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Pratt Development Inc.
 Pratt Residential Subdivision
 Preliminary Servicing &
 Stormwater Management Report

November 2022

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Disclaimer

This Preliminary Servicing & Stormwater Management Report (PS&SWMR) was prepared by **The Jones Consulting Group Ltd.** for **Pratt Development Inc.** The material in the Report reflects **The Jones Consulting Group Ltd.**'s best judgment in light of the information available at the time of the Report preparation. Any use which a third party makes of this Report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. **The Jones Consulting Group Ltd.** accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this Report.



Preliminary Servicing & Stormwater Management Report

Pratt Development Inc.

Pratt Residential 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 and Stormwater Management Report for the proposed residential Development known as the Pratt – Galloway Subdivision. The proposed development is located in the Town of Midland (Town) and consists of residential type (single detached and townhouse) development. There is a future Employment Land Subdivision currently owned by the proponent, located south of the proposed residential subdivision. It is proposed to include a stormwater management (SWM) facility within this future development, to service the proposed future employment lands, proposed residential land and existing upstream development. This Report has been prepared to summarize how the Pratt – Galloway subdivision will be serviced by proposed and existing surrounding municipal infrastructure.

In particular, this Report examines the Development's servicing in relation to:

- Sanitary Servicing
- Water Servicing
- Stormwater Management & Conveyance

1.2. Property Description

The site is generally rectangular in shape and bound to the north by an existing residential development. It is located approximately 390 metres (m) North of Highway 12 between William Street to the East and King Street to the West. King Street and William Street are both classified as Arterial Roadways in the Town of Midland's Official Plan (2017). A copy of the Town's Official Plan Road Classification Map Schedule 'C' is included **Appendix A**, for reference.

The Pratt – Galloway Subdivision property has a total area of approximately 13.9 hectares (ha). The development is municipally known as 823 King Street, Midland, and legally described as Part



of Lot 102, Concession 2, in the Town of Midland, County of Simcoe (County). The location of the subject property is shown in **Figure 1**.



Figure 1– Site Location Plan

The Development lands are mainly vegetated with a combination of pasture and forested type land cover. In general, the existing topography is considered to be gently sloping and drains in a south-easterly direction via a series of swales toward the William Street roadside ditch, north of Pillsbury Drive. The topography ranges from an elevation of approximately 217m to approximately 210m and corresponds to an average gradient of 4%. Rudy Mak Surveying Ltd. completed topographic survey information for the development.

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.



1.3. Proposed Land Use

The latest Pratt Residential Subdivision Draft Plan prepared by MHBC Planning, indicates that the Development will be subdivided into various sized residential lots and blocks (single detached and townhouse). The Site's proposed land use statistics are summarized in **Table 1**, below. Refer to the Draft Plan attached in **Appendix A** for the location and orientation of the Lots, Blocks and Streets.

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

Residential Lot Breakdown	Units
10m singles	48
12m singles	81
15m singles	9
6m Townhomes	80
7.6m Townhomes	49
Total	267

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 the existing development north, west and east of the Site, through the development lands to the proposed SWM facility. The proposed SWM facility is located on the future employment lands and will provide the required quality and quantity control in accordance with Ministry of Environment guidelines.

Two site accesses are proposed to connect the internal roadways to existing municipal right-of-ways. The first access/egress is to King Street, the second access/egress is to Pratt Avenue.

1.4. Existing Services and Easements

1.4.1. Sanitary

An existing 200mm PVC sanitary sewer servicing the existing residential development to the north, traverses through the Development land, conveying drainage from Park Avenue to William Street. The sewer extends westerly along the Site's northern boundary, before turning south at the properties north-west corner. This sanitary sewer then merges with an existing sanitary main from



King Street and sanitary flows are conveyed via a 450mm sanitary trunk sewer south past the Galloway Park soccer fields. The sanitary trunk then extends easterly for approximately 500m, immediately adjacent to the Site's southern boundary. An existing 200mm PVC sanitary sewer servicing Pratt Avenue extends southerly through the Site 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 sanitary trunk located at William Street. The existing sanitary easements are shown on the Draft Plan of the Subdivision. Refer to **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.

1.4.2. Water

Based on information provided by the Town, an existing 300mm diameter watermain is located along King Street, providing a 200mm connection to service the development lands. There is also an existing connection located along Pratt Avenue which is assumed to be a 200mm PVC watermain in this Report. In this regard, we kindly request that Record Information from the Town be provide to TJCG to confirm existing underground service information. The current underground service information provided by the Town is included in **Appendix A** for reference.

1.4.3. Storm

There are four (4) existing locations where external stormwater drainage enters the Pratt Residential Subdivision. An existing 825mm 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 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 Site via an existing 850mm 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 subject 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.

1.4.4. Hydro

There is an existing 9m wide Hydro easement located along the Site's southern boundary that extends easterly to William Street. In addition, existing Hydro extends from Trillium Wood Park to the existing hydro at the Site's southern boundary.

2. Supporting Documents

The following documents have been referenced in the preparation of this Report:

- Town of Midland Engineering Development Design Standards, Revised 2012
- Town of Midland Official Plan, 2017
- Ministry of the Environment, Design Guidelines for Sewage Works, 2008
- Ministry of the Environment, Design Guidelines for Drinking-Water Systems, 2008
- Ministry of the Environment, Stormwater Management Planning and Design Manual, March 2003;
- Ontario Regulation 350/06, Ontario Building Code;
- Soils Map of Simcoe County, Ontario, Soil Survey Report No. 29

3. Sanitary Servicing

3.1. 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 Drawings SAN-1 and SAN-2. Refer to **Appendix D**. Internally, sewage flows will be collected via proposed 200mm and 250mm diameter PVC SDR35 sanitary mains, and a series of 1200mm diameter maintenance holes to facilitate bends, appropriate clean out lengths, etc. Each proposed residential dwelling unit will be serviced with individual 100mm 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 sanitary trunk which drains north-east along the development's southern boundary. The proposed flows will eventually outfall to the sanitary trunk located at William Street.

The proposed sanitary sewer system has been sized to accommodate external flow from the existing development to the north. Two (2) connections are proposed. The first connection is located at Pratt Avenue and the second connection is located at the proposed sanitary easement, collecting flows from Park Avenue. Existing and proposed sanitary easements can be found on the Draft Plan drawing located in **Appendix A**.

3.2. Sanitary Service Design Flows

For proposed residential development, the analytical sanitary forecast is determined based on estimated population. In order to determine population each residential building type is assigned a number of Persons Per Unit (PPU). The following PPU's have been assigned to the proposed building types:

Single Family Residential = 3.0 PPU

Townhouse Unit = 2.5 PPU

With the above PPU's the estimated population of the development is determined to be 737 people (138 Units x 3.0 PPU (single-detached) + 129 Units x 2.5 PPU (townhouse)). The total sanitary flow for the development can therefore be calculated with the following formula.

$$Q_d = Q_{pd} + Q_i = \left[\frac{PQM}{86400} \right] + [I \times A_{res}]$$

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

Q_{pd} = Peak domestic sewage flow (L/s)



Q_i = Extraneous sewage flow (L/s)

P = Design population (737 people)

Q = Average daily flow (450 L/person/day)

Ares = Area of Residential Development (13.9Ha)

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

M = Harmon Peaking Factor; $1 + \left[\frac{14}{\left[\left(\frac{P}{1000} \right)^{0.5} + 4 \right]} \right]$ (2.0 < M < 4.0)

Therefore: $M = 1 + \left[\frac{14}{\left[\left(\frac{737}{1000} \right)^{0.5} + 4 \right]} \right]$

M = 3.88

$$Qd = \left[\frac{737 \times 450 \times 3.88}{86400} \right] + [0.23 \times 13.9]$$

Qd = 18.09 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.

4. Water Servicing and Distribution

4.1. Overview

All residential units within the Subdivision will be serviced by municipal water.

The proposed domestic and fire water servicing is detailed on drawing GS-1 and GS-2, attached in **Appendix D**. In order to provide a fully looped water distribution system, two (2) connections to the existing water system is proposed. The first connection will be to the existing 200mm diameter



watermain on King Street and the second connection will be to the existing watermain on Pratt Avenue. For the purposes of this Report, it is assumed that the existing connection at Pratt Avenue is a 200mm PVC watermain. We kindly ask that the Town verify this information. The existing connections will coincide with the Site entrance locations. Internally, the Development will be serviced with PVC class 150 watermain ranging in size from 150mm to 200mm. 25mm diameter (PE or Copper) domestic water services will be provided to each of the proposed single family dwellings and townhouse units. Fire hydrants will be provided and strategically located within the development to meet the Town's requirements for Fire Department suppression coverage.

4.2. Domestic Water Design Flows

Based on the estimated population of 737 people, the Average Daily Flow (ADF) is determined to be 331,650 L/day or 3.84 L/s (737 people x 450 L/day/person). 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: $3.84\text{L/s} \times 2.75 = 10.56\text{L/s}$

Peak Hourly Demand Factor: 4.13

Peak Hourly Demand: $3.84\text{L/s} \times 4.13 = 15.86\text{L/s}$

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.

5. Stormwater Management Plan

5.1. Overview

As previously noted, the proposed Subdivision is surrounded by existing development to the north, east and west. External storm drainage from these existing development lands discharge to the



proposed 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 development. In order to achieve this, a wetland stormwater management facility is proposed. The SWM facility is located in the future Employment Lands Subdivision (owned by the proponent) and will outlet to William Street. The SWM facility has been designed to provide peak flow quantity control for both the Pratt Residential Subdivision, as well as the Pratt Employment Land Subdivision. In addition to peak flow control, the proposed SWM facility will provide quality control (80% TSS removal) for the entire upstream drainage area directed to the proposed stormwater management facility. This will provide a significant benefit as currently a large portion of the upstream developments are directed to William street untreated.

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 Midlands 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.

5.2. Pre and Post Development Drainage

In the pre development condition the subject lands predominately drain in a south-easterly direction via a series of swales toward the roadside ditch at William Street, north of Pillsbury Drive. Stormwater run-off draining to William Street, ultimately drain to the Wye River to the East. The Site



receives external drainage from existing development to the north, east and west. This runoff has been incorporated in the stormwater management plan outlined in this Report and will be controlled in the post-development condition. The pre development condition has been broken down into eleven (11) catchments. The pre development catchments are outlined on drawing SWM-1, refer to **Appendix D**.

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 Site. 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 subject lands residential boundary. 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 future 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.

5.3. 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 43,711m³.

The wetland facility incorporates a permanent pool volume of 6,227m³. This volume exceeds the MECP required volume of 6,183m³ 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.



5.4. 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 **Pratt Employment Land Subdivision 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					

5.5. Minor and Major Stormwater Conveyance

In terms of minor event conveyance (i.e. storm events less than or equal to the 5-year event) runoff 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.

5.6. 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 67,346m³. In the post development condition the average annual infiltration volume was determined to be 28,536m³ without the use of water-balance mitigation measures. This ultimately produces a deficit of 38,810 m³/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 m³/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 460m³ 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 m³, 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.

6. 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.



7. 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.

8. Conclusion

The Pratt Residential Subdivision 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.

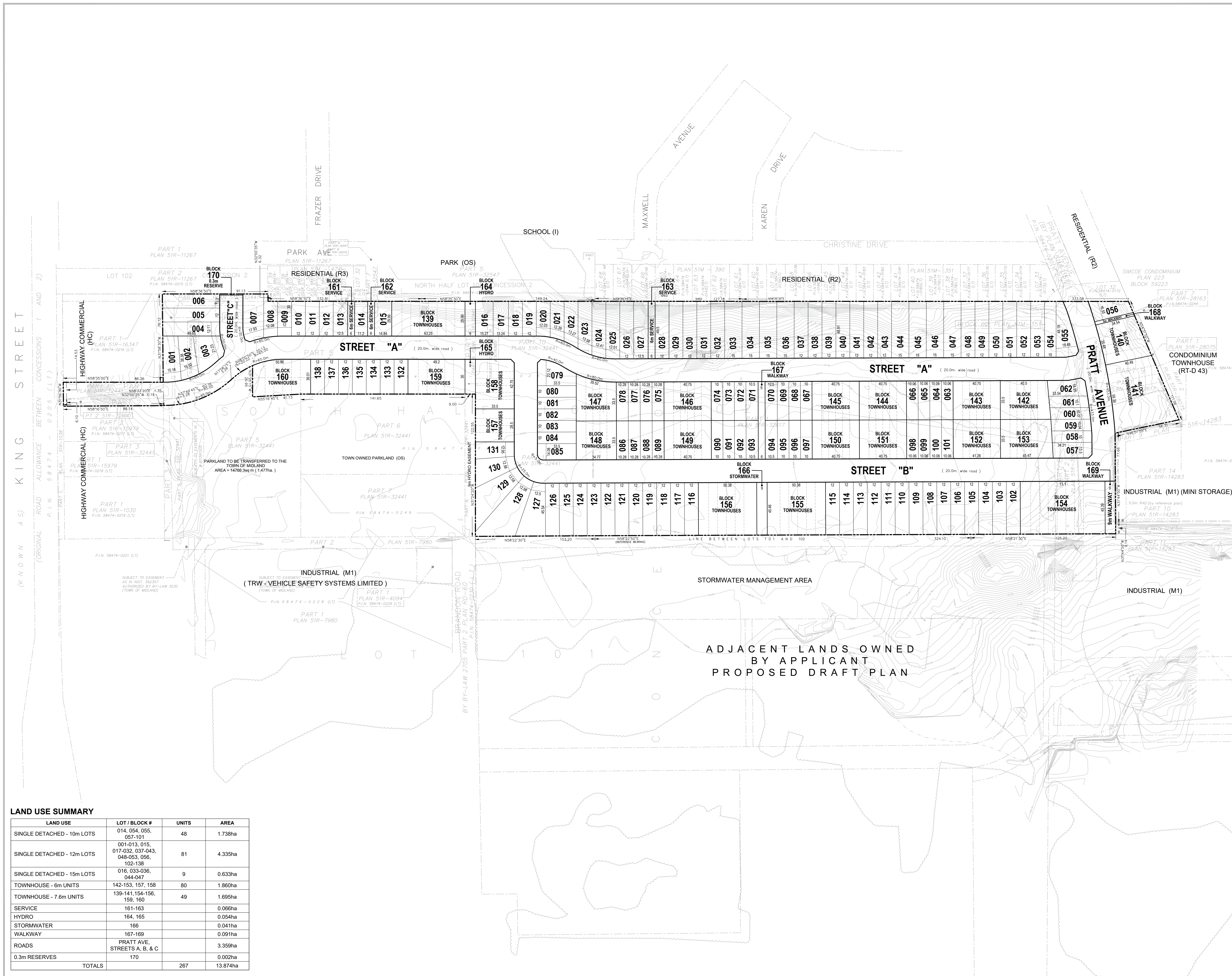
This Preliminary Servicing & Stormwater Management Report is respectfully submitted,

THE JONES CONSULTING GROUP LTD.



Appendix A

Background Information



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.

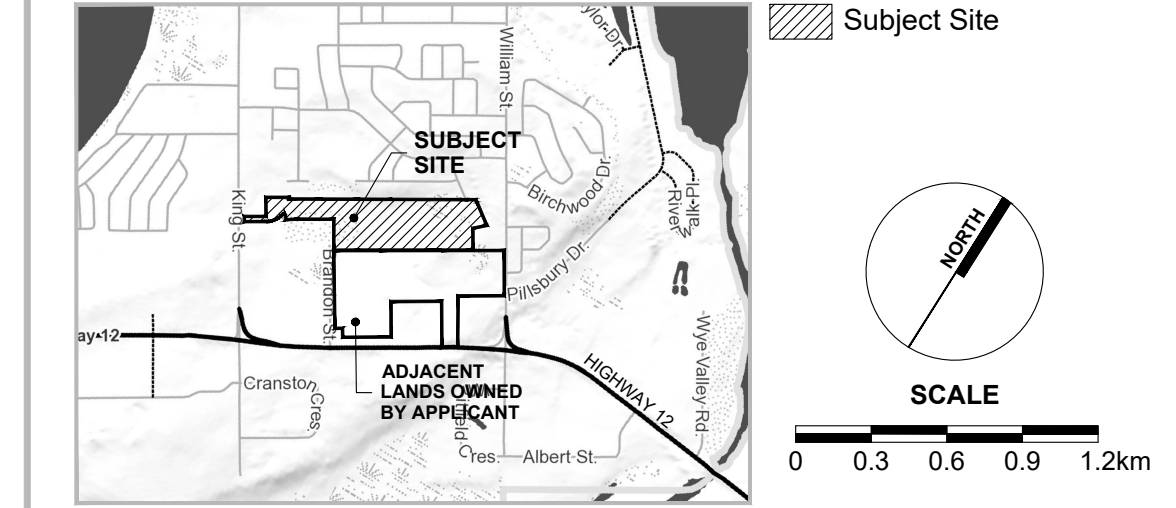
DATE: _____

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

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.
----	---------------	---	------

REV. No.	DATE	ISSUED / REVISION	BY
ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT R.S.O. 1990 C.P.13 AS AMENDED			
A. AS SHOWN	F. AS SHOWN	J. AS SHOWN	
B. AS SHOWN	G. AS SHOWN	K. ALL SERVICES AS REQUIRED	
C. AS SHOWN	H. MUNICIPAL WATER SUPPLY (PIPED)	L. AS SHOWN	
D. RESIDENTIAL	I. SANDY/SANDY LOAM		
E. AS SHOWN			


PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
MHBC PLANNING
 113 COLLIER STREET
 BARRIE, ON. L4M 1H2
 P: 705.728.0045 F: 705.728.2010
 WWW.MHBCPLAN.COM

LAND USE SUMMARY

LAND USE	LOT / BLOCK #	UNITS	AREA
SINGLE DETACHED - 10m LOTS	014, 064, 065, 057-101	48	1.738ha
SINGLE DETACHED - 12m LOTS	001-013, 015, 017-032, 037-043, 048-053, 056, 102-136	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		0.060ha
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

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

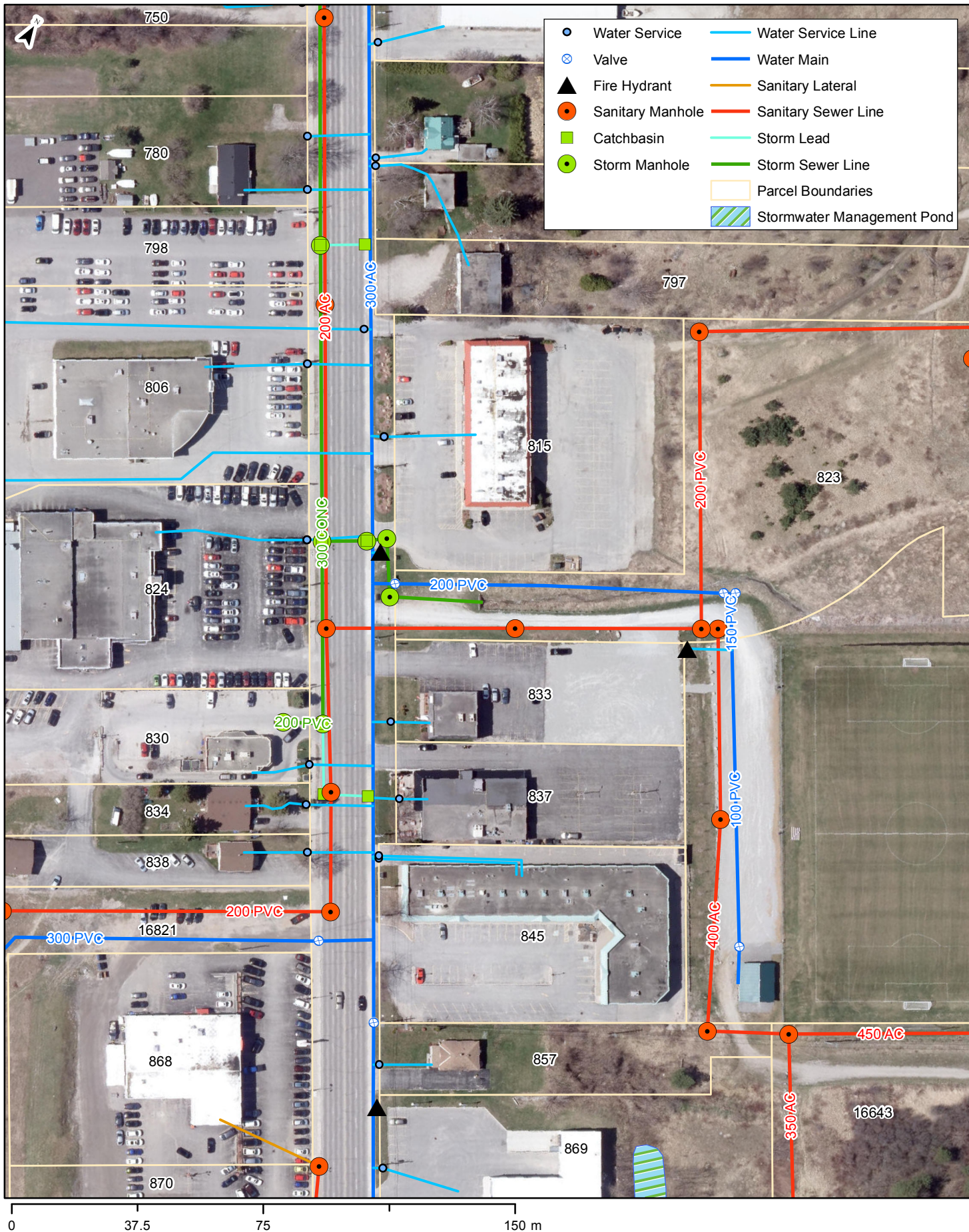
MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

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

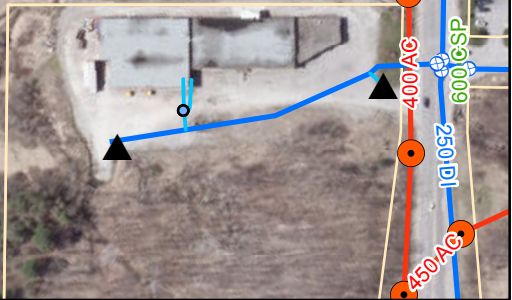
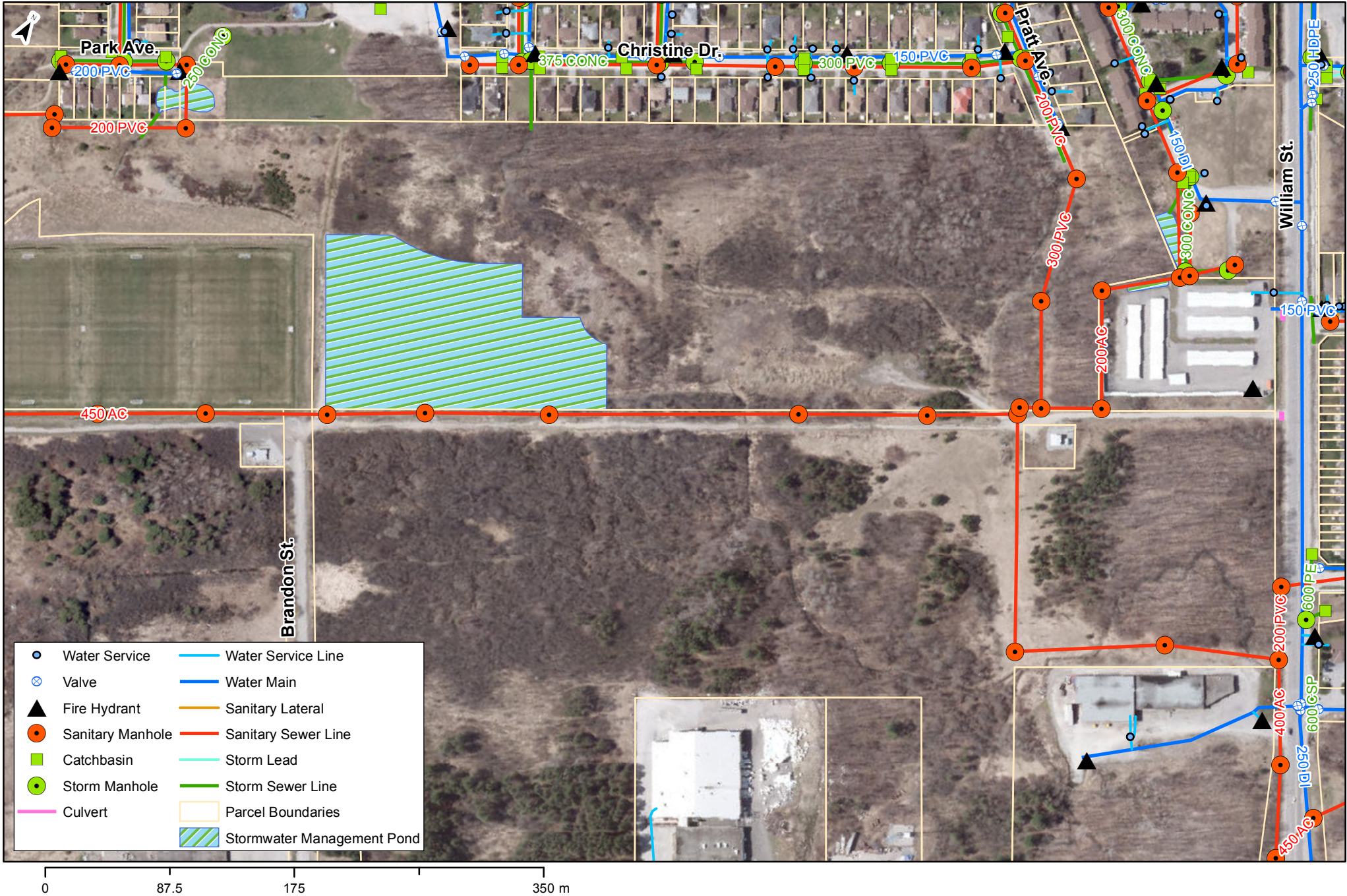
This is not a plan of survey. Data shown may not be complete or fully up to date. Also, locations shown may not be exact. The Town of Midland did not perform locates on private property. It is your responsibility to get the appropriate permissions, contact Ontario One Call and confirm locations in the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



0 87.5 175 350 m

File St Theresa h

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

of / d

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:

<u>STORM EVENT</u>	<u>ELEVATION</u> in metres	<u>PEAK INFLOW</u> m ³ /s	<u>PEAK OUTFLOW</u> 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;

THIS IS A TRUE COPY OF THE ORIGINAL CERTIFICATE FILED ON MAY 29 1991

.....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 day of May 1991
DATÉ À TORONTO ce 24th 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



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.



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.

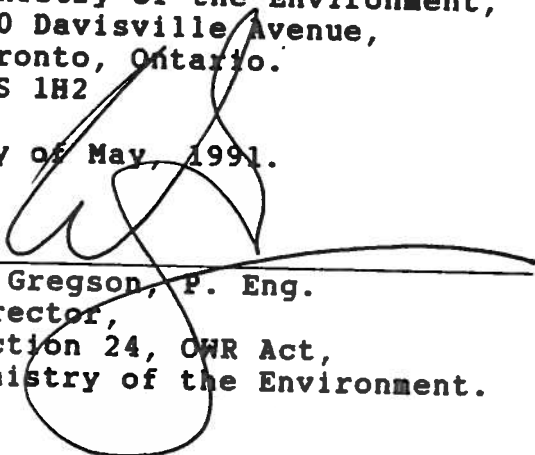
This Notice should be served upon:

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.

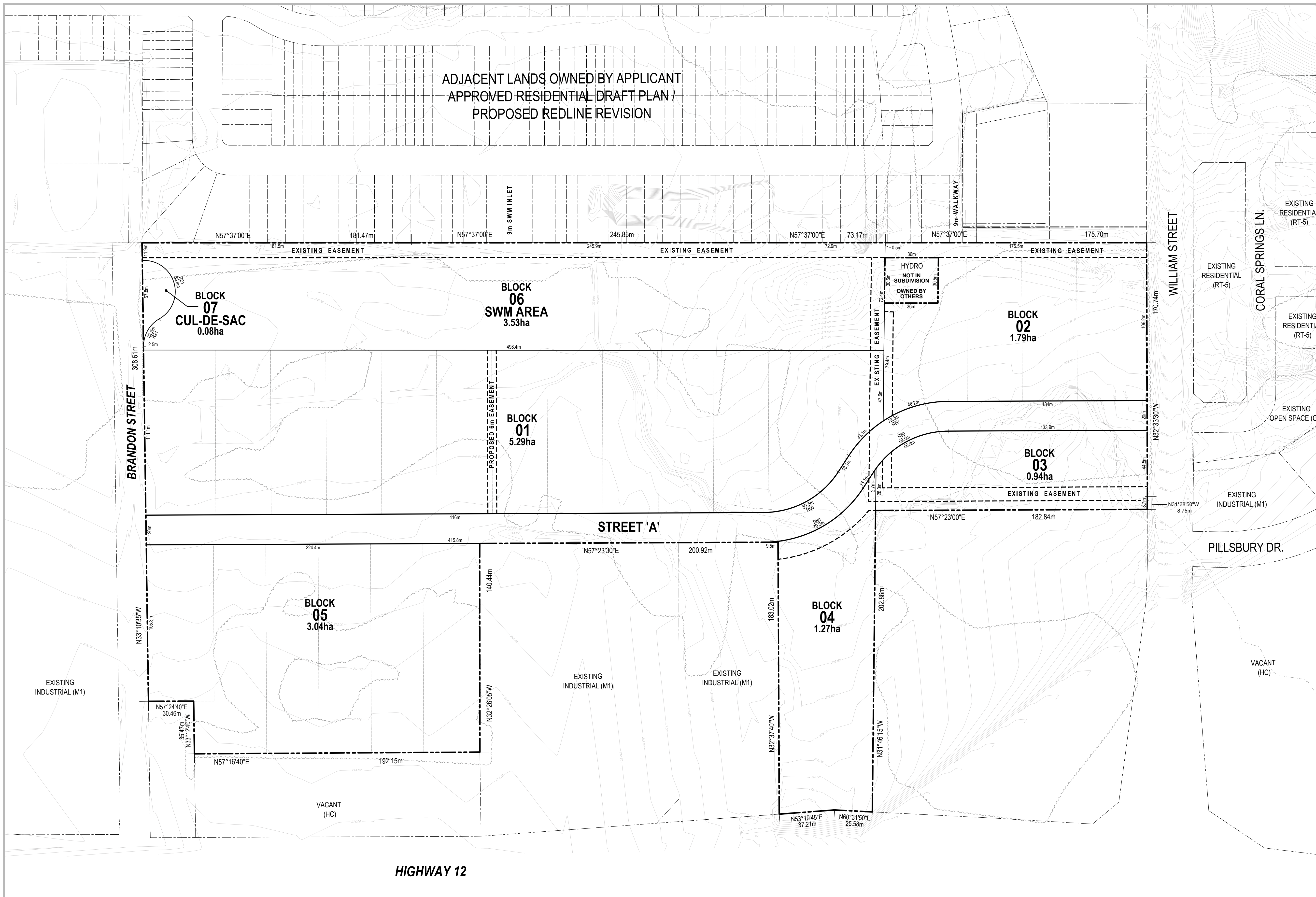
THIS IS A TRUE COPY OF THE ORIGINAL NOTICE MAILED

MAY 28 1991

CV

68183

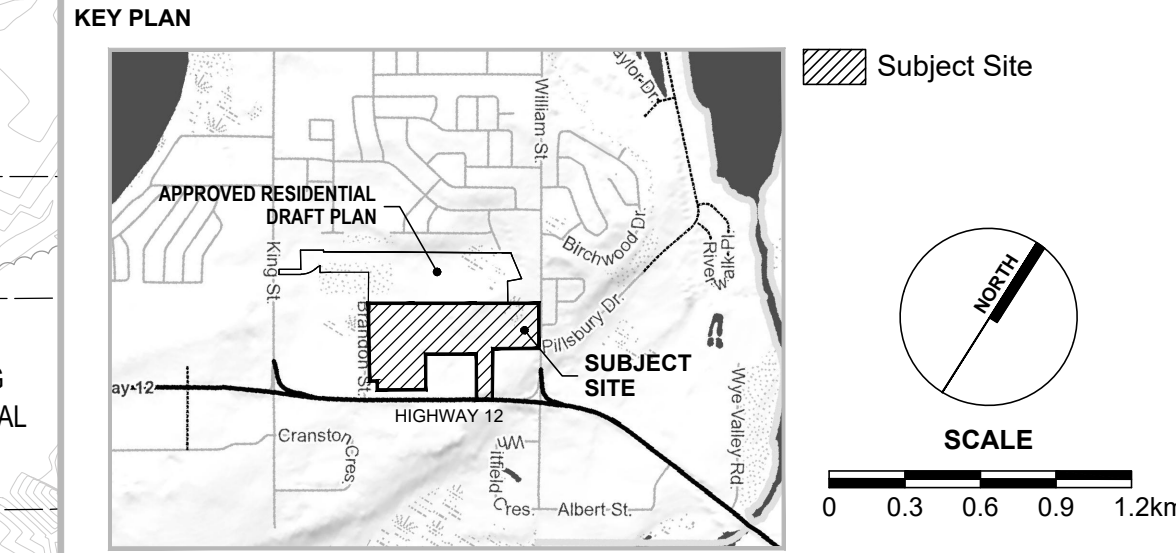
ADJACENT LANDS OWNED BY APPLICANT
APPROVED RESIDENTIAL DRAFT PLAN /
PROPOSED REDLINE REVISION



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.



LEGEND

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

01	NOV. 23, 2022	RELOCATE STORMWATER MANAGEMENT AREA, RELOCATE CUL-DE-SAC, REVISE ROW, ADJUST BLOCKS, ADD EASEMENT	MAM
REVISION No.	DATE	ISSUED / REVISION	BY
ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT R.S.O. 1990 C.P.13 AS AMENDED			
A. AS SHOWN	F. AS SHOWN	J. AS SHOWN	
B. AS SHOWN	G. AS SHOWN	K. MUNICIPAL	
C. AS SHOWN	H. MUNICIPAL	L. AS SHOWN	
D. INDUSTRIAL/COMMERCIAL	I. SILTY SAND/SILT AND CLAY/SILTY CLAY		
E. AS SHOWN			

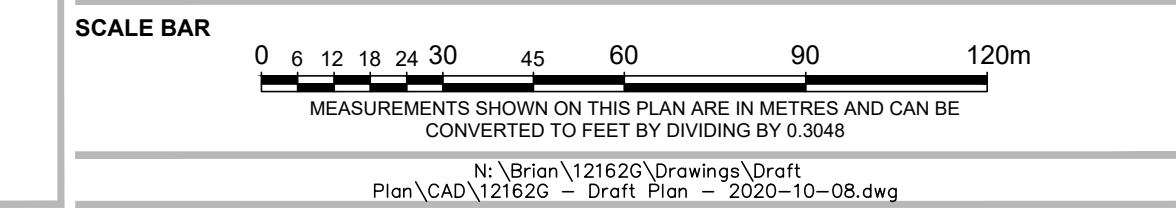
PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE MHBC PLANNING
113 COLLIER STREET
BARRIE ON L4M 1H2
P: 705 728 0045 F: 705 728 2010
WWW.MHBCPLAN.COM

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

FILE NAME
DRAFT
PLAN OF SUBDIVISION

DWG No.
1 of 1



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

TOWN OF MIDLAND

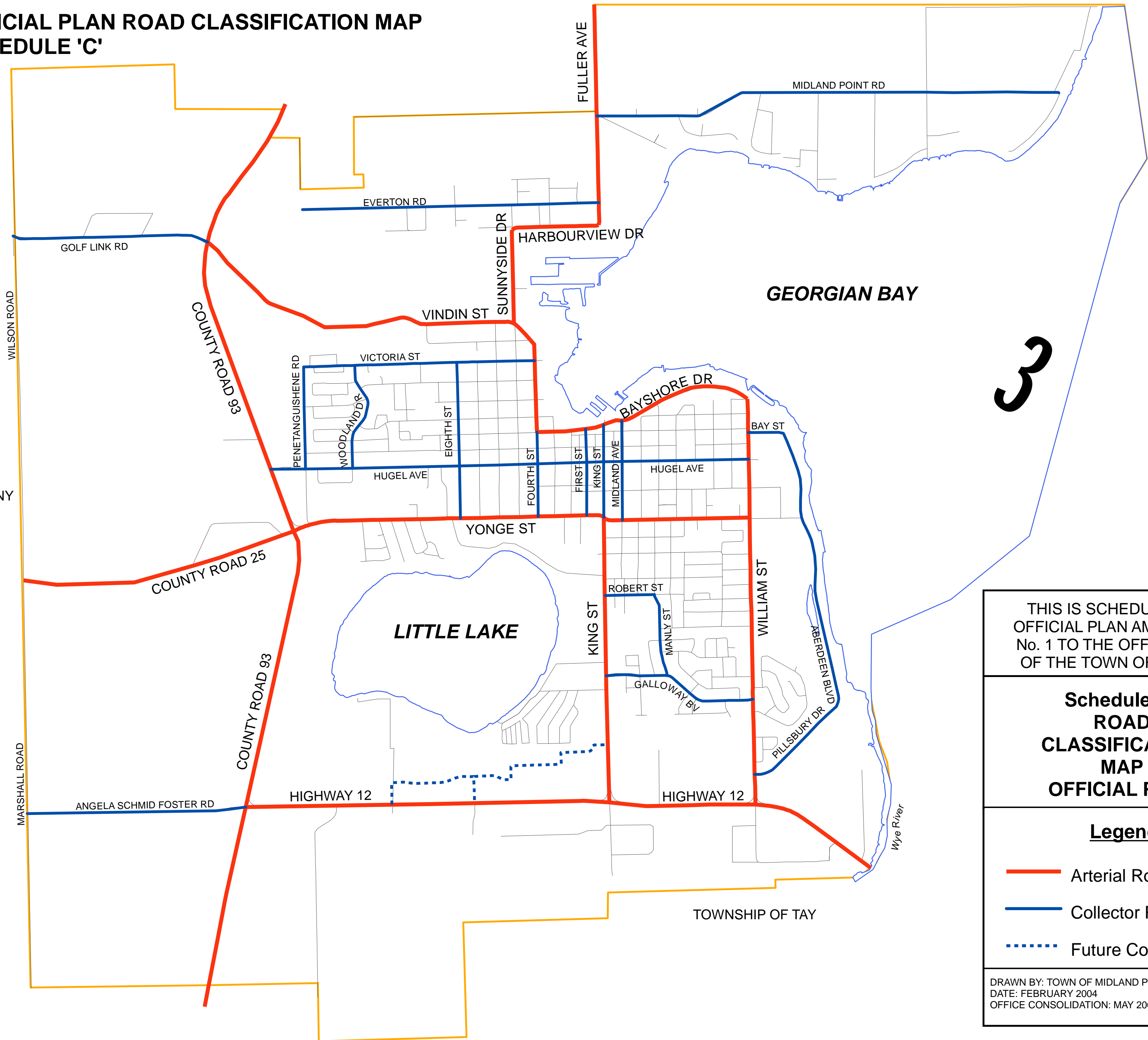


OFFICIAL PLAN ROAD CLASSIFICATION MAP SCHEDULE 'C'

TOWN OF PENETANGUISHENE

TOWNSHIP OF TINY

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

3



Town of Midland Sewer Overflow Locations

Midland Bay

A



B



WWTC

Bayshore Dr.

Gloucester St.

George St.

Bay St.

William St.

Russell St.

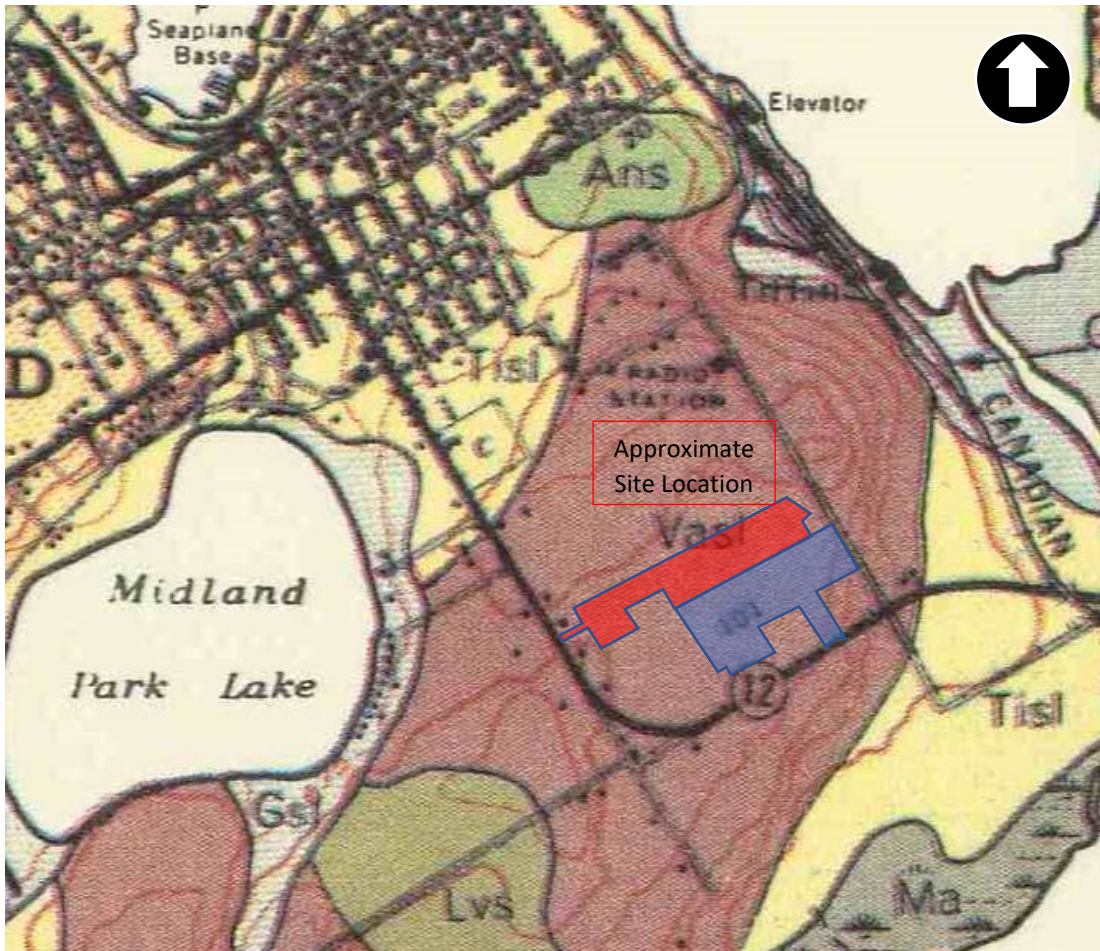
Hugel Ave.

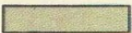

Queen St.

Dominion Ave.

Elizabeth St.

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 Podsollic and Grey-Brown Podsollic.



