FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT
IN SUPPORT OF ZONING BY-LAW AMENDMENT

175 Wynford Drive

City of Toronto
Toronto & East York District
M3C 1J3

counterpoint ENGINEERING

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File Number: 20028

Prepared For:
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1	Issued for ZBA	September 22nd, 2020
No.	**Revision**	**Date**

EXECUTIVE SUMMARY

This Functional Servicing and Stormwater Management Report has been prepared on behalf of DVP Hotel Development LP in support of a Zoning By-law Amendment application, to provide for site specific regulations for the site. This Report presents a site servicing strategy for the proposed development that addresses the requirements of the applicable regulatory agencies and provides the basis for detailed servicing design. The servicing strategy for the proposed development is summarized as follows:

WATER SERVICING:

The proposed development is to be serviced by two typical "h" (combined fire and domestic) connections and four additional domestic connections to the existing 400 mmø watermain located on Wynford Drive. The water demand requirement of the proposed development for Maximum Day Demand plus Fire Flow is **7,847 L/min**. The proposed development results in an increase in Maximum hour and Maximum Day demand. Site specific watermain pressure tests indicate that at the minimum residual pressure allowed in the City of Toronto, the existing 400 mmø watermain will have an available flow of approximately 34,369 L/min. The existing watermain will provide sufficient level of service to meet the water demand for the proposed development.

FOUNDATION DRAINAGE:

The short-term discharge rate is expected to be **607.40 m^3/ day (7.03 L/s).** The discharge will be to the 375 mmø sanitary sewer located on Wynford Drive. The quality limits for discharge in the sewer will satisfy the limits as listed in Table 1 – Limits for Sanitary/Combined Sewer Discharge. The anticipated construction dewatering rate will be significantly below the final peak sanitary discharge rate totalling **42.41 L/s**. The short-term discharge to the sanitary sewer system will cease before the site is occupied. As such, there is sufficient capacity in the municipal system to accommodate the short-term groundwater discharge.

The Hydrogeological Report indicates an estimated long-term discharge rate of **253.44 m^3/day (2.93 L/s)**. It should be noted that the current site will be built with a watertight foundation and thus will require no long-term groundwater discharge. Refer to **Appendix B** for the watertight foundation letters prepared by the mechanical consultant, structural consultant and the owner.

SANITARY SERVICING:

The proposed site will be serviced by six (6) new connections to the existing 375 mmø sanitary sewer on Wynford Drive. The estimated peak sanitary flow of the existing site is **8.76 L/s**. The peak sanitary design flow of the proposed development is **42.41 L/s** which is a **33.65 L/s** increase in flow.

A detailed analysis of the sanitary sewer system from the proposed development to the trunk sewer within the Don Valley has been completed under both dry and wet weather flow conditions. The existing sanitary sewer has capacity to accommodate the dry weather flow without surcharge. And the existing sanitary sewer surcharges in the wet weather flow condition. A hydraulic grade line analysis was completed from the trunk sewer up to the site. Based on the conclusions in the hydraulic grade line (HGL) analysis, the sanitary sewers upstream of the connection to the trunk sewer will not require external upgrades. The HGL is deeper than 1.80 m below the centerline road elevation for all sewers from the sanitary trunk sewer to the subject site.

STORMWATER SERVICING:

Under existing conditions, the existing building and the lands north of the existing building are currently draining via a 250 mmø connection to the 300 mmø storm sewer on Wynford Drive. The remainder of the site drains via a connection to a 375 mmø storm sewer within a Private Road south of the site which ultimately connects to a 375 mmø Wynford Drive storm sewer. The proposed development will be serviced by a new storm connection to the existing 300 mmø storm sewer on Wynford Drive. The City of Toronto's *Wet Weather Flow Management Policy* identifies performance objectives for runoff from new development sites including water quantity, quality and water balance.

Quantity - Quantity control will be provided on-site by a **351 m^3** underground storage tank in combination with an inlet control to ensure that the 100-year post development peak flows are attenuated to the 2-year predevelopment allowable release rate to Wynford Drive.

Water Balance – A water balance volume of **68.5 m^3** is required to achieve the 5 mm retention as outlined in the Wet Weather Flow Management Guidelines. In addition to providing the minimum requirement as per Wet Weather Flow Management Guidelines, it is possible to achieve the TGS Tier 2 version 3 Advanced Stormwater Retention and reuse which requires the retention of 10 mm. The retention of 10 mm to meet the Tier 2 of the TGS would require a total water balance volume of **137 m^3**. The water balance volume will be achieved though initial abstractions provided through green roof, pavement, permeable pavement and landscaped areas, and through a rainwater harvesting cistern for irrigation. The rainwater harvesting storage tank will form part of the underground stormwater storage tank provided for quantity control and a minimum of **47.3 m^3** will be provided.

Quality – Rooftop runoff is generally presumed clean and will not require treatment and will discharge directly into the storm tank. The use of a stormwater treatment system will however be required to achieve the 80% TSS removal from the other surfaces on site. The details regarding the design of the stormwater treatment system will be provided during the Site Plan Application approval.

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1.0 INTRODUCTION

1.1 BACKGROUND

This Functional Servicing and Stormwater Management Report (FSR) has been prepared on behalf of DVP Hotel Development LP in support of Zoning By-Law Amendment Approval for an overall **2.19 ha** area. This application proposes to re-designate the former zoning of the subject site.

This FSR has been prepared to address the site servicing strategy (stormwater, sanitary, and water) in support of a Zoning By-Law Amendment application. The proposed servicing works (including stormwater conveyance) will be designed to meet City of Toronto Design Guidelines.

The subject site is located at 175 Wynford Drive in the City of Toronto. It is located on west side of Wynford Drive, north of Eglinton Avenue East and east of the Don Valley Parkway. The site is bound by a senior's residence to the south, ravine lands to the north along with an existing 34-storey condominium to the west, Wynford Drive to the east and a private road to the south. Refer to **Figure 1** for the subject site within the context of its surroundings. Existing underground servicing infrastructure is available on Wynford Drive. The overall **2.19 ha** development area currently contains an existing hotel and an associated parking lot. The land generally slopes from the northeast to the southwest.

The proposed mixed used residential-retail development will consist of 4 residential towers along with 2 podiums having retail at grade. A 45-storey tower along with a 54-storey tower has been proposed on the west side of the site with a shared 8-storey podium. A 47-storey tower along with a 49-storey tower has been proposed on the east side of the site with a shared 8-storey podium. A total of **2750** residential units and **125** hotel units are proposed. As well **795 m^2** of retail area (including day care) is proposed. There will be 6 levels shared of underground parking and will be accessible from Wynford Drive for loading, parking and garbage removal.

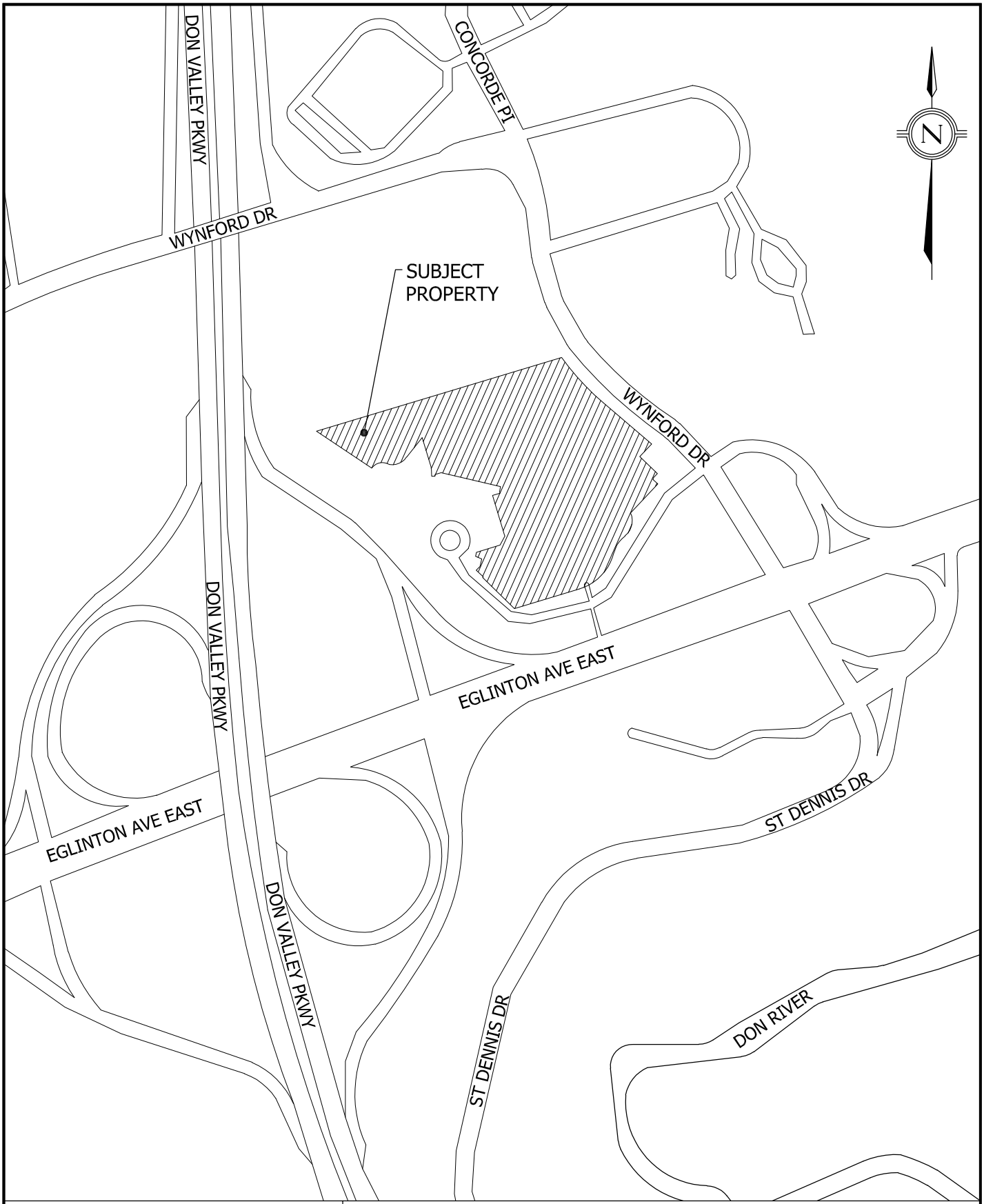
1.2 TRCA REGULATED LIMIT

An area of **0.82 ha** that encompasses the north part of the site is located within the Toronto and Region Conservation Authority (TRCA) regulated limit. This regulated area will be removed entirely from the proposed site area as these lands will be conveyed over to the TRCA. The limits were determined using a combination of a 10 m setback from the dripline as well as a 17 m setback from the TRCA staked top of bank. The regulated area must be stabilized and will drain directly into the creek. A portion of the TRCA regulated area currently conveys storm runoff to the Wynford Drive storm sewer as a courtyard area encroaches this area currently. Under proposed conditions the courtyard and any paved areas will be removed and naturalized. The drainage within the regulated limit will be directed to the Creek in post-development conditions. As a result, the site analysis area of **1.37 ha** will be used for stormwater and sanitary calculations.

2.0 STUDY PARAMETERS

This servicing assessment is based on the review of the following documents and drawings:

- **Architectural Plans** prepared by Quadrangle Architects
- **Geohydrology Report** prepared Grounded Engineering
- **Plan and Profile Drawings, Wynford Drive (W-157-06)**, provided by City of Toronto
- **City of Toronto Wet Weather Flow Management Guidelines**, prepared by City of Toronto, Revised November 2006
- **City of Toronto Sewer Atlas Maps**, prepared by City of Toronto, Third Edition January 2010



SITE LOCATION PLAN

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PROPOSED RESIDENTIAL DEVELOPMENT
175 WYNFORD DRIVE
TORONTO, ONTARIO

SCALE: N.T.S.

DATE: SEPTEMBER 2020
PROJECT No. 20028
FIGURE No. 1

3.0 WATER SUPPLY

3.1 EXISTING WATER SUPPLY

The existing site is serviced by connections to the 400 mmø watermain located on the east side of Wynford Drive. The existing watermain connections will be abandoned. There are two existing hydrants on the east side of Wynford Drive adjacent to the subject site.

3.2 PROPOSED WATER SUPPLY

The site will be serviced by the aforementioned 400 mmø watermain on the east side of Wynford Drive. Two typical “h” (combined fire and domestic) connections and four additional domestic connections have been proposed to support the development. Having connections to an adequately pressurized municipal watermain will provide a Standard Water Supply to the site as per the Fire Underwriter’s Survey (FUS) guidelines (1999). Six connections to the existing watermain are proposed on the northeast side of the development. As per Building Code 3.2.9.7 (4), for a proposed building with a height greater than 84 m high, measured between grade and the ceiling level of the top storey, the building shall be serviced by no fewer than two sources of water supply from a public water system. The proposed siamese connections will be a minimum of 45 m from the municipal hydrants located Wynford Drive to provide adequate fire coverage for the proposed development. Refer to **Figure 2** for the existing and proposed watermain layout.

0.82 ha RAVINE LANDS TO BE CONVEYED TO TRCA. AREA REMOVED FROM ANALYSIS AREA

DRIPLINE

10m DRIPLINE SETBACK

UNDERGROUND LIMITS

EX. MH 5(1200ø)
TOP=127.40
NW INV: 120.58
W INV: 120.22
E INV: 120.19

EX. 1050mmø CSP STM

EX. 375mmø CONC. SAN

WYNFORD DR.

