.00 | L/s |

Refer to Appendix 'C' for the water flow calculation sheet.

5.3 Proposed Fire Demand

As the residential apartment buildings will not have a fire suppression sprinkler system, the new service was sized to supply the daily water demand. Based on the Ontario building code

calculations, the water flow was evaluated at **130.00L/s**. Refer to Appendix 'C' for the fire flow calculation sheet.

The proposed buildings will be serviced with a new 50mm water service which will connect to the existing 250mm diameter watermain on Phoenix Crescent. The new services will be installed at the west side of the new buildings and be placed in the same trench as the sanitary service.

5.4 Water Capacity Comments

The boundary conditions and HGL for hydraulic analysis for 1592 Tenth Line were obtained from the city, see attached copy in Appendix 'E'. From the boundary conditions, there is a maximum HGL of 130.2 m for the water main elevation at 87.69 m and a maximum pressure estimate of 60.4 psi.

6.0 EROSION AND SEDIMENT CONTROL

During the construction, sediment and erosion protect will be implemented around the property to prevent any sediments from leaching off site. The construction and maintenance of the sediment controls must comply with the Ontario Provision Standard Specification OPSS 577. Refer to drawing C100 – Erosion and Sediment Control for the perimeter fence proposed.

7.0 CONCLUSION AND LIMITATION OF REPORT

7.1 Stormwater Management

The stormwater management proposed for the site will maintain the site to its pre-development release rate conditions and meet the requirements from the City of Ottawa. The post development release rate of the site will be maintained to its pre-development rate of **21.52 L/s** through an orifice plate before outletting to the sewer main on Phoenix Crescent. Stormwater quantity control will be achieved with 37.10m³ underground pipes/structures. The stormwater quality control will be met through the use of a stormwater treatment unit.

7.2 Sanitary Service

The current site will be serviced with a new 150mm sanitary connection onto Phoenix Crescent. The estimated sanitary flow of **1.27 L/s** will be directed to the existing 250mm sanitary sewer along Phoenix Crescent.

7.3 Water Service

Currently the existing building on site is serviced with an existing 19mm diameter water service that will be replaced with a new 50mm diameter water service to be connected to the existing 252mm diameter main on Phoenix Crescent. The existing connection will be replaced with a new 50mm water service. The water demand for the building was evaluated at **0.94 L/s** and the fire

flow demand **130.00L/s**. Sprinkler system is not proposed for the site. There is also one (3) fire located around the property within 90m from every entrance doors.

8.0 LIMITATION

This report was prepared for **Bridor Development.**, and is only applicable for the property at 1592 Tenth Line, Ottawa.

Any changes to the existing site may require a review by Blanchard Letendre engineering Ltd. to ensure all information is consistent with the proposed design.

Should you have any questions, please do not hesitate to contact the undersigned.

Sincerely Yours,



Guillaume Brunet, P. Eng.

Civil Engineer

APPENDIX “A”

Stormwater Management Design

File No.: 20-363
Project: New Residential Development
Project Address: 1592 Tenth Line Road - Orleans
Client: Bridor Development

Date: June 14, 2022
Designed: Guillaume Brunet
Checked: Guillaume Brunet
Drawing Reference: C300

STORM WATER MANAGEMENT DESIGN SHEET
SEWER DESIGN

| LOCATION | | | AREA (ha) | | | FLOW | | | | | STORM SEWER DATA | | | | | | | |
|--------------------|---------|--------|-----------|----------|----------|---------------|---------------|----------------------|----------------------------|-------------------|--------------------|------|-----------|------------|---------------------|---------------------|---------------------|------------------------------|
| WATERSHED / STREET | From MH | To MH | C = 0.20 | C = 0.80 | C = 0.90 | Indiv. 2.78AC | Accum. 2.78AC | Time of Conc. (min.) | Rainfall Intensity (mm/hr) | Peak Flow Q (l/s) | Pipe Diameter (mm) | Type | Slope (%) | Length (m) | Capacity Full (L/s) | Velocity Full (m/s) | Time of Flow (min.) | Ratio (Q/Q _{FULL}) |
| WS-02 | LCB08 | LCB06 | 0.000 | 0.000 | 0.028 | 0.07 | 0.07 | 10.00 | 104.19 | 7.17 | 250 | PVC | 0.25% | 7.5 | 29.7 | 0.61 | 0.21 | 0.24 |
| WS-06 | LCB06 | CB05 | 0.005 | 0.000 | 0.006 | 0.02 | 0.09 | 10.00 | 104.19 | 9.02 | 250 | PVC | 0.25% | 18.0 | 29.7 | 0.61 | 0.50 | 0.30 |
| WS-03 | CB05 | CBMH04 | 0.015 | 0.000 | 0.013 | 0.04 | 0.13 | 10.50 | 101.65 | 13.06 | 250 | PVC | 0.25% | 25.0 | 29.7 | 0.61 | 0.69 | 0.44 |
| WS-05 | CBMH04 | CBMH03 | 0.006 | 0.000 | 0.010 | 0.03 | 0.16 | 11.18 | 98.33 | 15.42 | 250 | PVC | 0.25% | 11.0 | 29.7 | 0.61 | 0.30 | 0.52 |
| WS-01 and WS-04 | CB09 | CBMH03 | 0.013 | 0.000 | 0.041 | 0.11 | 0.11 | 10.00 | 104.19 | 11.31 | 250 | PVC | 0.25% | 20.0 | 29.7 | 0.61 | 0.55 | 0.38 |
| | CBMH03 | CBMH02 | 0.000 | 0.000 | 0.000 | 0.00 | 0.27 | 11.49 | 96.95 | 25.73 | 250 | PVC | 0.30% | 2.0 | 32.6 | 0.66 | 0.05 | 0.79 |
| | CBMH02 | MH01 | 0.000 | 0.000 | 0.000 | 0.00 | 0.27 | 11.49 | 96.95 | 25.73 | 250 | PVC | 0.30% | 8.2 | 32.6 | 0.66 | 0.21 | 0.79 |
| | MH01 | CITY | 0.000 | 0.000 | 0.000 | 0.00 | 0.27 | 11.54 | 96.72 | 25.67 | 250 | PVC | 0.30% | 9.2 | 32.6 | 0.66 | 0.23 | 0.79 |

DESIGN PARAMETERS NOTES

Runoff Coefficient (C)
 Grass 0.2
 Gravel 0.80
 Asphalt / rooftop 0.90

Q = 2.78 AIC, where
 Q = Peak flow in Litres per second (L/s)
 A = Area in hectares (ha)
 I = Rainfall Intensity (mm/hr)
 C = Runoff Coefficient

Ottawa Macdonald-Cartier International Airport IDF curve
 $I_s = 998.071 / (T_c + 6.053)^{0.814}$
 Min. velocity = 0.76 m/s
 Manning's "n" = 0.013

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STORM WATER MANAGEMENT DESIGN SHEET
SEWER DESIGN

| LOCATION | | MANHOLE INFORMATION | | | | | | | AVAILABLE STORAGE | | | | | | |
|----------|--------|---------------------|-----------------|-------------------|-----------------|------------------|--------------------|------------------|---------------------------------------|---|-------------------------|------------------------|--------------------------|--|--|
| From MH | To MH | Up Invert (m) | Down Invert (m) | T/G Up Stream (m) | T/G Down Stream | Up Depth obv (m) | Down Depth obv (m) | Up Depth inv (m) | Pipe Storage 5 Year (m ³) | Pipe Storage 100 year (m ³) | Upstream CB/MH Size (m) | Water Depth 5 year (m) | Water Depth 100 year (m) | CB/MH Storage 5 year (m ³) | CB/MH Storage 100 year (m ³) |
| LCB08 | LCB05 | 87.90 | 87.60 | 88.50 | 88.08 | 0.35 | 0.23 | 0.35 | - | - | - | - | - | - | - |
| LCB06 | CB05 | 85.67 | 85.63 | 87.90 | 88.15 | 1.98 | 2.27 | 1.98 | - | - | 1.20 | 1.88 | 1.98 | - | - |
| CB05 | CBMH04 | 85.57 | 85.51 | 88.15 | 88.15 | 2.33 | 2.39 | 2.33 | 1.23 | 1.23 | 1.20 | 1.98 | 2.23 | 2.85 | 3.21 |
| CBMH04 | CBMH03 | 85.45 | 85.42 | 88.15 | 88.10 | 2.45 | 2.43 | 2.45 | 0.88 | 0.88 | 0.60 | 2.10 | 2.35 | 0.76 | 0.85 |
| CB09 | CBMH03 | 85.50 | 85.45 | 88.25 | 88.10 | 2.50 | 2.40 | 2.50 | - | - | 1.20 | 2.05 | 2.30 | - | - |
| CBMH03 | CBMH02 | 85.39 | 85.38 | 88.10 | 88.10 | 2.46 | 2.47 | 2.46 | - | - | 1.20 | 2.16 | 2.41 | - | - |
| CBMH02 | MH01 | 85.32 | 85.30 | 88.10 | 88.05 | 2.53 | 2.50 | 2.53 | - | - | 2.20 | 2.23 | 2.48 | - | - |
| MH01 | CITY | 85.24 | 85.21 | 88.05 | 87.80 | 2.81 | 2.34 | 2.56 | - | - | 3.20 | 2.31 | 2.56 | - | - |
| | | | | | | | | | 0.88 | 0.88 | | | 0.76 | 0.85 | |

| | |
|--------------------------|-------|
| HWL (5 Year) | 87.55 |
| HWL (100 Year) | 87.80 |
| TOTAL STORAGE - 5 YEAR | 1.64 |
| TOTAL STORAGE - 100 YEAR | 1.73 |



BLANCHARD LETENDRE
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| | | | |
|-------------------------|--------------------------------|---------------------------|------------------|
| File No. | 20-363 | Date: | June 14, 2022 |
| Project: | New Residential Development | Designed: | Guillaume Brunet |
| Project Address: | 1592 Tenth Line Road - Orleans | Checked: | Guillaume Brunet |
| Client: | Bridor Development | Drawing Reference: | C300 |

PRE-DEVELOPMENT DRAINAGE AREA

| Catchment Area | Runoff Coefficient | | | Total Area (ha) | Combined C |
|----------------|--------------------|----------|----------|-----------------|------------|
| | C = 0.30 | C = 0.80 | C = 0.90 | | |
| E-01 | 0.092 | 0.000 | 0.056 | 0.149 | 0.53 |
| TOTAL | 0.092 | 0.000 | 0.056 | 0.149 | 0.53 |

POST-DEVELOPMENT DRAINAGE AREA

| Catchment Area | Runoff Coefficient | | | Total Area (ha) | Combined C |
|----------------|--------------------|----------|----------|-----------------|------------|
| | C = 0.20 | C = 0.80 | C = 0.90 | | |
| WS-01 - ROOF | 0.000 | 0.000 | 0.034 | 0.034 | 0.90 |
| WS-02 - ROOF | 0.000 | 0.000 | 0.028 | 0.028 | 0.90 |
| WS-03 | 0.015 | 0.000 | 0.013 | 0.028 | 0.53 |
| WS-04 | 0.013 | 0.000 | 0.007 | 0.020 | 0.45 |
| WS-05 | 0.006 | 0.000 | 0.010 | 0.016 | 0.64 |
| WS-06 | 0.005 | 0.000 | 0.006 | 0.011 | 0.58 |
| WS-07 | 0.001 | 0.000 | 0.012 | 0.013 | 0.85 |
| TOTAL | 0.040 | 0.000 | 0.109 | 0.149 | 0.71 |

RUNOFF COEFFICIENT (C)

| | |
|-------------------|------|
| Grass | 0.20 |
| Gravel | 0.80 |
| Asphalt / rooftop | 0.90 |

| | | | |
|-------------------------|--------------------------------|---------------------------|------------------|
| File No. | 20-363 | Date: | June 14, 2022 |
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| Client: | Bridor Development | Drawing Reference: | C300 |

STORM WATER MANAGEMENT DESIGN SHEET
5 YEAR STORM EVENT

PRE-DEVELOPMENT STORMATER MANAGEMENT

| Runoff | Catchment Area | Area | | R= | ΣR ₅ |
|---------------|-----------------------------|--------------|----|------------|-----------------|
| Un-Controlled | EWS-01 | 0.149 | ha | R= | 0.53 |
| | Total Uncontrolled = | 0.149 | ha | ΣR= | 0.53 |

PRE-DEVELOPMENT ALLOWABLE RELEASE RATE

$$Q = 2.78CIA \text{ (L/s)}$$

$$I_5 = 998.071 / (Tc + 6.053)^{0.814}$$

| | | |
|--------------------------------|--------------|--|
| C = | 0.50 | up to a maximum of 0.5 as per City of Ottawa Sewer Design Guidelines |
| I = | 104.2 | mm/hr |
| Tc = | 10 | min |
| Total = | 0.149 | ha |
| Allowable Release Rate= | 21.52 | L/s |

POST-DEVELOPMENT STORMATER MANAGEMENT

| Runoff | Catchment Area | Area | | R= | ΣR ₅ | ΣR ₁₀₀ |
|------------|------------------------------|--------------|-----------|------------|-----------------|-------------------|
| Controlled | WS-01 | 0.034 | ha | R= | 0.90 | 1.00 |
| | WS-02 | 0.028 | ha | R= | 0.90 | 1.00 |
| | WS-03 | 0.028 | ha | R= | 0.53 | 0.66 |
| | WS-04 | 0.020 | ha | R= | 0.45 | 0.56 |
| | WS-05 | 0.016 | ha | R= | 0.64 | 0.80 |
| | WS-06 | 0.011 | ha | R= | 0.58 | 0.73 |
| | Total Controlled = | 0.136 | ha | ΣR= | 0.70 | 0.82 |
| | WS-07 | 0.013 | ha | R= | 0.85 | 1.00 |
| | Total Un-Controlled = | 0.013 | ha | ΣR= | 0.85 | 1.00 |

$$I_5 = 998.071 / (Td + 6.053)^{0.814}$$

| Time (min) | Intensity (mm/hr) | REQUIRED STORAGE | | | Uncontrolled Runoff (L/s) | Total Release Rate (L/s) |
|------------|-------------------|-------------------------|---------------------|-------------------------------|---------------------------|--------------------------|
| | | Controlled Runoff (L/s) | Storage Volume (m3) | Controlled Release Rate (L/s) | | |
| 10 | 104.2 | 27.65 | 7.55 | 15.07 | 3.19 | 18.25 |
| 15 | 83.6 | 22.17 | 6.40 | 15.07 | 2.56 | 17.62 |
| 20 | 70.3 | 18.64 | 4.29 | 15.07 | 2.15 | 17.22 |
| 25 | 60.9 | 16.16 | 1.64 | 15.07 | 1.86 | 16.93 |
| 30 | 53.9 | 14.31 | 0.00 | 15.07 | 1.65 | 16.72 |
| 35 | 48.5 | 12.88 | 0.00 | 15.07 | 1.48 | 16.55 |
| 40 | 44.2 | 11.73 | 0.00 | 15.07 | 1.35 | 16.42 |
| 50 | 37.7 | 9.99 | 0.00 | 15.07 | 1.15 | 16.22 |
| 60 | 32.9 | 8.74 | 0.00 | 15.07 | 1.01 | 16.08 |
| 80 | 26.6 | 7.05 | 0.00 | 15.07 | 0.81 | 15.88 |
| 90 | 24.3 | 6.45 | 0.00 | 15.07 | 0.74 | 15.81 |

STORMATER STORAGE REQUIREMENTS

| | | |
|----------------------------------|----------------------------|-----------------------------------|
| Total Storage Required = | 7.55 m³ | |
| Pipe Storage = | 0.00 m ³ | refer to Storm Sewer Design Sheet |
| CB/MH Storage = | 0.00 m ³ | refer to Storm Sewer Design Sheet |
| Underground Chambers | 37.10 m ³ | |
| Total Available Storage = | 37.10 m³ | |

APPENDIX “B”

Sanitary Design

File No. 20-363
Project: New Residential Development
Project Address: 1592 Tenth Line Road - Orleans
Client: Bridor Development

Date: June 14, 2022
Designed: Guillaume Brunet
Checked: Guillaume Brunet
Drawing Reference: C300

