



Functional Servicing and Stormwater Management Report

Proposed Mixed-Use Condominium Development 1012 Yonge Street City of Barrie

Prepared for Crown (Barrie) Developments Inc.

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1. Introduction

1.1 Background

GHD Limited was retained by Crown (Barrie) Developments Inc. (the "Owner") to provide professional engineering services related to the preparation of a site specific Functional Servicing and Stormwater Management Report (FSR-SWM) for a proposed mixed-use development located at 1012 Yonge Street (the "Site"), in the City of Barrie (the "City").

This report has been prepared to support the requirements of the Official Plan Amendment and Zoning By-Law Amendment Application Process within the Hewitt's Secondary Plan. This report discusses the existing infrastructure in the vicinity of the subject lads and recommendations for the conceptual provision of sanitary drainage, storm drainage, and water distribution / fire protection in accordance with the City of Barrie standards and criteria. Additionally, the report provides details about the stormwater management in accordance with City of Barrie, Ministry of Environment, Conservation and Parks (MECP), and Lake Simcoe Region Conservation Authority's (LSRCA) Stormwater Management guidelines.

The report concludes that the proposed services to be constructed as part of the overall subdivision development will adequately service the new development at 1012 Yonge Street.

The report has also been prepared and will continue to be coordinated with the Hewitt's Secondary Plan Area Subwatershed Impact Study, completed by Burnside & Associates.

Additionally, the following documents were used / referenced in preparation of this report:

- Stormwater Management Planning and Design Manual by the Ministry of Environment, Conservation and Parks (MECP) 2003 [MECP SWMPD];
- Technical Guidelines for Stormwater Management Submissions by the Lake Simcoe Region Conservation Authority (LSRCA) 2016 [LSRCA SWM Guidelines];
- City of Barrie's Storm Drainage and Stormwater Management Policies and Design Guidelines 2017 [City SWM Guidelines];
- Barrie Creek, Lovers Creek, and Hewitt Creek Subwatershed Plan by the LSRCA 2012 [LSRCA Subwatershed Plan];
- Phosphorus Offsetting Policy by the LSRCA 2017 [LSRCA Phosphorus Offsetting Policy];
- ➤ Lake Simcoe Protection Plan 2009 [LSPP];
- ➤ Highlights of Draft Changes to LSRCA SWM Technical Guidelines by the LSRCA June 24, 2016 [LSRCA Draft SWM Technical Guidelines];
- Drainage & Stormwater Master for the City of Barrie, prepared by Amec, Drawing No. SA-283-R22, dated October 2013;
- ➤ Site Plan (Dwg. No. A100) prepared by SRN Architects, dated August 15th, 2022;



- Hewitt's Secondary Plan Area Subwatershed Impact Study prepared by R.J. Burnside & Associates Limited, dated September 2016; and,
- Official Plan for the City of Barrie, Amendment No.39, dated 2014.
- Phosphorus Budget Tool in Support of Sustainable Development for the Lake Simcoe Watershed, Hutchinson Environmental Ltd., March 30, 2012
- Wet Weather Flow Management Guidelines, City of Toronto, November 2006

1.2 Site Description

The is located on the west side of Yonge Street and north of Lockheart Road with a municipal address of 1012 Yonge Street. The Site is approximately 4.90 ha in size in size is currently bounded by agricultural land to the north, west and south, and Yonge Street to the east. Refer to Figure 1 on Appendix A for the site location.

Currently, the site is used as agricultural land and is occupied by one 2-storey residential building, two stone and farm barns, a metal garage and a plastic green house. Vehicle access to the Site is provided by an existing gravel driveway connected to Yonge Street.

Based on the topographic survey, under existing conditions, the northwest corner of the site drains towards the existing agricultural lands to the north and west, while the reminder of the site drains from northwest to southeast, and into the existing ditch running along the west side of Yonge Street. Please refer to the topographic survey by GUIDO PAA SURVEYING, dated January 4th, 2019 in Appendix A for the existing condition of the site.

1.3 Existing Soils Condition

A geotechnical investigation was completed by Soil Engineers Ltd. by extending boreholes across the site to examine subsurface soil conditions. The boreholes were completed in March 2020 and found the site contains a layer of Topsoil (approximately 0.30m thick), underlain by Sandy Silt Till of approximately 2m – 3m depth, on average, underlain by a thicker layer of Sand, found within all boreholes down to the limit of borehole investigation, down to 9m depth. For further details related to existing soils data, refer to the Soil Engineers Ltd. Geotechnical Investigation Report.

1.4 Existing Groundwater Condition

A hydrogeological investigation was completed by GHD in 2021 and previous investigations were completed by Cole Engineering Group Ltd. Based on the results from the GHD investigations, the site is underlain by Ice contact deposits consisting of silt, sandy silt and sand from 0.76 to 15.85 metres below ground surface (mBGS). Based on the results from the SWRTSs, the horizontal hydraulic conductivity (K_h) ranges from 1.1 x 10^{-5} to 1.1 x 10^{-2} cm/s, due to the variability of the deposit. The horizontal hydraulic conductivity (geomean) of the ice contact deposits is 4.4×10^{-4} cm/s, and accounting for the variability of the deposit the hydraulic conductivity (geomean) plus one standard deviation is 4.3×10^{-3} cm/s, which is representative of the aquifer. Based on groundwater levels collected at the site in September 2021, the levels ranged from 3.75 mBGS at MW2-21 to 7.47 mBGS at BH1, and on average are about 5.7 mBGS or 263.53 mAMSL to 264.82 mAMSL. Groundwater flow is east to west across the site towards the tributary of Lover's Creek.

1.5 Site Development Proposal

The proposed development is based on the site plan by SRN Architects, dated August 15th, 2022, which proposes two 3-storey townhouses, one 3-storey condo building, one 4-storey condo building, two 6-



storey condo buildings and one 10-storey condo building, with commercial units fronting Yonge Street. The entire development will also consist of a shared level of below grade parking.

Vehicle access to the proposed development will be provided via a private driveway connected to the future municipal R.O.W. along the north, a new 24m to 25m R.O.W. along the south, and Yonge Street to the east. The new 24 to 25 meter municipal R.O.W. (Street A) is proposed along the entire southern boundary of the proposed development, connected to the future municipal R.O.W. to the west and Yonge Street to the east.

This development will be constructed in two phases. Phase 1 will consist of Building A and 612 parking spaces and Phase 2 will consist of Building B, Building C, Building D, Building E, Townhouse BG, Townhouse BF and the remainder of the underground parking garage. The proposed development will satisfy all stormwater management, water supply and sanitary drainage design criteria under both Phase 1 and Phase 2 construction.

A copy of the site plan by SRN Architects, dated August 15th, 2022 and phasing diagram is provided within Appendix A.

2. Terms of Reference

The Terms of Reference used for this report were based on the City of Barrie's Development Manual (2017), Storm Drainage and Stormwater Management Policies and Design Guidelines (2017), and the Sanitary Sewage Collection System Policies and Design Guideline (2017). Other documents that were used to establish the design criteria are noted in their appropriate section.

2.1 LSRCA Design Charrette

In accordance with the City of Barrie's requirements for the development within the Hewitt's Secondary Plan Area, a virtual design charrette meeting was held with City and LSRCA staff on August 13, 2020 on the Microsoft Teams platform.

Technical design parameters for stormwater, sanitary sewers and water distribution were presented and confirmed by the City and LSRCA staffs. These design parameters are presented in the beginning of each of these sections respectively.



3. Stormwater Management and Drainage

This section provides an analysis, valuate on a preliminary basis, of the site Stormwater Management (SWM) opportunities and constraints, including:

- Calculation of the proposed storm flows:
- > Evaluation of the capacity of the existing stormwater service connections or ultimate outlets; and,
- Demonstration that adequate capacity is or will be available within the receiving municipal sewers and downstream infrastructure to accommodate the additional stormwater flows from the proposed development.

3.1 Existing Conditions

As mentioned in section 1.2, the site is currently used as agricultural land and consists of one 2-storey residential building, two stone and farm barns, a metal garage and a plastic green house, with a total site area of 4.90 ha. Based on the topographic survey, there aren't any existing catchbasins on site. Runoff from the northwest corner of the site flows overland to the north and west (approximately 0.77ha) and the reminder of the site (4.13ha) flows into an existing ditch running along the west side of Yonge Street. See Figure DAP-1, for the existing storm drainage conditions.

3.2 Proposed Conditions

The proposed development consists of two 3-storey townhouses, one 3-storey condo building, one 4-storey condo building, two 6-storey condo buildings and one 10-storey condo building, with commercial units fronting Yonge Street. A small portion of the frontage along the western limit will drain onto the future municipal R.O.W. to the west, and eventually into SWM Pond #3.

The following design criteria will be applied:

- > SWM Quantity control: Post-development peak flows for all storms, up to and including 100-year, from the subject site are to be controlled to meet the pre-development levels;
- > SWM Quality Control: Stormwater is to be treated to Enhanced Protection levels, i.e., 80% TSS removal, as defined in the MECP 2003 SWMPD Manual;
- Phosphorus loadings will meet or be below existing conditions;
- Water Balance: Maintain the pre-development infiltration target to the extent feasible; and,
- > The City's Intensity-Duration-Frequency (IDF) data to be used for analysis.

Based on the latest Site Plan by SRN Architects Inc., revision dated August 15th, 2022, the site is proposed to be developed into a high-density residential site with commercial space off Yonge Street.

The majority of the entire private development (Area 100) and the new municipal R.O.W. along the southern limit (Area 103) will be draining towards Yonge Street and eventually into SWM Pond#5. However, a small area strip fronting the future R.O.W. to the west (Area 101) will drain to SWM Pond #3 instead. The total area draining towards SWM Pond #5 and SWM Pond#3 is approximately 4.87ha (Area 100 + Area 103) and 0.03 ha (Area 101) respectively. Refer to Figure DAP-2 attached to the end of this report for the proposed conditions drainage area.



3.3 Proposed Interim Condition

An interim conditions is proposed to maintain the existing drainage pattern prior to the completion of the future R.O.W to the west and north. A temporary swale will be proposed to run along the western limits of the site to capture storm runoff from Area 101, into a temporary ditch inlet catchbasin and eventually discharging into the storm sewer on Street A flowing towards SWM Pond #5.

Based on the above, the proposed development can proceed and be developed without the need of the future R.O.W. to the west and north, nor SWM Pond #3. The temporary ditch and catchbasin will be removed in the ultimate condition.

SWM Pond #5 will be constructed in conjunction with the proposed development.

Refer to Figure DAP-2 attached to the end of this report.

3.4 External Stormwater Management Scheme

As per the R. J. Burnside & Associates Limited issued Addendum No. 2, the 2019 SIS study (December 9, 2021), the required SWM controls for this site were intended to be provided using two end-of-pipe SWM facilities. The SIS originally proposed drainage divide cuts through the center of the site, whereby the western part of the subject site would drain westerly towards SWM Pond #3 (located within Lockhart Innisfill Investments Ltd. property) and the eastern part of the site would drain easterly towards SWM Pond #5 (located within Ballymore's property). Refer to Figure DD showing the originally proposed drainage divide in Appendix B, extracted from the R.J. Burnside & Associates Ltd. SIS report.

The drainage divide has since then been further revised based on Addendum No. 2 (December 9, 2021) from R.J. Burnside & Associates. The new storm drainage divide for SWM Pond #5 now encloses the entire proposed development and the new municipal R.O.W. along the southern boundary, with a total area of approximately 4.87ha. The remainder area of 0.03ha will drain onto the future R.O.W. to the west and eventually into SWM Pond #3. The designer of SWM Pond #5 has confirmed that SWM Pond#5 is able to accommodate the additional storm flow from the proposed development.

As per Figure 9 & 10-Proposed Storm Sewer Plan within Addendum No.2, new storm sewers will be constructed within the future R.O.W. to the west, the proposed 24m R.O.W. to the south and Yonge Street to the east. The storm sewers will be extended from the downstream SWM Ponds #3 and #5, through adjacent landowners as part of their respective development applications, up to the property limit of the subject site at both the east and west site boundaries to provide municipal storm connections.

A copy of the Figures 9 & 10 Proposed Storm Sewer Plan has been provided in Appendix B.

3.5 Internal Stormwater Management Scheme

The development will incorporate a "dual" drainage system consisting of storm sewers and catch-basins (minor system) to capture runoff up to the 100-year event and using the roadway to convey overland flow (major system for storm event beyond the 100-year storm). The site can be divided into two components when discussing stormwater management: 1) the private site plan area and 2) the municipal collector road ROW.

All storm runoff generated within the private site (Area 100), up to and including the 100-year storm event, will be captured via area drains and catchbasins, directed into the underground parking garage and routed via underground storm piping in an easterly direction towards Yonge Street. Clean water from the roof and grassed areas will also be conveyed to wards the proposed infiltration gallery located along the northern limit of the site, prior to discharged towards Yonge Street, in order to achieve the infiltration and water balance target (see section 3.7 and 3.8). Storm flows will then exit the underground garage at a



designated storm outlet location and connected to the future municipal storm sewer at Street 'A' and Yonge Street intersection which eventually drains into SWM Pond #5.

Additionally, runoff up to the 100-year storm event from new municipal ROW (Street 'A') will be captured just prior to Yonge Street using sufficiently sized catch basins and draining into the future storm sewer within Yonge Street, and eventually discharging into SWM Pond #5.

Lastly, flows beyond the 100 year storm event will be conveyed overland onto Yonge Street and into SWM Pond #5. However, a small western portion of Street A will be conveyed to the west and into SWM Pond #3 to accommodate future development to the south. Coordination with adjacent developments are ongoing.

Refer to Drawing DAP-2 Preliminary Functional Grading & Storm Drainage Plan, for a depiction of the intended post-development stormwater routing.

3.6 SWM Quantity Control and Storm Sewer Design

As mentioned in Section 3.4, the future storm sewer system flowing easterly will be sized for the total capture of the 100-year storm and convey the flow to SWMF #5 to achieve required SWM controls. The target flow to be conveyed to the pond block was calculated using the Rational Method with City's Intensity-Duration-Frequency (IDF) data. The runoff coefficient was calculated as per the City standard, and a 1.25 runoff coefficient is applied for the 100 year storm event as per City standard. The 100 year storm flow for Area 100, Area 101 and Area 103 is determined to be approximately 2.052 m³/s, 0.011 m³/s and 0.385 m³/s respectively, totaling 2.452 m³/s.

Since the proposed development will also achieve the 25mm on-site retention and reuse criteria (see section 3.9-Volume Control), the proposed 100 year storm flow is adjusted by subtracting the estimated 25mm-4hr rain event. The final 100 year storm flow draining into SWM Pond #5 is approximately 1.839 m³/s.

Detailed flow calculations are included in Appendix B.

3.7 SWM Quality Control

SWM Pond #5 is proposed to provide the quality controls for the proposed development and the new municipal R.O.W to the south for the interim and ultimate condition. However, once the future R.O.W. to the west is developed, a small piece of uncontrolled drainage (Area 101) will drain via surface onto the future R.O.W. and eventually into SWM Pond#3 instead.

Since the SWM Ponds are both located on external landowners' properties, the design of the SWM Ponds will be prepared by the external landowners' consultants and the details about the quality control calculations can be found within such external consultants engineering reports. In accordance with the SIS Addendum No. 2, it can be expected that downstream SWM Ponds #5 shall be designed to achieve Enhanced Level of treatment, or a minimum of 80% TSS removal. The SWM ponds will treat the runoff for pollutants such as oil, grease, gas and heavy metals.

3.8 Infiltration and Water Balance

As per the LSRCA guidelines, every attempt should be made to match post-development infiltration volumes to pre-development levels on an annual basis. An annual water budget analysis was completed to determine the infiltration deficit between pre-development conditions and uncontrolled post-development conditions (i.e., without infiltration). The water balance calculations are provided in Appendix B. As per the water balance calculations, the pre- and post-development annual infiltration volumes are 7,997 m³ and 3,039 m³, respectively, resulting in an annual infiltration deficit of 4,958 m³.



In order to mitigate this infiltration deficit, Low Impact Development measures in the form of Roof Water/Clean Surface Water Collector system piping and Underground Infiltration Chambers, are proposed to provide required infiltration to compensate the deficit resulting from the proposed development.

On September 19 and 20, 2022, in-situ infiltration rates were measured at the proposed LID locations and at the underside of chamber elevation using the Guelph Permeameter methodology in support of final infiltration chamber sizing and design. According to the Hydrogeological Assessment – Amendment – Guelph Permeameter Infiltration Testing, prepared by GHD on November 16, 2022, the infiltration rate for the native silty soils ranged from approximately 41 to 104 mm/hr. Based on the applied 2.5 safety factor, the design infiltration rate is 25 mm/hr (geometric mean). For the drawdown time of 24 hrs, the required area of infiltration system to mitigate infiltration deficit is 516 m². The estimate of infiltration area is provided in Appendix B.

Some rooftop areas are captured and piped through the underground garage to the Underground Infiltration Chambers to achieve the target mitigation infiltration to meet the annual pre-development infiltration rate. The detailed calculations are provided in Appendix B.

An infiltration area of 628 m² is proposed. The proposed infiltration area is much larger than the estimate above because the infiltration chambers provide for both water balance infiltration requirements and volume control, which is discussed in the following section. Infiltration chambers are proposed using StormTech SC-740 storm chambers with 150 mm clear stones under the chamber units. Given that only rooftop areas where the runoff generated can be considered as "clean" are conveyed into the chambers, no water quality pre-treatment is proposed.

Due to the sandy soils and generally deep groundwater table found on site, the underground infiltration chambers are proposed to be located under the northwest limit of the Site, in an area of deepest groundwater relative to finished grade (groundwater table approximately 7 m deep) and outside the influence of the underground garage footprint. Refer to Figure DAP-2 for the chamber locations.

3.9 Volume Control

Based on LSRCA's definition of major development, the proposed site creates in excess of 0.5 hectares of new impervious surfaces and should attempt to meet the LSRCA criteria for Volume Control, which indicates that for sites without restrictions "stormwater runoff volumes will be controlled, and the post-construction runoff volume shall be captured and retained / treated on site from a 25 mm rainfall event from the total impervious area." The required volume control is 761 m³.

Various methods for stormwater volume reduction may be considered such as infiltration, reuse and rainwater harvesting, canopy interception or evapotranspiration. The site development area is largely encumbered by either a proposed underground garage or municipal ROW, both of which prohibit the use of infiltration galleries. Additionally, the proposed infiltration gallery needs to be a minimum of 5 meters away from any build foundations and therefore the only area available for infiltration opportunity is under the northwest property limit.

The 25 mm storm event runoff from the rooftop and the landscaped area is conveyed to the StormTech Chamber system and a total storage volume of 424 m³ is provided. A total of 200 StormTech SC-740 chambers are proposed for volume control. The remaining volume is 337 m³. This remaining volume will be stored in a proposed 350 m³ underground storage tank where stormwater will be pumped and reuse through irrigation of landscape and greenroof areas and the washdown of garbage areas. Refer to Appendix B for the detailed calculations and Fig DAP-3 of the storm storage tank location. The final tank location will be coordinated with the mechanical engineer during SPA/detailed design.



3.10 Phosphorus Removal

In order to meet the required net zero phosphorus loading objective, a wet detention pond (off-site) and underground infiltration (on-site) are proposed to provide phosphorus removal for the proposed development. As per Table 3 of Hutchinson's Phosphorus Budget Tool in Support of Sustainable Development for the Lake Simcoe Watershed, March 30, 2012 the removal efficiency for wet ponds is 63% and underground storage is 25%. The underground storage removal efficiency is based on the assumption that only 150 mm of stone depth is provided on the storage chamber bottom. For this project 25 mm of rainfall from the roof top and landscaped area is conveyed to the chamber and retained, this is equivalent to 15 mm of rainfall for the whole site. According to Figure 1a in the Wet Weather Flow Management Guidelines (City of Toronto, November 2006) 15 mm of daily rainfall corresponds to 80% of annual rainfall. Therefore, the chamber system will provide 80% phosphorus removal.

An analysis of annual phosphorus loading was completed for both the pre-development and post-development conditions. The phosphorus export coefficient values used in the calculations are specific to Hewitts Creek as per Table 3 of Hutchinson's Phosphorus Budget Tool. Pre-development conditions were analyzed using 'Cropland' as per the current land use – a tree farm, resulting in an annual phosphorus loading of 0.93 kg/year. Post-development conditions were modelled using 'High Intensity Residential' land use type, resulting in an annual phosphorus loading of 6.47 kg/year. The implementation of the above treatment BMPs result in an annual post-development loading of 0.48 kg/year. The proposed Best Management Practices (BMPs) significantly reduces the annual phosphorous loading in post-development and a net zero phosphorous release from the site is achieved. Outputs from the phosphorous loading calculations have been provided in Appendix B.

3.11 Phase I of the Project

The Site will be developed in two phases. Phase I of the project has an area of approximately 2.6 ha and consists of Building A and a portion of the underground parking garage. A copy of the Phasing plan is included in Appendix A. In order to meet the required infiltration target during Phase I construction, the proposed infiltration chamber located at the northwest corner of the site and the proposed stormwater management tank will both be constructed during Phase I construction. Since the proposed infiltration system and the stormwater management tank has been designed to achieve the stormwater management requirements for the entire site, it will also provide the required stormwater management criteria for Phase I. During Phase 1 and during the rainfall events, clean water from roof top and landscape areas will be conveyed into the stormwater management tank, then pumped into the infiltration chamber. Once the infiltration chamber is full, the pump will shut off, and runoff will be conveyed to the storm sewer system on Street 'A' via an overflow outlet near the top of the stormwater management tank. Detailed pump size and calculations will be completed by and coordinated with the mechanical engineer during SPA/detailed design.