EX. MH6A(1200ø)
TOP=126.14
NW INV: 122.86
SW INV: -0.20
SE INV: 122.83

EX. MH 11(1200ø)
TOP=124.91
SW INV: 123.16
SE INV: 121.32

EX. 1050mmø CSP STM

MH1(1200ø)
TOP=123.80
NW INV: 120.36
SW INV: 120.60
SE INV: 120.36

EX. MH5A(1200ø)
TOP=122.52
NW INV: 119.19
SE INV: 119.13

EX. 300mmø CONC. SAN

EX. 375mmø CONC. SAN

EX. 375mmø CONC. SAN

EXISTING 400mm WATERMAIN

150mmø SAN CONNECTION (T1)
150mmø SAN CONNECTION (T2)
150mmø SAN CONNECTION (PODIUM)
150mmø SAN CONNECTION (T5)
150mmø SAN CONNECTION (PODIUM)
150mmø SAN CONNECTION (T4)
100mmø PVC DOM (T5)
150mmø PVC FIRE
100mmø PVC DOM (PODIUM)
150mmø PVC DOM (T3)
100mmø PVC DOM (T4)
100mmø PVC DOM (PODIUM)

T3
PROPOSED
47 STOREY
TOWER 3

11.7m-300mmø PVC. STM @ 2.5%

PODIUM
8 STOREY

CNTL STM(1200ø)
TOP=124.03
NE INV: 120.89

T2
PROPOSED
45 STOREY
TOWER 2

T4
PROPOSED
49 STOREY
TOWER 4

EX. MH 10(1200ø)
TOP=122.56
NW INV: 119.19
SE INV: 119.13

PODIUM
8 STOREY

T1
PROPOSED
54 STOREY
TOWER 1

34 Storey Building
(Poured Concrete Foundation)
ACCOLADE

PRIVATE ROAD

DELMANOR

N

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DVP HOTEL DEVELOPMENT LP
175 WYNFORD DRIVE
TORONTO, ONTARIO

PROPOSED SERVICING PLAN

DESIGNED BY: TM	DATE: SEPTEMBER 2020
CHECKED BY: AKD	PROJECT No. 20028
DRAWING BY: TM	
CHECKED BY: AKD	FIGURE No. 2
SCALE:1: 750	

The City of Toronto's design criteria states that the water demand used for watermain size selection should be sufficient to satisfy maximum day demand plus fire flow or the peak hour demand, whichever is greater. Fire flow for residential areas will not be less than 4,800 L/min for a 2 hour duration in addition to the maximum daily domestic demand, delivered with a residual pressure of not less than 140 kPa. For commercial, institutional and industrial areas, the minimum fire flow available will not be less than 5,000 L/min for 4 hours, delivered with a residual pressure of not less than 140 kPa. Fire demand was calculated as per the FUS.

The Fire Demand was calculated based on the conservative assumption that no fire walls are present.

Refer to **Appendix A** for the supporting calculations of the following proposed flows:

- Maximum Hour Demand = 1,628 L/min
- Maximum Day Demand = 847 L/min
- Fire Flow Demand (2.0 hours) = 7,000 L/min
- Maximum Day Demand plus Fire Flow Demand = **7,847 L/min** (governs)

City of Toronto design criteria dictates the following system pressure requirements:

- Average Day and Maximum Day range = 350 kPa to 550 kPa
- Minimum hour and peak hour range = 275 kPa to 700 kPa
- Minimum pressure under any non-fire demand scenario = not less than 275 kPa
- Minimum residual pressure during maximum day plus fire scenarios = not less than 140 kPa
- Maximum static pressure = 690kPa

The four towers will be sprinklered and will be designed to NFPA 13 and other NFPA standards. As per the FUS, the residential development is considered a low-hazard occupancy, but to accommodate the hotel and retail usage a combustible contents factor has been used in the fire demand calculations.

A flow and pressure test was conducted on the existing 400 mmø watermain at a north and south of the development. Refer to **Appendix A** for the flow test results. Based on the flow test results the existing watermain has a static pressure of 80 psi and a residual pressure of 75 psi at a flow of 8,979 L/min. (2373 GPM). Based on these results and utilizing the accepted calculation method of the National Fire Protection Agency (NFPA), the available

flow from this main at the minimum residual pressure allowed by City of Toronto criteria of 140 kPa would be approximately **34,369 L/min**. The available flow is greater than the maximum day demand plus Fire Flow Demand, therefore adequate flow and pressures can be provided in the existing system. Refer to **Appendix A** for the supporting calculations.

4.0 FOUNDATION DRAINAGE

Discharge of foundation drains to municipal sewers must be in accordance with Toronto Municipal Code, Chapter 681 Sewers. The quality limits for discharge in the sewers must satisfy the limits as listed in Table 1 – Limits for Sanitary and Combined Sewer Discharge and/or Table 2 – Limits for Storm Sewer Discharge of Chapter 681. A Permit to Take Water (PTTW) from the Ontario Ministry of the Environment and Climate Change (MOECC) through an online process is required for Short Term water taking between 50 m^3/day and 400 m^3/day. A PTTW is required for Long Term water taking from a permanent drainage system greater than 50 m^3/day. A permit is required from the City of Toronto for both short term and long term discharges to the municipal sewer system.

A Preliminary Geohydrology Assessment was prepared by **Grounded Engineering**, dated **August 2020** for the proposed development.

4.1 SHORT TERM DRAINAGE (CONSTRUCTION)

The Geohydrology Assessment indicates that positive dewatering such as eductors/will points will be required. The maximum groundwater rate will be limited to be **607.40 m^3/ day (7.03 L/s)** and the sump-collecting and pumping system will be designed accordingly by others. A limited PTTW from the MECP will be required for construction dewatering for the peak discharge rate is above 50 m^3/ day. The discharge will be to the 375 mmø sanitary sewer located on Wynford Drive. Temporary discharge must meet Toronto Table 1 Sanitary/Combined Sewer Discharge Limits prior to discharge to the municipal sanitary sewer. Details of Construction (short-term) dewatering will be provided by a dewatering contractor prior to construction that satisfies Toronto Municipal Code, Chapter 681 Sewers in order to obtain a temporary discharge permit from the City.

As discussed later in **Section 5.0 Sanitary Servicing** there is capacity in the existing sanitary system for proposed final peak sanitary discharge from the subject site of **42.41 L/s**. The anticipated construction dewatering rate will be below the final peak sanitary discharge rate of **3,664,224 L/day (42.41 L/s)** to the 375 mmø sanitary sewer. The short-term discharge to the sanitary sewer system will cease before the site is occupied. As such, there is sufficient capacity in the municipal system to accommodate the short-term groundwater discharge.

4.2 LONG TERM DRAINAGE

The Hydrogeological Report indicates an estimated long-term discharge rate of **253.44 m^3/day (2.93 L/s)**. It should be noted that the current site will be built with a watertight foundation and thus will require no long-term groundwater discharge. Refer to **Appendix D** for the watertight foundation letters prepared by the mechanical consultant, structural consultant and the property owner. The Servicing Report Groundwater Summary has been completed and is attached in **Appendix D.**

5.0 SANITARY SERVICING

5.1 EXISTING SANITARY SERVICING

The existing site is serviced by a connection to the 375 mmø sanitary sewer located on Wynford Drive. This 375 mmø sanitary sewer conveys flows south towards Eglinton Avenue East and eventually to the 1350 mmø trunk sewer within the Don Valley approximately 300 mm south of the subject site. The existing connections will be abandoned. Based on existing conditions it is estimated that the existing peak sanitary flow is approximately **8.76 L/s**.

The site is located within Basement Flooding Area 55. A Class Environmental Assessment (EA) Report is currently in progress and not available. A downstream sanitary sewer capacity analysis has been completed for the dray and wet weather conditions.

The existing dry-weather flow analysis determines that no surcharging occurs within the downstream sanitary sewer to the trunk sewer.

The City of Toronto standards have been used to determine the existing wet-weather flow within the downstream sanitary sewer to the trunk sewer. The gross sanitary sewer drainage area is greater than 50 ha; the wet-weather inflow and infiltration ("I/I") value of 3.0 L/s/ha was added to the analysis for the first 50 ha, then an I/I value of 2.0 L/s/ha was used for the remaining area. It was determined that two sections of sanitary sewer (MH4-MH2) to the trunk sewer surcharge during the wet-weather conditions. However, the hydraulic grade line (HGL) is a minimum of 1.80 m below the centre line of road. Refer to **Appendix B** and **Figure 3** for existing downstream analysis.

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EXISTING SANITARY DRAINAGE PLAN

MIXED USE DEVELOPMENT
175 WYNFORD DR
TORONTO, ONTARIO

DRAWING BY: MA
CHECKED BY: AD
SCALE: NTS

DATE: SEPTEMBER 2020
PROJECT No. 20028
FIGURE No. 3

5.2 PROPOSED SANITARY SERVICING

The proposed site will be serviced by six (6) new connections to the existing 375 mmø sanitary sewer on Wynford Drive. Refer to **Figure 2** for the proposed sanitary connections.

Using the City of Toronto Sanitary Design criteria, the equivalent population for the proposed development is approximately **4901 persons**. This includes a residential population of **4651 persons**, a hotel population of **250 persons** and a retail population of **9 persons** (including day care area). The peak sanitary flow for the proposed development has been calculated to be **42.41 L/s**. The proposed development will result in an increase of **33.65 L/s** in the peak sanitary flow. Refer to **Appendix B** for detailed calculations.

A detailed analysis of the sanitary sewer system from the proposed development to the trunk sewer within the Don Valley has been completed under both dry and wet weather flow conditions. Populations for the drainage areas have been calculated based on land use type and type of housing as outlined in the Toronto Sewer and Watermain Manual. Refer to **Figure 4** for the sanitary drainage areas.

The analysis determined that for the proposed development:

- The existing sanitary sewer has capacity to accommodate the proposed dry weather flow without surcharge;
- The existing sanitary sewer surcharges during the wet weather flow condition in two sections of sanitary sewer (MH4-MH2) for both the existing and proposed conditions;
- The hydraulic grade line (HGL) is deeper than 1.80 m below the centreline road elevation for all sewers from the sanitary trunk sewer to the subject site for both the existing and proposed conditions.
- No external sewer upgrades are required to accommodate the proposed development.

Refer to **Appendix B** for the sanitary calculations, downstream sanitary sewer capacity analysis.

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PROPOSED SANITARY DRAINAGE PLAN

MIXED USE DEVELOPMENT
175 WYNFORD DR
TORONTO, ONTARIO

DRAWING BY: MA
CHECKED BY: AD
SCALE: NTS

DATE: SEPTEMBER 2020
PROJECT No. 20028
FIGURE No. 4

6.0 STORMWATER SERVICING

6.1 EXISTING STORMWATER SERVICING

There is a 300 mmø storm sewer adjacent to the subject site that conveys flows south towards Eglinton Avenue East. There is also a 1050 mmø storm sewer that conveys flows south towards Eglinton Avenue East. The 300 mmø storm sewer is confluent with the 1050 mmø storm sewer approximately 130 m south of the subject site. These sewers continue south on Wynford Drive past Eglinton Avenue East prior to discharging into the East Branch Don River. The existing site is currently serviced via two storm connections. The existing building and the lands north of the existing building are currently draining via a 250 mmø connection to the 300 mmø storm sewer on Wynford Drive. The remainder of the site drains via a connection to a 375 mmø storm sewer located within the Private Road to the south of the site which ultimately connects to a 375 mmø Wynford Drive storm sewer. The 375 mmø storm sewer collects flows from the condominium and a part of the subject site. The existing connection will be abandoned through Toronto Water.

6.2 EXISTING DRAINAGE

An area of 0.74 ha including the existing building drains to the Wynford Drive storm sewer. An area of 0.63 ha drains to the existing private road storm sewer. As mentioned in **Section 1.2**, an area of 0.82 ha located within the TRCA regulated limit has been dedicated and removed from the analysis area. The resulting analysis area is **1.37 ha.** Refer to **Figure 5** for the existing storm drainage. Under existing conditions, it appears no external drainage enters the site.

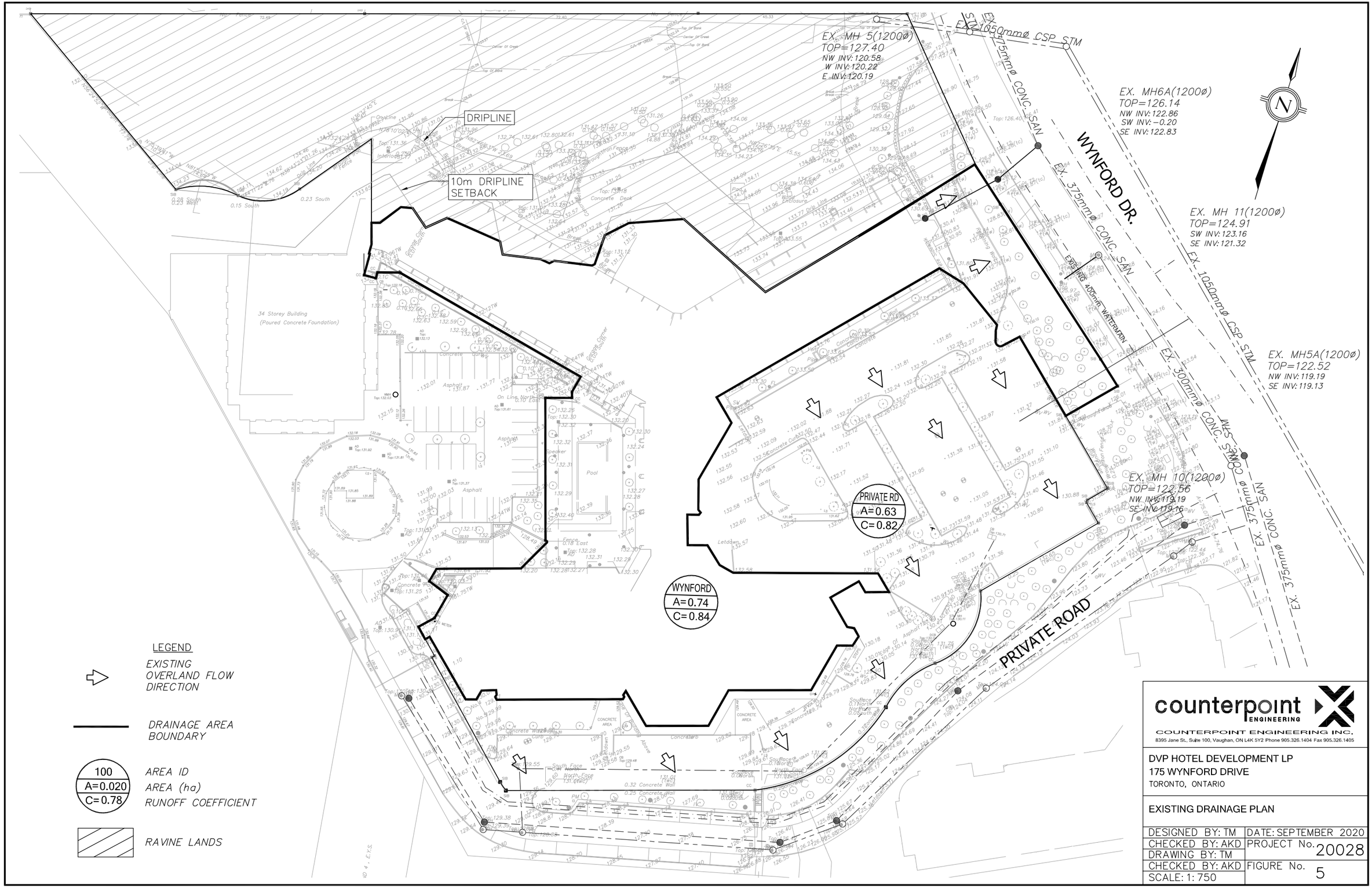
Under existing conditions, the flows to municipal storm sewer system are summarized in the below table.

