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Pratt Development Inc.

Pratt Employment Subdivision

Preliminary Servicing & Stormwater Management Report

November 2022

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Disclaimer

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Preliminary Servicing & Stormwater Management Report
Pratt Development Inc.
Pratt Employment Subdivision, Town of Midland

1. Introduction

1.1. Appointment

The Jones Consulting Group Ltd. (TJCG) was retained by Pratt Development Inc. (Client) to prepare this Preliminary Servicing & Stormwater Management Report for the proposed Employment Development known as the Pratt Employment Subdivision. The proposed development located in the Town of Midland (Town) consists of employment lands and includes a large proposed communal stormwater management (SWM) facility to service both the proposed development lands, as well as proposed residential lands to the north. The proposed residential is currently owned by the proponent. This Report has been prepared to summarize how the Pratt Employment Subdivision will be serviced by proposed and existing surrounding municipal infrastructure as well as how these lands will integrate with the residential development to the north.

This Report examines the Development's servicing in relation to:

- Stormwater Management & Conveyance
- Water Servicing
- Sanitary Servicing

1.2. Property Description

The Site is irregularly shaped and is comprised of approximately 17.33 hectares (ha) of undeveloped land. The subject property is municipally known as 16533 Highway 12, Midland, and legally described as Part of Lot 101, Concession 2, in the Geographic Township of Tay, Town of Midland, Simcoe County. A copy of the subject lands proposed *Draft Plan of Subdivision* prepared by MHBC Planning, has been attached in **Appendix A.** The subject site location is shown in the following **Figure 1**.

Figure 1 – Site Location Plan

The site is generally situated northwest of the intersection of Highway 12 and William Street. It is bound to the north by a proposed residential development owned by the proponent, to the west by William Street & existing industrial lands, to the east by Brandon Street, and to the south by Highway 12 and existing developed & undeveloped industrial lands. A small portion of the property extends south to Highway 12, with the remaining portion of the property set back from Highway 12. William Street and Highway 12 are classified as *Arterial Roadways* whereas Brandon Street is classified as a *Local Roadway* in the Town of Midland's *Official Plan (2017)*. A copy of the Town's *Official Plan Road Classification Map Schedule 'C'* has been included in **Appendix A**, for reference.

The Development lands are mainly vegetated with forested type land cover. The lands are bisected by a naturalized drainage channel. The lands to the east of the channel slope in a south-easterly direction. The lands to the west of the channel gently slope north. The topography ranges from an elevation of approximately 215m to approximately 205m with slopes ranging from 1% to 7%. Topographical information for the site was obtained from surveys completed by Rudy Mak Surveying Ltd. with survey truthing completed by TJCG.

The current draft plan proposes the development of five (5) employment blocks, and one (1) stormwater extended detention facility block. In addition, road right-of-way consisting of a 9.0m wide local roadway will be created as part of the proposed *Draft Plan of Subdivision.*

There are multiple external areas beyond the limits of the subject lands that contribute runoff to this development. This includes the Pratt Residential Subdivision located to the North of the subject lands.

A *Geotechnical Investigation* of the subject lands was undertaken by Terraprobe Inc., in June of 2018. Their fieldwork program advanced twelve (12) boreholes to a depth of 6.6 metres (m) below the existing ground surface. The boreholes generally encountered a layer of organic topsoil/fill over a layer of silt, sandy silt and clay and silty sand. A copy of the Geotechnical Report can be found under separate cover. Based on the *Soil Survey of Simcoe County Report No. 29,* and *MTO Design Chart H2-6A*, the soils on the entirety of the Site are represented by the Vasey Sandy Loam series, which corresponds to hydrologic soil group AB. An excerpt of the *Soil Survey of Simcoe County mapping* has been provided in **Appendix A**.

1.3. Proposed Land Use

The latest *Pratt – Galloway Employment Subdivision Draft Plan* prepared by MHBC Planning indicates that the Development will be subdivided into various sized Employment Blocks ranging in size from 0.94ha to 5.29ha The intent of using larger blocks instead of small individual lots is to allow greater flexibility with lot sizing once individual development plans are known. For the purpose of this Report, it has been assumed that the development could be comprised of approximately 24 individual employment lots. The conceptual lot lines are shown on the MHBC Plannings *Draft Plan of Subdivision*. The Draft plan also includes a number of servicing and stormwater management easements and blocks, and roadways. The Site's proposed land use statistics are summarized in **Table 1,** below. For further information refer to MHBC Plannings *Draft Plan of Subdivision,* dated revised November 2022 which has been included in **Appendix A**.

Table 1 – Pratt Employment Subdivision - Draft Plan Land Use Statistics

Residential Lot Breakdown	**Area (ha)**
Employment Blocks – Block 1 to 5	12.32
Stormwater Management Area	3.53
Cul-De-Sac	0.08
Right-of-Way	1.40
Total	**17.33**

The Development will be serviced by proposed municipal sanitary and water infrastructure, connected to existing municipal infrastructure. In addition, proposed municipal storm sewer infrastructure will convey drainage from proposed residential to the north, as well as existing development to the north, west and east of the project site, through the development lands to the proposed SWM facility. The proposed SWM facility is located within the employment lands and will provide the required quality and quantity control in accordance with *Ministry of Environment* guidelines.

Two (2) site access points are proposed to connect the internal roadways to existing municipal right-of-ways. Access points for the subject property will connect to Brandon Street and William Street.

1.4. Existing Sanitary Services and Easements

An existing 200mm diameter PVC sanitary sewer servicing the existing residential development is located along the northern boundary of the proposed Pratt-Galloway Employment Subdivision. The sanitary sewer traverses through the residential subdivision and employment lands, conveying drainage from Park Avenue to William Street. The sewer extends westerly along the northern boundary of the residential subdivision, before turning and continuing south. This sanitary sewer then merges with an existing sanitary main from King Street and sanitary flows are conveyed via a 450mm diameter sanitary trunk sewer south past the Galloway Park soccer fields and running along the proposed Employment Subdivision's northern limit. The sanitary trunk then extends easterly for approximately 500m. An existing 200mm diameter PVC sanitary sewer servicing Pratt Avenue extends southerly through the development lands and connects to the existing trunk sanitary. At this connection point the trunk sanitary extends southerly for approximately 160m before projecting eastward and connecting to the 450mm diameter sanitary trunk located at William Street. The existing sanitary easements are shown on the *Draft Plan of the Subdivision*. For further information refer to *Town of Midland Underground Servicing Mapping* provided in **Appendix A**.

At the time of Report preparation, record drawings for the existing trunk sanitary sewers were not available from the Town. Accordingly, the trunk sanitary depths and slopes have been assumed based on limited information obtained near Park Avenue and William Street. Record drawings will be required from the Town to confirm constructed depths and slopes of the existing trunk sanitary.

1.5. Existing Water Servicing

Based on information provided by the Town, there is an existing 250mm diameter Ductile Iron watermain located within the William Street Right-of-Way, located to the east of the development lands. In addition, there is an existing 250mm diameter watermain located in the Highway 12 Right-of-way. There is currently no water infrastructure located within Brandon Street; however, it is proposed to install a new watermain along Brandon Street, as part of the development proposal. We currently do not have Record Drawings for the two (2) proposed connection points to the existing municipal system, as such, we kindly request the Town provide this information. The current underground service information provided by the Town is included in **Appendix A** for reference.

1.6. Existing Storm Servicing

In terms of existing storm drainage, there are a number of locations where stormwater is directed to the proposed residential lands to the north, which will ultimately be conveyed to the proposed stormwater management facility located in the Employment Subdivision lands. There are four (4) existing locations where external stormwater drainage enters the residential subdivision. An existing 825mm diameter concrete storm sewer conveys drainage from King Street, and outlets to a headwall approximately 32m east of King Street. The location of this storm outlet coincides with the residential developments west entrance.

There is an existing 450mm diameter concrete outlet which discharges flows from an existing SWM facility located west of Trillium Wood Park and adjacent to Park Avenue. The existing SWM facility has a Certificate of Approval with the Ministry of Environment. A copy of the Certificate of Approval (C of A No. 3-0384-91-006) is included in **Appendix A** for reference.

Stormwater runoff from the north is also spilled onto the residential lands via an existing 850mm diameter concrete outlet located at the intersection of Christine Drive and Maxwell Avenue.

Lastly, there is an existing storm outlet that conveys runoff from Pratt Avenue onto the residential lands. In this regard, we kindly request that Record Information from the Town be provide to TJCG to confirm existing underground service information. Report information regarding existing (known) stormwater outlets was obtained through field survey procedures.

1.7. Existing Hydro Servicing

There is an existing 9m wide Hydro easement located along the employment lands northern boundary through Block 2 and Block 6 that extends easterly to William Street. In addition, an existing Hydro station is located in Block 2.

As part of the residential development proposal to the north, a large number of existing infrastructure will be collected and re-routed to the Employment Subdivision. For details on the proposed re-routing, reference should be made to the *Preliminary Servicing & Stormwater Management Report*, prepared by TJCG for the Pratt Residential Subdivision, dated December 2022, provided under separate cover.

1.8. Supporting Documents

The following documents have been referenced in preparation of this report:

- *Hydrogeological Assessment Revised*, prepared by Azimuth Environmental Consulting Inc., dated November 2022,
- *Town of Midland Engineering Development Design Standards*, dated revised December 2012,
- *Town of Midland Official Plan*, dated 2017,
- Ontario Regulation 350/06, Ontario Building Code,
- Soil Map of Simcoe County, Ontario, Soil Survey Report No. 29,
- Ministry of the Environment, Stormwater Management Planning and Design Manual, dated March 2003,
- Ministry of the Environment, Design Guidelines for Sewage Works, dated 2008,
- Ministry of the Environment, Design Guidelines for Drinking-Water Systems, dated 2008,
- Ministry of Transportation, Drainage Management Manual, dated February 2008,

2. Sanitary Servicing

2.1. Overview

The Town of Midland's Bay Street Sewage Treatment Plant (STP) serves the area where the development is situated. Sewage conveyance to the Bay Street STP is proposed via the existing sanitary sewers on William Street, located in close proximity to the proposed development. Based on initial discussion with the Town, we are not aware of any capacity concerns for the Bay Street STP or downstream sewer capacities.

The proposed sanitary servicing is detailed on the *Internal Sanitary Drainage Area Plans,* **Drawings SAN-1** and **SAN-2**, included in **Appendix D**. For the purpose of this Report and the sanitary servicing strategy, we have assumed that the Employment Blocks have been broken down using the conceptual lot lines outlined on the MHBC Plannings, *Draft Plan of Subdivision*. Internally, sewage flows will be collected via proposed 200mm diameter PVC SDR35 sanitary sewers, and a series of 1200mm diameter maintenance holes to facilitate bends, appropriate clean out lengths, etc. Each conceptual lot will be serviced with individual 150mm diameter PVC SDR28 service laterals that connect to the internal sanitary main.

The internal sanitary flows are proposed to be conveyed via gravity sewer to the existing 450mm diameter sanitary trunk sewer at manhole EX. SAN 127. This connection location collects external sanitary sewer flows from existing developments to the north and west of the subject property before sending it eastwards towards the Sanitary Trunk Sewer located at William Street.

The proposed Pratt Employment Subdivision has two (2) connection points to the trunk sanitary sewer. The first is at the existing sanitary maintenance hole 184, and the second connection point is at the east limit of Street 'A' adjacent to the Coral Springs Lane and William Street intersection at existing maintenance hole 253.

2.2. Sanitary Service Design Flows

For the proposed employment lands, the analytical sanitary forecast is determined based on the average Design Flow for Light and Heavy Industrial as described in the *Town of Midland's Engineering Design Standards* and the *Ministry of the Environment*. This flow rate is based on the overall area draining to the sewer system.

Light Industrial = 35.0 m^3/day/Ha or 0.41L/s/Ha

Heavy Industrial = 55.0 m^3/day/Ha or 0.64 L/s/Ha

Average Industrial = 45.0 m^3/day/Ha or 0.52L/s/Ha

To confirm that the proposed sanitary system has the capacity to convey the Site flows to the existing trunk sanitary sewer system. The peak projected sanitary flows have been calculated using the equivalent population with the Peak Domestic Sewage Flow Equation and the Harmon Formula below.

The overall area for this calculation does not include Blocks 6 and 7 because they are related to stormwater management and a small portion of a cul-de-sac, respectively and therefore do not have any effect on the population for this development. The area contributing to the sanitary sewer system is 13.35Ha. The equivalent Population was determined using the Town of Midland's average daily domestic flow of 450 L/day.

P= (45.0 m^3/day/Ha x 13.35Ha)/(450 L/day/Person /1000 L/m^3)

P=1335 people

With the above noted area-based flow rate converted to a population-based flow, the estimated sanitary flow of the employment development can therefore be calculated with the following formula.

$$Qd = P\ x\ q\ x\ M/86400 + [I \times Aind]$$

M=1+14/(4+P^0.5)

Where: P=Population (thousands) (1335)

M=1+14/(4+(1.335^0.5))

M=3.72

Where: Qd = Total peak sewage flow (L/s)

q = Industrial sewage flow

I = Extraneous sewage flow (L/s)

Aind = Area of Employment Development (13.35Ha)

I = Units of extraneous flow (0.23 L/s/Ha)

Therefore:

$$Qd = [1335\ x\ \ 450\ x\ 3.72/86400] + [0.23 \times 13.35]$$

Qd $= 28.94$ L/s ← total peak sewage flow

In order to confirm the proposed sanitary infrastructure within the development lands has been appropriately sized a sanitary sewer design sheet has been completed. Refer to **Appendix B**. The design sheet demonstrates that the proposed sewers have been appropriately sized to convey the required flows, in addition to meeting the minimum (0.6m/s) and maximum (3.0m/s) velocity requirements stipulated by the Town of Midland. It is important to note that at the time of Report preparation, existing external flow information (i.e. upstream sanitary design sheets) were not available. Accordingly, the external flows were estimated using aerial mapping & contours. We kindly request the Town confirm external sanitary flow and/or provide external sanitary design sheets for inclusion in this Report. Proposed residential flows from the lands to the north were determined from the Preliminary Servicing and Stormwater Management Report, Pratt – Galloway Subdivision, dated November 2022, provided under separate cover.

3. Water Servicing and Distribution

3.1. Overview

All employment Blocks and conceptual lots within the Employment Subdivision will be serviced by municipal water.

The proposed domestic and fire water servicing is detailed on drawing GS-1and GS-2, attached in **Appendix D**. For the purpose of this Report and the water servicing strategy, we have assumed that the employment Blocks have been broken down using the conceptual lot lines outlined on the MHBC Draft Plan of Subdivision. In order to provide a fully looped water distribution system, two (2) connections are proposed. The first connection will be to the existing 250mm diameter watermain on William Street and the second connection will be to Brandon Street at the Street 'A'. Currently there is no existing watermain along Brandon Street, as such, it is proposed to connect to the existing watermain at Highway 12, and construct a new watermain along Brandon Street to service the development.

Internally, the development will be serviced with PVC class 150 watermain ranging in size from 150mm to 300mm in diameter. 100mm diameter (PVC) domestic water services and 150mm diameter fire services will be provided to each of the proposed conceptual lots. Fire hydrants will be provided and strategically located within the development to meet the Town's requirements for Fire Department suppression coverage.

3.2. Domestic Water Design Flows

Similar to Section 3.2 of this Report, and based on the assumption of an average between the 'Light Industrial' and "Heavy Industrial' for the proposed development, the Average Daily Demand will correspond to 45m^3/day/Ha for the development area or 7.15L/s (13.72 Ha x 45 m^3/day/Ha). In order to determine the appropriate water distribution design flows for the Maximum Daily Demand (MDD) and Peak Hour Demand (PHD), the ADF is multiplied by the Ministry of Environment standard peaking factors. Refer to Table 3-1, Design Guidelines for Drinking-Water Systems 2008 prepared by the Ministry of Environment. The peaking factors and corresponding flows are summarized below:

Maximum Daily Demand Factor: 2.75

Maximum Daily Demand: 7.15L/s x 2.75 = 19.66L/s

Peak Hourly Demand Factor: 4.13

Peak Hourly Demand: 7.15L/s x 4.13 = 29.61L/s

Based on the determined flows above and initial discussion with Town technical staff, it is anticipated that the Town's overall water supply has sufficient pressure and capacity to provide the required flows to the Development. A Water System Analysis (WSA) will be completed at the detailed design stage to confirm watermain sizing and ensure adequate supply for potable use and fire protection is achieved for this Development.

4. Stormwater Management Plan

4.1. Overview

As previously noted, the proposed Employment Subdivision is surrounded by proposed residential development to the north, existing residential to the east, as well as existing commercial and/or industrial to the west and south. External storm drainage from these existing and proposed development lands discharge to the proposed Employment Subdivision via a combination of existing storm sewers and overland flow routes. Through consultation with the Town, it has been determined that a preliminary stormwater management plan be developed to provide quality and quantity control for the proposed Pratt Residential Subdivision and the proposed Pratt Employment Subdivision. In order to achieve this, a wetland stormwater management facility is proposed and located in the proposed Employment Lands Subdivision and will outlet to lands, William Street.

The stormwater management plan outlined in this Report was designed to ensure post-development stormwater flows and infiltration volumes match corresponding pre development values.

The proposed SWM facility and accompanying storm drainage system will be designed in accordance with the Town of Midland's Engineering Development Design Standards and the Ministry of Environment Policies and Guidelines. Specifically, the following criteria will be utilized:

- Minor system (storm sewers) will be sized to convey runoff up to the 5 year storm event;
- Major system (overland flow) will be designed to safely convey regulatory event run-off to the designated outlets;
- Quantity control of stormwater runoff will be provided to reduce post development peak flows to corresponding pre development flows for the 2 to 100 year storm events;
- Quality control of stormwater run-off will be provided in accordance with the "Enhanced" level of protection stipulated by the Ministry of Environment; and,
- Maintain existing annual water balance characteristics by promoting infiltration to counteract the increase in hard surfaces.

4.2. Pre and Post Development Drainage

Catchments 101, 102 and 103 represent existing development fronting King Street. Catchment 102 also includes the Galloway Parkland, which was previously dedicated to the Town. Run-off from these catchments are directed to west limit of the Pratt Residential Subdivision where they flow overland, traversing the Pratt Residential and Employment Lands Subdivisions, prior to out letting at William Street near Pillsbury Drive.

Catchments 104, 105, 106 and 107 represent the existing residential development located north and east of the Residential Subdivision. These catchments drain overland through the proposed Pratt Residential and Employment Lands Subdivisions prior to discharging to William Street.

Catchment 108 represents existing development fronting King Street/Highway 12 and is located west of the Employment Lands Subdivision. This catchment consists primarily of commercial/industrial development and drains uncontrolled to the Brandon Street right-of-way, prior to discharging to the Employment Lands Subdivision and ultimately to William Street.

Catchment 109 represents existing development fronting Highway 12 and is located south of the Employment Lands Subdivision. Drainage from this catchment primarily drains northerly to the Employment Lands Subdivision and the easterly to William Street. This catchment consists mainly of industrial type development.

Catchment area 110 represents the boundary of the Residential Subdivision lands. In the pre development condition, this catchment is comprised of a combination of forest and pasture type vegetation. All flows from this catchment drain through the Pratt Employment Lands Subdivision, prior to out letting to the William Street roadside ditch.

Catchment 111 encompasses the area of Employment Land Subdivision. Similar to catchment 110, this catchment is primarily vegetated with combination of pasture and forest type land cover. All run-off from this catchment is directed easterly and ultimately outlets to William Street.

The modelled pre development hydrologic catchment properties are summarized below in **Table 2**. The catchment properties are derived from the MTO Drainage Management Manual, and are based on the existing mixture of pasture and forest type ground cover, present on-site. Catchment properties for existing developed catchments have been determined through a combination of aerial photography, GIS mapping and on-site field review and survey. As previously noted, the underlying soil is Vasey Sandy Loam, corresponding to the type 'AB' hydrologic soil group. Catchment coefficients i.e. CN and Rational 'C' are based on the weighted mean of land cover

over the determined soil group. Supporting catchment property calculations are provided in **Appendix C**.

Table 2 – Pre-Development Catchment Properties

Catchment	Area (ha)	Curve Number	Rational Coefficient	Impervious (%)	Flow Length	Average Slope (%)
101	0.53	91	0.83	86	91	3.2
102	4.66	60	0.26	18	100	1.4
103	9.06	76	0.57	56	100	2.1
104	17.62	74	0.52	50	100	2.0
105	10.73	75	0.53	50	100	2.0
106	4.74	75	0.55	50	100	4.8
107	2.91	75	0.53	50	100	2.7
108	30.20	68	0.44	41	100	1.5
109	4.84	70	0.47	45	100	2.2
110	13.90	48	0.09	0	100	4.0
111	17.44	49	0.09	0	100	1.2

The post development drainage conditions are derived from the proposed servicing and grading plans accompanying this Report. In order to meet the required quality and quantity control targets outlined in Section 5.1 of this Report, a wetland stormwater management facility will be employed. In the post-development condition, the Site will drain in a south-easterly direction towards William Street, prior to ultimately draining to the Wye River. The post development condition has been broken down into twenty (20) catchments. Refer to drawing SWM-2, **Appendix D**.

Catchment areas 201 to 207 represent existing development that drains to the proposed Pratt Residential Subdivision. These catchments remain unchanged from the pre development condition. Stormwater flows from these catchments will be directed through the proposed Residential Subdivision and will be directed to the proposed stormwater management facility located in the Pratt Employment Lands Subdivision.

Catchment 208 represents existing development fronting King Street and the Highway 12 corridor. In the post development condition, drainage from this catchment is directed to Brandon Street which conveys flows to the proposed stormwater management facility located within the Employment Lands Subdivision.

The Brandon Street right-of-way is represented by catchments 209 and 213. All flows from Brandon Street will be directed to the proposed Employment Lands stormwater management facility.

Catchments 210 and 211 represent existing development south of the Employment Subdivision. Flows from these catchments will be directed through the Employment Land Subdivision and will be treated by the proposed stormwater management facility.

Catchment 212 represents existing industrial development fronting Highway 12. Due to grading constraints, the drainage from this catchment is unable to drain to the proposed stormwater management facility. Run-off from this catchment will remain uncontrolled and will drain via a series of swales to the outfall at William Street.

Catchments 214 to 217 represent the Pratt Residential Subdivisions internal catchments in the post development condition. All flows from these catchments are directed to the proposed stormwater management facility located in the Employment Lands Subdivision.

Catchments 218 and 219 represent the Pratt Employment Lands internal catchments in the post development condition. Catchment 218 primarily encompasses the proposed stormwater management facility, while catchment 219 mainly includes the developable area associated with the Employment Lands Subdivision. All runoff from Catchment 218 and 219 are directed to the proposed stormwater management facility for quantity control and quality treatment.

Catchment 220 represents the east portion of the Employment Lands Subdivision and the outfall channel of the proposed stormwater management facility. Due to Grading constraints, this catchment is unable to drain to the proposed stormwater management facility. These uncontrolled flows have been accounted for in the post development peak flow modelling. In order to meet quality control requirements, an OGS unit is proposed to treat stormwater run-off. The OGS unit has been sized to provide the enhanced level of protection, removing 80% TSS. The OGS unit will be located where the Employment Lands internal roadway meets William Street and will discharge to the William Street Ditch.

The post development properties of catchments 201 to 220 are summarized in **Table 3**. Catchment coefficients i.e. CN and Rational 'C' are based on the weighted mean of land cover over the determined soil group. Supporting catchment property calculations are provided in **Appendix C**.

Table 3 – Post Development Catchment Properties

Catchment	Area (ha)	Curve Number	Rational Coefficient	Impervious (%)	Flow Length	Average Slope (%)
201	0.53	91	0.83	86	91	3.2
202	4.66	60	0.26	18	100	1.4
203	9.06	76	0.57	56	100	2.1
204	17.62	74	0.52	50	100	2.0
205	10.73	75	0.53	50	100	2.0
206	4.74	75	0.55	50	100	4.8
207	2.91	75	0.53	50	100	2.7
208	29.41	68	0.44	41	100	1.5
209	0.46	79	0.61	61	10	2.0
210	1.06	48	0.11	3	45	2.2
211	1.99	90	0.81	84	100	2.2
212	1.76	60	0.31	26	30	2.2
213	0.33	74	0.53	50	22	2.0
214	1.13	76	0.56	54	45	2.0
215	0.72	70	0.44	40	28	3.0
216	10.29	77	0.58	56	100	2.0
217	1.76	71	0.45	42	100	2.0
218	4.06	53	0.13	6	40	5.0
219	8.64	87	0.74	76	100	2.0
220	4.74	77	0.57	55	100	2.0

Modeling of pre and post development catchments was undertaken using PCSWMM software. The 4-hour Chicago Storm Distribution and 24-hour SCS Type II Distribution were used to generate design storms based on the Orillia rain gauge in accordance with Town Standards. Event modeling design storms included the 25mm and 2 to 100-year 4-hour Chicago Storms, 2 to 100-year 24-hour SCS storms as well as the Regional (Timmins) storm. Detailed PCSWMM Outputs are provided in **Appendix C**. **Table 4** summarizes the determined pre and post development peak flow drainage patterns.

4.3. Stormwater Quality Control

In terms of the quality control requirements for stormwater run-off, the "Enhanced" level of protection as stipulated by the Ministry of Environment is to be provided. i.e. 80% removal of Total Suspended Solids (TSS). Furthermore, erosion control is required to ensure that the 25mm post-development peak flow is released over a 24-hour period. These requirements are achieved through the proposed communal stormwater management facility located in the Pratt Employment Lands Subdivision.

As previously noted, the SWM facility is a wetland type facility. The stormwater management facility provides quality control for all catchments draining to the facility in the proposed (developed) condition. This includes catchments 201 to 211 and 213 to 219. The total drainage area to the proposed facility is 110.10Ha, with a corresponding imperviousness of approximately 47.9%.

The bottom of wetland facility is 206.85m and includes a 0.3m deep permanent pool at elevation (207.15). Forebays are provided at each of the proposed pond inlets and are 1.5m deep. The bottom of the forebays correspond to an elevation of 205.65. The forebays have been designed to meet minimum dispersion and settling lengths in accordance with Equations 4.5 and 4.6 of the Ministry of Environment Stormwater Management Planning and Design Manual. The wetland facility also includes a 1.0m deep plunge pool (bottom elevation 206.15) at the outlet to further aid in quality treatment and prevent clogging of the outlet structure. The wetland facility has internal pond side slopes of 5:1 for 3m on either side of the permanent pool, and 4:1 side slopes above and below the 5:1 safety shelf. The top of pond corresponds to an elevation of 209.40m and includes a 5m wide maintenance access road surrounding the facility. External to the facility 3:1 side slopes are employed to match into existing and proposed grading surrounding the facility. Based on a top of pond elevation, the active storage depth is 2.25m and corresponds to a total volume of 43,711m^3.

The wetland facility incorporates a permanent pool volume of 6,227m^3. This volume exceeds the MECP required volume of 6,183m^3 to classify the facility as providing the "enhanced level of protection" (80% TSS removal). In addition, the facility has been designed to provide a 26.1 hour extended detention of the 25mm 4-hour Chicago Event, surpassing the MOE minimum requirement of 24 hours. This ensures downstream erosion is mitigated and further enhances the removal of TSS. The facilities drawdown characteristics are derived from Equation 4.1 of the Ministry of Environment Stormwater Management Planning and Design Manual. Refer to **Appendix C** for supporting calculations.

Catchment 220 drains uncontrolled towards the proposed right-of-way where it is collected by the underground storm sewers. These sewers will discharge to two OGS units (EFO10's) proposed in series before being released to existing conveyance channels along Williams Street. The two OGS units will provide 82.3% removal efficiency of TSS in series, achieving the 80% Enhanced level of protection.

4.4. Stormwater Quantity Control

The proposed SWM facility will provide the necessary stormwater quantity control for the development. The facility has been designed to attenuate post development run-off for storm events up to and including the 100-year event. The facility captures run-off from catchments 201 to 211 and 213 to 219, ensuring post development flows to William Street are controlled to corresponding pre-development peak flows.

The wetland facilities outlet structure is comprised of a 270mm primary orifice and trapezoidal weir. The primary orifice is located in the Control MH and is set at the permanent pool elevation of 207.15m. The Control MH is connected to the Plunge Pool of the stormwater management facility and the outfall channel by 450mm diameter storm sewers. The trapezoidal weir is set at an elevation of 207.65 and matches the required extended detention volume elevation. The trapezoidal weir is located within the SWM facility access road and outlets to the outfall channel. The trapezoidal weir is 10m wide and has 5:1 side slopes. The weir will be lined with concrete to mitigate erosion and ensure the elevation of the weir is precisely set. The weir also acts as an emergency overflow weir and has been sized to allow the uncontrolled regulatory peak flow to be conveyed through the facility while maintaining a minimum 0.3m freeboard.

Refer to **Appendix C** for supporting stage-storage-discharge calculations of the proposed SWM facility. Refer to **Drawings PND-1 to PND-4** for SWM facility drawings and details.

Modelling of the SWM facility was completed using PCSWMM modelling software. The determined pre and post development flows, as well as the event storage conditions in the facility are outlined in **Table 4**. Supporting PCSWMM outputs for the wetland facility are included in **Appendix C** for reference.

Table 4 – Pre-Development & Post-Dev Summary

Storm Peak Event Flow (m^3/s)							
Storm Distribution	**Area (ha)**	**Return Period (years)**					
		2	**5**	**10**	**25**	**50**	**100**
Pre-Development Condition (OF1)							
CHI 4-Hr Storm Distribution	116.60	8.339	11.070	13.140	16.210	18.600	21.370
SCS 24-Hr Storm Distribution	116.60	6.642	12.140	17.230	22.410	26.120	29.790
25mm 4-Hr Storm Distribution	116.60	6.005					
Timmins Storm	116.60	(Safe Conveyance)					
Post Development Condition (OF1)							
CHI 4-Hr Storm Distribution	116.60	0.624	2.884	5.007	8.091	10.690	13.070
SCS 24-Hr Storm Distribution	116.60	3.149	8.532	12.230	16.480	19.440	22.220
25mm 4-Hr Storm Distribution	116.60	0.185					
Timmins Storm	116.60	10.530					

Table 5 – Stormwater Management Facility Operations

Maximum Storage Elevation (m) - SWMF						
Storm Distribution	**Return Period (years)**					
	2	**5**	**10**	**25**	**50**	**100**
CHI 4-Hr Storm Distribution	207.74	207.90	208.01	208.13	208.22	208.30
SCS 24-Hr Storm Distribution	207.92	208.14	208.27	208.41	208.51	208.61
25mm 4-Hr Storm Distribution	207.58					
Timmins Storm	208.21					

4.5. Minor and Major Stormwater Conveyance

In terms of minor event conveyance (i.e. storm events less than or equal to the 5-year event) run-off will discharge to the SWM facility via the proposed storm sewer network. Refer to drawings STM-1, and STM-2, **Appendix D**. Supporting preliminary storm sewer sizing calculations are provided in **Appendix C**. During major storm events (storm events greater than the 5-year event) or in the event of a blockage to the storm sewer network, site grading has been completed to safely direct flows to the proposed SWM facility without causing flooding to the proposed buildings or adjacent

properties. The post development overland flow routes are shown on Drawing SWM-2, **Appendix D**.

Due to grading constraints, a number of open channels and ditches will be required to convey drainage to the proposed stormwater management facility and the outlet at William Street. Channel calculations and hydraulic grade line calculations have been completed to ensure blocks, easements, etc. are appropriately sized. Refer to **Appendix C** for supporting calculations.

4.6. Water Balance

A hydrogeological assessment was completed for the subject property by Azimuth Environmental Consulting dated November 28, 2022. The assessment included a detailed pre to post development water balance analysis for the Site. The assessment was completed using the Thornthwaite and Mather method (1957), evaluating evapotranspiration based on precipitation and temperature. Infiltration factors for the site were estimated based on Table 2 of the Ministry of Environment and Energy (MOEE) Hydrogeological Technical Information Requirements for Land Development Applications (1995). The complete hydrogeological assessment by Azimuth Environmental Consulting can be found under separate cover.

In the pre development condition, based on the site consisting of forest, shrub/meadow, and some impervious land uses, the average annual infiltration volume was determined to be 67,346m^3. In the post development condition the average annual infiltration volume was determined to be 28,536m^3 without the use of water-balance mitigation measures. This ultimately produces a deficit of 38,810 m^3/year between the pre and post development condition.

It was assumed in the assessment that 75% of rooftop drainage would be directed to pervious surfaces, this will allow for an additional 8,268 m^3/year to be infiltrated and subsequently lower the pre to post development deficit.

In order to achieve the required water balance for the site, a Green Storm ST modular underground storage infiltration gallery is located at the south limit of the stormwater management wetland facility. This infiltration gallery will be employed to promote infiltration in the post-development condition. The infiltration gallery is 8m wide, 0.6m high and 100m long. The total storage of the system is 460m^3 which accounts for the void space associated with this modular storage system.

Based on the hydrogeological assessment completed by Azimuth Environmental Consulting, it was determined that through the implementation of the infiltration system noted in this Report, the annual post-development infiltration volume with mitigation is 67,380 m^3, representing 100% of

the pre development infiltration volume, in turn achieving the required water balance and promoting groundwater recharge in this area of the watershed.

5. Erosion and Sediment Control

During construction, the majority of the development's natural features will be removed and the topsoil stripped within the development area. The exposed surface will be susceptible to erosion, increasing the potential for sediment runoff. To minimize local and downstream impacts from erosion and sedimentation during construction, the following measures have been recommended:

- Excess earth and topsoil is to be stockpiled away from environmentally sensitive areas and/or removed from Site. Stockpiles shall be seeded or covered with erosion control if left for periods of greater than 30 days.
- Temporary sediment control fencing should be erected around the perimeter of all grading activities;
- Temporary sediment traps should be installed on catch basins until surface cover has been stabilized;
- Temporary rock flow check dams should be installed within drainage cut-off swales;
- A temporary construction access mud mat should be installed at the construction accesses to reduce the amount of materials that may be transported off site;
- Temporary sediment and erosion control ponds should be installed to attenuate and treat sediment laden runoff during earthworks operations.
- Construction during drier months should be monitored for wind-borne transport of sediments. At the direction of the engineer, the contractor may be directed to water down exposed earth areas with an aqueous solution of calcium chloride or suitable alternative;
- All disturbed areas not under immediate construction for 30 days, or not intended for building activities within a 3-month time period, should be stabilized with hydro-seeding.

A detailed Erosion and Sediment Control Plan (ESC Plan) will be prepared and submitted at the detailed design stage to identify the location and details of the temporary devices.

6. Secondary Utilities

All secondary utility services will be co-coordinated and a Composite Utility Plan provided to indicate all underground locations once feedback from each utility company is provided. Electrical, Telephone/Cable are all available within the adjacent Right of Ways. At this time we do not foresee any limitations in servicing the development with secondary utilities; however, formal confirmation from each service provider is still required.

7. Conclusion

The Pratt Employment Subdivision development has been fully examined for serviceability in this Report. The development lands can be appropriately serviced via the municipal sanitary, water and storm infrastructure. Through proper execution of the preliminary site servicing described herein and on the accompanying drawings, it is evident that the proposed development can become a functional part of the Town of Midland.

This Preliminary Servicing & Stormwater Management Report is respectfully submitted,

THE JONES CONSULTING GROUP LTD.

Appendix A

Background Information

TOWN OF MIDLAND

OFFICIAL PLAN ROAD CLASSIFICATION MAP
SCHEDULE 'C'

TOWN OF PENETANGUISHENE

FULLER AVE

MIDLAND POINT RD

EVERTON RD

SUNNYSIDE DR

HARBOURVIEW DR

GOLF LINK RD

WILSON ROAD

COUNTY ROAD 93

VINDIN ST

GEORGIAN BAY

VICTORIA ST

PENETANGUISHENE RD

WOODLAND DR

EIGHTH ST

BAYSHORE DR

BAY ST

HUGEL AVE

FOURTH ST

FIRST ST

KING ST

MIDLAND AVE

HUGEL AVE

TOWNSHIP OF TINY

YONGE ST

COUNTY ROAD 25

ROBERT ST

WILLIAM ST

LITTLE LAKE

KING ST

MANLY ST

ABERDEEN BLVD

GALLOWAY BV

PILLSBURY DR

COUNTY ROAD 93

MARSHALL ROAD

ANGELA SCHMID FOSTER RD

HIGHWAY 12

HIGHWAY 12

Wye River

TOWNSHIP OF TAY

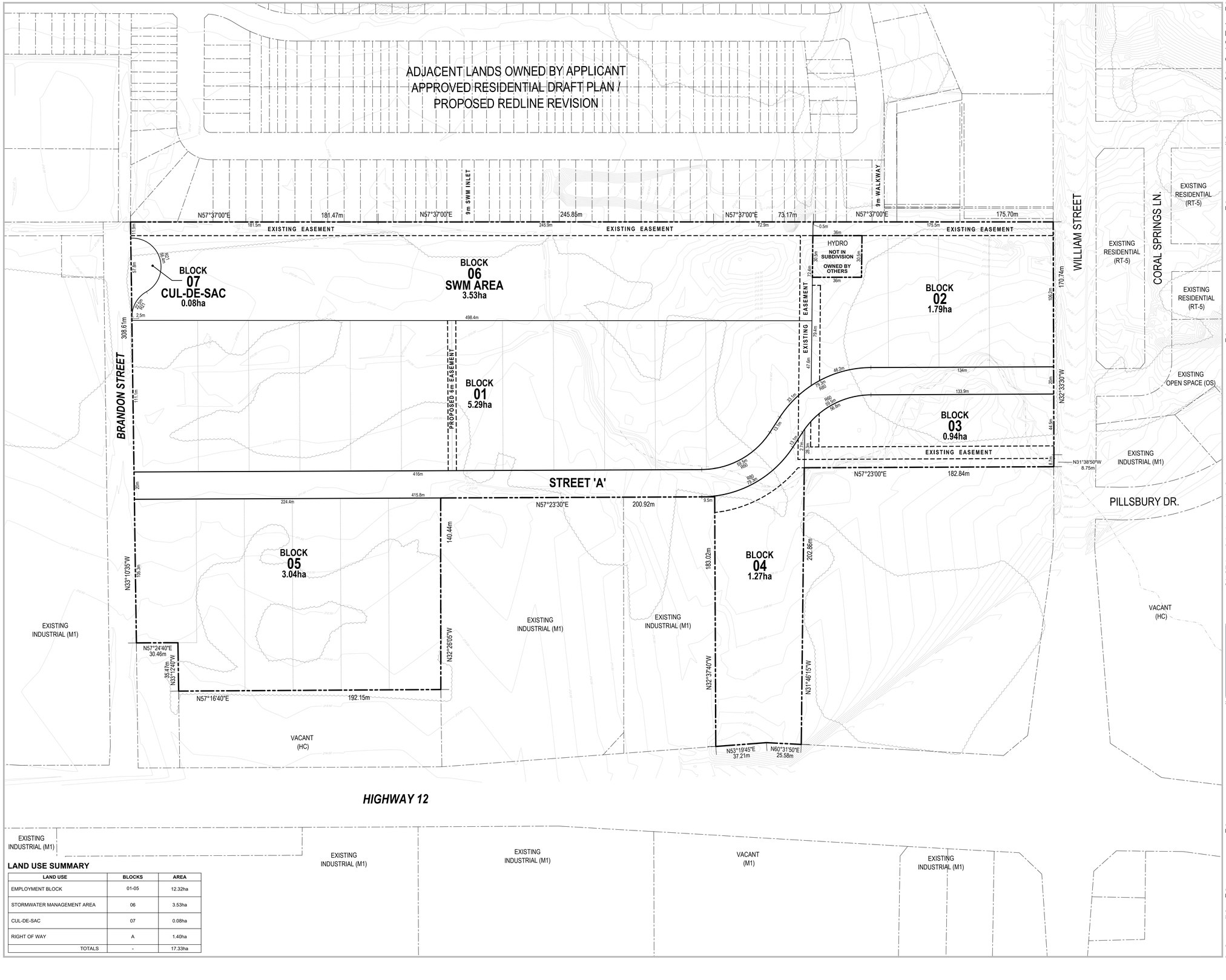
THIS IS SCHEDULE 'C' TO
OFFICIAL PLAN AMENDMENT
No. 1 TO THE OFFICIAL PLAN
OF THE TOWN OF MIDLAND

Schedule 'C'
ROAD
CLASSIFICATION
MAP
OFFICIAL PLAN

Legend

- Arterial Road
- Collector Road
- Future Collector Road

DRAWN BY: TOWN OF MIDLAND PLANNING DEPARTMENT
DATE: FEBRUARY 2004
OFFICE CONSOLIDATION: MAY 2007



LAND USE SUMMARY

LAND USE	BLOCKS	AREA
EMPLOYMENT BLOCK	01-05	12.32ha
STORMWATER MANAGEMENT AREA	06	3.53ha
CUL-DE-SAC	07	0.08ha
RIGHT OF WAY	A	1.40ha
TOTALS	-	17.33ha

LEGAL DESCRIPTION

16533 HIGHWAY 12
PART OF LOT 101, CONCESSION 2
GEOGRAPHIC TOWNSHIP OF TAY
TOWN OF MIDLAND
COUNTY OF SIMCOE

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.

DATE: _____

PRATT DEVELOPMENT INC.
DON PRATT, PRESIDENT

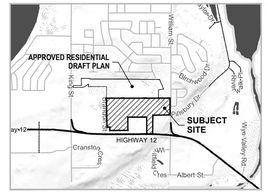
SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE: _____

RUDY MAL - O.L.S.
RUDY MAK SURVEYING LTD.

