

PREPARED FOR CENTRECOURT

5 & 15 TANGREEN COURT - MASTER PLAN FUNCTIONAL SERVICING REPORT

5 & 15 TANGREEN COURT

MARCH 15, 2023





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5 & 15 TANGREEN COURT, CITY OF TORONTO, ON M2M 3Z1

FUNCTIONAL SERVICING REPORT

PROJECT NO.: 221-13290

DATE: MARCH 15, 2023

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1 INTRODUCTION

1.1 INTRODUCTION

WSP Canada Inc. (WSP) has been retained by CAPREIT 2 Limited Partnership (the “client”) to prepare a Master Functional Servicing Report in support of a Zoning By-Law and Site Plan Application for a proposed mixed-use development at 5 & 15 Tangreen Court (the “Site”), located in the City of Toronto (the “City”). This report provides the conceptual framework for water distribution, sanitary sewage and storm drainage for this development, prior to the detailed design being undertaken. A Stormwater Management Report outlining the proposed quality and quantity controls for stormwater on this Site has been prepared under a separate cover.

The Site will be serviced by existing local Municipal sewers and watermains within adjoining municipal rights-of-ways to support the block development. Service connections will be extended into the proposed towers and coordinated with the architect and mechanical design teams. Any existing on-site service connections will be removed and decommissioned, as standard requirement by Toronto Water.

In preparing this report, WSP staff secured and reviewed available record as built drawings provided by the City of Toronto for the surrounding municipal rights-of-way, PUCC mapping, topographic survey, SUE investigations, active development applications in the vicinity and existing mechanical and architectural building drawings. This report is intended to act as the Master Plan for all phases of the development.

1.2 EXISTING SITE DESCRIPTION

This Master Functional Servicing report has been prepared at the request of CAPREIT 2 Limited Partnership in support of Zoning By-Law Application for proposal of mixed-use development towers at 5 & 15 Tangreen Court (the “Site”).

The gross development Site is approximately of 2.39 hectare parcel of land comprised of properties from 5-15 Tangreen Court. The Site is currently occupied by an existing 18-storey apartment building (address: 5 Tangreen Court) and existing 18-storey apartment building (address: 15 Tangreen Court), with postal code M2M 3Z1. The two existing principle vehicle entrances are off Tangreen Court with paved driveways, surface parking and remaining areas covered with landscaped sodded terrain. The site is bounded by Steeles Avenue to the north, Tangreen Court to the west, Centerpoint Mall to the east and existing Newtonbrook Secondary school parkgrounds to the south. Furthermore, there is an existing 6.10 m easement running parallel to the east property boundary. The site is relatively flat with ground surface boundary elevations ranging from 192.08 to 191.45 and is self-contained with no external drainage areas to consider. Refer to **Figure 1.1** and **Figure 1.2** for Site Location and the Pre-Development Plan.

The subject site is located within the Basement Flooding Study area (BFA) 28 which has been completed by City.

1.3 SITE PROPOSAL

The Site development contemplates a total of seven new high-rise residential towers which will be completed in phases. The overall development will deliver 3,325 new market residential units and approximately 852 square metres of non-residential elements consisting of retail. The site will propose a new 18.5m right-of-way E-W Public Street between the north and south Block. The new E-W Public Street will connect off Tangreen Court and run east to the boundary where it will punch through to connect into a future Street under separate development application. Moreover, this new E-W Public Street covers approximately 1808 square meters in area. The vehicle driveway entrances for the Towers will be accessible off New E-W Public Street and Steeles Avenue. All building service connections as mandated by City requirements will tie into the proposed sewers and watermain on E-W Public Street and the existing sewers on Tangreen Court. Furthermore, a future parklands dedication will be proposed for the Site situated adjacent to the existing 15 Tangreen apartment building which is to remain.

There will be no future service connections to Steeles Avenue as City of Vaughan and York Region have ownership over the storm, sanitary and watermain infrastructure along the frontage of the subject lands hence, to circumvent any execution of multi-party servicing agreements.

The development will be separated into three phases which are summarized below

- Phase 1 (North-East Portion)
 - A 55-storey mixed-use residential Tower A that will consist of total 637 units
 - A 40-storey residential Tower B that will consist of total 478 units
 - One (1) below-ground parking structure with parking stalls for the residents and visitors
 - Construction of the New E-W Public Street with proposed sewers and watermain
- Phase 2 (South Portion)
 - A 25-storey residential Tower C that will consist of total 326 units with connecting Podium up to 6 levels to Tower D
 - A 25-storey residential Tower D that will consist of total 293 units
 - One (1) below-ground parking structure with parking stalls for the residents and visitors
 - Future Parklands dedication
- Phase 3 (North-West Portion)
 - A 55-storey mixed-use residential Tower E that will consist of total 633 units
 - A 45-storey residential Tower F that will consist of total 557 units with connecting Podium up to 8 levels to Tower G
 - A 35-storey residential Tower G that will consist of total 401 units
 - One (1) below-ground parking structure with parking stalls for the residents and visitors and have connectivity to Phase 1 underground parking structure

- Existing 5 Tangreen Ct apartment building will be demolished


The re-development will involve the demolition of the existing 5 Tangreen apartment building in order to build Phase 3 Towers. The future Parkland dedication proposal will provide outdoor amenity features and green spaces which will be further detailed in subsequent application submission.

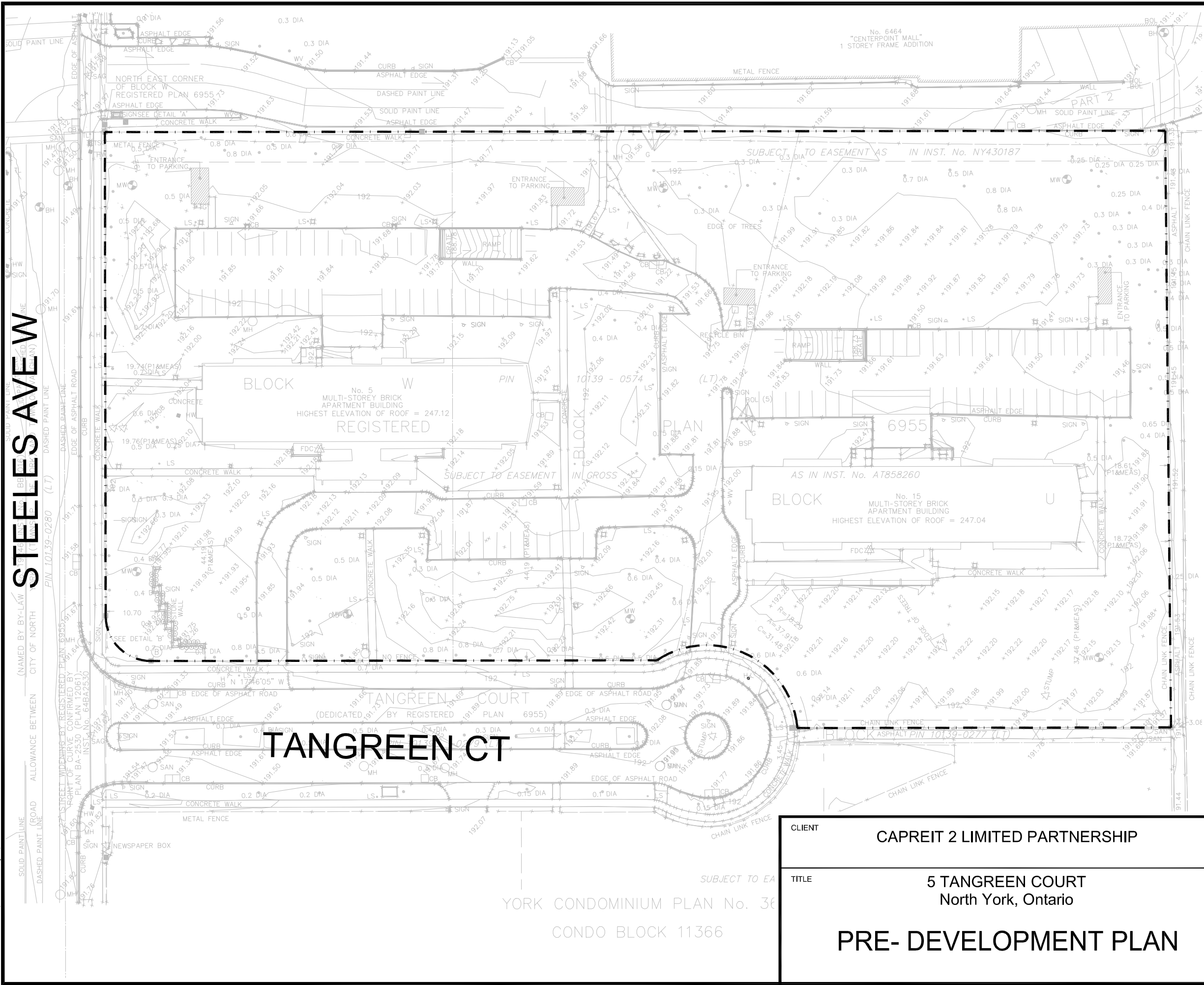
Please refer to **Figure 1** for the Location Map, **Figure 2** for the Pre-Development Plan and **Figure 3** for an illustration of the Proposed Development Plan.

211-13290_Fig_1.dwg Site Location C:\Users\cal2077646\ACD\Docs\WSP Canada projects (AMER)\Land Development Ontario\Project Files\221-13290-00 5 Tangreen Court\Figures\ Mar 13, 2023 - 3:29pm



@2022 Google - Map data @2022

CLIENT CAPREIT 2 LIMITED PARTNERSHIP				
TITLE 5 TANGREEN COURT, NORTH YORK, TORONTO SITE LOCATION				
Checked M.K.		Drawn AutoCAD/L.Z.		
Date MARCH 2023		Proj. No. 221-13290-00		
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STEELES AVE W

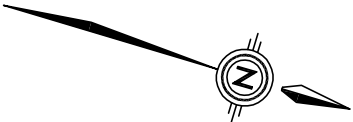
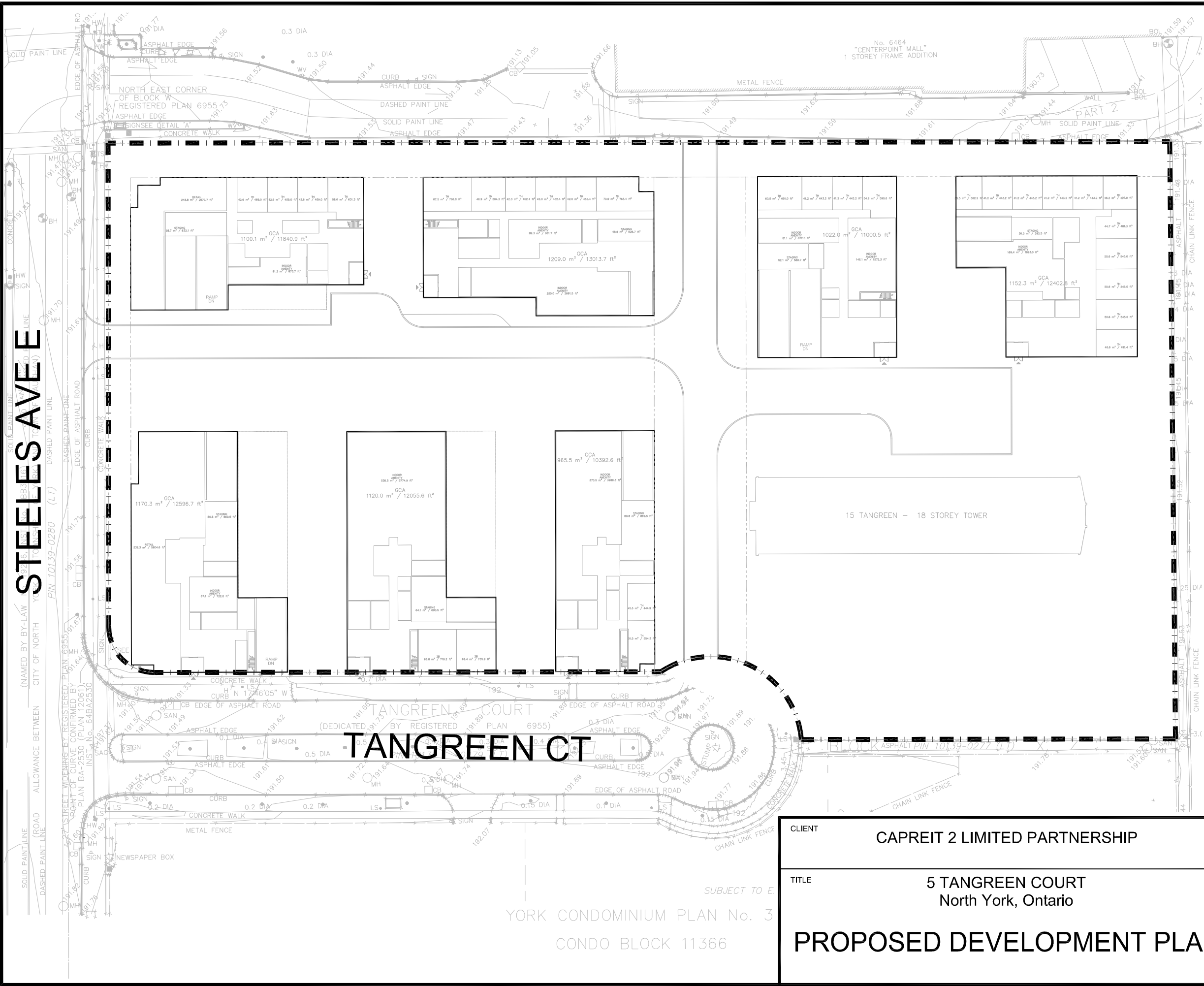
TANGREEN CT

LEGEND

--- LIMIT OF PROPERTY

CLIENT		CAPREIT 2 LIMITED PARTNERSHIP	
TITLE		5 TANGREEN COURT North York, Ontario	
PRE- DEVELOPMENT PLAN			
			
		100 Commerce Valley Dr. West, Thornhill, ON Canada L3T 0A1 t: 905.882.1100 f: 905.882.0055 www.wsp.com	
Checked		M.K.	Drawn L.Z.
Date		MARCH 2023	Proj. No. 221-13290-00
Scale			Figure No. 2

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LEGEND

--- LIMIT OF PROPERTY

CLIENT
CAPREIT 2 LIMITED PARTNERSHIP

TITLE
5 TANGREEN COURT
North York, Ontario
PROPOSED DEVELOPMENT PLAN



100 Commerce Valley Dr. West, Thornhill, ON Canada L3T 0A1
t: 905.882.1100 f: 905.882.0055 www.wsp.com

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Date	MARCH 2023	Proj. No.	221-13290-00
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2 WATER SUPPLY

2.1 EXISTING CONDITIONS

WSP has obtained existing building mechanical plumbing plans and as-builts from the City of Toronto for our site surroundings, as well as the PUCC mapping for the area. WSP also reviewed the SUE QL-B investigation

The existing municipal watermains that are adjacent to the Site are as follows:

- A 300 mm diameter CI watermain located on the east side of Tangreen Court runs up to the existing fire hydrant located near the turning circle. This water line transitions to a 150mm to service existing 15 Tangreen apartment; and,
- A 300mm diameter CI watermain on the south side of Steeles Avenue.

There are multiple existing hydrants located in the vicinity of the Site, including two (2) on Tangreen Court and two (2) on Steeles Avenue. An existing water meter chamber is located on Tangreen Ct at the intersection of Steeles Avenue. All existing water services for 5 Tangreen apartment will be decommissioned and stubbed at the property line under Phase 3 of construction.

Please refer to **Figure 4** for the location of existing watermains and appurtenances in the area. Relevant record drawings and locates are included in **Appendix A** of this report.

2.2 WATER SUPPLY

As per City records, site has existing water service connections to the existing Municipal watermain. New water services will be provided for the proposed Towers. The following table shows the domestic water demand calculations prepared for the proposed Site in accordance with the January 2021 City of Toronto Design Criteria for Sewers and Watermains:

Table 1: Domestic Water Demand

Phase	Phase 1		Phase 2		Phase 3		
Tower	Tower A	Tower B	Tower C	Tower D	Tower E	Tower F	Tower G
Residential Water Demand Rate	190 litres/capita/day						
Population Density	Studio and one (1) Bedroom: 1.4 ppu Two (2) Bedroom: 2.1 ppu Three (3) Bedroom: 3.1 ppu Townhouse: 2.7 ppu Commercial/ Retail: 1.1 ppl/100 m ² of GFA						
Total Residential Units	637 units	478 units	326 Units	293 Units	633 Units	557 Units	401 Units
Total Retail Area GFA	272 m ²	-	-	-	580 m ²	-	-
Peaking Factors	Residential - Apartments: Max. Day = 1.30, Peak Hour = 2.50 Commercial/Retail: Max Day = 1.10, Peak Hour = 1.20						
Average Daily Water Demand	2.38 L/s	1.77 L/s	1.22 L/s	1.19 L/s	2.37 L/s	2.06 L/s	1.51 L/s
Total Average Daily Water Demand	4.16 L/s		2.41 L/s		5.94 L/s		

Peak Hour (P.H.) and Maximum Day (M.D.) Demands	P.H. = 5.94 L/s M.D. = 3.09 L/s	P.H. = 4.43 L/s M.D. = 2.31 L/s	P.H. = 3.05 L/s M.D. = 1.59 L/s	P.H. = 2.97 L/s M.D. = 1.54 L/s	P.H. = 5.90 L/s M.D. = 3.08 L/s	P.H. = 5.16 L/s M.D. = 2.68 L/s	P.H. = 3.77 L/s M.D. = 1.96 L/s
Total Peak Hour and Max. Day Demands	P.H. = 10.38 L/s M.D. = 5.40 L/s		P.H. = 6.02 L/s M.D. = 3.13 L/s		P.H. = 14.83 L/s M.D. = 7.72 L/s		

The estimated average day domestic demand under the Site existing conditions is 2.66 L/s and peak hour demand is 6.66 L/s. Furthermore, the existing 15 Tangreen Ct building to remain has an estimated average daily demand of 1.33 L/s and peak hour demand of 3.33 L/s.

It is anticipated that in order to service the Phase 1 residential development with domestic water, an average daily consumption of approximately 4.16 L/s, a maximum daily consumption of 5.40 L/s and a peak hour demand of 10.38 L/s will be required. For Phase 2 of development, it is anticipated an average daily consumption of approximately 2.41 L/s, a maximum daily consumption of 3.13 L/s and a peak hour demand of 6.02 L/s will be required. For Phase 3 of development, it is anticipated an average daily consumption of approximately 5.94 L/s, a maximum daily consumption of 7.72 L/s and a peak hour demand of 14.83 L/s will be required.

As such, the total estimated average day domestic demand required from the surrounding watermain system under ultimate post-development condition is 13.84 L/s and a peak hour demand of 34.56 L/s, including 15 Tangreen building. Detailed pre-and post-development water demand calculations are included in **Appendix B**.

Moreover, estimated fire flows for each phase of the development have been prepared using the recommendations of the Water Supply for Public Fire Protection, 1999 – Fire Underwriters Survey (FUS), and are presented in **Table 2**. The largest fire flow demand was identified in Towers C w/ Podium under the proposed Phase 2 and was calculated to be 6,000 L/min (equal to 100 L/s or 1,590 US GPM). As such, the minimum fire suppression flow of approximately 1,590 USGPM (100 L/s) at a pressure of 140kPa (20 PSI) will be required for the proposed development.

The fire flow calculations have been prepared with the understanding that vertical openings and exterior vertical communications will be properly protected with a one (1) hour fire rating to meet OBC requirements, and each Tower will be equipped with an adequately designed sprinkler system conforming to NFPA 13 standards. It is assumed that a fire resistive construction be provided for the Towers. For detailed calculations, refer to **Appendix C**.

Table 2: Fire Flow Calculations

	Estimated Required Fire Flows (L/s)
Phase 1 – Tower A	67
Phase 1 – Tower B	83
Phase 2 – Tower C w/ Podium	100
Phase 2 – Tower D	83
Phase 3 – Tower E	67
Phase 3 – Tower F w/ Podium	83
Phase 3 – Tower G	83

Using the calculated maximum and peak day water demands and the calculated fire flows, a hydraulic model analysis will be performed using H2ONet water modelling software to verify that adequate water supply is available for the proposed development.

