IVANHOÉ CAMBRIDGE

100 BAYSHORE DRIVE, OTTAWA
ADEQUACY OF SERVICES STUDY

DECEMBER 20, 2019

100 BAYSHORE DRIVE, OTTAWA

ADEQUACY OF SERVICES STUDY

IVANHOÉ CAMBRIDGE

PROJECT NO.: 191-13783-00
DATE: DECEMBER 20, 2019

WSP
SUITE 300
2611 QUEENSVIEW DRIVE
OTTAWA, ON, CANADA K2B 8K2

T: +1 613 829-2800
F: +1 613 829-8299
WSP.COM

IVANHOÉ CAMBRIDGE
95 Wellington St. West, Suite 300
Toronto, ON M5J 2R2

Attention: David A. Baffa

Dear Sir:

Subject: 100 Bayshore Drive, Ottawa - Adequacy of Services Study

We are pleased to deliver the enclosed Adequacy of Services Study in support of the application for an Official Plan and Zoning By-law Amendment for the subject residential development project. This study presents the existing potable water and sanitary sewer capacity of the services near the site, per coordination with the City, compared against estimations of demand (including fire flow) based on current conceptual design of the site. There is some discussion regarding the stormwater management criteria which will be developed during design stage. This study also presents the existing electrical capacity, in coordination with Hydro Ottawa, and compared against estimations of demand.

Should there be any questions or comments regarding this report, please do not hesitate to contact the undersigned.

Kind regards,

Stephen McCaughey, P.Eng.
Project Engineer

Ishaque Jafferjee, P.Eng.
Senior Project Engineer

WSP ref.: 191-13783-00

SIGNATURES

PREPARED BY

Stephen McCaughey, P.Eng.
Project Engineer
Name, Designation
Title

December 19, 2019
Date

APPROVED BY

Ishaque Jafferjee, P.Eng.
Senior Project Engineer
Name, Designation
Title

December 19, 2019
Date

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1 INTRODUCTION

WSP was retained by Ivanhoé Cambridge to provide engineering services for the adequacy of services for the 100 Bayshore Drive re-zoning and development in Ottawa, ON. The services investigated are potable water, sanitary sewer, storm sewer, and electrical power.

1.1 SITE DESCRIPTION

This 100 Bayshore Drive site is an undeveloped plot of land approximately 0.6 ha located along the south side of Woodridge Crescent near the Bayshore Shopping Centre and Bayshore Transit Station (see Figure 1-1). The proposed development is two high-rise towers below 30 storeys each along with a four-storey podium (one of which is below ground) connecting the two towers for parking and shared amenities. The buildings will have a combined gross floor area of approximately 50,000 m^2. See Appendix A for architectural conceptual design as of November 1, 2019 upon which this report is based. The project is currently envisioned to be a phased development, with one tower commissioned prior to the construction of the other.

Figure 1-1 100 Bayshore Drive Site Location

1.2 EXISTING INFRASTRUCTURE

The existing civil infrastructure near the site is located along Woodridge Crescent to the north of the site. This civil infrastructure encompasses, in nominal dimensions, a 200mm PVC potable watermain, a 250mm concrete sanitary sewer, and a 675mm concrete storm sewer. According to GeoOttawa, the sanitary sewer may be asbestos cement which would invoke special handling requirements; as such, the existing sewer material should be confirmed. In addition, there is an existing 300mm storm sewer of unknown material within the site property conflicting with the proposed development, discussed in Section 4. The nearest fire hydrant is located immediately outside the site, at the northwest corner, with two additional fire hydrants located within 150m. See Figure 1-2 for schematic of nearby civil infrastructure captured from the GeoOttawa website.

The potable watermain is within the 1W pressure zone. The sanitary sewer on Woodridge Cres. ultimately discharges to the West Nepean Collector on Carling Ave. north of the site. The storm sewer on Woodridge Cres. discharges to Graham Creek less than 1 km northwest of the site, and the creek discharges to the Ottawa River through Andrew Haydon Park less than 1 km northwards.

There is an existing 8kV service in a 5m wide easement in the westmost side of site complete with a hydro pad at the northwest corner.

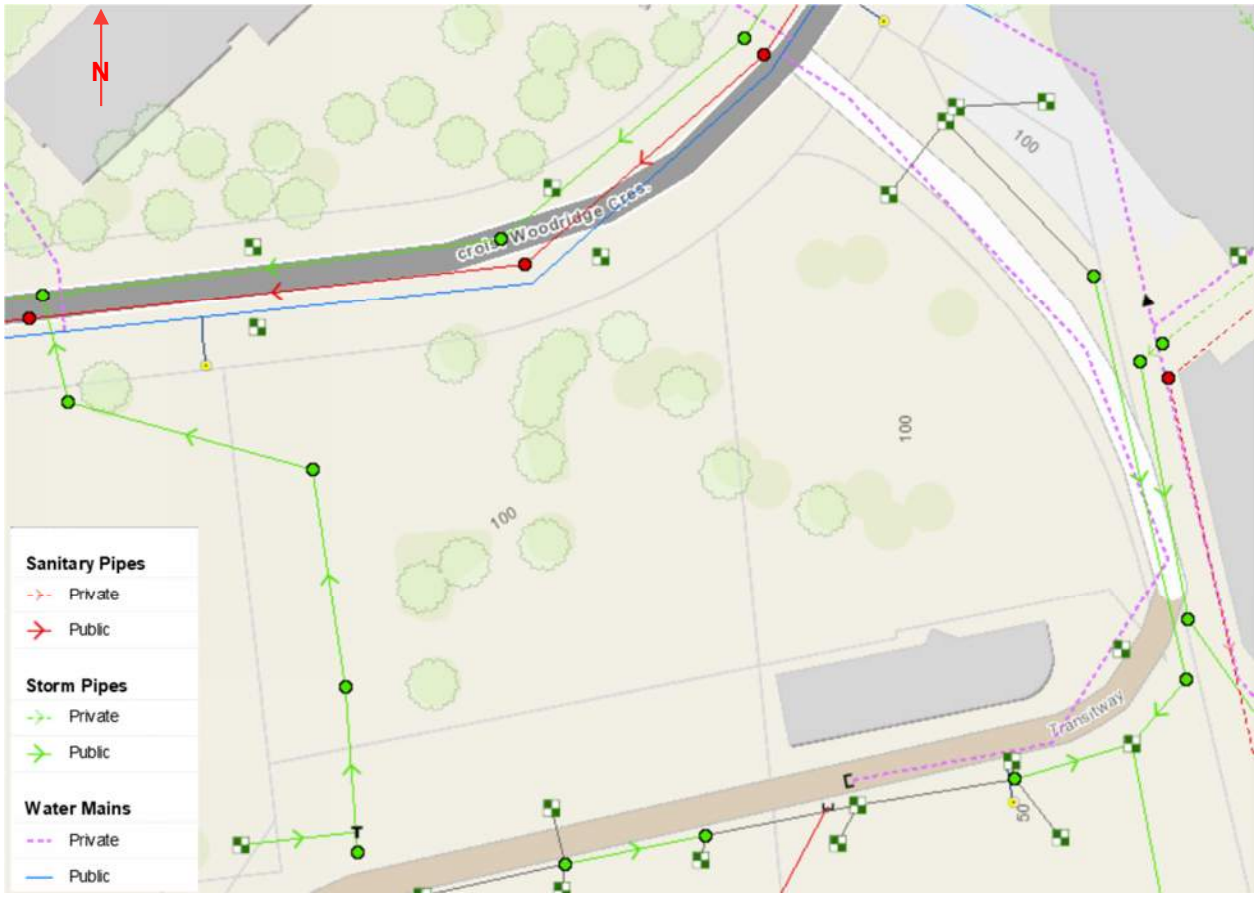


Figure 1-2 Civil Infrastructure around Site (GeoOttawa)

