

REPORT
Project: 122764-6.2.3

DESIGN BRIEF ORLEANS GARDENS RESIDENTIAL 1615 Orleans Boulevard

Development Application File No. **D07-12-23-0026**



Prepared for North American Development Group
by IBI GROUP
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1 INTRODUCTION

1.1 Scope

IBI Group Professional Services Inc. (IBI Group) has been retained by North American Development Group to prepare the necessary engineering plans, specifications and documents to support the proposed Site Plan Application for the subject lands in accordance with the policies set out by the Planning and Development Branch of the City of Ottawa. This Brief will present a detailed servicing scheme to support development of the property, and will include sections on water supply, wastewater disposal, minor and major stormwater management, grading and with erosion and sediment control.

1.2 Subject Property

The subject property, currently known as Orleans Gardens, is located on the southeast corner of the intersection of Jean D'Arc Boulevard and Orleans Boulevard, in Orleans. The site is bound by Jean D'Arc Boulevard to the North, existing residential to the east, Beausejour Drive to the South and Orleans Boulevard to the West. Refer to key plan Figure 1.1 below.

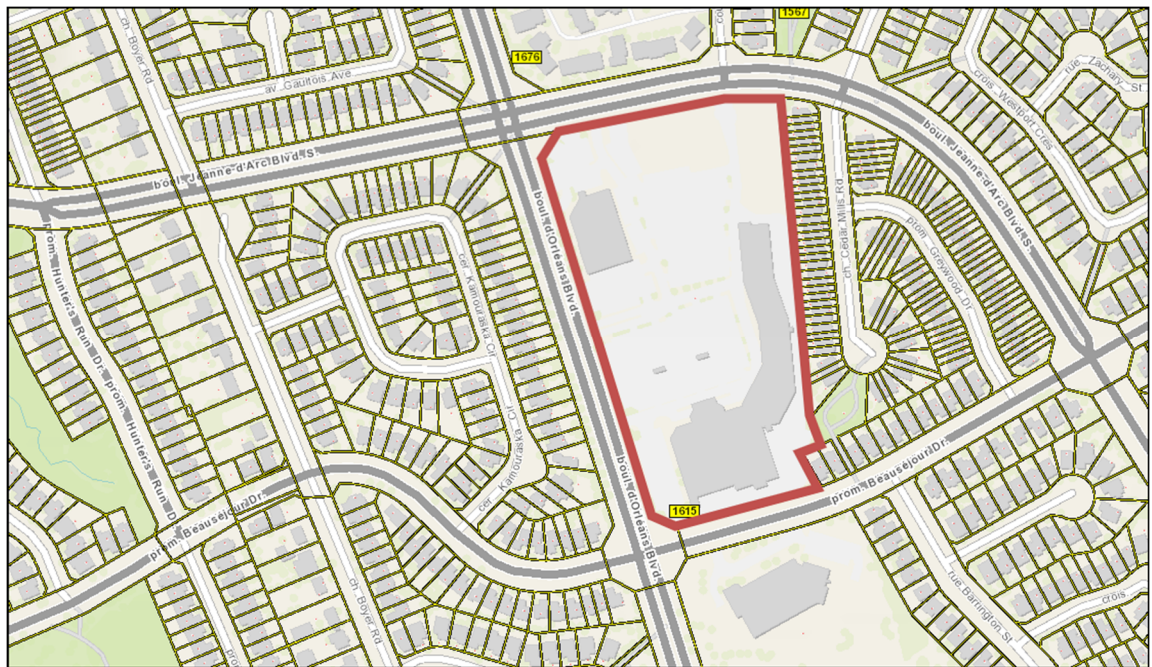


Figure 1.1 – Key Plan

Key Plan taken from City of Ottawa GeoOttawa

The existing site is currently entirely commercial use, with development being completed for the site in various stages from the late 1980's through to the 2000's. Previous site plan approval for the site included commercial development concepts for the northern lands, which have remained undeveloped for the last 30+ years. The client previously received permission rezone this portion of the existing site to allow for and residential use. A copy of the Architectural Site Plan upon which this report is based has been provided in **Appendix A**. The plan identifies 60 units which consist of 1 and 2 bedroom stacked townhouse units with attached garages. The site will share services and roads with the existing commercial site and will consist of new on-site private roadways, on-site dedicated private parking areas and a private amenity area.

1.3 Previous Studies

- **Design Brief, Orleans Gardens Pads A & B, prepared by IBI Group July 2013**
This report was not approved, and the application was ceased. The report demonstrated that storm, sanitary and water service allocations for commercial buildings which differed from the original site plan from 1988.

Servicing reports or memorandums were unable to be tracked through the City's archive database, nor through CCL records for which IBI maintains access to. Various servicing, and grading plan drawings from original site plan application and design are included in **Appendix A**.

1.4 Guidelines and Standards

This evaluation takes into consideration the City of Ottawa Sewer Design Guidelines (OSDG) (October 2012), and the February 2014 Technical Bulletin ISDTB-2014-01, the September 2016 Technical Bulletin PIEDTB-2016-01, the June 2018 Technical Bulletin ISTB-2018-04, October 2019 Technical Bulletin 2019-01, and the July Technical Bulletin 2019-02.

It also considers the City of Ottawa Water Distribution Design Guidelines (OWDDG), and the 2010 Technical Bulletin 2010-02, the 2014 Technical Bulletin 2014-02, and the 2018 Technical Bulletin 2018-02.

All specifications are as per current City of Ottawa standards and specifications, and Province of Ontario (OPSS/D) standards, specifications, and drawings.

1.5 Pre-Consultation Meeting

The City of Ottawa hosted a virtual pre-consultation meeting on September 27th, 2022. Notes of the meeting are provided in **Appendix A**. There were no major engineering concerns flagged in this meeting. The City of Ottawa Servicing Study Checklist has also been included in **Appendix A**.

1.6 Environmental Issues

There are no environmental issues related to this site.

There are no existing watercourses or drainage features associated with this site.

1.7 Geotechnical Considerations

Paterson Group Inc. was retained to prepare a geotechnical investigation for the site. The objectives of the investigation were to prepare a report to:

- To provide geotechnical recommendations pertaining to the design of the proposed development including construction considerations.

The geotechnical investigation report PG3068-1 Dated September 13, 2013 confirmed that the site consists of a stiff clay crust over a deep sensitive silty clay deposit. These conditions will provide a suitable base for construction. The subject site is subject to a 1.0m grade raise restriction.

The report contains recommendations which include but are not limited to the following:

- Fill for roads to be suitable native material in 300mm lifts compared to 95% SPMDD

Pavement Structure – Car Parking Areas:

LOCAL ROAD	THICKNESS
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Asphaltic Concrete	50mm
OPSS Granular A Base	150mm
OPSS Granular B Type II Subbase	300mm

Pavement Structure – Private Roadways and Main Drive Aisles:

LOCAL ROAD	THICKNESS
Asphaltic Concrete	90mm
OPSS Granular A Base	150mm
OPSS Granular B Type II Subbase	450mm

- Pipe bedding and cover: The pipe bedding for sewer and water pipes placed on a relatively dry, undisturbed subgrade surface should consist of at least 150 mm of OPSS Granular A material. Where the bedding is located within the firm grey silty clay, the thickness of the bedding material should be increased to a minimum of 300 mm. The cover material, which should consist of OPSS Granular A, should extend from the spring line of the pipe to 300 mm above the obvert of the pipe. The material should be placed in 225 mm thick lifts and compacted to a minimum of 95% of its SPMDD.

2 WATER SUPPLY

2.1 Existing Conditions

The subject site is located within Pressure Zone 2E of the City of Ottawa's water distribution system.

The plaza is serviced by a 200 mm diameter watermain that connects to the 400 mm diameter watermain on Orleans Blvd and a 200 mm diameter watermain connection to the 600 mm diameter watermain on Jeanne D'Arc Blvd. The Orleans Gardens Plaza has several 150 mm and 200 mm diameter watermains that run throughout the site to service the different commercial buildings located within.

2.2 Design Criteria

2.2.1 Water Demands

The subject lands are proposed to consist of 4 buildings of Back-to-Back townhouses with a of 60 units. A water demand has been calculated using the following data as per table 4.2 of the Ottawa Design Guidelines – Water Distribution.

- Townhouses 2.7 person per unit
- Residential Average Day Demand 280 l/cap/day

A watermain demand calculation sheet is included in **Appendix B** and the total demands for the townhouse units are summarized as follows;

- Average Day 0.53 l/s
- Maximum Day 1.32 l/s
- Peak Hour 2.90 l/s

2.2.2 System Pressures

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

Minimum Pressure: Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi).

Fire Flow: During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.

Maximum Pressure: Maximum pressure at any point in the distribution system shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

2.2.3 Fire Flow Rate

The fire flow rate for the subject building is determined by the Fire Underwriters Survey (FUS) method in which the building construction type, type of occupancy, sprinkler system and

separation from adjacent building is considered. FUS calculations has been conducted for all townhouse blocks, 2 hour rated firewalls are used to breakup the blocks into smaller fire units in accordance with the FUS methodology. Results of the calculations results in a fire flow demand of 12,000 l/min for Building A, 12,000 l/min for Building B and 10,000 l/min for Buildings C and D. Copies of the FUS calculations is included in **Appendix B**.

2.2.4 Hydrant Spacing

Four fire hydrants have been added to the site to satisfy the fire hydrant spacing guidelines, this brings the total amount of of hydrants in proximity of the buildings to eight. The figure below illustrates the fire hydrant spacing on site.

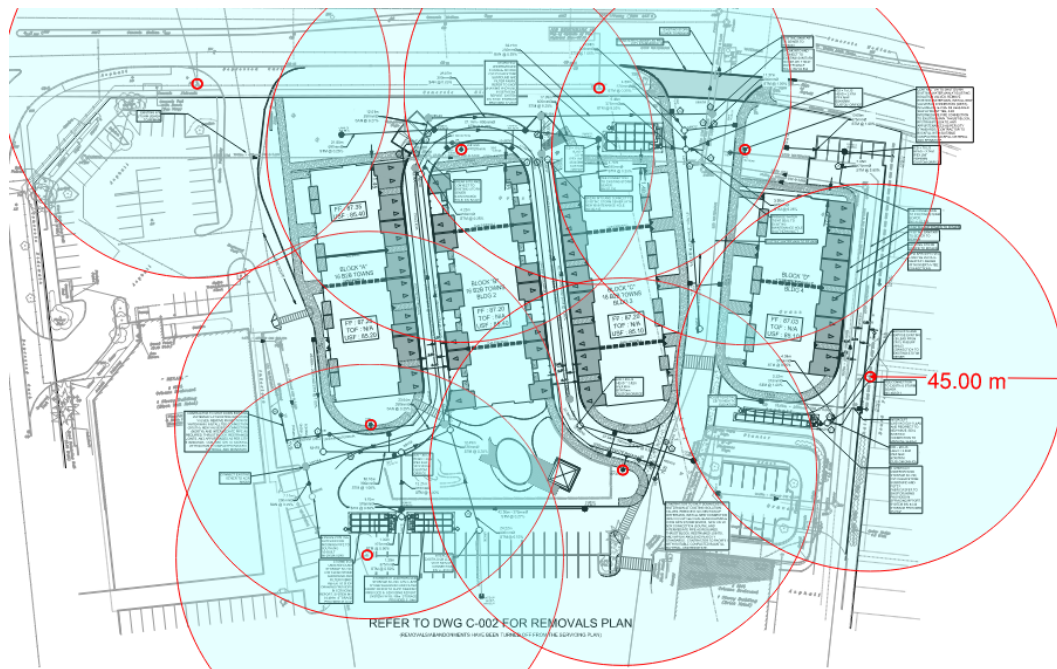


Figure 1.2 – Fire Hydrant Spacing

2.3 Proposed Water Plan

The watermain layout for this site is shown on Drawing C-001 General Plan of Services. As stated in Section 2.1 the plaza is serviced by existing 100 mm, 150 mm diameter and 200 mm diameter watermains. The 200 diameter watermain that runs along the eastern edge of the site will be able to adequately service the 'Block D' building.

To service Blocks A, B & C, two watermain connections will need to be made within the site to existing 100 mm and 150 mm diameter watermains to create a loop that will run along the access roads inside the new development area. There are 5 hydrants that service the new townhouse blocks, 4 of the hydrants are new with one installed on an existing main. Spacing of the hydrants is per Section 4.5.1 of the Ottawa Design Guidelines – Water Distribution.

City of Ottawa has provided the hydraulic boundary conditions at both the 406 mm watermain on Orleans Gardens Blvd and the 305 mm watermain on Jeanne D'Arc Blvd. A copy of the boundary conditions is included in **Appendix B** and summarized as follows

Criteria	Hydraulic Head (m)		Pressure (psi)	
	Orleans Gardens Blvd	Jeanne D'Arc Blvd	Orleans Gardens Blvd	Jeanne D'Arc Blvd
Maximum HGL	130.3	130.4	63.2	62.8
Peak Hour	127.3	127.3	58.9	58.4
Max Day Plus Fire Flow	128.8	127.5	59.6	58.6

Ground elevation of Orleans Gardens Blvd: 85.9 m

Ground elevation of Jeanne D'Arc Blvd: 86.2 m

Hydraulic modeling of the watermains in this area was conducted with the InfoWater 12.4. Update #5 program by Innovyze. Results of the analysis is summarized as follows for each scenario and output from the water model is included in **Appendix B**.

Basic Day (Maximum Pressure)

The maximum basic day pressure on the site is 431.55 kPa at Node J01. As this does not exceed 553 kPa (80 psi) pressure reducing control in the form of pressure reducing valves at the building in accordance with Technical Bulletin ISDTB-2014-02 is not recommended for all buildings.

Peak Hour (Minimum Pressure)

The lowest peak hour pressure on the site is 405.08 kPa which exceeds the minimum requirement of 278 kPa (40 psi).

Max Day and Fire (Fire Flows)

The lowest design fire flow is 186.08 l/s (11,164.8 l/min) at the node H1 which represents the hydrant at the south end of Building A which exceeds the required fire flow of 11,000 l/min for Building A. All other hydrant nodes have design flows over 200 l/s (12,000 l/min) which exceeds the required fire flows for the remainder of the buildings.

3 WASTEWATER DISPOSAL

3.1 Existing Conditions

As previously noted, the existing site was developed in the late 1980s through the 2000's. The wastewater disposal system was previously constructed to service the entire commercial parcels lands, and is currently operational.

3.2 Design Criteria

The sanitary sewers for the subject site will be based on the City of Ottawa design criteria. It should be noted that the sanitary sewer design for new sewers in this study incorporates the latest City of Ottawa design parameters identified in Technical Bulletin ISTB-2018-01. Some of the key criteria will include the following:

- Demand per capital 280 litres/person/day
- Peaking factor Harmon formula where $K=0.8$
- Infiltration allowance 0.33 l/s/ha
- Velocities 0.60 m/s min. to 3.0 m/s max.
- Minimum Pipe Size Residential 200mm @ 0.35%
- Minimum Pipe Size Commercial 250mm @ 0.25%
- Pre-Dev Commercial Flow 35,000 L/Ha/Day (based on OSDG prior to 2018)
- Pre-Dev Commercial Peak Factor 1.5

3.3 Recommended Wastewater Plan

The sanitary system will consist of a new 250mm sewer through the redevelopment plan to service the commercial site to the west. An existing sewer required relocation due to conflict with proposed Block 'C', and its flows will be conveyed through the new private streets and will remain a 250mm diameter, per OSDG for sewers servicing ICI lands. The remainder of the sewers within the redevelopment plan which service only residential blocks will be sized to 200mm. Sewers will be installed at normal depth and slope and have been designed using the criteria noted above in section 3.2.

The predevelopment wastewater allocation for the redevelopment lands can be calculated based using the 1988 Servicing Plan, the total redevelopment area is 1.54 ha and which contains "FUTURE DEV" building Area of 0.13Ha at a commercial flow of 35,000 L/Ha/Day (OSDG prior to 2018), with a peaking factor of 1.5, for a total peak flow average allocation of 0.6 L/s.

The proposed redevelopment will have a peak flow of 1.86 L/s, refer to Sanitary Sewer Design Sheet in Appendix C for supporting calculations. Since the infiltration allowance area is unchanged between pre- and post-development, with no new areas being added, the total increase in flow from the site is 1.26 L/s. This flow increase is well within the residual capacity of all existing on-site. It is expected that this marginal increase in flow will have a negligible impact on the downstream wastewater system.

A copy of the sanitary sewer design sheet and the sanitary drainage area plan can be found in **Appendix C**. Please refer to the site servicing plan 122764-C-001 in **Appendix A** for further details.

In order to maintain service to the existing commercial block to the west of the redevelopment area, the realigned 250mm privately owned sanitary sewer configuration required a longer length

than previously constructed. Invert changes at the manholes on the 250mm run through the redevelopment are designed at 0.02m, regardless of angle, which is less than the minimum stipulated in Section 6.2.12 of the OSDG.

4 SITE STORMWATER MANAGEMENT

4.1 Existing Conditions

As previously noted, the subject lands are part of an existing development plan, and remained undeveloped through the years due to market considerations. The area of redevelopment has been allocated to the existing storm sewer system, where the majority of the area exists as asphalt parking lot with some grassy soft scape along Jean D'Arc Boulevard. A stormwater management report was not available for the existing development.

4.2 Design Criteria

The stormwater system was designed following the principles of dual drainage, making accommodations for both major and minor flow.

Some of the key criteria include the following:

- Design Storm 1:2 year return (Ottawa)
- Rational Method Sewer Sizing
- Initial Time of Concentration 10 minutes
- Runoff Coefficients for new areas Calculated Individually
- Pipe Velocities 0.80 m/s to 6.0 m/s
- Minimum Pipe Size 250 mm diameter (200 mm CB Leads)

4.3 System Concept

The redevelopment configuration requires to the relocation of some of the existing on-site storm sewers.

Where existing drainage is captured, unaltered by grading adjustments, new sewers have been sized to convey those flows uncontrolled to a 2-year design storm, with an anticipated starting time of concentration of 15minutes plus the length of the existing sewer network at an assumed velocity of 1.0m/s. The 15minute starting Tc is consistent with sewer design principles of the era.

Where redeveloped areas are provided with a new storm sewer, the sewer has been sized to the 2-year storm design, per OSDG.

In some instances, the existing pipes are shown in the new storm sewer design sheet with negative capacity, they convey existing development flows. Without access to the 1988 site development calculations, we are unable to determine the reasoning for this. It is possible that the existing site had a stormwater management plan implemented with restricted flow rates, which in turn may have been used for sewer sizing, or that a higher 20 minute starting Tc may have been used for sewer sizing, both of these possibilities would reduce the design flow solving the theoretical negative capacity issues which are presented in the new storm sewer design sheet. There are no basements on site, therefore some minor potential for surcharging would have no impact on any of the existing or proposed buildings.

4.4 Stormwater Management

4.4.1 Restricted Flowrate

An offsite dual drainage release was not provided by the downstream system. In pre-consultation with the City of Ottawa, a restricted flow rate for the new development area was determined to be a 5yr release, based on a runoff coefficient of 0.5 and a Tc of 10minutes.

STORM EVENT	CRITERIA AND FORMULAS
Redevelopment Area (ha), A	1.54Ha
Runoff Coefficient, C	0.50
Time of Concentration, Tc	10min
5yr Storm Intensity, I	$=998.071 / (Tc + 6.053)^{0.814}$ $=998.071 / (10 + 6.053)^{0.814}$ =104.19
Restricted Flowrate, Qr	$=2.78 \times A \times C \times I$ $=2.78 \times 1.54 \times 0.50 \times 104.19$ =223.04 L/s

Therefore, the maximum allowable release from the redevelopment area is 223.04 L/s.

4.4.2 Uncontrolled Release

There are several areas which tie into existing storm sewers, where existing catchbasin are maintained, however the drainage area and grading conditions have changed from pre-development. As a result, we have designed these areas to be uncontrolled release for the 100 year rainfall event is used for the uncontrolled areas.

STORM EVENT	CRITERIA AND FORMULAS
Uncontrolled Area (ha), A	0.05
Runoff Coefficient, C	0.85
Time of Concentration, Tc	10min
100yr Storm Intensity, I	$=1735.688 / (Tc + 6.014)^{0.820}$ $=1735.688 / (10 + 6.014)^{0.820}$ =178.56
Uncontrolled Flowrate, Qu	$=2.78 \times A \times 1.25C \times I$ $=2.78 \times 0.05 \times 1.25(0.85) \times 178.56$ =26.37 L/s

Therefore, the uncontrolled release from site can be quantified as 26.37L/s.

4.4.1 Maximum Allowable Release Rate

The maximum allowable release rate to the storm sewer system is the restricted flowrate less the uncontrolled release.

$$\begin{aligned}
 Q_{\max} &= Q_r - Q_u \\
 Q_{\max} &= 223.04 \text{ L/s} - (26.37 \text{ L/s}) \\
 Q_{\max} &= 196.66 \text{ L/s}
 \end{aligned}$$

Therefore, the maximum allowable release rate to the sewer system is **175.57 L/s**.

Surface flows in excess of the site’s allowable release rate will be stored on site in strategic surface storage areas and underground storage system or pipes, and gradually released into the minor system to respect the site’s allowable release rate. The maximum static surface retention depth located within the redeveloped areas is limited to 300mm as shown on the **Ponding Plan** located in **Appendix D**. Overland flow routes will be provided in the grading to permit emergency overland flow. Each building entrance is provided with a minimum of 300mm freeboard from adjacent ponding areas.

The modified rational method was used to evaluate the on-site stormwater management for the redevelopment area. The total restricted flow rate through the minor system will be the maximum allowable release rate of **175.57 l/s**. This will be achieved by the used of Inlet Control Devices (ICD’s) placed strategically in site catchbasins or maintenance holes. A summary of the ICD’s, their corresponding storage requirements, storage availability, and associated drainage areas has been provided below.

DRAINAGE AREA/ICD LOCATION	ICD RESTRICTED FLOW (L/s)	100 YEAR STORAGE REQUIRED (m ³)	SURFACE STORAGE PROVIDED (m ³)	Underground Storage *Provided (m3)	100yr OVERFLOW
MH18	80	180.49	99.40	88.81	0
MH11	40	25.99	29.26	0	0
CBMH05	10	99.10	107.50	0	0
CBMH09	10	37.14	37.83	0	0
MH21	15	97.18	6.56	93.94	0
MH25	40	40.62	2.90	43.31	0
TOTAL	195	480.52	283.45	226.06	0

*Underground storage provided within storm sewers, dedicated storage system, or combination.

Where underground storage is required, a summary of the underground storage calculations, including dedicated storage system sizing information has been provided in **Appendix D**. There are three underground storage systems, which utilizes arched HDPE chambers and clear stone surround to meet the storage target for the prescribed area. Sample shop drawings have also been provided in **Appendix D**.

The total controlled release rates from the redevelopment areas are less than the maximum allowable, therefore the stormwater management objective have been met.

4.4.2 2 Year Ponding

A review of the 2 year ponding has been completed using the modified rational method. A minimum Tc of 10min has been used. Where volumes are calculated as a negative value, 0.0m³ has been shown. A summary of each drainage area has been provided below.

DRAINAGE AREA	Total 2-Year Ponding Volume (m ³)	2-year Ponding Depth (m)	Comment
MH18	32.60	0.0	Contained within U/G Storage
MH11	1.55	0.13	Minimal Ponding during 2year event
CBMH05	21.56	0.0	Minimal Ponding during 2year event
CBMH09	3.29	0.13	Minimal Ponding during 2year event
MH21	22.12	0	Contained within U/G Storage
MH25	5.30	0	Contained within U/G Storage

Drainage areas MH11, CBMH09 and CBMH05 have some demonstrated 2 year ponding in the modified rational method storm water management calculations (1.55m³, 2.68m³ and 21.56m³ respectively). Based on ODSG underground storage cannot be accounted for unless a reduction of 50% of the release rate is applied. However, each of these areas is able to meet the 100 year stormwater management requirements without the use of underground storage. Notwithstanding that, each of these areas includes some underground storage capacity upstream of the ICD, which exceeds the calculated 2 year ponding volumes. Therefore, ponding during the 2 year event can be contained within the proposed infrastructure. Storage calculations for these three areas can be found in **Appendix D**. They area also summarized in the table provided below.

DRAINAGE AREA	Total 2-Year Ponding Volume (m ³)	Uncounted Structure Storage (m ³)
MH11	1.55	9.42
CBMH09	2.68	5.01
CBMH05	21.56	36.8

A letter from the owner accepting a small amount of 2 year ponding for this private site has been provided in **Appendix D**.

4.4.3 100 year + 20% Stress Test

A cursory review of the 100yr event + 20% has been performed using the modified rational method. The Peak flow from each area during a 100year event has been increased by 20%. The calculations have been included in **Appendix D**.

A summary of the required storage volumes, and overflow balances is provided below.

DRAINAGE AREA	ICD RESTRICTED FLOW (L/s)	100yr20 STORAGE REQUIRED (m ³)	STORAGE PROVIDED (m ³)	100yr20 OVERFLOW (m ³)
MH18	80	233.39	188.21	45.18
MH11	40	35.03	29.26	5.77
CBMH05	10	125.52	107.50	18.02
CBMH09	10	30.79	39.60	0.00
MH21	15	123.10	100.50	22.60
MH25	40	53.55	46.21	7.34

TOTAL	195	601.38	511.28	98.91
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*Overflow from R3 to R4, and from S2 to S5.

**Storage provided in R4 and S5 reduces the total overflow.

Where overflow is noted, the peak overflow volume can be reverse calculated using the peaking time of concentration to determine a flow rate. Once the flow rate is established an open channel flow depth calculation was performed at each spill location to determine the depth of the stress test overflow. A copy of the calculations has been provided in **Appendix D**. A summary of the overflow rates and depths is provided below.

DRAINAGE AREA	100yr20 OVERFLOW (m3)	Peaking Time of Concentration (Tc)	OVERFLOW (L/s)	OVERFLOW DEPTH (m)
MH18	45.18	35	21.51	0.02
MH11	5.77	8	12.01	0.02
CBMH05	18.02	36	5.46	0.03
CBMH09	0.00	22	0.00	0.00
MH21	22.60	72	5.23	0.02
MH25	7.34	20	6.12	0.02
TOTAL	112.65		49.35	

All overflow depths have been rounded up to the nearest 0.01 for consistency on the ponding plan. Where stress test overflow occurs, the overflow does not touch the building, or the building openings, and is well within the 300mm provided freeboard over the static ponding elevation.

4.4.4 Hydraulic Grade Line

A Hydraulic Grade Line analysis was not completed in the original site plan from 1988. All buildings on site consist of low-rise commercial buildings with slab on grade construction (i.e. no basements).

Depending on storm intensity, localized surcharging of the storm sewer may occur in existing and proposed conditions. The proposed residential development will also consist of slab on grade buildings, therefore there are no hydraulic grade line implications associated with the proposed buildings.

The three locations that utilize UGS all have a minimum vertical separation of at least 0.45m between the inverts of the UGS and their individual connections to the main sewer. This vertical separation is beyond a standard 300mm freeboard, thus reducing the concern associated with the impacts of a surcharge system.

DRAINAGE AREA	STORAGE INVERT (M)	SURCHARGE PIPE OBVERT (M)	DIFFERENCE (M)
UGS21	84.000	82.765	1.235
UGS25	84.400	82.761	1.639
UGS75	84.000	83.513	0.487

5 SOURCE CONTROLS

5.1 General

On site level or source control management of runoff will be provided to provide quality control for the subject lands. Such controls or mitigative measures are proposed for the development not only for final development but also during construction and build out. Some of these measures are:

- flat lot grading;
- split lot drainage;
- Roof-leaders to vegetated areas where possible;
- vegetation planting

5.2 Lot Grading

In accordance with local municipal standards, the parking lots will be graded between 1.5% and 5.0%. Private roadways will have a minimum gradient of 0.5% along barrier curbs. Most landscaped area drainage will be directed into a dedicated drainage system, and connects to the storm sewer system. Copies of the grading plans have been included in **Appendix E**.

5.3 Roof Leaders

This development will consist of stacked homes and apartments. It is proposed that roof leaders from these units be constructed such that runoff is directed to grass areas adjacent to the units. This will promote water quality treatment through settling, absorption, filtration and infiltration and a slower release rate to the conveyance network.

5.4 Vegetation

As with most site plan agreements, the developer will be required to complete a vegetation and planting program. Vegetation throughout the development including planting along roadsides and within landscape and amenity areas provide the opportunity to improve vegetation.

6 CONVEYANCE CONTROLS

6.1 General

Besides source controls, the development also proposes to use several conveyance control measures to improve runoff quality. These will include:

- catchbasin and maintenance hole sumps; and

6.2 Catchbasins

All catchbasins within the development, either rear yard or street, will be constructed with minimum 600 mm deep sumps. These sumps trap pollutants, sand, grit and debris which can be mechanically removed prior to being flushed into the minor pipe system. Both rear yard and street catchbasins will be fabricated to OPSD 705.010 or 705.020. All storm sewer maintenance holes servicing local sewers less than 900 mm diameter shall be constructed with a 300 mm sump as per City standards.

7 SEDIMENT AND EROSION CONTROL PLAN

7.1 General

During construction, existing stream and conveyance systems can be exposed to significant sediment loadings. Although construction is only a temporary situation, it is proposed to introduce a number of mitigative construction techniques to reduce unnecessary construction sediment loadings. These will include:

- groundwater in trench will be pumped into a filter mechanism prior to release to the environment;
- bulkhead barriers will be installed at the nearest downstream manhole in each sewer which connects to an existing downstream sewer;
- seepage barriers will be constructed in any temporary drainage ditches; and
- silt sacks will remain on open surface structure such as manholes and catchbasins until these structures are commissioned and put into use.

7.2 Trench Dewatering

During construction of municipal services, any trench dewatering using pumps will be discharged into a filter trap made up of geotextile filters and straw bales similar in design to the OPSD 219.240 Dewatering Trap. These will be constructed in a bowl shape with the fabric forming the bottom and the straw bales forming the sides. Any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filters as needed including sediment removal and disposal and material replacement as needed.

7.3 Bulkhead Barriers

At the first manhole constructed immediately upstream of an existing sewer, a ½ diameter bulkhead will be constructed over the lower half of the outletting sewer. This bulkhead will trap any sediment-carrying flows, thus preventing any construction-related contamination of existing sewers. The bulkheads will be inspected and maintained including periodic sediment removal as needed.