A new 300mm watermain with looped configuration is designed for the E-W Public Street and connect back onto existing 300mm watermain system at Steeles Avenue. As such, a water model will be used to analyze the impact of the post-development water demands to the existing water infrastructure located within the surrounding municipal rights-of-ways. The water model analysis will be provided under separate application upon completion of the relevant hydrant flow testing.

A summary of the water supply demands for each phase of the development is shown below in **Table 3**.

Table 3: Summary of Water Demand

	Estimated Required Fire Flows (L/s)	Max Day Domestic Flow (L/s)	Fire Flows + Max Day Domestic Flow (L/s)	Peak Hour Domestic Flow (L/s)
Phase 1 – Tower A	67	3.09	70.09	5.94
Phase 1 - Tower B	83	2.31	85.31	4.43
Phase 2 – Tower C w/ Podium	100	1.59	101.59	3.05
Phase 2 – Tower D	83	1.54	84.54	2.97
Phase 3 – Tower E	67	3.08	70.08	5.90
Phase 3 – Tower F w/ Podium	83	2.68	85.68	5.16
Phase 3 – Tower G	83	1.96	84.96	3.77

2.3 HYDRANT FLOW TEST

In order to evaluate the municipal water supply network's ability to support the subject site, hydrant flow tests are to be conducted in accordance with NFPA 291. The flow test results will be used to determine the estimated fire flow pressure at 20 PSI available in the system and verify conformance to general supply. Hydrant flow testing will be completed during the City's permitted window timeframe and results to be provided under separate application.

2.4 PROPOSED WATER SERVICES

The new E-W Public Street will have a proposed 300mm looped watermain to provide water supply for the Towers. The 300mm watermain will connect into the existing 300mm watermain on Tangreen Ct with cut-in-tee method and looped around the new public street and ultimately connect back onto the exiting 300mm watermain on Steeles Avenue. A water meter chamber with three gate valves will be installed at the Steeles Avenue intersection.

New domestic and fire water service connections for the proposed development will be provided in compliance with City's standards and per the Ontario Building Code (O.B.C.) and the City of Toronto Servicing Requirements for Different Built Forms. Moreover, if any tower exceeds 84m in building height, the Ontario Building Code (OBC) mandates that a secondary fire supply service line be provided for redundancy. Moreover, OBC requires any building protected by two adjacent independent fire service connections be separated by an isolation valve which is to be installed on the main line. Typical water

service connections consist of main line which will branch off in 'h-style' tee into two separate lines: fire and domestic, per City of Toronto standards T-1104.02-03.

To service Phase 1 development, two 150mm domestic water lines are required for residential Towers A and B, respectively. A 200mm fire line is proposed for the shared underground P1 structure. Since both Tower A and Tower B exceed 84m in height, two additional 150mm secondary supply fire line is provided for redundancy. The domestic water lines will branch off the fire lines which are proposed to connect into the new 300 watermain on E-W Public Street.

For Phase 2 development, three 150mm domestic water lines are required to service Tower C, Tower D and connecting Podium, respectively. A 200mm fire line is proposed for the shared underground P1 structure. The 150mm domestic line for Tower C will branch off of the fire line with h-style connection and tap into the new 300mm watermain on E-W Public Street.

For Phase 3 development, four 150mm domestic water lines are required to service Tower E, Tower F, Podium and Tower G, respectively. A 200m main fire line is proposed off of Tangreen Ct for the shared P1 underground structure. Furthermore, all three towers in Phase 3 exceed 84m in building height and thus, three additional secondary supply fire lines are proposed off of new 300mm waterman on E-W Public Street. The 150mm domestic lines will branch off of the fire lines with h-style connection.

As part of the proposed development, a Public Parkland Dedication will be conveyed to the City. Future Park design considerations are to be determined. As such, a service connection will be evaluated during the detailed Park design phase when more information becomes available.

All the proposed water service connections will be made with a tapping sleeve and valve per City standards. Valve and boxes will be installed on each service at the property line accordingly. The water service locations will be coordinated with Mechanical consultant.

The proposed Water Servicing Plan is shown on **Figure 4**.

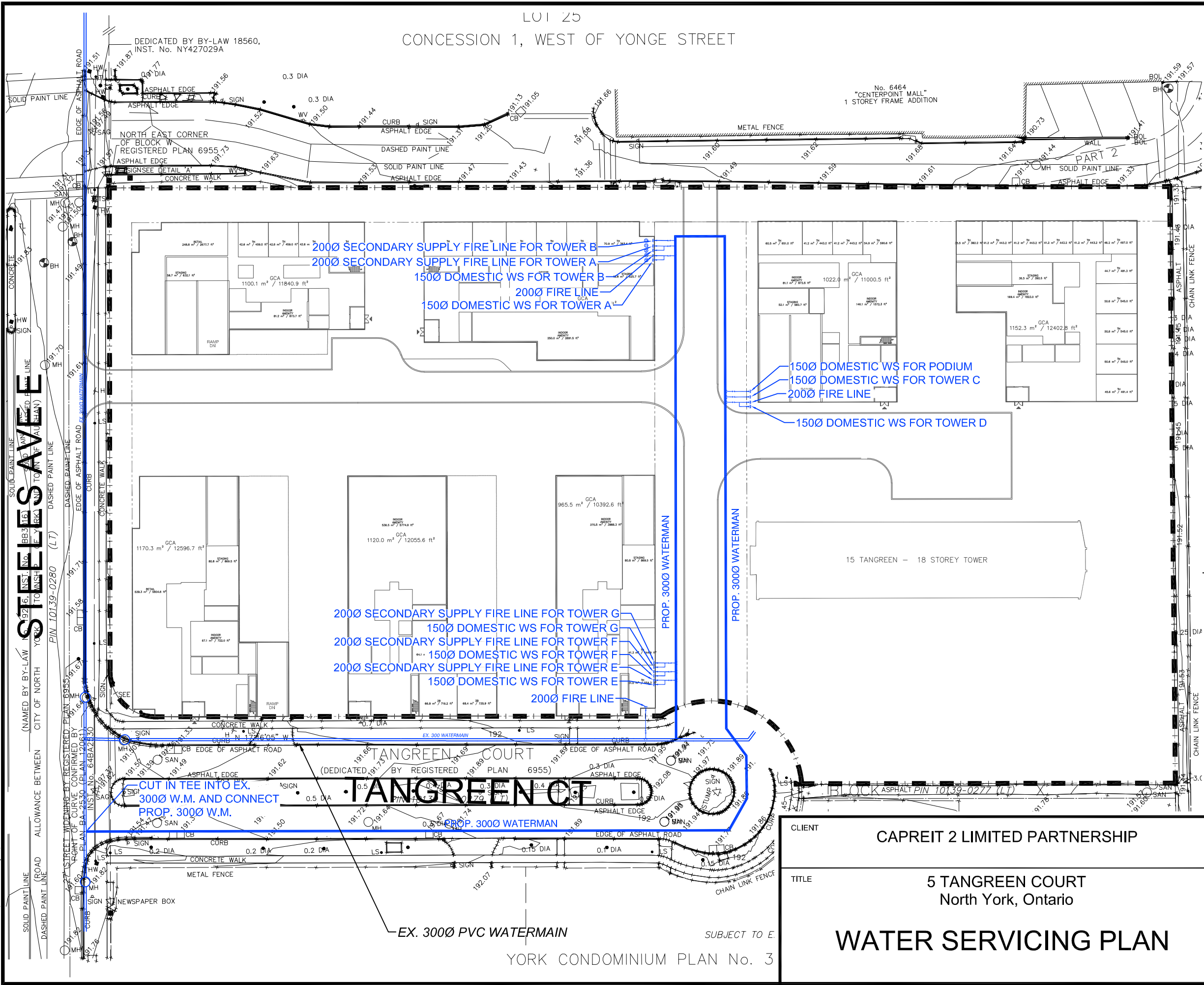
2.5 WATERMAIN APPURTENANCES

Ontario Building Code requirements stipulate that each building be serviced by a fire hydrant which is located no more than 45m away from the building's siamese connection.

As noted in Section 2.1, there are multiple existing hydrants located on the surrounding municipal rights-of-way: two (2) on Tangreen Court and two (2) on Steeles Avenue.

In accordance with City Standards, a water meter and a backflow preventer valve will be installed on the incoming domestic lines dedicated for each tower within the mechanical rooms. A detector check assembly will be installed on each fire service line in compliance with the OBC. Each meter room will need to be accessible to the City and provide remote read-out locations for the City's use in reading the meters. Details of the rooms' layout will be provided by the Mechanical Consultant.

PLOTDATE: Mar 13, 2023 - 8:54pm, CAMK078863



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- LIMIT OF PROPERTY
- == EX. WATERMAIN
- PROP. W/M CONNECTION
- ⊗ PROP. VALVE & CHAMBER
- ⊕ PROP. VALVE & BOX
- ⓑ BACKFLOW PREVENTER
- ⓓ DETECTOR CHECK VALVE
- Ⓜ WATER METER

CLIENT
CAPREIT 2 LIMITED PARTNERSHIP

TITLE
5 TANGREEN COURT
North York, Ontario
WATER SERVICING PLAN



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Scale	1:750	Figure No.	4

3 SANITARY SEWAGE SYSTEM

3.1 EXISTING SEWER SYSTEM

Existing sanitary sewer in the vicinity of the Site include:

- A 250mm sanitary sewer located on the west side of Tangreen Court and draining south and ultimately discharging to the trunk sewer on Fargo Avenue

Based on record drawings of the existing Site plan, and the SUE investigation completed by Telecon (attached in **Appendix A** of this report), it was determined that existing flows drainage from 5 Tangreen and 15 Tangreen buildings are currently directed to the sanitary sewer on Tangreen Ct. According to City policies, all existing sanitary services of any buildings to be demolished are to be decommissioned and plugged at the property line as directed by Toronto Water.

Under pre-development conditions, it was estimated that each residential building generates a peak sanitary flow of 1.68 L/s, including infiltration. Thus, the total peak sanitary flow discharging from the Site is 3.97 L/s. Refer to **Appendix D** for the Pre-Development Sanitary Drainage Plan and calculations.

3.2 DESIGN PARAMETERS

To calculate the theoretical peak sanitary flows and demand, the following requirements in the City of Toronto Design Criteria for Sewers and Watermains, September 2022, have been considered:

Design Flows: Pre-Development and Post-Development

- $I/I = 0.26 \text{ L/s}$
- 240 L/cap/day average day flow generation rate for residential (to *existing* sewer)
- 250 L/cap/day average day flow generation rate for commercial (to *existing* sewer)

Design of new sanitary sewer

- 450 L/cap/day flow generation rate for residential and commercial uses
- 1.1 people per 100 m² for commercial/retail
- 1.4 people/unit (for 1 bedroom units)
- 2.1 people/unit (for 2 bedroom units)
- 3.1 people/unit (for 3 bedroom units)
- Infiltration allowance = 0.26 L/s/ha (Dry Weather)

3.3 POST-DEVELOPMENT SEWAGE FLOWS

The anticipated sanitary discharge flows from the development were calculated based on the City of Toronto Design Criteria and Ontario Building Code guidelines, along with the architectural site statistics.

Under post-development conditions, Phase 1 Tower A and Tower B, will convey flows to the new proposed 250mm sanitary sewer on E-W Public Street. The estimated total peak sanitary peak flow from Phase 1 was calculated to be 37.6 L/s. For Phase 2 – Tower C and Tower D will convey flows to the new 250mm sanitary sewer on E-W Public Street and will generate a peak sanitary flow of 22.8 L/s. Ultimately, the sewage discharge on E-W Public Street will drain west into the existing 250mm sanitary sewer on Tangreen Court.

Furthermore, under Phase 3, the residential Tower E, Tower F and Tower G will convey peak flows directly to the existing 250mm sanitary sewer on Tangreen Ct. The estimated total peak flow for Phase 3 Towers combined was calculated to be 53.9 L/s. These flows will be accounted for in our sanitary dry weather analysis from the upstream leg down to the nearest Trunk.

Refer to **Figure 5** for proposed sanitary servicing and existing sanitary services adjacent to the Site. **Table 6** below summarizes the proposed sanitary peak flows generated from the phased development and abides with the City's design criteria.

Detailed calculations of the pre- and post-development sanitary sewage flows has been included in **Appendix D**.

Table 4: Summary Sanitary Peak Flows (Post-Development Condition)

Phase	Phase 1		Phase 2		Phase 3		
Towers	Tower A	Tower B	Tower C	Tower D	Tower E	Tower F	Tower G
Discharge Location	E-W Public Street Sewer		E-W Public Street Sewer		Tangreen Ct Sewer		
Average Residential Sewage Flow	450 litres/person/day (Proposed)						
Total Residential Population	1079	806	555	540	1070	933	680
Average Flow	5.6 L/s	4.2 L/s	2.89 L/s	2.81 L/s	5.57 L/s	4.86 L/s	3.54 L/s
Residential Harmon Peaking Factor M = 1+14/(4+p ^{0.5}) where p = population in thousands	3.78	3.86	3.95	3.96	3.78	3.82	3.90
Commercial, Retail Sewage flows	0.07 L/s	-	-	-	0.15 L/s	-	-
Peak groundwater pump rate	-		-		-		
Infiltration	0.06 L/s	0.06 L/s	0.12 L/s	0.12 L/s	0.06 L/s	0.06 L/s	0.06 L/s
Peak Flow	21.4 L/s	16.3 L/s	11.5 L/s	11.2 L/s	21.3 L/s	18.7 L/s	13.9 L/s

3.4 SANITARY SERVICE

The new E-W Public Street will have a proposed Municipal 250mm sanitary sewer that serve the Phase 1 and Phase 2 buildings. This sewer will slope in west direction and connect into the existing 250mm sewer on Tangreen Ct via new sanitary manhole. Sanitary service connections to the site within the Municipal Road allowance will be designed to the City of Toronto standards. A 200mm sanitary sewer connection sloped at minimum 2.0% is provided for each Tower and including any connecting Podiums to comply with the City's site servicing requirements based on built form. For Phase 1 and Phase 2, the proposed lateral sanitary services will connect into the new 250mm sewer on E-W Public Street. For Phase 3, the proposed lateral sanitary sewers will connect onto existing 250mm sewer on Tangreen Ct. Moreover, each service connection will be equipped with a cast-in-place (CIP) control maintenance hole inside the property line. The proposed 200mm service connections will be more than adequate to convey the sanitary discharge flows from the site.

3.5 SANITARY SEWER CAPACITY ANALYSIS – (DRY WEATHER ANALYSIS ONLY)

An external static sanitary flow analysis has been completed for the municipal sanitary sewer system that will be accepting flow from this Development under post-development condition. The analysis was conducted for the sanitary sewer network from Tangreen Court to the intersection of Goulding Avenue and Fargo Avenue, where the network discharges to the sanitary trunk sewer. The analysis was undertaken in order to determine the overall impact to sanitary sewer capacity and to identify if any improvements and / or mitigation measures would be required to the existing downstream sanitary sewer system up to the connection point at the trunk as a result of post development peak sanitary flows from the site. Capacity of the downstream sewers was analyzed under pre- and post- development scenarios for the 'dry' weather conditions. 'Wet' weather condition analyses were not conducted since the sewer network consists of primarily sanitary sewers and does not contain any stormwater contributions.

To perform the analysis, WSP utilized sewer information data (e.g., pipe diameter, slope, length, invert elevations and ground elevations) obtained from the City of Toronto PUCC and record drawings. Moreover, population counts from existing buildings used in the analysis are based on the review of the actual existing land uses within the sewer shed. Google Satellite imagery and Street View images were reviewed to estimate the number of residential dwellings, the number of storeys and the gross floor areas of churches, commercial spaces, schools, and parklands. It should be noted that no industrial or office buildings were found and therefore not included in the analysis. Research was undertaken to determine the number of units for high-density residential buildings and shopping centres. The addresses and estimated populations for the existing buildings are summarized in **Appendix D**.

As aforementioned, the sanitary drainage from the site under pre-development condition discharges to existing sanitary sewers on Tangreen Court and ultimately discharges into the trunk sewer on Fargo Avenue located at the intersections of Goulding Avenue and Fargo Avenue. Flows continue to drain

southward. It was determined that the utilization of existing sanitary sewers range from 14.88% - 34.76% under pre-development conditions with six sewer legs at above capacity.

Under post-development scenario, Phases 1 and 2 will discharge to sewer on E-W Public Street and Phase 3 will discharge directly into the Tangreen Court sanitary sewers. All three phases will ultimately discharge to the Tangreen Court sanitary sewers. These changes result in an increase of flow of approximately 73.5 L/s into the trunk sewer. In addition to the calculated sanitary flows, an allowance for infiltration / foundation drainage was added to the design sheets. Per City of Toronto Design Criteria, a value of 0.26 L/s/ha was utilized for the infiltration allowance. These allowances were added to the calculated flow dry weather conditions. As a result of the increase in flows, the sewer legs are over 100% utilization for majority of the segments to the trunk. WSP has concluded that further analysis will need to be conducted to better assess sewer upgrade requirements. The Basement Flooding EA for this area has been completed by the City.

Please refer to the design sheets attached in **Appendix D**. Estimated dry weather flows for the subject sewer shed up to the respective trunk sewer, which includes peak sanitary flow and infiltration can be found in **Appendix D**. To facilitate this analysis, Sanitary Sewer Drainage Area Plans have been created and included in **Appendix D**.

3.6 PERMANENT DEWATERING SYSTEM (PDS)

A Hydrogeological Assessment Report has been prepared for the Site by DS Consultants Ltd., dated March 2023. The report details the soil and groundwater conditions, groundwater quality, and construction and long-term dewatering rates.

The Site is comprised of fill material, sandy silt till deposits, silty clay and lower till. The topography of the site is relatively flat with surface elevation of approximately 191.9 metres above sea level (masl). After taking a set of unfiltered groundwater samples and analyzing in a laboratory, observed concentration levels of Manganese, Phosphorus, Zinc, BOD5 and Total Suspended Solids (TSS) were in exceedance with City of Toronto's Storm Sewer Use By-law limits. However, the quality parameters met the City's Sanitary/Combined Sewer Use By-law limits with exception of TSS. Therefore, findings groundwater flows can be discharge to the sanitary sewer system with the need of pre-treatment measures.

As per Hydrogeological report, the expected long-term theoretical groundwater flow to the underfloor drainage system is 74,000 L/day (0.86 L/s), includes factor of safety 2. The City of Toronto foundation drainage policy and guidelines effective January 1st, 2022 should be considered during the design for on-site management options for permanent drainage that may include, but not limited to, waterproofing, and above-ground discharge and infiltration.

Under each phase of development, it is assumed that underground structures will consist of waterproofing the foundation walls and drainage layer.

Moreover, the construction dewatering daily rate for the site is approximately 212,400 L/day (2.46 L/s) as per the Hydrogeological report. This short-term dewatering rate for two (2) levels of underground parking has an applied safety factor of 2.0 and takes into consideration additional stormwater from a theoretical 10mm precipitation event. The maximum flow calculation is intended to provide a conservative value to account for unforeseeable conditions that may arise during construction. At the time of this report, a dewatering plan was not made available. As such, dewatering rate of maximum 2.46 L/s will be conveyed to the existing 250mm sanitary sewer and will require treatment prior to discharge. It should be noted a discharge permit will be required from Toronto Water. Furthermore, a Permit to Take Water (PTTW) application must be submitted to the Ministry of the Environment, Conservation and Parks (MECP) if dewatering rates exceed 50 m³/day.

Please refer to **Appendix E** for Groundwater Summary Forms.

4 STORM DRAINAGE

4.1 STORMWATER MANAGEMENT REPORT

A Stormwater Management Report for this development has been prepared by WSP under a separate cover. The report is in compliance with the City's Wet Weather Flow Management Guidelines (WWFMG) and it contains more detailed analysis to stormwater management and examines the water quantity, water quality controls and water balance measures under which this site will operate.

4.2 EXISTING CONDITIONS

Based on the PUCC maps and as-built record drawings retrieved from the City, the existing storm sewers in the vicinity of the Site are:

- ▶ A 900 mm R.C.P. diameter storm sewer in the City Easement at the east draining south;
- ▶ A 600 mm diameter concrete storm sewer on the south side of Steeles Avenue and is owned by City of Vaughan;
- ▶ A 450 mm diameter storm sewer in Tangreen Court at the west which drains south and has road catchbasins that connect into it.