Table 1 - Existing Site Release Rates

Storm Event	Area 101 Existing Site Uncontrolled Runoff to Wynford Drive (L/s)	Area 102 Existing Site Uncontrolled Runoff to Private Road (L/s)	Ultimate Drainage to Wynford Drive (L/s)
2-Year	152	127	**279**
5-Year	228	189	**417**
10-Year	280	233	**513**
25-Year	327	272	**599**
50-Year	387	322	**709**
100-Year	432	360	**792**

Refer to **Appendix C** for calculations

As the storms flows for the existing site are confluent approximately 130 m south of the site, the allowable release rate will be calculated for the entire **1.37 ha** analysis area.



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DVP HOTEL DEVELOPMENT LP
175 WYNFORD DRIVE
TORONTO, ONTARIO

EXISTING DRAINAGE PLAN

DESIGNED BY: TM	DATE: SEPTEMBER 2020
CHECKED BY: AKD	PROJECT No. 20028
DRAWING BY: TM	
CHECKED BY: AKD	FIGURE No. 5
SCALE: 1: 750	

6.3 ALLOWABLE RELEASE RATE

The sites imperviousness under existing conditions is higher than 50%. Under Wet Weather Guidelines the maximum value of C (Runoff Coefficient) used in calculating the pre-development peak runoff rate is limited to 0.50 for the 2-year storm event. As the existing properties are greater than 50% impervious this rule applies.

As shown in **Figure 5**, the **1.37 ha** analysis area is comprised of an existing hotel and associated parking lot of drains.

The allowable minor system discharge from the subject site is calculated using the **1.37 ha** at a runoff coefficient of 0.50 as follows:

$$\mathbf{Q_A = C \times A \times i \times N\ (L/s)}$$

Table 2 - Allowable Release Rate

Variables	Site
A - Site Area (ha)	1.37
Tc (min)	10
C - Runoff Coefficient	0.50
i - Intensity	88.19
N – Constant	2.778
Q - Release Rate (l/s)	**168**

The allowable release rate to the 300 mmø concrete storm sewer on Wynford Drive is **168 L/s**. Refer to **Appendix C** for allowable release rate calculations.

6.4 PROPOSED STORMWATER SERVICING

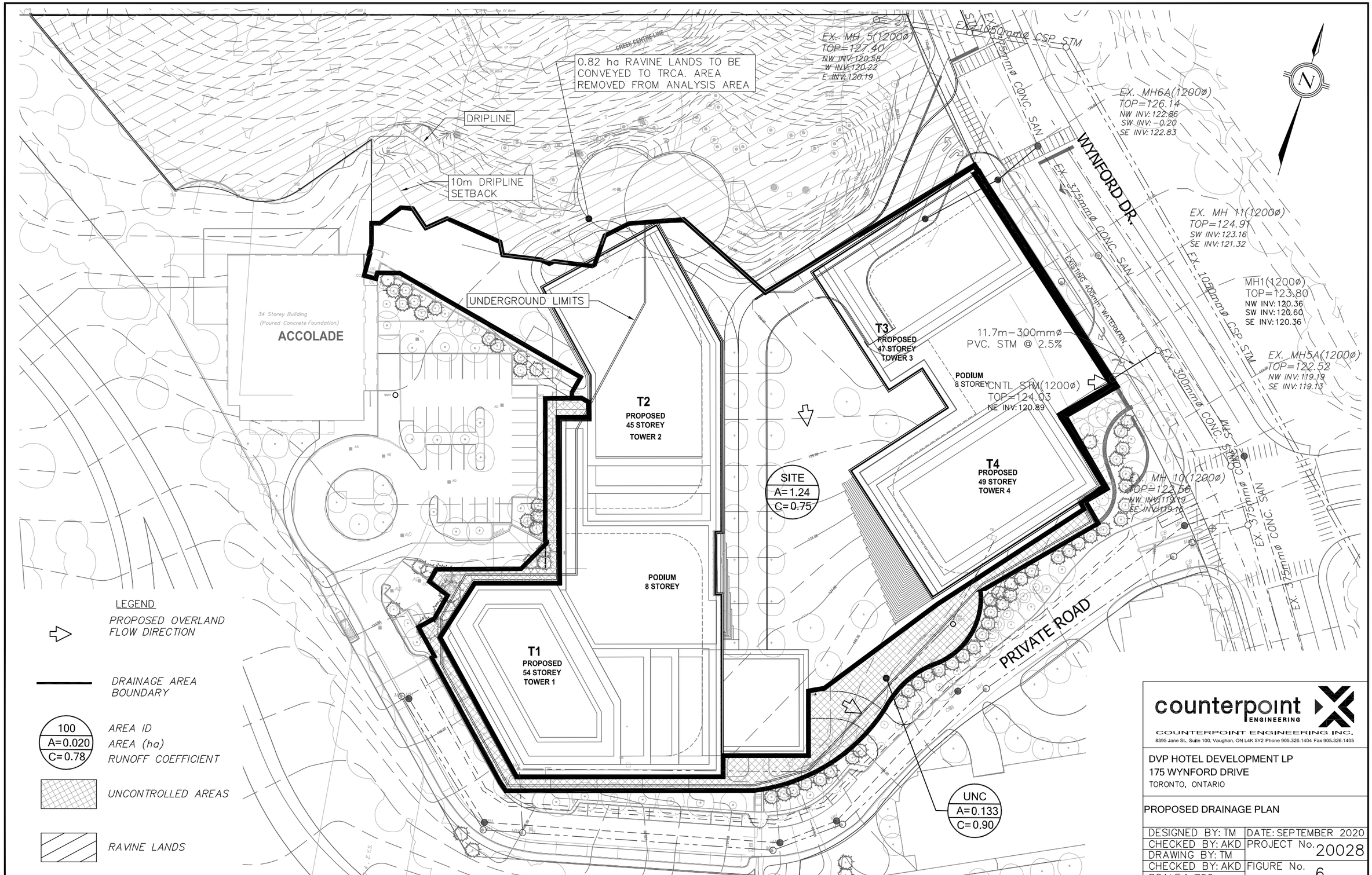
This report has been prepared in accordance with the criteria set by the City of Toronto Wet Weather Flow Management Guidelines (WWFMG). The site will be serviced by a 300 mmø storm connection with a slope of 2.5% to the 300 mmø storm sewer located in the center of Wynford Drive. Refer to **Figure 2** for the existing and proposed stormwater sewer layout.

Under proposed conditions, buildings and non-vehicular walkways, courtyards and landscape areas comprises the majority of the site and will outlet to Wynford Drive. Refer to **Figure 6** for the proposed storm drainage. A portion of the southern limits of the site currently drain to the private road in existing conditions and will continue to drain there under proposed conditions

due to grading constraints. A total uncontrolled area of **0.13 ha** will produce a peak runoff of **64 L/s** during the 100-year storm event. As a result, the remainder of the development area is to be controlled to a maximum release rate of **104 L/s** such that the maximum allowable release rate from the redevelopment meets the target release rate of **168 L/s**.

There may be runoff from rainstorms that exceeds the capacity of the City's storm service connections. Therefore, the owner shall be responsible to provide flood protection or a safe overland flow route for the proposed development without causing damage to the proposed and adjacent public and private properties.

Existing drainage patterns on adjacent properties shall not be altered and stormwater runoff from the subject development shall not be directed to drain onto adjacent properties.



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DVP HOTEL DEVELOPMENT LP
175 WYNFORD DRIVE
TORONTO, ONTARIO

PROPOSED DRAINAGE PLAN

DESIGNED BY: TM	DATE: SEPTEMBER 2020
CHECKED BY: AKD	PROJECT No. 20028
DRAWING BY: TM	
CHECKED BY: AKD	FIGURE No. 6
SCALE:1: 750	

6.5 QUANTITY CONTROL

Quantity control will be provided on-site by an underground storage tank within the building on the P1 level of the building in combination with a **150 mmø orifice tube** to ensure that the 100-year post redevelopment peak flows from the site are attenuated to the 2-year release rate of **168 L/s**. A storage volume of **351 m³** will be provided to control the 100-year post development flows to the allowable release rate. Note that an additional **65.2 m³** volume will be available for the water reuse cistern portion of the tank. Refer to **Appendix C** for detailed calculations.

Table 3 – Peak Flow and Storage Summary - 100-Year Storm Event

Area ID	Area (ha)	Runoff Coefficient	t_c (min)	Storage Available (m^3)	Storage Required (m^3)	Release Rate (L/s)	Description	Orifice Size (mm)
SITE	1.24	0.75	10	351	335	93	Orifice Control	150
Uncontrolled	0.13	0.70	10	0	0	64	Uncontrolled	-
Total	**1.37**			**351**	**335**	**157**		

As shown in **Table 3** above, the proposed site release rate of **157 L/s** during the 100-year storm event will be less than the allowable release rate of **168 L/s**. Refer to **Appendix C** for storage volume calculations.

In situations where the orifice control is not sufficient, the at grade access lid to the underground storage tank located in the southeast corner of the development will allow water to discharge overland to Wynford Drive. The access lid is to be as per OPSD 401.010 – Type B – Open Cover. The required water reuse volume will be available below the outlet invert and is discussed in further detail later in this report in **Section 6.6.**

The design of all internal piping within the building must provide adequate capacity for full capture and conveyance of all flows generated by storms up to and including the 100-year rainfall event. All design and associated calculations for the internal storm system, including the design of the internal inlet structures, piping and mechanical appurtenances is to be completed by the Mechanical Engineer.

6.6 WATER BALANCE

The Wet Weather Flow Guidelines indicate that the minimum on-site runoff retention requires the proponent to retain all runoff from a small design rainfall event – typically 5 mm (In Toronto, storms with 24 hour volumes of 5 mm or less contribute about 50% of the total average annual rainfall volume). Refer to **Appendix C** for the calculations to determine that 5 mm will contribute to 50% of the annual rainfall volume based on a total precipitation of 840 mm. This runoff must be retained through infiltration, evapotranspiration or rainwater reuse.

As the building underground footprint occupies the majority of the site the opportunity for infiltration is not feasible. As well the City does not allow other forms of water reuse such as for car washing or for custodial purposes; therefore, only irrigation can be provided as a water balance measure for the rainwater harvesting cistern. Water balance does not typically occur during the winter months since the ground is frozen, not allowing for water to infiltrate. Proposing to use the rainwater harvesting cistern for irrigation will satisfy the annual water balance targets since there are low to no precipitation amounts in the winter months, and since infiltration does not occur during the winter months.

5 mm Water Balance Target

To achieve the water balance objectives, the site was categorized by surface types: impervious asphalt/paved/roof, pervious green roof/landscaped areas. The initial abstraction values for the impervious surfaces and pervious surfaces were 1 mm and 5 mm, respectively. The initial abstraction was determined based on percent of surface area and initial abstraction values of each surface type. Based on the site area of 1.37 ha, a 5 mm - 24 hour storm is equivalent to approximately **68.5 m^3** of total site water balance volume. Without any additional on-site retention measures, the proposed development would achieve the following levels of water balance as seen in **Table 4**.

Table 4 – Achieved Water Balance

Site Description	Fraction of Site Area		Initial Abstraction (mm)	Overall Initial Abstraction (mm)
Non-Green Roof Area	36%	0.497 ha	1.0	0.36
Asphalt	2%	0.028 ha	1.0	0.02
Pervious	40%	0.546 ha	5.0	2.00
Green Roof and Planters	22%	0.299 ha	5.0	1.1
Total	**100%**	**1.37** ha		**3.47**
			Reuse volume to be Retained (m^3)	**21.0**

Based on **Table 4** the site will have a shortfall of 1.53 mm (5 mm – 3.47 mm) of initial abstraction. This is equivalent to **21.0 m^3** of storage. To achieve water balance requirements, a water re-use system will be employed to provide the additional storage indicated above.

10 mm Water Balance Target

In addition to providing the minimum requirement as per Wet Weather Flow Management Guidelines, it is possible to achieve the TGS Tier 2 version 3 Advanced Stormwater Retention and reuse. The Tier 2 of the TGS requires the retention of 10mm depth of rainfall from all site surfaces through infiltration, evapotranspiration, water harvesting and reuse. Based on the site area of 1.37 ha, a 10 mm - 24 hour storm is equivalent to approximately **137.0 m^3** of total site storage. Without any additional on-site retention measures, the proposed development would achieve the following levels of water balance as seen in **Table 5**.