3.12 Other Pollutants

As per Sections 2.3.3 to 2.3.5 of the LSRCA SWM Technical Guidelines, winter salt, temperature and other contaminants such as oil, grease and gas, and heavy metals should be addressed. For winter salt, only clean water is discharged to the infiltration chamber. In the detailed design stage, design practices including location of snow storage, use of deciduous plants, minimal road grades and rougher pavement will be considered. For temperature, the runoff from the site is discharged to storm sewer system and there is no fish or fish habitat at the outlet. For oil, grease and gas, and heavy metals, SWM Pond #3 and #5 has been designed to meet the water quality control criteria and regular pond maintenance shall be implemented to achieve the appropriate removal rate for the pollutants.



4. Water Supply System

4.1 Existing System

According to our available records, the existing site is supplied via a local water well. Existing water infrastructure is currently not available in the area.

4.2 Water Supply

The proposed water servicing of the site will comprise of a new municipal watermain that will be aligned along the proposed 24.0m wide municipal ROW (Street A) to connect with future development to the west and east. Private water connection shall be made to provide fire protection and domestic water supply for the residential and commercial component of the subject site. Service connections, Water meter, backflow preventer, and detector assembly will be provided within the building, all to be designed in accordance with City's Design standards. The mechanical consultant shall confirm the final watermain size to meet the demands for the proposed buildings.

Refer to Fig DAP-3 for the preliminary proposed water connections.

4.3 Domestic Demand

The domestic water usage will be calculated based on the MECP's Design Guidelines for Drinking Water Systems and City of Barrie's design guideline as outlined in Table 1 below.

	Criteria	Criteria Source
Domestic Average Flow	225 L/Day/Person	Barrie Standard
Population Count (High Density)	1.67 Persons/Unit	Barrie Standard
Population Count (Medium Density)	2.57 Persons/Unit	Barrie Standard
Maximum Day Factor	2.50	MECP Standard
Peak Hour Factor	3.75	MECP Standard
Minimum Hour Factor	0.45	MECP Standard

Table 2 below shows the breakdown of units used to estimate the equivalent population.

The domestic demand for the new development is based on an equivalent population of approximately 1,844 persons (1,092 High Density Condo Units x 1.67 persons + 8 Medium Density Townhouse Units x 2.57 persons) with a consumption rate of 225 litres/capita/day and 1,167.30 sq.m of commercial retail with a consumption rate of 28 m³/Day/Ha. Therefore, the domestic demand for the proposed development is as follows:

- Average Day = (225 x 1,844) + (28 x 1,167.3) = 418,168 L/day (4.83 L/s)
- Maximum Day = 2.5 x Average Day = 1,045,420 L/day (725.9 L/min or 12.1 L/s)



Peak Hour = 3.75 x Average Day = 1,568,130 L/day (1088.9 L/min or 18.15 L/s)

Table 2 - Equivalent Population

Building	Units	Density	Pop.
Α	570	1.67 persons	959
В	194	1.67 persons	324
С	181	1.67 persons	302
D	56	1.67 persons	94
Е	76	1.67 persons	127
F	4	2.57 persons	10
G	4	2.57 persons	10
Total	1100		1844

The population per unit of 1.67 was utilized for the proposed the condo apartment units of the development in our calculations, which is considered to be a high density development land use. Please refer to Appendix C for the email confirmation between IBI (formerly Cole Engineering Group Ltd.) and City staff (Oct. 28/19). The population per unit of 2.57 was utilized for the proposed townhouse, which is considered to be medium density development land use.

4.4 Fire Demand

The proposed buildings will have protected openings (as defined by the Fire Underwriters Survey) and a sprinkler system. The buildings will also be constructed using fire resistive construction methods. Given the above, the estimated fire flow required is given by the following formula (as based on the Fire Underwriters Survey):

For a building with fire resistive construction, C=0.6, however we have conservatively used C=0.8 for the purpose of the calculations,

$$C = 0.8$$

For fire resistive buildings, 'A' is taken as the area of the largest floor plus 25% of each of the two adjoining floors (excluding the basement). As such,

$$A = 8,979 \text{ m}^2 (5,974.32 \text{ m}^2 + (0.25 \text{ x} 6,044.04 \text{ m}^2) + (0.25 \text{ x} 5,974.32 \text{ m}^2))$$

Therefore, the required fire flow is:

F = 17.000 litres/min.



As the proposed development (Building A) will be assumed to have combustible occupancy due to the retail/commercial unit located on ground level, the fire flow will be reduced by 0% due to occupancy hazard reduction/surcharge, and thus,

F = 17,000 litres/min.

As the development will be equipped with an automatic sprinkler system, the fire flow may be further reduced by 30%, or by 5,100 L/min.

Finally, the fire flow will be increased by 20%, or by 3,400 L/min due to exposure to structures within 45 meters of the building. Thus,

F = 15,000 litres/min

Our calculations are included in Appendix D for all buildings in the development site.

Based on the FUS, the governing building has an effective floor area taken to be 8,979 sq.m. According to the calculations, a minimum fire suppression flow of approximately 15,000 L/min (3,963 USGPM) will be required from the nearest hydrant with at least 140 kPA (20 Psi) of pressure.

4.5 Total Demand

The total demand is the greater of the Maximum Day Domestic Demand plus the Fire Demand or the Peak Hour Demand. Based on the FUS, the governing building for the development site will be Building A with an effective floor area taken to be 8,979 sq.m. Thus, the total demand for the proposed development is approximately 15,725.9 litres per minute (approximately 262.09 litres per second, or 4,154.35 U.S. gallons per minutes).

According to the calculations, a minimum fire suppression flow of approximately 15,725.9 L/min (4,154.35 USGPM) will be required from the nearest hydrant with at least 140 kPA (20 Psi) of pressure.

Watermain sizing within the site to provide adequate flows and fire protection is to be determined and confirmed with the City during the detail design process, following the City's confirmation of their Water Pressure Model. Flows from the proposed development will be incorporated within the Water Pressure Model to ensure there is sufficient pressure within the future watermains to support the proposed development.

5. Sanitary Drainage System

5.1 Existing Sanitary Drainage System and Flows

Currently, the site is used as agricultural land and is occupied by one 2-storey residential building, two stone and farm barns, a metal garage and a plastic green house. Vehicle access to the Site is provided by an existing gravel driveway connected to Yonge Street.

According to available records, there is no existing sanitary sewer system in the area. The current apple orchard within the property operates through a septic system. Therefore, the existing site does not currently contribute any flows to the municipal sanitary sewer system.

5.2 Proposed Sanitary Servicing

The peak sanitary sewage discharge from the site will be determined using sanitary sewer design sheets that consider the land use and site statistics as shown on the Site Plan.



The estimated sanitary discharge rate from the proposed site will be calculated based on the criteria set out by the City's Sanitary Sewage Collection System Policies and Design Guidelines, as outlined in Table 3 below.

Feb 21, 2023

Table 3 - Sanitary Design Parameters

	Criteria	Criteria Source
Domestic Average Flow	225 L/Day/Person	Barrie Standard
Extraneous Flow	0.1 L/s/Ha (Infiltration)	Barrie Standard
Peaking Factor	Harmon: $M = 1 + (14/(4 + P^{0.5}))$	
	(Where P is Population in Thousands)	
	OR	Barrie Standard
	Babbit: $M = 5 / P^{0.2}$	
	(Where <i>P</i> is Population in Thousands)	
Commercial/Institutiona	28 m³/Day/Ha	Barrie Standard

A total peak sanitary discharge flow of 21.69 L/s for the entire proposed development area was calculated based on the equivalent population calculated in Section 4.3 and Table 3 above. For conservative purposes, the greater peaking factor was used to calculate the peak sanitary discharge (Babbit). Refer to Appendix C for detailed sanitary flow calculations.

Currently, the SIS proposes a sanitary drainage divide approximately three-quarters through the site, where the western quarter of the subject site would discharge sanitary flow westerly towards a new subtrunk sanitary sewer (outleting to Patrick Drive at the western limit of the Secondary Plan Area) and the eastern three-quarters of the site would discharge sanitary flow easterly towards a new sub-trunk sanitary sewer along future Kneeshaw Drive (outfall to Mapleview Drive).

Based on the latest site plan, the entire underground parking garage spans the majority of the site, therefore sanitary discharge for the entire site will be directed to a single outlet. The entire site proposes to direct all sanitary sewage towards the future sanitary sewer on Street A which will then flow easterly towards Yonge Street. The sanitary sewer connection shall be directed easterly under Yonge Street and connect to a new sanitary sewer on Kneeshaw Drive, located within Ballymore's property, which directs drainage northerly towards Mapleview Drive. A depiction of the proposed sanitary diversion area is shown on the SIS Figure 14-Proposed Sanitary Sewer Plan, provided in Appendix C. Please see Fig DAP-3 for the preliminary sanitary service connection location in Appendix A.

To ensure there will be sufficient sanitary sewer capacity downstream within the Secondary Plan Area to accept sanitary flows from the entire proposed development, please refer to the email exchange in Appendix C between the Group Engineer (R.J. Burnside) and City staff on October 18 and 29, 2019. The email exchange references an increase to the capacity allowance to d/D ratio to 0.70 for the proposed downstream 375mm diameter sanitary sewer, which would support potential increases in density from the contributing lands, including the subject site.



6. Site Grading

The proposed grades will match the intended drainage patterns as per the Subwatershed Impact Study, to the extent possible, recognizing the need to direct all storm and sanitary drainage easterly and recognizing the need to meet future perimeter grades along all boundaries.

Current preliminary grading design has been prepared for the proposed site development that ties to current existing grades along Yonge Street. The preliminary grading design is generally showing the proposed drainage patterns of the development site all draining east towards Yonge Street, meeting the overall stormwater management approach.

A detailed perimeter and internal grading will be prepared at the site plan application stage of planning approvals and will be based on the adjacent subdivision development design including: Rainsong (by Great Gulf), Rainsong's future Recreation Center and the Yonge Street centreline profile and cross-sections proposed in the Phase 2 Public Information Centre drawings, prepared by the City of Barrie, dated January 16, 2018, in recognition of future boulevards and urbanization along the Yonge Street corridor. Emergency stormwater overland flow will be directed to approved outlet(s), such as existing municipal roads (Yonge Street) to the east. The proposed Yonge Street transportation improvement drawings can be found in Appendix A.

For preliminary grading design, refer to Drawing DAP-2, Preliminary Functional Grading & Storm Drainage Plan', located after the report.



7. Erosion and Sediment Control

Prior to any disturbance on site, an Erosion and Sediment Control (ESC) Plan will be submitted to the municipality and LSRCA in support of a Site Alteration Permit. The ESC design will be completed to include:

- ESC is a dynamic process and plan designs must be flexible and adapted to the conditions and stages of work
- ESC's are to address:
 - Stage 1: Topsoil stripping, grading and re-stabilization
 - Stage 2: Site servicing and roads
 - Stage 3: Building construction
- Select the types and locations of best management practices based on the outcome of the erosion risk assessment.
- Preserve existing vegetation and maintain vegetation buffer whenever possible
- Stabilize stockpiles and any other exposed soils on areas inactive for 30 days.
- Protect exposed soils, particularly on steep slopes
- Slow flow velocity and settle sediments
- Protect existing storm inlets and storm sewer system
- Conduct pre-construction meeting with the developer, contractor, and regulatory authorities to confirm understanding of the design and monitoring
- Continuous inspection and reporting of the measures

The ESC design will include all calculations demonstrating appropriate sizing of stormwater control features such as Cut-Off Swales, Temporary Sediment Traps and/or Temporary Sediment Control Ponds. Construction access for the site will be depicted on the ESC Plan and its location will be subject to City of Barrie approval.

8. Groundwater Discharge

The proposed development includes an underground parking facility. Since the lowest finished floor elevation of the underground facility is below the reported groundwater table, measures to address groundwater are necessary.

8.1 Short Term Groundwater Discharge

The temporary groundwater discharge strategy for the proposed development is to discharge to the municipal sanitary system, the discharge will be addressed through an application to the City of Barrie for the short term permits.

As per the Hydrogeological Assessment prepared by GHD dated February 8, 2022. Total temporary dewatering volume for the development is estimated to be 13.77 L/s. Temporary groundwater discharge will be pumped to the sanitary sewer on future Street 'A' ROW, which has enough capacity to convey a proposed sanitary flow of 21.69 L/s, based on the sanitary analysis in Section 5 of this report. Given that the temporary dewater volume is lower than the proposed sanitary flow, it is safe to assume that the downstream sanitary sewer will also have enough capacity to convey the temporary groundwater discharge during construction, and the pump shall be sized for a maximum pump rate of 21.69 L/s.

8.2 Long Term Groundwater Discharge

There is no permanent groundwater discharge to the municipal sewers.



9. Utilities

Utilities such as gas, cable, telephone and hydro are proposed to be available within the future right of way fronting the development site (Street A). As stated in Amendment No. 39 to the City's Official Plan, Section 9.6.6 "Prior to approval of development within the Hewitt's Secondary Plan Area, all interested telecommunications providers and required utilities providers shall work with the landowner(s) and the City to confirm their plans for services to support the proposed development. The City shall work with the providers to determine appropriate locations for large equipment or cluster sites."

10. Conclusions and Recommendations

Based on our investigations, we conclude the following:

Storm Water

The storm drainage divide for SWM Pond #5 has been revised based on coordination with Burnside. The majority of the stormwater runoff from the site will be directed to SWM Pond #5, located to the east of Yonge Street, and a small portion of the site will be directed to SWM Pond #3 located to the west of Yonge Street. However, an interim condition of a temporary swale along the west, are proposed to ensure the proposed development can proceed prior to the completion of SWM Pond #3. Both ponds are currently under design by others and new storm sewers will be extended to the site property line, by neighboring developments. The required quantity and quality control will be provided in SWM Pond #5 pond blocks to achieve the minimum 80% TSS removal as well as treat additional pollutants such as oil, grease, and heavy metals. The designers of SWM Pond #5 has also confirmed that SWM Pond #5 is able to accommodate the increase in storm flow based on the new storm drainage divide.

Post-development water balance and volume control will meet pre-development rates through the use of Roof Water Collector pipes, underground infiltration chambers, irrigation, garbage wash down areas and car wash areas. Storm runoff from the majority of rooftops across the site will be captured and directed to underground chambers in the northwest portion of the property. Sandy soil and relatively deep groundwater table conditions are suitable for on-site infiltration measures. Phosphorus removal calculations show that up to 93% of phosphorus can be removed in the post-development condition using downstream SWM Ponds and the proposed underground infiltration facilities.

Sanitary Flows

The expected net increase in peak sanitary discharge flow from the site is approximately 21.69 L/s based on the proposed site plan. The entire site will be serviced by a sanitary connection at Yonge Street and all sewage directed east to the proposed sanitary sewer on Kneeshaw Drive, east of the proposed development. The principle of diverting sanitary drainage area and utilizing a single outlet has been reviewed by the Group Engineer.

Water Supply

A new municipal watermain will extend along the proposed collector road, Street 'A', extending from Yonge Street to the western property boundary where municipal water supply for the site will be provided. The site requires a minimum flow rate of 15,725.9 L/min (4,154.35 USGPM) at a pressure of 140 kPa (20 PSI) to account for both fire and domestic flows. The final watermain sizing is to be determined at the detail design stage, following the City's update of the Water Pressure Model.



Sincerely,

GHD

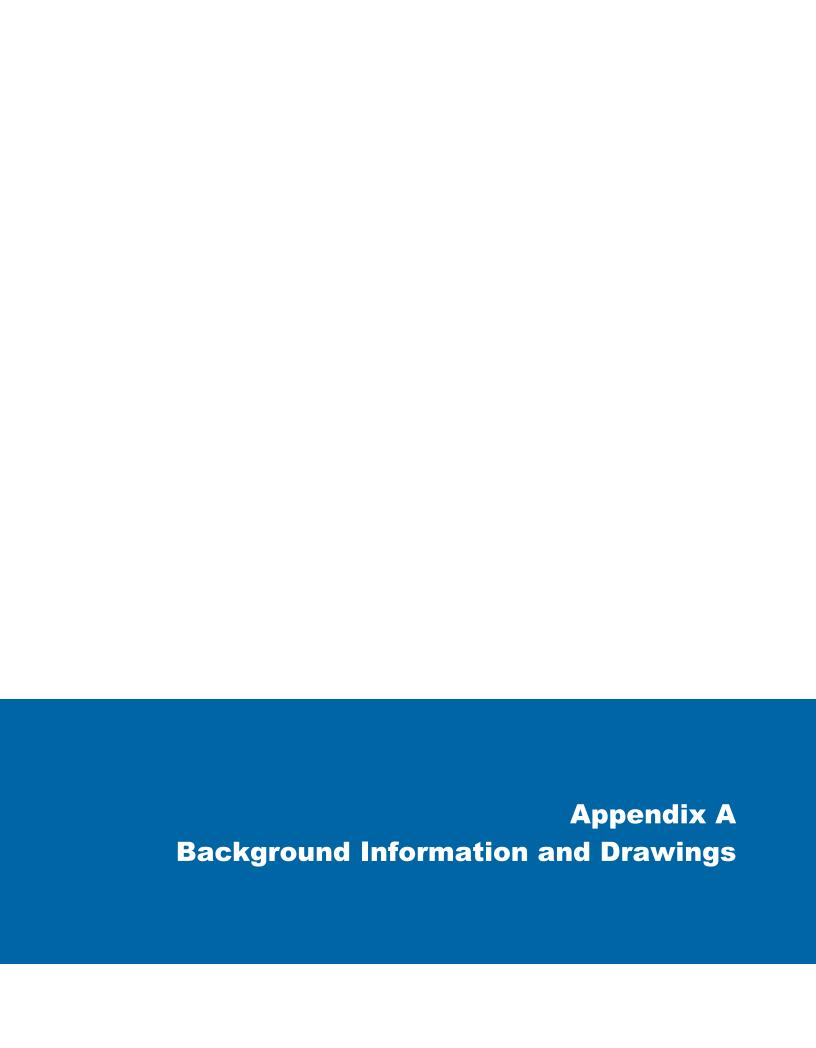


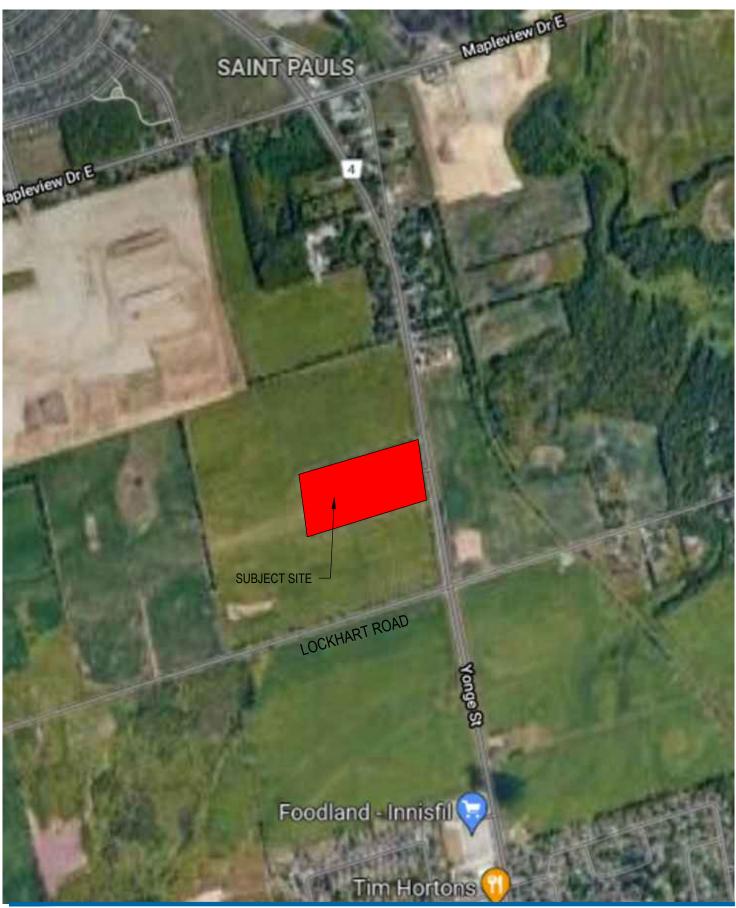
Winston Thai, P.Eng.Project Manager, Community Development

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Dave Liu, E.I.TDesigner, Community Development