1.3 REFERENCES

This study of servicing adequacy was undertaken in conformance with, and utilizing information from, the following documents:

- Ottawa Sewer Design Guidelines, Second Edition, Document SDG002, October 2012, City of Ottawa including:
    - Technical Bulletin ISDTB-2012-4 (June 20, 2012)
    - Technical Bulletin ISDTB-2014-01 (February 5, 2014)
    - Technical Bulletin PIEDTB-2016-01 (September 6, 2018)
    - Technical Bulletin ISDTB-2018-01 (March 21,2018)
    - Technical Bulletin ISDTB-2018-04 (June 27, 2018)
- Ottawa Design Guidelines – Water Distribution, July 2010 (WDG001), including:
    - Technical Bulletin ISDTB-2014-02 (May 27, 2014)
    - Technical Bulletin ISTB-2018-02 (March 21, 2018)
- Fire Underwriters Survey, Water Supply for Public Fire Protection (FUS), 1999.
- Ontario Electrical Safety Code, 27th Edition, 2018

In addition, the minutes for the Pre-Application Consultation Meeting for this Official Plan Amendment Application are provided for reference in Appendix B.

2 POTABLE WATER

2.1 DEMAND CRITERIA

The potable water demand was calculated based on the architectural conceptual design of the site, as of November 1, 2019, to estimate residential unit numbers, unit types, and floor area. The domestic demand criteria are from the City of Ottawa Design Guidelines – Water Distribution (2010), applicable criteria summarized in Table 2-1 and Table 2-2.

Table 2-1 Residential Potable Water Demand Criteria

Demand	Value	Unit
Residential Avg. Day Demand	280	L/cap/d
Residential Max. Day Factor	2.5 x Avg. Day	
Residential Peak Hour Factor	2.2 x Max. Day	

Table 2-2 Apartment Unit Density Criteria

Apartment Unit Type	Persons/Unit
Bachelor	1.4
1 Bedroom	1.4
2 Bedroom	2.1
3 Bedroom	3.1
Average Apt.	1.8

The estimation of fire demand is from the Fire Underwriters Survey - Water Supply for Public Fire Protection (1999), summarized in Table 2-3, as interpreted by the City of Ottawa Technical Bulletin ISTB-2018-02 (2018). The base fire demand is calculated based on construction type and occupancy, then modified based on sprinkler system and proximity to nearby structures.

Table 2-3 FUS Fire Demand Calculation Criteria

Base Formula	$F = 220*C\sqrt{A}$ Where; F = minimum required fire flow in L/min C = construction type coefficient A = Total above grade floor area in m^2
Construction Type ‘C’	1.5 for wood frame construction 1.0 for regular construction

	0.8 for non-combustible construction 0.6 for fire-resistive construction
Modification of 'F' for occupancy (F_{mod})	Less 25% for non-combustible occupancy Less 15% for limited combustible occupancy No change for regular combustible occupancy Plus 15% for free burning occupancy Plus 25% for rapid burning occupancy
Reduction of 'F_{mod}' for sprinkler protection	Less 50% for complete sprinkler system Less 30% for basic NFPA 13 conforming system Additional 10% reduction for standard water lines Additional 10% reduction for supervised system *Max. 50% reduction in category
Addition of 'F_{mod}' for building exposure (each side)	Plus 25% for 0-3m separation Plus 20% for 3-10m separation Plus 15% for 10-20m separation Plus 10% for 20-30m separation Plus 5% for 30-45m separation *Max. total addition of 75% for all sides

2.2 DOMESTIC DEMAND ESTIMATION

The domestic potable water demand was calculated based on the design criteria in Section 2.1 and the architectural conceptual design of the two high-rise towers, as of November 1, 2019. The summary of the conceptual design, as it relates to domestic potable water demand is presented in Table 2-4.

Table 2-4 Residential Population Estimation from Conceptual Design (Nov 1, 2019)

Unit Type	East Tower		West Tower	
1 Bedroom	184 units	258 capita	164 units	230 capita
2 Bedroom	80 units	168 capita	71 units	149 capita
Total	264 units	**426 capita**	235 units	**379 capita**

Following this the domestic potable water demand was calculated and is presented in Table 2-5. While the demand of the two high-rises was calculated separately, only the total demands are relevant since only a single metered service will be provided for the two towers.

Table 2-5 Domestic Potable Water Demand

	East Tower	West Tower	Total
Average Day Demand	1.38 L/s	1.23 L/s	**2.61 L/s**
Max. Day Demand	3.45 L/s	3.07 L/s	**6.52 L/s**
Peak Hour Demand	7.59 L/s	6.75 L/s	**14.34 L/s**

2.3 FIRE DEMAND ESTIMATION

The fire demand was calculated based on the design criteria in Section 2.1 and the architectural conceptual design of the two high-rise towers, as of November 1, 2019. The summary of the fire demand calculation, completed with conservative interpretations of the criteria, is presented in Table 2-6. The fire demand is calculated for the two towers separately, but the relevant fire demand for the site is the maximum value between the two.

As confirmed by a letter from the architect, provided in Appendix B, the buildings will be constructed in accordance with OBC 3.2.2.42 for fire protection. Based on this confirmation, the buildings were taken as Fire-Resistive for the fire flow calculation (2hr fire rating of all floors, roof, and structural frame). Accordingly, per the FUS criteria, for a fire-resistive structure a reduced gross floor area is permitted based on the two largest adjacent floor areas and the next eight floors above.

Table 2-6 Fire Demand of Potable Water

	East Tower		West Tower	
	Criteria	**Value**	**Criteria**	**Value**
Construction Type 'C'	Fire-resistive	0.6	Fire-resistive	0.6
Gross Floor Area		10,926 m^2		10,915 m^2
Base Fire Demand 'F' (nearest 1,000 L/min)		14,000 L/min		14,000 L/min
Occupancy	Limited combustible	-15%	Limited combustible	-15%
Occupancy-modified Fire Demand 'F_{mod}'		11,900 L/min		11,900 L/min
Sprinkler Protection	Complete	-50%	Complete	-50%
Exposure	~20m to West Tower	+15%	~20m to East Tower	+15%
Final Fire Demand (nearest 1,000 L/min)		8,000 L/min (133.33 L/s)		8,000 L/min (133.33 L/s)
Final Fire Demand for Site		**8,000 L/min (133.33 L/s)**		

2.4 PROPOSED SERVICE CONNECTION

In accordance with the City's Water Distribution Guidelines, since the site has an average day demand of greater than 50 m^3/d (0.58 L/s) two watermain connections will be required for redundancy. The two service laterals will connect to the 200mm watermain on Woodridge Cres. near one another with a valve installed on the watermain between the two connections to facilitate isolation. Within the site, the two laterals will be looped within the building complex to ensure redundancy of supply for both towers. The internal looping of the water will be coordinated with the Mechanical Designer during the design phase. See Appendix C for a marked up drawing as the Conceptual Site Servicing Plan.