Under pre-development conditions, the site currently drain south east direction towards the easement with a small portion of area surface runoff towards Tangreen Court. Relevant existing building plans and locates are included in Appendix A of this report.

4.3 PROPOSED DEVELOPMENT

As aforementioned, the proposed development is separated into multiple phases. In the ultimate condition, the site will be separated by a proposed new Municipal right-of-way, and each phase will consist of different drainage catchments. A new Municipal 900mm Storm sewer is proposed to be constructed underneath the E-W Public Street. For the purpose of Stormwater Management strategy, each catchment in the development will have its own stormwater management system. All storm flow from each catchment will be captured and directed to its respective stormwater storage tanks. The tanks will be sized to control the 100-year post-development flows to the 2-year pre-development levels. As the storm outflow from the site will be reduced in the post-development condition, the proposed development will have a net positive effect on the existing storm sewer system.

Phase 1 will consist of one proposed mixed-use tower buildings (Tower A) with 55 storeys and one residential building (Tower B) with 40 storeys. A one-level underground parking structure underlays the two towers. Phase 1 covers an area of approximately 0.49 ha. The storm flows from Phase 1 will be captured and directed to a stormwater cistern located in the underground parking structure to control the flows prior to discharging to the 900 mm storm sewer on the future right-of-way. A water quality system MFS Treatment Unit model SFPD 0811, will be provided upstream of the cistern to meet quality control measures and achieve the required 80% Total Suspended Solids (TSS) removal. For the purpose of the storm analysis, Phase 1 will be referred to as Catchment 1.

Phase 2 will consist of two proposed residential tower buildings (Tower C and D) with 25 storeys with one-level underground parking underlays each tower. Phase 2 covers an area of approximately 0.50 ha. The storm flows from Phase 2 will be captured and directed to a stormwater cistern located in the underground P1 structure to control the release rate prior to discharging to the 900 mm storm sewer. Similarly, a water quality device, MFS Treatment Unit model SFPD 0814, will be provided upstream of the cistern to ensure the required quality controls are satisfied. For the purpose of the storm analysis, Phase 2 will be referred to as Catchment 2.

Phase 3, which will be referred to as Catchment 3, covers an area of 0.69 ha. In Phase 3, the existing residential building at 5 Tangreen and the surface parking lots will be demolished. Additionally, Phase 3 consists of a mixed-use tower (Tower E) with 55 storeys, a residential building (Tower F) with 45 storeys, and a residential building (Tower G) with 35 storeys. The storm runoff from this area will be captured on-site and directed to a stormwater cistern located in the underground P1 structure to control the flows prior to discharging to the 900 mm storm sewer. A water quality device, MFS Treatment Unit model SFPD 0811, will be provided upstream of the cistern to meet 80% Total Suspended Solids (TSS) removal per the WWFMG. It is recommended that the MFS Stormfilter systems be inspected on a periodic basis to ensure proper operation.

15 Tangreen Ct building is to remain under post-development condition. It is assumed that the storm runoff from the building and the public park spaces will discharge to the 450 mm storm sewers located on the west side of site. Therefore, the storm runoff from 15 Tangreen Ct will be excluded from the storm analysis.

For detailed hydrologic modelling and storage and storm flow calculations, please refer to the Stormwater Management Report prepared by WSP Canada Inc. under a separate cover.

4.4 MINOR STORM DRAINAGE SYSTEM

The following sections will describe the minor storm drainage system for each discharge catchment. Please refer to the Stormwater Management Report prepared by WSP under a separate cover for more details.

4.4.1 CATCHMENT AREAS

Catchment 1 is at the northeast corner of the site which consists of Towers A and B proposals. All storm flows will be collected by an internal storm drainage system and conveyed into the stormwater storage tank which is located adjacent to E-W Public Street in the P1 level and controlled to an allowable release rate of 45.50 L/s. Tank 1 will be designed to hold a volume of 195.0 m³.

Catchment 2 is located south of E-W Public Street of the site which consists of Towers C and D proposals. All storm flows will be collected by an internal storm drainage system and directed into the stormwater storage tank which is located adjacent to right-of-way in the P1 level and controlled to an allowable release rate of 46.4 L/s. Tank 2 will be designed to hold a volume of 273.0 m³.

Catchment 3 is at the northwest corner of the site which consists of Towers E, F, and G proposals. All storm flows will be collected by an internal storm drainage system and conveyed into the stormwater storage tank and controlled to an allowable release rate of 64.1 L/s, which will conform with requirements set out in the WWFM guidelines. Tank 3 will be designed to hold a volume of 234.0 m³.

A new 250mm storm service connection will be proposed for each catchment and will connect into the proposed 900mm storm sewer located on E-W Public Street. Furthermore, storm connections will be designed to comply with standards and specifications outlined by the City of Toronto.

A cast-in-place control maintenance hole will be installed immediately inside the property line. The storage volume in the cisterns will be pumped into the respective control manhole via a pump system. The pump system will be designed to control the flow below the allowable release rate. In case of system failure or storm event greater than a 100-year storm, each tank will be equipped with an emergency overflow access hatch to the surface to allow water to spill out safely. Additionally, on-site quantity and quality control measures will be provided in accordance with WWFMG and will improve the current conditions by reducing the contributing peak flow and runoff quality levels carried to the municipal storm sewers. Refer to **Figure 6** for the proposed storm sewer layout.

Since all storm flows, up to the 100-year storm event, will be reduced to the 2-year pre-development level, it can be concluded that during storm events, the existing storm sewer system will not be adversely affected under the post-development conditions and have adequate capacity to support flows from the proposed development.

4.4.2 CATCHMENT 4 (PROPOSED RIGHT-OF-WAY)

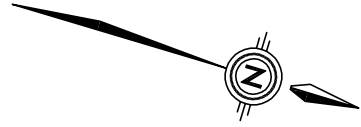
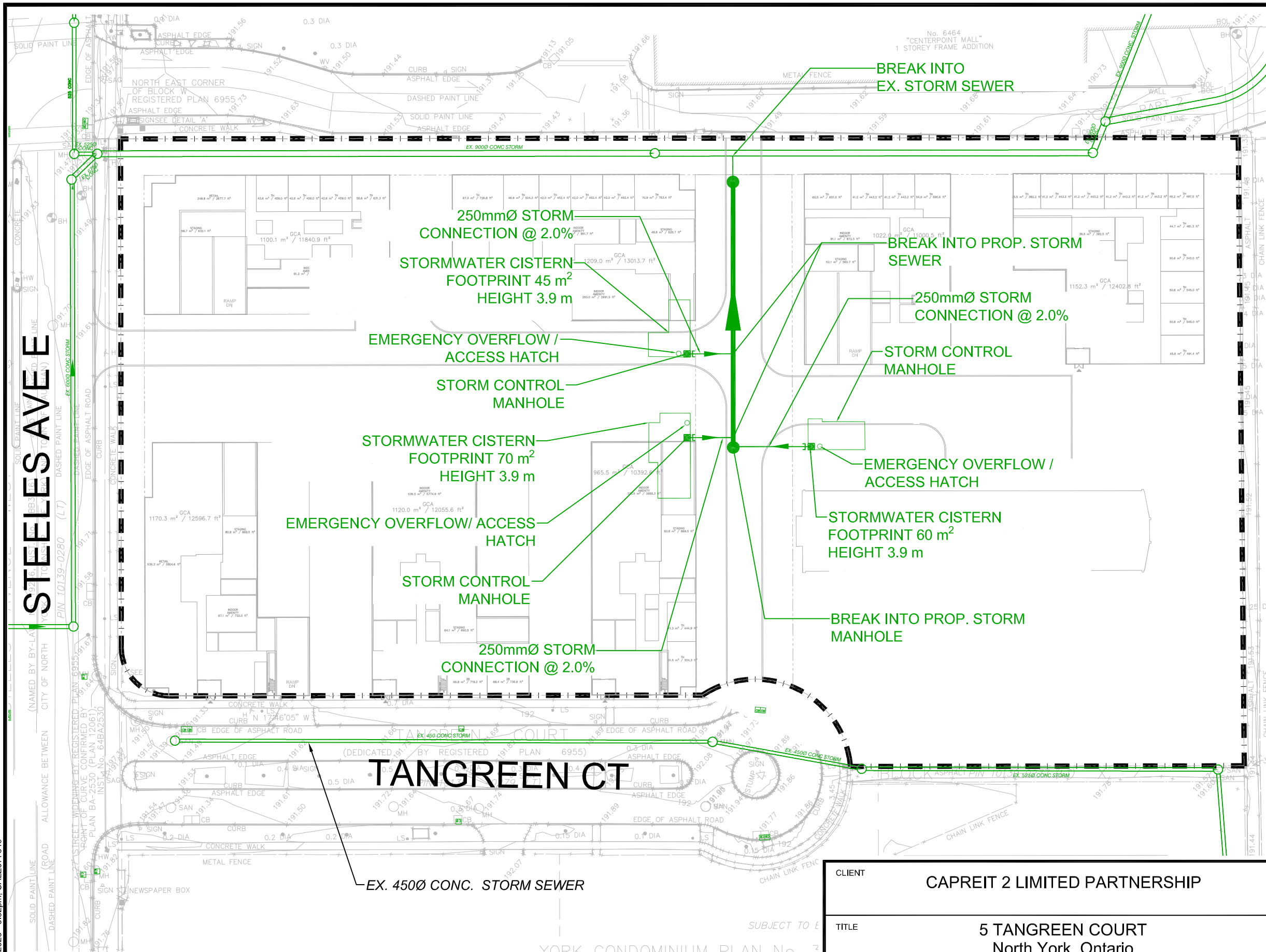
The storm runoffs from the proposed E-W Public Street were analyzed and demonstrated that a 900mm storm pipe storage pipe at 0.3% slope is required to capture the runoff within the right-of-way. The pipe has been sized to control the 100-year post-development flow to the 2-year pre-development level, per the requirement of the WWFM guidelines. The storm flow from the pipe will be released into the existing 900mm storm sewer in the Easement at an allowable release rate of 56.6 L/s via a 250mm flow control pipe with a 150mm diameter orifice tube. For further information on the proposed storm storage pipe, refer to the Stormwater Management Report. Refer to **Figure 6** for the proposed storm sewer system.

4.5 MAJOR STORM DRAINAGE SYSTEM

The major storm system is a conveyance system for flows in excess of the minor system flows. Stormwater runoff from events up to and including the 100-year storm event will be contained on-site and directed to the respective stormwater management facilities for each catchment area.


Majority of surface runoff will be collected on-site and directed via the building's plumbing system or the site's storm sewer network to the respective stormwater cisterns before being discharged to the municipal sewer system. WSP will coordinate with the mechanical consultant to assure that the plumbing system is designed to convey runoff from a 100-year storm for all catchment areas.

As previously stated, an emergency overflow hatch will be provided at the top of the cisterns, with spill point to grade and ultimately allow overland flow to sheet drain to the municipal rights-of-way. This will prevent stormwater from backing up into the building mechanical piping system if the pumps fail, or if a storm event greater than the 100-year return period occurs. In addition, the site will be graded so that all runoff will flow away from all proposed buildings and entrances.



LEGEND

- LIMIT OF PROPERTY
- == EX. STORM SEWER
- PROP. STORM CONNECTION

CLIENT		CAPREIT 2 LIMITED PARTNERSHIP	
TITLE		5 TANGREEN COURT North York, Ontario	
STORM SERVICING PLAN			
			
		100 Commerce Valley Dr. West, Thornhill, ON Canada L3T 0A1 t: 905.882.1100 f: 905.882.0055 www.wsp.com	
Checked		M.K.	Drawn L.Z.
Date		MARCH 2023	Proj. No. 221-13290-00
Scale			Figure No. 6

5 SITE GRADING AND UTILITIES

5.1 SITE GRADING

The grading design of the proposed Development will direct minor storm drainage (up to and including the 100-year storm event) to the on-site collections points so that the drainage is contained within the Site. An overland flow route for the major storm drainage (greater than 100-year storm event) will be provided to direct drainage safely away from the buildings on Site and to the surrounding municipal rights-of-ways. Site grading will also take into consideration into the following:

- Proposed grades along the boundaries to match existing to extent possible so that there will be no impact to adjacent properties.
- Minimize disruption to existing municipal rights-of-way containing utilities and services;
- Promote drainage into the minor storm sewer system;
- Building floor level will be set to avoid building/property damage during all design storms; and
- Entrance ramps into loading areas will be protected from major storm flows

During construction, erosion and sediment control measures will be provided to prevent sediment runoff to the Municipal sewer system. An erosion and sediment control program will be implemented on-site during the entire duration of construction stage in accordance with the GTA Conservation Authorities Erosion and Sediment Control Guidelines for Urban Construction (2006). Due to the nature of this development, the site will include temporary measures such as, a siltation control fence around the perimeter of the site, sediment control traps with geotextile fabrics on external catchbasins adjacent to the site, mud mat at the access points of the sites to control mud tracking by construction traffic and to minimize distribution of mud into the public realm.

5.2 UTILITIES

Record drawings and PUCC data obtained by WSP from the City of Toronto indicate the development is within an urbanized area of the city, with readily available utilities, including, telecommunication, cable, hydro and gas to service the Site. Further coordination with the various utility companies will be required throughout the duration of the project to ensure the utilities can accommodate the proposed redevelopment.

6 CONCLUSIONS

6.1 WATER

A new 300mm Municipal watermain is proposed in the E-W Public Street and be designed with looped configuration to connect back onto the existing 300mm watermain on Steeles Avenue.

The proposed water servicing for the Site will include appropriate domestic and fire service lines for each Phase in accordance with City' standards and per the Ontario Building Code (O.B.C.) and the City of Toronto Servicing Requirements for Different Built Forms. Furthermore, a separate secondary supply fire line is proposed for Towers that exceed 84m in building height and designed to connect off different watermain network, where feasible, to provide redundancy.

The water service connections will be made to either the 300mm watermain on E-W Public Street or Tangreen Court by way of tapping sleeve and valve. Furthermore, valve and boxes will be installed on each incoming service line at the property line.

Domestic and fire flow calculations for the development have been completed for each Tower. Hydrant Flow Tests will be conducted at later date and results are to demonstrate that the existing watermain system has sufficient flows and pressures to support the development proposal.

6.2 SANITARY

Sanitary sewage from the development will be conveyed to the existing 250mm diameter sanitary sewer on Tangreen Court. All of the sanitary sewer pipes in this sewershed will convey flows south and eventually connect into the 1350mm Trunk sewer.

The post-development sanitary peak discharge flows, including an infiltration allowance, was calculated to be 37.7 L/s for Phase 1, 22.7 L/s for Phase 2 and 53.9 L/s for Phase 3. Each tower will be serviced by an individual 200mm sanitary sewer connection to convey the flows to the Municipal sewer. A cast-in-place sanitary control manhole will be installed upstream prior to connecting to the sanitary sewers located within the public rights-of-way as required by City of Toronto's standards.

An external static downstream capacity analysis has been completed. Further analysis is required to better assess sewer upgrade requirements and verify our findings.

6.3 STORM

The proposed storm servicing for the Site will include 250mm storm service building connections for each phase and connect to the proposed 900 mm diameter storm sewer within the E-W Public Street. Flows will drain east to discharge into the existing 900 mm storm sewer in the City Easement and continue to proceed draining south.

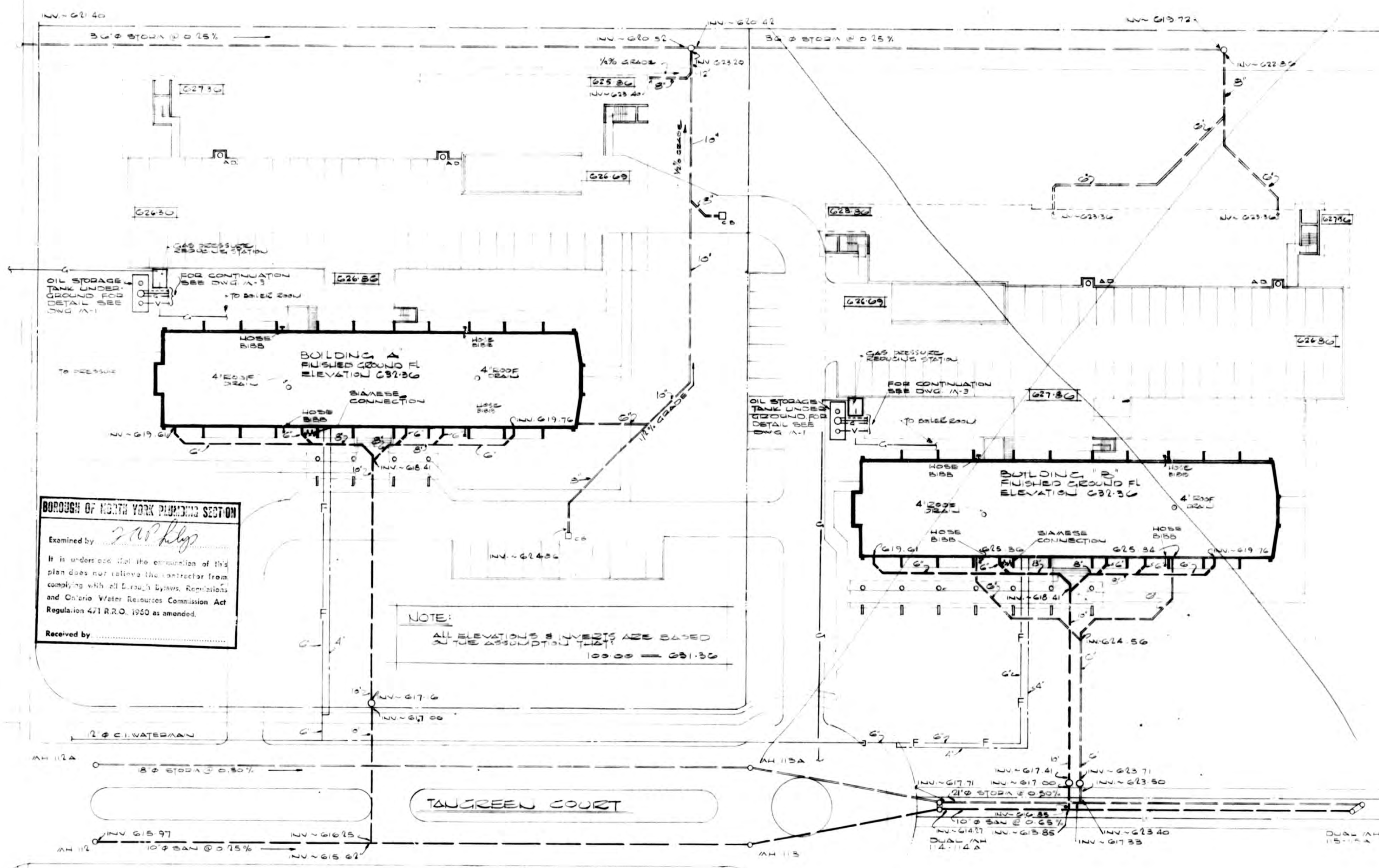
Stormwater runoff from the mixed-use and/or residential towers and proposed right-of-way will be controlled utilizing stormwater storage cisterns, pump systems, and a proposed 250mm storm flow control pipe with a 150mm orifice tube to attenuate the release rate of stormwater from the Site. The existing storm sewer system will not be adversely affected by the post-development condition as the rate of stormwater release from this site will be decreased. Water quality controls in the form of MFS treatment units, are proposed to satisfy the required quality measures for the site controlled at-grade areas.

A Stormwater Management Report has been prepared by WSP under separate cover for more detailed information regarding the stormwater management facilities proposed.