Table 5 – Achieved Water Balance Tier 2 TGS

Site Description	Fraction of Site Area		Initial Abstraction (mm)	Overall Initial Abstraction (mm)
Non-Green Roof Area	36%	0.497 ha	1.0	0.36
Asphalt	2%	0.028 ha	1.0	0.02
Pervious	40%	0.546 ha	10.0	4.00
Green Roof and Planters	22%	0.299 ha	10.0	2.20
Total	**100%**	**1.37** ha		**6.55**
			Reuse volume to be Retained (m^3)	**47.3**

The retention of 10 mm to meet the Tier 2 of the TGS would require a total water reuses volume of **47.3 m^3** will be required. Refer to **Appendix B** for water balance volume calculations.

The rainwater harvesting storage tank will form part of the underground stormwater storage tank provided for quantity control. The underground storage tank will outlet at an elevation such that minimum **47.3 m^3** will be available below the outlet invert for reuse. Runoff from the rooftop areas is considered to be generally clean and will outlet directly into the storm tank. The harvested rainwater will be pumped to the irrigation system and a minimum volume of **47.3 m^3** will be required to be used within 72 hours. Refer to **Appendix C** for water balance retention calculations and irrigation demand calculations.

6.7 QUALITY CONTROL

Rooftop runoff is generally presumed clean and will not require treatment and will discharge directly into the storm tank. The use of a stormwater treatment system will be required to achieve the 80% TSS removal from the other surfaces on site. The details regarding the design of the oil-grit separator will be provided during the Site Plan Application.

7.0 EROSION AND SEDIMENT CONTROL

During construction, erosion and sediment control will be implemented on site. This will be achieved through methods such as installation of silt fence/construction fence around the perimeter of the site, placement of mud mats at the site access point to the municipal roadway and the use of sediment control barriers at existing catch basins located in proximity to the site. Erosion and sediment control measure details will be considered as part of the detailed design phase of the development.

8.0 CONCLUSIONS

This Functional Servicing Report presents a site servicing strategy for the proposed development that addresses the requirements of the applicable design guidelines and provides the basis for detailed servicing design.

We trust this report sufficiently addresses the site servicing requirements and allows for approval of the proposed Zoning By-Law Amendment of the subject site for the proposed use described herein. Should there be any questions or comments, please feel free to contact the undersigned.

Sincerely,
Counterpoint Engineering Inc.

Theyonas Manoharan, P.Eng
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Andrea Dasek, P.Eng., LEED AP
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Appendix A

Water Servicing

Counterpoint Engineering Inc.

Water Demand Design Calculations

Project: 175 Wynford Drive
Project No: 20028
Location: Toronto, Ontario

Population

Townhouse	2.7	ppu
Single Family Dwelling	3.5	ppu
1BR/1BR+Den	1.4	ppu
2BR/2BR+Den/	2.1	ppu
3BR/3BR+Den	3.1	ppu
Retail	1.1	persons/100m^2
Instituitional (Hotel)	1	person/bed

	1B / 1B+D	2B / 2B + D	3B / 3B+D	Hotel Units**	Total Units	Retail Area (m^2)
Tower 1	679	158	93	125	1055	-
Tower 2	500	117	69	-	686	250
Tower 3	393	91	54	-	538	545
Tower 4	435	101	60	-	596	-
TOTAL UNITS / AREA (m^2)	**2007**	**467**	**276**	**125**	**2875**	**795**

	Population 1BR / 1B + D	Population 2BR / 2BR + D	Population 3BR / 3BR + D	Population Hotel **	Population Retail	TOTAL POPULATION
Tower 1	951	332	289	250	-	1822
Tower 2	700	246	214	-	3	1163
Tower 3	551	192	168	-	6	917
Tower 4	609	213	186	-	-	1008
Total Equivalent Population	2811	983	857	250	9	**4910**

**Hotel units are assumed to have 2 double beds to be conservative

City of Toronto Watermain Guidelines

Per Capita Demand

Single Family	320	(l/capita/day)
Multi-Unit	191	(l/capita/day)

Peaking Factors

Land Use	Minimum Hour	Maximum Hour	Maximum Day	
Residential	0.70	2.48	1.65	
Commercial	0.84	1.20	1.10	*Values used for Commercial Land Use
Industrial	0.84	0.90	1.10	
Institutional	0.84	0.90	1.10	
Apartment	0.84	2.50	1.30	*Values used for Residential (Multi-Unit) Land Use

Water Demand based on Equivalent Populatior

Land Use	Population	Minimum Hour (l/min)	Maximum Hour (l/min)	Maximum Day (l/min)	Fire Flow Required (l/min)	Fire Flow Duration (hr)*	Max Day + Fire Flow (l/min)
Tower 1 **	1,822	203	604	314	6,000	2.00	-
Tower 2	1,163	130	386	201	6,000	2.00	-
Tower 3	917	102	304	158	6,000	2.00	-
Tower 4	1,008	112	334	174	7,000	2.00	-
Totals	**4,910**	**547**	**1,628**	**847**	**7,000**	**2.00**	**7,847**

* See attached table in Appendix B for Fire Flow Duration
**Water demand for hotel units have been have calculated using apartment peaking factors to be conservative

Counterpoint Engineering Inc.

REQUIRED FIRE FLOW WORKSHEET - TOWER 1
Fire Underwriters Survey

Project : **175 Wynford Drive**
Project No: **20028**

Guide for Determination of Required Flow Copyright I.S.O

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

F = the required fire flow in litres per minute.
C = coefficient related to the type of construction.
= 1.5 for wood frame construction (structure essentially all combustible).
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior).
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls).
= 0.6 for fire-resistive construction (fully protected frame, floors, roof).
A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building being considered.

Type of Construction		Class Factor
WF	Wood Frame	1.5
OC	Ordinary Construction	1.0
NC	Non-Combustible	0.8
FC	Fire-Resistive	0.6

Contents		% Reduction
NC	Non-Combustible	25
LC	Limited Combustible	15
C	Combustible	0
FB	Free Burning	15
RB	Rapid Burning	25

Area Notes for Fire Resistive Buildings (from FUS manual, 1999):

If Vertical Openings are inadequately protected (less than 1-hour fire rating): Area is the total of the two largest adjoining floors (above ground level) plus 50% of the area of each of the next 8 adjoining floors above that.

If Vertical Openings are adequately protected (at least 1-hour fire rating): Area is the total of the largest floor (above ground level) plus 25% of the area of each of the next 2 immediately adjoining floors above that.

1) Fire Flow

Type of Construction:	FC
C=	0.6
A*=	3345 m^2
F=	7,634 **L/min**
F=	8,000 **L/min** (round to the nearest 1,000L/min)

***Note: Fire resistive building with Vertical Openings protected.**
Area is the total of the largest floor (above ground level) plus 25% of the area of each of the next 2 immediately adjoining

2) Occupancy Reduction/Surcharge

Contents Factor:		C			
Reduction/Surcharge of		0%	=	0	L/min
F=	8000L/min +	0	L/min =	8,000	**L/min**

3) System Type Reduction

NFPA 13 Sprinkler:		YES	30%		
Standard Water Supply:		YES	10%		
Fully Supervised:		YES	10%		
Total			50%		
Reduction of		50%	L/min =	4,000	L/min
F=	8000L/min -	4,000	L/min =	4,000	**L/min**

4) Separation Charge

Building Face	Dist(m)	Charge			
North	0	25%			
East	39	5%			
South	50	0%			
West	50	0%			
Total		30%	**of** 8000 **L/min** =	2,400	**L/min**

(max exposure charge can be 75%)

Separation	Charge	Separation	Charge
0 to 3m	25%	20.1 to 30 m	10%
3.1 to 10m	20%	30.1 to 45m	5%
10.1 to 20m	15%		

F= 4000L/min + 2400L/min = 6,400 **L/min** (2,000L/min<F<45,000L/min)

F=	6,000	**L/min** (round to the nearest 1,000L/min)
F=	100	**L/s**
F=	1,585	**gpm**

Counterpoint Engineering Inc.

REQUIRED FIRE FLOW WORKSHEET - TOWER 2
Fire Underwriters Survey

Project : **175 Wynford Drive**
Project No: **20028**

Guide for Determination of Required Flow Copyright I.S.O

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

F = the required fire flow in litres per minute.
C = coefficient related to the type of construction.
= 1.5 for wood frame construction (structure essentially all combustible).
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior).
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls).
= 0.6 for fire-resistive construction (fully protected frame, floors, roof).
A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building being considered.

Type of Construction		Class Factor
WF	Wood Frame	1.5
OC	Ordinary Construction	1.0
NC	Non-Combustible	0.8
FC	Fire-Resistive	0.6

Contents		% Reduction
NC	Non-Combustible	25
LC	Limited Combustible	15
C	Combustible	0
FB	Free Burning	15
RB	Rapid Burning	25

Area Notes for Fire Resistive Buildings (from FUS manual, 1999):

If Vertical Openings are inadequately protected (less than 1-hour fire rating): Area is the total of the two largest adjoining floors (above ground level) plus 50% of the area of each of the next 8 adjoining floors above that.

If Vertical Openings are adequately protected (at least 1-hour fire rating): Area is the total of the largest floor (above ground level) plus 25% of the area of each of the next 2 immediately adjoining floors above that.

1) Fire Flow

Type of Construction:	FC
C=	0.6
A*=	3227 m^2
F=	7,498 **L/min**
F=	7,000 **L/min** (round to the nearest 1,000L/min)

***Note: Fire resistive building with Vertical Openings protected.**
Area is the total of the largest floor (above ground level) plus 25% of the area of each of the next 2 immediately adjoining

2) Occupancy Reduction/Surcharge

Contents Factor:		C			
Reduction/Surcharge of		0%	=	0	L/min
F=	7000L/min +	0	L/min =	7,000	**L/min**

3) System Type Reduction

NFPA 13 Sprinkler:		YES	30%		
Standard Water Supply:		YES	10%		
Fully Supervised:		YES	10%		
Total			50%		
Reduction of		50%	L/min =	3,500	L/min
F=	7000L/min -	3,500	L/min =	3,500	**L/min**

4) Separation Charge

Building Face	Dist(m)	Charge
North	50	0%
East	29	10%
South	0	25%
West	35	5%
Total		40% **of** 7000 **L/min** = 2,800 **L/min**

(max exposure charge can be 75%)

Separation	Charge	Separation	Charge
0 to 3m	25%	20.1 to 30 m	10%
3.1 to 10m	20%	30.1 to 45m	5%
10.1 to 20m	15%		

F= 3500L/min + 2800L/min = 6,300 **L/min** (2,000L/min<F<45,000L/min)

F=	6,000	**L/min** (round to the nearest 1,000L/min)
F=	100	**L/s**
F=	1,585	**gpm**

Counterpoint Engineering Inc.

REQUIRED FIRE FLOW WORKSHEET - TOWER 3
Fire Underwriters Survey

Project : **175 Wynford Drive**
Project No: **20028**

Guide for Determination of Required Flow Copyright I.S.O

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

F = the required fire flow in litres per minute.
C = coefficient related to the type of construction.
= 1.5 for wood frame construction (structure essentially all combustible).
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior).
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls).
= 0.6 for fire-resistive construction (fully protected frame, floors, roof).
A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building being considered.

Type of Construction		Class Factor
WF	Wood Frame	1.5
OC	Ordinary Construction	1.0
NC	Non-Combustible	0.8
FC	Fire-Resistive	0.6

Contents		% Reduction
NC	Non-Combustible	25
LC	Limited Combustible	15
C	Combustible	0
FB	Free Burning	15
RB	Rapid Burning	25

Area Notes for Fire Resistive Buildings (from FUS manual, 1999):

If Vertical Openings are inadequately protected (less than 1-hour fire rating): Area is the total of the two largest adjoining floors (above ground level) plus 50% of the area of each of the next 8 adjoining floors above that.

If Vertical Openings are adequately protected (at least 1-hour fire rating): Area is the total of the largest floor (above ground level) plus 25% of the area of each of the next 2 immediately adjoining floors above that.

1) Fire Flow

Type of Construction:	FC
C=	0.6
A*=	3154 m^2
F=	7,413 **L/min**
F=	**7,000** **L/min** (round to the nearest 1,000L/min)

***Note: Fire resistive building with Vertical Openings protected.**
Area is the total of the largest floor (above ground level) plus 25% of the area of each of the next 2 immediately adjoining

2) Occupancy Reduction/Surcharge

Contents Factor:		C			
Reduction/Surcharge of		0%	=	0	L/min
F=	7000L/min +	0	L/min =	7,000	**L/min**

3) System Type Reduction

NFPA 13 Sprinkler:		YES	30%		
Standard Water Supply:		YES	10%		
Fully Supervised:		YES	10%		
Total			50%		
Reduction of		50%	L/min =	3,500	L/min
F=	7000L/min -	3,500	L/min =	3,500	**L/min**

4) Separation Charge

Building Face	Dist(m)	Charge
North	50	0%
East	50	0%
South	0	25%
West	28	10%
Total		35% **of** 7000 **L/min** = 2,450 **L/min**

(max exposure charge can be 75%)

Separation	Charge	Separation	Charge
0 to 3m	25%	20.1 to 30 m	10%
3.1 to 10m	20%	30.1 to 45m	5%
10.1 to 20m	15%		

F= 3500L/min + 2450L/min = 5,950 **L/min** (2,000L/min<F<45,000L/min)

F=	6,000	**L/min** (round to the nearest 1,000L/min)
F=	100	**L/s**
F=	1,585	**gpm**

Counterpoint Engineering Inc.