Appendix B

Supporting Sanitary Design Calculations



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: JWJ

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%	



PCSWMM - Catchment Properties																		
<table border="1"> <tr> <td>Catchment ID</td> <td>101</td> </tr> <tr> <td>Area (Ha)</td> <td>0.53 ha</td> </tr> <tr> <td>Catchment Width</td> <td>59 m</td> </tr> <tr> <td>Catchment Length</td> <td>91 m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> </tr> </table>			Catchment ID	101	Area (Ha)	0.53 ha	Catchment Width	59 m	Catchment Length	91 m	Soil Class	AB	Infiltration - Green Ampt					
			Catchment ID	101														
			Area (Ha)	0.53 ha														
			Catchment Width	59 m														
			Catchment Length	91 m														
Soil Class	AB																	
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											
Average Slope (%)	3.2%	m	Loamy Sand	0.0000	29.97	60.96	0.39											
Runoff Coefficient (2-10yr)	0.83		Sandy Loam	0.5349	10.92	109.98	0.368											
CN Value	91		Loam	0.0000	3.3	88.9	0.347											
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>86%</td> </tr> </table>			Imperviousness (%)	86%	Silt Loam	0.0000	6.6	169.93	0.366									
			Imperviousness (%)	86%														
			Sandy Clay Loam	0.0000	1.52	219.96	0.262											
Clay Loam	0.0000	1.02	210.06	0.277														
Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270	0.261											
			Sandy Clay	0.0000	0.51	240.03	0.209											
Manning's Impervious	0.013		Silty Clay	0.0000	0.51	290.07	0.228											
Manning's Pervious	0.190		Clay	0.0000	0.25	320.04	0.21											
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.															
Depression Storage																		
Wetland	16	mm	<table border="1"> <thead> <tr> <th>Area (Ha)</th> <th>Land Use</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>Lakes and Wetlands</td> </tr> <tr> <td>0.000</td> <td>Woodlot or Cutover</td> </tr> <tr> <td>0.076</td> <td>Pasture Land</td> </tr> <tr> <td>0.000</td> <td>Cultivated Land</td> </tr> <tr> <td>0.459</td> <td>Impervious Area</td> </tr> </tbody> </table>				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
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																	
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%															

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>102</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>4.66</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>466</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	102		Area (Ha)	4.66	ha	Catchment Width	466	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	102																	
			Area (Ha)	4.66	ha																
			Catchment Width	466	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	1.4%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.26		Sandy Loam	4.6597	10.92	109.98															
CN Value	60		Loam	0.0000	3.3	88.9															
			Silt Loam	0.0000	6.6	169.93															
Imperviousness (%)	18%		Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270															
Manning's Impervious	0.013		Sandy Clay	0.0000	0.51	240.03															
Manning's Pervious	0.190		Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm	<table border="1"> <thead> <tr> <th>Area (Ha)</th> <th>Land Use</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>Lakes and Wetlands</td> </tr> <tr> <td>0.037</td> <td>Woodlot or Cutover</td> </tr> <tr> <td>3.768</td> <td>Pasture Land</td> </tr> <tr> <td>0.000</td> <td>Cultivated Land</td> </tr> <tr> <td>0.855</td> <td>Impervious Area</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>				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			
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																				
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%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>103</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>9.06</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>906</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	103		Area (Ha)	9.06	ha	Catchment Width	906	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	103																	
			Area (Ha)	9.06	ha																
			Catchment Width	906	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.1%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.57		Sandy Loam	9.0583	10.92	109.98															
CN Value	76		Loam	0.0000	3.3	88.9															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>56%</td> <td></td> </tr> </table>			Imperviousness (%)	56%		Silt Loam	0.0000	6.6	169.93												
			Imperviousness (%)	56%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270												
			Sandy Clay	0.0000	0.51	240.03															
Manning's Impervious	0.013		Silty Clay	0.0000	0.51	290.07															
Manning's Pervious	0.190		Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm	<table border="1"> <thead> <tr> <th>Area (Ha)</th> <th>Land Use</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>Lakes and Wetlands</td> </tr> <tr> <td>1.017</td> <td>Woodlot or Cutover</td> </tr> <tr> <td>3.002</td> <td>Pasture Land</td> </tr> <tr> <td>0.000</td> <td>Cultivated Land</td> </tr> <tr> <td>5.040</td> <td>Impervious Area</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>				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			
Area (Ha)	Land Use																				
0.000	Lakes and Wetlands																				
1.017	Woodlot or Cutover																				
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0.000	Cultivated Land																				
5.040	Impervious Area																				
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%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>104</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>17.62</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>1762</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	104		Area (Ha)	17.62	ha	Catchment Width	1762	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	104																	
			Area (Ha)	17.62	ha																
			Catchment Width	1762	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.0%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.52		Sandy Loam	17.6238	10.92	109.98															
CN Value	74		Loam	0.0000	3.3	88.9															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>50%</td> <td></td> </tr> </table>			Imperviousness (%)	50%		Silt Loam	0.0000	6.6	169.93												
			Imperviousness (%)	50%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270												
<table border="1"> <tr> <td>Manning's Impervious</td> <td>0.013</td> <td></td> </tr> <tr> <td>Manning's Pervious</td> <td>0.190</td> <td></td> </tr> </table>			Manning's Impervious	0.013		Manning's Pervious	0.190		Sandy Clay	0.0000	0.51	240.03									
Manning's Impervious	0.013																				
Manning's Pervious	0.190																				
			Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm	<table border="1"> <thead> <tr> <th>Area (Ha)</th> <th>Land Use</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>Lakes and Wetlands</td> </tr> <tr> <td>1.798</td> <td>Woodlot or Cutover</td> </tr> <tr> <td>7.014</td> <td>Pasture Land</td> </tr> <tr> <td>0.000</td> <td>Cultivated Land</td> </tr> <tr> <td>8.812</td> <td>Impervious Area</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>		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					
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																				
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%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>105</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>10.73</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>1073</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	105		Area (Ha)	10.73	ha	Catchment Width	1073	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	105																	
			Area (Ha)	10.73	ha																
			Catchment Width	1073	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.0%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.53		Sandy Loam	10.7306	10.92	109.98															
CN Value	75		Loam	0.0000	3.3	88.9															
			Silt Loam	0.0000	6.6	169.93															
Imperviousness (%)	50%		Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270															
Manning's Impervious	0.013		Sandy Clay	0.0000	0.51	240.03															
Manning's Pervious	0.190		Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
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Depression Storage																					
Wetland	16	mm	<table border="1"> <thead> <tr> <th>Area (Ha)</th> <th>Land Use</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>Lakes and Wetlands</td> </tr> <tr> <td>0.000</td> <td>Woodlot or Cutover</td> </tr> <tr> <td>5.365</td> <td>Pasture Land</td> </tr> <tr> <td>0.000</td> <td>Cultivated Land</td> </tr> <tr> <td>5.365</td> <td>Impervious Area</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>				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			
Area (Ha)	Land Use																				
0.000	Lakes and Wetlands																				
0.000	Woodlot or Cutover																				
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0.000	Cultivated Land																				
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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%																				

PCSWMM - Catchment Properties																				
<table border="1"> <tr> <td>Catchment ID</td> <td>106</td> </tr> <tr> <td>Area (Ha)</td> <td>4.74 ha</td> </tr> <tr> <td>Catchment Width</td> <td>474 m</td> </tr> <tr> <td>Catchment Length</td> <td>100 m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> </tr> </table>			Catchment ID	106	Area (Ha)	4.74 ha	Catchment Width	474 m	Catchment Length	100 m	Soil Class	AB	Infiltration - Green Ampt							
			Catchment ID	106																
			Area (Ha)	4.74 ha																
			Catchment Width	474 m																
			Catchment Length	100 m																
Soil Class	AB																			
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													
Average Slope (%)	4.8%	m	Loamy Sand	0.0000	29.97	60.96	0.39													
Runoff Coefficient (2-10yr)	0.55		Sandy Loam	4.7438	10.92	109.98	0.368													
CN Value	75		Loam	0.0000	3.3	88.9	0.347													
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>50%</td> </tr> </table>			Imperviousness (%)	50%	Silt Loam	0.0000	6.6	169.93	0.366											
			Imperviousness (%)	50%																
			Sandy Clay Loam	0.0000	1.52	219.96	0.262													
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			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270	0.261										
<table border="1"> <tr> <td>Manning's Impervious</td> <td>0.013</td> </tr> <tr> <td>Manning's Pervious</td> <td>0.190</td> </tr> </table>			Manning's Impervious	0.013	Manning's Pervious	0.190	Sandy Clay	0.0000	0.51	240.03	0.209									
Manning's Impervious	0.013																			
Manning's Pervious	0.190																			
			Silty Clay	0.0000	0.51	290.07	0.228													
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			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																	
Depression Storage																				
Wetland	16	mm	<table border="1"> <thead> <tr> <th>Area (Ha)</th> <th>Land Use</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>Lakes and Wetlands</td> </tr> <tr> <td>0.000</td> <td>Woodlot or Cutover</td> </tr> <tr> <td>2.372</td> <td>Pasture Land</td> </tr> <tr> <td>0.000</td> <td>Cultivated Land</td> </tr> <tr> <td>2.372</td> <td>Impervious Area</td> </tr> <tr> <td>4.7438</td> <td></td> </tr> </tbody> </table>				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	
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																				
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%																			

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>107</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>2.91</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>291</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	107		Area (Ha)	2.91	ha	Catchment Width	291	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	107																	
			Area (Ha)	2.91	ha																
			Catchment Width	291	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.7%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.53		Sandy Loam	2.9079	10.92	109.98															
CN Value	75		Loam	0.0000	3.3	88.9															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>50%</td> <td></td> </tr> </table>			Imperviousness (%)	50%		Silt Loam	0.0000	6.6	169.93												
			Imperviousness (%)	50%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270												
			Sandy Clay	0.0000	0.51	240.03															
Manning's Impervious	0.013		Silty Clay	0.0000	0.51	290.07															
Manning's Pervious	0.190		Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm			Area (Ha)	Land Use															
Woods	10	mm			0.000	Lakes and Wetlands															
Pasture/Lawns	5	mm			0.000	Woodlot or Cutover															
Cultivated	7	mm			1.454	Pasture Land															
Impervious Dstore	2.00	mm			0.000	Cultivated Land															
Pervious Dstore	5.00	mm			1.454	Impervious Area															
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	40%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>108</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>30.20</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>3020</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	108		Area (Ha)	30.20	ha	Catchment Width	3020	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	108																	
			Area (Ha)	30.20	ha																
			Catchment Width	3020	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	1.5%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.44		Sandy Loam	30.1997	10.92	109.98															
CN Value	68		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>41%</td> <td></td> </tr> </table>			Imperviousness (%)	41%		Silt Loam	0.0000	6.60	169.93												
			Imperviousness (%)	41%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
<table border="1"> <tr> <td>Manning's Impervious</td> <td>0.013</td> <td></td> </tr> <tr> <td>Manning's Pervious</td> <td>0.190</td> <td></td> </tr> </table>			Manning's Impervious	0.013		Manning's Pervious	0.190		Sandy Clay	0.0000	0.51	240.03									
Manning's Impervious	0.013																				
Manning's Pervious	0.190																				
			Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm	<table border="1"> <thead> <tr> <th>Area (Ha)</th> <th>Land Use</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>Lakes and Wetlands</td> </tr> <tr> <td>7.620</td> <td>Woodlot or Cutover</td> </tr> <tr> <td>10.220</td> <td>Pasture Land</td> </tr> <tr> <td>0.000</td> <td>Cultivated Land</td> </tr> <tr> <td>12.361</td> <td>Impervious Area</td> </tr> </tbody> </table>				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			
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																				
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%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>109</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>4.81</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>481</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	109		Area (Ha)	4.81	ha	Catchment Width	481	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	109																	
			Area (Ha)	4.81	ha																
			Catchment Width	481	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.2%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.47		Sandy Loam	4.8064	10.92	109.98															
CN Value	70		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>45%</td> <td></td> </tr> </table>			Imperviousness (%)	45%		Silt Loam	0.0000	6.60	169.93												
			Imperviousness (%)	45%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
			Sandy Clay	0.0000	0.51	240.03															
Manning's Impervious	0.013		Silty Clay	0.0000	0.51	290.07															
Manning's Pervious	0.190		Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm																			
Woods	10	mm	Area (Ha)	Land Use																	
Pasture/Lawns	5	mm	0.000	Lakes and Wetlands																	
Cultivated	7	mm	1.390	Woodlot or Cutover																	
			1.273	Pasture Land																	
Impervious Dstore	2.00	mm	0.000	Cultivated Land																	
Pervious Dstore	7.61	mm	2.143	Impervious Area																	
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	43%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>110</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>13.90</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>1390</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	110		Area (Ha)	13.90	ha	Catchment Width	1390	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	110																	
			Area (Ha)	13.90	ha																
			Catchment Width	1390	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	4.0%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.09		Sandy Loam	13.8967	10.92	109.98															
CN Value	48		Loam	0.0000	3.3	88.9															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>0%</td> <td></td> </tr> </table>			Imperviousness (%)	0%		Silt Loam	0.0000	6.6	169.93												
			Imperviousness (%)	0%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270												
			Sandy Clay	0.0000	0.51	240.03															
Manning's Impervious	0.013		Silty Clay	0.0000	0.51	290.07															
Manning's Pervious	0.190		Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm	<table border="1"> <thead> <tr> <th>Area (Ha)</th> <th>Land Use</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>Lakes and Wetlands</td> </tr> <tr> <td>6.029</td> <td>Woodlot or Cutover</td> </tr> <tr> <td>7.868</td> <td>Pasture Land</td> </tr> <tr> <td>0.000</td> <td>Cultivated Land</td> </tr> <tr> <td>0.000</td> <td>Impervious Area</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>				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			
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																				
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%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>111</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>17.44</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>1744</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	111		Area (Ha)	17.44	ha	Catchment Width	1744	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	111																	
			Area (Ha)	17.44	ha																
			Catchment Width	1744	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	1.2%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.09		Sandy Loam	17.4417	10.92	109.98															
CN Value	49		Loam	0.0000	3.3	88.9															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>0%</td> <td></td> </tr> </table>			Imperviousness (%)	0%		Silt Loam	0.0000	6.6	169.93												
			Imperviousness (%)	0%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270												
<table border="1"> <tr> <td>Manning's Impervious</td> <td>0.013</td> <td></td> </tr> <tr> <td>Manning's Pervious</td> <td>0.190</td> <td></td> </tr> </table>			Manning's Impervious	0.013		Manning's Pervious	0.190		Sandy Clay	0.0000	0.51	240.03									
Manning's Impervious	0.013																				
Manning's Pervious	0.190																				
			Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm																			
Woods	10	mm	Area (Ha)	Land Use																	
Pasture/Lawns	5	mm	0.000	Lakes and Wetlands																	
Cultivated	7	mm	6.155	Woodlot or Cutover																	
			11.279	Pasture Land																	
Impervious Dstore	2.00	mm	0.000	Cultivated Land																	
Pervious Dstore	6.77	mm	0.009	Impervious Area																	
Sub Area Routing	Outlet																				
Sub Area Routing Percentage	100%																				

PRA-16084 - Pre-Dev-PF 25mm 4HrCHI WQE Status Report

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

 PRA-16084 Galloway Subdivision & Pratt Industrial Subdivision
 PROJECT MANAGER: JWJ
 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

Name	Data Source	Data Type	Recording 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.

PRA-16084 - Pre-Dev-PF 25mm 4HrCHI WQE Status Report

 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

PRA-16084 - Pre-Dev-PF 25mm 4HrCHI WQE Status Report

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

	Volume	Depth
Runoff Quantity Continuity	hectare-m	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	

	Volume	Volume
Flow Routing Continuity	hectare-m	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	

PRA-16084 - Pre-Dev-PF 25mm 4HrCHI WQE Status Report

 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

PRA-16084 - Pre-Dev-PF 100Yr24HrSCS Status Report

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

PRA-16084 Galloway Subdivision & Pratt Industrial Subdivision
PROJECT MANAGER: JWJ
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

Name	Data Source	Data Type	Recording 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.

PRA-16084 - Pre-Dev-PF 100Yr24HrSCS Status Report

 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

PRA-16084 - Pre-Dev-PF 100Yr24HrSCS Status Report

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

	Volume	Depth
Runoff Quantity Continuity	hectare-m	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	

	Volume	Volume
Flow Routing Continuity	hectare-m	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	

PRA-16084 - Pre-Dev-PF 100Yr24HrSCS Status Report

 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

PRA-16084 - Pre-Dev-PF Timmins Status Report

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

PRA-16084 Galloway Subdivision & Pratt Industrial Subdivision
 PROJECT MANAGER: JWJ
 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

Name	Data Source	Data Type	Recording 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.

PRA-16084 - Pre-Dev-PF Timmins Status Report

 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

PRA-16084 - Pre-Dev-PF Timmins Status Report

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

	Volume	Depth
Runoff Quantity Continuity	hectare-m	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	

	Volume	Volume
Flow Routing Continuity	hectare-m	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	

PRA-16084 - Pre-Dev-PF Timmins Status Report

 Subcatchment Runoff Summary

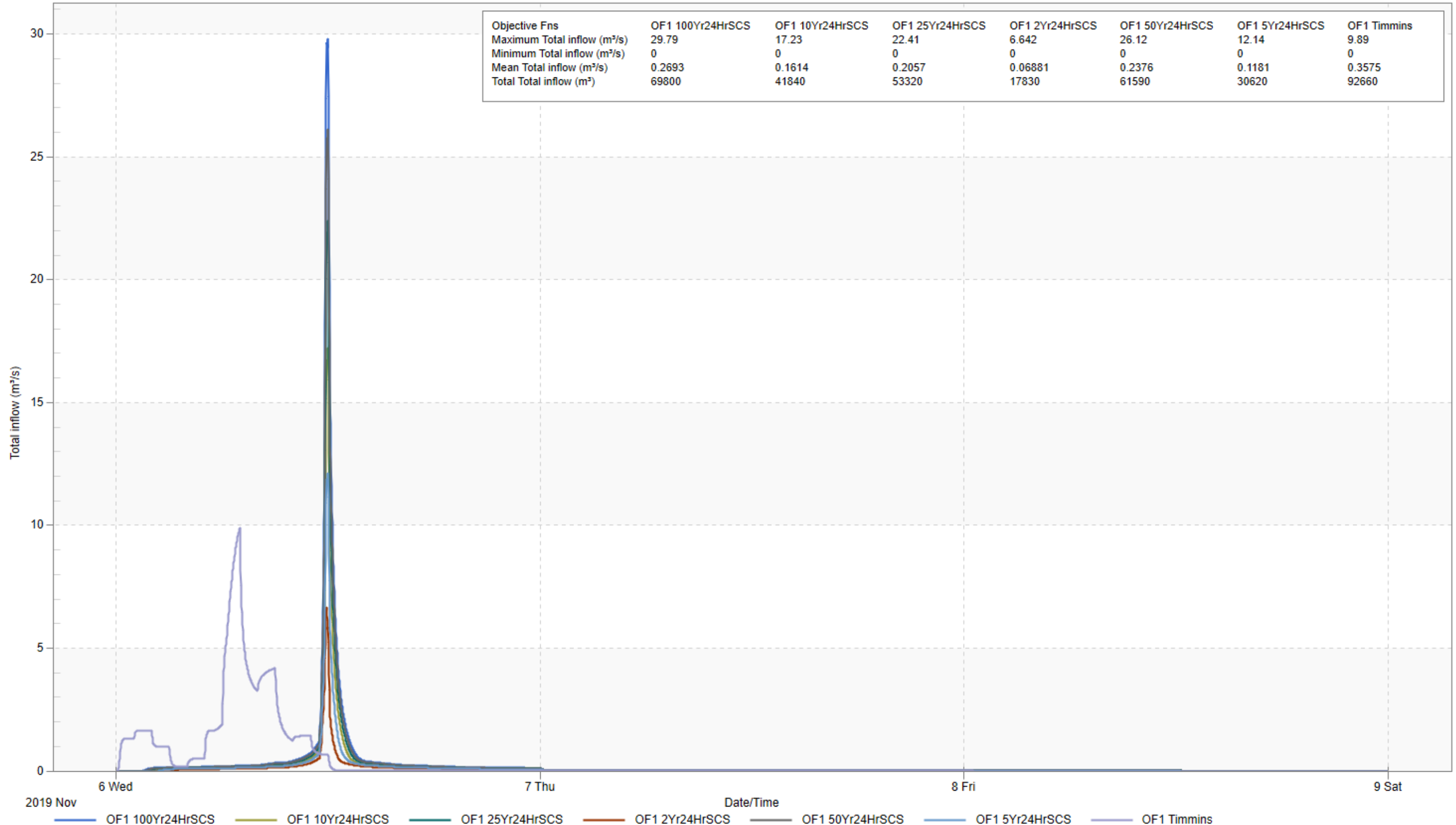
Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10 ⁶ ltr	Peak Runoff CMS	Runoff Coeff
101	193.00	0.00	0.00	22.22	164.46	4.82	169.28	0.91	0.06	0.877
102	193.00	0.00	0.00	133.30	34.44	25.00	59.44	2.77	0.34	0.308
103	193.00	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

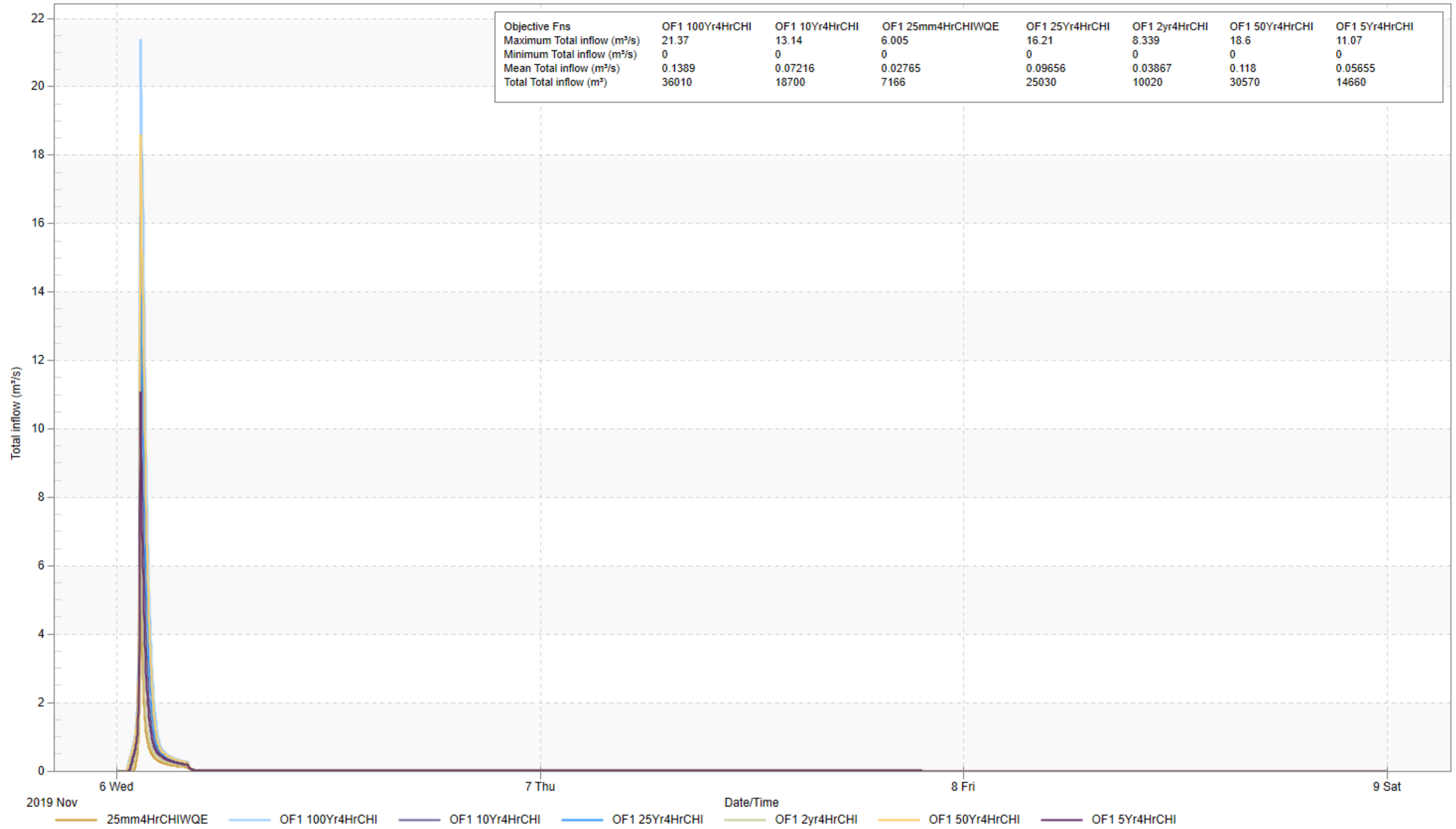
Objective Fns	OF1 100Yr24HrSCS	OF1 10Yr24HrSCS	OF1 25Yr24HrSCS	OF1 2Yr24HrSCS	OF1 50Yr24HrSCS	OF1 5Yr24HrSCS	OF1 Timmins
Maximum Total inflow (m ³ /s)	29.79	17.23	22.41	6.642	26.12	12.14	9.89
Minimum Total inflow (m ³ /s)	0	0	0	0	0	0	0
Mean Total inflow (m ³ /s)	0.2693	0.1614	0.2057	0.06881	0.2376	0.1181	0.3575
Total Total inflow (m ³)	69800	41840	53320	17830	61590	30620	92660

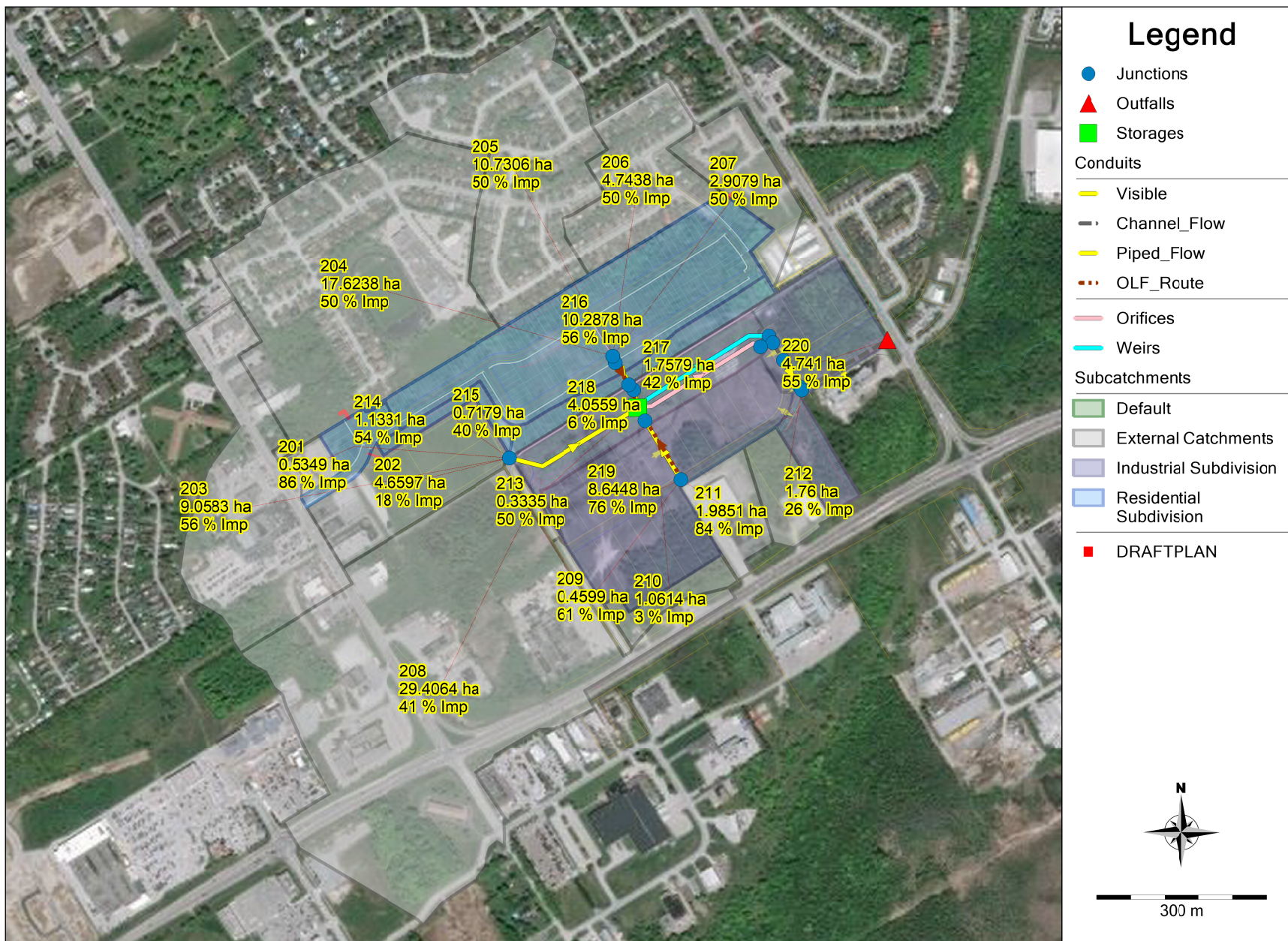


Node OF1

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

Objective Fns	OF1 100Yr4HrCHI	OF1 10Yr4HrCHI	OF1 25mm4HrCHI WQE	OF1 25Yr4HrCHI	OF1 2yr4HrCHI	OF1 50Yr4HrCHI	OF1 5Yr4HrCHI
Maximum Total inflow (m ³ /s)	21.37	13.14	6.005	16.21	8.339	18.6	11.07
Minimum Total inflow (m ³ /s)	0	0	0	0	0	0	0
Mean Total inflow (m ³ /s)	0.1389	0.07216	0.02765	0.09656	0.03867	0.118	0.05655
Total Total inflow (m ³)	36010	18700	7166	25030	10020	30570	14660





PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>201</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>0.53</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>59</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>91</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	201		Area (Ha)	0.53	ha	Catchment Width	59	m	Catchment Length	91	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	201																	
			Area (Ha)	0.53	ha																
			Catchment Width	59	m																
			Catchment Length	91	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	3.2%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.83		Sandy Loam	0.5349	10.92	109.98															
CN Value	91		Loam	0.0000	3.3	88.9															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>86%</td> <td></td> </tr> </table>			Imperviousness (%)	86%		Silt Loam	0.0000	6.6	169.93												
			Imperviousness (%)	86%																	
			Sandy Clay Loam	0.0000	1.52	219.96	0.262														
			Clay Loam	0.0000	1.02	210.06	0.277														
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270												
<table border="1"> <tr> <td>Manning's Impervious</td> <td>0.013</td> <td></td> </tr> <tr> <td>Manning's Pervious</td> <td>0.190</td> <td></td> </tr> </table>			Manning's Impervious	0.013		Manning's Pervious	0.190		Sandy Clay	0.0000	0.51	240.03									
Manning's Impervious	0.013																				
Manning's Pervious	0.190																				
			Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm																			
Woods	10	mm	Area (Ha)	Land Use																	
Pasture/Lawns	5	mm	0.000	Lakes and Wetlands																	
Cultivated	7	mm	0.000	Woodlot or Cutover																	
			0.076	Pasture Land																	
Impervious Dstore	2.00	mm	0.000	Cultivated Land																	
Pervious Dstore	5.00	mm	0.459	Impervious Area																	
Sub Area Routing	Outlet																				
Sub Area Routing Percentage	100%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>202</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>4.66</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>466</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	202		Area (Ha)	4.66	ha	Catchment Width	466	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	202																	
			Area (Ha)	4.66	ha																
			Catchment Width	466	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	1.4%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.26		Sandy Loam	4.6597	10.92	109.98															
CN Value	60		Loam	0.0000	3.3	88.9															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>18%</td> <td></td> </tr> </table>			Imperviousness (%)	18%		Silt Loam	0.0000	6.6	169.93												
			Imperviousness (%)	18%																	
			Sandy Clay Loam	0.0000	1.52	219.96	0.262														
Clay Loam	0.0000	1.02	210.06	0.277																	
Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270															
Manning's Impervious	0.013		Sandy Clay	0.0000	0.51	240.03															
Manning's Pervious	0.190		Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm			Area (Ha)	Land Use															
Woods	10	mm			0.000	Lakes and Wetlands															
Pasture/Lawns	5	mm			0.037	Woodlot or Cutover															
Cultivated	7	mm			3.768	Pasture Land															
Impervious Dstore	2.00	mm			0.000	Cultivated Land															
Pervious Dstore	5.05	mm			0.855	Impervious Area															
Sub Area Routing	Outlet																				
Sub Area Routing Percentage	100%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>203</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>9.06</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>906</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	203		Area (Ha)	9.06	ha	Catchment Width	906	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	203																	
			Area (Ha)	9.06	ha																
			Catchment Width	906	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.1%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.57		Sandy Loam	9.0583	10.92	109.98															
CN Value	76		Loam	0.0000	3.3	88.9															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>56%</td> <td></td> </tr> </table>			Imperviousness (%)	56%		Silt Loam	0.0000	6.6	169.93												
			Imperviousness (%)	56%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270												
<table border="1"> <tr> <td>Manning's Impervious</td> <td>0.013</td> <td></td> </tr> <tr> <td>Manning's Pervious</td> <td>0.190</td> <td></td> </tr> </table>			Manning's Impervious	0.013		Manning's Pervious	0.190		Sandy Clay	0.0000	0.51	240.03									
Manning's Impervious	0.013																				
Manning's Pervious	0.190																				
			Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
<table border="1"> <tr> <td>Wetland</td> <td>16</td> <td>mm</td> </tr> <tr> <td>Woods</td> <td>10</td> <td>mm</td> </tr> <tr> <td>Pasture/Lawns</td> <td>5</td> <td>mm</td> </tr> <tr> <td>Cultivated</td> <td>7</td> <td>mm</td> </tr> </table>			Wetland	16	mm	Woods	10	mm	Pasture/Lawns	5	mm	Cultivated	7	mm			Area (Ha)	Land Use			
Wetland	16	mm																			
Woods	10	mm																			
Pasture/Lawns	5	mm																			
Cultivated	7	mm																			
<table border="1"> <tr> <td>Impervious Dstore</td> <td>2.00</td> <td>mm</td> </tr> <tr> <td>Pervious Dstore</td> <td>6.26</td> <td>mm</td> </tr> </table>			Impervious Dstore	2.00	mm	Pervious Dstore	6.26	mm			0.000	Lakes and Wetlands									
Impervious Dstore	2.00	mm																			
Pervious Dstore	6.26	mm																			
					1.017	Woodlot or Cutover															
					3.002	Pasture Land															
					0.000	Cultivated Land															
					5.040	Impervious Area															
<table border="1"> <tr> <td>Sub Area Routing</td> <td>Outlet</td> <td></td> </tr> <tr> <td>Sub Area Routing Percentage</td> <td>100%</td> <td></td> </tr> </table>			Sub Area Routing	Outlet		Sub Area Routing Percentage	100%														
Sub Area Routing	Outlet																				
Sub Area Routing Percentage	100%																				

PCSWMM - Catchment Properties																	
<table border="1"> <tr> <td>Catchment ID</td> <td>204</td> </tr> <tr> <td>Area (Ha)</td> <td>17.62 ha</td> </tr> <tr> <td>Catchment Width</td> <td>1762 m</td> </tr> <tr> <td>Catchment Length</td> <td>100 m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> </tr> </table>			Catchment ID	204	Area (Ha)	17.62 ha	Catchment Width	1762 m	Catchment Length	100 m	Soil Class	AB	Infiltration - Green Ampt				
			Catchment ID	204													
			Area (Ha)	17.62 ha													
			Catchment Width	1762 m													
			Catchment Length	100 m													
Soil Class	AB																
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										
Average Slope (%)	2.0%	m	Loamy Sand	0.0000	29.97	60.96	0.39										
Runoff Coefficient (2-10yr)	0.52		Sandy Loam	17.6238	10.92	109.98	0.368										
CN Value	74		Loam	0.0000	3.3	88.9	0.347										
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>50%</td> </tr> </table>			Imperviousness (%)	50%	Silt Loam	0.0000	6.6	169.93	0.366								
			Imperviousness (%)	50%													
			Sandy Clay Loam	0.0000	1.52	219.96	0.262										
			Clay Loam	0.0000	1.02	210.06	0.277										
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270	0.261							
<table border="1"> <tr> <td>Manning's Impervious</td> <td>0.013</td> </tr> <tr> <td>Manning's Pervious</td> <td>0.190</td> </tr> </table>			Manning's Impervious	0.013	Manning's Pervious	0.190	Sandy Clay	0.0000	0.51	240.03	0.209						
Manning's Impervious	0.013																
Manning's Pervious	0.190																
			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.														
Depression Storage																	
Wetland	16	mm			<table border="1"> <thead> <tr> <th>Area (Ha)</th> <th>Land Use</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>Lakes and Wetlands</td> </tr> <tr> <td>1.798</td> <td>Woodlot or Cutover</td> </tr> <tr> <td>7.014</td> <td>Pasture Land</td> </tr> <tr> <td>0.000</td> <td>Cultivated Land</td> </tr> <tr> <td>8.812</td> <td>Impervious Area</td> </tr> </tbody> </table>	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
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																
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%																

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>205</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>10.73</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>1073</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	205		Area (Ha)	10.73	ha	Catchment Width	1073	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	205																	
			Area (Ha)	10.73	ha																
			Catchment Width	1073	m																
			Catchment Length	100	m																
Soil Class	AB																				
		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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.0%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.53		Sandy Loam	10.7306	10.92	109.98															
CN Value	75		Loam	0.0000	3.3	88.9															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>50%</td> <td></td> </tr> </table>			Imperviousness (%)	50%		Silt Loam	0.0000	6.6	169.93												
			Imperviousness (%)	50%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270												
<table border="1"> <tr> <td>Manning's Impervious</td> <td>0.013</td> <td></td> </tr> <tr> <td>Manning's Pervious</td> <td>0.190</td> <td></td> </tr> </table>			Manning's Impervious	0.013		Manning's Pervious	0.190		Sandy Clay	0.0000	0.51	240.03									
Manning's Impervious	0.013																				
Manning's Pervious	0.190																				
			Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm			Area (Ha)	Land Use															
Woods	10	mm			0.000	Lakes and Wetlands															
Pasture/Lawns	5	mm			0.000	Woodlot or Cutover															
Cultivated	7	mm			5.365	Pasture Land															
Impervious Dstore	2.00	mm			0.000	Cultivated Land															
Pervious Dstore	5.00	mm			5.365	Impervious Area															
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	40%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>206</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>4.74</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>474</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	206		Area (Ha)	4.74	ha	Catchment Width	474	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	206																	
			Area (Ha)	4.74	ha																
			Catchment Width	474	m																
			Catchment Length	100	m																
Soil Class	AB																				
		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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	4.8%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.55		Sandy Loam	4.7438	10.92	109.98															
CN Value	75		Loam	0.0000	3.3	88.9															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>50%</td> <td></td> </tr> </table>			Imperviousness (%)	50%		Silt Loam	0.0000	6.6	169.93												
			Imperviousness (%)	50%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270												
Manning's Impervious	0.013		Sandy Clay	0.0000	0.51	240.03															
Manning's Pervious	0.190		Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm			Area (Ha)	Land Use															
Woods	10	mm			0.000	Lakes and Wetlands															
Pasture/Lawns	5	mm			0.000	Woodlot or Cutover															
Cultivated	7	mm			2.372	Pasture Land															
Impervious Dstore	2.00	mm			0.000	Cultivated Land															
Pervious Dstore	5.00	mm			2.372	Impervious Area															
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	40%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>207</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>2.91</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>291</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	207		Area (Ha)	2.91	ha	Catchment Width	291	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	207																	
			Area (Ha)	2.91	ha																
			Catchment Width	291	m																
			Catchment Length	100	m																
Soil Class	AB																				
		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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.7%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.53		Sandy Loam	2.9079	10.92	109.98															
CN Value	75		Loam	0.0000	3.3	88.9															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>50%</td> <td></td> </tr> </table>			Imperviousness (%)	50%		Silt Loam	0.0000	6.6	169.93												
			Imperviousness (%)	50%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270												
<table border="1"> <tr> <td>Manning's Impervious</td> <td>0.013</td> <td></td> </tr> <tr> <td>Manning's Pervious</td> <td>0.190</td> <td></td> </tr> </table>			Manning's Impervious	0.013		Manning's Pervious	0.190		Sandy Clay	0.0000	0.51	240.03									
Manning's Impervious	0.013																				
Manning's Pervious	0.190																				
			Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm			Area (Ha)	Land Use															
Woods	10	mm			0.000	Lakes and Wetlands															
Pasture/Lawns	5	mm			0.000	Woodlot or Cutover															
Cultivated	7	mm			1.454	Pasture Land															
Impervious Dstore	2.00	mm			0.000	Cultivated Land															
Pervious Dstore	5.00	mm			1.454	Impervious Area															
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	40%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>208</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>29.41</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>2941</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	208		Area (Ha)	29.41	ha	Catchment Width	2941	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	208																	
			Area (Ha)	29.41	ha																
			Catchment Width	2941	m																
			Catchment Length	100	m																
Soil Class	AB																				
		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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	1.5%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.44		Sandy Loam	29.4064	10.92	109.98															
CN Value	68		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>41%</td> <td></td> </tr> </table>			Imperviousness (%)	41%		Silt Loam	0.0000	6.60	169.93												
			Imperviousness (%)	41%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
Manning's Impervious	0.013		Sandy Clay	0.0000	0.51	240.03															
Manning's Pervious	0.190		Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm			Area (Ha)	Land Use															
Woods	10	mm			0.000	Lakes and Wetlands															
Pasture/Lawns	5	mm			7.544	Woodlot or Cutover															
Cultivated	7	mm			9.950	Pasture Land															
Impervious Dstore	2.00	mm			0.000	Cultivated Land															
Pervious Dstore	7.16	mm			11.913	Impervious Area															
Sub Area Routing	Outlet																				
Sub Area Routing Percentage	100%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>209</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>0.46</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>460</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>10</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	209		Area (Ha)	0.46	ha	Catchment Width	460	m	Catchment Length	10	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	209																	
			Area (Ha)	0.46	ha																
			Catchment Width	460	m																
			Catchment Length	10	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.0%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.61		Sandy Loam	0.4599	10.92	109.98															
CN Value	79		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>61%</td> <td></td> </tr> </table>			Imperviousness (%)	61%		Silt Loam	0.0000	6.60	169.93												
			Imperviousness (%)	61%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
<table border="1"> <tr> <td>Manning's Impervious</td> <td>0.013</td> <td></td> </tr> <tr> <td>Manning's Pervious</td> <td>0.190</td> <td></td> </tr> </table>			Manning's Impervious	0.013		Manning's Pervious	0.190		Sandy Clay	0.0000	0.51	240.03									
Manning's Impervious	0.013																				
Manning's Pervious	0.190																				
			Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm	<table border="1"> <thead> <tr> <th>Area (Ha)</th> <th>Land Use</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>Lakes and Wetlands</td> </tr> <tr> <td>0.042</td> <td>Woodlot or Cutover</td> </tr> <tr> <td>0.138</td> <td>Pasture Land</td> </tr> <tr> <td>0.000</td> <td>Cultivated Land</td> </tr> <tr> <td>0.280</td> <td>Impervious Area</td> </tr> </tbody> </table>		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					
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																				
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%																		

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>210</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>1.06</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>236</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>45</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	210		Area (Ha)	1.06	ha	Catchment Width	236	m	Catchment Length	45	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	210																	
			Area (Ha)	1.06	ha																
			Catchment Width	236	m																
			Catchment Length	45	m																
Soil Class	AB																				
		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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.2%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.11		Sandy Loam	1.0614	10.92	109.98															
CN Value	48		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>3%</td> <td></td> </tr> </table>			Imperviousness (%)	3%		Silt Loam	0.0000	6.60	169.93												
			Imperviousness (%)	3%																	
			Sandy Clay Loam	0.0000	1.52	219.96	0.262														
			Clay Loam	0.0000	1.02	210.06	0.277														
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
<table border="1"> <tr> <td>Manning's Impervious</td> <td>0.013</td> <td></td> </tr> <tr> <td>Manning's Pervious</td> <td>0.190</td> <td></td> </tr> </table>			Manning's Impervious	0.013		Manning's Pervious	0.190		Sandy Clay	0.0000	0.51	240.03									
Manning's Impervious	0.013																				
Manning's Pervious	0.190																				
			Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm			Area (Ha)	Land Use															
Woods	10	mm			0.000	Lakes and Wetlands															
Pasture/Lawns	5	mm			0.661	Woodlot or Cutover															
Cultivated	7	mm			0.374	Pasture Land															
Impervious Dstore	2.00	mm			0.000	Cultivated Land															
Pervious Dstore	8.19	mm			0.027	Impervious Area															
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	67%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>211</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>1.99</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>199</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	211		Area (Ha)	1.99	ha	Catchment Width	199	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	211																	
			Area (Ha)	1.99	ha																
			Catchment Width	199	m																
			Catchment Length	100	m																
Soil Class	AB																				
		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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.2%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.81		Sandy Loam	1.9851	10.92	109.98															
CN Value	90		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>84%</td> <td></td> </tr> </table>			Imperviousness (%)	84%		Silt Loam	0.0000	6.60	169.93												
			Imperviousness (%)	84%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
Manning's Impervious	0.013		Sandy Clay	0.0000	0.51	240.03															
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			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm			Area (Ha)	Land Use															
Woods	10	mm			0.000	Lakes and Wetlands															
Pasture/Lawns	5	mm			0.000	Woodlot or Cutover															
Cultivated	7	mm			0.325	Pasture Land															
Impervious Dstore	2.00	mm			0.000	Cultivated Land															
Pervious Dstore	5.00	mm			1.661	Impervious Area															
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	45%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>212</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>1.76</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>587</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>30</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	212		Area (Ha)	1.76	ha	Catchment Width	587	m	Catchment Length	30	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	212																	
			Area (Ha)	1.76	ha																
			Catchment Width	587	m																
			Catchment Length	30	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.2%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.31		Sandy Loam	1.7600	10.92	109.98															
CN Value	60		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>26%</td> <td></td> </tr> </table>			Imperviousness (%)	26%		Silt Loam	0.0000	6.60	169.93												
			Imperviousness (%)	26%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
<table border="1"> <tr> <td>Manning's Impervious</td> <td>0.013</td> <td></td> </tr> <tr> <td>Manning's Pervious</td> <td>0.190</td> <td></td> </tr> </table>			Manning's Impervious	0.013		Manning's Pervious	0.190		Sandy Clay	0.0000	0.51	240.03									
Manning's Impervious	0.013																				
Manning's Pervious	0.190																				
			Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
<table border="1"> <tr> <td>Wetland</td> <td>16</td> <td>mm</td> </tr> <tr> <td>Woods</td> <td>10</td> <td>mm</td> </tr> <tr> <td>Pasture/Lawns</td> <td>5</td> <td>mm</td> </tr> <tr> <td>Cultivated</td> <td>7</td> <td>mm</td> </tr> </table>			Wetland	16	mm	Woods	10	mm	Pasture/Lawns	5	mm	Cultivated	7	mm			Area (Ha)	Land Use			
Wetland	16	mm																			
Woods	10	mm																			
Pasture/Lawns	5	mm																			
Cultivated	7	mm																			
<table border="1"> <tr> <td>Impervious Dstore</td> <td>2.00</td> <td>mm</td> </tr> <tr> <td>Pervious Dstore</td> <td>7.80</td> <td>mm</td> </tr> </table>			Impervious Dstore	2.00	mm	Pervious Dstore	7.80	mm			0.000	Lakes and Wetlands									
Impervious Dstore	2.00	mm																			
Pervious Dstore	7.80	mm																			
					0.730	Woodlot or Cutover															
<table border="1"> <tr> <td>Sub Area Routing</td> <td>Pervious</td> <td></td> </tr> <tr> <td>Sub Area Routing Percentage</td> <td>36%</td> <td></td> </tr> </table>			Sub Area Routing	Pervious		Sub Area Routing Percentage	36%				0.574	Pasture Land									
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	36%																				
					0.000	Cultivated Land															
					0.456	Impervious Area															

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>213</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>0.33</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>152</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>22</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	213		Area (Ha)	0.33	ha	Catchment Width	152	m	Catchment Length	22	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	213																	
			Area (Ha)	0.33	ha																
			Catchment Width	152	m																
			Catchment Length	22	m																
Soil Class	AB																				
		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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.0%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.53		Sandy Loam	0.3335	10.92	109.98															
CN Value	74		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>50%</td> <td></td> </tr> </table>			Imperviousness (%)	50%		Silt Loam	0.0000	6.60	169.93												
			Imperviousness (%)	50%																	
			Sandy Clay Loam	0.0000	1.52	219.96	0.262														
			Clay Loam	0.0000	1.02	210.06	0.277														
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
			Sandy Clay	0.0000	0.51	240.03															
Manning's Impervious	0.013		Silty Clay	0.0000	0.51	290.07															
Manning's Pervious	0.190		Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm																			
Woods	10	mm	Area (Ha)	Land Use																	
Pasture/Lawns	5	mm	0.000	Lakes and Wetlands																	
Cultivated	7	mm	0.032	Woodlot or Cutover																	
			0.134	Pasture Land																	
Impervious Dstore	2.00	mm	0.000	Cultivated Land																	
Pervious Dstore	5.96	mm	0.168	Impervious Area																	
Sub Area Routing	Outlet																				
Sub Area Routing Percentage	100%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>214</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>1.13</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>252</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>45</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	214		Area (Ha)	1.13	ha	Catchment Width	252	m	Catchment Length	45	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	214																	
			Area (Ha)	1.13	ha																
			Catchment Width	252	m																
			Catchment Length	45	m																
Soil Class	AB																				
		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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.0%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.56		Sandy Loam	1.1331	10.92	109.98															
CN Value	76		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>54%</td> <td></td> </tr> </table>			Imperviousness (%)	54%		Silt Loam	0.0000	6.60	169.93												
			Imperviousness (%)	54%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
			Sandy Clay	0.0000	0.51	240.03															
Manning's Impervious	0.013		Silty Clay	0.0000	0.51	290.07															
Manning's Pervious	0.190		Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm			Area (Ha)	Land Use															
Woods	10	mm			0.000	Lakes and Wetlands															
Pasture/Lawns	5	mm			0.000	Woodlots or Cutovers															
Cultivated	7	mm			0.523	Pasture or Lawns															
Impervious Dstore	2.00	mm			0.000	Cultivated Land															
Pervious Dstore	5.00	mm			0.610	Impervious Area															
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	38%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>215</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>0.72</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>256</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>28</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	215		Area (Ha)	0.72	ha	Catchment Width	256	m	Catchment Length	28	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	215																	
			Area (Ha)	0.72	ha																
			Catchment Width	256	m																
			Catchment Length	28	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	3.0%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.44		Sandy Loam	0.7179	10.92	109.98															
CN Value	70		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>40%</td> <td></td> </tr> </table>			Imperviousness (%)	40%		Silt Loam	0.0000	6.60	169.93												
			Imperviousness (%)	40%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
Manning's Impervious	0.013		Sandy Clay	0.0000	0.51	240.03															
Manning's Pervious	0.190		Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm			Area (Ha)	Land Use															
Woods	10	mm			0.000	Lakes and Wetlands															
Pasture/Lawns	5	mm			0.000	Woodlot or Cutover															
Cultivated	7	mm			0.431	Pasture Land															
Impervious Dstore	2.00	mm			0.000	Cultivated Land															
Pervious Dstore	5.00	mm			0.287	Impervious Area															
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	100%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>216</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>10.29</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>1029</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	216		Area (Ha)	10.29	ha	Catchment Width	1029	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	216																	
			Area (Ha)	10.29	ha																
			Catchment Width	1029	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)			Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)			Sandy Loam	10.2878	10.92	109.98															
CN Value			Loam	0.0000	3.30	88.90															
Imperviousness (%)			Silt Loam	0.0000	6.60	169.93															
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Silty Clay Loam	0.0000	1.02	270.00															
			Sandy Clay	0.0000	0.51	240.03															
Manning's Roughness Coefficients - Overland Flow			Silty Clay	0.0000	0.51	290.07															
Manning's Impervious			Clay	0.0000	0.25	320.04															
Manning's Pervious			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland																					
Woods			Area (Ha)	Land Use																	
Pasture/Lawns			0.000	Lakes and Wetlands																	
Cultivated			0.000	Woodlot or Cutover																	
			4.526	Pasture Land																	
Impervious Dstore			0.000	Cultivated Land																	
Pervious Dstore			5.761	Impervious Area																	
Sub Area Routing			Pervious																		
Sub Area Routing Percentage			52%																		

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>217</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>1.76</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>176</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	217		Area (Ha)	1.76	ha	Catchment Width	176	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	217																	
			Area (Ha)	1.76	ha																
			Catchment Width	176	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.0%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.45		Sandy Loam	1.7579	10.92	109.98															
CN Value	71		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>42%</td> <td></td> </tr> </table>			Imperviousness (%)	42%		Silt Loam	0.0000	6.60	169.93												
			Imperviousness (%)	42%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
Manning's Impervious	0.013		Sandy Clay	0.0000	0.51	240.03															
Manning's Pervious	0.190		Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm																			
Woods	10	mm	Area (Ha)	Land Use																	
Pasture/Lawns	5	mm	0.000	Lakes and Wetlands																	
Cultivated	7	mm	0.000	Woodlot or Cutover																	
			1.027	Pasture Land																	
Impervious Dstore	2.00	mm	0.000	Cultivated Land																	
Pervious Dstore	5.00	mm	0.731	Impervious Area																	
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	96%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>218</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>4.06</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>1014</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>40</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	218		Area (Ha)	4.06	ha	Catchment Width	1014	m	Catchment Length	40	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	218																	
			Area (Ha)	4.06	ha																
			Catchment Width	1014	m																
			Catchment Length	40	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	5.0%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.13		Sandy Loam	4.0559	10.92	109.98															
CN Value	53		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>6%</td> </tr> </table>			Imperviousness (%)	6%	Silt Loam	0.0000	6.60	169.93													
			Imperviousness (%)	6%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
Manning's Impervious	0.013		Sandy Clay	0.0000	0.51	240.03															
Manning's Pervious	0.190		Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm																			
Woods	10	mm	Area (Ha)	Land Use																	
Pasture/Lawns	5	mm	1.220	Lakes and Wetlands																	
Cultivated	7	mm	0.000	Woodlot or Cutover																	
			2.602	Pasture Land																	
Impervious Dstore	2.00	mm	0.000	Cultivated Land																	
Pervious Dstore	8.51	mm	0.234	Impervious Area																	
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	0%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>219</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>8.64</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>864</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	219		Area (Ha)	8.64	ha	Catchment Width	864	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	219																	
			Area (Ha)	8.64	ha																
			Catchment Width	864	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.0%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.74		Sandy Loam	8.6448	10.92	109.98															
CN Value	87		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>76%</td> <td></td> </tr> </table>			Imperviousness (%)	76%		Silt Loam	0.0000	6.60	169.93												
			Imperviousness (%)	76%																	
			Sandy Clay Loam	0.0000	1.52	219.96															
			Clay Loam	0.0000	1.02	210.06															
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
Manning's Impervious	0.013		Sandy Clay	0.0000	0.51	240.03															
Manning's Pervious	0.190		Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm																			
Woods	10	mm	Area (Ha)	Land Use																	
Pasture/Lawns	5	mm	0.000	Lakes and Wetlands																	
Cultivated	7	mm	0.000	Woodlot or Cutover																	
			2.097	Pasture Land																	
Impervious Dstore	2.00	mm	0.000	Cultivated Land																	
Pervious Dstore	5.00	mm	6.548	Impervious Area																	
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	69%																				

PCSWMM - Catchment Properties																					
<table border="1"> <tr> <td>Catchment ID</td> <td>220</td> <td></td> </tr> <tr> <td>Area (Ha)</td> <td>4.74</td> <td>ha</td> </tr> <tr> <td>Catchment Width</td> <td>474</td> <td>m</td> </tr> <tr> <td>Catchment Length</td> <td>100</td> <td>m</td> </tr> <tr> <td>Soil Class</td> <td>AB</td> <td></td> </tr> </table>			Catchment ID	220		Area (Ha)	4.74	ha	Catchment Width	474	m	Catchment Length	100	m	Soil Class	AB		Infiltration - Green Ampt			
			Catchment ID	220																	
			Area (Ha)	4.74	ha																
			Catchment Width	474	m																
			Catchment Length	100	m																
Soil Class	AB																				
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)															
			Sand	0.0000	120.34	49.02															
Average Slope (%)	2.0%	m	Loamy Sand	0.0000	29.97	60.96															
Runoff Coefficient (2-10yr)	0.57		Sandy Loam	4.7410	10.92	109.98															
CN Value	77		Loam	0.0000	3.30	88.90															
<table border="1"> <tr> <td>Imperviousness (%)</td> <td>55%</td> <td></td> </tr> </table>			Imperviousness (%)	55%		Silt Loam	0.0000	6.60	169.93												
			Imperviousness (%)	55%																	
			Sandy Clay Loam	0.0000	1.52	219.96	0.262														
			Clay Loam	0.0000	1.02	210.06	0.277														
			Manning's Roughness Coefficients - Overland Flow			Silty Clay Loam	0.0000	1.02	270.00												
<table border="1"> <tr> <td>Manning's Impervious</td> <td>0.013</td> <td></td> </tr> <tr> <td>Manning's Pervious</td> <td>0.190</td> <td></td> </tr> </table>			Manning's Impervious	0.013		Manning's Pervious	0.190		Sandy Clay	0.0000	0.51	240.03									
Manning's Impervious	0.013																				
Manning's Pervious	0.190																				
			Silty Clay	0.0000	0.51	290.07															
			Clay	0.0000	0.25	320.04															
			Source: PCSWMM Manual and Rawls, W.J. et al., (1983). J. Hyd. Engr., 109:1316.																		
Depression Storage																					
Wetland	16	mm																			
Woods	10	mm	Area (Ha)	Land Use																	
Pasture/Lawns	5	mm	0.000	Lakes and Wetlands																	
Cultivated	7	mm	0.000	Woodlot or Cutover																	
			2.130	Pasture Land																	
Impervious Dstore	2.00	mm	0.000	Cultivated Land																	
Pervious Dstore	5.00	mm	2.611	Impervious Area																	
Sub Area Routing	Pervious																				
Sub Area Routing Percentage	67%																				

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: JMG

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:

$$Q = 0.63A(2gH)^{0.5}$$

$$Q = 1.65 \left[\frac{m^2 D^4}{4} \right] \left[2 \cos^{-1} \left[\frac{(D/2) - H}{D/2} \right] \right] \left\{ \frac{180}{\pi} \right\}^{0.360} \left\{ \left[\frac{(D/2) - H}{D/2} \right] + \left[\frac{(D/2) - H}{D/2} \right]^2 \right\}^{1.5}$$

Where ponding elevation is above orifice centroid

Where ponding elevation is at or below orifice centroid

Where ponding elevation is at or below orifice centroid

where:

Q = flow rate (m³/s)

D = diameter of orifice (m)

A = area of orifice (m²)

g = Acceleration due to gravity 9.81 m/s²

H = head on the orifice (m)

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:

$$Q = C_L [H \wedge (3/2)]$$

Where C is a constant defined by, y = (a+bx)(1+cx+dx²) for rectangular & triangular broad crested

Triangular Broad Crested Weir Flow is given by:

$$Q = C_L [H \wedge (5/2)] \tan(\alpha/2)$$

weirs. x = head divided by downstream Length of Weir (H/L)

where:

Q = flow rate (m³/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
Imperviousness

110.10 ha
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:

Water Quality Volumetric Criteria

96.18 m³/ha

MOE Extended Detention Volumetric Criteria

40.00 m³/ha

MOE Permanent Pool Volumetric Criteria

56.18 m³/ha

SWMF Volume Requirements:

Water Quality Volume (WQV) Required

10,589.93 m³

MOE Extended Detention Volume Required

4,404.11 m³

MOE Permanent Pool Volume Required

6,185.82 m³

Extended Detention Volume Provided

7,409.80 m³

Permanent Pool Storage Volume Provided

6,227.19 m³

Total Water Quality Volume Provided

13,636.99 m³

PCSWMM 25mm 4hr CHI Water Quality Volume*

8,971.00 m³

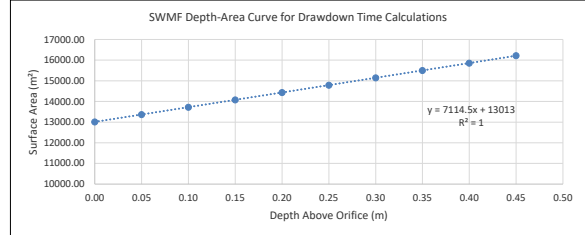
SWMF Drawdown Requirements:

Minimum Drawdown Time, MOE Table 4.7

24.00 Hours

Preferred Drawdown Time, MOE Table 4.7

24.00 Hours



Source & Notes:

Conducted linear interpolation from MOE Table 3.2 for Enhanced Protection level Wetlands.