KEY PLAN



LEGEND

- SITE BOUNDARY
- BLOCK & RIGHT OF WAY LINE
- EASEMENT LINE
- PARCEL FABRIC LINE
- CONCEPTUAL POTENTIAL FUTURE DEVELOPMENT BLOCK LINE
- WATERCOURSE
- WOODED AREA

REVISION No.	DATE	ISSUED / REVISION	BY
01	NOV. 23, 2022	RELOCATE STORMWATER MANAGEMENT AREA, RELOCATE CUL-DE-SAC, REVISE ROW, ADJUST BLOCKS, ADD EASEMENT	MAM

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT R.S.O. 1990 C.P.13 AS AMENDED

A. AS SHOWN
B. AS SHOWN
C. AS SHOWN
D. INDUSTRIAL/COMMERCIAL
E. AS SHOWN
F. AS SHOWN
G. AS SHOWN
H. MUNICIPAL
I. SILTY SAND/SILT AND CLAY/SILTY CLAY
J. AS SHOWN
K. MUNICIPAL
L. AS SHOWN

113 COLLIER STREET
BARRIE, ON, L4M 1H2
P: 705 728 0045 F: 705 728 2010
WWW.MHBCPLAN.COM

PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE
MHBC PLANNING

STAMP

DATE	AUG. 19, 2022
FILE No.	12162G
SCALE	1:1,250 (ARCH D)
DRAWN BY	M.M.
CHECKED BY	K.C.
OTHER	

PROJECT

PRATT EMPLOYMENT SUBDIVISION
PRATT DEVELOPMENTS INC.
27 CLAPPERTON ST. SUITE 300
BARRIE ON L4M 3E6
705-722-4500

NORTH

FILE NAME DRAFT PLAN OF SUBDIVISION

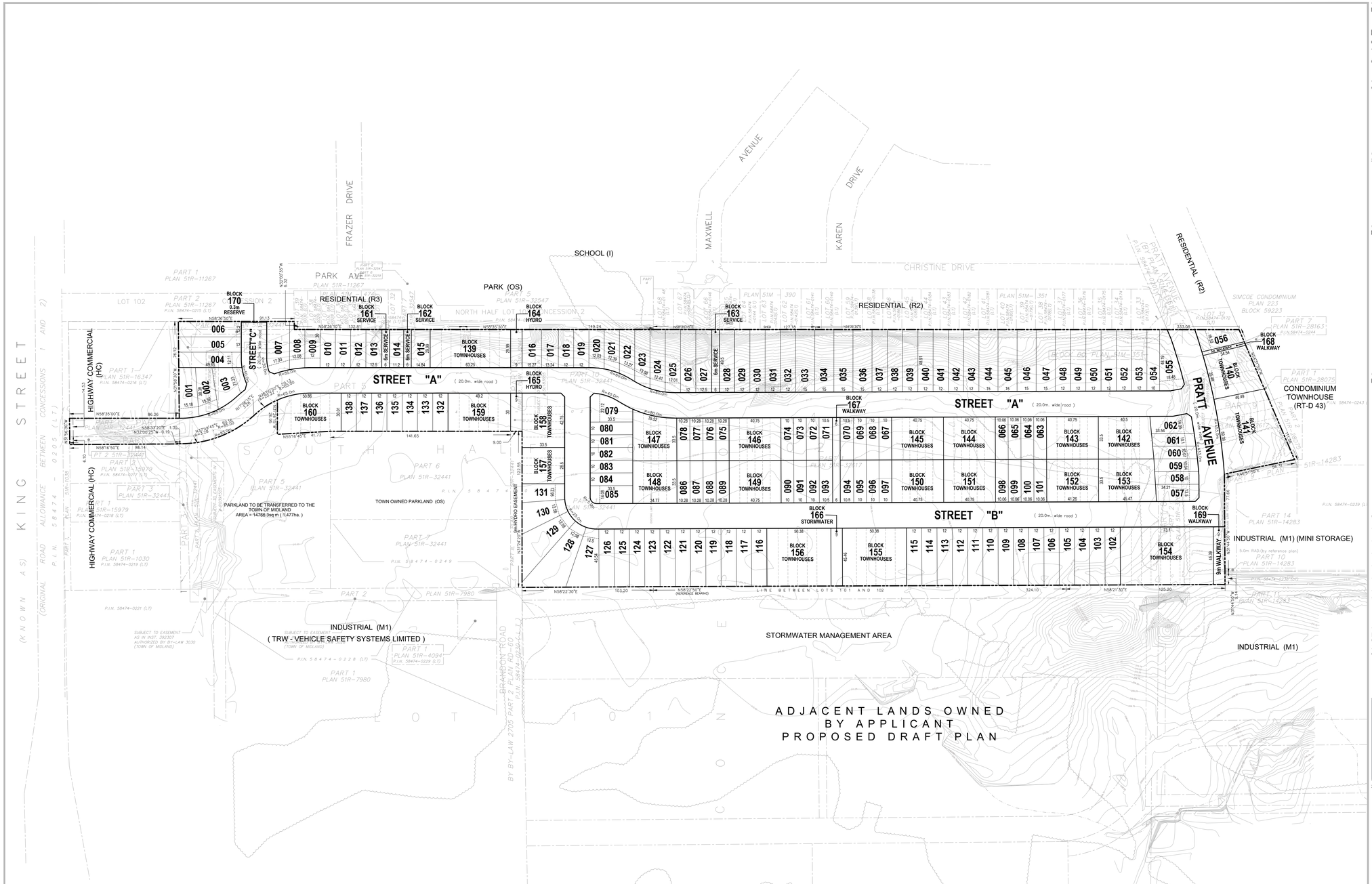
DWG No. 1 of 1

SCALE BAR

0 6 12 18 24 30 45 60 90 120m

MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

N:\Brian\12162G\Drawings\Draft Plan\CAD\12162G – Draft Plan – 2020-10-08.dwg



LAND USE SUMMARY

LAND USE	LOT / BLOCK #	UNITS	AREA
SINGLE DETACHED - 10m LOTS	014, 054, 055, 057-101	48	1.738ha
SINGLE DETACHED - 12m LOTS	001-013, 015, 017-032, 037-043, 048-053, 056, 102-138	81	4.335ha
SINGLE DETACHED - 15m LOTS	016, 033-036, 044-047	9	0.633ha
TOWNHOUSE - 6m UNITS	142-153, 157, 158	80	1.860ha
TOWNHOUSE - 7.6m UNITS	139-141,154-156, 159, 160	49	1.695ha
SERVICE	161-163		0.066ha
HYDRO	164, 165		0.054ha
STORMWATER	166		0.041ha
WALKWAY	167-169		0.091ha
ROADS	PRATT AVE, STREETS A, B, & C		3.359ha
0.3m RESERVES	170		0.002ha
TOTALS		267	13.874ha

LEGAL DESCRIPTION

PART OF LOT 102, CONCESSION 2,
GEOGRAPHIC TOWNSHIP OF TAY
TOWN OF MIDLAND
COUNTY OF SIMCOE

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.

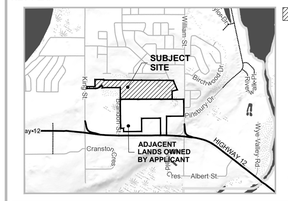
DATE: _____ _____

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE: _____ _____

KEY PLAN



LEGEND

- SITE BOUNDARY
- RIGHT OF WAY LINE
- BLOCK LINE
- PARCEL FABRIC LINE
- WATERCOURSE
- WOODED AREA

REV. No.	DATE	ISSUED / REVISION	BY
01	NOV. 23, 2022	ADD PART 11 OF PLAN 51R-32441 TO PROPERTY, REVISE RESIDENTIAL LOT MIX, REVISE ROAD LAYOUT, ADD EXTRA SERVICING BLOCKS, ADD EXTRA WALKWAY BLOCKS, ADD STORMWATER BLOCK	M.M.

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT R.S.O. 1990 C.P.13 AS AMENDED

- **A.** AS SHOWN
- **B.** AS SHOWN
- **C.** AS SHOWN
- **D.** RESIDENTIAL
- **E.** AS SHOWN
- **F.** AS SHOWN
- **G.** AS SHOWN
- **H.** MUNICIPAL WATER SUPPLY (PIPED)
- **I.** SANDY/SANDY LOAM
- **J.** AS SHOWN
- **K.** ALL SERVICES AS REQUIRED
- **L.** AS SHOWN

113 COLLIER STREET
BARRIE, ON, L4M 1H2
P: 705 728 0045 F: 705 728 2010
WWW.MHBCPLAN.COM
PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE
MHBC PLANNING

STAMP

DATE SEPT. 26, 2022

FILE No. 12162F

SCALE 1:1,500 (ARCH D)

DRAWN BY M.M.

CHECKED BY K.C.

OTHER

PROJECT

PRATT RESIDENTIAL SUBDIVISION

PRATT DEVELOPMENTS INC.
27 CLAPPERTON ST. SUITE 300
BARRIE ON L4M 3E6
705-722-4500

FILE NAME DRAFT PLAN OF SUBDIVISION

DWG No. 1 of 1

SCALE BAR

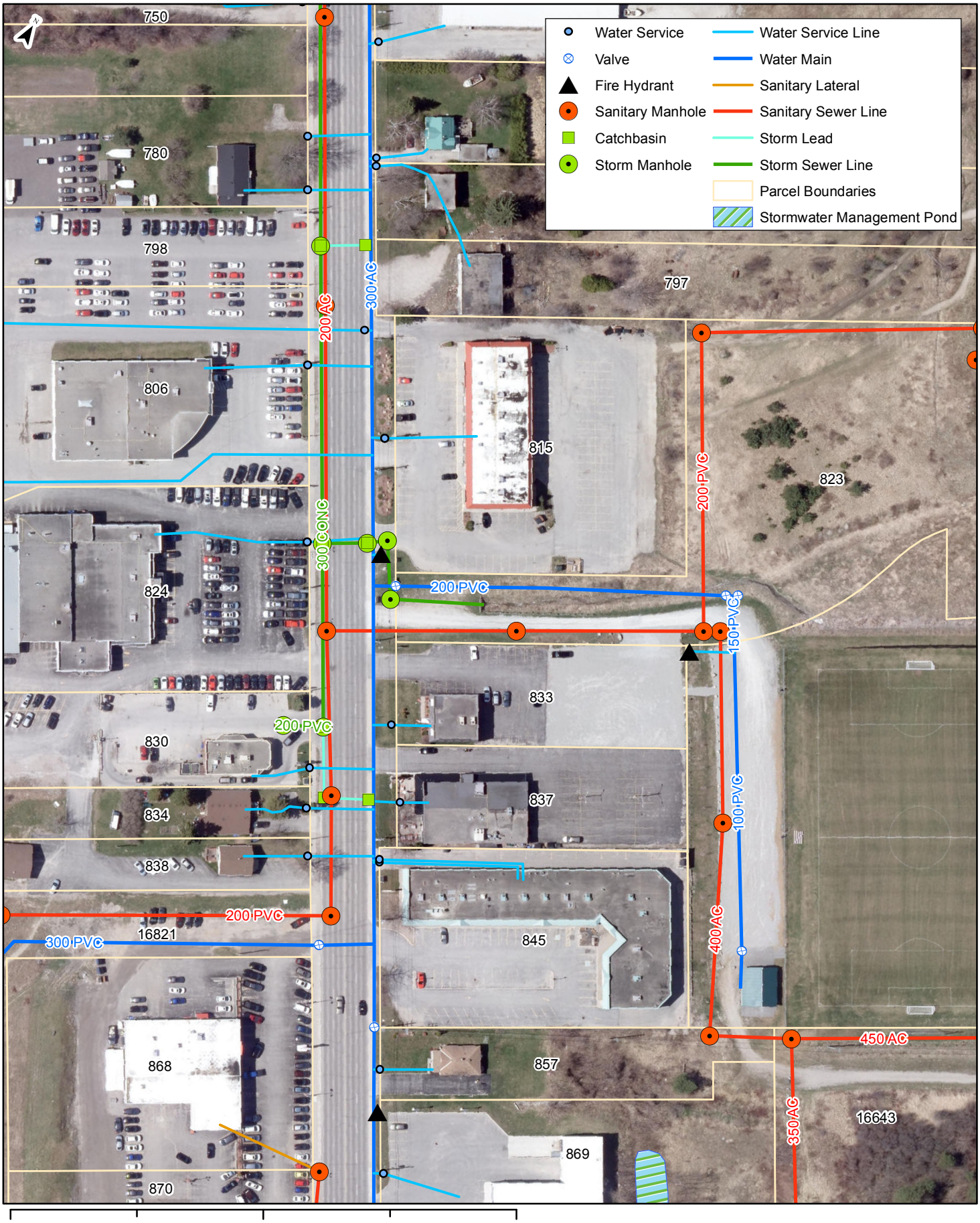
0 5 10 15 20 25 37.5 50 75 100m

MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

N:\Brian\12162F Pratt – Residential Draft Plan of Subdivision\Drawings\Draft Plan – Redline\CAD\12162F – Residential – Draft Plan – 2022-11-23.dwg

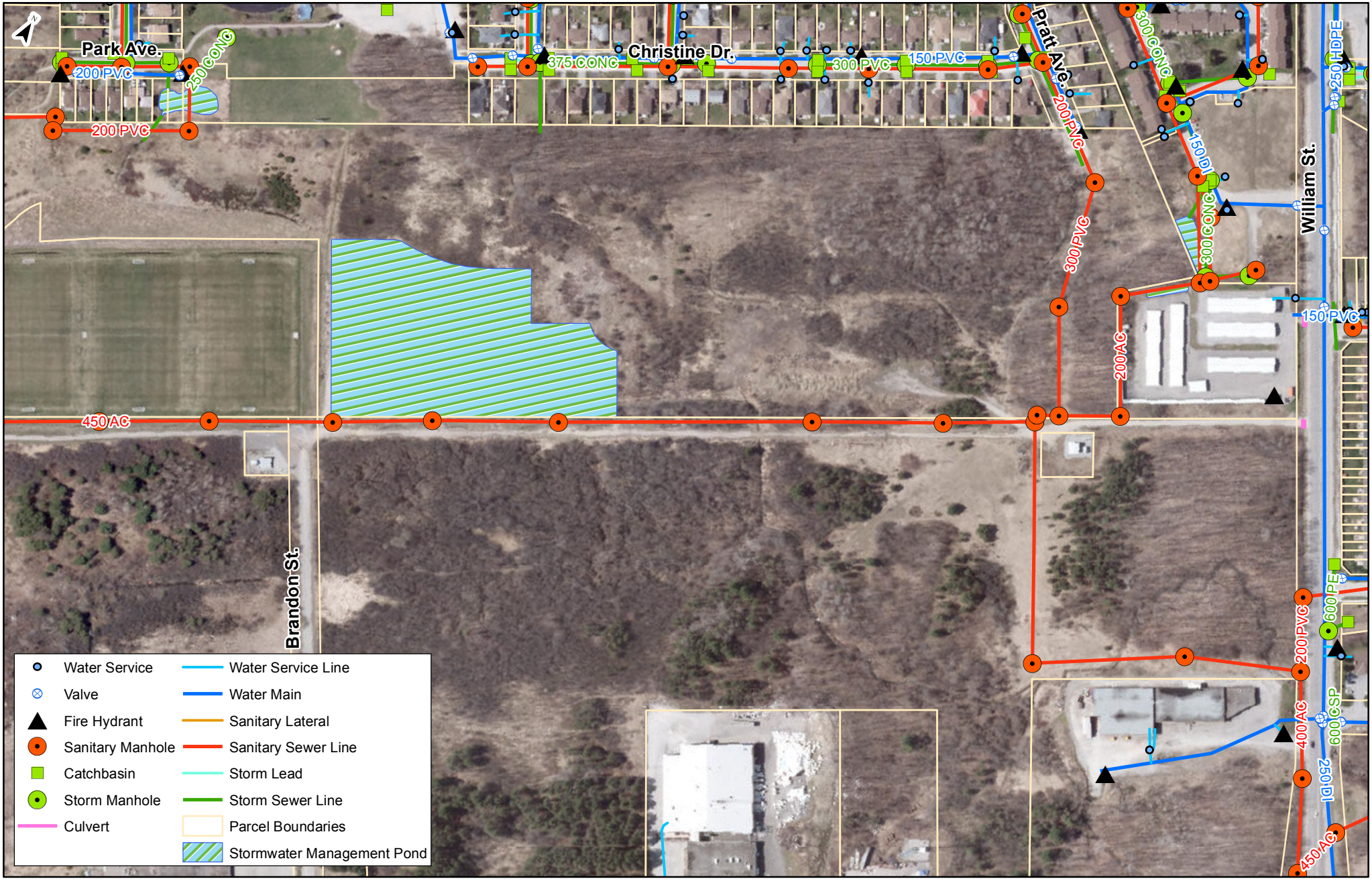
833 King Street Underground Services

This is not a plan of survey. Data shown may not be complete or fully up to date. Also, locations shown may not be exact.The Town of Midland did not perform locates on private property. It is your responsibility to get the appropriate permissions, contact Ontario One Call and confirm locations in the field before taking action.



Pratt Lands Area Underground Services

This is not a plan of survey. Data shown may not be complete or fully up to date. Also, locations shown may not be exact.The Town of Midland did not perform locates on private property. It is your responsibility to get the appropriate permissions, contact Ontario One Call and confirm locations in the field before taking action.




Town of Midland
Sewer Overflow Locations
B
WWTC
Midland Bay
Bayshore Dr.
Gloucester St.
George St.
Bay St.
William St.
Russell St.
Hugel Ave.
A
Queen St.
Dominion Ave.
Elizabeth St.

Ministry of the Environment
Ontario

Ministère de l'Environnement

Certificate of Approval (Sewage)
Certificat d'autorisation (eaux usées)

Number / *Numéro* 3-0384-91-006

File St Theresa

Whereas / ***Attendu que*** THE SIMCOE COUNTY ROMAN CATHOLIC SEPARATE SCHOOL BOARD
of / *d* BARRIE, ONTARIO

has applied in accordance with Section 24 of the Ontario Water Resources Act for approval of:
a fait, conformément à l'article 24 de la loi sur les ressources en eau de l'Ontario, une demande d'autorisation:

Construction of a stormwater pond for servicing St. Theresa High School (Lot 102 Concession 2) in the Town of Midland.

The stormwater detention pond will reduce post-development flows from a drainage area of 12.3 hectares to pre-development levels for the 1:100 year storm event. The pond (Parts 8 & 10 Registered Plan 51R20599) will be located approximately 200 metres south west of Christine Drive/ Galloway Boulevard and as shown on Drawing A103 Project 8925 dated March 12, 1991. The pond will consist of a 1346 cubic metre sloped and grassed detention basin with a maximum depth of 1.3 metre as well as overflow storage of 324 cubic metres on the adjacent eastern sports field with a maximum depth of 20 centimetre and dual outlet controls (400mm low level pipe and an overflow weir) limiting runoff to the Wye River as follows:

STORM EVENT	ELEVATION in metres	PEAK INFLOW m^3/s	PEAK OUTFLOW m^3/s
5 year	212.93	0.71	0.29
10 year	213.10	0.83	0.33
100 year	213.52	1.22	0.42

all in accordance with the Stormwater Management Study dated January 1991 as prepared by UMA Engineering Ltd., Consulting Engineers, at a total estimated cost, including engineering and contingencies, of EIGHTY ONE THOUSAND DOLLARS ONLY ($81,000.00);

subject to the following special terms and conditions considered necessary by the undersigned;

.....2

Now therefore this is to certify that after due enquiry the said proposed works have been approved under Section 24 of the Ontario Water Resources Act.
Le présent document *certifie qu'après vérification en bonne et due forme la construction dudit projet d'ouvrages a été approuvée aux termes de l'article 24 de la loi sur les ressources en eau de l'Ontario.*

DATED AT TORONTO this 24th day of May 1991
DATÉ À TORONTO ce *jour d*

Attn:The Simcoe County Roman Catholic Separate School Board
cc:Mr. F.G. Flood, Clerk, Town of Midland
Mr. H.G. Fraser, UMA Engineering Ltd.
Mr. R. Kaartinen, Russocki Zawadski
Mr. J. Merritt, MOE Central Reg. Dir.
Mr. I. Gray, MOE Barrie

W. Gregson, P. Eng.
Director / *Directeur*

EG/gm

SPECIAL TERMS AND CONDITIONS

1. For the purpose of this Certificate of Approval:

   (a) "Director" means any employee within the Approvals and Engineering Division of the Ministry duly appointed by the Minister of the Environment pursuant to section 4 of the Ontario Water Resources Act as a Director for the purposes of Sections 6, 23, 24, 25, 26 and 27 of said Act;

   (b) "Owner" means THE SIMCOE COUNTY ROMAN CATHOLIC SEPARATE SCHOOL BOARD and includes its successors and assignees;

2. i) The Owner shall notify the Director of any of the following changes within thirty (30) days of the change occurring:

   (a) change of Owner;

   (b) change of address or address of new Owner;

   (c) change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Partnerships Regulation Act shall be included in the notification to the Director;

   (d) change of name of the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (Form 1, 2 or 3 of Ontario Regulation 189, R.R.O. 1980, as amended from time to time), filed under the Corporations Information Act shall be included in the notification to the Director;

   (e) change in directors or officers or the corporation where the Owner is or at any time becomes a corporation, and a copy of the most current "Initial Notice of Change" as referred to in clause (d).

   ii) In the event of any change in ownership of the works, the Owner shall notify in writing the succeeding Owner of the existence of this Certificate, and a copy of such notice shall be forwarded to the Director.

   iii) The Owner shall ensure that all communications made pursuant to this condition will refer to OWRA Certificate of Approval 3-0384-91-006.

3. The Owner shall ensure that the 400mm outlet at the pond is kept clean and functional.

Ministry of the Environment
Ontario

Ministère de l'Environnement

Notice Avis

Simcoe County Roman Catholic Separate School
46 Alliance Blvd.
Barrie, Ontario
L4M 5K3

You are hereby notified that final Certificate of Approval No. 3-0384-91-006 has been issued to you subject to the conditions outlined therein.

The reasons for the imposition of these conditions are as follows:

1. Condition No. 1 is included to define terms used in this Certificate of Approval.

2. Condition No. 2 is included to ensure that the Ministry's records are kept accurate and current with respect to approved works and to ensure that subsequent Owners of the works are made aware of this Certificate and the conditions to operate the works in compliance with this Certificate.

3. Condition No. 3 is included to ensure that the stormwater system operates in accordance with the designed use.

You may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 63 of the Ontario Water Resources Act, R.S.O. 1980, C. 361, as amended, provides that the Notice requiring the hearing shall state the portions of each term or condition in the approval in respect of which the hearing is required and the grounds on which you intend to rely at the hearing.

This Notice should be served upon:

The Secretary,
Environmental Appeal Board,
112 St. Clair Ave. West,
5th Floor,
Toronto, Ontario.
M4V 1N3

AND

The Director,
Section 24, OWR Act,
Ministry of the Environment,
250 Davisville Avenue,
Toronto, Ontario.
M4S 1H2

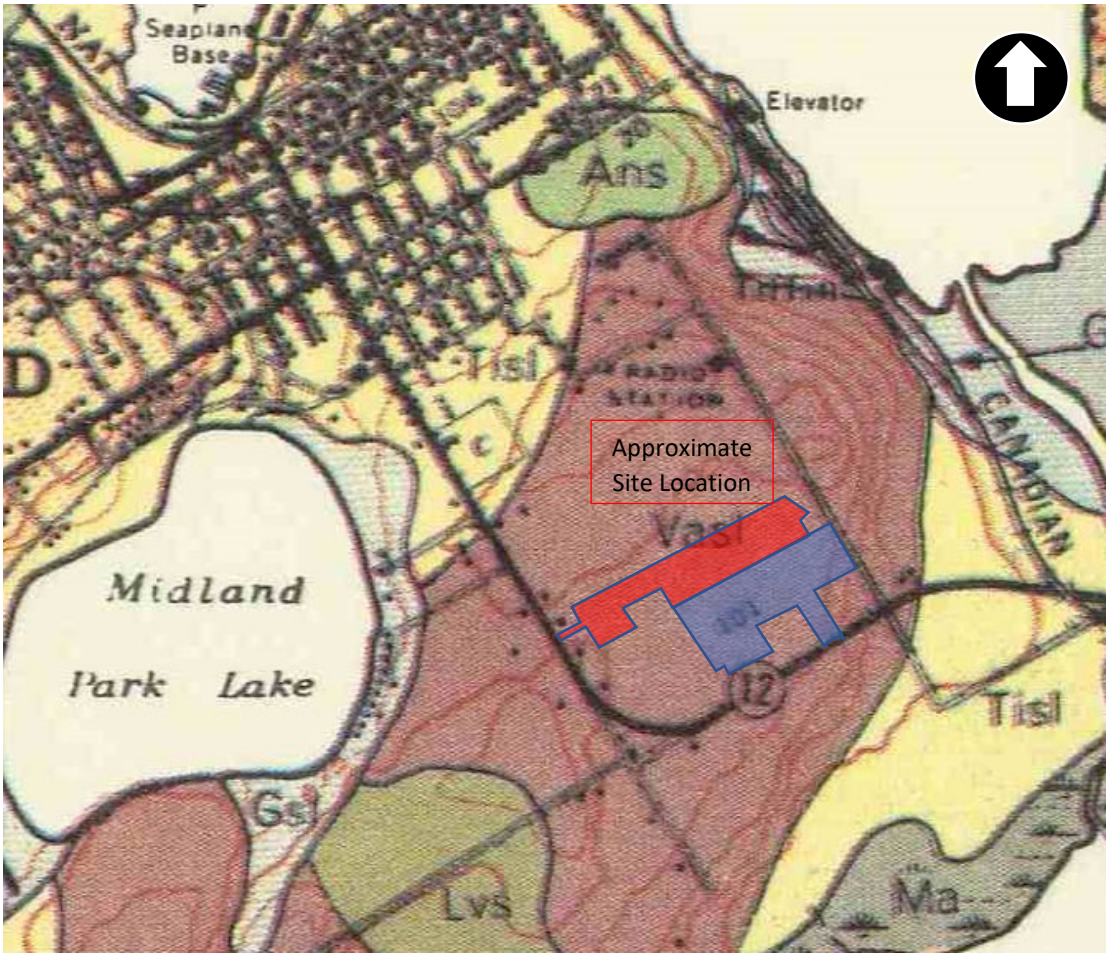
DATED at Toronto this 24th day of May, 1991.

W. Gregson, P. Eng.
Director,
Section 24, OWR Act,
Ministry of the Environment.

THIS IS A TRUE COPY OF THE ORIGINAL NOTICE MAILED
ON MAY 29 1991
SIGNED

1771 (11/89)

Soil Map of Simcoe County, Report No. 29 Excerpt



SERIES	OSPREY	VASEY
TYPE, SYMBOL, ACREAGE	loam Opl 1,300	sandy loam Vasl 71,700 sandy loam — steep phase Vasl-s 17,500 sandy loam — stony phase Vasl-b 13,400
COLOUR		
SOIL MATERIALS	Pale brown, calcareous, stony loam till.	Light grey, calcareous and non-calcareous, sandy loam till.
DRAINAGE	Good.	Good.
TOPOGRAPHY	Irregular, steeply sloping.	Smooth, moderately to steeply sloping.
SURFACE STONINESS	Very stony.	Moderately to very stony.
SURFACE REACTION	Neutral.	Slightly to medium acid.
GREAT SOIL GROUP	Brown Forest.	Brown Podzolic and Grey-Brown Podzolic.

Appendix B

Supporting Sanitary Design Calculations

SANITARY SEWER DESIGN

Development Details Basis

DESIGN SHEET
FILE NO PRA-16084
CONTRACT / PROJECT Pratt Galloway
Employment Subdivision

n ≥ 0.013
M = 1+[14/(4+P^0.5)] (Harmon peaking factor where; 2 ≤ M ≤ 4)
Q_p = P*q*M/86.4 (Peak population flow where; q = 45cu.m/day/ha; P = population in thousands)
Q_i = I*A (Peak extraneous flow: I= 0.23L/s/ha over development area)
$Q_{tot} = Q_p + Q_i$ (Total peak flow as the sum of peak population flow and peak extraneous flow)

Town of Midland section 6.1.4. Design flows
Single = 3 PPU Townhouse = 2.5 PPU
Average Daily Domestic Flow= 450 L/day capita

STREET	Area	MAINTENANCE HOLE FROM	MAINTENANCE HOLE TO	LOTS	Q (cu.m/day/ha)	AREA (ha)	AREA (ACC) (ha)	Q (cu.m/day)	EQUIVALENT POPULATION (P)	POP. (ACC)	M PEAKING FACTOR	Q_p (L/S)	Q_i (L/S)	Q_{tot} (L/S)	L (m)	D (mm)	S (%)	Q Full (L/S)	V Full (m/s)
Street A	1	MH 293	MH 294	7	45.00	3.52	3.52	158.40	352	352	4.00	7.33	0.81	8.14	110.0	200	1.0	32.80	1.04
Street A	2	MH 294	MH 295	5	45.00	2.32	5.84	104.40	232	584	3.94	11.98	0.53	12.51	110.0	200	0.50	23.19	0.74
Street A	3	MH 295	MH 296	3	45.00	1.31	7.15	58.95	131	715	3.89	14.48	0.30	14.78	110.0	200	0.50	23.19	0.74
Street A	4	MH 296	MH 297	2	45.00	0.88	8.03	39.60	88	803	3.86	16.14	0.20	16.34	67.7	200	0.50	23.19	0.74
Street A		MH 297	MH 298							803	3.86	16.14	0.20	16.34	30.1	200	0.50	23.19	0.74
Street A	5	MH 298	MH 299	2	45.00	2.03	10.06	91.35	203	1006	3.80	19.90	0.47	20.37	24.4	200	0.50	23.19	0.74
		MH 299	*EX. SAN 127*				10.06	91.35		1006	3.80	19.90		20.37	22.7	200	0.50	23.19	0.74
*External to North		*EX. MH 119*	*EX. MH 126*												82.3	450	0.50	201.60	1.27
		EX. MH 126	*EX. MH 127*				16.73			831	3.85	16.67	0.00	16.67	83.8	450	0.50	201.60	1.27
		EX. MH 127	*EX. MH 128*				26.79			1837	3.61	34.58	0.00	34.58	93.6	450	0.50	201.60	1.27
		EX. MH 128	EX. MH 129				26.79			1837	3.61	34.58	0.00	34.58	93.8	450	0.50	201.60	1.27
Street A	6	MH 251	MH 252	2	45.00	1.24	1.24	55.80	124	124	4.00	2.58	0.29	2.87	49.6	200	1.00	32.80	1.04
Street A	7	MH 252	*EX. MH 253*	3	45.00	2.05	3.29	92.25	205	329	4.00	6.85	0.47	7.33	110.0	200	0.70	27.44	0.87
**William Street External		EXT	*EX. MH 253*							220	4.00	4.583	0	4.58	54.8	200	2.00	46.38	1.48
William Street		*EX. MH 253*	*EX. MH 129*				3.29			549	3.95	11.30	0	11.30	51.2	200	3.30	59.58	1.90
William Street		EX. MH 129					30.08			2386	3.52	43.80	0	43.80	30.3	450	3.99	569.50	3.58

* External flow from the Employment Lands Residential Subdivision to the north, and unknown flows from the existing trunk sanitary sewer from the west
** External flow is based on estimated flow from unit count of 88 semi-detached town homes

DATE: 22-12-01 CALCULATED BY: KC CHECKED BY: JWI

Appendix C

Supporting Stormwater Design Calculations

Pratt-Galloway Employment Subdivision
Detailed Land Use Breakdown

CLIENT: Pratt Development Inc.
DATE: November 2022

PROJECT: Pratt-Galloway Employment Subdivision
DESIGN: MG

FILE: PRA-16084 (50)
CHECKED: JWI

Subdivision	Catchment ID	Total Area (m2)	Total Impervious (m2)	Road ROW (m2)	Impervious Roads ROW (m2)	Rooftops (m2)	Paved Surface (m2)	Total Pervious (m2)	% impervious	SAR
Pre-Development										
External	101	5349	4591			883	3708	758	86%	
External	102	46597	8552			2816	5736	38045	18%	
External	103	90583	50398			8894	41503	40185	56%	
External	104	176238	88119			35248	52871	88119	50%	
External	105	107306	53653			21461	32192	53653	50%	
External	106	47438	23719			9488	14231	23719	50%	
External	107	29079	14540			5816	8724	14540	50%	
External	108	301997	123605			26466	97139	178392	41%	
External	109	48064	21434			9299	12135	26630	45%	
SUB-TOTAL		**852650**	**388610**			**120370**	**268239**	**464040**	46%	
Residential Sub.	110	138967	86			86	0	138881	0%	
Industrial Sub.	111	174417	0			0	0	174417	0%	
TOTAL		**1166034**	**388696**			**120456**	**268239**	**777338**	33%	
Post-Development										
External	201	5349	4591			883	3708	758	86%	
External	202	46597	8552			2816	5736	38045	18%	
External	203	90583	50398			8894	41503	40185	56%	
External	204	176238	88119			35248	52871	88119	50%	
External	205	107306	53653			21461	32192	53653	50%	
External	206	47438	23719			9488	14231	23719	50%	
External	207	29079	14540			5816	8724	14540	50%	
External	208	294064	119127			26466	92661	174937	41%	
External	209	4599	2796			0	2796	1802	61%	
External	210	10614	268			180	88	10346	3%	
External	211	19851	16606			7499	9107	3245	84%	
External	212	17600	4561			1620	2941	13039	26%	
External	213	3335	1682			0	1682	1653	50%	
SUB-TOTAL		**852650**	**388610**			**120370**	**268239**	**464040**	46%	
Residential Sub.	214	11331	6098	5488	2592	2337	1169	5233	54%	66.7%
Residential Sub.	215	7179	2872	0	0	2872	0	4308	40%	100.0%
Residential Sub.	216	102878	57614	28129	12764	29900	14950	45264	56%	66.7%
Residential Sub.	217	17579	7305	0	0	7031	274	10274	42%	96.3%
SUB-TOTAL		**138967**	**73889**	**33617**	**15356**	**42140**	**16392**	**65079**	53%	
Industrial Sub.	218	40559	2342				2342	38217	6%	0.0%
Industrial Sub.	219	86448	65480	9721	4675	45372	15433	20968	76%	74.6%
Industrial Sub.	220	47410	26110	4319	2774	17523	5812	21300	55%	75.1%
SUB-TOTAL		**174417**	**93933**	**14040**	**7449**	**62895**	**23588**	**80485**	54%	72.7%
TOTAL		**1166034**	**556431**			**225406**	**308220**	**609603**	48%	

PRA-16084 - Pre-Dev-PF Schematic

PCSWMM - Catchment Properties

Catchment ID	101	
Area (Ha)	0.53	ha
Catchment Width	59	m
Catchment Length	91	m
Soil Class	AB	
Average Slope (%)	3.2%	m
Runoff Coefficient (2-10yr)	0.83	
CN Value	91	
Imperviousness (%)	86%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Outlet	
Sub Area Routing Percentage	100%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	0.5349	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
0.076	Pasture Land
0.000	Cultivated Land
0.459	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	102	
Area (Ha)	4.66	ha
Catchment Width	466	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	1.4%	m
Runoff Coefficient (2-10yr)	0.26	
CN Value	60	
Imperviousness (%)	18%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.05	mm
Sub Area Routing	Outlet	
Sub Area Routing Percentage	100%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	4.6597	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.037	Woodlot or Cutover
3.768	Pasture Land
0.000	Cultivated Land
0.855	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	103	
Area (Ha)	9.06	ha
Catchment Width	906	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.1%	m
Runoff Coefficient (2-10yr)	0.57	
CN Value	76	
Imperviousness (%)	56%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	6.26	mm
Sub Area Routing	Outlet	
Sub Area Routing Percentage	100%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	9.0583	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
1.017	Woodlot or Cutover
3.002	Pasture Land
0.000	Cultivated Land
5.040	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	104	
Area (Ha)	17.62	ha
Catchment Width	1762	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.0%	m
Runoff Coefficient (2-10yr)	0.52	
CN Value	74	
Imperviousness (%)	50%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	6.02	mm

Sub Area Routing	Pervious
Sub Area Routing Percentage	40%

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	17.6238	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
1.798	Woodlot or Cutover
7.014	Pasture Land
0.000	Cultivated Land
8.812	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	105	
Area (Ha)	10.73	ha
Catchment Width	1073	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.0%	m
Runoff Coefficient (2-10yr)	0.53	
CN Value	75	
Imperviousness (%)	50%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	40%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	10.7306	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
5.365	Pasture Land
0.000	Cultivated Land
5.365	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	106	
Area (Ha)	4.74	ha
Catchment Width	474	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	4.8%	m
Runoff Coefficient (2-10yr)	0.55	
CN Value	75	
Imperviousness (%)	50%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	40%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	4.7438	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
2.372	Pasture Land
0.000	Cultivated Land
2.372	Impervious Area
4.7438	

PCSWMM - Catchment Properties

Catchment ID	107	
Area (Ha)	2.91	ha
Catchment Width	291	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.7%	m
Runoff Coefficient (2-10yr)	0.53	
CN Value	75	
Imperviousness (%)	50%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	40%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	2.9079	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
1.454	Pasture Land
0.000	Cultivated Land
1.454	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	108	
Area (Ha)	30.20	ha
Catchment Width	3020	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	1.5%	m
Runoff Coefficient (2-10yr)	0.44	
CN Value	68	
Imperviousness (%)	41%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	7.14	mm

Sub Area Routing	Outlet
Sub Area Routing Percentage	100%

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	30.1997	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
7.620	Woodlot or Cutover
10.220	Pasture Land
0.000	Cultivated Land
12.361	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	109	
Area (Ha)	4.81	ha
Catchment Width	481	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.2%	m
Runoff Coefficient (2-10yr)	0.47	
CN Value	70	
Imperviousness (%)	45%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	7.61	mm

Sub Area Routing	Pervious
Sub Area Routing Percentage	43%

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	4.8064	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
1.390	Woodlot or Cutover
1.273	Pasture Land
0.000	Cultivated Land
2.143	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	110	
Area (Ha)	13.90	ha
Catchment Width	1390	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	4.0%	m
Runoff Coefficient (2-10yr)	0.09	
CN Value	48	
Imperviousness (%)	0%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	7.17	mm

Sub Area Routing	Outlet
Sub Area Routing Percentage	100%

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	13.8967	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
6.029	Woodlot or Cutover
7.868	Pasture Land
0.000	Cultivated Land
0.000	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	111	
Area (Ha)	17.44	ha
Catchment Width	1744	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	1.2%	m
Runoff Coefficient (2-10yr)	0.09	
CN Value	49	
Imperviousness (%)	0%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	6.77	mm
Sub Area Routing	Outlet	
Sub Area Routing Percentage	100%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	17.4417	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
6.155	Woodlot or Cutover
11.279	Pasture Land
0.000	Cultivated Land
0.009	Impervious Area

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
---------------------------------------------------------------

PRA-16084 Galloway Subdivision & Pratt Industrial Subdivision
PROJECT MANAGER: JWI
MODELLING COMPLETED BY: MG


*************
Element Count
*************
Number of rain gages ...... 14
Number of subcatchments ... 11
Number of nodes ........... 1
Number of links ........... 0
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                 Data       Recording
Name                 Data Source                 Type       Interval
------------------------------------------------------------------------
100Yr24HrSCS         100Yr24HrSCS                INTENSITY    6 min.
100Yr4HrCHI          100Yr4HrCHI                 INTENSITY    5 min.
10Yr24HrSCS          10Yr24HrSCS                 INTENSITY    6 min.
10Yr4HrCHI           10Yr4HrCHI                  INTENSITY    5 min.
25mm4HrCHIWQE        25mm4HrCHIWQE               INTENSITY    5 min.
25Yr24HrSCS          25Yr24HrSCS                 INTENSITY    6 min.
25Yr4HrCHI           25Yr4HrCHI                  INTENSITY    5 min.
2Yr24HrSCS           2Yr24HrSCS                  INTENSITY    6 min.
2yr4HrCHI            2yr4HrCHI                   INTENSITY    5 min.
50Yr24HrSCS          50Yr24HrSCS                 INTENSITY    6 min.
50Yr4HrCHI           50Yr4HrCHI                  INTENSITY    5 min.
5Yr24HrSCS           5Yr24HrSCS                  INTENSITY    6 min.
5Yr4HrCHI            5Yr4HrCHI                   INTENSITY    5 min.
Timmins              Timmins                     INTENSITY   60 min.
```

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
101	0.53	58.78	86.00	3.2000	25mm4HrCHIWQE	OF1
102	4.66	465.97	18.00	1.4000	25mm4HrCHIWQE	OF1
103	9.06	905.83	56.00	2.1000	25mm4HrCHIWQE	OF1
104	17.62	1762.38	50.00	2.0000	25mm4HrCHIWQE	OF1
105	10.73	1073.06	50.00	2.0000	25mm4HrCHIWQE	OF1
106	4.74	474.38	50.00	4.8000	25mm4HrCHIWQE	OF1
107	2.91	290.79	50.00	2.7000	25mm4HrCHIWQE	OF1
108	30.20	3019.97	41.00	1.5000	25mm4HrCHIWQE	OF1
109	4.81	480.64	45.00	2.2000	25mm4HrCHIWQE	OF1
110	13.90	1389.67	0.00	4.0000	25mm4HrCHIWQE	OF1
111	17.44	1744.17	0.00	1.2000	25mm4HrCHIWQE	OF1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OF1	OUTFALL	200.00	0.00	0.0	

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES

```
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Surcharge Method ......... EXTRAN
Starting Date ............ 11/06/2019 00:00:00
Ending Date .............. 11/09/2019 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	2.915	25.000
Evaporation Loss	0.000	0.000
Infiltration Loss	2.131	18.278
Surface Runoff	0.716	6.145
Final Storage	0.078	0.668
Continuity Error (%)	-0.363	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.716	7.165
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.716	7.165
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
101	25.00	0.00	0.00	3.50	20.03	0.00	20.03	0.11	0.09	0.801
102	25.00	0.00	0.00	20.50	4.17	0.00	4.17	0.19	0.18	0.167
103	25.00	0.00	0.00	11.00	13.04	0.00	13.04	1.18	0.98	0.522
104	25.00	0.00	0.00	17.16	11.64	0.00	6.98	1.23	1.04	0.279
105	25.00	0.00	0.00	17.16	11.64	0.00	6.98	0.75	0.63	0.279
106	25.00	0.00	0.00	17.15	11.62	0.00	6.97	0.33	0.30	0.279
107	25.00	0.00	0.00	17.15	11.63	0.00	6.98	0.20	0.18	0.279
108	25.00	0.00	0.00	14.75	9.54	0.00	9.54	2.88	2.45	0.382
109	25.00	0.00	0.00	18.25	10.47	0.00	5.97	0.29	0.25	0.239
110	25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.000
111	25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00	0.00	0.000

Analysis begun on: Fri Nov 25 17:09:04 2022
Analysis ended on: Fri Nov 25 17:09:05 2022
Total elapsed time: 00:00:01

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
--------------------------------------------------------------

PRA-16084 Galloway Subdivision & Pratt Industrial Subdivision
PROJECT MANAGER: JWI
MODELLING COMPLETED BY: MG


*************
Element Count
*************
Number of rain gages ...... 14
Number of subcatchments ... 11
Number of nodes ........... 1
Number of links ........... 0
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                 Data       Recording
Name                 Data Source                 Type       Interval
------------------------------------------------------------------------
100Yr24HrSCS         100Yr24HrSCS                INTENSITY    6 min.
100Yr4HrCHI          100Yr4HrCHI                 INTENSITY    5 min.
10Yr24HrSCS          10Yr24HrSCS                 INTENSITY    6 min.
10Yr4HrCHI           10Yr4HrCHI                  INTENSITY    5 min.
25mm4HrCHIWQE        25mm4HrCHIWQE               INTENSITY    5 min.
25Yr24HrSCS          25Yr24HrSCS                 INTENSITY    6 min.
25Yr4HrCHI           25Yr4HrCHI                  INTENSITY    5 min.
2Yr24HrSCS           2Yr24HrSCS                  INTENSITY    6 min.
2yr4HrCHI            2yr4HrCHI                   INTENSITY    5 min.
50Yr24HrSCS          50Yr24HrSCS                 INTENSITY    6 min.
50Yr4HrCHI           50Yr4HrCHI                  INTENSITY    5 min.
5Yr24HrSCS           5Yr24HrSCS                  INTENSITY    6 min.
5Yr4HrCHI            5Yr4HrCHI                   INTENSITY    5 min.
Timmins              Timmins                     INTENSITY   60 min.
```

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
101	0.53	58.78	86.00	3.2000	100Yr24HrSCS	OF1
102	4.66	465.97	18.00	1.4000	100Yr24HrSCS	OF1
103	9.06	905.83	56.00	2.1000	100Yr24HrSCS	OF1
104	17.62	1762.38	50.00	2.0000	100Yr24HrSCS	OF1
105	10.73	1073.06	50.00	2.0000	100Yr24HrSCS	OF1
106	4.74	474.38	50.00	4.8000	100Yr24HrSCS	OF1
107	2.91	290.79	50.00	2.7000	100Yr24HrSCS	OF1
108	30.20	3019.97	41.00	1.5000	100Yr24HrSCS	OF1
109	4.81	480.64	45.00	2.2000	100Yr24HrSCS	OF1
110	13.90	1389.67	0.00	4.0000	100Yr24HrSCS	OF1
111	17.44	1744.17	0.00	1.2000	100Yr24HrSCS	OF1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OF1	OUTFALL	200.00	0.00	0.0	

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES

```
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Surcharge Method ......... EXTRAN
Starting Date ............ 11/06/2019 00:00:00
Ending Date .............. 11/09/2019 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	14.354	123.100
Evaporation Loss	0.000	0.000
Infiltration Loss	7.334	62.901
Surface Runoff	6.972	59.791
Final Storage	0.078	0.668
Continuity Error (%)	-0.211	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	6.980	69.797
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	6.980	69.797
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
101	123.10	0.00	0.00	11.69	104.44	5.63	110.07	0.59	0.24	0.894
102	123.10	0.00	0.00	72.27	21.83	28.78	50.61	2.36	0.99	0.411
103	123.10	0.00	0.00	38.14	68.00	16.14	84.15	7.62	3.28	0.684
104	123.10	0.00	0.00	54.53	60.71	31.50	67.93	11.97	5.36	0.552
105	123.10	0.00	0.00	54.02	60.71	32.00	68.43	7.34	3.30	0.556
106	123.10	0.00	0.00	53.62	60.67	32.43	68.83	3.27	1.64	0.559
107	123.10	0.00	0.00	53.86	60.70	32.17	68.59	1.99	0.93	0.557
108	123.10	0.00	0.00	52.42	49.78	20.33	70.11	21.17	8.70	0.570
109	123.10	0.00	0.00	59.52	54.63	31.88	63.01	3.03	1.40	0.512
110	123.10	0.00	0.00	89.00	0.00	34.30	34.30	4.77	2.96	0.279
111	123.10	0.00	0.00	91.07	0.00	32.14	32.14	5.61	2.64	0.261