2.5 EXISTING CAPACITY

For purposes of adequacy of existing services, the following verifications were completed to check pressure and flow requirements:

- No flow, maximum system pressure
- Peak hour flow, minimum system pressure
- Maximum day and fire flow, minimum system pressure during fire

Following correspondence with the City (see Appendix B), the following existing boundary conditions were confirmed at the City connection:

- Assumed average ground elevation of 66m above sea level (ASL)
- Minimum hydraulic grade line: 105.5m (56 psi pressure)
- Maximum hydraulic grade line: 115.5m (71 psi pressure)
- Available flow at minimum fire pressure 20 psi (140 kPa): 145 L/s

Per the City's Water Distribution Guidelines during typical domestic demands pressures must be within 40-80 psi (275-550 kPa), with 20 psi (140 kPa) the minimum during fire demand and 100 psi (690 kPa) the maximum.

The twin service laterals were modelled in EPANET v2.0 to verify pressures at the connection points and building. The model outputs are provided in Appendix D. At zero demand the maximum pressure was 74 psi (510 kPa). At peak hour flow the minimum pressure was 55 psi (380 kPa). Therefore, domestic demands can be serviced within the City's pressure boundaries.

2.5.1 FIRE FLOW DEMAND

The total maximum day and fire flow is 139.85 L/s (6.52 L/s + 133.33 L/s). Per the City's noted available flow of 145 L/s at minimum fire pressure, we believe the existing system has sufficient capacity to supply the development.

Alternatively, per the City's Technical Bulletin ISTB-2018-02 Appendix I "Guideline on Coordination of Hydrant Placement with Required Fire Flow" Table 1 provides a holistic estimation of available capacity to based on proximity and type of hydrants near site in question. There is one Class AA hydrant within 75m of the site and two Class AA hydrants within 150m of the site. According to the table there is a total theoretical capacity of 222 L/s at 20 psi from these three hydrants, sufficient to support the estimated fire flow demand of the site.

At the time of writing this report, agreement has not been received by the City that the calculation of fire flow demand was performed in accordance with their interpretation of the FUS method nor formally that there is sufficient capacity for the fire flow. Based on the information presented, we believe the estimated demand is valid and the existing system capacity is sufficient to support this demand. Further discussion with the City may be needed to clarify the matter.

Should there ultimately prove to be insufficient capacity, alternatives to support the demand may require in depth coordination with the City which may include the following:

- Analysing fire flow requirements strictly based on sprinkler demands by mechanical designer;
- City to consider upsizing the proposed supply watermain back to Bayshore Drive;
- City to explore boosting pressure within the City network system to support Transit Oriented Developments;
- Provisions for an on-site cistern (considered impractical); or,
- Allow developer to carry the risk in the interim, in anticipation of future system upgrades likely required to support redevelopment elsewhere on Woodridge Crescent.

3 SANITARY SEWER

3.1 DEMAND CRITERIA

The sanitary sewer demand was calculated based on the architectural conceptual design of the site, as of November 1, 2019, to estimate residential unit numbers and unit types. The domestic demand criteria are from the City of Ottawa Sewer Design Guidelines (2012) and City of Ottawa Technical Bulletin ISTB-2018-01 (2018), summarized in Table 3-1, Table 3-2, and Table 3-3.

Table 3-1 Residential Sanitary Sewer Demand Criteria

Demand	Value	Unit
Residential Avg. Day Demand	280	L/cap/d
Residential Peaking Factor (Harmon Equation)	$PF = 1 + \left(\frac{14}{4 + \sqrt{\frac{Population}{1000}}} \right) * 0.8$ (Min. 2.0; Max. 4.0)	

Table 3-2 Apartment Unit Density Criteria

Apartment Unit Type	Persons/Unit
Bachelor	1.4
1 Bedroom	1.4
2 Bedroom	2.1
3 Bedroom	3.1
Average Apt.	1.8

Table 3-3 Peak Infiltration Allowance

Demand	Value	Unit
Peak Infiltration Allowance	0.33	L/s/ha

3.2 DEMAND ESTIMATION

The sanitary sewer demand was calculated based on the design criteria in Section 3.1 and the architectural conceptual design of the two high-rise towers, as of November 1, 2019. The summary of the conceptual design, as it relates to sanitary sewer demand is presented in Table 3-4.

Table 3-4 Residential Population Estimation from Conceptual Design (Nov 1, 2019)

Unit Type	East Tower		West Tower	
1 Bedroom	184 units	258 capita	164 units	230 capita
2 Bedroom	80 units	168 capita	71 units	149 capita
Total	264 units	**426 capita**	235 units	**379 capita**

Following this the sanitary sewer demand was calculated and is presented in Table 3-5. While the demand of the two high-rises was calculated separately, only the total demands are relevant since only a single service lateral will be provided for the two towers.

Table 3-5 Sanitary Sewer Residential Demand

	East Tower	West Tower	Total
Residential Average Day Demand	1.4 L/s	1.2 L/s	2.6 L/s
Residential Peaking Factor	3.41	3.43	
Residential Peak Daily Demand	4.7 L/s	4.2 L/s	**8.9 L/s**
Peak Infiltration Flow	0.1 L/s	0.1 L/s	**0.2 L/s**
			9.1 L/s

3.3 PROPOSED SERVICE CONNECTION

In accordance with the City's Sewer Design Guidelines, the sewer lateral should be designed with a minimum slope of 1%, minimum diameter of 135mm, and peak velocity between 0.6-3.0 m/s. A 150mm service lateral, assuming the minimum slope of 1%, will sufficiently carry the demand with velocities between 0.6-3.0 m/s. A monitoring maintenance hole will also be proposed inside the property line as per the Sewer Use By-law. Since the receiving sewer on Woodridge Cres. is a 250mm diameter concrete pipe (and service lateral greater than 50% of receiving sewer diameter), a maintenance hole will be installed on the sewer at the location of the connection. As noted in Section 1.2 the existing sanitary sewer may be asbestos cement and therefore will require special requirements to connect to. See Appendix C for a marked up drawing as the Conceptual Site Servicing Plan.

3.4 EXISTING CAPACITY

Following correspondence with the City, it was confirmed that the receiving sanitary sewers have sufficient capacity for the estimated 9.1 L/s peak sanitary flow. Correspondence with the City is provided in Appendix B for reference.

4 STORM SEWER

4.1 DEMAND & DESIGN CRITERIA

Per the Pre-Consultation Meeting with the City, the existing storm system in the Right of Way was built pre-1970 and therefore all post-development peak flows up to and including the 100-year storm must be controlled to a release rate of the 2-year pre-development peak flow. The existing capacity of the storm sewer was not determined since the site will necessarily be required to release storm runoff at pre-development rates, and it is assumed the storm infrastructure is currently adequate for this 2-year storm pre-development peak flow rate. These stormwater controls can be implemented through Best Management Practices such as underground stormwater detention tanks, inlet control devices, and infiltration promotion.

For reference, an estimation of the required storage was completed. Using the City's IDF curves and a 20-minute Time of Concentration, the maximum allowable discharge (equal to the 2-yr pre-development rate) is approximately 17 L/s. Assuming effectively no infiltration post-development, during the 100-yr storm the maximum stormwater storage required would be approximately 277 m^3. See Appendix E for details of the preliminary stormwater management calculations. This required storage can be reduced through increasing softscaped areas and infiltration promotion (depending on soil type and groundwater level from geotechnical investigation), though may be increased to compensate for any areas of the site that cannot be captured.

4.1.1 RIDEAU VALLEY CONSERVATION AUTHORITY CONSULTATION

In addition to this quantitative stormwater control, qualitative control will also be needed as typically required by Rideau Valley Conservation Authority (RVCA). Per pre-consultation with the Authority, an 80% TSS reduction will be required since the site is less than 1 km from the receiving water body, Graham Creek. This qualitative control will be achieved through Best Management Practices such as oil & grit separators.