MOE Section 3.3.2

MOE Section 3.3.2

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

Forebay Calculations:

Maximum Forebay Permanent Pool Area	2603 m ²
Total Permanent Pool Area Provided	13014 m ²
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: JMG
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
Preferred 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 preferred forebay 1 depth provided?	YES
Is preferred forebay 2 depth provided?	YES
Is preferred 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 forebay 3 provided?	YES

MOE Equation 4.5 - Forebay Settling Length

Dist = $\sqrt{RT((1+Q_p)/V_s)}$

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						

PRA-16084 - Post-Dev-PF 25mm 4HrCHI Water Quality Event Status Report

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

PRA-16084 Galloway Subdivision & Pratt Industrial Subdivision
 PROJECT MANAGER: JWJ
 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

Name	Data Source	Data Type	Recording Interval
100Yr24HrSCS	100Yr24HrSCS	INTENSITY	6 min.
100Yr4HrCHI	100Yr4HrCHI	INTENSITY	5 min.
10Yr24HrSCS	10Yr24HrSCS	INTENSITY	6 min.
10Yr4HrCHI	10Yr4HrCHI	INTENSITY	5 min.
25mm4HrCHI WQE	25mm4HrCHI WQE	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.

PRA-16084 - Post-Dev-PF 25mm 4HrCHI Water Quality Event Status Report

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	

PRA-16084 - Post-Dev-PF 25mm 4HrCHI Water Quality Event Status Report

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

PRA-16084 - Post-Dev-PF 25mm 4HrCHI Water Quality Event Status Report

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

PRA-16084 - Post-Dev-PF 25mm 4HrCHI Water Quality Event Status Report

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

	Volume	Depth
Runoff Quantity Continuity	hectare-m	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	

	Volume	Volume
Flow Routing Continuity	hectare-m	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	

PRA-16084 - Post-Dev-PF 25mm 4HrCHI Water Quality Event Status Report

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

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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

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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

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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

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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

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	0.09	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

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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			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	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

PRA-16084 - Post-Dev-PF 100Yr24HrSCS Status Report

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

PRA-16084 Galloway Subdivision & Pratt Industrial Subdivision
PROJECT MANAGER: JWJ
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

Name	Data Source	Data Type	Recording 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.

PRA-16084 - Post-Dev-PF 100Yr24HrSCS Status Report

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	

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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

PRA-16084 - Post-Dev-PF 100Yr24HrSCS Status Report

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

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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

	Volume	Depth
Runoff Quantity Continuity	hectare-m	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	

	Volume	Volume
Flow Routing Continuity	hectare-m	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	

PRA-16084 - Post-Dev-PF 100Yr24HrSCS Status Report

 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

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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

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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.

Hours	Max. Height Above Crown	Min. Depth Below Rim
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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

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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								
		Up Dry		Down Dry	Sub Dry	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

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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

Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity 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

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

PRA-16084 Galloway Subdivision & Pratt Industrial Subdivision
 PROJECT MANAGER: JWJ
 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

Name	Data Source	Data Type	Recording 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	

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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

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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

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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

	Volume	Depth
Runoff Quantity Continuity	hectare-m	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	

	Volume	Volume
Flow Routing Continuity	hectare-m	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	

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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

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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

PRA-16084 - Post-Dev-PF Timmins Status Report

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 Poned Depth Meters
J1	0.03	3.007	0 05:57	0.246	0.000

Storage Volume Summary

Storage Unit	Average Volume 1000 m3	Avg Full	Evap Loss	Exfil Loss	Maximum Volume 1000 m3	Max 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

PRA-16084 - Post-Dev-PF Timmins Status Report

 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

PRA-16084 - Post-Dev-PF Timmins Status Report

 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 -----			Hours	
	Both Ends	Upstream	Dnstream	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

PRA-16084 - Post-Dev-PF Timmins Status Report

Primary	0.50	0.50	3.87	0.01	0.01
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Analysis begun on: Thu Dec 1 10:35:26 2022

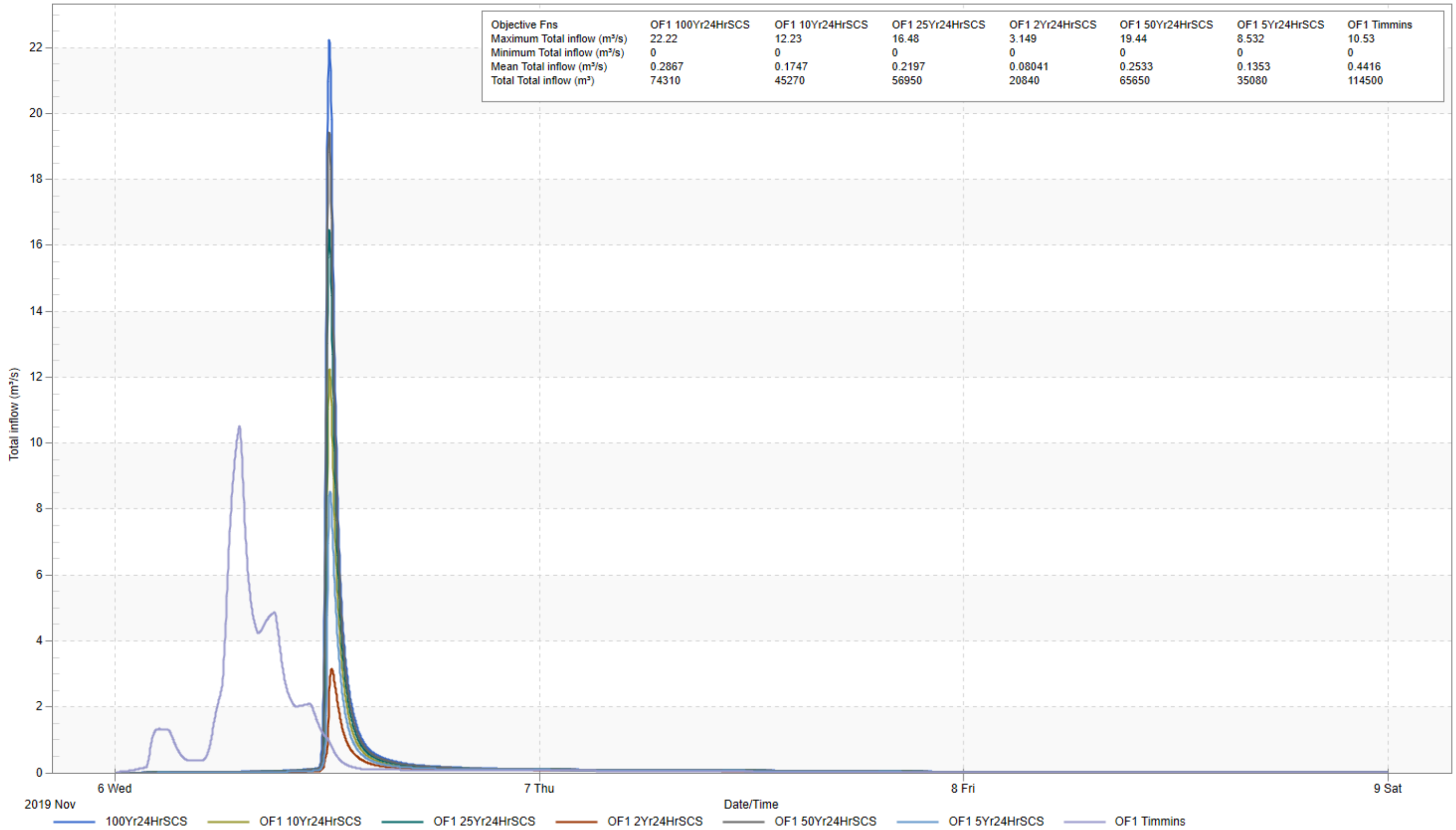
Analysis ended on: Thu Dec 1 10:35:34 2022

Total elapsed time: 00:00:08

Node OF1

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

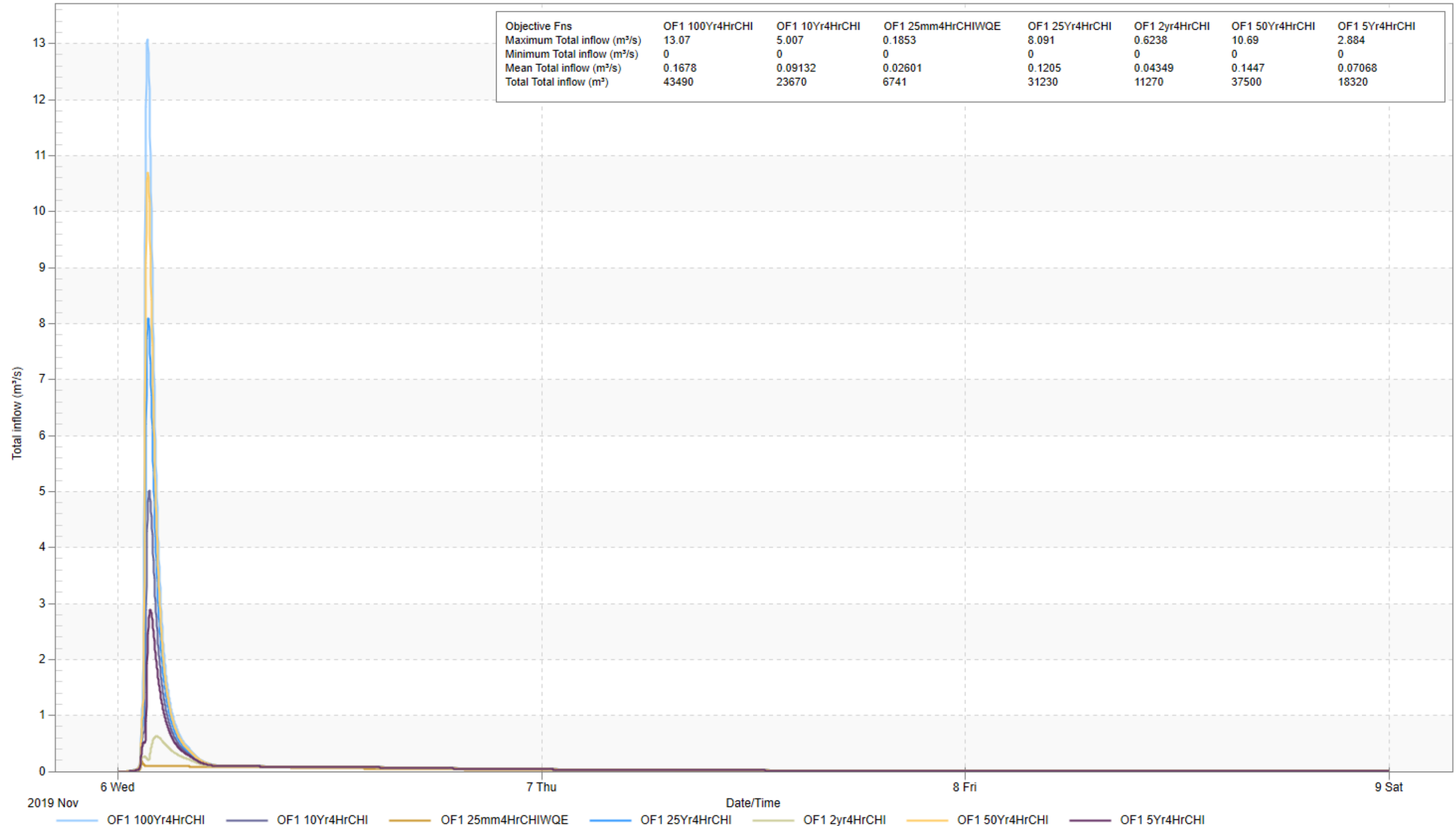
Objective Fns	OF1 100Yr24HrSCS	OF1 10Yr24HrSCS	OF1 25Yr24HrSCS	OF1 2Yr24HrSCS	OF1 50Yr24HrSCS	OF1 5Yr24HrSCS	OF1 Timmins
Maximum Total inflow (m ³ /s)	22.22	12.23	16.48	3.149	19.44	8.532	10.53
Minimum Total inflow (m ³ /s)	0	0	0	0	0	0	0
Mean Total inflow (m ³ /s)	0.2867	0.1747	0.2197	0.08041	0.2533	0.1353	0.4416
Total Total inflow (m ³)	74310	45270	56950	20840	65650	35080	114500



Node OF1

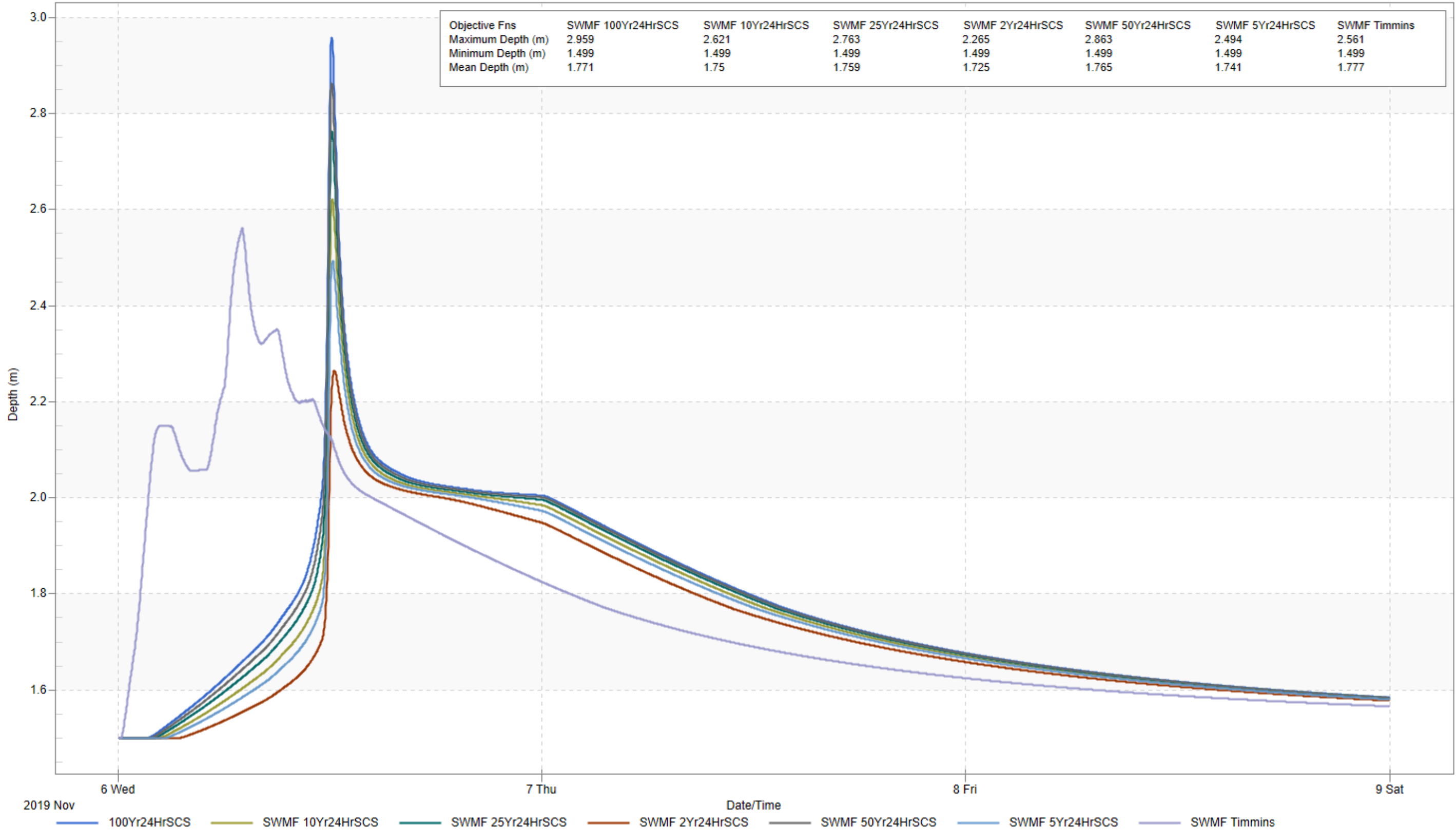
PRA-16084 - Post-Dev-PF Flow vs. Time - 4HrCHI & 25mm 4HrCHI WQE

Objective Fns	OF1 100Yr4HrCHI	OF1 10Yr4HrCHI	OF1 25mm4HrCHI WQE	OF1 25Yr4HrCHI	OF1 2yr4HrCHI	OF1 50Yr4HrCHI	OF1 5Yr4HrCHI
Maximum Total inflow (m ³ /s)	13.07	5.007	0.1853	8.091	0.6238	10.69	2.884
Minimum Total inflow (m ³ /s)	0	0	0	0	0	0	0
Mean Total inflow (m ³ /s)	0.1678	0.09132	0.02601	0.1205	0.04349	0.1447	0.07068
Total Total inflow (m ³)	43490	23670	6741	31230	11270	37500	18320



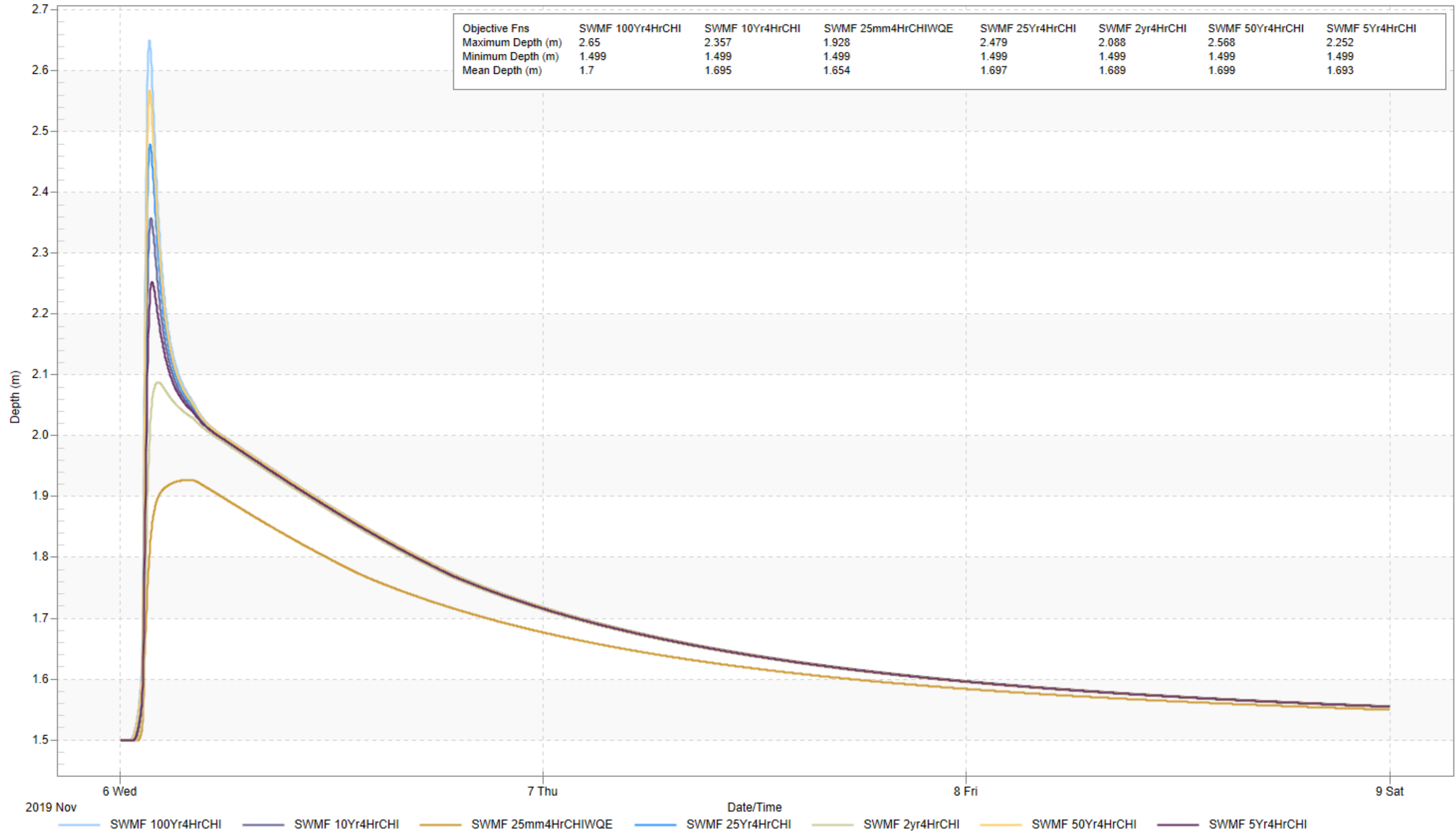
Node SWMF

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



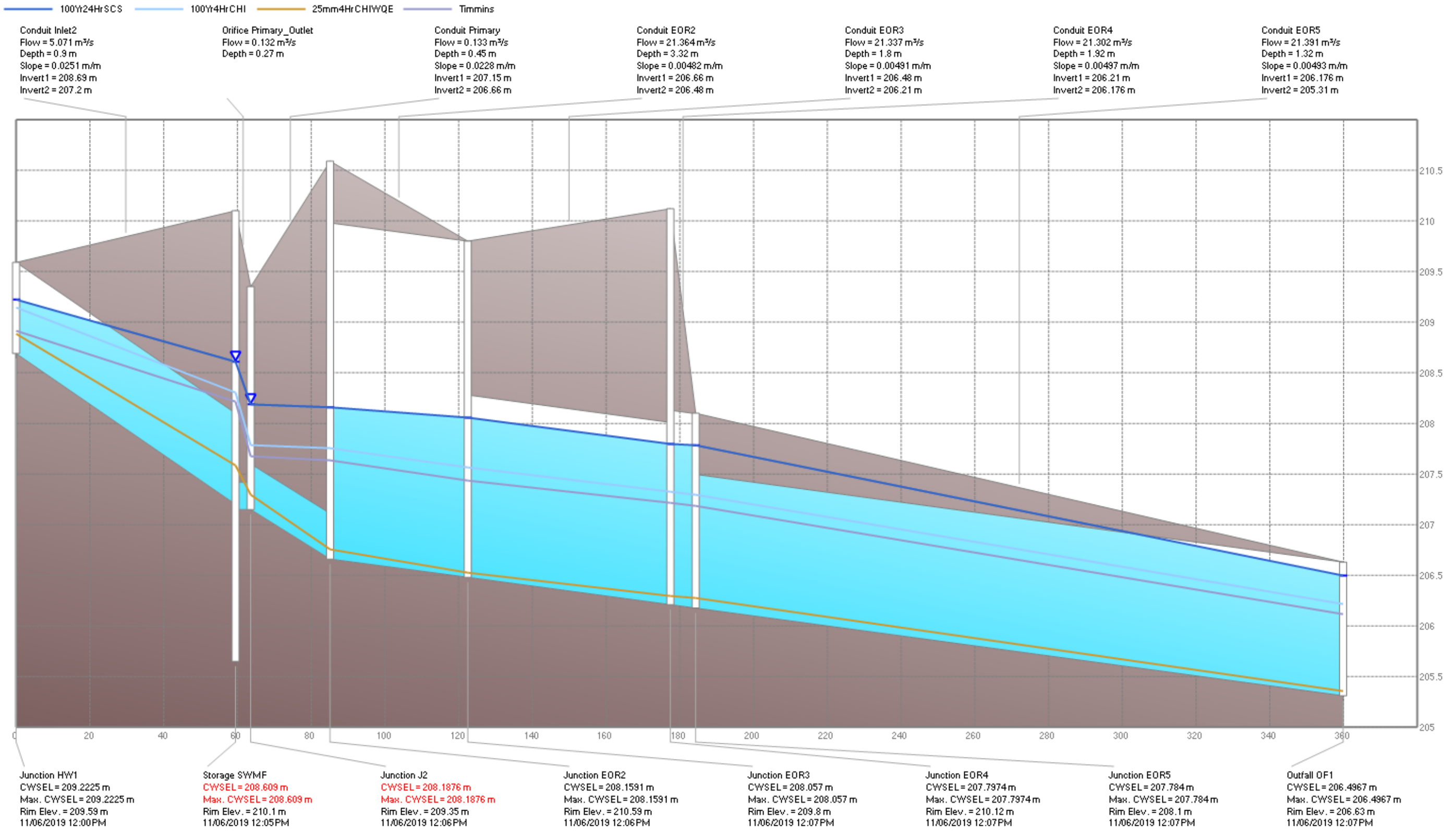
Node SWMF

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



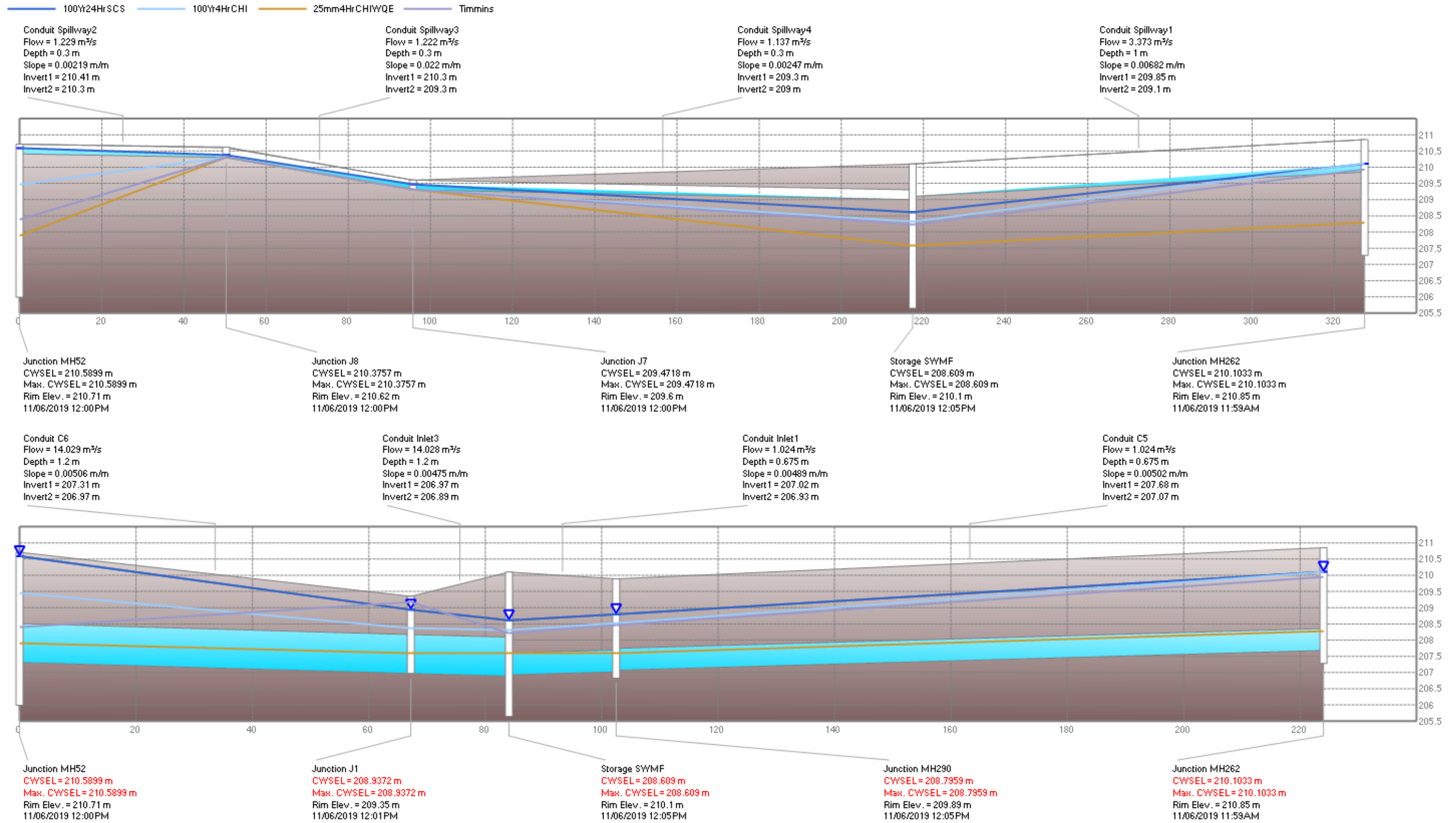
PRA-16084 - Post-Dev-PF HGL Profile

West to East Profile



PRA-16084 - Post-Dev-PF HGL Profile

North to South Profile



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

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:	

Site Name:	Pratt-Galloway Industrial Subdivision
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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):	

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

Stormceptor® EF Sizing Report

THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

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

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

Stormceptor®EF Sizing Report

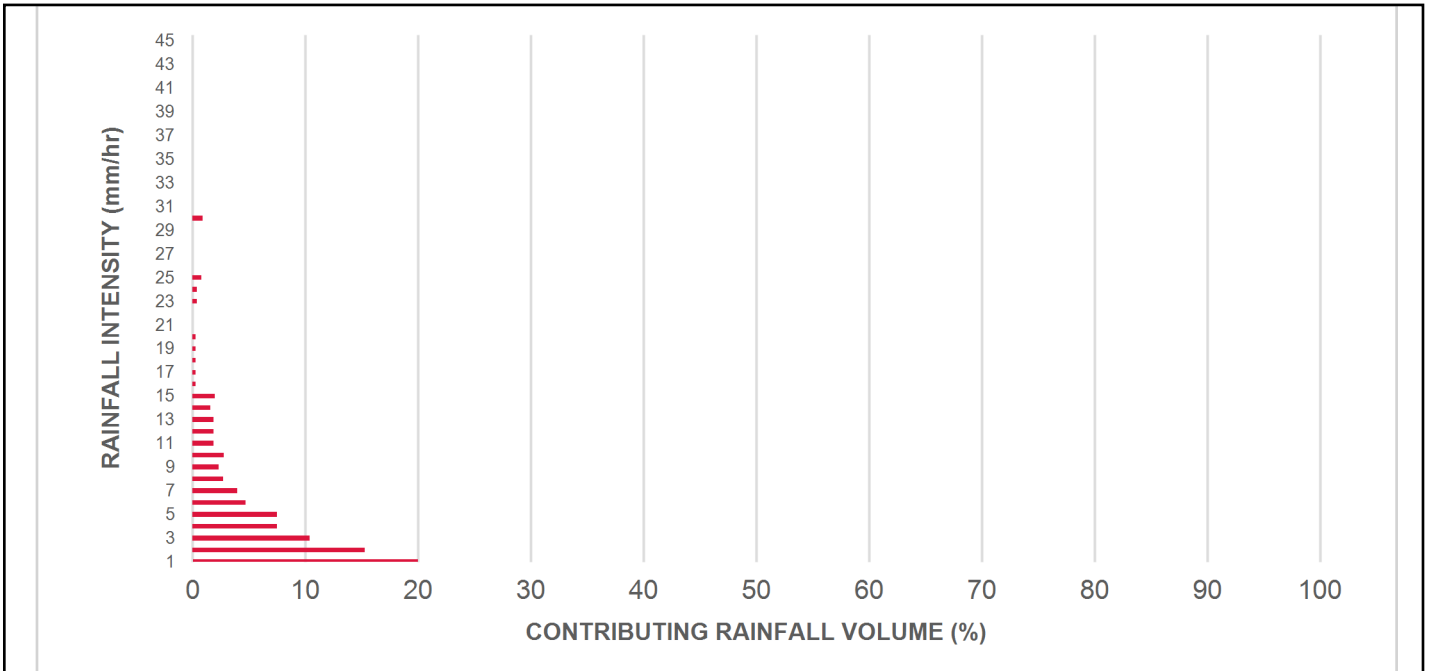
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m ²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.5	9.4	9.4	2.89	173.0	24.0	70	6.6	6.6
1	20.0	29.4	5.78	347.0	48.0	70	14.1	20.7
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

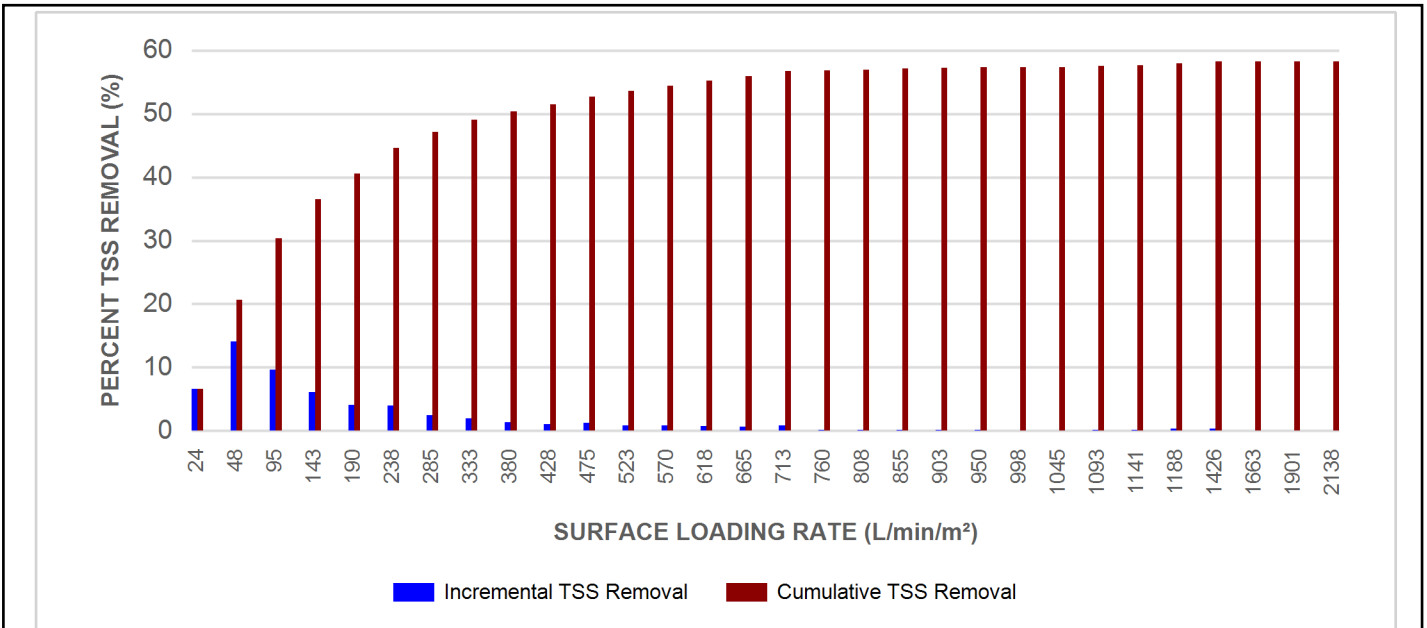


Stormceptor® EF Sizing Report

RAINFALL DATA FROM BARRIE-ORO RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Stormceptor® **EF** Sizing Report

Maximum Pipe Diameter / Peak Conveyance

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

SCOUR PREVENTION AND ONLINE CONFIGURATION

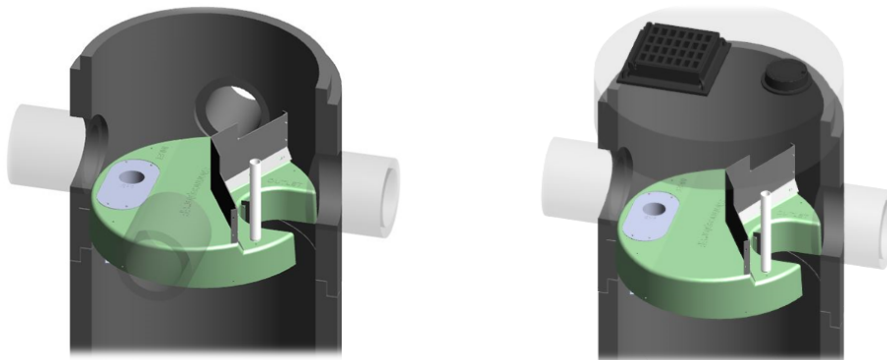
► Stormceptor® EF and EFO feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance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

DESIGN FLEXIBILITY

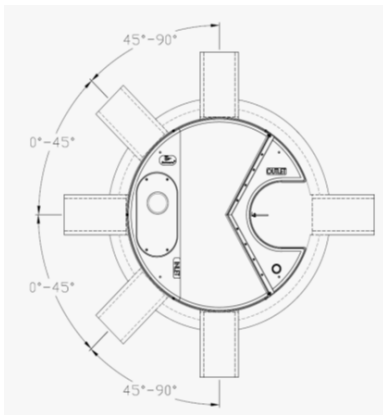
► Stormceptor® EF and EFO offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle,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

OIL CAPTURE AND RETENTION

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



Stormceptor® EF Sizing Report



INLET-TO-OUTLET DROP

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

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

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

HEAD LOSS

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

For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

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

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit <http://www.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>

Stormceptor® EF Sizing Report

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

SLR (L/min/m ²)	TSS % REMOVAL	SLR (L/min/m ²)	TSS % REMOVAL	SLR (L/min/m ²)	TSS % REMOVAL	SLR (L/min/m ²)	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		

Stormceptor® **EF** Sizing Report

**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



Stormceptor® EF Sizing Report

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/m² to 1400 L/min/m², 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/m² and 1400 L/min/m² 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/m² shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m². No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m².

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m² shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m², and shall be calculated using a simple proportioning formula, with 1400 L/min/m² 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/m².

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m².

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

Stormceptor® EF Sizing Report

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/m² to 2600 L/min/m²) 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										
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.)

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

**Equivalent Diameter Used

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

C: Runoff Coefficient

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: JWl



Appendix D

Engineering Drawings

PROPOSED RESIDENTIAL GALLOWAY SUBDIVISION

TOWN OF MIDLAND
COUNTY OF SIMCOE

CONTRACT No.