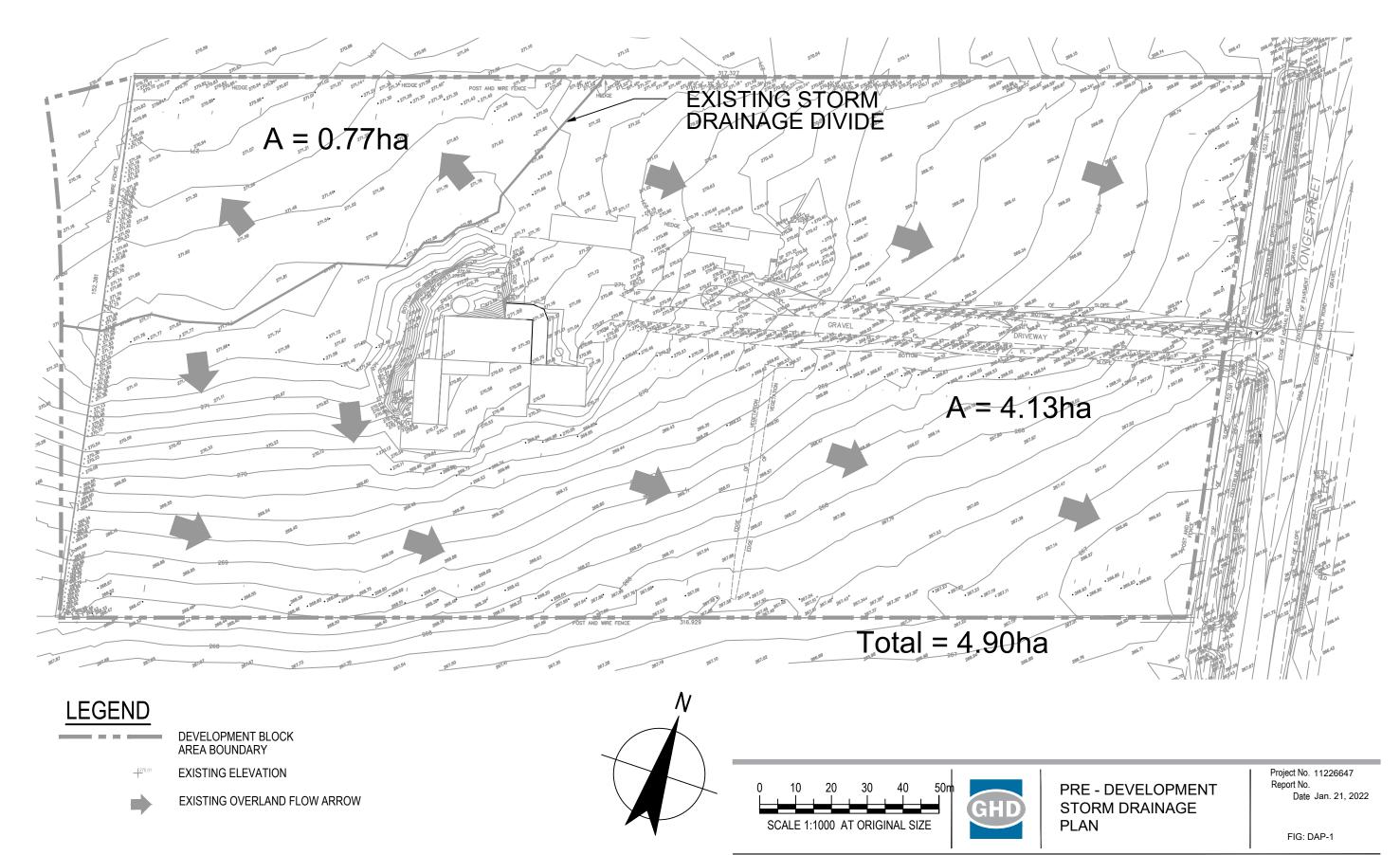
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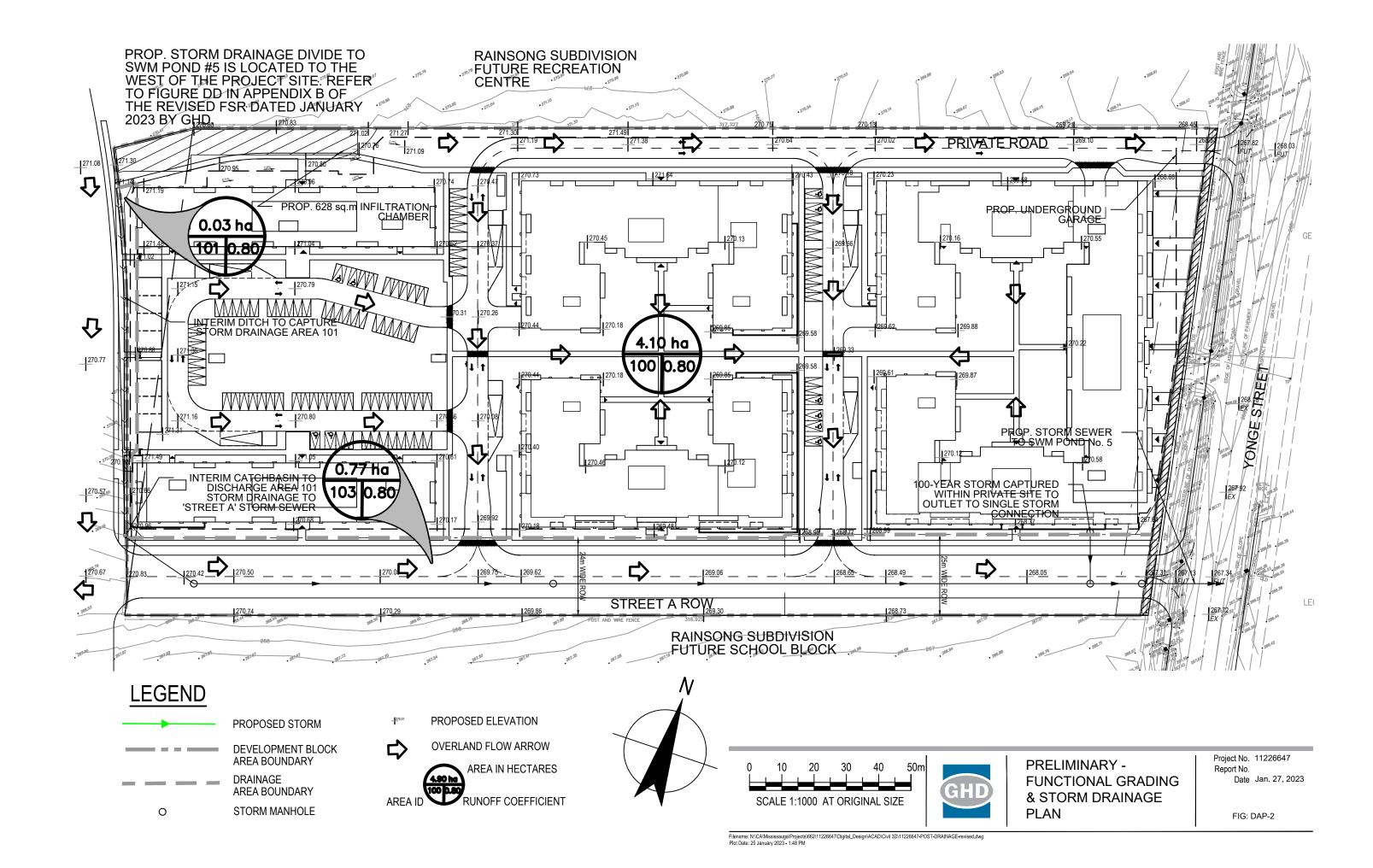
KEY PLAN

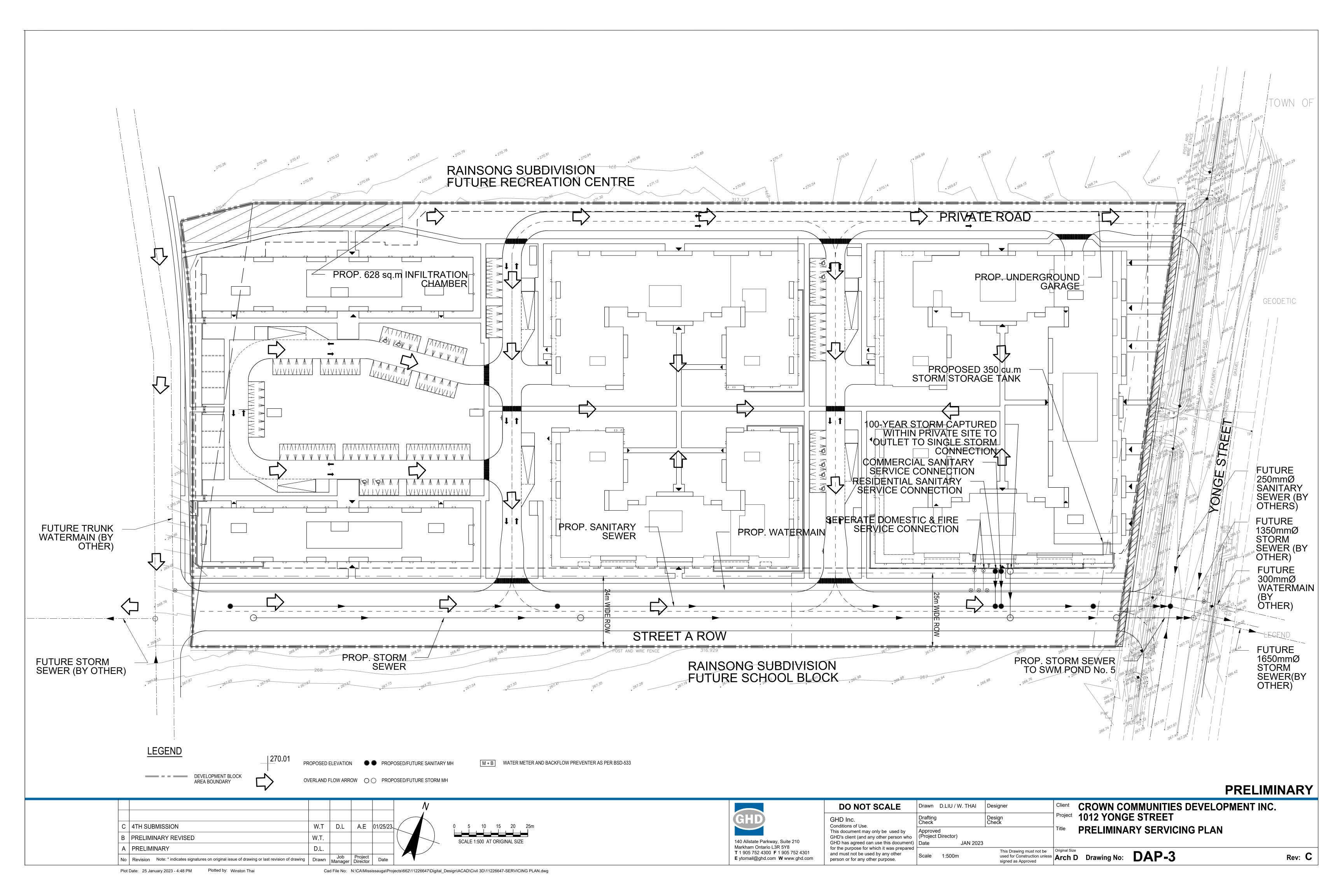
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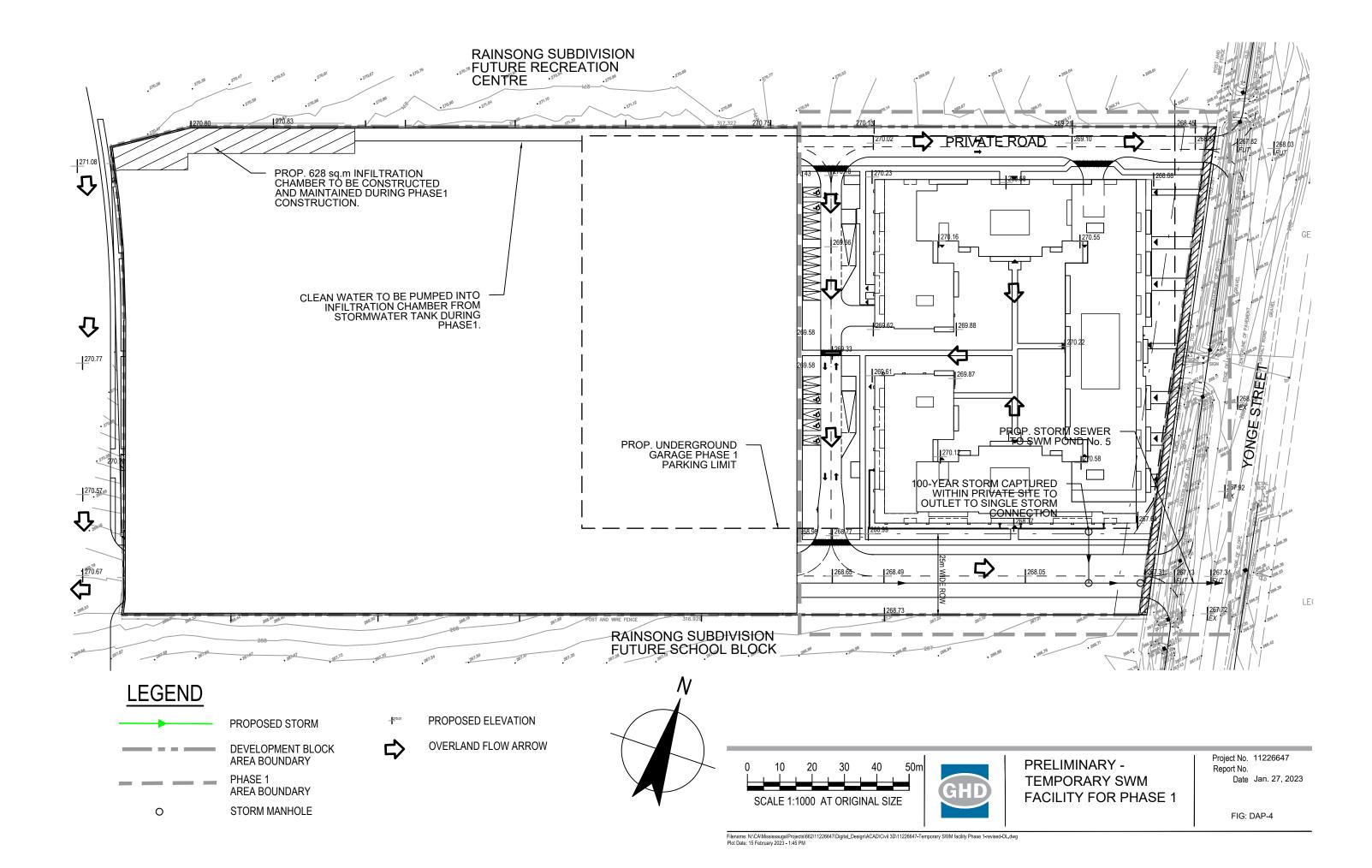
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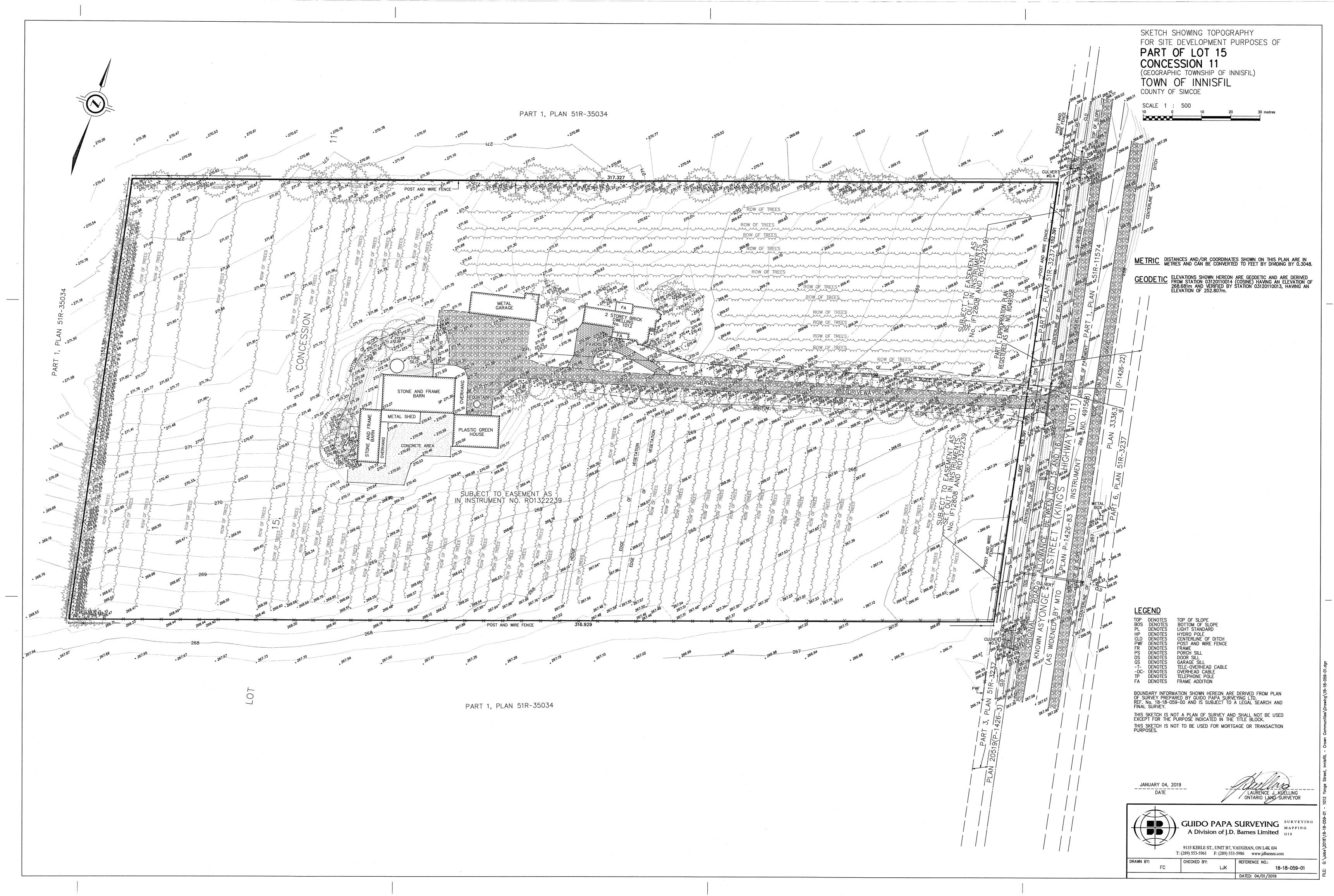
Figure 01

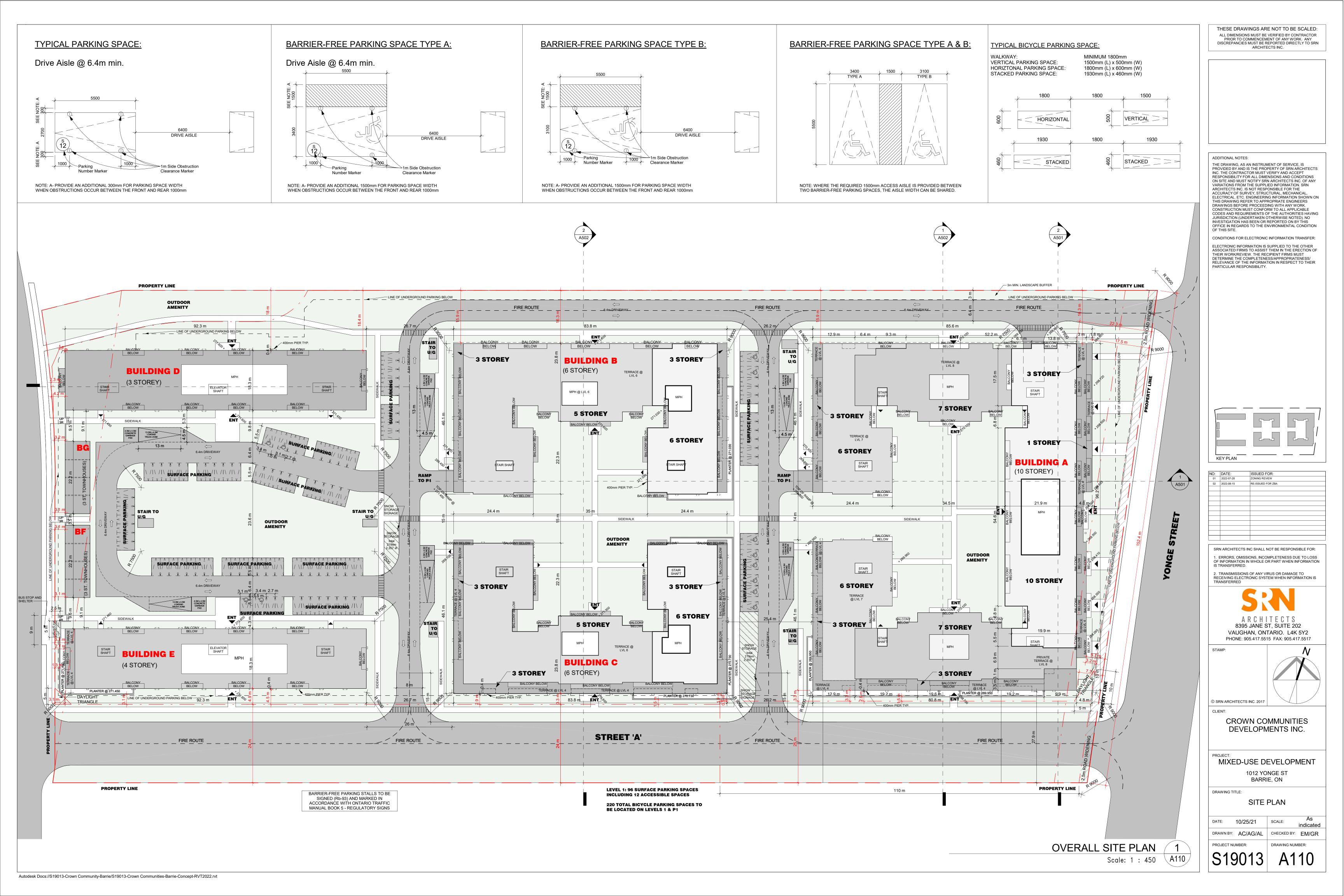












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000	COVER SHEET			
100				
101	DRAWING LIST, CONTEXT PLANS, PROJECT STATISTICS			
102	PROJECT SURVEY			
10	SITE PLAN			
200				
202	LEVEL P1 FLOOR PLAN			
00				
01	LEVEL 1 - OVERALL FLOOR PLAN		100	
310				
310	BA - LEVEL 1 - FLOOR PLAN		2-8	
11	BA - LEVEL 2 TO 3 TYP - FLOOR PLAN			
12	BA - LEVEL 4 TO 6 TYP - FLOOR PLAN			
13 14	BA - LEVEL 7 - FLOOR PLAN BA - LEVEL 8 TO 9 TYP - FLOOR PLAN			
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20				Statistics 15th, 2022
21	BB - NORTH & EAST ELEVATION		1.0	Site Area
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22				Area of ROW, Widening, Day
			1	Development A
30	BC - NORTH & EAST ELEVATION		3.6	Development Area
30 31	BC - NORTH & EAST ELEVATION BC - SOUTH & WEST ELEVATION		2.0	Development Area TFA - Total Floor Area 2.1 Building A
30 31 32			2.0	2.1 Building A Level 1
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Level 1
Levels 2 to 3
Building D TFA