7.4 Seepage Barriers

These barriers will consist of both the Light Duty Straw Bale Barrier as per OPSD 219.100 or the Light Duty Silt Fence Barrier as per OPSD 219.110 and will be installed in accordance with the sediment and erosion control drawing. The barriers are typically made of layers of straw bales or geotextile fabric staked in place. All seepage barriers will be inspected and maintained as needed.

7.5 Surface Structure Filters

All catch basins, and to a lesser degree manholes, convey surface water to sewers. However, until the surrounding surface has been completed these structures will be covered to prevent sediment from entering the minor storm sewer system. Until rear yards are sodded or until streets are asphalted and curbed, all catchbasins and manholes will be equipped with geotextile filter socks. These will stay in place and be maintained during construction and until it is appropriate to remove them.

7.6 Stockpile Management

During construction of any development similar to that being proposed both imported and native soils are stockpiled. Mitigative measures and proper management to prevent these materials entering the sewer systems is needed.

During construction of the deeper municipal services, water, sewers and service connections, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally before any catchbasins are installed. Street catchbasins are installed at the time of roadway construction and rear yard catchbasins are usually installed after base course asphalt is placed.

Contamination of the environment as a result of stockpiling of imported construction materials is generally not a concern since these materials are quickly used and the mitigative measures stated previously, especially the use of filter fabric in catchbasins and manholes help to manage these concerns.

The roadway granular materials are not stockpiled on site. They are immediately placed in the roadway and have little opportunity of contamination. Lot grading sometimes generates stockpiles of native materials. However, this is only a temporary event since the materials are quickly moved off site.

8 ROADS AND NOISE ATTENUATION

Vehicular access to the redevelopment area is provided by two private entrances from within the existing Orleans Gardens commercial development. The Orleans Gardens commercial development has multiple private entrances, some signalized, others unsignalized off Orleans Boulevard, and Jean D'Arc Boulevard.

There are sidewalks proposed within the redevelopment. They vary from 1.2 to 1.8m in width. Pedestrian access to the site will be via the existing private roadway, each with sidewalks connecting to Jean D'Arc Boulevard.

The site has been designed in order to provide curbside municipal waste disposal.

There are no bus routes proposed within the redevelopment area.

Jean D'Arc is an Arterial Road which would generate significant noise. An environmental noise impact assessment is required for this site.

9 RECOMMENDATIONS

Water, wastewater and stormwater systems required to redevelop a portion of the 1615 Orleans Boulevard site will be designed in accordance with MOE and City of Ottawa's current level of service requirements.

The use of lot level controls, conveyance controls and end of pipe controls outlined in the report will result in effective treatment of surface stormwater runoff from the site. Adherence to the proposed sediment and erosion control plan during construction will minimize harmful impacts on surface water.

Final detail design will be subject to governmental approval prior to construction, including but not limited to the following:

- Commence Work Order: City of Ottawa
- ECA for Sewage Works: MOECP Transfer of Review by City of Ottawa
- Watermain Approval: City of Ottawa

Report prepared by:



Demetrius Yannouloupoulos, P.Eng.
Director

Ryan Magladry, C.E.T.
Project Manager

Arthur Beresniewicz, E.I.T.
Engineering Intern

APPENDIX A

- Site Plan
- Site Servicing Plan 122764-C-001
- Preconsultation Meeting City Comments
- Preconsultation Meeting City Engineering Comments
- CCL Original Development Servicing Plan (Circa 1988)
- CCL Original Development Grading Plan (Circa 1988)
- Development Checklist

PROJECT INFO

LEGAL ADDRESS: LOTS 3 AND 5 CONCESSION 2 (OTTAWA FRONT) GEOGRAPHIC TOWNSHIP OF GLOUCESTER now CITY OF OTTAWA

Table with 2 columns: PROJECT STATISTICS and values. Includes total overall site area (55,727 m²), total project site area (11,345.2m²), and building statistics (total building area 9,764.64m²).

Table with 2 columns: SITE ZONING and values. Includes zoning by-law (GM12 F(0.6) H(2)) and permitted use (Plan Unit Development).

Table with 2 columns: SITE SETBACKS and values. Includes front yard and corner side yard (3m), interior side yard (5m), and rear yard (3m).

Table with 2 columns: PARKING STATISTICS and values. Includes residential parking rate (1 space per dwelling), accessible parking (1 space), and total parking spaces (72).

Table with 2 columns: BICYCLE PARKING STATISTICS and values. Includes bicycle parking spaces (2).

WASTE AND RECYCLING COLLECTION: Blocks A, B, C & D - Curb side daily pick up

PROJECT STATISTICS

Table with 2 columns: B2B TOWNHOMES and GFA SqM. Lists blocks A, B, C, and D with their respective GFA values.

Table with 2 columns: BLOCK A - 16 B2B TOWNHOMES and BLOCK B - 16 B2B TOWNHOMES. Details parking requirements for each block.

LEGEND

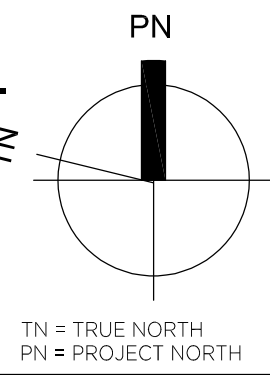
- SOFT LANDSCAPE (SOD)
FIRE ROUTE ROAD
HARD SURFACE PATH (PAVERS)

SPA SITE PLAN
1 : 250



G4 ARCHITECTS INC.

410 Yonge Street
Suite 502, Toronto, ON
M5P 2B7
T: 416.322.6334
F: 416.322.7294
E: info@q4architects.com



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Issued For:

Table with 3 columns: Issue number, description, and date. Lists three revisions for SPA #1.

Table with 2 columns: Description and Date. Revision Schedule section.

Project Title

Project Description

ORLEANS GARDENS

Location
1615 Orléans Blvd. Orléans, ON K1C 7E2

Client
NORTH AMERICAN DEVELOPMENT GROUP

Project No. 17047
Scale As indicated

Drawn By CG
Checked By Checker

SPA SITE PLAN

Sheet Title
BLOCKS A, B, C & D

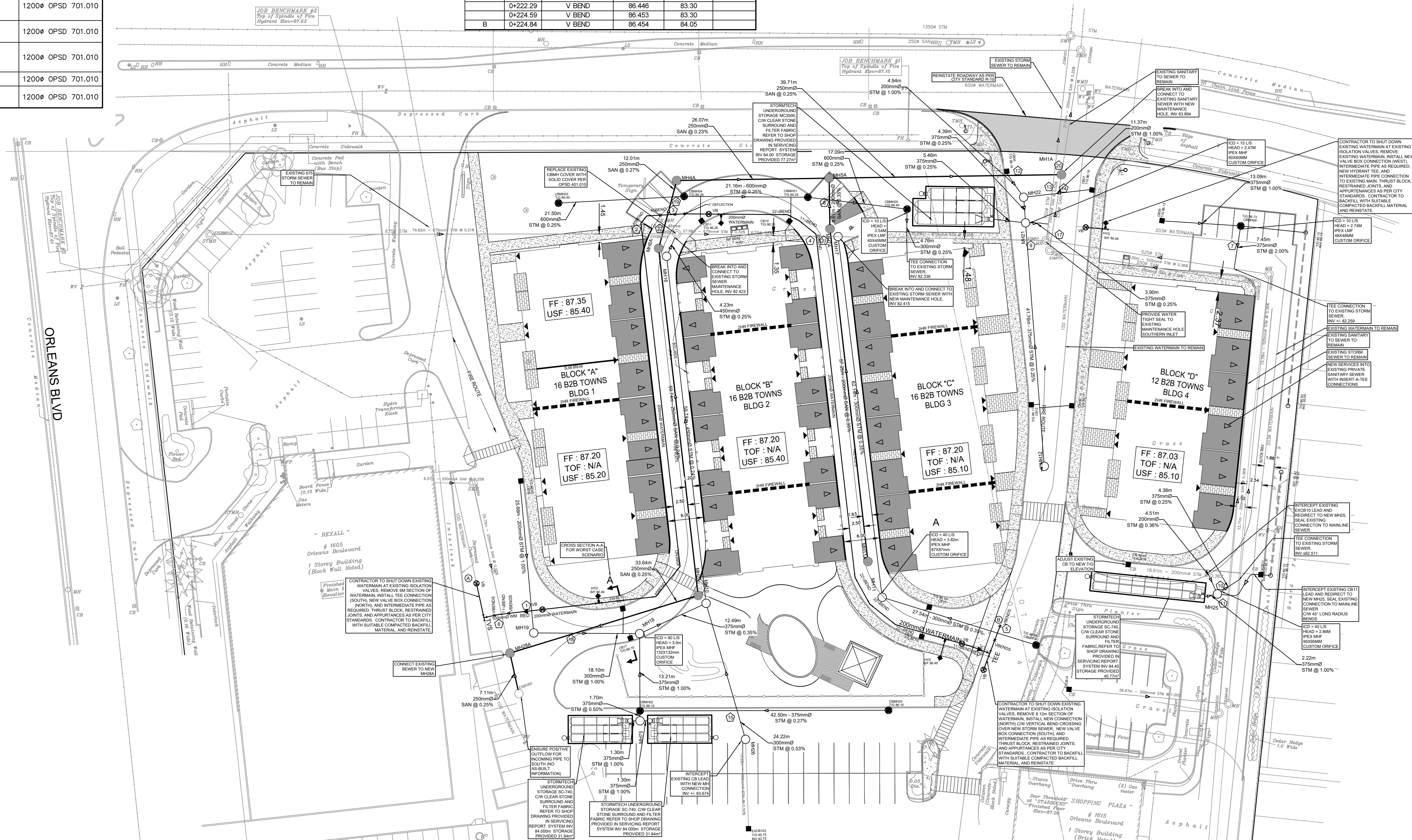
2022-12-02 11:58:19 AM \\Users\gonzalez\Documents\17047_Orléans Gardens_SPA_copontalica\ATL\..._t

STM STRUCTURE TABLE					
NAME	RIM ELEV.	INVERT IN	INVERT OUT	INVERT AS-BUILT	DESCRIPTION
CBMH01	86.27	W82.995	E82.975		1200# OPSD 701.010
CBMH02	86.12	E83.843 S83.394	N83.374		1200# OPSD 701.010
CBMH03	86.40		E83.121		1500# OPSD 701.011
CBMH04	86.27	W83.068	E83.048		1200# OPSD 701.010
CBMH05	86.40	W82.932	S82.912		1500# OPSD 701.011
CBMH09	86.13	W84.594	S83.500		1200# OPSD 701.010
CBMH14	86.40		W83.834		1200# OPSD 701.010
CBMH20	86.13		W83.956		1200# OPSD 701.010
EXCBMH11	86.55	W82.454 S82.423	E82.423		1200# OPSD 701.010
EXCBMH12	83.92		E82.621		1200# OPSD 701.010
EXMH1	86.39	W82.266 E82.145	N82.015		1200# OPSD 701.010
EXMH49	86.63	W84.590	N82.577		1200# OPSD 701.010
EXMH50	86.48	S82.315	W82.285		1200# OPSD 701.010
EXMH51	83.19	S81.821			1200# OPSD 701.010
MH10	86.66	SW83.168 SE83.213	N83.063		1200# OPSD 701.010
MH11	86.44	E83.738	N83.408		1200# OPSD 701.010
MH12	86.38		N83.774		1200# OPSD 701.010
MH16	86.67	S82.917	N82.434		1200# OPSD 701.010
MH17	86.56	S83.190 W82.335	E82.355		1200# OPSD 701.010
MH18	86.17	W83.317 S83.242	NE83.212		1200# OPSD 701.010
MH19	86.54	N84.793	E83.498		1200# OPSD 701.010
MH21	86.28	S83.670 W83.986 N83.670	E83.610		1200# OPSD 701.010
MH22	86.23	E84.666 NW84.711	S83.681		1200# OPSD 701.010
MH25	86.55	SW84.378 E83.512 NW83.512	NE83.461		1200# OPSD 701.010
MH26	86.23	S83.674	NW83.341		1200# OPSD 701.010
MH75	88.91	W83.987 E83.987	N83.403		1200# OPSD 701.010

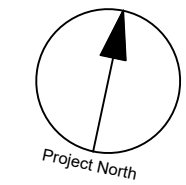
SAN STRUCTURE TABLE					
NAME	RIM ELEV.	INVERT IN	INVERT OUT	INVERT AS-BUILT	DESCRIPTION
EXMH1A	86.43	E83.993	N83.963		1200# OPSD 701.010
EXMH2A	86.44	S84.146	W84.116		1200# OPSD 701.010
EXMH03A	86.58		N84.408		1200# OPSD 701.010
EXMH9A	86.57		NW84.453		1200# OPSD 701.010
EXSANMH	84.70	S83.840			1200# OPSD 701.010
MH1A	86.28	W83.914 S83.594	N83.894		1200# OPSD 701.010
MH2A	86.66	SW84.330	N84.310		1200# OPSD 701.010
MH4A	86.50	S84.113	E84.093		1200# OPSD 701.010
MH5A	86.38	W84.033 S84.073	E84.013		1200# OPSD 701.010
MH7A	86.53	S84.123	N84.103		1200# OPSD 701.010
MH8A	86.67	S84.165	N84.145		1200# OPSD 701.010
MH11A	86.62		N84.324		1200# OPSD 701.010
MH28A	86.68	NW84.435 SE84.435	N84.415		1200# OPSD 701.010
MH29A	86.69	W84.559	SE84.499		1200# OPSD 701.010

WATERMAIN SCHEDULE					
Station	Description	Finished Grade	Top of Watermain	As Built Watermain	
A 0+000.00	VB	86.700	84.30		
0+005.00	TVS	86.696	84.30		
0+007.69	V BEND	86.696	84.30		
0+007.94	V BEND	86.680	83.94		
0+008.57	11 1/4 BEND	86.644	83.94		
0+010.19	V BEND	86.607	83.94		
0+010.44	V BEND	86.601	84.20		
0+012.84	200-100RED	86.545	84.15		
0+018.11	VB	86.468	84.07		
0+025.81	HYD	86.360	83.96		
0+030.17	V BEND	86.296	83.90		
0+035.65	45 BEND	86.393	83.99		
0+040.02	V BEND	86.511	84.15		
0+042.26	45 BEND	86.588	84.19		
0+071.69	V BEND	86.754	84.38		
0+101.32	45 BEND	86.644	84.24		
0+102.94	45 BEND	86.576	84.18		
0+105.12	V BEND	86.470	84.07		
0+105.37	V BEND	86.469	83.62		
0+107.62	V BEND	86.467	83.62		
0+107.87	V BEND	86.431	84.03		
0+109.38	3' DEFLECTION	86.407	84.01		
0+113.52	VB	86.298	83.90		
0+115.65	HYD	86.443	84.04		
0+119.95	V BEND	86.507	84.11		
0+129.99	22 1/2 BEND	86.304	83.90		
0+129.22	11 1/4 BEND	86.363	83.96		
0+132.92	45 BEND	86.568	84.17		
0+161.75	V BEND	86.754	84.35		
0+192.02	22 1/2 BEND	86.516	84.12		
0+197.24	22 1/2 BEND	86.38	83.98		
0+202.90	22 1/2 BEND	86.242	83.84		
0+207.70	V BEND	86.134	83.73		
0+211.74	HYD	86.222	83.62		
0+214.68	VB	86.298	83.50		
0+218.12	11 1/4 BEND	86.328	83.63		
0+218.27	200-150RED	86.39	83.99		
0+219.72	TEE	86.419	84.02		
0+222.04	V BEND	86.444	84.04		
0+222.29	V BEND	86.446	83.30		
0+224.59	V BEND	86.453	83.30		
0+224.84	V BEND	86.454	84.05		

JEANNE D'ARC BLVD



REFER TO DWG C-002 FOR REMOVALS PLAN
(REMOVALS/ABANDONMENTS HAVE BEEN TURNED OFF FROM THE SERVICING PLAN)

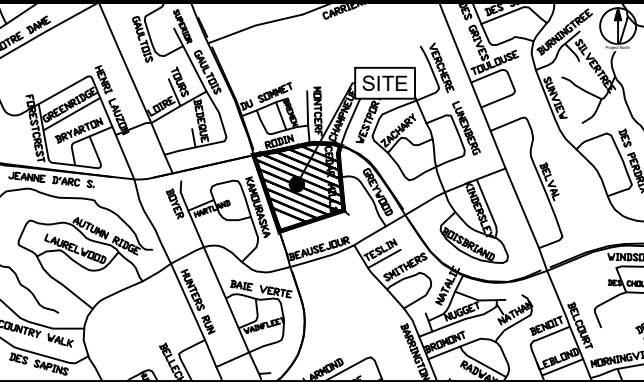


CLIENT
NORTH AMERICAN DEVELOPMENT GROUP

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ISSUES		
No.	DESCRIPTION	DATE
1	ISSUED FOR CITY REVIEW	2023-02-06
2	REVISED AS PER NEW SITE PLAN	2023-09-06
3	REVISED AS PER CITY COMMENTS	2024-05-24

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS.



CONSULTANTS
Project Coordinator:
North American Development Group
Site Plan Architect:
Q4 Architects Inc.

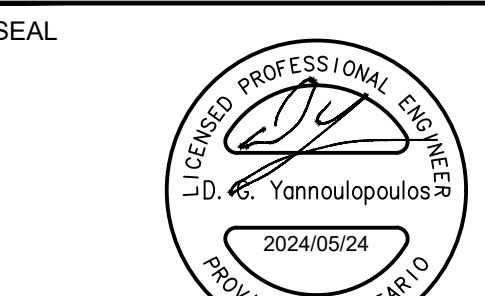
Surveyor:
Fairhall, Moffatt and Woodland Ltd.

Geotechnical:
Paterson Group

Traffic:
IBI Group

Electrical:
Hammerschlag & Joffe Inc.

Landscape:
Levschek Consultants Inc.



IBI GROUP
400 - 333 Preston Street
Ottawa ON K1S 5M4 Canada
Tel 613 225 5111 Fax 613 225 5866
ibigroup.com

PROJECT
ORLEANS GARDENS
1615 ORLEANS BOULEVARD
PROJECT NO:
122764
DRAWN BY:
A.B./E.H.
PROJECT MGR:
R.M.
CHECKED BY:
D.G.Y.
APPROVED BY:
D.G.Y.

SHEET TITLE
GENERAL PLAN OF SERVICES

SHEET NUMBER
C-001
ISSUE
3

CITY PLAN NO. 18981
FILE LOCATION: \\112764_OrleansGardens\7_0_Production\7_3_Design\04_OrleansGardens\C01_GENERAL PLAN OF SERVICES.dwg Last Saved: May 24, 2024, 10:20:31 AM by Eric Henne
SCALE CHECK

Pre-Application Consultation Meeting – City Comments

Property Address: 1615 Orleans Boulevard

File Number: PC2022-0222

Description: Application for Site Plan Control to build 60 back-to-back stacked townhouses, including required parking spaces and outdoor amenity space.

Meeting Location: Virtual – Microsoft Teams

Meeting Date: September 27, 2022

Submission Requirements

Documents required in support of this application are highlighted in the attached Study and Plan Identification List.

When checking for Application Completeness the City refers to the requirements provided in Ottawa’s [Guide to preparing studies and plans](#). Additional information is also available related to [building permits](#), [development charges](#), and the [Accessibility Design Standards](#). Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-application consultation comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change.

Application Type and Fees

The application fees (2022 rates) for the proposed applications are as follows. Application fees may vary from now to time of submission:

Application Type	Planning / Legal Fee	Initial Engineering Design Review and Inspection Fee	Conservation Authority Fee (Initial)	Total (HST may apply to part or all)
Site Plan Control - Complex	\$46,037.00	\$10,000	n/a (not in regulated area)	\$56,037.00

Staff Comments

Planning Comments – Kelly Livingstone

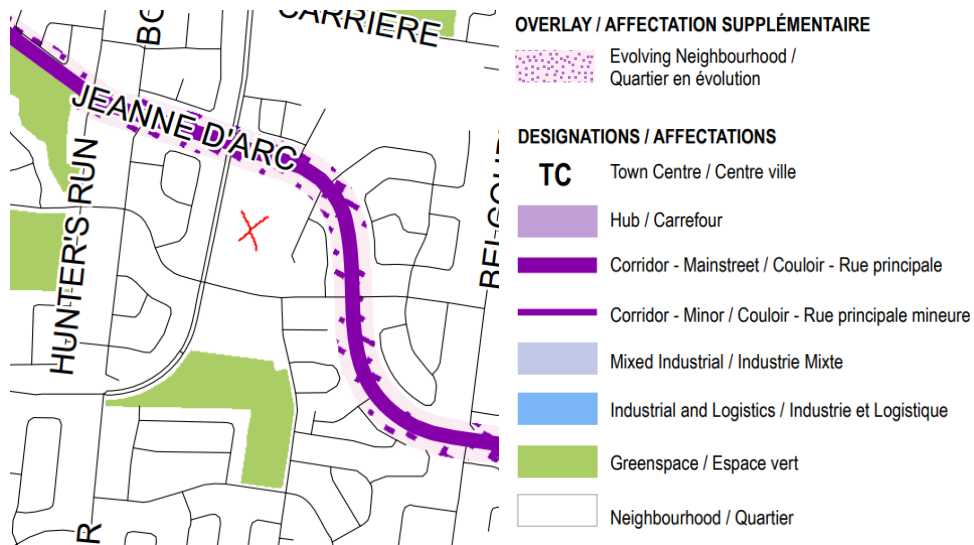
Policy Comments

2003 Official Plan

- Site designated General Urban Area
- Jeanne d’Arc is a Spine Route, Transit Priority Corridor, and an Existing Arterial road

2021 (New) Official Plan

- Ottawa's New Official Plan was adopted by Council in November 2021.
- With the new Official Plan the site received some new planning policy.
- The Site is in the **Suburban Transect**, and is designated **Neighbourhood**, with an **Evolving Neighbourhood** designation along the frontage to Jeanne d'Arc.
- Jeanne d'Arc is now a **Minor Corridor** as well. It is still considered a transit priority corridor and existing arterial.



- Staff would encourage the exploration of a revised layout that is more in keeping with the minor corridor and evolving neighbourhood designations in the new Official Plan. These designations speak about a gradual evolution to more urban built form patterns. The orientation of the townhouse units, with parking abutting the street is not desirable and may not achieve these objectives. The design suggestions provided by Urban Design may better accomplish these goals and could be preferable if you are willing to explore them. I'm happy to arrange for another pre-consultation meeting to discuss.

Zoning Comments

- The site is zoned GM12, F(0.6), H(22)
- GM12 - Permitted residential uses include: apartment dwellings low and medium rise, planned unit development, stacked dwelling, and townhouse dwellings.
- F(0.6) – Max FSI is 0.6, about 33,000 sq.m. based on site area. Confirmed in a previous pre-consultation that FSI is calculated over the entire site, so this also includes the commercial uses. Future plans will have to show the full site in a calculation.
- H(22) – Max height is 22m
- Any development would be a Planned Unit Development over the entire site. Information is limited on the plans submitted, which is fine, but I can't confirm

zoning complies at this point. There didn't seem to be glaring concerns however so long as FSI is less than 0.6.

Additional Items

- I encourage you to reach out to the local ward councillor before making a submission – this is Ward 2, Laura Dudas – this may change with the municipal election in less than a month.
- The City will soon be changing its Site Plan and Zoning By-law Amendment processes in response to Bill 109. A follow up pre-application consultation, and integration into this new planning process will be required if your application is submitted on or after January 1, 2023. More details can be shared at a future date.
- The High Performance Development Standards have been approved by Council and will apply once the New Official Plan is officially in effect. Site Plan metrics include such things like Building Energy Efficiency, Accessibility, Tree Planting and Species requirements. You can view them all by searching it up on the City's website.
 - The current Tier 1 High Performance Development Standard Requirements are provided on the linked page: https://engage.ottawa.ca/ottawa-high-performance-development-standard1/news_feed/hpds-requirements-site-plan
 - These will be design standards required to be shown on plans and met through Site Plan review and approval.

Transportation Planning – Mike Giampa

- TIA is not required
- A Noise Study is required.
- Jeanne D'Arc has a ROW protection of 37.5m.
- Regarding the internal private street layout, an appropriate throat length needs to be maintained at the signalized access. Refer to TAC guidelines.

Engineering – Rubina Rasool

- Engineering comments are provided in the attached "Preconsultation Engineering Comments 1615 Orleans" document.
- Engineering plan and report requirements are included in the "Preconsultation Required Plans 1615 Orleans" document.

Parks Planning – Phil Castro

Parks & Facilities Planning's (PFP) comments on the above-noted development application are below:

- Please note that PFP has recently undertaken a legislated replacement of the Parkland Dedication By-law, with the new by-law approved by City Council on August 31, 2022. To ensure you are aware of the parkland dedication requirements for your proposed development, we encourage you to familiarize

yourself with the staff report and By-Law that were approved by Council on August 31, 2022.

- In accordance with the City of Ottawa's Parkland First Policy, on development or redevelopment sites that generate a minimum of 400m² of parkland, PFP will take the maximum amount of parkland permitted as specified by the Parkland Dedication By-law. The land dedicated as parkland will meet the requirements of the Parkland Dedication By-law and Park Development Manual, to the satisfaction of PFP in consultation with Planning, Real Estate and Economic Development (PRED).

Please provide PFP with a surveyor's note (or equivalent) which specifies the gross land area of the property as well as the area to be redeveloped with your application.

Urban Design – Selma Hassan

1. A Design Brief is required with the submission. A Terms of Reference for the Brief is attached; all items highlighted in yellow must be included in the Brief.
2. Pedestrian connections, from the Jeanne D'Arc sidewalk, across the frontages of all the new units are important. These were shown on the applicant's pre-consultation drawings and should all be retained.
3. Understanding the site's limitations, we feel that there are still opportunities to explore alternative layouts that improve the interface with Jeanne D'Arc, consolidate open space for greater resident benefit and don't reduce unit counts.
 - a. The attached PDF is a very rough illustration of one possibility. On the PDF, the red lines are roads, the yellow and blue blocks are the proposed residential blocks pushed further into the site, the orange is visitor parking and the green is open space. While, surface parking is still visible from Jeanne D'Arc, a landscaped open space would be the primary impression from the street. The open space would also create a reasonable sized area for play for the children who are likely to be living in these family sized units.
4. The infill is primarily surrounded by commercial buildings and parking. To help establish a more residential feel to the development, planting in front of and around the units, as well as in the open space, is important. As illustrated in the applicant's package, the fronts of the units will essentially be hardscape (image below as example). The frontages need to include soft surface areas. While, the driveways and walkways can't be soft surface, the area between the stoop and street can be, and should include trees wherever there is enough soil volume.



The landscape plan should show trees:

- In the green areas shown in the PDF adjacent to Street B.
 - For Block D, along the unit fronts, in the area to the west adjacent to Jeanne D’Arc, and along the rear property line abutting the existing residential. Low planting should screen the surface parking from Jeanne D’Arc.
 - Along the frontage of Jeanne D’Arc, streets 1 and 2. The visitor parking should be screened with vegetation.
 - In the open space are shown in the PDF. The planting should create park like area for residents and patrons of the commercial uses. The area would also benefit from seating opportunities
5. Architecture – a slight simplification of the colours and / or material selection is suggested.
6. Questions:
- a. As part of the redevelopment, will the pylon sign at the southern entrance to the plaza be relocated?
 - b. How will residential garbage be handled? Will there be a common garbage area? If yes, where?

Forestry – Mark Richardson

LP tree planting requirements:

For additional information on the following please contact tracy.smith@Ottawa.ca

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.

- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to Ottawa Hydro’s planting guidelines (species and setbacks) when planting around overhead primary conductors.

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa’s Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please document on the LP that adequate soil volumes can be met:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

Sensitive Marine Clay

- Please follow the City’s 2017 Tree Planting in Sensitive Marine Clay guidelines



Tree Canopy Cover

- The landscape plan shall show how the proposed tree planting will replace and increase canopy cover on the site over time, to support the City’s 40% urban forest canopy cover target.
- At a site level, efforts shall be made to provide as much canopy cover as possible, through tree planting and tree retention, with an aim of 40% canopy cover at 40 years, as appropriate.
- Indicate on the plan the projected future canopy cover at 40 years for the site.

Site Plan Pre- Application Consultation Notes

Date: Tuesday, September 27, 2022.

Site Location: 1615 Orleans Blvd

Type of Development: Residential (townhomes, stacked, singles, apartments), Office Space, Commercial, Retail, Institutional, Industrial, Other: N/A

Infrastructure

Water

Existing public services:

- Jeanne D'Arc Blvd – 610mm backbone (existing service connection to remain)
- Orleans Blvd – 406 DI watermain (existing service connection)

Watermain Frontage Fees to be paid (\$190.00 per metre) Yes No

Boundary conditions:

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

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

General comments

- Service areas with a basic demand greater than 50 m³/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid creation of vulnerable service area.
- A District Metering Area Chamber (DMA) is required for services 150mm or greater in diameter.

Sanitary Sewer

Existing public services:

- Jeanne D'Arc Blvd – 250mm Conc. (existing service connection)
- Orleans Blvd – 375mm unknown

Is a monitoring manhole required on private property? Yes No

General comments

- Please submit sanitary demands with the water boundary conditions to identify any capacity constraints at the local pumping station.
- For concrete sewer pipe, maintenance holes shall be installed when the service is greater than 50% of the diameter of the mainline concrete pipe.

Storm Sewer

Existing public services:

- Jeanne D'Arc Blvd – 1350mm Conr. (existing service connection)
- Orleans Blvd – 1050 Conr. mm unknown

Is a monitoring manhole required on private property? Yes No

General comments

- Building foundation drains must be connected to a storm sewer that is operating in a free-flow state

Stormwater Management

Quality Control:

- Rideau Valley Conservation Authority to confirm quality control requirements.

Quantity Control:

- Site is located within the Billberry Creek Area Subwatershed Study Area draining to the Ottawa River. Please contact the RVCA for subwatershed study area requirements.
- Time of concentration (Tc): Tc = pre-development; maximum Tc = 10 min
- Allowable run-off coefficient: post-development to pre-development, max C = 0.5
- Allowable flowrate: Allowable flowrate: Control the 100-year storm events to the 5-year storm event.
- The stormwater management for the entire site must be provided to demonstrate adequate capacity in the private on-site network and that the site is within the overall site release rate requirement.