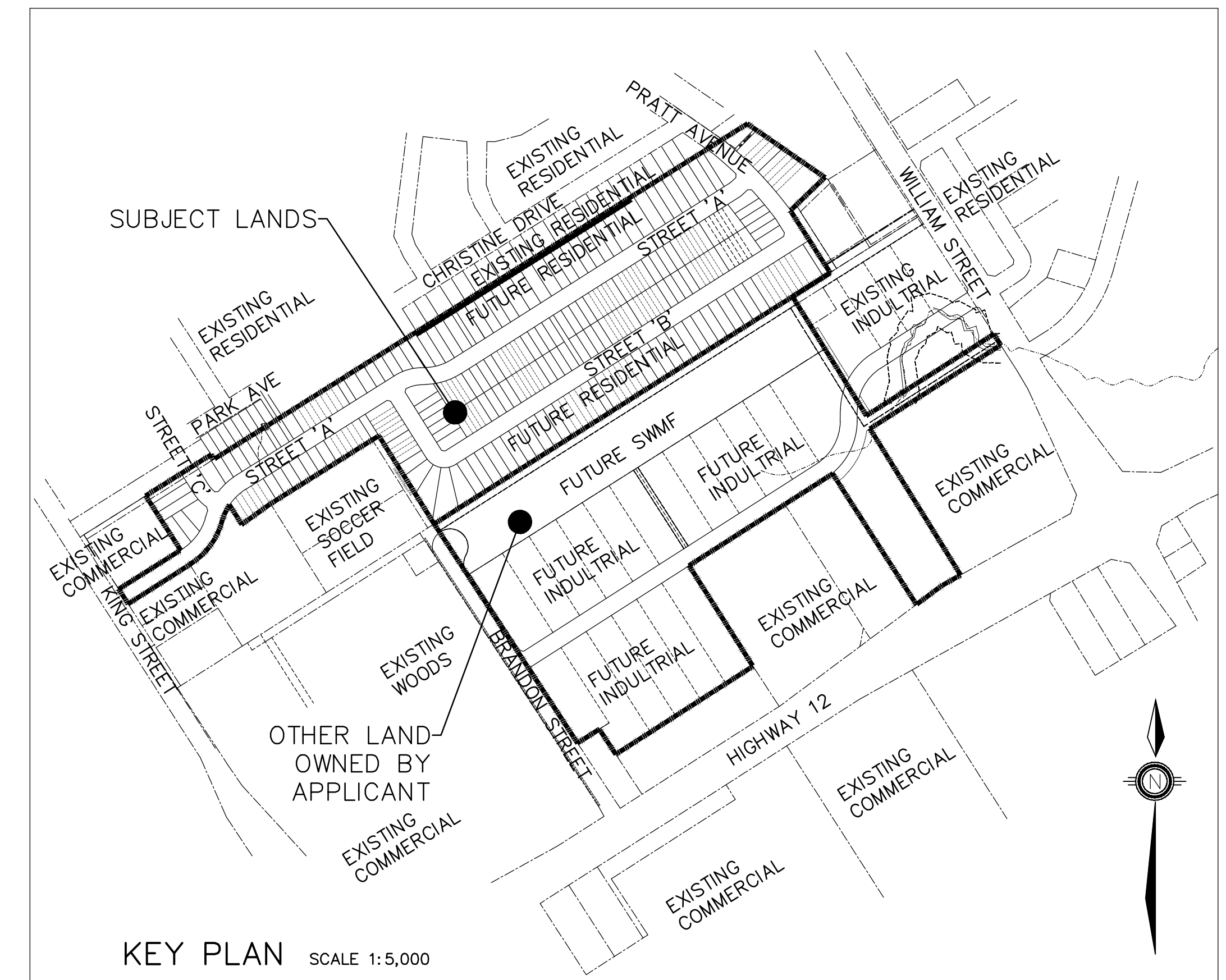
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MUNICIPAL OFFICE ADDRESS
575 Dominion Ave
Midland, ON
L4R 1R2
(705) 526-4275

PRATT HANSEN GROUP INC.
301 KING STREET
BARRIE, ON
(705) 792-3883

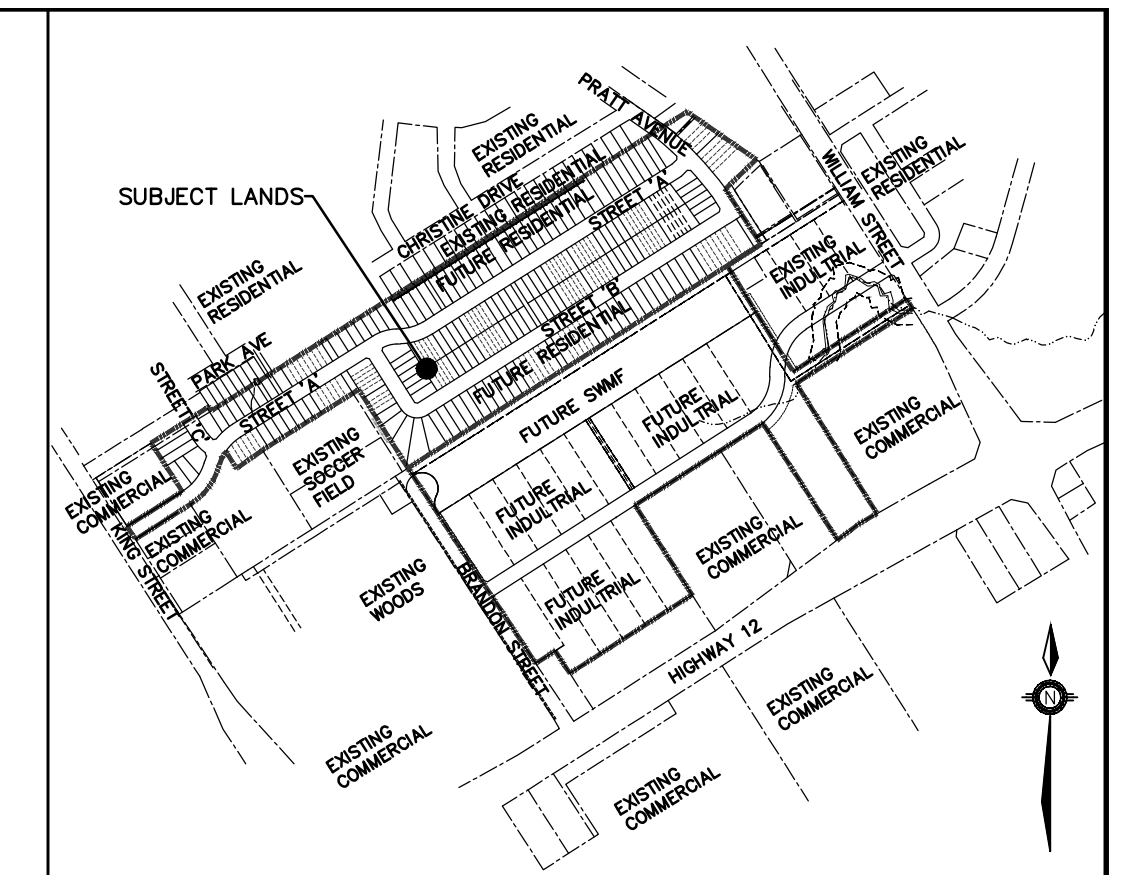


229 Mapleview Dr. E, Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056



LIST OF DRAWINGS

DWG. No.	DRAWING TITLE
	TITLE PAGE
GS-1	GENERAL SERVICING PLAN WEST
GS-2	GENERAL SERVICING PLAN EAST
LG-1	LOT GRADING PLAN
LG-2	LOT GRADING PLAN
LG-3	LOT GRADING PLAN
LG-4	LOT GRADING PLAN
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
SWM-1	PRE-DEVELOPMENT DRAINAGE AREA PLAN
SWM-2	POST-DEVELOPMENT DRAINAGE AREA PLAN
PP-1	PLAN AND PROFILE STREET A STA. -0+024.12 TO 0+240
PP-2	PLAN AND PROFILE STREET A STA. 0+240 TO 0+530
PP-3	PLAN AND PROFILE STREET A STA. 0+530 TO 0+800
PP-4	PLAN AND PROFILE STREET A STA. 0+800 TO 0+904.06
PP-5	PLAN AND PROFILE STREET B STA. 0+000 TO 0+160
PP-6	PLAN AND PROFILE STREET B STA. 0+160 TO 0+440
PP-7	PLAN AND PROFILE STREET B STA. 0+440 TO 0+594
PP-8	PLAN AND PROFILE STREET C STA. 0+100 TO 0+167
PP-9	PLAN AND PROFILE STREET D STA. 0+000 TO 0+260
PP-10	PLAN AND PROFILE PRATT AVENUE STA. -0+020 TO 0+205

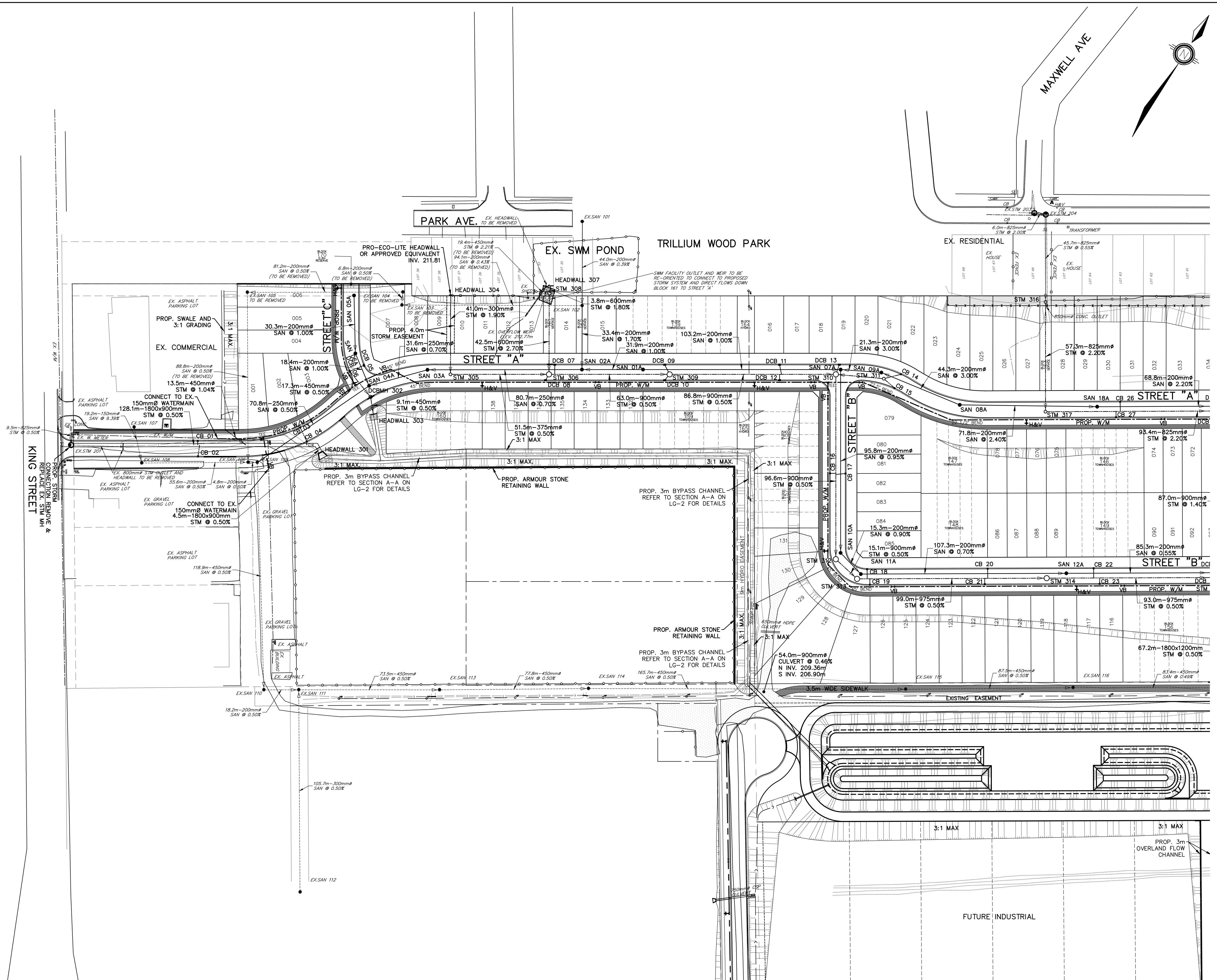


KEYPLAN
NTS

LEGEND

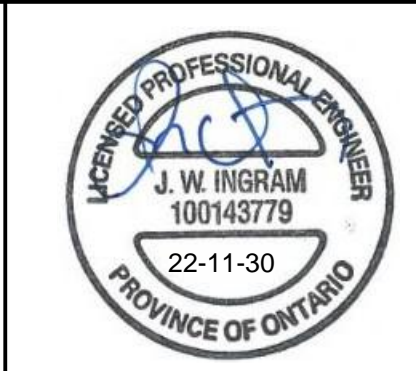
- EX SAN MH EXISTING SANITARY MAINTENANCE HOLE
- EX STM EXISTING STORM MAINTENANCE HOLE
- EX CB EXISTING CATCHBASIN
- EX DCB EXISTING DOUBLE CATCHBASIN
- EX V&B EXISTING VALVE & BOX
- EX H&V EXISTING HYDRANT & VALVE
- EX BELL PED EXISTING BELL PEDESTAL
- EX H&V POLE EXISTING HYDRANT POLE
- EX SIGN EXISTING SIGN
- EX BELL LINE EXISTING BELL LINE
- EX GAS LINE EXISTING GAS LINE
- EX TV LINE EXISTING TV LINE
- EX H&V EXISTING HYDRANT AND VALVE
- V&B VALVE AND BOX
- BELL PED BELL PEDESTAL
- CABLE PED CABLE PEDESTAL
- SAN MH SANITARY MAINTENANCE HOLE
- STM STORM MAINTENANCE HOLE
- CB CATCH BASIN
- DCB DOUBLE CATCH BASIN
- DEP CURB DEPRESSED CURB
- TRANSFORMER TRANSFORMER
- SWITCHGEAR SWITCHGEAR
- LS LIGHT STANDARD
- LS PED LIGHT STANDARD PEDESTAL
- SMB SUPER MAILBOX
- SAN SERV SANITARY SERVICE
- WATER SERV WATER SERVICE
- UTILITY DUCT UTILITY DUCT

REFER TO DWG GS-2



BENCHMARK:
BENCHMARK NO. 0082003042 RIB WITH CAP, 30 CM BELOW GRADE. - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.059 N494256.350 ELEV 194.842
BENCHMARK NO. 05719747317 62M NORTHEAST FROM BRANDON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.3xx

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FSR SUBMISSION	FEB 2020	JWI



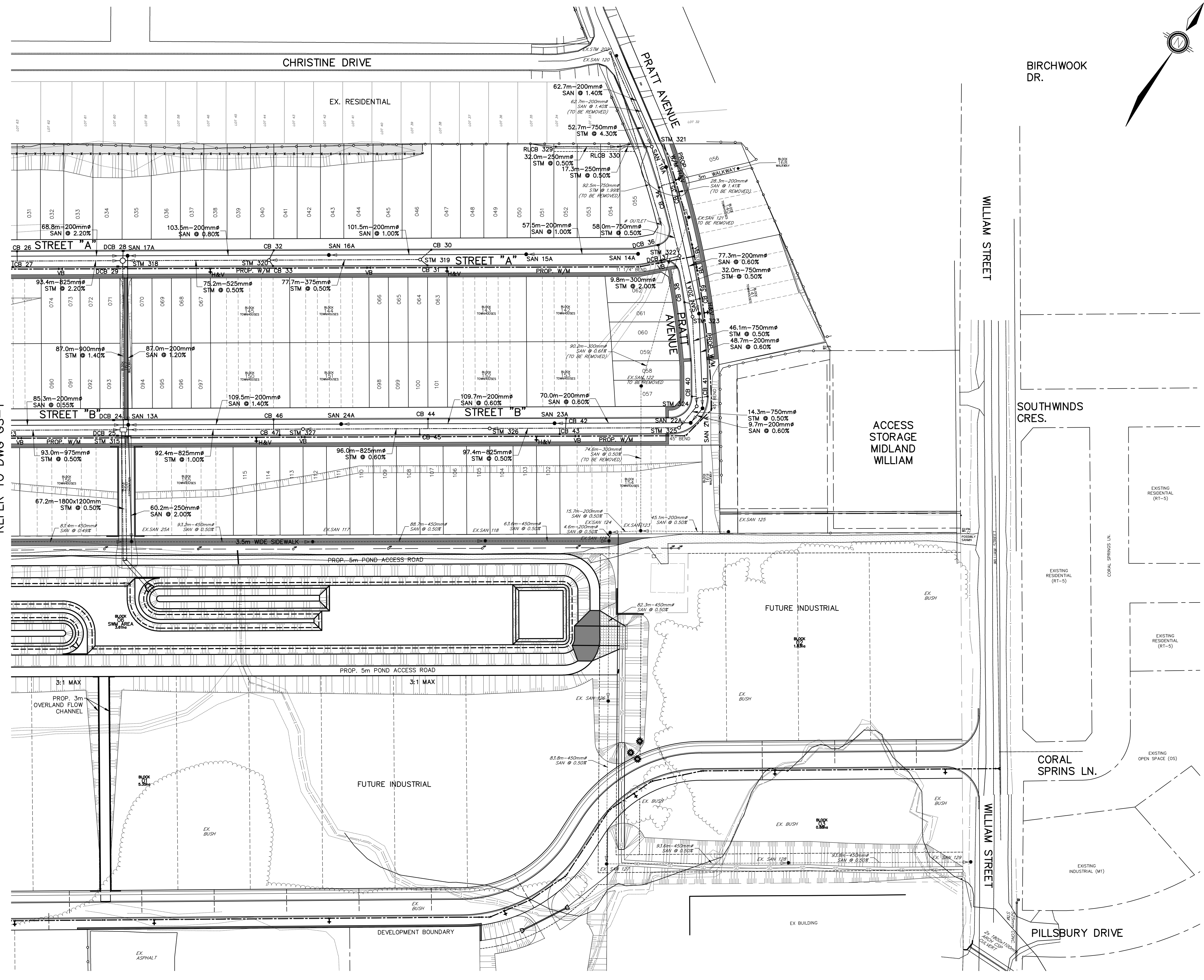
PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND

GENERAL SERVICING PLAN
WEST

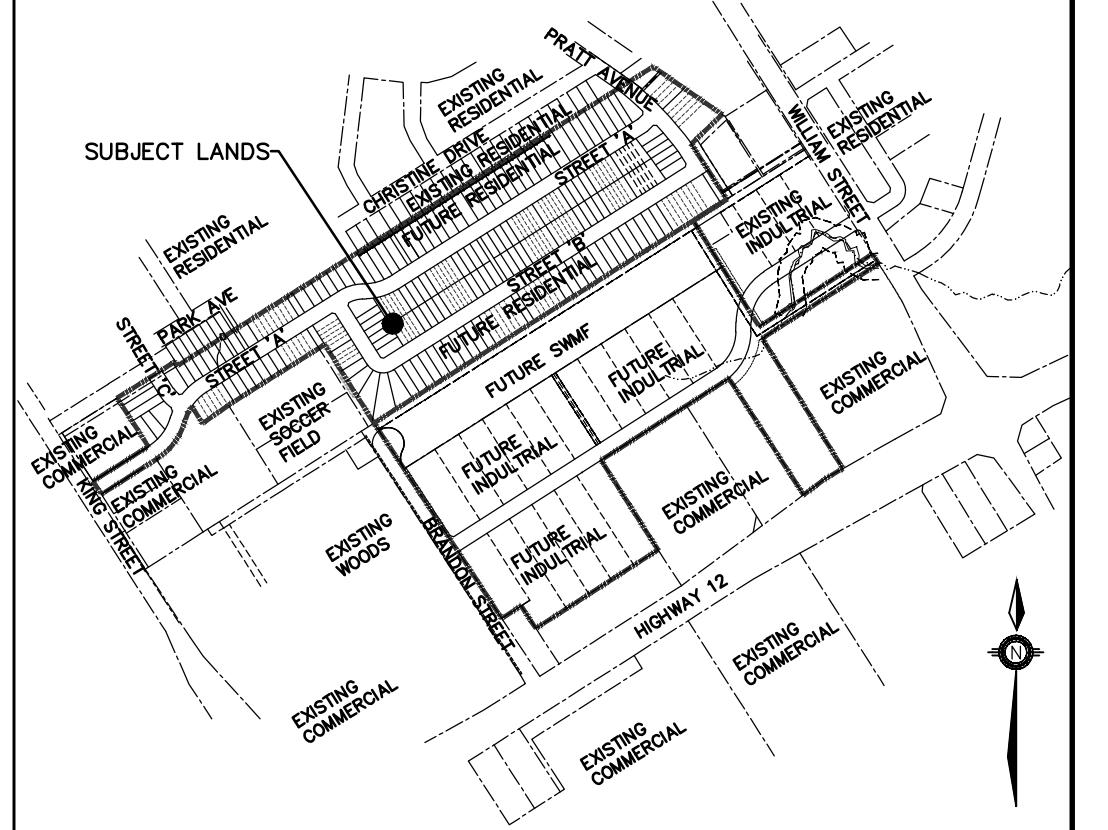
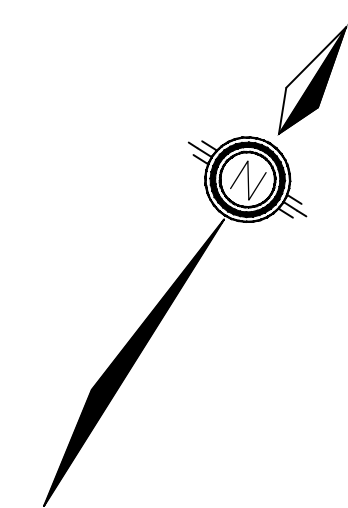
JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E. Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

DESIGN JH	SCALE: 1:1000	DATE FEBRUARY 2020
DRAWN JT	PROJECT PRA-16084	DWG. NO GS-1
CHECKED JWI		

G:\Eng_3D\PR-16084-GENERAL SERVICING\DWG\GS-1 Plotted Dec 01, 2022 @ 4:18pm by vsp@pratt-hansen.com



REFER TO DWG GS-1



KEYPLAN
NTS

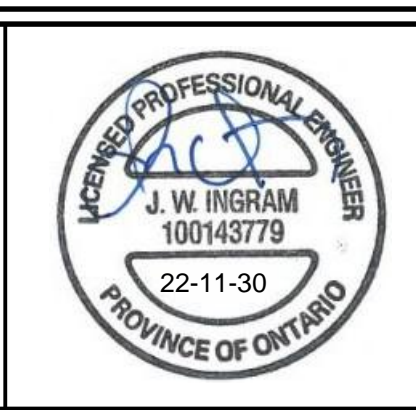
LEGEND

- EX SAN MH EXISTING SANITARY MAINTENANCE HOLE
- EX STM EXISTING STORM MAINTENANCE HOLE
- EX CB EXISTING CATCH BASIN
- EX DCB EXISTING DOUBLE CATCH BASIN
- EX V&B EXISTING VALVE & BOX
- EX H&V EXISTING HYDRANT & VALVE
- EX B.P. EXISTING BELL PEDESTAL
- EX H.P. EXISTING HYDRO POLE
- EX SIGN EXISTING SIGN
- U/B EXISTING BELL LINE
- G EXISTING GAS LINE
- TV EXISTING TV LINE
- H&V EXISTING HYDRANT AND VALVE
- V&B EXISTING VALVE AND BOX
- B.P. EXISTING BELL PEDESTAL
- C.P. EXISTING CABLE PEDESTAL
- SAN1 SANITARY MAINTENANCE HOLE
- STM1 STORM MAINTENANCE HOLE
- CB CATCH BASIN
- DCB DOUBLE CATCH BASIN
- DC DEPRESSED CURB
- TR TRANSFORMER
- SW SWITCHGEAR
- LS LIGHT STANDARD
- LS.P. LIGHT STANDARD PEDESTAL
- SMB SUPER MAILBOX
- SS SANITARY SERVICE
- WS WATER SERVICE
- UD UTILITY DUCT

G:\Eng_3D\PRAs-16084-GENERAL SERVING.DWG Layout:GS-2 Plotted: Dec. 01, 2022 @ 4:18pm by vespersdm The Jones Consulting Group Ltd.

BENCHMARK:
BENCHMARK NO. 00820038042 RIB WITH CAP, 30 CM BELOW GRADE. - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.099 N4924256.350 ELEV 194.842
BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANDON ST AND HWY 12 INTERSECTION. UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.30x

NO.	REVISIONS	DATE	INITIAL
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1.	FSR SUBMISSION	FEB 2020	JWI

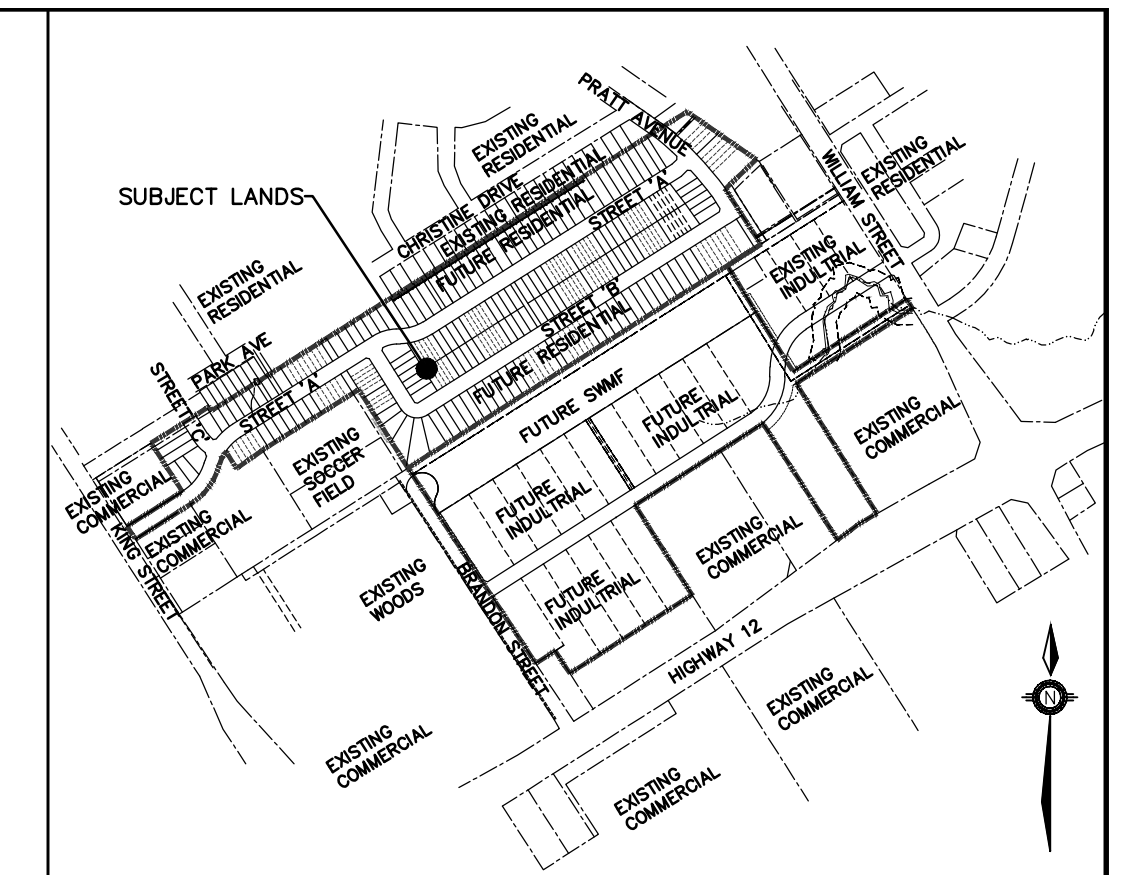


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GALLOWAY SUBDIVISION
TOWN OF MIDLAND

GENERAL SERVICING PLAN
EAST

JONES CONSULTING GROUP LTD.
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DESIGN JH	SCALE: 1:1000	DATE FEBRUARY 2020
DRAWN JT	PROJECT PRA-16084	DWG. NO CS-2
CHECKED JWI		

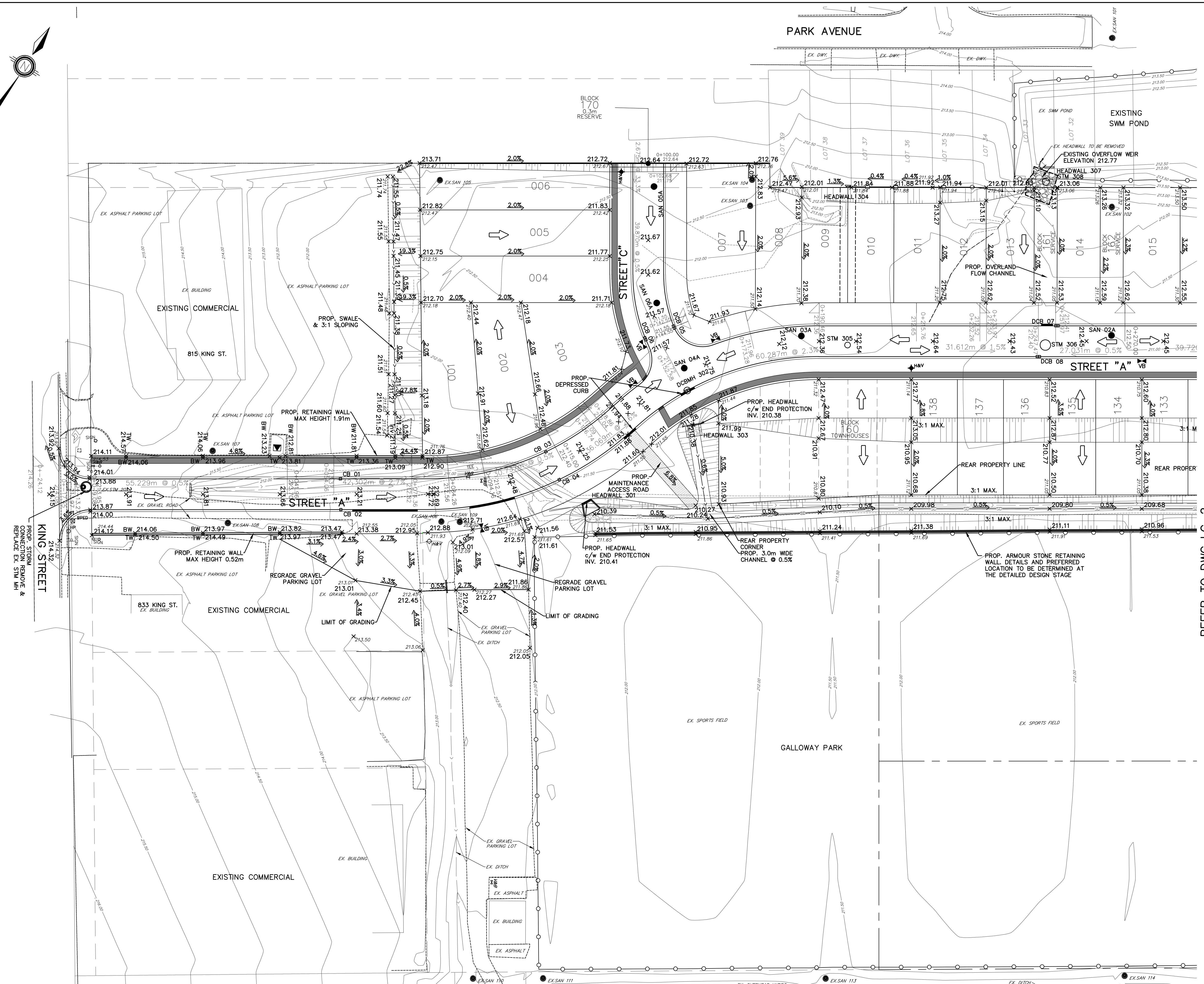


KEYPLAN NTS

LEGEND

- LIMIT OF SUBDIVISION
- EX. CONTOUR
- PROPOSED DITCH
- EX. SANITARY MANHOLE
- PROPOSED SANITARY MAINTENANCE HOLE
- PROPOSED STORM MAINTENANCE HOLE
- PROPOSED CATCHBASIN
- PROPOSED DOUBLE CATCHBASIN
- TREE PRESERVATION FENCE
- SLOPE (3:1 MAX.)
- PROPOSED HYDRANT AND VALVE
- PROPOSED VALVE
- CURB STOP
- EX. BOREHOLE LOCATION ID# & GROUNDWATER ELEVATION
- TRANSFORMER
- SWITCHGEAR
- LIGHT STANDARD
- BELL/ROGERS
- MAJOR OVERLAND FLOW ROUTE
- SPLIT DRAINAGE LOT
- WALK OUT LOT
- LOOK OUT LOT
- FRONT DRAINING LOT
- TRANSITION LOT
- EX. BOTTOM/TOP OF SLOPE
- BASEMENT SLAB TO BE ADJUSTED TO PROVIDE MINIMUM 0.5m SEPARATION FROM HIGH GROUNDWATER
- LOT TYPE
- ORIGINAL GROUND ELEVATION
- PROPOSED ELEVATION
- HOUSE ELEVATION DICTATED BY WATER TABLE
- 3:1 SLOPE (MAX)
- DRAFT PLAN LOT NUMBER
- SURFACE DRAINAGE DIRECTION & GRADE
- CONCEPTUAL BUILDING ENVELOPE
- RECOMMENDED FINISHED FLOOR ELEVATION
- RECOMMENDED BASEMENT FLOOR ELEVATION
- HIGH GROUNDWATER ELEVATION
- ENGINEERED FILL
- CURB STOP
- LIMIT OF ROW
- SIDEWALK PER OPSD 310.010
- ASPHALT DRIVEWAY APRON
- TWO-STAGE BARRIER CURB & GUTTER OPSD-M600.070
- DROPPED CURB
- GRADE CHANGE FLAG
- ROAD LENGTH & GRADE
- STATION & ELEVATION

ENGINEERED FILL DETAIL N.T.S.



REFER TO DWG LG-2

BENCHMARK:

BENCHMARK NO. 0082003042 RIB WITH CAP, 30 CM BELOW GRADE - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E504085.099 N494256.360 ELEV 194.845

BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANSON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.3xx

NO.	REVISIONS	DATE	INITIAL
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1.	FSR SUBMISSION	FEB 2020	JWI

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FSR SUBMISSION	FEB 2020	JWI



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GALLOWAY SUBDIVISION
TOWN OF MIDLAND

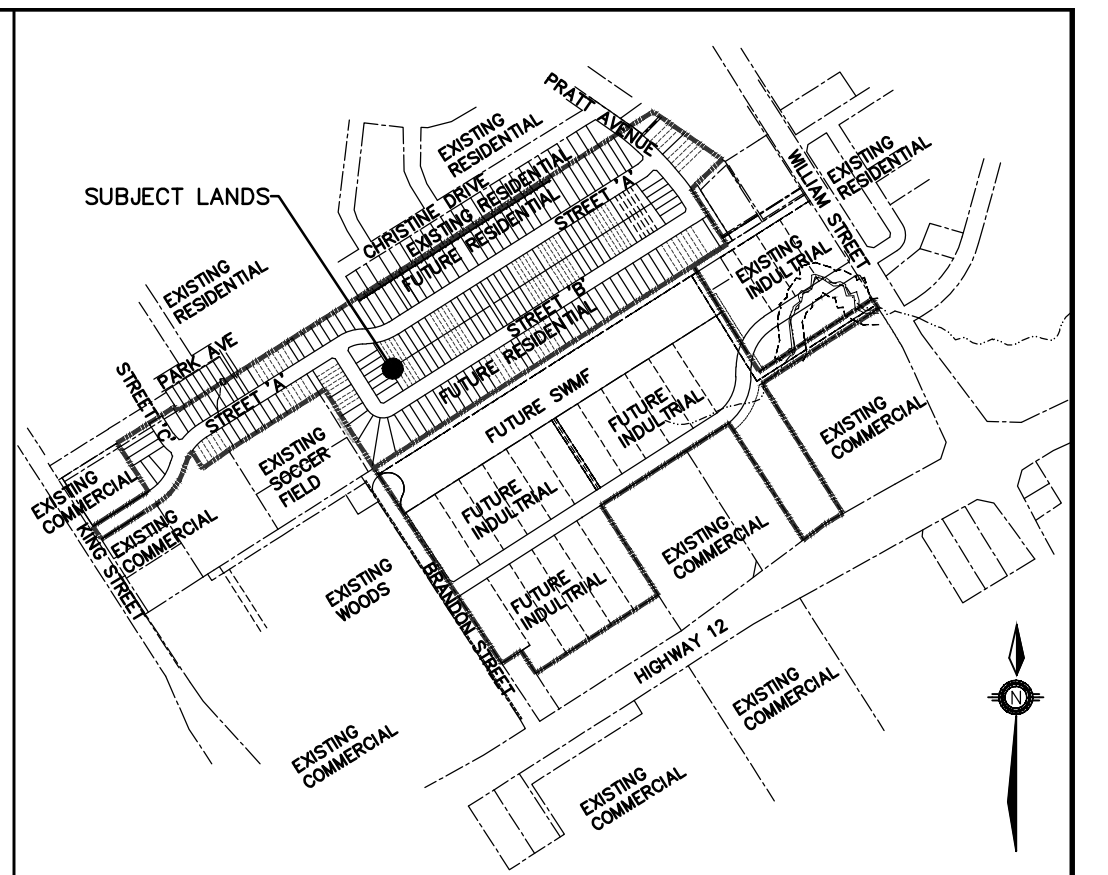
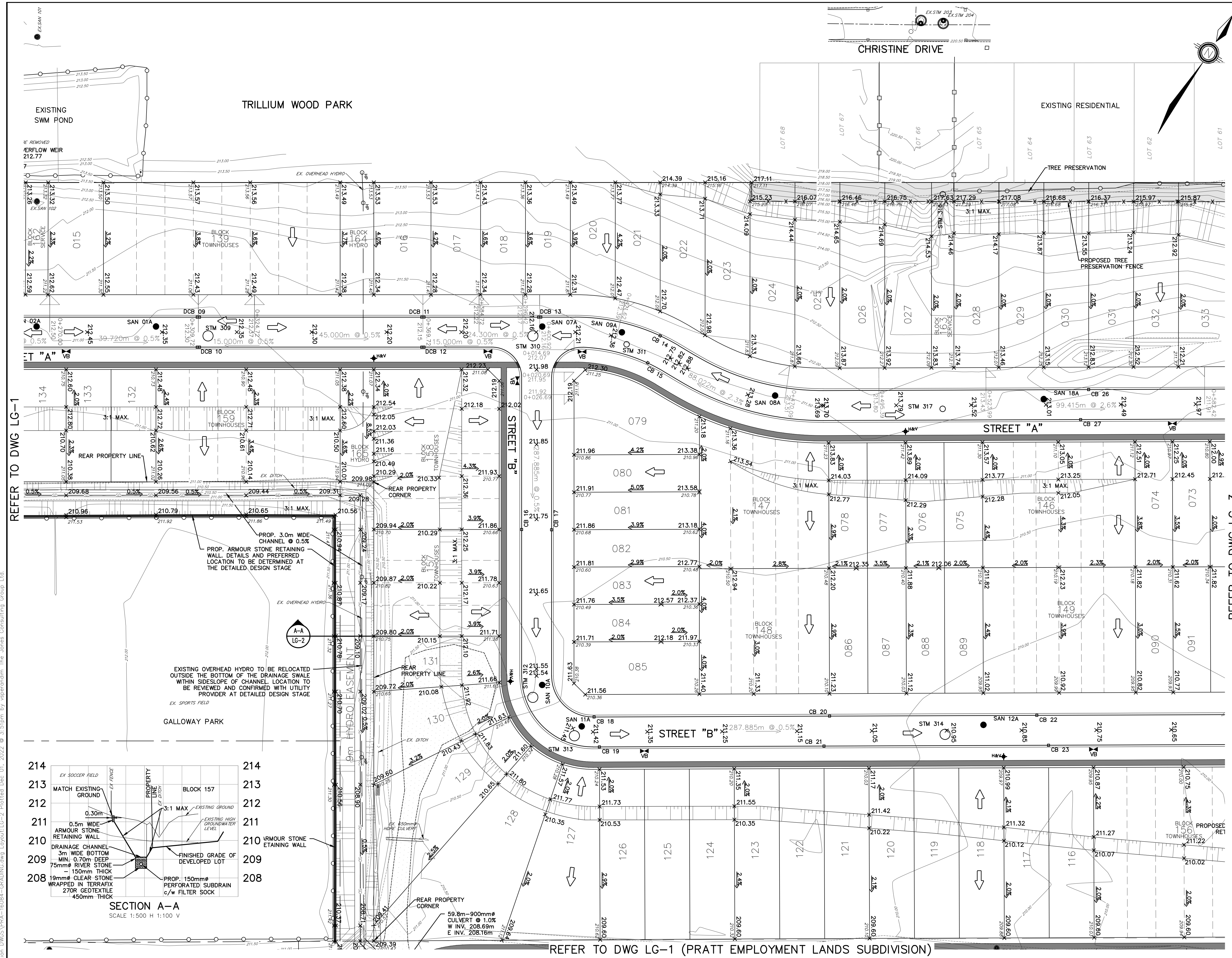
LOT GRADING PLAN

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 JH	SCALE: 1:500	DATE FEBRUARY 2020
DRAWN JT	PROJECT PRA-16084	DWG. NO LG-1
CHECKED JWI		

G:\Eng_3D\PRAs-16084-GRADING.dwg Layout\LG-1 Plotted Dec. 01, 2022 @ 3:53pm by asperandean The Jones Consulting Group Ltd.



KEYPLAN
NTS

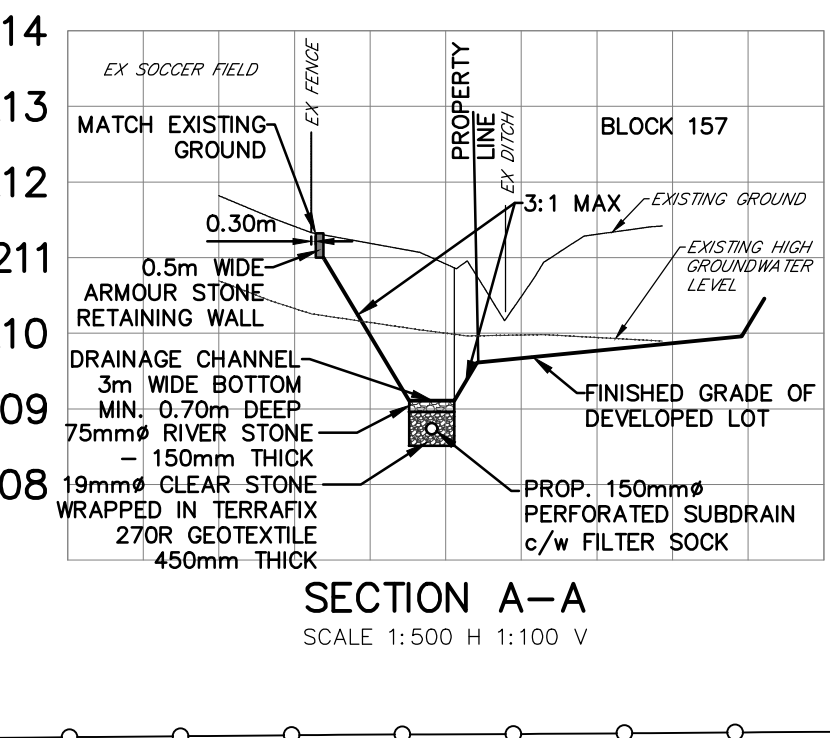
LEGEND

- LIMIT OF SUBDIVISION
- EX. CONTOUR
- PROPOSED DITCH
- EX. SANITARY MANHOLE
- PROPOSED SANITARY MAINTENANCE HOLE
- PROPOSED STORM MAINTENANCE HOLE
- PROPOSED CATCHBASIN
- PROPOSED DOUBLE CATCHBASIN
- TREE PRESERVATION FENCE
- SLOPE (3:1 MAX.)
- PROPOSED HYDRANT AND VALVE
- PROPOSED VALVE
- CURB STOP
- EX. BORSHOLE LOCATION
- ID # & GROUNDWATER ELEVATION
- TRANSFORMER
- SWITCHGEAR
- LIGHT STANDARD
- BELL/ROGERS
- MAJOR OVERLAND FLOW ROUTE
- SPLIT DRAINAGE LOT
- WALK OUT LOT
- LOOK OUT LOT
- FRONT DRAINING LOT
- TRANSITION LOT
- EX. BOTTOM/TOP OF SLOPE
- BASEMENT SLAB TO BE ADJUSTED TO PROVIDE MINIMUM 0.5m SEPARATION FROM HIGH GROUNDWATER
- LOT TYPE
- ORIGINAL GROUND ELEVATION
- PROPOSED ELEVATION
- HOUSE ELEVATION DICTATED BY WATER TABLE
- 3:1 SLOPE (MAX)
- DRAFT PLAN LOT NUMBER
- SURFACE DRAINAGE DIRECTION & GRADE
- CONCEPTUAL BUILDING ENVELOPE
- RECOMMENDED FINISHED FLOOR ELEVATION
- RECOMMENDED BASEMENT FLOOR ELEVATION
- HIGH GROUNDWATER ELEVATION
- ENGINEERED FILL
- CURB STOP
- LIMIT OF ROW
- SIDEWALK PER OPSD 310.010
- ASPHALT DRIVEWAY APRON
- TWO-STAGE BARRIER CURB & GUTTER OPSD-M600.070
- DROPPED CURB
- GRADE CHANGE FLAG
- ROAD LENGTH & GRADE
- STATION & ELEVATION

ENGINEERED FILL DETAIL
N.T.S.

REFER TO DWG LG-1

REFER TO DWG LG-1



BENCHMARK:

BENCHMARK NO. 00820038042 RB WITH CAP, 30 CM BELOW GRADE - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.099 N494263.360 ELEV 194.842

BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANSON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.30x

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FSR SUBMISSION	FEB 2020	JWI

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FSR SUBMISSION	FEB 2020	JWI



PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND

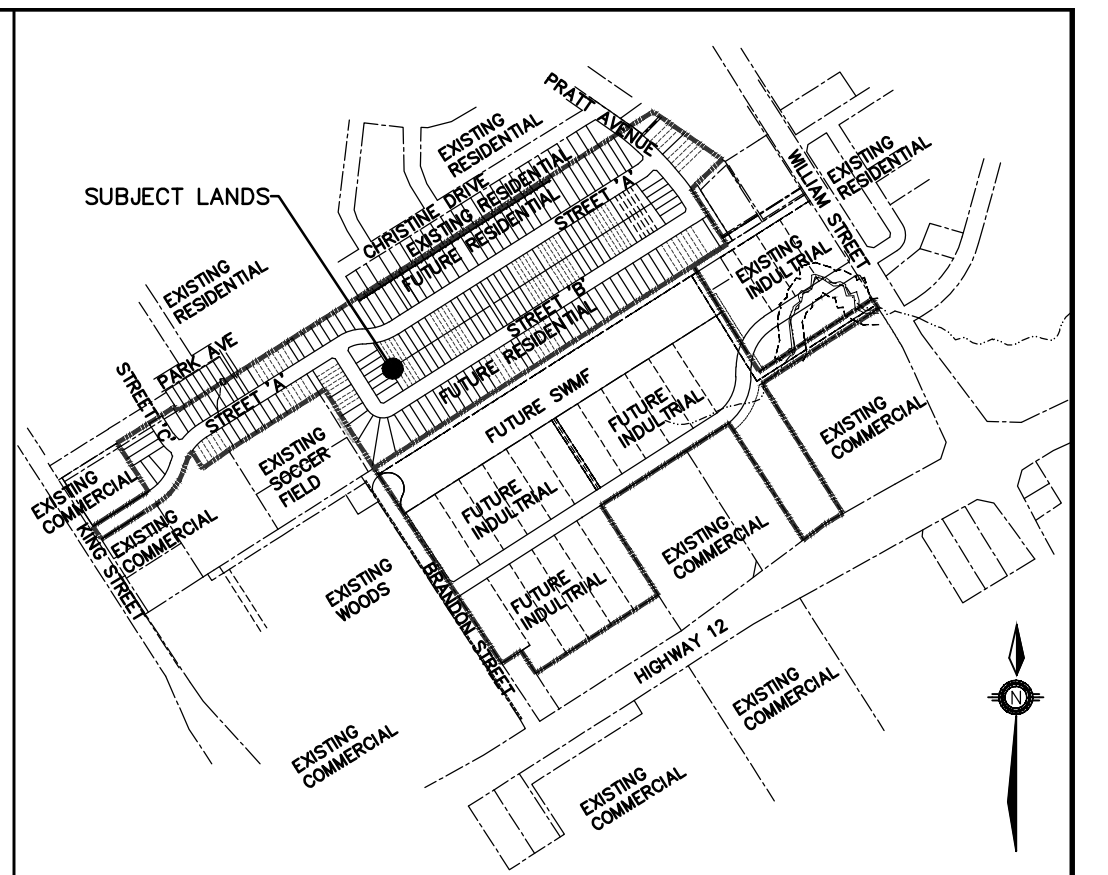
LOT GRADING PLAN

DESIGN	JH	SCALE: 1:500	DATE	FEBRUARY 2020
DRAWN	JT	PROJECT	PRA-16084	DWG. NO
CHECKED	JWI			LG-2

229 Mapleview Dr. E. Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS

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KEYPLAN

NTS

LEGEND

- LIMIT OF SUBDIVISION
- EX. CONTOUR
- PROPOSED DITCH
- EX. SANITARY MANHOLE
- PROPOSED SANITARY MAINTENANCE HOLE
- PROPOSED STORM MAINTENANCE HOLE
- PROPOSED CATCHBASIN
- PROPOSED DOUBLE CATCHBASIN
- TREE PRESERVATION FENCE
- SLOPE (3:1 MAX.)
- PROPOSED HYDRANT AND VALVE
- PROPOSED VALVE
- CURB STOP
- EX. BOREHOLE LOCATION
- ID # & GROUNDWATER ELEVATION
- TRANSFORMER
- SWITCHGEAR
- LIGHT STANDARD
- BELL/ROGERS
- MAJOR OVERLAND FLOW ROUTE
- SPLIT DRAINAGE LOT
- WALK OUT LOT
- LOOK OUT LOT
- FRONT DRAINING LOT
- TRANSITION LOT
- EX. BOTTOM/TOP OF SLOPE
- BASEMENT SLAB TO BE ADJUSTED TO PROVIDE MINIMUM 0.5m SEPARATION FROM HIGH GROUNDWATER
- LOT TYPE
- ORIGINAL GROUND ELEVATION
- PROPOSED ELEVATION
- HOUSE ELEVATION DICTATED BY WATER TABLE
- 3:1 SLOPE (MAX)
- DRAFT PLAN LOT NUMBER
- SURFACE DRAINAGE DIRECTION & GRADE
- CONCEPTUAL BUILDING ENVELOPE
- RECOMMENDED FINISHED FLOOR ELEVATION
- RECOMMENDED BASEMENT FLOOR ELEVATION
- HIGH GROUNDWATER ELEVATION
- ENGINEERED FILL
- CURB STOP
- LIMIT OF ROW
- SIDEWALK PER OPSD 310.010
- ASPHALT DRIVEWAY APRON
- TWO-STAGE BARRIER CURB & OUTER OPSD-M600.070
- DROPPED CURB
- GRADE CHANGE FLAG
- ROAD LENGTH & GRADE
- STATION & ELEVATION

ENGINEERED FILL DETAIL

N.T.S.