SANITARY DESIGN SHEET
SEWER DESIGN

| LOCATION | | | RESIDENTIAL AREA AND POPULATION | | | | | | COMMERCIAL | | INDUSTRIAL | | | INSTITUTIONAL | | C+I+I | INFILTRATION | | | TOTAL FLOW (l/s) | PIPE | | | | | MANHOLE | | |
|----------|---------------|---------------|---------------------------------|------|-------------|------|------------|-----------------|------------|-----------------|------------|-----------------|------------|---------------|-----------------|-----------------|-----------------|-----------------|--------------------|------------------|------------|-----------|----------|-----------|-------------------|-------------------|---------------|-----------------|
| STREET | FROM MH | TO MH | AREA (Ha) | POP. | CUMMULATIVE | | PEAK FACT. | PEAK FLOW (l/s) | AREA (Ha) | ACCU. AREA (Ha) | AREA (Ha) | ACCU. AREA (Ha) | PEAK FACT. | AREA (Ha) | ACCU. AREA (Ha) | PEAK FLOW (l/s) | TOTAL AREA (Ha) | ACCU. AREA (Ha) | INFILT. FLOW (l/s) | | LENGTH (m) | DIA. (mm) | MATERAIL | SLOPE (%) | CAP. (FULL) (l/s) | VEL. (FULL) (m/s) | UP INVERT (m) | DOWN INVERT (m) |
| | | | | | AREA (Ha) | POP. | | | | | | | | | | | | | | | | | | | | | | |
| SITE | PROP. BLDG | PROPERTY LINE | 0.149 | 37.8 | 0.15 | 37.8 | 4.0 | 0.61 | 0.000 | 0.000 | 0.00 | 0.00 | 7.0 | 0.0 | 0.0 | 0.61 | 0.149 | 0.149 | 0.04 | 1.27 | 3.4 | 150 | PVC | 1.00% | 15.23 | 0.86 | 85.85 | 85.82 |
| | PROPERTY LINE | CITY | 0.000 | 37.8 | 0.00 | 0.0 | 0.0 | 0.00 | 0.000 | 0.000 | 0.00 | 0.00 | 7.0 | 0.0 | 0.0 | 0.00 | 0.000 | 0.149 | 0.04 | 1.27 | 10.8 | 150 | PVC | 1.00% | 15.23 | 0.86 | 85.82 | 85.71 |

DESIGN PARAMETERS NOTES

Average Daily Flow = 350 L/p/day
 Commercial and Institutional Flow = 50000 L/ha/da
 Industrial Flow = 35000.00 L/ha/da
 Maximum Residential Peak Flow = 4
 Commection and Intitutional Peak Factor = 1.5

Industrial Peak Factor = 7 as per Appendix 4-B
 Extraneous Flow = 0.28 L/s/ha
 Minimum Velocity = 0.76 m/s
 Mannings n = 0.013

| Appartments: | Person Per Unit | Appartment | Total |
|--------------|-----------------|------------|-------|
| Bachelor = | 1.4 | 0 | 0 |
| 1 Bedroom = | 1.4 | 27 | 37.8 |
| 2 Bedroom = | 2.1 | 0 | 0 |
| 3 Bedroom = | 3.1 | 0 | 0 |

APPENDIX “C”

Watermain Design

| | | | |
|-------------------------|--------------------------------|---------------------------|------------------|
| File No. | 20-363 | Date: | June 14, 2022 |
| Project: | New Residential Development | Designed: | Guillaume Brunet |
| Project Address: | 1592 Tenth Line Road - Orleans | Checked: | Guillaume Brunet |
| Client: | Bridor Development | Drawing Reference: | |

WATER CONSUMPTION CALCULATION

| | | | |
|-------------------------------|-----------------|-------------------------|------|
| Total Building Floor Area = | 566 | m ² | |
| Site Total Area = | 0.214 | ha | |
| Total Population = | 37.8 | ea. | |
| Average Demand Per People = | 350 | L/c/d | |
| Average Water Demand = | 13230.00 | L/d | 0.15 |
| Maximum Daily Peak Factor = | 2.5 | * As per City of Ottawa | |
| Maximum Daily = | 33075.00 | L/d | 0.38 |
| Maximum Hourly Peak Factor = | 2.2 | * As per City of Ottawa | |
| Maximum Hourly = | 72765.00 | L/d | 0.84 |
| Total Domestic Flow = | 0.84 | L/s | |
| Total Fire Flow = | 130.00 | L/s | |

| | Unit Counts | WSFU | Total |
|--------------------|-------------|------|--------------|
| Unrinal Flush Tank | 27 | 2 | 54 |
| Sinks | 54 | 1 | 54 |
| Bathub | 27 | 4 | 108 |
| Diswasher | 27 | 1.5 | 40.5 |
| Washing Machine | 27 | 2 | 54 |
| Total | | | 310.5 |

| Appartments: | Person Per Unit | Appartment | Total |
|--------------|-----------------|------------|-------------|
| Bachelor = | 1.4 | 0 | 0 |
| 1 Bedroom = | 1.4 | 27 | 37.8 |
| 2 Bedroom = | 2.1 | 0 | 0 |
| 3 Bedroom = | 3.1 | 0 | 0 |
| Total | | | 37.8 |

File No.: 20-363
Project: New Residential Development
Project Address: 1592 Tenth Line Road - Orleans
Client: Bridor Development

Date: June 14, 2022
Designed: Guillaume Brunet
Checked: Guillaume Brunet
Drawing Reference:

FIRE FLOW FOR BOTH BUILDING COMBINED

| Term | Options | Multiplier | Choose: | Value | unit | Fire Flow |
|--|---|-------------|-----------------------------------|-------|-------|---------------|
| Coefficient C related to the type of construction | Wood Frame | 1.5 | Non-combustible construction | 0.8 | | |
| | Ordinary Construction | 1.0 | | | | |
| | Non-combustible construction | 0.8 | | | | |
| | Fire resistive construction <2 hrs | 0.7 | | | | |
| | Fire resistive construction >2 hrs | 0.6 | | | | |
| Type of housing | Single family dwelling | 0 | Building - no. of units per floor | 10 | unit | |
| | Townhouse - no. of units | 0 | | | | |
| | Building - no. of units per floor | 10 | | | | |
| | Number of floors excluding the basement | 3 | | | | |
| | Floor space per unit | varies | | | | |
| Required fire flow | Fire Flow = 220 x C x Area^{0.5} | | | | L/min | 7,252 |
| | | | | | L/s | 121 |
| Occupancy hazard reduction or surcharge | Non-combustible | -0.25 | Limited combustible | -0.15 | | |
| | Limited combustible | -0.15 | | | | |
| | Combustible | 0 | | | | |
| | Free burning | 0.15 | | | | |
| | Rapid burning | 0.25 | | | | |
| Sprinkler reduction | Sprinklers (NFPA13) | -0.30 | False | 0 | | |
| | Water supply is standard for both the system and fire department hose lines | -0.10 | False | 0 | L/min | 5,548 |
| | Fully supervised system | -0.10 | True | -0.1 | L/s | 92 |
| Exposure distance between units | North side | 20.1 to 30m | 0.1 | | | |
| | East side | Over 45m | 0 | | | |
| | South side | 3.1 to 10m | 0.2 | | L/min | 7,767 |
| | West side | 20.1 to 30m | 0.1 | 0.4 | L/s | 129 |
| Minimum required fire flow rate (rounded to nearest 100) | | | | | L/min | 7,800 |
| Minimum required fire flow rate | | | | | L/s | 130.00 |
| Required duration of fire flow | | | | | min | 30 |

File No. 20-363
Project: New Residential Development
Project Address: 1592 Tenth Line Road - Orleans
Client: Bridor Development

Date: June 14- 2022
Designed: Guillaume Brunet
Checked: Guillaume Brunet
Drawing Reference:

FIRE FLOW BUILDING A ISOLATED. Note 2hrs fire separation wall between underground shared parking

| Term | Options | Multiplier | Choose: | Value | unit | Fire Flow | | |
|--|---|-------------|-----------------------------------|-------|-------|--------------|-------|--------------|
| Coefficient C related to the type of construction | Wood Frame | 1.5 | Non-combustible construction | 0.8 | | | | |
| | Ordinary Construction | 1.0 | | | | | | |
| | Non-combustible construction | 0.8 | | | | | | |
| | Fire resistive construction <2 hrs | 0.7 | | | | | | |
| | Fire resistive construction >2 hrs | 0.6 | | | | | | |
| Type of housing | Single family dwelling | 0 | Building - no. of units per floor | 10 | unit | | | |
| | Townhouse - no. of units | 0 | | | | | | |
| | Building - no. of units per floor | 10 | | | | | | |
| | Number of floors excluding the basement | 3 | | | | | floor | |
| | Floor space per unit | varies | | | | | 275 | 275 |
| Required fire flow | Fire Flow = 220 x C x Area^{0.5} | | | | L/min | 5,055 | | |
| | | | | | L/s | 84 | | |
| Occupancy hazard reduction or surcharge | Non-combustible | -0.25 | Limited combustible | -0.15 | | | | |
| | Limited combustible | -0.15 | | | | | | |
| | Combustible | 0 | | | | | | |
| | Free burning | 0.15 | | | | | L/min | 4,297 |
| | Rapid burning | 0.25 | | | | | L/s | 72 |
| Sprinkler reduction | Sprinklers (NFPA13) | -0.30 | False | 0 | | | | |
| | Water supply is standard for both the system and fire department hose lines | -0.10 | False | 0 | L/min | 3,867 | | |
| | Fully supervised system | -0.10 | True | -0.1 | L/s | 64 | | |
| Exposure distance between units | North side | 20.1 to 30m | 0.1 | | | | | |
| | East side | Over 45m | 0 | | | | | |
| | South side | 3.1 to 10m | 0.2 | | L/min | 5,414 | | |
| | West side | 20.1 to 30m | 0.1 | 0.4 | L/s | 90 | | |
| Minimum required fire flow rate (rounded to nearest 100) | | | | | L/min | 5,400 | | |
| Minimum required fire flow rate | | | | | L/s | 90.00 | | |
| Required duration of fire flow | | | | | min | 30 | | |

File No.: 20-363
Project: New Residential Development
Project Address: 1592 Tenth Line Road - Orleans
Client: Bridor Development

Date: June 14, 2022
Designed: Guillaume Brunet
Checked: Guillaume Brunet
Drawing Reference:

FIRE FLOW BUILDING B ISOLATED. Note 2hrs fire separation wall between underground shared parking

| Term | Options | Multiplier | Choose: | Value | unit | Fire Flow |
|--|---|-------------|-----------------------------------|-------|-------|--------------|
| Coefficient C related to the type of construction | Wood Frame | 1.5 | Non-combustible construction | 0.8 | | |
| | Ordinary Construction | 1.0 | | | | |
| | Non-combustible construction | 0.8 | | | | |
| | Fire resistive construction <2 hrs | 0.7 | | | | |
| | Fire resistive construction >2 hrs | 0.6 | | | | |
| Type of housing | Single family dwelling | 0 | Building - no. of units per floor | 10 | unit | |
| | Townhouse - no. of units | 0 | | | | |
| | Building - no. of units per floor | 10 | | | | |
| | Number of floors excluding the basement | 3 | | | | |
| | Floor space per unit | varies | | | | |
| Required fire flow | Fire Flow = 220 x C x Area^{0.5} | | | | L/min | 5,200 |
| | | | | | L/s | 87 |
| Occupancy hazard reduction or surcharge | Non-combustible | -0.25 | Limited combustible | -0.15 | | |
| | Limited combustible | -0.15 | | | | |
| | Combustible | 0 | | | | |
| | Free burning | 0.15 | | | | |
| | Rapid burning | 0.25 | | | | |
| Sprinkler reduction | Sprinklers (NFPA13) | -0.30 | False | 0 | | |
| | Water supply is standard for both the system and fire department hose lines | -0.10 | False | 0 | L/min | 3,978 |
| | Fully supervised system | -0.10 | True | -0.1 | L/s | 66 |
| Exposure distance between units | North side | 20.1 to 30m | 0.1 | | | |
| | East side | Over 45m | 0 | | | |
| | South side | 3.1 to 10m | 0.2 | | L/min | 5,569 |
| | West side | 20.1 to 30m | 0.1 | 0.4 | L/s | 93 |
| Minimum required fire flow rate (rounded to nearest 100) | | | | | L/min | 5,600 |
| Minimum required fire flow rate | | | | | L/s | 93.33 |
| Required duration of fire flow | | | | | min | 30 |

APPENDIX “D”

Underground Chambers & Stormwater Treatment Unit

Project: 1592 Tenth Line Road



Chamber Model -
 Units -
 Number of Chambers -
 Number of End Caps -
 Voids in the stone (porosity) -
 Base of Stone Elevation -
 Amount of Stone Above Chambers -
 Amount of Stone Below Chambers -
 Amount of Stone Between Chambers -

| |
|---------|
| MC-3500 |
| Metric |
| 7 |
| 2 |
| 40 |
| 85.72 |
| 305 |
| 229 |
| 152 |