General Service Design Comments

- All structure must be a minimum of 1.0m from existing mains on-site. Sewer mains within 6.0m of the building foundation must provide include a section within the geotechnical report discussing the minimum separation distance between the mains and the building foundations for future maintenance and repair.

Other

Capital Works Projects within proximity to application? Yes No

References and Resources

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

- To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre:
InformationCentre@ottawa.ca<mailto:InformationCentre@ottawa.ca>
(613) 580-2424 ext. 44455
- geoOttawa
<http://maps.ottawa.ca/geoOttawa/>

SITE PLAN APPLICATION – Municipal servicing

For information on preparing required studies and plans refer to:

<http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans>

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

S – Required for Site Plan Control/Subdivision

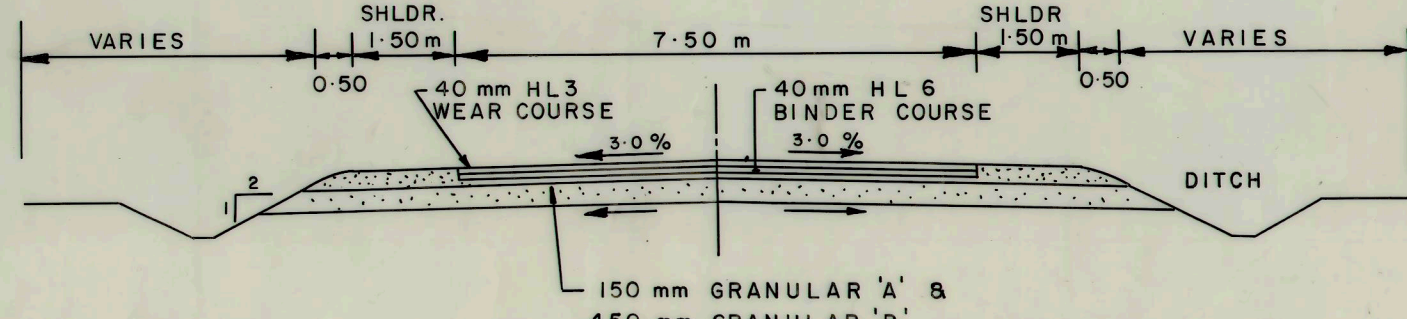
It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with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

Notes:

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

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

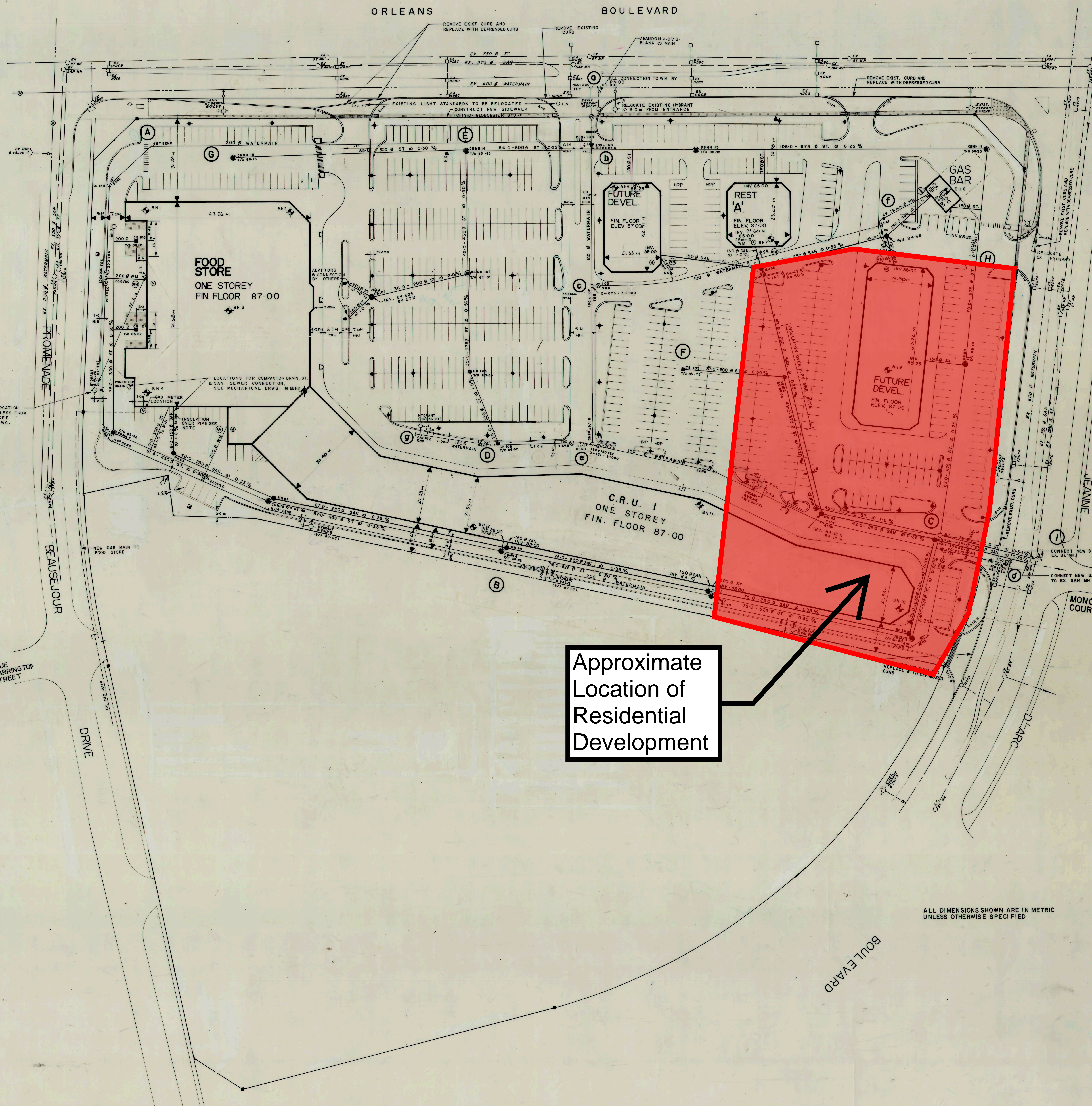
11. Stormwater Management Report/Brief - required with all site plan applications as per Official Plan section 4.7.6.



- NOTES**
- BOTTOM OF DITCH TO BE MINIMUM 300 mm BELOW GRANULAR SUBGRADE.
 - SUB-EXCAVATE SOFT AREAS IN SUBBASE AND FILL WITH GRANULAR 'B' COMPACTED IN 150 mm LAYERS.
 - ALL MATERIALS TO BE SUPPLIED AND PLACED AS PER M.T.C. STANDARDS AND SPECIFICATIONS.
 - DEPTH OF GRANULAR 'B' TO BE INCREASED AS REQUIRED BY SOIL CONDITIONS.

TEMPORARY ROAD CROSS - SECTION

- ROAD STRUCTURE:**
- 80 mm HL 3
 - 150 mm GRANULAR 'A'
 - 450 mm GRANULAR 'B'
 - COMPACTED SUBGRADE
- PARKING SPACE STRUCTURE:**
- 50 mm HL 3
 - 150 mm GRANULAR 'A'
 - 380 mm GRANULAR 'B'
 - COMPACTED SUBGRADE



Approximate Location of Residential Development

WATERMAIN SCHEDULE

STATION	DESCRIPTION	PROPOSED SURFACE GRADE	TOP OF WATERMAIN	AS BUILT
0+000	EX. 400 Ø WM 400 x 200 TEE			
0+011	VALVE & V.C.	86.60	84.20	83.98
0+020	200x200 TEE, 200x150 REDUCER	86.74	84.34	84.15
0+073	150 x 100 TEE	86.74	84.34	84.31
0+100		86.63	84.23	84.21
0+128.5	11/4" BEND	86.68	84.28	84.19
0+131	150 x 150 TEE	86.68	84.28	84.19
0+134	VALVE & V.C.	86.68	84.28	84.19
0+176	11/4" BEND	86.57	84.17	84.22
0+192	HYDRANT & VALVE	86.57	84.17	84.22
0+220	11/4" BEND	86.65	84.25	84.34
0+266	300x150 REDUCER 200x200 TEE	86.64	84.24	84.28
0+284	300x200 REDUCER & EXIST. PLUS	86.16	83.76	
0+290	EX. WM			
2+000	150 x 150 TEE	86.68	84.28	84.19
2+004	11/4" BEND	86.70	84.30	84.19
2+008	150 V.B.V.	86.65	84.15	84.19
2+037	22 1/2" BEND	86.52	84.12	84.19
2+054	HYDRANT	86.62	84.22	84.25
2+065	CAPPED END	86.62	84.22	84.27
3+000	150 x 100 TEE V.B.V.C.	86.74	84.34	84.31
3+060		86.66	84.26	84.19
3+107	CAPPED END	86.65	84.25	84.48

GENERAL NOTES

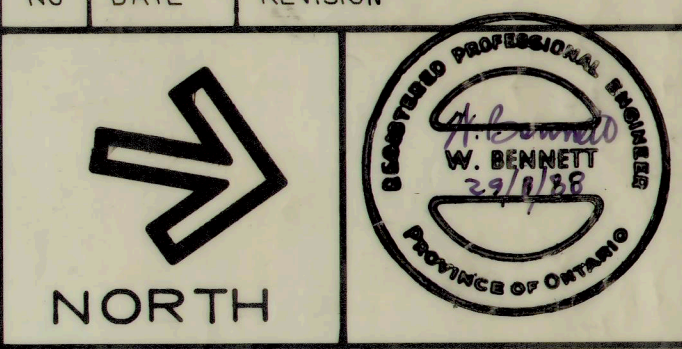
- DO NOT SCALE DRAWINGS. FIGURED DIMENSIONS ONLY TO BE USED.
- EXISTING GROUND ELEVATIONS SHOWN ON ALL DRAWINGS TAKEN FROM WESTER & SIMMONS SURVEYING DRAWING DATED OCT 23/87.
- SANITARY SEWER PVC PIPES OR 35 STORM SEWER CONC. CL. III B CL. III.
- ALL WATERMAIN TO BE D.I.T. OR R.V.C. MIN. 2.4 m COVER (H.O.T. & V.E.T.).
- WATER SERVICE TO BE MIN. 2.4 m COVER.
- CONNECTIONS TO STORM & SANITARY TO BE MACHINE CUT.
- GRAN. ST. TO EXTEND MIN. 0.6 m BACK OF CURB OR TO FOUNDATION WHERE CURB ADJACENT TO BUILDING.
- SANITARY MH PER CITY OF GLOUCESTER STANDARD S-1 FLAT TOP WHERE REQUIRED.
- C.B.'S PER CITY OF GLOUCESTER STANDARD S-9.
- ALL INSTALLATIONS TO CURRENT CITY OF GLOUCESTER AND R.W.O.C. WORKS DEPT. STANDARDS AND SPECIFICATIONS.
- ALL CURBS TO CITY OF GLOUCESTER STANDARD R-18.
- FOR BOREHOLE DETAILS SEE GOLDBER'S REPORT DATED AUG /86.
- PERFORATED PIPE TO BE LAID IN GRANULAR FILL AROUND CATCHBASINS.
- 12 m x 75 mm STYROFOAM MH WITH INSULATION OVER SAN. SEWER WITH COVER 150 mm OR LESS.

SIDEWALK TO BE DEPRESSED AND CONTINUOUS ACROSS THE ENTRANCE.

LEGEND:

- Light Standard
- Transformer
- Bore Hole
- Meter
- Remote Meter
- Impermeable Cut Off Wall

No	DATE	REVISION
12	89/04/05	AS BUILT - WATERMAIN F.D.
11	88/12/23	REVISE SERVICE PIPE ELEV. TO C.R.U. 1
10	88/12/23	REVISE ST. GRAIN FROM 200D TO 300D FOR C.R.U. 1 AS PER R.J. McKEE CONSULTANTS
9	88/10/31	REVISE RADIUS AT ENTRANCES
8	88/10/27	REVISE CBMH 1/0'S
7	88/10/24	REVISE INVERTS CBMH 107 & ISSUE FOR CONSTRUCTION
6	88/10/07	REVISE CURB NOTES AND TURNING LANES
5	88/09/28	REVISE ISLAND
4	88/09/26	REVISE AS PER FIRE DEPT. AND RMOIC
3	88/09/12	ADD IMPERMEABLE CUT OFF WALL
2	88/09/12	REVISE SAN FROM 200D TO 300D. CHANGE G.I. TO 150mm. REVISE SIDEWALK LOCATION ON JEANNE GARD.
1	29/08/88	ISSUED FOR TENDER



ORLEANS GARDENS SHOPPING CENTRE
STEINBERG PLUS STORE # 173
JEANNE D'ARC BLVD., ORLEANS

BASE INFORMATION BY
MARCUS BERNIS ARCH.

FirstCity
SHOPPING CENTRE GROUP

CC
Cumming Cockburn Limited
Consulting Engineers and Planners
Hall, Ottawa, Belleville, Kingston, Toronto, Waterloo, London

GENERAL PLAN OF SERVICES

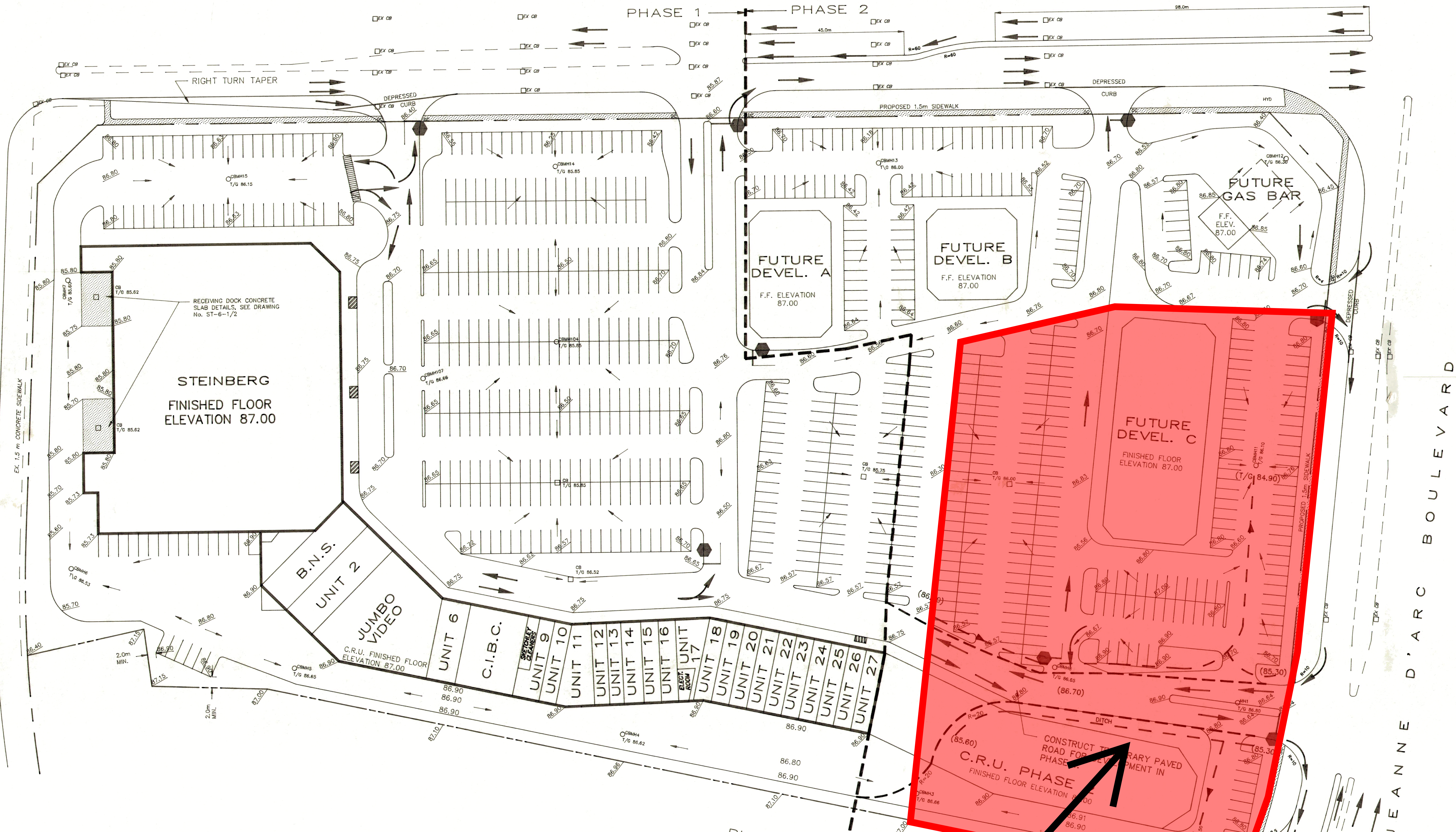
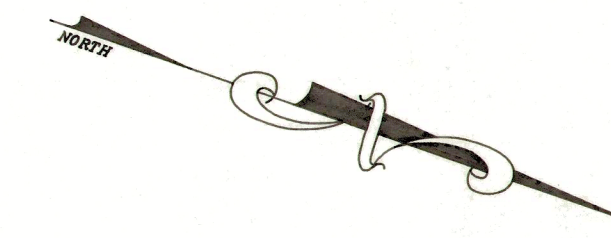
DATE	DRAWN	JOB No	DRAWING No
JULY 1988		3100-87	100
SCALE	CHECKED		
1:500			

ALL DIMENSIONS SHOWN ARE IN METRIC UNLESS OTHERWISE SPECIFIED

PROMENADE BEAUSSEJOUR

ORLEANS BOULEVARD

PHASE 1 PHASE 2



Approximate Location of Residential Development

JEANNE D'ARC BOULEVARD

GENERAL NOTES :

- 1. DO NOT SCALE DRAWINGS. FIGURED DIMENSIONS ONLY TO BE USED.
- 2. GENERAL GRADING, TOPSOIL, SEEDING AND SWALES REQUIRED TO DIRECT WATER TO CDM'S 1.2,3,8,11, 12,13,C0102,AND C0103 DURING PHASE 1 DEVELOPMENT.

LEGEND

- 86.80 PROPOSED GRADE
- DRAINAGE ARROWS
- TRAFFIC DIRECTION
- STOP SIGN
- (T/G 85.50) T/G ELEVATION SET DURING PHASE 1 CONSTRUCTION
- DC DEPRESSED CURB
- ▨ RAMP

NOTE:

FOR ROAD STRUCTURE SEE DRAWING 3100-87-100

NO.	REVISIONS	DATE	INITIAL

ORLEANS GARDENS SHOPPING CENTRE
FIRST CITY
SHOPPING CENTRE GROUP

GRADING PLAN

Cumming Cockburn Limited
Consulting Engineers and Planners

SCALE 1:500
DRAWN BY M.M./CAD
DESIGN D.Y. CHECKED D.Y.
DATE JULY 1988
FIELD BOOK
DRAWING No. 3100-87-200

Servicing study guidelines for development applications

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- Executive Summary (for larger reports only).
- Date and revision number of the report.
- Location map and plan showing municipal address, boundary, and layout of proposed development.
- Plan showing the site and location of all existing services.
- Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- Summary of Pre-consultation Meetings with City and other approval agencies.
- Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria.
- Statement of objectives and servicing criteria.
- Identification of existing and proposed infrastructure available in the immediate area.
- Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- Proposed phasing of the development, if applicable.

- Reference to geotechnical studies and recommendations concerning servicing.

- All preliminary and formal site plan submissions should have the following information:
 - Metric scale

 - North arrow (including construction North)

 - Key plan

 - Name and contact information of applicant and property owner

 - Property limits including bearings and dimensions

 - Existing and proposed structures and parking areas

 - Easements, road widening and rights-of-way

 - Adjacent street names

4.2 Development Servicing Report: Water

- Confirm consistency with Master Servicing Study, if available
- Availability of public infrastructure to service proposed development
- Identification of system constraints
- Identify boundary conditions
- Confirmation of adequate domestic supply and pressure
- Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.
- Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.
- Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
- Address reliability requirements such as appropriate location of shut-off valves
- Check on the necessity of a pressure zone boundary modification.
- Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

- Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- Confirm consistency with Master Servicing Study and/or justifications for deviations.
- Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.
- Description of proposed sewer network including sewers, pumping stations, and forcemains.
- Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).
- Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- Analysis of available capacity in existing public infrastructure.
- A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.
- Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- Set-back from private sewage disposal systems.
- Watercourse and hazard lands setbacks.
- Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- Any proposed diversion of drainage catchment areas from one outlet to another.
- Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.
- Identification of potential impacts to receiving watercourses
- Identification of municipal drains and related approval requirements.
- Descriptions of how the conveyance and storage capacity will be achieved for the development.
- 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- Inclusion of hydraulic analysis including hydraulic grade line elevations.
- Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

- Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.
- Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- Changes to Municipal Drains.
- Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

- Clearly stated conclusions and recommendations
- Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.
- All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

APPENDIX B

- City Correspondence regarding Boundary Conditions
- Watermain Demand Calculation Sheet
- Fire Flow Calculations
- Water Model Schematic and Results

Boundary Conditions 1615 Orléans Blvd.

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	49	0.82
Maximum Daily Demand	106	1.76
Peak Hour	205	3.42
Fire Flow Demand #1	12,000	200.00

Location



Results

Connection 1 – Orléans Blvd.

Demand Scenario	Head (m)	Pressure¹ (psi)
Maximum HGL	130.3	63.2
Peak Hour	127.3	58.9
Max Day plus Fire Flow #1	127.8	59.6

¹ Ground Elevation = 85.9 m

Connection 2 – Jeanne d’Arc Blvd.

Demand Scenario	Head (m)	Pressure¹ (psi)
Maximum HGL	130.4	62.8
Peak Hour	127.3	58.4
Max Day plus Fire Flow #1	127.5	58.6

¹ Ground Elevation = 86.2 m

Disclaimer

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

WATERMAIN DEMAND CALCULATION SHEET



IBI GROUP
333 PRESTON STREET
OTTAWA, ONTARIO
K1S 5N4

PROJECT : Orleans Gardens
CLIENT : North American Dev.

FILE: 122764-6.4.4
DATE PRINTED: 23-May-24
DESIGN: AB
PAGE: 1 OF 1

NODE	RESIDENTIAL				NON-RESIDENTIAL (ICI)			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND (l/min)
	SINGLE FAMILY UNITS	TOWNHOUSE / BACK TO BACK UNITS	MEDIUM DENSITY UNITS	POPULATION	INDUST. (ha)	COMM. (ha)	INSTIT. (ha)	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	
New Residential																	
J20		24		64.8				0.21		0.21	0.53		0.53	1.16		1.16	
J21		24		64.8				0.21		0.21	0.53		0.53	1.16		1.16	
J23		12		32.4				0.11		0.11	0.26		0.26	0.58		0.58	
Hydrants																	
H1																	11,000
H2																	12,000
H3																	12,000
H4																	10,000
H5																	10,000
Existing Commercial																	
J04 - REXALL									0.13				0.06	0.06		0.07	0.07
J6 - NORTHSTRIP MALL									0.21		0.04	0.04	0.09	0.09		0.11	0.11
J7 - SOUTH STRIP MALL									0.17		0.06	0.06	0.07	0.07		0.09	0.09
J8 - GROCERY STORE									0.45		0.05	0.05	0.20	0.20		0.23	0.23
J16 - BLOCK W/ REXALL									0.07		0.13	0.13	0.03	0.03		0.04	0.04
Total		60		162.0		1.03		0.53	0.30	0.82	1.31	0.45	1.76	2.89	0.54	3.42	

POPULATION DENSITY	WATER DEMAND RATES	PEAKING FACTORS
Single Family	3.3 persons/unit	Residential
Townhouse Unit:	2.7 persons/unit	280 l/cap/day
Back to Back Un	2.7 persons/unit	Commercial Shopping Center
		2,500 L/(1000m2)/day
*Note: Population Density as per MSS, not OSDG		Maximum Daily
		Residential
		2.5 x avg. day
		Commercial
		1.5 x avg. day
		Maximum Hourly
		Residential
		2.2 x max. day
		Commercial
		1.8 x avg. day

Fire Flow Requirement from Fire Underwriters Survey

1615 Orleans Blvd - Block A

Building Floor Area Building divided into 2 sections with 2 hour fire wall
width 25.4 m
depth 15.5 m
stories 3
Area 1,176.0 m²

$F = 220C\sqrt{A}$

C	1.5	C =	1.5 wood frame
A	1,176 m ²		1.0 ordinary
			0.8 non-combustile
F	11,316 l/min		0.6 fire-resistive
use	11,000 l/min		

Occupancy Adjustment

Use -15%

-25% non-combustile
-15% limited combustile
0% combustile
+15% free burning
+25% rapid burning

Adjustment	-1650 l/min
Fire flow	9,350 l/min

Sprinkler Adjustment

Use 0%

Adjustment 0 l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	0.0	0.0	0	0	0%
east	15.2	27.0	3	81	14%
south	0.0	0.0	0	0	0%
west	18.4	19.0	1	19	10%

Total 24%

Adjustment	2,244 l/min
------------	-------------

Total adjustments	2,244 l/min
Fire flow	11,594 l/min
Use	12,000 l/min
	200.0 l/s

* Exposure charges from Water Supply For Public Protection in Canada 2020
Technical Bulletin ISTB 2021-03

Fire Flow Requirement from Fire Underwriters Survey

1615 Orleans Blvd - Block B

Building Floor Area Building divided into 3 sections with 2 hour fire wall
width 18.5 m
depth 14.0 m
stories 4
Area 1,036.0 m²

$F = 220C\sqrt{A}$

C	1.5	C =	1.5 wood frame
A	1,036 m ²		1.0 ordinary
			0.8 non-combustile
F	10,622 l/min		0.6 fire-resistive
use	11,000 l/min		

Occupancy Adjustment

		-25% non-combustile
		-15% limited combustile
Use	-15%	0% combustile
		+15% free burning
		+25% rapid burning
Adjustment	-1650 l/min	
Fire flow	9,350 l/min	

Sprinkler Adjustment

Use	0%
Adjustment	0 l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	0.0	0.0	0	0	0%
east	15.2	23.4	3	70	13%
south*	0.0	0.0	0	0	0%
west	15.2	27.6	3	83	14%
Total					27%

Adjustment	2,525 l/min
<hr/>	
Total adjustments	2,525 l/min
Fire flow	11,875 l/min
Use	12,000 l/min
	200.0 l/s

* Exposure charges from Water Supply For Public Protection in Canada 2020
Technical Bulletin ISTB 2021-03

Fire Flow Requirement from Fire Underwriters Survey

1615 Orleans Blvd - Block C

<u>Building Floor Area</u>	Building divided into 3 sections with 2 hour fire wall
	width 18.1 m
	depth 14.5 m
	stories 3
	Area 785.6 m ²

$$F = 220C\sqrt{A}$$

C	1.5	C =	1.5 wood frame
A	786 m ²		1.0 ordinary
F	9,249 l/min		0.8 non-combustile
use	9,000 l/min		0.6 fire-resistive

Occupancy Adjustment

		-25% non-combustile
		-15% limited combustile
Use	-15%	0% combustile
		+15% free burning
		+25% rapid burning
Adjustment	-1350 l/min	
Fire flow	7,650 l/min	

Sprinkler Adjustment

Use	0%
Adjustment	0 l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	0.0	0.0	0	0	0%
east	18.3	21.6	3	65	13%
south	35.6	2.1	2	4	0%
west	15.2	23.4	3	70	13%

Total 26%

Adjustment 1,989 l/min

Total adjustments	1,989 l/min
Fire flow	9,639 l/min
Use	10,000 l/min
	166.7 l/s

* Exposure charges from Water Supply For Public Protection in Canada 2020
Technical Bulletin ISTB 2021-03

Fire Flow Requirement from Fire Underwriters Survey

1615 Orleans Blvd - Block D

<u>Building Floor Area</u>	Building divided into 2 sections with 2 hour fire wall
	width 20.4 m
	depth 14.5 m
	stories 3
	Area 887.8 m ²

$$F = 220C\sqrt{A}$$

C	1.5	C =	1.5 wood frame
A	888 m ²		1.0 ordinary
F	9,833 l/min		0.8 non-combustile
use	10,000 l/min		0.6 fire-resistive

Occupancy Adjustment

		-25% non-combustile
		-15% limited combustile
Use	-15%	0% combustile
		+15% free burning
		+25% rapid burning
Adjustment	-1500 l/min	
Fire flow	8,500 l/min	

Sprinkler Adjustment

Use	0%
Adjustment	0 l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	0.0	0.0	0	0	0%
east	21.3	38.0	2	76	6%
south	>45	11.0	2	22	0%
west	18.3	39.6	3	119	15%

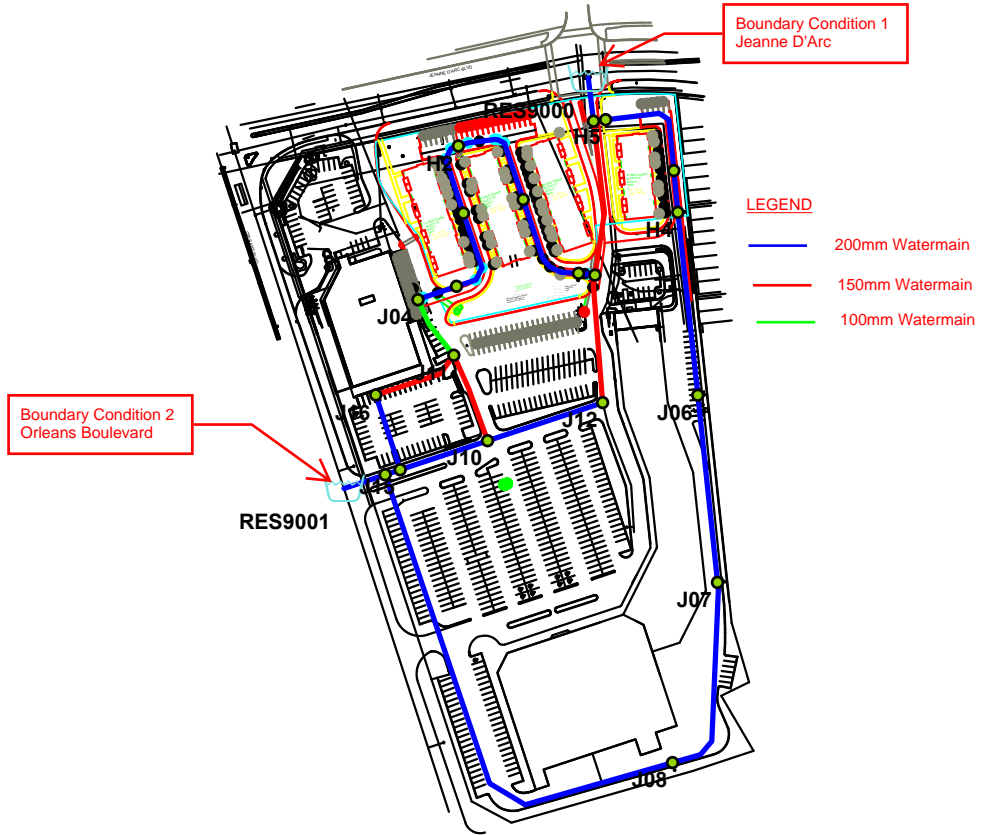
Total 21%

Adjustment 1,785 l/min

Total adjustments	1,785 l/min
Fire flow	10,285 l/min
Use	10,000 l/min
	166.7 l/s

* Exposure charges from Water Supply For Public Protection in Canada 2020
Technical Bulletin ISTB 2021-03