APPENDIX

A RECORD DRAWINGS AND SUPPORTING DOCUMENTS

- LEGEND**
- SANITARY DRAIN BURIED
 - STORM DRAIN BURIED
 - SANITARY DRAIN ABOVE
 - STORM DRAIN ABOVE
 - DOM. COLD WATER
 - DOM. HOT WATER
 - DOM. HEATING LINE
 - VENT LINE
 - FIRE LINE
 - GAS LINE
 - HOT WATER HEATING
 - GATE VALVE
 - GLOBE VALVE
 - CHECK VALVE
 - STRAINER
 - FLOOR DRAIN
 - ROOF DRAIN
 - CATCH BASIN
 - AREA DRAIN
 - SLOTTED AREA DRAIN
 - FIRE HOSE CABINET
 - FIRE DAMPER



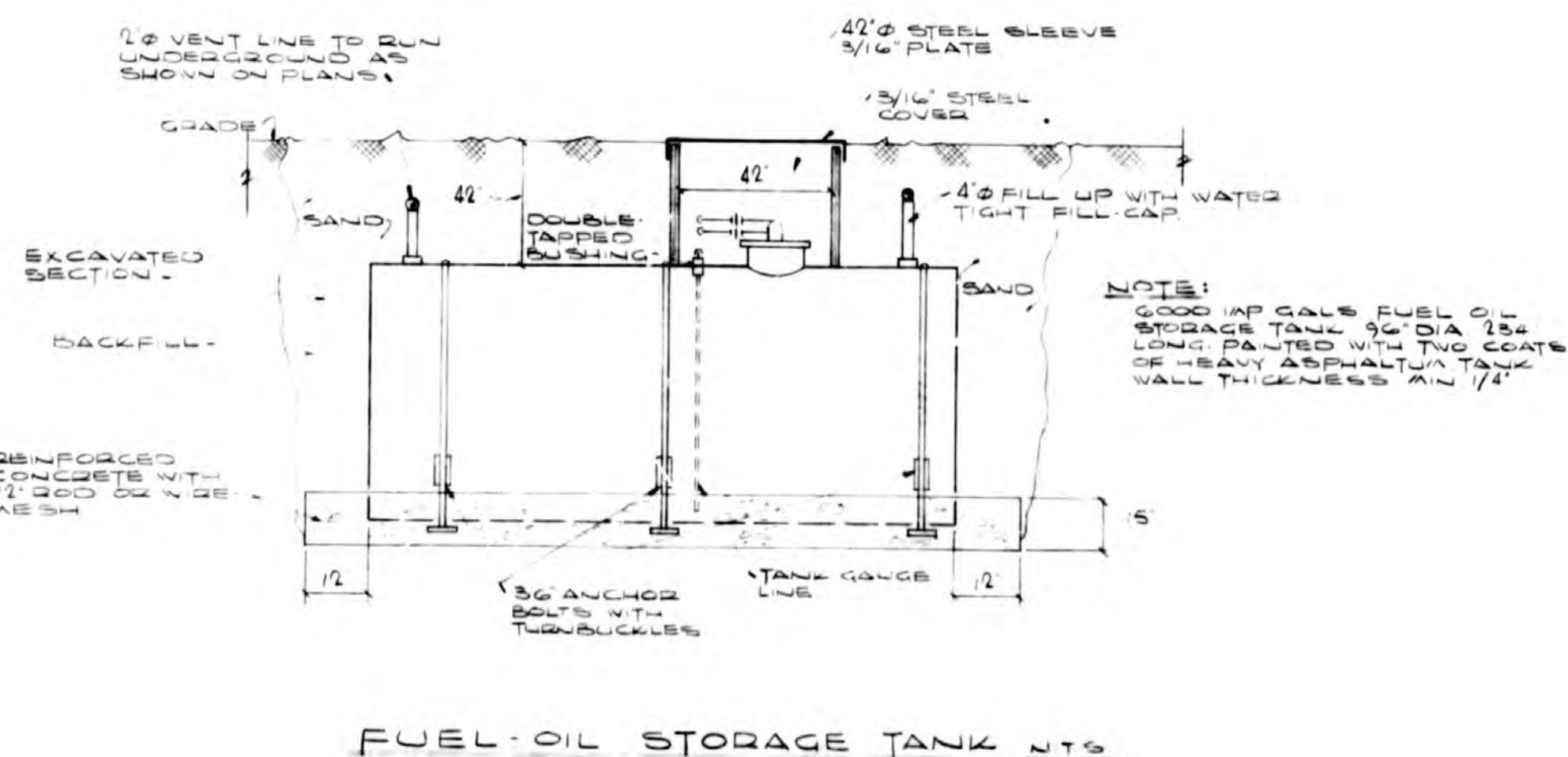
BOROUGH OF NORTH YORK PLANNING SECTION

Examined by: *208 Rly*

It is understood that the examination of this plan does not relieve the contractor from complying with all Local Ordinances, Regulations and Ontario Water Resources Commission Act Regulation 471 R.R.O. 1950 as amended.

Received by: _____

NOTE:
ALL ELEVATIONS & INVERTS ARE BASED ON THE ASSUMPTION THAT 100.00 = 631.36



PUMP SCHEDULE

NO.	DESCRIPTION	LOCATION	GPM	HD (FT)	HP	S.P.M.	MAKE	MODEL	REMARKS
1	EAST ZONE HTG.	BOILER RM	250	31	3	1750	B+G	UB-A	60/3/105 BASE MTD
2	WEST ZONE HTG.	BOILER RM	280	32	5	1750	B+G	UB-A	60/3/105 BASE MTD
3	DOMESTIC HTG. L.P.	BOILER RM	40	12	1/4	1750	B+G	2 1/2"	60/1/110 N.L.NE
4	DOMESTIC HTG. H.P.	BOILER RM	140	12	1	1750	B+G	PE 3/4"	60/3/105 BASE MTD
5	SNOW MELTING CONVERTER	BOILER RM	55	12	1/4	1750	B+G	2 1/2"	60/1/110 N.L.NE
6	SNOW MELTING GYCOL	BOILER RM	26	14	1/4	1750	B+G	2 1/2"	60/1/110 N.L.NE
7	FRESH AIR CONVERTER	BOILER RM	66	12	1/3	1750	B+G	HD 5	60/1/110 N.L.NE
8	FRESH AIR	BOILER RM	33	12	1/4	1750	B+G	2 1/2"	60/1/110 N.L.NE
9	BOOSTER PUMP FLUID DRIVE	BOILER RM	170	170	20	1750	DARLING	2 DYN 220-115	60/3/105 BASE MTD
10	BOOSTER PUMP STAND-BY	BOILER RM	80	170	7 1/2	3500	DARLING	1/2 CFAC	60/3/105 BASE MTD
11	DOMESTIC RECIRC. L.P.	BOILER RM	20	10	1/6	1750	B+G	1 1/2" H.V. B.B.	60/1/110 N.L.NE
12	DOMESTIC RECIRC. H.P.	BOILER RM	20	10	1/6	1750	B+G	1 1/2" H.V. B.B.	60/1/110 N.L.NE
13	FIRE PUMP	BOILER RM	70	285	15	3500	DARLING	1/2 CFAC	60/3/105 BASE MTD
14	SUMP PUMP	SUB-BASMT GARAGE	75	65	1		WESTCO	2" S.I.	60/3/105 BASE MTD
15	SUMP PUMP	SUB-BASMT GARAGE	75	20	1		WESTCO	2" S.I.	60/3/105 BASE MTD

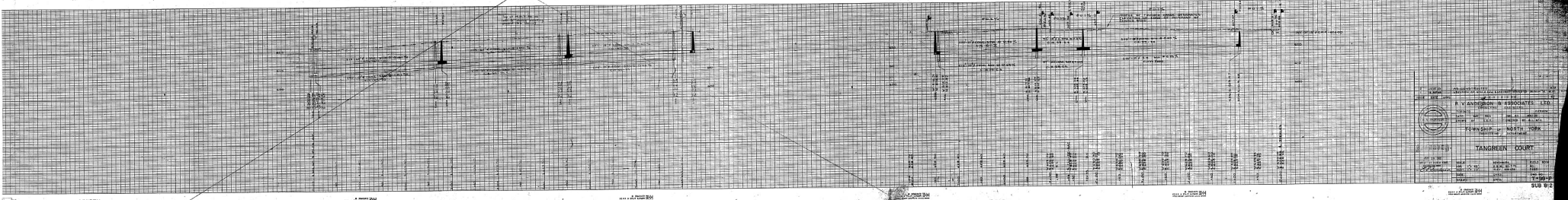
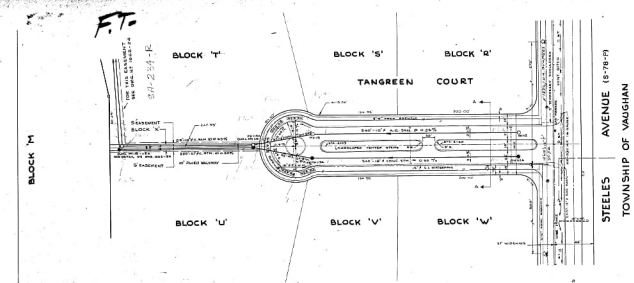
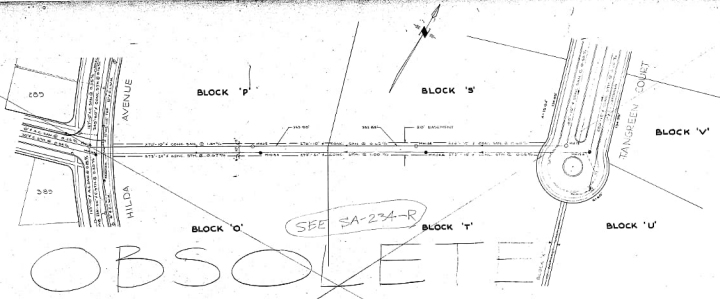
FAN SCHEDULE

TYPE	DESCRIPTION	LOCATION	C.F.M.	D.P.A.	S.P.	HP	S.P.	MAKE	MODEL NO.	BUDGETICAL CHARACTER
A	EXHAUST	ROOF	2700	46	1038	3/4	5/8	LAU	BD 70	60/3/105
B	EXHAUST	ROOF	5400	370	1782	1/2	3/4	LAU	BD 75	60/3/105
C	EXHAUST	ROOF	1800	447	1154	1/2	1"	LAU	BD 18	60/1/110
D	EXHAUST	ROOF	2325	447	894	3/4	5/8	LAU	BD 70	60/3/105
E	EXHAUST	ROOF	2700	447	1038	3/4	3/4	LAU	BD 70	60/3/105
F	EXHAUST	ROOF	1700	447	1090	1/2	3/4	LAU	BD 18	60/1/110
G	EXHAUST	ROOF	3650	375	1144	3/4	5/8	LAU	BD 72	60/3/105
H	FRESH AIR	ROOF	2844	570	1318	1	1"	LAU	A.B. 13A	60/3/105
J	EXHAUST	ROOF	1800	447	1154	1/2	5/8	LAU	BD 18	60/1/110
K	EXHAUST	GARAGE	1050	1140		1/2	0"	PRYNE	XB 21	60/1/110
L	EXHAUST	TV PLAY RM	700			1/25	0"	XPRYNE	GDA FAN	60/1/110
M	FRESH AIR	BASMT LOCKERS	6000	569	1195	3	1 1/4	PRYNE	T-14	60/3/105
N	FRESH AIR	BASMT LOCKERS	360	735	1560	1/2	1"	PRYNE	215	60/3/105
O	EXHAUST	BASMT LOCKERS	15000	342		3/4	0"	PRYNE	42NF	60/3/105
P	EXHAUST	BASMT LOCKERS	55			1/25	0"	PRYNE	2205	60/1/110

ISSUED
MAR 11 1968
JOHN GARAY & ASSOC. LTD.

24X
PRINTS NOT TO BE SCALED

FRAME A



TANGREEN COURT
 TOWNSHIP OF VAUGHAN
 1974

PART 4
PLAN 66R-18411
PIN 10139-0289 (LT)
LOT 25
CONCESSION 1, WEST OF YONGE STREET

PLAN OF SURVEY SHOWING TOPOGRAPHY OF
ALL OF BLOCKS U, V AND W
REGISTERED PLAN 6955
CITY OF TORONTO

SCALE 1 : 500
10 0 10 20 30 metres
THE INTENDED PLOT SIZE OF THIS PLAN IS 779mm IN WIDTH BY 523mm IN HEIGHT
WHEN PLOTTED AT A SCALE OF 1:500
J.D. BARNES LIMITED
© COPYRIGHT 2022

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTES
BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (2010.0).
DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999797.
FOR BEARING COMPARISONS, A ROTATION OF 1°03'10" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON PLAN P1.
FOR BEARING COMPARISONS, A ROTATION OF 0°59'50" COUNTER-CLOCKWISE WAS APPLIED TO BEARINGS ON PLAN P3 TO CONVERT TO GRID BEARINGS.

INTEGRATION DATA			
OBSERVED REFERENCE POINTS (ORPs): UTM ZONE 17, NAD83 (CSRS) (2010.0)			
COORDINATES TO URBAN ACCURACY PER SECTION 14 (2) OF O.REG 216/10.			
POINT ID	EASTING	NORTHING	
ORP (A)	626 781.23	4 850	308.37
ORP (B)	626 617.15	4 850	470.84
COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.			
THE RESULTANT TIE BETWEEN ORP (A) AND ORP (B) IS 230.96 N 45°16'55" W			

BENCHMARK NOTE
ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM (CGVD28:PRE78) AND ARE DERIVED FROM THE CITY OF TORONTO BENCHMARK NO 12319654377 HAVING A PUBLISHED ELEVATION OF 192.172 METRES.

LEGEND	
■	DENOTES SURVEY MONUMENT FOUND
□	DENOTES SURVEY MONUMENT SET
SIB	DENOTES STANDARD IRON BAR
SSIB	DENOTES SHORT STANDARD IRON BAR
IB	DENOTES IRON BAR
PB	DENOTES PLASTIC BAR
WT	DENOTES WITNESS
OU	DENOTES ORIGIN UNKNOWN
ME	DENOTES MEASURED
NI	DENOTES NOT IDENTIFIABLE
JDB	DENOTES J.D. BARNES LIMITED, O.L.S.
MMM	DENOTES MARSHALL MACLIN MONAGHAN, O.L.S.
P1	DENOTES PLAN OF SURVEY BY R. AVIS SURVEYING INC., O.L.S., DATED DECEMBER 14th, 2017
P2	DENOTES SURVEYOR'S REAL PROPERTY REPORT BY SCHAEFFER & DZALDOV LIMITED, O.L.S., DATED NOVEMBER 26th, 2001
P3	DENOTES PLAN 66R-18411
CB	DENOTES DOUBLE CATCHBASIN
CB	DENOTES CATCHBASIN
G	DENOTES GAS METER
HW	DENOTES HANDWELL
MH	DENOTES MANHOLE
TMH	DENOTES TELEPHONE MANHOLE
SAN	DENOTES SANITARY MANHOLE
WMH	DENOTES WATER MANHOLE
BH	DENOTES BORE HOLE
MW	DENOTES MONITORING WELL
BOL	DENOTES BOLLARD
LS	DENOTES LIGHT STANDARD
TSC	DENOTES TRAFFIC SIGNAL CONTROL
TL	DENOTES TRAFFIC SIGNAL
H	DENOTES FIRE HYDRANT
WK	DENOTES WATER KEY
BSP	DENOTES BURIED SPRINKLER
WV	DENOTES WATER VALVE
FDC	DENOTES FIRE DEPARTMENT CONNECTION
RW	DENOTES RETAINING WALL
PROD	DENOTES PRODUCTION
○	DENOTES DECIDUOUS TREE WITH X DIAMETER TREE TRUNK
●	DENOTES CONIFEROUS TREE WITH X DIAMETER TREE TRUNK

SURVEYOR'S CERTIFICATE
I CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 5th DAY OF DECEMBER, 2022.

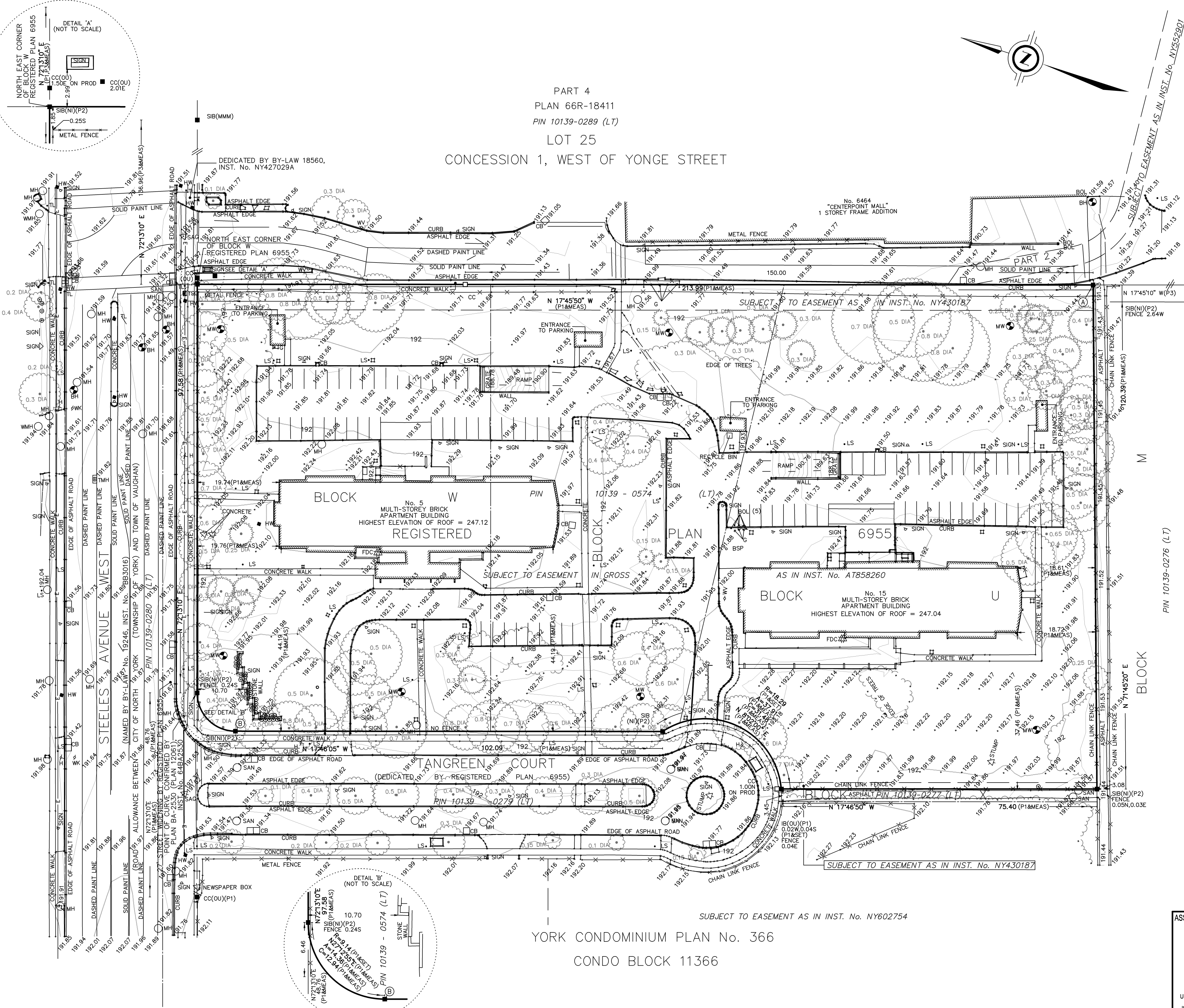
DECEMBER 19th, 2022
DATE
FRANCIS BABU
ONTARIO LAND SURVEYOR

ASSOCIATION OF ONTARIO
LAND SURVEYORS
PLAN SUBMISSION FORM
2196020

J.D. BARNES
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SURVEYING
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411 RICHMOND ST. EAST, SUITE 107, TORONTO, ON M5A 3S5
T: (416) 368-3737 P: (416) 368-5308 www.jdbarnes.com

DRAWN BY:	TC/FB	CHECKED BY:	FB	REFERENCE NO.:	22-22-160-02-PST
ISSUED BY THE SURVEYOR	IN ACCORDANCE WITH REGULATION 1026, SECTION 29(3)				
PLOTTED:	12/19/2022	DATED:	12/19/22		

FILE: G:\22-22-160\02\Drawing\22-22-160-02.dgn



1.0 SITE

1.1 SITE AREA

	sq.m.	AREA ac.	ha.
GROSS SITE AREA	23,880.7	5.9	2.4
DEDUCTIONS			
Deduction E-W Public Street	(1,808.3)	(0.4)	(0.2)
Road Widening (Steeles & Street A)	(1,931.1)	(0.5)	(0.2)
SUBTOTAL	(3,739.4)	(0.9)	(0.4)
NET SITE AREA	20,141.3	5.0	2.0