Include Perimeter Stone in Calculations

43.7 sq.meters Min. Area - 35.246 sq.meters

| 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 Chamber, End (cubic meters) | Cumulative System (cubic meters) | Elevation (meters) |
|-----------------------|---|---|-------------------------------------|------------------------------------|----------------------------------|---|----------------------------------|--------------------|
| 1676 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 42.87 | 87.40 |
| 1651 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 42.43 | 87.37 |
| 1626 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 41.99 | 87.34 |
| 1600 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 41.54 | 87.32 |
| 1575 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 41.10 | 87.29 |
| 1549 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 40.65 | 87.27 |
| 1524 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 40.21 | 87.24 |
| 1499 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 39.77 | 87.22 |
| 1473 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 39.32 | 87.19 |
| 1448 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 38.88 | 87.17 |
| 1422 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 38.44 | 87.14 |
| 1397 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 37.99 | 87.12 |
| 1372 | 0.00 | 0.00 | 0.01 | 0.00 | 0.439 | 0.45 | 37.55 | 87.09 |
| 1346 | 0.01 | 0.00 | 0.04 | 0.00 | 0.428 | 0.47 | 37.10 | 87.07 |
| 1321 | 0.01 | 0.00 | 0.06 | 0.00 | 0.420 | 0.48 | 36.63 | 87.04 |
| 1295 | 0.01 | 0.00 | 0.08 | 0.00 | 0.411 | 0.49 | 36.15 | 87.01 |
| 1270 | 0.02 | 0.00 | 0.14 | 0.00 | 0.388 | 0.53 | 35.66 | 86.99 |
| 1245 | 0.03 | 0.00 | 0.20 | 0.00 | 0.360 | 0.57 | 35.13 | 86.96 |
| 1219 | 0.04 | 0.00 | 0.25 | 0.01 | 0.342 | 0.60 | 34.56 | 86.94 |
| 1194 | 0.04 | 0.00 | 0.28 | 0.01 | 0.328 | 0.62 | 33.96 | 86.91 |
| 1168 | 0.04 | 0.00 | 0.31 | 0.01 | 0.316 | 0.64 | 33.35 | 86.89 |
| 1143 | 0.05 | 0.00 | 0.34 | 0.01 | 0.305 | 0.65 | 32.71 | 86.86 |
| 1118 | 0.05 | 0.01 | 0.36 | 0.01 | 0.295 | 0.67 | 32.06 | 86.84 |
| 1092 | 0.05 | 0.01 | 0.38 | 0.01 | 0.286 | 0.68 | 31.39 | 86.81 |
| 1067 | 0.06 | 0.01 | 0.40 | 0.01 | 0.277 | 0.69 | 30.71 | 86.79 |
| 1041 | 0.06 | 0.01 | 0.42 | 0.01 | 0.269 | 0.71 | 30.02 | 86.76 |
| 1016 | 0.06 | 0.01 | 0.44 | 0.01 | 0.262 | 0.72 | 29.31 | 86.74 |
| 991 | 0.07 | 0.01 | 0.46 | 0.02 | 0.255 | 0.73 | 28.59 | 86.71 |
| 965 | 0.07 | 0.01 | 0.47 | 0.02 | 0.248 | 0.74 | 27.87 | 86.68 |
| 940 | 0.07 | 0.01 | 0.49 | 0.02 | 0.242 | 0.75 | 27.13 | 86.66 |
| 914 | 0.07 | 0.01 | 0.50 | 0.02 | 0.236 | 0.75 | 26.38 | 86.63 |
| 889 | 0.07 | 0.01 | 0.51 | 0.02 | 0.231 | 0.76 | 25.63 | 86.61 |
| 864 | 0.08 | 0.01 | 0.53 | 0.02 | 0.226 | 0.77 | 24.86 | 86.58 |
| 838 | 0.08 | 0.01 | 0.54 | 0.02 | 0.221 | 0.78 | 24.09 | 86.56 |
| 813 | 0.08 | 0.01 | 0.55 | 0.02 | 0.216 | 0.79 | 23.32 | 86.53 |
| 787 | 0.08 | 0.01 | 0.56 | 0.02 | 0.211 | 0.79 | 22.53 | 86.51 |
| 762 | 0.08 | 0.01 | 0.57 | 0.02 | 0.207 | 0.80 | 21.74 | 86.48 |
| 737 | 0.08 | 0.01 | 0.58 | 0.02 | 0.203 | 0.80 | 20.94 | 86.46 |
| 711 | 0.08 | 0.01 | 0.59 | 0.02 | 0.199 | 0.81 | 20.13 | 86.43 |
| 686 | 0.09 | 0.01 | 0.60 | 0.02 | 0.195 | 0.82 | 19.32 | 86.40 |
| 660 | 0.09 | 0.01 | 0.61 | 0.02 | 0.192 | 0.82 | 18.51 | 86.38 |
| 635 | 0.09 | 0.01 | 0.61 | 0.02 | 0.188 | 0.83 | 17.68 | 86.35 |
| 610 | 0.09 | 0.01 | 0.62 | 0.03 | 0.185 | 0.83 | 16.86 | 86.33 |
| 584 | 0.09 | 0.01 | 0.63 | 0.03 | 0.182 | 0.84 | 16.03 | 86.30 |
| 559 | 0.09 | 0.01 | 0.63 | 0.03 | 0.179 | 0.84 | 15.19 | 86.28 |
| 533 | 0.09 | 0.01 | 0.64 | 0.03 | 0.177 | 0.84 | 14.35 | 86.25 |
| 508 | 0.09 | 0.01 | 0.65 | 0.03 | 0.174 | 0.85 | 13.51 | 86.23 |
| 483 | 0.09 | 0.01 | 0.65 | 0.03 | 0.172 | 0.85 | 12.66 | 86.20 |
| 457 | 0.09 | 0.01 | 0.66 | 0.03 | 0.169 | 0.86 | 11.81 | 86.18 |
| 432 | 0.09 | 0.01 | 0.66 | 0.03 | 0.167 | 0.86 | 10.95 | 86.15 |
| 406 | 0.10 | 0.01 | 0.67 | 0.03 | 0.165 | 0.86 | 10.09 | 86.13 |
| 381 | 0.10 | 0.01 | 0.67 | 0.03 | 0.163 | 0.87 | 9.23 | 86.10 |
| 356 | 0.10 | 0.02 | 0.68 | 0.03 | 0.161 | 0.87 | 8.36 | 86.07 |
| 330 | 0.10 | 0.02 | 0.68 | 0.03 | 0.159 | 0.87 | 7.50 | 86.05 |
| 305 | 0.10 | 0.02 | 0.69 | 0.03 | 0.157 | 0.87 | 6.62 | 86.02 |
| 279 | 0.10 | 0.02 | 0.69 | 0.03 | 0.155 | 0.88 | 5.75 | 86.00 |
| 254 | 0.10 | 0.02 | 0.69 | 0.03 | 0.152 | 0.88 | 4.87 | 85.97 |
| 229 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 3.99 | 85.95 |
| 203 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 3.55 | 85.92 |
| 178 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 3.11 | 85.90 |
| 152 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 2.66 | 85.87 |
| 127 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 2.22 | 85.85 |
| 102 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 1.78 | 85.82 |
| 76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 1.33 | 85.80 |
| 51 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 0.89 | 85.77 |
| 25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.444 | 0.44 | 0.44 | 85.74 |

| PROJECT INFORMATION | |
|-----------------------------|---|
| ENGINEERED PRODUCT MANAGER: | HAIDER NASRULLAH 647-850-9417 HAIDER.NASRULLAH@ADS-PIPE.COM |
| ADS SALES REP: | MICHAEL REID 613-882-4186 MICHAEL.REID@ADS-PIPE.COM |
| PROJECT NO: | S209349 |
| ADS SITE COORDINATOR: | MATTHEW BEGHIN 519-710-3687 MATTHEW.BEGHIN@ADS-PIPE.COM |



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1592 TENTH LINE ROAD

ORLEANS, ON.

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH MC-3500.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- 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.
- 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.
- 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 AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. 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.
- 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.
- 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

- STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- 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.
- THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
- INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE WELL GRADED BETWEEN ¾" AND 2" (20-50 mm).
- STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- 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

- STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- 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".
- 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.

PROPOSED LAYOUT

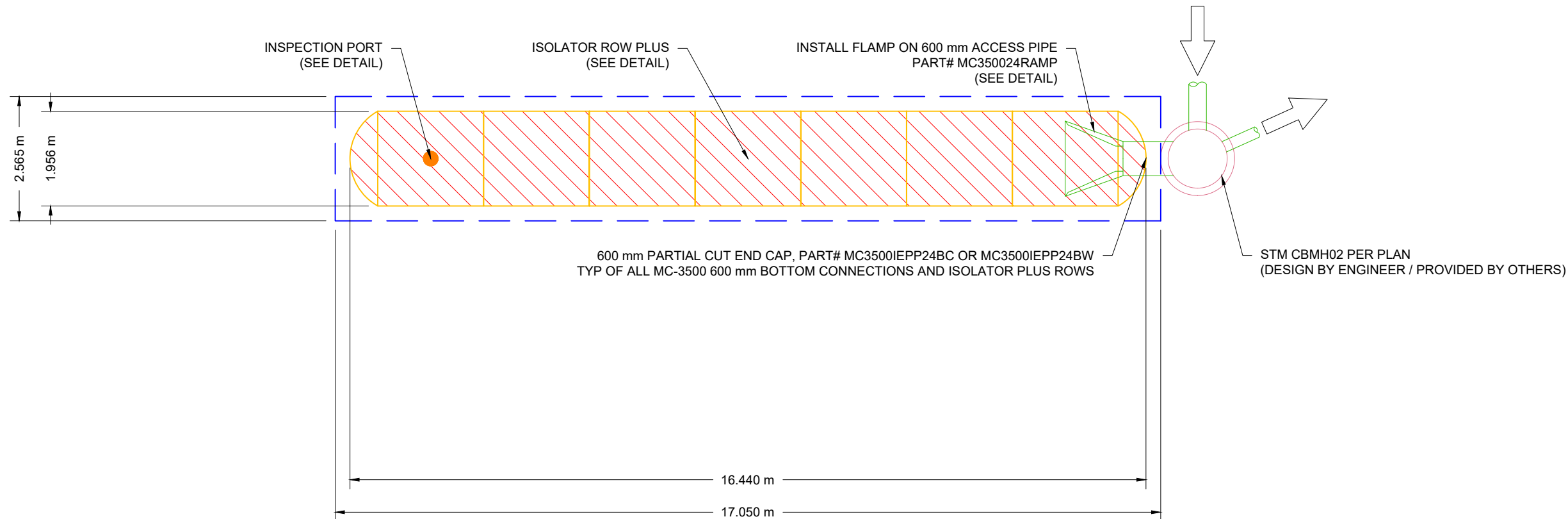
| | |
|-------------|--|
| 7 | STORMTECH MC-3500 CHAMBERS |
| 2 | STORMTECH MC-3500 END CAPS |
| 305 | STONE ABOVE (mm) |
| 229 | STONE BELOW (mm) |
| 40 | % STONE VOID |
| 37.1 | INSTALLED SYSTEM VOLUME (m³) ABOVE ELEVATION 86.00 (PERIMETER STONE INCLUDED) |
| 43.7 | SYSTEM AREA (m²) |
| 39.2 | SYSTEM PERIMETER (m) |

PROPOSED ELEVATIONS

| | |
|--------|--|
| 89.529 | MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED): |
| 87.701 | MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC): |
| 87.548 | MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC): |
| 87.548 | MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT): |
| 87.548 | MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT): |
| 87.396 | TOP OF STONE: |
| 87.091 | TOP OF MC-3500 CHAMBER: |
| 86.000 | 600 mm ISOLATOR ROW PLUS INVERT: |
| 85.948 | BOTTOM OF MC-3500 CHAMBER: |
| 85.719 | BOTTOM OF STONE: |

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL NOTE 6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.



| | |
|----------------------|--------------|
| 1592 TENTH LINE ROAD | |
| ORLEANS, ON. | |
| DATE: 11/04/20 | DRAWN: RCT |
| PROJECT #: S209349 | CHECKED: NPB |

| DATE | DRWN | CHKD | DESCRIPTION |
|------|------|------|-------------|
| | | | |
| | | | |
| | | | |
| | | | |

StormTech
Retention • Retention • Water Quality

520 CROMWELL AVENUE | ROCKY HILL | CT | 06067
 860-529-8188 | 888-892-2894 | WWW.STORMTECH.COM

ADS
ADVANCED DRAINAGE SYSTEMS, INC.

4640 TRUEMAN BLVD
 HILLIARD, OH 43026

SCALE = 1 : 100

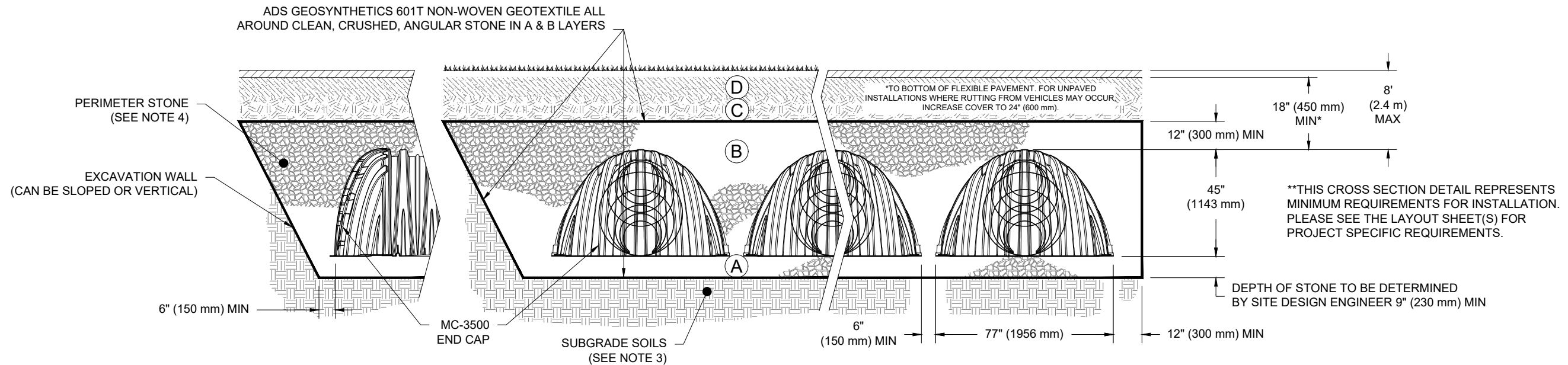
THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE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

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 | 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. | 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. | 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. | 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.



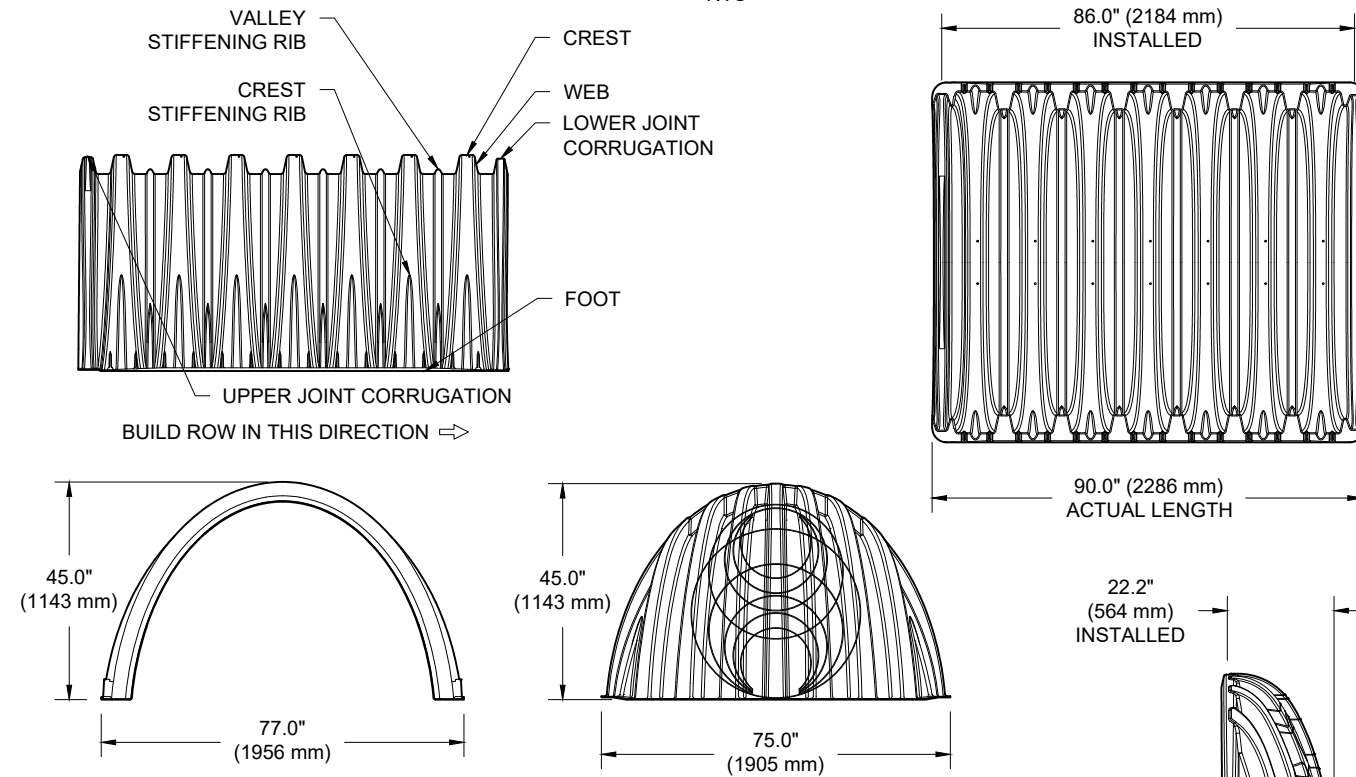
NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "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/IN/IN. 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.

| | | | | |
|---|---|------------|--------------------|--------------|
| 1592 TENTH LINE ROAD ORLEANS, ON. | DATE: 11/04/20 | DRAWN: RCT | PROJECT #: S209349 | CHECKED: NPB |
| DATE | DRWN | CHKD | DESCRIPTION | |
| | | | | |
| <p style="font-size: small; margin: 0;">520 CROMWELL AVENUE ROCKY HILL CT 06067 860-529-8188 888-892-2894 WWW.STORMTECH.COM</p> | | | | |
| <p style="font-size: x-small; margin: 0;">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.</p> | | | | |
| 4640 TRUEMAN BLVD HILLIARD, OH 43026 | <p style="font-size: x-small; margin: 0;">ADVANCED DRAINAGE SYSTEMS, INC.</p> | | | |
| 3 | SHEET OF | | | 5 |

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 m ³) |
| MINIMUM INSTALLED STORAGE* | 175.0 CUBIC FEET | (4.96 m ³) |
| 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 m ³) |
| MINIMUM INSTALLED STORAGE* | 45.1 CUBIC FEET | (1.28 m ³) |
| 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.