WATER MODEL ORLEANS GARDENS



Basic Day (Max HGL) Junction Report

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	<input type="checkbox"/>	H1	0.00	86.66	130.36	428.28
2	<input type="checkbox"/>	H2	0.00	86.47	130.36	430.08
3	<input type="checkbox"/>	H3	0.00	86.47	130.36	430.06
4	<input type="checkbox"/>	H4	0.00	86.51	130.32	429.30
5	<input type="checkbox"/>	H5	0.00	86.29	130.31	431.39
6	<input type="checkbox"/>	J01	0.00	86.27	130.31	431.55
7	<input type="checkbox"/>	J02	0.00	86.47	130.36	430.06
8	<input type="checkbox"/>	J04	0.04	86.70	130.36	427.84
9	<input type="checkbox"/>	J06	0.06	86.70	130.33	427.54
10	<input type="checkbox"/>	J07	0.05	86.70	130.34	427.65
11	<input type="checkbox"/>	J08	0.13	86.60	130.35	428.75
12	<input type="checkbox"/>	J09	0.00	86.55	130.39	429.58
13	<input type="checkbox"/>	J10	0.00	86.76	130.38	427.47
14	<input type="checkbox"/>	J11	0.00	86.56	130.38	429.43
15	<input type="checkbox"/>	J12	0.00	86.75	130.38	427.52
16	<input type="checkbox"/>	J15	0.00	86.70	130.39	428.10
17	<input type="checkbox"/>	J16	0.02	86.57	130.39	429.36
18	<input type="checkbox"/>	J20	0.21	86.55	130.36	429.26
19	<input type="checkbox"/>	J21	0.21	86.47	130.36	430.07
20	<input type="checkbox"/>	J23	0.11	86.45	130.32	429.85

Basic Day Pipe Report

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count
1	<input type="checkbox"/>	P1	RES9000	J01	21.06	204.00	110.00	-7.35	0.22	0.01	0.46	Open	0
2	<input type="checkbox"/>	P10	J09	RES9001	21.11	204.00	110.00	-8.18	0.25	0.01	0.56	Open	0
3	<input type="checkbox"/>	P13	J11	J04	32.26	108.00	100.00	1.55	0.17	0.02	0.67	Open	0
4	<input type="checkbox"/>	P14	J10	J12	58.85	204.00	110.00	2.79	0.09	0.00	0.08	Open	0
5	<input type="checkbox"/>	P15	J02	J12	62.03	155.00	100.00	-2.79	0.15	0.02	0.34	Open	0
6	<input type="checkbox"/>	P17	J11	J10	44.54	155.00	100.00	-0.27	0.01	0.00	0.00	Open	0
7	<input type="checkbox"/>	P18	J10	J15	44.65	204.00	110.00	-3.06	0.09	0.00	0.09	Open	0
8	<input type="checkbox"/>	P19	J15	J09	7.68	204.00	110.00	-4.35	0.13	0.00	0.17	Open	0
9	<input type="checkbox"/>	P20	J15	J16	38.10	204.00	110.00	1.29	0.04	0.00	0.02	Open	0
10	<input type="checkbox"/>	P22	J16	J11	44.01	155.00	100.00	1.27	0.07	0.00	0.08	Open	0
11	<input type="checkbox"/>	P24	H1	J04	19.81	204.00	110.00	-1.51	0.05	0.00	0.02	Open	0
12	<input type="checkbox"/>	P26	J20	H1	44.35	204.00	110.00	-1.51	0.05	0.00	0.02	Open	0
13	<input type="checkbox"/>	P28	J21	H2	51.93	204.00	110.00	-1.30	0.04	0.00	0.02	Open	0
14	<input type="checkbox"/>	P3	J02	H3	7.98	204.00	110.00	-1.09	0.03	0.00	0.01	Open	0
15	<input type="checkbox"/>	P30	H3	J21	49.89	204.00	110.00	-1.09	0.03	0.00	0.01	Open	0
16	<input type="checkbox"/>	P34	J23	H4	20.37	204.00	110.00	-3.59	0.11	0.00	0.12	Open	0
17	<input type="checkbox"/>	P36	J01	J02	75.17	155.00	100.00	-3.87	0.21	0.05	0.63	Open	0
18	<input type="checkbox"/>	P38	H5	J23	56.45	204.00	110.00	-3.48	0.11	0.01	0.11	Open	0
19	<input type="checkbox"/>	P4	H2	J20	37.21	204.00	110.00	-1.30	0.04	0.00	0.02	Open	0
20	<input type="checkbox"/>	P5	J01	H5	5.99	204.00	110.00	-3.48	0.11	0.00	0.11	Open	0
21	<input type="checkbox"/>	P6	H4	J06	89.08	204.00	110.00	-3.59	0.11	0.01	0.12	Open	0
22	<input type="checkbox"/>	P7	J06	J07	91.15	204.00	110.00	-3.65	0.11	0.01	0.12	Open	0
23	<input type="checkbox"/>	P8	J07	J08	99.60	204.00	110.00	-3.70	0.11	0.01	0.13	Open	0
24	<input type="checkbox"/>	P9	J08	J09	252.44	204.00	110.00	-3.83	0.12	0.03	0.14	Open	0

Peak Hour Junction Report

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	<input type="checkbox"/>	H1	0.00	86.66	129.22	417.06
2	<input type="checkbox"/>	H2	0.00	86.47	129.16	418.33
3	<input type="checkbox"/>	H3	0.00	86.47	129.11	417.81
4	<input type="checkbox"/>	H4	0.00	86.51	127.92	405.80
5	<input type="checkbox"/>	H5	0.00	86.29	127.63	405.13
6	<input type="checkbox"/>	J01	0.00	86.27	127.61	405.08
7	<input type="checkbox"/>	J02	0.00	86.47	129.10	417.78
8	<input type="checkbox"/>	J04	0.07	86.70	129.23	416.77
9	<input type="checkbox"/>	J06	0.11	86.70	128.27	407.35
10	<input type="checkbox"/>	J07	0.09	86.70	128.63	410.88
11	<input type="checkbox"/>	J08	0.23	86.60	129.03	415.75
12	<input type="checkbox"/>	J09	0.00	86.55	130.05	426.25
13	<input type="checkbox"/>	J10	0.00	86.76	129.89	422.61
14	<input type="checkbox"/>	J11	0.00	86.56	129.88	424.51
15	<input type="checkbox"/>	J12	0.00	86.75	129.75	421.39
16	<input type="checkbox"/>	J15	0.00	86.70	130.01	424.39
17	<input type="checkbox"/>	J16	0.04	86.57	129.99	425.47
18	<input type="checkbox"/>	J20	1.16	86.55	129.18	417.72
19	<input type="checkbox"/>	J21	1.16	86.47	129.13	418.03
20	<input type="checkbox"/>	J23	0.58	86.45	127.84	405.59

Peak Hour Pipe Report

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count
1	<input type="checkbox"/>	P1	RES9000	J01	21.06	204.00	110.00	-47.84	1.46	0.31	14.63	Open	0
2	<input type="checkbox"/>	P10	J09	RES9001	21.11	204.00	110.00	-51.28	1.57	0.35	16.63	Open	0
3	<input type="checkbox"/>	P13	J11	J04	32.26	108.00	100.00	9.71	1.06	0.65	20.16	Open	0
4	<input type="checkbox"/>	P14	J10	J12	58.85	204.00	110.00	17.61	0.54	0.14	2.30	Open	0
5	<input type="checkbox"/>	P15	J02	J12	62.03	155.00	100.00	-17.61	0.93	0.65	10.45	Open	0
6	<input type="checkbox"/>	P17	J11	J10	44.54	155.00	100.00	-1.69	0.09	0.01	0.14	Open	0
7	<input type="checkbox"/>	P18	J10	J15	44.65	204.00	110.00	-19.31	0.59	0.12	2.72	Open	0
8	<input type="checkbox"/>	P19	J15	J09	7.68	204.00	110.00	-27.36	0.84	0.04	5.20	Open	0
9	<input type="checkbox"/>	P20	J15	J16	38.10	204.00	110.00	8.06	0.25	0.02	0.54	Open	0
10	<input type="checkbox"/>	P22	J16	J11	44.01	155.00	100.00	8.02	0.42	0.11	2.43	Open	0
11	<input type="checkbox"/>	P24	H1	J04	19.81	204.00	110.00	-9.64	0.29	0.01	0.75	Open	0
12	<input type="checkbox"/>	P26	J20	H1	44.35	204.00	110.00	-9.64	0.29	0.03	0.75	Open	0
13	<input type="checkbox"/>	P28	J21	H2	51.93	204.00	110.00	-8.48	0.26	0.03	0.59	Open	0
14	<input type="checkbox"/>	P3	J02	H3	7.98	204.00	110.00	-7.32	0.22	0.00	0.45	Open	0
15	<input type="checkbox"/>	P30	H3	J21	49.89	204.00	110.00	-7.32	0.22	0.02	0.45	Open	0
16	<input type="checkbox"/>	P34	J23	H4	20.37	204.00	110.00	-23.49	0.72	0.08	3.92	Open	0
17	<input type="checkbox"/>	P36	J01	J02	75.17	155.00	100.00	-24.93	1.32	1.50	19.90	Open	0
18	<input type="checkbox"/>	P38	H5	J23	56.45	204.00	110.00	-22.91	0.70	0.21	3.74	Open	0
19	<input type="checkbox"/>	P4	H2	J20	37.21	204.00	110.00	-8.48	0.26	0.02	0.59	Open	0
20	<input type="checkbox"/>	P5	J01	H5	5.99	204.00	110.00	-22.91	0.70	0.02	3.74	Open	0
21	<input type="checkbox"/>	P6	H4	J06	89.08	204.00	110.00	-23.49	0.72	0.35	3.92	Open	0
22	<input type="checkbox"/>	P7	J06	J07	91.15	204.00	110.00	-23.60	0.72	0.36	3.95	Open	0
23	<input type="checkbox"/>	P8	J07	J08	99.60	204.00	110.00	-23.69	0.72	0.40	3.98	Open	0
24	<input type="checkbox"/>	P9	J08	J09	252.44	204.00	110.00	-23.92	0.73	1.02	4.05	Open	0

Max Day Fireflow Design Report

		ID	Total Demand (L/s)	Hydrant Available Flow (L/s)	Critical Node ID for Design Run	Critical Node Pressure at Available Flow (kPa)	Critical Pressure for Design Run (kPa)
1	<input type="checkbox"/>	H1	183.30	186.08	H1	139.96	139.96
2	<input type="checkbox"/>	H2	200.00	206.30	H2	139.96	139.96
3	<input type="checkbox"/>	H3	200.00	260.75	H3	139.96	139.96
4	<input type="checkbox"/>	H4	166.70	318.77	H4	139.96	139.96
5	<input type="checkbox"/>	H5	166.70	603.21	H5	139.96	139.96

Max Day Fireflow Design Report

		ID	Hydrant Design Flow (L/s)	Hydrant Pressure at Design Flow (kPa)
1	<input type="checkbox"/>	H1	186.08	139.98
2	<input type="checkbox"/>	H2	206.30	140.01
3	<input type="checkbox"/>	H3	260.75	140.27
4	<input type="checkbox"/>	H4	318.77	139.96
5	<input type="checkbox"/>	H5	603.21	139.97

Max Day Fireflow Report

		ID	Static Demand (L/s)	Static Pressure (kPa)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (kPa)	Hydrant Available Flow (L/s)
1	<input type="checkbox"/>	H1	0.00	397.44	127.21	183.30	147.02	186.08
2	<input type="checkbox"/>	H2	0.00	399.32	127.22	200.00	154.40	206.30
3	<input type="checkbox"/>	H3	0.00	399.43	127.23	200.00	240.49	260.75
4	<input type="checkbox"/>	H4	0.00	400.77	127.41	166.70	321.63	318.77
5	<input type="checkbox"/>	H5	0.00	403.37	127.45	166.70	378.37	603.21

Max Day Fireflow Report

		ID	Hydrant Pressure at Available Flow (kPa)
1	<input type="checkbox"/>	H1	139.96
2	<input type="checkbox"/>	H2	139.96
3	<input type="checkbox"/>	H3	139.96
4	<input type="checkbox"/>	H4	139.96
5	<input type="checkbox"/>	H5	139.96

Max Day Junction Report

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	<input type="checkbox"/>	H1	0.00	86.66	127.58	401.05
2	<input type="checkbox"/>	H2	0.00	86.47	127.59	402.92
3	<input type="checkbox"/>	H3	0.00	86.47	127.60	403.01
4	<input type="checkbox"/>	H4	0.00	86.51	127.73	403.92
5	<input type="checkbox"/>	H5	0.00	86.29	127.76	406.42
6	<input type="checkbox"/>	J01	0.00	86.27	127.76	406.62
7	<input type="checkbox"/>	J02	0.00	86.47	127.60	403.02
8	<input type="checkbox"/>	J04	0.06	86.70	127.58	400.60
9	<input type="checkbox"/>	J06	0.09	86.70	127.69	401.71
10	<input type="checkbox"/>	J07	0.07	86.70	127.66	401.36
11	<input type="checkbox"/>	J08	0.20	86.60	127.62	401.96
12	<input type="checkbox"/>	J09	0.00	86.55	127.53	401.55
13	<input type="checkbox"/>	J10	0.00	86.76	127.54	399.60
14	<input type="checkbox"/>	J11	0.00	86.56	127.54	401.57
15	<input type="checkbox"/>	J12	0.00	86.75	127.55	399.80
16	<input type="checkbox"/>	J15	0.00	86.70	127.53	400.11
17	<input type="checkbox"/>	J16	0.03	86.57	127.53	401.39
18	<input type="checkbox"/>	J20	0.53	86.55	127.58	402.06
19	<input type="checkbox"/>	J21	0.53	86.47	127.59	402.96
20	<input type="checkbox"/>	J23	0.26	86.45	127.74	404.58

APPENDIX C

- Sanitary Sewer Design Sheet
- Sanitary Drainage Area Plan 122764-C-400
- Sanitary External Drainage Area Plan (Whole Site) 122764-C-401

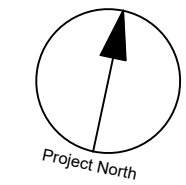


IBI GROUP
 500-333 Preston Street
 Ottawa, Ontario K1S 5N4 Canada
 tel 613 225 1311 fax 613 225 9868
 ibigroup.com

SANITARY SEWER DESIGN SHEET

Ottawa Gardens Redevelopment - 1615 Ottawa Blvd
 CITY OF OTTAWA
 North American Development Group

LOCATION				RESIDENTIAL						ICI AREAS						INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN													
STREET	AREA ID	FROM MH	TO MH	AREA w/ Units (Ha)	UNIT TYPES				AREA w/o Units (Ha)	POPULATION		RES PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)			ICI PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)			FLOW (L/s)	IND	CUM	(L/s)	IND	CUM	(L/s)	CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (m/s)	AVAILABLE CAPACITY	
					SF	TH/SD	1 Bed APT	2 Bed APT		IND	CUM			IND	CUM	IND			CUM	IND	CUM													IND	CUM
	MH28A	EXM4-VET	MH9A							0.0	0.0	3.80	0.00				1.50	0.04	0.08	0.08	0.03	0.00	0.0	0.07	31.02	70.57	250	0.25	0.612	30.95	99.79%				
		MH8A	MH28A							0.0	0.0	3.80	0.00				1.50	0.04	0.00	0.08	0.03	0.00	0.0	0.07	31.02	7.11	250	0.25	0.612	30.95	99.79%				
	MH28A	REXALL	MH29A							0.0	0.0	3.80	0.00				1.50	0.06	0.12	0.12	0.04	0.00	0.0	0.10	31.02	8.57	250	0.25	0.612	30.92	99.68%				
		MH29A	MH28A							0.0	0.0	3.80	0.00				1.50	0.06	0.38	0.50	0.17	0.00	0.0	0.22	31.02	25.66	250	0.25	0.612	30.80	99.28%				
	EX04	MH28A	MH2A							0.0	0.0	3.80	0.00				1.50	0.10	0.00	0.58	0.19	0.00	0.0	0.29	31.02	33.95	250	0.25	0.612	30.73	99.07%				
		MH2A	MH8A	0.32				24		64.8	64.8	3.63	0.76				1.50	0.10	0.32	0.90	0.30	0.00	0.0	1.16	31.02	58.24	250	0.25	0.612	29.86	96.27%				
		MH8A	MH4A							0.0	64.8	3.63	0.76				1.50	0.10	0.00	0.90	0.30	0.00	0.0	1.16	31.02	12.78	250	0.25	0.612	29.86	96.27%				
		MH4A	MH5A	0.10						0.0	64.8	3.63	0.76				1.50	0.06	0.10	1.00	0.33	0.00	0.0	1.16	31.02	23.87	250	0.25	0.612	29.86	96.27%				
		MH11A	MH7A	0.25				24		64.8	64.8	3.63	0.76				1.00	0.00	0.25	0.25	0.08	0.00	0.0	0.85	20.24	57.25	200	0.35	0.624	19.40	95.82%				
		MH7A	MH5A							0.0	64.8	3.63	0.76				1.00	0.00	0.00	0.25	0.08	0.00	0.0	0.85	20.24	8.67	200	0.35	0.624	19.40	95.82%				
		MH5A	MH1A	0.06						0.0	129.6	3.57	1.50				1.00	0.06	0.06	1.31	0.43	0.00	0.0	2.00	31.02	39.71	250	0.25	0.612	29.02	93.57%				
		EX01, EX02, EX03	EXM13A	EXM12A						0.0	0.0	3.80	0.00				1.50	0.40	3.41	3.41	1.13	0.00	0.0	1.53	36.70	75.00	250	0.35	0.724	35.77	95.83%				
			EXM12A	EXM11A	0.19			12		32.4	32.4	3.68	0.39				1.50	0.40	0.19	3.60	1.19	0.00	0.0	1.98	36.70	36.00	250	0.35	0.724	34.72	94.61%				
			EXM11A	MH1A	0.07					0.0	32.4	3.68	0.39				1.50	0.40	0.07	3.67	1.21	0.00	0.0	2.00	31.02	13.13	250	0.25	0.612	29.02	93.55%				
			MH1A	EXSANMH	0.07					0.0	162.0	3.54	1.86				1.50	0.50	0.07	5.05	1.67	0.00	0.0	4.03	31.02	21.49	250	0.25	0.612	26.99	87.02%				
					1.06					162.00									5.05																
Design Parameters:				Notes:						Designed:						No.			Revision		Date														
Residential				1. Manning's coefficient (n) = 0.013						AB						1.			Servicing Brief - Submission No. 1		2023-02-07														
SF 3.4 p/p/ha				2. Demand (per capita): 280 L/day						Checked: RM						2.			Servicing Brief - Submission No. 2		2023-03-21														
TH/SD 2.7 p/p/ha				3. Infiltration allowance: 0.33 L/s/ha						Dwg. Reference: 122764-400						3.			Servicing Brief - Submission No. 3		2024-05-23														
1 Bed 1.4 p/p/ha				4. Residential Peaking Factor: Harmon Formula = 1 + (14(L+P)/1000)^0.5/0.8						File Reference: 122764-6.04.04																									
2 Bed 2.1 p/p/ha				where K = 0.8 Correction Factor						Date: 2024-05-23																									
Other 60 p/p/ha				5. Commercial and Institutional Peak Factors based on total area, 1.5 if greater than 20%, otherwise 1.0						Sheet No: 1 of 1																									



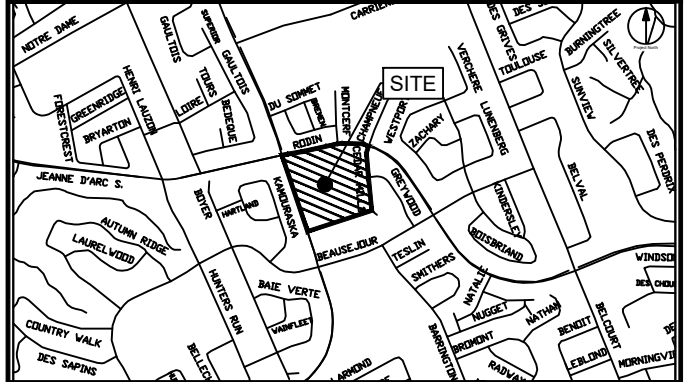
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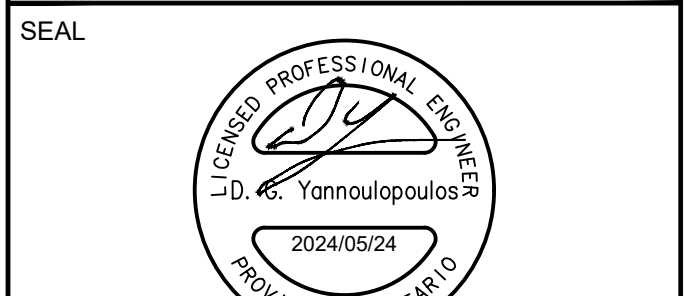
ISSUES

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Project Coordinator:
North American Development Group
Site Plan Architect:
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IBI GROUP
400 - 333 Preston Street
Ottawa ON K1S 5M4 Canada
tel 613 225 1311 fax 613 225 5986
ibigroup.com

PROJECT
ORLEANS GARDENS
1615 ORLEANS BOULEVARD
PROJECT NO:
122764
DRAWN BY:
A.B. / E.H.
PROJECT MGR:
R.M.
CHECKED BY:
D.G.Y.
APPROVED BY:
D.G.Y.

SHEET TITLE
SANITARY DRAINAGE AREA PLAN

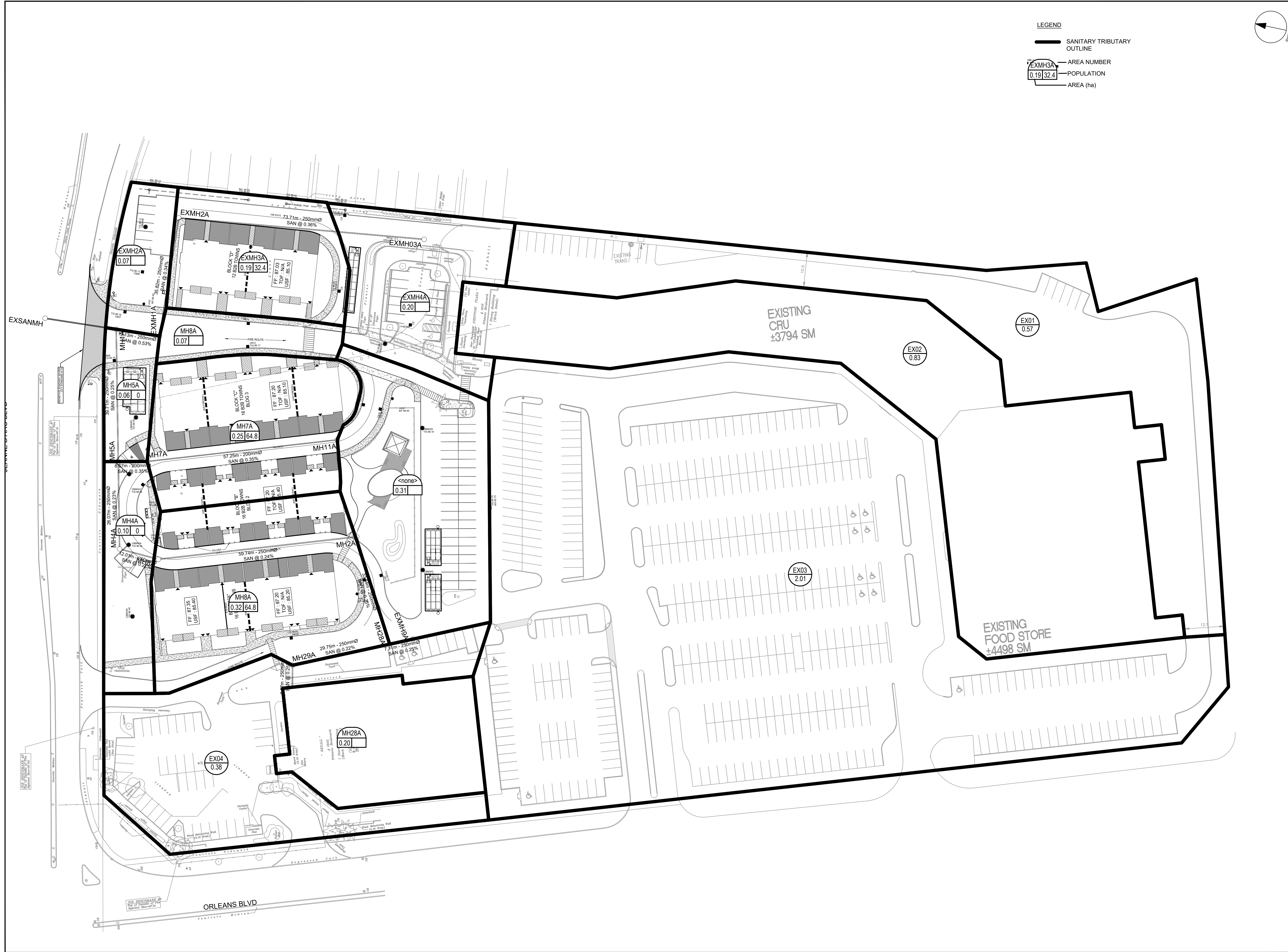
SHEET NUMBER
C-400
ISSUE
3

LEGEND

	SANITARY TRIBUTARY OUTLINE
	AREA NUMBER POPULATION
	AREA (ha)

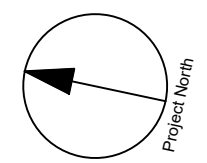


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CITY FILE NO. D07-16-22-008
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Plotted: Friday, May 24, 2024, 10:32:23 AM by Eric Henne



LEGEND

	SANITARY TRIBUTARY OUTLINE
	AREA NUMBER
	POPULATION
	AREA (ha)



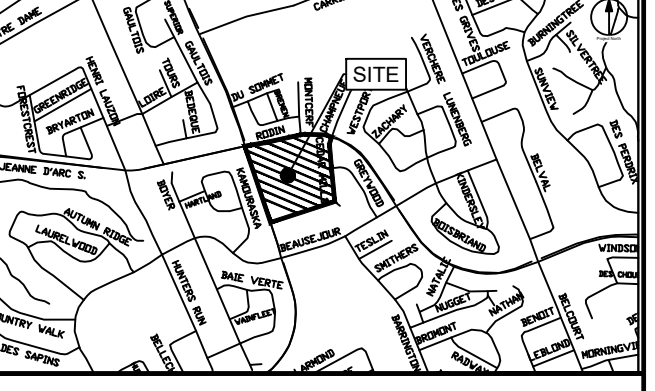
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IBI GROUP
400 - 333 Preston Street
Ottawa ON K1S 5M4 Canada
tel 613 225 1311 fax 613 225 5866
ibigroup.com

PROJECT
ORLEANS GARDENS
1615 ORLEANS BOULEVARD

PROJECT NO:
122764
DRAWN BY:
A.B. / E.H.
PROJECT MGR:
R.M.
CHECKED BY:
D.G.Y.
APPROVED BY:
D.G.Y.