2.6 Buildings F & G

GFA - Gross Floor Area

Level 1 Levels 2 to 3

Buildings F & G TFA

Levels 2 to 3

Levels 4 to 6 Level 7

Levels 8 to 9

Levels 2 to 3

Levels 4 to 5

Levels 4 to 5

Levels 6

Building C GFA

Levels 2 to 3

Building D GFA

Building E Residential

Building E GFA

Building B GFA

Level 10

Building A GFA

3.3 Building B Residential

5,974.32 5,279.96

3,856.62

1,951.30

2,810.68 2,816.88

2,594.88 895.02

2,816.88

2,407.48

1,598.75

(excludes indoor amenity, storage, parking, stairwell, elevator, trash chute, trash room, mechanical & electrical storage)

5,865.92

5,160.94

3,763.12

1,912.01

2,320.48

2,533.59

2,753.78 2,344.37 809.50

2,755.59 x 2

1,555.70 x 2

1,556.17 x 2 1,511.34 x 1

x 2

1,598.75 x 1 1,598.75 x 2

Crown Communities - Zoning Matrix	REQUIRED	PROPOSED / PROVIDED
OVERALL SITE AREA (sq.m)		41,249
UNIT COUNT		1,100
TOTAL FLOOR AREA (sq.m)		84,273.17
GROSS FLOOR AREA (sq.m) (RESIDENTIAL & COMMERCIAL)		80,724.34
RESIDENTIAL GROSS FLOOR AREA (sq.m)		79,557.04
BUILDING BA (sq.m)		40,587.30
BUILDING BB (sq.m)		13,758.98
BUILDING BC (sq.m)		13,468.16
BUILDING BD (sq.m)		4,607.39
BUILDING BE (sq.m)		6,120.23
BUILDING BF (sq.m)		507.49
BUILDING BG (sq.m)		507.49
COMMERCIAL GROSS FLOOR AREA (sq.m)		1,167.30
LOT FRONTAGE (m)		128.1 (YONGE ST.)
FRONT YARD SETBACK (Yonge Street)(m)		1.6 (YONGE ST.)
SIDE YARD SETBACK (Street A)(m)		2.9
SIDE YARD SETBACK (Private Rd.)(m)		15.9
REAR YARD SETBACK (m)		2.3
CONSOLIDATED AMENITY AREA		
(12 SQ. M. PER UNIT, EXCLUDING MINIMUM REQUIRED YARD AREA	12,996	15,903.34
ADJACENT TO BUILDING)(sq.m)	Unit 795 SEC 55	70 SVI JANUS 2000, POSS
LANDSCAPED OPEN SPACE		18,568sq.m 45%
MINIMUM DWELLING UNIT AREA(sq.m)		47.31
Lot Coverage (Buildings)		15,878sq.m 38.5%
BUILDING BA HEIGHT (AVERAGE GRADE TO ROOF)(m)		32.7
BUILDING BB HEIGHT (AVERAGE GRADE TO ROOF)(m)		19.9
BUILDING BC HEIGHT (AVERAGE GRADE TO ROOF)(m)		19.9
BUILDING BD HEIGHT (AVERAGE GRADE TO ROOF)(m)		10.7
BUILDING BE HEIGHT (AVERAGE GRADE TO ROOF)(m)		13.9
BUILDING BF HEIGHT (AVERAGE GRADE TO ROOF)(m)		9.5
BUILDING BG HEIGHT (AVERAGE GRADE TO ROOF)(m)		9.4
PARKING AREA COVERAGE (% OF LOT AREA)(sq.m)		6,803
TOTAL PARKING SPACES (INC. BARRIER-FREE)		100000
(1 PER DWELLING UNIT INCL. VISITOR SPACES, 1 PER 24 SQ.M OF	1,149	1,202
COMMERCIAL)		
SURFACE PARKING SPACES		96
UNDERGROUND PARKING SPACES		1,106
TOTAL BARRIER FREE PARKING SPACES		36
TYPE A (3.4M X 5.5M + 1.5M AISLE)		18
TYPE B (3.1M X 5.5M + 1.5M AISLE)		18

ZONING MATRIX 3 A101



sq.ft. 65,057.44 128,613.97

170,498.88

Levels 8 to 9

Levels 4 to 5 Levels 6

Level 1 Levels 2 to 3 Level 4

Total Condo Units Provided for Buildings A, B, C, D, E

.4 Building D

41,512.27 42,007.20 20,232.47

sq.ft. 30,253.88 60,641.23 55,862.06 9,633.91 **156,391.07**

sq.ft. 30,320.61 60,641.23 51,827.75 9,101.09 **151,890.68**

sq.ft. 17,208.79 34,417.57

sq.ft. 17,208.79 34,417.57

10,925.19

sq.ft. 42,464.98 126,280.35

166,655.53 40,505.85

41,161.37

19,809.56 **436,877.64**

sq.ft. 24,977.41 59,321.79 54,542.62 9,258.46

sq.ft. 26,504.60 59,282.83

50,469.13

8,713.38

33,500.92

Vehicular Parking

Commercial

11,948.64

15,839.88

3,856.62

3,902.60

2,810.68 5,633.76 5,189.76 895.02

5,633.76

4,814.96

845.52

sq.m. 1,598.75 3,197.50

3,197.50

11,731.84

15,482.82

3,763.12

3,824.02

2,320.48 5,511.18 5,067.18

860.14

2,462.36 5,507.56 4,688.74 809.50

3,111.40

3,112.34



ENLARGED CONTEXT PLAN 5

2,806.54 30,209.32

1,536.31 16,536.69

1,117.93 12,033.29

672.72 7,241.09

1 space per 24 sq.m.

1 space per 24 sq.m.

5,686.54 61,209.35 6,085.49 65,503.61

2,504.03 26,953.13 2,711.08 29,181.79

2,441.31 26,278.02 2,648.34 28,506.47

 280.00
 3,013.89

 2,072.50
 22,308.18
 2,180.14
 23,466.81

1,605.57 17,282.19

CONTEXT PLAN 4

<u>Provided Bicycle Parking</u> *based on rate of 0.2 spaces per unit sq.m. sq.ft. % 15,878 170,909 38.5 6,803 73,227 16.5

PROJECT STATISTICS 2

41,249 444,000 100

OBC MATRIX 1

THESE DRAWINGS ARE NOT TO BE SCALED: ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR PRIOR TO COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES MUST BE REPORTED DIRECTLY TO SRN ARCHITECTS INC.

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CONDITIONS FOR ELECTRONIC INFORMATION TRANSFER: ELECTRONIC INFORMATION IS SUPPLIED TO THE OTHER ASSOCIATED FIRMS TO ASSIST THEM IN THE ERECTION OF THEIR WORK/REVIEW. THE RECIPIENT FIRMS MUST DETERMINE THE COMPLETENESS/APPROPRIATENESS/
RELEVANCE OF THE INFORMATION IN RESPECT TO THEIR
PARTICULAR RESPONSIBILITY.

NO:	DATE:	ISSUED FOR:	
01	2022-07-28	ZONING REVIEW	
02	2022-08-15	RE-ISSUED FOR ZBA	

SRN ARCHITECTS INC SHALL NOT BE RESPONSIBLE FOR: 1. ERRORS, OMISSIONS, INCOMPLETENESS DUE TO LOSS OF INFORMATION IN WHOLE OR PART WHEN INFORMATION

2. TRANSMISSIONS OF ANY VIRUS OR DAMAGE TO RECEIVING ELECTRONIC SYSTEM WHEN INFORMATION IS

8395 JANE ST, SUITE 202 VAUGHAN, ONTARIO. L4K 5Y2 PHONE: 905.417.5515 FAX: 905.417.5517

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CROWN COMMUNITIES DEVELOPMENTS INC.

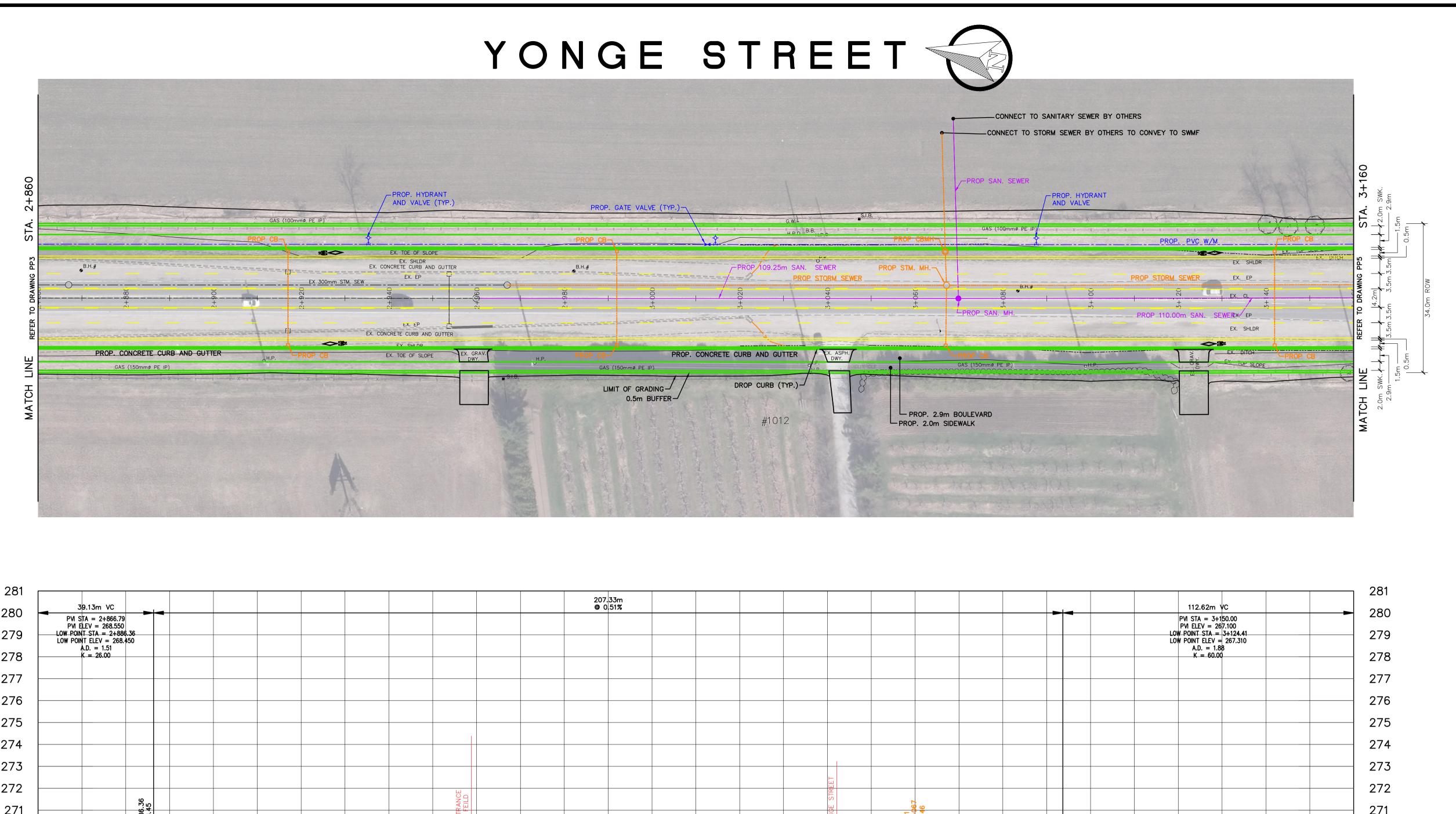
MIXED-USE DEVELOPMENT

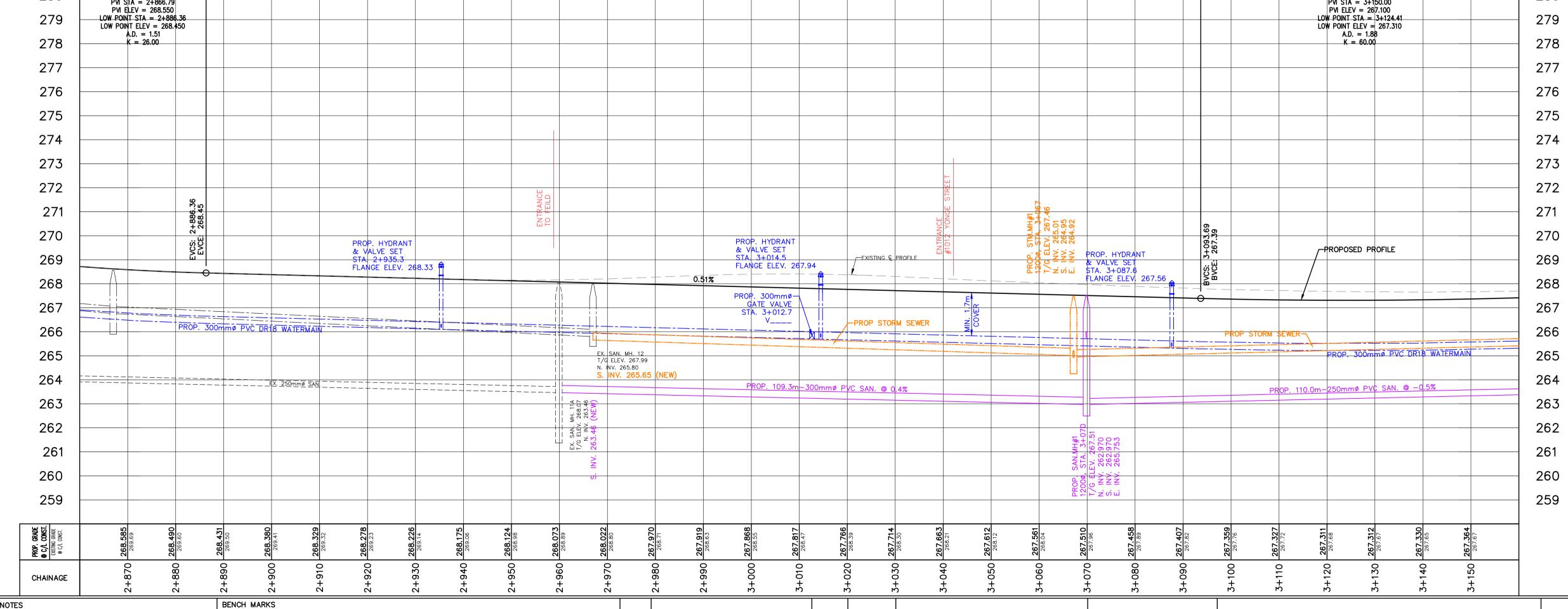
1012 YONGE ST

BARRIE, ON DRAWING LIST, CONTEXT

DATE: 06/11/22 SCALE: 1:25 DRAWN BY: AC/AG/AL CHECKED BY: EM/GR DRAWING NUMBER:

PLANS, PROJECT STATISTICS





GENERAL NOTES REFER TO CURRENT CITY OF BARRIE STANDARDS FOR APPLICABLE GENERAL NOTES.

NO. DATE APPROVED REVISIONS 30% DRAFT SUBMISSION 02/2018 2. 30% SUBMISSION 02/2018 RRW 3. PUBLIC INFORMATION CENTRE 11/2018 TMK

CITY OF BARRIE ACCEPTED DIRECTOR OF ENGINEERING

YONGE STREET **IMPROVEMENTS**

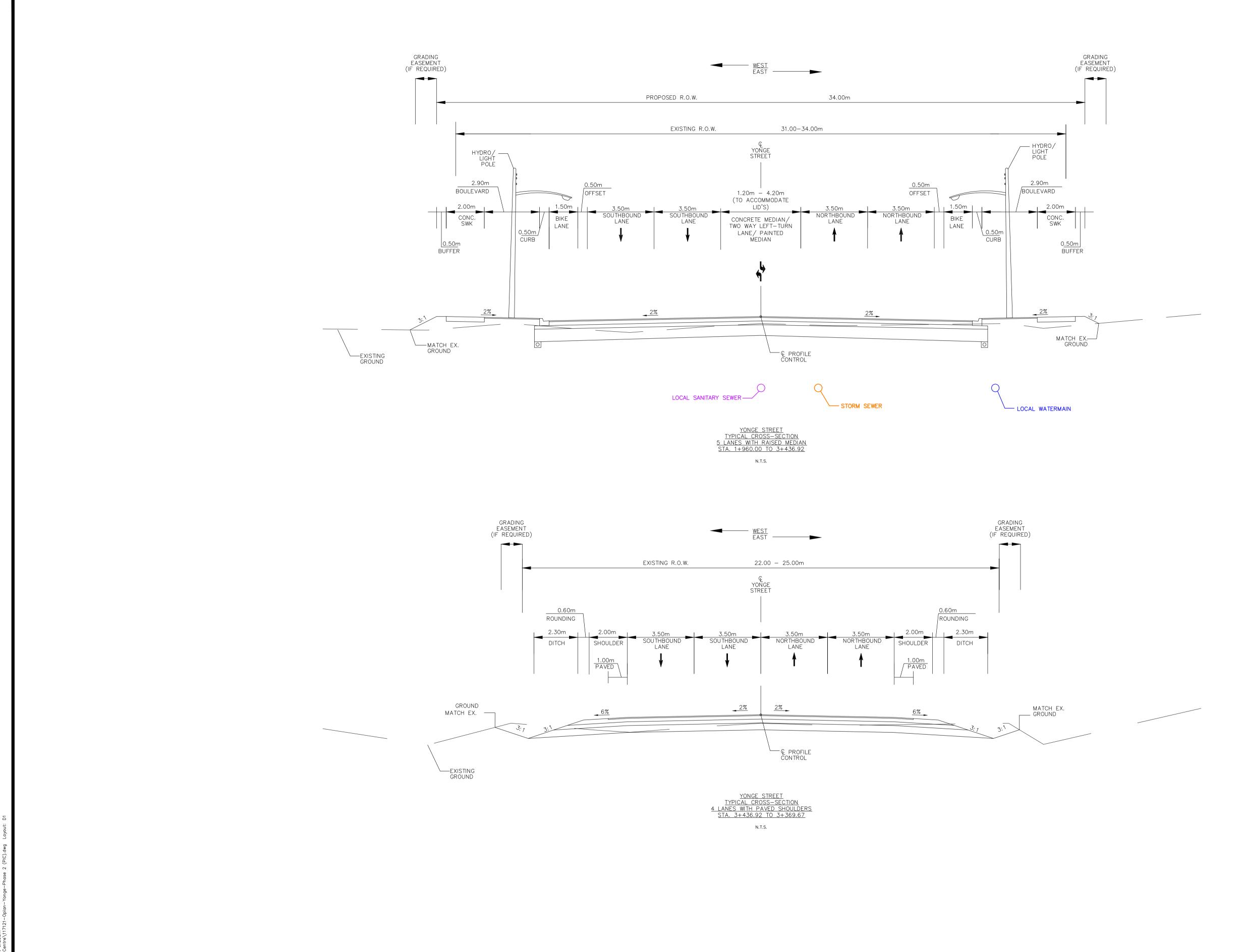
PLAN & PROFILE - YONGE STREET STA. 2+860 TO 3+160

Ba	rrie)
MOINEEDING	DED.4	_

ENGINEERING DEPARTMENT

VERT. **SCALE HOR.** 1:500 1:100 DESIGN **DRAWN** J.M.M. SHEET NO. **DATE** 2018.01.16 **REVIEWED** T.F.H.

KEY PLAN



GENERAL NOTES

REFER TO CURRENT CITY OF BARRIE STANDARDS FOR APPLICABLE GENERAL NOTES.

BENCH MARKS

DATE NO. APPROVED REVISIONS 02/2018 30% DRAFT SUBMISSION 2. 30% SUBMISSION 02/2018 RRW 3. PUBLIC INFORMATION CENTRE 11/2018 TMK

CITY OF BARRIE ACCEPTED DIRECTOR OF ENGINEERING

YONGE STREET IMPROVEMENTS

TYPICAL CROSS SECTIONS DESIGN REVIEWED T.F.H.