4.1.2 MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS CONSULTATION

While not required at this re-zoning application stage, an Environmental Compliance Approval (ECA) may be required by the Ministry of the Environment, Conservation and Parks (MECP) as part of the Site Plan Control process. The proposed site contains two individual parcels but will have a single storm discharge to Woodridge Cres. and therefore, an ECA will be required. However, if the two parcels are amalgamated as a single parcel and are recognized as such by the City and MECP then no such ECA will be required. Our understanding is that the two parcels will be amalgamated into one Property Identification Number (PIN).

4.2 EXISTING ON-SITE STORM SEWER

As shown in Figure 1-2, a 300mm storm sewer runs through the west side of the site conflicting with the conceptual design of the high-rise. Based on data available on GeoOttawa, this storm sewer originates from a catch basin in 90 Woodridge Cres. west of the site, enters the Bayshore Transit Station property, then north through 100 Bayshore Dr. site, and back into 90 Woodridge Cres. before connecting to the storm sewer on Woodridge Crescent. It appears the catch basin only collects stormwater in a very small corner of 90 Woodridge Cres., and the rest of site draining by overland flow towards Woodridge Crescent. There are multiple options for this sewer prior to construction of the high-rises:

- Relocate the sewer within the site to avoid conflict with construction;

- Consult with the designers of the Bayshore Transit Station for the Phase 2 LRT to accept this stormwater through the Station's property and abandon the sewer in 100 Bayshore Drive; or,
- Consult with the property owner to regrade this corner where the catch basin is located to allow overland flow consistent with the rest of the area and allow abandonment of the conflicting sewer in 100 Bayshore Drive.

While not necessary at this stage of the project, it is prudent to coordinate early to resolve the conflict.

5 ELECTRICAL POWER

5.1 DEMAND & DESIGN CRITERIA

A site visit was performed, along with a neighbourhood review of the existing pad-mounted transformer being used by other properties. A preliminary load was calculated using the OESC to determine the overall requirements and the calculated loads were then discussed with Hydro Ottawa.

Based upon a typical apartment calculation per OESC-Sec. 8, the average is 14kW per apartment based on largest unit, plus approximate allowances for common areas, garage load, elevators, and fire pumps. The calculations are detailed in Appendix F.

East Tower: Load = 3,956kW; Design Load = 678.75kW or 817A at 600VAC-3ph

West Tower: Load = 3,550kW; Design Load = 638.15kW or 769A at 600VAC-3ph

Total: 1316.9kW (or 1586A at 600VAC-3ph)

Note, these load calculations are approximate and will vary during detailed design.

5.2 EXISTING CAPACITY

The site is currently supplied from an 8kV system by Hydro Ottawa. The maximum transformer size on an 8kV system is 1000kVA. With the current conceptual design and estimated load calculations for the development, a singular pad-mounted transformer would not be sufficient for the site. However, Hydro Ottawa may allow two pad-mounted transformers, one per tower, which would coincide with the proposed phasing of the two towers. Further coordination with Hydro Ottawa is necessary to verify existing capacity.

Alternatively, Hydro Ottawa is currently investigating expanding the 13kV system into this area for the future Bayshore LRT station estimated to be energized by 2022. Their current estimate for this expansion is $4.5M, of which the developer would be expected to contribute capital based on expected usage, when connection occurs, in coordination with Hydro Ottawa. See Appendix B for communication with Hydro Ottawa. For a 13kV system, the maximum service size is 1500kVA for a pad-mounted transformer or 4500kVA for an underground hydro-vault. Therefore, a single hydro-vault would be sufficient to supply the proposed development.

6 CONCLUSION

WSP was retained by Invanhoé Cambridge to provide this Adequacy of Services Study in support of the Official Plan and Zoning By-Law Amendment Application for the subject site located at 100 Bayshore Drive and planned twin high-rise residential towers therein. The services investigated were potable water, sanitary sewer, storm sewer, and electrical power.

The preliminary water demand was calculated as 14.3 L/s peak hour domestic demand and 139.5 L/s max day plus fire flow. Per coordination with the City for the supply watermain boundary conditions, a 200mm main on Woodridge Cres., it was confirmed the existing system has sufficient capacity to supply the domestic demands within system pressure limits. We believe there is sufficient capacity to supply the fire flow demand as well, but confirmation needs to be received from the City. Further discussion may be required with the City.

The preliminary sanitary sewer demand was calculated as 9.1 L/s peak demand. Per coordination with the City it was confirmed that the proposed receiving sewer, a 250mm sanitary sewer on Woodridge Cres., has sufficient capacity to receive the proposed demand.

The site will be required by the City to limit the discharge rate of the stormwater to the pre-development 2yr storm rate, storing or infiltrating the stormwater up to the post-development 100yr storm. Preliminary estimates of the runoff rates lead to an approximate maximum discharge rate of 17 L/s, with a required storage for approximately 277 m^3.

The preliminary electrical power demand was calculated as 1317kW (1586A at 600VAC-3ph). Per coordination with Hydro Ottawa, the 8kV system that currently services the site may be able to service each tower with a separate pad-mounted transformer. Alternatively, a 13kV system will likely be expanded to service the future Bayshore LRT station which would be sufficient to supply this site demand. Further coordination with Hydro Ottawa is necessary to develop design options.

Therefore, with exception of the electrical power and fire flow, it is confirmed the existing infrastructure is sufficient to support the proposed development. Further coordination is required with the City regarding fire flow and Hydro Ottawa regarding electrical power. It should be noted that all demand calculations are estimates based on conceptual architectural plans and are subject to change during the design phase.

APPENDIX

A ARCHITECTURAL CONCEPTUAL BUILDING DESIGN (NOV 1, 2019)