Analysis begun on: Fri Nov 25 17:09:04 2022
Analysis ended on: Fri Nov 25 17:09:05 2022
Total elapsed time: 00:00:01

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
--------------------------------------------------------------

PRA-16084 Galloway Subdivision & Pratt Industrial Subdivision
PROJECT MANAGER: JWI
MODELLING COMPLETED BY: MG


*************
Element Count
*************
Number of rain gages ...... 14
Number of subcatchments ... 11
Number of nodes ........... 1
Number of links ........... 0
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                 Data       Recording
Name                 Data Source                 Type       Interval
------------------------------------------------------------------------
100Yr24HrSCS         100Yr24HrSCS                INTENSITY    6 min.
100Yr4HrCHI          100Yr4HrCHI                 INTENSITY    5 min.
10Yr24HrSCS          10Yr24HrSCS                 INTENSITY    6 min.
10Yr4HrCHI           10Yr4HrCHI                  INTENSITY    5 min.
25mm4HrCHIWQE        25mm4HrCHIWQE               INTENSITY    5 min.
25Yr24HrSCS          25Yr24HrSCS                 INTENSITY    6 min.
25Yr4HrCHI           25Yr4HrCHI                  INTENSITY    5 min.
2Yr24HrSCS           2Yr24HrSCS                  INTENSITY    6 min.
2yr4HrCHI            2yr4HrCHI                   INTENSITY    5 min.
50Yr24HrSCS          50Yr24HrSCS                 INTENSITY    6 min.
50Yr4HrCHI           50Yr4HrCHI                  INTENSITY    5 min.
5Yr24HrSCS           5Yr24HrSCS                  INTENSITY    6 min.
5Yr4HrCHI            5Yr4HrCHI                   INTENSITY    5 min.
Timmins              Timmins                     INTENSITY   60 min.
```

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
101	0.53	58.78	86.00	3.2000	Timmins	OF1
102	4.66	465.97	18.00	1.4000	Timmins	OF1
103	9.06	905.83	56.00	2.1000	Timmins	OF1
104	17.62	1762.38	50.00	2.0000	Timmins	OF1
105	10.73	1073.06	50.00	2.0000	Timmins	OF1
106	4.74	474.38	50.00	4.8000	Timmins	OF1
107	2.91	290.79	50.00	2.7000	Timmins	OF1
108	30.20	3019.97	41.00	1.5000	Timmins	OF1
109	4.81	480.64	45.00	2.2000	Timmins	OF1
110	13.90	1389.67	0.00	4.0000	Timmins	OF1
111	17.44	1744.17	0.00	1.2000	Timmins	OF1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
OF1	OUTFALL	200.00	0.00	0.0	

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES

```
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Surcharge Method ......... EXTRAN
Starting Date ............ 11/06/2019 00:00:00
Ending Date .............. 11/09/2019 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	22.504	193.000
Evaporation Loss	0.000	0.000
Infiltration Loss	13.176	113.001
Surface Runoff	9.265	79.458
Final Storage	0.078	0.668
Continuity Error (%)	-0.065	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	9.265	92.651
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	9.265	92.651
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.000	

****
Subcatchment Runoff Summary
****

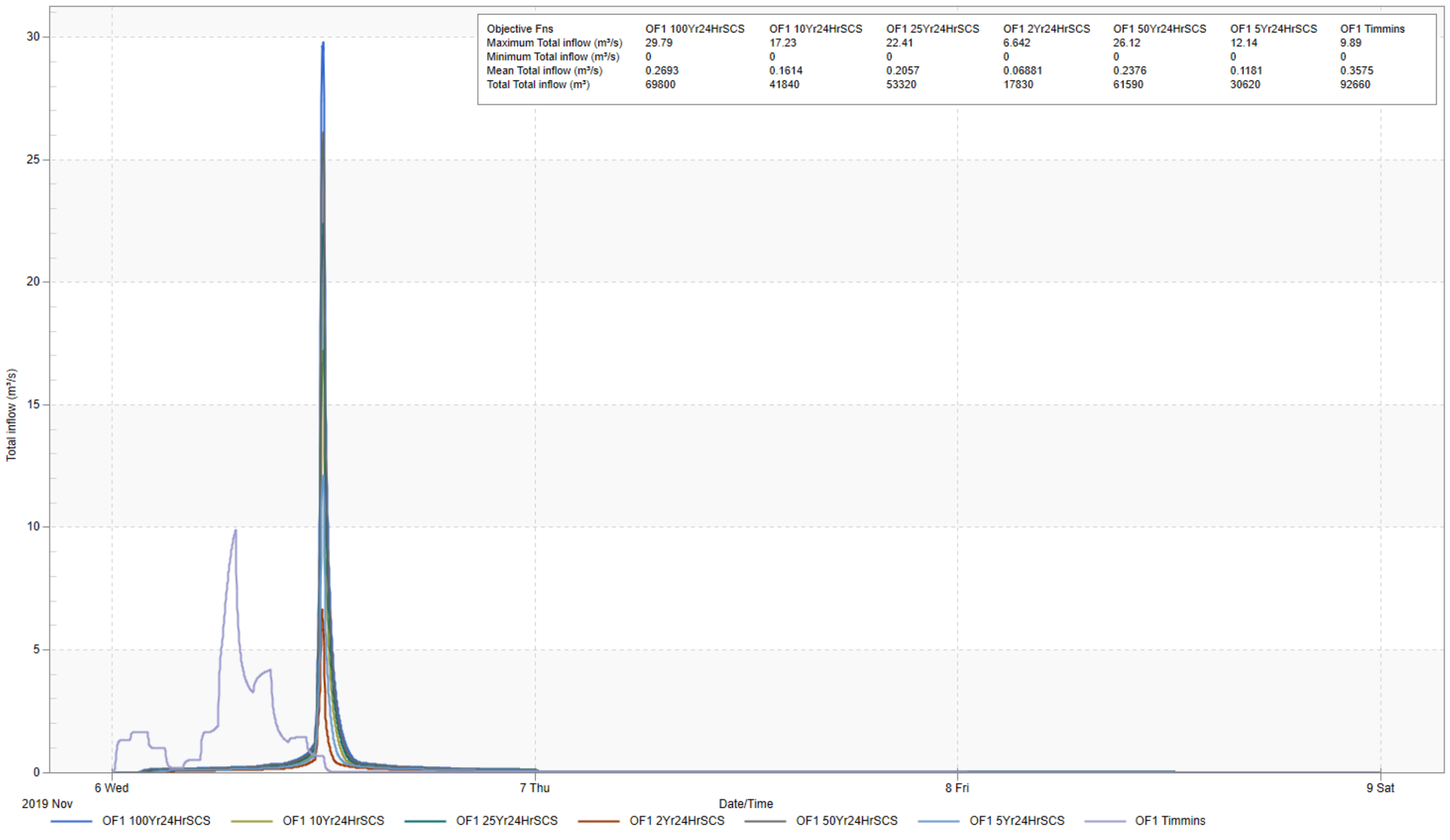
Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
101	193.00	0.00	0.00	22.22	164.46	4.82	169.28	0.91	0.06	0.877
102	193.00	0.00	0.00	133.30	34.44	25.00	59.44	2.77	0.34	0.308
103	193.00	0.00	0.00	71.29	107.10	13.66	120.76	10.94	0.92	0.626
104	193.00	0.00	0.00	92.72	95.63	42.07	99.45	17.53	1.77	0.515
105	193.00	0.00	0.00	92.13	95.63	42.66	100.03	10.73	1.08	0.518
106	193.00	0.00	0.00	91.70	95.65	43.10	100.49	4.77	0.48	0.521
107	193.00	0.00	0.00	91.97	95.63	42.82	100.20	2.91	0.29	0.519
108	193.00	0.00	0.00	96.74	78.42	17.16	95.57	28.86	2.69	0.495
109	193.00	0.00	0.00	101.65	86.07	41.56	90.62	4.36	0.47	0.470
110	193.00	0.00	0.00	164.09	0.00	28.96	28.96	4.02	0.90	0.150
111	193.00	0.00	0.00	165.22	0.00	27.81	27.81	4.85	0.90	0.144

Analysis begun on: Fri Nov 25 17:09:28 2022
Analysis ended on: Fri Nov 25 17:09:31 2022
Total elapsed time: 00:00:03

Node OF1

PRA-16084 - Pre-Dev-PF Flow vs. Time - 24HrSCS & Timmins

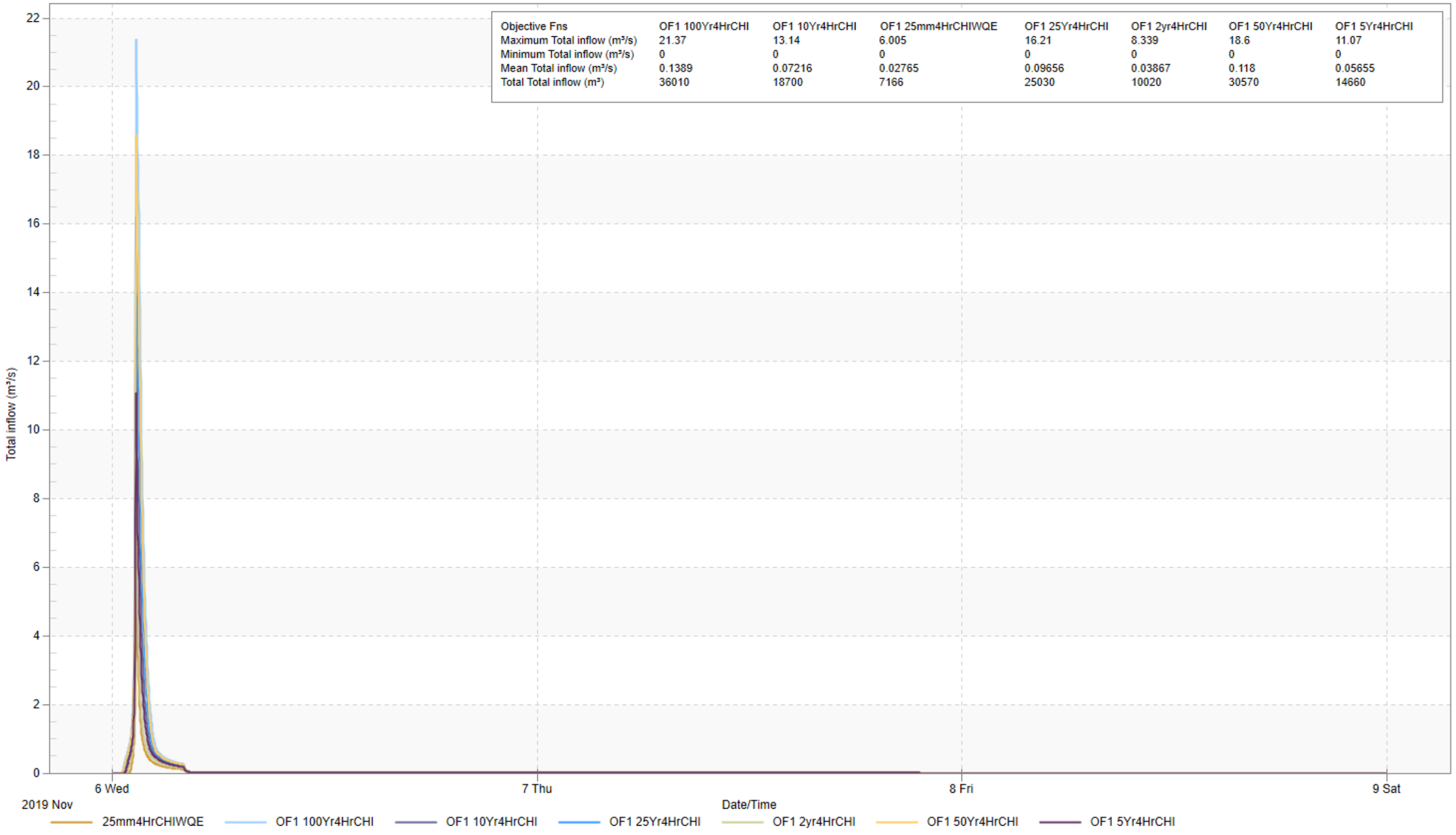
Objective Fns	OF1 100Yr24HrSCS	OF1 10Yr24HrSCS	OF1 25Yr24HrSCS	OF1 2Yr24HrSCS	OF1 50Yr24HrSCS	OF1 5Yr24HrSCS	OF1 Timmins
Maximum Total inflow (m³/s)	29.79	17.23	22.41	6.642	26.12	12.14	9.89
Minimum Total inflow (m³/s)	0	0	0	0	0	0	0
Mean Total inflow (m³/s)	0.2693	0.1614	0.2057	0.06881	0.2376	0.1181	0.3575
Total Total inflow (m³)	69800	41840	53320	17830	61590	30620	92660



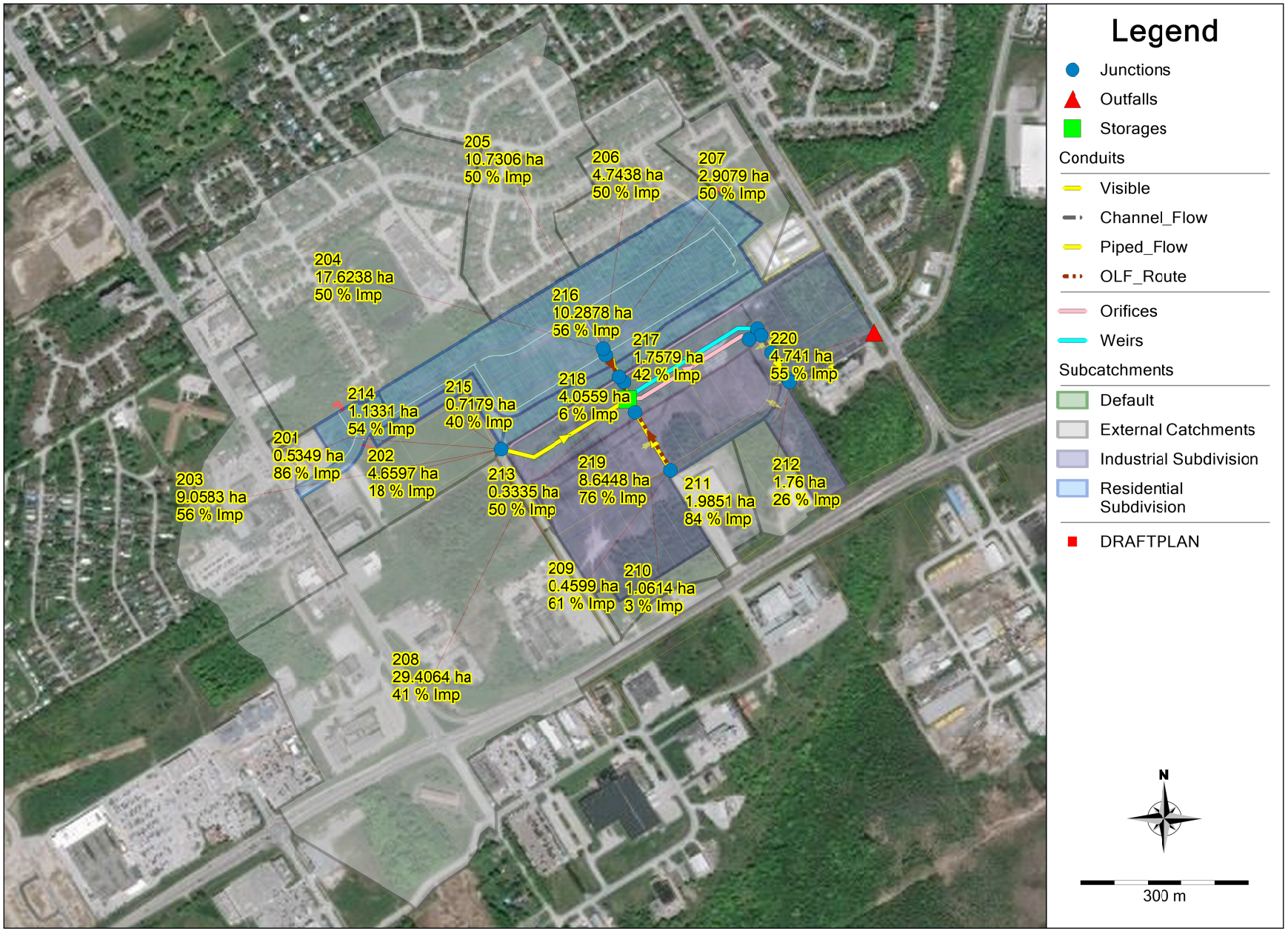
Node OF1

PRA-16084 - Pre-Dev-PF Flow vs. Time - 4HrCHI & 25mm4HrCHI WQE

Objective Fns	OF1 100Yr4HrCHI	OF1 10Yr4HrCHI	OF1 25mm4HrCHIWQE	OF1 25Yr4HrCHI	OF1 2yr4HrCHI	OF1 50Yr4HrCHI	OF1 5Yr4HrCHI
Maximum Total inflow (m³/s)	21.37	13.14	6.005	16.21	8.339	18.6	11.07
Minimum Total inflow (m³/s)	0	0	0	0	0	0	0
Mean Total inflow (m³/s)	0.1389	0.07216	0.02765	0.09656	0.03867	0.118	0.05655
Total Total inflow (m³)	36010	18700	7166	25030	10020	30570	14660



PRA-16084 - Post-Dev-PF Schematic



PCSWMM - Catchment Properties

Catchment ID	201	
Area (Ha)	0.53	ha
Catchment Width	59	m
Catchment Length	91	m
Soil Class	AB	
Average Slope (%)	3.2%	m
Runoff Coefficient (2-10yr)	0.83	
CN Value	91	
Imperviousness (%)	86%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Outlet	
Sub Area Routing Percentage	100%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	0.5349	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21
Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.				

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
0.076	Pasture Land
0.000	Cultivated Land
0.459	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	202	
Area (Ha)	4.66	ha
Catchment Width	466	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	1.4%	m
Runoff Coefficient (2-10yr)	0.26	
CN Value	60	
Imperviousness (%)	18%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.05	mm

Sub Area Routing	Outlet
Sub Area Routing Percentage	100%

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	4.6597	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.037	Woodlot or Cutover
3.768	Pasture Land
0.000	Cultivated Land
0.855	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	203	
Area (Ha)	9.06	ha
Catchment Width	906	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.1%	m
Runoff Coefficient (2-10yr)	0.57	
CN Value	76	
Imperviousness (%)	56%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	6.26	mm
Sub Area Routing	Outlet	
Sub Area Routing Percentage	100%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	9.0583	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21
Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.				

Area (Ha)	Land Use
0.000	Lakes and Wetlands
1.017	Woodlot or Cutover
3.002	Pasture Land
0.000	Cultivated Land
5.040	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	204	
Area (Ha)	17.62	ha
Catchment Width	1762	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.0%	m
Runoff Coefficient (2-10yr)	0.52	
CN Value	74	
Imperviousness (%)	50%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	6.02	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	40%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	17.6238	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
1.798	Woodlot or Cutover
7.014	Pasture Land
0.000	Cultivated Land
8.812	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	205	
Area (Ha)	10.73	ha
Catchment Width	1073	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.0%	m
Runoff Coefficient (2-10yr)	0.53	
CN Value	75	
Imperviousness (%)	50%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	40%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	10.7306	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21
Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.				

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
5.365	Pasture Land
0.000	Cultivated Land
5.365	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	206	
Area (Ha)	4.74	ha
Catchment Width	474	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	4.8%	m
Runoff Coefficient (2-10yr)	0.55	
CN Value	75	
Imperviousness (%)	50%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	40%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	4.7438	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21
Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.				

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
2.372	Pasture Land
0.000	Cultivated Land
2.372	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	207	
Area (Ha)	2.91	ha
Catchment Width	291	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.7%	m
Runoff Coefficient (2-10yr)	0.53	
CN Value	75	
Imperviousness (%)	50%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	40%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.39
Sandy Loam	2.9079	10.92	109.98	0.368
Loam	0.0000	3.3	88.9	0.347
Silt Loam	0.0000	6.6	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.21
Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.				

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
1.454	Pasture Land
0.000	Cultivated Land
1.454	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	208	
Area (Ha)	29.41	ha
Catchment Width	2941	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	1.5%	m
Runoff Coefficient (2-10yr)	0.44	
CN Value	68	
Imperviousness (%)	41%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	7.16	mm

Sub Area Routing	Outlet
Sub Area Routing Percentage	100%

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	29.4064	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210
Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.				

Area (Ha)	Land Use
0.000	Lakes and Wetlands
7.544	Woodlot or Cutover
9.950	Pasture Land
0.000	Cultivated Land
11.913	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	209	
Area (Ha)	0.46	ha
Catchment Width	460	m
Catchment Length	10	m
Soil Class	AB	
Average Slope (%)	2.0%	m
Runoff Coefficient (2-10yr)	0.61	
CN Value	79	
Imperviousness (%)	61%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	6.17	mm

Sub Area Routing	Outlet
Sub Area Routing Percentage	100%

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	0.4599	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.042	Woodlot or Cutover
0.138	Pasture Land
0.000	Cultivated Land
0.280	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	210	
Area (Ha)	1.06	ha
Catchment Width	236	m
Catchment Length	45	m
Soil Class	AB	
Average Slope (%)	2.2%	m
Runoff Coefficient (2-10yr)	0.11	
CN Value	48	
Imperviousness (%)	3%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	8.19	mm

Sub Area Routing	Pervious
Sub Area Routing Percentage	67%

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	1.0614	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.661	Woodlot or Cutover
0.374	Pasture Land
0.000	Cultivated Land
0.027	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	211	
Area (Ha)	1.99	ha
Catchment Width	199	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.2%	m
Runoff Coefficient (2-10yr)	0.81	
CN Value	90	
Imperviousness (%)	84%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	45%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	1.9851	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210
Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.				

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
0.325	Pasture Land
0.000	Cultivated Land
1.661	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	212	
Area (Ha)	1.76	ha
Catchment Width	587	m
Catchment Length	30	m
Soil Class	AB	
Average Slope (%)	2.2%	m
Runoff Coefficient (2-10yr)	0.31	
CN Value	60	
Imperviousness (%)	26%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	7.80	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	36%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	1.7600	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.730	Woodlot or Cutover
0.574	Pasture Land
0.000	Cultivated Land
0.456	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	213	
Area (Ha)	0.33	ha
Catchment Width	152	m
Catchment Length	22	m
Soil Class	AB	
Average Slope (%)	2.0%	m
Runoff Coefficient (2-10yr)	0.53	
CN Value	74	
Imperviousness (%)	50%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.96	mm

Sub Area Routing	Outlet
Sub Area Routing Percentage	100%

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	0.3335	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.032	Woodlot or Cutover
0.134	Pasture Land
0.000	Cultivated Land
0.168	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	214	
Area (Ha)	1.13	ha
Catchment Width	252	m
Catchment Length	45	m
Soil Class	AB	
Average Slope (%)	2.0%	m
Runoff Coefficient (2-10yr)	0.56	
CN Value	76	
Imperviousness (%)	54%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	38%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	1.1331	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210
Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.				

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlots or Cutovers
0.523	Pasture or Lawns
0.000	Cultivated Land
0.610	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	215	
Area (Ha)	0.72	ha
Catchment Width	256	m
Catchment Length	28	m
Soil Class	AB	
Average Slope (%)	3.0%	m
Runoff Coefficient (2-10yr)	0.44	
CN Value	70	
Imperviousness (%)	40%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	100%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	0.7179	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
0.431	Pasture Land
0.000	Cultivated Land
0.287	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	216	
Area (Ha)	10.29	ha
Catchment Width	1029	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.0%	m
Runoff Coefficient (2-10yr)	0.58	
CN Value	77	
Imperviousness (%)	56%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm

Sub Area Routing	Pervious
Sub Area Routing Percentage	52%

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	10.2878	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
4.526	Pasture Land
0.000	Cultivated Land
5.761	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	217	
Area (Ha)	1.76	ha
Catchment Width	176	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.0%	m
Runoff Coefficient (2-10yr)	0.45	
CN Value	71	
Imperviousness (%)	42%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	96%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	1.7579	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210
Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.				

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
1.027	Pasture Land
0.000	Cultivated Land
0.731	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	218	
Area (Ha)	4.06	ha
Catchment Width	1014	m
Catchment Length	40	m
Soil Class	AB	
Average Slope (%)	5.0%	m
Runoff Coefficient (2-10yr)	0.13	
CN Value	53	
Imperviousness (%)	6%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	8.51	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	0%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	4.0559	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
1.220	Lakes and Wetlands
0.000	Woodlot or Cutover
2.602	Pasture Land
0.000	Cultivated Land
0.234	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	219	
Area (Ha)	8.64	ha
Catchment Width	864	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.0%	m
Runoff Coefficient (2-10yr)	0.74	
CN Value	87	
Imperviousness (%)	76%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	69%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	8.6448	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
2.097	Pasture Land
0.000	Cultivated Land
6.548	Impervious Area

PCSWMM - Catchment Properties

Catchment ID	220	
Area (Ha)	4.74	ha
Catchment Width	474	m
Catchment Length	100	m
Soil Class	AB	
Average Slope (%)	2.0%	m
Runoff Coefficient (2-10yr)	0.57	
CN Value	77	
Imperviousness (%)	55%	

Manning's Roughness Coefficients - Overland Flow

Manning's Impervious	0.013
Manning's Pervious	0.190

Depression Storage

Wetland	16	mm
Woods	10	mm
Pasture/Lawns	5	mm
Cultivated	7	mm
Impervious Dstore	2.00	mm
Pervious Dstore	5.00	mm
Sub Area Routing	Pervious	
Sub Area Routing Percentage	67%	

Infiltration - Green Ampt

Soil Type	Vasey Sandy Loam	
Suction Head	109.980	mm
Conductivity	10.920	mm/hr
Initial Deficit	0.368	(fraction)

Soil Texture Class	Area (Ha)	Hydraulic Conductivity (mm/hr)	Suction Head (mm)	Initial Deficit (fraction)
Sand	0.0000	120.34	49.02	0.413
Loamy Sand	0.0000	29.97	60.96	0.390
Sandy Loam	4.7410	10.92	109.98	0.368
Loam	0.0000	3.30	88.90	0.347
Silt Loam	0.0000	6.60	169.93	0.366
Sandy Clay Loam	0.0000	1.52	219.96	0.262
Clay Loam	0.0000	1.02	210.06	0.277
Silty Clay Loam	0.0000	1.02	270.00	0.261
Sandy Clay	0.0000	0.51	240.03	0.209
Silty Clay	0.0000	0.51	290.07	0.228
Clay	0.0000	0.25	320.04	0.210

Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.

Area (Ha)	Land Use
0.000	Lakes and Wetlands
0.000	Woodlot or Cutover
2.130	Pasture Land
0.000	Cultivated Land
2.611	Impervious Area

Stormwater Management Facility
Stage-Storage-Discharge Table & Water Quality Calculations

CLIENT: Pratt Development Inc.
PROJECT: Pratt Employment Subdivision
FILE: PRA-16084 (50)

DATE: Nov. 2022
DESIGN: MG
CHECKED: JWI

Facility Information		
Bottom of Facility	205.65	m
Top of Facility	209.40	m
Permanent Pool Elevation	207.15	m

Trapezoidal Emergency Overflow Weir		
Weir Sill Elevation	207.65	m
Length	10.00	m
Weir Sideslopes	5	:1 (H:V)
Downstream Length of Weir	12	at Sill Elev.

Primary Orifice		
Radius	0.135	m
Outlet Diameter	270	mm
Invert Elevation	207.15	m

Elevation (m)	Water Depth (m)	Area (m^2)	Total Storage (m^3)	Permanent Pool Storage (m^3)	Extended Detention Storage (m^3)	Primary Orifice Flow (m^3/s)	Depth Above Overflow Weir (m)	Trapezoidal Weir			Total Outflow (m^3/s)	Comments
								Rectangular Weir (m^3/s)	Triangular Weir (m^3/s)	Combined Flow (m^3/s)		
205.65	0.00	571	0	0	0	0.000	0.00	0.000	0.000	0.000	0.000	Bottom of forebays 1 through 3
205.70	0.05	651	31	31	0	0.000	0.00	0.000	0.000	0.000	0.000	
205.75	0.10	732	65	65	0	0.000	0.00	0.000	0.000	0.000	0.000	
205.80	0.15	813	104	104	0	0.000	0.00	0.000	0.000	0.000	0.000	
205.85	0.20	896	146	146	0	0.000	0.00	0.000	0.000	0.000	0.000	
205.90	0.25	979	193	193	0	0.000	0.00	0.000	0.000	0.000	0.000	
205.95	0.30	1063	244	244	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.00	0.35	1148	300	300	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.05	0.40	1234	359	359	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.10	0.45	1320	423	423	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.15	0.50	1972	505	505	0	0.000	0.00	0.000	0.000	0.000	0.000	Bottom of Plunge Pool
206.20	0.55	2079	607	607	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.25	0.60	2188	713	713	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.30	0.65	2298	825	825	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.35	0.70	2408	943	943	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.40	0.75	2521	1066	1066	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.45	0.80	2634	1195	1195	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.50	0.85	2748	1330	1330	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.55	0.90	2864	1470	1470	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.60	0.95	3010	1617	1617	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.65	1.00	3157	1771	1771	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.70	1.05	3307	1933	1933	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.75	1.10	3458	2102	2102	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.80	1.15	3611	2279	2279	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.85	1.20	10894	2641	2641	0	0.000	0.00	0.000	0.000	0.000	0.000	Bottom of Main Cell
206.90	1.25	11247	3195	3195	0	0.000	0.00	0.000	0.000	0.000	0.000	
206.95	1.30	11600	3766	3766	0	0.000	0.00	0.000	0.000	0.000	0.000	
207.00	1.35	11953	4355	4355	0	0.000	0.00	0.000	0.000	0.000	0.000	
207.05	1.40	12306	4961	4961	0	0.000	0.00	0.000	0.000	0.000	0.000	
207.10	1.45	12660	5585	5585	0	0.000	0.00	0.000	0.000	0.000	0.000	
207.15	1.50	13014	6227	6227	0	0.000	0.00	0.000	0.000	0.000	0.000	Permanent Pool Elevation Primary Outlet Invert 207.15m
207.20	1.55	13369	6887	6227	660	0.005	0.00	0.000	0.000	0.000	0.005	
207.25	1.60	13724	7564	6227	1337	0.007	0.00	0.000	0.000	0.000	0.007	
207.30	1.65	14079	8259	6227	2032	0.020	0.00	0.000	0.000	0.000	0.020	
207.35	1.70	14434	8972	6227	2745	0.041	0.00	0.000	0.000	0.000	0.041	
207.40	1.75	14790	9703	6227	3475	0.054	0.00	0.000	0.000	0.000	0.054	
207.45	1.80	15146	10451	6227	4224	0.065	0.00	0.000	0.000	0.000	0.065	
207.50	1.85	15502	11217	6227	4990	0.074	0.00	0.000	0.000	0.000	0.074	
207.55	1.90	15859	12001	6227	5774	0.082	0.00	0.000	0.000	0.000	0.082	
207.60	1.95	16216	12803	6227	6576	0.090	0.00	0.000	0.000	0.000	0.090	25mm WQE Elev. 207.58m
207.65	2.00	17140	13637	6227	7410	0.097	0.00	0.000	0.000	0.000	0.097	Extended Detention & Emergency Overflow Weir Sill Elevation 207.65m
207.70	2.05	17377	14500	6227	8273	0.103	0.05	0.049	0.001	0.050	0.153	
207.75	2.10	17615	15375	6227	9148	0.109	0.10	0.323	0.010	0.332	0.441	
207.80	2.15	17806	16260	6227	10033	0.115	0.15	0.706	0.032	0.739	0.853	
207.85	2.20	17997	17155	6227	10928	0.120	0.20	1.175	0.074	1.249	1.369	
207.90	2.25	18189	18060	6227	11833	0.125	0.25	1.717	0.138	1.855	1.980	2Yr24HrSCS Elev. 207.92m
207.95	2.30	18380	18974	6227	12747	0.130	0.30	2.322	0.229	2.551	2.681	
208.00	2.35	18572	19898	6227	13671	0.135	0.35	2.985	0.350	3.335	3.470	
208.05	2.40	18764	20831	6227	14604	0.140	0.40	3.702	0.503	4.205	4.345	
208.10	2.45	18957	21774	6227	15547	0.144	0.45	4.468	0.692	5.160	5.304	
208.15	2.50	19149	22727	6227	16500	0.149	0.50	5.282	0.918	6.199	6.348	5Yr24HrSCS Elev. 208.14m
208.20	2.55	19342	23689	6227	17462	0.153	0.55	6.140	1.183	7.323	7.476	Timmins Storm Elev. 208.21m
208.25	2.60	19535	24661	6227	18434	0.157	0.60	7.040	1.491	8.532	8.689	
208.30	2.65	19728	25643	6227	19416	0.161	0.65	7.982	1.843	9.825	9.986	10Yr24HrSCS Elev. 208.27m
208.35	2.70	19922	26634	6227	20407	0.165	0.70	8.962	2.241	11.203	11.368	
208.40	2.75	20116	27635	6227	21408	0.169	0.75	9.981	2.686	12.667	12.835	25Yr24HrSCS Elev. 208.41m
208.45	2.80	20310	28646	6227	22419	0.172	0.80	11.035	3.181	14.217	14.389	
208.50	2.85	20504	29666	6227	23439	0.176	0.85	12.125	3.728	15.853	16.030	50Yr24HrSCS Elev. 208.51m
208.55	2.90	20699	30696	6227	24469	0.180	0.90	13.250	4.328	17.578	17.757	
208.60	2.95	20894	31736	6227	25509	0.183	0.95	14.408	4.983	19.390	19.573	100Yr24HrSCS Elev. 208.61m
208.65	3.00	21089	32786	6227	26558	0.187	1.00	15.598	5.694	21.292	21.478	
208.70	3.05	21284	33845	6227	27618	0.190	1.05	16.821	6.462	23.283	23.473	
208.75	3.10	21480	34914	6227	28687	0.193	1.10	18.074	7.291	25.365	25.558	
208.80	3.15	21676	35993	6227	29766	0.197	1.15	19.358	8.180	27.538	27.735	
208.85	3.20	21872	37082	6227	30854	0.200	1.20	20.672	9.132	29.804	30.004	
208.90	3.25	22068	38180	6227	31953	0.203	1.25	22.015	10.147	32.163	32.366	
208.95	3.30	22265	39288	6227	33061	0.206	1.30	23.387	11.228	34.615	34.821	
209.00	3.35	22462	40407	6227	34179	0.209	1.35	24.787	12.375	37.162	37.372	
209.05	3.40	22659	41535	6227	35307	0.212	1.40	26.215	13.590	39.806	40.018	
209.10	3.45	22856	42672	6227	36445	0.215	1.45	27.670	14.875	42.545	42.760	

Stormwater Management Facility
Stage-Storage-Discharge Table & Water Quality Calculations

CLIENT: Pratt Development Inc.
PROJECT: Pratt Employment Subdivision
FILE: PRA-16084 (50)

DATE: Nov. 2022
DESIGN: MG
CHECKED: JWI

209.15	3.50	23054	43820	6227	37593	0.218	1.50	29.152	16.230	45.382	45.600	
209.20	3.55	23252	44978	6227	38751	0.221	1.55	30.661	17.657	48.318	48.539	
209.25	3.60	23450	46145	6227	39918	0.224	1.60	32.196	19.156	51.352	51.576	
209.30	3.65	23648	47323	6227	41096	0.227	1.65	33.756	20.730	54.487	54.713	
209.35	3.70	26148	48568	6227	42341	0.230	1.70	35.342	22.380	57.722	57.952	
209.40	3.75	28687	49939	6227	43711	0.232	1.75	36.953	24.106	61.059	61.292	Top of Pond

Shaded columns were entered into PCSWMM storage curve.

Orifice Outflow equation is for orifice flow given by:

$Q=0.63A(2gH)^{0.5}$ Where ponding elevation is above orifice centroid

$Q=1.65\{[(\pi D^2/4)([2\cos^{-1}\{[(D/2)-H]/[D/2]\}\{180/\pi\}]/360)-[\{(D/2)-H\}[DH-H^2]\,\hat{}\,(1/2)]/H]\}H\,\hat{}\,(1.5)$ Where ponding elevation is at or below orifice centroid

where;
Q = flow rate (m^3/s)
D= diameter of orifice (m)
A = area of orifice (m^2)
H = head on the orifice (m)
g = Acceleration due to gravity 9.81m/s²

Rectangular sharp crested weir flow is given by: $Q=CLH^{1.5}$ Where the constant for sharp crested weirs is 1.837

Trapezoidal Broad Crested Weir flow is determined by the combined discharge of representative triangular and rectangular broad crested weirs.

Rectangular Broad Crested Weir flow is given by: $Q=CL(H\,\hat{}\,(3/2))$
Triangular Broad Crested Weir Flow is given by: $Q=C[H\,\hat{}\,(5/2)]Tan(\alpha/2)$

Where C is a constant definied by, $y=(a+bx)/(1+cx+dx^2)$ for rectangular & triangular broad crested weirs. x = head divided by downstream Length of Weir (H/L)

where;
Q = flow rate (m^3/s)
L = length (m)
H = head on the weir (m)
α = angle at apex of triangle (radians)
C = constant (refer to Triangular and Rectangular 'C' Equations)

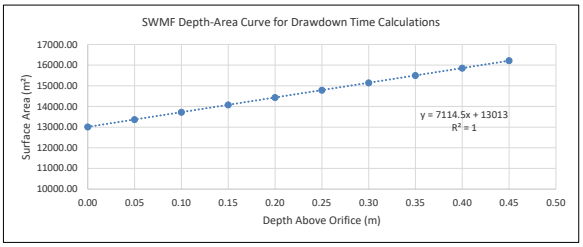
Rectangular 'C' Equation		Triangular 'C' Equation	
a	-10383.4898	a	-1.0071E-05
b	3418997.012	b	143.5986704
c	2131595.078	c	114.5046511
d	-235014.247	d	-4.768574216

Permanent Pool and Extended Detention Volumes:

Drainage Area: **110.10** ha
Imperviousness: **47.9%**

Wetland	
Imperviousness	Storage Vol.
35%	80 m^3/ha
55%	105 m^3/ha
70%	120 m^3/ha
85%	140 m^3/ha

Excerpt - MOE Table 3.2, March 2003



Volumetric Criteria:

Source & Notes:

Water Quality Volumetric Criteria	**96.18** m^3/ha	*Conducted linear interpolation from MOE Table 3.2 for Enhanced Protection level Wetlands.*
MOE Extended Detention Volumetric Criteria	**40.00** m^3/ha	*MOE Section 3.3.2*
MOE Permanent Pool Volumetric Criteria	**56.18** m^3/ha	*MOE Section 3.3.2*

SWMF Volume Requirements:

Water Quality Volume (WQV) Required	**10,589.93** m^3	
MOE Extended Detention Volume Required	**4,404.11** m^3	
MOE Permanent Pool Volume Required	**6,185.82** m^3	
Extended Detention Volume Provided	**7,409.80** m^3	
Permanent Pool Storage Volume Provided	**6,227.19** m^3	
Total Water Quality Volume Provided	**13,636.99** m^3	
PCSWMM 25mm 4hr CHI Water Quality Volume*	**8,971.00** m^3	

Based on Eqn. 4.11 MOE SWM Planning and Design Manual

Hydraulic Detention Time		
Intercept of Regression, C3	12934.8	
Slope of Regression, C2	7632.9	
Orifice Area	0.0573	m^2
Invert Secondary Orifice Elevation	207.65	m
Depth over Primary Orifice Centroid (WQV WL)	0.365	m
Drawdown Time - Ultimate Ponding Level	106,318	Sec
	29.5	Hours
25mm Event Elevation*	207.58	m
Depth over Orifice (WQV WL)	0.293	m
Drawdown Time - 25mm Event Ponding Level	94,009	Sec
	26.1	Hours

SWMF Drawdown Requirements:

Minimum Drawdown Time, MOE Table 4.7	**24.00**	Hours
Preferred Drawdown Time, MOE Table 4.7	**24.00**	Hours

Forebay Calculations:

Maximum Forebay Permanent Pool Area	**2603**	m²
Total Permanent Pool Area Provided	**13014**	m²
Max. Percentage of Permanent Pool Area	**20.0**	%

Stormwater Management Facility
Stage-Storage-Discharge Table & Water Quality Calculations

CLIENT: Pratt Development Inc.
PROJECT: Pratt Employment Subdivision
FILE: PRA-16084 (50)

DATE: Nov. 2022
DESIGN: MG
CHECKED: JWI

SWMF Forebay Requirements:

Forebay 1 Width Provided	16.20	m
Forebay 1 Length Provided	40.00	m
Forebay 1 Length to With Ratio Provided	2.47	:1
Forebay 1 Depth Provided	1.50	m
Forebay Area Provided	619.84	m^2
Minimum Forebay 1 Length, MOE Equations 4.5 & 4.6	26.45	m
Forebay 2 Width Provided	16.20	m
Forebay 2 Length Provided	80.00	m
Forebay 2 Length to With Ratio Provided	4.94	:1
Forebay 2 Depth Provided	1.50	m
Forebay Area Provided	1,267.84	m^2
Minimum Forebay 2 Length, MOE Equations 4.5 & 4.6	37.40	m
Forebay 3 Width Provided	16.20	m
Forebay 3 Length Provided	90.00	m
Forebay 3 Length to With Ratio Provided	5.56	:1
Forebay 3 Depth Provided	1.50	m
Forebay Area Provided	1,429.84	m^2
Minimum Forebay 3 Length, MOE Equations 4.5 & 4.6	80.46	m
Minimum Forebay Depth, MOE Table 4.7	1.00	m
Prefered Forebay Depth, MOE Table 4.6	1.50	m
Maximum Forebay Area, MOE Table 4.7	20.00	%
Minimum Forebay L : W, MOE Table 4.7	2.00	:1
Preferred Forebay L : W, MOE Table 4.7	3.00	:1

Design Criteria Check:

Is max. required WQV met?	YES
Is min. required drawdown time met?	YES
Is required forebay 1 length provided?	YES
Is required forebay 2 length provided?	YES
Is required forebay 3 length provided?	YES
Is minimum forebay 1 depth provided?	YES
Is minimum forebay 2 depth provided?	YES
Is minimum forebay 3 depth provided?	YES
Is prefered forebay 1 depth provided?	YES
Is prefered forebay 2 depth provided?	YES
Is prefered forebay 3 depth provided?	YES
Is maximum forebay 1 area provided?	YES
Is maximum forebay 2 area provided?	YES
Is maximum forebay 3 area provided?	YES
Is minimum L : W ratio for forebay 1 provided?	YES
Is minimum L : W ratio for forebay 2 provided?	YES
Is minimum L : W ratio for forebay 3 provided?	YES
Is preferred L : W ratio for forebay 1 provided?	NO
Is preferred L : W ratio for forebay 2 provided?	YES
Is preferred L : W ratio for forbay 3 provided?	YES

MOE Equation 4.5 - Forebay Settling Length $Dist = SQRT((r*Q_p)/V_s)$

Forebay 1:

Forebay Length Required	Dist	26.45	m
Length-to-width ratio of forebay	r	2.47	:1
Peak flow released during design quality storm*	Q_p	0.085	m^3/s
Settling velocity	V_s	0.0003	m/s

Forebay 2:

Forebay Length Required	Dist	37.40	m
Length-to-width ratio of forebay	r	4.94	:1
Peak flow released during design quality storm*	Q_p	0.085	m^3/s
Settling velocity	V_s	0.0003	m/s

Forebay 3:

Forebay Length Required	Dist	39.67	m
Length-to-width ratio of forebay	r	5.56	:1
Peak flow released during design quality storm*	Q_p	0.085	m^3/s
Settling velocity	V_s	0.0003	m/s

MOE Equation 4.6 - Dispersion Length $Dist = (8*Q)/(d*Vf)$

Forebay 1:

Length of dispersion	Dist	25.51	m
Inlet (Pipe Capacity) flowrate-5 yr*	Q	2.392	m^3/s
Depth of the permanent pool in the forebay	d	1.50	m
Desired velocity in the forebay	Vf	0.50	m/s

Forebay 2:

Length of dispersion	Dist	24.46	m
Inlet (Pipe Capacity) flowrate-5 yr*	Q	2.293	m^3/s
Depth of the permanent pool in the forebay	d	1.50	m
Desired velocity in the forebay	Vf	0.50	m/s

Forebay 3:

Length of dispersion	Dist	80.46	m
Inlet (Pipe Capacity) flowrate-5 yr*	Q	7.543	m^3/s
Depth of the permanent pool in the forebay	d	1.50	m
Desired velocity in the forebay	Vf	0.50	m/s

Additional Notes:

The 5 year inlet pipe capacity flow rate has been referenced from the governing 5 year storm events PCSWMM PF model.