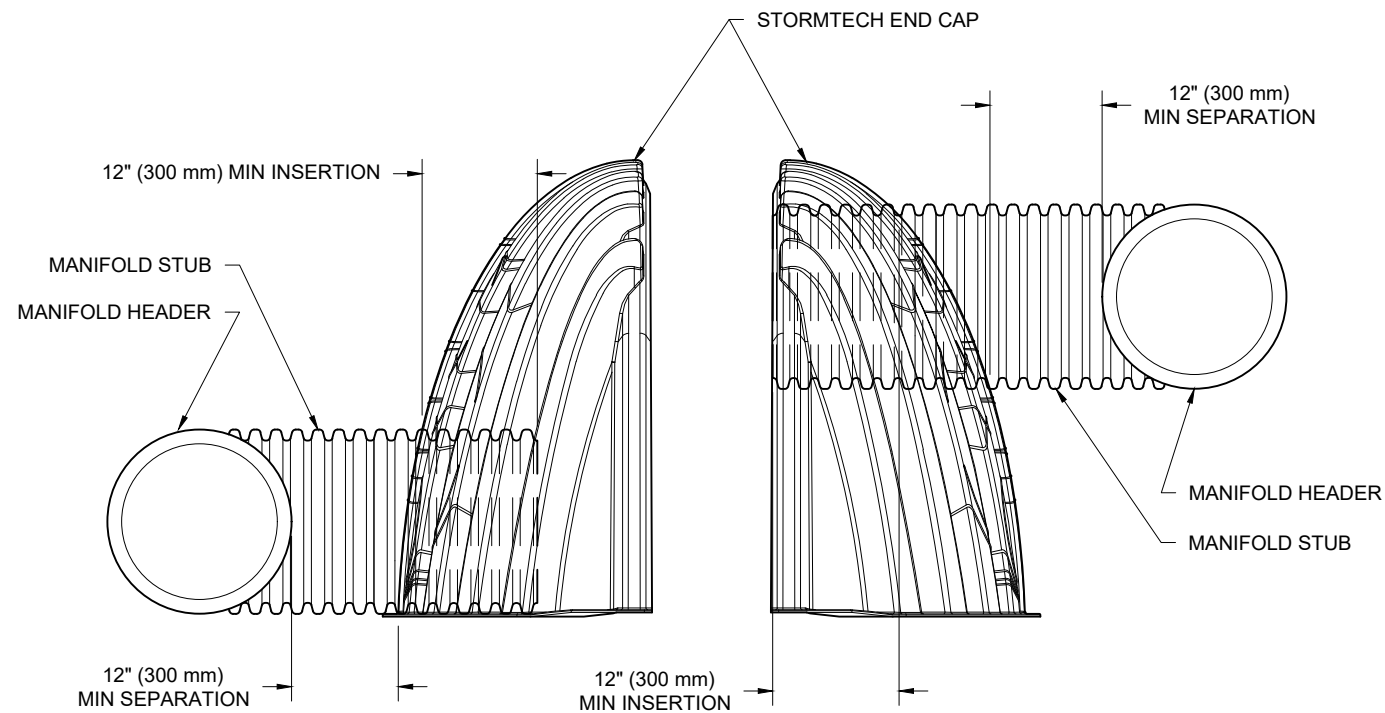
PARTIAL CUT HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
 PARTIAL CUT HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
 END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"
 END CAPS WITH A WELDED CROWN PLATE END WITH "C"

| 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) |

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.

NOTE: ALL DIMENSIONS ARE NOMINAL

1592 TENTH LINE ROAD

ORLEANS, ON.

DATE: 11/04/20 DRAWN: RCT

PROJECT #: S209349 CHECKED: NPB

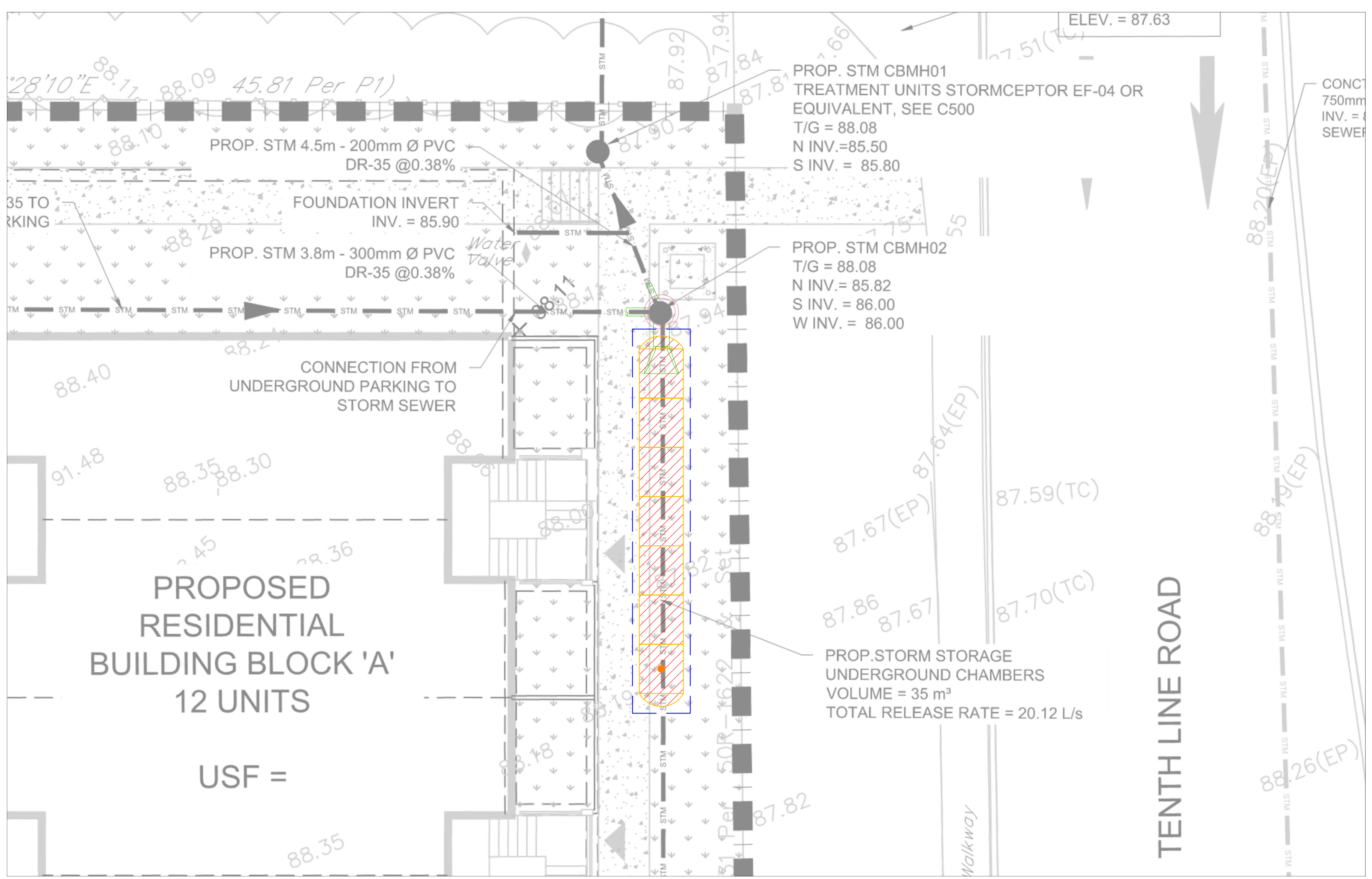


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ELEV. = 87.63

28'10" E 45.81 Per P1)

PROP. STM 4.5m - 200mm Ø PVC
DR-35 @0.38%

PROP. STM CBMH01
TREATMENT UNITS STORMCEPTOR EF-04 OR
EQUIVALENT, SEE C500
T/G = 88.08
N INV.=85.50
S INV. = 85.80

35 TO
RKING

FOUNDATION INVERT
INV. = 85.90

PROP. STM 3.8m - 300mm Ø PVC
DR-35 @0.38%

PROP. STM CBMH02
T/G = 88.08
N INV.= 85.82
S INV. = 86.00
W INV. = 86.00

CONNECTION FROM
UNDERGROUND PARKING TO
STORM SEWER

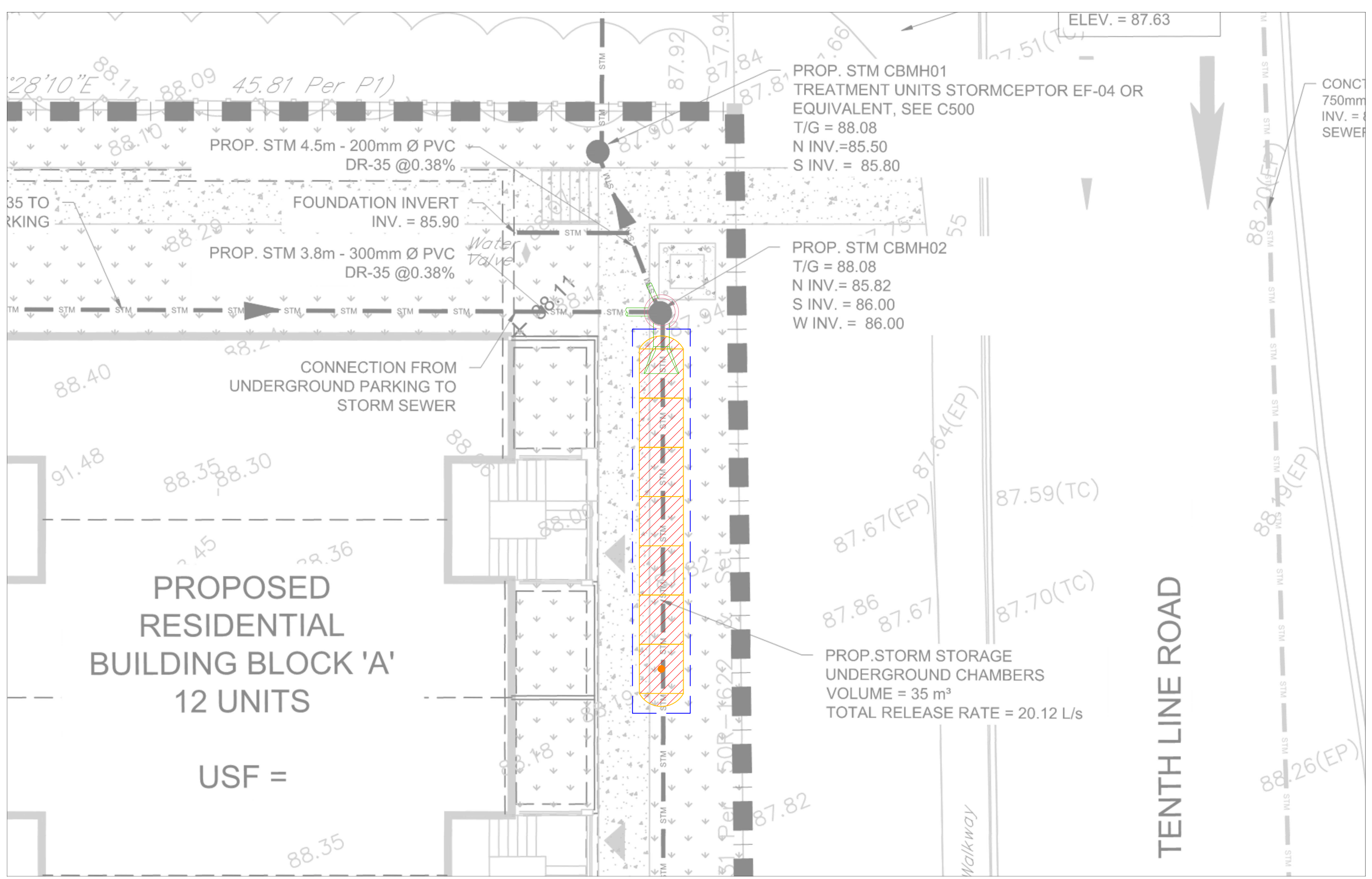
PROPOSED
RESIDENTIAL
BUILDING BLOCK 'A'
12 UNITS

USF =

PROP. STORM STORAGE
UNDERGROUND CHAMBERS
VOLUME = 35 m³
TOTAL RELEASE RATE = 20.12 L/s

TENTH LINE ROAD

CONCT
750mm
INV. =
SEWER



Stormceptor® EF Sizing Report

STORMCEPTOR®

ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

11/17/2020

| | |
|---------------------------|-----------------------------------|
| Province: | Ontario |
| City: | Ottawa |
| Nearest Rainfall Station: | OTTAWA MACDONALD-CARTIER INT'L AP |
| NCDC Rainfall Station Id: | 6000 |
| Years of Rainfall Data: | 37 |

| | |
|-------------------|----------------------------|
| Project Name: | Tenth Line |
| Project Number: | 20-363 |
| Designer Name: | GUILLAUME BRUNET |
| Designer Company: | BL ENGINEERING |
| Designer Email: | guillaume@blengineering.ca |
| Designer Phone: | 613-693-0700 |
| EOR Name: | |
| EOR Company: | |
| EOR Email: | |
| EOR Phone: | |

| | |
|------------|-----------------|
| Site Name: | 1592 Tenth Line |
|------------|-----------------|

| | |
|-------------------------|------|
| Drainage Area (ha): | 0.15 |
| Runoff Coefficient 'c': | 0.84 |

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

| | |
|--|-------|
| Required Water Quality Runoff Volume Capture (%): | 90.00 |
| Estimated Water Quality Flow Rate (L/s): | 4.55 |
| Oil / Fuel Spill Risk Site? | No |
| Upstream Flow Control? | Yes |
| Upstream Orifice Control Flow Rate to Stormceptor (L/s): | 18.05 |
| Peak Conveyance (maximum) Flow Rate (L/s): | |
| Site Sediment Transport Rate (kg/ha/yr): | |

| Net Annual Sediment (TSS) Load Reduction Sizing Summary | |
|---|--------------------------|
| Stormceptor Model | TSS Removal Provided (%) |
| EF4 | 88 |
| EF6 | 91 |
| EF8 | 92 |
| EF10 | 93 |
| EF12 | 93 |

| | |
|--|----------------|
| Recommended Stormceptor EF Model: | EF4 |
| Estimated Net Annual Sediment (TSS) Load Reduction (%): | 88 |
| Water Quality Runoff Volume Capture (%): | > 90 |

Stormceptor® EF Sizing Report

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 waterways.