100 Bayshore

KingSett CAPITAL

Ivanhoé Cambridge
CDP Capital
Groupe immobilier

HOBIN
ARCHITECTURE

NOVEMBER 1ST, 2019

100 Bayshore

CONTEXT IMAGE - AERIAL VIEW

SCALE 1:300

NOVEMBER 1ST, 2019

HOBIN ARCHITECTURE

KingSett CAPITAL

Ivanhoé Cambridge
CDP Capital
Groupe immobilier

FACING SOUTH EAST

FACING SOUTH WEST

FACING NORTH EAST

FACING NORTH EAST

HOBIN ARCHITECTURE

100 Bayshore

CONTEXT IMAGES

SCALE 1:300

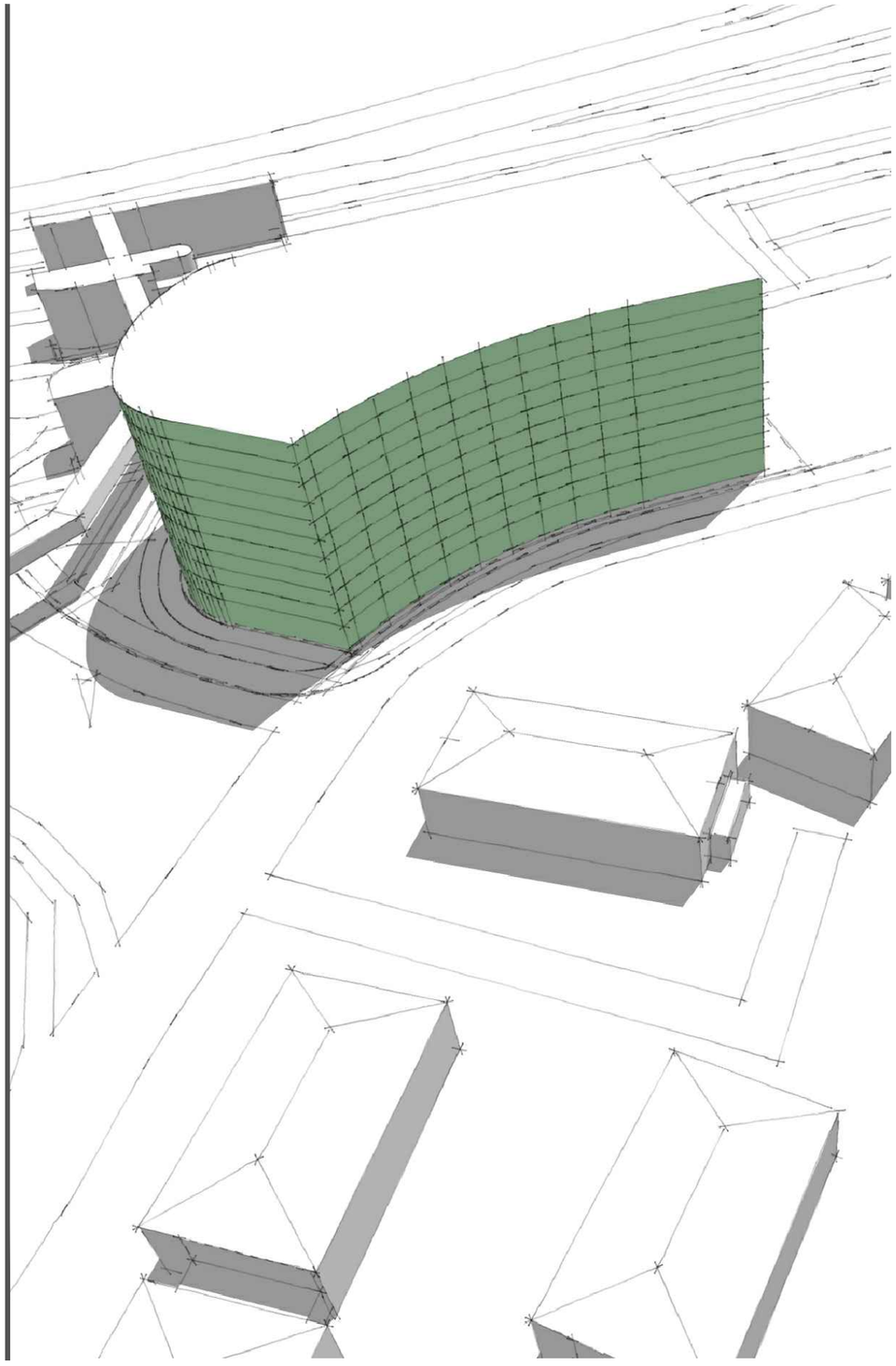
NOVEMBER 1ST, 2019

KingSett CAPITAL

Ivanhoé Cambridge
CDP Capital
Groupe immobilier

PERMITTED YIELD
46,340 SQ.FT. PER FLOOR
46,340 SQ.FT. x 11 FLOORS
=
509,740 SQ.FT. x 1.25
637,175 SQ.FT. MAX DEVELOPMENT
WHITHOUT TRIGERING BEFORE SECTION 37

CURRENT DESIGN YIELD FOR BOTH PHASES
539,320 SQ.FT.



HOBIN ARCHITECTURE

100 Bayshore

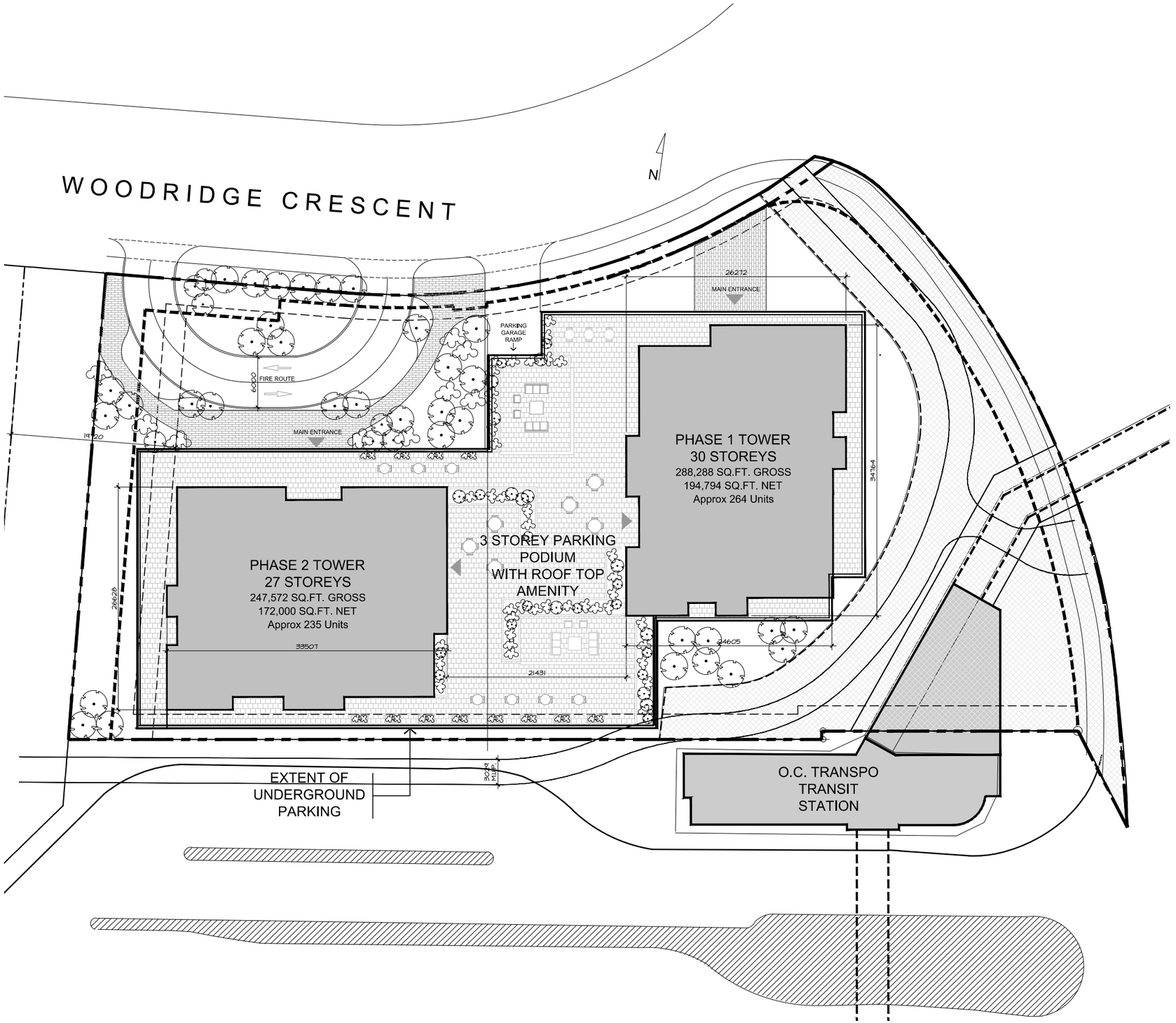
PERMITTED ZONING ENVELOPE

SCALE 1:500

OCTOBER 18th, 2019

KingSett CAPITAL

Ivanhoé Cambridge
CDP Capital
Groupe immobilier



DEVELOPMENT STATS

OVERALL STATS:

-TOTAL GROSS FLOOR AREA	535,860 SQ.FT.
-TOTAL NET LEASEABLE AREA	366,794 SQ.FT.
-UNIT COUNT	493 UNITS
-PARKING COUNT	297 UNITS
-AMENITY AREA	15,300 SQ.FT.