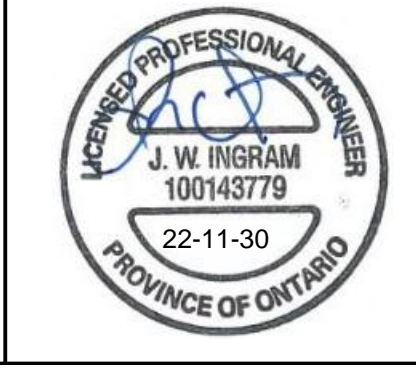
REFER TO DWG LG-2

REFER TO DWG LG-4

REFER TO DWG LG-2 (PRATT EMPLOYMENT LANDS SUBDIVISION)

BENCHMARK:
 BENCHMARK NO. 0082003042 RIB WITH CAP, 30 CM BELOW GRADE - LOCATED ON NORTHEAST CORNER OF HWY 12 AND WELLMAN ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.009 N494256.360 ELEV 194.845
 BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANSON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.30x

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FSR SUBMISSION	FEB 2020	JWI

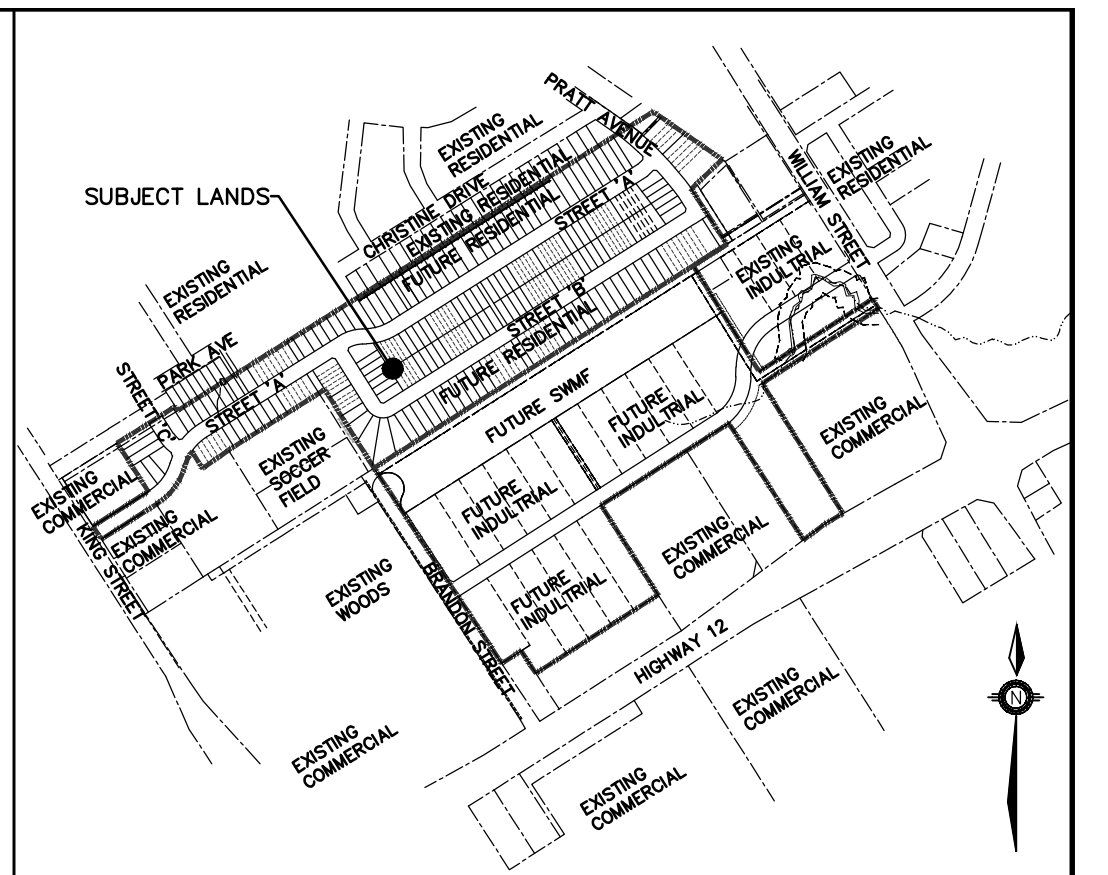
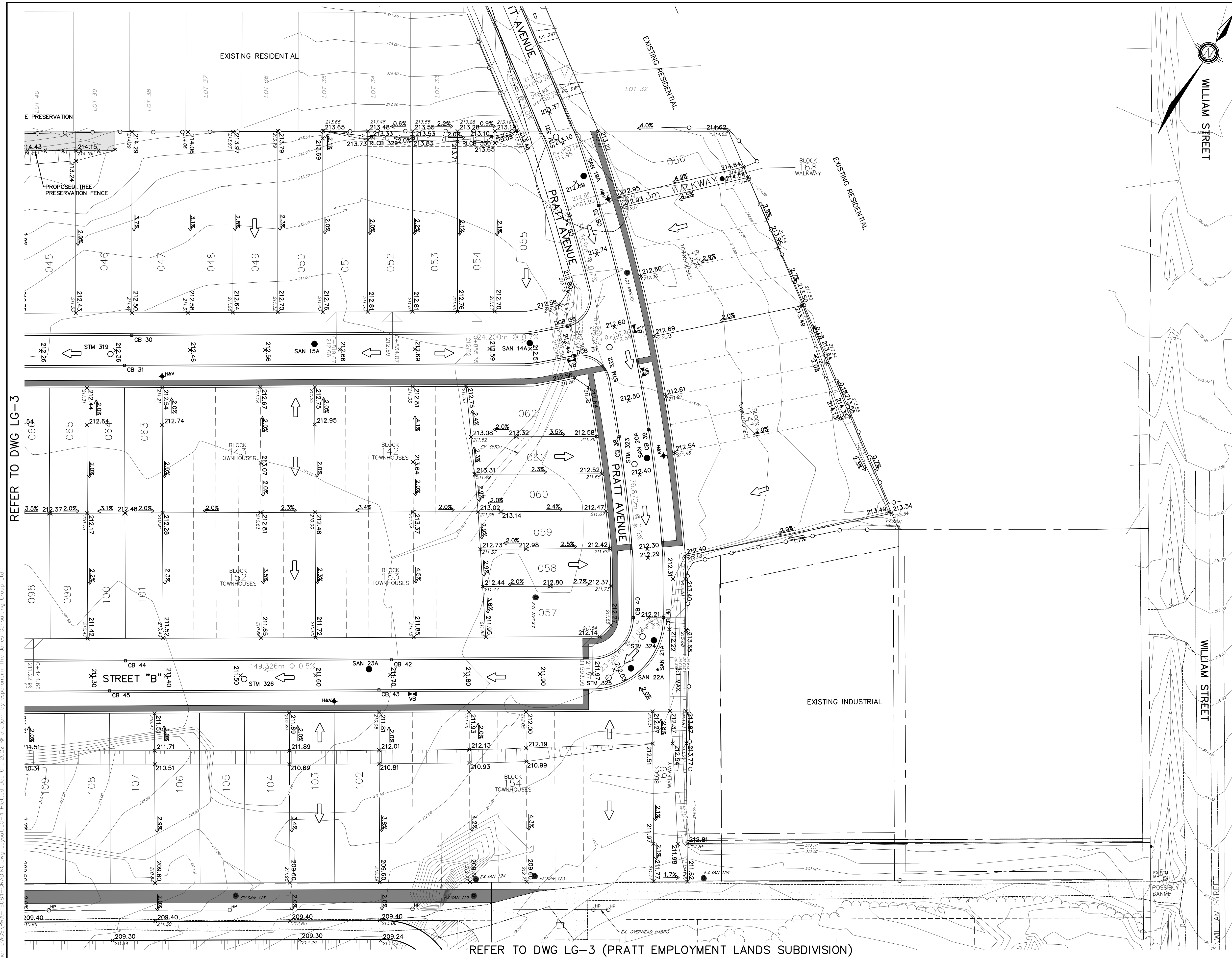


PRATT HANSEN GROUP INC.
 GALLOWAY SUBDIVISION
 TOWN OF MIDLAND

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	JH	SCALE: 1:500	DATE	FEBRUARY 2020
DRAWN	JT	PROJECT	PRA-16084	DWG. NO
CHECKED	JWI			LG-3



KEYPLAN
NTS

LEGEND

- LIMIT OF SUBDIVISION
- EX. CONTOUR
- PROPOSED DITCH
- EX. SANITARY MANHOLE
- PROPOSED SANITARY MAINTENANCE HOLE
- PROPOSED STORM MAINTENANCE HOLE
- PROPOSED CATCHBASIN
- PROPOSED DOUBLE CATCHBASIN
- TREE PRESERVATION FENCE
- SLOPE (3:1 MAX.)
- PROPOSED HYDRANT AND VALVE
- PROPOSED VALVE
- CURB STOP
- EX. BOREHOLE LOCATION ID# & GROUNDWATER ELEVATION
- TRANSFORMER
- SWITCHGEAR
- LIGHT STANDARD
- BELL/ROGERS
- MAJOR OVERLAND FLOW ROUTE
- SPLIT DRAINAGE LOT
- WALK OUT LOT
- LOOK OUT LOT
- FRONT DRAINING LOT
- TRANSITION LOT
- EX. BOTTOM/TOP OF SLOPE
- BASEMENT SLAB TO BE ADJUSTED TO PROVIDE MINIMUM 0.5m SEPARATION FROM HIGH GROUNDWATER

ENGINEERED FILL DETAIL
N.T.S.

- LOT TYPE
- ORIGINAL GROUND ELEVATION
- PROPOSED ELEVATION
- HOUSE ELEVATION DICTATED BY WATER TABLE
- 3:1 SLOPE (MAX)
- DRAFT PLAN LOT NUMBER
- SURFACE DRAINAGE DIRECTION & GRADE
- CONCEPTUAL BUILDING ENVELOPE
- RECOMMENDED FINISHED FLOOR ELEVATION
- RECOMMENDED BASEMENT FLOOR ELEVATION
- HIGH GROUNDWATER ELEVATION
- ENGINEERED FILL
- CURB STOP
- LIMIT OF ROW
- SIDEWALK PER OPSD 310.010
- ASPHALT DRIVEWAY APRON
- TWO-STAGE BARRIER CURB & GUTTER OPSD-M600.070
- DROPPED CURB
- GRADE CHANGE FLAG
- ROAD LENGTH & GRADE
- STATION & ELEVATION

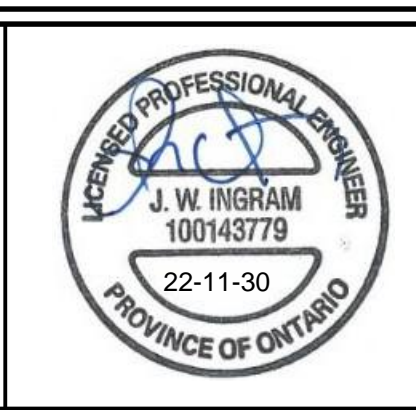
REFER TO DWG LG-3

REFER TO DWG LG-3 (PRATT EMPLOYMENT LANDS SUBDIVISION)

BENCHMARK:
BENCHMARK NO. 00820038042 RIB WITH CAP, 30 CM BELOW GRADE - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.059 N4954255.350 ELEV 194.84m

BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANSON ST AND HWY 12 INTERSECTION. UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.30m

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FSR SUBMISSION	FEB 2020	JWI

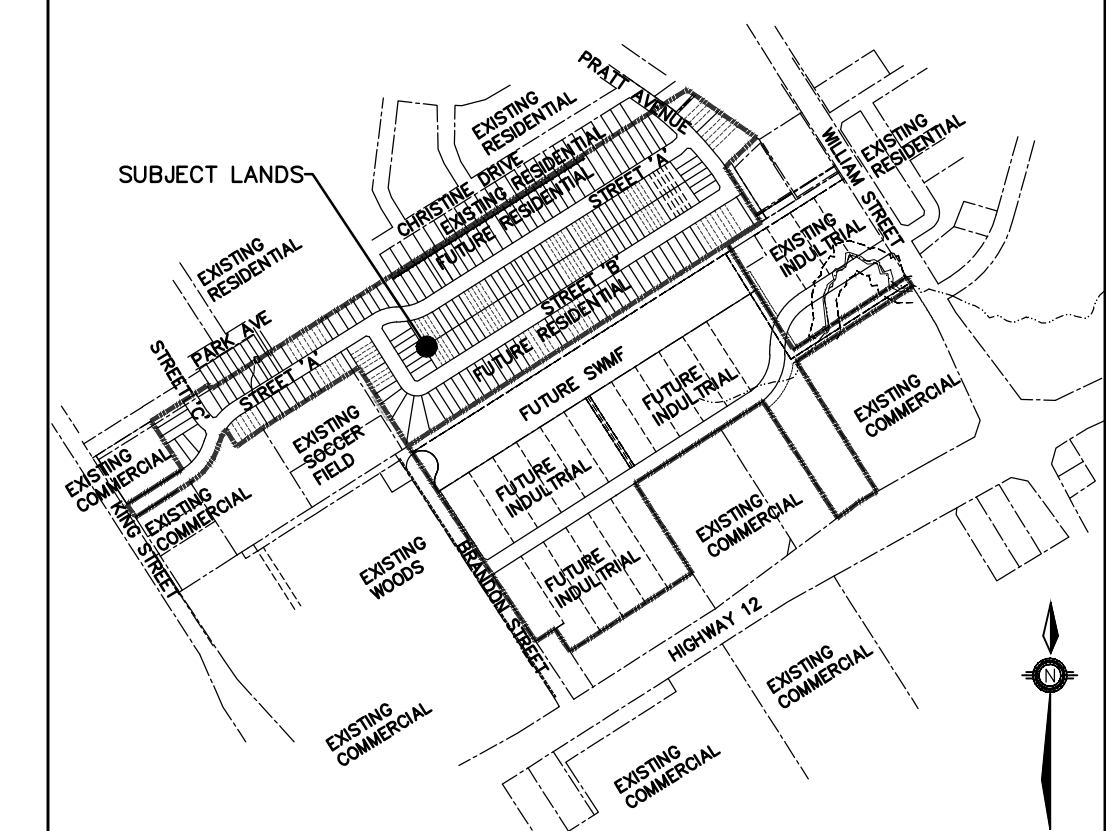


PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND

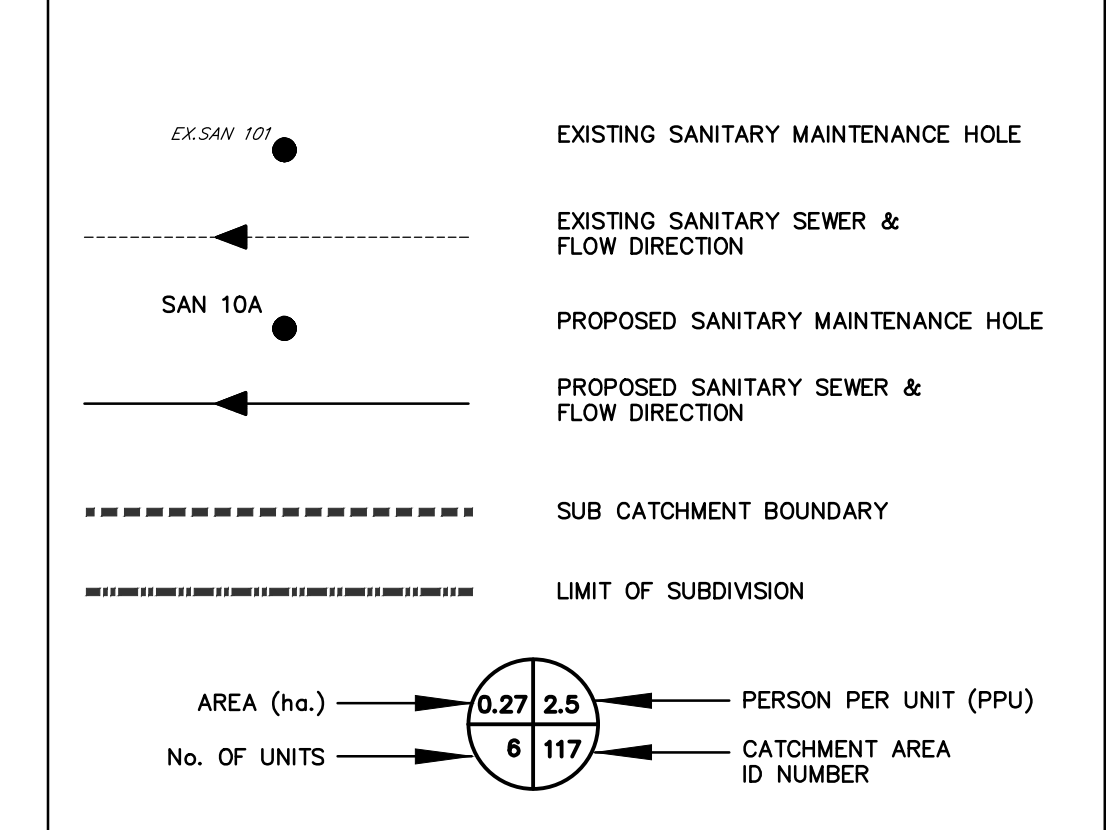
LOT GRADING PLAN

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

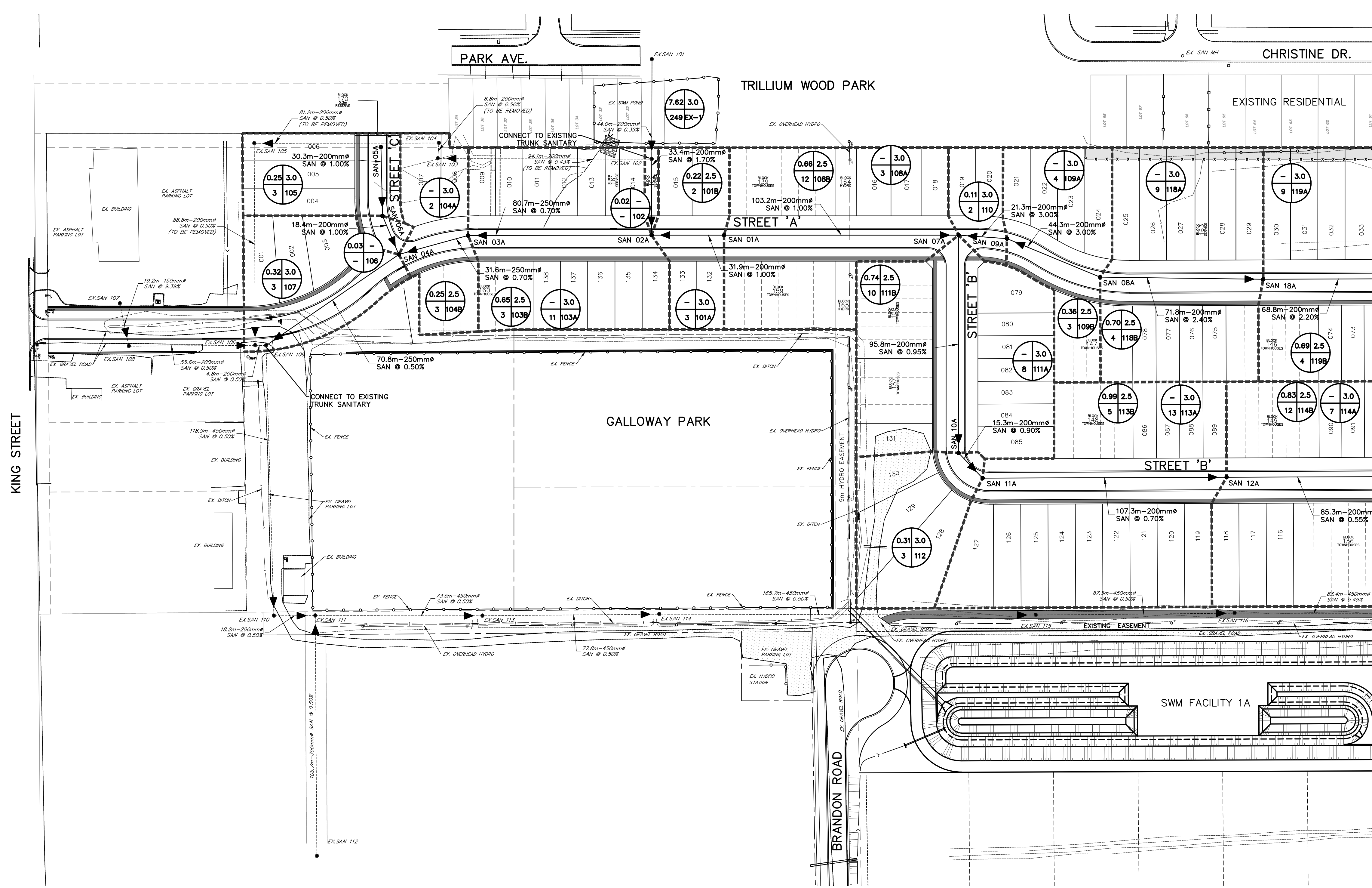
DESIGN	JH	SCALE: 1:500	DATE	FEBRUARY 2020
DRAWN	JT	PROJECT	PRA-16084	DWG. NO
CHECKED	JWI			LG-4



KEYPLAN
NTS



REFER TO SAN-2



BENCHMARK:
 BENCHMARK NO. 0082003042 RIB WITH CAP, 30 CM BELOW GRADE. - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.099 144924256.350 ELEV 194.842
 BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANDON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 144953919.657 ELEV 213.3xx

2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FSR SUBMISSION	FEB 2020	JWI
NO.	REVISIONS	DATE	INITIAL

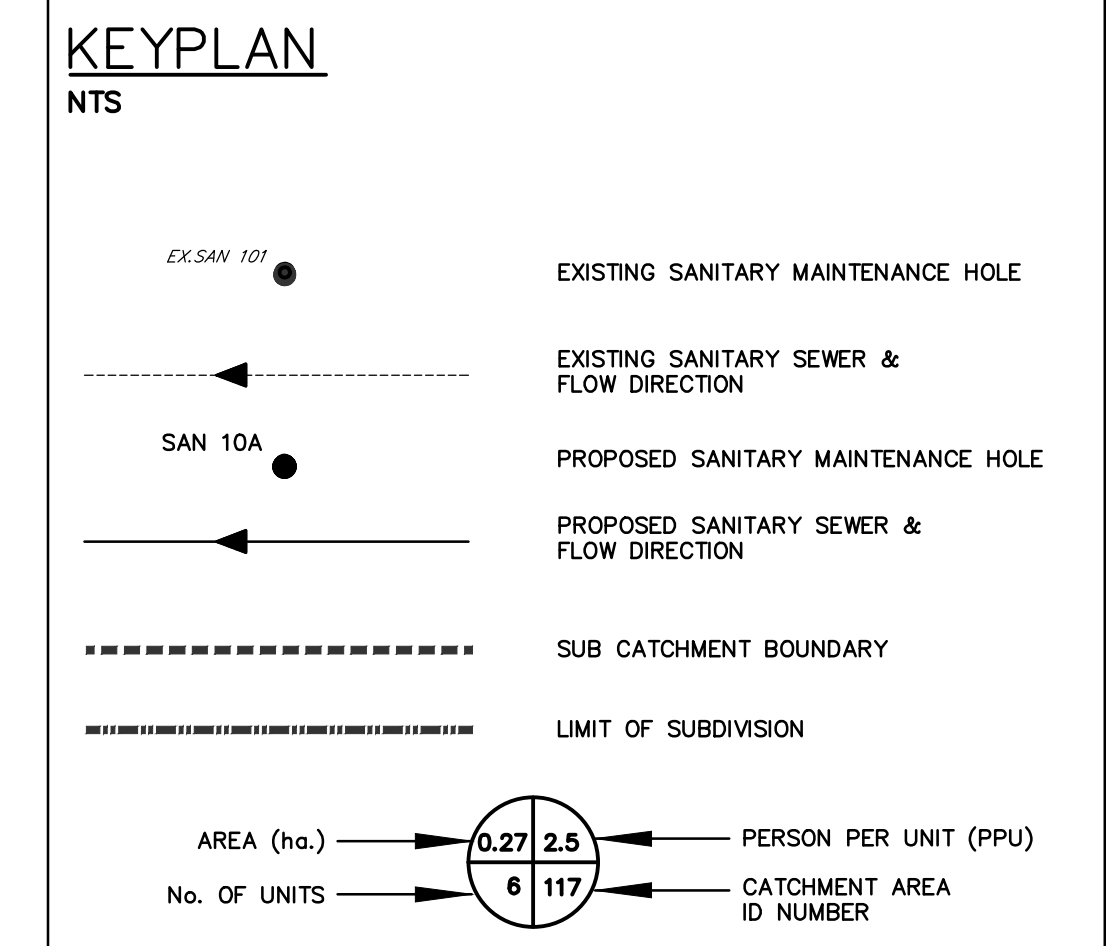
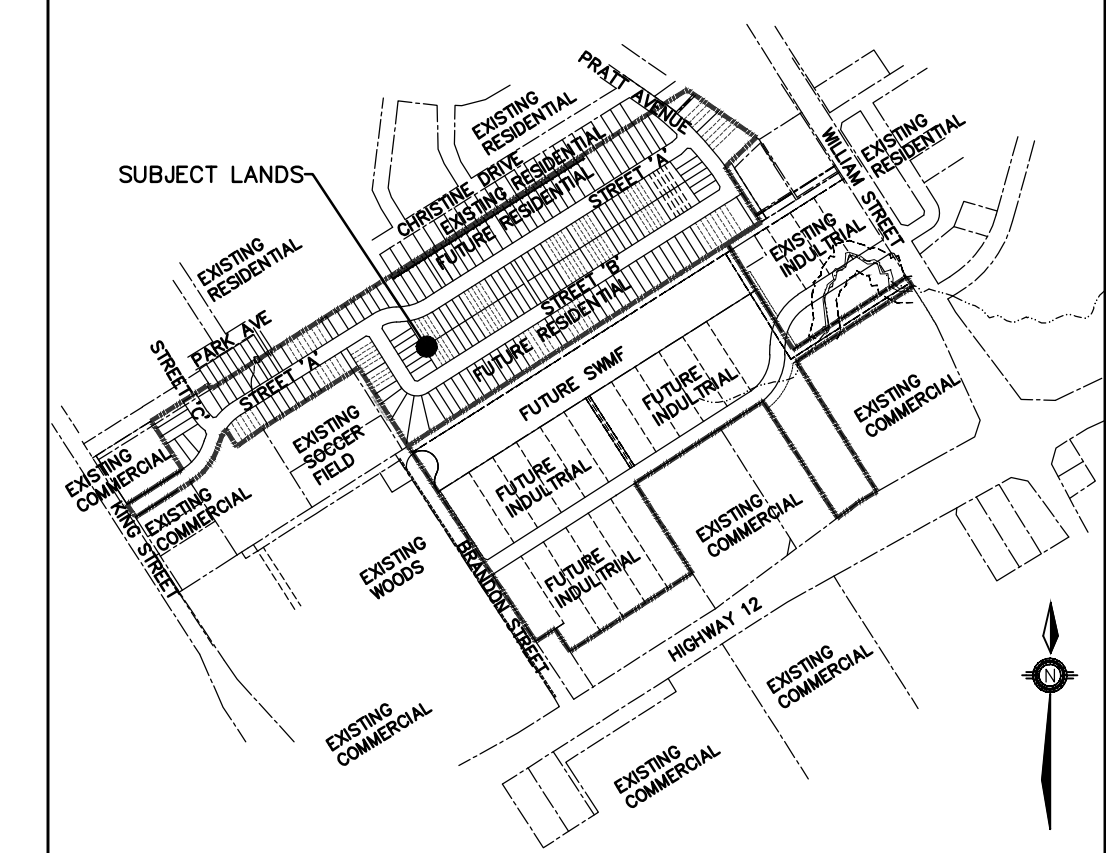
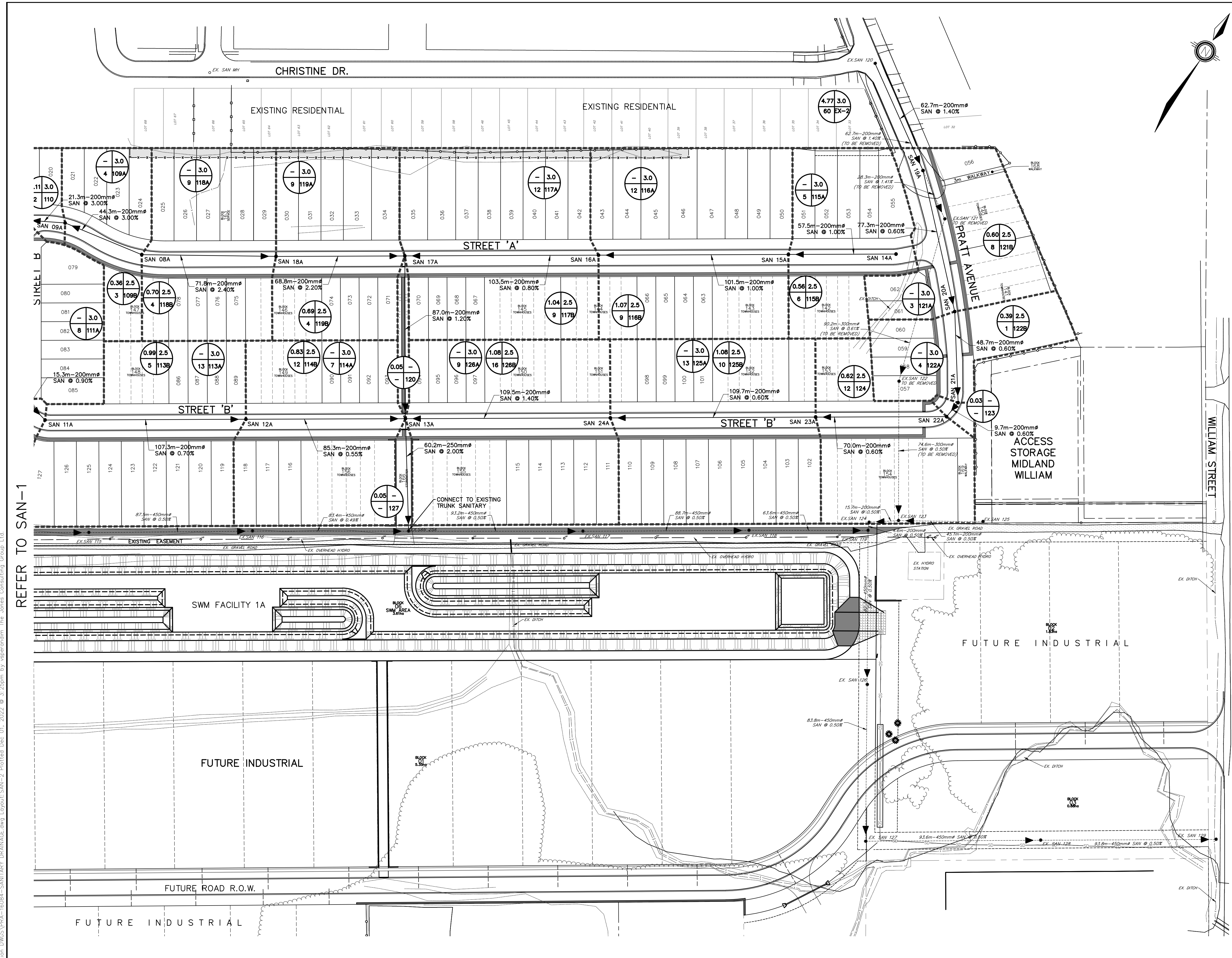


PRATT HANSEN GROUP INC.
 GALLOWAY SUBDIVISION
 TOWN OF MIDLAND
 INTERNAL SANITARY
 DRAINAGE AREA PLAN
 WEST

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	JH	SCALE: 1:1000	DATE	FEBRUARY 2020
DRAWN	CG	PROJECT	PRA-16084	DWG. NO
CHECKED	JWI			SAN-1

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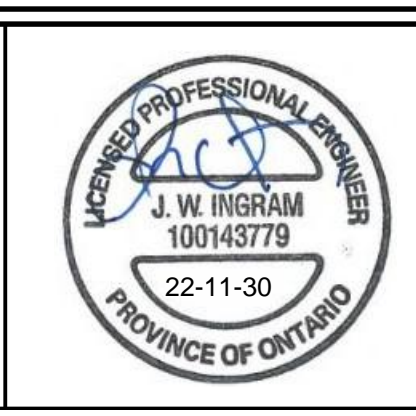


REFER TO SAN-1

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BENCHMARK:
BENCHMARK NO. 0082003042 RIB WITH CAP, 30 CM BELOW GRADE, - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.099 N494255.350 ELEV 194.842
BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANDON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.3xx

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FSR SUBMISSION	FEB 2020	JWI

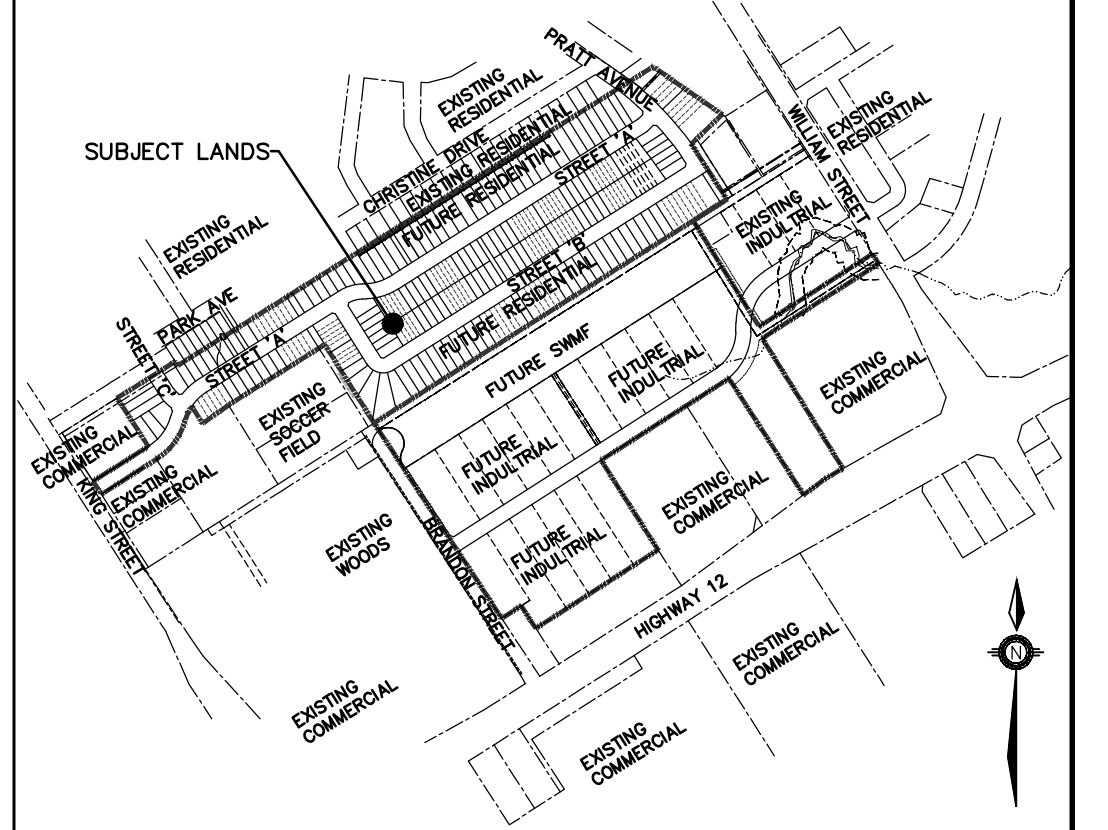
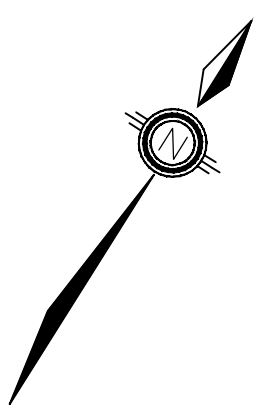
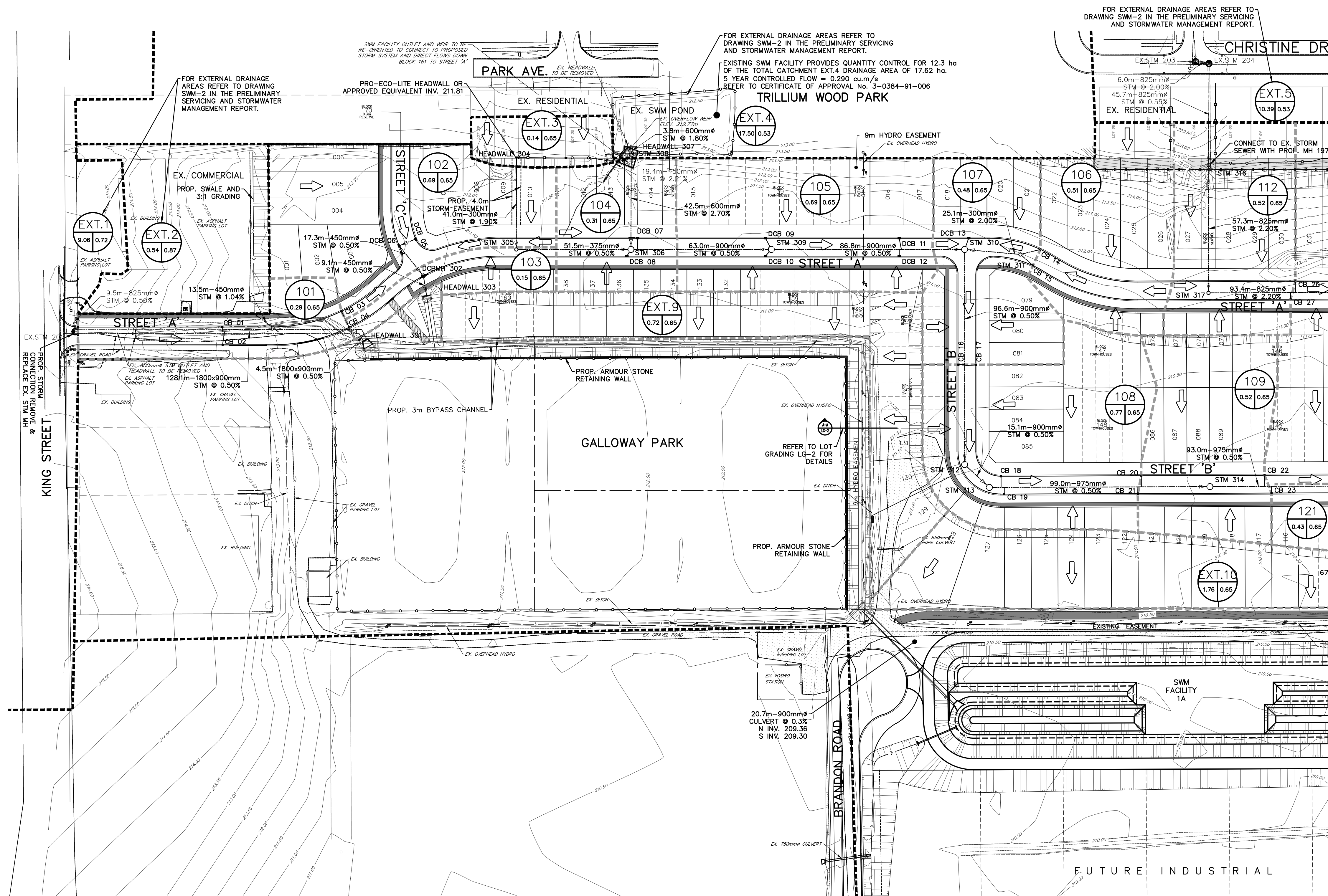


PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND

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 JH	SCALE: 1:1000	DATE FEBRUARY 2020
DRAWN CG	PROJECT PRA-16084	DWG. NO DWG. SAN-2
CHECKED JWI		



KEYPLAN NTS

- EXISTING CONTOUR AND ELEVATION
 - PROPOSED STORM MAINTENANCE HOLE
 - STORM SINGLE CATCHBASIN
 - STORM DOUBLE CATCHBASIN
 - STORM DOUBLE CATCHBASIN MAINTENANCE HOLE
 - PROPOSED STORM SEWER & FLOW DIRECTION
 - PROPOSED DIRECTION OF OVERLAND FLOW
 - EXTERNAL CATCHMENT BOUNDARY
 - CATCHMENT BOUNDARY
 - SUBDIVISION BOUNDARY
- CATCHMENT AREA ID NUMBER 108
- AREA (ha.) 0.78 0.65
- RUN-OFF COEFFICIENT 0.78 0.65

REFER TO STM-2

G:\Eng_3D\PR-16084-Storm_Drainage\Layout\STM-1_Plot.dwg, 3:36pm, by vsperran, The Jones Consulting Group Ltd.

BENCHMARK:
 BENCHMARK NO. 0082003042 RIB WITH CAP, 30 CM BELOW GRADE, - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590485.099 N4924256.350 ELEV 194.842
 BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANDON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.30x

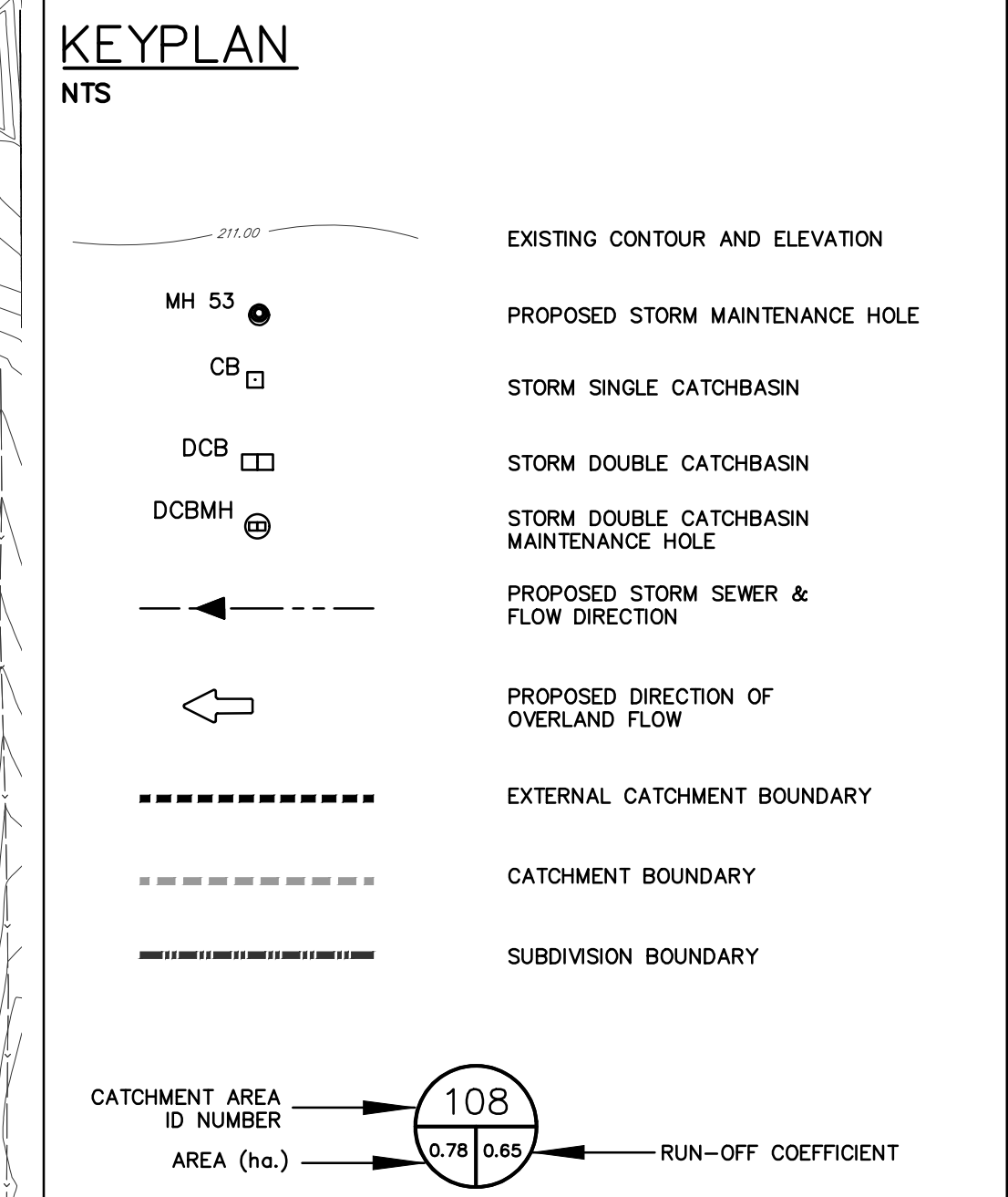
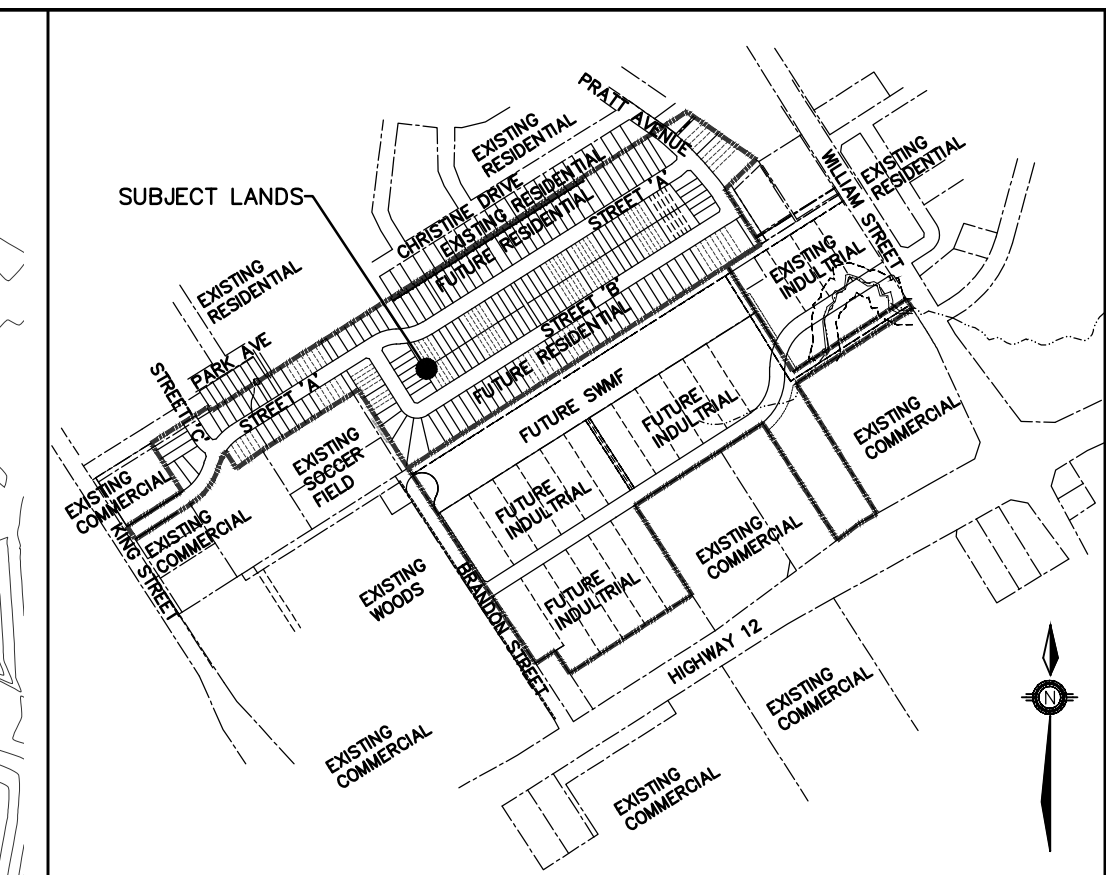
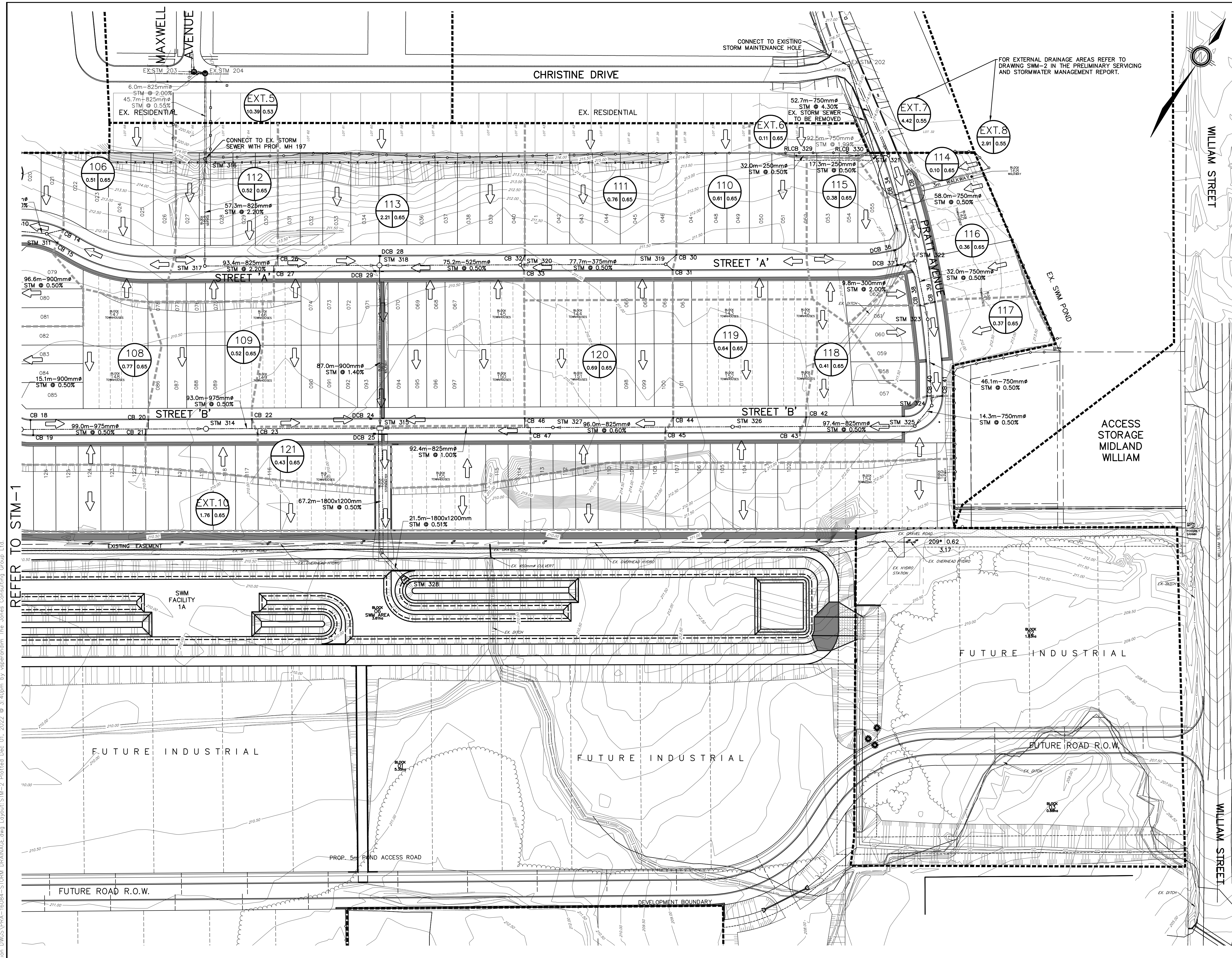
NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FSR SUBMISSION	FEB 2020	JWI



PRATT HANSEN GROUP INC.
 GALLOWAY 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

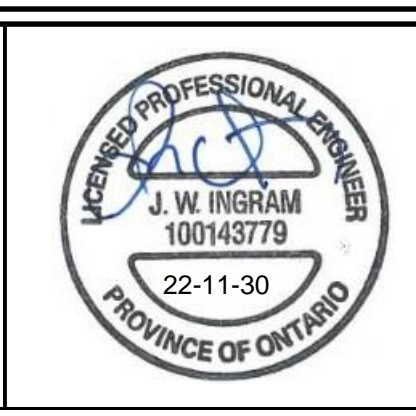
DESIGN	JH	SCALE: 1:1000	DATE	FEBRUARY 2020
DRAWN	CG	PROJECT	DWG. NO	
CHECKED	JWI	PRA-16084	STM-1	



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BENCHMARK:
BENCHMARK NO. 00820038042 RIB WITH CAP, 30 CM BELOW GRADE - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.059 N4954255.350 ELEV 194.842
BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANDON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.3xx

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FSR SUBMISSION	FEB 2020	JWI



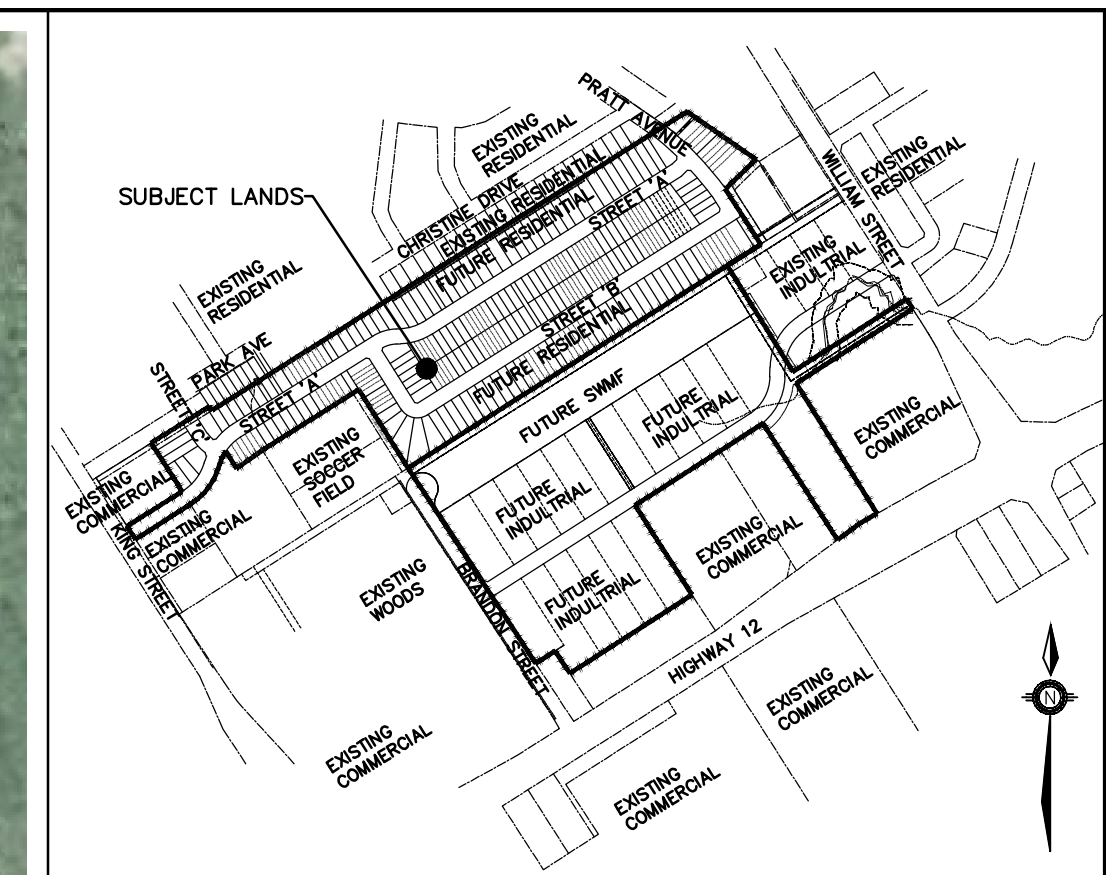
PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND

INTERNAL STORM
DRAINAGE AREA PLAN
EAST

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS

229 Mapleview Dr. E. Unit 1
Barrie, ON L4N 0W5
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F. 705.734.1056

DESIGN	JH	SCALE:	1:1000	DATE	FEBRUARY 2020
DRAWN	CG	PROJECT	PRA-16084	DWG. NO	STM-2
CHECKED	JWI				



KEY PLAN
NTS

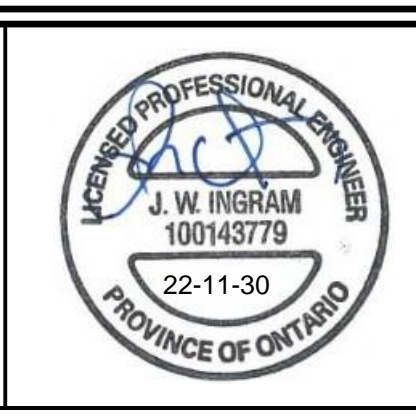
LEGEND

- LIMIT OF SUBDIVISION
- EXISTING PRE-DEVELOPMENT STORM DRAINAGE
- EX. CONTOUR AND ELEVATION
- CATCHMENT BOUNDARY
- CATCHMENT AREA ID NUMBER
206 15%
1.56
AREA (ha.)
- LIMIT OF DEVELOPMENT

G:\Eng_3D\PRG-16084-PRD-DEVELOPMENT\DWG\PRG-16084-FRE-DEVELOPMENT 2022-11-18.dwg, Layout:SWM-1, Plot: Dec 01, 2022 @ 3:56pm by vsperridin, The Jones Consulting Group, Ltd.