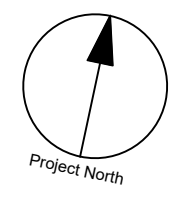
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EXTERNAL SANITARY DRAINAGE AREA PLAN

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APPENDIX D

- Storm Sewer Design Sheet
- Storm Drainage Area Plan 122764-C-500
- Storm External Drainage Area Plan 122764-C-501
- Ponding Plan 122764-C-600
- Stormwater Management Design Sheet – Modified Rational Method
- Orifice Sizing Sheet
- Underground Storage Calculation Sheet
- Uncounted Underground Storage Calculation Sheet
- 2 Year Ponding Letter NADG
- ADS Stormtech Underground Storage System @ MH18
- ADS Stormtech Underground Storage System @ MH21
- ADS Stormtech Underground Storage System @ MH25
- Stress Test Overflow Calculation
- C value Calculation Sheet
- C Value Calculation Soft Scape plan



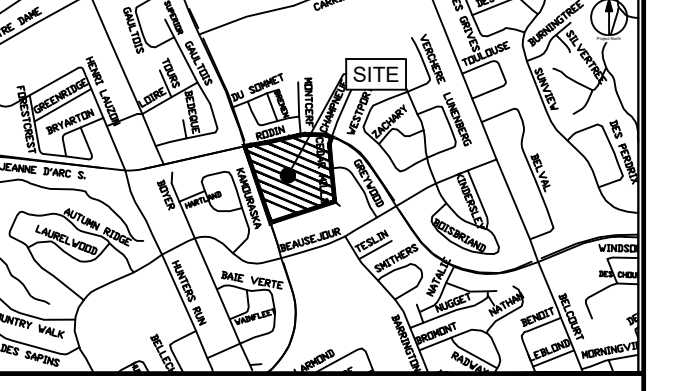
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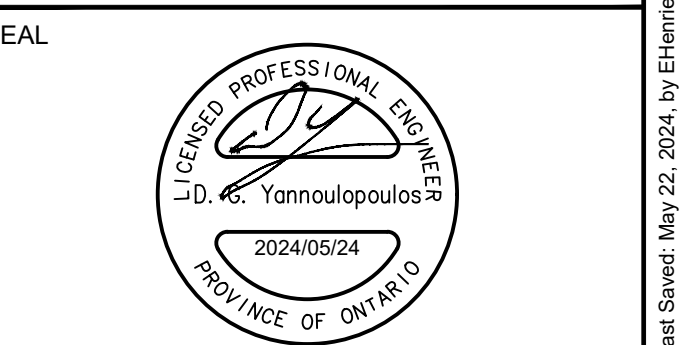
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Project Coordinator:
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Ottawa ON K1S 5M4 Canada
tel 613 225 1311 fax 613 225 5966
ibigroup.com

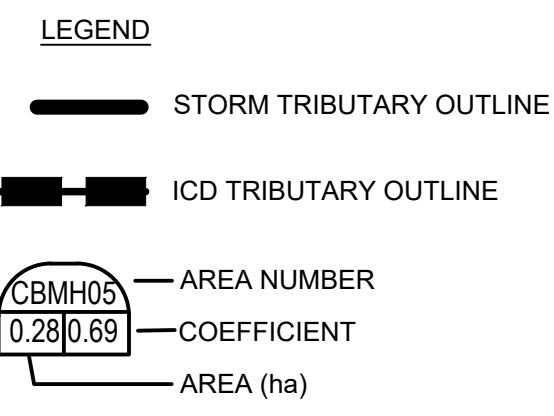
PROJECT
ORLEANS GARDENS
1615 ORLEANS BOULEVARD

PROJECT NO:
122764
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PROJECT MGR:
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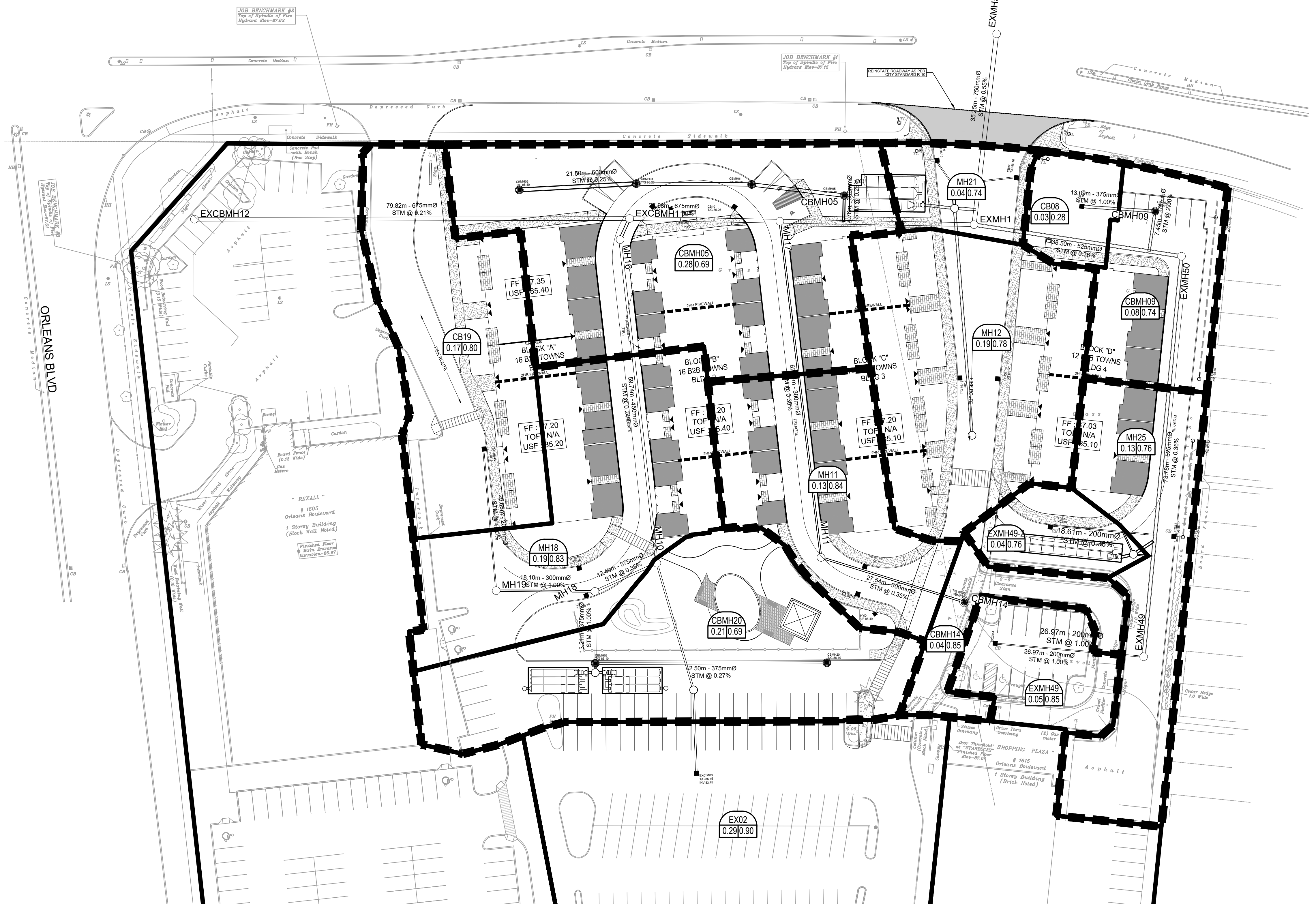
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SHEET TITLE
STORM DRAINAGE AREA PLAN

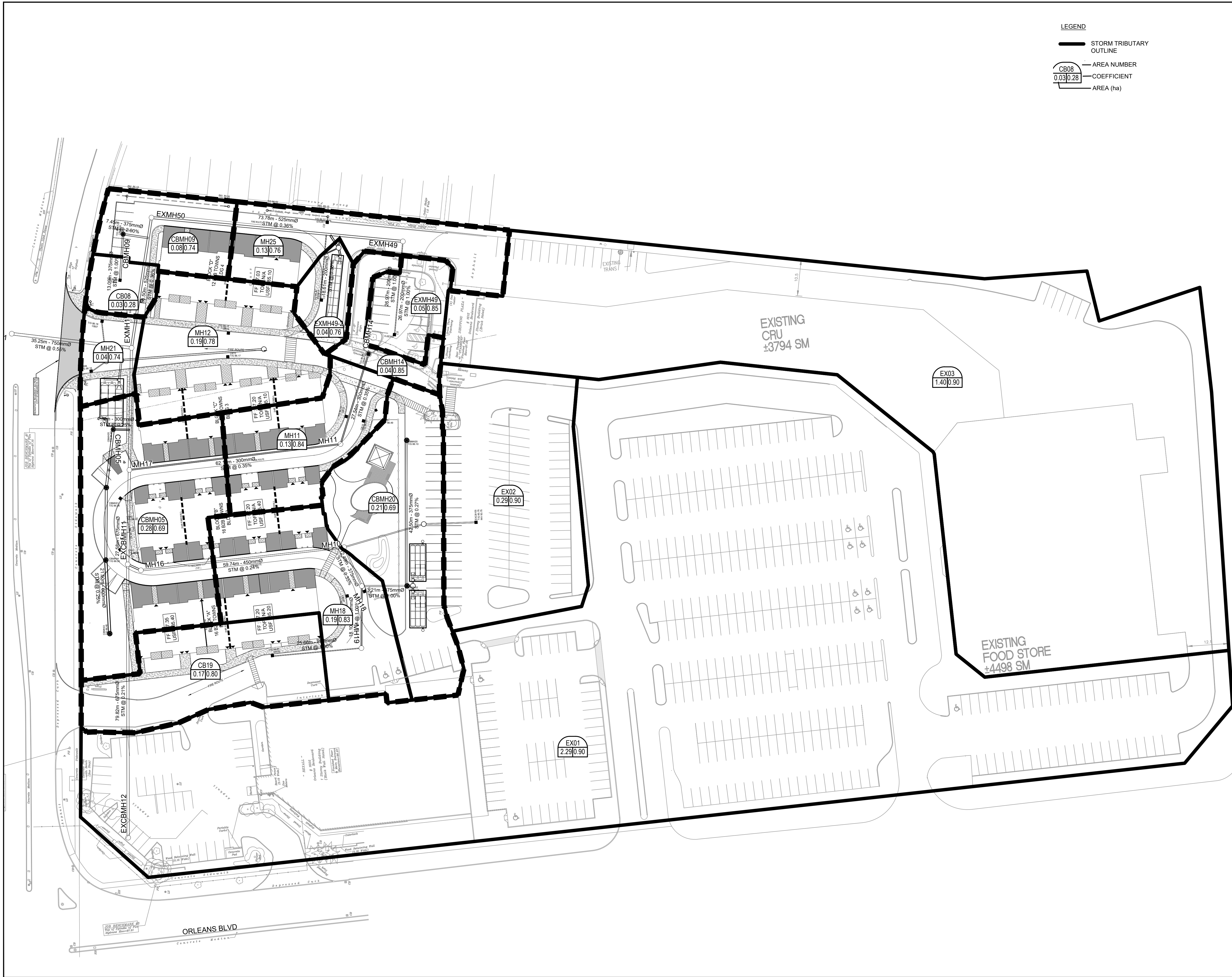
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ISSUE
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JEANNE D'ARC BLVD

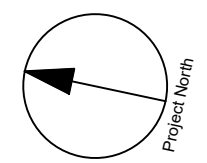


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CITY FILE NO. D07-16-22-008
File Location: J:\122764_OrleansGardens\7_0_Production\7_3_Design\04_Civil\Sheet\C-500 STORM DRAINAGE AREA PLAN.dwg Last Saved: May 22, 2024, by: E.Hennie Printed: Friday, May 24, 2024 10:33:35 AM by: Eric Hennie



LEGEND

- STORM TRIBUTARY OUTLINE
- AREA NUMBER
- COEFFICIENT
- AREA (ha)

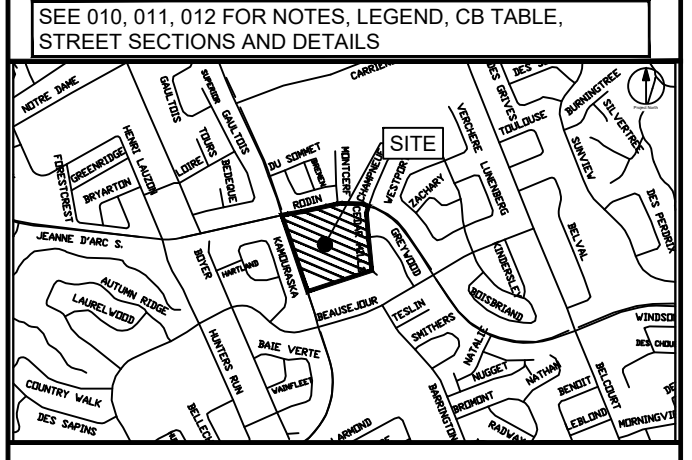


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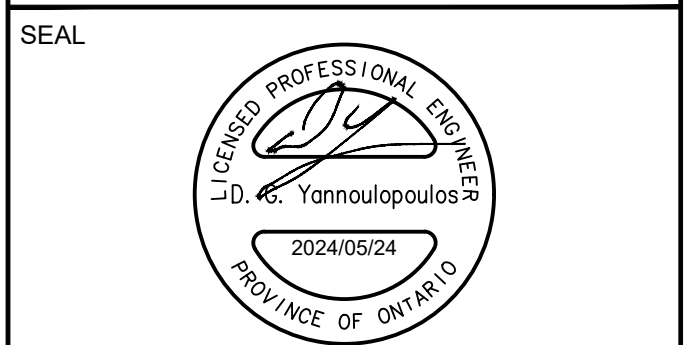
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400 - 333 Preston Street
Ottawa ON K1S 5M4 Canada
tel 613 225 1311 fax 613 225 5966
ibigroup.com

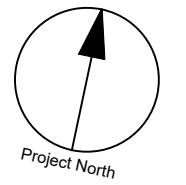
PROJECT
ORLEANS GARDENS
1615 ORLEANS BOULEVARD

PROJECT NO:
122764
DRAWN BY:
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PROJECT MGR:
R.M.**CHECKED BY:**
D.G.Y.
APPROVED BY:
D.G.Y.**SHEET TITLE**

EXTERNAL STORM DRAINAGE AREA PLAN

SHEET NUMBER
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ISSUE
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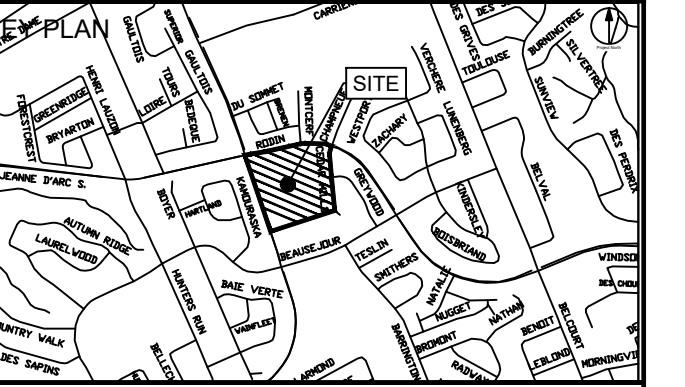
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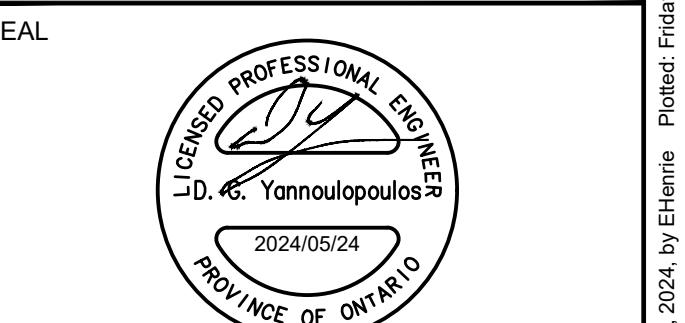
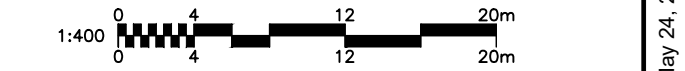
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tel 613 225 5111 fax 613 225 5966
ibigroup.com

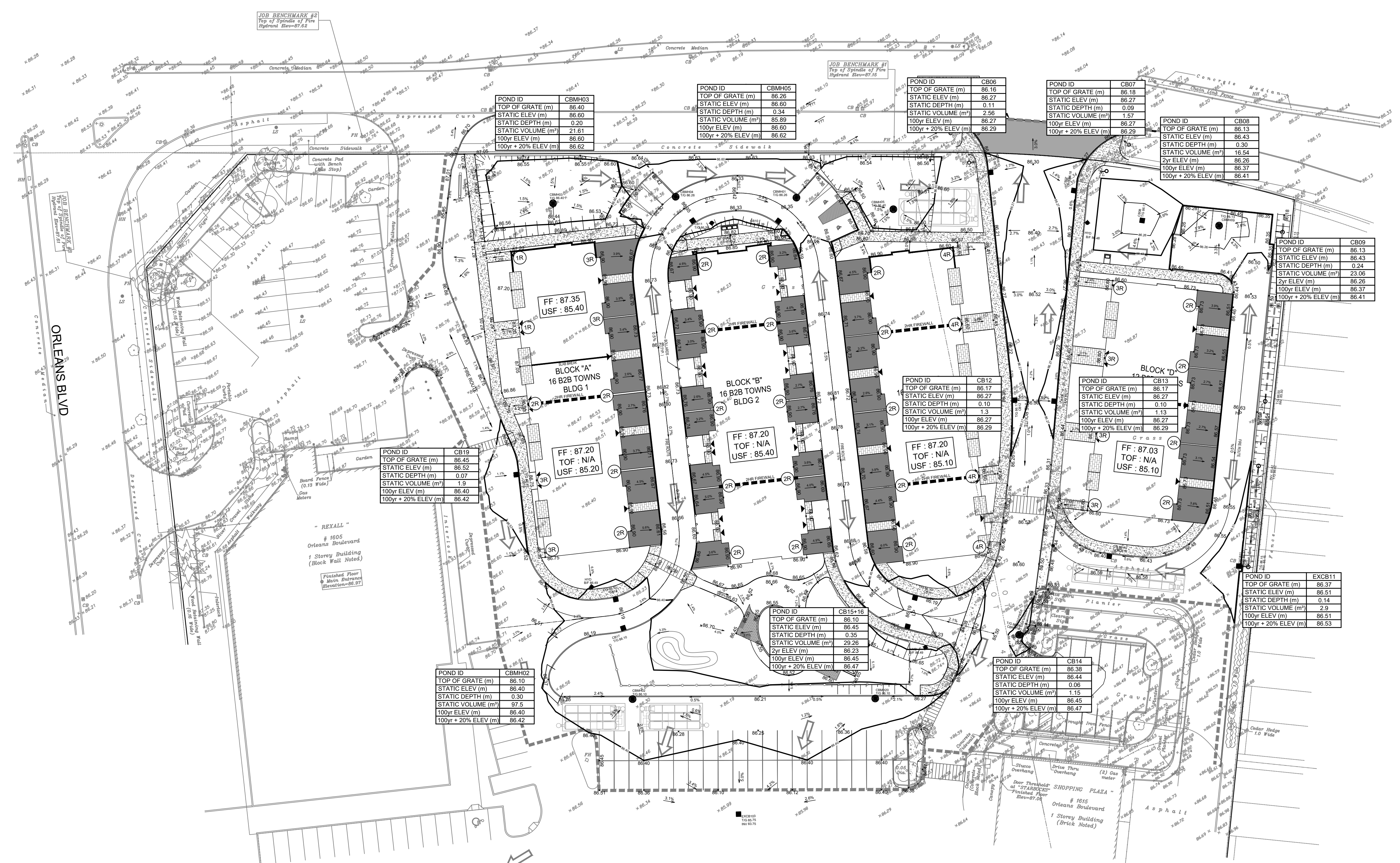
PROJECT
ORLEANS GARDENS
1615 ORLEANS BOULEVARD

PROJECT NO:
122764
DRAWN BY:
A.B. / E.H.
PROJECT MGR:
R.M.
CHECKED BY:
R.M./D.G.Y.
APPROVED BY:
D.G.Y.

SHEET TITLE
PONDING PLAN

SHEET NUMBER
C-600
ISSUE
3

JEANNE D'ARC BLVD



POND ID	CBM403
TOP OF GRATE (m)	86.40
STATIC ELEV (m)	86.60
STATIC DEPTH (m)	0.20
STATIC VOLUME (m³)	21.61
100yr ELEV (m)	86.60
100yr + 20% ELEV (m)	86.62

POND ID	CBM405
TOP OF GRATE (m)	86.16
STATIC ELEV (m)	86.60
STATIC DEPTH (m)	0.34
STATIC VOLUME (m³)	89.89
100yr ELEV (m)	86.60
100yr + 20% ELEV (m)	86.62

POND ID	CB806
TOP OF GRATE (m)	86.16
STATIC ELEV (m)	86.27
STATIC DEPTH (m)	0.11
STATIC VOLUME (m³)	2.56
100yr ELEV (m)	86.27
100yr + 20% ELEV (m)	86.29

POND ID	CB807
TOP OF GRATE (m)	86.18
STATIC ELEV (m)	86.27
STATIC DEPTH (m)	0.09
STATIC VOLUME (m³)	1.67
100yr ELEV (m)	86.27
100yr + 20% ELEV (m)	86.29

POND ID	CB808
TOP OF GRATE (m)	86.13
STATIC ELEV (m)	86.43
STATIC DEPTH (m)	0.30
STATIC VOLUME (m³)	19.54
2yr ELEV (m)	86.26
100yr ELEV (m)	86.37
100yr + 20% ELEV (m)	86.41

POND ID	CB809
TOP OF GRATE (m)	86.13
STATIC ELEV (m)	86.43
STATIC DEPTH (m)	0.24
STATIC VOLUME (m³)	23.06
2yr ELEV (m)	86.26
100yr ELEV (m)	86.37
100yr + 20% ELEV (m)	86.41

POND ID	CB812
TOP OF GRATE (m)	86.17
STATIC ELEV (m)	86.27
STATIC DEPTH (m)	0.10
STATIC VOLUME (m³)	1.13
100yr ELEV (m)	86.27
100yr + 20% ELEV (m)	86.29

POND ID	CB813
TOP OF GRATE (m)	86.17
STATIC ELEV (m)	86.27
STATIC DEPTH (m)	0.10
STATIC VOLUME (m³)	1.13
100yr ELEV (m)	86.27
100yr + 20% ELEV (m)	86.29

POND ID	CB819
TOP OF GRATE (m)	86.45
STATIC ELEV (m)	86.52
STATIC DEPTH (m)	0.07
STATIC VOLUME (m³)	1.9
100yr ELEV (m)	86.45
100yr + 20% ELEV (m)	86.42

POND ID	CB15110
TOP OF GRATE (m)	86.10
STATIC ELEV (m)	86.45
STATIC DEPTH (m)	0.35
STATIC VOLUME (m³)	29.26
2yr ELEV (m)	86.23
100yr ELEV (m)	86.45
100yr + 20% ELEV (m)	86.47

POND ID	CBM402
TOP OF GRATE (m)	86.10
STATIC ELEV (m)	86.40
STATIC DEPTH (m)	0.30
STATIC VOLUME (m³)	97.5
100yr ELEV (m)	86.40
100yr + 20% ELEV (m)	86.42

POND ID	CB814
TOP OF GRATE (m)	86.39
STATIC ELEV (m)	86.44
STATIC DEPTH (m)	0.06
STATIC VOLUME (m³)	1.15
100yr ELEV (m)	86.45
100yr + 20% ELEV (m)	86.47

POND ID	EXCB11
TOP OF GRATE (m)	86.37
STATIC ELEV (m)	86.51
STATIC DEPTH (m)	0.14
STATIC VOLUME (m³)	2.9
100yr ELEV (m)	86.51
100yr + 20% ELEV (m)	86.53

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IBI GROUP
 500-333 Preston Street
 Ottawa, Ontario K1S 5N4 Canada
 tel 613 225 1311 fax 613 225 9868
 ibigroup.com

PROJECT: Orleans Garden
DATE: 2024-05-23
FILE: 122764-5.11
REV #: 3
DESIGNED BY: AB
CHECKED BY: RM

STORMWATER MANAGEMENT

Formulas and Descriptions

$i_{2yr} = 1.2 \text{ year Intensity} = 732.951 / (T_c + 6.199)^{0.810}$
 $i_{5yr} = 1.5 \text{ year Intensity} = 998.071 / (T_c + 6.053)^{0.814}$
 $i_{100yr} = 1:100 \text{ year Intensity} = 1735.688 / (T_c + 6.014)^{0.820}$
 $T_c = \text{Time of Concentration (min)}$
 $C = \text{Average Runoff Coefficient}$
 $A = \text{Area (Ha)}$
 $Q = \text{Flow} = 2.78CJA \text{ (L/s)}$

Maximum Allowable Release Rate

Restricted Flowrate ($Q_{\text{restricted}} = 2.78 \cdot C^2 \cdot i_{5yr} \cdot A_{\text{controlled}}$)

$C = 0.5$
 $T_c = 10 \text{ min}$
 $i_{5yr} = 104.19 \text{ mm/hr}$
 $A_{\text{site}} = 1.540 \text{ Ha}$

$Q_{\text{restricted}} = 223.04 \text{ L/s}$

Uncontrolled Release ($Q_{\text{uncontrolled}} = 2.78 \cdot 1.25C^2 \cdot i_{100yr} \cdot A_{\text{uncontrolled}}$)

$C = 0.85$
 $T_c = 10 \text{ min}$
 $i_{100yr} = 178.56 \text{ mm/hr}$
 $A_{\text{uncontrolled}} = 0.05 \text{ Ha}$

$Q_{\text{uncontrolled}} = 26.37 \text{ L/s}$

Maximum Allowable Release Rate ($Q_{\text{max allowable}} = Q_{\text{restricted}} - Q_{\text{uncontrolled}}$)

$Q_{\text{max allowable}} = 196.66 \text{ L/s}$

SWM Statistics of Modified Site Areas		
Controlled	Area	ICD Flow
MH18	0.57	80.00
MH11	0.17	40.00
CBMH05	0.28	10.00
CBMH09	0.11	10.00
MH21	0.23	15.00
MH25	0.17	40.00
Sum	1.13	195.00
Uncontrolled	Area	Flow
EXMH49	0.05	26.37
Sum	0.05	26.37
Total Sum	1.18	221.371
Allowable		223.04
		TRUE

MODIFIED RATIONAL METHOD (100-Year & 2-Year Ponding)

Drainage Area		MH18	
Area (Ha)	0.570	Restricted Flow ICD_{Actual} (L/s)=	80.00
$1.25C_{(1.0max)}$	0.96	Restricted Flow $Q_{for\ sum\ cdc}$ (L/s)=	40.00
50% reduction for sub-surface storage			

100-Year Ponding						100-Year +20% Ponding					
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78 \times 1.25 C_{100yr} A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	$100YRQ_{20\%}$ (L/s)	$Qp - Qr$ (L/s)	Volume 100+20 (m^3)			
25	103.85	158.39	40.00	118.39	177.58						
30	91.87	140.12	40.00	100.12	180.21						
35	82.58	125.95	40.00	85.95	180.49	151.14	111.14	233.39			
40	75.15	114.61	40.00	74.61	179.06						
45	69.05	105.31	40.00	65.31	176.35						

Storage (m^3)						100+20					
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Surface	Sub-surface	Balance		
0.00	180.49	99.40	88.81	0.00	0.00	233.39	99.40	88.81	45.18		

convert to flow with peak T_c (L/s) 21.51

overflows to: Existing

Drainage Area		MH18	
Area (Ha)	0.570	Restricted Flow ICD_{Actual} (L/s)=	80.00
$1.25C_{(1.0max)}$	0.77	Restricted Flow $Q_{for\ sum\ cdc}$ (L/s)=	40.00
50% reduction for sub-surface storage			

5-Year Ponding					
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78 C_{5yr} A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
12	94.70	115.54	40.00	75.54	54.39
14	86.93	106.07	40.00	66.07	55.50
16	80.46	98.17	40.00	58.17	55.85
18	74.97	91.47	40.00	51.47	55.59
20	70.25	85.72	40.00	45.72	54.86

Storage (m^3)					
Overflow	Required	Surface	Sub-surface	Balance	
0.00	55.85	99.40	88.81	0.00	

convert to flow with peak T_c (L/s)

overflows to: Existing

Drainage Area		MH18	
Area (Ha)	0.570	Restricted Flow ICD_{Actual} (L/s)=	80.00
$1.25C_{(1.0max)}$	0.77	Restricted Flow $Q_{for\ sum\ cdc}$ (L/s)=	40.00
50% reduction for sub-surface storage			

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78 C_{2yr} A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
10	76.81	93.71	40.00	53.71	32.23
11	73.17	89.27	40.00	49.27	32.52
12	69.89	85.28	40.00	45.28	32.60
13	66.93	81.66	40.00	41.66	32.50
14	64.23	78.37	40.00	38.37	32.23

Storage (m^3)					
Overflow	Required	Surface	Sub-surface	Balance	
0.00	32.60	99.40	88.81	0.00	

convert to flow with peak T_c (L/s)

overflows to: Existing

Drainage Area		MH11	
Area (Ha)	0.170	Restricted Flow ICD_{Actual} (L/s)=	40.00
$1.25C_{(1.0max)}$	1.00	Restricted Flow $Q_{for\ sum\ cdc}$ (L/s)=	40.00
50% reduction for sub-surface storage			

100-Year Ponding						100-Year +20% Ponding					
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78 \times 1.25 C_{100yr} A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	$100YRQ_{20\%}$ (L/s)	$Qp - Qr$ (L/s)	Volume 100+20 (m^3)			
-2	555.31	262.44	40.00	222.44	-26.69						
3	286.05	135.19	40.00	95.19	17.13						
8	199.20	94.14	40.00	54.14	25.99	112.97	72.97	35.03			
13	155.11	73.30	40.00	33.30	25.98						
18	129.08	60.53	40.00	20.53	22.17						

Storage (m^3)						100+20					
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Surface	Sub-surface	Balance		
0.00	25.99	29.26	0	0.00	0.00	35.03	29.26	0	5.77		

convert to flow with peak T_c (L/s) 12.01

overflows to: Existing

Drainage Area		MH11	
Area (Ha)	0.170	Restricted Flow ICD_{Actual} (L/s)=	40.00
$1.25C_{(1.0max)}$	0.84	Restricted Flow $Q_{for\ sum\ cdc}$ (L/s)=	40.00
50% reduction for sub-surface storage			

5-Year Ponding					
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78 C_{5yr} A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
0	230.48	91.50	40.00	51.50	0.00
2	182.69	72.52	40.00	32.52	3.90
4	152.51	60.54	40.00	20.54	4.93
6	131.57	52.23	40.00	12.23	4.40
8	116.11	46.09	40.00	6.09	2.93

Storage (m^3)					
Overflow	Required	Surface	Sub-surface	Balance	
0.00	4.93	29.26	0	0.00	

convert to flow with peak T_c (L/s)

overflows to: Existing

Drainage Area		MH11	
Area (Ha)	0.170	Restricted Flow ICD_{Actual} (L/s)=	40.00
$1.25C_{(1.0max)}$	0.84	Restricted Flow $Q_{for\ sum\ cdc}$ (L/s)=	40.00
50% reduction for sub-surface storage			

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78 C_{2yr} A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
0	167.22	66.38	40.00	26.38	0.00
1	148.14	58.81	40.00	18.81	1.13
2	133.33	52.93	40.00	12.93	1.55
3	121.46	48.22	40.00	8.22	1.48
4	111.72	44.35	40.00	4.35	1.04

Storage (m^3)					
Overflow	Required	Surface	Sub-surface	Balance	
0.00	1.55	29.26	0	0.00	

convert to flow with peak T_c (L/s)

overflows to: Existing

Drainage Area		CBMH05	
Area (Ha)	0.280	Restricted Flow ICD_{Actual} (L/s)=	10.00
$1.25C_{(1.0max)}$	0.86	Restricted Flow $Q_{for\ sum\ cdc}$ (L/s)=	10.00
50% reduction for sub-surface storage			