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 |

Stormceptor[®] EF Sizing Report

Upstream Flow Controlled Results

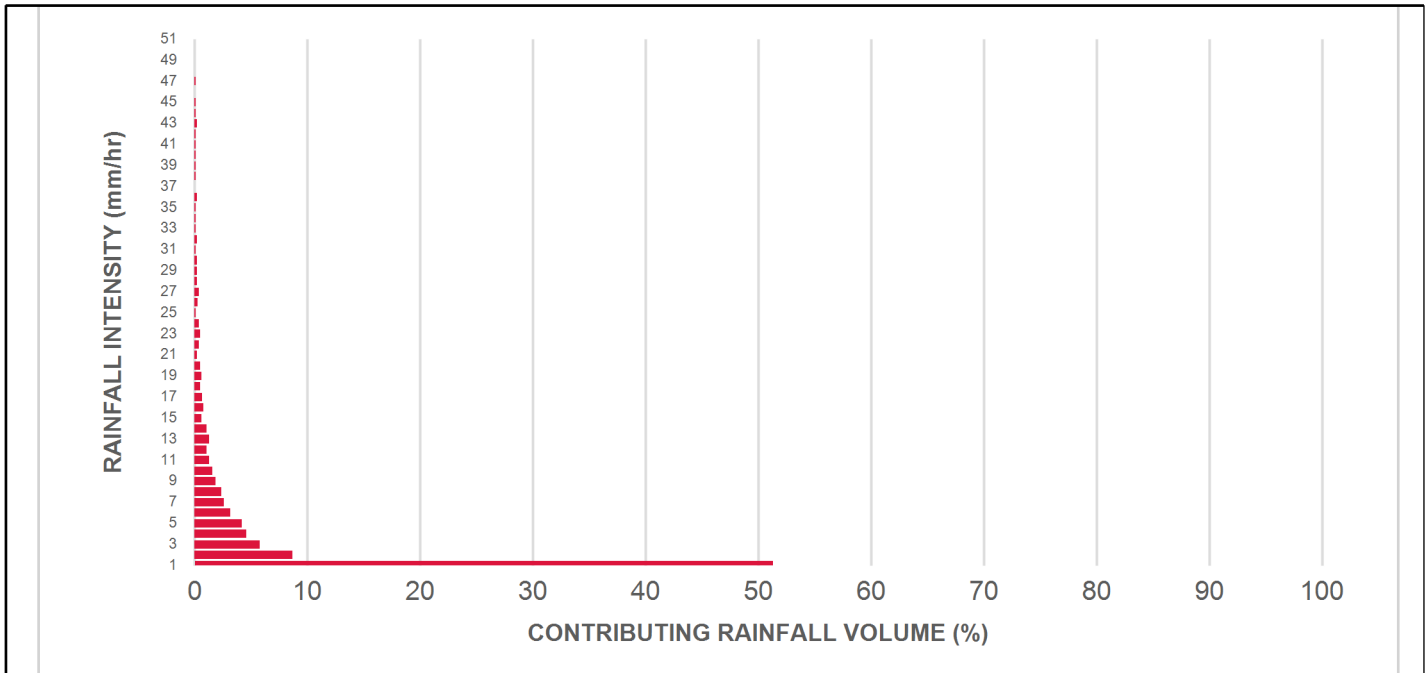
| Rainfall Intensity (mm / hr) | Percent Rainfall Volume (%) | Cumulative Rainfall Volume (%) | Flow Rate (L/s) | Flow Rate (L/min) | Surface Loading Rate (L/min/m ²) | Removal Efficiency (%) | Incremental Removal (%) | Cumulative Removal (%) |
|------------------------------|-----------------------------|--------------------------------|-----------------|-------------------|--|------------------------|-------------------------|------------------------|
| 1 | 51.3 | 51.3 | 0.35 | 21.0 | 18.0 | 93 | 47.7 | 47.7 |
| 2 | 8.7 | 60.0 | 0.70 | 42.0 | 35.0 | 93 | 8.1 | 55.8 |
| 3 | 5.8 | 65.8 | 1.05 | 63.0 | 53.0 | 92 | 5.3 | 61.1 |
| 4 | 4.6 | 70.4 | 1.40 | 84.0 | 70.0 | 90 | 4.1 | 65.3 |
| 5 | 4.2 | 74.6 | 1.75 | 105.0 | 88.0 | 89 | 3.7 | 69.0 |
| 6 | 3.2 | 77.8 | 2.10 | 126.0 | 105.0 | 87 | 2.8 | 71.8 |
| 7 | 2.6 | 80.4 | 2.45 | 147.0 | 123.0 | 85 | 2.2 | 74.0 |
| 8 | 2.4 | 82.8 | 2.80 | 168.0 | 140.0 | 83 | 2.0 | 76.0 |
| 9 | 1.9 | 84.7 | 3.15 | 189.0 | 158.0 | 81 | 1.5 | 77.5 |
| 10 | 1.6 | 86.3 | 3.50 | 210.0 | 175.0 | 79 | 1.3 | 78.8 |
| 11 | 1.3 | 87.6 | 3.85 | 231.0 | 193.0 | 77 | 1.0 | 79.8 |
| 12 | 1.1 | 88.7 | 4.20 | 252.0 | 210.0 | 75 | 0.8 | 80.6 |
| 13 | 1.3 | 90.0 | 4.55 | 273.0 | 228.0 | 74 | 1.0 | 81.6 |
| 14 | 1.1 | 91.1 | 4.90 | 294.0 | 245.0 | 72 | 0.8 | 82.4 |
| 15 | 0.6 | 91.7 | 5.25 | 315.0 | 263.0 | 71 | 0.4 | 82.8 |
| 16 | 0.8 | 92.5 | 5.60 | 336.0 | 280.0 | 69 | 0.6 | 83.4 |
| 17 | 0.7 | 93.2 | 5.95 | 357.0 | 298.0 | 68 | 0.5 | 83.8 |
| 18 | 0.5 | 93.7 | 6.31 | 378.0 | 315.0 | 66 | 0.3 | 84.2 |
| 19 | 0.6 | 94.3 | 6.66 | 399.0 | 333.0 | 64 | 0.4 | 84.5 |
| 20 | 0.5 | 94.8 | 7.01 | 420.0 | 350.0 | 63 | 0.3 | 84.9 |
| 21 | 0.2 | 95.0 | 7.36 | 441.0 | 368.0 | 62 | 0.1 | 85.0 |
| 22 | 0.4 | 95.4 | 7.71 | 462.0 | 385.0 | 60 | 0.2 | 85.2 |
| 23 | 0.5 | 95.9 | 8.06 | 483.0 | 403.0 | 58 | 0.3 | 85.5 |
| 24 | 0.4 | 96.3 | 8.41 | 504.0 | 420.0 | 58 | 0.2 | 85.7 |
| 25 | 0.1 | 96.4 | 8.76 | 525.0 | 438.0 | 58 | 0.1 | 85.8 |

Stormceptor[®] EF Sizing Report

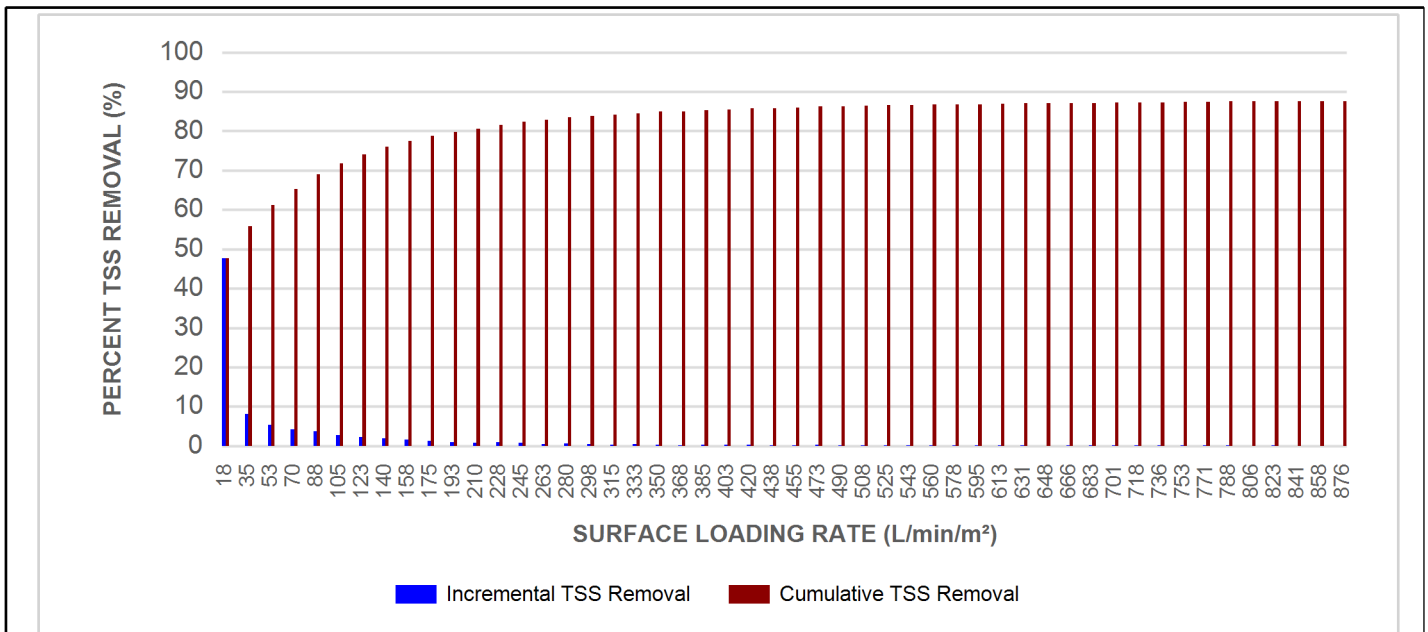
| Rainfall Intensity (mm / hr) | Percent Rainfall Volume (%) | Cumulative Rainfall Volume (%) | Flow Rate (L/s) | Flow Rate (L/min) | Surface Loading Rate (L/min/m ²) | Removal Efficiency (%) | Incremental Removal (%) | Cumulative Removal (%) |
|---|-----------------------------|--------------------------------|-----------------|-------------------|--|------------------------|-------------------------|------------------------|
| 26 | 0.3 | 96.7 | 9.11 | 546.0 | 455.0 | 58 | 0.2 | 86.0 |
| 27 | 0.4 | 97.1 | 9.46 | 567.0 | 473.0 | 57 | 0.2 | 86.2 |
| 28 | 0.2 | 97.3 | 9.81 | 588.0 | 490.0 | 57 | 0.1 | 86.3 |
| 29 | 0.2 | 97.5 | 10.16 | 609.0 | 508.0 | 57 | 0.1 | 86.4 |
| 30 | 0.2 | 97.7 | 10.51 | 631.0 | 525.0 | 57 | 0.1 | 86.5 |
| 31 | 0.1 | 97.8 | 10.86 | 652.0 | 543.0 | 57 | 0.1 | 86.6 |
| 32 | 0.2 | 98.0 | 11.21 | 673.0 | 560.0 | 56 | 0.1 | 86.7 |
| 33 | 0.1 | 98.1 | 11.56 | 694.0 | 578.0 | 56 | 0.1 | 86.8 |
| 34 | 0.1 | 98.2 | 11.91 | 715.0 | 595.0 | 56 | 0.1 | 86.8 |
| 35 | 0.1 | 98.3 | 12.26 | 736.0 | 613.0 | 56 | 0.1 | 86.9 |
| 36 | 0.2 | 98.5 | 12.61 | 757.0 | 631.0 | 56 | 0.1 | 87.0 |
| 37 | 1.5 | 100.0 | 12.96 | 778.0 | 648.0 | 56 | 0.8 | 87.8 |
| 38 | 0.1 | 100.1 | 13.31 | 799.0 | 666.0 | 56 | 0.1 | 87.9 |
| 39 | 0.1 | 100.2 | 13.66 | 820.0 | 683.0 | 56 | 0.1 | 87.9 |
| 40 | 0.1 | 100.3 | 14.01 | 841.0 | 701.0 | 56 | 0.1 | 88.0 |
| 41 | 0.1 | 100.4 | 14.36 | 862.0 | 718.0 | 55 | 0.1 | 88.0 |
| 42 | 0.1 | 100.5 | 14.71 | 883.0 | 736.0 | 55 | 0.1 | 88.1 |
| 43 | 0.2 | 100.7 | 15.06 | 904.0 | 753.0 | 55 | 0.1 | 88.2 |
| 44 | 0.1 | 100.8 | 15.41 | 925.0 | 771.0 | 55 | 0.1 | 88.3 |
| 45 | 0.1 | 100.9 | 15.76 | 946.0 | 788.0 | 55 | 0.1 | 88.3 |
| 46 | -0.9 | 100.0 | 16.11 | 967.0 | 806.0 | 55 | N/A | 87.8 |
| 47 | 0.1 | 100.1 | 16.46 | 988.0 | 823.0 | 55 | 0.1 | 87.9 |
| 48 | -0.1 | 100.0 | 16.81 | 1009.0 | 841.0 | 55 | N/A | 87.8 |
| 49 | 0.0 | 100.0 | 17.16 | 1030.0 | 858.0 | 55 | 0.0 | 87.8 |
| 50 | 0.0 | 100.0 | 17.51 | 1051.0 | 876.0 | 55 | 0.0 | 87.8 |
| Estimated Net Annual Sediment (TSS) Load Reduction = | | | | | | | | 88 % |

Stormceptor® EF Sizing Report

RAINFALL DATA FROM OTTAWA MACDONALD-CARTIER INT'L AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Stormceptor® EF Sizing Report

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

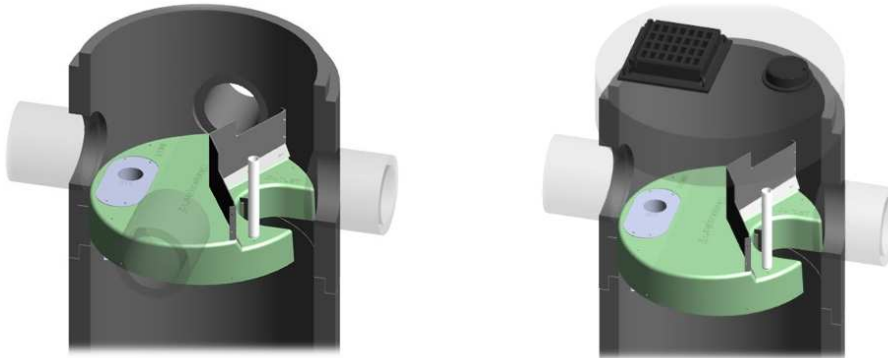
► **Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

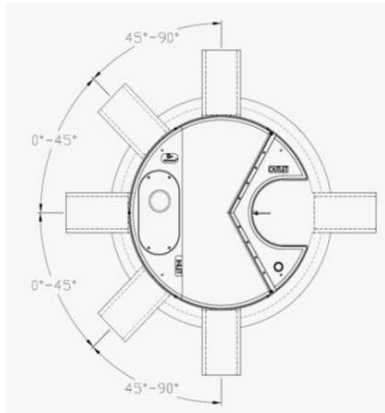
► **Stormceptor® EF and EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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



Stormceptor® EF Sizing Report



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) | (ft³) | (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/ft³)

| 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.imbrium.com/stormwater-treatment-solutions/stormceptor-ef>

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

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 Separators.**

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

| | | |
|-------|-------------------------------------|---|
| 2.1.1 | 4 ft (1219 mm) Diameter OGS Units: | 1.19 m ³ sediment / 265 L oil |
| | 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

Stormceptor[®] EF Sizing Report

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 shall be determined using historical rainfall data and a sediment removal performance curve derived from the actual third-party verified laboratory testing data. 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/m².

APPENDIX “E”

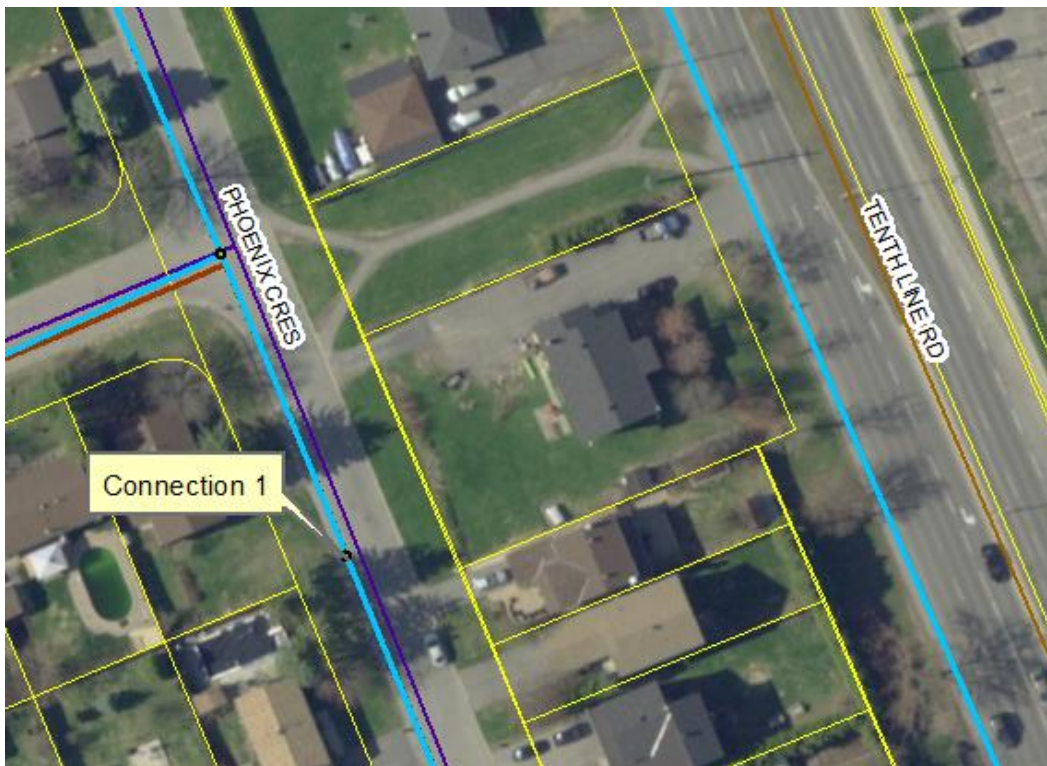
Boundary Conditions

Boundary Conditions 1592 Tenth Line

Provided Information

| Scenario | Demand | |
|----------------------|--------|--------|
| | L/min | L/s |
| Average Daily Demand | 10 | 0.17 |
| Maximum Daily Demand | 26 | 0.43 |
| Peak Hour | 56 | 0.94 |
| Fire Flow Demand #1 | 8,200 | 136.67 |

Location



Results

Connection 1 – Phoenix Cres.

| Demand Scenario | Head (m) | Pressure ¹ (psi) |
|---------------------|----------|-----------------------------|
| Maximum HGL | 130.2 | 60.4 |
| Peak Hour | 125.7 | 54.1 |
| Max Day plus Fire 1 | 115.9 | 40.2 |

¹ Ground Elevation = 87.69 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.