The 25mm 4 hour CHI Water Quality Volume and 25mm Event Elevation has been referenced from the Post-Dev-PF PCSWMM model at storage node SWMF.

SWMF Pre vs. Post Development
PF PCSWMM Model Performance Summary

CLIENT: Pratt Developments Inc. **DATE:** Nov. 2022

PROJECT: Pratt Employment Subdivision **DESIGN:** MG

FILE: PRA-16084 (50) **CHECKED:** JWI

Storm Peak Event Flow (m^3/s)							
Storm Distribution	**Area (ha)**	**Return Period (years)**					
		2	**5**	**10**	**25**	**50**	**100**
Allowable Condition (OF1)							
CHI 4-Hr Storm Distribution	116.60	8.339	11.070	13.140	16.210	18.600	21.370
SCS 24-Hr Storm Distribution	116.60	6.642	12.140	17.230	22.410	26.120	29.790
25mm 4-Hr Storm Distribution	116.60	6.005					
Timmins Storm	116.60	(Safe Conveyance)					
Post Development Condition (OF1)							
CHI 4-Hr Storm Distribution	116.60	0.624	2.884	5.007	8.091	10.690	13.070
SCS 24-Hr Storm Distribution	116.60	3.149	8.532	12.230	16.480	19.440	22.220
25mm 4-Hr Storm Distribution	116.60	0.185					
Timmins Storm	116.60	10.530					

Maximum Storage Elevation (m) - SWMF						
Storm Distribution	**Return Period (years)**					
	2	**5**	**10**	**25**	**50**	**100**
CHI 4-Hr Storm Distribution	2.088	2.252	2.357	2.479	2.568	2.650
SCS 24-Hr Storm Distribution	2.265	2.494	2.621	2.763	2.863	2.959
25mm 4-Hr Storm Distribution	1.928					
Timmins Storm	2.561					

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
--------------------------------------------------------------

PRA-16084 Galloway Subdivision & Pratt Industrial Subdivision
PROJECT MANAGER: JWI
MODELLING COMPLETED BY: MG

WARNING 02: maximum depth increased for Node EOR2
WARNING 02: maximum depth increased for Node HW1
WARNING 02: maximum depth increased for Node MH262

*************
Element Count
*************
Number of rain gages ...... 14
Number of subcatchments ... 20
Number of nodes ........... 15
Number of links ........... 17
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                 Data       Recording
Name                 Data Source                 Type       Interval
------------------------------------------------------------------------
100Yr24HrSCS         100Yr24HrSCS                INTENSITY    6 min.
100Yr4HrCHI          100Yr4HrCHI                 INTENSITY    5 min.
10Yr24HrSCS          10Yr24HrSCS                 INTENSITY    6 min.
10Yr4HrCHI           10Yr4HrCHI                  INTENSITY    5 min.
25mm4HrCHIWQE        25mm4HrCHIWQE               INTENSITY    5 min.
25Yr24HrSCS          25Yr24HrSCS                 INTENSITY    6 min.
25Yr4HrCHI           25Yr4HrCHI                  INTENSITY    5 min.
2Yr24HrSCS           2Yr24HrSCS                  INTENSITY    6 min.
2yr4HrCHI            2yr4HrCHI                   INTENSITY    5 min.
50Yr24HrSCS          50Yr24HrSCS                 INTENSITY    6 min.
50Yr4HrCHI           50Yr4HrCHI                  INTENSITY    5 min.
5Yr24HrSCS           5Yr24HrSCS                  INTENSITY    6 min.
```

```
5Yr4HrCHI            5Yr4HrCHI                    INTENSITY    5 min.
Timmins              Timmins                      INTENSITY   60 min.
```

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
201	0.53	58.78	86.00	3.2000	25mm4HrCHIWQE	214
202	4.66	465.97	18.00	1.4000	25mm4HrCHIWQE	HW1
203	9.06	905.83	56.00	2.1000	25mm4HrCHIWQE	HW1
204	17.62	1762.38	50.00	2.0000	25mm4HrCHIWQE	MH52
205	10.73	1073.06	50.00	2.0000	25mm4HrCHIWQE	MH52
206	4.74	474.38	50.00	4.8000	25mm4HrCHIWQE	MH52
207	2.91	290.79	50.00	2.7000	25mm4HrCHIWQE	MH52
208	29.41	2940.64	41.00	1.5000	25mm4HrCHIWQE	213
209	0.46	459.90	61.00	2.0000	25mm4HrCHIWQE	MH262
210	1.06	235.87	3.00	2.2000	25mm4HrCHIWQE	219
211	1.99	198.51	84.00	2.2000	25mm4HrCHIWQE	MH262
212	1.76	176.00	26.00	2.2000	25mm4HrCHIWQE	EOR5
213	0.33	33.35	50.00	2.0000	25mm4HrCHIWQE	218
214	1.13	377.70	54.00	2.0000	25mm4HrCHIWQE	HW1
215	0.72	326.32	40.00	3.0000	25mm4HrCHIWQE	HW1
216	10.29	2286.18	56.00	2.0000	25mm4HrCHIWQE	MH52
217	1.76	627.82	42.00	2.0000	25mm4HrCHIWQE	SWMF
218	4.06	1013.98	6.00	5.0000	25mm4HrCHIWQE	SWMF
219	8.64	864.48	76.00	2.0000	25mm4HrCHIWQE	MH262
220	4.74	474.10	55.00	2.0000	25mm4HrCHIWQE	OF1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
EOR1	JUNCTION	206.73	3.93	0.0	
EOR2	JUNCTION	206.66	3.93	0.0	
EOR3	JUNCTION	206.48	3.32	0.0	
EOR4	JUNCTION	206.21	3.91	0.0	

EOR5	JUNCTION	206.18	1.92	0.0
HW1	JUNCTION	208.69	0.90	0.0
J1	JUNCTION	206.97	2.38	0.0
J2	JUNCTION	207.15	2.20	0.0
J7	JUNCTION	209.30	0.30	0.0
J8	JUNCTION	210.30	0.32	0.0
MH262	JUNCTION	207.28	3.57	0.0
MH290	JUNCTION	206.82	3.07	0.0
MH52	JUNCTION	205.99	4.72	0.0
OF1	OUTFALL	205.31	1.32	0.0
SWMF	STORAGE	205.65	3.75	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C5	MH262	MH290	CONDUIT	121.5	0.5019	0.0130
C6	MH52	J1	CONDUIT	67.2	0.5058	0.0130
EOR1	EOR1	EOR2	CONDUIT	12.5	0.5584	0.0300
EOR2	EOR2	EOR3	CONDUIT	37.3	0.4821	0.0300
EOR3	EOR3	EOR4	CONDUIT	54.9	0.4914	0.0130
EOR4	EOR4	EOR5	CONDUIT	6.8	0.4966	0.0300
EOR5	EOR5	OF1	CONDUIT	175.6	0.4931	0.0300
Inlet1	MH290	SWMF	CONDUIT	18.4	0.4886	0.0130
Inlet2	HW1	SWMF	CONDUIT	59.5	2.5056	0.0130
Inlet3	J1	SWMF	CONDUIT	16.9	0.4748	0.0130
Primary	J2	EOR2	CONDUIT	21.5	2.2755	0.0130
Spillway1	MH262	SWMF	CONDUIT	110.0	0.6818	0.0130
Spillway2	MH52	J8	CONDUIT	50.3	0.2188	0.0130
Spillway3	J8	J7	CONDUIT	45.5	2.2003	0.0130
Spillway4	J7	SWMF	CONDUIT	121.6	0.2467	0.0130
Primary_Outlet	SWMF	J2	ORIFICE			
EOW	SWMF	EOR1	WEIR			

****
Cross Section Summary
****

	Full	Full	Hyd.	Max.	No. of	Full

Conduit	Shape	Depth	Area	Rad.	Width	Barrels	Flow
C5	CIRCULAR	0.68	0.36	0.17	0.68	1	0.60
C6	RECT_CLOSED	1.20	2.16	0.36	1.80	1	5.98
EOR1	TRAPEZOIDAL	3.93	58.12	2.09	26.58	1	236.45
EOR2	TRAPEZOIDAL	3.32	43.03	1.79	22.92	1	147.00
EOR3	RECT_CLOSED	1.80	5.40	0.56	3.00	1	19.85
EOR4	TRAPEZOIDAL	1.92	16.82	1.11	14.52	1	42.38
EOR5	TRAPEZOIDAL	1.32	9.19	0.81	10.92	1	18.68
Inlet1	CIRCULAR	0.68	0.36	0.17	0.68	1	0.59
Inlet2	RECT_CLOSED	0.90	1.62	0.30	1.80	1	8.84
Inlet3	RECT_CLOSED	1.20	2.16	0.36	1.80	1	5.79
Primary	CIRCULAR	0.45	0.16	0.11	0.45	1	0.43
Spillway1	TRAPEZOIDAL	1.00	8.00	0.71	11.00	1	40.31
Spillway2	TRAPEZOIDAL	0.30	1.77	0.26	6.80	1	2.57
Spillway3	RECT_OPEN	0.30	2.40	0.28	8.00	1	11.70
Spillway4	TRAPEZOIDAL	0.30	2.40	0.22	11.00	1	3.32

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN

```
Starting Date ............ 11/06/2019 00:00:00
Ending Date .............. 11/09/2019 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 2
Head Tolerance ........... 0.001500 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	2.915	25.000
Evaporation Loss	0.000	0.000
Infiltration Loss	2.084	17.872
Surface Runoff	0.742	6.366
Final Storage	0.112	0.958
Continuity Error (%)	-0.784	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.742	7.422
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.674	6.741
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.623	6.231
Final Stored Volume	0.692	6.916
Continuity Error (%)	-0.025	

****
Time-Step Critical Elements
****
Link EOR4 (18.23%)

****
Highest Flow Instability Indexes
****
Link Inlet3 (2)
Link C6 (2)

****
Routing Time Step Summary
****

Minimum Time Step	:	2.52 sec
Average Time Step	:	4.89 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	-0.00
Average Iterations per Step	:	2.00
Percent Not Converging	:	0.00
Time Step Frequencies	:	
5.000 - 3.155 sec	:	99.67 %
3.155 - 1.991 sec	:	0.33 %
1.991 - 1.256 sec	:	0.00 %
1.256 - 0.792 sec	:	0.00 %
0.792 - 0.500 sec	:	0.00 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
201	25.00	0.00	0.00	3.50	20.03	0.00	20.03	0.11	0.09	0.801
202	25.00	0.00	0.00	20.50	4.17	0.00	4.17	0.19	0.18	0.167

203	25.00	0.00	0.00	11.00	13.04	0.00	13.04	1.18	0.98	0.522
204	25.00	0.00	0.00	17.16	11.64	0.00	6.98	1.23	1.04	0.279
205	25.00	0.00	0.00	17.16	11.64	0.00	6.98	0.75	0.63	0.279
206	25.00	0.00	0.00	17.15	11.62	0.00	6.97	0.33	0.30	0.279
207	25.00	0.00	0.00	17.15	11.63	0.00	6.98	0.20	0.18	0.279
208	25.00	0.00	0.00	14.75	9.54	0.00	9.54	2.81	2.39	0.382
209	25.00	0.00	0.00	9.75	14.09	0.00	14.09	0.06	0.06	0.564
210	25.00	0.00	0.00	24.72	0.69	0.00	0.23	0.00	0.00	0.009
211	25.00	0.00	0.00	9.32	19.56	3.67	14.43	0.29	0.16	0.577
212	25.00	0.00	0.00	20.67	6.03	0.00	3.86	0.07	0.06	0.154
213	25.00	841.40	0.00	51.61	432.55	387.33	819.88	2.73	2.20	0.946
214	25.00	9.45	0.00	21.35	17.60	1.25	12.16	0.14	0.09	0.353
215	25.00	0.00	0.00	24.20	9.24	0.05	0.05	0.00	0.00	0.002
216	25.00	0.00	0.00	17.75	12.99	0.01	6.24	0.64	0.58	0.250
217	25.00	0.00	0.00	23.76	9.71	0.08	0.47	0.01	0.01	0.019
218	25.00	67.42	0.00	62.40	5.43	25.51	30.94	1.25	0.87	0.335
219	25.00	0.03	0.00	13.89	17.72	4.52	10.01	0.87	0.47	0.400
220	25.00	0.00	0.00	19.75	12.81	0.09	4.32	0.20	0.17	0.173

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
EOR1	JUNCTION	0.00	0.02	206.75	0 03:59	0.02
EOR2	JUNCTION	0.04	0.09	206.75	0 04:00	0.09
EOR3	JUNCTION	0.02	0.04	206.52	0 04:01	0.04
EOR4	JUNCTION	0.03	0.08	206.29	0 03:53	0.08
EOR5	JUNCTION	0.04	0.10	206.27	0 03:41	0.10
HW1	JUNCTION	0.00	0.19	208.88	0 01:20	0.19
J1	JUNCTION	0.34	0.61	207.58	0 03:52	0.61
J2	JUNCTION	0.07	0.14	207.29	0 04:00	0.14
J7	JUNCTION	0.00	0.00	209.30	0 00:00	0.00
J8	JUNCTION	0.00	0.00	210.30	0 00:00	0.00
MH262	JUNCTION	0.41	0.98	208.26	0 01:30	0.98
MH290	JUNCTION	0.49	0.76	207.58	0 03:59	0.76

MH52	JUNCTION	1.37	1.90	207.89	0	01:20	1.89
OF1	OUTFALL	0.02	0.04	205.35	0	03:41	0.04
SWMF	STORAGE	1.66	1.93	207.58	0	04:00	1.93

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
EOR1	JUNCTION	0.000	0.002	0	01:36	0	0.000477	-0.712	
EOR2	JUNCTION	0.000	0.085	0	03:59	0	6.48	0.017	
EOR3	JUNCTION	0.000	0.085	0	04:01	0	6.47	0.014	
EOR4	JUNCTION	0.000	0.085	0	04:01	0	6.48	0.015	
EOR5	JUNCTION	0.062	0.086	0	03:37	0.0679	6.54	0.066	
HW1	JUNCTION	1.246	1.246	0	01:20	1.51	1.51	0.468	
J1	JUNCTION	0.000	2.744	0	01:20	0	3.25	0.573	
J2	JUNCTION	0.000	0.085	0	04:00	0	6.48	0.003	
J7	JUNCTION	0.000	0.000	0	00:00	0	0	0.000	ltr
J8	JUNCTION	0.000	0.000	0	00:00	0	0	0.000	ltr
MH262	JUNCTION	0.630	0.630	0	01:30	1.22	1.22	1.012	
MH290	JUNCTION	0.000	0.626	0	01:30	0	1.21	-0.591	
MH52	JUNCTION	2.725	2.725	0	01:20	3.15	3.16	0.009	
OF1	OUTFALL	0.166	0.186	0	01:20	0.205	6.74	0.000	
SWMF	STORAGE	0.873	4.561	0	01:20	1.26	13.4	-0.080	

****
Node Surcharge Summary
****

No nodes were surcharged.

****
Node Flooding Summary
****

****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
SWMF	8.423	17	0	0	12.443	25	0 04:00	0.358

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	98.75	0.028	0.186	6.741
System	98.75	0.028	0.186	6.741

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C5	CONDUIT	0.626	0 01:30	2.03	1.05	0.80

C6	CONDUIT	2.744	0	01:20	2.66	0.46	0.48
EOR1	CONDUIT	0.002	0	01:36	0.02	0.00	0.01
EOR2	CONDUIT	0.085	0	04:01	0.40	0.00	0.02
EOR3	CONDUIT	0.085	0	04:01	0.47	0.00	0.03
EOR4	CONDUIT	0.085	0	04:04	0.30	0.00	0.04
EOR5	CONDUIT	0.086	0	03:41	0.39	0.00	0.05
Inlet1	CONDUIT	0.626	0	01:30	2.13	1.07	0.89
Inlet2	CONDUIT	1.242	0	01:20	3.58	0.14	0.22
Inlet3	CONDUIT	2.734	0	01:20	2.64	0.47	0.54
Primary	CONDUIT	0.085	0	04:00	2.62	0.20	0.26
Spillway1	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
Spillway2	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
Spillway3	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
Spillway4	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
Primary_Outlet	ORIFICE	0.085	0	04:00			1.00
EOW	WEIR	0.000	0	00:00			0.00

****
Flow Classification Summary
****

	Adjusted	Fraction of Time in Flow Class								
Conduit	/Actual Length	Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C5	1.00	0.00	0.09	0.00	0.90	0.00	0.00	0.01	0.98	0.00
C6	1.00	0.00	0.04	0.00	0.96	0.00	0.00	0.00	0.64	0.00
EOR1	1.00	0.01	0.79	0.00	0.20	0.00	0.00	0.00	0.81	0.00
EOR2	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
EOR3	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.98	0.00
EOR4	1.00	0.01	0.01	0.00	0.98	0.00	0.00	0.00	0.75	0.00
EOR5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
Inlet1	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.01	0.00	0.00
Inlet2	1.00	0.02	0.31	0.00	0.66	0.00	0.00	0.01	0.97	0.00
Inlet3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Primary	1.00	0.01	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00
Spillway1	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spillway2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spillway3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

```
Spillway4               1.00   1.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
```

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Hours Full: Upstream	Hours Full: Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C5	0.01	0.01	0.01	0.16	0.01
Inlet1	0.01	0.01	0.01	0.18	0.01

```
Analysis begun on:  Thu Dec  1 10:34:35 2022
Analysis ended on:  Thu Dec  1 10:34:47 2022
Total elapsed time: 00:00:12
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
--------------------------------------------------------------

PRA-16084 Galloway Subdivision & Pratt Industrial Subdivision
PROJECT MANAGER: JWI
MODELLING COMPLETED BY: MG

WARNING 02: maximum depth increased for Node EOR2
WARNING 02: maximum depth increased for Node HW1
WARNING 02: maximum depth increased for Node MH262

*************
Element Count
*************
Number of rain gages ...... 14
Number of subcatchments ... 20
Number of nodes ........... 15
Number of links ........... 17
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                 Data       Recording
Name                 Data Source                 Type       Interval
----------------------------------------------------------------------
100Yr24HrSCS         100Yr24HrSCS                INTENSITY    6 min.
100Yr4HrCHI          100Yr4HrCHI                 INTENSITY    5 min.
10Yr24HrSCS          10Yr24HrSCS                 INTENSITY    6 min.
10Yr4HrCHI           10Yr4HrCHI                  INTENSITY    5 min.
25mm4HrCHIWQE        25mm4HrCHIWQE               INTENSITY    5 min.
25Yr24HrSCS          25Yr24HrSCS                 INTENSITY    6 min.
25Yr4HrCHI           25Yr4HrCHI                  INTENSITY    5 min.
2Yr24HrSCS           2Yr24HrSCS                  INTENSITY    6 min.
2yr4HrCHI            2yr4HrCHI                   INTENSITY    5 min.
50Yr24HrSCS          50Yr24HrSCS                 INTENSITY    6 min.
50Yr4HrCHI           50Yr4HrCHI                  INTENSITY    5 min.
5Yr24HrSCS           5Yr24HrSCS                  INTENSITY    6 min.
```

5Yr4HrCHI	5Yr4HrCHI	INTENSITY	5 min.
Timmins	Timmins	INTENSITY	60 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
201	0.53	58.78	86.00	3.2000	100Yr24HrSCS	214
202	4.66	465.97	18.00	1.4000	100Yr24HrSCS	HW1
203	9.06	905.83	56.00	2.1000	100Yr24HrSCS	HW1
204	17.62	1762.38	50.00	2.0000	100Yr24HrSCS	MH52
205	10.73	1073.06	50.00	2.0000	100Yr24HrSCS	MH52
206	4.74	474.38	50.00	4.8000	100Yr24HrSCS	MH52
207	2.91	290.79	50.00	2.7000	100Yr24HrSCS	MH52
208	29.41	2940.64	41.00	1.5000	100Yr24HrSCS	213
209	0.46	459.90	61.00	2.0000	100Yr24HrSCS	MH262
210	1.06	235.87	3.00	2.2000	100Yr24HrSCS	219
211	1.99	198.51	84.00	2.2000	100Yr24HrSCS	MH262
212	1.76	176.00	26.00	2.2000	100Yr24HrSCS	EOR5
213	0.33	33.35	50.00	2.0000	100Yr24HrSCS	218
214	1.13	377.70	54.00	2.0000	100Yr24HrSCS	HW1
215	0.72	326.32	40.00	3.0000	100Yr24HrSCS	HW1
216	10.29	2286.18	56.00	2.0000	100Yr24HrSCS	MH52
217	1.76	627.82	42.00	2.0000	100Yr24HrSCS	SWMF
218	4.06	1013.98	6.00	5.0000	100Yr24HrSCS	SWMF
219	8.64	864.48	76.00	2.0000	100Yr24HrSCS	MH262
220	4.74	474.10	55.00	2.0000	100Yr24HrSCS	OF1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
EOR1	JUNCTION	206.73	3.93	0.0	
EOR2	JUNCTION	206.66	3.93	0.0	
EOR3	JUNCTION	206.48	3.32	0.0	
EOR4	JUNCTION	206.21	3.91	0.0	

EOR5	JUNCTION	206.18	1.92	0.0
HW1	JUNCTION	208.69	0.90	0.0
J1	JUNCTION	206.97	2.38	0.0
J2	JUNCTION	207.15	2.20	0.0
J7	JUNCTION	209.30	0.30	0.0
J8	JUNCTION	210.30	0.32	0.0
MH262	JUNCTION	207.28	3.57	0.0
MH290	JUNCTION	206.82	3.07	0.0
MH52	JUNCTION	205.99	4.72	0.0
OF1	OUTFALL	205.31	1.32	0.0
SWMF	STORAGE	205.65	3.75	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C5	MH262	MH290	CONDUIT	121.5	0.5019	0.0130
C6	MH52	J1	CONDUIT	67.2	0.5058	0.0130
EOR1	EOR1	EOR2	CONDUIT	12.5	0.5584	0.0300
EOR2	EOR2	EOR3	CONDUIT	37.3	0.4821	0.0300
EOR3	EOR3	EOR4	CONDUIT	54.9	0.4914	0.0130
EOR4	EOR4	EOR5	CONDUIT	6.8	0.4966	0.0300
EOR5	EOR5	OF1	CONDUIT	175.6	0.4931	0.0300
Inlet1	MH290	SWMF	CONDUIT	18.4	0.4886	0.0130
Inlet2	HW1	SWMF	CONDUIT	59.5	2.5056	0.0130
Inlet3	J1	SWMF	CONDUIT	16.9	0.4748	0.0130
Primary	J2	EOR2	CONDUIT	21.5	2.2755	0.0130
Spillway1	MH262	SWMF	CONDUIT	110.0	0.6818	0.0130
Spillway2	MH52	J8	CONDUIT	50.3	0.2188	0.0130
Spillway3	J8	J7	CONDUIT	45.5	2.2003	0.0130
Spillway4	J7	SWMF	CONDUIT	121.6	0.2467	0.0130
Primary_Outlet	SWMF	J2	ORIFICE			
EOW	SWMF	EOR1	WEIR			

****
Cross Section Summary
****

	Full	Full	Hyd.	Max.	No. of	Full

Conduit	Shape	Depth	Area	Rad.	Width	Barrels	Flow
C5	CIRCULAR	0.68	0.36	0.17	0.68	1	0.60
C6	RECT_CLOSED	1.20	2.16	0.36	1.80	1	5.98
EOR1	TRAPEZOIDAL	3.93	58.12	2.09	26.58	1	236.45
EOR2	TRAPEZOIDAL	3.32	43.03	1.79	22.92	1	147.00
EOR3	RECT_CLOSED	1.80	5.40	0.56	3.00	1	19.85
EOR4	TRAPEZOIDAL	1.92	16.82	1.11	14.52	1	42.38
EOR5	TRAPEZOIDAL	1.32	9.19	0.81	10.92	1	18.68
Inlet1	CIRCULAR	0.68	0.36	0.17	0.68	1	0.59
Inlet2	RECT_CLOSED	0.90	1.62	0.30	1.80	1	8.84
Inlet3	RECT_CLOSED	1.20	2.16	0.36	1.80	1	5.79
Primary	CIRCULAR	0.45	0.16	0.11	0.45	1	0.43
Spillway1	TRAPEZOIDAL	1.00	8.00	0.71	11.00	1	40.31
Spillway2	TRAPEZOIDAL	0.30	1.77	0.26	6.80	1	2.57
Spillway3	RECT_OPEN	0.30	2.40	0.28	8.00	1	11.70
Spillway4	TRAPEZOIDAL	0.30	2.40	0.22	11.00	1	3.32

```
**********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
**********************************************************

***************
Analysis Options
***************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
```

```
Starting Date ............ 11/06/2019 00:00:00
Ending Date .............. 11/09/2019 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 2
Head Tolerance ........... 0.001500 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	14.354	123.100
Evaporation Loss	0.000	0.000
Infiltration Loss	6.740	57.804
Surface Runoff	7.541	64.675
Final Storage	0.112	0.958
Continuity Error (%)	-0.274	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	7.545	75.451
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	7.430	74.303
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.623	6.231
Final Stored Volume	0.739	7.388
Continuity Error (%)	-0.010	

```
**************************
Time-Step Critical Elements
**************************
Link EOR4 (42.27%)
Link Inlet1 (6.13%)


******************************
Highest Flow Instability Indexes
******************************
Link Inlet3 (6)
Link C6 (5)


************************
Routing Time Step Summary
************************
Minimum Time Step           :     0.50 sec
Average Time Step           :     4.21 sec
Maximum Time Step           :     5.00 sec
Percent in Steady State     :    -0.00
Average Iterations per Step :     2.00
Percent Not Converging      :     0.01
Time Step Frequencies       :
    5.000 -  3.155 sec      :    79.81 %
    3.155 -  1.991 sec      :    12.09 %
    1.991 -  1.256 sec      :     4.67 %
    1.256 -  0.792 sec      :     3.40 %
    0.792 -  0.500 sec      :     0.03 %


**************************
Subcatchment Runoff Summary
**************************
```

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
201	123.10	0.00	0.00	11.69	104.44	5.63	110.07	0.59	0.24	0.894

202	123.10	0.00	0.00	72.27	21.83	28.78	50.61	2.36	0.99	0.411
203	123.10	0.00	0.00	38.14	68.00	16.14	84.15	7.62	3.28	0.684
204	123.10	0.00	0.00	54.53	60.71	31.50	67.93	11.97	5.36	0.552
205	123.10	0.00	0.00	54.02	60.71	32.00	68.43	7.34	3.30	0.556
206	123.10	0.00	0.00	53.62	60.67	32.43	68.83	3.27	1.64	0.559
207	123.10	0.00	0.00	53.86	60.70	32.17	68.59	1.99	0.93	0.557
208	123.10	0.00	0.00	52.43	49.78	20.32	70.10	20.61	8.47	0.569
209	123.10	0.00	0.00	32.40	73.89	15.88	89.76	0.41	0.21	0.729
210	123.10	0.00	0.00	87.07	3.63	35.11	36.31	0.39	0.28	0.295
211	123.10	0.00	0.00	29.89	102.03	35.86	91.98	1.83	0.79	0.747
212	123.10	0.00	0.00	71.70	31.54	30.92	51.10	0.90	0.43	0.415
213	123.10	6192.87	0.00	180.89	3157.30	2981.18	6138.48	20.47	8.52	0.972
214	123.10	52.00	0.00	63.15	93.54	53.29	111.29	1.26	0.63	0.636
215	123.10	0.00	0.00	71.95	48.45	50.73	50.73	0.36	0.27	0.412
216	123.10	0.00	0.00	52.82	67.93	36.91	69.52	7.15	3.87	0.565
217	123.10	0.00	0.00	70.49	50.89	50.10	52.13	0.92	0.64	0.424
218	123.10	503.10	0.00	188.21	37.46	401.22	438.68	17.79	8.36	0.701
219	123.10	4.49	0.00	43.60	95.70	53.33	83.00	7.18	3.43	0.651
220	123.10	0.00	0.00	57.86	66.79	42.51	64.55	3.06	1.55	0.524

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
EOR1	JUNCTION	0.09	1.47	208.20	0 12:05	1.47
EOR2	JUNCTION	0.14	1.50	208.16	0 12:05	1.50
EOR3	JUNCTION	0.10	1.58	208.06	0 12:06	1.58
EOR4	JUNCTION	0.13	1.59	207.80	0 12:07	1.59
EOR5	JUNCTION	0.15	1.61	207.78	0 12:07	1.61
HW1	JUNCTION	0.02	0.53	209.22	0 12:00	0.53
J1	JUNCTION	0.52	1.97	208.94	0 12:01	1.97
J2	JUNCTION	0.13	1.04	208.19	0 12:05	1.04
J7	JUNCTION	0.00	0.17	209.47	0 12:00	0.17
J8	JUNCTION	0.00	0.08	210.38	0 11:54	0.08
MH262	JUNCTION	0.54	2.82	210.10	0 11:59	2.82

MH290	JUNCTION	0.68	1.98	208.80	0	12:04	1.98
MH52	JUNCTION	1.55	4.60	210.59	0	12:00	4.60
OF1	OUTFALL	0.09	1.19	206.50	0	12:07	1.19
SWMF	STORAGE	1.84	2.96	208.61	0	12:05	2.96

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
EOR1	JUNCTION	0.000	21.291	0	12:05	0	58.2	-0.000
EOR2	JUNCTION	0.000	21.390	0	12:05	0	70.4	0.002
EOR3	JUNCTION	0.000	21.375	0	12:05	0	70.3	0.003
EOR4	JUNCTION	0.000	21.368	0	12:05	0	70.3	0.002
EOR5	JUNCTION	0.427	21.580	0	12:05	0.9	71.2	0.006
HW1	JUNCTION	5.105	5.105	0	11:54	11.6	11.6	0.004
J1	JUNCTION	0.000	14.066	0	11:54	0	32.1	0.123
J2	JUNCTION	0.000	0.134	0	11:50	0	12.1	0.003
J7	JUNCTION	0.000	1.226	0	12:00	0	0.485	-0.308
J8	JUNCTION	0.000	1.231	0	12:00	0	0.486	0.036
MH262	JUNCTION	4.314	4.314	0	11:59	9.41	9.41	-0.014
MH290	JUNCTION	0.000	1.024	0	11:44	0	6.1	0.081
MH52	JUNCTION	15.094	15.094	0	11:54	31.7	31.7	-0.009
OF1	OUTFALL	1.548	22.224	0	12:06	3.06	74.3	0.000
SWMF	STORAGE	8.976	32.170	0	12:00	18.7	78.6	-0.018

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Hours	Max. Height Above Crown	Min. Depth Below Rim

Node	Type	Surcharged	Meters	Meters
J1	JUNCTION	0.72	0.769	0.411
MH290	JUNCTION	2.81	1.051	1.094

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
SWMF	11.288	23	0	0	31.927	64	0 12:05	21.395

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	98.24	0.865	22.224	74.302
System	98.24	0.865	22.224	74.302

****
Link Flow Summary

****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C5	CONDUIT	1.024	0	11:44	2.86	1.72	1.00
C6	CONDUIT	14.066	0	11:54	6.51	2.35	1.00
EOR1	CONDUIT	21.287	0	12:05	1.96	0.09	0.38
EOR2	CONDUIT	21.375	0	12:05	1.90	0.15	0.46
EOR3	CONDUIT	21.368	0	12:05	4.60	1.08	0.88
EOR4	CONDUIT	21.323	0	12:05	2.00	0.50	0.83
EOR5	CONDUIT	21.399	0	12:07	2.53	1.15	0.95
Inlet1	CONDUIT	1.024	0	11:44	2.86	1.74	1.00
Inlet2	CONDUIT	5.117	0	11:54	4.02	0.58	0.80
Inlet3	CONDUIT	14.065	0	11:54	6.51	2.43	1.00
Primary	CONDUIT	0.133	0	12:48	2.71	0.31	1.00
Spillway1	CONDUIT	3.386	0	11:59	2.32	0.08	0.25
Spillway2	CONDUIT	1.231	0	12:00	1.80	0.48	0.43
Spillway3	CONDUIT	1.226	0	12:00	2.36	0.10	0.41
Spillway4	CONDUIT	1.158	0	12:00	1.06	0.35	0.55
Primary_Outlet	ORIFICE	0.134	0	11:50			1.00
EOW	WEIR	21.291	0	12:05			0.55

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C5	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.96	0.00
C6	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.41	0.00
EOR1	1.00	0.02	0.48	0.00	0.50	0.00	0.00	0.00	0.48	0.00
EOR2	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
EOR3	1.00	0.02	0.00	0.00	0.93	0.04	0.00	0.00	0.94	0.00
EOR4	1.00	0.02	0.01	0.00	0.97	0.00	0.00	0.00	0.50	0.00

EOR5	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00
Inlet1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Inlet2	1.00	0.02	0.11	0.00	0.81	0.03	0.00	0.03	0.94	0.00
Inlet3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Primary	1.00	0.02	0.00	0.00	0.09	0.89	0.00	0.00	0.06	0.00
Spillway1	1.00	0.97	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
Spillway2	1.00	0.93	0.06	0.00	0.00	0.01	0.00	0.00	0.83	0.00
Spillway3	1.00	0.46	0.47	0.00	0.06	0.01	0.00	0.00	0.83	0.00
Spillway4	1.00	0.46	0.00	0.00	0.00	0.00	0.00	0.54	0.00	0.00

****
Conduit Surcharge Summary
****

	Hours Full			Hours Above Full	Hours Capacity
Conduit	Both Ends	Upstream	Dnstream	Normal Flow	Limited
C5	1.01	1.01	2.81	0.79	0.79
C6	0.49	0.50	0.72	0.37	0.32
EOR3	0.01	0.01	0.01	0.15	0.01
EOR5	0.01	0.24	0.01	0.23	0.01
Inlet1	4.73	4.73	15.46	0.80	0.80
Inlet2	0.01	0.01	0.76	0.01	0.01
Inlet3	0.68	0.72	0.78	0.38	0.28
Primary	0.65	0.65	1.49	0.01	0.01

Analysis begun on: Thu Dec 1 10:34:02 2022
Analysis ended on: Thu Dec 1 10:34:07 2022
Total elapsed time: 00:00:05

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.015)
--------------------------------------------------------------

PRA-16084 Galloway Subdivision & Pratt Industrial Subdivision
PROJECT MANAGER: JWI
MODELLING COMPLETED BY: MG

WARNING 02: maximum depth increased for Node EOR2
WARNING 02: maximum depth increased for Node HW1
WARNING 02: maximum depth increased for Node MH262

*************
Element Count
*************
Number of rain gages ...... 14
Number of subcatchments ... 20
Number of nodes ........... 15
Number of links ........... 17
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                 Data       Recording
Name                 Data Source                 Type       Interval
------------------------------------------------------------------------
100Yr24HrSCS         100Yr24HrSCS                INTENSITY    6 min.
100Yr4HrCHI          100Yr4HrCHI                 INTENSITY    5 min.
10Yr24HrSCS          10Yr24HrSCS                 INTENSITY    6 min.
10Yr4HrCHI           10Yr4HrCHI                  INTENSITY    5 min.
25mm4HrCHIWQE        25mm4HrCHIWQE               INTENSITY    5 min.
25Yr24HrSCS          25Yr24HrSCS                 INTENSITY    6 min.
25Yr4HrCHI           25Yr4HrCHI                  INTENSITY    5 min.
2Yr24HrSCS           2Yr24HrSCS                  INTENSITY    6 min.
2yr4HrCHI            2yr4HrCHI                   INTENSITY    5 min.
50Yr24HrSCS          50Yr24HrSCS                 INTENSITY    6 min.
50Yr4HrCHI           50Yr4HrCHI                  INTENSITY    5 min.
5Yr24HrSCS           5Yr24HrSCS                  INTENSITY    6 min.
```

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5Yr4HrCHI            5Yr4HrCHI                    INTENSITY    5 min.
Timmins              Timmins                      INTENSITY   60 min.
```

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
201	0.53	58.78	86.00	3.2000	Timmins	214
202	4.66	465.97	18.00	1.4000	Timmins	HW1
203	9.06	905.83	56.00	2.1000	Timmins	HW1
204	17.62	1762.38	50.00	2.0000	Timmins	MH52
205	10.73	1073.06	50.00	2.0000	Timmins	MH52
206	4.74	474.38	50.00	4.8000	Timmins	MH52
207	2.91	290.79	50.00	2.7000	Timmins	MH52
208	29.41	2940.64	41.00	1.5000	Timmins	213
209	0.46	459.90	61.00	2.0000	Timmins	MH262
210	1.06	235.87	3.00	2.2000	Timmins	219
211	1.99	198.51	84.00	2.2000	Timmins	MH262
212	1.76	176.00	26.00	2.2000	Timmins	EOR5
213	0.33	33.35	50.00	2.0000	Timmins	218
214	1.13	377.70	54.00	2.0000	Timmins	HW1
215	0.72	326.32	40.00	3.0000	Timmins	HW1
216	10.29	2286.18	56.00	2.0000	Timmins	MH52
217	1.76	627.82	42.00	2.0000	Timmins	SWMF
218	4.06	1013.98	6.00	5.0000	Timmins	SWMF
219	8.64	864.48	76.00	2.0000	Timmins	MH262
220	4.74	474.10	55.00	2.0000	Timmins	OF1

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
EOR1	JUNCTION	206.73	3.93	0.0	
EOR2	JUNCTION	206.66	3.93	0.0	
EOR3	JUNCTION	206.48	3.32	0.0	
EOR4	JUNCTION	206.21	3.91	0.0	

EOR5	JUNCTION	206.18	1.92	0.0
HW1	JUNCTION	208.69	0.90	0.0
J1	JUNCTION	206.97	2.38	0.0
J2	JUNCTION	207.15	2.20	0.0
J7	JUNCTION	209.30	0.30	0.0
J8	JUNCTION	210.30	0.32	0.0
MH262	JUNCTION	207.28	3.57	0.0
MH290	JUNCTION	206.82	3.07	0.0
MH52	JUNCTION	205.99	4.72	0.0
OF1	OUTFALL	205.31	1.32	0.0
SWMF	STORAGE	205.65	3.75	0.0

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C5	MH262	MH290	CONDUIT	121.5	0.5019	0.0130
C6	MH52	J1	CONDUIT	67.2	0.5058	0.0130
EOR1	EOR1	EOR2	CONDUIT	12.5	0.5584	0.0300
EOR2	EOR2	EOR3	CONDUIT	37.3	0.4821	0.0300
EOR3	EOR3	EOR4	CONDUIT	54.9	0.4914	0.0130
EOR4	EOR4	EOR5	CONDUIT	6.8	0.4966	0.0300
EOR5	EOR5	OF1	CONDUIT	175.6	0.4931	0.0300
Inlet1	MH290	SWMF	CONDUIT	18.4	0.4886	0.0130
Inlet2	HW1	SWMF	CONDUIT	59.5	2.5056	0.0130
Inlet3	J1	SWMF	CONDUIT	16.9	0.4748	0.0130
Primary	J2	EOR2	CONDUIT	21.5	2.2755	0.0130
Spillway1	MH262	SWMF	CONDUIT	110.0	0.6818	0.0130
Spillway2	MH52	J8	CONDUIT	50.3	0.2188	0.0130
Spillway3	J8	J7	CONDUIT	45.5	2.2003	0.0130
Spillway4	J7	SWMF	CONDUIT	121.6	0.2467	0.0130
Primary_Outlet	SWMF	J2	ORIFICE			
EOW	SWMF	EOR1	WEIR			

****
Cross Section Summary
****

	Full	Full	Hyd.	Max.	No. of	Full

Conduit	Shape	Depth	Area	Rad.	Width	Barrels	Flow
C5	CIRCULAR	0.68	0.36	0.17	0.68	1	0.60
C6	RECT_CLOSED	1.20	2.16	0.36	1.80	1	5.98
EOR1	TRAPEZOIDAL	3.93	58.12	2.09	26.58	1	236.45
EOR2	TRAPEZOIDAL	3.32	43.03	1.79	22.92	1	147.00
EOR3	RECT_CLOSED	1.80	5.40	0.56	3.00	1	19.85
EOR4	TRAPEZOIDAL	1.92	16.82	1.11	14.52	1	42.38
EOR5	TRAPEZOIDAL	1.32	9.19	0.81	10.92	1	18.68
Inlet1	CIRCULAR	0.68	0.36	0.17	0.68	1	0.59
Inlet2	RECT_CLOSED	0.90	1.62	0.30	1.80	1	8.84
Inlet3	RECT_CLOSED	1.20	2.16	0.36	1.80	1	5.79
Primary	CIRCULAR	0.45	0.16	0.11	0.45	1	0.43
Spillway1	TRAPEZOIDAL	1.00	8.00	0.71	11.00	1	40.31
Spillway2	TRAPEZOIDAL	0.30	1.77	0.26	6.80	1	2.57
Spillway3	RECT_OPEN	0.30	2.40	0.28	8.00	1	11.70
Spillway4	TRAPEZOIDAL	0.30	2.40	0.22	11.00	1	3.32

```
**********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
**********************************************************