REQUIRED FIRE FLOW WORKSHEET - TOWER 4
Fire Underwriters Survey

Project : **175 Wynford Drive**
Project No: **20028**

Guide for Determination of Required Flow Copyright I.S.O

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

F = the required fire flow in litres per minute.
C = coefficient related to the type of construction.
= 1.5 for wood frame construction (structure essentially all combustible).
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior).
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls).
= 0.6 for fire-resistive construction (fully protected frame, floors, roof).
A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building being considered.

Type of Construction		Class Factor
WF	Wood Frame	1.5
OC	Ordinary Construction	1.0
NC	Non-Combustible	0.8
FC	Fire-Resistive	0.6

Contents		% Reduction
NC	Non-Combustible	25
LC	Limited Combustible	15
C	Combustible	0
FB	Free Burning	15
RB	Rapid Burning	25

Area Notes for Fire Resistive Buildings (from FUS manual, 1999):

If Vertical Openings are inadequately protected (less than 1-hour fire rating): Area is the total of the two largest adjoining floors (above ground level) plus 50% of the area of each of the next 8 adjoining floors above that.

If Vertical Openings are adequately protected (at least 1-hour fire rating): Area is the total of the largest floor (above ground level) plus 25% of the area of each of the next 2 immediately adjoining floors above that.

1) Fire Flow

Type of Construction:	FC
C=	0.6
A*=	3077 m^2
F=	7,322 **L/min**
F=	**7,000** **L/min** (round to the nearest 1,000L/min)

***Note: Fire resistive building with Vertical Openings protected.**
Area is the total of the largest floor (above ground level) plus 25% of the area of each of the next 2 immediately adjoining

2) Occupancy Reduction/Surcharge

Contents Factor:		C			
Reduction/Surcharge of		0%	=	0	L/min
F=	7000L/min +	0	L/min =	7,000	**L/min**

3) System Type Reduction

NFPA 13 Sprinkler:		YES	30%		
Standard Water Supply:		YES	10%		
Fully Supervised:		YES	10%		
Total			50%		
Reduction of		50%	L/min =	3,500	L/min
F=	7000L/min -	3,500	L/min =	3,500	**L/min**

4) Separation Charge

Building Face	Dist(m)	Charge
North	0	25%
East	50	0%
South	21	10%
West	29	10%
Total		45% **of** 7000 **L/min** = 3,150 **L/min**

(max exposure charge can be 75%)

Separation	Charge	Separation	Charge
0 to 3m	25%	20.1 to 30 m	10%
3.1 to 10m	20%	30.1 to 45m	5%
10.1 to 20m	15%		

F= 3500L/min + 3150L/min = 6,650 **L/min** (2,000L/min<F<45,000L/min)

F=	7,000	**L/min** (round to the nearest 1,000L/min)
F=	117	**L/s**
F=	1,849	**gpm**

counterpoint engineering

NFPA Theoretical Flow Calculations

Project Name: **175 Wynford Drive**
Project Number: **20028**

Based on National Fire Protection Association Guidelines, the available flow at the minimum residual pressure of 20psi can be calculated based on the observed flow at the observed pressure readings, as follows:

$$\mathbf{Q_F = 29.83 \times c \times d^2 \times p^{0.5}}$$, where

Q_F = observed flow (US GPM)
c = hydrant nozzle coefficient (0.90 - 0.95)
d = nozzle diameter (in)
p = observed pitot pressure

$$\mathbf{Q_R = Q_F \times h_F^{0.54} / h_R^{0.54}}$$, where

Q_R = available flow
Q_F = observed flow (US GPM)
h_F = drop from measured static to desired baseline pressure
h_R = drop from measured static to measured residual pressure

Based on flow test results obtained by ***Jackson Waterworks, July 02,2020***

c =	0.9		
d =	2.5	in	
number of ports =	2		
p =	50		
Q_F =	**2373**	**US GPM**	
Measured Static Pressure =	80	psi	
Measured Residual Pressure =	75	psi	
Desired Residual Pressure =	20	psi	, minimum per City of Toronto design criteria
Q_R =	**9079**	**US GPM**	per fire conneciton
	34,369	**L/min**	

TABLES

STANDARD HYDRANT DISTRIBUTION	
Fire Flow Required (litres per minute)	Average Area per Hydrant (m^2)
2,000	16,000
4,000	15,000
6,000	14,000
8,000	13,000
10,000	12,000
12,000	11,000
14,000	10,000
16,000	9,500
18,000	9,000
20,000	8,500
22,000	8,000
24,000	7,500
26,000	7,000
28,000	6,500
30,000	6,000
32,000	5,500
34,000	5,250
36,000	5,000
38,000	4,750
40,000	4,500
42,000	4,250
44,000	4,000
46,000	3,750
48,000	3,500

REQUIRED DURATION OF FIRE FLOW	
Fire Flow Required (litres per minute)	Duration (hours)
2,000 or less	1.0
3,000	1.25
4, 000	1.5
5,000	1.75
6,000	2.0
8000	2.0
10,000	2.0
12,000	2.5
14,000	3.0
16,000	3.5
18,000	4.0
20000	4.5
22,000	5.0
24,000	5.5
26,000	6.0
28,000	6.5
30,000	7.0
32000	7.5
34,000	8.0
36,000	8.5
38,000	9.0
40,000 and over	9.5

Interpolate for intermediate figures

Area refers to surface area of blocks and bounding streets. For a street without adjacent streets, a depth of one-half block is used.

A water supply system is considered to be adequate for fire protection when it can supply water as indicated above with consumption at the maximum daily rate. Certain types of emergency supplies may be included where reasonable conditions for their immediate use exist. Storage on the system is credited on the basis of the normal daily minimum maintained insofar as pressure permits its delivery at the rate considered.

JACKSON WATERWORKS

Telephone: 905.229.3176
Toll Free: 800.734.5732
email: jww@bellnet.ca
Website: www.jacksonwaterworks.ca

Ms. Andrea Dasek
Counterpoint Engineering Inc.
8395 Jane Street, Suite 100
Vaughan Ontario **L4K 5Y2**

04 July 2020

Jackson Waterworks has recently completed fire hydrant flow testing at 175 Wynford Drive in Toronto.

We define the Test Hydrants as the ones being flowed, and the Base Hydrant as the one where static and residual pressures are recorded. Wherever possible, we inspect the secondary valve for the Test Hydrants to make sure it is in the fully open position. Likewise, we count the number of turns needed to open the Test Hydrants (to make sure it is opening completely).

We do not use pitot conversion factors for different nozzle profiles. The Engineer may use these factors if desired and warranted.

The secondary valve for the Test Hydrant could not be located for inspection at the time of test.

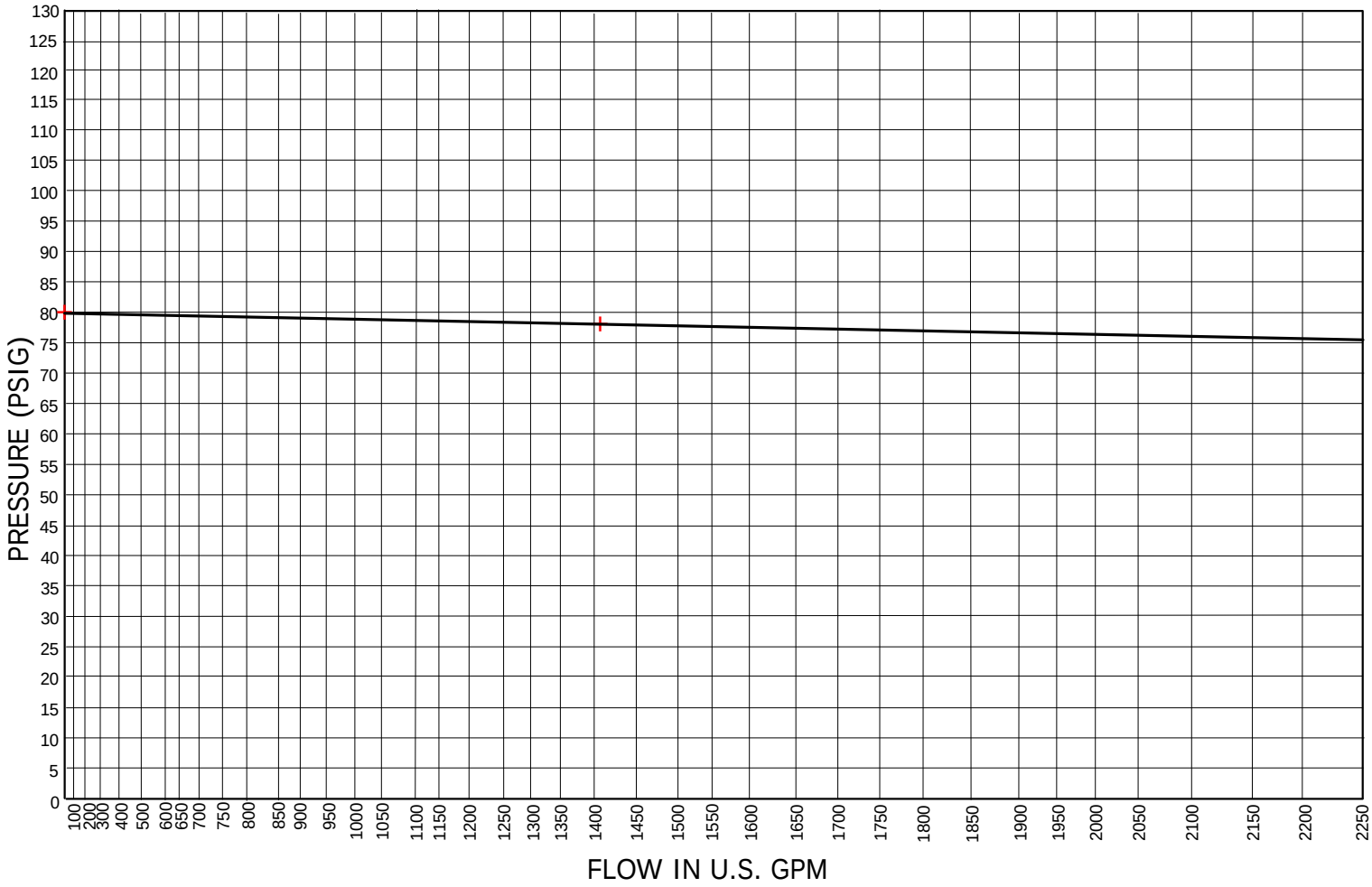
Testing was completed in accordance with NFPA 291 guidelines.

There were no irregularities to report.

Trusting this meets with your approval, we are...

Yours truly,

Mark Schmidt
Jackson Waterworks



# of Ports	PORT DIA. (in/mm)	PITOT (psig)	FLOW (usgpm)	RESIDUAL (psig)
1	2.50/63	70	1404	78
2	2.50/63	50/50	2372	75
THEORETICAL FLOW @ 20psi			8810	

General Data	
Test Date	02 July 2020
Test Time	10:00am
Pipe Dia.	16"
Static	80

Site Information	
Site or Developer Name	Counterpoint Engineering
Site Address/Municipality	175 Wynford Drive, Toronto
Location of Test Hydrant	1st South of 175 Wynford Drive
Location of Base Hydrant	1st North of 175 Wynford Drive
Technician's Comments	No conversion factor used for flow calculation based on round and flush internal nozzle
	configuration. Flow testing has been conducted in accrodance with NFPA 291 guidelines
	wherever possible. Refer to attached report for further information.
	Verified By: Mark Schmidt

Appendix B

Sanitary Servicing

Counterpoint Engineering Inc.

Existing Sanitary Flow Calculations

Project: 175 Wynford Drive
Project No: 20028
Location: Toronto
Site Area: 2.19 ha

As per Design Criteria for Sewers and Watermains - First Edition November 2009 City of Toronto
Design flow = average daily dry weather flow x peaking factor + infiltration

Persons Per Unit and per Land Use

Townhouse	2.7	ppu
Single Family Dwelling	3.5	ppu
1BR/1BR+Den	1.4	ppu
2BR/2BR+Den/	2.1	ppu
3BR/3BR+Den	3.1	ppu
Hotel	1	person/bed
Commercial	1.1	persons/100m^2
Offices	3.3	persons/100m^2

	Institutional		
	Hotel Suites	**Area**	**Total Units**
Existing Hotel	354		354
Meeting Room (Office)		1486	
TOTAL UNITS / AREA (m^2)	**354**	**1486**	**354**

*Assuming Hotel Suites have 2 beds each

	Hotel Suites	Area	TOTAL POPULATION
Hotel (Instituitional)	708		708
Meeting Room (Office)		1486	50
Total Equivalent Population			**758**

Peak flow Design Parameters

Residential Average flow	240	litres/person/day
Commercial/Institutional Average flow	250	litres/person/day
Infiltration	0.26	litres/second/ha

Harmon Peaking Factor

PF = 1 + (14/(4+(P/1000)$^{1/2}$))

Total Population	Harmon Peak Factor
708	**3.89**

Instituitional Peak Flow	8.19	**l/s**
Infiltration	0.57	**l/s**
Flow	**8.76**	**l/s**

Counterpoint Engineering Inc.