APPENDIX “F”

Engineering Drawings

EROSION AND SEDIMENT CONTROL MEASURES:

** CONTRACTOR IS RESPONSIBLE FOR ALL INSTALLATION, MONITORING, REPAIR AND REMOVAL OF ALL EROSION AND SEDIMENT CONTROL FEATURES **

1. PRIOR TO START OF CONSTRUCTION:

- 1.1. PRIOR TO THE REMOVAL OF ANY VEGETATIVE COVER, MOVING OF ANY SOIL, AND CONSTRUCTION:
 - 1.1.1. INSTALL SILT FENCE IMMEDIATELY DOWNSTREAM FROM AREAS TO BE DISTURBED (SEE PLAN FOR LOCATION).
 - 1.1.2. INSTALL GEOSOCK INSERTS WITH AN OVERFLOW IN ALL THE DOWNSTREAM CATCH BASINS AND MANHOLES.
 - 1.1.3. INSTALL SILTSACK FILTERS IN ALL CONCRETE CATCH BASIN STRUCTURES.
 - 1.1.4. INSPECT MEASUREMENTS IMMEDIATELY AFTER INSTALLATION.

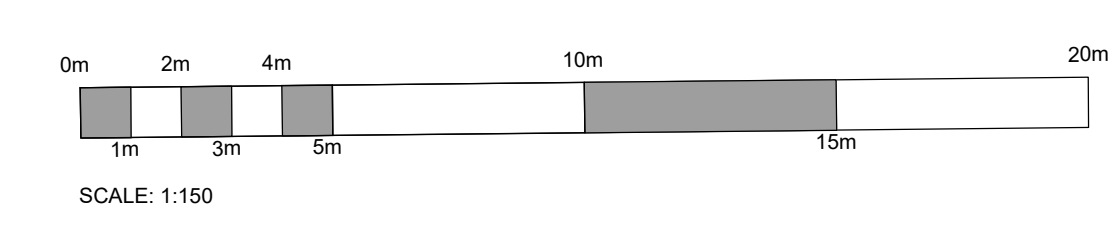
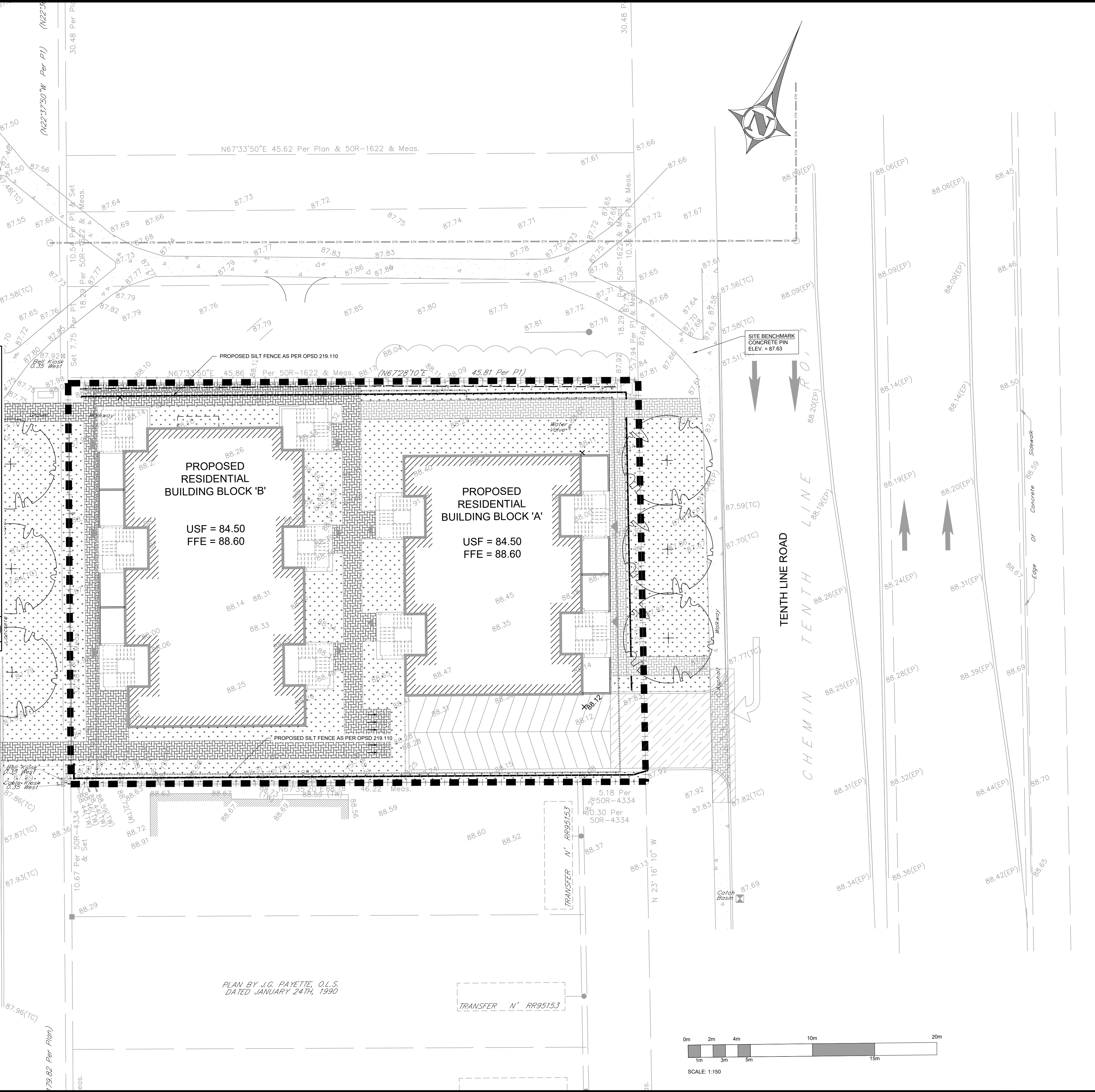
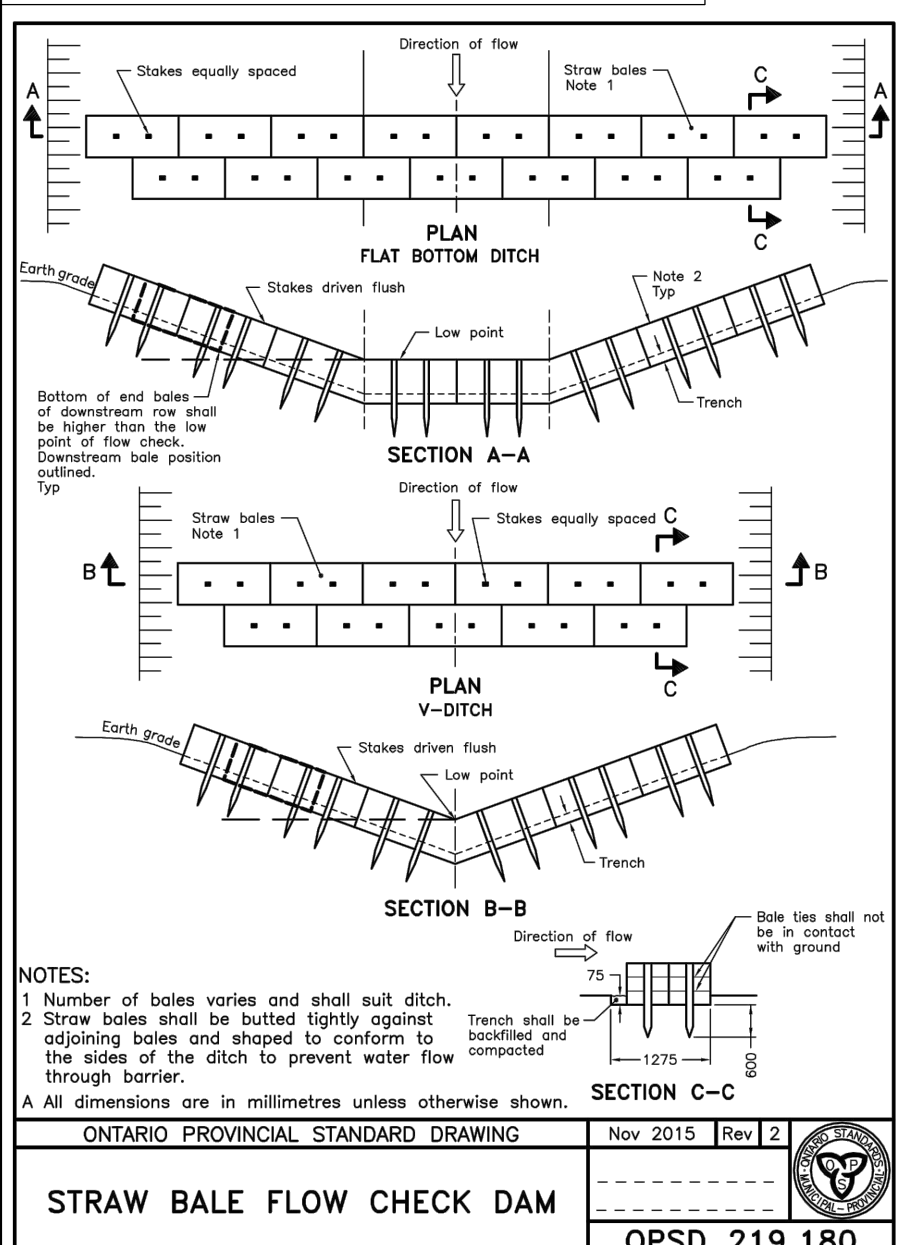
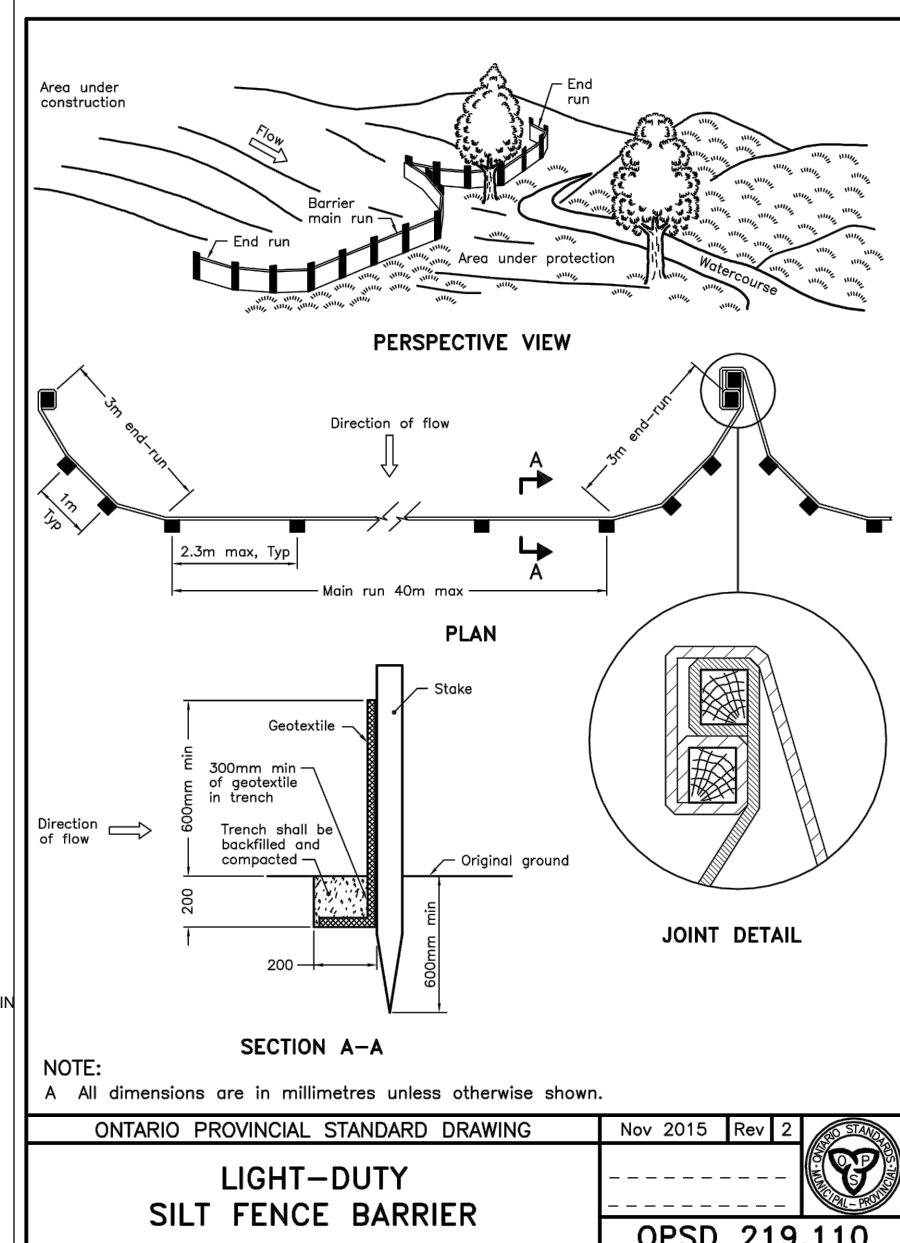
2. DURING CONSTRUCTION:

- 2.1. WORK TO BE DONE IN THE VICINITY OF MAJOR WATERWAYS TO BE CARRIED OUT FROM JULY TO SEPTEMBER ONLY.
- 2.2. MINIMIZE THE EXTENT OF DISTURBED AREAS AND THE DURATION OF EXPOSURE.
- 2.3. PROTECT DISTURBED AREAS FROM RUNOFF.
- 2.4. PROVIDE TEMPORARY COVER SUCH AS SEEDING OR MULCHING IF DISTURBED AREA WILL NOT BE REHABILITATED WITHIN 30 DAYS.
- 2.5. INSPECT SILT FENCE, FILTER CLOTHS, AND CATCH BASIN SUMPS WEEKLY AND AFTER EVERY MAJOR STORM EVENT. CLEAN AND REPAIR WHEN NECESSARY.
- 2.6. PLAN TO BE REVIEWED AND REVISED AS REQUIRED DURING CONSTRUCTION.
- 2.7. EROSION CONTROL FENCING TO BE ALSO INSTALLED AROUND THE BASE OF ALL STOCKPILES.
- 2.8. DO NOT LOCATE TOPSOIL PILES AND EXCAVATION MATERIAL CLOSER THAN 2.5m FROM ANY PAVED SURFACE, OR ONE WHICH IS TO BE PAVED BEFORE PILE IS REMOVED. ALL TOPSOIL PILES ARE TO BE SEEDED IF THEY ARE TO REMAIN ON SITE LONG ENOUGH FOR SEEDS TO GROW (30 DAYS).

- 2.9. CONTROL WIND-BLOWN DUST OFF SITE TO ACCEPTABLE LEVELS BY SEEDING TOPSOIL PILES AND OTHER AREAS TEMPORARILY (PROVIDE WATERING AS REQUIRED).
 - 2.10. ALL EROSION CONTROL STRUCTURE TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN STABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE GROUND COVER.
 - 2.11. NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THIS CONSULTING ENGINEER AND THE CITY DEPARTMENT OF PUBLIC WORKS. TO PREVENT UNNECESSARY SEDIMENT DISCHARGE, THE CONTRACTOR IS PERMITTED TO PLACE ADDITIONAL SEDIMENT AND EROSION CONTROL MEASURES IN A TIMELY MANNER, IF REQUIRED, THE CONTRACTOR TO ADVISE CONSULTANT ONCE INSTALLED FOR INSPECTION.
 - 2.12. CONTRACTOR RESPONSIBLE FOR CITY ROADWAY AND SIDEWALK TO BE CLEANED OF ALL SEDIMENT FROM VEHICULAR TRACKING ETC. AT THE END OF EACH WORK DAY.
 - 2.13. PROVIDE GRAVEL ENTRANCE WHEREVER EQUIPMENT LEAVES THE SITE TO PREVENT MUD TRACKING ONTO PAVED SURFACES. GRAVEL BED SHALL BE A MINIMUM OF 15m LONG, 4m WIDE AND 0.3m DEEP AND SHALL CONSIST OF COARSE (50mm CRUSHER-RUN LIMESTONE). MAINTAIN GRAVEL ENTRANCE IN CLEAN CONDITION.
 - 2.14. DURING WET CONDITIONS, TIRES OF ALL VEHICLES/EQUIPMENT LEAVING THE SITE ARE TO BE SCRAPPED.
 - 2.15. ANY MUD/MATERIAL TRACKED ONTO THE ROAD SHALL BE REMOVED IMMEDIATELY BY HAND OR RUBBER TIRE LOADER.
 - 2.16. TAKE ALL NECESSARY STEPS TO PREVENT BUILDING MATERIAL, CONSTRUCTION DEBRIS OR WASTE BEING SPILLED OR TRACKED ONTO ADJUTING PROPERTIES OR PUBLIC STREETS DURING CONSTRUCTION AND PROCEED IMMEDIATELY TO CLEAN UP ANY AREAS SO AFFECTED.
- 3. AFTER CONSTRUCTION:**
- 3.1. PROVIDE PERMANENT COVER CONSISTING OF TOPSOIL AND SEED TO DISTURBED AREA.
 - 3.2. REMOVE STRAW BALE FLOW CHECK DAMS, SILT FENCES AND FILTER CLOTHS ON CATCH BASINS AND MANHOLE COVERS AFTER DISTURBED AREAS HAVE BEEN REHABILITATED AND STABILIZED.
 - 3.3. INSPECT AND CLEAN CATCH BASIN SUMPS AND STORM SEWERS.