***************
Analysis Options
***************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
```

```
Starting Date ............ 11/06/2019 00:00:00
Ending Date .............. 11/09/2019 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 5.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 2
Head Tolerance ........... 0.001500 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	22.505	193.000
Evaporation Loss	0.000	0.000
Infiltration Loss	10.960	93.992
Surface Runoff	11.457	98.253
Final Storage	0.112	0.958
Continuity Error (%)	-0.105	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	11.456	114.559
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	11.446	114.458
Flooding Loss	0.025	0.246
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.623	6.231
Final Stored Volume	0.714	7.139
Continuity Error (%)	-0.871	

```
*************************
Highest Continuity Errors
*************************
Node J1 (-1.62%)


***************************
Time-Step Critical Elements
***************************
Link EOR4 (50.20%)
Link Inlet3 (1.22%)


*******************************
Highest Flow Instability Indexes
*******************************
Link Inlet3 (5)
Link C6 (4)
Link EOR1 (2)
Link Inlet1 (2)
Link EOW (2)


************************
Routing Time Step Summary
************************
Minimum Time Step           :     0.50 sec
Average Time Step           :     3.86 sec
Maximum Time Step           :     5.00 sec
Percent in Steady State     :    -0.00
Average Iterations per Step :     2.06
Percent Not Converging      :     0.83
Time Step Frequencies       :
    5.000 -  3.155 sec      :    67.51 %
    3.155 -  1.991 sec      :    11.92 %
    1.991 -  1.256 sec      :    18.50 %
    1.256 -  0.792 sec      :     2.02 %
    0.792 -  0.500 sec      :     0.05 %


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Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
201	193.00	0.00	0.00	22.22	164.46	4.82	169.28	0.91	0.06	0.877
202	193.00	0.00	0.00	133.30	34.44	25.00	59.44	2.77	0.34	0.308
203	193.00	0.00	0.00	71.29	107.10	13.66	120.76	10.94	0.92	0.626
204	193.00	0.00	0.00	92.72	95.63	42.07	99.45	17.53	1.77	0.515
205	193.00	0.00	0.00	92.13	95.63	42.66	100.03	10.73	1.08	0.518
206	193.00	0.00	0.00	91.70	95.65	43.10	100.49	4.77	0.48	0.521
207	193.00	0.00	0.00	91.97	95.63	42.82	100.20	2.91	0.29	0.519
208	193.00	0.00	0.00	96.76	78.42	17.15	95.56	28.10	2.62	0.495
209	193.00	0.00	0.00	61.67	116.83	13.72	130.55	0.60	0.05	0.676
210	193.00	0.00	0.00	160.66	5.75	30.48	32.38	0.34	0.08	0.168
211	193.00	0.00	0.00	34.11	160.61	69.13	157.47	3.13	0.23	0.816
212	193.00	0.00	0.00	128.05	49.74	32.73	64.57	1.14	0.15	0.335
213	193.00	8426.12	0.00	125.84	4309.29	4186.80	8496.09	28.33	2.62	0.986
214	193.00	79.91	0.00	92.05	146.47	89.30	180.11	2.04	0.18	0.660
215	193.00	0.00	0.00	115.68	76.60	76.87	76.87	0.55	0.07	0.398
216	193.00	0.00	0.00	85.15	107.14	55.55	106.98	11.01	1.08	0.554
217	193.00	0.00	0.00	112.48	80.39	76.75	79.96	1.41	0.17	0.414
218	193.00	698.60	0.00	208.49	53.42	630.08	683.49	27.72	2.80	0.767
219	193.00	3.98	0.00	51.39	148.34	98.34	144.33	12.48	1.05	0.733
220	193.00	0.00	0.00	89.78	105.18	67.61	102.32	4.85	0.49	0.530

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
EOR1	JUNCTION	0.15	0.96	207.69	0 07:01	0.96
EOR2	JUNCTION	0.19	0.97	207.63	0 07:01	0.97

EOR3	JUNCTION	0.15	0.96	207.44	0	07:01	0.95
EOR4	JUNCTION	0.19	1.00	207.21	0	07:02	1.00
EOR5	JUNCTION	0.21	1.01	207.18	0	07:02	1.01
HW1	JUNCTION	0.03	0.22	208.91	0	07:00	0.22
J1	JUNCTION	0.56	2.38	209.35	0	05:30	2.20
J2	JUNCTION	0.12	0.52	207.67	0	07:01	0.52
J7	JUNCTION	0.00	0.00	209.30	0	00:00	0.00
J8	JUNCTION	0.00	0.00	210.30	0	00:00	0.00
MH262	JUNCTION	0.64	2.64	209.92	0	07:00	2.64
MH290	JUNCTION	0.73	1.62	208.44	0	07:00	1.62
MH52	JUNCTION	1.57	2.39	208.38	0	07:00	2.39
OF1	OUTFALL	0.14	0.80	206.11	0	07:02	0.80
SWMF	STORAGE	1.88	2.56	208.21	0	07:01	2.56

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
EOR1	JUNCTION	0.000	9.830	0	07:01	0	96.4	-0.000	
EOR2	JUNCTION	0.000	9.947	0	07:01	0	108	0.001	
EOR3	JUNCTION	0.000	9.948	0	07:01	0	108	0.001	
EOR4	JUNCTION	0.000	9.950	0	07:01	0	108	0.001	
EOR5	JUNCTION	0.146	10.082	0	07:01	1.14	110	0.005	
HW1	JUNCTION	1.503	1.503	0	07:00	16.3	16.3	0.024	
J1	JUNCTION	0.000	4.699	0	07:00	0	53.5	-1.593	
J2	JUNCTION	0.000	0.133	0	06:18	0	12	0.002	
J7	JUNCTION	0.000	0.000	0	00:00	0	0	0.000	ltr
J8	JUNCTION	0.000	0.000	0	00:00	0	0	0.000	ltr
MH262	JUNCTION	1.331	1.331	0	07:00	16.2	16.2	0.022	
MH290	JUNCTION	0.000	0.980	0	06:11	0	15.2	-0.005	
MH52	JUNCTION	4.701	4.701	0	07:00	46.9	47	-0.074	
OF1	OUTFALL	0.492	10.526	0	07:01	4.85	114	0.000	
SWMF	STORAGE	2.973	10.502	0	07:00	29.1	122	-0.107	

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	1.01	1.180	0.000
MH290	JUNCTION	8.82	0.691	1.454

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J1	0.03	3.007	0 05:57	0.246	0.000

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
SWMF	11.981	24	0	0	23.907	48	0 07:01	9.948

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
OF1	99.91	1.069	10.526	114.457
System	99.91	1.069	10.526	114.457

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C5	CONDUIT	0.980	0 06:11	2.74	1.64	1.00
C6	CONDUIT	4.699	0 07:00	2.36	0.79	0.95
EOR1	CONDUIT	9.830	0 07:01	1.72	0.04	0.25
EOR2	CONDUIT	9.948	0 07:01	1.75	0.07	0.29
EOR3	CONDUIT	9.950	0 07:01	3.39	0.50	0.54
EOR4	CONDUIT	9.949	0 07:01	1.65	0.23	0.52
EOR5	CONDUIT	10.079	0 07:02	1.95	0.54	0.68
Inlet1	CONDUIT	0.980	0 06:11	2.74	1.67	1.00
Inlet2	CONDUIT	1.502	0 07:00	2.05	0.17	0.62
Inlet3	CONDUIT	5.410	0 06:05	3.06	0.93	1.00
Primary	CONDUIT	0.133	0 06:18	2.71	0.31	1.00
Spillway1	CONDUIT	0.399	0 07:00	1.07	0.01	0.07
Spillway2	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
Spillway3	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
Spillway4	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
Primary_Outlet	ORIFICE	0.133	0 06:18			1.00
EOW	WEIR	9.830	0 07:01			0.32

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C5	1.00	0.00	0.04	0.00	0.96	0.00	0.00	0.01	0.92	0.00
C6	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.46	0.00
EOR1	1.00	0.00	0.48	0.00	0.52	0.00	0.00	0.00	0.62	0.00
EOR2	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
EOR3	1.00	0.00	0.00	0.00	0.95	0.04	0.00	0.00	0.90	0.00
EOR4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.56	0.00
EOR5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Inlet1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Inlet2	1.00	0.00	0.18	0.00	0.80	0.01	0.00	0.01	0.99	0.00
Inlet3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Primary	1.00	0.00	0.00	0.00	0.25	0.75	0.00	0.00	0.14	0.00
Spillway1	1.00	0.96	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
Spillway2	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spillway3	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spillway4	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C5	3.14	3.14	8.82	2.11	2.11
C6	0.01	0.01	0.88	0.01	0.01
Inlet1	11.22	11.22	15.10	2.16	2.16
Inlet2	0.01	0.01	0.88	0.01	0.01
Inlet3	0.67	0.88	0.93	0.01	0.01

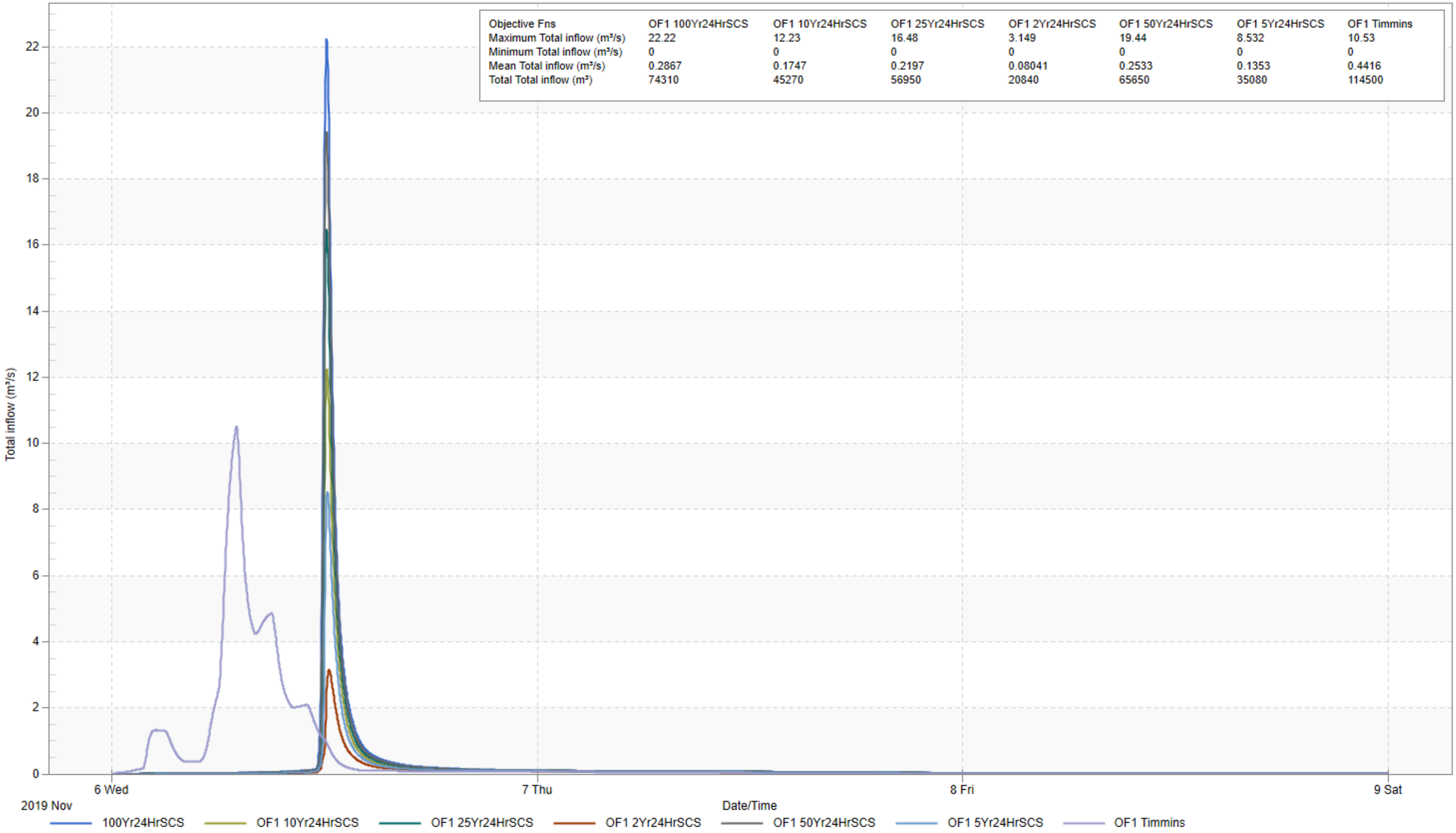
Primary	0.50	0.50	3.87	0.01	0.01

Analysis begun on: Thu Dec 1 10:35:26 2022
Analysis ended on: Thu Dec 1 10:35:34 2022
Total elapsed time: 00:00:08

Node OF1

PRA-16084 - Post-Dev-PF Flow vs. Time - 24HrSCS & Timmins

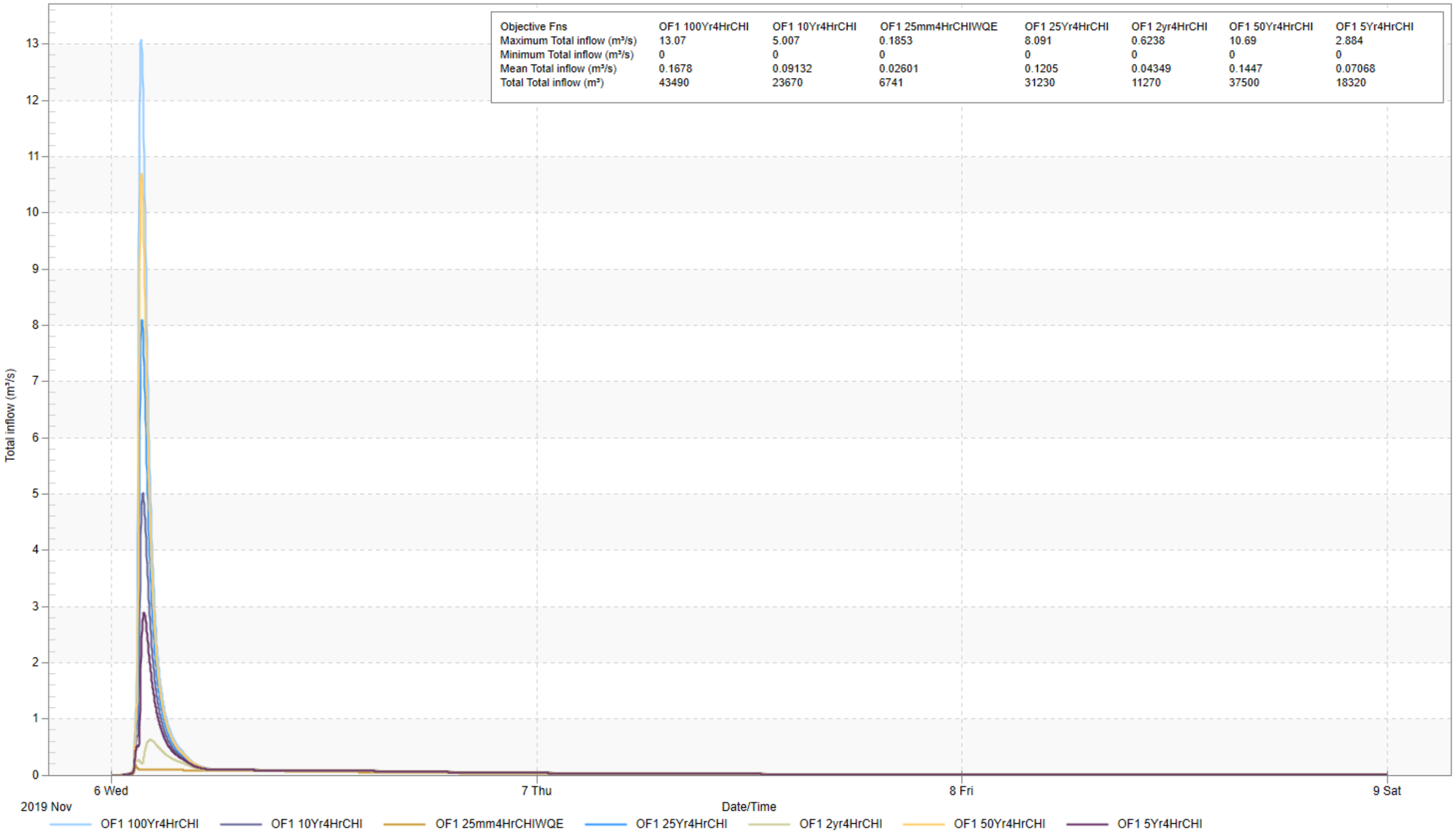
Objective Fns	OF1 100Yr24HrSCS	OF1 10Yr24HrSCS	OF1 25Yr24HrSCS	OF1 2Yr24HrSCS	OF1 50Yr24HrSCS	OF1 5Yr24HrSCS	OF1 Timmins
Maximum Total inflow (m³/s)	22.22	12.23	16.48	3.149	19.44	8.532	10.53
Minimum Total inflow (m³/s)	0	0	0	0	0	0	0
Mean Total inflow (m³/s)	0.2867	0.1747	0.2197	0.08041	0.2533	0.1353	0.4416
Total Total inflow (m³)	74310	45270	56950	20840	65650	35080	114500



Node OF1

PRA-16084 - Post-Dev-PF Flow vs. Time - 4HrCHI & 25mm 4HrCHI WQE

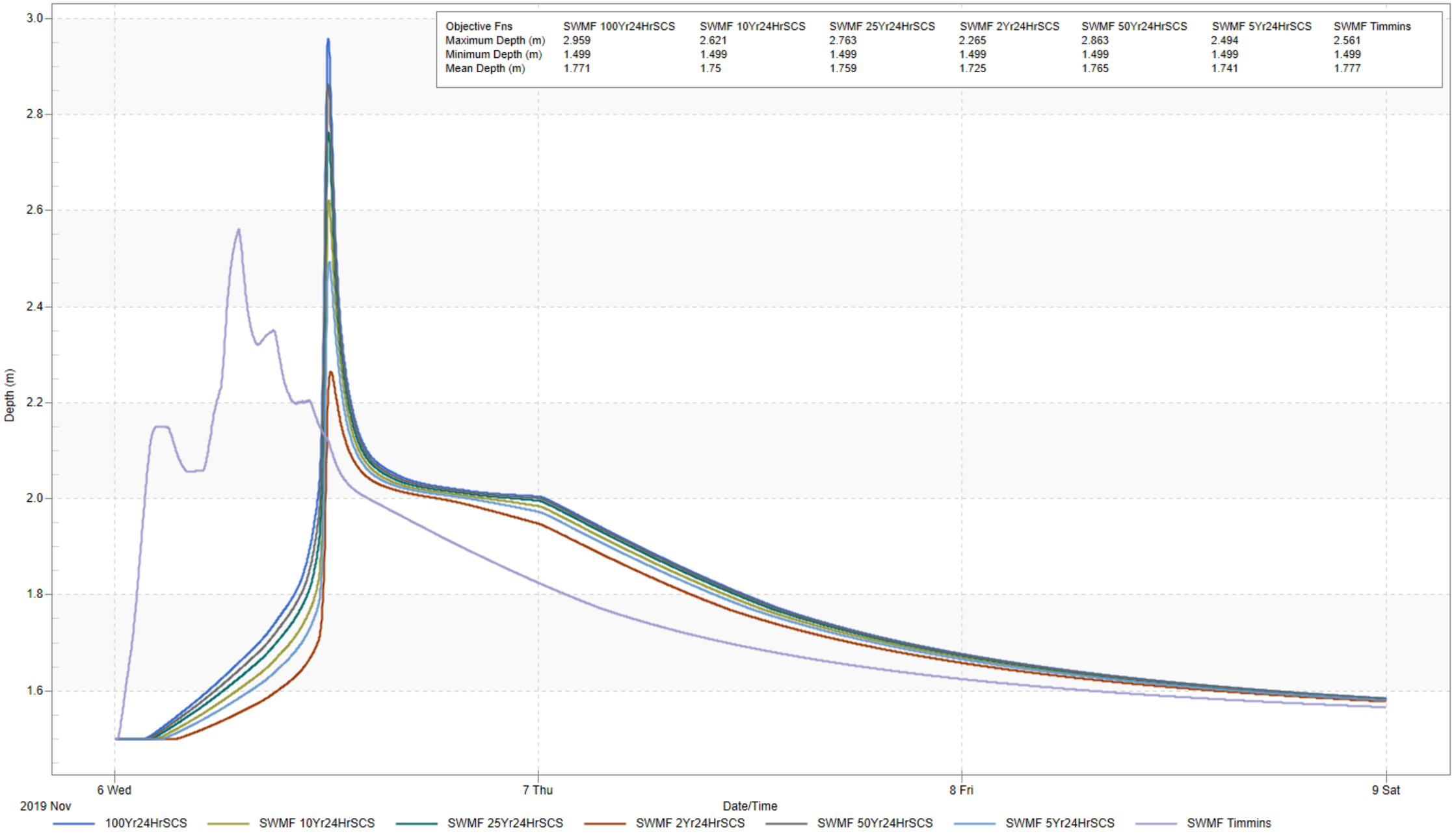
Objective Fns	OF1 100Yr4HrCHI	OF1 10Yr4HrCHI	OF1 25mm4HrCHIWQE	OF1 25Yr4HrCHI	OF1 2yr4HrCHI	OF1 50Yr4HrCHI	OF1 5Yr4HrCHI
Maximum Total inflow (m³/s)	13.07	5.007	0.1853	8.091	0.6238	10.69	2.884
Minimum Total inflow (m³/s)	0	0	0	0	0	0	0
Mean Total inflow (m³/s)	0.1678	0.09132	0.02601	0.1205	0.04349	0.1447	0.07068
Total Total inflow (m³)	43490	23670	6741	31230	11270	37500	18320



Node SWMF

PRA-16084 - Post-Dev-PF Depth vs. Time - 24HrSCS & Timmins

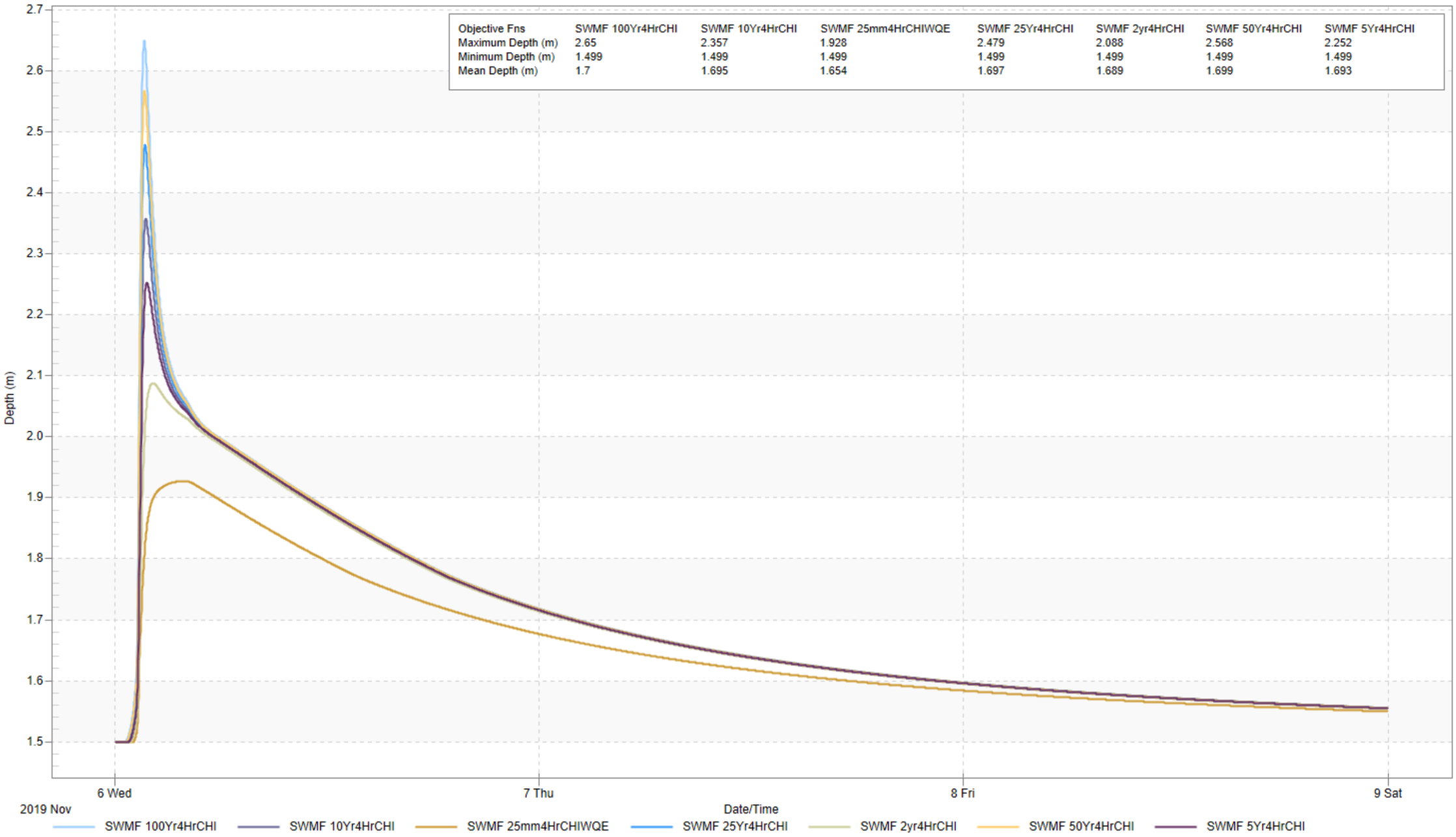
Objective Fns	SWMF 100Yr24HrSCS	SWMF 10Yr24HrSCS	SWMF 25Yr24HrSCS	SWMF 2Yr24HrSCS	SWMF 50Yr24HrSCS	SWMF 5Yr24HrSCS	SWMF Timmins
Maximum Depth (m)	2.959	2.621	2.763	2.265	2.863	2.494	2.561
Minimum Depth (m)	1.499	1.499	1.499	1.499	1.499	1.499	1.499
Mean Depth (m)	1.771	1.75	1.759	1.725	1.765	1.741	1.777



Node SWMF

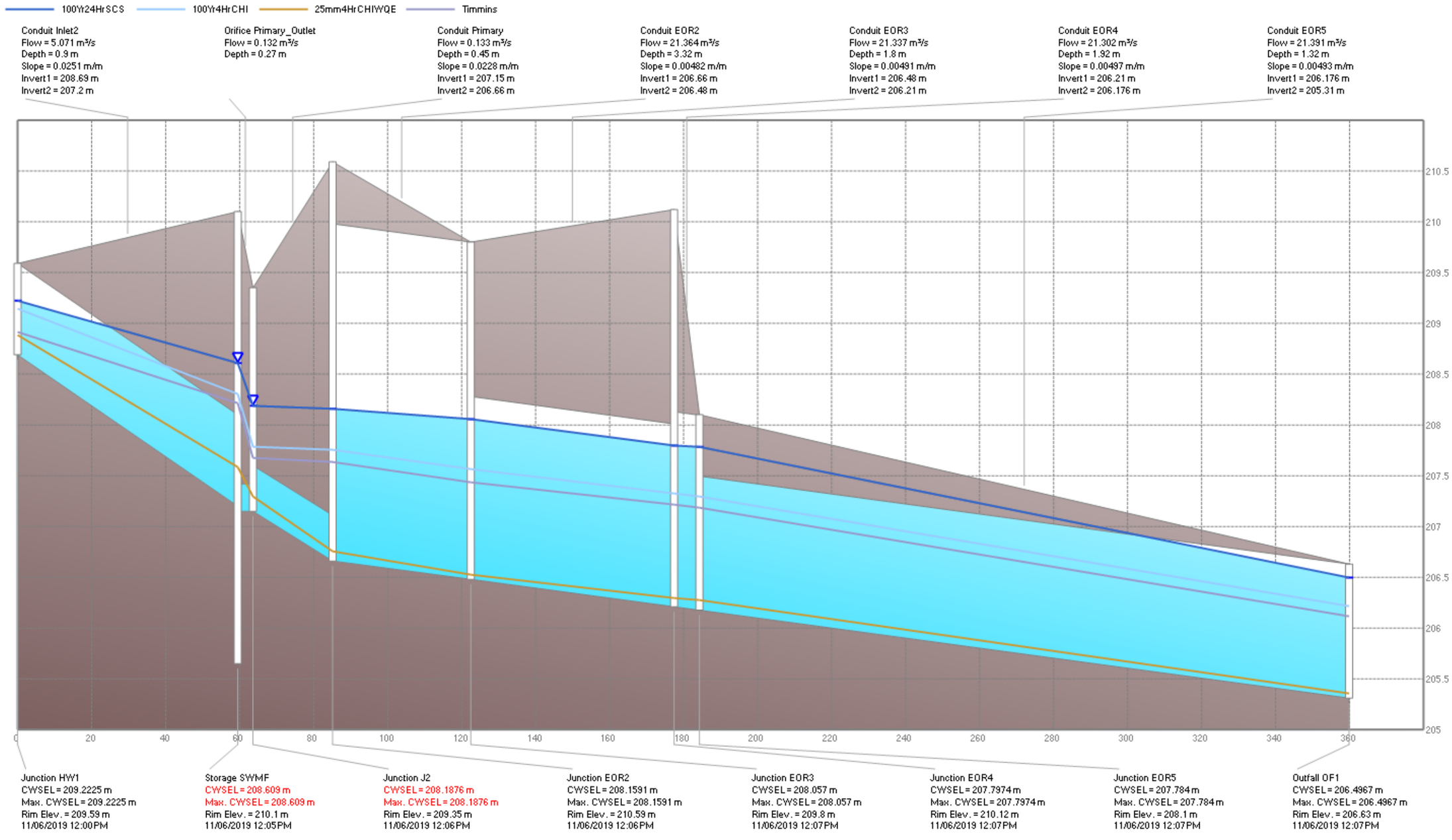
PRA-16084 - Post-Dev-PF Depth vs. Time - 4HrCHI & 25mm 4HrCHI WQE

Objective Fns	SWMF 100Yr4HrCHI	SWMF 10Yr4HrCHI	SWMF 25mm4HrCHIWQE	SWMF 25Yr4HrCHI	SWMF 2yr4HrCHI	SWMF 50Yr4HrCHI	SWMF 5Yr4HrCHI
Maximum Depth (m)	2.65	2.357	1.928	2.479	2.088	2.568	2.252
Minimum Depth (m)	1.499	1.499	1.499	1.499	1.499	1.499	1.499
Mean Depth (m)	1.7	1.695	1.654	1.697	1.689	1.699	1.693



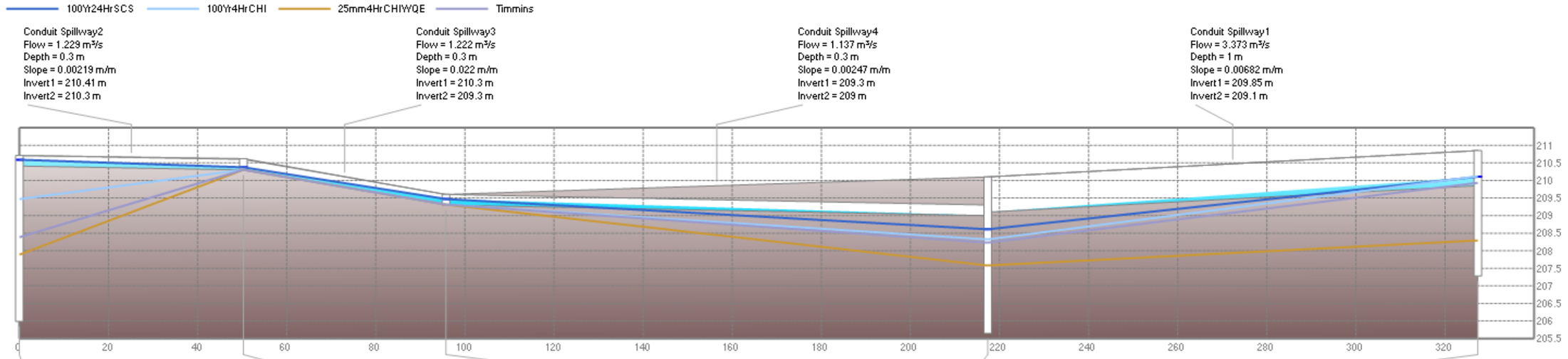
PRA-16084 - Post-Dev-PF HGL Profile

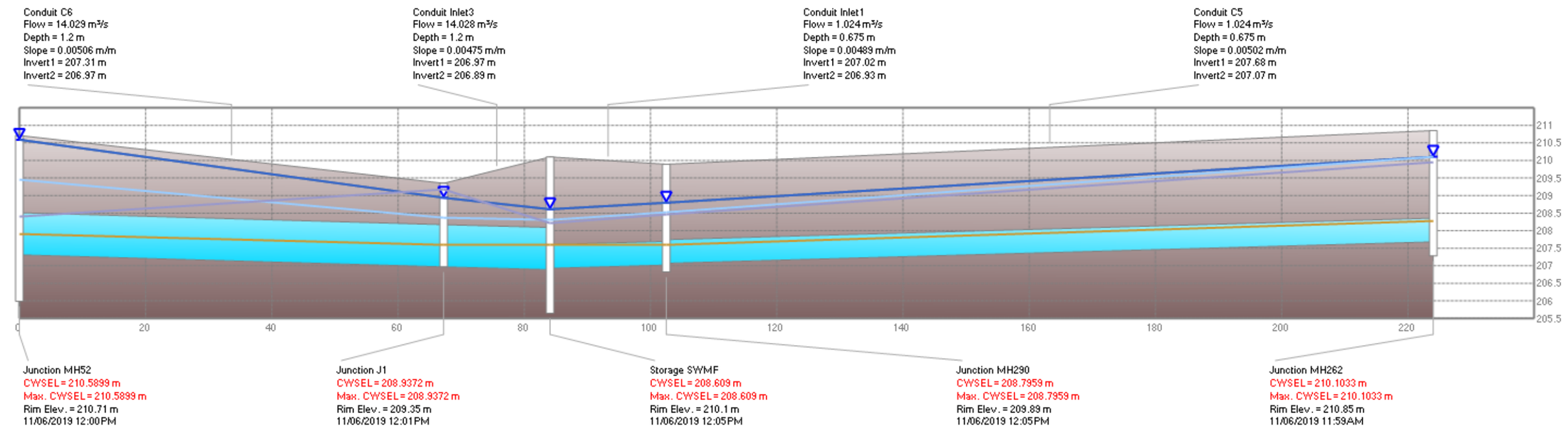
West to East Profile



PRA-16084 - Post-Dev-PF HGL Profile

North to South Profile





Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

12/01/2022

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

Site Name:	Pratt-Galloway Industrial Subdivision
Drainage Area (ha):	2.751
% Imperviousness:	76.00

Runoff Coefficient 'c': 0.75

Particle Size Distribution:	CA ETV
Target TSS Removal (%):	58.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	67.78
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Project Name:	Pratt-Galloway
Project Number:	PRA-16084
Designer Name:	Cole Shakell
Designer Company:	Jones Consulting Group Ltd
Designer Email:	cshakell@jonesconsulting.com
Designer Phone:	705-734-2538
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	37
EFO6	48
EFO8	54
EFO10	58
EFO12	61

Recommended Stormceptor EFO Model: EFO10

Estimated Net Annual Sediment (TSS) Load Reduction (%): 58

Water Quality Runoff Volume Capture (%): > 90

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THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

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

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

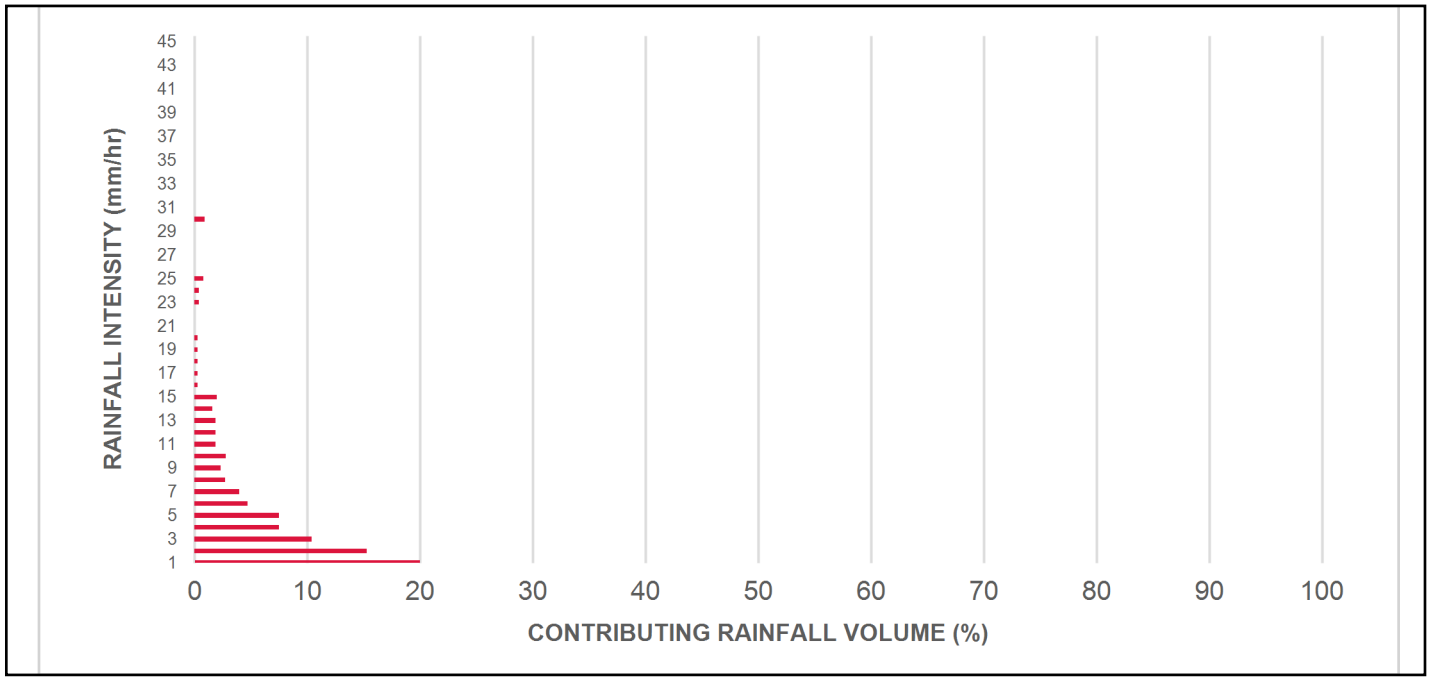
imbrium

Stormceptor® EF Sizing Report

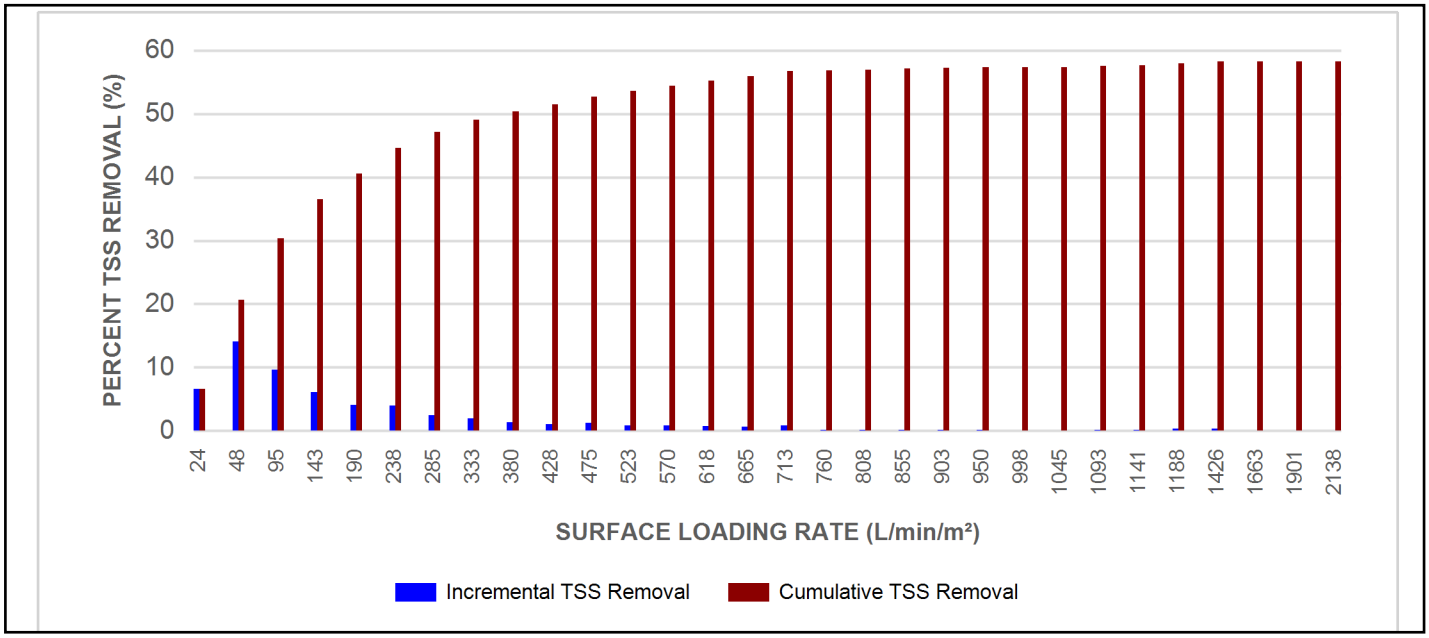
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.5	9.4	9.4	2.89	173.0	24.0	70	6.6	6.6
1	20.0	29.4	5.78	347.0	48.0	70	14.1	20.7
2	15.3	44.7	11.56	694.0	95.0	63	9.7	30.4
3	10.4	55.1	17.35	1041.0	143.0	59	6.1	36.5
4	7.5	62.6	23.13	1388.0	190.0	55	4.1	40.6
5	7.5	70.1	28.91	1735.0	238.0	53	4.0	44.6
6	4.7	74.9	34.69	2081.0	285.0	52	2.4	47.1
7	4.0	78.8	40.47	2428.0	333.0	50	2.0	49.0
8	2.7	81.6	46.25	2775.0	380.0	49	1.3	50.4
9	2.3	83.9	52.04	3122.0	428.0	47	1.1	51.5
10	2.8	86.6	57.82	3469.0	475.0	46	1.3	52.7
11	1.9	88.6	63.60	3816.0	523.0	44	0.9	53.6
12	1.9	90.5	69.38	4163.0	570.0	43	0.8	54.4
13	1.9	92.4	75.16	4510.0	618.0	42	0.8	55.2
14	1.6	94.0	80.94	4857.0	665.0	42	0.7	55.9
15	2.0	96.0	86.73	5204.0	713.0	41	0.8	56.7
16	0.3	96.3	92.51	5550.0	760.0	41	0.1	56.8
17	0.3	96.6	98.29	5897.0	808.0	41	0.1	56.9
18	0.3	96.9	104.07	6244.0	855.0	41	0.1	57.1
19	0.3	97.2	109.85	6591.0	903.0	41	0.1	57.2
20	0.3	97.5	115.63	6938.0	950.0	40	0.1	57.3
21	0.0	97.5	121.42	7285.0	998.0	40	0.0	57.3
22	0.0	97.5	127.20	7632.0	1045.0	39	0.0	57.3
23	0.4	97.9	132.98	7979.0	1093.0	39	0.1	57.5
24	0.4	98.3	138.76	8326.0	1141.0	38	0.2	57.6
25	0.8	99.1	144.54	8673.0	1188.0	37	0.3	57.9
30	0.9	100.0	173.45	10407.0	1426.0	34	0.3	58.2
35	0.0	100.0	202.36	12142.0	1663.0	29	0.0	58.2
40	0.0	100.0	231.27	13876.0	1901.0	25	0.0	58.2
45	0.0	100.0	260.18	15611.0	2138.0	22	0.0	58.2
Estimated Net Annual Sediment (TSS) Load Reduction =								**58 %**

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