Proposed Sanitary Flow Calculations

Project: 175 Wynford Drive
Project No: 20028
Location: Toronto
Site Area: 1.37 ha

As per Design Criteria for Sewers and Watermains - First Edition November 2009 City of Toronto
Design flow = average daily dry weather flow x peaking factor + infiltration

Persons Per Unit and per Land Use

Townhouse	2.7	ppu
1BR/1BR+Den	1.4	ppu
2BR/2BR+Den/	2.1	ppu
3BR/3BR+Den	3.1	ppu
Commercial / Retail	1.1	persons/100m^2
Offices	3.3	persons/100m^2
Instituitional (Hotel)	1	person/bed

	1B / 1B+D	2B / 2B + D	3B / 3B+D	Total Residential Units	Hotel Units**	Retail Area (m^2)
Tower 1	679	158	93	930	125	-
Tower 2	500	117	69	686	-	250
Tower 3	393	91	54	538	-	545
Tower 4	435	101	60	596	-	-
TOTAL UNITS / AREA (m^2)	**2007**	**467**	**276**	**2750**	**125**	**795**

	Population 1BR / 1B + D	Population 2BR / 2BR + D	Population 3BR / 3BR + D	TOTAL RESIDENTIAL POPULATION	Population Hotel **	Population Retail
Tower 1	951	332	289	1572	250	-
Tower 2	700	246	214	1160	-	3
Tower 3	551	192	168	911	-	6
Tower 4	609	213	186	1008	-	-
Total Equivalent Population	2811	983	857	**4651**	**250**	**9**

**Hotel units are assumed to have 2 double beds to be conservative

Peak flow Design Parameters

Residential Average flow	240	litres/person/day
Instituitional Average flow	250	litres/person/day
Infiltration	0.26	litres/second/ha

Harmon Peaking Factor

PF = 1 + (14/(4+(P/1000)$^{1/2}$))

Total Residential and Instituitional Population	Harmon Peak Factor
4901	**3.25**

Residential and Institutional Peak Flow	42.03	**l/s**
Retail Peak Flow	0.03	**l/s**
Infiltration	0.36	**l/s**
Groundwater Flows	0.00	**l/s**
Total Peak Flow	**42.41**	**l/s**

Existing Dry Conditions Sanitary Flow

175 WYNFORD DRIVE

P#:20028

Composite population density
per unit Single - 3.5
Semi & Townhouse - 2.7
P = population = sum p A site

Population density-Commercial 1.1 p / 100 m^2
Population density-Office 3.3 p / 100 m^2
Population density-Institutional 86 p / hectare
A = area ha

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$M = 1+ (14)/(4+(P/10^3))^{0.5}$
I = 0.26 x A gross l/s
q = 240 l/person/day (For the analysis of existing sewers)

Pflow = M q P / 86400 = population flow l/s
Q TOTAL = P flow + I l/s

Date: 16-Sep-20
Designed by: MA
Checked by: AD

A GROSS - Cumulative Residential + Non-Residential Area

STREET	MANHOLE FROM	MANHOLE TO	AREA ha	EQUIV. POP P	CUMULATIVE POP. P	CUMULATIVE M	CUMULATIVE PEAK FLOW l/s	A GROSS ha	I l/s	Q TOTAL l/s	LENGTH (m)	SLOPE S %	D (mm)	TYPE OF PIPE	ROUGH. COEFF.	Q FULL (L/s)	Velocity Full (m/s)	Capacity (%)	Invert UP (m)	Invert down (m)
Input: WYNFORD DRIVE			**53.23**	**12650**	**12650**	**2.90**	**101.9**	**53.23**												
WYNFORD DR (site)	MH6	MH5	2.19	**758**	13408	2.80	104.3	55.42	14.41	118.7	**80.77**	**4.50**	**375**	CONC	0.013	388.0	3.40	31%	122.83	119.19
Input: WYNFORD DRIVE WEST			**0.00**	**0**	**13408**	**2.80**	**104.3**	**55.42**												
WYNFORD DR	MH5	MH4	1.72	**240**	13648	2.80	106.2	57.14	14.86	121.0	**93.57**	**3.95**	**375**	CONC	0.013	363.5	3.19	33%	119.13	115.43
WYNFORD DR	MH4	MH3	2.79	**1712**	15360	2.80	119.5	59.93	15.58	135.0	**66.45**	**8.50**	**300**	CONC	0.013	294.6	4.03	46%	115.17	109.43
WYNFORD DR	MH3	MH2	0.43	**0**	15360	2.80	119.5	60.36	15.69	135.2	**56.34**	**2.50**	**375**	CONC	0.013	289.2	2.54	47%	108.41	107.01
WYNFORD DR	MH2	MH1	0.36	**0**	15360	2.80	119.5	60.72	15.79	135.3	**72.24**	**8.96**	**375**	CONC	0.013	547.5	4.80	25%	106.91	100.43
Eccleston DR	MH1	TRUNK	0.05	**0**	15360	2.80	119.5	60.77	15.80	135.3	**14.94**	**31.00**	**300**	CONC	0.013	562.7	7.70	24%	100.09	95.46
		Trunk invert=	94.5																	
		Diameter	1370.0																	

Proposed Dry Conditions Sanitary Flow

175 WYNFORD DRIVE

P#:20028

Composite population density
per unit Single - 3.5
Semi & Townhouse - 2.7
P = population = sum p A site

Population density-Commercial 1.1 p / 100 m^2
Population density-Office 3.3 p / 100 m^2
Population density-Institutional 86 p / hectare
A = area ha

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$M = 1+ (14)/(4+(P/10^3))^{0.5}$
I = 0.26 x A gross l/s
q = 240 l/person/day (For the analysis of existing sewers)

Pflow = M q P / 86400 = population flow l/s
Q TOTAL = P flow + I l/s

Date: 16-Sep-20
Designed by: MA
Checked by: AD

A GROSS - Cumulative Residential + Non-Residential Area

STREET	MANHOLE FROM	MANHOLE TO	AREA ha	EQUIV. POP P	CUMULATIVE POP. P	CUMULATIVE M	CUMULATIVE PEAK FLOW l/s	A GROSS ha	I l/s	Q TOTAL l/s	LENGTH (m)	SLOPE S %	D (mm)	TYPE OF PIPE	ROUGH. COEFF.	Q FULL (L/s)	Velocity Full (m/s)	Capacity (%)	Invert UP (m)	Invert down (m)
Input: WYNFORD DRIVE			**53.23**	**12650**	**12650**	**2.90**	**101.9**	**53.23**												
WYNFORD DR (site)	MH6	MH5	1.37	**4910**	17560	2.70	131.7	54.60	14.20	145.9	**80.77**	**4.50**	**375**	CONC	0.013	388.0	3.40	38%	122.83	119.19
Input: WYNFORD DRIVE WEST			**0.00**	**0**	**17560**	**2.70**	**131.7**	**54.60**												
WYNFORD DR	MH5	MH4	1.72	**240**	17800	2.70	133.5	56.32	14.64	148.1	**93.57**	**3.95**	**375**	CONC	0.013	363.5	3.19	41%	119.13	115.43
WYNFORD DR	MH4	MH3	2.79	**1712**	19512	2.70	146.3	59.11	15.37	161.7	**66.45**	**8.50**	**300**	CONC	0.013	294.6	4.03	55%	115.17	109.43
WYNFORD DR	MH3	MH2	0.43	**0**	19512	2.70	146.3	59.54	15.48	161.8	**56.34**	**2.50**	**375**	CONC	0.013	289.2	2.54	56%	108.41	107.01
WYNFORD DR	MH2	MH1	0.36	**0**	19512	2.70	146.3	59.90	15.57	161.9	**72.24**	**8.96**	**375**	CONC	0.013	547.5	4.80	30%	106.91	100.43
Eccleston DR	MH1	TRUNK	0.05	**0**	19512	2.70	146.3	59.95	15.59	161.9	**14.94**	**31.00**	**300**	CONC	0.013	562.7	7.70	29%	100.09	95.46
		Trunk invert=	94.5																	
		Diameter	1370.0																	

Existing Wet Conditions Sanitary Flow

175 WYNFORD DRIVE

P#:20028

Composite population density
per unit — Single - 3.5; Semi & Townhouse - 2.7
P = population = sum p A site

Population density-Commercial 1.1 p / 100 m^2
Population density-Office 3.3 p / 100 m^2
Population density-Institutional 86 p / hectare
A = area ha

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$M = 1 + (14)/(4+(P/10^3))^{0.5}$
I = 0.26 x A gross l/s
q = 240 l/person/day (For the analysis of existing sewers)

Pflow = M q P / 86400 = population flow l/s
Q TOTAL = P flow + I l/s

Date: 16-Sep-20
Designed by: MA
Checked by: AD

A GROSS - Cumulative Residential + Non-Residential Area

STREET	MANHOLE FROM	MANHOLE TO	AREA ha	EQUIV. POP P	CUMULATIVE POP. P	CUMULATIVE M	CUMULATIVE PEAK FLOW l/s	A GROSS ha	I l/s	Q TOTAL l/s	LENGTH (m)	SLOPE S %	D (mm)	TYPE OF PIPE	ROUGH. COEFF.	Q FULL (L/s)	Velocity Full (m/s)	Capacity (%)	Invert UP (m)	Invert down (m)
Input: WYNFORD DRIVE			**53.23**	**12650**	**12650**	**2.90**	**101.9**	**53.23**												
WYNFORD DR (site)	MH6	MH5	2.19	**758**	13408	2.80	104.3	55.42	166.26	270.5	**80.77**	**4.50**	**375**	CONC	0.013	388.0	3.40	70%	122.83	119.19
Input: WYNFORD DRIVE WEST			**0.00**	**0**	**13408**	**2.80**	**104.3**	**55.42**												
WYNFORD DR	MH5	MH4	1.72	**240**	13648	2.80	106.2	57.14	169.70	275.9	**93.57**	**3.95**	**375**	CONC	0.013	363.5	3.19	76%	119.13	115.43
WYNFORD DR	MH4	MH3	2.79	**1712**	15360	2.80	119.5	59.93	175.28	294.7	**66.45**	**8.50**	**300**	CONC	0.013	294.6	4.03	**100%**	115.17	109.43
WYNFORD DR	MH3	MH2	0.43	**0**	15360	2.80	119.5	60.36	176.14	295.6	**56.34**	**2.50**	**375**	CONC	0.013	289.2	2.54	**102%**	108.41	107.01
WYNFORD DR	MH2	MH1	0.36	**0**	15360	2.80	119.5	60.72	176.86	296.3	**72.24**	**8.96**	**375**	CONC	0.013	547.5	4.80	54%	106.91	100.43
Eccleston DR	MH1	TRUNK	0.05	**0**	15360	2.80	119.5	60.77	176.96	296.4	**14.94**	**31.00**	**300**	CONC	0.013	562.7	7.70	53%	100.09	95.46
		inv.	94.5																	
		Dia	1370.0																	

Proposed Wet Conditions Sanitary Flow

175 WYNFORD DRIVE

P#:20028

Composite population density
per unit — Single - 3.5; Semi & Townhouse - 2.7
P = population = sum p A site

Population density-Commercial 1.1 p / 100 m^2
Population density-Office 3.3 p / 100 m^2
Population density-Institutional 86 p / hectare
A = area ha

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$M = 1 + (14)/(4+(P/10^3))^{0.5}$
I = 0.26 x A gross l/s
q = 240 l/person/day (For the analysis of existing sewers)

Pflow = M q P / 86400 = population flow l/s
Q TOTAL = P flow + I l/s

Date: 16-Sep-20
Designed by: MA
Checked by: AD

A GROSS - Cumulative Residential + Non-Residential Area

STREET	MANHOLE FROM	MANHOLE TO	AREA ha	EQUIV. POP P	CUMULATIVE POP. P	CUMULATIVE M	CUMULATIVE PEAK FLOW l/s	A GROSS ha	I l/s	Q TOTAL l/s	LENGTH (m)	SLOPE S %	D (mm)	TYPE OF PIPE	ROUGH. COEFF.	Q FULL (L/s)	Velocity Full (m/s)	Capacity (%)	Invert UP (m)	Invert down (m)
Input: WYNFORD DRIVE			**53.23**	**12650**	**12650**	**2.90**	**101.9**	**53.23**												
WYNFORD DR (site)	MH6	MH5	1.37	**4910**	17560	2.70	131.7	54.60	163.80	295.5	**80.77**	**4.50**	**375**	CONC	0.013	388.0	3.40	76%	122.83	119.19
Input: WYNFORD DRIVE WEST			**0.00**	**0**	**17560**	**2.70**	**131.7**	**54.60**												
WYNFORD DR	MH5	MH4	1.72	**240**	17800	2.70	133.5	56.32	167.24	300.7	**93.57**	**3.95**	**375**	CONC	0.013	363.5	3.19	83%	119.13	115.43
WYNFORD DR	MH4	MH3	2.79	**1712**	19512	2.70	146.3	59.11	172.82	319.2	**66.45**	**8.50**	**300**	CONC	0.013	294.6	4.03	**108%**	115.17	109.43
WYNFORD DR	MH3	MH2	0.43	**0**	19512	2.70	146.3	59.54	173.68	320.0	**56.34**	**2.50**	**375**	CONC	0.013	289.2	2.54	**111%**	108.41	107.01
WYNFORD DR	MH2	MH1	0.36	**0**	19512	2.70	146.3	59.90	174.40	320.7	**72.24**	**8.96**	**375**	CONC	0.013	547.5	4.80	59%	106.91	100.43
Eccleston DR	MH1	TRUNK	0.05	**0**	19512	2.70	146.3	59.95	174.50	320.8	**14.94**	**31.00**	**300**	CONC	0.013	562.7	7.70	57%	100.09	95.46
		inv.	94.5																	
		Dia	1370.0																	

Counterpoint Engineering Inc.