ENGINEERING DEPARTMENT SCALE HOR. 1:100

DRAWN J.M.M. SHEET NO. **DATE** 2018.01.16

City of Barrie Official Plan

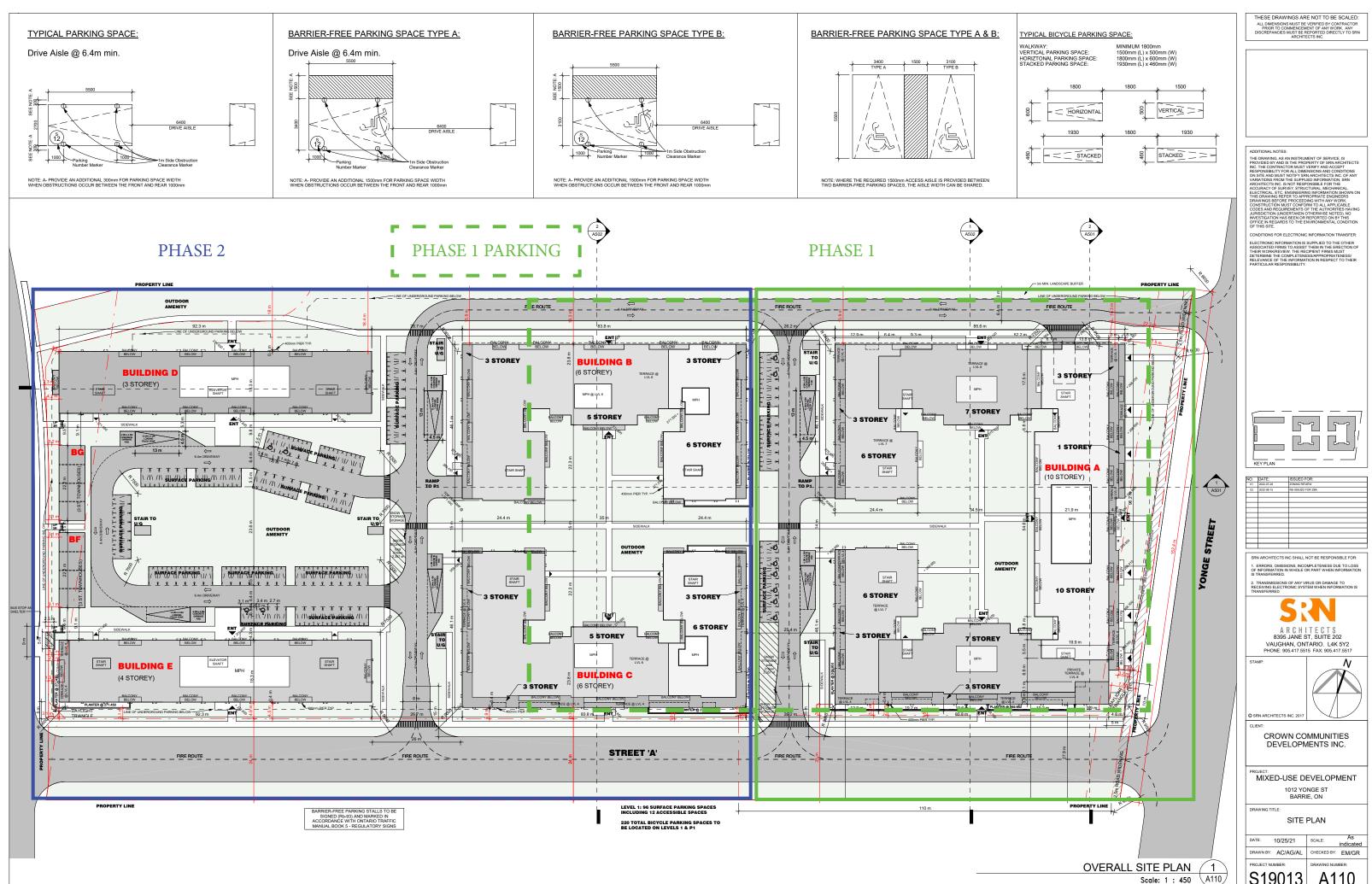
c) The provision of water and wastewater services shall also relate to the phasing of development as set out in Section 9.7.3.2 of this Plan and the Master Plans and Class EAs identified in Section 9.6.4 b).

9.6.5 STORMWATER MANAGEMENT

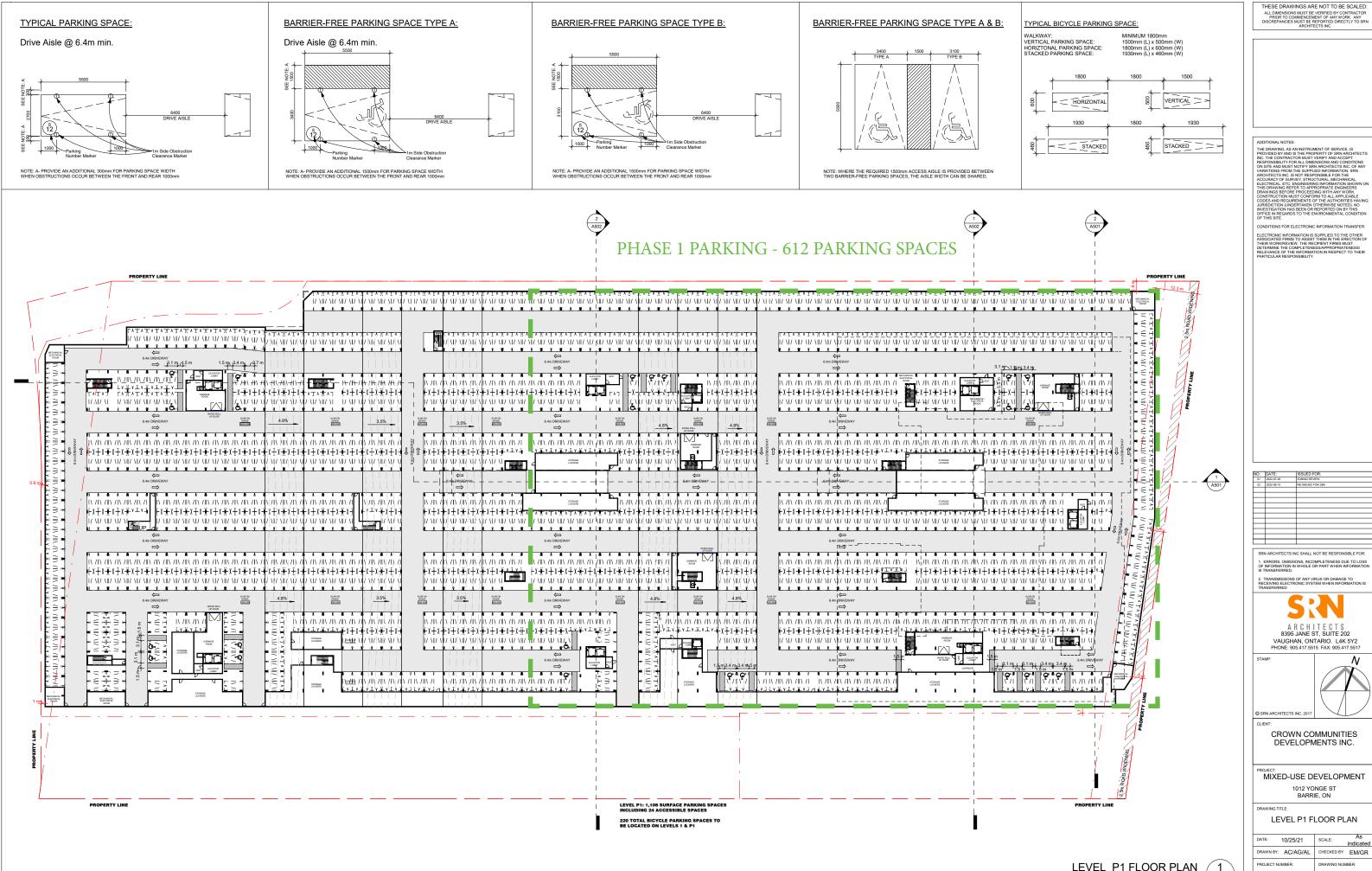
- a) All new development shall comply with the recommendations of the Drainage and Stormwater Management Master Plan with respect to stormwater management, including the use of Low Impact Development Design Standards which will be encouraged. No amendments to the Secondary Plan shall be required to implement the directions in the Master Plan, for changes to the number or location of stormwater management facilities or where the Plan supports the realignment or other modifications to streams or changes in the locations of drainage facilities.
- b) Subwatershed Impact Studies for Sub-watershed Impact Areas are a submission requirement for a complete application. The study areas can be modified or consolidated subject to the approval of the City, in consultation with the applicable conservation authority. The goal of the Subwatershed Impact Studies will be to achieve a greater level of detail in the integration of land use, servicing and stormwater management. The objectives of the studies will be:
 - i) identification of a final preferred servicing plan (including public/private utilities);
 - ii) identification of a final preferred road layout;
 - iii) integration of stormwater management facilities;
 - iv) exploration of opportunities to integrate recreation opportunities with stormwater management;
 - v) phasing and cost sharing in areas of multiple ownership;
 - vi) validation of fisheries mitigation and compensation; and,
 - vii) the survey of the boundary of the Natural Heritage System.

9.6.6 UTILITIES

- a) Prior to approval of development within the Hewitt's Secondary Plan Area, all interested telecommunications providers and required utilities providers shall work with the landowner(s) and hte City to confirm their plans for services to support the proposed development. The City shall work with the providers to determine appropriate locations for large equipment or cluster sites.
- b) All telecommunications services and utilities should be located within an initial common trench, whenever possible, to avoid unnecessary digging and disruption on municipal rights of way.
- c) Consideration shall be given to the location of telecommunication facilities and utilities within public rights of way as well as on private property. Utilities and telecommunications facilities shall be grouped/clustered or combined where possible and feasible to maximize the use of land and, where applicable, to minimize visual impact. Utilities and telecommunications facilities shall be placed in such a manner so as to not visually detract from the streetscape. The City shall encourage utility and



S19013 A110



S19013 A202

A202

Scale: 1 : 450



Hewitt's Secondary Plan Area Subwatershed Impact Study Lover's, Hewitt's and Sandy Cove Creeks

Hewitt's Landowner's Group c/o Bratty and Partners 7501 Keele Street, Suite 200 Vaughan ON L4K 1Y2

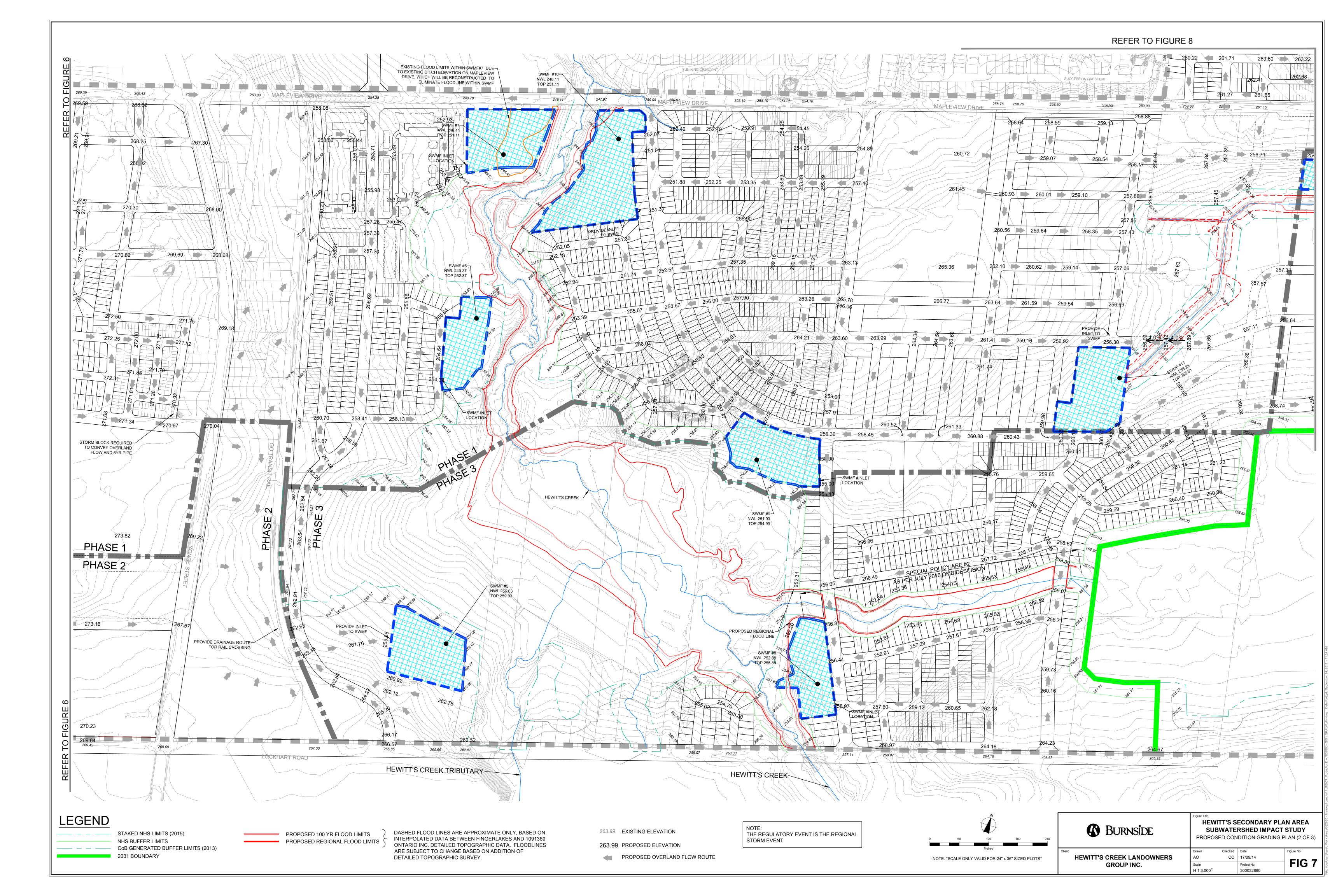
R.J. Burnside & Associates Limited 128 Wellington Street West, Suite 301 Barrie ON L4N 8J6 CANADA

in partnership with:



Azimuth Environmental Consulting Inc. 642 Welham Road
Barrie ON L4N 9A1 CANADA

September 2016 300032860.0000





November 18, 2022

Via: e-mail (Andrew.Gameiro@barrie.ca)

Andrew Gameiro Senior Planner City of Barrie 70 Collier Street Barrie ON L4M 4T5

Dear Mr. Gameiro:

Re: Crown Communities Developments Inc. – 1012 Yonge Street

Hewitt's Secondary Plan, City of Barrie

SIS Conformity Clearance

RJB Project No.: 300032860.0000

In support of the re-zoning applications made for the subject lands, I confirm that based on my general review of the submission materials prepared by GHD, and my discussions with Crown Communities, the submission is in general conformance with the Burnside SIS, in terms of servicing strategy and stormwater management.

Since the previous submission, the proponent has revised the servicing strategy and is now proposing to service the site with respect to sanitary and storm drainage, as originally anticipated in the SIS (via ASA lands to Kneeshaw).

It is noted that there is ongoing work within the landowners group to coordinate water looping for the developments along Yonge Street (including Crown) in advance of Yonge Street reconstruction proceeding.

This will involve a watermain feeding the site from the west (via Madelaine, and / or Mattamy and Rainsong lands), in addition to a watermain on Kneeshaw connecting to Yonge Street via ASA lands.

These details will be worked through with the landowners involved and the City of Barrie to ensure that adequate water distribution is provided in advance of Yonge Street construction.

Project No.: 300032860.0000

Please contact the undersigned if you have any questions or require anything further to this effect.

Yours truly,

R.J. Burnside & Associates Limited

James Orr, P.Eng.

Hewitt's Creek Landowner's Group Engineer

JO:kd

cc: Adam Taverna, Crown Communities (<u>adam@thecrowncommunities.com</u>)

Winston Thai, GHD (Winston.Thai@ghd.com)

Ray Duhamel, Hewitt's Creek Landowner's Group (rduhamel@jonesconsulting.com)

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Stormwater Management Analysis





Post Development Uncontrolled Release Rate

Utilizing the rational method, the post development release rate can be determined:

Q = C I A where,

Q= Flow rate (cms) C = I = A = Runoff Coefficient Intensity (mm/hr) Area (ha)

The Intensity can be calculated as:

I = a / (b + t)^c where,

		25mm4hr	2 Year	5 Year	10 Year	25 Year	25 Year	100 Year	
a =	Constant =	459.294	678.085	853.608	975.865	1146.275	1236.152	1426.408	
b =	Constant =	4.699	4.699	4.699	4.699	4.922	4.699	5.273	
c =	Constant =	0.781	0.781	0.766	0.760	0.757	0.751	0.759	
t =	Time of Concentration (min) =	10	10	10	10	10	10	10	
=	Intensity (mm/hr) =	56.29	83.11	108.92	126.55	148.15	164.22	180.15	

Based on the proposed land use the post development flow rates are:

				Flow Rates (m ³ /s)											
Area ID	Area Description	Area (ha)	Runoff Coefficient (C)	25mm4hr	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	100 Year - 25mm4hr (Interim)	100 Year - 25mm4hr (Ultimate)			
100	Private Site Drainaing East	4.10	0.80	0.513	0.757	0.992	1.153	1.485	1.796	2.052	1.539	1.539			
101	Drainage to West	0.03	0.80	0.004	0.006	0.007	0.008	0.011	0.013	0.015	0.011	0.011			
103	New South municipal R.O.W. Drainaing East	0.77	0.80	0.096	0.142	0.186	0.217	0.279	0.337	0.385	0.289	0.289			
	Total	4.90	0.80	0.613	0.905	1.186	1.378	1.775	2.146	2.452	1.839	1.828			
			fficient Factor:	1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00	1.10 1.10	1.20 1.20		< Used				

Notes: During interim condition, the entire proposed development will be draining to SWM Pond #5 and during the ultimate condition only Area 100 and Area 103 will be draining to SWM Pond #5. Since the 25mm 4hr storm event is retained on site, the maximum flow going into SWM Pond #5 is $1.839 m^3/s$.

HYDROLOGICAL ASSESSMENT WATER BUDGET DATA 6154142 KING SMOKE TREE AND 6150867 BUTTONVILLE A FOR THE PERIOD 1974 - 2018

Pervious Area

WATER HOLDING CAPACITY...150 MM

Month	Temperature (°C)	Precipitation (mm)	Rainfall (mm)	Snowmelt (mm)	Potential Evapotranspiration (mm)	Actual Evapotranspiration (mm)	Deficit (mm)	Water Surplus (mm)
January	-7	55	21	17	1	1	0	29
February	-6.2	48	19	23	1	1	0	38
March	-1.1	55	36	47	9	9	0	75
April	6.1	71	67	15	33	33	0	50
May	13.1	82	82	0	79	79	0	18
June	18	87	87	0	113	113	0	6
July	20.9	87	87	0	134	126	-8	0
August	19.9	84	84	0	118	102	-16	2
September	15.7	81	81	0	79	70	-9	3
October	8.9	73	73	0	39	37	-2	6
November	2.7	75	68	6	13	13	0	20
December	-3.5	60	29	15	2	2	0	24
Total		858	734	123	621	586	-35	271

Impervious Area

WATER HOLDING CAPACITY... 10 MM

Month	Temperature (°C)	Precipitation (mm)	Rainfall (mm)	Snowmelt (mm)	Potential Evapotranspiration (mm)	Actual Evapotranspiration (mm)	Deficit (mm)	Water Surplus (mm)
	(C)	(111111)	(111111)	(111111)	(111111)	(111111)	(111111)	(111111)
January	-7	55	21	17	1	1	0	37
February	-6.2	48	19	23	1	1	0	41
March	-1.1	55	36	47	9	9	0	75
April	6.1	71	67	15	33	33	0	50
May	13.1	82	82	0	79	69	-10	18
June	18	87	87	0	113	81	-32	9
July	20.9	87	87	0	134	85	-49	3
August	19.9	84	84	0	118	82	-37	3
September	15.7	81	81	0	79	66	-13	12
October	8.9	73	73	0	39	37	-2	32
November	2.7	75	68	6	13	13	0	59
December	-3.5	60	29	15	2	2	0	42
Total		858	734	123	621	479	-143	381

HYDROLOGICAL ASSESSMENT EXISTING CONDITIONS WATER BALANCE CALCULATIONS

Detail	Units	Impervious Area	Pervious Area	Total
Input Information				
Land Type	%	0	100	100
Area ¹	ha	0.00	4.90	4.90
Soil Type			Sandy Silt Till	
Hydrologic Soil Group			С	
Pervious Infiltration Factor ²				
Topography		-	0.3	
Soil		-	0.2	
Land Type		-	0.1	
TOTAL		0	0.6	
Average Annual Depth ³				
Precipitation	mm	858	858	
Evapotranspiration	mm	479	586	586
Output Information				
Annual Rainfall Volume	m³	0	42,042	42,042
Annual Evapotranspiration Volume	m^3	0	28,714	28,714
Precipitation Surplus	m³	0	13,328	13,328
Annual Groundwater Recharge Volume ⁴	m ³	0	7,997	7,997
Annual Runoff Volume	m ³	0	5,331	5,331
Allitual Number Volume	111	J	3,331	3,331

Notes:

- 1. Total developable area of the Site
- 2. Table 3.1 from the Stormwater Management Planning and Design Manual (MECP, March 2003)
- 3. This amount was provided by Engineering Climate Service, Environment Canada to represent average annual conditions at the Environment Canada weather stations.
- 4. (Annual Groundwater Recharge Volume) = (Precipitation Surplus) x (TOTAL Pervious Infiltration Factor) x Area