RAINFALL DATA FROM BARRIE-ORO RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

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

SCOUR PREVENTION AND ONLINE CONFIGURATION

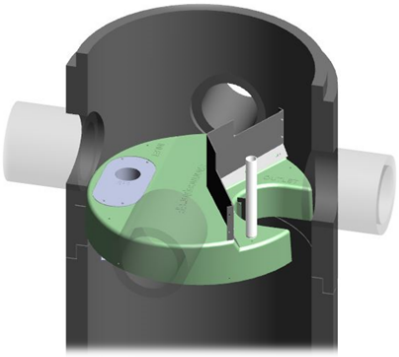
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

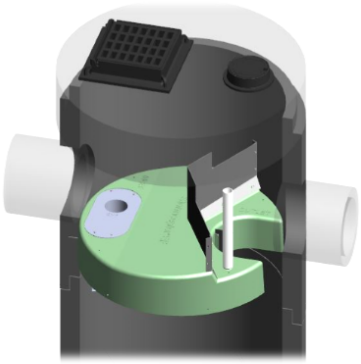
DESIGN FLEXIBILITY

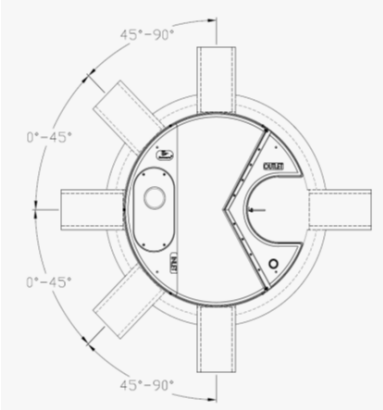
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

OIL CAPTURE AND RETENTION

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







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

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

Pollutant Capacity

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

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

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

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

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

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

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

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

3.2 SIZING METHODOLOGY

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

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

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

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

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

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

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

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to

assess whether light liquids captured after a spill are effectively retained at high flow rates.

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

TOWN OF MIDLAND

STORM SEWER DESIGN SHEET

Jones Consulting Project No.: PRA-16084

GALLOWAY SUBDIVISION

R.P. No.:

5 Year Storm Sewer Sizing

Area ID#	Street / Location	Maintenance Hole		Length (m)	Increment			Total CA	Flow Time (min)		I (mm/hr)	Total Q (cms)	S (%)	DIA (mm)	Q Full (cms)	V Full (m/s)	Percent Capacity (%)
		From	To		C	A	CA		To	In							
EXT.1	King Street				0.72	9.06	6.52										
EXT.2	King Street				0.87	0.54	0.47				1800x900mm BOX CULV						
101	Street 'A'	EX.STM 201**	HW 301**	132.6	0.65	0.29	0.19	7.18	15.00	0.84	83	1.651	**0.50**	**1350**	3.77	2.6	44%
102	Street 'C'	DCB 06	DCBMH 302	17.3	0.65	0.69	0.45	0.45	10.00	0.23	102	0.127	**0.50**	**450**	0.20	1.3	63%
103	Street 'A'	DCBMH 302	HW 303	9.1	0.65	0.15	0.10	0.55	10.23	0.12	101	0.153	**0.50**	**450**	0.20	1.3	76%
EXT.3	Easement	HW 304	STM 305	41.0	0.65	0.14	0.09	0.09	10.00	0.36	102	0.026	**1.90**	**300**	0.13	1.9	19%
	Street 'A'	STM 305	STM 306	51.5				0.09	10.36	0.76	101	0.025	**0.50**	**375**	0.12	1.1	20%
									5 Year Flow Per Certificate of Approval 3-0384-91-006 [12.3Ha]								
EXT.4	EX. SWM POND	HW 307	STM 308	3.8	0.53	**12.30**						**0.290**	**1.80**	**600**	0.82	2.9	35%
EXT.4	BLOCK 161	STM 308	STM 306	42.5	0.53	**5.32**	2.82	2.82	15.00	0.20	83	0.938	**2.70**	**600**	1.01	3.6	93%
104	Street 'A'	STM 306	STM 309	63.0	0.65	0.31	0.20	3.11	15.20	0.52	82	1.000	**0.50**	**900**	1.28	2.0	78%
105	Street 'A'	STM 309	STM 310	86.8	0.65	0.69	0.45	3.56	15.72	0.72	81	1.087	**0.50**	**900**	1.28	2.0	85%
106	Street 'A'	STM 311	STM 310	25.1	0.65	0.51	0.33	0.33	10.00	0.22	102	0.094	**2.00**	**300**	0.14	1.9	69%
107	Street 'B'	STM 310	STM 312	96.6	0.65	0.49	0.32	4.21	16.44	0.80	79	1.209	**0.50**	**900**	1.28	2.0	94%
	Street 'B'	STM 312	STM 313	15.1				4.21	17.24	0.13	76	1.184	**0.50**	**900**	1.28	2.0	92%
108	Street 'B'	STM 313	STM 314	99.0	0.65	0.78	0.51	4.72	17.36	0.78	76	1.287	**0.50**	**975**	1.58	2.1	81%
109	Street 'B'	STM 314	STM 315	93.0	0.65	0.52	0.34	5.06	18.14	0.73	74	1.332	**0.50**	**975**	1.58	2.1	84%
EXT.5	MAXWELL/EASEMENT	STM 316	STM 317	57.3	0.53	10.39	5.51	5.51	15.00	0.24	83	1.266	**2.20**	**825**	2.13	4.0	59%
112	Street 'B'	STM 317	STM 318	93.4	0.65	0.52	0.34	5.84	15.24	0.39	82	1.332	**2.20**	**825**	2.13	4.0	63%
110	Street 'B'	STM 319	STM 320	77.7	0.65	0.61	0.40	0.40	10.00	1.15	102	0.113	**0.50**	**375**	0.12	1.1	91%
111	Street 'B'	STM 320	STM 318	75.2	0.65	0.76	0.49	0.89	11.15	0.89	97	0.240	**0.50**	**525**	0.30	1.4	79%
113	BLOCK 167	STM 318	STM 315	87.0	0.65	2.21	1.44	8.17	15.63	0.43	81	1.836	**1.40**	**900**	2.14	3.4	86%
EXT.6	REAR LOT EASEMENT	RLCB 330	STM 321	17.3	0.65	0.11	0.07	0.07	10.00	0.34	102	0.020	**0.50**	**250**	0.04	0.9	48%
EXT.7	PRATT AVENUE	EX.STM 202	STM 321	52.7	0.55	4.42	2.43	2.43	15.00	0.17	83	0.559	**4.30**	**750**	2.31	5.2	24%
114	PRATT AVENUE	STM 321	STM 322	58.0	0.65	0.10	0.07	2.57	15.17	0.54	82	0.587	**0.50**	**750**	0.79	1.8	75%
115	Street 'B'	DCB 37	STM 322	9.8	0.65	0.38	0.25	0.25	10.00	0.08	102	0.070	**2.00**	**300**	0.14	1.9	51%
116	PRATT AVENUE	STM 322	STM 323	32.0	0.65	0.36	0.23	3.05	15.71	0.30	81	0.683	**0.50**	**750**	0.79	1.8	87%
117	PRATT AVENUE	STM 323	STM 324	46.1	0.65	0.37	0.24	3.29	16.01	0.43	80	0.729	**0.50**	**750**	0.79	1.8	93%

TOWN OF MIDLAND

STORM SEWER DESIGN SHEET

Jones Consulting Project No.: PRA-16084

GALLOWAY SUBDIVISION

R.P. No.:

5 Year Storm Sewer Sizing

Area ID#	Street / Location	Maintenance Hole		Length (m)	Increment			Total CA	Flow Time (min)		I (mm/hr)	Total Q (cms)	S (%)	DIA (mm)	Q Full (cms)	V Full (m/s)	Percent Capacity (%)
		From	To		C	A	CA		To	In							
		STM 324	STM 325	14.3				3.29	16.44	0.13	79	0.718	**0.50**	**750**	0.79	1.8	91%
118	Street 'B'	STM 325	STM 326	97.4	0.65	0.41	0.27	3.56	16.57	0.85	78	0.772	**0.50**	**825**	1.02	1.9	76%
119	Street 'B'	STM 326	STM 327	96.0	0.65	0.64	0.42	3.97	17.43	0.77	76	0.838	**0.60**	**825**	1.11	2.1	75%
120	Street 'B'	STM 327	STM 315	92.4	0.65	0.69	0.45	4.42	18.20	0.57	74	0.909	**1.00**	**825**	1.44	2.7	63%
121	BLOCK 166	STM 315**	HW 328**	81.7	0.65	0.43	0.28	17.93	18.77	0.48	73	3.909	**0.50**	**1500**	5.00	2.8	78%
														1800x1200mm BOX CULV			

Stormwater Information:

$I = A/(td + B)^c$

A = 5 Year-1135.40, 100 Year-2193.10

B = 5 Year-7.5, 100 Year-9.04

C= 5 Year-0.841, 100 Year-0.871

t_d = Storm Duration (mins.)

Q = (C*I*A)/360 (cms)

C: Runoff Coefficiant

I: Rainfall Intensity (mm/hr)(See IDF Curve for the 5-year storm)

A: Area (ha)

Date: 31-Oct-22

Calculated By: VBS

Checked By: JWI

Town of Midland IDF data taken from Section 5.2.5: Orillia Atmospheric Envirnoment Weather Station

**Equivalent Diameter Used

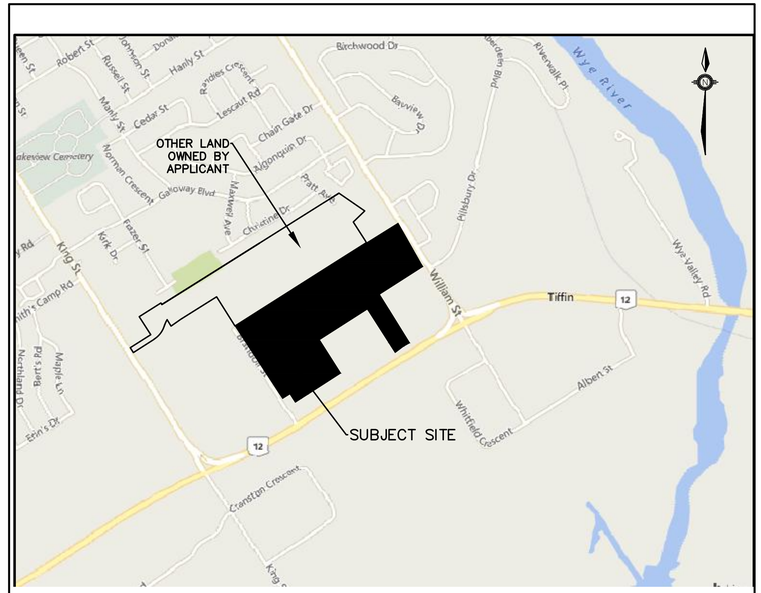
Appendix D

Engineering Drawings

PROPOSED
PRATT EMPLOYMENT SUBDIVISION

TOWN OF MIDLAND
COUNTY OF SIMCOE

CONTRACT No.
###-####



KEY PLAN SCALE 1:10000

LIST OF DRAWINGS

DWG. No.	DRAWING TITLE
	TITLE PAGE
GS-1	GENERAL SERVICING PLAN WEST
GS-2	GENERAL SERVICING PLAN EAST
SAN-1	INTERNAL SANITARY DRAINAGE AREA PLAN WEST
SAN-2	INTERNAL SANITARY DRAINAGE AREA PLAN EAST
STM-1	INTERNAL STORM DRAINAGE AREA PLAN WEST
STM-2	INTERNAL STORM DRAINAGE AREA PLAN EAST
LG-1	LOT GRADING PLAN
LG-2	LOT GRADING PLAN
LG-3	LOT GRADING PLAN
LG-4	LOT GRADING PLAN
LG-5	LOT GRADING PLAN
LG-6	LOT GRADING DETAILS
PP-1	PLAN AND PROFILE STREET 'A' STA. 0+000 TO 0+280
PP-2	PLAN AND PROFILE STREET 'A' STA. 0+280 TO 0+580
PP-3	PLAN AND PROFILE STREET 'A' STA. 0+580 TO 0+733.07
PP-4	PLAN AND PROFILE BRANDON STREET STA. 0+000 TO 0+260
PP-5	PLAN AND PROFILE BRANDON STREET STA. 0+260 TO 0+490.71
PND-1	SWM FACILITY No. 1A BLOCK 06 PLAN VIEW
PND-2	SWM FACILITY No. 1A BLOCK 06 SECTIONS
PND-3	SWM FACILITY NO. 1A BLOCK 06 SECTIONS
PND-4	SWM FACILITY OUTFALL CHANNEL PLAN & PROFILE

MUNICIPAL OFFICE ADDRESS
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Midland, ON
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PRATT DEVELOPMENTS INC.
22 CLAPPERTON ST., SUITE 300
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PLANNERS & ENGINEERS
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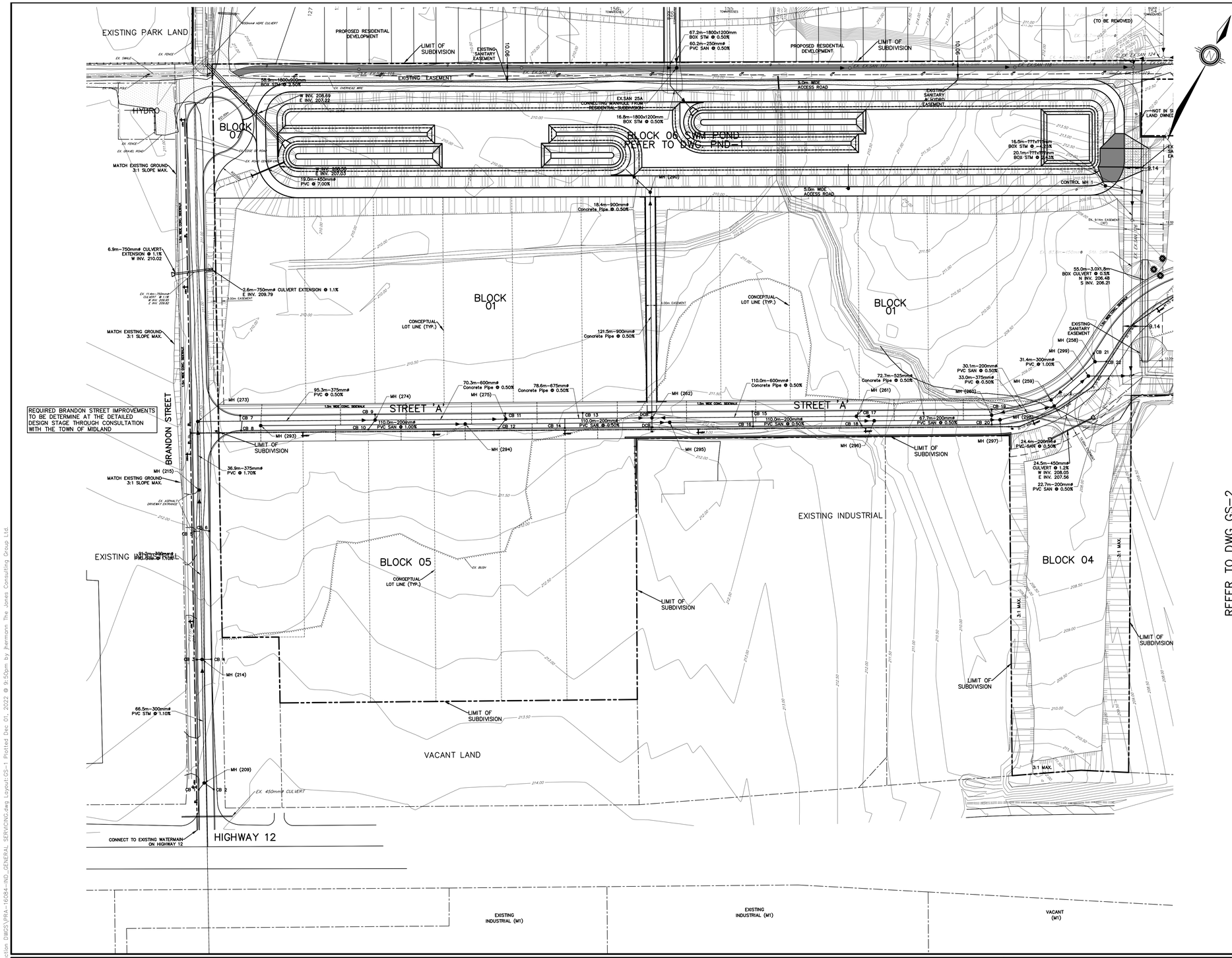
PRA-16084 NOV 2022



BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

LICENSED PROFESSIONAL ENGINEER J. W. INGRAM 100143779 22-11-30 PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

GENERAL SERVICING PLAN WEST

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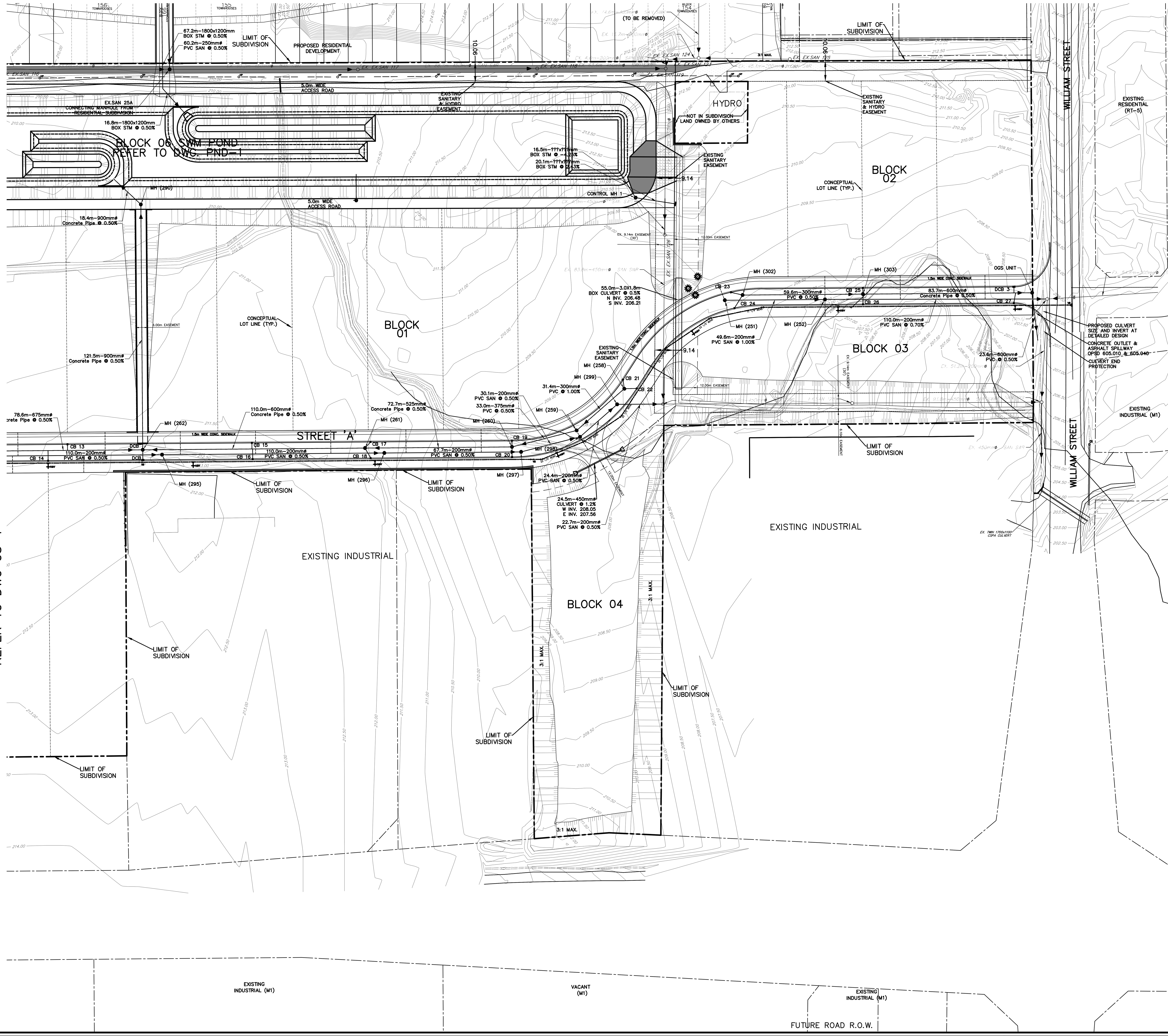
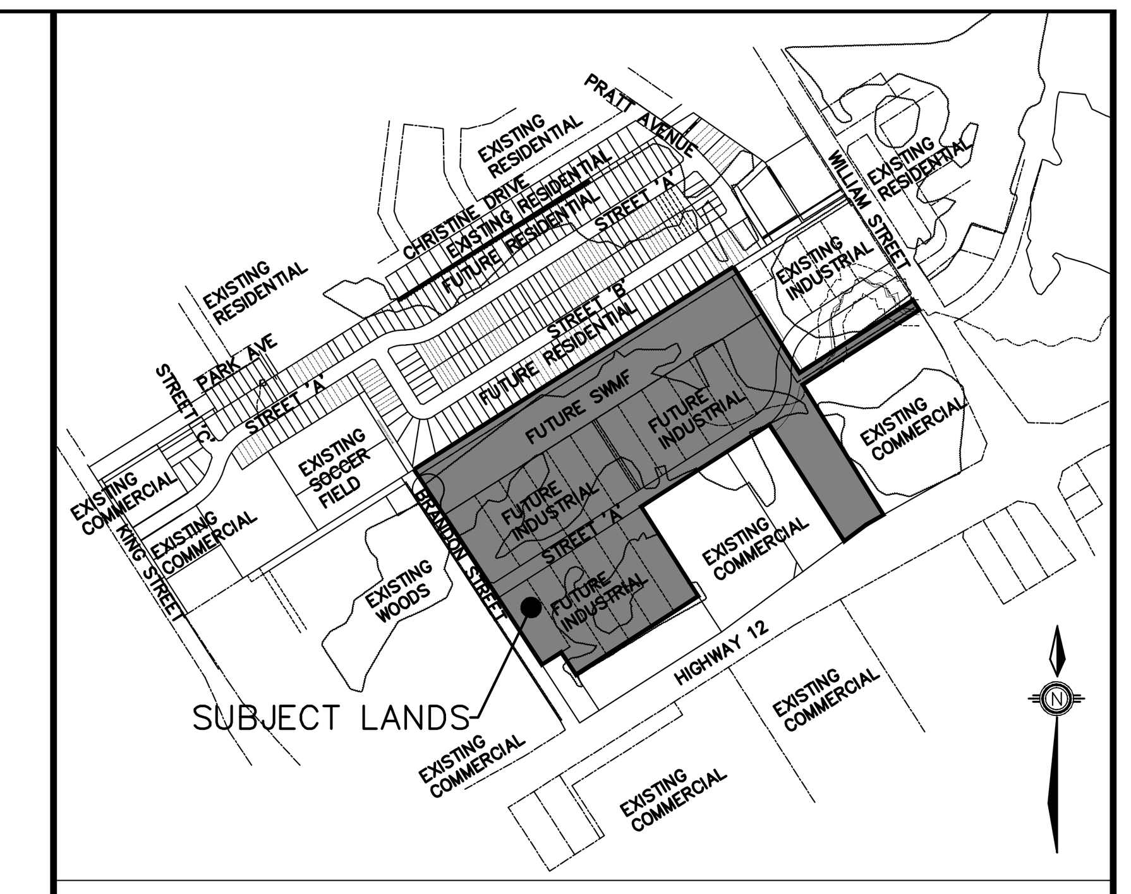
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	JJH	SCALE: 1:1000	DATE OCTOBER 2020
DRAWN	JJH	PROJECT PRA-16084	DWG. Nº GS-1
CHECKED	JWI		



KEYPLAN

NTS



LEGEND

- SUBDIVISION BOUNDARY
- BLOCK 05 — BLOCK NUMBER
- EX SAN MH — EXISTING SANITARY MAINTENANCE HOLE
- EXISTING STORM MAINTENANCE HOLE
- EX.CB — EXISTING CATCHBASIN
- EX.DCB — EXISTING DOUBLE CATCHBASIN
- EX.V6291 — EXISTING VALVE & BOX
- EX.H2982 — EXISTING HYDRANT & VALVE
- EX.BPED — EXISTING BELL PEDESTAL
- EX.HP — EXISTING HYDRO POLE
- EX.SIGN — EXISTING SIGN
- U/B — EXISTING BELL LINE
- G — EXISTING GAS LINE
- CTV — EXISTING TV LINE
- H&V — HYDRANT AND VALVE
- V&B — VALVE AND BOX
- BELL PEDESTAL
- CABLE PEDESTAL
- SAN1 — SANITARY MAINTENANCE HOLE
- STM1 — STORM MAINTENANCE HOLE
- CATCH BASIN
- DOUBLE CATCH BASIN
- DEPRESSED CURB
- SANITARY SERVICE
- WATER SERVICE AND VALVE
- EX. WATERMAIN
- WATERMAIN
- EX. SANITARY SEWER AND DIRECTION OF FLOW
- SANITARY SEWER AND DIRECTION OF FLOW
- EX. STORM SEWER AND DIRECTION OF FLOW
- STORM SEWER AND DIRECTION OF FLOW
- CONCEPTUAL LOT LINE
- EASEMENT LINE

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

LICENSED PROFESSIONAL ENGINEER — J. W. INGRAM — 100143779 — 22-11-30 — PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

GENERAL SERVICING PLAN
EAST

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F. 705.734.1056

DESIGN JJH	SCALE: 1:1000	DATE OCTOBER 2020	
DRAWN JJH	PROJECT	DWG. №	
CHECKED JWI	PRA-16084	GS-2	

EXISTING PARK LAND

PROPOSED RESIDENTIAL DEVELOPMENT

CONNECTING MAN HOLE FROM FUTURE RESIDENTIAL SUBDIVISION

60.2m–250mmø PVC SAN @ 0.50%

PROPOSED RESIDENTIAL DEVELOPMENT

LIMIT OF SUBDIVISION

EX. 165.7m–450mmø SAN SWR

EX. 87.5m–450mmø SAN SWR

EX. 83.4m–450mmø SAN SWR

EX. 93.2m–450mmø SAN SWR

EX. 88.7m–450mmø SAN SWR

EX. 83.6m–450mmø SAN SWR

EX. 74.6m–300mmø SAN SWR

EX. 4.6m–200mmø SAN SWR

EX. 45.1m–200mmø SAN SWR

EX. 15.7m–200mmø SAN SWR

EX.SAN 115

EX.SAN 116

EX.SAN 25A

EX.SAN 117

EX.SAN 118

EX.SAN 119

EX.SAN 123

EX.SAN 124

EX.SAN 125

EXISTING EASEMENT

HYDRO

BLOCK 07

BLOCK 06 SWM POND
REFER TO DWG. PND-1

HYDRO

NOT IN SUBDIVISION
LAND OWNED BY OTHERS

BLOCK 02

MATCH EXISTING GROUND
3:1 SLOPE MAX.

1.24 | 45.0
1 | 6

EX. 9.14m EASEMENT (30')

EX.HYD 126

12.00m EASEMENT

49.6m–200mmø
PVC SAN @ 1.00%

MH (251)

3.00m EASEMENT

BLOCK 01

CONCEPTUAL LOT LINES
(TYP.)

BLOCK 01

CONCEPTUAL LOT LINES
(TYP.)

2.03 | 45.0
2 | 5

BLOCK 03

30.1m–200mmø
PVC SAN @ 0.50%

CONNECT TO EX.
SAN MH 184

1.31 | 45.0
3 | 3

0.88 | 45.0
2 | 4

24.4m–200mmø
PVC SAN @ 0.50%

MH (299)

EX. 9.14m EASEMENT (30')

EX.SAN 122

LIMIT OF SUBDIVISION

STREET A

MH (293)

110.0m–200mmø PVC SAN @ 1.00%

MH (294)

110.0m–200mmø PVC SAN @ 0.50%

MH (295)

110.0m–200mmø PVC SAN @ 0.50%

MH (296)

67.7m–200mmø PVC SAN @ 0.50%

MH (297)

MH (298)

22.7m–200mmø
PVC SAN @ 0.50%

3.52 | 45.0
7 | 1

2.32 | 45.0
5 | 2

LIMIT OF SUBDIVISION

MATCH EXISTING GROUND
3:1 SLOPE MAX.

BRANDON STREET

LIMIT OF SUBDIVISION

EXISTING INDUSTRIAL

BLOCK 05

BLOCK 04

CONCEPTUAL LOT LINES
(TYP.)

EXISTING INDUSTRIAL

EXISTING INDUSTRIAL

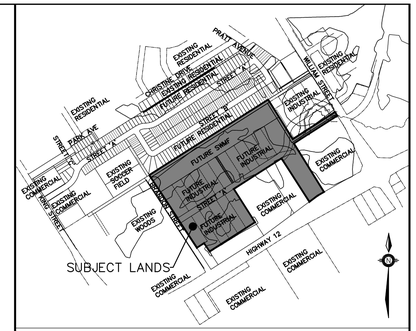
LIMIT OF SUBDIVISION

LIMIT OF SUBDIVISION

VACANT LAND

HIGHWAY 12

HIGHWAY 12



KEYPLAN

NTS

LEGEND

- LIMIT OF SUBDIVISION
- EX. CONTOUR (260.00)
- SANITARY SEWER AND DIRECTION OF FLOW
- SANITARY SERVICE
- SLOPE (3:1 MAX.)
- EX. BOREHOLE LOCATION ID# & GROUNDWATER ELEVATION (BH7 254.60)
- MAJOR OVERLAND FLOW ROUTE
- AREA (ha) / cu.m/DAY/ha (0.42 | 3.13)
- No. OF UNITS (10 | 13)
- CATCHMENT AREA ID No.
- CATCHMENT BOUNDARY
- CONCEPTUAL LOT LINE
- EASEMENT LINE

NOTE: SANITARY SERVICE LOCATIONS BASED ON CONCEPTUAL LOT LINES

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

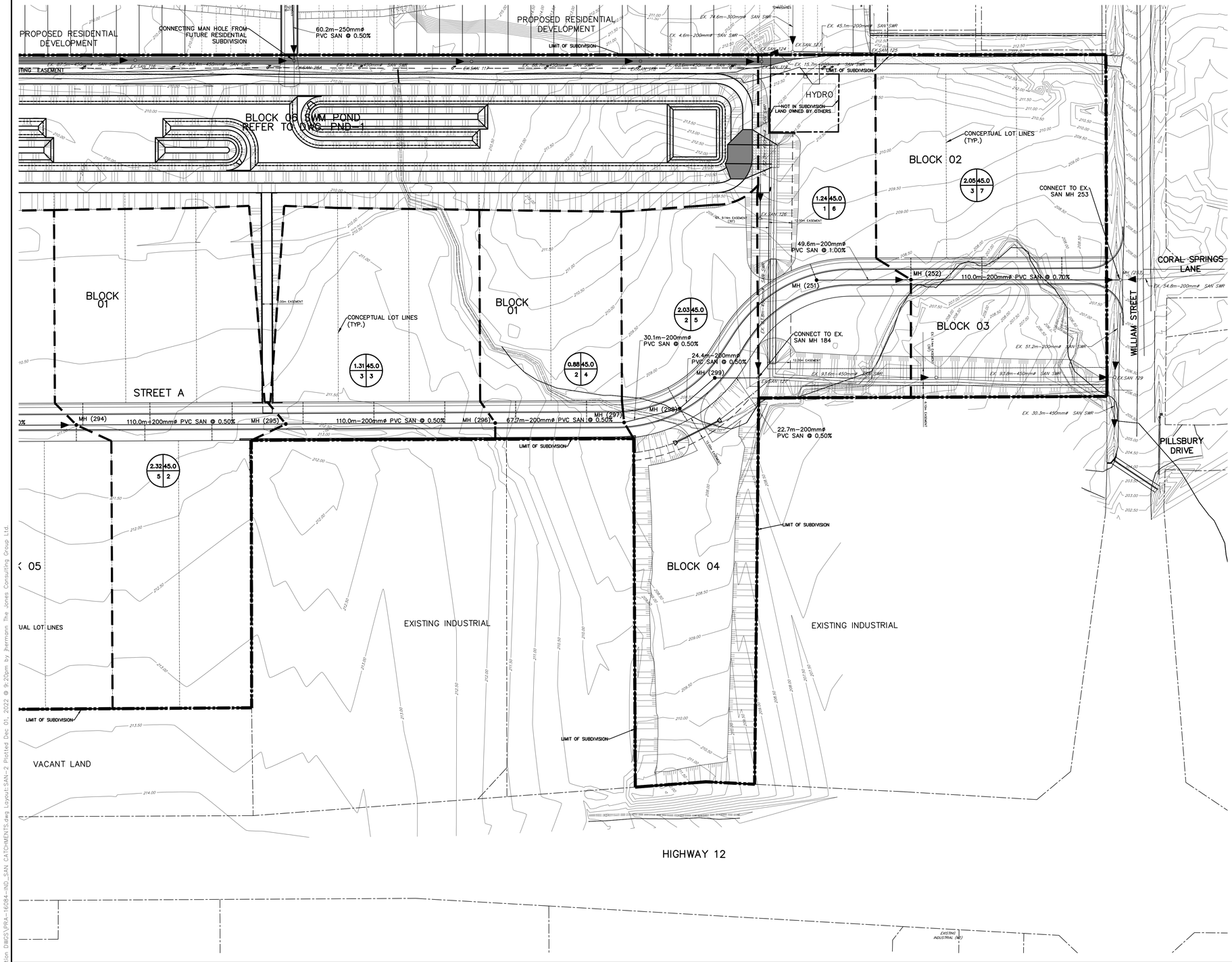