BENCHMARK:
BENCHMARK NO. 0082003042 RB WITH CAP, 30 CM BELOW GRADE. - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590485.099 N4924236.350 ELEV 194.842
BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANSON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.3xx

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FSR SUBMISSION	FEB 2020	JWI
NO.	REVISIONS	DATE	INITIAL

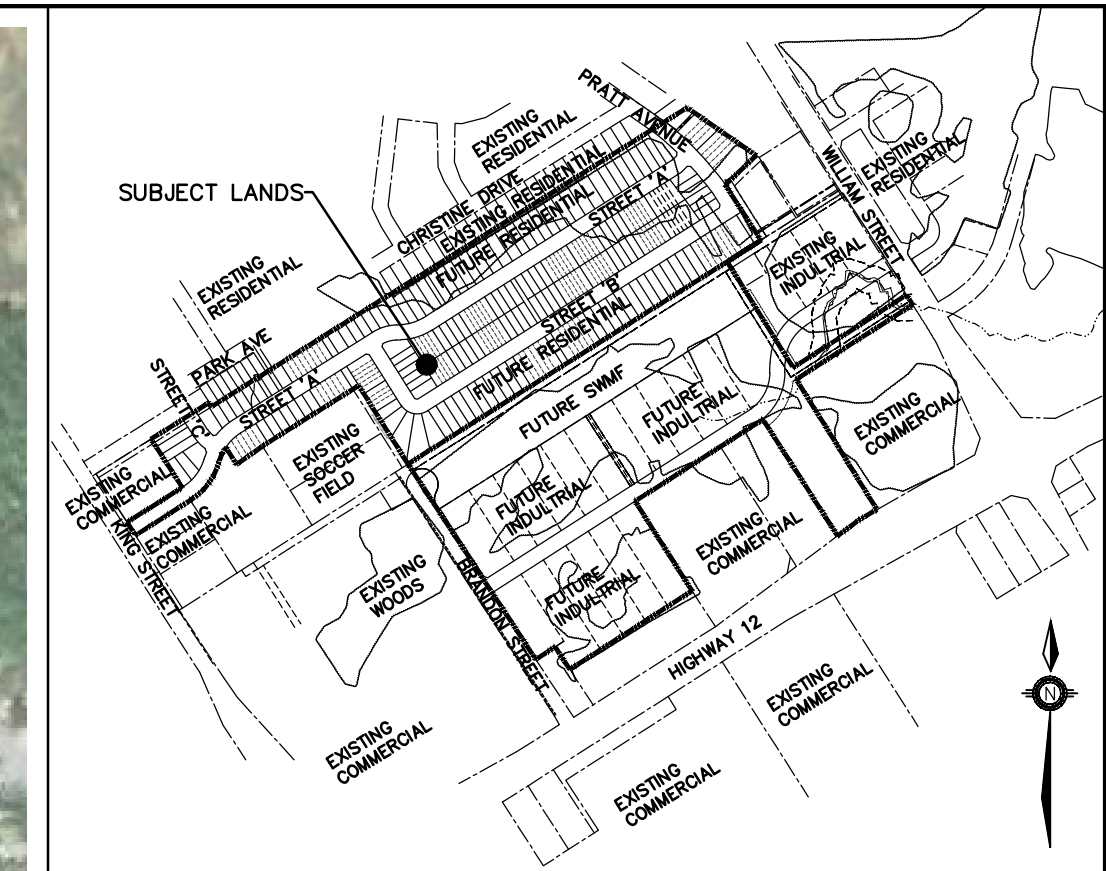
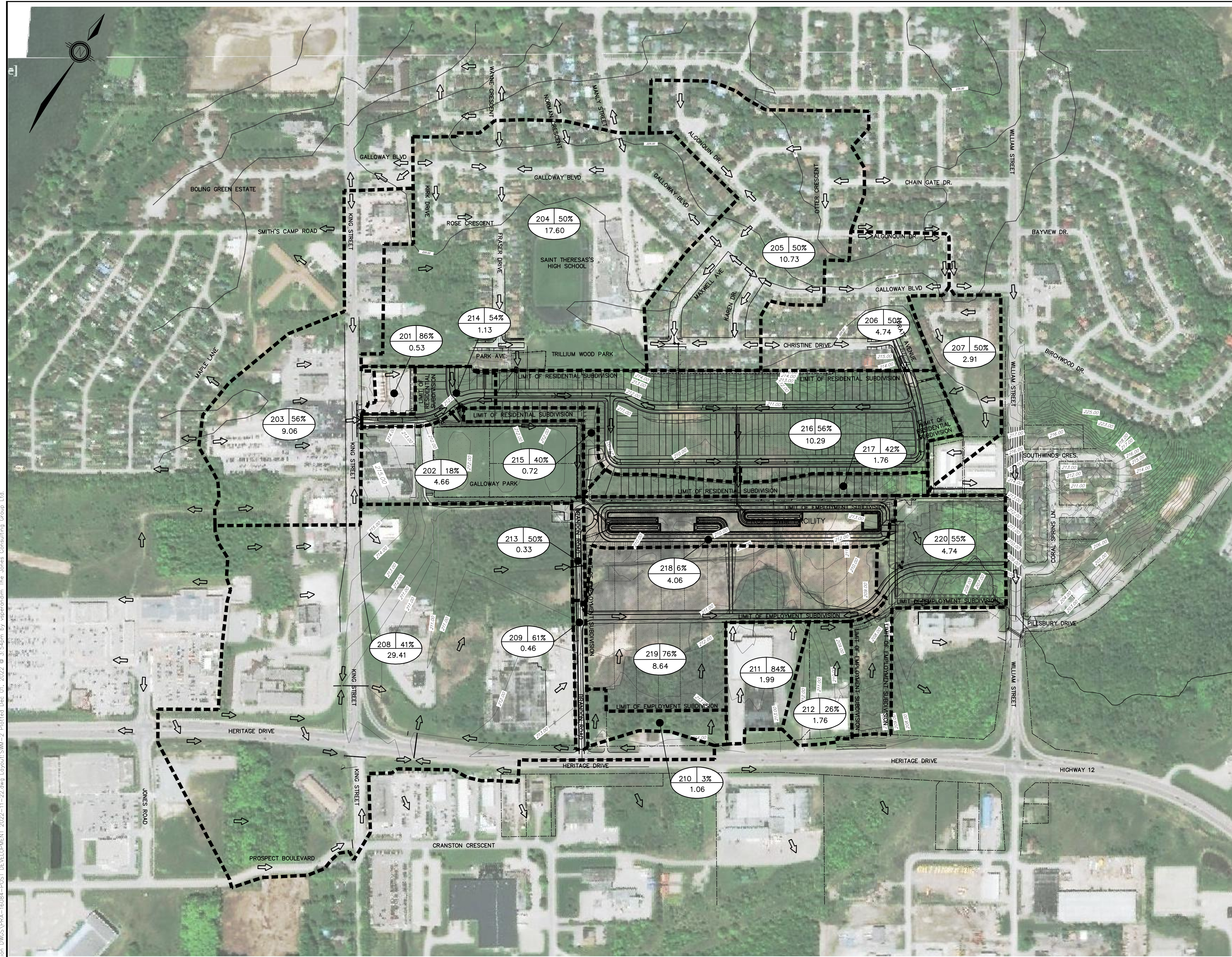


PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND

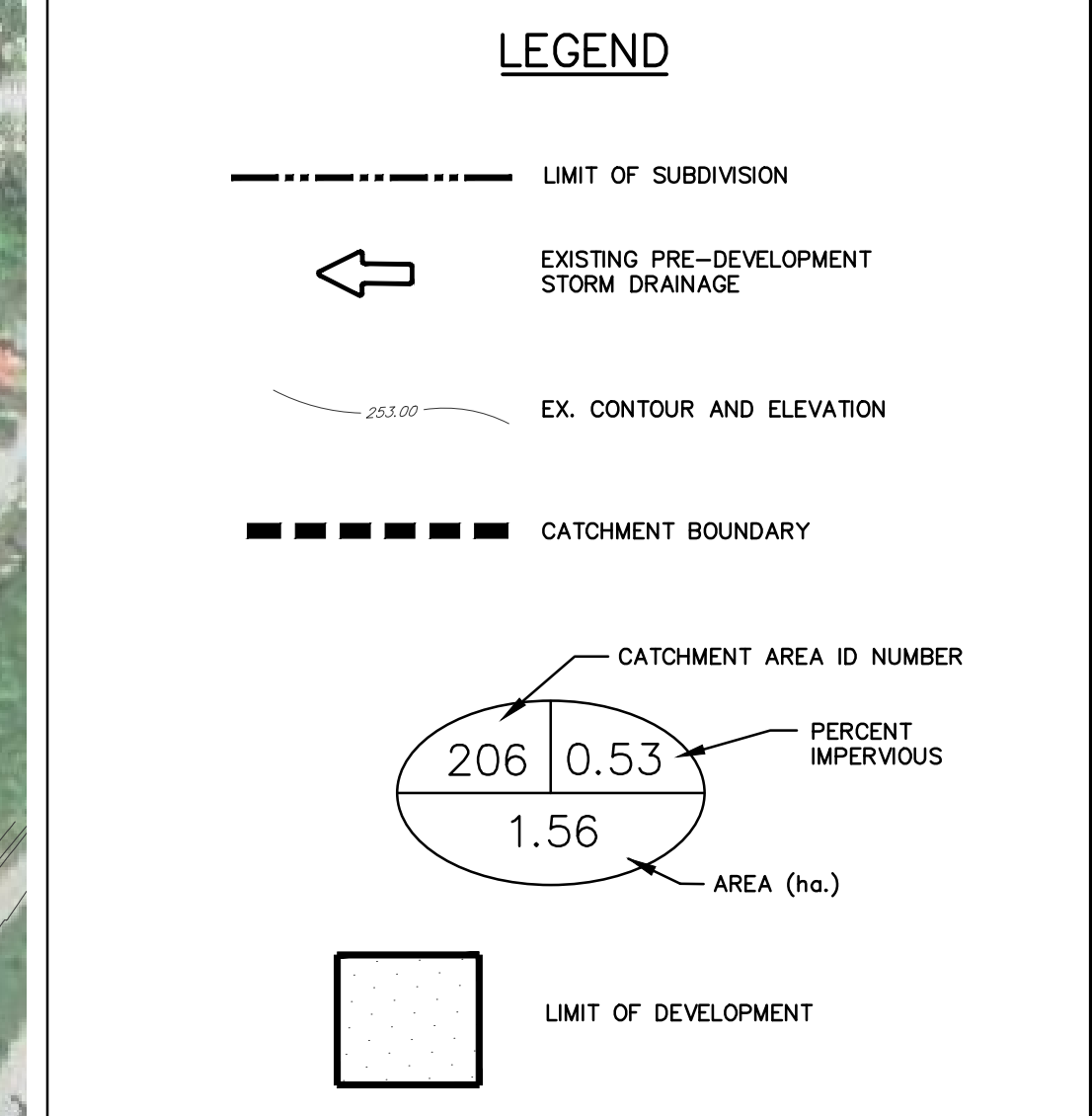
PRE-DEVELOPMENT
DRAINAGE AREA PLAN

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS
229 Mapleview Dr. E. Unit 1
Barrie, ON L4N 0W5
P. 705.734.2638
F. 705.734.1056

DESIGN	VBS	SCALE: 1:2500	DATE	NOV 2022
DRAWN	VBS	PROJECT	DWG. NO	
CHECKED	JWI	PRA-16084	SWM-1	



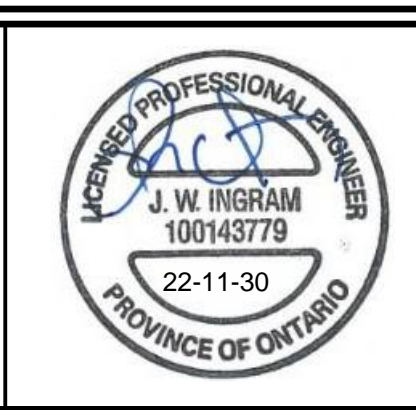
KEY PLAN
NTS



G:\Eng_3D\PRAs-16084-POST DEVELOPMENT\DWG\PRAs-16084-POST DEVELOPMENT 2022-11-22.dwg Layout:SWM-2 Plotted: Dec. 01, 2022 @ 3:54pm by asperandm The Jones Consulting Group Ltd.

BENCHMARK:
 BENCHMARK NO. 0082003042 RB WITH CAP, 30 CM BELOW GRADE. - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.099 N4954236.350 ELEV 194.842
 BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANSON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.30x

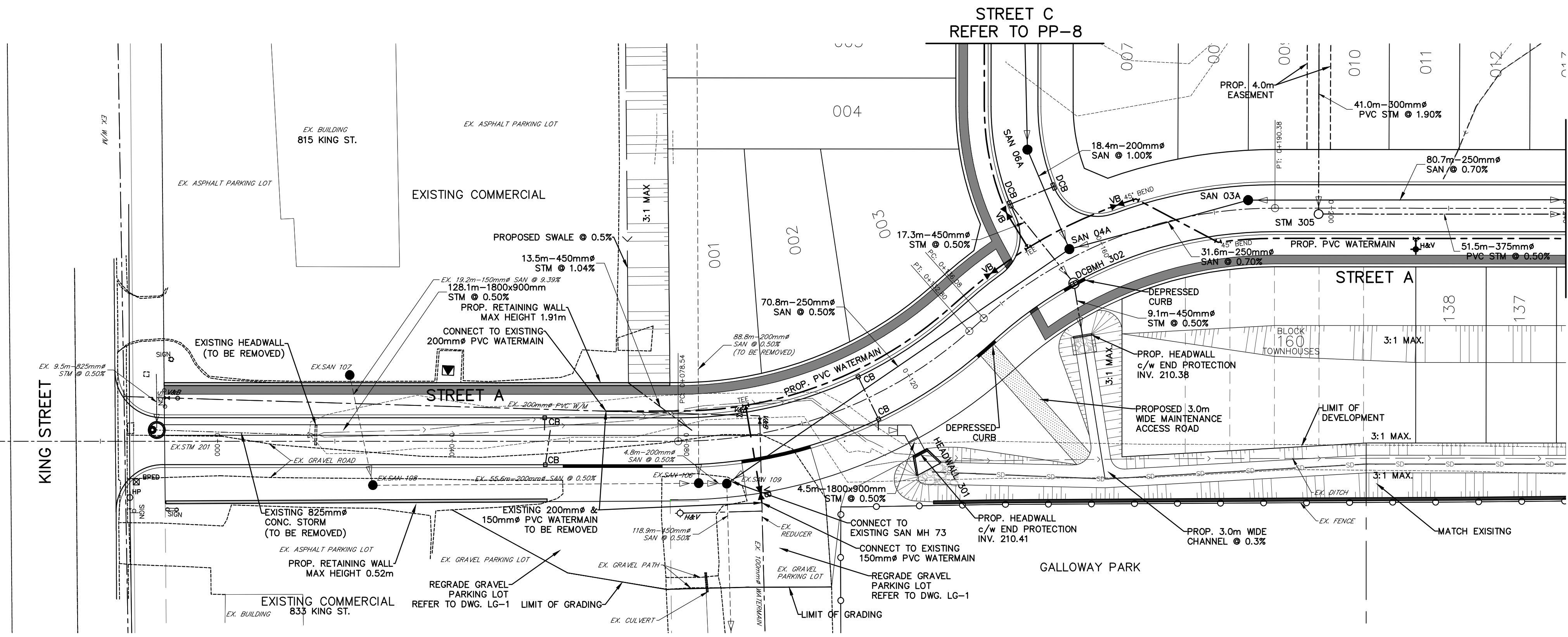
NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FSR SUBMISSION	FEB 2020	JWI



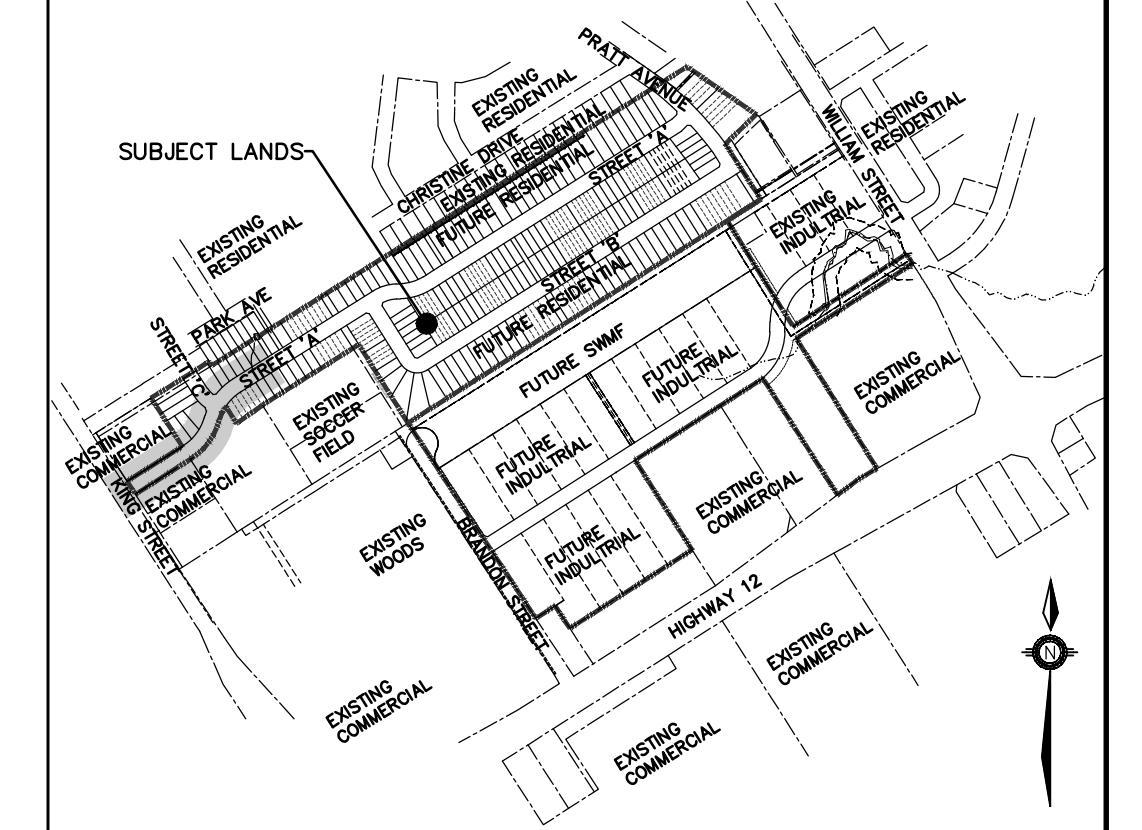
PRATT HANSEN GROUP INC.
 GALLOWAY SUBDIVISION
 TOWN OF MIDLAND
 POST-DEVELOPMENT
 DRAINAGE AREA PLAN

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

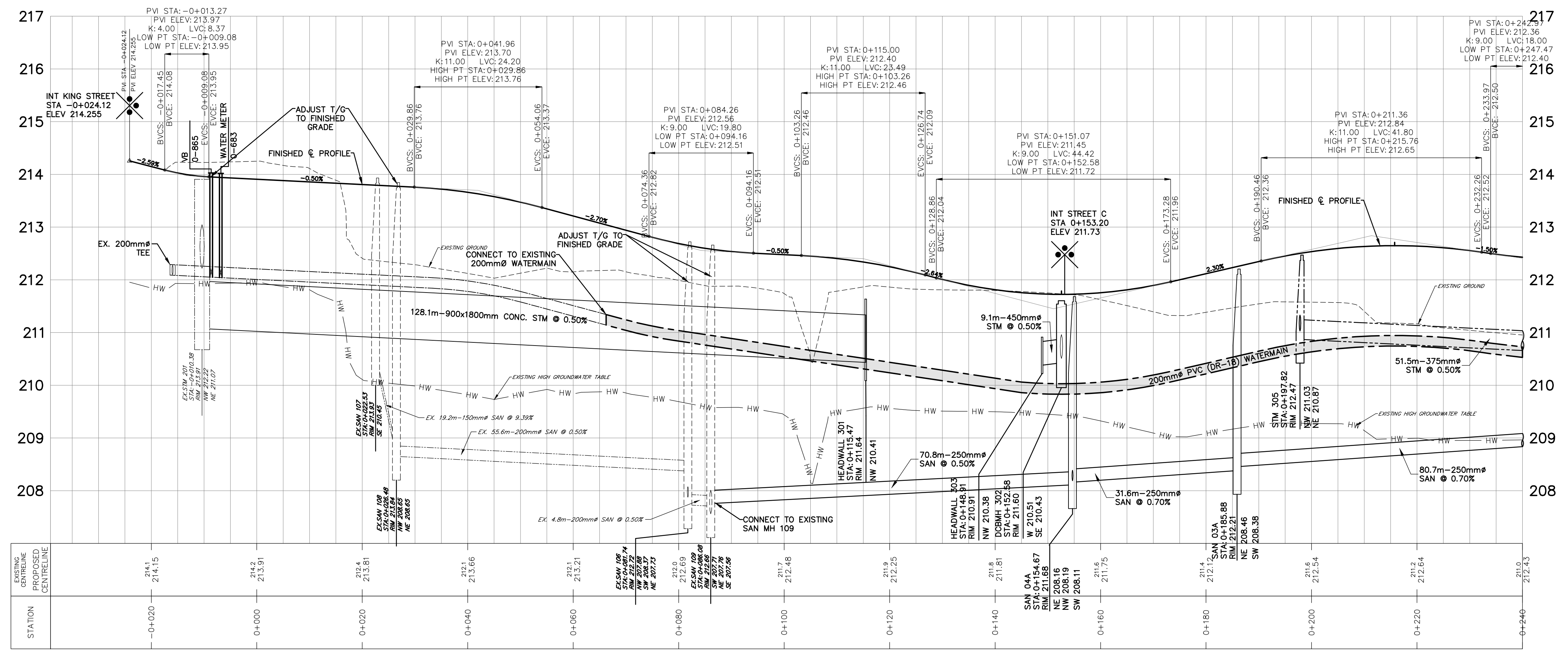
DESIGN	VBS	SCALE: 1:2500	DATE	NOV 2022
DRAWN	VBS	PROJECT	DWG. NO	
CHECKED	JWI	PRA-16084	SWM-2	



MATCH LINE STA 0+240
REFER TO PP-2

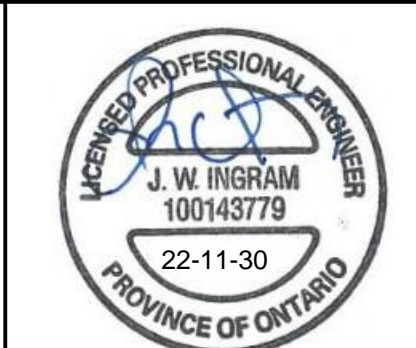


- ### KEYPLAN
- ### LEGEND
- SUBDIVISION BOUNDARY
 - EX SAN 105 ● EX. SANITARY MAINTENANCE HOLE
 - EX STM 201 ○ EX. STORM MAINTENANCE HOLE
 - CB □ EX. CATCHBASIN
 - DCB □ EX. DOUBLE CATCHBASIN
 - EX V&B □ EX. VALVE & BOX
 - EX H&V □ EX. HYDRANT & VALVE
 - EX BPED □ EX. BELL PEDESTAL
 - EX HP □ EX. HYDRO POLE
 - EX SIGN □ EX. SIGN
 - EXISTING LIGHT STANDARD
 - HYDRANT AND VALVE
 - VALVE AND BOX
 - BELL VAULT
 - CABLE VAULT
 - SAN 15A ● SANITARY MAINTENANCE HOLE
 - STM 310 ● STORM MAINTENANCE HOLE
 - CB □ CATCH BASIN
 - DCB □ DOUBLE CATCH BASIN
 - DROPPED CURB
 - TRANSFORMER
 - SWITCHGEAR
 - PULLING CHAMBER
 - LIGHT STANDARD
 - LIGHT STANDARD PEDESTAL
 - COMMUNITY MAILBOX
 - TACTILE WARNING PLATES
 - BOREHOLE WITH ID#
 - SANITARY SERVICE
 - WATER SERVICE AND VALVE
 - EXISTING WATERMAIN
 - PROPOSED WATERMAIN
 - EXISTING SANITARY SEWER AND DIRECTION OF FLOW
 - PROPOSED SANITARY SEWER AND DIRECTION OF FLOW
 - EXISTING STORM SEWER AND DIRECTION OF FLOW
 - PROPOSED STORM SEWER AND DIRECTION OF FLOW
 - 83 DRAFTPLAN LOT / BLOCK NUMBER
 - ENGINEERED FILL
- NOTE: SHOP DRAWINGS TO BE PROVIDED FOR ALL SANITARY & STORM STRUCTURES. BUOYANCY CALCULATIONS TO BE PROVIDED FOR ALL STRUCTURES LOCATED BELOW THE SEASONALLY HIGH GROUNDWATER TABLE.



BENCHMARK:
BENCHMARK NO. 00820038042 RIB WITH CAP, 30 CM BELOW GRADE. -- LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590485.099 14824265.350 ELEV 194.842
BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANSON ST AND HWY 12 INTERSECTION. UTM ZONE 17 E589914.683 14953919.657 ELEV 213.30x

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FIRST SUBMISSION	AUG 2020	JWI

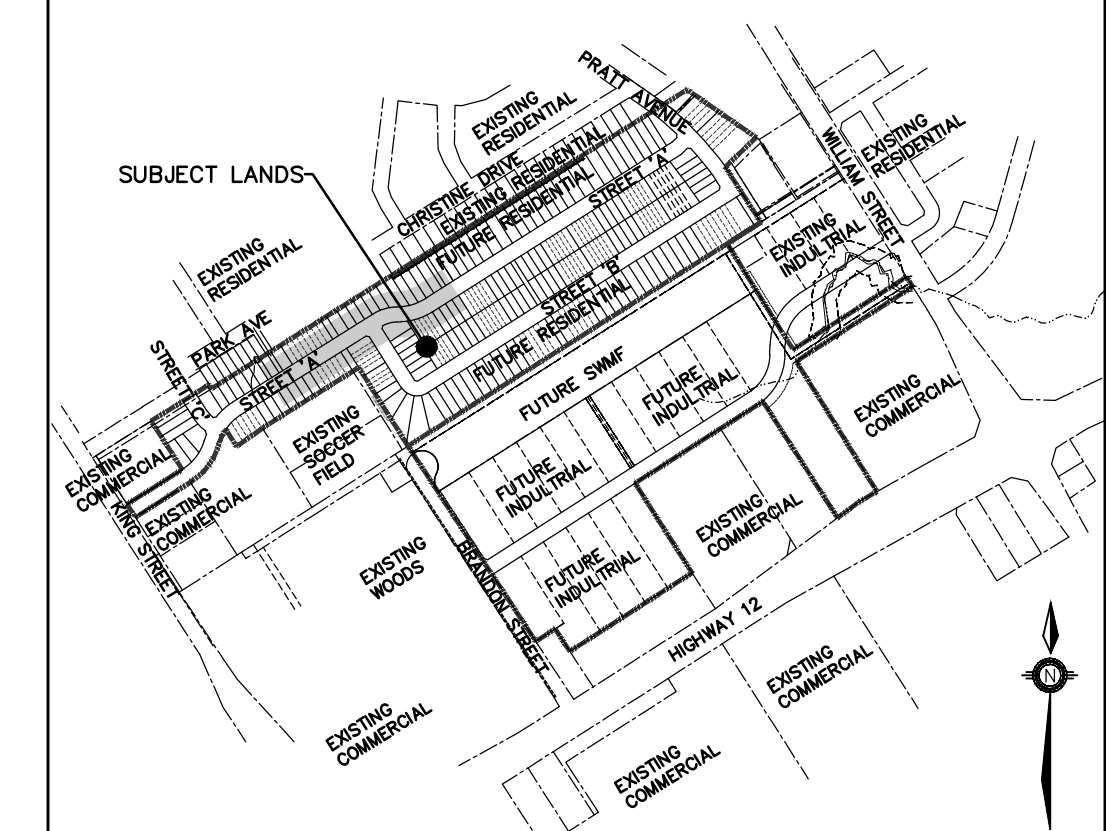
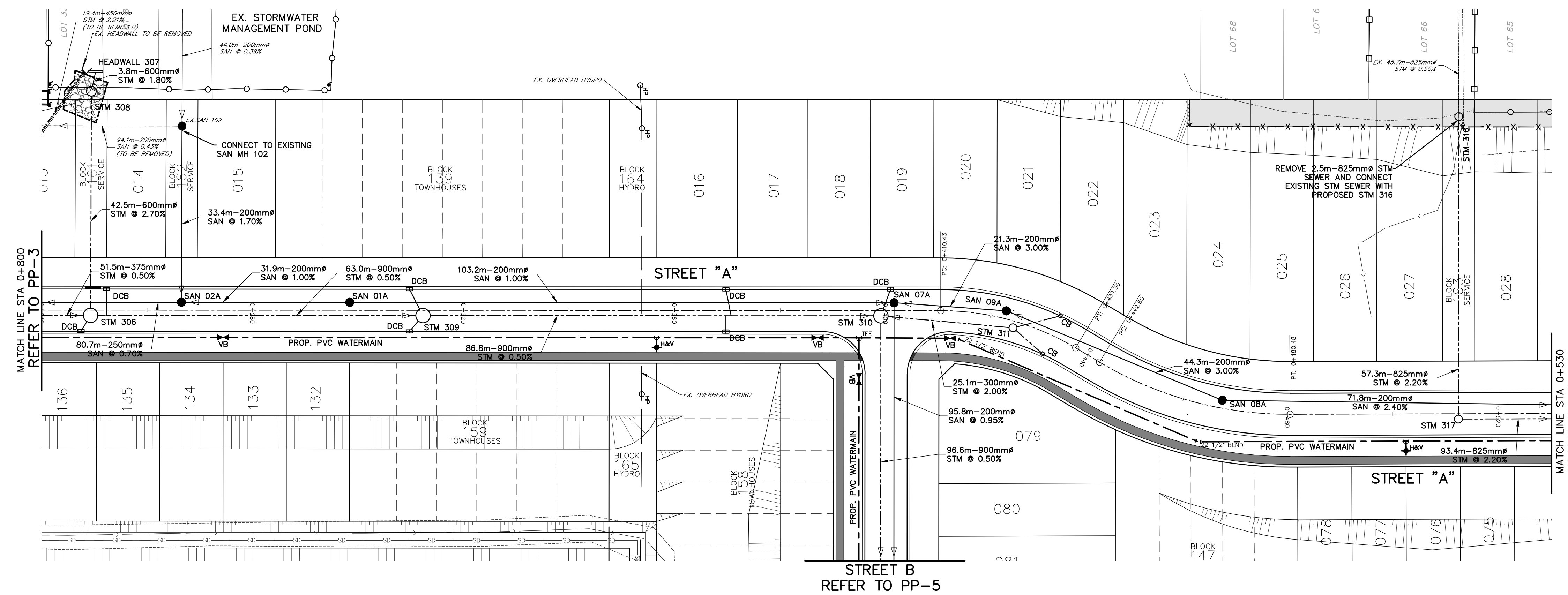


PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND
PLAN AND PROFILE
STREET A
STA -0+024.12 TO 0+240

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 JH	SCALE: H=1:500 V=1:50	DATE FEB 2020
DRAWN JH	PROJECT PRA-16084	DWG. NO PP-1
CHECKED JWI		

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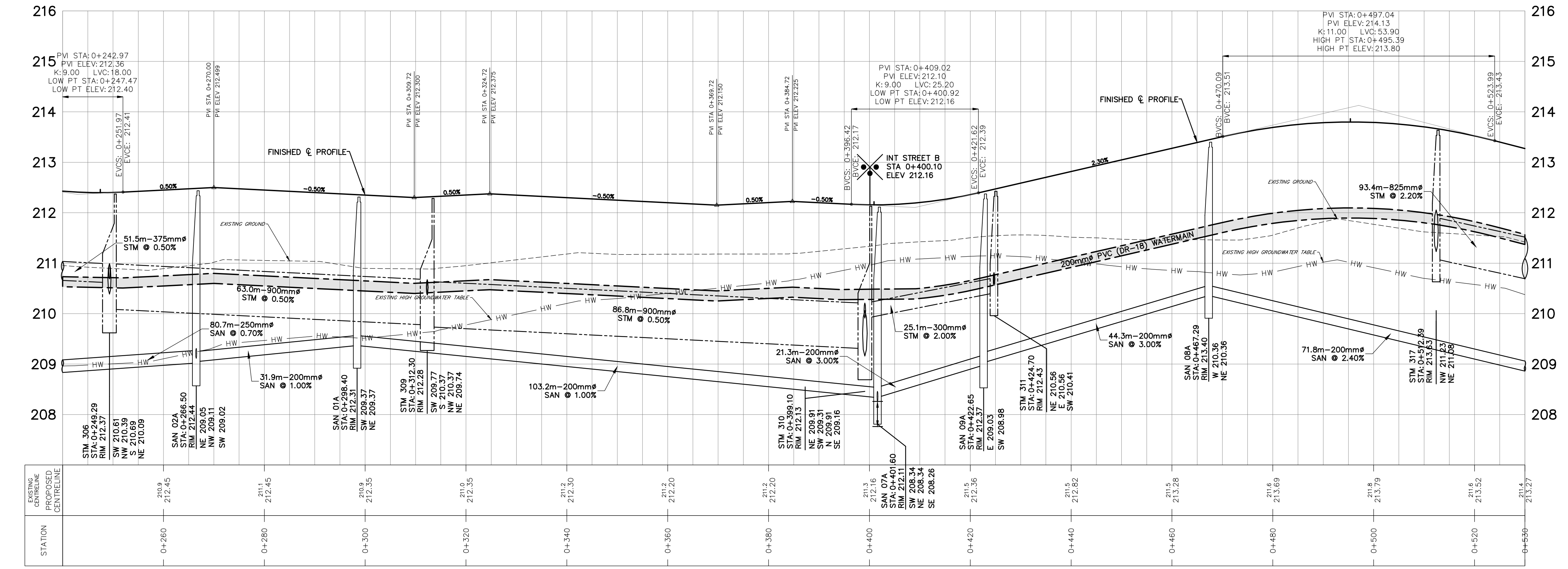


KEYPLAN
NTS

LEGEND

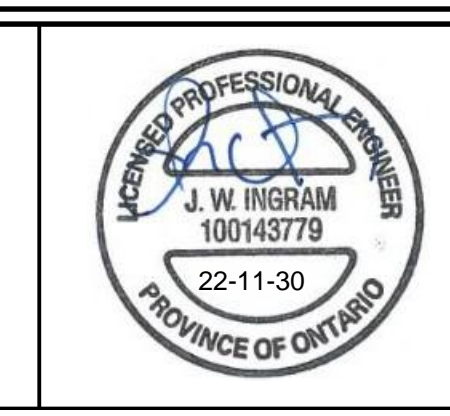
- ▬ SUBDIVISION BOUNDARY
- EX. SANITARY MAINTENANCE HOLE
- EX. STORM MAINTENANCE HOLE
- EX. CATCHBASIN
- EX. DOUBLE CATCHBASIN
- EX. VALVE & BOX
- EX. HYDRANT & VALVE
- EX. BELL PEDESTAL
- EX. HYDRO POLE
- EX. SIGN
- EXISTING LIGHT STANDARD
- HYDRANT AND VALVE
- VALVE AND BOX
- BELL VAULT
- CABLE VAULT
- SAN 15A
- STM 310
- CB
- DCB
- TRANSFORMER
- SWITCHGEAR
- PULLING CHAMBER
- LIGHT STANDARD
- LIGHT STANDARD PEDESTAL
- COMMUNITY MAILBOX
- TACTILE WARNING PLATES
- BOREHOLE WITH ID#
- SANITARY SERVICE
- WATER SERVICE AND VALVE
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- EXISTING SANITARY SEWER AND DIRECTION OF FLOW
- PROPOSED SANITARY SEWER AND DIRECTION OF FLOW
- EXISTING STORM SEWER AND DIRECTION OF FLOW
- PROPOSED STORM SEWER AND DIRECTION OF FLOW
- 83 DRAFTPLAN LOT / BLOCK NUMBER
- ▨ ENGINEERED FILL

NOTE: SHOP DRAWINGS TO BE PROVIDED FOR ALL SANITARY & STORM STRUCTURES. BUOYANCY CALCULATIONS TO BE PROVIDED FOR ALL STRUCTURES LOCATED BELOW THE SEASONALLY HIGH GROUNDWATER TABLE.