Wet Weather HGL - Existing

Project: 175 WYNFORD DRIVE
Project No: 20028
Client:
Location: North York, Ontario
Prepared by: MA
Checked by:
Date: 16-Sep-20

Street	INVERT ELEV U/S (m)	INVERT ELEV D/S (m)	GROUND U/S (m)	COVER U/S (m)	PIPE PARAMETERS Diam (mm)	PIPE PARAMETERS Length (m)	PIPE PARAMETERS 'n'	Population San Flow (cms)	Infiltration/ Inflow Flow (cms)	TOTAL FLOW (cms)	Q-cap (cms)	Qin/ Qcap	Surch. (U/S) (m)	HGL(U/S) (m) 95.91	HGL(D/S) (m) <- outlet	HEIGHT ABOVE OBV. (U/S)	Distance betw HGL &Ground (m)
*NOTE	OBV OF TRUNK-CONSERVATIVE			95.910 m													
Eccleston DR (MH1-Trunk)	**100.09**	**95.46**	**103.63**	3.240	300	14.9	0.013	0.120	0.177	0.297	0.538	0.55	-0.8126	99.577	95.910	-0.81	4.053
WYNFORD DR (MH2-MH1)	**106.91**	**100.43**	**110.95**	3.665	375	72.2	0.013	0.120	0.177	0.297	0.525	0.56	0.0000	107.285	95.910	0.00	3.665
WYNFORD DR (MH3-MH2)	**108.41**	**107.01**	**111.56**	2.772	375	56.3	0.013	0.120	0.176	0.296	0.276	1.07	0.1142	108.899	107.385	0.11	2.658
WYNFORD DR (MH4-MH3)	**115.17**	**109.43**	**118.87**	3.400	300	66.5	0.013	0.120	0.175	0.295	0.284	1.04	0.4684	115.938	109.730	0.47	2.932
WYNFORD DR (MH5-MH4)	**119.13**	**115.43**	**123.14**	3.635	375	93.6	0.013	0.106	0.170	0.276	0.349	0.79	0.0669	119.572	116.018	0.07	3.568
WYNFORD DR (MH6-MH5)	**122.83**	**119.19**	**126.18**	2.975	375	80.8	0.013	0.104	0.166	0.270	0.372	0.73	-0.2680	122.937	119.652	-0.27	3.243

Counterpoint Engineering Inc.

Wet Weather HGL - Proposed

Project: 175 WYNFORD DRIVE
Project No: 20028
Client:
Location: North York, Ontario
Prepared by: MA
Checked by:
Date: 16-Sep-20

Street	INVERT ELEV U/S (m)	INVERT ELEV D/S (m)	GROUND U/S (m)	COVER U/S (m)	PIPE PARAMETERS Diam (mm)	PIPE PARAMETERS Length (m)	PIPE PARAMETERS 'n'	Population San Flow (cms)	Infiltration/ Inflow Flow (cms)	TOTAL FLOW (cms)	Q-cap (cms)	Qin/ Qcap	Surch. (U/S) (m)	HGL(U/S) (m) 95.91	HGL(D/S) (m) <- outlet	HEIGHT ABOVE OBV. (U/S)	Distance betw HGL &Ground (m)
*NOTE	OBV OF TRUNK-CONSERVATIVE			95.910 m													
Eccleston DR (MH1-Trunk)	**100.09**	**95.46**	**103.63**	3.240	300	14.9	0.013	0.146	0.174	0.320	0.538	0.59	-0.7297	99.660	95.910	-0.73	3.970
WYNFORD DR (MH2-MH1)	**106.91**	**100.43**	**110.95**	3.665	375	72.2	0.013	0.146	0.174	0.320	0.525	0.61	0.0000	107.285	95.910	0.00	3.665
WYNFORD DR (MH3-MH2)	**108.41**	**107.01**	**111.56**	2.772	375	56.3	0.013	0.146	0.174	0.320	0.276	1.16	0.1142	108.899	107.385	0.11	2.658
WYNFORD DR (MH4-MH3)	**115.17**	**109.43**	**118.87**	3.400	300	66.5	0.013	0.146	0.173	0.319	0.284	1.12	0.4684	115.938	109.730	0.47	2.932
WYNFORD DR (MH5-MH4)	**119.13**	**115.43**	**123.14**	3.635	375	93.6	0.013	0.134	0.167	0.301	0.349	0.86	0.2134	119.718	116.018	0.21	3.422
WYNFORD DR (MH6-MH5)	**122.83**	**119.19**	**126.18**	2.975	375	80.8	0.013	0.132	0.164	0.296	0.372	0.79	0.0892	123.294	119.798	0.09	2.886

Appendix C

Storm Servicing

counterpoint engineering

Predevelopment Flows

Project Name: 15-21 Holmes Ave

Project Number: 18008

Rational Method - 2 Year Predevelopment

Event:		2	years
ABC's:	A	21.8	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.84	
Site Area	A	0.74	ha
Intensity $i=A/(T)^c$	i	88.19	mm/hr
Flow Q=CiA/360	Q	0.15	m^3/s
		152	**l/s**

Rational Method - 5 Year Predevelopment

Event:		5	years
ABC's:	A	32	
	C	0.79	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.84	
Site Area	A	0.74	ha
Intensity $i=A/(T)^c$	i	131.79	mm/hr
Flow Q=CiA/360	Q	0.23	m^3/s
		228	l/s

Rational Method - 10 Year Predevelopment

Event:		10	years
ABC's:	A	38.7	
	C	0.8	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.84	
Site Area	A	0.74	ha
Intensity $i=A/(T)^c$	i	162.27	mm/hr
Flow Q=CiA/360	Q	0.28	m^3/s
		280	l/s

Rational Method - 25 Year Predevelopment

Event:		25	years
ABC's:	A	45.2	
	C	0.8	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.84	
Site Area	A	0.74	ha
Intensity $i=A/(T)^c$	i	189.52	mm/hr
Flow Q=CiA/360	Q	0.33	m^3/s
		327	l/s

Rational Method - 50 Year Predevelopment

Event:		50	years
ABC's:	A	53.5	
	C	0.8	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.84	
Site Area	A	0.74	ha
Intensity $i=A/(T)^c$	i	224.32	mm/hr
Flow Q=CiA/360	Q	0.39	m^3/s
		387	l/s

Rational Method - 100 Year Predevelopment

Event:		100	years
ABC's:	A	59.7	
	C	0.8	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.84	
Site Area	A	0.74	ha
Intensity $i=A/(T)^c$	i	250.32	mm/hr
Flow Q=CiA/360	Q	0.43	m^3/s
		432	l/s

AREA ID Existing Site

Composite RC Value	Area [ha]	RC	RC * Area
Landscape	0.069	0.25	0.0171
Building/Impervious Area	0.672	0.90	0.6044
	0.740	Total	0.6215
	Divided by Total Area =		0.84

counterpoint engineering

Predevelopment Flows

Project Name: 15-21 Holmes Ave

Project Number: 18008

Rational Method - 2 Year Predevelopment

Event:		2	years
ABC's:	A	21.8	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.82	
Site Area	A	0.630	ha
Intensity $i=A/(T)^c$	i	88.19	mm/hr
Flow Q=CiA/360	Q	0.13	m^3/s
		127	**l/s**

Rational Method - 5 Year Predevelopment

Event:		5	years
ABC's:	A	32	
	C	0.79	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.82	
Site Area	A	0.630	ha
Intensity $i=A/(T)^c$	i	131.79	mm/hr
Flow Q=CiA/360	Q	0.19	m^3/s
		189	l/s

Rational Method - 10 Year Predevelopment

Event:		10	years
ABC's:	A	38.7	
	C	0.8	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.82	
Site Area	A	0.630	ha
Intensity $i=A/(T)^c$	i	162.27	mm/hr
Flow Q=CiA/360	Q	0.23	m^3/s
		233	l/s

Rational Method - 25 Year Predevelopment

Event:		25	years
ABC's:	A	45.2	
	C	0.8	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.82	
Site Area	A	0.630	ha
Intensity $i=A/(T)^c$	i	189.52	mm/hr
Flow Q=CiA/360	Q	0.27	m^3/s
		272	l/s

Rational Method - 50 Year Predevelopment

Event:		50	years
ABC's:	A	53.5	
	C	0.8	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.82	
Site Area	A	0.630	ha
Intensity $i=A/(T)^c$	i	224.32	mm/hr
Flow Q=CiA/360	Q	0.32	m^3/s
		322	l/s

Rational Method - 100 Year Predevelopment

Event:		100	years
ABC's:	A	59.7	
	C	0.8	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.82	
Site Area	A	0.630	ha
Intensity $i=A/(T)^c$	i	250.32	mm/hr
Flow Q=CiA/360	Q	0.36	m^3/s
		360	l/s

AREA ID Existing Site

Composite RC Value	Area [ha]	RC	RC * Area
Landscape	0.077	0.25	0.0192
Building/Impervious Area	0.553	0.90	0.4979
	0.630	Total	0.5171
	Divided by Total Area =		0.82

counterpoint engineering

Allowable Release Rate

Project Name: 175 Wynford Drive

Project Number: 20028

Rational Method - 2 Year Predevelopment

Holmes

Event:		2	years
ABC's:	A	21.8	
	C	0.78	
Time of Concentration:	t	10	min
Runoff Coefficient:	C	0.50	*0.5 Maximum
Site Area	A	1.37	ha
Intensity	i	88.19	mm/hr
$i=A/(T)^c$			
Flow	Q	0.168	m^3/s
Q=CiA/360		**168**	**l/s**

Composite RC Value	Area (ha)	RC	RC * Area
Landscape	0.15	0.25	0.04
Impervious/Building	1.23	0.90	1.11
		Total	1.1418
		Divided by Total Area =	0.83

counterpoint engineering

Project Name: 175 Wynford Drive
Project Number: 20028

Rainfall Data			
Location:	Toronto	a	59.7
Event	100 Year	b	0
		c	0.8

Area ID	Area (ha)	Runoff Coefficient	t_c (min)	Storage Available (m^3)	Storage Required (m^3)	Release Rate (L/s)	Description	Orifice Size (mm)	Allowable Release Rate (L/s)
SITE	1.24	0.75	10	351	335	93	Orifice Control	150	168
Uncontrolled	0.13	0.70	10	0	0	64	Uncontrolled	-	
Total	**1.37**			**351**	**335**	**157**			

NOTES: On-site storage will be provided via an underground storage tank located within the building
Refer to **Appendix D** for modified rational calculations.

Storm Connection Capacity Summary

Storm Connection (mm)	Slope Pipe (%)	Total Flow to Connection (l/s)	Pipe Area (sq.m)	Hydraulic Radius (m)	Pipe Capacity (l/s)
300	2.5%	93	0.07	0.038	96

AREA ID SITE

Composite RC Value	Area [ha]	RC	RC * Area
Landscape	0.076	0.25	0.0190
Green Roof anf Roof Planters	0.299	0.45	0.1347
Building/Impervious Area	0.865	0.90	0.7781
	1.24	Total	0.9318
	Divided by Total Area =		0.75

AREA ID Uncontrolled

Composite RC Value	Area [ha]	RC	RC * Area
Landscape	0.040	0.25	0.0100
Building/Impervious Area	0.090	0.90	0.0810
	0.13	Total	0.0910

counterpoint engineering

Modified Rational **Area:** **Uncontrolled**

Project Name: 175 Wynford Drive
Project Number: 20028

Rainfall Data			
Location:	Toronto	a	59.700
Event	100 Year	b	0.000
		c	0.800

Site Data		
Area	0.130	ha
Runoff Coefficient	0.70	
AC	0.09	
Tc	10	
Time Increment	10	
Release Rate	64.0	l/s
Storage Required	0	m^3

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	250	0.06	38	38	0	********
20	144	0.04	44	77	-33	
30	104	0.03	47	115	-68	
40	83	0.02	50	154	-103	
50	69	0.02	52	192	-140	
60	60	0.02	54	230	-176	
70	53	0.01	56	269	-213	
80	47	0.01	58	307	-250	
90	43	0.01	59	346	-287	
100	40	0.01	60	384	-324	
110	37	0.01	61	422	-361	
120	34	0.01	62	461	-398	
130	32	0.01	63	499	-436	
140	30	0.01	64	538	-473	
150	29	0.01	65	576	-511	
160	27	0.01	66	614	-548	
170	26	0.01	67	653	-586	
180	25	0.01	68	691	-623	
190	24	0.01	68	730	-661	
200	23	0.01	69	768	-699	
210	22	0.01	70	806	-737	

counterpoint engineering

Modified Rational **Area:** **SITE**

Project Name: 175 Wynford Drive
Project Number: 20028

Rainfall Data			
Location:	Toronto	a	59.700
Event	100 Year	b	0.000
		c	0.800

Site Data		
Area	1.240	ha
Runoff Coefficient	0.75	
AC	0.93	
Tc	10	
Time Increment	10	
Release Rate	93.1	l/s
Storage Required	335	m^3

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	250	0.65	389	56	333	
20	144	0.37	447	112	335	********
30	104	0.27	485	168	317	
40	83	0.21	513	223	290	
50	69	0.18	537	279	258	
60	60	0.15	557	335	222	
70	53	0.14	574	391	183	
80	47	0.12	590	447	143	
90	43	0.11	604	503	101	
100	40	0.10	617	558	58	
110	37	0.10	628	614	14	
120	34	0.09	640	670	-31	
130	32	0.08	650	726	-76	
140	30	0.08	660	782	-122	
150	29	0.07	669	838	-169	
160	27	0.07	677	894	-216	
170	26	0.07	686	949	-264	
180	25	0.06	694	1005	-312	
190	24	0.06	701	1061	-360	
200	23	0.06	708	1117	-409	
210	22	0.06	715	1173	-457	
220	21	0.05	722	1229	-507	
230	20	0.05	728	1284	-556	

counterpoint engineering

Orifice Control & Detention Storage

Project Name: 175 Wynford Drive

Project No.: 20028

Area: SITE

Orifice Equation: $Q = C_d A(2gh)^{1/2}$

Orifice Diameter: 150 mm

Area: 0.018 m^2

g = 9.81 m/s^2

C_d = 0.81 orifice tube

Underground Storage Tank Footprint = 150 m^2

	Stage	Head (m)	Storage (m3)	Discharge (L/s)
Invert E.L.	120.89	0.00	0	0
100-year Elevation	123.12	2.16	335	**93**
Ceiling Elevation	123.23	2.27	351	**95**