1.2 PARKLAND DEDICATION

	(Park Land / Net Site Area)	sq.m.	ac.	ha.
PARKLAND DEDICATION	10.0%	2,014.1	0.5	0.2

2.0 FLOOR AREAS

2.1 GROSS FLOOR AREA

	Non-Res GFA		Residential GFA		TOTAL GFA	
	sq.m.	sq.ft.	sq.m.	sq.ft.	sq.m.	sq.ft.
EXISTING						
5 & 15 Tangreen			37,598	404,700	37,598	404,700
To be demolished (5 Tangreen)			(18,799)	(202,350)	(18,799)	(202,350)
Retained (15 Tangreen)			18,799	202,350	18,799	202,350
NEW DEVELOPMENT						
Building A - 55 Storeys	272	2,927	39,906	429,548	40,178	432,475
Building B - 40 Storeys			29,829	321,076	29,829	321,076
Building C - 25 Storeys			20,975	225,773	20,975	225,773
Building D - 25 Storeys			20,265	218,132	20,265	218,132
Building E - 55 Storeys	580	6,245	39,758	427,948	40,338	434,193
Building F - 45 Storeys			34,684	373,337	34,684	373,337
Building G - 35 Storeys			25,010	269,201	25,010	269,201
SUBTOTAL	852	9,172	210,427	2,265,015	211,279	2,274,187
GRAND TOTAL	852	9,172	229,226	2,467,365	230,078	2,476,537

2.2 DENSITY

F.S.I (TOTAL GFA / NET SITE AREA):	11.4
------------------------------------	------

3.0 UNIT MIXES

	1B		2B		3B		TOTAL
Buildings A & B	810	(73%)	194	(17%)	111	(10%)	1,115
Building A	458	(72%)	117	(18%)	62	(10%)	637
Building B	352	(74%)	77	(16%)	49	(10%)	478
Buildings C & D	385	(62%)	170	(27%)	64	(10%)	619
Building C	237	(73%)	53	(16%)	36	(11%)	326
Building D (R.R)	91	(43%)	105	(49%)	18	(8%)	214
Building D (M.R)	57	(72%)	12	(15%)	10	(13%)	79
Buildings E & F & G	1,176	(74%)	251	(16%)	164	(10%)	1,591
Building E	471	(74%)	92	(15%)	70	(11%)	633
Building F	416	(75%)	87	(16%)	54	(10%)	557
Building G	289	(72%)	72	(18%)	40	(10%)	401
TOTAL	2,371	(71%)	615	(18%)	339	(10%)	3,325

4.0 AMENITY AREAS

4.1 AMENITY AREA PROVIDED

	INDOOR AMENITY			OUTDOOR AMENITY			TOTAL	
	sq.m.	sq.ft.	Ratio (sq.m/unit)	sq.m.	sq.ft.	Ratio (sq.m/unit)	sq.m.	sq.ft.
Buildings A & B	1,673	18,003	(1.5)	1,338	14,402	(1.2)	3,011	32,405
Buildings C & D	929	9,994	(1.5)	743	7,995	(1.2)	1,671	17,990
Buildings E & F & G	2,387	25,688	(1.5)	1,909	20,550	(1.2)	4,296	46,238
TOTAL	4,988	53,685	(1.5)	3,990	42,948	(1.2)	8,978	96,633

5.0 PARKING

5.1 PARKING

	PARKING REQUIRED			PARKING PROPOSED			
	Visitor (2.0 + rate of 0.05)	Residents (rate of 0.00)	TOTAL	Visitor	Residents	Rental Replacement	TOTAL
Buildings A & B	58	0	58	58	92		150
Buildings C & D	33	0	33	33	103	64	200
Buildings E & F & G	82	0	82	82	185		267
TOTAL	173	0	173	173	380	64	617

6.0 BICYCLE PARKING SPACE

6.1 REQUIRED

	SHORT-TERM			LONG-TERM		
	Retail (3.0 spc. + 0.25 per 100m)	Residential (0.07 per Unit)	Sub-total	Retail (0.13 per 100m)	Residential (0.68 per Unit)	Sub-total
Buildings A & B	4	81	85	1	761	762
Buildings C & D		46	46		423	423
Buildings E & F & G	5	114	119	1	1,084	1,085
TOTAL	9	241	250	2	2,268	2,270

6.2 PROVIDED

	SHORT-TERM	LONG-TERM
Buildings A & B		
Mezzanine	34	490
Ground Floor		
P1	51	272
SUBTOTAL	85	762
Buildings C & D		
Mezzanine	41	423
Ground Floor	5	
P1		
SUBTOTAL	46	423
Buildings E & F & G		
Mezzanine		654
Ground Floor	119	
P1		431
SUBTOTAL	119	1,085
TOTAL	250	2,270



Statistics Template – Toronto Green Standard Version 4.0

Mid to High Rise Residential and all New Non-Residential Development

The Toronto Green Standard Version 4.0 Statistics Template is submitted with Site Plan Control Applications and stand-alone Zoning Bylaw Amendment applications. Complete the table and copy it directly onto the Site Plan submitted as part of the application.

For Zoning Bylaw Amendment applications: complete General Project Description and Section 1.
For Site Plan Control applications: complete General Project Description, Section 1 and Section 2.
For further information, please visit www.toronto.ca/greenstandards

General Project Description	Proposed
Total Gross Floor Area	238078.10 m2
Breakdown of project components (m2):	
Residential	229,226.00 m2
Retail	852.10 m2
Commercial	
Industrial	
Institutional/Other	
Total number of residential units	3,325

Section 1: For Stand Alone Zoning Bylaw Amendment Applications and Site Plan Control Applications

Low Emissions Transportation	Required	Proposed	Proposed %
Number of Parking Spaces		617	
Number of EV Parking Spaces (Residential)	80	80	100%
Number of EV Parking Spaces (non-residential)	34	34	100%

Cycling Infrastructure	Required	Proposed	Proposed %
Number of long-term bicycle parking spaces (all-uses)	2,270	2,270	100%
Number of long-term bicycle parking located on:			
a) first storey of building		1,567	69%
b) second storey of building			
c) first level below-ground		703	1%
d) second level below-ground		0	
e) other levels below-ground		0	

Cycling Infrastructure	Required	Proposed	Proposed %
Number of short-term bicycle parking spaces	248	248	100%
Number of shower and change facilities (non-residential)			
Tree Canopy	Required	Proposed	Proposed %
Total Soil Volume (40% of the site area + 66 m2 x 30 m2)			
Soil volume provided within the site area (m3)			
Soil Volume provided within the public boulevard (m3)			

Section 2: For Site Plan Control Applications

Cycling Infrastructure	Required	Proposed	Proposed %
Number of short-term bicycle parking spaces (all-uses) at-grade or on first level below grade			
Number of publicly accessible bicycle parking spaces			
Number of energized outlets for electric bicycles			

Tree Canopy	Required	Proposed	Proposed %
Total site area (m2)			
Total Soil Volume (40% of the site area + 66 m2 x 30 m2)			
Total number of trees planted			
Number of surface parking spaces (if applicable)			
Number of shade trees located in surface parking area			

Landscaping & Biodiversity	Required	Proposed	Proposed %
Total non-roof hardscape area (m2)			
Total non-roof hardscape area treated for Urban Heat Island (minimum residential 73% or non-residential 50%) (m2)			
Area of non-roof hardscape treated with: (indicate m2)			
a) high-reflectance surface material			
b) open-grid pavement			
c) shade from tree canopy			

Landscaping & Biodiversity	Required	Proposed	Proposed %
a) shade from high-obed structures			
a) shade from energy generation structures			
Percentage of (a) Area as Soft Landscaping (non-residential only)			
Total number of plants			
Total number of native plants and % of total plants			
Available Roof Space (m2)			
Available Roof Space provided as Green Roof (m2)			
Available Roof Space provided as Cool Roof (m2)			
Available Roof Space provided as Solar Panels (m2)			

Bird Collision Mitigation	Required	Proposed	Proposed %
Total area of glazing of all elevations within 1.6m above grade			
Total area of treated glazing (minimum 85% of total area of glazing within 1.6m above grade) (m2)			
Percentage of glazing within 1.6m above grade treated with:			
a) Visual markers			
b) non-reflective glass			
c) Building Integrated structures			

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is a member of the IBI Group of companies

KEY PLAN

ISSUES

No.	DESCRIPTION	DATE
01	ZBZ SUBMISSION	2023/03/07

SEAL

PROJECT

5 & 15 TANGREEN COURT,
NORTH YORK

PROJECT NO:
141719

DATE:
2023-01-25

SCALE:
-

CHECKED BY:

APPROVED BY:

SHEET TITLE
STATISTICS & TGS

SHEET NUMBER
A.002

ISSUE

IBI GROUP ARCHITECTS
7th Floor-55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel 416 596 1930 fax 416 596 0844
ibigroup.com

SHEET NUMBER
A.002

ISSUE

APPENDIX

B WATER DEMAND CALCULATIONS

APPENDIX B

5-15 Tangreen Court

Pre-Development Water Demand Estimate

Pre-Development Condition

5 Tangreen Ct

Land Use /Unit Type	Unit Count	GFA (m2)	Density (-/100m2)	Equivalent Population
Apartment	-	18270	3.3	603
Total	-	18270	-	603

Population = 603 ppl
 Avg. Demand = 1.33 L/s (using 190 L/capita/day)
 Peak Factor = 2.50 (For Peak Hour Demand)
 Peak Flow = 3.33 L/s
 Max. Day Factor = 1.30 (For Max. Day Demand)
 Max. Day Flow = 1.73 L/s

15 Tangreen Ct

Land Use /Unit Type	Unit Count	GFA (m2)	Density (-/100m2)	Equivalent Population
Apartment	-	18270	3.3	603
Total	-	18270	-	603

Population = 603 ppl
 Avg. Demand = 1.33 L/s (using 190 L/capita/day)
 Peak Factor = 2.50 (For Peak Hour Demand)
 Peak Flow = 3.33 L/s
 Max. Day Factor = 1.30 (For Max. Day Demand)
 Max. Day Flow = 1.73 L/s

Total Avg. Daily Water Demand = 2.66 L/s
Total Peak Hour Demand = 6.66 L/s
Total Max. Day Demand = 3.46 L/s

Notes:

- 1) For Pre-development condition, it was taken as the apartments 18-storey GFA used to determine equivalent density
- 2) GFA measurements for Pre-development condition was estimated using Google Maps.



DOMESTIC WATER DEMAND

Project:	5 Tangreen Ct	Proj. #	221-13290
Date:	March 13, 2023		
Calc'd by:	MK		

Note:
Based on the City of Toronto Standards
and the Ontario Building Code, Part 8
"Sewage Systems", OBC Table 8.2.1.3.A and
8.2.1.3.B

	Site Component	Tower A	Tower B				
Residential Occupancy Data	Studio / 1+d bed units	458	352				
	People per unit	1.4	1.4				
	2 bed units / 2+D	117	77				
	People per unit	2.1	2.1				
	3 bed units	62	49				
	People per unit	3.1	3.1				
	4 bed units						
	People per unit	3.6	3.6				
	Townhouse units						
	People per unit	2.7	2.7				
	Hotel Room						
	Person per room	1.0	1.0				
Commercial Occupancy Data	Retail GFA (m2)	272 sq m					
	person / 100 m2	1.1					
	Office (m2)						
	person / 100 m2						
	blank						
	blank						

Unit Quantity by Site Component	Water Demand	Units	Equivalent Population (persons)					
Residential Occupancies								
Apartments, Condominiums, Other Multi-family Dwellings	190	L/person/day	1079	806	-	-	-	-
Hotels and Motels (excluding bars and restaurants), a) Regular	250	L/room/day	0.0	0.0	-	-	-	-
Not used	-	-	-	-	-	-	-	-
Other Occupancies			Flow Rates (L/d)					
Commercial or Retail	250	L/person/day	748	-	-	-	-	-
Office Building	75	L/9.3m2 of floor area/day	-	-	-	-	-	-
Not used	-	-	-	-	-	-	-	-

Daily Flow Rate (L/d)								
Residential Occupancies								
Apartments, Condominiums, Other Multi-family Dwellings		358,245	205,029	153,216	0	0	0	0
Hotels and Motels (excluding bars and restaurants), a) Regular		0	0.00	0.00	0	0	0	0
Not used		0	0	0	0	0	0	0
Other Occupancies								
Commercial or Retail		748.00	748.00	0	0	0	0	0
Office Building		0	0	0	0	0	0	0
Not used		0	0	0	0	0	0	0

	Total Flow							
Average day (L/d)	358,993	205,777	153,216	0.00	0.00	0.00	0.00	
Average day (L/s)	4.16	2.38	1.77	0.00	0.00	0.00	0.00	
Max. day (L/d)	466,541	267,361	199,181	0.00	0.00	0.00	0.00	
Max. day (L/s)	5.40	3.09	2.31	0.00	0.00	0.00	0.00	
Min. hour (L/hr)	12,565	7,202	5,363	0.00	0.00	0.00	0.00	
Peak hour (L/hr)	37,355	21,395	15,960	0.00	0.00	0.00	0.00	
Peak hour (L/s)	10.38	5.94	4.43	0.00	0.00	0.00	0.00	

Peaking Factors			
Land Use	Minimum Hour	Peak Hour	Maximum Day
Residential	0.84	2.50	1.30
Commercial / Retail	0.84	1.20	1.10



DOMESTIC WATER DEMAND

Project:	5 Tangreen Ct	Proj. #	221-13290
Date:	March 13, 2023		
Calc'd by:	MK		

Note:
Based on the City of Toronto Standards
and the Ontario Building Code, Part 8
"Sewage Systems", OBC Table 8.2.1.3.A and
8.2.1.3.B

	Site Component	Tower C w/ Podium	Tower D				
Residential Occupancy Data	Studio / 1+d bed units	237	148				
	People per unit	1.4	1.4				
	2 bed units / 2+D	53	117				
	People per unit	2.1	2.1				
	3 bed units	36	28				
	People per unit	3.1	3.1				
	4 bed units						
	People per unit	3.6	3.6				
	Townhouse units						
	People per unit	2.7	2.7				
	Hotel Room						
	Person per room	1.0	1.0				
Commercial Occupancy Data	Retail GFA (m2)						
	person / 100 m2						
	Office (m2)						
	person / 100 m2						
	blank						
	blank						

Unit Quantity by Site Component	Water Demand	Units	Equivalent Population (persons)					
Residential Occupancies								
Apartments, Condominiums, Other Multi-family Dwellings	190	L/person/day	555	540	-	-	-	-
Hotels and Motels (excluding bars and restaurants), a) Regular	250	L/room/day	0.0	0.0	-	-	-	-
Not used	-	-	-	-	-	-	-	-
Other Occupancies			Flow Rates (L/d)					
Commercial or Retail	250	L/person/day	-	-	-	-	-	-
Office Building	75	L/9.3m2 of floor area/day	-	-	-	-	-	-
Not used	-	-	-	-	-	-	-	-

Daily Flow Rate (L/d)								
Residential Occupancies								
Apartments, Condominiums, Other Multi-family Dwellings		207,936	105,393	102,543	0	0	0	0
Hotels and Motels (excluding bars and restaurants), a) Regular		0	0.00	0.00	0	0	0	0
Not used		0	0	0	0	0	0	0
Other Occupancies								
Commercial or Retail		0	0	0	0	0	0	0
Office Building		0	0	0	0	0	0	0
Not used		0	0	0	0	0	0	0

	Total Flow						
Average day (L/d)	207,936	105,393	102,543	0.00	0.00	0.00	0.00
Average day (L/s)	2.41	1.22	1.19	0.00	0.00	0.00	0.00
Max. day (L/d)	270,317	137,011	133,306	0.00	0.00	0.00	0.00
Max. day (L/s)	3.13	1.59	1.54	0.00	0.00	0.00	0.00
Min. hour (L/hr)	7,278	3,689	3,589	0.00	0.00	0.00	0.00
Peak hour (L/hr)	21,660	10,978	10,682	0.00	0.00	0.00	0.00
Peak hour (L/s)	6.02	3.05	2.97	0.00	0.00	0.00	0.00

Peaking Factors			
Land Use	Minimum Hour	Peak Hour	Maximum Day
Residential	0.84	2.50	1.30
Commercial / Retail	0.84	1.20	1.10



DOMESTIC WATER DEMAND

Project:	5 Tangreen Ct	Proj. #	221-13290
Date:	March 13, 2023		
Calc'd by:	MK		

Note:
Based on the City of Toronto Standards
and the Ontario Building Code, Part 8
"Sewage Systems", OBC Table 8.2.1.3.A and
8.2.1.3.B

	Site Component	Tower E	Tower F w/ Podium	Tower G			
Residential Occupancy Data	Studio / 1+d bed units	471	416	289			
	People per unit	1.4	1.4	1.4			
	2 bed units / 2+D	92	87	72			
	People per unit	2.1	2.1	2.1			
	3 bed units	70	54	40			
	People per unit	3.1	3.1	3.1			
	4 bed units						
	People per unit	3.6	3.6	3.6			
	Townhouse units		2	2			
	People per unit	2.7	2.7	2.7			
	Hotel Room						
	Person per room	1.0	1.0	1.0			
Commercial Occupancy Data	Retail GFA (m2)	580 sq m					
	person / 100 m2	1.1					
	Office (m2)						
	person / 100 m2						
	blank						
	blank						

Unit Quantity by Site Component	Water Demand	Units	Equivalent Population (persons)					
Residential Occupancies								
Apartments, Condominiums, Other Multi-family Dwellings	190	L/person/day	1070	938	685	-	-	-
Hotels and Motels (excluding bars and restaurants), a) Regular	250	L/room/day	0.0	0.0	0.0	-	-	-
Not used	-	-	-	-	-	-	-	-
Other Occupancies			Flow Rates (L/d)					
Commercial or Retail	250	L/person/day	1595	-	-	-	-	-
Office Building	75	L/9.3m2 of floor area/day	-	-	-	-	-	-
Not used	-	-	-	-	-	-	-	-

Daily Flow Rate (L/d)								
Residential Occupancies								
Apartments, Condominiums, Other Multi-family Dwellings		511,613	203,224	178,201	130,188	0	0	0
Hotels and Motels (excluding bars and restaurants), a) Regular		0	0.00	0.00	0.00	0	0	0
Not used		0	0	0	0	0	0	0
Other Occupancies								
Commercial or Retail		1,595	1,595	0	0	0	0	0
Office Building		0	0	0	0	0	0	0
Not used		0	0	0	0	0	0	0

	Total Flow							
Average day (L/d)	513,208	204,819	178,201	130,188	0.00	0.00	0.00	
Average day (L/s)	5.94	2.37	2.06	1.51	0.00	0.00	0.00	
Max. day (L/d)	666,851	265,946	231,661	169,244	0.00	0.00	0.00	
Max. day (L/s)	7.72	3.08	2.68	1.96	0.00	0.00	0.00	
Min. hour (L/hr)	17,962	7,169	6,237	4,557	0.00	0.00	0.00	
Peak hour (L/hr)	53,373	21,249	18,563	13,561	0.00	0.00	0.00	
Peak hour (L/s)	14.83	5.90	5.16	3.77	0.00	0.00	0.00	

Peaking Factors			
Land Use	Minimum Hour	Peak Hour	Maximum Day
Residential	0.84	2.50	1.30
Commercial / Retail	0.84	1.20	1.10

APPENDIX

C FUS CALCULATIONS, HYDRANT FLOW TEST AND MODELLING RESULTS



FIRE FLOW CALCULATION

Project:	5 Tangreen Ct	Project #	221-13290
Date:	March 13, 2023		
Calc'ed by:	MK		

Fire Resistive Construction:	YES	Site Component:	Tower A	Tower B				
<div>The following calculations are for the proposed development and are based on the largest floorplate area. The FUS requires that a minimum water supply source 'F' be provided at 150KPa. The minimum flow 'F' can be calculated as such:</div> <div>$F = 220C \sqrt{A}$</div> <div><i>F = Required fire flow L/min</i></div> <div><i>C = Coefficient related to construction</i></div> <div><i>A = Total area in m²</i></div> <div><i>'Calculations, formulas and factors are as per Fire Underwriter's Survey (FUS) Water Supply for Public Fire Protection</i></div>	Total Floor Area	Largest Floor Area (m2)	1061	1170				
		Area Above (m2)	889	1000				
		Area Below (m2)	889	1000				
		Total Floor Area (m2)	1377	1543				
	Flow (F)	C (dimensionless)	0.6	0.6				
		A (m2)	1377	1543				
		F (L/min)	5000	5000				
	Reduction Factor	F (L/min)	5000	5000				
		f ₁ (dimensionless)	0.85	0.85				
		F' = F x f _f (L/min)	4250	4250				
		<i>f₁ = occupancy factor; ie, Residential, f₁ = 0.85; for Retail or Commercial, f₁ = 1.00</i>						
	Sprinkler and Exposure Increase or Decrease	f ₂ (sprinkler factor)	30%	30%				
		North Side	0%	15%				
		East Side	0%	15%				
		South Side	15%	10%				
		West Side	10%	10%				
		f ₃	25%	50%				
		<i>f₃ = Exposure factor not to exceed 75%, determined as per FUS Guide Item 4, page 18)</i>						