HYDROLOGICAL ASSESSMENT PROPOSED CONDITIONS WATER BALANCE CALCULATIONS

Detail	Units	Impervious Area	Pervious Area	Total
Input Information				
Land Type	%	62	38	100
Area ¹	ha	3.04	1.86	4.90
Soil Type			Sandy Silt Till	
Hydrologic Soil Group			С	
Pervious Infiltration Factor ²				
Topography		-	0.3	
Soil		-	0.2	
Land Type		-	0.1	
TOTAL		0	0.6	
Average Annual Depth ³				
Precipitation	mm	858	858	
Evapotranspiration	mm	479	586	520
Output Information				
Annual Rainfall Volume	m³	26,066	15,976	42,042
Annual Evapotranspiration Volume	m^3	14,552	10,911	25,463
Precipitation Surplus	m³	11,514	5,065	16,579
Annual Groundwater Recharge Volume ⁴	m³	0	3,039	3,038.8
Annual Runoff Volume	m³	11,514	2,026	13,540

Notes:

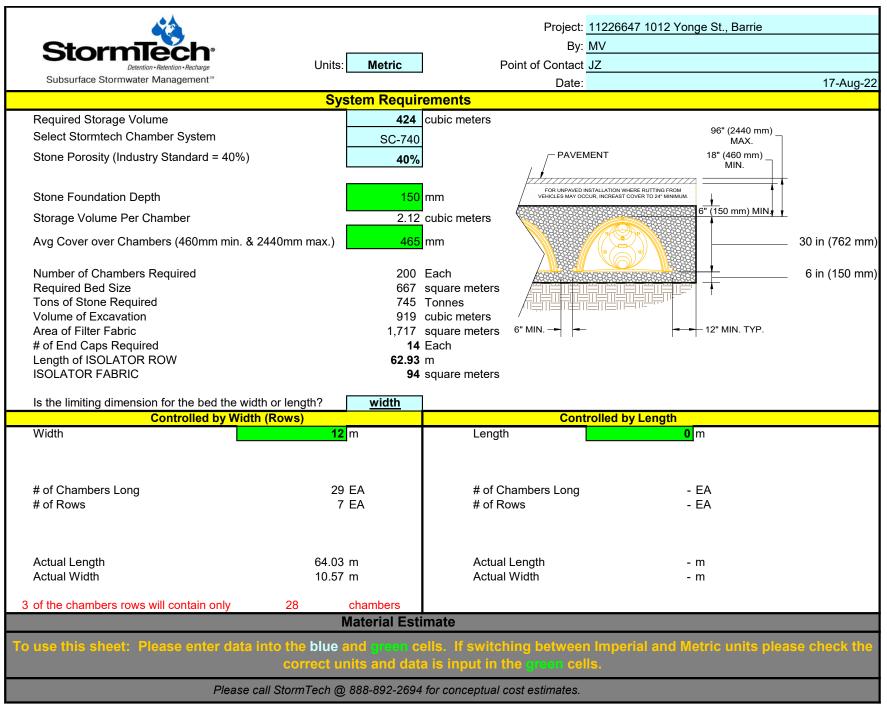
- 1. Total developable area of the Site
- 2. Table 3.1 from the Stormwater Management Planning and Design Manual (MECP, March 2003)
- 3. This amount was provided by Engineering Climate Service, Environment Canada to represent average annual conditions at the Environment Canada weather stations.
- 4. (Annual Groundwater Recharge Volume) = (Precipitation Surplus) x (TOTAL Pervious Infiltration Factor) x Area

HYDROLOGICAL ASSESSMENT SUMMARY OF CALCULATIONS

Details	Precipitation	Evapotranspiration	Precipitation Surplus	Infiltration	Runoff
Details	(m³)	(m³)	(m³)	(m ³)	(m ³)
Pre-development					
Existing Conditions	42,042	28,714	13,328	7,997	5,331
Percentage of Annual Precipitation		68%		19%	13%
Post-development					
Proposed Conditions (uncontrolled)	42,042	25,463	16,579	3,039	13,540
Percentage of Annual Precipitation		61%		7%	32%
Pre- to Post-development Difference					
Proposed Conditions (uncontrolled)	0	-3,251	3,251	-4,958	8,209
Percentage Change		-11%	24%	-62%	154%
			l l		

Estimate of Infiltration Area of LID System 11226647 1012 Yonge St., Barrie

ltem	Value	Unit	Notes
Design Infiltration Rate			
			According to the Hydrogeological Assessment –
			Amendment – Guelph Permeameter Infiltration Testing,
Hydraulic Conductivity	1.70E-06 m/s		prepared by GHD on November 16, 2022
Infiltration Rate	62 mm/	hr	From above report.
Safety Factor	2.5		
Design infiltration rate (Geometric Mean)	25 mm/	hr	From above report.
	600.0 mm/	day	
	0.600 m/da	•	
	0.600 m/24	l-hrs	
Estimated Deficit Volume			
Estimated deficit based on water balance calculations	4958 m^3		
Storage to infiltrate to meet deficit	310 m^3/	2-week	Assume 8 months/yr with rainfall.
LID Area and the Site			
Area of infiltration system required to mitigate infiltration deficit	516 m^2		
Drawdown time	24 hrs		24 to 48 hrs





Chamber Model - Units -

SC-740

Metric Click Here for Imperial

Number of chambers -Voids in the stone (porosity) -Base of Stone Elevation -Amount of Stone Above Chambers -Amount of Stone Below Chambers -Area of system -

	_
200	
40	%
267.00	m
152	mm
152	mm
628.2	sq.meters

✓ Include Perimeter Stone in Calculations

Min. Area -

628.102 sq.meters

StormTech SC-740 Cumulative Storage Volumes Height of Uncremental Single Incremental Incremental Incremental Cumulative													
Height of Incremental Single Incremental Incremental Incremental Cumulative													
System	Chamber		Stone	Ch & St	Chamber	Elevation							
(mm)	(cubic meters)	(meters)											
1067	0.00	0.00	6.38	6.38	424.21	268.07							
1041	0.00	0.00	6.38	6.38	417.83	268.04							
1016			6.38	6.38	411.45	268.02							
991	0.00	0.00	6.38	6.38	405.06	267.99							
965	0.00	0.00	6.38	6.38	398.68	267.97							
940	0.00	0.00	6.38	6.38	392.30	267.94							
914	0.00	0.31	6.26	6.57	385.92	267.91							
889	0.00	0.92	6.01	6.94	379.35	267.89							
864	0.01	1.60	5.74	7.34	372.41	267.86							
838	0.02	3.42	5.01	8.43	365.07	267.84							
813	0.02	4.54	4.57	9.11	356.63	267.81							
787	0.03	5.38	4.23	9.61	347.53	267.79							
762	0.03	6.09	3.95	10.03	337.92	267.76							
737	0.03	6.69	3.71	10.39	327.88	267.74							
711	0.04	7.17	3.52	10.68	317.49	267.71							
686	0.04	7.67	3.31	10.99	306.80	267.69							
660	0.04	8.24	3.09	11.32	295.82	267.66							
635	0.04	8.64	2.93	11.56	284.49	267.64							
610	0.04	8.96	2.80	11.76	272.93	267.61							
584	0.05	9.30	2.66	11.96	261.17	267.58							
559	0.05	9.62	2.53	12.16	249.21	267.56							
533	0.05	9.93	2.41	12.34	237.05	267.53							
508	0.05	10.21	2.30	12.51	224.71	267.51							
483	0.05	10.51	2.18	12.69	212.20	267.48							
457	0.05	10.72	2.09	12.82	199.52	267.46							
432	0.05	10.95	2.00	12.95	186.70	267.43							
406	0.06	11.19	1.91	13.09	173.75	267.41							
381	0.06	11.38	1.83	13.21	160.65	267.38							
356	0.06	11.58	1.75	13.33	147.44	267.36							
330	0.06	11.75	1.68	13.43	134.11	267.33							
305	0.06	11.92	1.61	13.54	120.67	267.30							
279	0.06	12.07	1.55	13.63	107.14	267.28							
254	0.06	12.20	1.50	13.70	93.51	267.25							
229	0.06	12.33	1.45	13.78	79.81	267.23							
203	0.06	12.45	1.40	13.85	66.03	267.20							
178	0.06	12.50	1.38	13.88	52.18	267.18							
152	0.00	0.00	6.38	6.38	38.30	267.15							
127	0.00	0.00	6.38	6.38	31.91	267.13							
102	0.00	0.00	6.38	6.38	25.53	267.10							
76	0.00	0.00	6.38	6.38	19.15	267.08							
51	0.00	0.00	6.38	6.38	12.77	267.05							
25	0.00	0.00	6.38	6.38	6.38	267.03							

						Land	Use Types	(ha.)						Total Pre-	
Subcatchment ID/Description	Cropland	Hay- Pasture		High Intensity Commercia I/ Industrial	High Intensity Residential		Quarry	Unpaved Road	Forest	Transition	Wetland	Open Water	Total Catchment Area (ha.)	development Annual	Rationale for choice in Land use Type
1012 Yonge St Barrie	4.90												4.90	0.93	
Tot	als: 4.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.90	0.93	

Notes:

1 Total phosphorus loading based land use type, using phosphorus export coefficients from Table 2 of the MOE Phosphorus Budget Tool, Page 15:

	Land Use	Cropland	Hay-Pasture	Sod Farm/ Golf Course	High Intensity Commercial/ Industrial	High Intensity	Low Intensity Development	Quarry	Unpaved Road	Forest	Transition	Wetland	Open Water	
•	Phosphorus Export Coefficient (kg/ha/yr)	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26	Hewitts Creek

						Land	d Use Ty	pes (ha.)							Treatmen	t Train - Firs	t BMP	Net Total	
Subcatchment ID/Description	Croplan d	Hay- Pasture	Sod Farm/ Golf Course	High Intensity Commerci al/ Industrial	lei	Low Intensity Develop ment	Quarry	Unpave d Road	Forest	Transition	Wetland	Open Water	Total Catchment Area (ha.)	Total Post- Developme nt Annual Phosphorus Loading to BMP (kg/yr)	Best Management Practice Selected	Efficiency of Selected	Phosphorus Reduction of	Post- Developme nt Annual Phosphoru	Rationale for choice
1012 Yonge St Barrie					4.90								4.90	6.47	Manual input	80%	5.17	1.29	
														1.29	Wet Detention Ponds	63%	0.81	0.48	
Total	s: 0.00	0.00	0.00	0.00	4.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.90	7.76				0.48	

Notes:

1 Total phosphorus loading based land use type, using phosphorus export coefficients from Table 2 of the MOE Phosphorus Budget Tool, Page 15:

Land Use	Cropland	Hay-Pasture	Sod Farm/ Golf Course	High Intensity Commercial/ Industrial	High Intensity Residential	Low Intensity Developme nt	Quarry	Unpaved Road	Forest	Transition	Wetland	Open Water	
Phosphorus Export Coefficient (kg/ha/yr)	0.19	0.07	0.12	1.82	1.32	0.13	0.08	0.83	0.05	0.06	0.05	0.26	Hewitts Creek

2 Phosphorus removal efficiencies for best management practices obtained from Table 3 of the MOE Phosphorus Budget Tool, Page 21:

BMP Class	Manual input	Bioretentio (n System	Constructed Wetlands	Dry Detention Ponds	Dry Swales	Enhanced Grass/Wate r Quality Swales	Flow Balancing Systems	Green Roofs	Hydrodyna mic Devices	Perforated Pipe Infiltration/Exfilt ration Systems	Sand or Media Filters	Soakaways - Infiltration Trenches	Sorbtive Media	Underground Storage	Vegetated Filter Strips/Stream Buffers	Wet Detention Ponds
Median Removal Efficiency (%)	80%	0%	77%	10%	0%	0%	77%	0%	0%	87%	45%	60%	79%	25%	65%	63%

PRE-DEVELOPMENT CONDITIONS ANNUAL PHOSPHORUS LOADS

Summary of Phosphorus Loading Calculations

ltem	Total P (kg/yr)
Total Pre-Development Phosphorus Loading	0.93
Total Post-Development Phosphorus Loading	7.76
Net Total Post-Development Phosphorus Loading (after application of BMPs)	0.48
Pre-Development Load - Net Post-Development Load	-0.45
Increase/decrease of:	-49%



Addendum No. 2

Date: December 9, 2021 **Project No.:** 300032860.0000

Project Name: Hewitt's Secondary Plan Area Subwatershed Impact Study

Client Name: Hewitt's Creek Landowners Group Inc.

Submitted By: Michelle Zettel, P.Eng.

Reviewed By: James Orr, P.Eng.

The Hewitt's Secondary Plan Area (SPA) Subwatershed Impact Study (SIS) was originally completed in September 2016. Following the receipt of comments from the City of Barrie (City) and the Lake Simcoe Region Conservation Authority (LSRCA), Addendum No. 1 was completed in November 2017 to rectify any issues raised by the agencies. Addendum No. 1, in concert with the original SIS, has set the framework for all developments within the Hewitt's SPA advancing through preliminary and detailed design. This memo, noted as Addendum No. 2 of the SIS, is presented to address a change in the proposed Lover's Creek and Hewitt's Creek subwatersheds, relative to Addendum No. 1.

Within the Hewitt's SPA there is an existing subwatershed divide between the Lover's Creek watershed and the Hewitt's Creek watershed. The grading design in the original Subwatershed Impact Study (SIS) and subsequent Addendum No. 1 (November 2017) resulted in a minor adjustment to this drainage divide. The SIS drainage divide between Hewitt's Creek and Lover's Creek watersheds were initially designed to limit the diversion of drainage from one watershed to the other, while optimizing earthworks across the site. As developers advance their individual designs, several landowners along this divide expressed interest in adjusting the proposed SIS divide in order to coincide better with property limits and phasing limits.

Through 2020, preliminary drainage divide revisions were circulated for coordination between landowners, and for discussion with the LSRCA. Most recently, a small area from the Lover's Creek watershed has been redirected to Hewitt's Creek, representing about 100m of ROW. With no further coordination or adjustments anticipated at this time, Addendum 2 has been finalized for approval as follows.

Technical Memorandum
Project No.: 300032860.0000

December 9, 2021

For reference, the previous drainage Figures 9 and 10 from Addendum 1 (November 2017) are included in Appendix A. The revised Figures 9 and 10 have been included, which are to replace the previously submitted drainage divide figures. An additional figure, DD, has also been included for clarity. The Addendum 2 Figures are found in Appendix B.

A comparison between the revised drainage divide and the SIS Addendum 1, is summarized in tabular form below.

Table 1: Summary of the Revised Drainage Divide and the Original SIS

SIS Addendum 1			
	Lover's	Hewitt's	Description
	-5.8	5.8	North commercial area and some residential to drain east.
Swapped Area (ha)	11.2	-11.2	Central residential and part of recreation centre area to drain west.
	-3.9	3.9	Part of school block to drain east.
Net Diversion (ha)	1.5	-1.5	
Percent Change in Watershed Area (%)	0.61%	0.47%	
Revised Scenario – A	ddendum	2	
	Lover's	Hewitt's	Description
		110111111	Bescription
	-4.6	4.6	North commercial area to drain east.
Swapped Area (ha)	-4.6 13.1	4 95	•
Swapped Area (ha)	,,,,	4.6	North commercial area to drain east. Central residential and additional 6.72 ha
Swapped Area (ha) Net Diversion (ha)	13.1	4.6 -13.1	North commercial area to drain east. Central residential and additional 6.72 ha residential diverted to west. Rec Centre and site plan diverted to east

As noted above, the proposed update will result in a negligible area being swapped between the Lover's Creek and Hewitt's Creek watersheds. The complete details of the calculations are in Appendix C. It is noted that Stormwater Management Facilities 3 and 7 will receive decreased drainage from the development area, while SWMFs 4 and 5 will need to accept an increased drainage area, relative to SIS Addendum 1. However, catchment 7a (draining to SWMF7) has been expanded to include the north portion of Yonge Street and any increased drainage associated with the proposed widening. Appropriate coordination has been had with all impacted developers to ensure that the ponds will still function as intended.

In keeping with the original SIS, the drainage diversion has been kept to a minimum. Once approved, this addendum is set to be the framework for all development and review moving forward.

Project No.: 300032860.0000

December 9, 2021

R.J. Burnside & Associates Limited

Michelle Zettel, Eng.

Water Resources Engineer

MLZ:sp:sc

Enclosure(s) Appendix A

Addendum 1 Figures

Appendix B

Figure 9 – Proposed Storm Sewer Plan (1 of 3) Figure 10 – Proposed Storm Sewer Plan (2 of 3)

Figure DD - Proposed Drainage Divide

Appendix C

Drainage Divide Calculations

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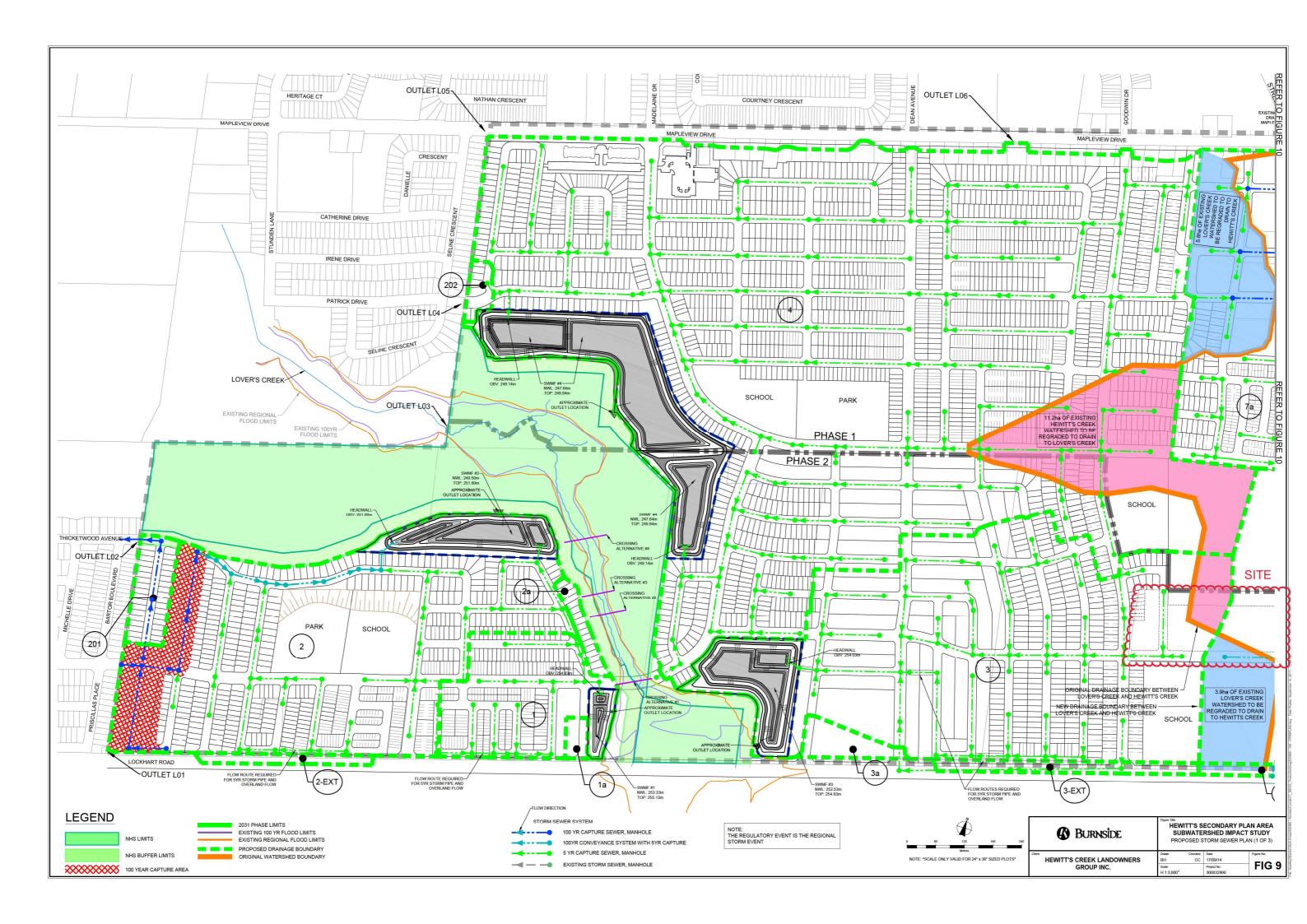
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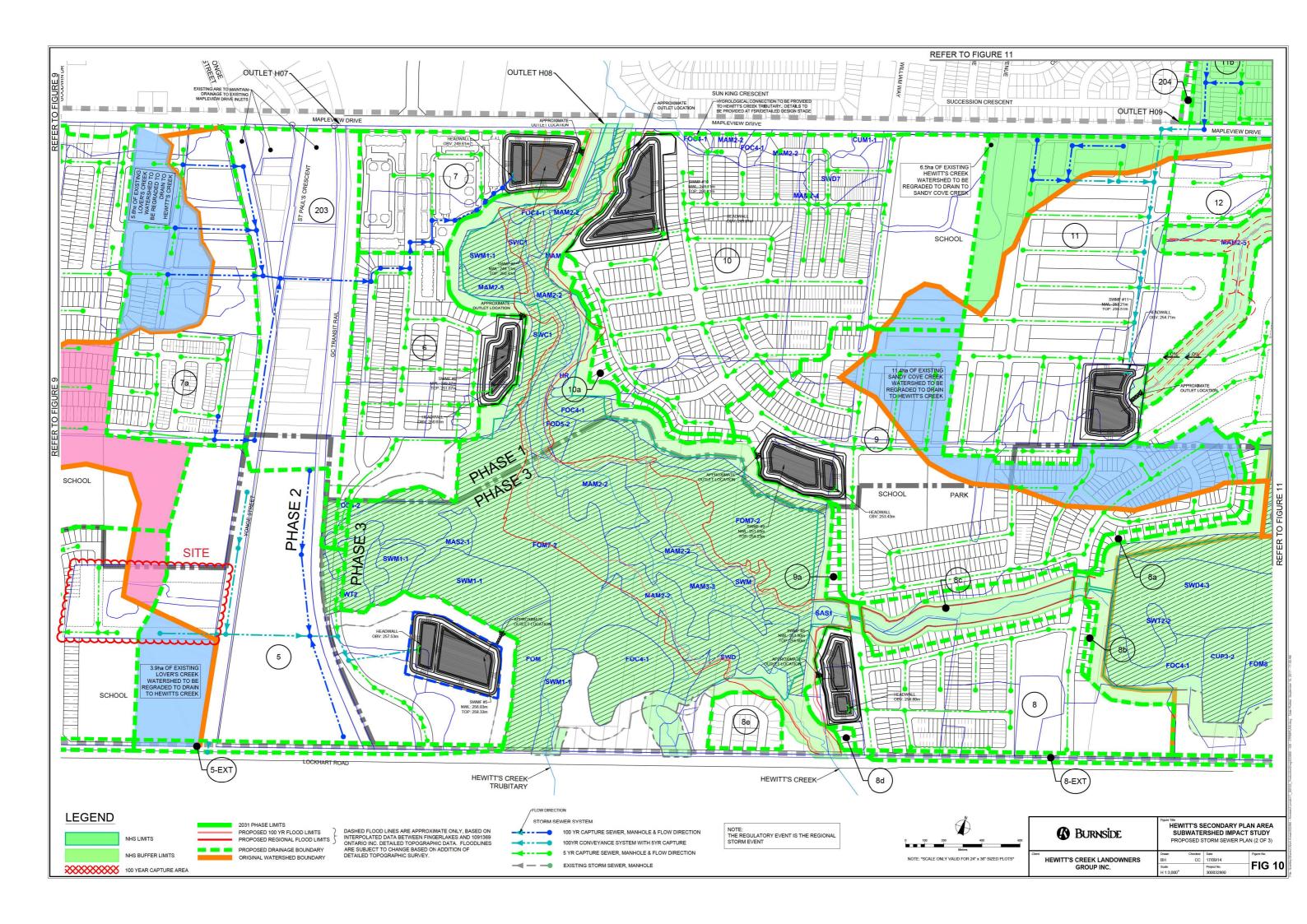
211207 - Drainage Divide Addendum (032860) 09/12/2021 3:09 PM