BENCHMARK:
BENCHMARK NO. 00820030042 RIB WITH CAP, 30 CM BELOW GRADE, - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.059 N4954266.360 ELEV 194.845
BENCHMARK NO. 05719747317 62M NORTHEAST FROM BRANDON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.3xx

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FIRST SUBMISSION	AUG 2020	JWI

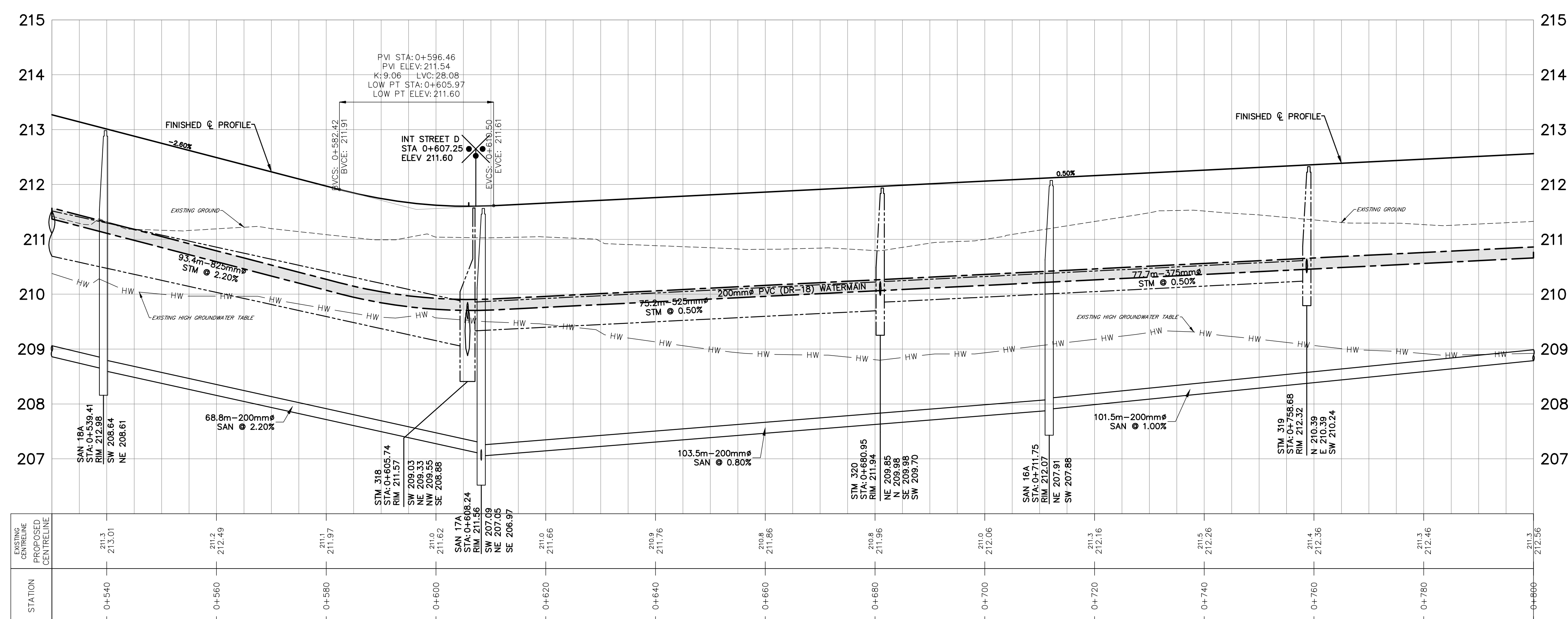
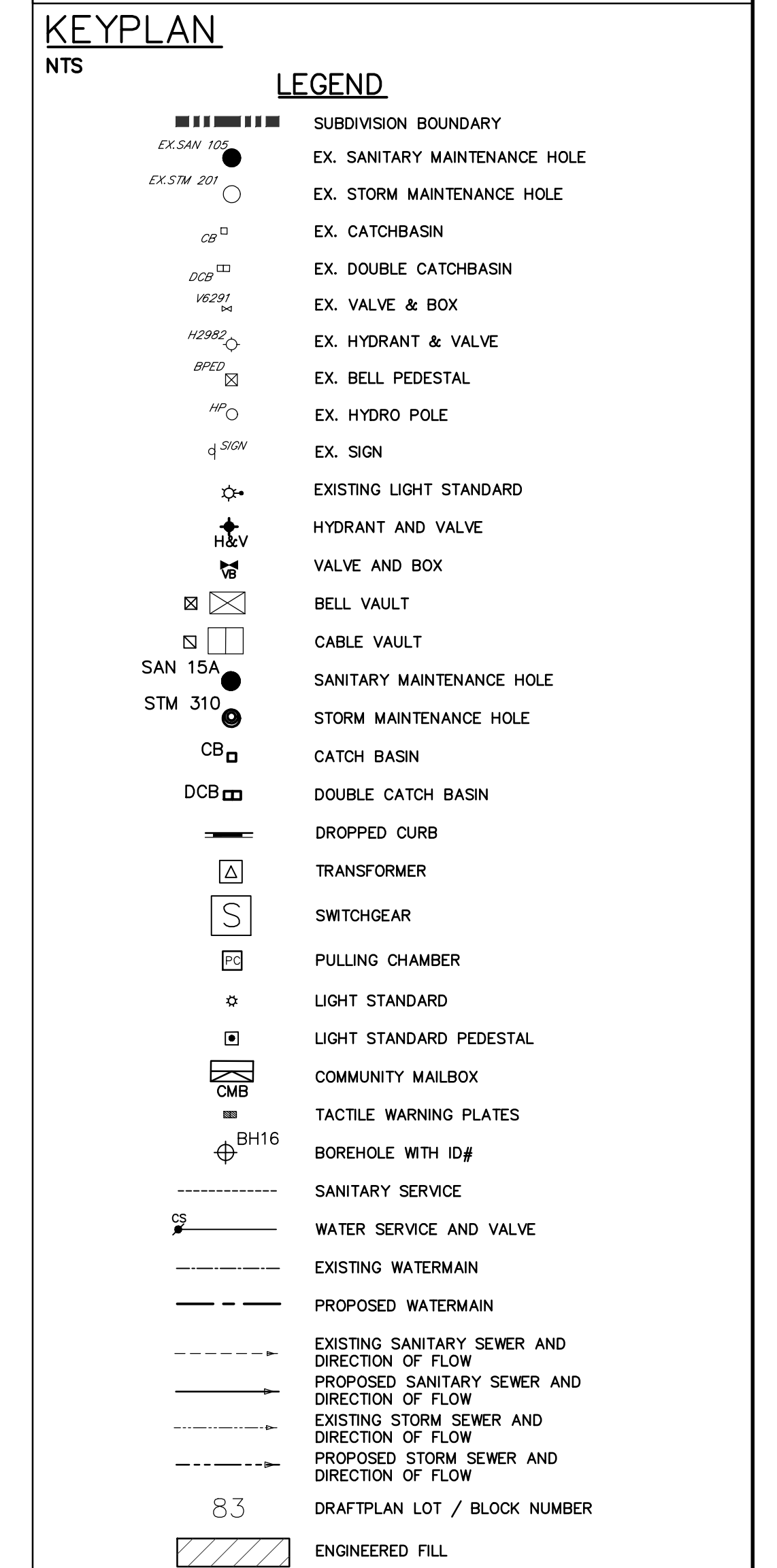
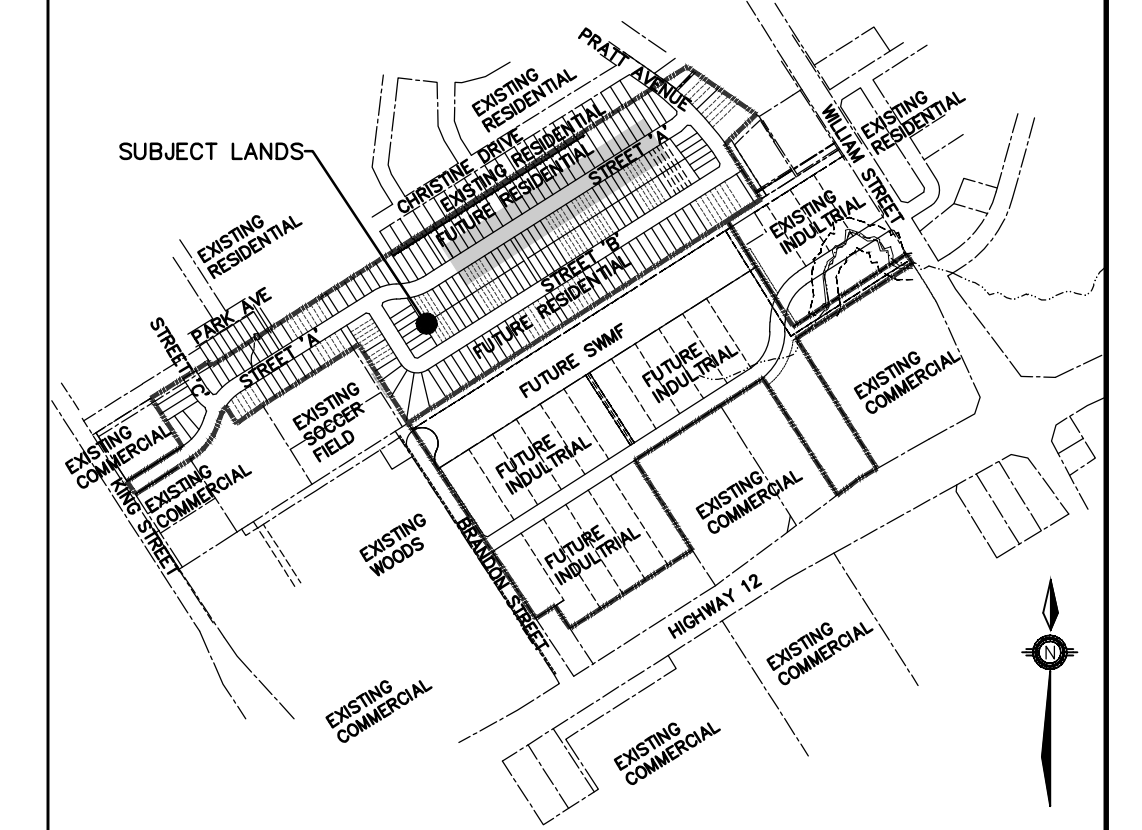
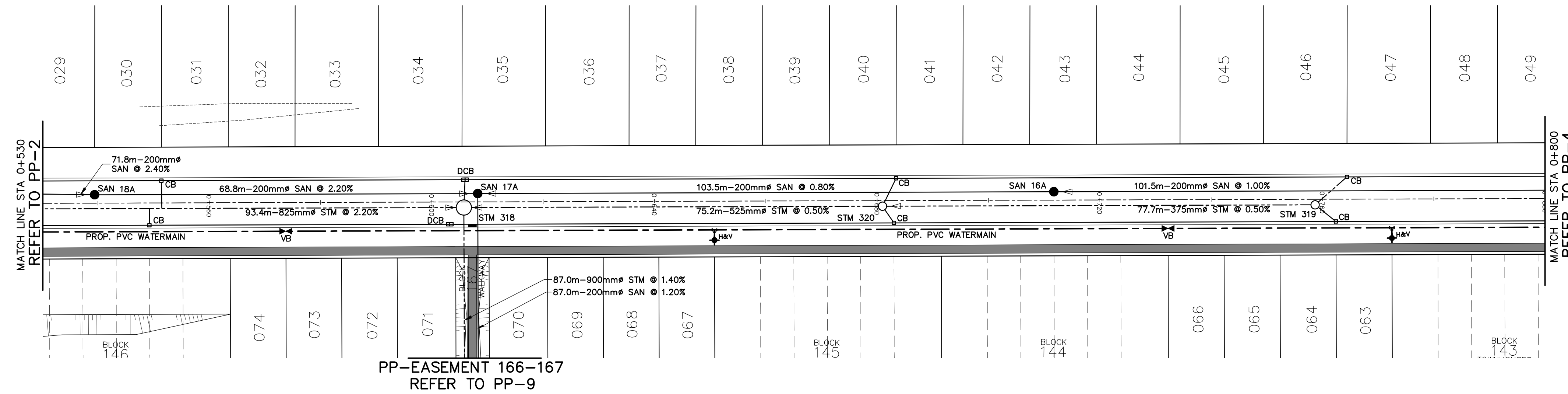


PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND
PLAN AND PROFILE
STREET A
STA 0+240 TO 0+530

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 JH	SCALE: H=1:500 V=1:50	DATE FEB 2020
DRAWN JH	PROJECT PRA-16084	DWG. NO PP-2
CHECKED JWI		

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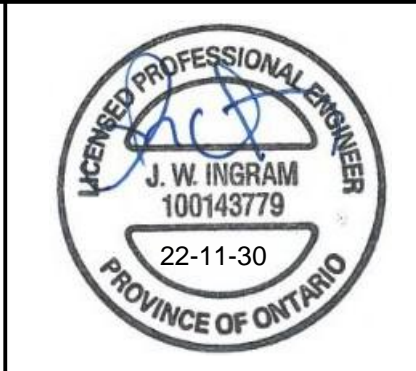


BENCHMARK:

BENCHMARK NO. 00820038042 RIB WITH CAP, 30 CM BELOW GRADE. - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WELLMAN ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590485.059 N4924266.360 ELEV 194.842

BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANDON ST AND HWY 12 INTERSECTION. UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.3xx

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FIRST SUBMISSION	AUG 2020	JWI



PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND

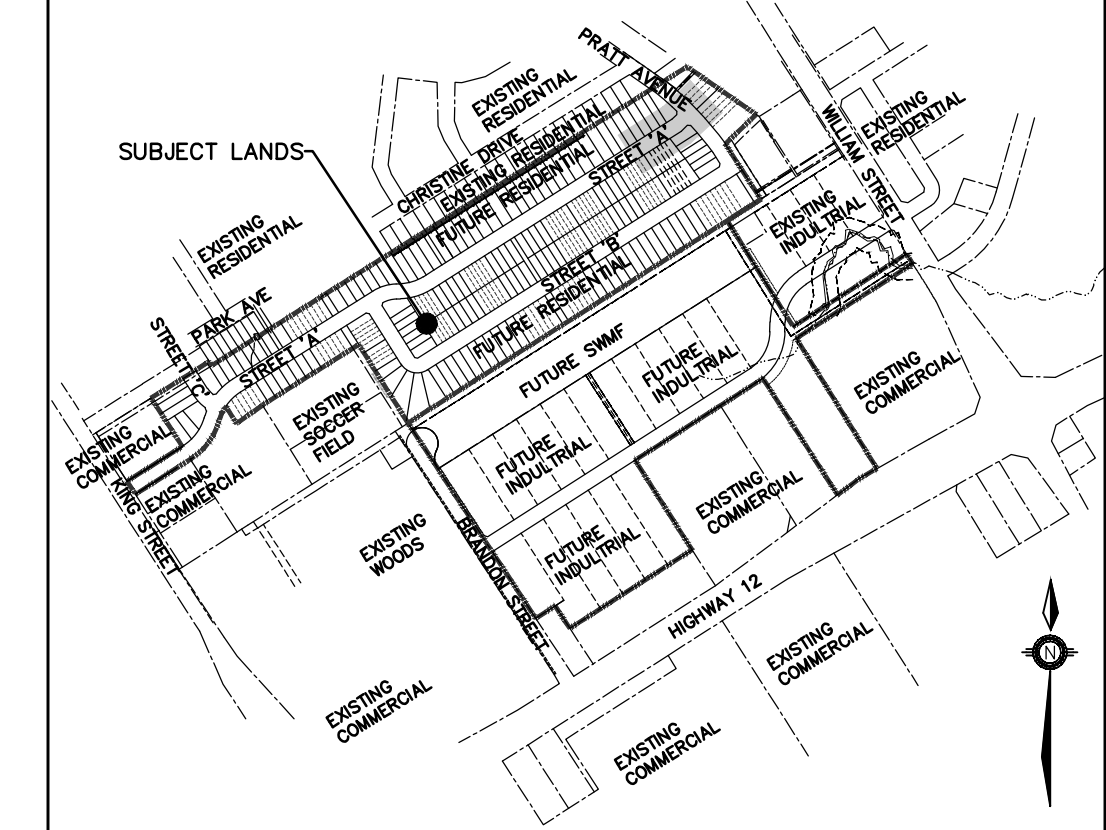
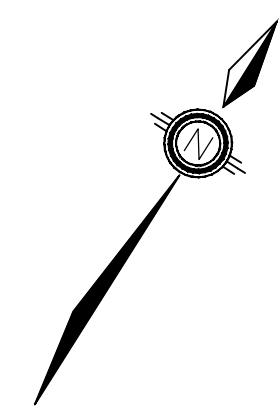
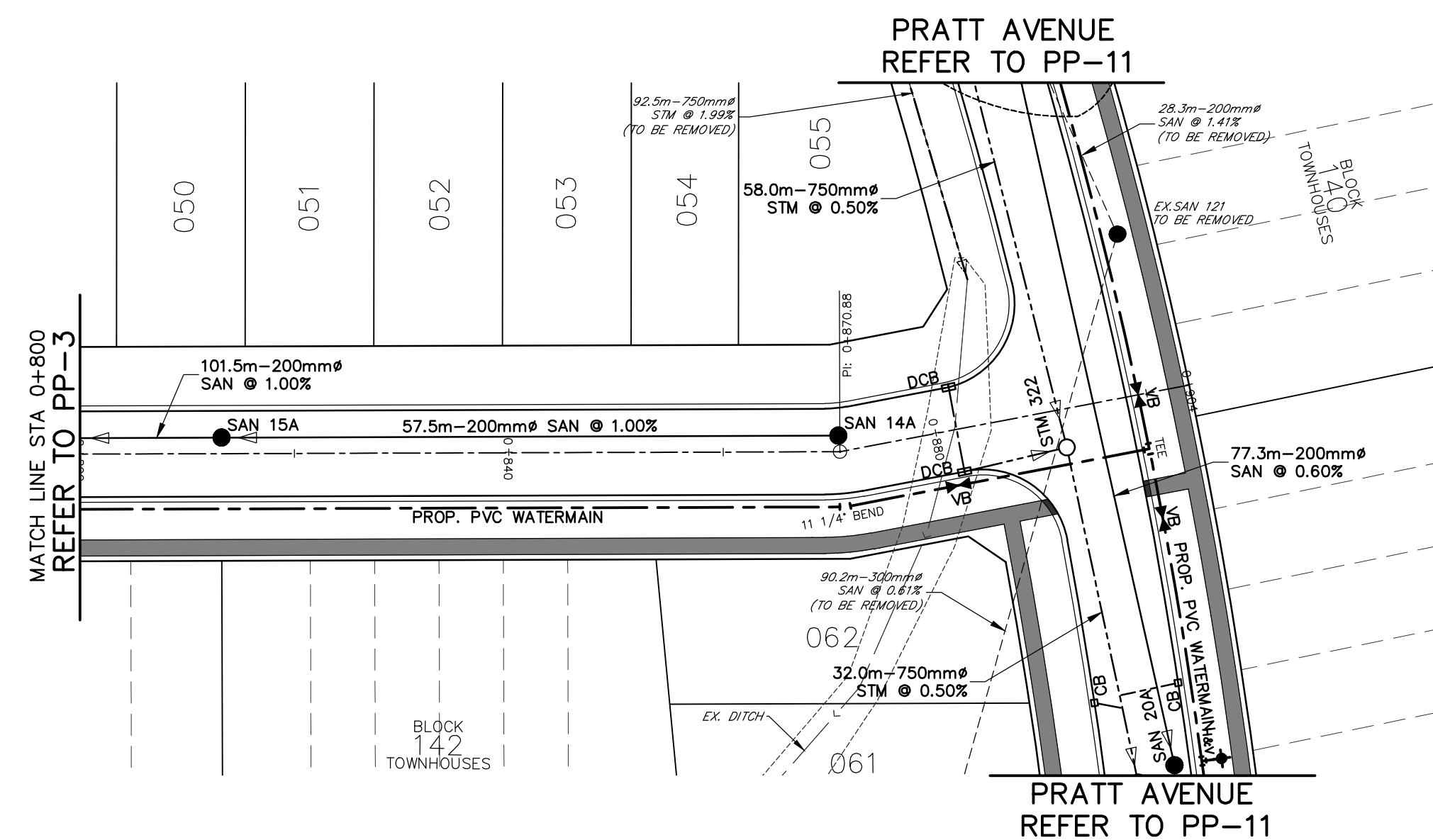
PLAN AND PROFILE
STREET A
STA 0+530 TO 0+800

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS

229 Mapleview Dr. E. Unit 1
Barrie, ON L4N 0W6
P. 705.734.2638
F. 705.734.1056

DESIGN JH	SCALE: H=1:500 V=1:50	DATE FEB 2020
DRAWN JH	PROJECT PRA-16084	DWG. NO PP-3
CHECKED JWI		

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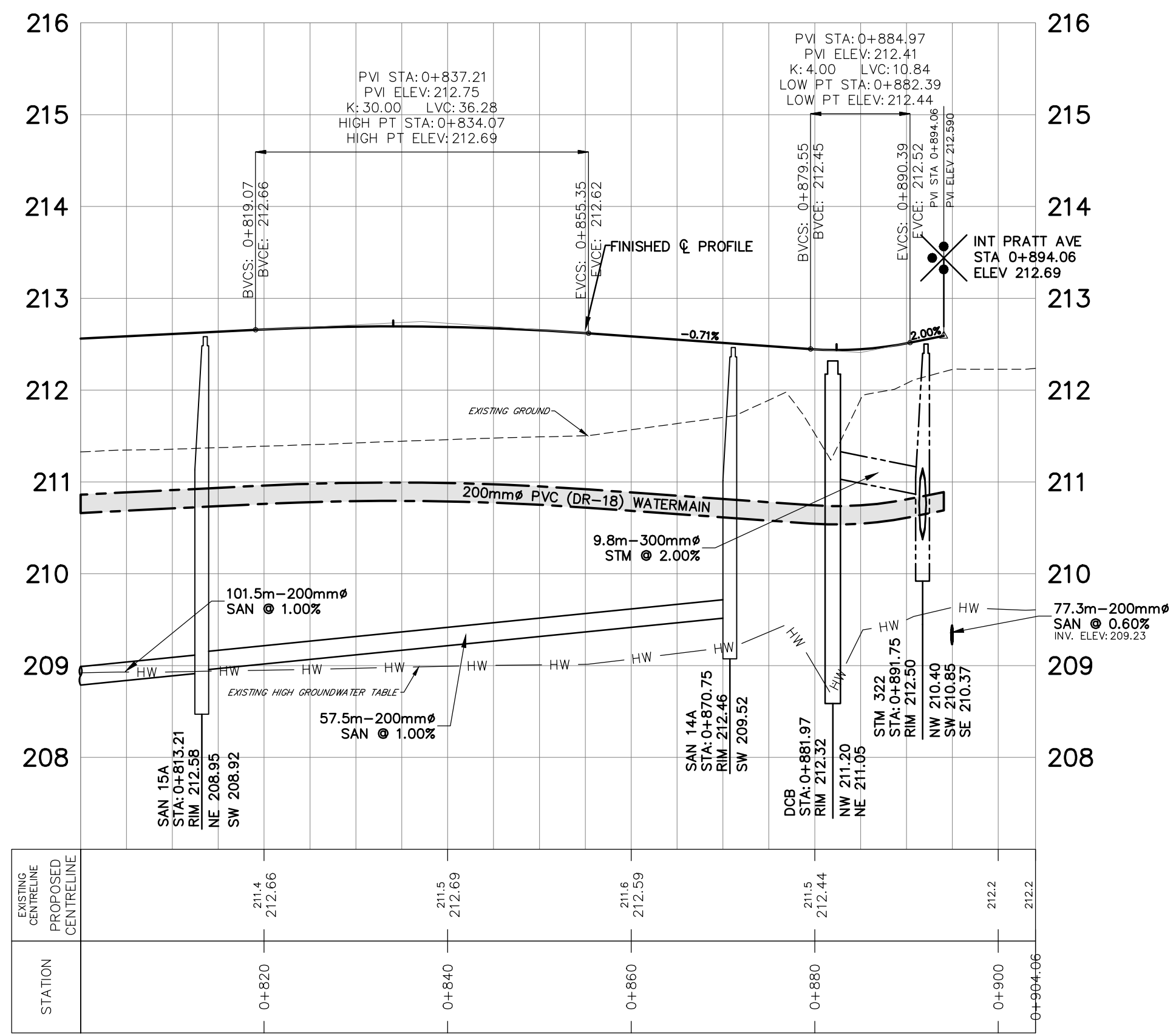


KEYPLAN
NTS

LEGEND

- SUBDIVISION BOUNDARY
- 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
- EXISTING LIGHT STANDARD
- HYDRANT AND VALVE
- VALVE AND BOX
- BELL VAULT
- CABLE VAULT
- SAN 15A
- SANITARY MAINTENANCE HOLE
- STM 310
- STORM MAINTENANCE HOLE
- CATCH BASIN
- DCB
- DOUBLE CATCH BASIN
- DROPPED CURB
- TRANSFORMER
- SWITCHGEAR
- PULLING CHAMBER
- LIGHT STANDARD
- LIGHT STANDARD PEDESTAL
- COMMUNITY MAILBOX
- TACTILE WARNING PLATES
- BOREHOLE WITH ID#
- SANITARY SERVICE
- WATER SERVICE AND VALVE
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- EXISTING SANITARY SEWER AND DIRECTION OF FLOW
- PROPOSED SANITARY SEWER AND DIRECTION OF FLOW
- EXISTING STORM SEWER AND DIRECTION OF FLOW
- PROPOSED STORM SEWER AND DIRECTION OF FLOW
- 83 DRAFTPLAN LOT / BLOCK NUMBER
- ▨ ENGINEERED FILL

NOTE: SHOP DRAWINGS TO BE PROVIDED FOR ALL SANITARY & STORM STRUCTURES. BUOYANCY CALCULATIONS TO BE PROVIDED FOR ALL STRUCTURES LOCATED BELOW THE SEASONALLY HIGH GROUNDWATER TABLE.



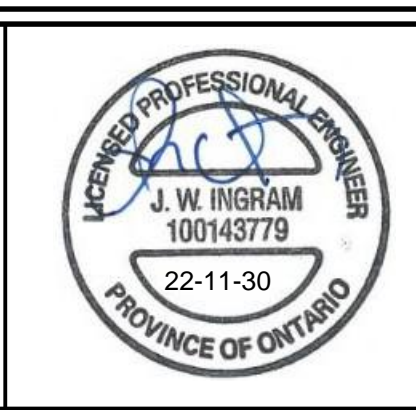
BENCHMARK:

BENCHMARK NO. 00820038042 RIB WITH CAP, 30 CM BELOW GRADE. - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590485.099 N4954256.350 ELEV 194.842

BENCHMARK NO. 02719747317 62m NORTHEAST FROM BRANSON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.30x

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FIRST SUBMISSION	AUG 2020	JWI

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FIRST SUBMISSION	AUG 2020	JWI



PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND

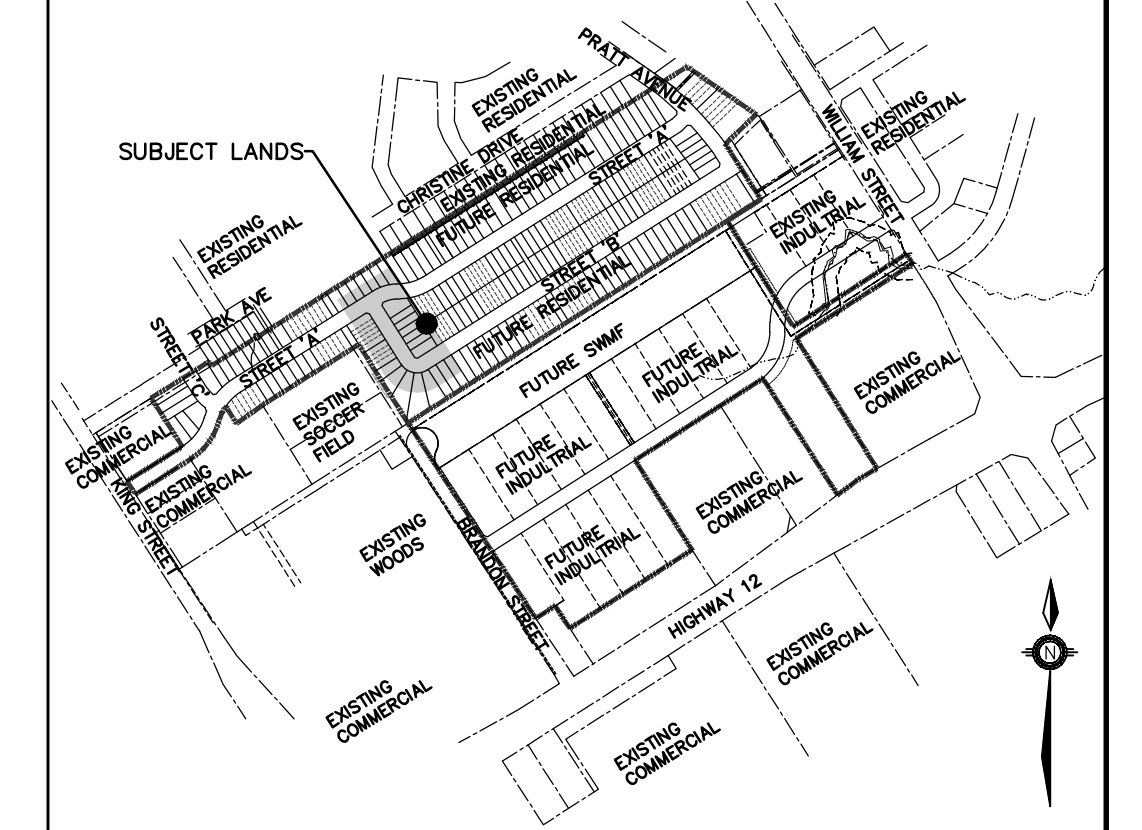
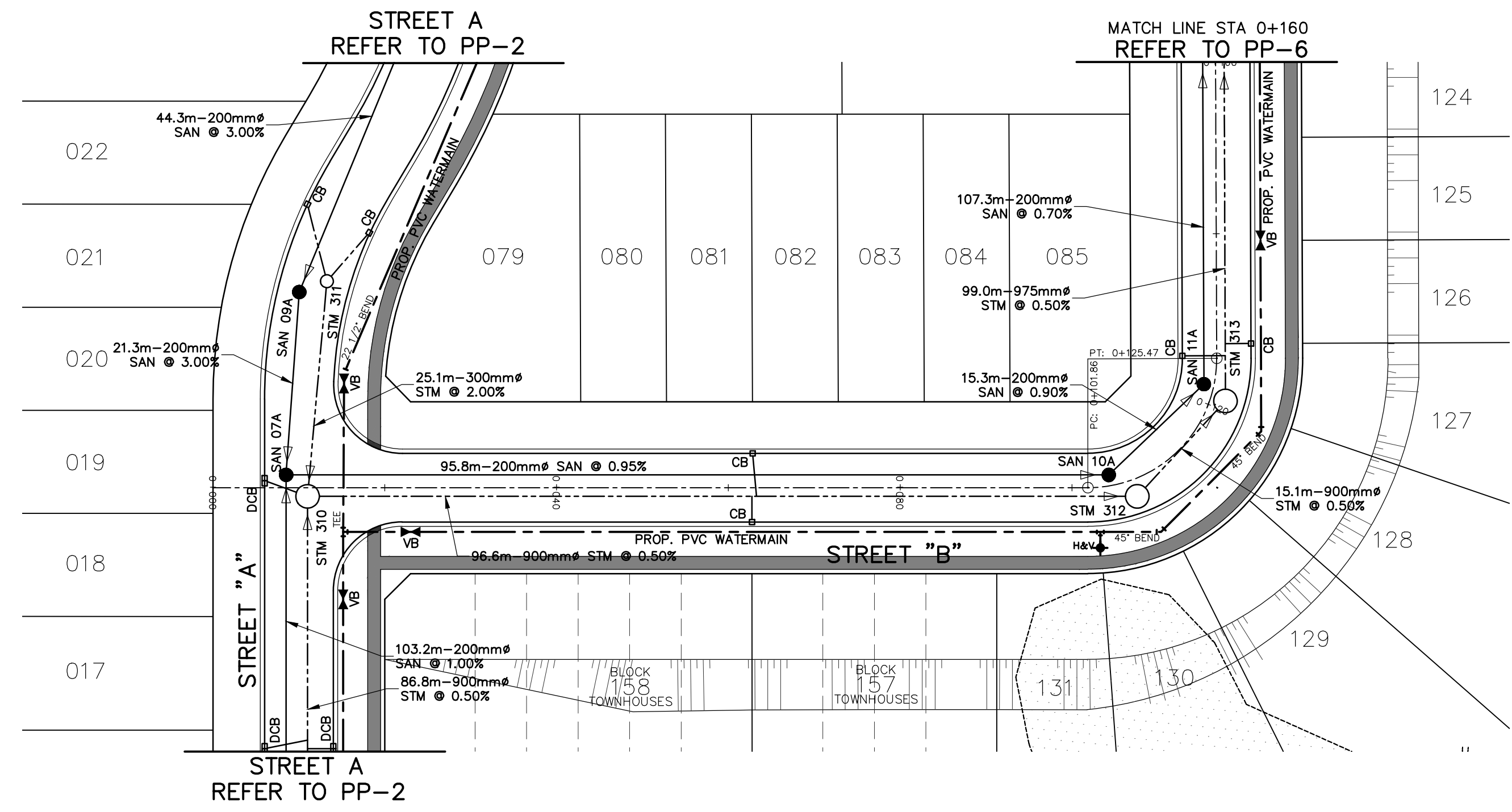
PLAN AND PROFILE
STREET A
STA 0+800 TO 0+904.06

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS

229 Mapleview Dr. E. Unit 1
Barrie, ON L4N 0W6
P. 705.734.2538
F. 705.734.1056

DESIGN	JH	SCALE: H=1:500 V=1:50	DATE	FEB 2020
DRAWN	JH	PROJECT	PRA-16084	DWG. NO
CHECKED	JWI			PP-4

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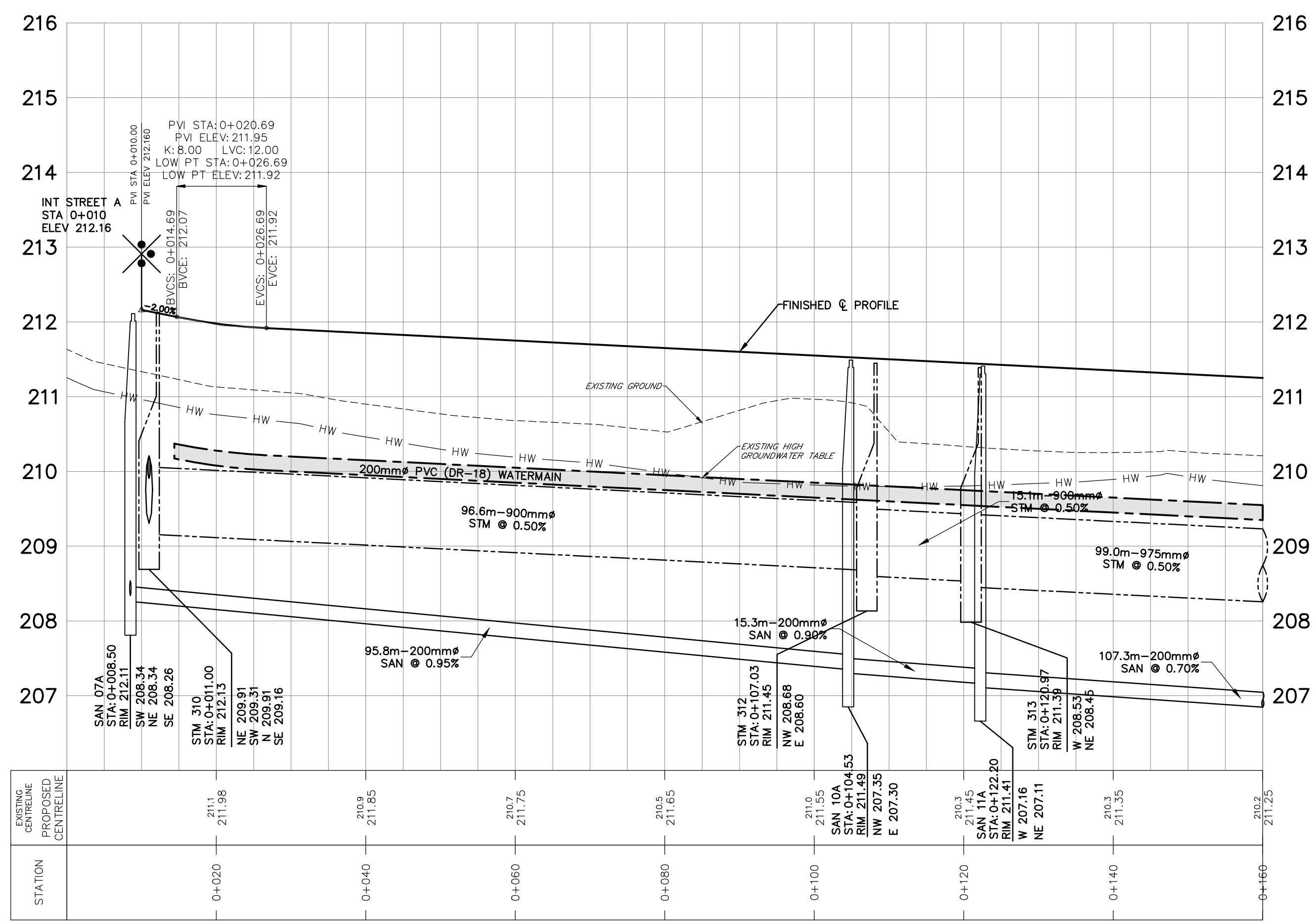


KEYPLAN
NTS

LEGEND

---	SUBDIVISION BOUNDARY	●	EX. SANITARY MAINTENANCE HOLE
○	EX. STORM MAINTENANCE HOLE	□	EX. CATCH BASIN
□	EX. DOUBLE CATCH BASIN	□	EX. VALVE & BOX
○	EX. HYDRANT & VALVE	○	EX. BELL PEDESTAL
○	EX. HYDRO POLE	○	EX. SIGN
○	EXISTING LIGHT STANDARD	+	HYDRANT AND VALVE
+	VALVE AND BOX	□	BELL VAULT
□	CABLE VAULT	□	SAN 15A
●	SANITARY MAINTENANCE HOLE	○	STM 310
○	STORM MAINTENANCE HOLE	□	CATCH BASIN
□	DOUBLE CATCH BASIN	—	DROPPED CURB
△	TRANSFORMER	□	SWITCHGEAR
□	PULLING CHAMBER	○	LIGHT STANDARD
□	LIGHT STANDARD PEDESTAL	□	COMMUNITY MAILBOX
□	TACTILE WARNING PLATES	○	BOREHOLE WITH ID#
—	SANITARY SERVICE	—	WATER SERVICE AND VALVE
—	EXISTING WATERMAIN	—	EXISTING WATERMAIN
—	PROPOSED WATERMAIN	—	EXISTING SANITARY SEWER AND DIRECTION OF FLOW
—	EXISTING SANITARY SEWER AND DIRECTION OF FLOW	—	PROPOSED SANITARY SEWER AND DIRECTION OF FLOW
—	EXISTING STORM SEWER AND DIRECTION OF FLOW	—	PROPOSED STORM SEWER AND DIRECTION OF FLOW
83	DRAFTPLAN LOT / BLOCK NUMBER		
▨	ENGINEERED FILL		

NOTE: SHOP DRAWINGS TO BE PROVIDED FOR ALL SANITARY & STORM STRUCTURES. BUOYANCY CALCULATIONS TO BE PROVIDED FOR ALL STRUCTURES LOCATED BELOW THE SEASONALLY HIGH GROUNDWATER TABLE.

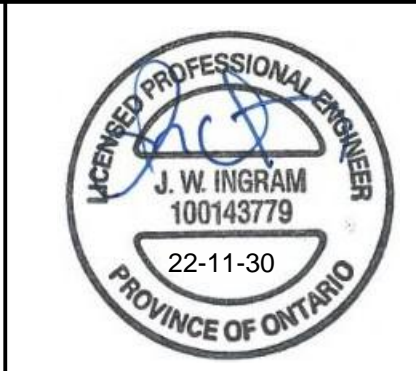


BENCHMARK:

BENCHMARK NO. 00820038042 RIB WITH CAP, 30 CM BELOW GRADE. - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E50465.099 N4954256.350 ELEV 194.842

BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANDON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.30x

2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FIRST SUBMISSION	AUG 2020	JWI
NO.	REVISIONS	DATE	INITIAL



PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND

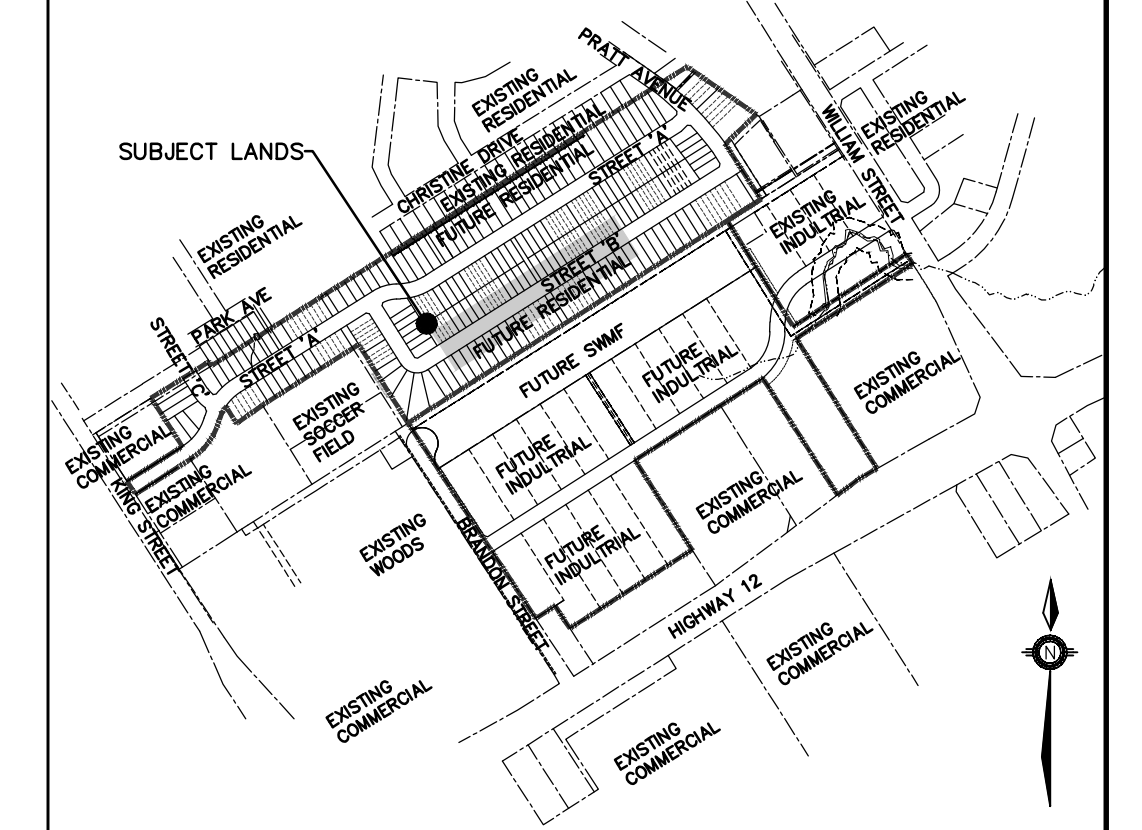
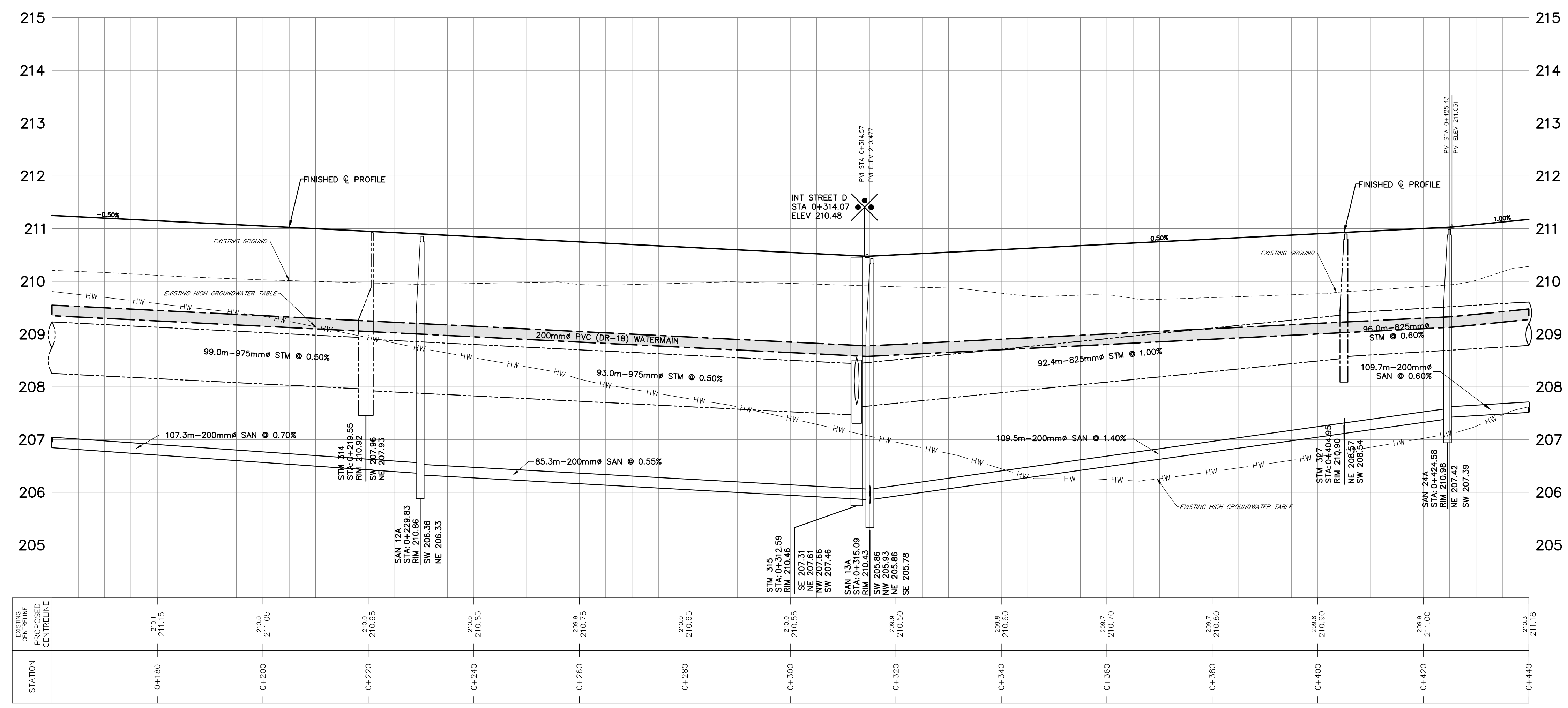
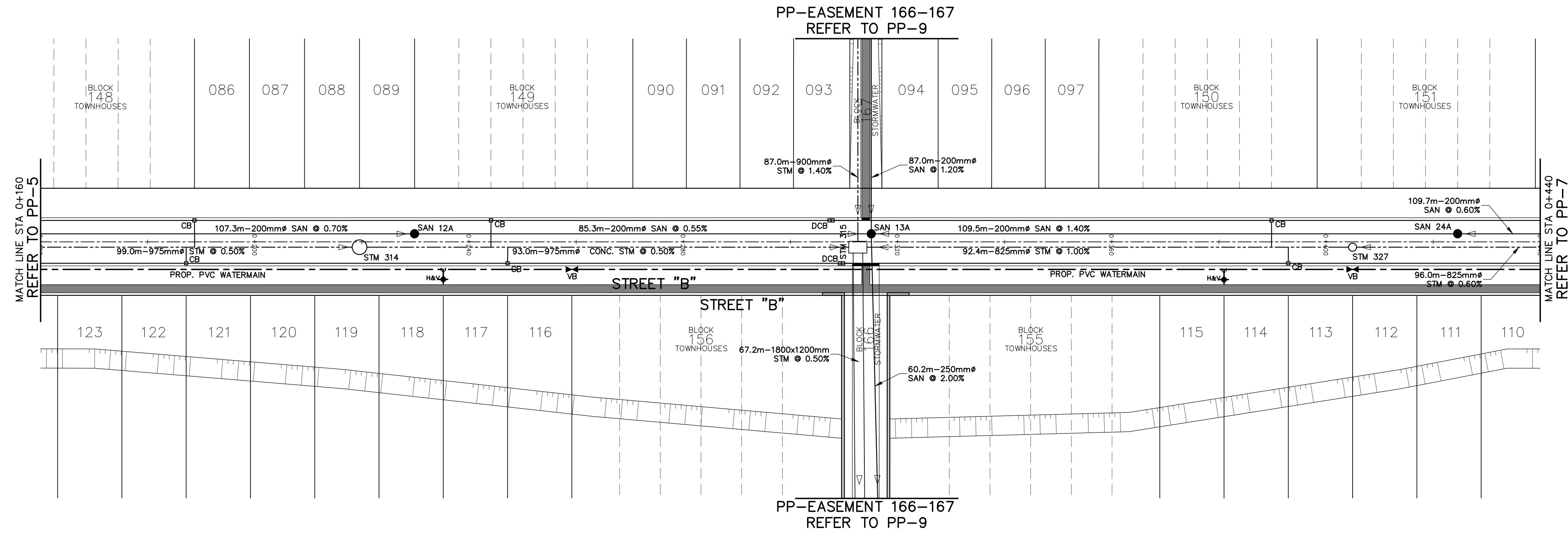
PLAN AND PROFILE
STREET B
STA 0+000 TO 0+160

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	FEB 2020
DRAWN	JJH	PROJECT	PRA-16084	DWG. NO
CHECKED	JWI			PP-5

G:\Eng_3D\PRAs-16084\Production\DWGS\PRAs-16084-PP-5_Plot.dwg Layout:PP-5_Plot.dwg By:esperandim The Jones Consulting Group Ltd.



KEYPLAN NTS

LEGEND

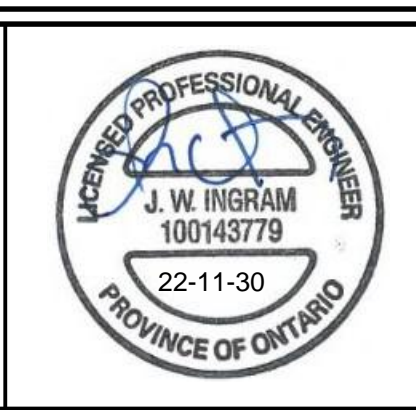
- SUBDIVISION BOUNDARY
- EX. SANITARY MAINTENANCE HOLE
- EX. STORM MAINTENANCE HOLE
- EX. CATCH BASIN
- EX. DOUBLE CATCH BASIN
- EX. VALVE & BOX
- EX. HYDRANT & VALVE
- EX. BELL PEDESTAL
- EX. HYDRO POLE
- EX. SIGN
- EXISTING LIGHT STANDARD
- HYDRANT AND VALVE
- VALVE AND BOX
- BELL VAULT
- CABLE VAULT
- SAN 15A
- SANITARY MAINTENANCE HOLE
- STM 310
- STORM MAINTENANCE HOLE
- CATCH BASIN
- DCB
- DOUBLE CATCH BASIN
- DROPPED CURB
- TRANSFORMER
- SWITCHGEAR
- PULLING CHAMBER
- LIGHT STANDARD
- LIGHT STANDARD PEDESTAL
- COMMUNITY MAILBOX
- TACTILE WARNING PLATES
- BOREHOLE WITH ID#
- SANITARY SERVICE
- WATER SERVICE AND VALVE
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- EXISTING SANITARY SEWER AND DIRECTION OF FLOW
- PROPOSED SANITARY SEWER AND DIRECTION OF FLOW
- EXISTING STORM SEWER AND DIRECTION OF FLOW
- PROPOSED STORM SEWER AND DIRECTION OF FLOW
- 83 DRAFTPLAN LOT / BLOCK NUMBER
- ▨ ENGINEERED FILL

NOTE: SHOP DRAWINGS TO BE PROVIDED FOR ALL SANITARY & STORM STRUCTURES. BUOYANCY CALCULATIONS TO BE PROVIDED FOR ALL STRUCTURES LOCATED BELOW THE SEASONALLY HIGH GROUNDWATER TABLE.