F' (L/min)	4250	4250				
S = F' * f ₂ (L/min)	1275	1275				
E = F' * f ₃ (L/min)	1062.5	2125				

F''=F'-S+E (L/min) rounded to nearest 1,000	4000	5000				
F''(L/s)	67	83				
F''(USGPM)	1060	1330				

Table 1

Sprinkler Reduction Factor (f ₂)		
No Sprinkler System	Sprinklered	Sprink. + Supervised
0%	30%	50%

Table 2

Construction Type "C" Factor			
Wood Frame	Ordinary Construction	Non-Combustible	Fire Resistive
1.5	1	0.80	0.60

Table 3

Occupancy Factor (f ₁)				
Rapid Burning	Free Burning	Combustible	Limited Combustible	Non-Combust.
25%	15%	0%	-15%	-25%

Table 4

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



FIRE FLOW CALCULATION

Project:	5 Tangreen Ct	Project #	221-13290
Date:	March 13, 2023		
Calc'ed by:	MK		

Fire Resistive Construction:	YES	Site Component:	Tower C w/ Podium	Tower D				
<div>The following calculations are for the proposed development and are based on the largest floorplate area. The FUS requires that a minimum water supply source 'F' be provided at 150KPa. The minimum flow 'F' can be calculated as such:</div> <div>$F = 220C \sqrt{A}$</div> <div><i>F = Required fire flow L/min</i></div> <div><i>C = Coefficient related to construction</i></div> <div><i>A = Total area in m²</i></div> <div><i>'Calculations, formulas and factors are as per Fire Underwriter's Survey (FUS) Water Supply for Public Fire Protection</i></div>	Total Floor Area	Largest Floor Area (m2)	1236	1113				
		Area Above (m2)	1236	753				
		Area Below (m2)	1236	753				
		Total Floor Area (m2)	1854	1220				
	Flow (F)	C (dimensionless)	0.6	0.6				
		A (m2)	1854	1220				
		F (L/min)	6000	5000				
	Reduction Factor	F (L/min)	6000	5000				
		f ₁ (dimensionless)	0.85	0.85				
		F' = F x f _f (L/min)	5100	4250				
		<i>f₁ = occupancy factor; ie, Residential, f₁ = 0.85; for Retail or Commercial, f₁ = 1.00</i>						
	Sprinkler and Exposure Increase or Decrease	f ₂ (sprinkler factor)	30%	30%				
		North Side	10%	15%				
		East Side	15%	15%				
		South Side	15%	0%				
		West Side	10%	10%				
		f ₃	50%	40%				
		<i>f₃ = Exposure factor not to exceed 75%, determined as per FUS Guide Item 4, page 18)</i>						

F' (L/min)	5100	4250				
S = F' * f ₂ (L/min)	1530	1275				
E = F' * f ₃ (L/min)	2550	1700				

F''=F'-S+E (L/min) rounded to nearest 1,000	6000	5000				
F''(L/s)	100	83				
F''(USGPM)	1590	1330				

Table 1

Sprinkler Reduction Factor (f ₂)		
No Sprinkler System	Sprinklered	Sprink. + Supervised
0%	30%	50%

Table 2

Construction Type "C" Factor			
Wood Frame	Ordinary Construction	Non-Combustible	Fire Resistive
1.5	1	0.80	0.60

Table 3

Occupancy Factor (f ₁)				
Rapid Burning	Free Burning	Combustible	Limited Combustible	Non-Combust.
25%	15%	0%	-15%	-25%

Table 4

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



FIRE FLOW CALCULATION

Project:	5 Tangreen Ct	Project #	221-13290
Date:	March 13, 2023		
Calc'ed by:	MK		

Fire Resistive Construction:	YES	Site Component:	Tower E	Tower F w/ Podium	Tower G			
<div>The following calculations are for the proposed development and are based on the largest floorplate area. The FUS requires that a minimum water supply source 'F' be provided at 150KPa. The minimum flow 'F' can be calculated as such:</div> <div>$F = 220C \sqrt{A}$</div> <div><i>F = Required fire flow L/min</i></div> <div><i>C = Coefficient related to construction</i></div> <div><i>A = Total area in m²</i></div> <div><i>'Calculations, formulas and factors are as per Fire Underwriter's Survey (FUS) Water Supply for Public Fire Protection</i></div>	Total Floor Area	Largest Floor Area (m2)	1061	1292	1061			
		Area Above (m2)	918	1034	734			
		Area Below (m2)	918	1034	734			
		Total Floor Area (m2)	1413	1616	1183			
	Flow (F)	C (dimensionless)	0.6	0.6	0.6			
		A (m2)	1413	1616	1183			
		F (L/min)	5000	5000	5000			
	Reduction Factor	F (L/min)	5000	5000	5000			
		f ₁ (dimensionless)	0.85	0.85	0.85			
		F' = F x f _f (L/min)	4250	4250	4250			
		<i>f₁ = occupancy factor; ie, Residential, f₁ = 0.85; for Retail or Commercial, f₁ = 1.00</i>						
	Sprinkler and Exposure Increase or Decrease	f ₂ (sprinkler factor)	30%	30%	30%			
		North Side	0%	15%	15%			
		East Side	10%	10%	10%			
		South Side	15%	15%	15%			
		West Side	0%	0%	0%			
		f ₃	25%	40%	40%			
		<i>f₃ = Exposure factor not to exceed 75%, determined as per FUS Guide Item 4, page 18)</i>						

F' (L/min)	4250	4250	4250			
S = F' * f ₂ (L/min)	1275	1275	1275			
E = F' * f ₃ (L/min)	1063	1700	1700			

F''=F'-S+E (L/min) rounded to nearest 1,000	4000	5000	5000			
F''(L/s)	67	83	83			
F''(USGPM)	1060	1330	1330			

Table 1

Sprinkler Reduction Factor (f ₂)		
No Sprinkler System	Sprinklered	Sprink. + Supervised
0%	30%	50%

Table 2

Construction Type "C" Factor			
Wood Frame	Ordinary Construction	Non-Combustible	Fire Resistive
1.5	1	0.80	0.60

Table 3

Occupancy Factor (f ₁)				
Rapid Burning	Free Burning	Combustible	Limited Combustible	Non-Combust.
25%	15%	0%	-15%	-25%

Table 4

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

APPENDIX

D SANITARY DEMAND, CALCULATIONS, DESIGN SHEET & DRAINAGE PLAN

Appendix D
SANITARY FLOW GENERATION

Project: 5-15 Tangreen Court

Job No.: 221-13290

Date: 2023-03-14

Existing Sanitary Flows

Total Site Area		2.39 ha					
Land-Use	Unit Count/Site Area (m2)	Occupany Rate (ppl/100m2)	Equivalent Population	Per Capita Flow (L/cap/day)	Average Daily Flow (L/s)	Peaking Factor	Peak Flow (L/s)
5 Tangreen Ct	18270	3.3	603	240	1.68	1.00	1.68
15 Tangreen Ct	18270	3.3	603	240	1.68	1.00	1.68
Infiltration	---	---	---	---	0.62	---	0.62
TOTAL	36540		1206		3.97		3.97

Notes:

- 15 Tangreen is to remain under post-development condtion when the site is developed. Existing Flows from 15 Tangreen will be added to the Post-Development Condition
- It is assumed that there is no groundwater discharge to sewers under existing conditions

Proposed Sanitary Flows - Phase 1 (Based on Arch Stats dated March 10th, 2023)

Area Discharging to E-W Public Road Sewer:

Ph1 Study Area = 0.49 ha

Unit Type	Unit Count/ GFA (m ²)	Occupancy Rate (ppu)	Equivalent Population	Per Capita or Area Flow (L/cap/day)	Average Daily Flow (L/s)	Peaking Factor	Peak Flow (L/s)
Phase 1 - Tower A							
1 Bedroom	458	1.4	641				
2 Bedroom	117	2.1	246				
3 Bedroom	62	3.1	192				
Commercial GFA	272		3	450	0.02	4.45	0.07
Sub-total Residential	637		1079	450	5.6	3.78	21.2
Infiltration	---	---	---	---	0.06	---	0.06
TOTAL			1079		5.7		21.4
Phase 1 - Tower B							
1 Bedroom	352	1.4	493				
2 Bedroom	77	2.1	162				
3 Bedroom	49	3.1	152				
Commercial GFA	0						
Sub-total Residential	478		806	450	4.2	3.86	16.2
Sub-total Commercial	0		0	450	0.00	4.50	0.00
Groundwater Discharge	---	---	---	---	0.00	---	0.00
Infiltration	---	---	---	---	0.06	---	0.06
TOTAL			806		4.3		16.3

Phase 1 Total

1886

37.6

Proposed Sanitary Flows - Phase 2 (Based on Arch Stats dated March 10th, 2023)

Area Discharging to E-W Public Road Sewer: Ph2 Study Area = 0.91 ha

Unit Type	Unit Count/ GFA (m²)	Occupancy Rate (ppu)	Equivalent Population	Per Capita or Area Flow (L/cap/day)	Average Daily Flow (L/s)	Peaking Factor	Peak Flow (L/s)
Phase 2 - Tower C + Podium							
1 Bedroom	237	1.4	332				
2 Bedroom	53	2.1	111				
3 Bedroom	36	3.1	112				
Sub-total Residential	326		555	450	2.89	3.95	11.4
Infiltration	---	---	---	---	0.12	---	0.12
TOTAL			555		3.0		11.5
Phase 2 - Tower D							
1 Bedroom	148	1.4	207				
2 Bedroom	117	2.1	246				
3 Bedroom	28	3.1	87				
Sub-total Residential	293		540	450	2.81	3.96	11.1
Groundwater Discharge	---	---	---	---	---	---	---
Infiltration	---	---	---	---	0.12	---	0.12
TOTAL			540		8.9		11.2
Phase 2 Total			1095				22.8

Proposed Sanitary Flows - Phase 3 (Based on Arch Stats dated March 10th, 2023)

Area Discharging to Tangreen Court Sewer: Ph3 Study Area = 0.67 ha

Unit Type	Unit Count/ GFA (m²)	Occupancy Rate (ppu)	Equivalent Population	Per Capita or Area Flow (L/cap/day)	Average Daily Flow (L/s)	Peaking Factor	Peak Flow (L/s)
Phase 3 - Tower E							
1 Bedroom	471	1.4	659				
2 Bedroom	92	2.1	193				
3 Bedroom	70	3.1	217				
Commercial GFA	580		6	450	0.03	4.43	0.15
Sub-total Residential	633		1070	450	5.57	3.78	21.1
Infiltration					0.06		0.06
TOTAL					5.6		21.3
Phase 3 - Tower F + Podium							
1 Bedroom	416	1.4	582				
2 Bedroom	87	2.1	183				
3 Bedroom	54	3.1	167				
Commercial GFA	0		0				
Sub-total Residential	557		933	450	4.86	3.82	18.5
Groundwater Discharge	---	---	---	---		---	0.00
Infiltration	---	---	---	---	0.17	---	0.17
TOTAL			933		5.0		18.7

Proposed Sanitary Flows - Phase 3 (Based on Arch Stats dated March 10th, 2023)

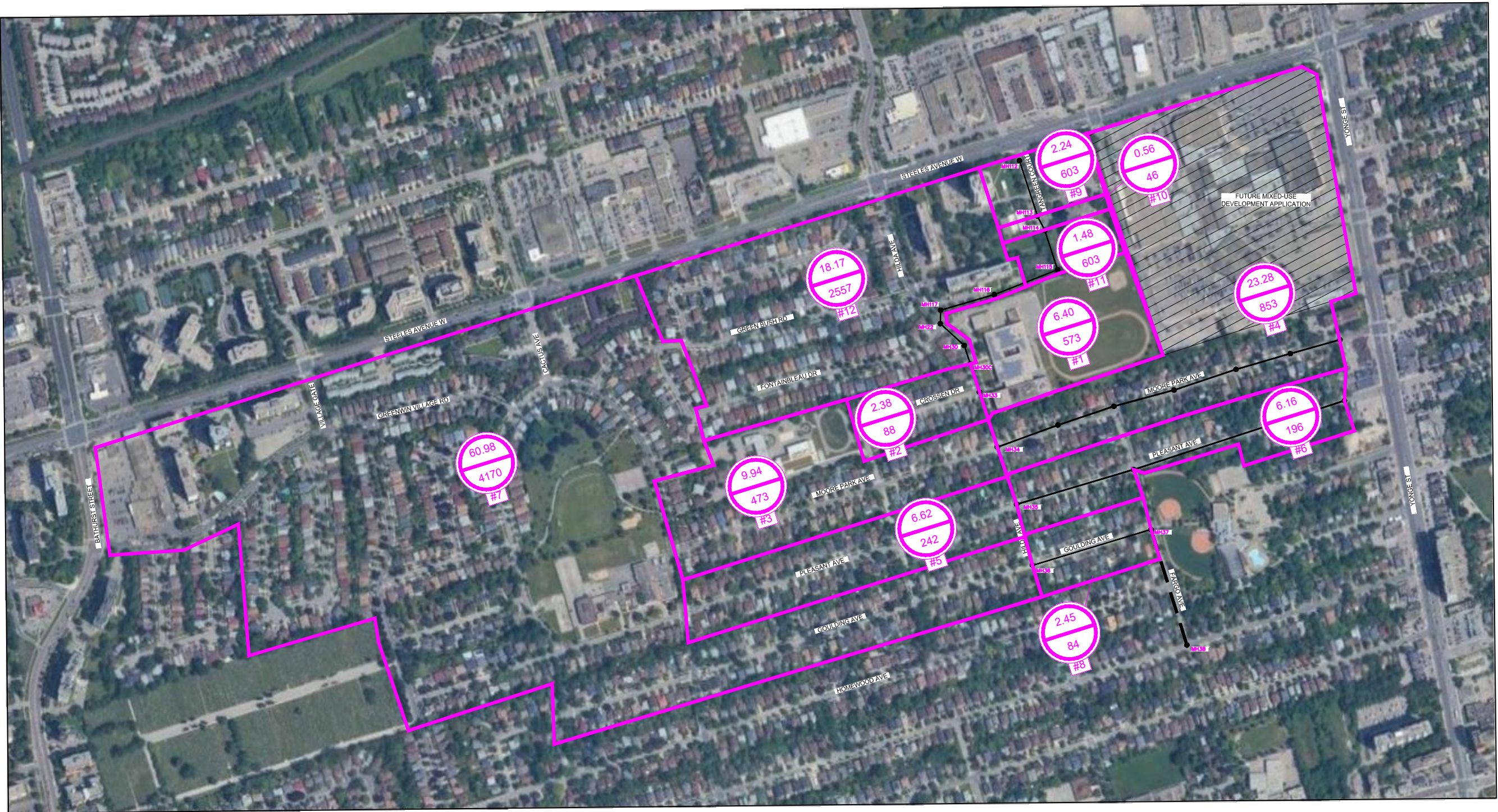
Area Discharging to E-W Public Road Sewer:

Ph3 Study Area= 0.67 ha

Unit Type	Unit Count/ GFA (m²)	Occupancy Rate (ppu)	Equivalent Population	Per Capita or Area Flow (L/cap/day)	Average Daily Flow (L/s)	Peaking Factor	Peak Flow (L/s)
Phase 3 - Tower G							
1 Bedroom	289	1.4	405				
2 Bedroom	72	2.1	151				
3 Bedroom	40	3.1	124				
Sub-total Residential	401		680	450	3.54	3.90	13.82
Groundwater Discharge	---	---	---	---		---	0.00
Infiltration	---	---	---	---	0.06	---	0.06
TOTAL			680		3.6		13.9
Phase 3 Total			2682	53.9			

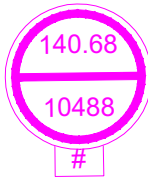
Notes:

1. Occupancy rates, per capita flows and peaking factor are as per the City of Toronto Sewer and Watermain Design Manual dated January 2021
2. Unit Counts and Floor Areas are per Preliminary Project Statistics prepared by IBI Group Architects dated March 2023
3. For Groundwater Discharge rates, it is assumed all phases will be bathtubbed and waterproofed, Dewatering rates to be updated upon receiving the updated geotechnical and hydrogeological reports.



LEGEND

- SANITARY SEWER DRAINAGE AREA
- EXISTING SANITARY LOCAL SEWER
- - - EXISTING SANITARY TRUNK SEWER



CATCHMENT AREA
POPULATION
CATCHMENT ID

CLIENT
CAPREIT 2 LIMITED PARTNERSHIP

TITLE
5 TANGREEN COURT
North York, Ontario
SANITARY DRAINAGE PLAN
(PRE-DEVELOPMENT CONDITIONS)



100 Commerce Valley Dr. West, Thornhill, ON Canada L3T 0A1
t: 905.882.1100 f: 905.882.0055 www.wsp.com

Checked	M.K.	Drawn	L.Z.
Date	MARCH 2023	Proj. No.	221-13290-00
Scale	1:7500	Figure No.	SAN-1

**Sanitary Analysis Calculations****Project:** 5 Tangreen Court**No.:** 221-13290**Existing Populations Estimate - Summary****By:** CP**Date:** 2023-03-14**Page:**
1**Checked:** GW/MK

Catchment	Area (ha)	Residential			High Density	School	Church	Other
		Single Houses	Semi Houses	Townhouses	Units	GFA (m2)	GFA (m2)	Area (m2)
1	6.40					22200.00		
2	2.38	25						
3	9.95	67	17			7450.00		
4	23.29	71						
5	6.62	69						
6	6.16	56						
7	60.98	217	308	198	629	7400.00	515.12	41998.00
8	2.45	24						
9	2.24				214			
10	0.56					1786.75		
11	1.48				214			
12	18.17		258		523			
TOTAL:	140.6798							

NOTES:

- (1) - All home businesses/offices are included in residential count
- (2) - Catchment area 9 assumed to drain into MH112
- (3) - Area specified in "Other" for catchment 7 is parkland
- (4) - 10 Tangreen Court apartment building included in Catchment 12
- (5) - 20 Tangreen Court in Catchment 10 to remain in post-development conditions