LEGEND:

- — — — — EXISTING PROPERTY LINE TO REMAIN
- - - - - PROPOSED EASEMENT
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- — — — — PROPOSED DOOR ENTRANCE/EXIT
- +50.00 PROPOSED ELEVATION
- +50.00 BW PROPOSED BOTTOM OF WALL ELEVATION
- +50.00 SD PROPOSED TOP OF SIDEWALK ELEVATION
- +50.00 EX MATCH INTO EXISTING ELEVATION
- 70.19 EXISTING ELEVATION
- ➔ PROPOSED OVERLAND MAJOR FLOW ROUTE
- — — — — PROPOSED SILT FENCE AS PER OPSD 219.110
- — — — — PROPOSED 200mm PERFORATED SUBDRAIN
- — — — — PROPOSED STORM SEWER
- — — — — PROPOSED SANITARY SEWER
- — — — — PROPOSED WATERMAIN
- — — — — EXISTING SANITARY SEWER
- — — — — EXISTING WATERMAIN
- — — — — PROPOSED CATCH BASIN/MANHOLE/CATCH-BASIN
- — — — — PROPOSED PIPE INSULATION
- — — — — PROPOSED 100 YEAR HIGH WATER LEVEL
- — — — — STORM WATERSHED EXTENT
- WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES
- PROPOSED GRASS AREA. REFER TO LANDSCAPE
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED GRAVEL AREA
- PROPOSED RIP RAP AS PER OPSD 810.010
- PROPOSED WATER METER



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EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
1592 TENTH LINE RD,
ORLEANS, ON

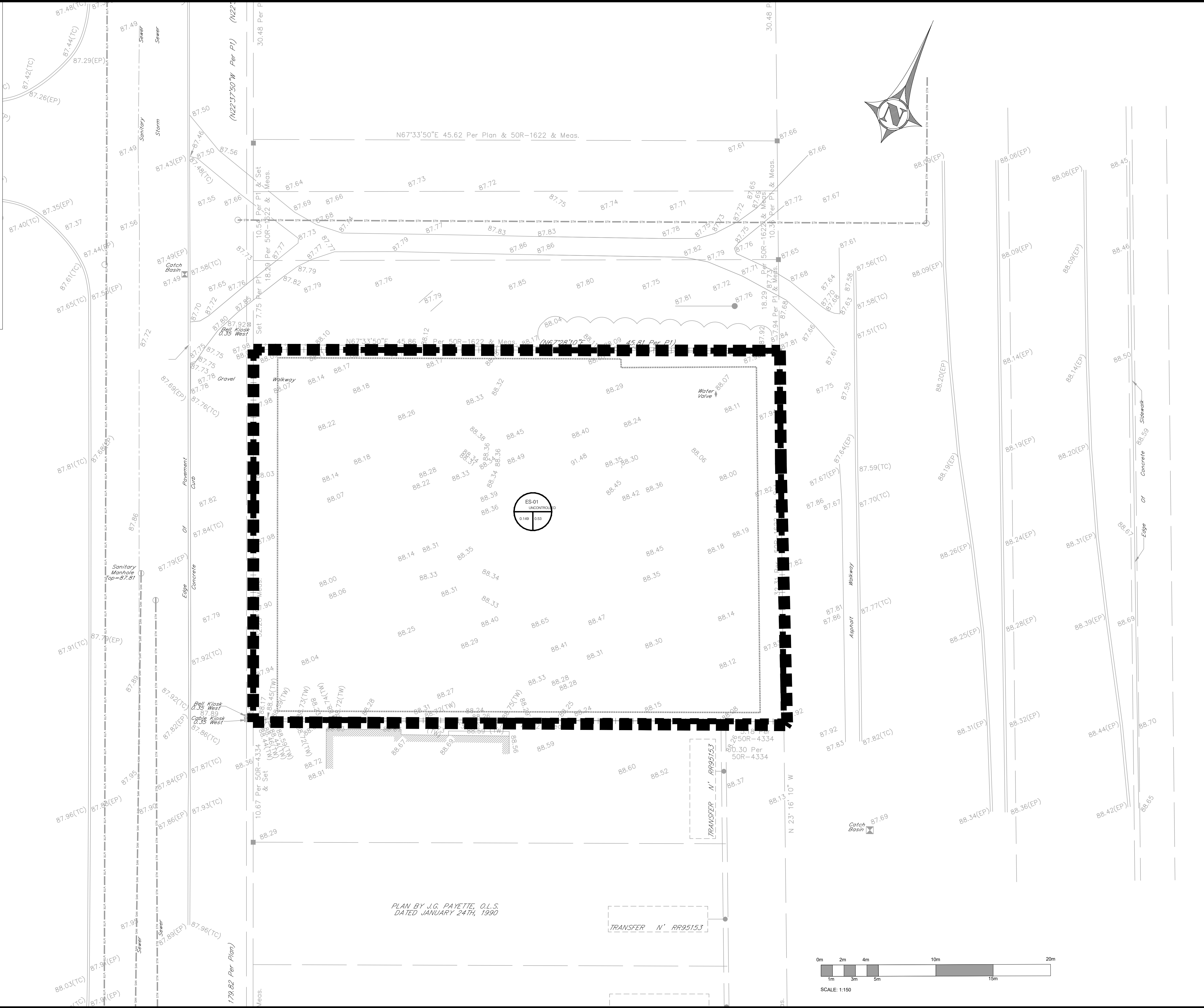
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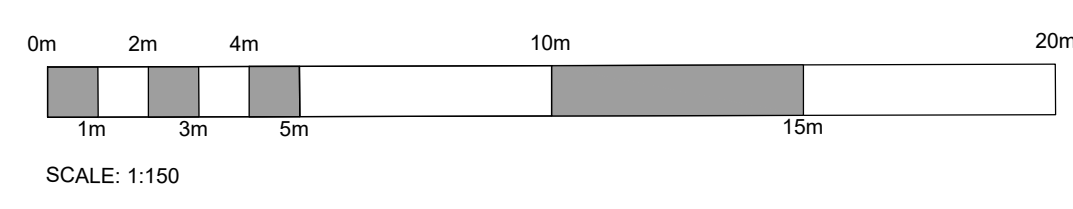
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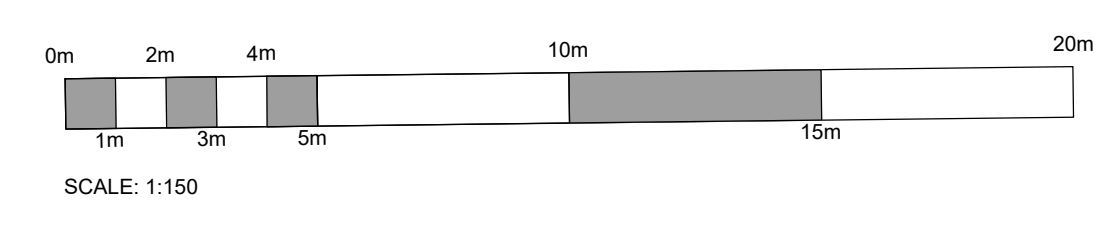
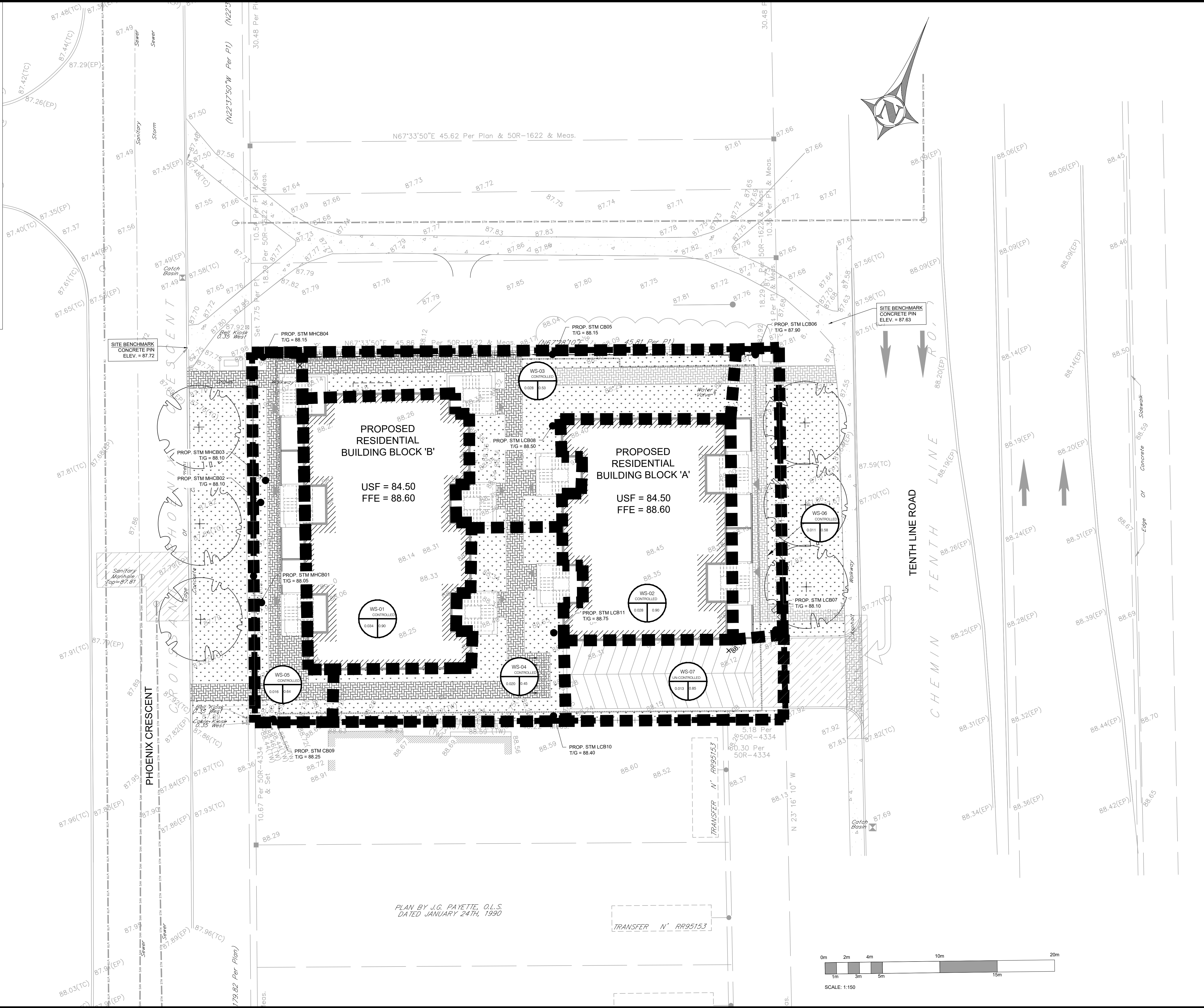
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DATED JANUARY 24TH, 1990

TRANSFER N' RR95153

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- WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES
- PROPOSED GRASS AREA. REFER TO LANDSCAPING
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- PROPOSED GRAVEL AREA
- PROPOSED RIP RAP AS PER OPSD 810.010
- PROPOSED WATER METER



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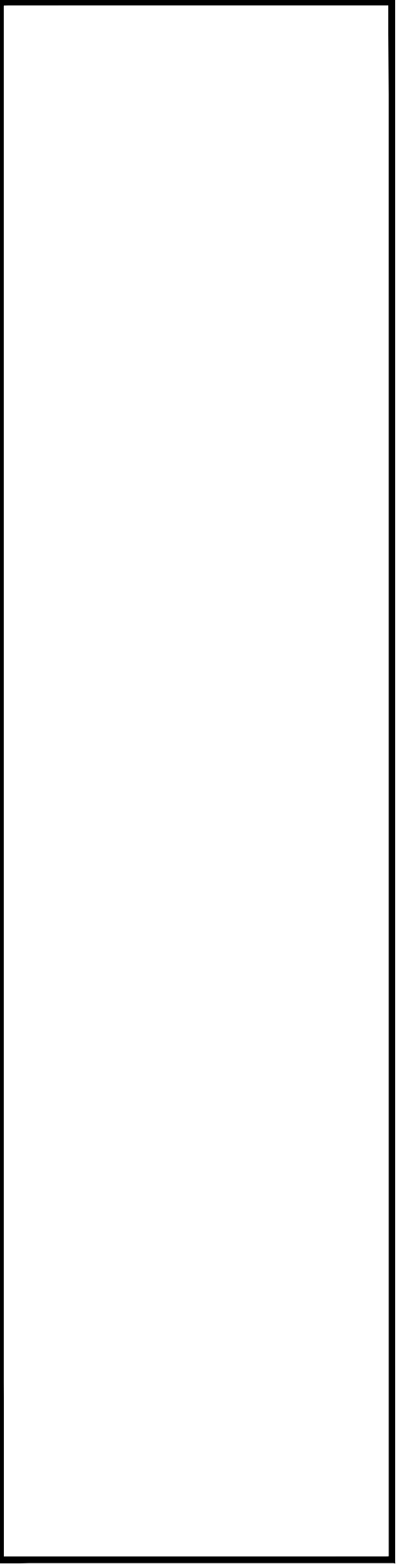
CLIENT:
BRIDOR DEVELOPMENT
996-B ST. AUGUSTIN RD.
EMBRUN, ON

PROJECT:
NEW RESIDENTIAL DEVELOPMENT
1592 TENTH LINE RD.
ORLEANS, ON

DRAWING:
POST DEVELOPMENT STORAGE AREA

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DETAILS - 1

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C500

| PROJECT INFORMATION | |
|-----------------------------|---|
| ENGINEERED PROJECT MANAGER: | HAIDER NASRULLAH 647-859-8417 HAIDER.NASRULLAH@ADS-PIPE.COM |
| DESIGNER: | MICHAEL REID 413-462-4186 MICHAEL.REID@ADS-PIPE.COM |
| PROJECT NO.: | S202049 |
| 445 SITE COORDINATOR: | MATTHEW BECHIN 519-710-3887 MATTHEW.BECHIN@ADS-PIPE.COM |



ADVANCED DRAINAGE SYSTEMS, INC.

1592 TENTH LINE ROAD

ORLEANS, ON.