LICENSED PROFESSIONAL ENGINEER
J. W. INGRAM
100149779
22-11-30
PROVINCE OF ONTARIO

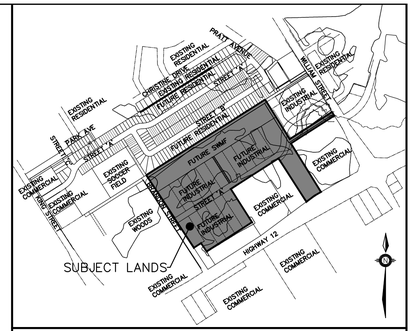
PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

INTERNAL SANITARY DRAINAGE AREA PLAN WEST

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	JJH	SCALE: 1:1000	DATE OCTOBER 2020
DRAWN	JJH	PROJECT PRA–16084	DWG. Nº SAN–1
CHECKED	JWI		





KEYPLAN

NTS

LEGEND

- LIMIT OF SUBDIVISION
- EX. CONTOUR
- SANITARY SEWER AND DIRECTION OF FLOW
- SANITARY SERVICE
- SLOPE (3:1 MAX.)
- EX. BOREHOLE LOCATION ID# & GROUNDWATER ELEVATION (BH7, 254.60)
- MAJOR OVERLAND FLOW ROUTE
- AREA (ha) / No. OF UNITS (0.42 / 10) / cu.m/DAY/ha (3.13) / CATCHMENT AREA ID No. (13)
- CATCHMENT BOUNDARY
- CONCEPTUAL LOT LINE
- EASEMENT LINE

NOTE: SANITARY SERVICE LOCATIONS BASED ON CONCEPTUAL LOT LINES

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

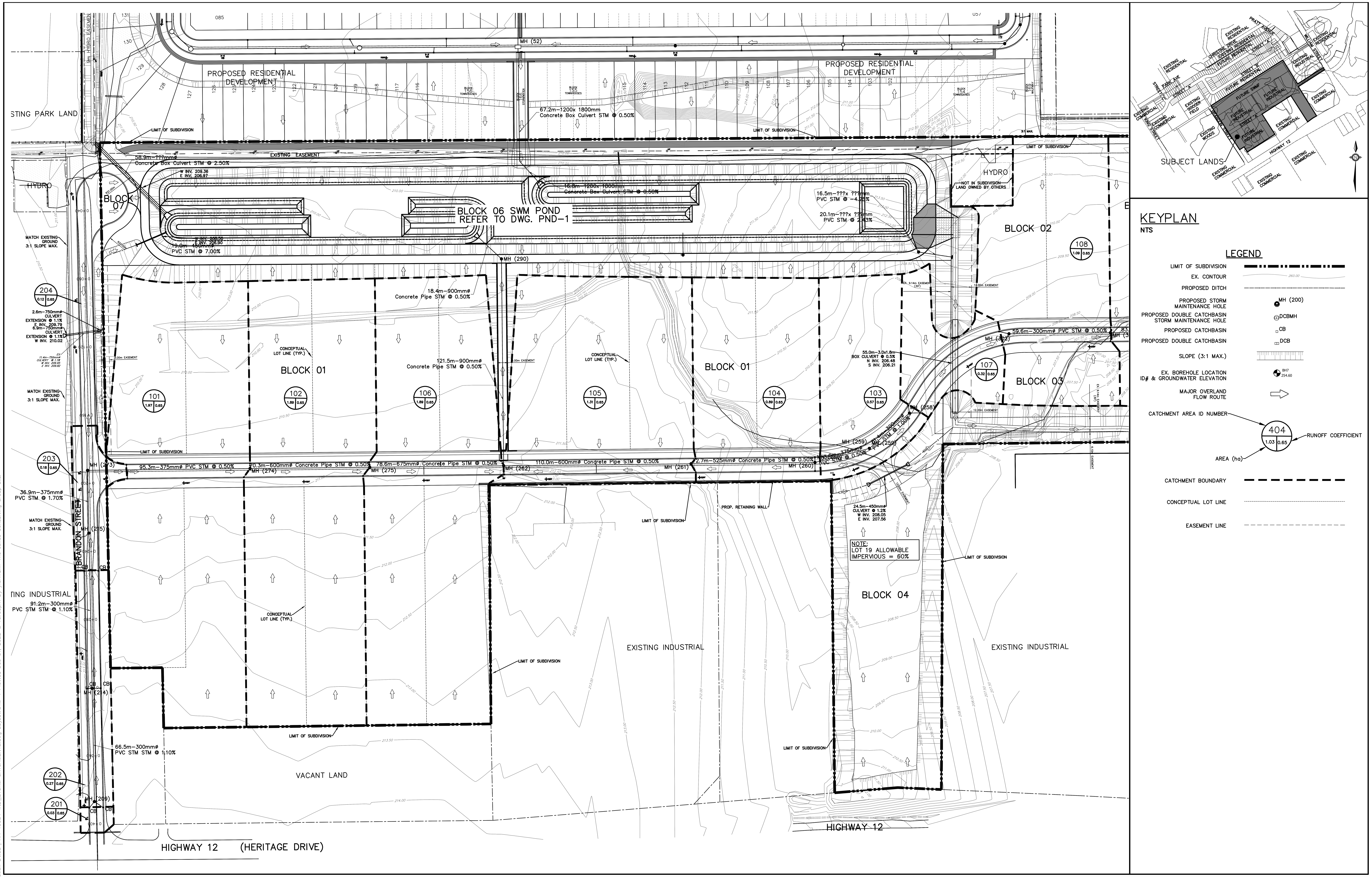
LICENCED PROFESSIONAL ENGINEER J. W. INGRAM 100143779 22-11-30 PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

INTERNAL SANITARY DRAINAGE AREA PLAN EAST

JONES CONSULTING GROUP LTD. PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	JJH	SCALE: 1:1000	DATE OCTOBER 2020
DRAWN	JJH	PROJECT PRA-16084	DWG. Nº SAN-2
CHECKED	JWI		



BENCHMARK:	NO.	REVISIONS	DATE	INITIAL
	2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
	1.	DRAFT SUBMISSION	OCT 2020	JWI

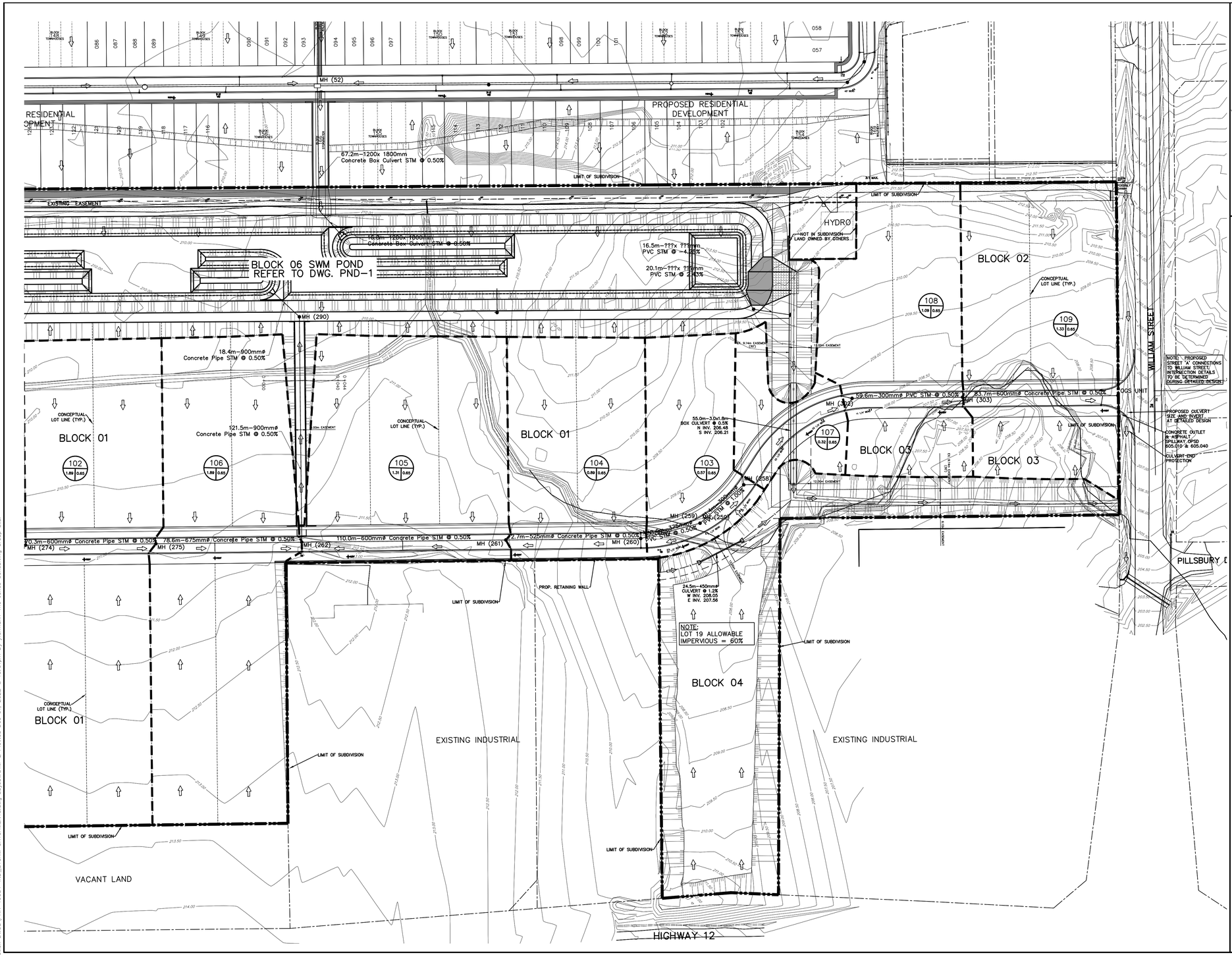
J. W. INGRAM 100143779 22-11-30 PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

INTERNAL STORM DRAINAGE AREA PLAN WEST

JONES CONSULTING GROUP LTD. PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1 Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN JJH	SCALE: 1:1000	DATE OCTOBER 2020	
DRAWN JJH	PROJECT	DWG. Nº	
CHECKED JWI	PRA-16084	STM-1	



KEYPLAN

NTS

LEGEND

- LIMIT OF SUBDIVISION
- EX. CONTOUR
- PROPOSED DITCH
- PROPOSED STORM MAINTENANCE HOLE — MH (200)
- PROPOSED DOUBLE CATCHBASIN STORM MAINTENANCE HOLE — DCBMH
- PROPOSED CATCHBASIN — CB
- PROPOSED DOUBLE CATCHBASIN — DCB
- SLOPE (3:1 MAX.)
- EX. BOREHOLE LOCATION ID# & GROUNDWATER ELEVATION — BH7 254.60
- MAJOR OVERLAND FLOW ROUTE
- CATCHMENT AREA ID NUMBER — 404 (1.03 / 0.65) — RUNOFF COEFFICIENT — AREA (ha)
- CATCHMENT BOUNDARY
- CONCEPTUAL LOT LINE
- EASEMENT LINE

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOW 2022	JWI
1.	DRAFT SUBMISSION	OCT 2020	JWI

LICENSED PROFESSIONAL ENGINEER — J. W. INGRAM — 100143779 — 22-11-30 — PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

INTERNAL STORM DRAINAGE AREA PLAN EAST

JONES CONSULTING GROUP LTD. PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	JJH	SCALE: 1:1000	DATE OCTOBER 2020
DRAWN	JJH	PROJECT PRA-16084	DWG. Nº STM-2
CHECKED	JWI		

REFER TO DWG LG-2 (PRATT GALLOWAY RESIDENTIAL SUBDIVISION)

PROPOSED RESIDENTIAL DEVELOPMENT

EXISTING EASEMENT

LIMIT OF SUBDIVISION

PROP 3.5m WIDE GRAVEL TRAIL\ACCESS ROAD

TOP OF GRATE TO BE ADJUSTED TO FINISHED GRADE

MH (78)

MH (79)

MH (80)

PROP 5.0m WIDE ACCESS ROAD

EXISTING SANITARY EASEMENT

58.9m-900x1800mm BOX CULVERT @ 2.5% W INV. 205.89 E INV. 207.22

BOTTOM OF WETLAND FACILITY 206.85

BOTTOM OF WET CELL 205.75

BLOCK 06 SWM POND REFER TO DWG. PND-1

BLOCK 07

BLOCK 01

BLOCK 05

21.0m-450mmø CULVERT @ 7.0% W INV. 208.50 E INV. 207.03

REQUIRED BRANDON STREET IMPROVEMENTS TO BE DETERMINE AT THE DETAILED DESIGN STAGE IN CONSULTATION WITH THE TOWN OF MIDLAND

MATCH EXISTING GROUND 3:1 SLOPE MAX.

2.6m-750mmø CULVERT EXTENSION @ 1.1% E INV. 209.80

7.4m-750mmø CULVERT EXTENSION @ 1.1% W INV. 210.03

EX. 11.4m-750mmø CULVERT @1.1% W INV. 209.93 E INV. 209.80

PROPOSED CONCRETE GUTTER OUTLET AND EROSION PROTECTION

3.00m EASEMENT

6.00m EASEMENT

BRANDON STREET

1.5m WIDE CONC. SIDEWALK

STREET A

CB 8 CB 9 CB 10 CB 11 CB 12 CB 13 CB 14

MH (293) MH (274) MH (294) MH (275) MH (262) MH (295)

DCB 1 DCB 2

CONCEPTUAL LOT LINE (TYP.)

PROPOSED 5.0m WIDE ASPHALT CONCRETE ACCESS ROAD LOT LINE (TYP.)

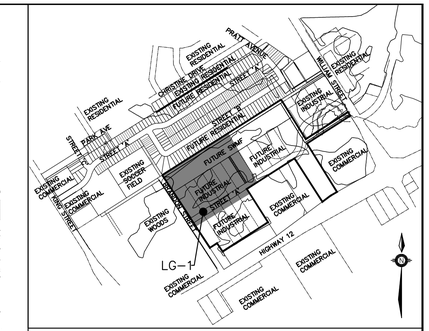
PROPOSED 0.3m HIGH LANDSCAPE RETAINING WALL

STRUCTURAL RETAINING WALL DETAILS TO BE PROVIDED IN

PROP. RETAINING WALL

REFER TO DWG LG-4

REFER TO DWG LG-2

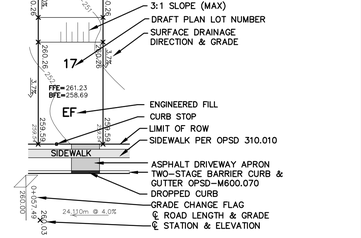


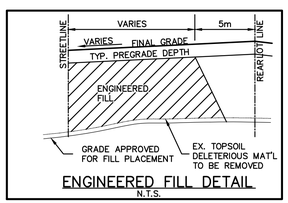
KEYPLAN

NTS

LEGEND

- LIMIT OF SUBDIVISION
- EX. CONTOUR
- PROPOSED DITCH
- EX. SANITARY MANHOLE
- PROPOSED SANITARY MAINTENANCE HOLE — MH (100)
- PROPOSED STORM MAINTENANCE HOLE — MH (200)
- PROPOSED CATCHBASIN — CB
- PROPOSED DOUBLE CATCHBASIN — DCB
- TREE PRESERVATION FENCE
- SLOPE (3:1 MAX.)
- PROPOSED HYDRANT AND VALVE — H&V
- PROPOSED VALVE — VB
- CURB STOP
- EX. BOREHOLE LOCATION ID# & GROUNDWATER ELEVATION — BH7 259.80
- TRANSFORMER
- SWITCHGEAR
- LIGHT STANDARD
- BELL/ROGERS — BPED
- MAJOR OVERLAND FLOW ROUTE
- CONCEPTUAL LOT LINE
- EASEMENT LINE





ENGINEERED FILL DETAIL

N.T.S.

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

LICENSED PROFESSIONAL ENGINEER — J. W. INGRAM — 100143779 — 22-11-30 — PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

LOT GRADING PLAN

JONES CONSULTING GROUP LTD. PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN JJH	SCALE: 1:500	DATE OCT 2020	
DRAWN JJH	PROJECT PRA-16084	DWG. Nº LG-1	
CHECKED JWI			

REFER TO DWG LG-2 (PRATT GALLOWAY RESIDENTIAL SUBDIVISION)

REFER TO DWG LG-1

REFER TO DWG LG-3

REFER TO DWG LG-5

BLOCK 06 SWM POND
REFER TO DWG. PND-1

BOTTOM OF WET CELL 205.75

BLOCK 01

BLOCK 02

BLOCK 03

BLOCK 04

STREET 'A'

PROPOSED RESIDENTIAL DEVELOPMENT

BLOCK 154 TOWNHOUSES

155 TOWNHOUSES

BLOCK 153 TOWNHOUSES

GLOW WAY

HYDRO

NOT IN SUBDIVISION
LAND OWNED BY OTHERS

NOT IN SUBDIVISION
OWNED BY OTHERS

EXISTING INDUSTRIAL

EXISTING GRAVEL ACCESS ROAD TO BE REINSTATED WITHIN EASEMENT

EXISTING SANITARY & HYDRO EASEMENT

LIMIT OF SUBDIVISION

TOP OF GRATE TO BE ADJUSTED TO FINISHED GRADE

2.74m HIGH STRUCTURAL RETAINING WALL

1.7m HIGH STRUCTURAL RETAINING WALL. DETAILS TO BE PROVIDED IN DETAILED DESIGN

STRUCTURAL RETAINING WALL. DETAILS TO BE PROVIDED IN DETAILED DESIGN

AUTHORIZATION FROM LAND OWNER TO ALLOW GRADING WITHIN PROPERTY TO BE OBTAINED

CONCEPTUAL LOT LINE (TYP.)

EX. 9.14m EASEMENT (30')

12.00m EASEMENT

8.00m EASEMENT

150mmø SUBDRAIN AS PER DETAIL DRAWING PND-3

55.0m-3.0x1.8m BOX CULVERT @ 0.5%
N INV. 206.48
S INV. 206.21

1.5m WIDE CONC. SIDEWALK

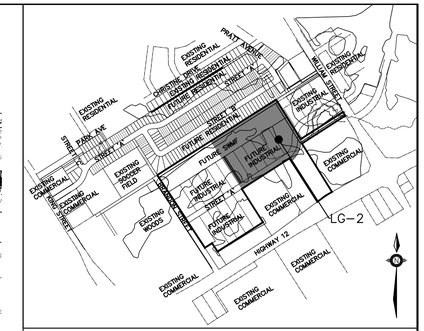
BH102 210.00

BH103 211.19

BH105 208.53

MH (80) MH (81) MH (82) MH (83) MH (164) MH (165) MH (295) MH (296) MH (297) MH (298) MH (251) MH (302) MH (261) MH (260) MH (259) MH (258) MH (184)

CB 1 CB 15 CB 16 CB 17 CB 18 CB 19 CB 20 CB 21 CB 22 CB 23 CB 24

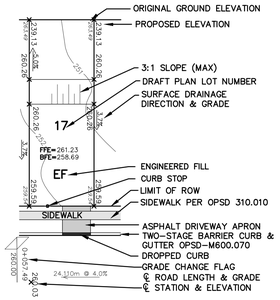


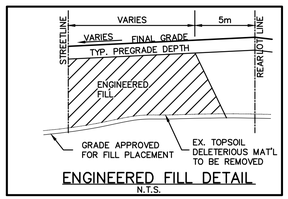
KEYPLAN

NTS

LEGEND

- LIMIT OF SUBDIVISION
- EX. CONTOUR
- PROPOSED DITCH
- EX. SANITARY MANHOLE
- PROPOSED SANITARY MAINTENANCE HOLE — MH (100)
- PROPOSED STORM MAINTENANCE HOLE — MH (200)
- PROPOSED CATCHBASIN — CB
- PROPOSED DOUBLE CATCHBASIN — DCB
- TREE PRESERVATION FENCE
- SLOPE (3:1 MAX.)
- PROPOSED HYDRANT AND VALVE — H&V
- PROPOSED VALVE — VB
- CURB STOP
- EX. BOREHOLE LOCATION ID# & GROUNDWATER ELEVATION
- TRANSFORMER
- SWITCHGEAR — S
- LIGHT STANDARD
- BELL/ROGERS — BPED
- MAJOR OVERLAND FLOW ROUTE
- CONCEPTUAL LOT LINE
- EASEMENT LINE





ENGINEERED FILL DETAIL
N.T.S.

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

LICENSED PROFESSIONAL ENGINEER
J. W. INGRAM
100143779
22-11-30
PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

LOT GRADING PLAN

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	JJH	SCALE: 1:500	DATE OCT 2020
DRAWN	JJH	PROJECT PRA-16084	DWG. Nº LG-2
CHECKED	JWI		

REFER TO DWG LG-2 (PRATT GALLOWAY RESIDENTIAL SUBDIVISION)

REFER TO DWG LG-2

REFER TO DWG LG-5

BLOCK 154 TOWNHOUSES

PROPOSED RESIDENTIAL DEVELOPMENT

EXISTING INDUSTRIAL

WILLIAM STREET

LIMIT OF SUBDIVISION

TOP OF GRATE TO BE ADJUSTED TO FINISHED GRADE

MH (62)

MH (63)

MH (164)

MH (165)

MH (166)

MH (167)

HYDRO

EXISTING SANITARY & HYDRO EASEMENT

EXISTING GRAVEL ACCESS ROAD TO BE REINSTATED WITHIN EASEMENT

NOT IN SUBDIVISION LAND OWNED BY OTHERS

BLOCK 06 SWM POND
REFER TO DWG. PND-1

2.74m HIGH STRUCTURAL RETAINING WALL

AUTHORIZATION FROM LAND OWNER TO ALLOW GRADING WITHIN PROPERTY TO BE OBTAINED

1.7m HIGH STRUCTURAL RETAINING WALL DETAILS TO BE PROVIDED IN DETAILED DESIGN

NOT IN SUBDIVISION OWNED BY OTHERS

BLOCK 02

CONCEPTUAL LOT LINE (TYP.)

EX. 9.14m EASEMENT (30')

12.00m EASEMENT

150mmø SUBDRAIN AS PER DETAIL DRAWING PND-3

STREET 'A'

1.5m WIDE CONC. SIDEWALK

BLOCK 01

BLOCK 03

BLOCK 04

55.0m-3.0x1.8m BOX CULVERT @ 0.5%
N INV. 206.48
S INV. 206.21

3:1 MAX

6.10m EASEMENT

EXISTING INDUSTRIAL

LIMIT OF SUBDIVISION

NOTE:1 PROPOSED STREET 'A' CONNECTION TO WILLIAM STREET. INTERSECTION DETAILS TO BE DETERMINED DURING DETAILED DESIGN

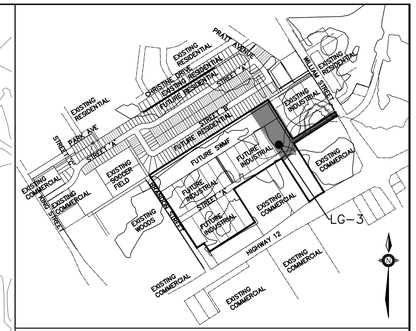
CORAL SPRINGS LANE

PROPOSED CULVERT SIZE AND INVERT AT DETAILED DESIGN

CONCRETE OUTLET & ASPHALT SPILLWAY OPSD 605.010 & 605.040

CULVERT END PROTECTION

PILLSBURY DRIVE

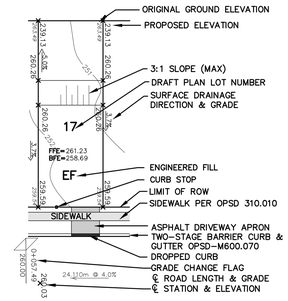


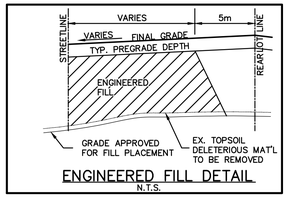
KEYPLAN

NTS

LEGEND

- LIMIT OF SUBDIVISION
- EX. CONTOUR
- PROPOSED DITCH
- EX. SANITARY MANHOLE
- PROPOSED SANITARY MAINTENANCE HOLE (MH (100))
- PROPOSED STORM MAINTENANCE HOLE (MH (200))
- PROPOSED CATCHBASIN (CB)
- PROPOSED DOUBLE CATCHBASIN (DCB)
- TREE PRESERVATION FENCE
- SLOPE (3:1 MAX.)
- PROPOSED HYDRANT AND VALVE (H&V)
- PROPOSED VALVE (VB)
- CURB STOP
- EX. BOREHOLE LOCATION ID# & GROUNDWATER ELEVATION (BH1 209.80)
- TRANSFORMER
- SWITCHGEAR
- LIGHT STANDARD
- BELL/ROGERS (BPED)
- MAJOR OVERLAND FLOW ROUTE
- CONCEPTUAL LOT LINE
- EASEMENT LINE





ENGINEERED FILL DETAIL
N.T.S.

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

LICENSED PROFESSIONAL ENGINEER
J. W. INGRAM
100143779
22-11-30
PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

LOT GRADING PLAN

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	JJH	SCALE: 1:500	DATE OCT 2020
DRAWN	JJH	PROJECT PRA-16084	DWG. Nº LG-3
CHECKED	JWI		

REFER TO DWG LG-1

STREET A

BLOCK 05

CONCEPTUAL LOT LINE (TYP.)

LIMIT OF SUBDIVISION

MATCH EXISTING GROUND 3:1 SLOPE MAX.

STRUCTURAL RETAINING WALL DETAILS TO BE PROVIDED IN DETAILED DESIGN

REQUIRED BRANDON STREET IMPROVEMENTS TO BE DETERMINE AT THE DETAILED DESIGN STAGE THROUGH CONSULTATION WITH THE TOWN OF MIDLAND

EXISTING INDUSTRIAL

EXISTING INDUSTRIAL

REFER TO DWG LG-5

BRANDON STREET

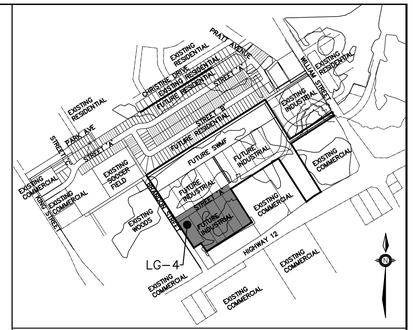
1.5m WIDE CONC. SIDEWALK

VACANT (HC)

NOTE: PROPOSED BRANDON STREET CONNECTION TO HIGHWAY 12. INTERSECTION DETAILS TO BE DETERMINED DURING DETAILED DESIGN

HIGHWAY 12

HIGHWAY 12

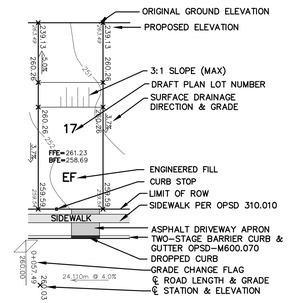


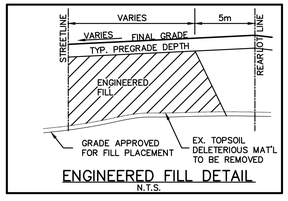
KEYPLAN

NTS

LEGEND

- LIMIT OF SUBDIVISION
- EX. CONTOUR
- PROPOSED DITCH
- EX. SANITARY MANHOLE
- PROPOSED SANITARY MAINTENANCE HOLE — MH (100)
- PROPOSED STORM MAINTENANCE HOLE — MH (200)
- PROPOSED CATCHBASIN — CB
- PROPOSED DOUBLE CATCHBASIN — DCB
- TREE PRESERVATION FENCE
- SLOPE (3:1 MAX.)
- PROPOSED HYDRANT AND VALVE — H&V
- PROPOSED VALVE — VB
- CURB STOP
- EX. BOREHOLE LOCATION ID# & GROUNDWATER ELEVATION — BH7 259.60
- TRANSFORMER
- SWITCHGEAR — S
- LIGHT STANDARD
- BELL/ROGERS — BPED
- MAJOR OVERLAND FLOW ROUTE
- CONCEPTUAL LOT LINE
- EASEMENT LINE





ENGINEERED FILL DETAIL

N.T.S.

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

LICENCED PROFESSIONAL ENGINEER — J. W. INGRAM — 100143779 — 22-11-30 — PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

LOT GRADING PLAN

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

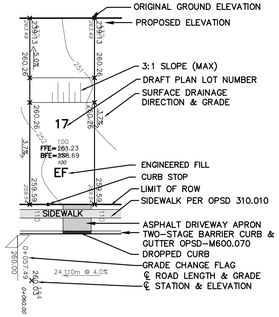
DESIGN	JJH	SCALE: 1:500	DATE FEBRUARY 2020
DRAWN	JT	PROJECT PRA-16084	DWG. Nº LG-4
CHECKED	JWI		

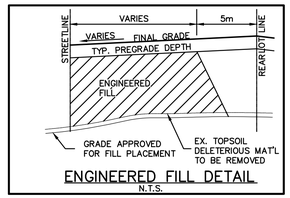
LEGEND

- LIMIT OF SUBDIVISION
- EX. CONTOUR (260.00)
- PROPOSED DITCH
- EX. SANITARY MANHOLE (MH 000)
- PROPOSED SANITARY MAINTENANCE HOLE (MH (100))