EAST PHASE BREAKDOWN - 30 STOREY

-TOTAL GROSS FLOOR AREA	
GROUND RES:	6,878 SQ.FT.
GROUND PARKING:	13,150 SQ.FT.
LEVELS 2 & 3 PARKING:	40,056 SQ.FT.
RES LEVELS 4 & ABOVE:	228,204 SQ FT.
TOTAL GROSS:	288,288 SQ FT.
-TOTAL NET LEASEABLE AREA	194,794 SQ.FT.
-UNIT COUNT	
1 BED :	158
1 BED + DEN:	26
2 BED :	26
2 BED + DEN:	54
UNIT TOTAL:	264 UNITS
-REQUIRED VEHICLE PARKING	132 SPACES
-REQUIRED VISITOR PARKING	25 SPACES
	157 TOTAL PARKING SPACES
-PROVIDED VEHICLE PARKING	163 SPACES
-REQUIRED TOTAL AMENITY SPACE	17,050 SQ.FT. (6 SQ.M./ UNIT)
-REQUIRED SHARED AMENITY SPACE	8,525 SQ.FT.
- PROVIDED SHARED AMENITY	8,500 SQ.FT.
- BALANCE TO BE PROVIDED AS PRIVATE BALCONIES	

WEST PHASE BREAKDOWN - 27 STOREY

-TOTAL GROSS FLOOR AREA	
GROUND RES:	6,145 SQ.FT.
GROUND PARKING:	9,035 SQ.FT.
LEVELS 2 & 3 PARKING:	30,360 SQ.FT.
RES LEVELS 4 & ABOVE:	202,032 SQ FT.
TOTAL GROSS:	247,572 SQ FT.
-TOTAL NET LEASEABLE AREA	172,000 SQ.FT.
-UNIT COUNT	
1 BED :	164
2 BED :	47
2 BED + DEN:	24
UNIT TOTAL:	235 UNITS
-REQUIRED VEHICLE PARKING	118 SPACES
-REQUIRED VISITOR PARKING	22 SPACES
	140 TOTAL PARKING SPACES
-PROVIDED VEHICLE PARKING	134 SPACES
6 MISSING STALLS TO BE USED FROM PHASE 1	
-REQUIRED TOTAL AMENITY SPACE	15,177 SQ.FT. (6 SQ.M./ UNIT)
-REQUIRED SHARED AMENITY SPACE	7,588 SQ.FT.
- PROVIDED SHARED AMENITY	6,800 SQ.FT.
- BALANCE TO BE PROVIDED AS PRIVATE BALCONIES	