G:\Eng_3D\PRAs\16084-PP-6_Plot1.dwg Layout:PP-6_Plot1.dwg by isperindm The Jones Consulting Group Ltd. Dec 01, 2022 @ 4:40pm

BENCHMARK:
 BENCHMARK NO. 0082003042 RIB WITH CAP, 30 CM BELOW GRADE - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.099 N4924256.350 ELEV 194.842
 BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANDON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.3xx

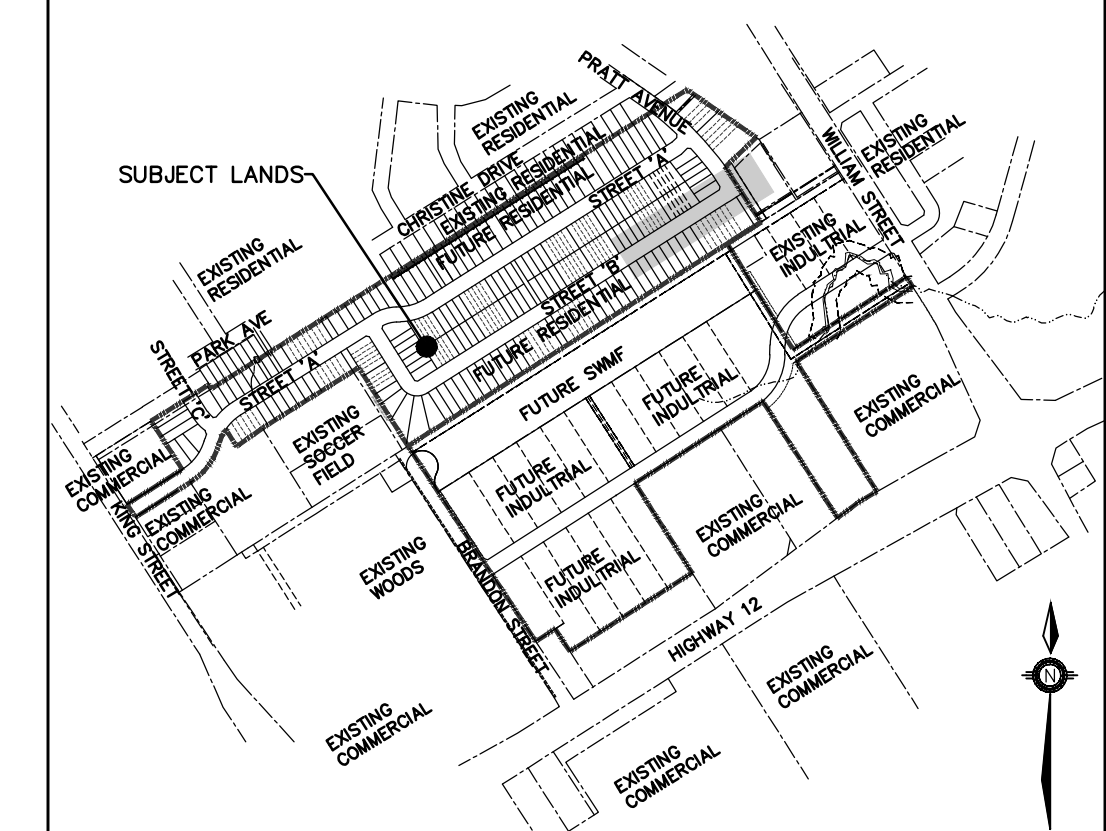
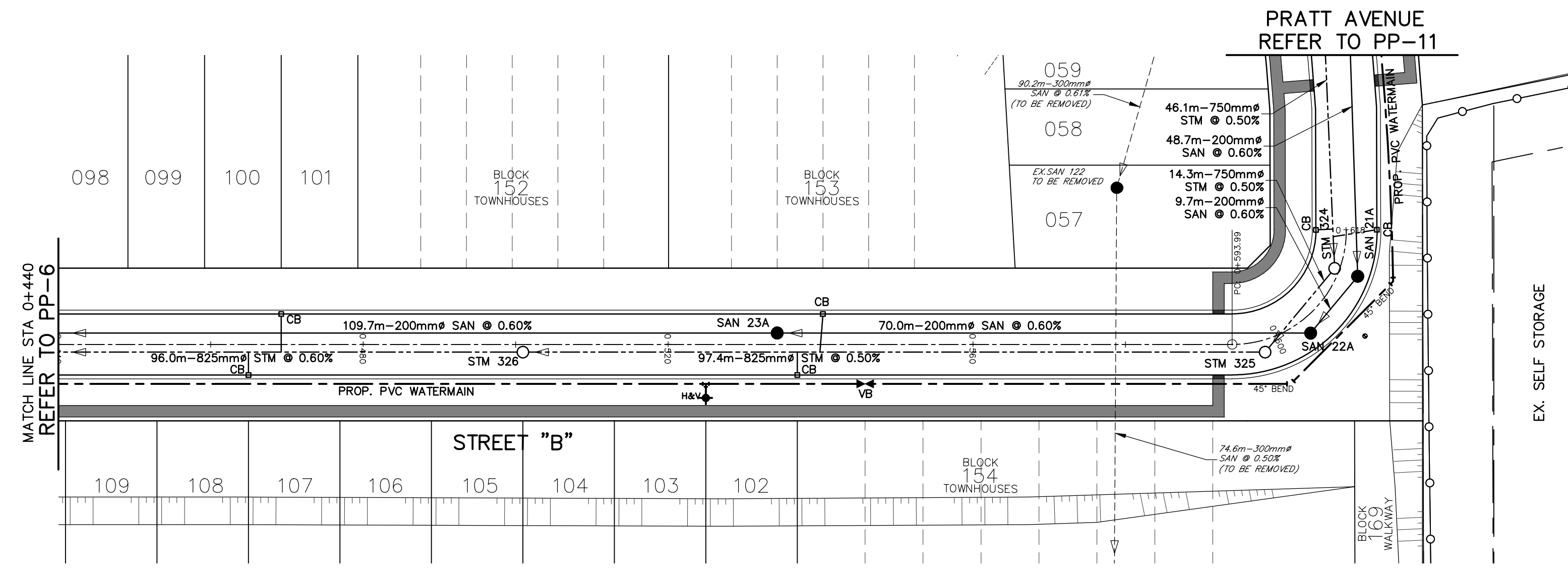
NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FIRST SUBMISSION	AUG 2020	JWI



PRATT HANSEN GROUP INC.
 GALLOWAY SUBDIVISION
 TOWN OF MIDLAND
 PLAN AND PROFILE
 STREET B
 STA 0+160 TO 0+440

JONES CONSULTING GROUP LTD.
 PLANNERS & ENGINEERS
 229 Mapleview Dr. E. Unit 1
 Barrie, ON L4N 0W5
 P. 705.734.2538
 F. 705.734.1058

DESIGN: JH SCALE: H=1:500 V=1:50 DATE: FEB 2020
 DRAWN: JH PROJECT: PRA-16084 DWG. NO: PP-6
 CHECKED: JWI

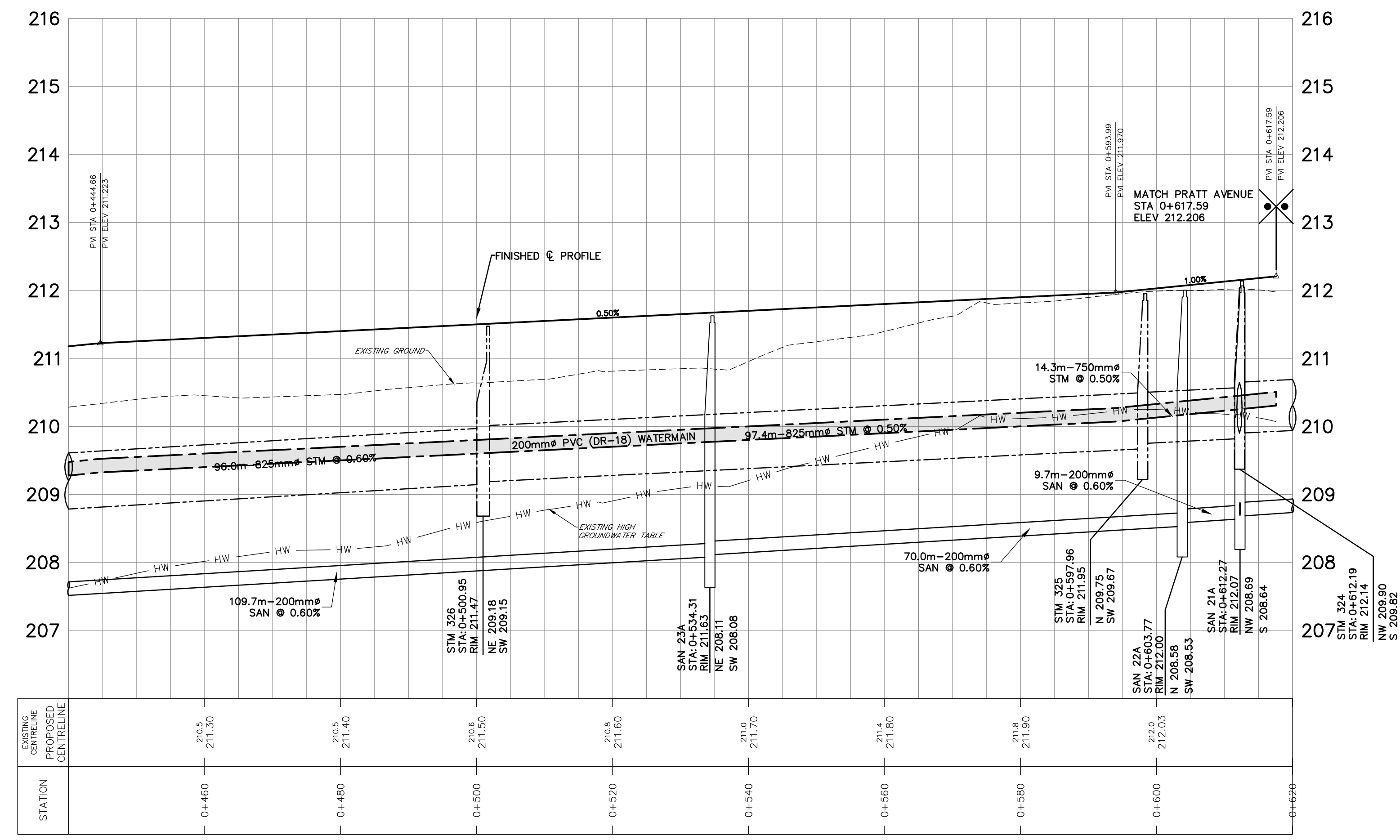


KEYPLAN
NTS

LEGEND

	SUBDIVISION BOUNDARY
	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
	EXISTING LIGHT STANDARD
	HYDRANT AND VALVE
	VALVE AND BOX
	BELL VAULT
	CABLE VAULT
	SAN 15A
	SANITARY MAINTENANCE HOLE
	STORM MAINTENANCE HOLE
	CATCH BASIN
	DOUBLE CATCH BASIN
	DROPPED CURB
	TRANSFORMER
	SWITCHGEAR
	PULLING CHAMBER
	LIGHT STANDARD
	LIGHT STANDARD PEDESTAL
	COMMUNITY MAILBOX
	TACTILE WARNING PLATES
	BOREHOLE WITH ID#
	SANITARY SERVICE
	WATER SERVICE AND VALVE
	EXISTING WATERMAIN
	PROPOSED WATERMAIN
	EXISTING SANITARY SEWER AND DIRECTION OF FLOW
	PROPOSED SANITARY SEWER AND DIRECTION OF FLOW
	EXISTING STORM SEWER AND DIRECTION OF FLOW
	PROPOSED STORM SEWER AND DIRECTION OF FLOW
	83 DRAFTPLAN LOT / BLOCK NUMBER
	ENGINEERED FILL

NOTE: SHOP DRAWINGS TO BE PROVIDED FOR ALL SANITARY & STORM STRUCTURES. BUOYANCY CALCULATIONS TO BE PROVIDED FOR ALL STRUCTURES LOCATED BELOW THE SEASONALLY HIGH GROUNDWATER TABLE.

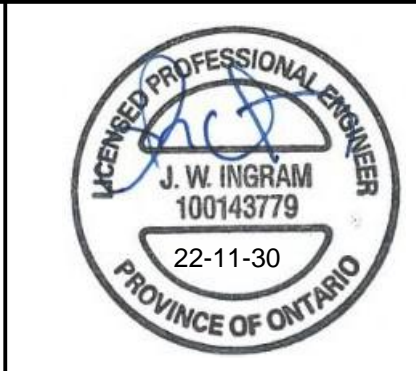


BENCHMARK:

BENCHMARK NO. 00820038042 RIB WITH CAP, 30 CM BELOW GRADE. - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.059 N4954256.350 ELEV 194.842

BENCHMARK NO. 05719747317 62M NORTHEAST FROM BRANDON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.3xx

2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FIRST SUBMISSION	AUG 2020	JWI
NO.	REVISIONS	DATE	INITIAL

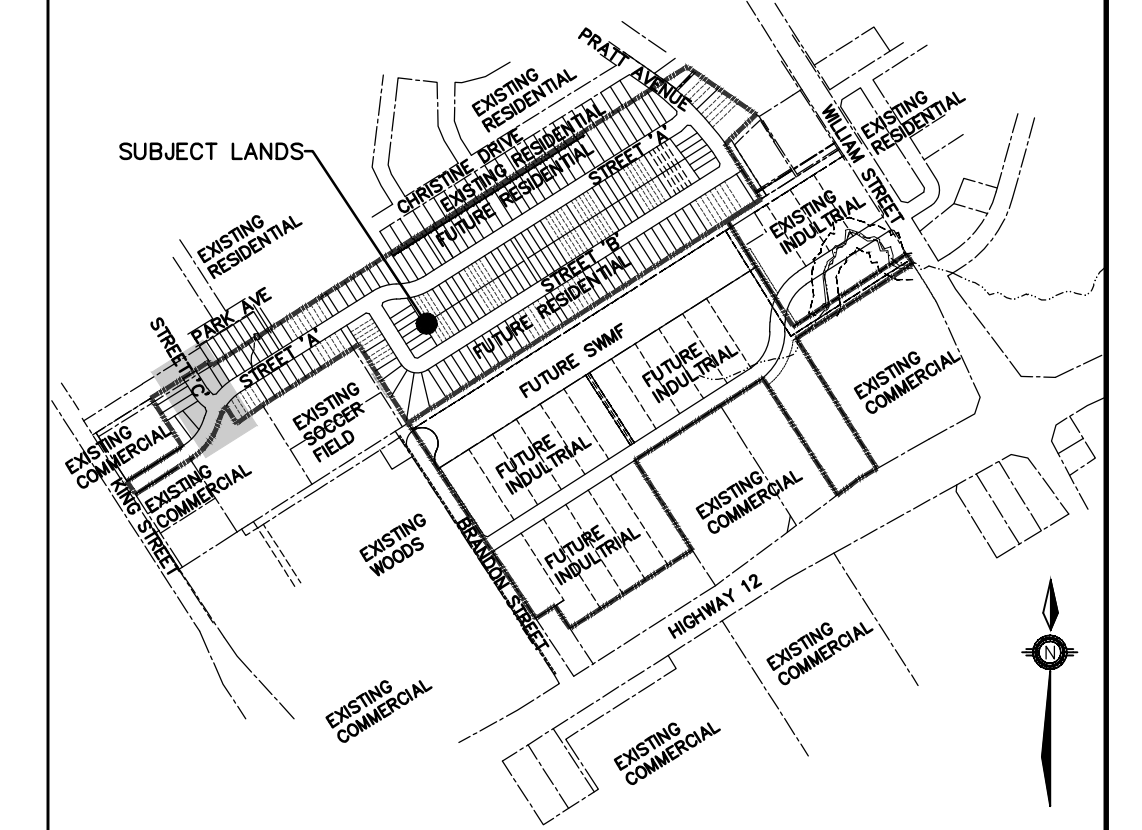
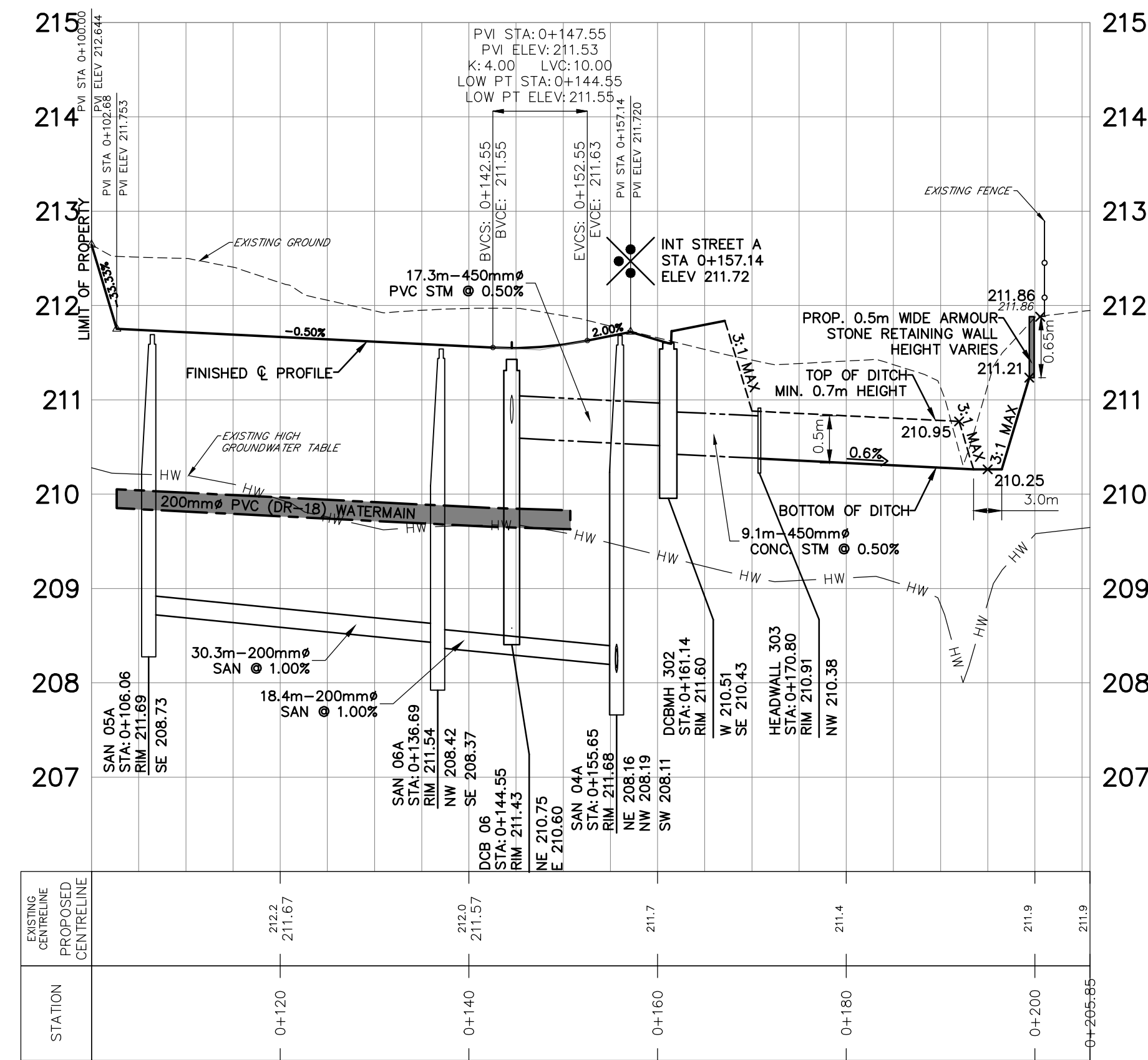
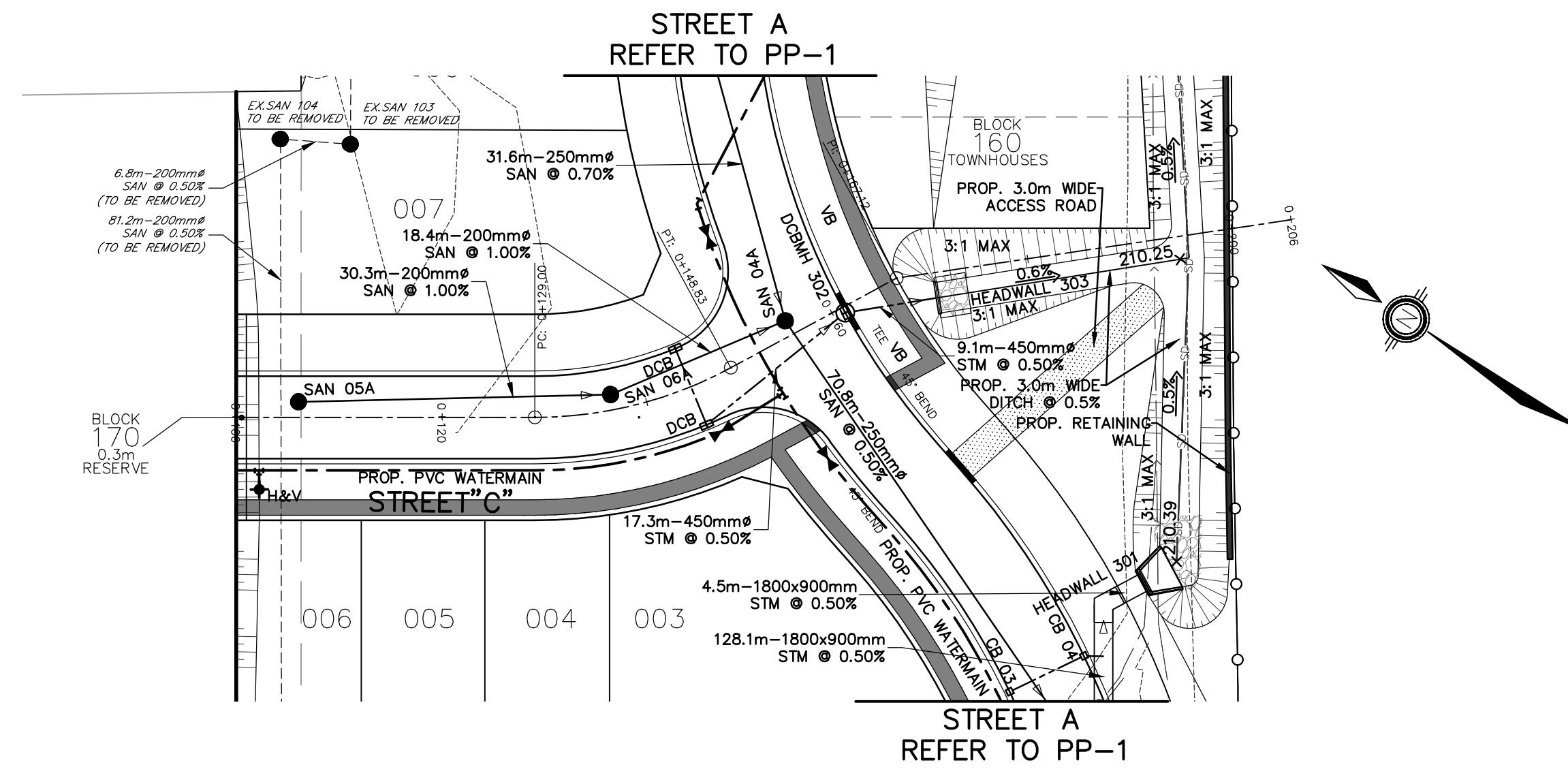


PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND

PLAN AND PROFILE
STREET B
STA 0+440 TO 0+594

<p>JONES CONSULTING GROUP LTD. PLANNERS & ENGINEERS</p>		<p>229 Mapleview Dr. E. Unit 1 Barrie, ON L4N 0W5 P. 705.734.2538 F. 705.734.1056</p>			
DESIGN	JJH	SCALE: H=1:500 V=1:50	DATE	FEB 2020	
DRAWN	JJH	PROJECT	PRA-16084	DWG. NO	PP-7
CHECKED	JWI				

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KEYPLAN

NTS

LEGEND

- SUBDIVISION BOUNDARY
- 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
- EXISTING LIGHT STANDARD
- VALVE AND BOX
- BELL VAULT
- CABLE VAULT
- SAN 15A SANITARY MAINTENANCE HOLE
- STM 310 STORM MAINTENANCE HOLE
- CB CATCH BASIN
- DCB DOUBLE CATCH BASIN
- DROPPED CURB
- △ TRANSFORMER
- SWITCHGEAR
- PULLING CHAMBER
- LIGHT STANDARD
- LIGHT STANDARD PEDESTAL
- COMMUNITY MAILBOX
- TACTILE WARNING PLATES
- BOREHOLE WITH ID#
- SANITARY SERVICE
- WATER SERVICE AND VALVE
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- EXISTING SANITARY SEWER AND DIRECTION OF FLOW
- PROPOSED SANITARY SEWER AND DIRECTION OF FLOW
- EXISTING STORM SEWER AND DIRECTION OF FLOW
- PROPOSED STORM SEWER AND DIRECTION OF FLOW
- 83 DRAFTPLAN LOT / BLOCK NUMBER
- ▨ ENGINEERED FILL

NOTE: SHOP DRAWINGS TO BE PROVIDED FOR ALL SANITARY & STORM STRUCTURES. BUOYANCY CALCULATIONS TO BE PROVIDED FOR ALL STRUCTURES LOCATED BELOW THE SEASONALLY HIGH GROUNDWATER TABLE.

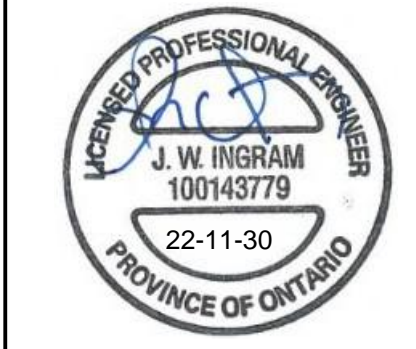
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BENCHMARK:

BENCHMARK NO. 0082003042 RIB WITH CAP, 30 CM BELOW GRADE. - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590485.099 N4954256.350 ELEV 194.842

BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANDON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.30x

2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FIRST SUBMISSION	AUG 2020	JWI
NO.	REVISIONS	DATE	INITIAL



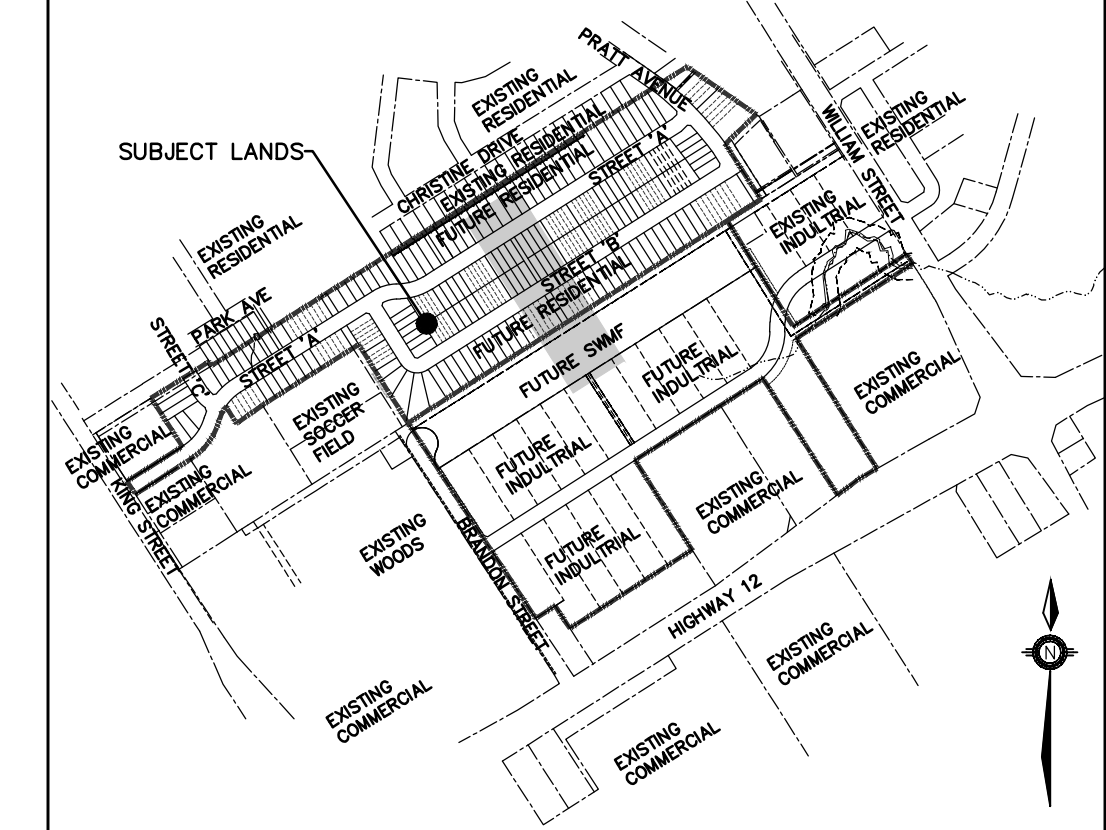
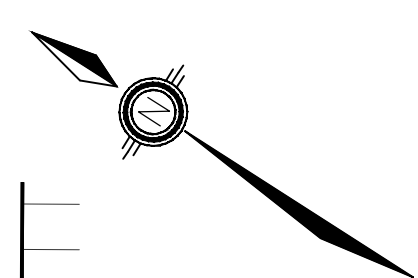
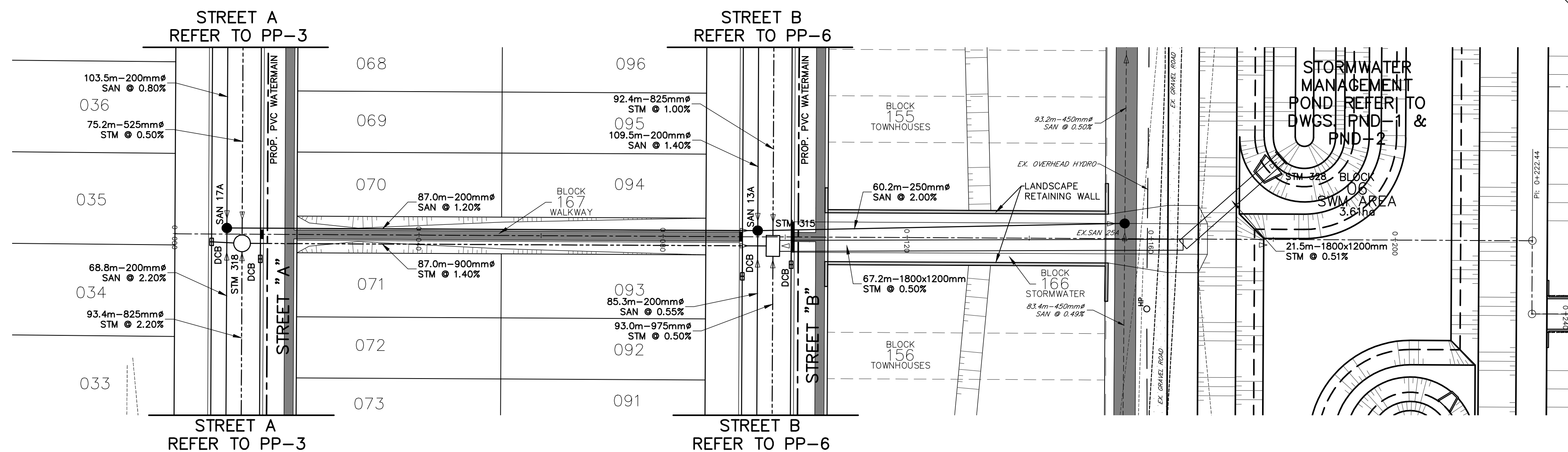
PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND

PLAN AND PROFILE
STREET C
STA 0+100 TO 0+167

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS

229 Mapleview Dr. E. Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1056

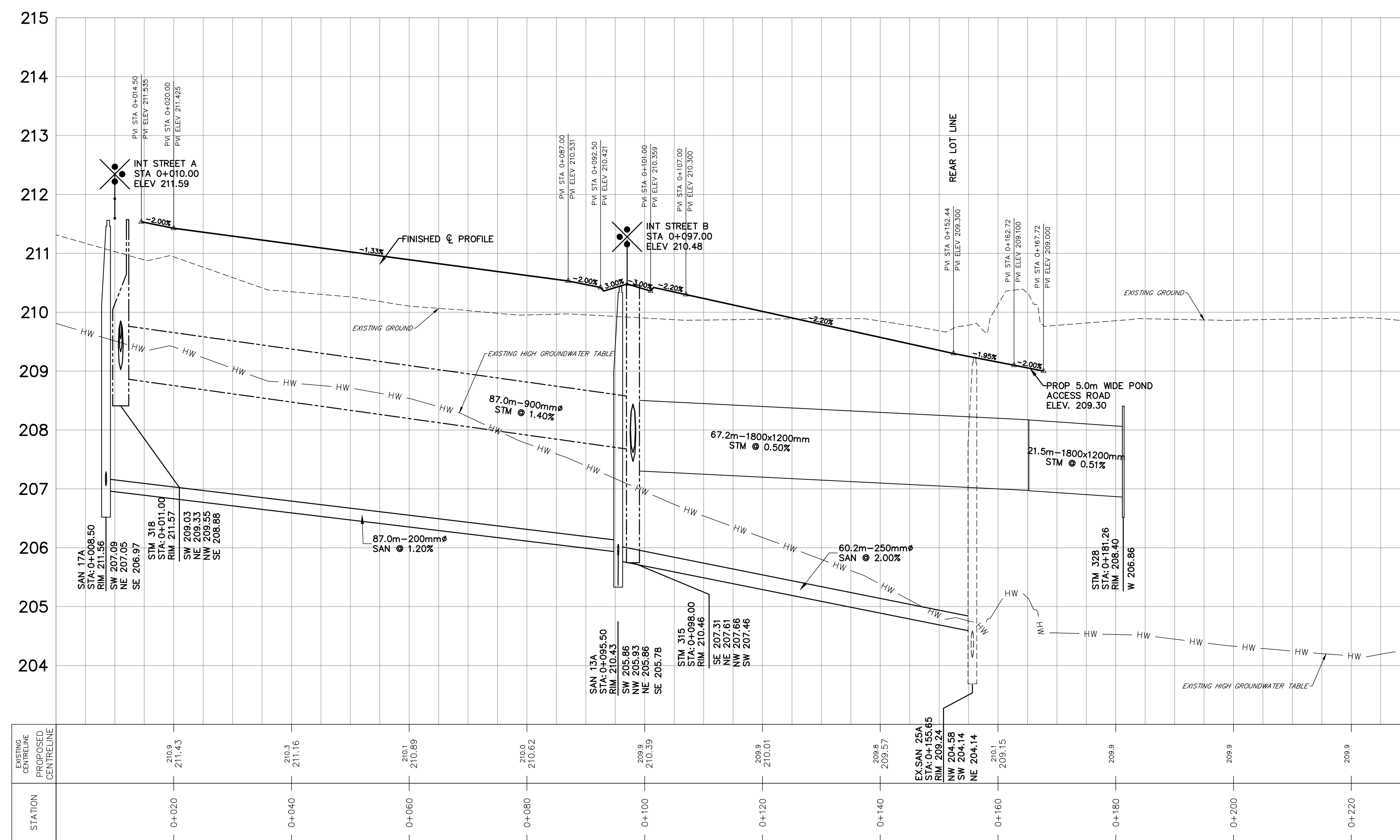
DESIGN	JH	SCALE: H=1:500 V=1:50	DATE	FEB 2020
DRAWN	JH	PROJECT	DWG. NO	
CHECKED	JWI	PRA-16084	PP-8	



KEYPLAN
NTS

LEGEND

	SUBDIVISION BOUNDARY		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
	EXISTING LIGHT STANDARD		HYDRANT AND VALVE
	VALVE AND BOX		BELL VAULT
	CABLE VAULT		SAN 15A
	SANITARY MAINTENANCE HOLE		STORM MAINTENANCE HOLE
	CATCH BASIN		DOUBLE CATCH BASIN
	DROPPED CURB		TRANSFORMER
	SWITCHGEAR		PULLING CHAMBER
	LIGHT STANDARD		LIGHT STANDARD PEDESTAL
	COMMUNITY MAILBOX		TACTILE WARNING PLATES
	BOREHOLE WITH ID#		SANITARY SERVICE
	WATER SERVICE AND VALVE		EXISTING WATERMAIN
	PROPOSED WATERMAIN		EXISTING SANITARY SEWER AND DIRECTION OF FLOW
	PROPOSED SANITARY SEWER AND DIRECTION OF FLOW		EXISTING STORM SEWER AND DIRECTION OF FLOW
	PROPOSED STORM SEWER AND DIRECTION OF FLOW		83 DRAFTPLAN LOT / BLOCK NUMBER
	ENGINEERED FILL	NOTE: SHOP DRAWINGS TO BE PROVIDED FOR ALL SANITARY & STORM STRUCTURES. BUOYANCY CALCULATIONS TO BE PROVIDED FOR ALL STRUCTURES LOCATED BELOW THE SEASONALLY HIGH GROUNDWATER TABLE.	



BENCHMARK:

BENCHMARK NO. 00820038042 RIB WITH CAP, 30 CM BELOW GRADE, - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.059 N4954236.350 ELEV 194.842

BENCHMARK NO. 05719747317 62M NORTHEAST FROM BRANDON ST AND HWY 12 INTERSECTION UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.3xx

2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FIRST SUBMISSION	AUG 2020	JWI
NO.	REVISIONS	DATE	INITIAL



PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND

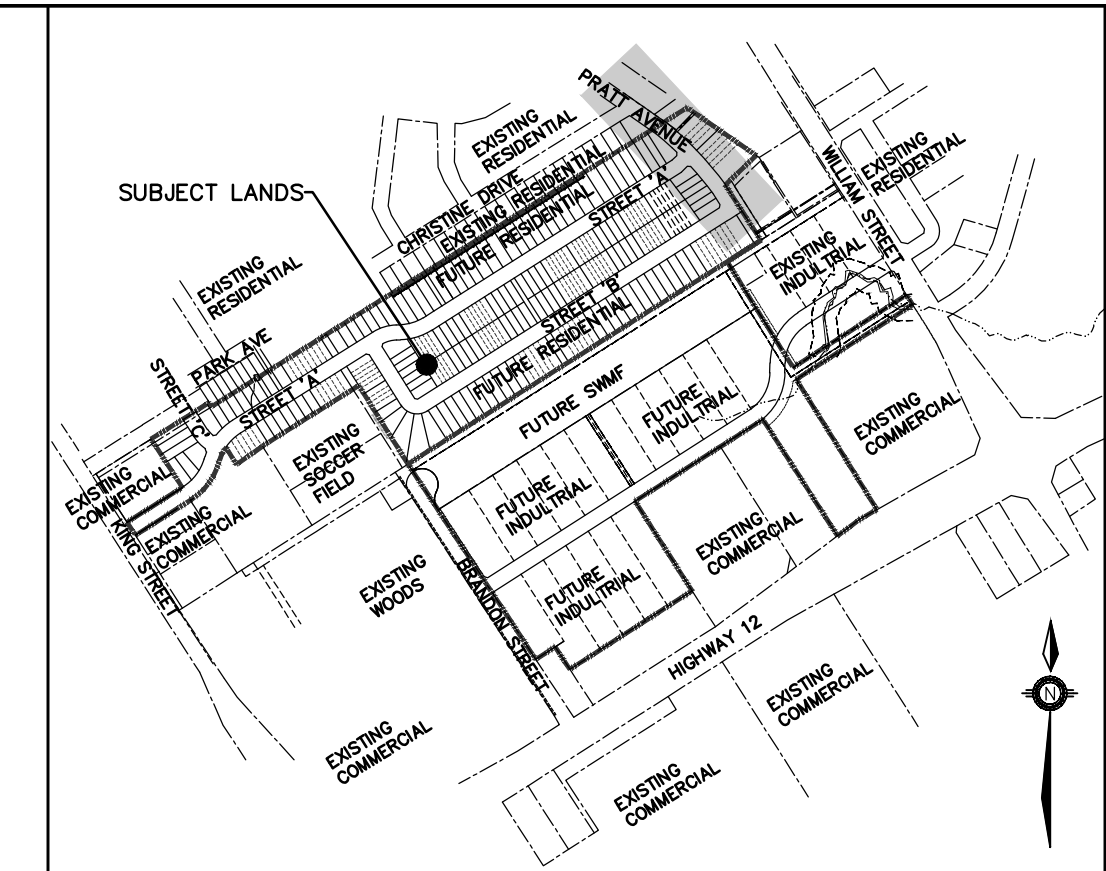
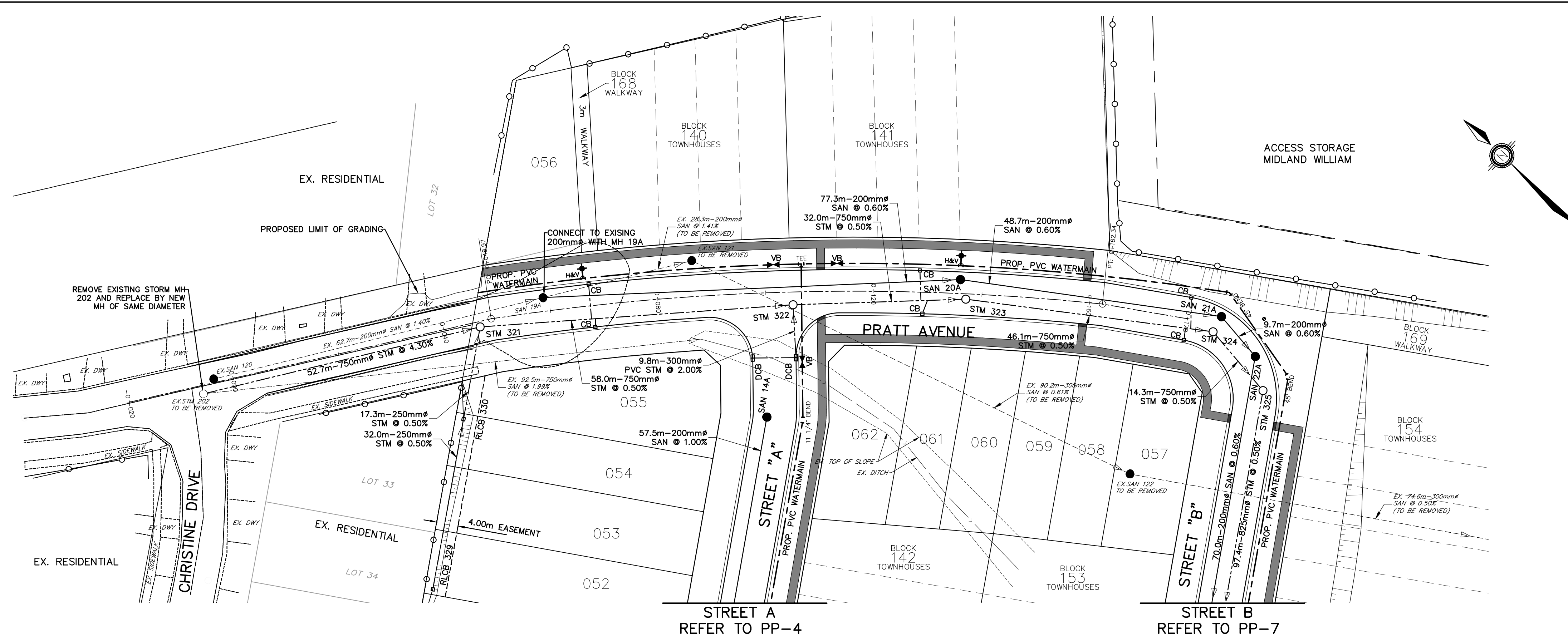
PLAN AND PROFILE
STREET D
STA 0+000 TO 0+300

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS

229 Mapleview Dr. E. Unit 1
Barrie, ON L4N 0W5
P. 705.734.2538
F. 705.734.1058

DESIGN	JJH	SCALE: H=1:500 V=1:50	DATE	FEB 2020
DRAWN	JJH	PROJECT	DWG. NO	
CHECKED	JWI	PRA-16084	PP-9	

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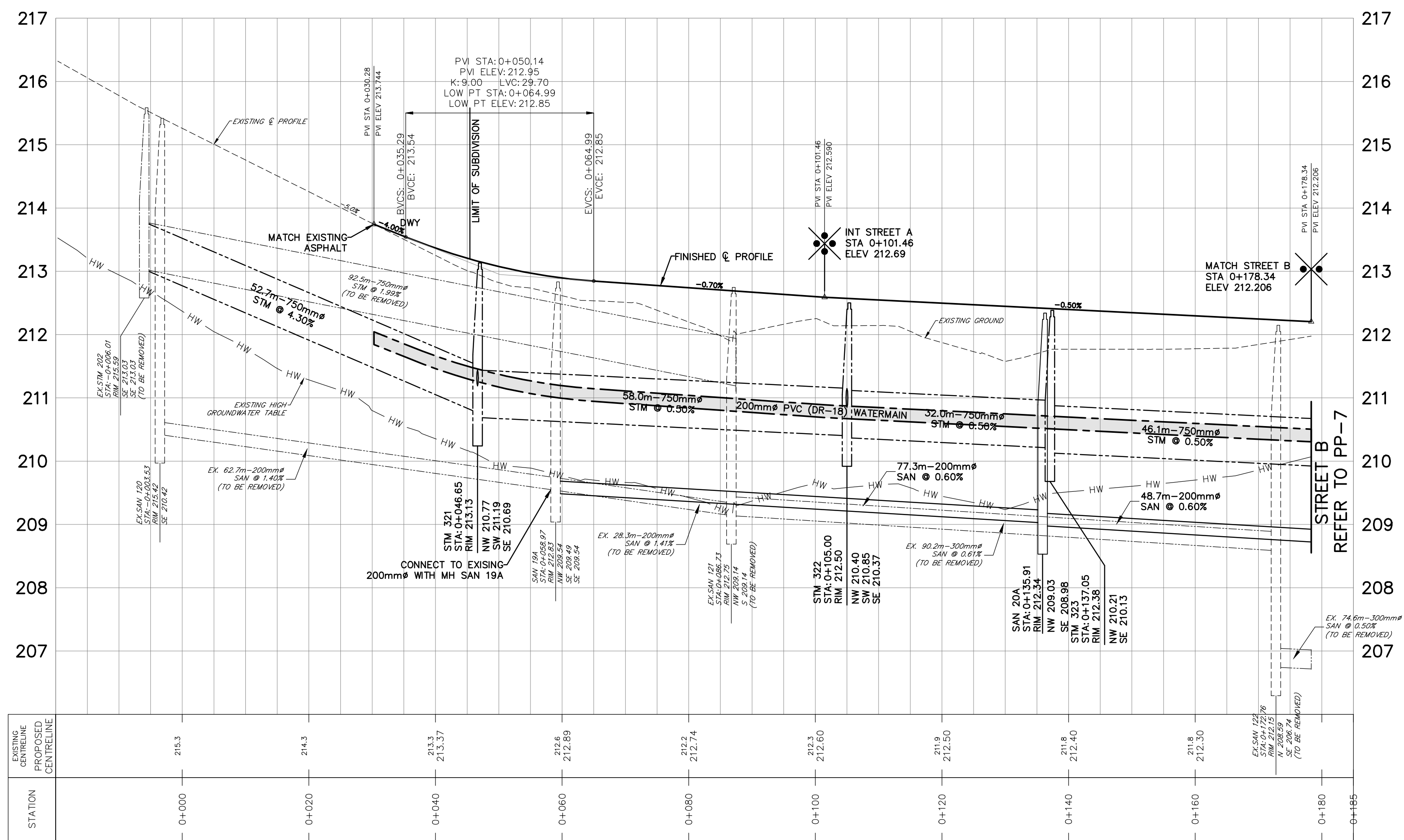


KEYPLAN
NTS

LEGEND

- SUBDIVISION BOUNDARY
- EX SAN 105 ● EX. SANITARY MAINTENANCE HOLE
- EX STM 201 ○ EX. STORM MAINTENANCE HOLE
- CB □ EX. CATCH BASIN
- DCB □ EX. DOUBLE CATCH BASIN
- EX V&B □ EX. VALVE & BOX
- H&V □ EX. HYDRANT & VALVE
- BPED □ EX. BELL PEDESTAL
- HP □ EX. HYDRO POLE
- EX SIGN □ EX. SIGN
- EXISTING LIGHT STANDARD
- H&V ● HYDRANT AND VALVE
- V&B ● VALVE AND BOX
- BELL VAULT
- CABLE VAULT
- SAN 15A □ SANITARY MAINTENANCE HOLE
- STM 310 ● STORM MAINTENANCE HOLE
- CB □ CATCH BASIN
- DCB □ DOUBLE CATCH BASIN
- DROPPED CURB
- △ TRANSFORMER
- SWITCHGEAR
- PULLING CHAMBER
- LIGHT STANDARD
- LIGHT STANDARD PEDESTAL
- COMMUNITY MAILBOX
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- BOREHOLE WITH ID#
- SANITARY SERVICE
- WATER SERVICE AND VALVE
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- EXISTING SANITARY SEWER AND DIRECTION OF FLOW
- PROPOSED SANITARY SEWER AND DIRECTION OF FLOW
- EXISTING STORM SEWER AND DIRECTION OF FLOW
- PROPOSED STORM SEWER AND DIRECTION OF FLOW
- 83 DRAFTPLAN LOT / BLOCK NUMBER
- ▨ ENGINEERED FILL

NOTE: SHOP DRAWINGS TO BE PROVIDED FOR ALL SANITARY & STORM STRUCTURES. BUOYANCY CALCULATIONS TO BE PROVIDED FOR ALL STRUCTURES LOCATED BELOW THE SEASONALLY HIGH GROUNDWATER TABLE.



BENCHMARK:

BENCHMARK NO. 00820038042 RIB WITH CAP, 30 CM BELOW GRADE. - LOCATED ON NORTHWEST CORNER OF HWY 12 AND WILLIAM ST IN TOWN OF MIDLAND. POINT IS LOCATED ON TRAFFIC ISLAND CLOSE TO CURB. UTM ZONE 17 E590465.099 N4954255.350 ELEV 194.842

BENCHMARK NO. 05719747317 62m NORTHEAST FROM BRANSON ST AND HWY 12 INTERSECTION. UTM ZONE 17 E589914.683 N4953919.657 ELEV 213.30x

NO.	REVISIONS	DATE	INITIAL
2.	DRAFT PLAN SUBMISSION	NOV 2022	JWI
1.	FIRST SUBMISSION	AUG 2020	JWI

PRATT HANSEN GROUP INC.
GALLOWAY SUBDIVISION
TOWN OF MIDLAND

PLAN AND PROFILE
PRATT AVENUE
STA -0+020 TO 0+205

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS

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F. 705.734.1056

DESIGN JH SCALE: H=1:500 V=1:50 DATE FEB 2020
DRAWN JH PROJECT PP-10
CHECKED JWI PRA-16084

JONES CONSULTING GROUP LTD.
PLANNERS & ENGINEERS

22-11-30
PROVINCE OF ONTARIO

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