Appendix A

Addendum 1 Figures

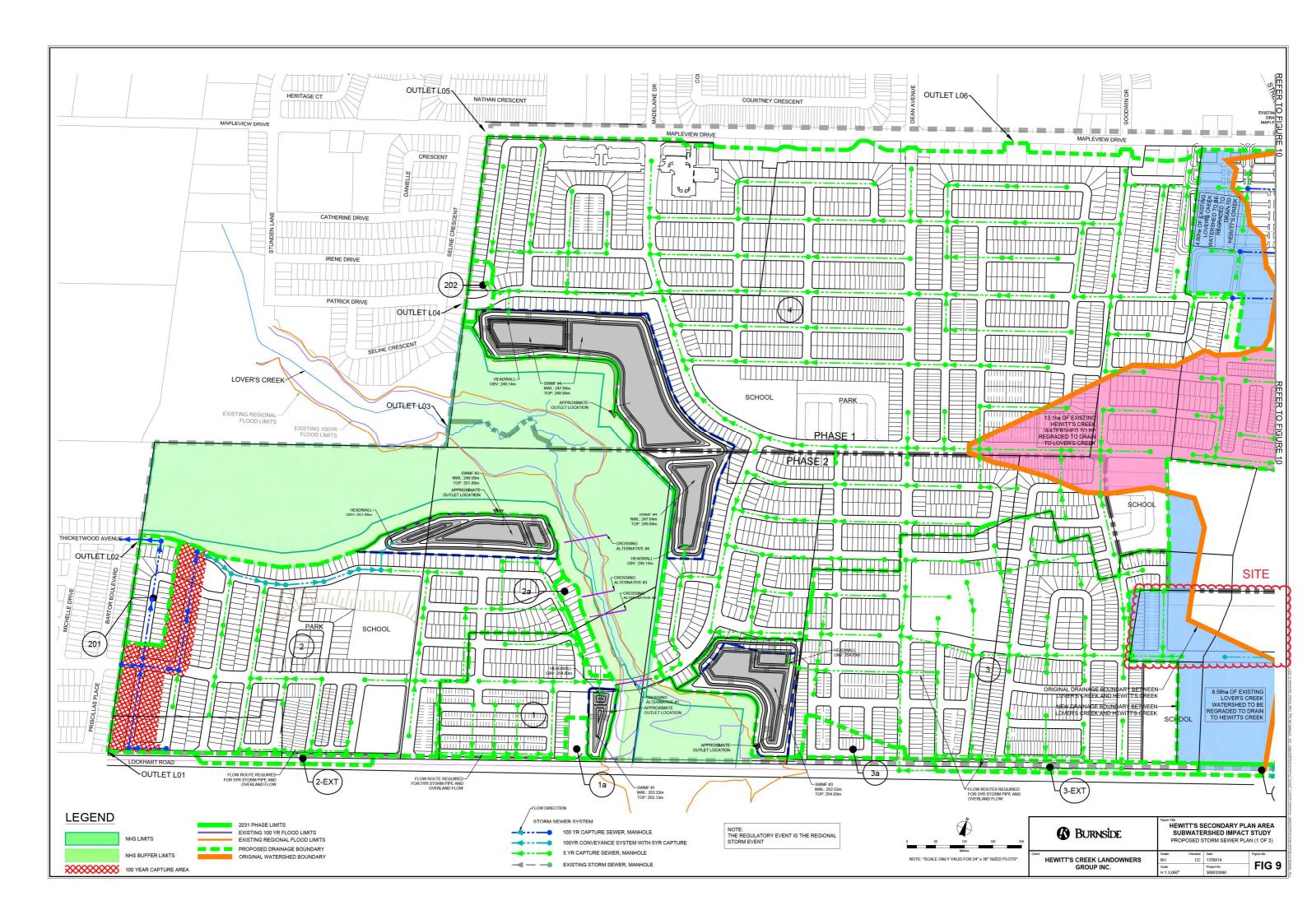


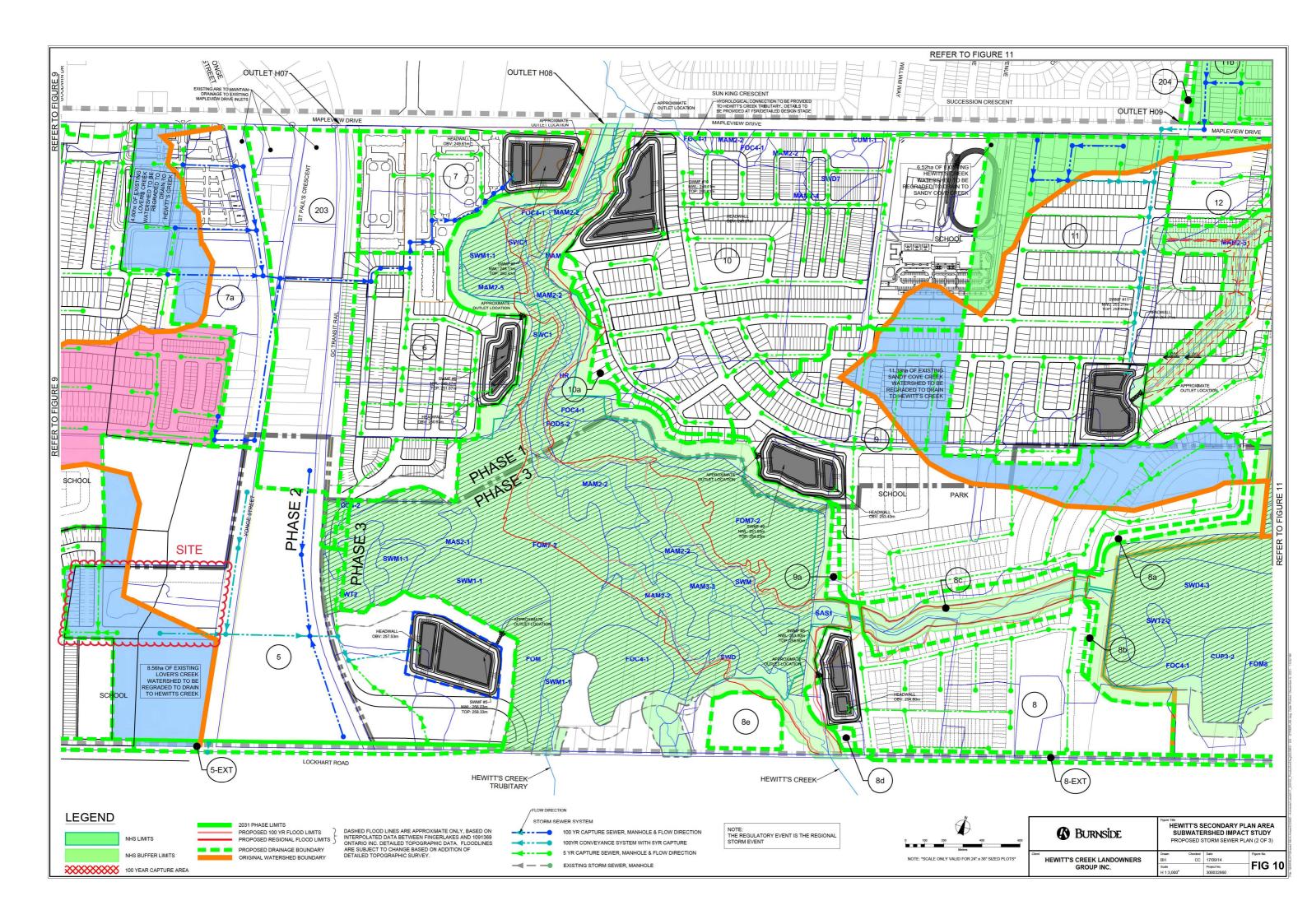


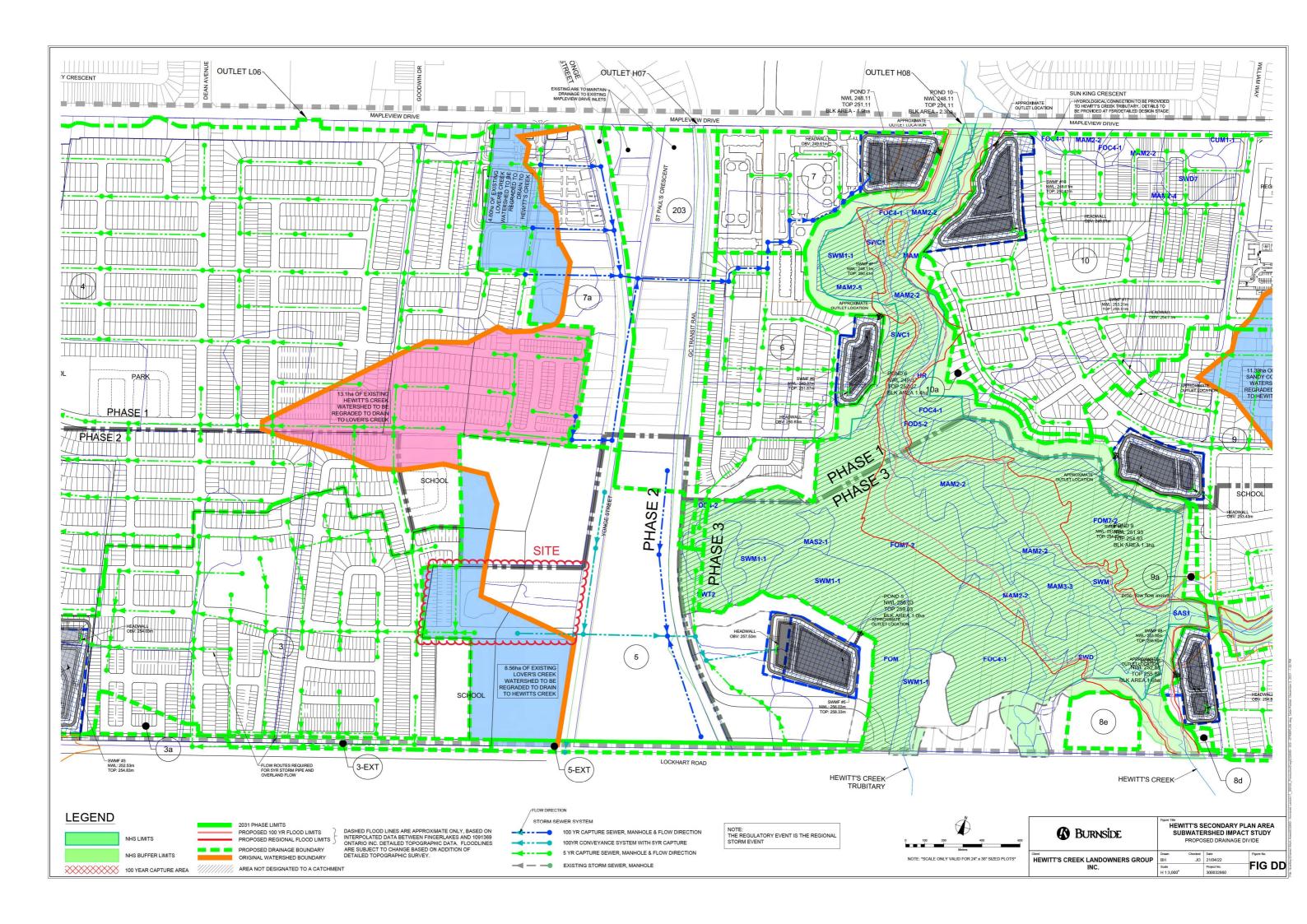


Appendix B

Figure 9 – Proposed Storm Sewer Plan (1 of 3)
Figure 10 – Proposed Storm Sewer Plan (2 of 3)
Figure DD – Proposed Drainage Divide









Appendix C

Drainage Divide Calculations

Project Number: 300032860

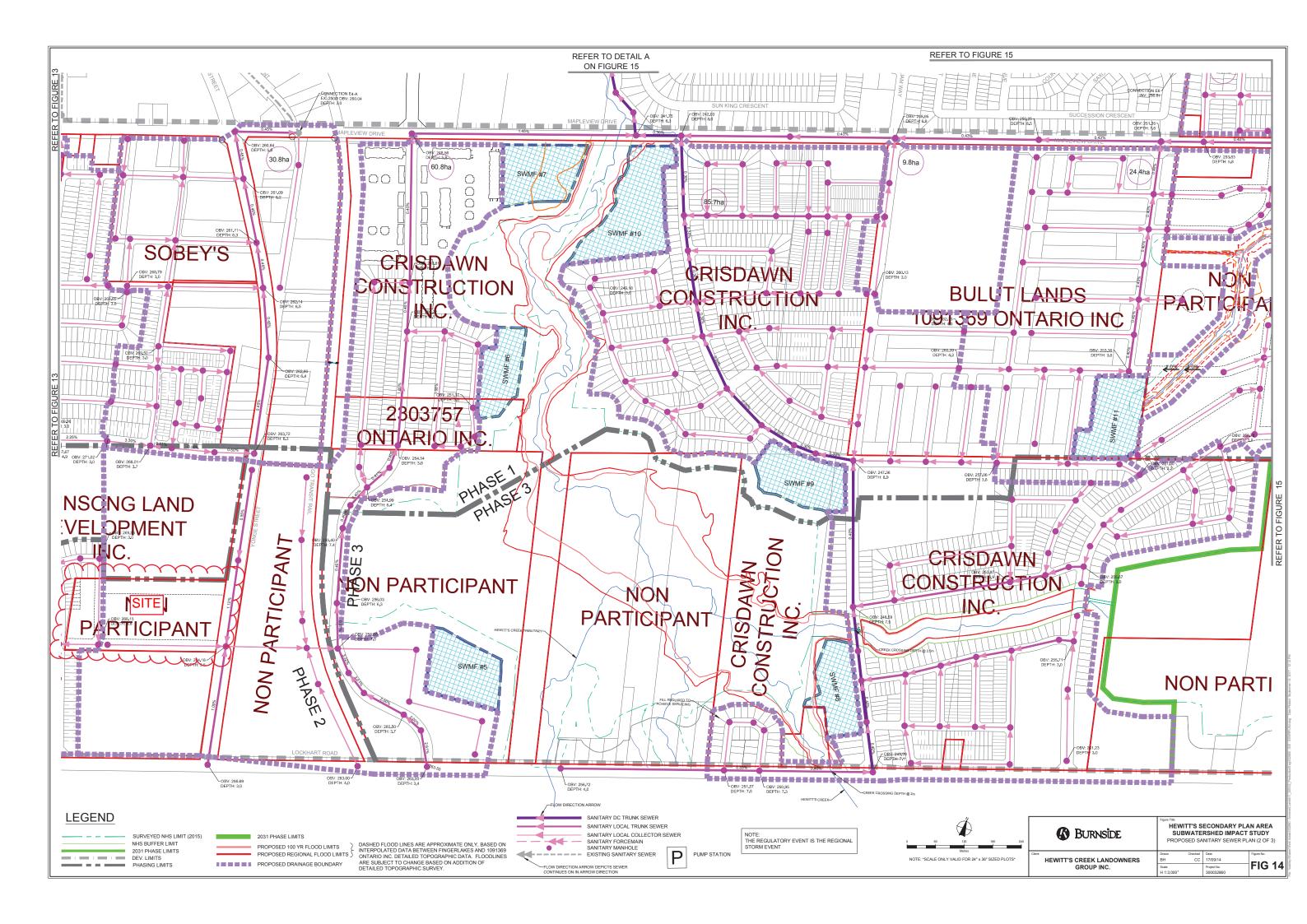
Date: Dec-21
Author: MZ

Hewitt's and Lover's Drainage Divide Revision

	Lover's Creek	Hewitt's Creek
Existing Watershed in	245.69	320.77
Hewitt's SPA (ha)	243.03	320.77
Proposed Gains/Losses	1.5	-1.5
(ha)	1.5	-1.5
Proposed Watershed in	247.19	319.27
Hewitt's SPA (ha)	247.19	319.27
Percent Change in	0.61%	0.47%
Watershed Area (%)	0.01%	0.47%

	Lover's Creek	Hewitt's Creek
Existing Watershed in Hewitt's SPA (ha)	245.69	320.77
Proposed Gains/Losses (ha)	-0.1	0.1
Proposed Watershed in Hewitt's SPA (ha)	245.59	320.87
Percent Change in Watershed Area (%)	0.04%	0.03%

Appendix C Sanitary Servicing Analysis



Project Name: 1012 Yonge Street

Project Number: 11226647

Date Created:August 24, 2022Date Printed:August 24, 2022

Wastewater Flow Calculations (Existing vs. Proposed)

	Single and Semi Detached	Townhouses (Medium Density)	Condo Apartment (High Density)	Total Unit Count	Commercial Retail (sq.m)		Generation	Commercial Generation Rate (L/day)	Infiltration Allowance (0.1 l/s/ha)	Total Generation Peak Rate (L/s)
Existing Development	0	0	0	0	0	0	0	0	0	0.00
Proposed Development	0	8	1092	1100	1167.3	1844	414,900	3,268	0.491	21.69

Residential sanitary generation rate (Existing & Proposed) =	225	L/person/day
Residential sanitary generation rate (Existing) =	225	L/person/day
Low population density =	3.13	persons/unit
Medium population density =	2.57	persons/unit
High population density =	1.67	persons/unit
Commercial or Retail population density =	28.0	m3/day/ha
Site Area =	4.91	hectares
Harmon Peaking factor =	3.60	
Babbit Peaking factor =	4.40	
Infiltration factor =	0.10	L/s/ha

^{*}Harmon Peaking factor or Babbit Peaking factor, whichever is higher will be used.

Luis Vieira

Subject:

FW: Crown Communities, 1012 Yonge Street, City File No. D09-ANN

From: Nadine Rush [mailto:Nadine.Rush@barrie.ca]

Sent: October-28-19 8:58 AM

To: Peter Slama <psiama@coleengineering.ca>

Cc: Adam Taverna <adam@thecrowncommunities.com>; May Taverna <may@thecrowncommunities.com>; Darren

Vella <dvella@ipsconsultinginc.com>

Subject: RE: Crown Communities, 1012 Yonge Street, City File No. D09-ANN

Hi Peter,

We recommend using the High Density ppu for your sanitary flow calculations as your site is considered high density.

Regards,

Nadine Rush, C.E.T.

Senior Development Services Technologist Development Services Engineering

The City of Barrie Central Ontario's Premier Waterfront Community

Mailing Address:

P.O. Box 400, Barrie ON, L4M 4T5 Tel: 705-739-4220 ext. 5231

From: Peter Slama [mailto:pslama@coleengineering.ca]

Sent: October 25, 2019 2:41 PM

To: Nadine Rush < Nadine.Rush@barrie.ca>

Cc: Adam Taverna < <u>adam@thecrowncommunities.com</u>>; May Taverna < <u>may@thecrowncommunities.com</u>>; Darren

Vella <dvella@ipsconsultinginc.com>

Subject: Crown Communities, 1012 Yonge Street, City File No. D09-ANN

Hello Nadine,

We are in receipt of the City's comments related to the Conformity Review process for the above referenced development project, in particular the Engineering Comments letter dated September 5, 2019.