HOBIN ARCHITECTURE

100 Bayshore

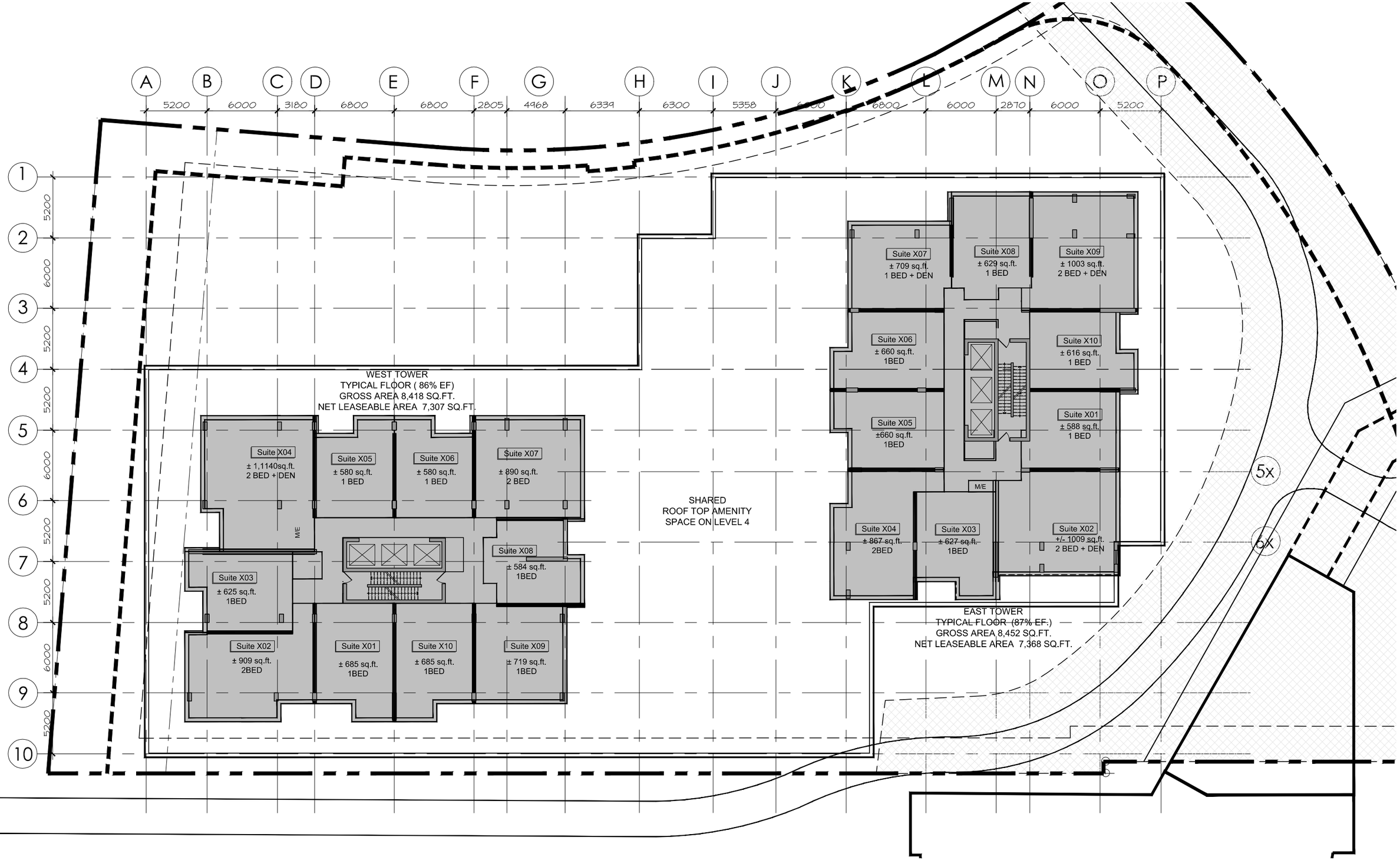
PROPOSED SITE PLAN

SCALE 1:300

NOVEMBER 1ST, 2019

KingSett CAPITAL

Ivanhoé Cambridge
CDP Capital
Groupe immobilier



100 Bayshore

TYPICAL FLOORS 5-30

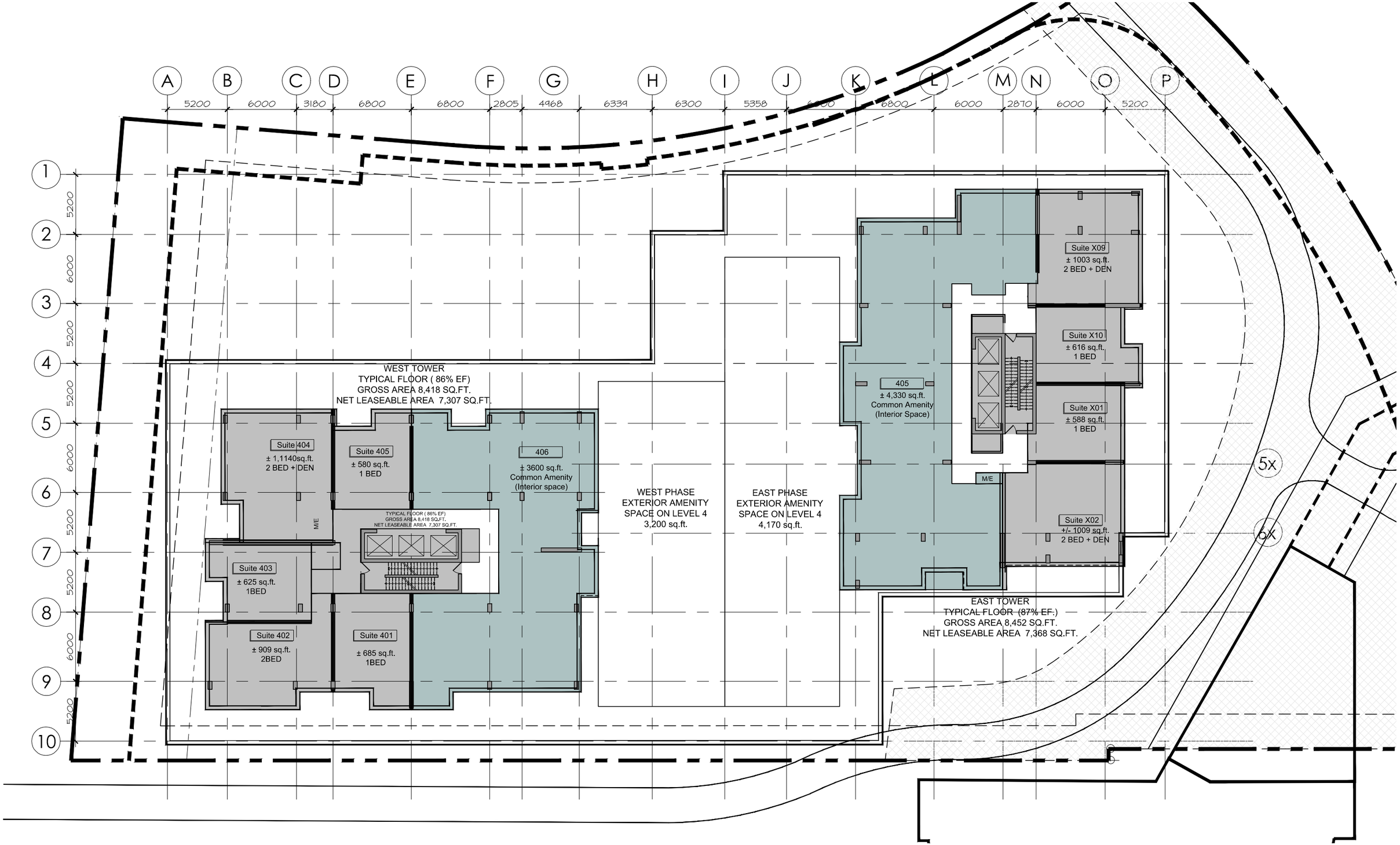
SCALE 1:300

NOVEMBER 1ST, 2019

HOBIN ARCHITECTURE

KingSett CAPITAL

Ivanhoé Cambridge
CDP Capital
Groupe immobilier



100 Bayshore

LEVEL 4 - MAIN AMENITY FLOOR

SCALE 1:300

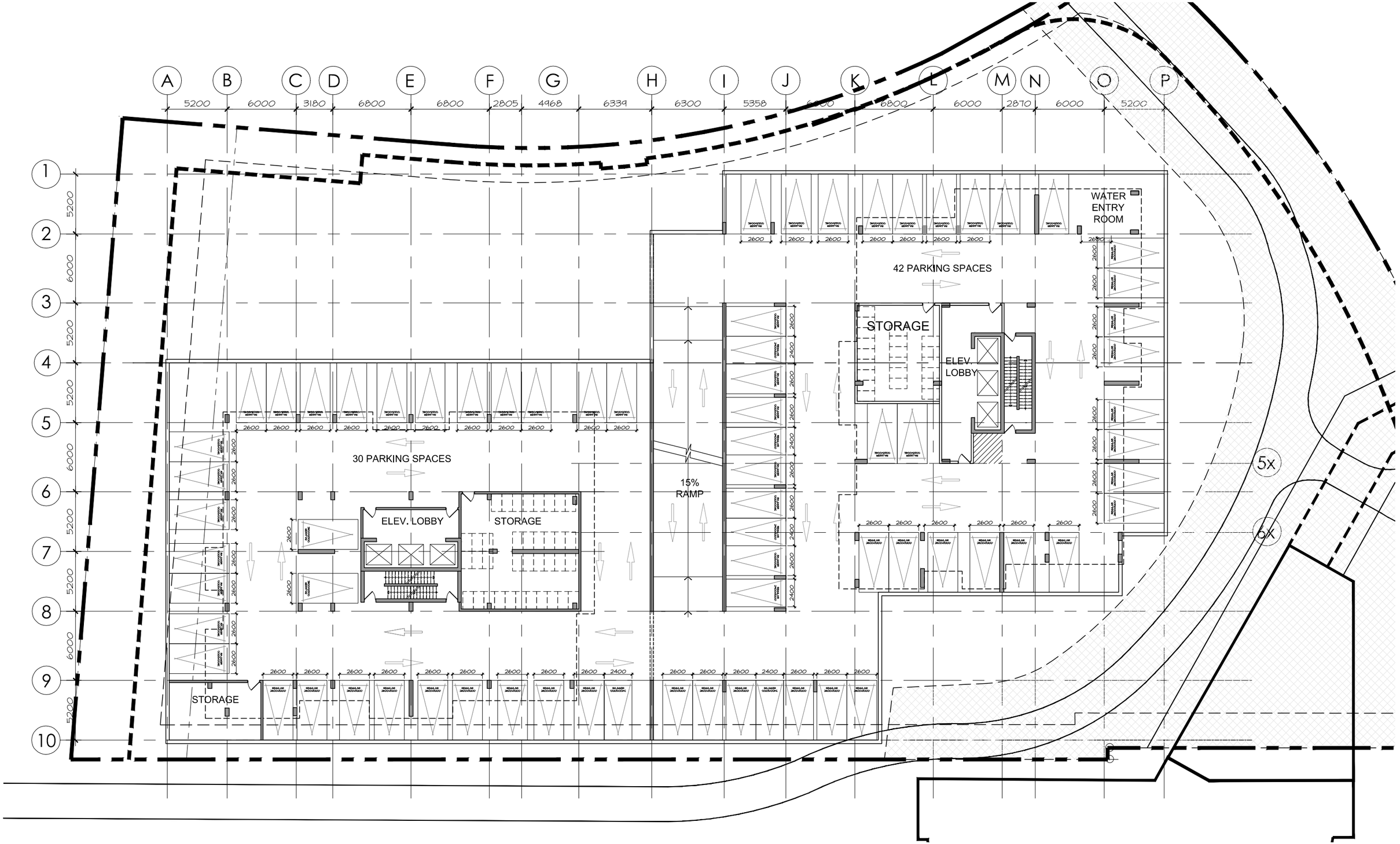
NOVEMBER 1ST, 2019

HOBIN ARCHITECTURE

KingSett CAPITAL

Ivanhoé Cambridge

CDP Capital