* invert based on centre of orifice tube

Counterpoint Engineering

Water Balance

175 Wynford Drive

City of Toronto's Green Standard Tier 1 Section QW 2.2

Initial Abstraction Asphalt, I	1	mm
Initial Abstraction Pervious, P	5	mm
Initial Abstraction Green Roof, P	5	mm
Initial Abstraction Roof, R	1	mm
Toronto's small design rainfall event has 5mm excess rainfall		

Type of Area	Area	Units	% Redevelopment Area
Non-Green Roof Area	0.497	ha	36%
Asphalt	0.028	ha	2%
Pervious	0.546	ha	40%
Green Roof and Roof Planter Area	0.299	ha	22%
Total Area	1.37	ha	100%

Initial Abstraction= Percent Impervious (Roof) *R + Percent Impervious (Asphalt)* I + Percent Previous (landscape) * P + Percent Pervious Intensive Green Roof * P

Initial Abstraction= 0.36 x 1mm + 0.02 x 1mm + 0.40 x 5mm + 0.22 x 5mm

Initial Abstraction (credit)= 3.47 mm

Required Development Retention = (Excess Rainfall- Initial Abstraction) * (Total Development Area)

Required Development Retention = (5mm - 3.47 mm) x (1.370)ha

Required Development Retention (debit)= 21.0 m^3

Counterpoint Engineering

Water Balance

175 Wynford Drive

City of Toronto's Green Standard Tier 2 Section QW 2.2

Initial Abstraction Asphalt, I	1	mm
Initial Abstraction Pervious, P	10	mm
Initial Abstraction Green Roof, P	10	mm
Initial Abstraction Roof, R	1	mm
Toronto's small design rainfall event has 5mm excess rainfall		

Type of Area	Area	Units	% Redevelopment Area
Non-Green Roof Area	0.497	ha	36%
Asphalt	0.028	ha	2%
Pervious	0.546	ha	40%
Green Roof and Roof Planter Area	0.299	ha	22%
Total Area	1.37	ha	100%

Initial Abstraction= Percent Impervious (Roof) *R + Percent Impervious (Asphalt)* I + Percent Previous (landscape) * P + Percent Pervious Intensive Green Roof * P

Initial Abstraction= 0.36 x 1mm + 0.02 x 1mm + 0.40 x 5mm + 0.22 x 5mm

Initial Abstraction (credit)= 6.55 mm

Required Development Retention = (Excess Rainfall- Initial Abstraction) * (Total Development Area)

Required Development Retention = (10mm - 6.6 mm) x (1.370)ha

Required Development Retention (debit)= 47.3 m^3

Appendix D

Groundwater

TORONTO

December 2017

SERVICING REPORT GROUNDWATER SUMMARY

The form is to be completed by the Professional that prepared the Servicing Report.
Use of the form by the City of Toronto is not to be construed as verification of engineering/hydrological content.

For City Staff Use Only:	
Name of ECS Case Manager (please print)	
Date Review Summary provided to to TW	

A. SITE INFORMAITON		**Included in SR (reference page number)**	**Report Includes this information City staff (Check)**
Date Servicing Report was prepared: September 22, 2020		Cover	
Title of Servicing Report: Functional Servicing and Stormwater Management Report		Cover	
Name of Consulting Firm that prepared Servicing Report: Counterpoint Engineering Inc.		Cover	
Site Address	175 Wynford Drive Toronto, Ontario	Cover	
Postal Code	M3C 1J3	Cover	
Property Owner (identified on planning request for comments memo)	DVP Hotel Development LP	Cover	
Proposed description of the project (ex. number of point towers, number of podiums, etc.)	A 47-storey tower and a 49-storey tower located on top of a 8- podium, and a 45-storey tower and a 54-storey tower located on top of an 8-storey podium.	Page 7	
Land Use (ex. commercial, residential, mixed, industrial, institutional) as defined by the Planning Act	Mixed use (retail and residential)	Page 7	
Number of below grade levels	Six (6)	Page 7	

December 2017

SERVICING REPORT GROUNDWATER SUMMARY

Does the SR include a private water drainage system (PWDS)? **PWDS: Private Water Drainage System:** A subsurface drainage system which may consist of but is not limited to weeping tile(s), foundation drain(s), private water collection sump(s), private water pump or any combination thereof for the disposal of private water on the surface of the ground or to a private sewer connection or drainage system for disposal in a municipal sewer.	If **Yes** continue completing Section B (Information Relating to Groundwater) **ONLY** **If Yes, Number of PWDS?** *(Each of these PWDS may require a separate Toronto Water agreement)* If **No** skip to Sections C (On-site Groundwater Containment) and/or D (Water Tight Requirements) as applicable	◯ YES ⊗ NO	
B. INFORMATION RELATING TO GROUNDWATER		**Included in SR (reference page number)**	**Report Includes this information City Staff (Check)**
A copy of the pump schedule(s) for **ALL** groundwater sump pump(s) for the development site has been included in the SR **or** A letter written by a Mechanical Consultant (signed and stamped by a Professional Engineer of Ontario) shall be attached to the SR stating the peak flow rate of the groundwater discharge for the development site for all groundwater sump pump(s). This peak flow rate must be based on the pump			

SERVICING REPORT GROUNDWATER SUMMARY

schedule(s) that have been designed by the Mechanical Consultant. A template of this letter is attached in Schedule A. ****If there is more than one groundwater sump they must ALL be included in the letters along with a combined flow****			
Is it proposed that the groundwater from the development site will be discharged to the sanitary, combined or storm sewer?	◯ Sanitary Sewer ◯ Combined Sewer ◯ Storm Sewer		
Will the proposed PWDS discharge from the site go to the Western Beaches Tunnel (WBT)? *Reference attached WBT drainage map*	◯ YES ◯ NO **If Yes, private water discharge fees will apply and site requires a sanitary discharge agreement.**		
What is the street name where the receiving sewer is located?			
What is the diameter of the receiving sewer?			
Is there capacity in the proposed local sewer system? ◯ YES ◯ NO	Are there any improvements required to the sewer system? If yes, identify them below and refer to the section and page number of the SR where this information can be found. If a sewer upgrade is required, the owner is required to enter into an Agreement with the City to improve the infrastructure? ◯ YES		
Has Toronto Water-WIM confirmed that there is there capacity in the proposed infrastructure listed below? - Trunk System? ◯ YES ◯ NO -Pumping Station? ◯ YES ◯ NO			

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SERVICING REPORT GROUNDWATER SUMMARY

-Wastewater treatment plant? ◯ YES ◯ NO -Outfall? ◯ YES ◯ NO -Combined Sewer Overflow? ◯ YES ◯ NO *If there is no capacity in any of the above then alternative options need to be considered by the Owner and site cannot discharge to City sewer system.			
Total allowable peak flow rate during a 100 year storm event (L/sec) to storm sewer When groundwater is to be discharged to the storm sewer the total groundwater and stormwater discharge shall not exceed the permissible peak flow rate during a 2 year pre development storm event, as per the City's Wet Weather Flow Management Guidelines, dated 2006	_____ L/sec		
Short-Term Groundwater Discharge Provide proposed total flow rate to the sanitary/combined sewer in post-development scenario Total Flow (L/sec) = sanitary flow + peak short-term groundwater flow rate	_____ L/sec		
Long-Tem Groundwater Discharge Provide proposed total flow rate to the sanitary/combined sewer in post-development scenario	_____ L/sec		

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SERVICING REPORT GROUNDWATER SUMMARY

Total Flow (L/sec) = sanitary flow + peak long-term groundwater flow rate			
Does the water quality meet the receiving sewer Bylaw limits? ◯ YES ◯ NO	If the water quality does not meet the applicable receiving sewer Bylaw limits and the applicant is proposing a treatment system the applicant will need to include a letter stating that a treatment system will be installed and the details of the treatment system will be included in the private water discharge application that will be submitted to TW EM&P.		
C. ON-SITE GROUNDWATER CONTAINMENT		**Included in SR (reference page number)**	**Report Includes this information City Staff (Check)**
How is the site proposing to manage the groundwater discharge on site?			
Has the above proposal been approved by:	◯ TW-WIM And ◯ TW-EM&P And ◯ ECS		
If the site is proposing a groundwater infiltration gallery, has it been stated that the groundwater infiltration gallery will not be connected to the municipal sewer? A connection between the infiltration gallery/dry well and the municipal sewer is not permitted Please be advised if an infiltration gallery/dry	◯ YES ◯ NO		

SERVICING REPORT GROUNDWATER SUMMARY

well on site is not connected to the municipal sewer, the site **must** submit two letters using the templates in Schedule B and Schedule C.			
Confirm that the infiltration gallery can infiltrate 100% of the expected peak groundwater flow year round, ensure that the top of the infiltration trench is below the frost line (1.8m depth), not less than 5 m from the building foundation, bottom of the trench 1m above the seasonally high water table, and located so that the drainage is away from the building.			
D. WATER TIGHT REQUIREMENTS		**Included in SR (reference page number)**	**Report Includes this information City Staff (Check)**
If the site is proposing a water tight structure: 1. The owner must submit a letter using the template in Schedule D. 2. A Professional Engineer (Structural), licensed to practice in Ontario and qualified in the subject must submit a letter using the template in Schedule E. 3. A Professional Engineer (Mechanical), licensed to practice in Ontario and qualified in the subject must submit a letter using the template in Schedule F.		Required letters are attached in Appendix D of the report	

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SERVICING REPORT GROUNDWATER SUMMARY

Provide a copy of the approved SR to Toronto Water Environmental Monitoring & Protection Unit at pwapplication@toronto.ca.

Consulting Firm that prepared Servicing Report: _____Counterpoint Engineering Inc._____

Professional Engineer who completed the report summary: ___Andrea Dasek, P. Eng._____
Print Name

Professional Engineer who completed the report summary: _____
Signature Date & Stamp

JABLONSKY, AST AND PARTNERS
Consulting Engineers

400 - 3 Concorde Gate
Toronto, ON M3C 3N7
Telephone (416) 447-7405
Fax (416) 447-2771
www.astint.on.ca
Email jap@astint.on.ca

September 16, 2020

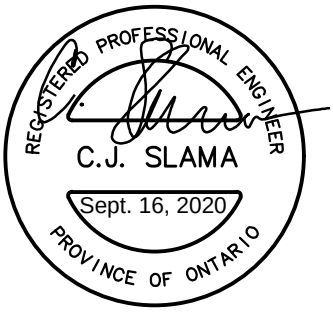
Attention: Executive Director, Engineering and Construction Services
c/o Manager, Development Engineering
55 John Street, 16th Floor, Toronto, ON M5V 3C6

cc: General Manager, Toronto Water
c/o Manager, Environmental Monitoring and Protection Unit
30 Dee Ave, Toronto, ON M9N 1S9

Re: 175 Wynford Drive
Toronto, Ontario
Raft Foundation – Water-tight Design
Our Project No: 20103

Dear Sir or Madam,

I, Craig Slama, P. Eng., confirm that buildings on the subject lands of 175 Wynford Drive, can be structurally constructed, completely water-tight below grade, in a manner that will resist hydrostatic pressure without any structural requirement for Private Water Drainage System (subsurface drainage system) consisting of but not limited to weeping tile(s), foundation drain(s), private water collection sump(s), private water pump or any combination thereof for the disposal of private water on the surface of the ground or to a private sewer connection directly or indirectly or drainage system for disposal directly or indirectly in a municipal sewer.



Craig Slama, P. Eng.
Partner
cslama@astint.on.ca

freed

DVP Hotel Development LP
552 Wellington Avenue 1501
Toronto ON
M5V2V5

September 16, 2020

Attention: Executive Director, Engineering and Construction Services
c/o Manager, Development Engineering
Toronto City Hall 24th fl. E., 100 Queen St. W. Toronto ON M5H 2N2

cc: General Manager, Toronto Water
c/o Manager, Environmental Monitoring and Protection Unit
30 Dee Ave, Toronto ON M9N 1S9

Dear Sir or Madam,

I DVP Hotel Development LP, confirm and undertake that I will construct and maintain all building(s) on the subject lands (175 Wynford Avenue) in a manner which shall be completely water-tight below grade and resistant to hydrostatic pressure without any necessity for Private Water Drainage System (subsurface drainage system) consisting of but not limited to weeping tile(s), foundation drain(s), private water collection sump(s), private water pump or any combination thereof for the disposal of private water on the surface of the ground or to a private sewer connection directly or indirectly or drainage system for disposal directly or indirectly in a municipal sewer.

Peter Freed,
DVP Hotel Development LP

Email jimmy.sun@freeddevelopments.com

I, Peter Freed, have the authority to bind the corporation.

Smith + Andersen
1100 – 100 Sheppard Ave. East, Toronto ON, M2N 6N5
416 487 8151 f 416 487 9104 smithandandersen.com

2020-09-18

Attention: Executive Director, Engineering and Construction Services
c/o Manager, Development Engineering

Cc: General Manager, Toronto Water
c/o Manager, Environmental Monitoring and Protection Unit
30 Dee Ave, Toronto ON M9N 1S9

RE: 175 WYNFORD DRIVE
S+A PROJECT # 17587.001.M.001
GROUND WATER DISCHARGE STRATEGY

By way of this letter we confirm that all building(s) on the subject lands at 145 Wynford Drive will be designed and constructed below grade in a manner without any necessity for Private Water Drainage System (subsurface drainage system) consisting of but not limited to weeping tile(s), foundation drain(s), Private Water collection sump(s), Private Water pump or any combination thereof for the disposal of Private Water on the surface of the ground or to a private sewer connection directly or indirectly or drainage system for disposal directly or indirectly in a municipal sewer. Underground structure(s) of the proposed building(s) will be built completely watertight without any direct or indirect connection to the City sewer system for the discharge of Groundwater (from a PWDS or floor drain or other infrastructure).

I understand that a Private Water Drainage System as an emergency back-up system is not permitted, as part of this proposal

Smith + Andersen

Bram Atlin P.Eng., LEED AP
Principal
bram.atlin@smithandandersen.com

17587.001.m.001.l001-R0- Ground Water Strategy.docx