Sanitary Analysis Calculations

Project: 5 Tangreen Court

No.: 221-13290

Existing Populations Estimate -
Commercial & High Density

By: CP

Checked: GW/MK

Date: 2023-03-14

Page:
2

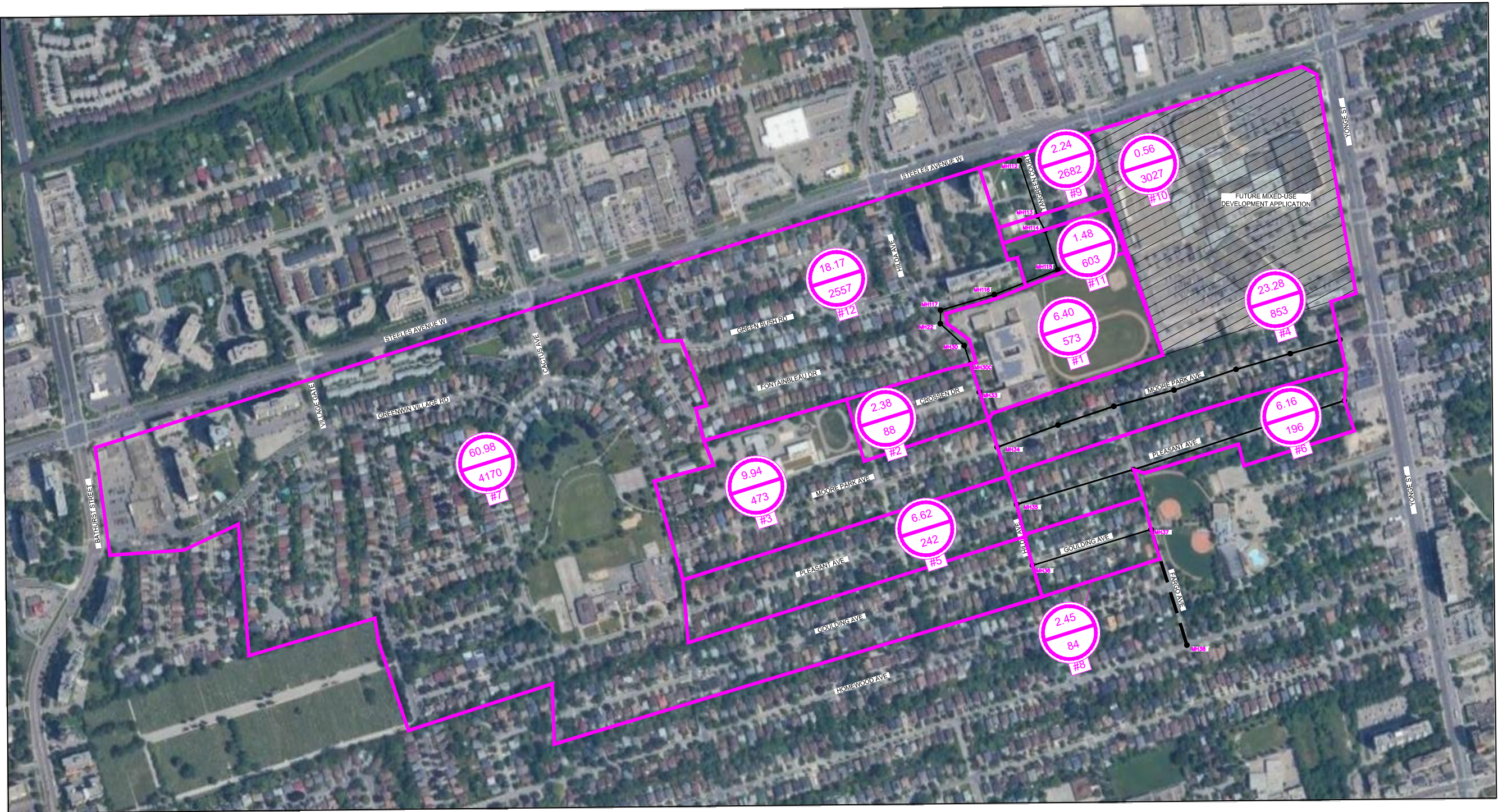
Commercial

ADDRESS	CATCHMENT	STORIES	AREA (m2)	GFA (m2)
Centrepont Mall	4	-	-	55,000
6201 Bathurst St	7	1	9038.44	9038.44
6464 Yonge	13	1	33354.00	33354.00
			TOTAL:	42392.436

High Density

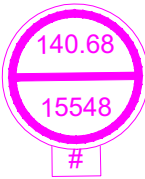
ADDRESS	CATCHMENT	UNITS
755 Steeles Avenue W	7	196
765 Steeles Avenue W	7	167
777 Steeles Avenue W	7	72
775 Steeles Avenue W	7	194
5 Tangreen Ct	9	214
15 Tangreen Ct	11	214
175 Hilda Ave.	12	166
205 Hilda Ave	12	259
10 Tangreen Ct	12	264
	TOTAL:	1746

NOTES:



LEGEND

- SANITARY SEWER DRAINAGE AREA
- EXISTING SANITARY LOCAL SEWER
- EXISTING SANITARY TRUNK SEWER



CATCHMENT AREA
POPULATION
CATCHMENT ID

CLIENT
CAPREIT 2 LIMITED PARTNERSHIP

TITLE
5 TANGREEN COURT
North York, Ontario
SANITARY DRAINAGE PLAN
(POST-DEVELOPMENT CONDITIONS)



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Checked	M.K.	Drawn	L.Z.
Date	MARCH 2023	Proj. No.	221-13290-00
Scale	1:7500	Figure No.	SAN-2

CITY OF TORONTO

5 Tangreen Court

Manning's n = 0.01.

Date: March 14, 2023

TOTAL PRE POPULATION = 9,881

(5) - Catchment area 12 assumed to drain into MH22

CITY OF TORONTO

5 Tangreen Court

Schools and Churches = 0.025

persons per m²

Existing Commercial, Office Avg. Daily Flow = 250 Uda

[illegible]

Manning's n = 0.013

Date: March 14, 2023

[illegible]

TOTAL POST POPULATION = 14,94

APPENDIX

E GROUNDWATER SUPPORTING DOCUMENTS

October 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 INFORMATION		Included in SR (reference page number)	Report Includes this information City staff (Check)
Date Servicing Report was prepared: March 2023		Cover	
Title of Servicing Report: 5 & 15 Tangreen Court Master Plan - Functional Servicing Report		Cover	
Name of Consulting Firm that prepared Servicing Report: WSP Canada Inc.		Cover	
Site Address	5 & 15 Tangreen Court Toronto, Ontario	Page 5	
Postal Code	M2M 3Z1	Cover	
Property Owner (identified on planning request for comments memo)	CAPREIT 2 LIMITED PARTNERSHIP	Page 5	
Proposed description of the project (ex. number of point towers, number of podiums, etc.)	Proposed 7 Towers (Residential and Commercial) with two connecting Podiums. One level of underground parking. New E-W Public Street	Page 6	
Land Use (ex. commercial, residential, mixed, industrial, institutional) as defined by the Planning Act	Residential and Commercial uses	Page 6	
Number of below grade levels	1 levels of below grade parking	Page 6	

SERVICING REPORT GROUNDWATER SUMMARY

<p>Does the SR include a private water drainage system (PWDS)?</p> <p>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.</p>	<p>If Yes continue completing Section B (Information Relating to Groundwater) <u>ONLY</u></p> <p>If Yes, Number of PWDS?</p> <p>_____</p> <p><i>(Each of these PWDS may require a separate Toronto Water agreement)</i></p> <p>If No skip to Sections C (On-site Groundwater Containment) and/or D (Water Tight Requirements) as applicable</p>	<p><input type="radio"/> YES</p> <p><input checked="" type="radio"/> NO</p>	
<p>B. INFORMATION RELATING TO GROUNDWATER</p>		<p>Included in SR (reference page number)</p>	<p>Report Includes this information City Staff (Check)</p>
<p>A copy of the pump schedule(s) for ALL groundwater sump pump(s) for the development site has been included in the FSR</p> <p>or</p> <p>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 schedule(s) that have been designed by the Mechanical Consultant. A template of this letter is attached in Schedule A.</p>		<p>N/A</p>	

SERVICING REPORT GROUNDWATER SUMMARY

<p>**If there is more than one sump they must ALL be included in the letters along with a combined flow**</p>			
<p>Is it proposed that the groundwater from the development site will be discharged to the sanitary, combined or storm sewer?</p>	<p><input type="radio"/> Sanitary Sewer</p> <p><input type="radio"/> Combined Sewer</p> <p><input type="radio"/> Storm Sewer</p>	<p>N/A</p>	
<p>Will the proposed PWDS discharge from the site go to the Western Beaches Tunnel (WBT)?</p> <p>*Reference attached WBT drainage map*</p>	<p><input type="radio"/> YES <input type="radio"/> NO</p> <p>If Yes, private water discharge fees will apply and site requires a sanitary discharge agreement.</p>		
<p>What is the street name where the receiving sewer is located?</p>		<p>N/A</p>	
<p>What is the diameter of the receiving sewer?</p>		<p>N/A</p>	
<p>Is there capacity in the proposed local sewer system?</p> <p><input type="radio"/> YES <input type="radio"/> NO</p>	<p>Are there any improvements required to the sewer system? If yes, identify them below and refer to the section and page number of the FSR where this information can be found.</p> <p>If a sewer upgrade is required, the owner is required to enter into an Agreement with the City to improve the infrastructure?</p> <p><input type="radio"/> YES</p>	<p>N/A</p>	
<p>Total allowable peak flow rate during a 100 year storm event (L/sec) to storm sewer</p> <p>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</p>	<p>_____ L/sec</p>		

October 2017

SERVICING REPORT GROUNDWATER SUMMARY

Wet Weather Flow Management Guidelines, dated 2006			
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-Term Groundwater Discharge Provide proposed total flow rate to the sanitary/combined sewer in post-development scenario Total Flow (L/sec) = sanitary flow + peak long-term groundwater flow rate	_____ L/sec		
Does the water quality meet the receiving sewer Bylaw limits? <input type="radio"/> YES <input type="radio"/> 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?		N/A	

October 2017

SERVICING REPORT GROUNDWATER SUMMARY

<p>Has the above proposal been approved by:</p>	<p><input type="radio"/> TW-WIM</p> <p>And</p> <p><input type="radio"/> TW-EM&P</p> <p>And</p> <p><input type="radio"/> ECS</p>		
<p>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?</p> <p>A connection between the infiltration gallery/dry well and the municipal sewer is not permitted</p> <p>Please be advised if an infiltration gallery/dry 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.</p>	<p><input type="radio"/> YES</p> <p><input checked="" type="radio"/> NO</p>	<p>N/A</p>	
<p>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.</p>		<p>N/A</p>	
<p>D. WATER TIGHT REQUIREMENTS</p>		<p>Included in SR (reference page number)</p>	<p>Report Includes this information City Staff</p>

October 2017

SERVICING REPORT GROUNDWATER SUMMARY

		(Check)
<p>If the site is proposing a water tight structure:</p> <ol style="list-style-type: none"> 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. 	<div style="border: 1px solid red; padding: 5px; color: red;"> <p>These letters will be provided as part of future SPA</p> </div>	<p>Page 23</p>

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

Consulting Firm that prepared Servicing Report: WSP Canada Inc.

Professional Engineer who completed the report summary: Manpreet Kalsi
Print Name

Professional Engineer who completed the report summary: _____
Signature



Hydrogeological Investigation

Proposed Residential Buildings
5 & 15 Tangreen Court
Toronto, ON

Prepared For:

Capreit 2 Limited Partnership

Project No.: 23-011-100
Date: March 8, 2023



DS CONSULTANTS LTD.

6221 Highway 7, Unit 16
Vaughan, Ontario, L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

23-011-100

March 8, 2023

**Capreit 2 Limited Partnership
11 Church Street, Suite 401
Toronto, ON**

Attn: Mr. Shawni Lo

RE: Hydrogeological Investigation – 5 & 15 Tangreen Court, Toronto, Ontario

DS Consultants Limited (DS) was retained by Capreit 2 Limited Partnership to complete a hydrogeological investigation for the proposed development located at 5 and 15 Tangreen Court in Toronto (Site). The Site is an 23,889 m² parcel of land situated approximately 500 meters west of the intersection of Yonge Street and Steeles Avenue. The Site is currently occupied by two (2) 18-storey residential buildings and associated paved parking space. It is understood that the proposed development will consist of constructing six (6) high-rise buildings (Towers A to F) with podiums connecting some of the buildings. It is also understood that the proposed residential towers may potentially be built with two (2) and up to five (5) levels of underground parking (P2 and up to P5).

The average ground elevation at the site is at about 191.9 meters above sea level (masl). The assumed maximum excavation depth of P2 and P5 considering the footings and elevator shaft would be approximately 9 and 18 meters below ground surface (mbgs) respectively (Elev P2: 182.9 and P5: 173.9 masl.)

This investigation is based on five (5) monitoring wells (BH23-1 to BH23-5) advanced by DS between February 10 and 17, 2023 and seven (7) existing monitoring wells installed by Englobe in 2020 in support of previous geotechnical and hydrogeological investigations at the site. This hydrogeological investigation includes an overview of the existing geological and hydrogeological conditions at the Site and the surrounding area, an assessment of the hydrogeological constraints, impacts of the proposed development on the local groundwater, and provides an estimation of construction dewatering and permanent drainage requirements during the proposed development phase.

The hydrogeological investigation report has been prepared in general accordance with the Ontario Water Resource Act (OWRA), the Ontario Water Taking Regulation (O.Reg.387/04), and the City of Toronto Sewers By-law (Toronto Municipal Code, Chapter 681, Sewers). If needed, the results of this investigation can be used in support of an application for a Category 3 Permit to Take Water (PTTW) or an Environmental Activity Sector Registry (EASR) for construction dewatering from the Ministry of the Environment Conservation and Parks (MECP). The hydrogeological report may also be used to support Site Plan Approvals (SPA) and discharge permitting (short and long term) from the City of Toronto. Based on the results of this investigation, the following conclusions and recommendations are presented:

1. As part of the hydrogeological investigation, DS completed a search of the MECP water well records (WWRs) database. Based on the MECP WWR search, there are one hundred thirty-eight (138) water wells within 500 meters of the site. All wells were noted as monitoring well or unknown except for five

- (5) wells recorded as domestic and three (3) wells noted as commercial well. The study area is serviced by municipal water, therefore there are no groundwater users expected within the study area, and therefore no impacts to water supply wells are anticipated.
2. Between February 10 to 17, 2023, DS drilled five (5) boreholes (BH23-1 through BH23-5) and equipped all drilled boreholes with monitoring wells at the site as part of the current geotechnical and hydrogeological investigations. The boreholes were advanced to a depth ranging from 24.9 to 37.2 mbgs. Monitoring wells were screened to depths ranging from 12.2 to 21.3 mbgs.
 3. The surficial geology at the site is characterized as till deposits and consist of stone-poor sandy silt to silty sand-textured till on Paleozoic terrain. The overburden geology at the site generally consisted of upper sandy silt till, upper silty clay to clayey silt, lower sandy silt to silty sand (till) and lower silty clay to clayey Silt deposits.
 4. Groundwater levels were measured in all available wells on March 3rd, 2023, by DS staff. The groundwater levels ranged from 8.57 to 17.11 mbgs (Elev: 173.32 to 184.53 masl). The flow direction in the study area is inferred to be easterly towards German Mills Creek, a tributary of Don River which ultimately discharges into Lake Ontario.
 5. A total of nine (9) Single Well Response Tests (slug tests) were completed by DS on February 27 and 28, 2023, to estimate hydraulic conductivity (k) for the representative geological units in which the wells were screened. Hydraulic conductivity (k) values were calculated using the Hvorslev method using the AquiferTest® Software. The k-values ranged between 2.79×10^{-8} to 9.54×10^{-7} m/s.
 6. To assess the suitability for discharge of groundwater to the City of Toronto's Sanitary/Storm Sewers, two (2) unfiltered groundwater sample were collected from monitoring well BH23-2 and BH23-3 on February 28th, 2023. The reported analytical results indicated that no parameters were in exceedance of the Toronto's Storm Sewer Discharge By-Law criteria except Total Suspended Solid (TSS), Manganese, Phosphorus and Zinc for BH23-2 and TSS, Manganese and Biochemical Oxygen Demand (BOD5) for BH23-3. All parameters met the City's Sanitary Sewer Discharge By-Law criteria except TSS for BH23-2. Therefore, water cannot be discharged to the City's storm and sanitary sewers without pre-treatment. Treatment is needed to comply with the water quality limits set in Table 1 for sanitary and combined sewers and Table 2 for storm sewers before any discharge.
 7. The total estimated daily dewatering rate of short-term construction dewatering for the proposed development Considering the unsealed excavation method for two and five levels of underground parking (P2 and P5), would be approximately 212,400 L/day ($212.4 \text{ m}^3/\text{day}$) and 377,200 L/day ($377.2 \text{ m}^3/\text{day}$), respectively. This estimated conservative value incorporates a safety factor of x2 and a theoretical 10 mm storm event into the open excavation during construction. These calculations are based on the assumption that the entire site will be excavated concurrently, as such, dewatering values have to be further refined when details design and construction sequencing become available.

8. Based on the assumed design, depth to water and estimated k-values, the estimated permanent theoretical flow would be 37,000 L/day (37 m³/day). However, if a safety factor 2 is included, a conservative permanent flow of 74,000 L/day (74 m³/day) will be needed to be pumped into the sewer system to manage any unforeseen groundwater issues in the future. The City of Toronto's foundation drainage policy and guidelines effective as of January 1, 2022, should be considered during the design for on-site management of foundation drainage or permanent drainage in future. As mentioned in the policy, on-site management options for foundation drains/permanent drainage may include but are not limited to, waterproofing the foundation, modifying building design to avoid intersection with the maximum anticipated groundwater level, and/or above-ground discharge and infiltration from sump pumps.
9. Since the expected design dewatering rate for the unsealed excavation for proposed construction considering P2 and P5 is between the MECP water taking limit of 50,000 and 400,000 L/day, an EASR application is required to be submitted to the MECP for short-term dewatering prior to construction. Based on current groundwater conditions, permanent groundwater flow or permanent drainage is expected to be more than the water-taking limit of 50,000 L/day. Therefore, a PTTW is required on a permanent basis.
10. Once a groundwater dewatering system is set up at the Site, daily and weekly monitoring should be implemented to assess the groundwater conditions such as water levels, measurement of discharge flow, discharge water quality and any adverse impacts as a result of dewatering.
11. A groundwater level monitoring program has been implemented at the Site on a bi-weekly basis for three (3) months to document the pre-construction groundwater conditions and assess seasonal groundwater fluctuations. To meet the City of Toronto's requirements, the monitoring program includes all monitoring wells and a total of six (6) water level measurements.
12. There are structures and utilities within the maximum predicted zone of influence (ZOI) of about 77 meters considering the proposed development with P2 and 106 meters when considering an unsealed excavation including P5. Assuming the proposed development to be built with P5, since the construction is anticipated to be constructed within the water bearing silty sand till deposits, an effect of settlement due to dewatering would be expected within the predicted zone of influence.
13. In conformance with Regulation 903 of the Ontario Water Resources Act, the decommissioning of any dewatering system and monitoring wells should be carried out by a licensed contractor under the supervision of a licensed water well technician.

Should you have any questions regarding these findings, please contact the undersigned.

DS Consultants Ltd.

Prepared By:

A handwritten signature in black ink, appearing to read 'Meysam Jafari', with a stylized flourish underneath.

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FIGURES

Figure 1	Development Site Location and MECP Water Well Record Map
Figure 2	Surficial Geology Map
Figure 3	Borehole and Monitoring Well Location Plan
Figure 4	Geological Cross-Section A-A'

APPENDICES:

Appendix A	Borehole Logs
Appendix B	Hydraulic Conductivity Analysis
Appendix C	Groundwater Quality Certificate of Analysis
Appendix D	MECP Water Wells Records

1.0 INTRODUCTION

DS Consultants Limited (DS) was retained by Capreit 2 Limited Partnership to complete a hydrogeological investigation for the proposed development located at 5 and 15 Tangreen Court in Toronto (Site). The Site is a 23,889 m² parcel of land situated approximately 500 meters west of the intersection of Yonge Street and Steeles Avenue. The Site is currently occupied by two (2) 18-storey residential buildings and associated paved parking space. It is understood that the proposed development will consist of constructing six (6) high-rise buildings (Towers A to F) with podiums connecting some of the buildings. It is also understood that the proposed residential towers may potentially be built with two (2) and up to five (5) levels of underground parking (P2 and up to P5). **Figure 1** presents the site location map that highlights the location of the site and the surrounding area.

The average ground elevation at the site is at about 191.9 meters above sea level (masl). The assumed maximum excavation depth of P2 and P5 considering the footings and elevator shaft would be approximately 9 and 18 meters below ground surface (mbgs) respectively (Elev P2: 182.9 and P5: 173.9 masl.)

1.1 Purpose

The purpose of this Hydrogeological Investigation is to assess the current groundwater conditions at the Site in order to evaluate the following:

- Temporary construction dewatering for the excavations of the proposed building on Site;
- Explore the potential need for a Permit to Take Water (PTTW) or Environmental Activity and Sector Registration (EASR) for the purposes of Construction Dewatering from the MECP;
- Temporary management and discharge of groundwater during short term construction dewatering
- Assess permanent drainage requirements; and
- Assess groundwater quality to identify potential adverse impacts to Toronto Region's sewer system.