As we prepare for a resubmission, we have a question related to calculating the sanitary peak flow generation rate.

The proposed site plan (attached for reference) is considered High Density, based on the Units/Hectare of 140UPH. The City of Barrie's Sanitary Design Population for High Density (Apartments) is 1.67 ppu.

However, the proposed built form of the development is Stacked Townhouses Back-To-Back, which more closely aligns with the Medium Density designation within the City's standards requiring a Sanitary Design Population of 2.34ppu.

We're kindly requesting confirmation from the City as to which Design Population rate (1.67ppu or 2.34ppu) is most appropriate and acceptable for the present site plan.

Thank you.

Peter Slama, P.Eng.
Project Manager, Urban Development

Cole Engineering Group Ltd.

70 Valleywood Drive, Markham, ON Canada L3R 4T5 T: 905-940-6161 Ext. 375 Tor. Line: 416-987-6161

F: 905-940-2064

E: pslama@ColeEngineering.ca

www.ColeEngineering.ca

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Peter Slama

Subject:

FW: 375mm Local Sanitary Sewer Mapleview / Kneeshaw

From: James Orr [mailto:James.Orr@rjburnside.com]

Sent: October-29-19 9:44 AM

To: Frank Palka <Frank.Palka@barrie.ca>; Bala Araniyasundaran <Bala.Araniyasundaran@barrie.ca>; Larry Klein <Larry.Klein@barrie.ca>

Cc: Ray Duhamel < RDuhamel@jonesconsulting.com >; jhermann0812@gmail.com < DRichardson@jonesconsulting.com >

Subject: RE: 375mm Local Sanitary Sewer Mapleview / Kneeshaw

Hi Frank,

Thanks for this response. I was out yesterday and just catching up on your e-mail.

I acknowledge that we'll need to assess each development in terms of how it compares to the design assumption, but the Group is just looking for assurance that this pipe can go to a d/D of 0.70, regardless of how the density distribution plays out amongst the various owners.

Based on density increases assumed on a proportional basis (which in reality will be variable, and must be negotiated among developers – the Group will manage allocation), the land owners are comfortable proceeding so long as they can have this assurance that the "full pipe" criteria will be based on d/D of 0.7 which is approximately 85% full, still allowing a buffer.

Could you acknowledge your understanding and acceptance of this – your response below is alluding to it but I just want to ensure we're 100% clear for the owners.

We have a group meeting today at 1:30 and I'm aware of a number of owners who are quite keen on ensuring this is resolved.

Thanks,

James

From: Frank Palka < Frank.Palka@barrie.ca > Sent: Friday, October 25, 2019 4:42 PM

To: James Orr < <u>James.Orr@rjburnside.com</u>>; Bala Araniyasundaran < <u>Bala.Araniyasundaran@barrie.ca</u>>; Larry Klein < <u>Larry.Klein@barrie.ca</u>>

Cc: Ray Duhamel < RDuhamel@jonesconsulting.com >; jhermann0812@gmail.com < DRichardson@jonesconsulting.com >

Subject: RE: 375mm Local Sanitary Sewer Mapleview / Kneeshaw

Good afternoon James,

As previously discussed and messaged to the LOG the City would look at each individual project and assess the merits of any increase in pipe size were warranted on an individual basis. I believe the below assumption on theoretical flows provided enough background to allow this project to proceed towards construction as designed.

Through the master plans certain assumptions were made therefore resulting in appropriate sewer sizing based on the design criteria of the day. Through best practices we all agree it may be appropriate to increase certain pipes to allow for "potential increase in densities". You can appreciate that we do not have that mandate at this time, however, if individual or the landowners group wish upsize pipes beyond the local service requirement we would not be opposed but caution any expectation of DC credits for these works.

Regards

Frank E. Palka C.E.T. Manager of Approvals Engineering Department



City of Barrie: City Hall, 70 Collier Street, P.O. Box 400, Barrie ON, L4M 4T5

Office: 705-739-4220 x4445

www.barrie.ca

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From: James Orr

Sent: Friday, October 18, 2019 3:59 PM

To: <u>bala.araniyasundaran@barrie.ca</u>; 'Frank Palka' <<u>Frank.Palka@barrie.ca</u>>; Larry Klein <<u>Larry.Klein@barrie.ca</u>>

Cc: Ray Duhamel <RDuhamel@jonesconsulting.com>; jhermann0812@gmail.com <DRichardson@jonesconsulting.com>

Subject: 375mm Local Sanitary Sewer Mapleview / Kneeshaw

Importance: High

Good afternoon Bala,

As presented to you at the Working Group meeting yesterday, given the City's interest in promoting higher densities not only in existing Barrie but in Hewitt's secondary plan, I am formally requesting the following on behalf of the Hewitt's Landowners Group:

 That the 375mm DIA sanitary sewer branch west of the Hewitt's Trunk (running west along Mapleview Drive and south on future Kneeshaw to Lockhart) be approved at its current size (375mm), but also be considered as a trunk sewer (per the Local Servicing policy), such that the d/D standard for the sewer be set at 0.70, instead of 0.50.

The City of Barrie's design guidelines for <u>Trunk Sanitary Sewers</u> speak to the 85% or 0.7 d/D as the maximum design criteria.

The City's acceptance of this request will allow the current, approved design of the infrastructure to remain unchanged, allowing construction to proceed imminently, while allowing for a significant increase in population to the contributing catchments that gives the landowners far more flexibility to propose higher densities, which is the City's vision for this area.

The approved Sanitary Drainage Plans and Design Sheet for the sewer (designed by Jones) are attached. This design was approved with a maximum d/D of 0.58, and this was based on previous discussions with the City about the fact that applying the new sanitary design standards would theoretically increase the pipe size to a 450mm DIA, which would be

DC eligible. Recall that the City's position was to grant an exception to the new standard rather than increase the pipe size.

The notion of this sewer being considered a trunk is supported by the fact that it only has direct connections at the top end (within Ballymore), and has a considerably sized catchment and length, therefore not behaving nearly as "peaky" as a local sewer.

Technical Summary:

1. Current Design - max 0.58 d/D

Sanitary Sewer Design Street "Sanitary Sewer Design – Trunk Sewer, Development Details Basis", dated 08-15-19

Corresponding EX-SAN-1 and EX-SAN-2 sanitary sewer catchment plans, stamp dated 08-16-2019

The above identifies the current design population allocation or peak flow allocation in the case of Institutional lands.

2. Increased population to max 0.70 d/D

Sanitary Sewer Design Sheet "Sanitary Sewer Design – Trunk Sewer, Development Details Basis – d/D at 0.7", dated 10/16/2019

Commentary: See "ADD POP. Max downstream d/D = 0.7" line highlighted in blue.

The d/D of 0.7 in the downstream sewer is reached with an additional upstream population of approximately 4730 above the approved design.

From our meeting, we understood you were agreeable to this in principle, subject to seeing verification of the request, which I have provided herein.

The Group has asked that the City of Barrie provide confirmation of your acceptance by Monday October 21st at 9 am, to ensure we do not have to make other arrangements for the imminent construction contract we are about to execute.

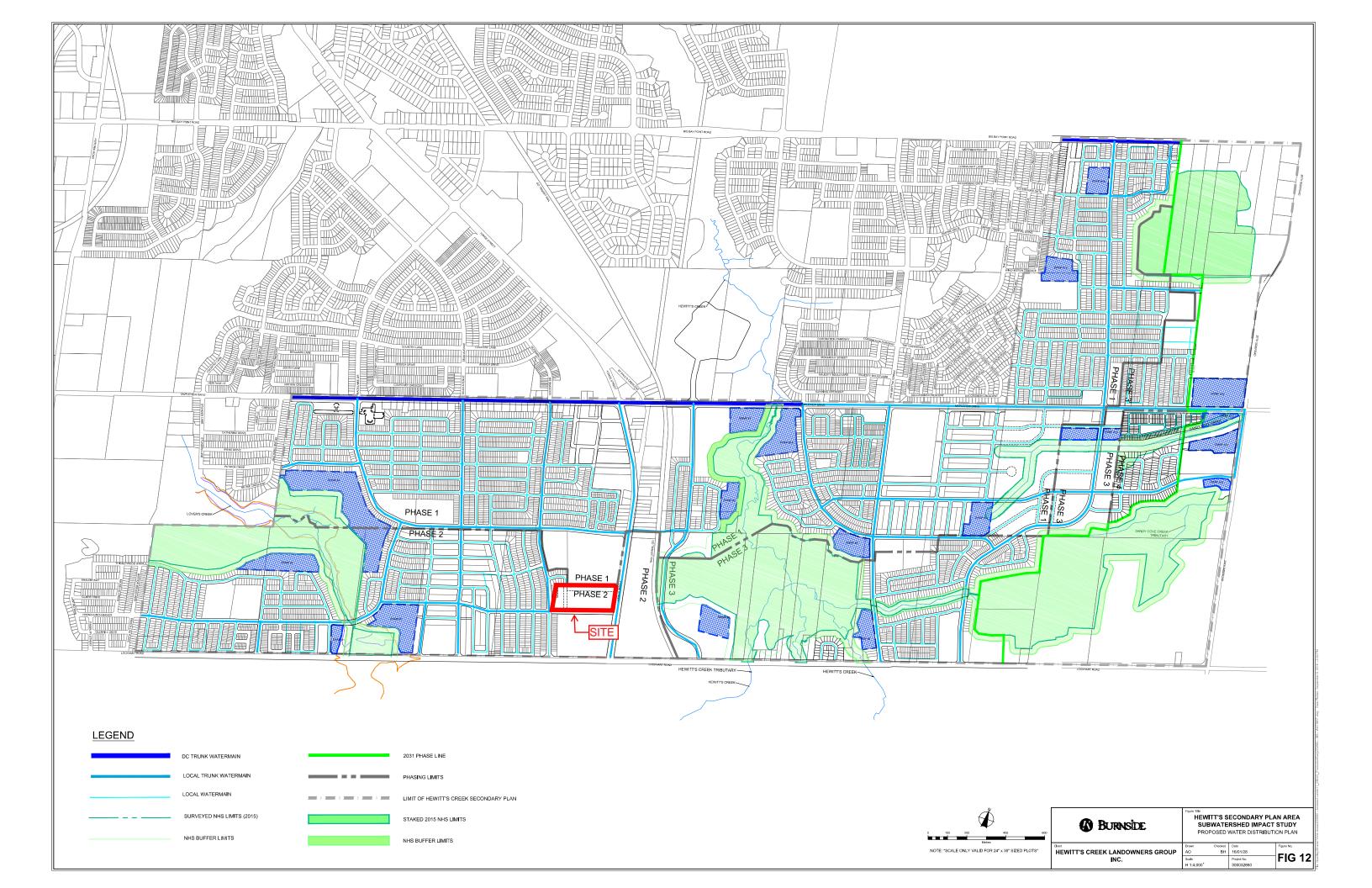
Thank you kindly, and we look forward to your confirmation.

Have a great weekend,

James

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Appendix D
Water Demand Calculations



С	Coefficient related to type of construction • Wood frame	[yes/no]	- 1.5		Building	j A	
	Ordinary construction		1				
	Non-combustible construction		0.8		C=0.8 w	ill be used for	r
	• Fire resistive construction (> 2 hrs)	yes	0.6		conserva	ative purpose	S
A	Area of structure considered (m²)	8,979	<==>	96,648	ft ²		
F	Required fire flow (L/min)						
	$F = 220 \text{ C (A)}^{0.5}$		=	17,000	L/min		=
	Occupancy hazard reduction of surcharge	[yes/no]					
	Non-combustible		-25%				
	 Limited combustible 		-15%				
	 Combustible 	yes	0%				
	 ◆ Free burning 		15%				
	Rapid burning		25%	17,000	L/min		(1)
	Sprinkler Reduction		_	11,000			= \ ' '
	Non-combustible - Fire Resistive (3)	yes	30%_	5,100	L/min		(2)
	Exposure surcharge (cumulative (%), 1 side)	[yes/no]					
	0 - 3 m		25%				
	3.1 - 10 m		20%				
	10.1 - 20 m		15%				
	20.1 - 30 m	yes	10%	2 side		20%	
	30.1- 45 m		5% Cum	ulative Total		20%	
				3 400	L/min		(3)
			=	3,400	<i>L</i> ///////		=(3)
	REQUIRED FIRE FLOW [(1) - (2) + (3)]			15,000	L/min		
	(2,000 L/min < Fire Flow < 45,000 L/min)		or or	250.00			1

С	Coefficient related to type of construction • Wood frame	[yes/no]	- 1.5	I	Building B	
	Ordinary construction		1			
	Non-combustible construction		8.0	(C=0.8 will be used fo	r
	• Fire resistive construction (> 2 hrs)	yes	0.6	(conservative purpose	es
A	Area of structure considered (m²)	4,224	<==>	45,464 (it ²	
F	Required fire flow (L/min)					
	$F = 220 \text{ C (A)}^{0.5}$		_	11,000	L/min	=
	Occupancy hazard reduction of surcharge	[yes/no]				
	 Non-combustible 		-25%			
	 Limited combustible 		-15%			
	 Combustible 	yes	0%			
	 Free burning 		15%			
	Rapid burning		25%	11,000	L/min	(1)
	Sprinkler Reduction		_	,,,,,		=\''
	Non-combustible - Fire Resistive (3)	yes	30%_	3,300	L/min	(2)
	Exposure surcharge (cumulative (%), 1 side)	[yes/no]				
	0 - 3 m		25%			
	3.1 - 10 m		20%			
	10.1 - 20 m	yes	15%	1 side	15%	
	20.1 - 30 m	yes	10%	2 side	20%	
	30.1- 45 m		5% Cum	ulative Total	35%	
				3,850	L/min	(3)
			_	·		= ` `
	REQUIRED FIRE FLOW [(1) - (2) + (3)]			12,000		7
	(2,000 L/min < Fire Flow < 45,000 L/min)		or or	200.00 I	L/s USGPM	

PROJECT: The Roselawn Project DATE CREATED: 21-Nov-19 August 17, 2022 DATE PRINTED: JOB#: 12560188

Coefficient related to type of construction	[yes/no]	_		Buildin	g C
 Wood frame 		1.5			
 Ordinary construction 		1			
 Non-combustible construction 		8.0		C=0.8 v	vill be used for
• Fire resistive construction (> 2 hrs)	yes	0.6		conserv	ative purposes
Area of structure considered (m²)	4,225	<==>	45,481	ft ²	
Required fire flow (L/min)					
$F = 220 \text{ C (A)}^{0.5}$		_	11,000	L/min	
Occupancy hazard reduction of surcharge	[yes/no]				
 Non-combustible 		-25%			
Limited combustible		-15%			
 Combustible 	yes	0%			
 ◆ Free burning 		15%			
 Rapid burning 		25%			
			11,000	L/min	
Sprinkler Reduction					
 Non-combustible - Fire Resistive (3) 	yes	30%_	3,300	L/min	
Exposure surcharge (cumulative (%), 1 side)	[yes/no]	_			
0 - 3 m		25%			
3.1 - 10 m		20%			
10.1 - 20 m	yes	15%	1 side		15%
20.1 - 30 m	yes	10%	2 side		20%
30.1- 45 m		5% Cum	ulative Total		35%
		_	3,850	L/min	
		_	·		
REQUIRED FIRE FLOW [(1) - (2) + (3)]			12,000		
(2,000 L/min < Fire Flow < 45,000 L/min)		or or	200.00 3 170	L/s USGPN	1
		Oi.	3,170	3331 N	•

С	Coefficient related to type of construction • Wood frame	[yes/no]	- 1.5	E	Building D	
	 Ordinary construction 		1			
	 Non-combustible construction Fire resistive construction (> 2 hrs) 	V00	0.8 0.6		C=0.8 will be used for conservative purpos	
	The resistive construction (> 2 ms)	yes	0.0		conservative purpos	63
A	Area of structure considered (m²)	2,398	<==>	25,813 f	t ²	
F	Required fire flow (L/min)					
	$F = 220 \text{ C (A)}^{0.5}$		_	9,000 1	_/min	_
	Occupancy hazard reduction of surcharge	[yes/no]				
	Non-combustible		-25%			
	Limited combustible		-15%			
	 ◆ Combustible 	yes	0%			
	 ◆ Free burning 		15%			
	◆ Rapid burning		25%	9,000 1	l /min	(1)
	Sprinkler Reduction		=	9,000 1	_//////	_(''
	• Non-combustible - Fire Resistive (3)	yes	30%_	2,700 1	L/min	(2)
	Exposure surcharge (cumulative (%), 1 side)	[yes/no]				
	0 - 3 m	[ycs/no]	25%			
	3.1 - 10 m	yes	20%	1 side	20%	
	10.1 - 20 m	,,,,	15%	. 0.00	2070	
	20.1 - 30 m	yes	10%	1 side	10%	
	30.1- 45 m	•	5%			
			Cum	ulative Total	30%	
			_	2,700 L/min		(3)
	REQUIRED FIRE FLOW [(1) - (2) + (3)]			9,000 1	L∕min	_
	(2,000 L/min < Fire Flow < 45,000 L/min)		or	150.00 L		
			or	2,378 (USCOM	

С	Coefficient related to type of construction • Wood frame	[yes/no]	- 1.5		Building E	
	 Ordinary construction 		1			
	Non-combustible construction		8.0		C=0.8 will be used for	
	 Fire resistive construction (> 2 hrs) 	yes	0.6		conservative purpos	ses
A	Area of structure considered (m²)	2,398	<==>	25,813	ft ²	
F	Required fire flow (L/min)					
	$F = 220 \text{ C (A)}^{0.5}$		_	9,000	L/min	_
	Occupancy hazard reduction of surcharge	[yes/no]				
	Non-combustible		-25%			
	 Limited combustible 		-15%			
	 Combustible 	yes	0%			
	 ◆ Free burning 		15%			
	Rapid burning		25%	9,000	I /min	(1)
	Sprinkler Reduction		_	0,000	2,,,,,,,	(.,
	Non-combustible - Fire Resistive (3)	yes	30%_	2,700	L/min	(2)
	Exposure surcharge (cumulative (%), 1 side)	[yes/no]				
	0 - 3 m		25%			
	3.1 - 10 m	yes	20%	1 side	20%	
	10.1 - 20 m		15%			
	20.1 - 30 m	yes	10%	1 side	10%	
	30.1- 45 m		5% Cum	ulative Total	30%	
				2,700 L/min		
	REQUIRED FIRE FLOW [(1) - (2) + (3)]			9,000		7
	(2,000 L/min < Fire Flow < 45,000 L/min)		or	150.00		
			or	2,3/8	USGPM	ı

;	Coefficient related to type of construction	[yes/no]	_		Building	ı F
	 Wood frame 		1.5			
	Ordinary construction		1			
	Non-combustible construction		0.8			ill be used for
	Fire resistive construction (> 2 hrs)	yes	0.6		conserva	ative purpose
	Area of structure considered (m ²)	507	<==>	5,462	ft ²	
	Required fire flow (L/min)					
	$F = 220 \text{ C (A)}^{0.5}$		_	4,000	L/min	
	Occupancy hazard reduction of surcharge	[yes/no]				
	Non-combustible		-25%			
	 Limited combustible 		-15%			
	Combustible	yes	0%			
	 ◆ Free burning 	-	15%			
	Rapid burning		25%			
				4,000	L/min	
	Sprinkler Reduction					
	Non-combustible - Fire Resistive (3)		30%_	0	L/min	
	Exposure surcharge (cumulative (%), 1 side)	[yes/no]	_			
	0 - 3 m		25%			
	3.1 - 10 m	yes	20%	2 side		40%
	10.1 - 20 m		15%			
	20.1 - 30 m		10%			
	30.1- 45 m		5%			
			Cum	ulative Total		40%
			_	1,600	L/min	
	REQUIRED FIRE FLOW [(1) - (2) + (3)]				L/min	
	(2,000 L/min < Fire Flow < 45,000 L/min)		or	100.00		
			or	1.585	USGPM	

PROJECT: The Roselawn Project DATE CREATED: 21-Nov-19 DATE PRINTED: August 17, 2022 JOB#: 12560188

Coefficient related to type of construction	[yes/no]			Building G	
 Wood frame 		1.5			
Ordinary construction		1			
Non-combustible construction		0.8		C=0.8 will be use	ed for
◆ Fire resistive construction (> 2 hrs)	yes	0.6		conservative purp	poses
Area of structure considered (m²)	507	<==>	5,462	ft ²	
Required fire flow (L/min)					
$F = 220 \text{ C (A)}^{0.5}$		_	4,000	L/min	
Occupancy hazard reduction of surcharge	[yes/no]				
 Non-combustible 		-25%			
Limited combustible		-15%			
Combustible	yes	0%			
 Free burning 	•	15%			
Rapid burning		25%			
1 0			4,000	L/min	
Sprinkler Reduction		=	-		
Non-combustible - Fire Resistive (3)		30%	0	L/min	
Exposure surcharge (cumulative (%), 1 side)	[yes/no]	_			
0 - 3 m		25%			
3.1 - 10 m	yes	20%	2 side	40%	
10.1 - 20 m	-	15%			
20.1 - 30 m		10%			
30.1- 45 m		5%			
		Cum	ulative Total	40%	
		_	1,600	L/min	
REQUIRED FIRE FLOW [(1) - (2) + (3)]				L/min	
(2,000 L/min < Fire Flow < 45,000 L/min)		or	100.00		
		or	1,585	USGPM	