100-Year Ponding						100-Year +20% Ponding					
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78 \times 1.25 C_{100yr} A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	$100YRQ_{20\%}$ (L/s)	$Qp - Qr$ (L/s)	Volume 100+20 (m^3)			
45	69.05	46.36	10.00	36.36	98.17						
50	63.95	42.94	10.00	32.94	98.81						
55	59.62	40.03	10.00	30.03	99.10	48.04	38.04	125.52			
60	55.99	37.53	10.00	27.53	99.09						
65	52.85	35.35	10.00	25.35	98.85						

Storage (m^3)						100+20					
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Surface	Sub-surface	Balance		
0.00	99.10	107.50	0	0.00	0.00	125.52	107.50	0	18.02		

convert to flow with peak T_c (L/s) 5.46

overflows to: EXMH11/Offsite

Drainage Area		CBMH05	
Area (Ha)	0.280	Restricted Flow ICD_{Actual} (L/s)=	10.00
$1.25C_{(1.0max)}$	0.69	Restricted Flow $Q_{for\ sum\ cdc}$ (L/s)=	10.00
50% reduction for sub-surface storage			

5-Year Ponding					
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78 C_{5yr} A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
24	62.54	33.59	10.00	23.59	33.97
26	59.35	31.87	10.00	21.87	34.12
28	56.49	30.34	10.00	20.34	34.17
30	53.93	28.96	10.00	18.96	34.14
32	51.61	27.72	10.00	17.72	34.02

Storage (m^3)					
Overflow	Required	Surface	Sub-surface	Balance	
0.00	34.17	107.50	0	0.00	

convert to flow with peak T_c (L/s)

overflows to: EXMH11/Offsite

Drainage Area		CBMH05	
Area (Ha)	0.280	Restricted Flow ICD_{Actual} (L/s)=	10.00
$1.25C_{(1.0max)}$	0.69	Restricted Flow $Q_{for\ sum\ cdc}$ (L/s)=	10.00
50% reduction for sub-surface storage			

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78 C_{2yr} A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
19	53.70	28.84	10.00	18.84	21.48
20	52.03	27.95	10.00	17.95	21.53
21	50.48	27.11	10.00	17.11	21.56
22	49.02	26.33	10.00	16.33	21.55
23	47.66	25.60	10.00	15.60	21.52

Storage (m^3)					
Overflow	Required	Surface	Sub-surface	Balance	
0.00	21.56	107.50	0	0.00	

convert to flow with peak T_c (L/s)

overflows to: EXMH11/Offsite

Drainage Area		CBMH09	
Area (Ha)	0.110	Restricted Flow ICD_{Actual} (L/s)=	10.00
$1.25C_{(1.0max)}$	0.74	Restricted Flow $Q_{for\ sum\ cdc}$ (L/s)=	10.00
50% reduction for sub-surface storage			

100-Year Ponding						100-Year +20% Ponding					
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78 \times 1.25 C_{100yr} A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	$100YRQ_{20\%}$ (L/s)	$Qp - Qr$ (L/s)	Volume 100+20 (m^3)			
12	162.13	36.57	10.00	26.57	19.13						
17	132.63	29.91	10.00	19.91	20.31						
22	112.98	25.46	10.00	15.46	20.40	30.55	20.55	27.13			
27	98.66	22.25	10.00	12.25	19.95						
32	87.89	19.82	10.00	9.82	18.86						

Storage (m^3)						100+20					
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Surface	Sub-surface	Balance		
0.00	20.40	39.60	0	0.00	0.00	27.13	39.60	0	0.00		

convert to flow with peak T_c (L/s) 0.00

overflows to: EXMH11/Offsite

Drainage Area		CBMH09	
Area (Ha)	0.110	Restricted Flow ICD_{Actual} (L/s)=	10.00
$1.25C_{(1.0max)}$	0.59	Restricted Flow $Q_{for\ sum\ cdc}$ (L/s)=	10.00
50% reduction for sub-surface storage			

5-Year Ponding					
T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p = 2.78 C_{5yr} A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 5yr (m^3)
6	131.57	23.74	10.00	13.74	4.95
8	116.11	20.95	10.00	10.95	5.26
10	104.19	18.80	10.00	8.80	5.28
12	94.70	17.09	10.00	7.09	5.10
14	86.93	15.68	10.00	5.68	4.78

Storage (m^3)					
Overflow	Required	Surface	Sub-surface	Balance	
0.00	5.28	39.60	0	0.00	

convert to flow with peak T_c (L/s)

overflows to: EXMH11/Offsite

Drainage Area		CBMH09	
Area (Ha)	0.110	Restricted Flow ICD_{Actual} (L/s)=	10.00
$1.25C_{(1.0max)}$	0.59	Restricted Flow $Q_{for\ sum\ cdc}$ (L/s)=	10.00
50% reduction for sub-surface storage			

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78 C_{2yr} A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
4	111.72	20.16	10.00	10.16	2.44
5	103.57	18.69	10.00	8.69	2.61
6	96.64	17.44	10.00	7.44	2.66
7	90.65	16			



IBI GROUP
 500-333 Preston Street
 Ottawa, Ontario K1S 5N4 Canada
 tel 613 225 1311 fax 613 225 9868
 ibigroup.com

PROJECT: Orleans Gardens
DATE: 2024-05-22
FILE: 122764-6.2.4
REV #: 3
DESIGNED BY: RM
CHECKED BY: RM

ORIFICE SIZING

Orifice coefficients	
Cv =	0.60

	Invert (m)	Diameter (mm)	Centre ICD (m)	Max. Pond Elevation (m)	Hydraulic Slope (m)	Target Flow (l/s)	Theoretical		Recommended	
							Orifice (m)	Actual Flow (l/s)	Orifice (m)	Actual Flow (l/s)
MH18	83.212	375	83.400	86.40	3.00	80.00	0.1320	80.21	0.132	80.21
MH11	82.485	300	82.635	86.45	3.82	40.00	0.0870	39.29	0.087	39.29
CBMH05	82.912	300	83.062	86.60	3.54	10.00	0.0450	10.12	0.045	10.12
CBMH09	83.500	375	83.688	86.43	2.74	10.00	0.0480	10.14	0.048	10.14
MH21	83.610	375	83.798	86.27	2.47	15.00	0.0600	15.04	0.060	15.04
MH25	83.461	375	83.649	86.51	2.86	40.00	0.0950	40.57	0.095	40.57
						195.00				195.38

H-VEX

Pipe Storage		MH18				
From	To	Length	Diameter	X-sec Area	Volume	
CBMH20	CBMH02	42.50	375	0.110	4.69	
CBMH02	MH18	13.21	375	0.110	1.46	
CB19	MH10	18.10	200	0.031	0.57	
MH10	MH18	25.66	250	0.049	1.26	
CB17	MAIN	6.00	200	0.031	0.19	
CB18	MAIN	1.00	200	0.031	0.03	
					Total	8.20

Structure Storage		MH18					
	Base	Top	Height	Dia. / Width	X-sec Area	Volume	
CBMH20	83.956	86.10	2.14	1200	1.131	2.42	
CBMH02	83.374	86.10	2.73	1200	1.131	3.08	
MH75	83.403	86.10	2.70	1200	1.131	3.05	
MH19	83.598	86.40	2.80	1200	1.131	3.17	
MH18	83.212	86.40	3.19	1200	1.131	3.61	
CB17	84.700	86.10	1.40	600	0.360	0.50	
CB18	84.700	86.10	1.40	600	0.360	0.50	
CB19	84.700	86.40	1.70	600	0.360	0.61	
Stormtech East						31.83	
Stormtech West						31.83	
						Total	80.61

TOTAL MH18 88.81

Pipe Storage		MH21				
From	To	Length	Diameter	X-sec Area	Volume	
CB06	MH22	4.94	200	0.031	0.16	
CB07	MH22	11.37	200	0.031	0.36	
MH22	MH21	4.39	375	0.110	0.48	
CB12	MAIN	1.01	200	0.031	0.03	
CB13	MAIN	5.09	200	0.031	0.16	
MH12	MH21	41.76	375	0.110	4.61	
ADS Stormtech	MH21	5.46	375	0.110	0.60	
					Total	6.40

Structure Storage		MH21					
	Base	Top	Height	Dia. / Width	X-sec Area	Volume	
CB06	84.760	86.16	1.40	600	0.283	0.40	
CB07	84.780	86.18	1.40	600	0.283	0.40	
MH22	83.681	86.20	2.52	1200	1.131	2.85	
CB12	84.770	86.17	1.40	600	0.283	0.40	
CB13	84.770	86.17	1.40	600	0.283	0.40	
MH12	83.774	86.27	2.50	1200	1.131	2.82	
MH21	83.610	86.27	2.66	1200	1.131	3.01	
ADS Stormtech						77.27	
						Total	87.53

TOTAL AREA EXMH11 93.94



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UNDERGROUND STORAGE CALCULATIONS

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 Prepared By: AB | Checked By: RM

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Pipe Storage		MH25				
From	To	Length	Diameter	X-sec Area	Volume	
EXCB11	MH25	8.23	200	0.031	0.26	
ADS Stormtech	MH25	2.22	375	0.110	0.25	
Total					0.50	

Structure Storage		MH25					
	Base	Top	Height	Dia. / Width	X-sec Area	Volume	
EXCB11	84.170	86.51	2.34	600	0.283	0.66	
MH25	83.461	86.51	3.05	1200	1.131	3.45	
ADS Stormtech						33.73	
Total						37.84	

TOTAL AREA EXCBMH49-1	38.34
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UNCOUNTED UNDERGROUND STORAGE CALCULATIONS

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Pipe Storage		CBMH09				
From	To	Length	Diameter	X-sec Area	Volume	
CB08	CBMH09	13.90	375	0.110	1.54	
Total					1.54	

Structure Storage		CBMH09				
	Base	Top	Height	Dia. / Width	X-sec Area	Volume
CB08	84.730	86.13	1.40	600	0.360	0.50
CBMH09	83.500	86.13	2.63	1200	1.131	2.97
Total						3.48

TOTAL CBMH09 5.01

Pipe Storage		MH11				
From	To	Length	Diameter	X-sec Area	Volume	
CBMH14	MH11	27.54	300	0.071	1.95	
CB15	MAIN	0.89	200	0.031	0.03	
CB16	MAIN	4.02	200	0.031	0.13	
Total					2.10	

Structure Storage		MH11				
	Base	Top	Height	Dia. / Width	X-sec Area	Volume
MH11	83.408	86.10	2.69	1200	1.131	3.04
CB15	84.700	86.10	1.40	600	0.360	0.50
CB16	84.700	86.10	1.40	600	0.360	0.50
CBMH14	83.834	86.10	2.27	1200	1.131	2.56
Total						6.62

TOTAL MH11 8.72



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<i>Pipe Storage</i>		<i>CBMH05</i>				
From	To	Length	Diameter	X-sec Area	Volume	
CBMH03	CBMH14	21.50	600	0.283	6.08	
CB11	MAIN	3.60	200	0.031	0.11	
CBMH14	CBMH09	21.16	600	0.283	5.98	
CBMH09	CBM05	17.09	600	0.283	4.83	
CB10	MAIN	3.55	200	0.031	0.11	
Total					17.12	

<i>Structure Storage</i>		<i>CBMH05</i>				
	Base	Top	Height	Dia. / Width	X-sec Area	Volume
CBMH03	83.243	86.40	3.16	1500	1.767	5.58
CBMH05	83.034	86.40	3.37	1500	1.767	5.95
CB11	84.760	86.26	1.50	600	0.360	0.54
CBMH14	83.170	86.26	3.09	1200	1.131	3.49
CBMH09	83.097	86.26	3.16	1200	1.131	3.58
CB10	84.760	86.26	1.50	600	0.360	0.54
Total						19.68

TOTAL CBMH05	36.80
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May 17th, 2024

Mr. Cam Elsby
Project Manager, Infrastructure Approvals
Development Review – East Branch
City of Ottawa
110 Laurier Avenue West
Ottawa, Ontario K1P 1J1
cam.elsby@ottawa.ca

Dear Mr. Elsby:

RE: SITE PLAN CONTROL APPLICATION - 1615 ORLEANS BOULEVARD D07-12-23-0026

Orleans Gardens Shopping Centre Inc. (OGSC) & I.G. Investment management, LTD. are the owners of the Orleans Gardens Shopping Centre located at 1615 Orleans Boulevard. This letter has been prepared in consultation with our civil consultant, Arcadis Profession Services (Canada) Inc. Its intent is to provide our acceptance of the potential for localized surface ponding in parking areas during infrequent storm events, including the 2-year event.

Based on our discussions with Arcadis, there are two areas (Area MH11 and Area CBMH09) where 2-year ponding has been flagged within the servicing brief. We understand that qualifying available underground storage in these areas is detrimental to the stormwater management of more severe and less frequent storms (100-year events), which are currently retained using only surface-level ponding strategies without additional underground storage. However, unaccounted underground storage exists in each area (9.42m³ in Area MH11 and 5.01m³ in Area CBMH09) with volumes exceeding the calculated 2-year ponding requirements (1.55m³ in Area MH11 and 3.07m³ in Area CBMH09). Given the City's guidelines for calculation methods when utilizing underground storage in combination with surface-level storage, the release rate to the system must be reduced by 50% when calculating the retention volumes, which would, in turn, increase the theoretical total storage requirements for each catchment. We are willing to accept the theoretical ponding potential during 2-year events.

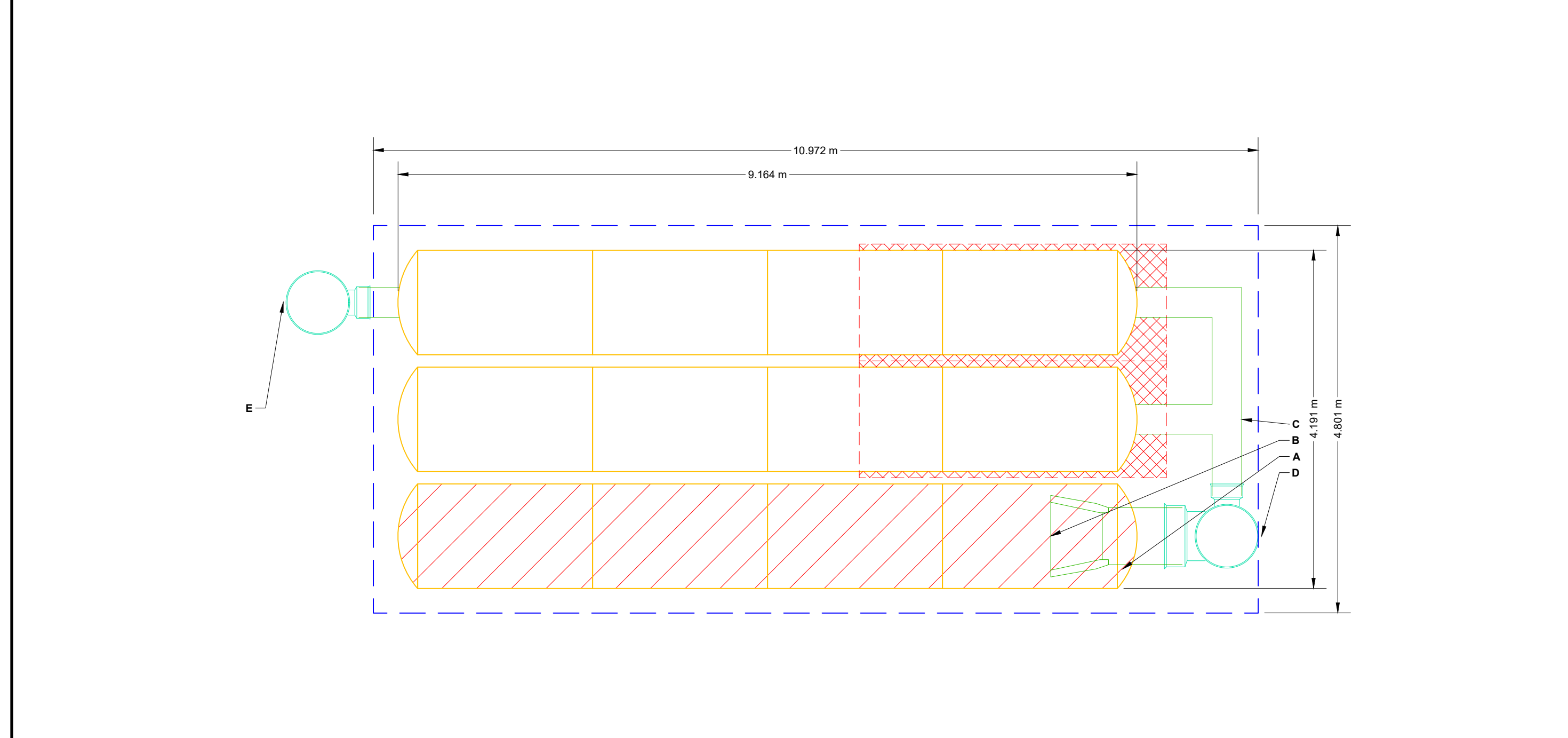
We understand that the City of Ottawa does not typically accept ponding during the 2-year event; however, as the owner of this privately owned system, we accept this condition.

Sincerely,

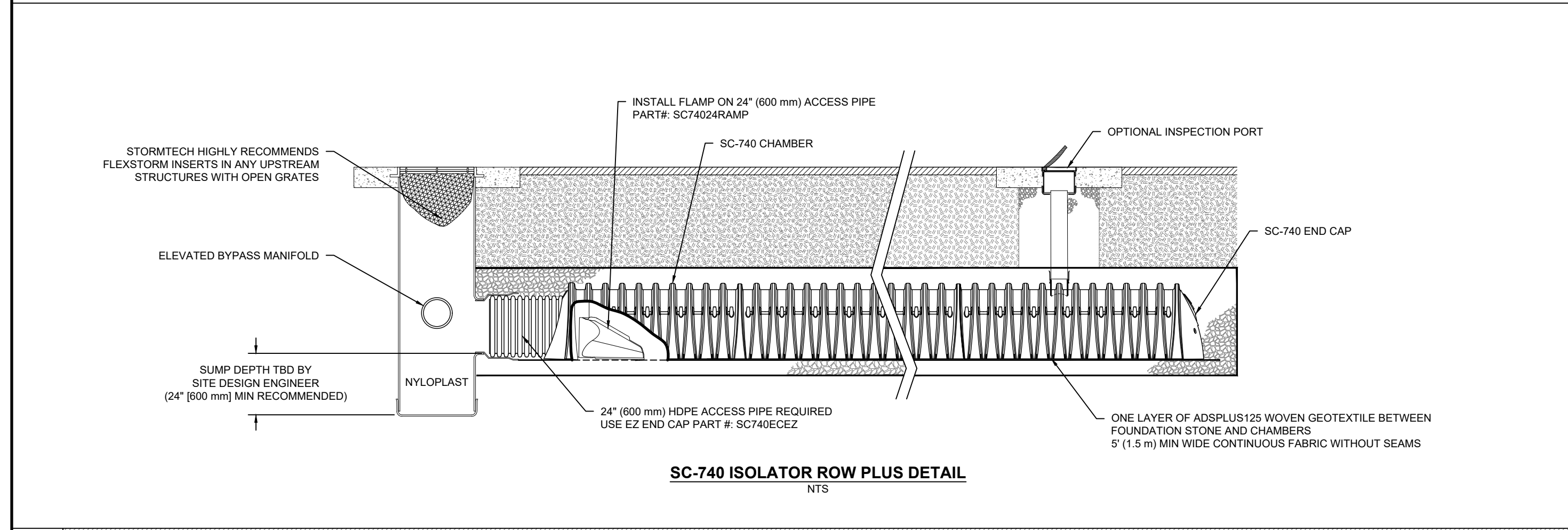


Pegah Abhari
Manager, Development Services
North American Development Group
T: 289-800-1629
C: 416-400-4146
E: pabhari@nadg.com

PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS:		PART TYPE		ITEM ON LAYOUT	DESCRIPTION	INVERT	MAX FLOW
12	STORMTECH SC-740 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	3.353						
4	STORMTECH SC-740 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1.924						
152	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1.372						
152	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1.372						
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1.372						
	INSTALLED SYSTEM VOLUME (m ³)	TOP OF STONE:	1.507						
31.8	(PERIMETER STONE INCLUDED)	TOP OF SC-740 CHAMBER:	0.114						
		300 mm x 300 mm TOP MANIFOLD INVERT:	0.470						130 L/s IN
		300 mm BOTTOM CONNECTION INVERT:	0.183						
52.7	SYSTEM AREA (m ²)	400 mm ISOLATOR ROW PLUS INVERT:	0.151						57 L/s OUT
31.5	SYSTEM PERIMETER (m)	BOTTOM OF SC-740 CHAMBER:	0.152						
		BOTTOM OF STONE:	0.000						



NOTES
MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
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NOT FOR CONSTRUCTION: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.



3	SC-740 ISOLATOR ROW PLUS DETAIL
	<p>INSPECTION & MAINTENANCE</p> <p>STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT</p> <p>A. INSPECTION PORTS (IF PRESENT)</p> <p>A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN</p> <p>A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED</p> <p>A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG</p> <p>A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)</p> <p>A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.</p> <p>B. ALL ISOLATOR ROW PLUS ROWS</p> <p>B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS</p> <p>B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE</p> <p>i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY</p> <p>ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE</p> <p>B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.</p> <p>STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS</p> <p>A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED</p> <p>B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN</p> <p>C. VACUUM STRUCTURE SLUMP AS REQUIRED</p> <p>STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.</p> <p>STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.</p> <p>NOTES</p> <p>1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.</p> <p>2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.</p>

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SC-740 TECHNICAL SPECIFICATION																																																																									
<p>NOMINAL CHAMBER SPECIFICATIONS</p> <table border="1"> <thead> <tr> <th>SIZE (W X H X INSTALLED LENGTH)</th> <th>51.0" X 30.0" X 85.4"</th> <th>(1295 mm X 762 mm X 2169 mm)</th> </tr> </thead> <tbody> <tr> <td>CHAMBER STORAGE</td> <td>45.9 CUBIC FEET</td> <td>(1.30 m³)</td> </tr> <tr> <td>MINIMUM INSTALLED STORAGE*</td> <td>74.9 CUBIC FEET</td> <td>(2.12 m³)</td> </tr> <tr> <td>WEIGHT</td> <td>76.0 lbs</td> <td>(33.6 kg)</td> </tr> </tbody> </table> <p>*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS</p>				SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)	CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m ³)	MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m ³)	WEIGHT	76.0 lbs	(33.6 kg)																																																										
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2 SC-740 TECHNICAL SPECIFICATION																																																																									

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS				
MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT	
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145 A-1, A-2.4, A-3 OR AASHTO M43 ³ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 ³ 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 ³ 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{2,3}

PLEASE NOTE:

- 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".
- STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERS WITH A VIBRATORY COMPACTOR.
- 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.
- 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.

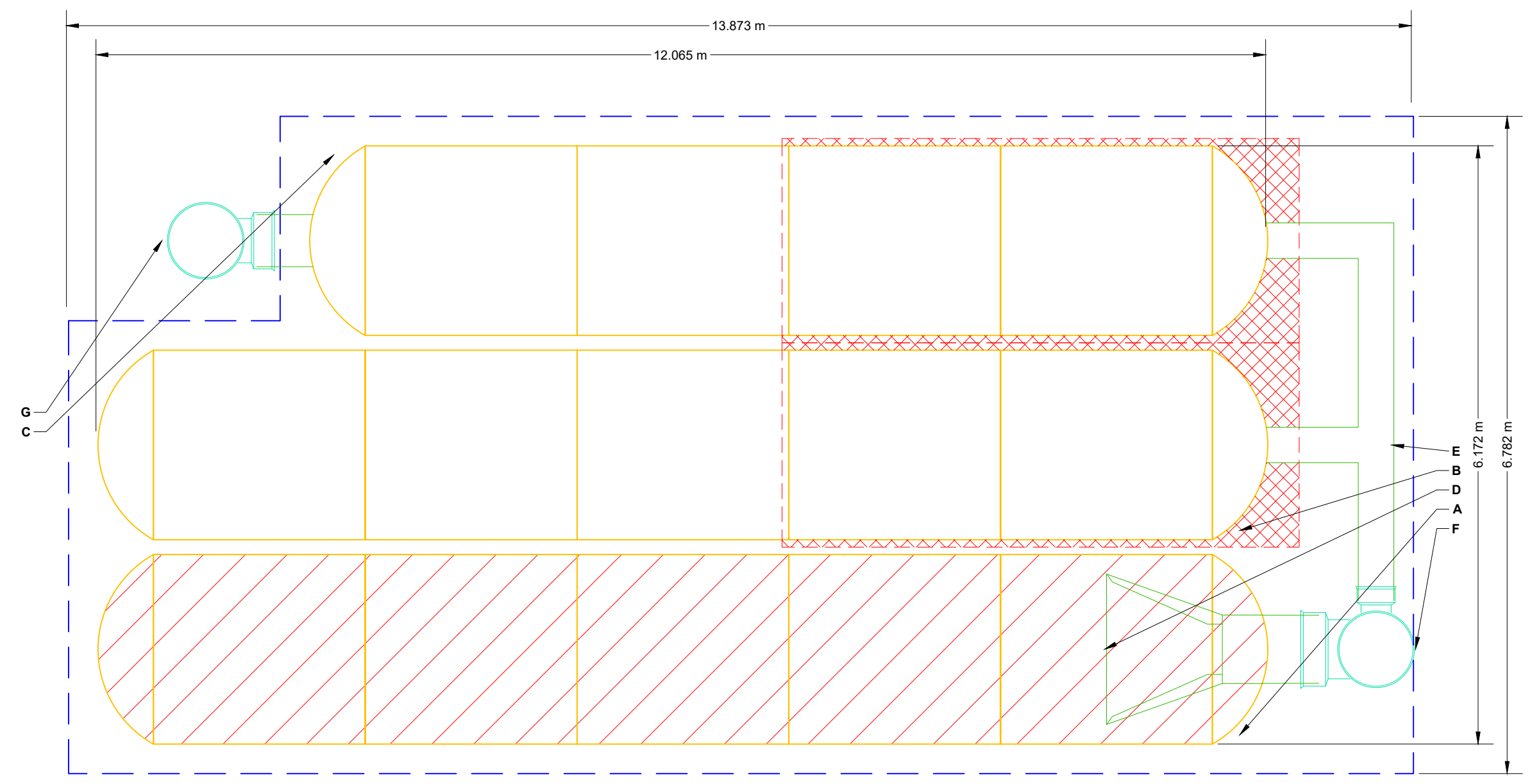


1	SC-740 CROSS SECTION DETAIL
	<p>NOTES:</p> <p>1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".</p> <p>2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".</p> <p>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.</p> <p>4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.</p> <p>5. REQUIREMENTS FOR HANDLING AND INSTALLATION:</p> <ul style="list-style-type: none"> 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 2". TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT². THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. 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.

DATE:	PROJECT #:	NOT TO SCALE
DRAWN: RM	CHECKED: N/A	REV:
1615 ORLEANS BVD - MH18		
OTTAWA, ON, CANADA		
StormTech Chamber System		
888-892-2694 WWW.STORMTECH.COM		
4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473		
ADS		
SHEET 1 OF 1		

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.

PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS:		PART TYPE		ITEM ON LAYOUT	DESCRIPTION	*INVERT ABOVE BASE OF CHAMBER	MAX FLOW
14	STORMTECH MC-3500 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	3.810						
6	STORMTECH MC-3500 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1.981						
305	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1.829			A	600 mm BOTTOM CORED END CAP, PART#: MC3500EPP24BC / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	52 mm	
229	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1.829			B	300 mm TOP CORED END CAP, PART#: MC3500EPP12T / TYP OF ALL 300 mm TOP CONNECTIONS	670 mm	
30	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1.829			C	450 mm BOTTOM CORED END CAP, PART#: MC3500EPP18BC / TYP OF ALL 450 mm BOTTOM CONNECTIONS	45 mm	
77.3	INSTALLED SYSTEM VOLUME (m ³)	TOP OF STONE:	1.374			D	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: MCFLAMP		
	(PERIMETER STONE INCLUDED)	TOP OF MC-3500 CHAMBER:	0.858			E	300 mm x 300 mm TOP MANIFOLD INVERT:		
	(COVER STONE INCLUDED)	800 mm ISOLATOR ROW PLUS INVERT:	0.281			F	MANIFOLD	670 mm	
	(BASE STONE INCLUDED)	450 mm BOTTOM CONNECTION INVERT:	0.272			G	NYLOPLAST (INLET W/ ISO PLUS ROW)		140 L/s IN
89.5	SYSTEM AREA (m ²)	BOTTOM OF MC-3500 CHAMBER:	0.220						113 L/s OUT
41.3	SYSTEM PERIMETER (m)	BOTTOM OF STONE:	0.000						



- ISOLATOR ROW PLUS (SEE DETAIL)
- PLACE MINIMUM 5.334 m OF ADSP1575 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS
- BED LIMITS

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH 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.
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MC-3500 TECHNICAL SPECIFICATION

NOMINAL CHAMBER SPECIFICATIONS		NOMINAL END CAP SPECIFICATIONS	
SIZE (W X H X INSTALLED LENGTH)	77.0' X 45.0' X 86.0'	SIZE (W X H X INSTALLED LENGTH)	75.0' X 45.0' X 22.2'
CHAMBER STORAGE	109.9 CUBIC FEET (3.11 m ³)	END CAP STORAGE	14.9 CUBIC FEET (0.42 m ³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET (4.96 m ³)	MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET (1.28 m ³)
WEIGHT	134 lbs. (60.8 kg)	WEIGHT	49 lbs. (22.2 kg)

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

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

PART #	STUB	B	C
MC3500EPP08T	6" (150 mm)	33.21" (844 mm)	0.66" (17 mm)
MC3500EPP08B	8" (200 mm)	31.16" (791 mm)	---
MC3500EPP08	10" (250 mm)	29.04" (738 mm)	0.81" (21 mm)
MC3500EPP10T	12" (300 mm)	26.36" (670 mm)	0.93" (24 mm)
MC3500EPP10B	---	---	---
MC3500EPP12T	---	---	1.35" (34 mm)
MC3500EPP12B	---	---	---
MC3500EPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500EPP15B	---	---	1.50" (38 mm)
MC3500EPP18T	18" (450 mm)	20.03" (509 mm)	---
MC3500EPP18B	---	---	1.77" (45 mm)
MC3500EPP24T	24" (600 mm)	14.48" (368 mm)	---
MC3500EPP24B	---	---	2.06" (52 mm)
MC3500EPP24W	---	---	2.75" (70 mm)
MC3500EPP30B	---	---	---

CUSTOM PRECURED 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.