1.2 Scope of Work

The scope of work for this investigation included:

- Site visits;
- Desktop review of pertinent geological and hydrogeological resources;
- Review the MECP Water Well Records and water use in the surrounding area;
- Field work drilling program including installation of five (5) monitoring wells;

- Conducting single well response tests (slug tests) to determine hydraulic conductivity values across the site;
- Characterize the stratigraphy and measure the ground water levels across the site;
- Collection and analysis of groundwater samples in order to quantify and characterize any possible contaminants that may impact future discharge applications;
- Estimation of construction dewatering volumes, which is to be used to predict the short-term groundwater control requirements for the construction of the proposed building on site.

2.0 FIELDWORK

Between February 10 to 17, 2023, DS drilled five (5) boreholes (BH23-1 through BH23-5) and equipped all drilled boreholes with monitoring wells at the site as part of the current geotechnical and hydrogeological investigations. The boreholes were advanced to a depth ranging from 24.9 to 37.2 mbgs. Monitoring wells were screened to depths ranging from 12.2 to 21.3 mbgs. All wells were completed with 50 mm diameter PVC pipes with 1.5 and 3.05 m well screens and were installed using flush-mounted protective casings. In order to help better understating of the hydrogeological setting, DS also utilized the existing monitoring wells BH1, BH2, BH3, BH5, BH6, BH8 and BH10 installed by Englobe in 2020. All monitoring wells were developed before any use to allow for groundwater level monitoring, hydraulic conductivity testing, and to assess groundwater quality. A total of nine (9) single well response tests (SWRTs) were completed by performing a rising head test (slug test) to estimate hydraulic conductivity values of soils at the site. Two (2) unfiltered groundwater samples were also collected and analyzed for the parameters listed under the City of Toronto Sewers By-law (Toronto Municipal Code, Chapter 681, Sewers) to assess groundwater quality. The borehole (BH) and monitoring well (MW) location plan is shown in **Figure 3**.

3.0 PHYSICAL SETTING

Available topographic maps, environmental, geotechnical, and hydrogeological reports were used to develop an understanding of the physical setting of the study area. Borehole logs and the MECP WWRs were used to interpret the geological and hydrogeological conditions at the development site.

3.1 Physiography and Drainage

The topography at the Site is relatively flat with a surface elevation of approximately 191.9 metres above sea level (masl). The nearest surface water body to the Site is German Mills Creek a tributary of Don River, located about 2.4 km to the east of the Site, which drains into Don River and ultimately Lake Ontario. Drainage in the study area is generally controlled by streams, artificial channels, and the local topography.

3.2 Geology

The following presents a brief description of regional and development site geology based on the review of available information and development site-specific soil investigations.

3.2.1 Quaternary Geology

According to the Ontario Geological Survey mapping across the region, the site lies within the Bevelled Till Plains physiographic region of southern Ontario and quaternary geology of the Site is partially characterized by glaciolacustrine deposits of silt and clay, minor sand, basin and quiet water and Halton till predominantly silt to silty clay matrix, high in carbonate content and clast poor deposits of Pleistocene. The surficial geology at the site is characterized as till deposits and consist of stone-poor sandy silt to silty sand-textured till on Paleozoic terrain. The surficial geology map is shown in **Figure 2**.

3.2.2 Bedrock Geology

According to the Ontario Geological Survey mapping across the region the bedrock at the site is predominantly comprised of shale, limestone, dolostone, siltstone of the Georgian Bay formation; Blue Mountain formation; Billings formation; Collingwood Member, and Eastview Member. Bedrock was not encountered during the current investigation.

3.2.3 Site Geology

On-site subsurface soil conditions were summarized from the boreholes advanced by DS for the current investigation. Detailed subsurface conditions are presented in **Figure 4**, and the borehole logs are presented in **Appendix A**. The subsurface conditions in the boreholes are summarized in the following paragraphs.

Topsoil: A surficial topsoil layer with a thickness of approximately 200 mm was encountered at all boreholes by DS. It should be noted that the thickness of the topsoil explored at the borehole locations may not be representative for the site and should not be relied on to calculate the amount of topsoil at the site. Shallow hand-dug test-pits should be carried out to further explore the topsoil conditions.

Fill Materials: Fill materials consisting of silty clay and sandy silt with organics were encountered in all boreholes (BH23-1 to BH23-5). Fill material extended to depths ranging from approximately 1.8 to 2.6 mbgs.

Upper Sandy Silt Till Deposit: Upper sandy silt till deposit was encountered below the fill materials in all boreholes and extended to depths ranging from 4.6 to 5.6 mbgs.

Upper Silty Clay to Clayey Silt (Till): An upper silty clay to clayey silt (till) deposit was encountered below the upper sandy silt till deposit in all boreholes and extended to depths ranging from 9.1 to 16.8 mbgs.

Lower Sandy Silt to Silty Sand (Till) Deposit: Lower sandy silt to silty sand (till) deposit was encountered below the upper silty clay to clayey silt (till) deposit in all boreholes and extended to depths ranging from approximately 15.2 to 21.3 mbgs. A silt layer was encountered at a depth of approximately 12.2 to 13.7 mbgs in borehole BH23-3.

Lower Silty Clay to Clayey Silt (Till): A lower silty clay to clayey silt (till) deposit was encountered below the lower sandy silt to silty sand (till) deposit in all boreholes and extended to depths ranging from 24.9 to 37.2 mbgs.

3.3 Hydrogeology

The hydrogeology at the site was evaluated using the on-site monitoring wells installed by DS, Englobe and the MECP WWRs in the study area.

3.3.1 Local Groundwater Use

As part of the hydrogeological investigation, DS completed a search of the MECP water well records (WWRs) database. Based on the MECP WWR search, there are one hundred thirty-eight (138) water wells within 500 meters of the site (**Appendix D**). All wells were noted as monitoring well, or unknown except five (5) wells recorded as domestic and three (3) wells noted as commercial well. **Figure 1** shows the MECP water well location plan. There are no groundwater users expected within the study area, and therefore no impacts to water supply wells are anticipated.

3.3.2 Groundwater Conditions

Groundwater levels were measured in all available wells on March 3rd, 2023, by DS staff. **Table 3-1** presents the groundwater levels in all monitoring wells. The groundwater levels ranged from 8.57 to 17.11 mbgs (Elev: 173.32 to 184.53 masl). The flow direction in the study area is inferred to be easterly towards German Mills Creek, a tributary of Don River which ultimately discharges into Lake Ontario.

Table 3-1: Groundwater Levels in Monitoring Wells

Well ID	Ground Elevation (masl)	Screened Interval (mbgs)	Depth to Water (mbgs)	Groundwater Elevation (masl)
BH1	191.82	15.2-18.3	9.45	182.37
BH2	193	12.2-15.2	11.88	181.12
BH3	192.66	17.1-20.1	16.61	176.05
BH5	193.1	9.1-12.1	8.57	184.53
BH6	191.6	9.1-12.2	11.32	180.28
BH8	191.91	16.8-19.8	Dry	-
BH10	191.57	22.5-23.5	18.25	173.32
BH23-1	191.57	12.2-15.2	Dry	-
BH23-2	191.82	18.3-21.3	17.11	174.71
BH23-3	192.66	15.3-18.3	12.69	179.97
BH23-4	191.91	15.2-18.2	14.9	177.01
BH23-5	191.6	13.7-16.7	15.84	175.76

3.3.3 Hydraulic Conductivity

A total of nine (9) Single Well Response Tests (slug tests) were completed by DS on February 27 and 28, 2023 to estimate hydraulic conductivity (k) for the representative geological units in which the wells were screened. SWRTs were completed by performing a rising head test (slug test) with the use of Waterra® tubing to ‘instantaneously’ remove water from the well. A data logger was placed at the bottom of the wells to accurately measure the change in the hydraulic head versus time. Hydraulic conductivity (k) values were calculated using the Hvorslev method using the AquiferTest® Software. The semi-log plots for normalized drawdown versus time are provided in **Appendix B**. The k-values ranged between 2.79×10^{-8} to 9.54×10^{-7} m/s. **Table 3-2** presents the Hydraulic Conductivity (k) values for the representative geological units.

Table 3-2: Summary of Hydraulic Conductivity (k) Test Results

Well ID	Screened Interval (mbgs)	Screened Formation	K-value (m/s)	Geomean value
BH1	15.2-18.3	SANDY SILTY CLAY TILL	6.70×10^{-8}	1.24×10^{-7}
BH2	12.2-15.2	SANDY CLAYEY SILT TILL/SANDY SILT	2.42×10^{-7}	
BH3	17.1-20.1	SANDY SILTY TILL	6.49×10^{-8}	
BH5	9.1-12.1	SANDY CLAYEY SILT TILL/SILTY CLAY	9.54×10^{-7}	
BH6	9.1-12.2	SILTY CLAY TILL	2.59×10^{-8}	
BH10	22.5-23.5	SILTY CLAY TILL	1.19×10^{-7}	
BH23-2	18.3-21.3	CLAYEY SILT TILL/SILTY SAND	2.23×10^{-7}	
BH23-3	15.3-18.3	SILTY SAND/SANDY SILT TILL	3.75×10^{-7}	
BH23-5	13.7-16.7	SILTY SAND/CLAYEY SILT TILL	2.79×10^{-8}	

3.3.4 Groundwater Quality

To assess the suitability for discharge of groundwater to the City of Toronto’s Sanitary/Storm Sewers, two (2) unfiltered groundwater sample was collected from monitoring well BH23-2 and BH23-3 on February 28th, 2023. The samples were placed in pre-cleaned laboratory supplied vials and/or bottles provided with analytical test group-specific preservatives, as required. Dedicated nitrile gloves were used during sample handling. The groundwater samples were submitted to SGS Laboratories in Mississauga, Ontario. SGS is certified by the Canadian Association of Laboratory Accreditation Inc. (CALA) and the Canadian Standard Association (CSA). The analytical results were compared to the City of Toronto's Table 1 Limits for Sanitary and Combined Sewer Discharge, and Table 2 Limits for Storm Sewer Discharge. The reported analytical results indicated that no parameters were in exceedance of the Toronto’s Storm Sewer Discharge By-Law criteria except Total Suspended Solid (TSS), Manganese, Phosphorus and Zinc for BH23-2 and TSS, Manganese and Biochemical Oxygen Demand (BOD5) for BH23-3. All parameters met the City’s Sanitary Sewer Discharge By-Law criteria except TSS for BH23-2. Therefore, water cannot be discharged to the City’s storm and sanitary sewers without treatment. Treatment is needed to comply with the water quality limits set in Table 1 for sanitary and combined sewers and Table 2 for storm sewers before any discharge. **Table 3-3** presents a summary of the exceeded parameters, and the certificates of analyses are provided in **Appendix C**.

Table 3-3: Parameters in Groundwater Exceeding City of Toronto Sewer Use By-law 100-2016

Parameter	Unit	Toronto Sanitary By-Law Criteria	Toronto Storm By-Law Criteria	BH23-2	BH23-3
Total Suspended Solid (TSS)	mg/L	350	15	<u>1,000</u>	<u>187</u>
Manganese	mg/L	5	0.05	<u>1.11</u>	<u>0.154</u>
Phosphorus	mg/L	10	0.4	<u>2.34</u>	0.187
Zinc	mg/L	2	0.04	<u>0.049</u>	0.030
Biochemical Oxygen Demand (BOD5)	mg/L	300	15	< 4↑	<u>42</u>
Bold- Exceeds Sanitary Sewer Use by Law Criteria					
<u>Underlined-</u> Exceeds Storm Sewer Use by Law Criteria					

4.0 CONSTRUCTION DEWATERING

The proposed residential development will include the construction of six (6) high-rise building (Towers A to F) with podiums connecting some of the buildings. It is also understood that the proposed towers may potentially be built with two (2) or five (5) levels of underground parking (P2 or P5). The assumed maximum excavation depth of P2 and P5 considering the footings and elevator shaft would be approximately 9 and 18 meters below ground surface (mbgs) respectively (Elev P2: 182.9 and P5: 173.9 masl.). For construction dewatering purposes, the groundwater level should be lowered at least one (1) m below the footings and elevator shaft elevation at about 183.9 masl for P2 and 172.9 masl for P5. The unsealed construction excavation method with excavation dimensions of 200 m long and 80 m wide for considered for the proposed development. Since the proposed underground structure will be below the groundwater table, dewatering will be required during the excavation of overburden material.

Dewatering calculations are based on the assumption that the entire site will be excavated concurrently, as such, dewatering values have to be further refined when details design and construction sequencing become available.

4.1 Estimation of Flow Rate - Unsealed Excavation

This section calculates the estimated dewatering required during the construction of the proposed building based on the geomean k-value, the highest groundwater elevations at the site using the steady-state flow equation for unsealed excavation as follows. The estimated flow rates for the proposed buildings are summarised in Table 4-1.

$$Q_R = K \times \frac{H^2 - h^2}{0.733} \times \text{Log} (R_0/r_e)$$

$$r_e = \left(\frac{(a \times b)}{\pi} \right)^{0.5}$$

$$R_0 = (r_e + 3000)(H - h)(k^{0.5})$$

Table: 4-1 Estimation of Flow Rate (Short-term Discharge) - Unsealed Excavation

Parameters	Option 1	Option 2
	P2	P5
K -Hydraulic conductivity(geomean) (m/s)	9.54×10^{-7}	9.54×10^{-7}
H-Distance from water level to the bottom of an aquifer (m)	3	13
h -Depth of water in the well while pumping (m)	1	1
a- length of excavation (m)	200	200
b- Width of excavation (m)	80	80
r_e -equivalent radius, where a and b excavation dimensions (m)	71	71
R_o - Radius of the cone of depression	77	106
Estimated Flow Rate- L/day (without safety factor)	26,200	108,600

4.2 Estimation of Flow Rate- Storm Water Consideration

During construction, additional removal of stormwater from precipitation into the open excavation will be required. The estimated flow rate is based on the excavation dimensions for the entire development and a theoretical 10 mm precipitation event in 24 hours. The total estimated dewatering that might be needed as a result of a 10 mm precipitation event for would be approximately 160,000 L/day (160 m³/day).

4.3 Total Estimation of Flow Rate (Short-Term/ Temporary Discharge)

Considering the unsealed excavation method, the recommended pumping rate for the proposed development considering two and five levels of underground parking (P2 and P5), would be approximately 212,400 L/day (212.4 m³/day) and 377,200 L/day (377.2 m³/day), respectively. These values incorporate a safety factor of x2 and account for stormwater as a result of a 10 mm precipitation event. The recommended flow rates for the proposed buildings are summarised in Table 4-2.

Table 4-2: Total Construction Dewatering (Short-term Discharge) - Unsealed Excavation

U/G	Flow Rate Q- without a safety factor (L/day)	Flow Rate Q- with a safety factor x2 (L/day)	Storm water (@ 10 mm/24 hrs.) (L/day)	Designed Flow Rate Or Total Flow Rate (L/day)
P2	26,200	52,400	160,000	212,400
P5	108,600	217,200	160,000	377,200

It is expected that the initial dewatering rate will be higher to remove groundwater within the overburden formation. The dewatering rates are expected to decrease once the target water level is achieved in the excavation footprint as groundwater will have been removed locally from storage resulting in lower seepage rates into the excavation. The maximum flow calculation is intended to provide a conservative value to account for unforeseeable conditions that may arise during construction.

4.4 Permanent Drainage (Long-term Discharge)

Following the construction of the underground structure, long-term groundwater flow to the underfloor drainage system for the building will be a function of the upward flux and drainage along the foundation wall. Based on the assumed design, depth to water and given k-value, the estimated permanent theoretical flow would expect to be 37,000 L/day (37 m³/day). However, if a safety factor 2 is included, a conservative permanent flow of **74,000 L/day (74 m³/day)** will be needed to be pumped into the sewer system to manage any unforeseen groundwater issues in the future. The City of Toronto's foundation drainage policy and guidelines effective as of January 1, 2022, should be considered during the design for on-site management of foundation drainage or permanent drainage in future. As mentioned in the policy, on-site management options for foundation drains/permanent drainage may include but are not limited to, waterproofing the foundation, modifying building design to avoid intersection with the maximum anticipated groundwater level, and/or above-ground discharge and infiltration from sump pumps.

4.5 Permit Requirements

4.5.1 Environmental Activity and Sector Registry (EASR) /Permit to Take Water (PTTW) Application

An EASR is required to be submitted to the MECP if the taking of groundwater and stormwater for a temporary construction project is between 50,000 L/day and 400,000 L/day. The EASR application is an online registry and should be submitted to the MECP before any construction dewatering. A PTTW is only required to be submitted to the MECP if the taking of groundwater and stormwater for a temporary construction project is more than 400,000 L/day.

Since the expected design dewatering rate for the unsealed excavation for the proposed development is between the MECP water taking limit of 50,000 and 400,000 L/day, an EASR application is required to be submitted to the MECP for short-term dewatering prior to construction. Based on current groundwater conditions, permanent groundwater flow or permanent drainage is expected to be more than the water-taking limit of 50,000 L/day. Therefore, a PTTW is required on a permanent basis.

4.5.2 Discharge Permits (Construction Dewatering)

A discharge permit will be required from the City of Toronto if private water is to be sent to the sewer system for construction dewatering and permanent drainage.

5.0 POTENTIAL IMPACTS

The following are the predicted potential impacts due to construction dewatering:

5.1 Local Groundwater Use

The area is fully serviced by municipal water supply. Since it is not expected to have any use of groundwater as a source of drinking water within a 500 meters radius from the Site, it is not anticipated

that there will be short-term or long-term impacts on private water wells occurring from the proposed dewatering activities.

5.2 Point of Discharge and Groundwater Quality

The reported analytical results indicated that no parameters were in exceedance of the Toronto's Storm Sewer Discharge By-Law criteria except Total Suspended Solid (TSS), Manganese, Phosphorus, Biochemical Oxygen Demand (BOD5) and Zinc. All parameters met the City's Sanitary Sewer Discharge By-Law criteria except for TSS. Therefore, water cannot be discharged to the City's storm and sanitary sewers without treatment. Treatment is needed to comply with the water quality limits set in Table 1 for sanitary and combined sewers and Table 2 for storm sewers before any discharge. Treatment options include but are not limited to settlement and filtration of sediments.

5.3 Settlement Due to Dewatering Activities

There are structures and utilities within the maximum predicted zone of influence (ZOI) of about 77 meters considering the proposed development with P2 and 106 meters when considering an unsealed excavation including P5. Assuming the proposed development to be built with P5, since the construction is anticipated to be constructed within the water bearing silty sand till deposits, an effect of settlement due to dewatering would be expected within the predicted zone of influence. DS recommends consulting geotechnical consultants for settlement monitoring requirements to assess potential settlement due to any dewatering activities at the site during construction.

5.4 Well Decommissioning

Following the completion of construction activities, all dewatering wells, well points, eductors and monitoring wells installed at various stages of this project must be decommissioned. The installation and eventual decommissioning of the wells and the dewatering system must be carried out by a licenced water well contractor in accordance with Regulation 903 of the Ontario Water Resources Act.

6.0 MONITORING AND MITIGATION

Based on the findings of this hydrogeological assessment and associated potential impacts due to development, the following monitoring and mitigation program is provided:

- A groundwater level monitoring program has been implemented at the Site on a bi-weekly basis for three (3) months to document the pre-construction groundwater conditions and assess seasonal groundwater fluctuations. To meet the City of Toronto's requirements, the monitoring program includes all monitoring wells and a total of six (6) water level measurements.
- Baseline groundwater quality has been assessed and established before construction. However, groundwater quality can change based on several factors (land-use change, spills, etc.) and should be monitored during construction dewatering and after construction to ensure that water quality meets the guideline or regulations associated with any permits from the MECP and the City of Toronto.

- Once a groundwater dewatering system is set up at the Site, daily and weekly monitoring should be implemented to assess the groundwater conditions such as water levels, measurement of discharge flow, discharge water quality and any adverse impacts as a result of dewatering include settlement.
- Based on the dewatering assessment, an EASR application is required for short-term dewatering and a PTTW is required on a permanent basis. Additional monitoring may be required by the MECP to be implemented during the design stage.
- A discharge permit is required to be submitted to the city for short-term dewatering if private water is sent to the sewer system.
- Following the completion of construction activities, all dewatering wells, well points, eductors and monitoring wells installed at various stages of this project must be decommissioned. The installation and eventual decommissioning of the wells and the dewatering system must be carried out by a licensed water well contractor in accordance with Regulation 903 of the Ontario Water Resources Act.

Should you have any questions regarding these findings, please contact the undersigned.

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APPENDIX

F ENGINEERING PLANS