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH MC-3500.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL BE CERTIFIED TO CSA B14, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES" AND MEET THE REQUIREMENTS OF ASTM F2418-18a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45/75 DESIGNATION IS.
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- 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 58 CL 613 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- 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.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LOGS.
 - 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 AS DEFINED IN SECTION 6.2.3 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN², 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.
- 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 1.85 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 CRISP 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.
- 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

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

NOTES FOR CONSTRUCTION EQUIPMENT

- STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- THE USE OF EQUIPMENT OVER MC-3500 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 MC-3500/MC-4500 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- 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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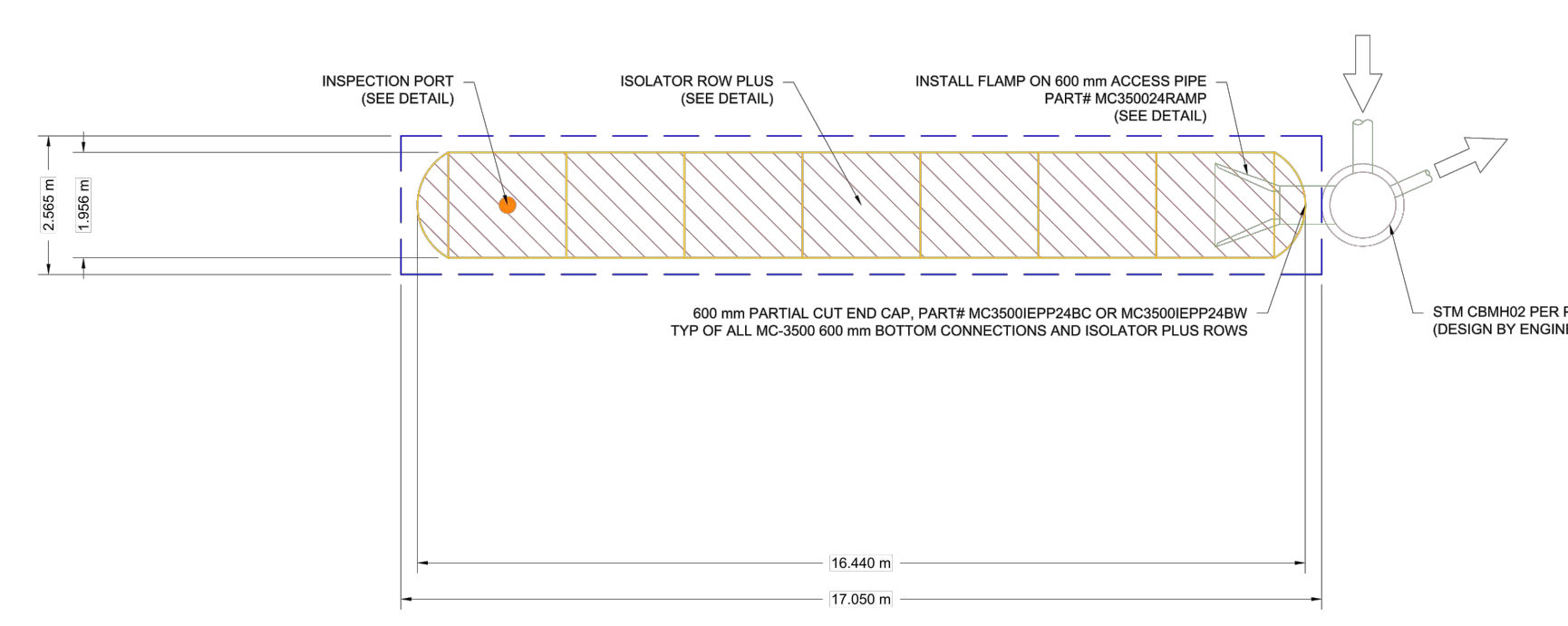
| PROPOSED LAYOUT | |
|--------------------------|---|
| 7 | STORMTECH MC-3500 CHAMBERS |
| 2 | STORMTECH MC-3500 END CAPS |
| 306 | STONE ABOVE (mm) |
| 229 | STONE BELOW (mm) |
| 40 | 1" STONE VOID |
| 37.1 | INSTALLED SYSTEM VOLUME (m ³) ABOVE ELEVATION 86.00 |
| PERIMETER STONE INCLUDED | |
| 43.7 | SYSTEM AREA (m ²) |
| 39.2 | SYSTEM PERIMETER (m) |

PROPOSED ELEVATIONS

| | |
|--------|---|
| 89.00 | MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED) |
| 87.701 | MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC) |
| 87.548 | MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC) |
| 87.548 | MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT) |
| 87.548 | MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT) |
| 87.396 | TOP OF STONE |
| 87.091 | TOP OF MC-3500 CHAMBER |
| 86.000 | 600 mm ISOLATOR ROW PLUS INVERT |
| 86.948 | BOTTOM OF MC-3500 CHAMBER |
| 85.719 | BOTTOM OF STONE |

NOTES

- MANHOLE SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL NOTE 8.32 FOR MANHOLE SIZING GUIDANCE.
- DU TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANHOLE COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSTALLED SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.



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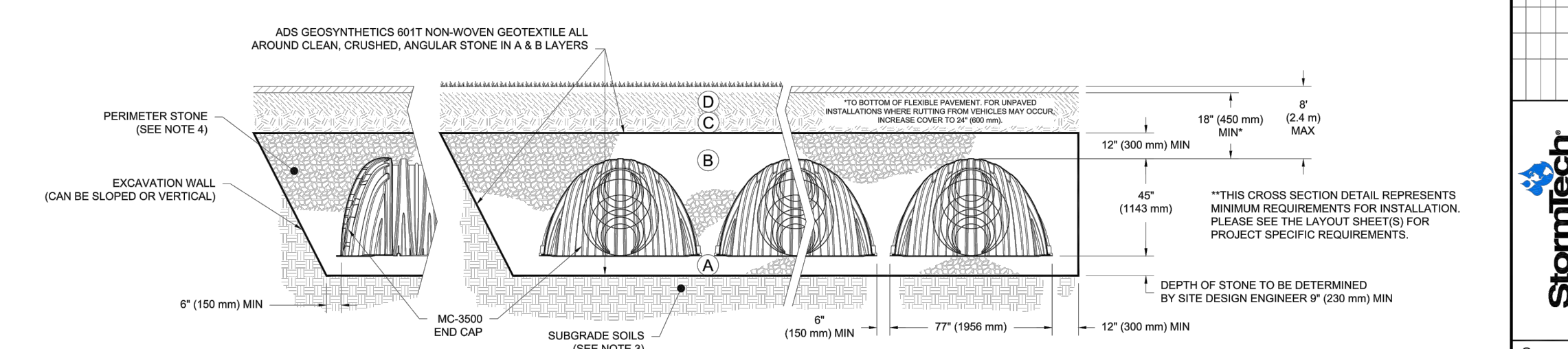
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ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

| 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. | 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. | AASHTO M145 ¹ A1, A2-4, A-3 OR AASHTO M43 ² 3, 307, 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. 98% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 90% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. |
| B | EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE. | AASHTO M43 ² 3, 4 | NO COMPACTION REQUIRED. |
| A | FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER. | AASHTO M43 ² 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 ALL LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (200 mm) MAX LIFTS USING TWO FULL COVERS WITH A VIBRATORY COMPACTOR.
 3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOADS, 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.



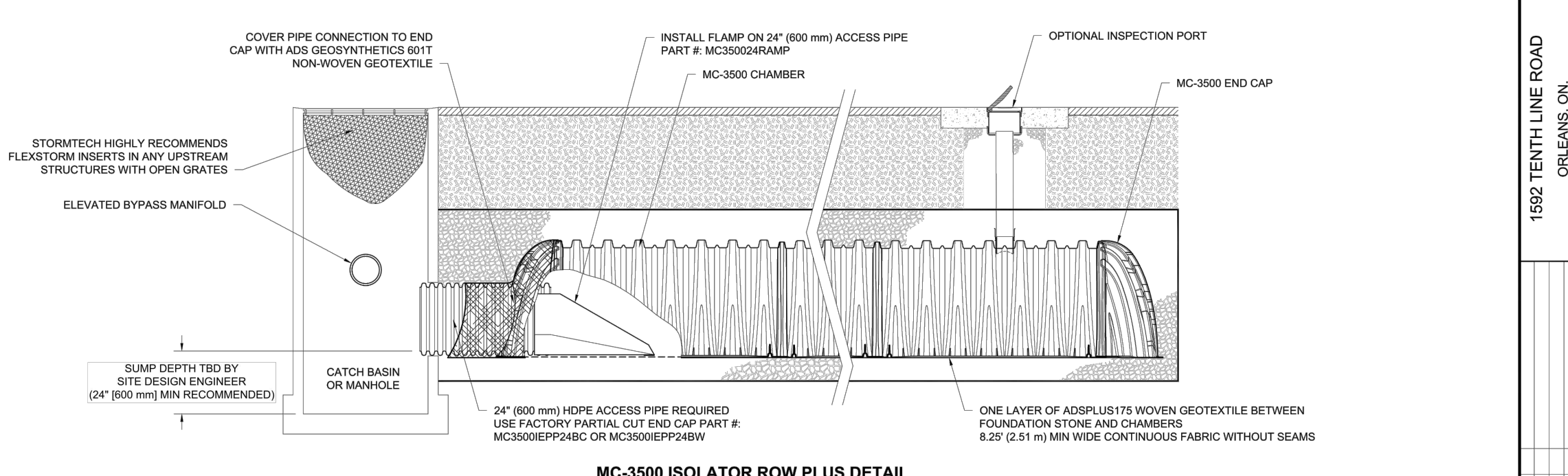
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- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-18a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45/75 DESIGNATION IS.
- MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSIGNING 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.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED STACKING LOGS.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LOGS.
 - 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 AS DEFINED IN SECTION 6.2.3 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN², 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.

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MC-3500 ISOLATOR ROW PLUS DETAIL
N.T.S.

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 FLEXFORM FILTER IF INSTALLED

A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG

A.4. LOWER 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

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 BACKWASH 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

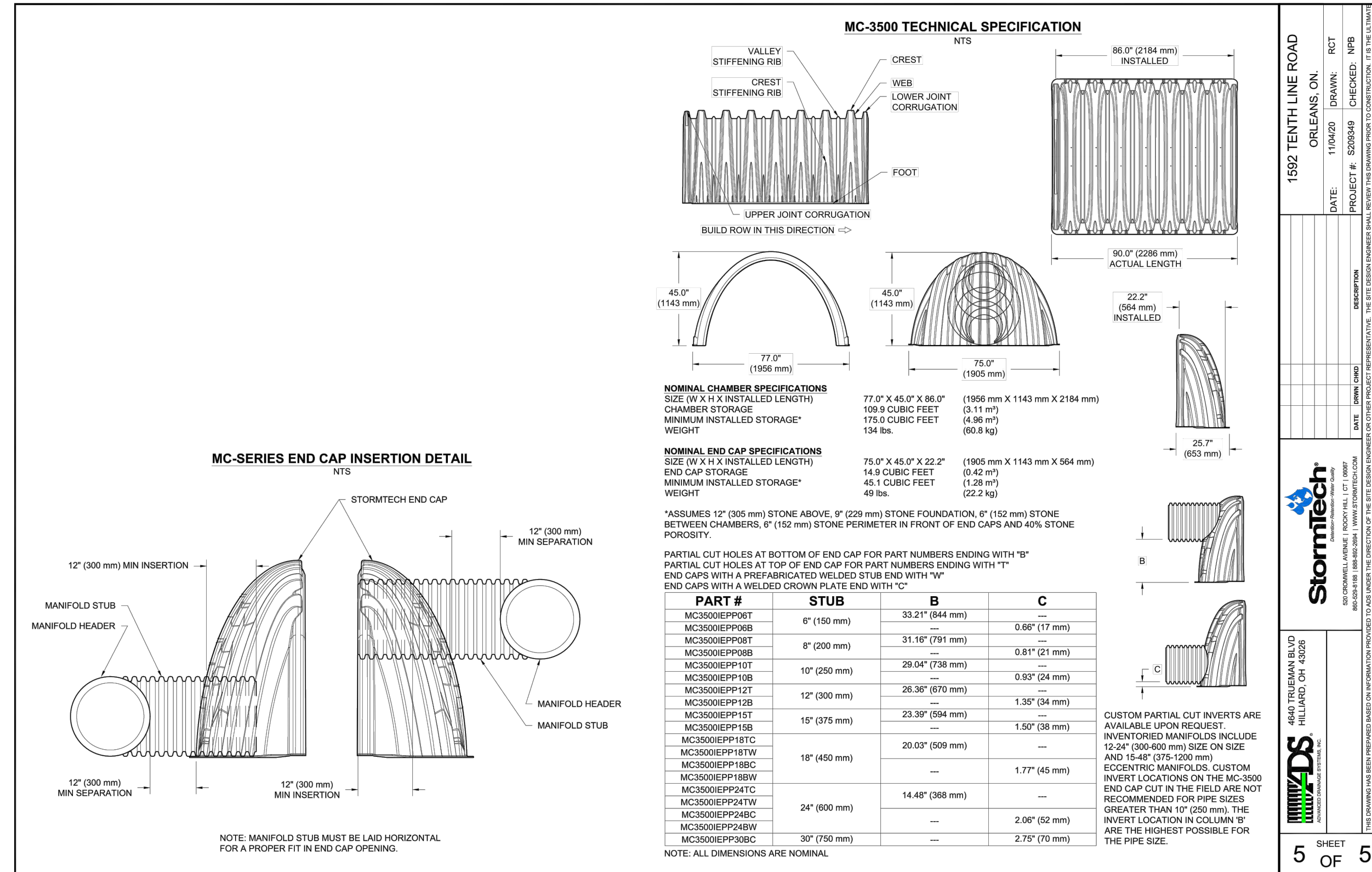
- INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
- CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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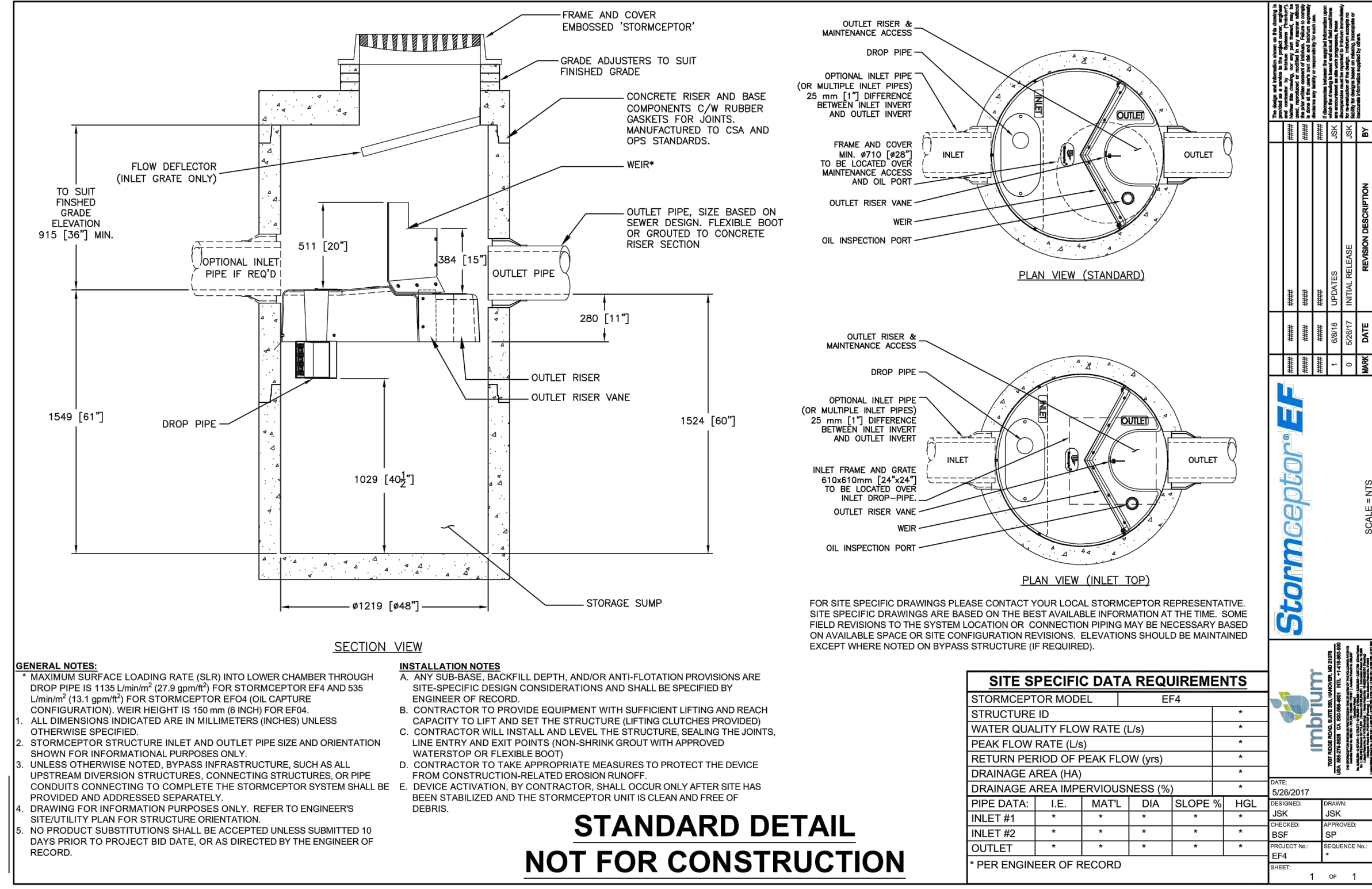


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