NOTE: ALL DIMENSIONS ARE NOMINAL

2 MC-3500 TECHNICAL SPECIFICATION

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT

A. INSPECTION PORTS (IF PRESENT)

- REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
- REMOVE AND CLEAN FLEXITORN FILTER IF INSTALLED
- USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
- LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
- IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

B. ALL ISOLATOR PLUS ROWS

- REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
- USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
- MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
- FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
- 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 FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
- APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLOWING WATER IS CLEAN
- 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.

3 MC-3500 ISOLATOR ROW PLUS DETAIL

4 MC-SERIES END CAP INSERTION DETAIL

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145 ¹ A-1, A-2.4, A-3 OR AASHTO M43 ² 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 ² 3, 4
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 ² 3, 4

PLEASE NOTE:

- 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".
- STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERSAGES WITH A VIBRATORY COMPACTOR.
- 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.
- 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:

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION 55.
- 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 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.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- 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 SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT². THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. 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.

1 MC-3500 CROSS SECTION DETAIL

ORLEANS GARDENS
OTTAWA, ON, CANADA

DATE: _____
PROJECT #: _____
DRAWN: RM
CHECKED: N/A
REV: _____

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StormTech®
Chamber System

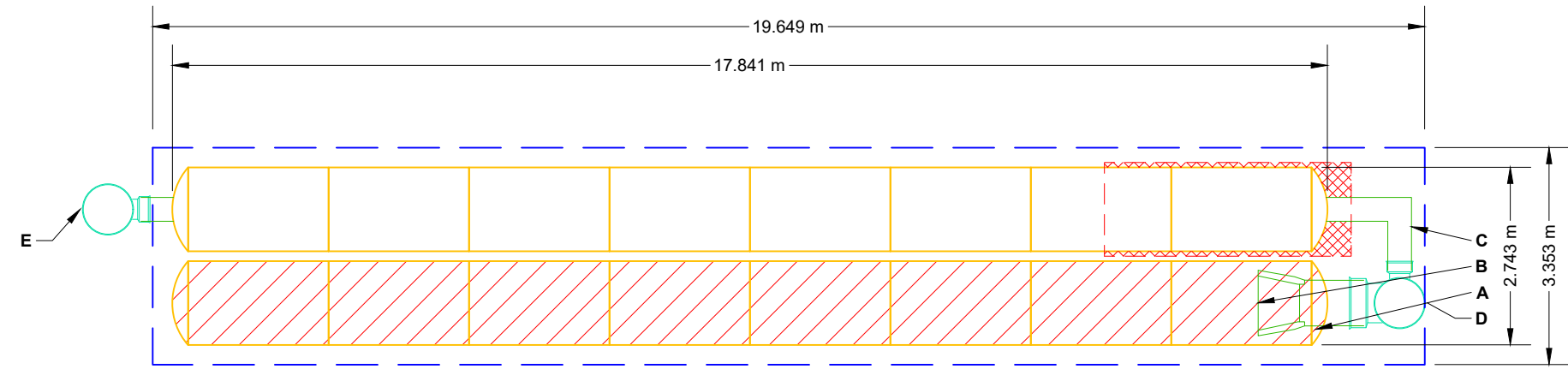
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

ADS

SHEET
1 OF 1

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.

PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS:		PART TYPE		ITEM ON LAYOUT	DESCRIPTION	INVERT	MAX FLOW
16	STORMTECH SC-740 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	3.353						
4	STORMTECH SC-740 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1.924						
152	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1.372						
152	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1.372						
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1.372						
40.8	INSTALLED SYSTEM VOLUME (m ³)	TOP OF STONE:	1.924						
	(PERIMETER STONE INCLUDED)	TOP OF SC-740 CHAMBER:	0.314						
	(COVER STONE INCLUDED)	300 mm x 300 mm TOP MANIFOLD INVERT:	0.470						65 L/s IN
	(BASE STONE INCLUDED)	300 mm BOTTOM CONNECTION INVERT:	0.183						57 L/s OUT
65.9	SYSTEM AREA (m ²)	400 mm ISOLATOR ROW PLUS INVERT:	0.155						
46.0	SYSTEM PERIMETER (m)	BOTTOM OF SC-740 CHAMBER:	0.152						
		BOTTOM OF STONE:	0.000						



NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH 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.
- NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

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SC-740 TECHNICAL SPECIFICATION

NTS

NOMINAL CHAMBER SPECIFICATIONS		NOMINAL END CAP SPECIFICATIONS	
SIZE (W X H X INSTALLED LENGTH)	51.0' X 30.0' X 85.4' (1,300 m ³)	SIZE (W X H X INSTALLED LENGTH)	45.9' X 29.3' X 9.6' (1,108 mm X 744 mm X 244 mm)
CHAMBER STORAGE	45.9 CUBIC FEET (1.30 m ³)	END CAP STORAGE	2.6 CUBIC FEET (0.07 m ³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET (2.12 m ³)	MINIMUM INSTALLED STORAGE**	13.5 CUBIC FEET (0.38 m ³)
WEIGHT	75.0 lbs. (33.6 kg)	WEIGHT	11.7 lbs. (5.3 kg)

* ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS
 ** ASSUMES 6" (152 mm) STONE ABOVE AND BELOW END CAPS, 6" (152 mm) BETWEEN ROWS, 12" (305 mm) BEYOND END CAPS

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9' (277 mm)	18.5' (470 mm)	---
SC740EPE08B / SC740EPE08BPC	8" (200 mm)	12.2' (310 mm)	16.5' (419 mm)	0.5' (13 mm)
SC740EPE08T / SC740EPE08TPC	8" (200 mm)	12.2' (310 mm)	16.5' (419 mm)	---
SC740EPE10B / SC740EPE10BPC	10" (250 mm)	13.4' (340 mm)	14.5' (368 mm)	---
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4' (340 mm)	14.5' (368 mm)	---
SC740EPE12B / SC740EPE12BPC	12" (300 mm)	14.7' (373 mm)	12.5' (318 mm)	---
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7' (373 mm)	12.5' (318 mm)	1.2' (30 mm)
SC740EPE15B / SC740EPE15BPC	15" (375 mm)	18.4' (467 mm)	---	1.3' (33 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4' (467 mm)	---	---
SC740EPE18B / SC740EPE18BPC	18" (450 mm)	19.7' (500 mm)	5.0' (127 mm)	---
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7' (500 mm)	5.0' (127 mm)	---
SC740EPE24B / SC740EPE24BPC	24" (600 mm)	18.5' (470 mm)	---	1.6' (41 mm)
SC740EPE24T / SC740EPE24TPC	24" (600 mm)	18.5' (470 mm)	---	0.1' (3 mm)

ALL STUBS, EXCEPT FOR THE SC740EPEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740EPEZ THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

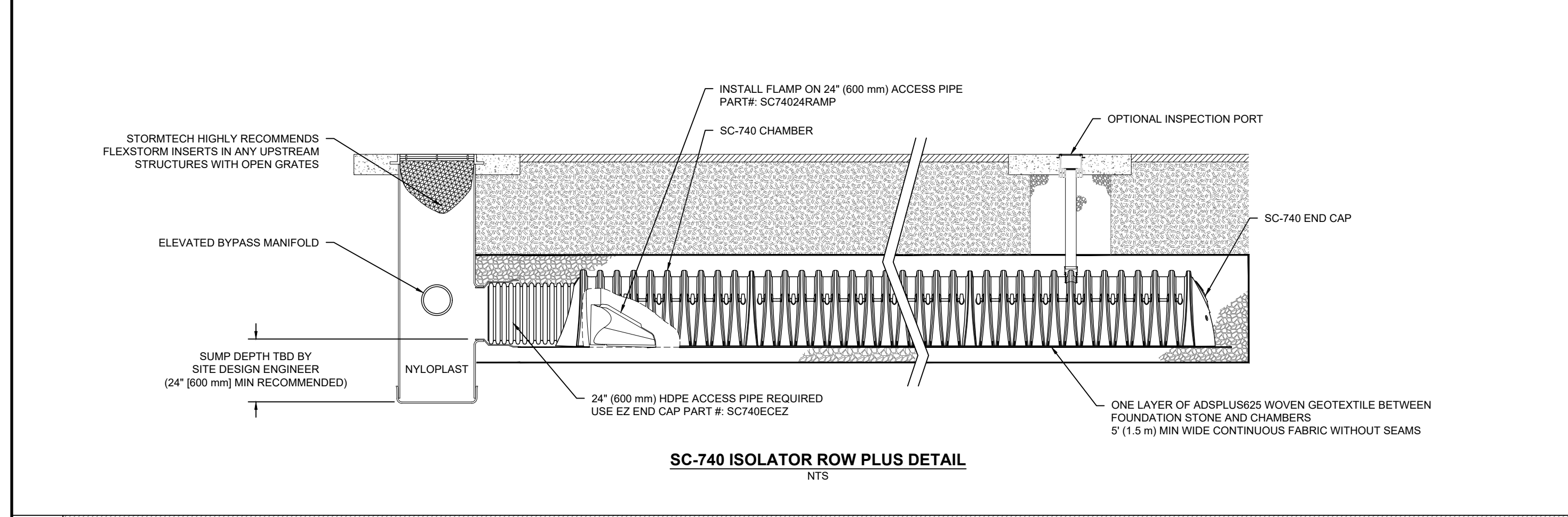
NOTE: ALL DIMENSIONS ARE NOMINAL

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. OR MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145 ¹ A-1, A-2.4, A-3 OR AASHTO M43 ² 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE ³	AASHTO M43 ² 3, 357, 4, 467, 5, 56, 57
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE ³	AASHTO M43 ² 3, 357, 4, 467, 5, 56, 57

PLEASE NOTE:

- 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".
- STORMTECH COMPACTION REQUIREMENTS ARE MET FOR A LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERSAGES WITH A VIBRATORY COMPACTOR.
- 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.
- 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.
- WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 'RECYCLED CONCRETE STRUCTURAL BACKFILL'.



INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT

A. INSPECTION PORTS (IF PRESENT)

- REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
- REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
- USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
- LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
- IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

B. ALL ISOLATOR ROW PLUS ROWS

- REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
- USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
 - MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
 - FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
- 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 FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
- APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- VACUUM STRUCTURE SLUMP 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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SC-740 CROSS SECTION DETAIL

DATE: _____ PROJECT #: _____ NOT TO SCALE

DRAWN: AB CHECKED: N/A REV: _____

ORLEANS GARDENS - UGS25
 OTTAWA, ON, CANADA

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

4640 TRUJEMAN BLVD
 HILLIARD, OH 43026
 1-800-733-7473

ADS

SHEET 1 OF 1

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.

Storm Overflow Calculations

Ditch MH18		Length =		15.00 m	
New Ditch Section Required 1:100 yr. +20% flow = 21.51 l/s		0.022 Cu m/sec			
From Seelye use n =	0.013 (Channels)	area=	0.12		
choose: slope S =	4.00 %	Up Stream Ditch btm=	86.40	wp=	12.00
Ditch Bottom	0.00 metres	Dn Stream Ditch Btm =	85.80		
Ditch slopes	300.00 :1	Difference =	0.60		
Water depth	0.020 metres (depth needed to carry 0.13 Cu. M/sec)	Top Bank =	86.45		
Check Ditch Capacity (Q)		Free Board =	0.03		
Q =	0.086 Cu M/sec	and Velocity =	0.71 M/s		

Ditch MH11		Length =		6.00 m	
New Ditch Section Required 1:100 yr. +20% flow = 12.01 l/s		0.012 Cu m/sec			
From Seelye use n =	0.013 (Channels)	area=	0.05		
choose: slope S =	2.33 %	Up Stream Ditch btm=	86.44	wp=	4.80
Ditch Bottom	0.00 metres	Dn Stream Ditch Btm =	86.30		
Ditch slopes	120.00 :1	Difference =	0.14		
Water depth	0.020 metres (depth needed to carry 0.13 Cu. M/sec)	Top Bank =	86.6		
Check Ditch Capacity (Q)		Free Board =	0.14		
Q =	0.026 Cu M/sec	and Velocity =	0.55 M/s		

Ditch CBMH05		Length =		18.50 m	
New Ditch Section Required 1:100 yr. +20% flow = 5.46 l/s		0.005 Cu m/sec			
From Seelye use n =	0.020 (Channels)	area=	0.02		
choose: slope S =	1.03 %	Up Stream Ditch btm=	86.40	wp=	1.76
Ditch Bottom	0.00 metres	Dn Stream Ditch Btm =	86.21		
Ditch slopes	40.00 :1	Difference =	0.19		
Water depth	0.022 metres (depth needed to carry 0.13 Cu. M/sec)	Top Bank =	86.45		
Check Ditch Capacity (Q)	0.00	Free Board =	0.03		
Q =	0.005 Cu M/sec	and Velocity =	0.25 M/s		

Ditch MH21		Length =		15.25 m	
New Ditch Section Required 1:100 yr. +20% flow = 5.23 l/s		0.005 Cu m/sec			
From Seelye use n =	0.013 (Channels)	area=	0.02		
choose: slope S =	2.10 %	Up Stream Ditch btm=	86.27	wp=	1.60
Ditch Bottom	0.00 metres	Dn Stream Ditch Btm =	85.95		
Ditch slopes	40.00 :1	Difference =	0.32		
Water depth	0.020 metres (depth needed to carry 0.13 Cu. M/sec)	Top Bank =	86.32		
Check Ditch Capacity (Q)		Free Board =	0.03		
Q =	0.008 Cu M/sec	and Velocity =	0.52 M/s		

Ditch MH25		Length =		7.00 m	
New Ditch Section Required 1:100 yr. +20% flow = 8.23 l/s		0.008 Cu m/sec			
From Seelye use n =	0.013 (Channels)	area=	0.02		
choose: slope S =	1.86 %	Up Stream Ditch btm=	86.51	wp=	1.60
Ditch Bottom	0.00 metres	Dn Stream Ditch Btm =	86.38		
Ditch slopes	40.00 :1	Difference =	0.13		
Water depth	0.020 metres (depth needed to carry 0.13 Cu. M/sec)	Top Bank =	86.59		
Check Ditch Capacity (Q)		Free Board =	0.06		
Q =	0.008 Cu M/sec	and Velocity =	0.49 M/s		

$Q = A \cdot (1.0/n) \cdot R^{2/3} \cdot S^{1/2}$
where:
A = cross sectional area in Sq. m
n = friction coefficient
R = hydraulic radius = A/wetted perimetre (wp) in m



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 Ottawa, Ontario K1S 5N4 Canada
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IBI GROUP

RUN-OFF COEFFICIENTS

Development Name | Name of Client/Developer
 123456-6.0 | Rev #3 | 2024-05-23
 Prepared By: AB | Checked By: RM

	CBMH20			CB08			CBMH09			CBMH14			MH11			CB19				
	GRASS	HARD		GRASS	HARD		GRASS	HARD		GRASS	HARD		GRASS	HARD		GRASS	HARD			
	406.70		1430.57	274.90		12.82	179.40		608.27	36.26		342.69			15.78		1175.26	41.46		1448.20
	175.95			12.28			12.33			21.05					15.78			40.44		
	24.44														5.50			10.96		
	62.34														56.00			7.33		
															31.68			151.61		
TOTAL (m²)	669.43	0.00	1430.57	287.18	0.00	12.82	191.73	0.00	608.27	57.31	0.00	342.69			124.74	0.00	1175.26	251.80	0.00	1448.20
	2100.00			300.00			800.00			400.00			1300.00			1700.00				

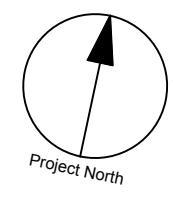
Runoff Coefficient (C):	0.25	0.90	0.90	0.25	0.90	0.90	0.25	0.90	0.90	0.25	0.90	0.90				0.25	0.90	0.90	0.25	0.90	0.90
Ave. Runoff Coefficient (C):	0.69			0.28			0.74			0.81			0.84			0.80					

Runoff Coefficient Used(C):	0.69			0.28			0.74			0.85			0.76			0.84			0.80		
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	CBMH05			MH22			EXMH49			MH25			EXMH49-2			MH10			MH12		
	GRASS	HARD		GRASS	HARD		GRASS	HARD		GRASS	HARD		GRASS	HARD		GRASS	HARD		GRASS	HARD	
	740.14		1913.21	98.04		301.96	48.12		422.34	222.67		1021.42	62.79		306.08	38.52		1708.59	4.98		1556.31
	53.82						13.91			24.57			31.13			13.64			58.90		
	6.60						15.63			31.34						92.83			51.36		
	15.86															8.00			54.77		
	15.84															16.06			53.28		
	7.30															15.86			53.08		
	37.86															6.50			42.67		
	9.37																		9.61		
																			8.85		
																			6.19		
TOTAL (m²)	886.79	0.00	1913.21	98.04	0.00	301.96	77.66	0.00	422.34	278.58	0.00	1021.42	93.92	0.00	306.08	191.41	0.00	1708.59	343.69	0.00	1556.31
	2800.00			400.00			500.00			1300.00			400.00			1900.00			1900.00		

Runoff Coefficient (C):	0.25	0.90	0.90	0.25	0.90	0.90	0.25	0.90	0.90	0.25	0.90	0.90	0.25	0.90	0.90	0.25	0.90	0.90	0.25	0.90	0.90
Ave. Runoff Coefficient (C):	0.69			0.74			0.80			0.76			0.75			0.83			0.78		

Runoff Coefficient Used(C):	0.69			0.74			0.85			0.76			0.76			0.83			0.78		
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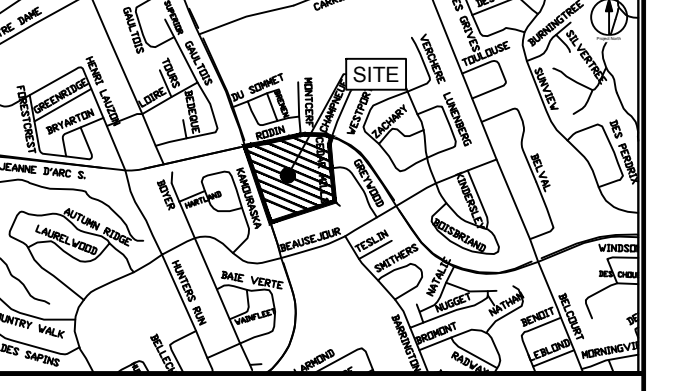
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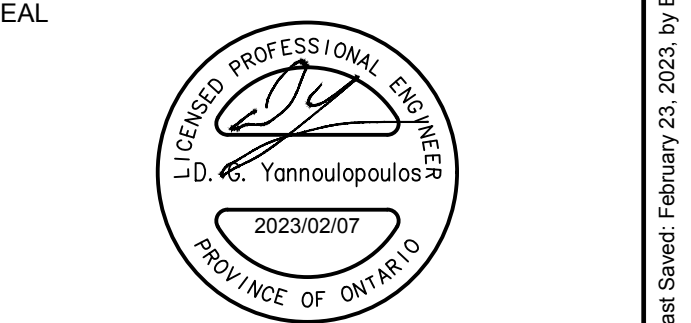
ISSUES

No.	DESCRIPTION	DATE
1	ISSUED FOR CITY REVIEW	2023-02-06

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS.



CONSULTANTS
Project Coordinator:
North American Development Group
Site Plan Architect:
Q4 Architects Inc.
Surveyor:
Fairhall, Moffatt and Woodland Ltd.
Geotechnical:
Paterson Group
Traffic:
IBI Group
Electrical:
Hammerschlag & Joffe Inc.
Landscape:
Levstek Consultants Inc.



IBI GROUP
400 - 333 Preston Street
Ottawa ON K1S 9M4 Canada
tel 613 225-1111 fax 613 225-9868
ibigroup.com

PROJECT
ORLEANS GARDENS
1615 ORLEANS BOULEVARD

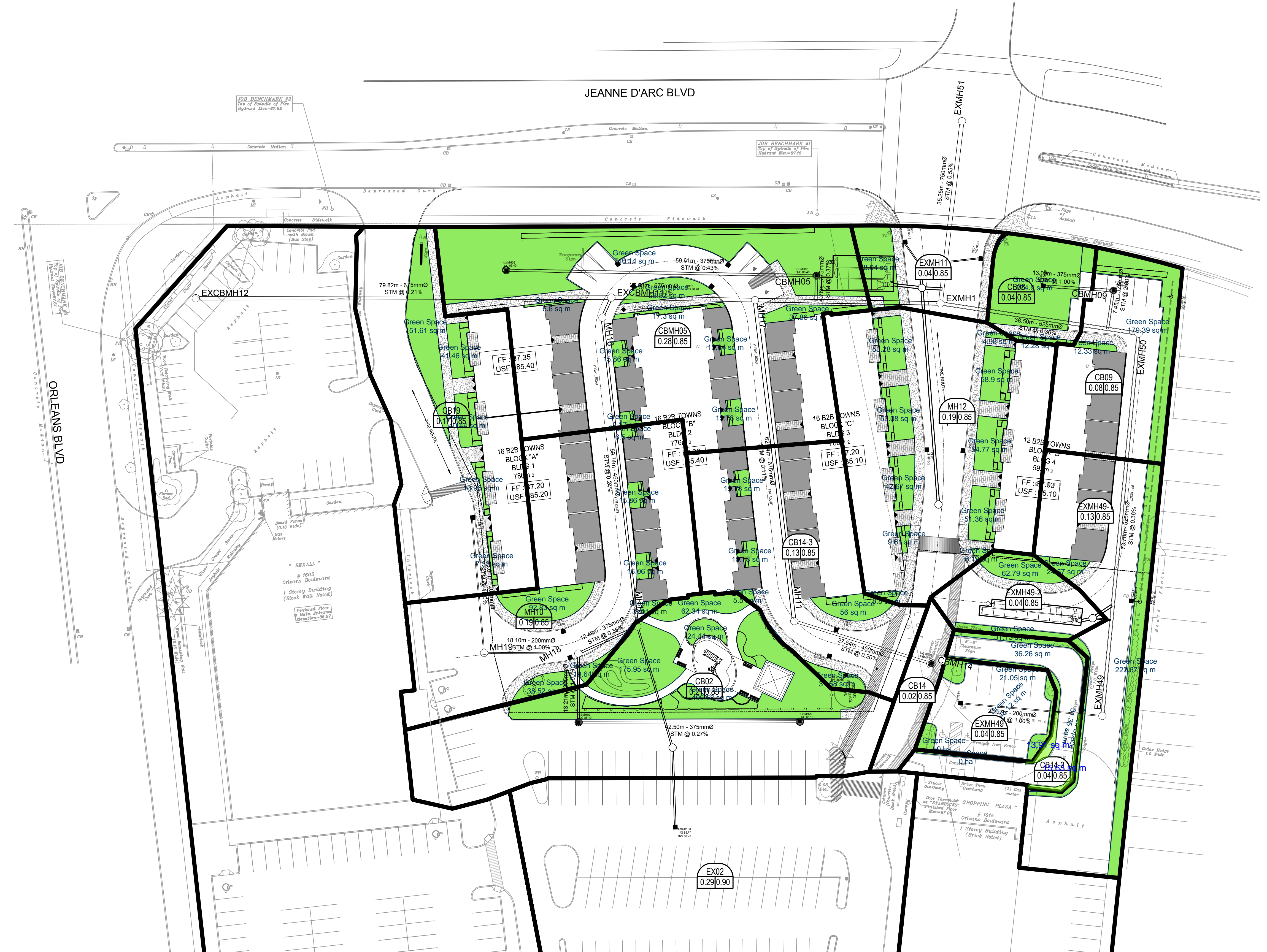
PROJECT NO:
122764
DRAWN BY:
A.B. / E.H.
PROJECT MGR:
R.M.
CHECKED BY:
D.G.Y.
APPROVED BY:
D.G.Y.

SHEET TITLE
STORM DRAINAGE AREA PLAN

SHEET NUMBER
C-500
ISSUE
1

LEGEND

	STORM TRIBUTARY OUTLINE
	AREA NUMBER
	COEFFICIENT
	AREA (ha)

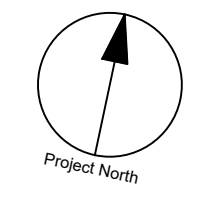
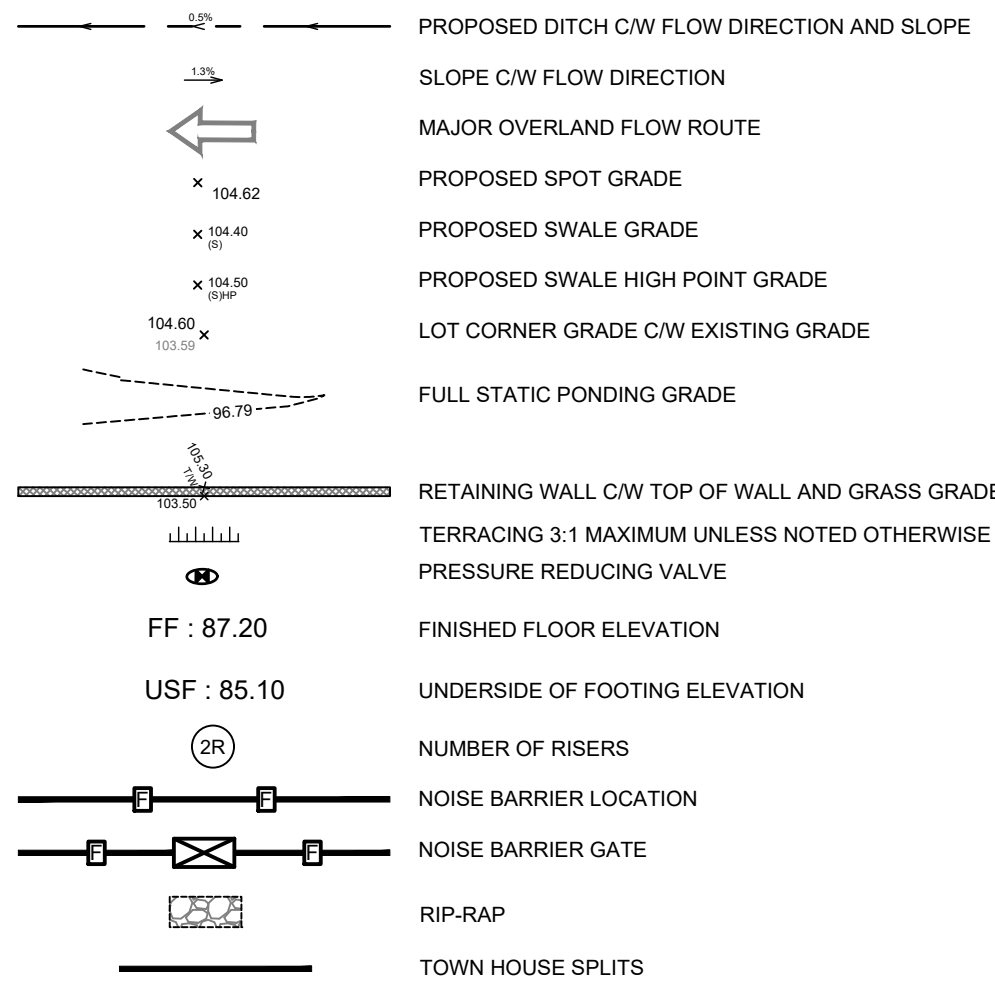


CITY PLAN NO. 18981
CITY FILE NO. D07-12-23-0026
Last Saved: February 23, 2023, by Ehenie
Printed: Thursday, July 13, 2023 11:06:12 AM by Eric Henne

APPENDIX E

- Grading Plan 122764-C-200
- Erosion and Sediment Control Plan 122764-C-900

GRADING LEGEND



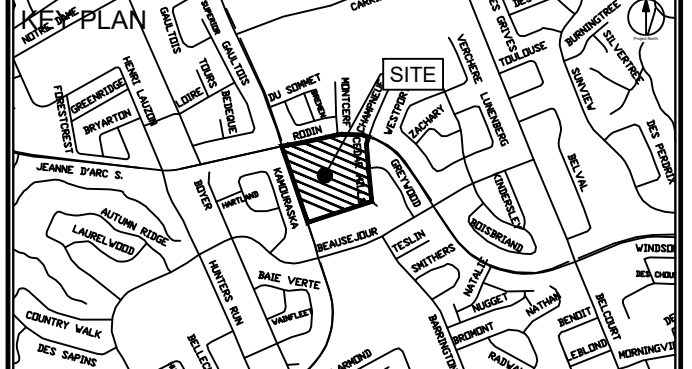
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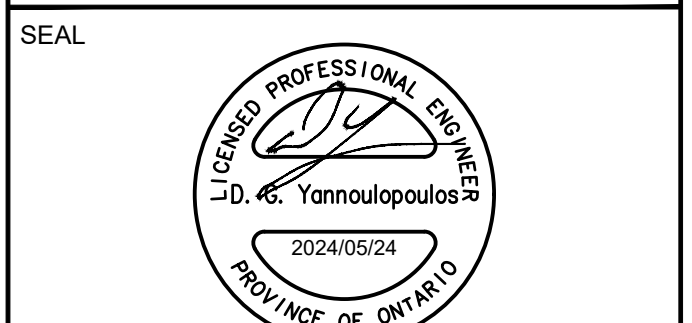
ISSUES

No.	DESCRIPTION	DATE
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2	REVISED AS PER NEW SITE PLAN	2023-09-06
3	REVISED AS PER CITY COMMENTS	2024-05-24

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS.



CONSULTANTS
Project Coordinator:
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Site Plan Architect:
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Surveyor:
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Geotechnical:
Paterson Group
Traffic:
IBI Group
Electrical:
Hammerschlag & Joffe Inc.
Landscape:
Levstek Consultants Inc.