- PROPOSED STORM MAINTENANCE HOLE (MH (200))
- PROPOSED CATCHBASIN (CB)
- PROPOSED DOUBLE CATCHBASIN (DCB)
- TREE PRESERVATION FENCE
- SLOPE (3:1 MAX.)
- PROPOSED HYDRANT AND VALVE (H&V)
- PROPOSED VALVE (VB)
- CURB STOP
- CONCEPTUAL LOT LINE
- EASEMENT LINE

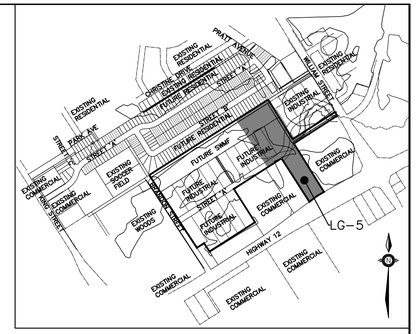
- EX. BOREHOLE LOCATION ID# & GROUNDWATER ELEVATION (BH7 254.60)
- TRANSFORMER
- SWITCHGEAR (S)
- LIGHT STANDARD
- BELL/ROGERS (BPED)
- MAJOR OVERLAND FLOW ROUTE

55.0m–3.0x1.8m BOX CULVERT @ 0.5%
N INV. 206.48
S INV. 206.21





ENGINEERED FILL DETAIL
N.T.S.



KEYPLAN
NTS

REFER TO DWG LG-3

REFER TO DWG LG-3

BLOCK 06 SWM POND
REFER TO DWG. PND-1

BLOCK 02

BLOCK 03

BLOCK 01

BLOCK 04

BLOCK 04

BLOCK 04

HYDRO
NOT IN SUBDIVISION
OWNED BY OTHERS

12.00m EASEMENT

EX. 9.14m EASEMENT (INST.)

55.0m–3.0x1.8m
BOX CULVERT @ 0.5%
N INV. 206.48
S INV. 206.21

1.5m WIDE CONC. SIDEWALK

CONCEPTUAL LOT LINE (TYP.)

STREET 'A'

LIMIT OF SUBDIVISION

EXISTING INDUSTRIAL (M1)

EXISTING INDUSTRIAL (M1)

EXISTING INDUSTRIAL (M1)

HIGHWAY 12

MH (302)
MH (251)
MH (184)
MH (258)
MH (299)
MH (298)
MH (259)
MH (297)
CB 23
CB 24
CB 22
CB 21
CB 19
CB 20

208.60BW
208.92BW
209.65BW

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

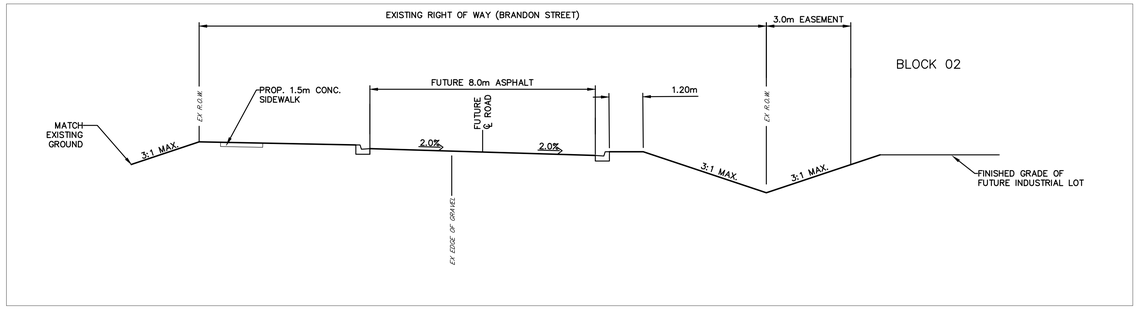
LICENSED PROFESSIONAL ENGINEER
J. W. INGRAM
100143779
22-11-30
PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

LOT GRADING PLAN

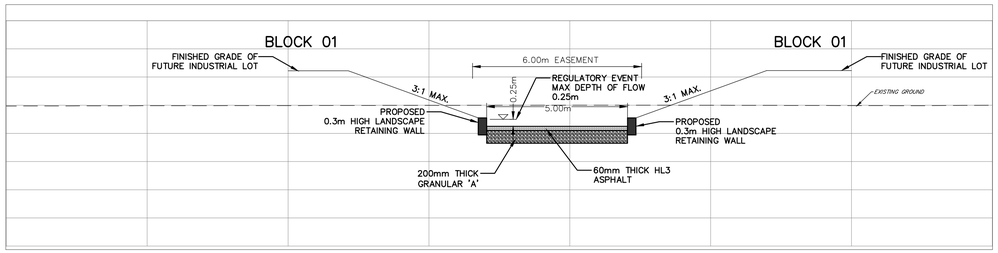
JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN JJH	SCALE: 1:500	DATE FEBRUARY 2020
DRAWN JT	PROJECT PRA–16084	DWG. Nº LG–5
CHECKED JWI		



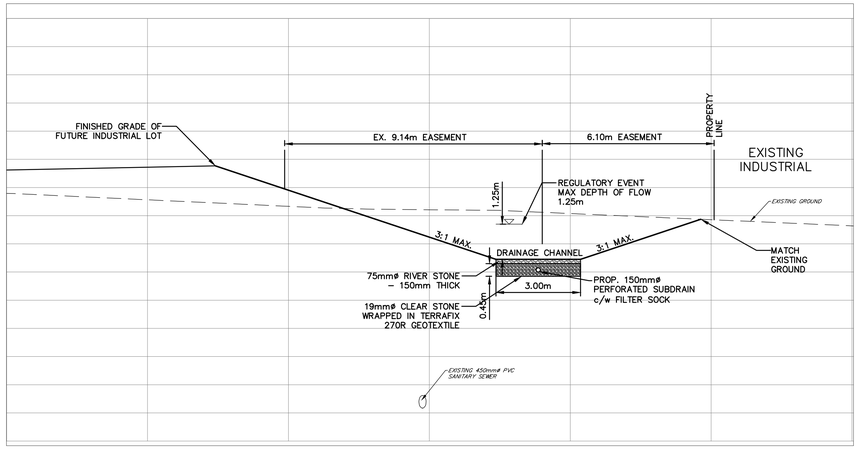
SECTION A–A SCALE 1:100

CHANNEL DETAIL ADJACENT TO BRANDON ROAD



TYPICAL SECTION B–B SCALE 1:100

DRAINAGE CHANNEL DETAIL TO STORMWATER MANAGEMENT POND



TYPICAL SECTION C–C SCALE 1:100

CHANNEL DETAIL ADJACENT TO EXISTING INDUSTRIAL LANDS

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

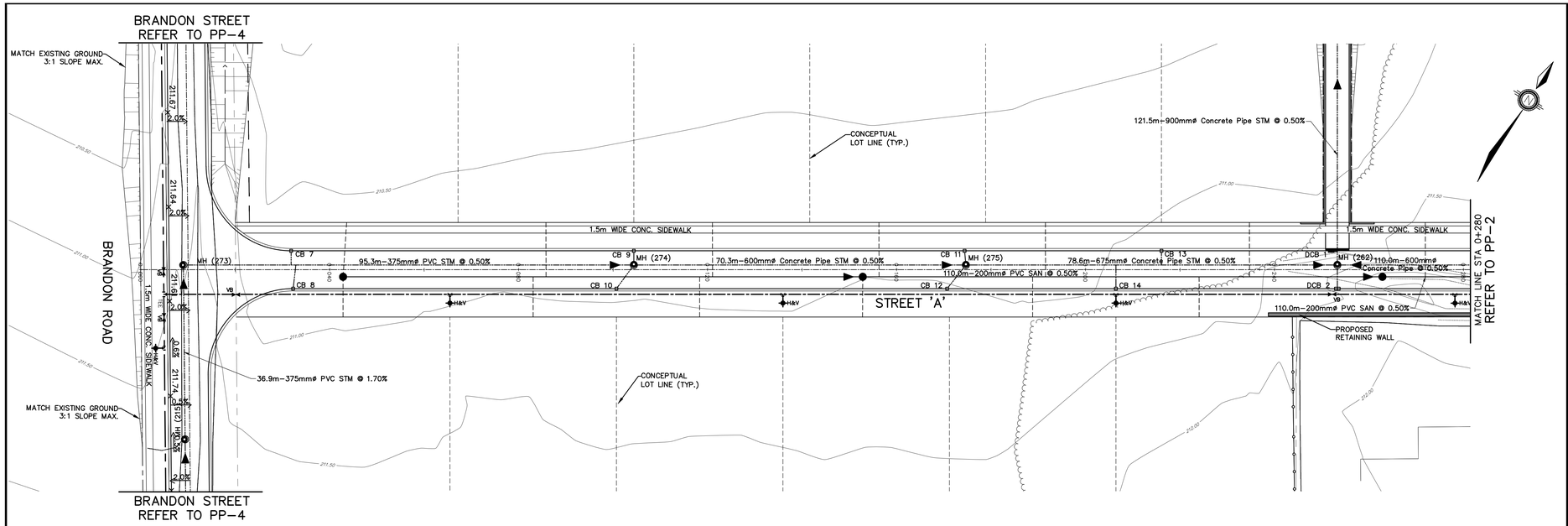
LICENSED PROFESSIONAL ENGINEER
J. W. INGRAM
100143779
22-11-30
PROVINCE OF ONTARIO

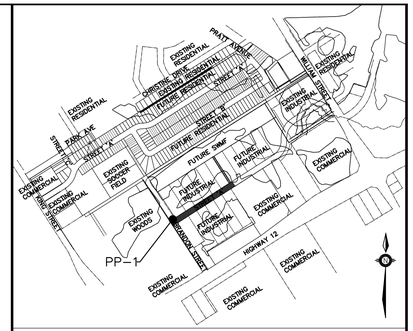
PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

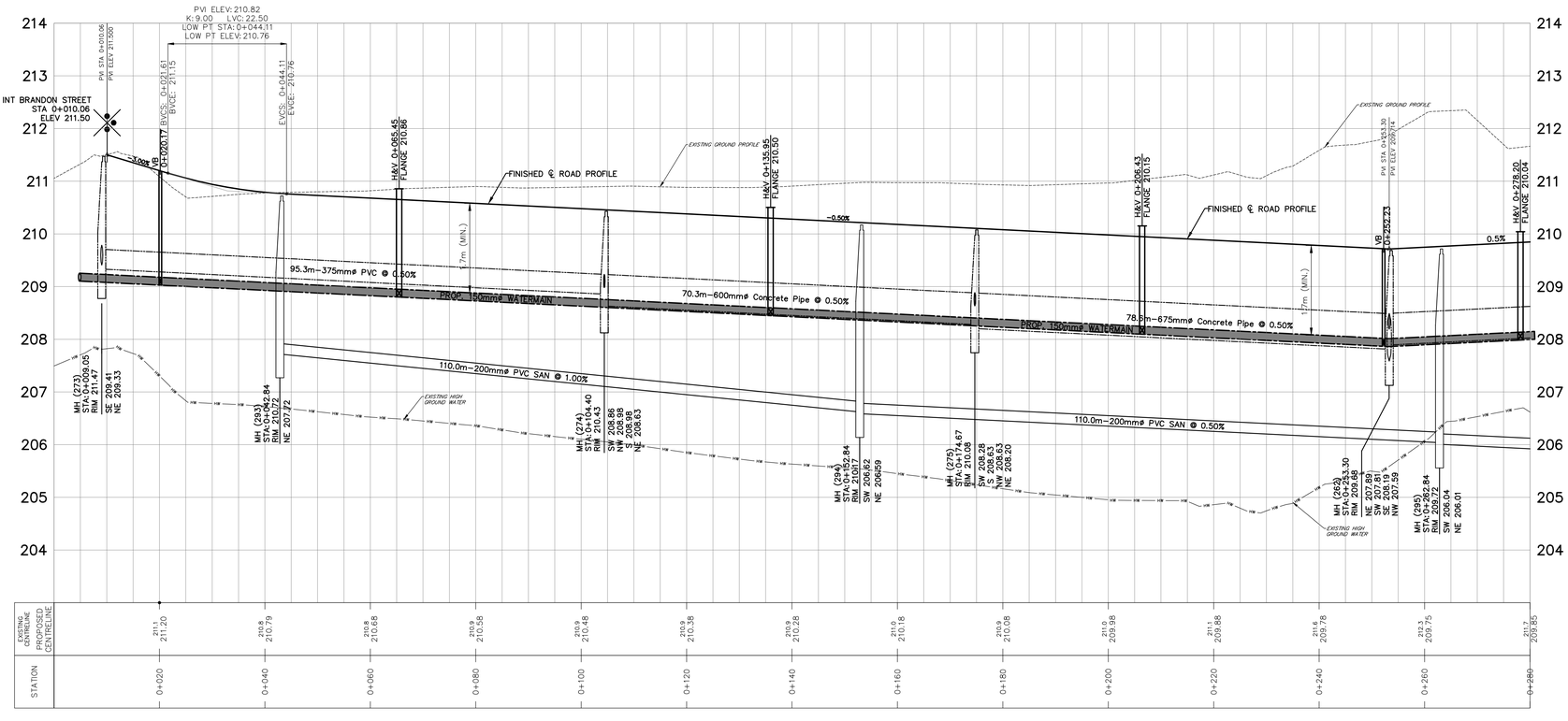
LOT GRADING DETAILS

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN JJH	SCALE: AS NOTED	DATE OCT 2020	
DRAWN JT	PROJECT PRA–16084	DWG. Nº LG–6	
CHECKED JWI			







LEGEND

15	LOT NUMBER
100304672	EX. SANITARY MAINTENANCE HOLE
#DDHW00816	EX. STORM MAINTENANCE HOLE
CB	EX. CATCHBASIN
DCB	EX. DOUBLE CATCHBASIN
V6291	EX. VALVE & BOX
H2982	EX. HYDRANT & VALVE
BPED	EX. BELL PEDESTAL
HP	EX. HYDRO POLE
SIGN	EX. SIGN
	EX. LIGHT STANDARD
H&V	HYDRANT AND VALVE
VB	VALVE AND BOX
SAN1	SANITARY MAINTENANCE HOLE
STM1	STORM MAINTENANCE HOLE
CB	CATCH BASIN
DCB	DOUBLE CATCH BASIN
	DROPPED CURB
BH01 260.00	BOREHOLE WITH ID#
	SANITARY SERVICE
	WATER SERVICE AND VALVE
	EX. WATERMAIN
	WATERMAIN
	EX. SANITARY SEWER AND DIRECTION OF FLOW
	SANITARY SEWER AND DIRECTION OF FLOW
	EX. STORM SEWER AND DIRECTION OF FLOW
	STORM SEWER AND DIRECTION OF FLOW
	CONCEPTUAL LOT LINE
	EASEMENT LINE

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

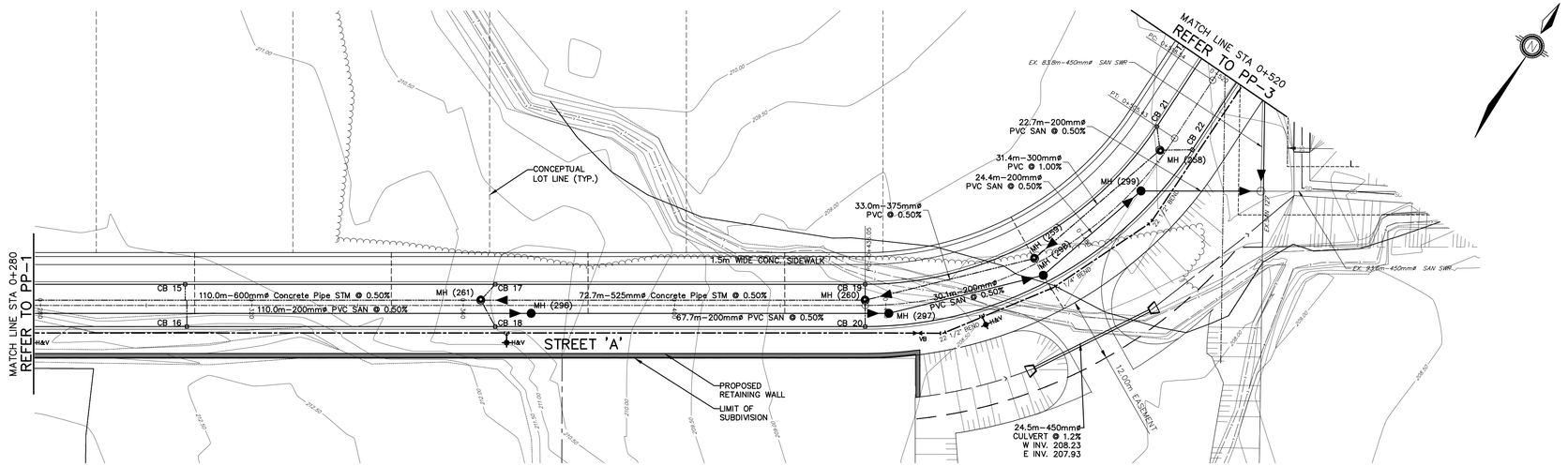
LICENSED PROFESSIONAL ENGINEER
J. W. INGRAM
100149779
22-11-30
PROVINCE OF ONTARIO

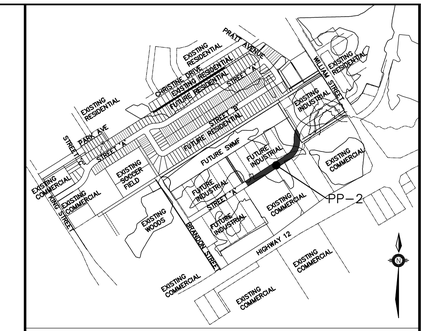
PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

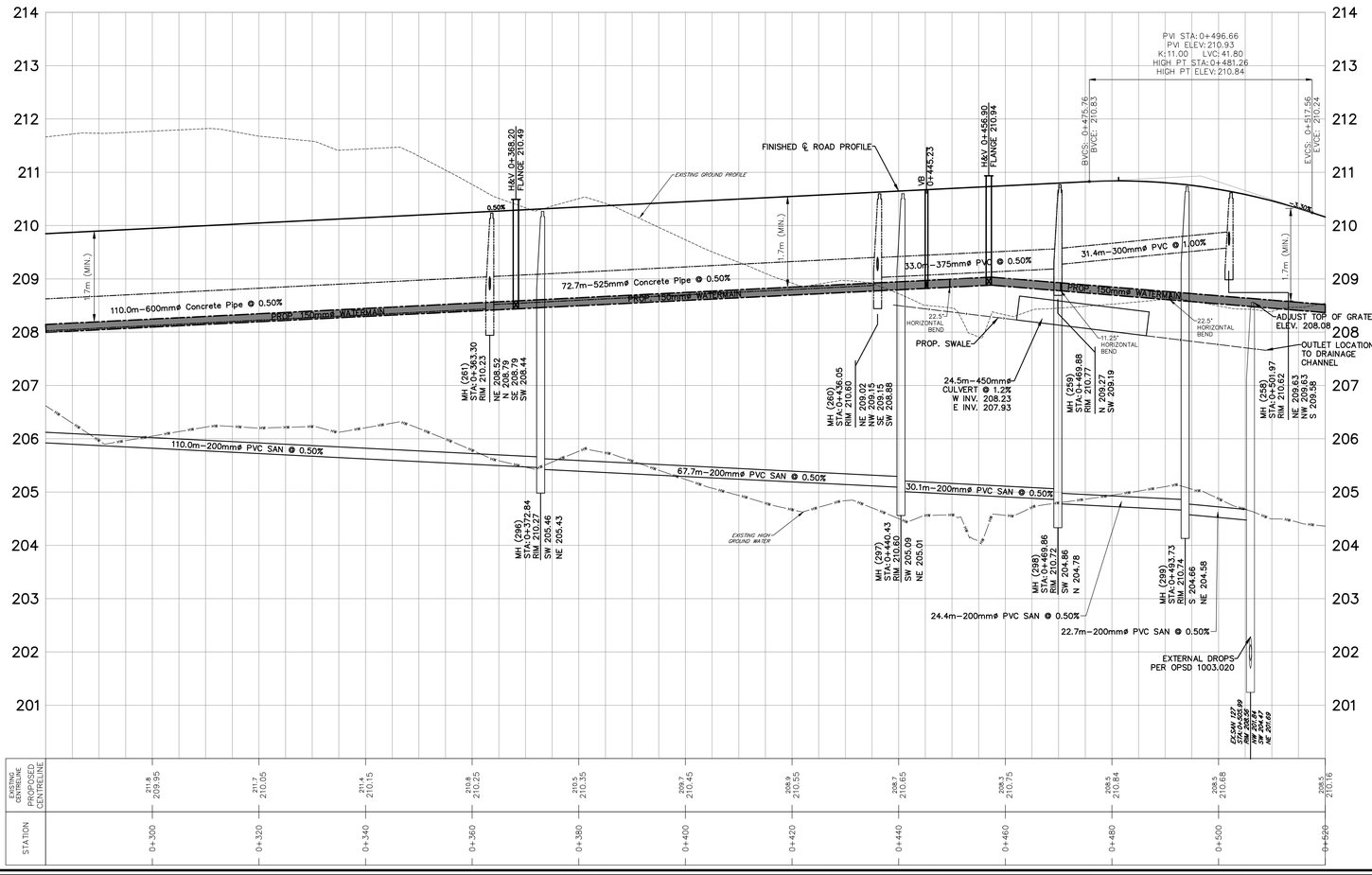
PLAN AND PROFILE
STREET 'A'
STA 0+000 TO 0+280

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	JJH	SCALE: H=1:500 V=1:50	DATE OCT 2020
DRAWN	JJH	PROJECT PRA-16084	DWG. Nº PP-1
CHECKED	JWI		







LEGEND

15	LOT NUMBER
100304672	EX. SANITARY MAINTENANCE HOLE
#DDHW00816	EX. STORM MAINTENANCE HOLE
CB	EX. CATCHBASIN
DCB	EX. DOUBLE CATCHBASIN
V62971	EX. VALVE & BOX
H2982	EX. HYDRANT & VALVE
BPED	EX. BELL PEDESTAL
HP	EX. HYDRO POLE
SIGN	EX. SIGN
	EX. LIGHT STANDARD
H&V	HYDRANT AND VALVE
VB	VALVE AND BOX
SAN1	SANITARY MAINTENANCE HOLE
STM1	STORM MAINTENANCE HOLE
CB	CATCH BASIN
DCB	DOUBLE CATCH BASIN
	DROPPED CURB
BH01 260.00	BOREHOLE WITH ID#
	SANITARY SERVICE
	WATER SERVICE AND VALVE
	EX. WATERMAIN
	WATERMAIN
	EX. SANITARY SEWER AND DIRECTION OF FLOW
	SANITARY SEWER AND DIRECTION OF FLOW
	EX. STORM SEWER AND DIRECTION OF FLOW
	STORM SEWER AND DIRECTION OF FLOW
	CONCEPTUAL LOT LINE
	EASEMENT LINE

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

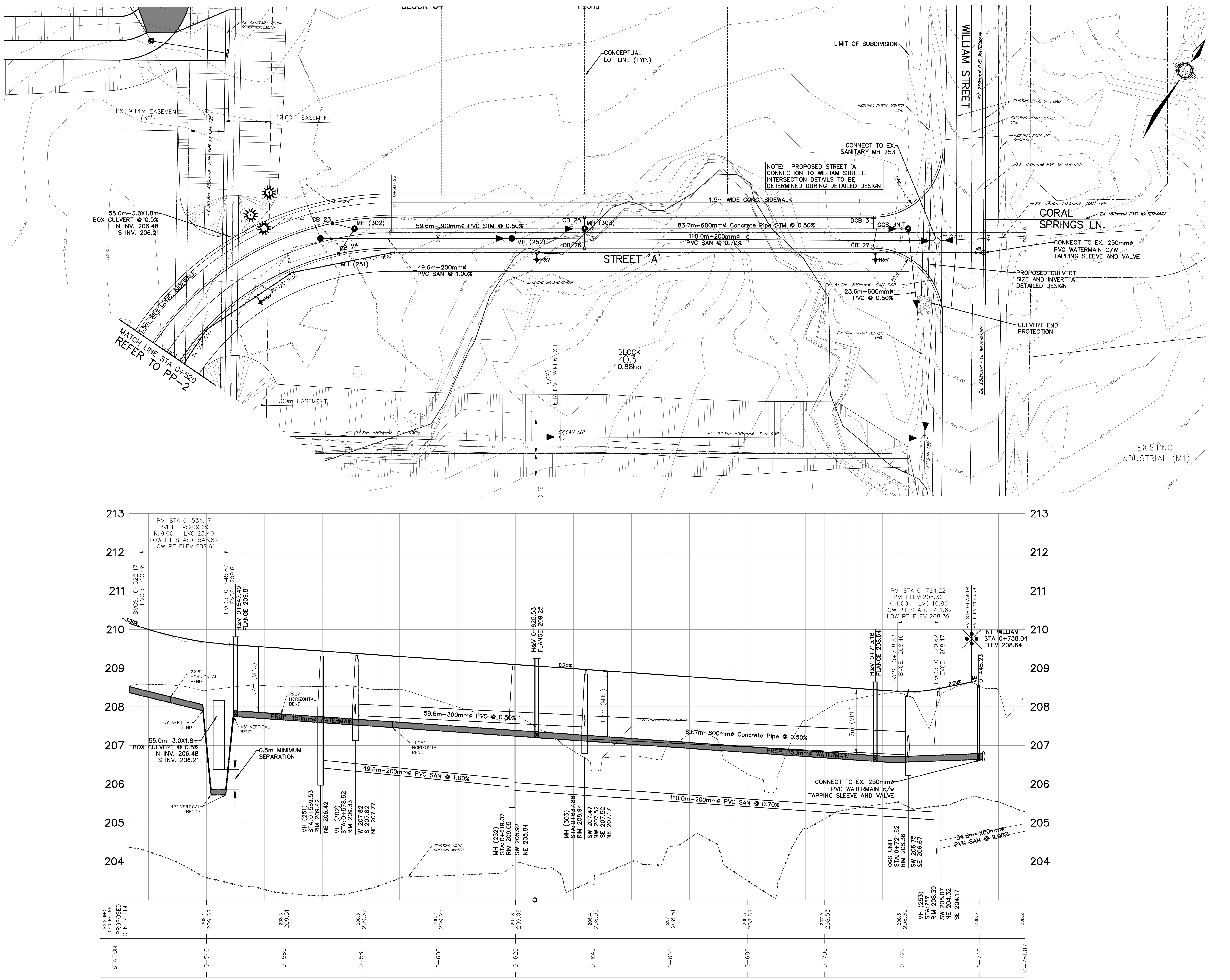
LICENSED PROFESSIONAL ENGINEER
J. W. INGRAM
100143779
22-11-30
PROVINCE OF ONTARIO

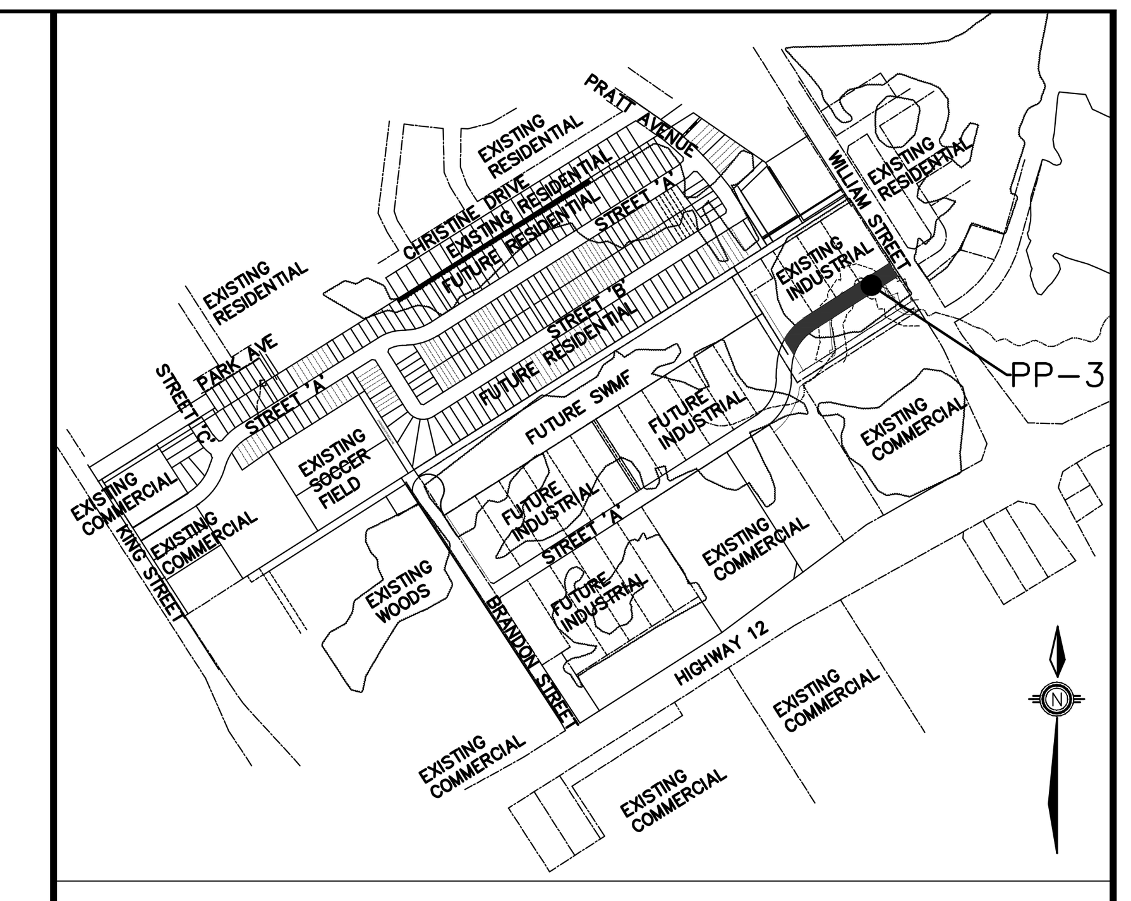
PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

PLAN AND PROFILE
STREET 'A'
STA 0+280 TO 0+520

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	JJH	SCALE: H=1:500 V=1:50	DATE OCT 2020
DRAWN	JJH	PROJECT PRA–16084	DWG. Nº PP–2
CHECKED	JW		





LEGEND

- LOT NUMBER
- EX. SANITARY MAINTENANCE HOLE
- EX. STORM MAINTENANCE HOLE
- EX. CATCHBASIN
- EX. DOUBLE CATCHBASIN
- EX. VALVE & BOX
- EX. HYDRANT & VALVE
- EX. BELL PEDESTAL
- EX. HYDRO POLE
- EX. SIGN
- EX. LIGHT STANDARD
- HYDRANT AND VALVE
- VALVE AND BOX
- SANITARY MAINTENANCE HOLE
- STORM MAINTENANCE HOLE
- CATCH BASIN
- DOUBLE CATCH BASIN
- DROPPED CURB
- BOREHOLE WITH ID#
- SANITARY SERVICE
- WATER SERVICE AND VALVE
- EX. WATERMAIN
- WATERMAIN
- EX. SANITARY SEWER AND DIRECTION OF FLOW
- SANITARY SEWER AND DIRECTION OF FLOW
- EX. STORM SEWER AND DIRECTION OF FLOW
- STORM SEWER AND DIRECTION OF FLOW
- CONCEPTUAL LOT LINE
- EASEMENT LINE

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

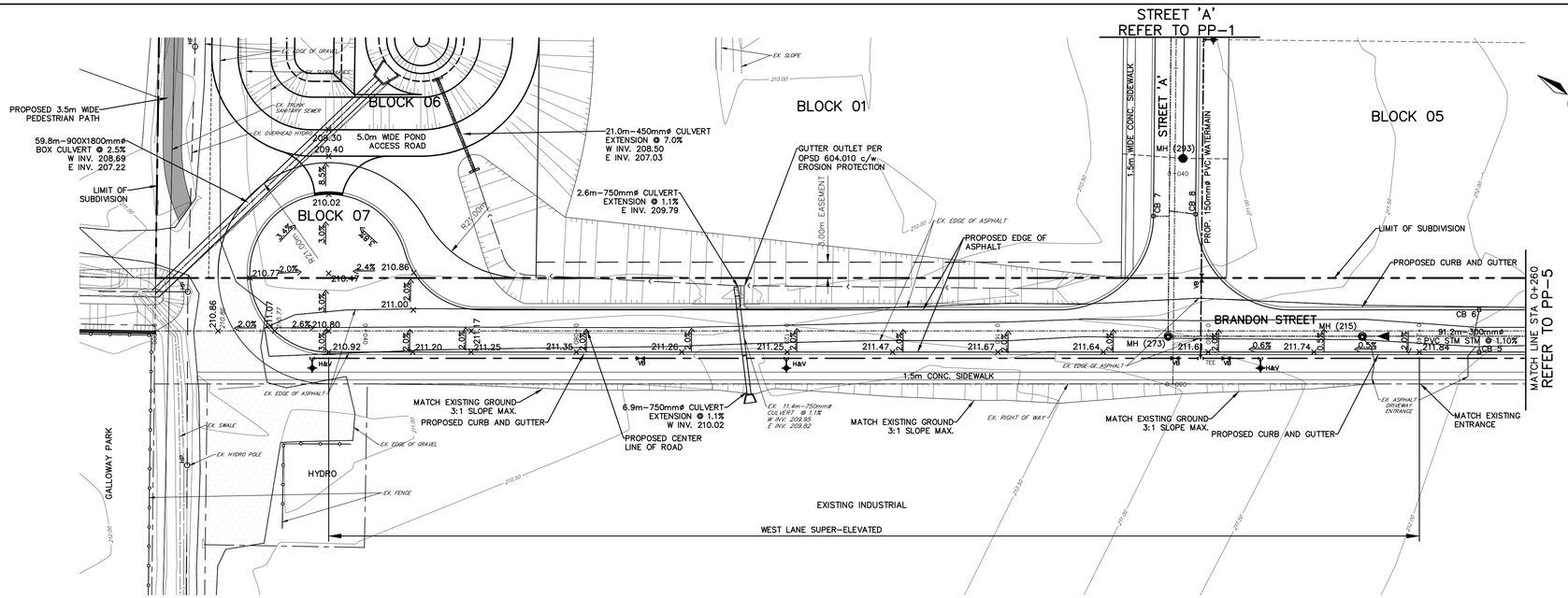
LICENSED PROFESSIONAL ENGINEER J. W. INGRAM 100143779 22-11-30 PROVINCE OF ONTARIO

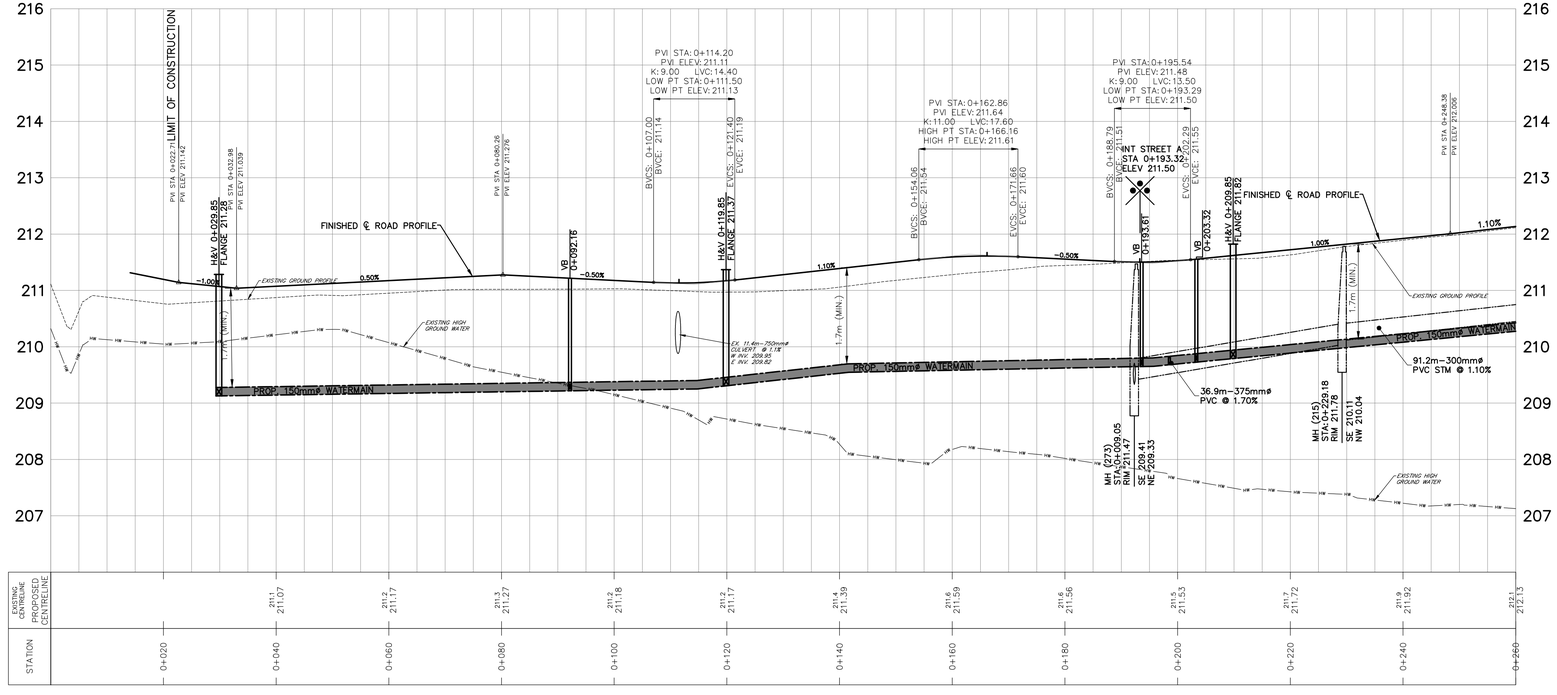
PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

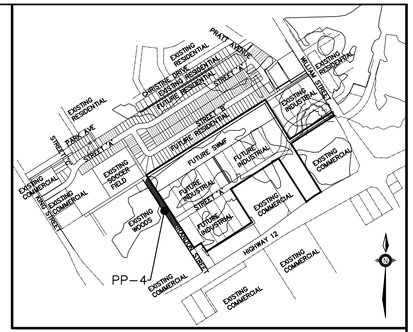
PLAN AND PROFILE
STREET 'A'
STA 0+520 TO 0+733.07

JONES CONSULTING GROUP LTD. PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1, Barrie, ON L4N 0W5
P. 705.734.2538 F. 705.734.1056

DESIGN JJH	SCALE: H=1:500 V=1:50	DATE OCT 2020
DRAWN JJH	PROJECT	DWG. Nº
CHECKED JWI	PRA-16084	PP-3







LEGEND

- 15 — LOT NUMBER
- 100304672 — EX. SANITARY MAINTENANCE HOLE
- #CDHW00816 — EX. STORM MAINTENANCE HOLE
- CB — EX. CATCHBASIN
- DCB — EX. DOUBLE CATCHBASIN
- VB291 — EX. VALVE & BOX
- H2982 — EX. HYDRANT & VALVE
- BPED — EX. BELL PEDESTAL
- HP — EX. HYDRO POLE
- SIGN — EX. SIGN
- EX. LIGHT STANDARD
- H&V — HYDRANT AND VALVE
- VB — VALVE AND BOX
- SAN1 — SANITARY MAINTENANCE HOLE
- STM1 — STORM MAINTENANCE HOLE
- CB — CATCH BASIN
- DCB — DOUBLE CATCH BASIN
- DROPPED CURB
- BH01 260.00 — BOREHOLE WITH ID#
- SANITARY SERVICE
- WATER SERVICE AND VALVE
- EX. WATERMAIN
- WATERMAIN
- EX. SANITARY SEWER AND DIRECTION OF FLOW
- SANITARY SEWER AND DIRECTION OF FLOW
- EX. STORM SEWER AND DIRECTION OF FLOW
- STORM SEWER AND DIRECTION OF FLOW
- CONCEPTUAL LOT LINE
- EASEMENT LINE

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

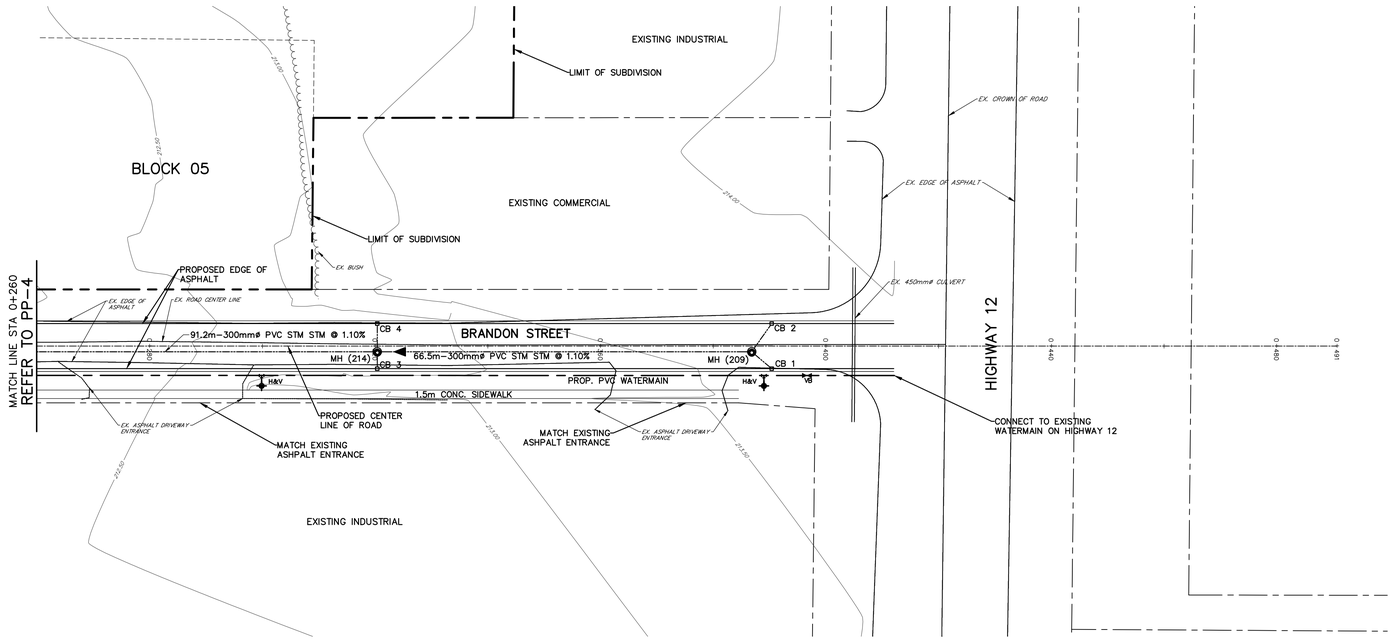
LICENSED PROFESSIONAL ENGINEER — J. W. INGRAM — 100143779 — 22-11-30 — PROVINCE OF ONTARIO

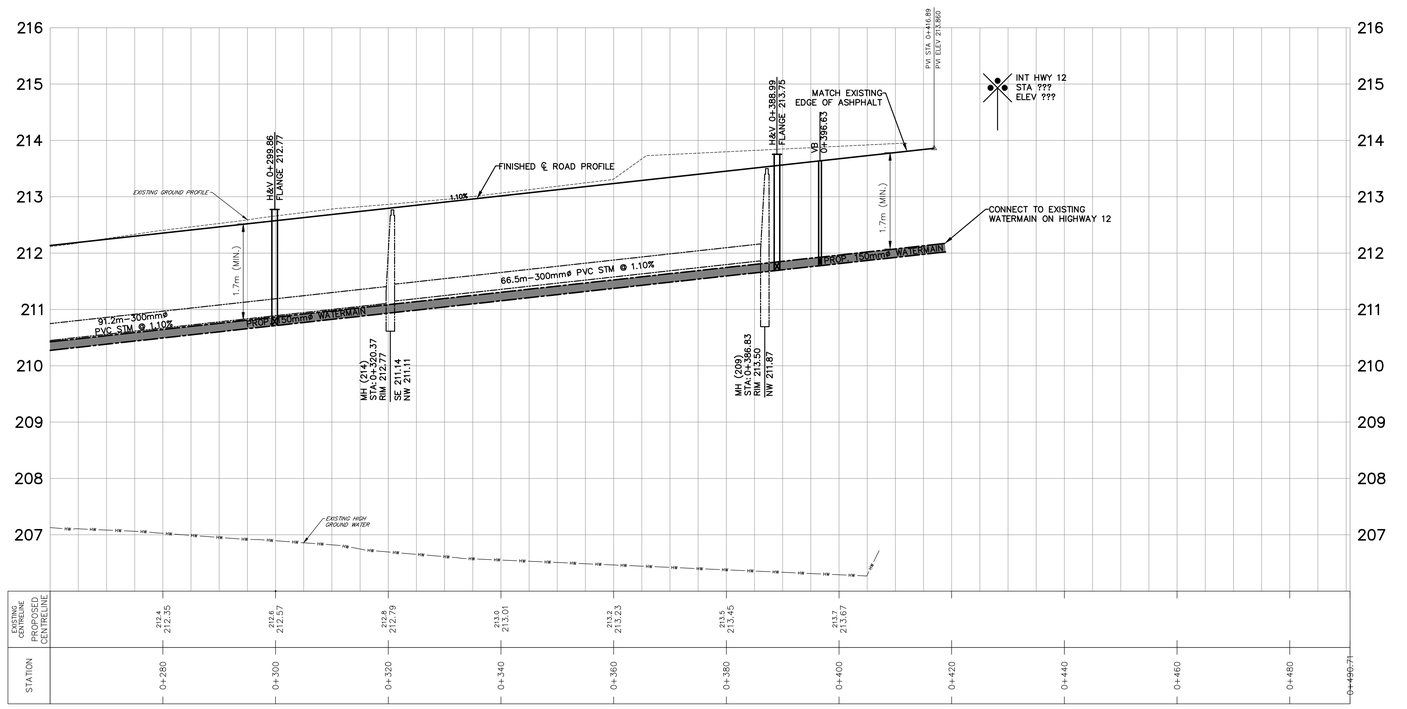
PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

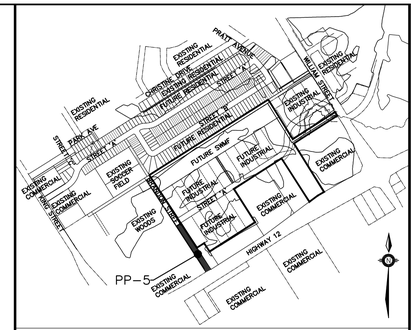
PLAN AND PROFILE
BRANDON STREET
STA 0+000 TO 0+260

JONES CONSULTING GROUP LTD. PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	JJH	SCALE: H=1:500 V=1:50	DATE OCT 2020
DRAWN	JJH	PROJECT PRA-16084	DWG. Nº PP-4
CHECKED	JWI		







LEGEND

- 15 — LOT NUMBER
- 100304672 — EX. SANITARY MAINTENANCE HOLE
- #CDHWOOD816 — EX. STORM MAINTENANCE HOLE
- CB — EX. CATCHBASIN
- DCB — EX. DOUBLE CATCHBASIN
- V6291 — EX. VALVE & BOX
- H2982 — EX. HYDRANT & VALVE
- BPED — EX. BELL PEDESTAL
- HP — EX. HYDRO POLE
- SIGN — EX. SIGN
- EX. LIGHT STANDARD
- H&V — HYDRANT AND VALVE
- VB — VALVE AND BOX
- SAN1 — SANITARY MAINTENANCE HOLE
- STM1 — STORM MAINTENANCE HOLE
- CB — CATCH BASIN
- DCB — DOUBLE CATCH BASIN
- DROPPED CURB
- BH01 260.00 — BOREHOLE WITH ID#
- SANITARY SERVICE
- WATER SERVICE AND VALVE
- EX. WATERMAIN
- WATERMAIN
- EX. SANITARY SEWER AND DIRECTION OF FLOW
- SANITARY SEWER AND DIRECTION OF FLOW
- EX. STORM SEWER AND DIRECTION OF FLOW
- STORM SEWER AND DIRECTION OF FLOW
- CONCEPTUAL LOT LINE
- EASEMENT LINE

BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

LICENSED PROFESSIONAL ENGINEER
J. W. INGRAM
100143779
22-11-30
PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

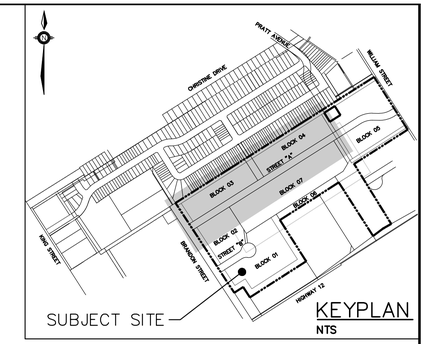
PLAN AND PROFILE
BRANDON STREET
STA 0+280 TO 0+490.71

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN	JJH	SCALE: H=1:500 V=1:50	DATE OCT 2020
DRAWN	JJH	PROJECT PRA-16084	DWG. Nº PP-5
CHECKED	JWI		

LEGEND

- MH — PROPOSED STORMWATER MAINTENANCE HOLE
- PROPOSED STORM SEWER & FLOW DIRECTION
- A / PND-2 — CROSS SECTION LOCATION AND DRAWING PLAN NUMBER
- CONCEPTUAL LOT LINE
- EASEMENT LINE



KEYPLAN
NTS

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

BENCHMARK:

LICENCED PROFESSIONAL ENGINEER — J. W. INGRAM — 100143779 — 22-11-30 — PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

SWM FACILITY No. 1A
BLOCK 06
PLAN VIEW

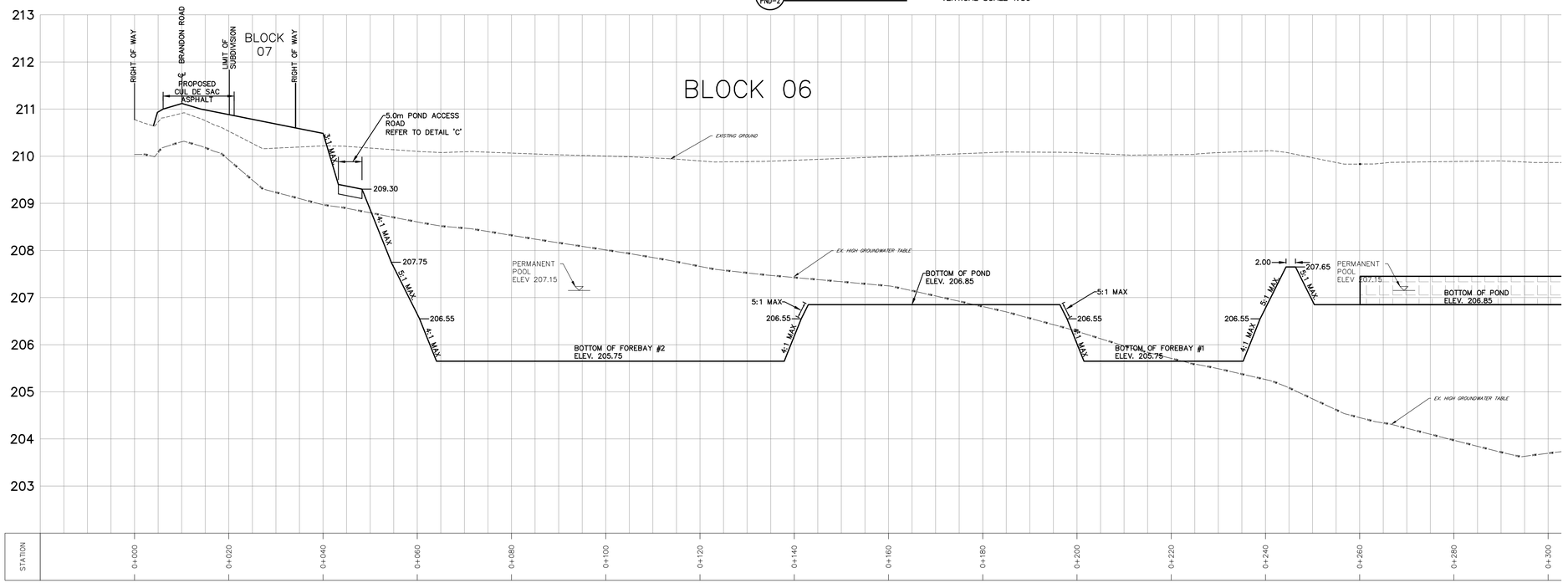
JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

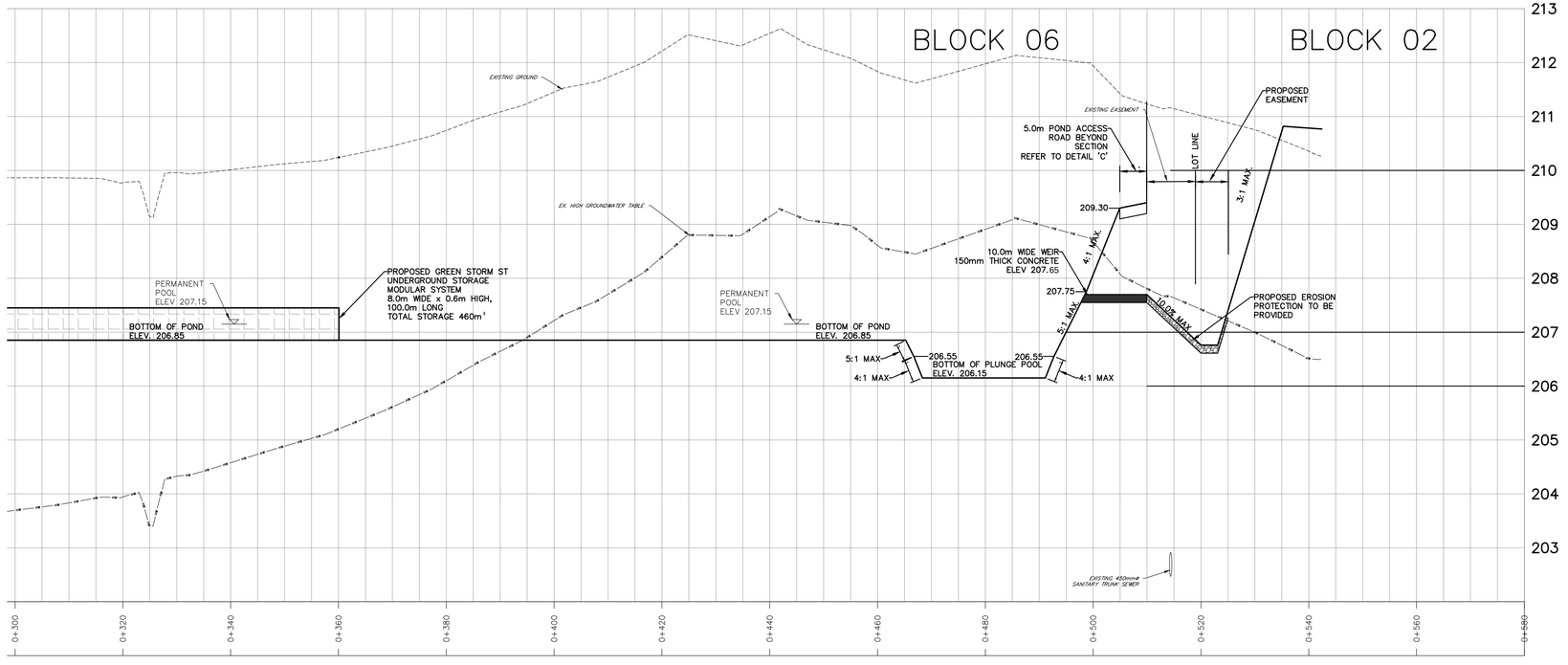
DESIGN	KR	SCALE: 1:750	DATE FEBRUARY 2020
DRAWN	KR	PROJECT PRA–16084	DWG. Nº PND–1
CHECKED	JWI		

SECTION A–A

PND-2

HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:50





BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

LICENSED PROFESSIONAL ENGINEER
J. W. INGRAM
100143779
22-11-30
PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

SWM FACILITY No. 1A
BLOCK 06
SECTIONS

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
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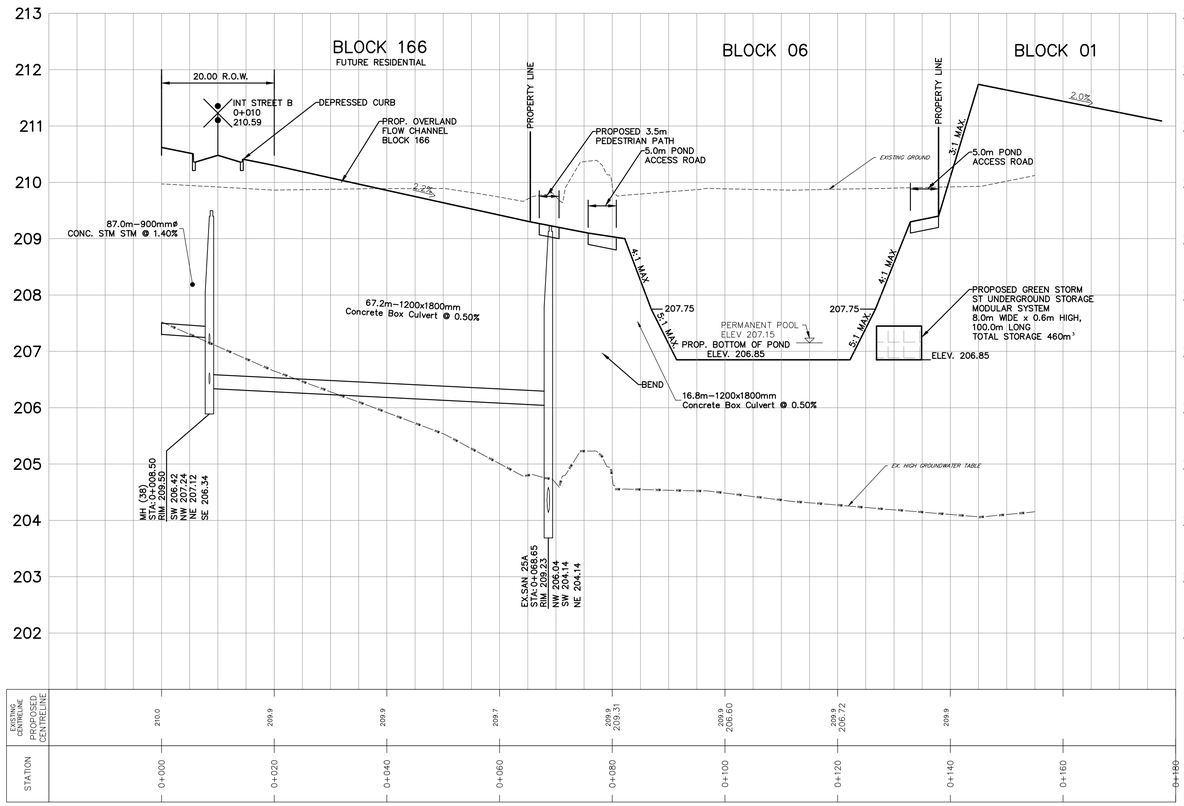
DESIGN KR	SCALE: AS NOTED	DATE FEBRUARY 2020
DRAWN KR	PROJECT PRA–16084	DWG. Nº PND–2
CHECKED JWI		

SECTION B–B

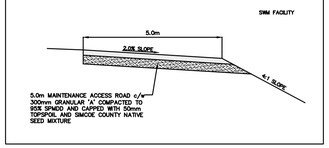
(12 / PND-1)

HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:50



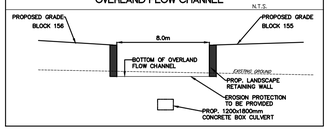
DETAIL 'C'
SWM FACILITY ACCESS ROAD DETAIL

N.T.S.



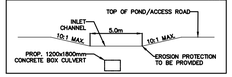
DETAIL 'D'
OVERLAND FLOW CHANNEL

N.T.S.



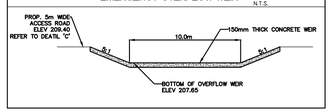
DETAIL 'E'
OVERLAND FLOW CHANNEL (SWM FACILITY INLET)

N.T.S.



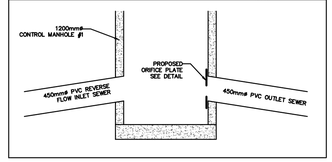
DETAIL 'F'
EMERGENCY OVERFLOW WEIR

N.T.S.



DETAIL 'I'
CONTROL MANHOLE #1

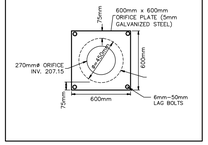
N.T.S.



DETAIL 'I2'
270mmø ORIFICE PLATE

BOLTED TO THE EAST SIDE OF THE MANHOLE

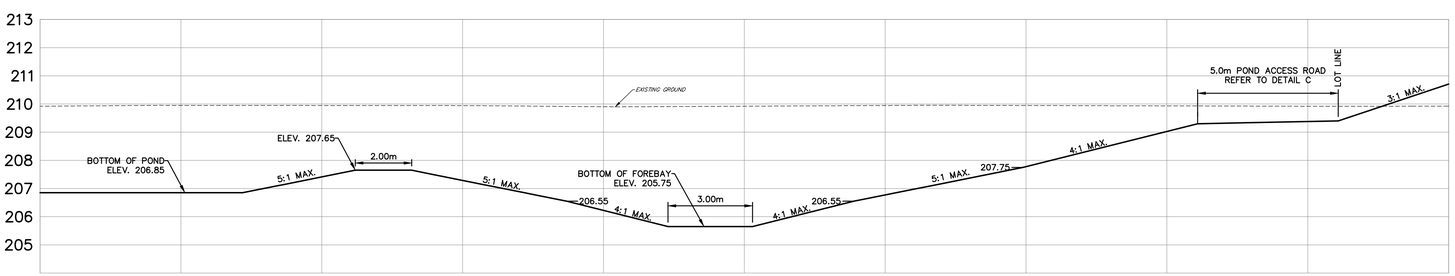
N.T.S.



SECTION G–G
TYPICAL FOREBAY SECTION

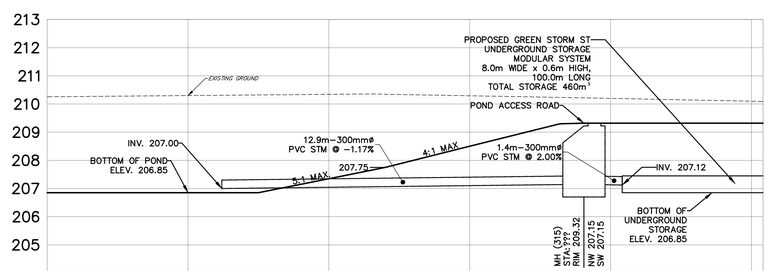
(13 / PND-1)

HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:100



SECTION H–H
HORIZONTAL SCALE 1:100
VERTICAL SCALE 1:100

(13 / PND-1)



BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

LICENCED PROFESSIONAL ENGINEER
J. W. INGRAM
100143779
22-11-30
PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

SWM FACILITY No. 1A
BLOCK 06
SECTIONS

JONES CONSULTING GROUP LTD.
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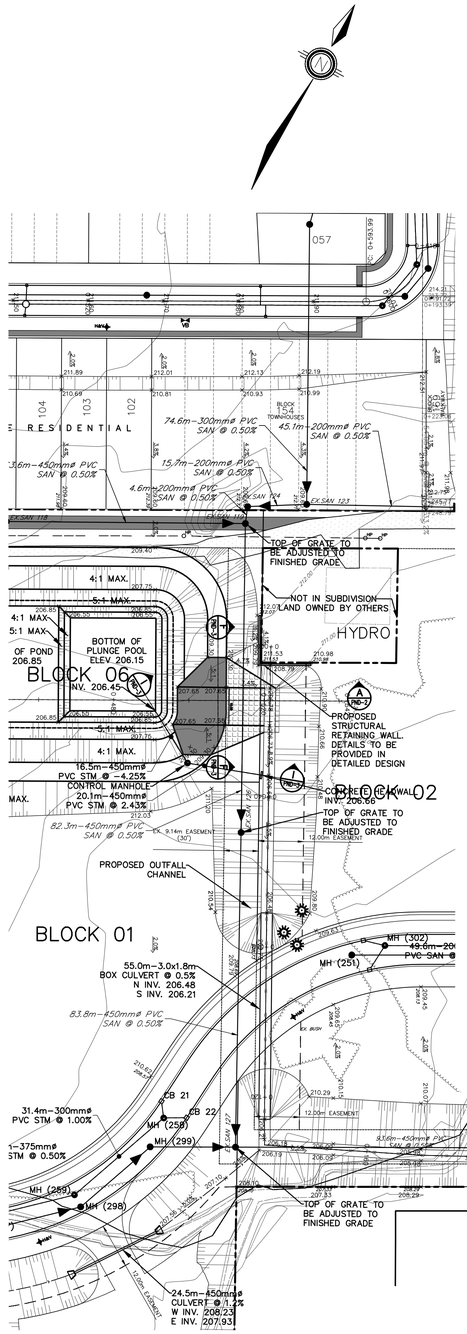
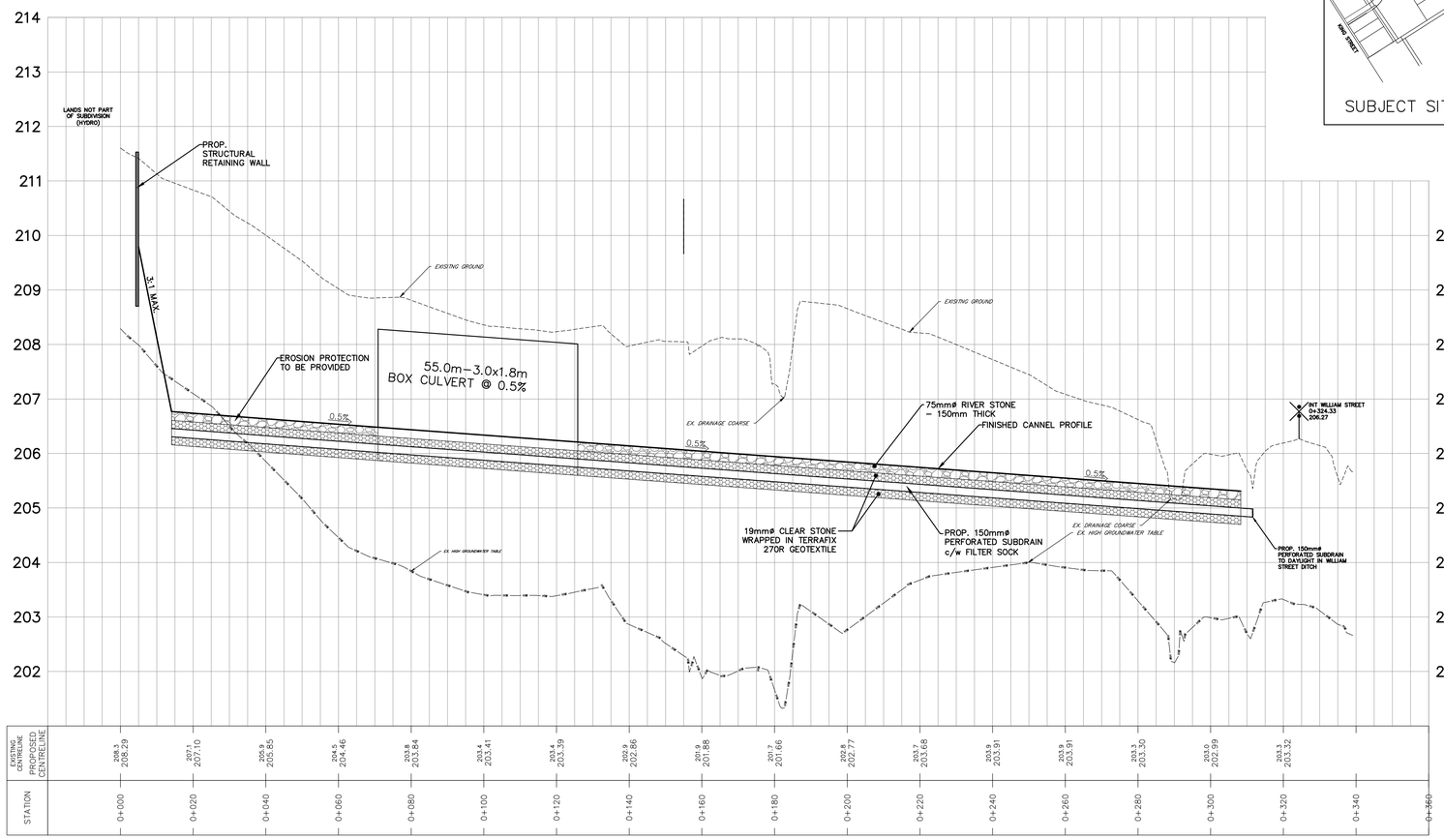
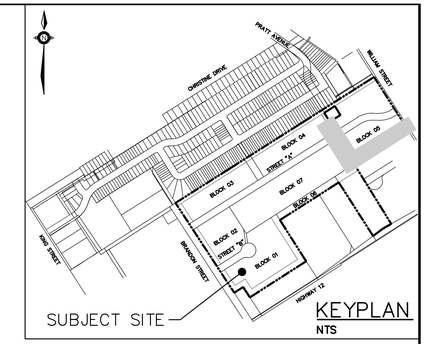
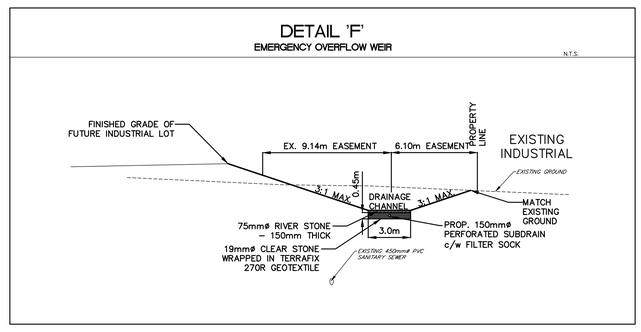
DESIGN KR	SCALE: AS NOTED	DATE FEBRUARY 2020	
DRAWN KR	PROJECT PRA–16084	DWG. Nº PND–3	
CHECKED JWI			









BENCHMARK:

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	DRAFT SUBDIVISION APPROVAL	OCT 2020	JWI

LICENCED PROFESSIONAL ENGINEER
J. W. INGRAM
100143779
22-11-30
PROVINCE OF ONTARIO

PRATT DEVELOPMENTS INC.
PRATT EMPLOYMENT SUBDIVISION
TOWN OF MIDLAND

SWM FACILITY No. 1A
OUTFALL CHANNEL
PLAN & PROFILE

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PLANNERS & ENGINEERS
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DESIGN	JJH	SCALE: H 1:750, V 1:50	DATE NOV 2022
DRAWN	JJH	PROJECT PRA–16084	DWG. Nº PND–4
CHECKED	JW		