SEAL

IBI GROUP
400 - 333 Preston Street
Ottawa ON K1S 5M4 Canada
tel 613 225 1311 fax 613 225 5966
ibigroup.com

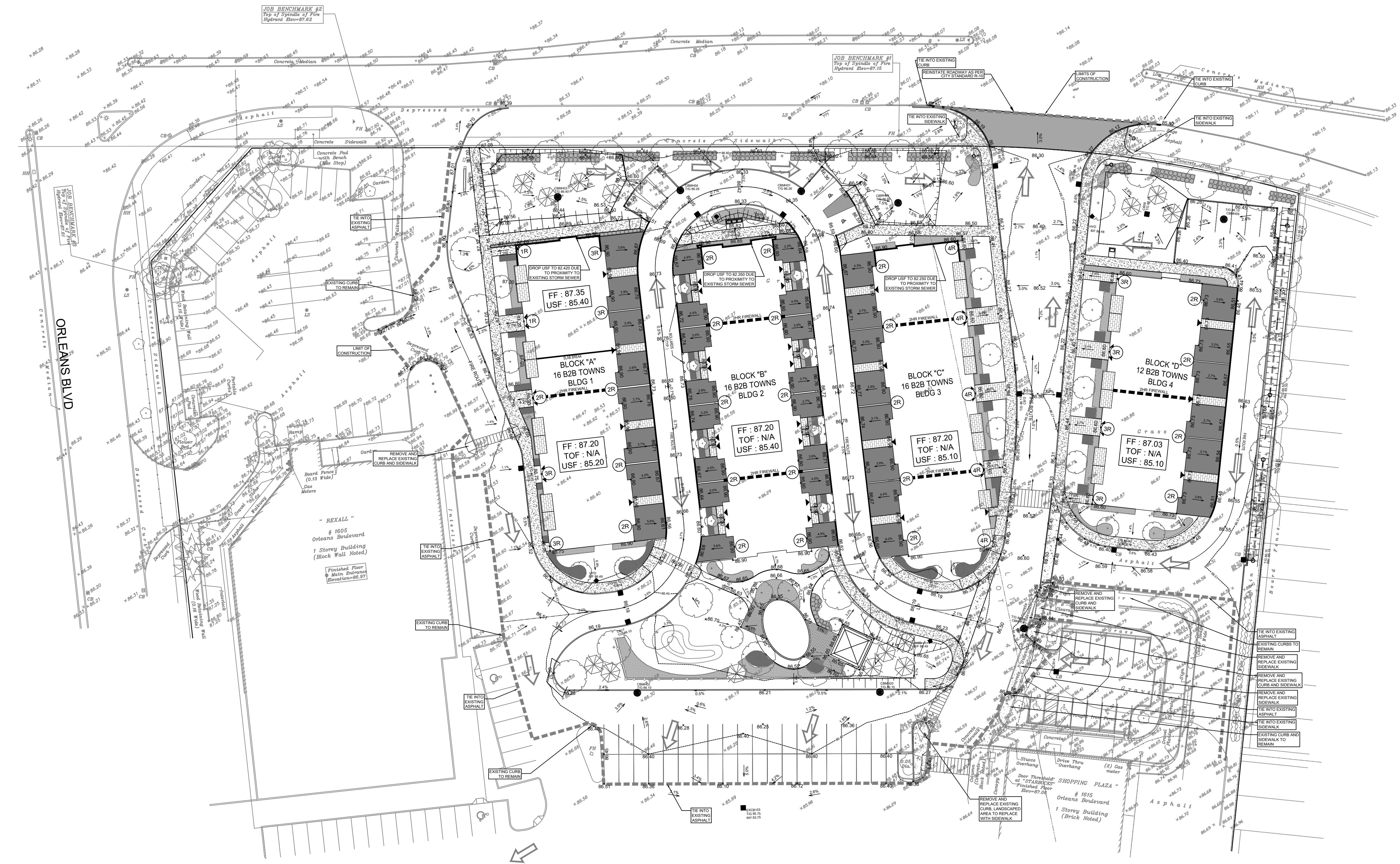
PROJECT
ORLEANS GARDENS
1615 ORLEANS BOULEVARD

PROJECT NO:
122764
DRAWN BY:
A.B. / E.H.
PROJECT MGR:
R.M.
CHECKED BY:
R.M./D.G.Y.
APPROVED BY:
D.G.Y.

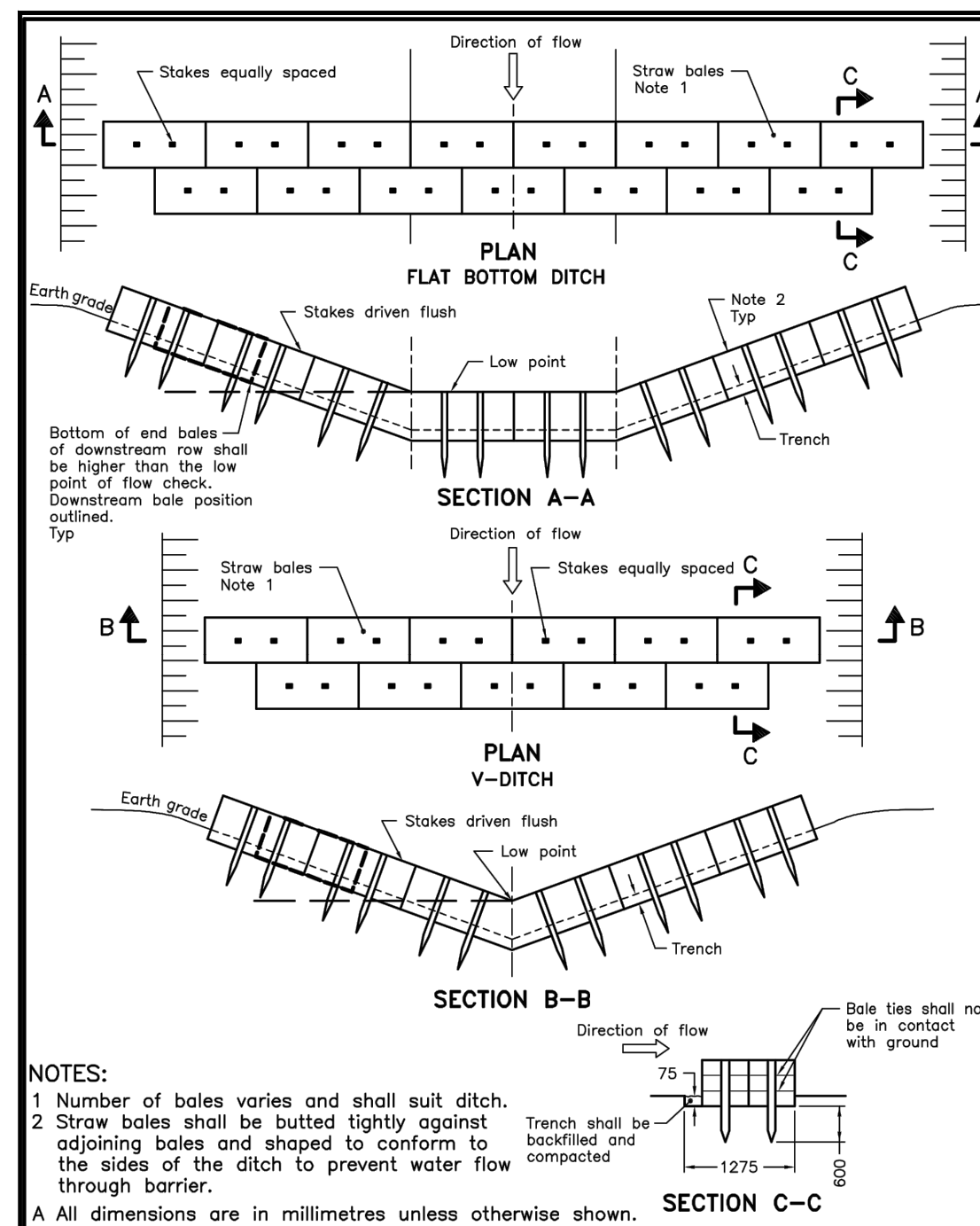
SHEET TITLE
GRADING PLAN

SHEET NUMBER
C-200
ISSUE
3

JEANNE D'ARC BLVD



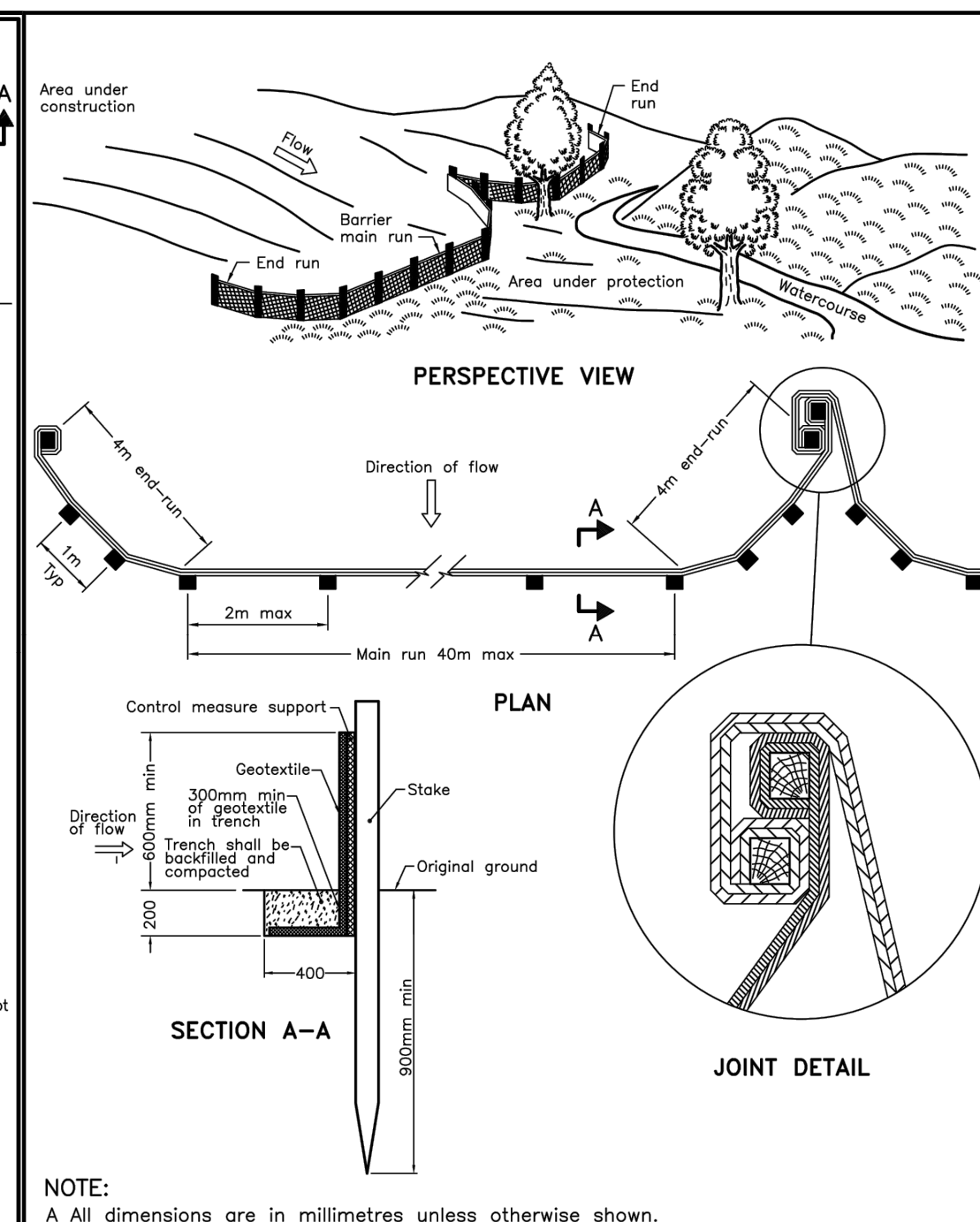
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 Plotted: Friday, May 24, 2024 10:31:47 AM by: Eric Henne
CITY PLAN NO. 18981
CITY FILE NO. D07-16-22-008



ONTARIO PROVINCIAL STANDARD DRAWING Nov 2015 Rev 2

STRAW BALE FLOW CHECK DAM

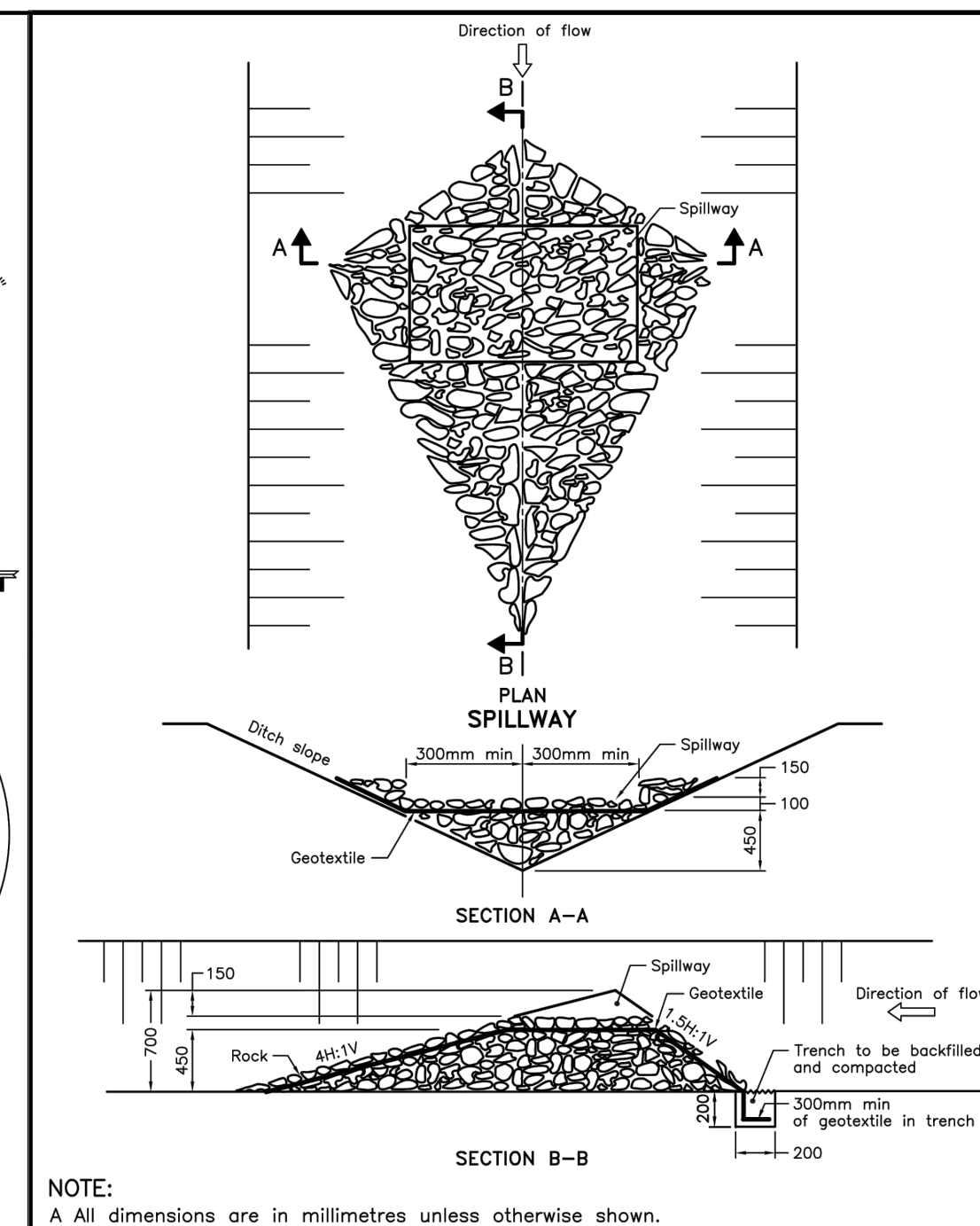
OPSD 219.180



ONTARIO PROVINCIAL STANDARD DRAWING Nov 2021 Rev 3

HEAVY-DUTY SILT FENCE BARRIER

OPSD 219.130



ONTARIO PROVINCIAL STANDARD DRAWING Nov 2006 Rev 1

ROCK FLOW CHECK DAM V-DITCH

OPSD 219.210

- NOTES:**
- SILT FENCE TO BE ERECTED PRIOR TO EARTH WORKS BEING COMMENCED. SILT FENCE TO BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED OR UNTIL START OF SUBSEQUENT PHASE.
 - STRAW BALE SEDIMENT TRAPS TO BE CONSTRUCTED IN EXISTING ROAD SIDE DITCHES. TRAPS TO REMAIN AND BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED.
 - SILT SACK TO BE PLACED AND MAINTAINED UNDER COVER OF ALL CATCHBASINS. GEOTEXTILE SILT SACK IN STREET C&Bs TO REMAIN UNTIL ALL CURBS ARE CONSTRUCTED. GEOTEXTILE FABRIC IN RYCBs TO REMAIN UNTIL VEGETATION IS ESTABLISHED. ALL CATCHBASINS TO BE REGULARLY INSPECTED AND CLEANED, AS NECESSARY, UNTIL SOD AND CURBS ARE CONSTRUCTED.
 - CONTRACTOR TO PROVIDE DETAILS ON LOCATION(S) AND DESIGN OF DEWATERING TRAP(S) PRIOR TO COMMENCING WORK. CONTRACTOR ALSO RESPONSIBLE FOR MAINTAINING TRAP(S) AND ADJUSTING SIZE(S) IF DEEMED REQUIRED BY THE ENGINEER DURING CONSTRUCTION.
 - CONTRACTOR TO PROTECT EXISTING CATCHBASINS WITH FILTER CLOTH UNDER THE COVERS TO TRAP SEDIMENTATION. REFER TO IDENTIFIED STRUCTURES.
 - WORKS NOTED ABOVE ARE TO BE INSTALLED, INSPECTED, MAINTAINED AND ULTIMATELY REMOVED BY SERVICING CONTRACTOR.
 - THIS IS A "LIVING DOCUMENT" AND MAY BE MODIFIED IN THE EVENT THE PROPOSED CONTROL MEASURES ARE INSUFFICIENT.

- LEGEND:**
- HEAVY DUTY SILT FENCE AS PER OPSD-219.130
 - SNOW FENCE
 - STRAW BALE CHECK DAM AS PER OPSD-219.180
 - ROCK CHECK DAM AS PER OPSD-219.210
 - SILT SACK PLACED UNDER EXISTING CB COVER
 - TEMPORARY MUD MAT 0.15m THICK 50mm CLEAR STONE ON NON WOVEN FILTER CLOTH

CLIENT

NORTH AMERICAN DEVELOPMENT GROUP

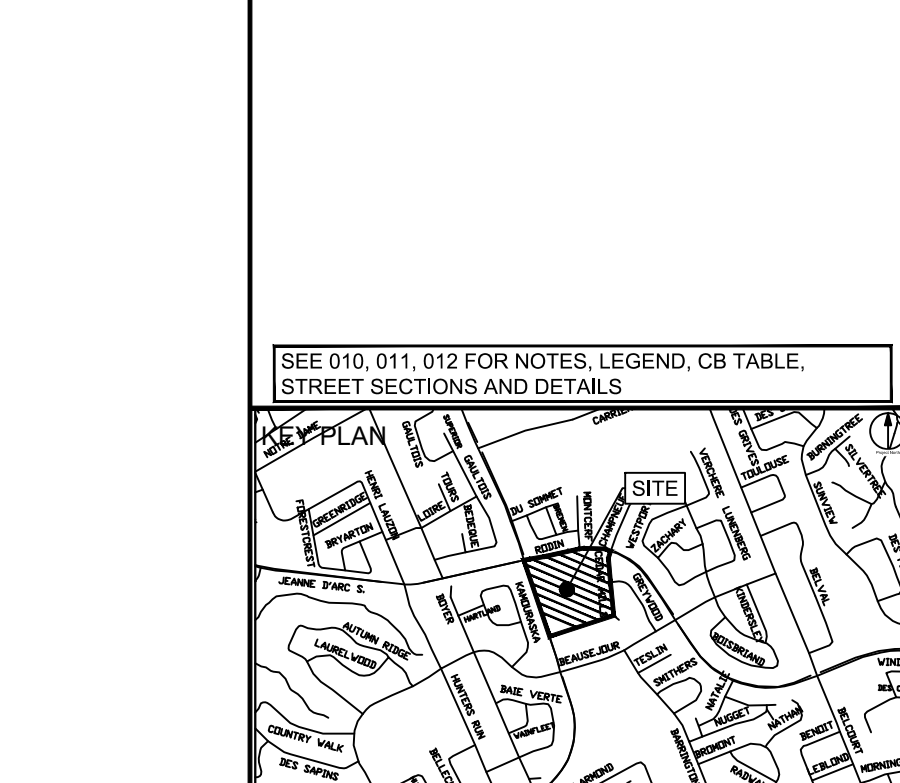
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3	REVISED AS PER CITY COMMENTS	2024-05-24



LEGEND

Project Coordinator:
North American Development Group

Site Plan Architect:
Q4 Architects Inc.

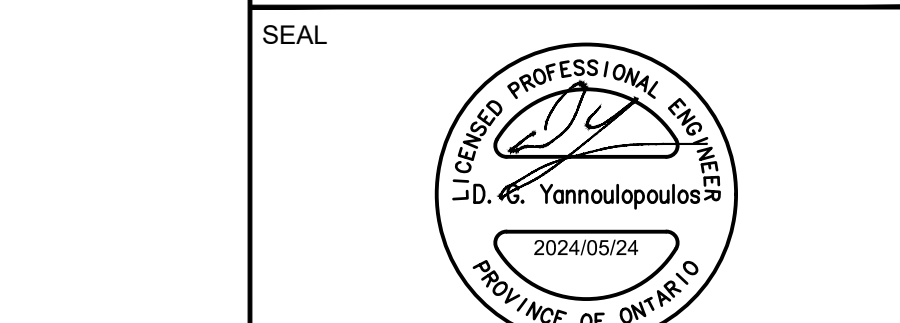
Surveyor:
Fairhall, Moffatt and Woodland Ltd.

Geotechnical:
Paterson Group

Traffic:
IBI Group

Electrical:
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Landscape:
Levstek Consultants Inc.



IBI GROUP
Suite 400 - 333 Preston Street
Ottawa ON K1S 5N4 Canada
Tel: 613 225 1311 / 613 241 3300 Fax: 613 225 9868
ibigroup.com

PROJECT

ORLEANS GARDENS

1615 ORLEANS BOULEVARD

PROJECT NO:
122764

DRAWN BY:
A.B. / E.H.

CHECKED BY:
R.M./D.G.Y.

PROJECT MGR:
R.M.

APPROVED BY:
D.G.Y.

SHEET TITLE

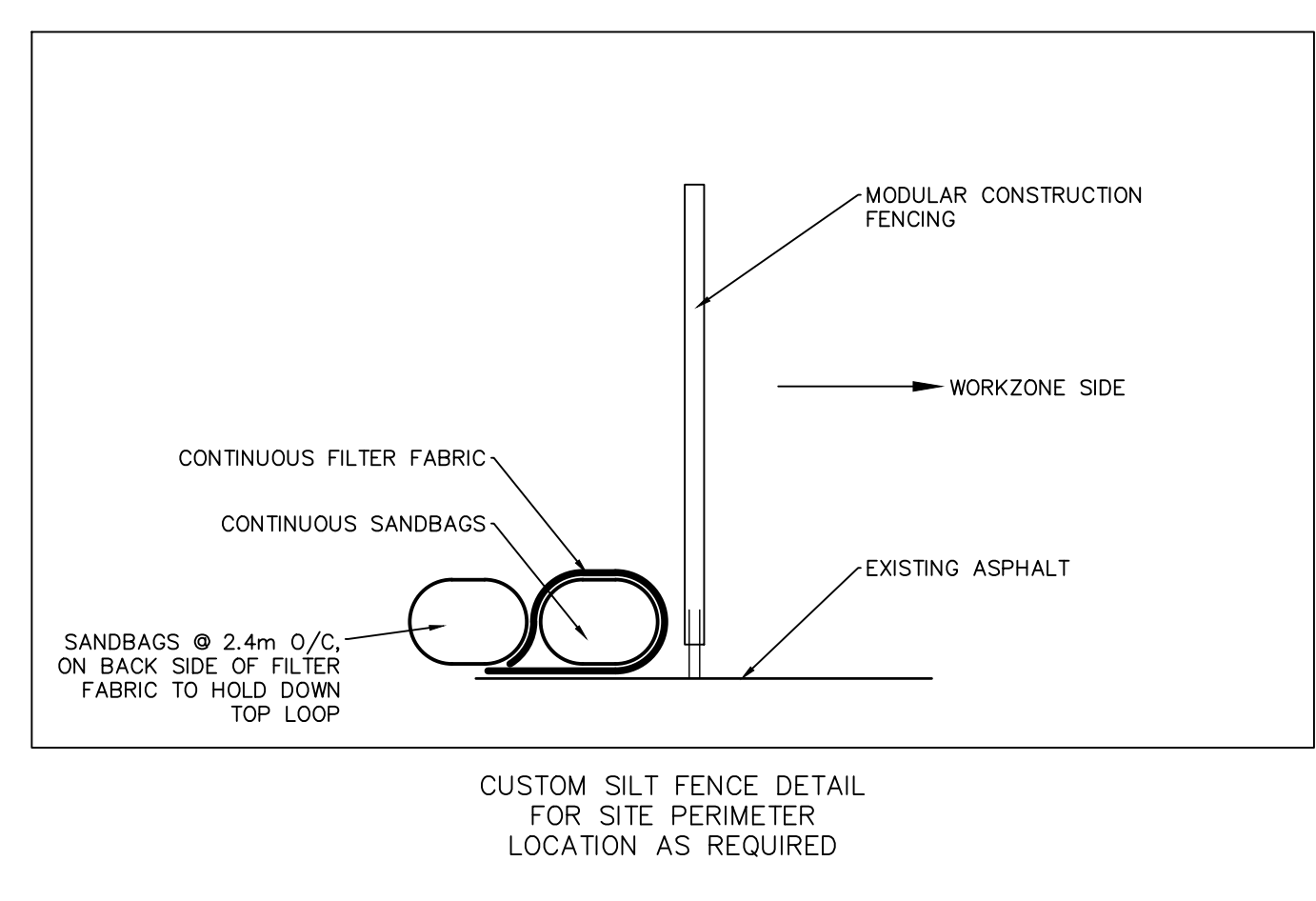
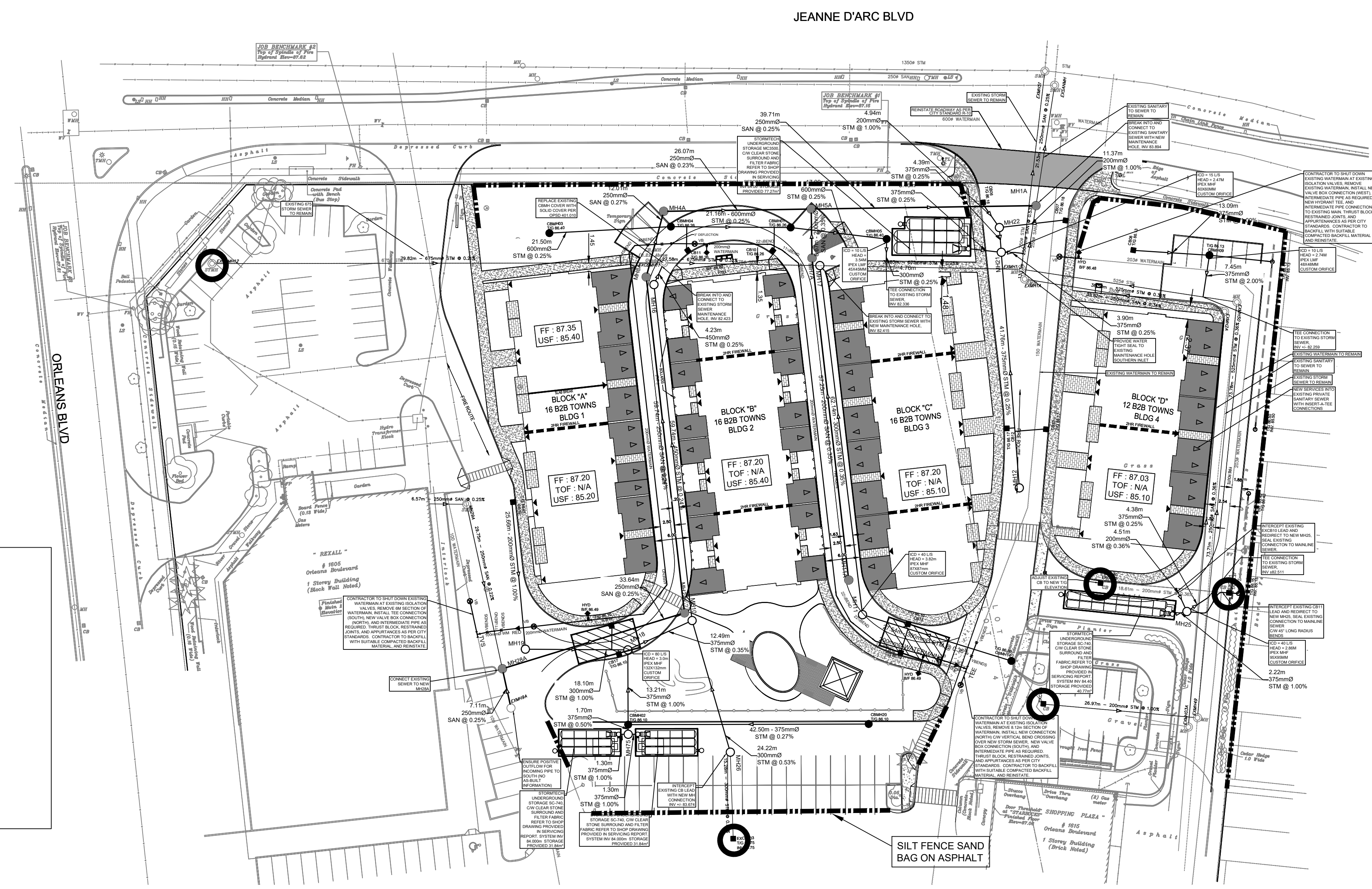
SEDIMENT-EROSION PLAN

SHEET NUMBER

C-900

ISSUE

3



CITY PLAN NO. 18981
CITY FILE NO. D07-16-22-008
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