Groupe immobilier



100 Bayshore

PARKING LEVEL 2-3

SCALE 1:300

NOVEMBER 1ST, 2019

HOBIN ARCHITECTURE

KingSett CAPITAL

Ivanhoé Cambridge
CDP Capital
Groupe immobilier

100 Bayshore

GROUND LEVEL

SCALE 1:300

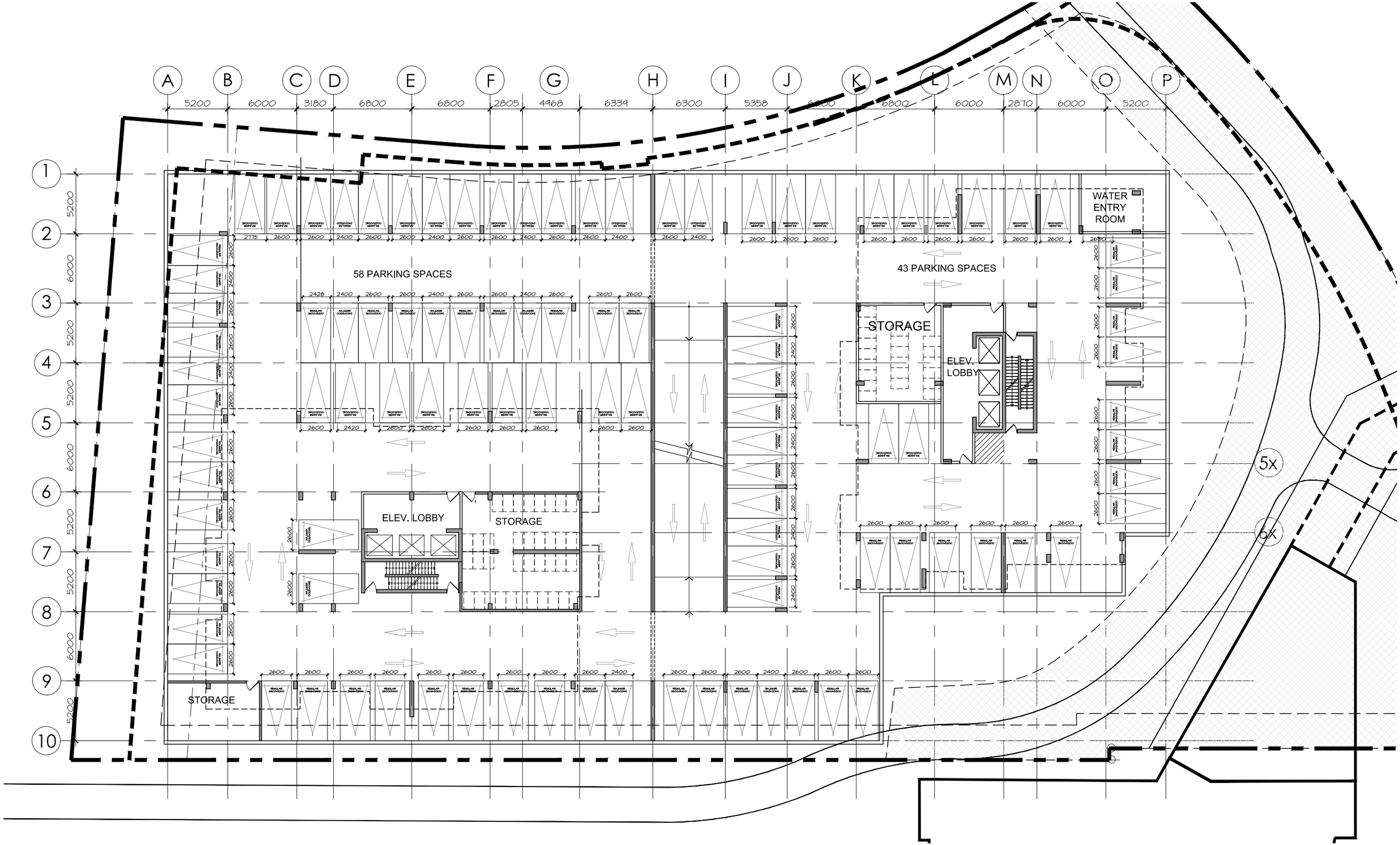
NOVEMBER 1ST, 2019

HOBIN ARCHITECTURE

KingSett CAPITAL

Ivanhoé Cambridge

CDP Capital
Groupe immobilier



100 Bayshore

PARKING LEVEL P1

SCALE 1:300

NOVEMBER 1ST, 2019

HOBIN ARCHITECTURE

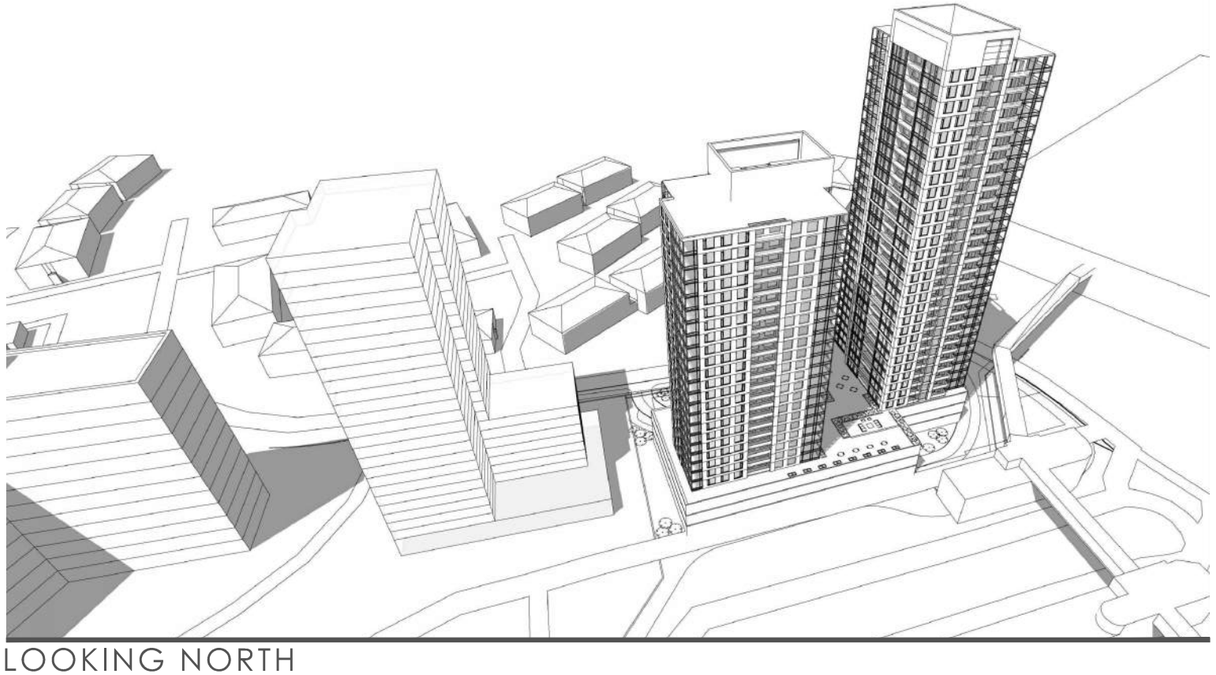
KingSett CAPITAL

Ivanhoé Cambridge

CDP Capital Groupe immobilier

LOOKING SOUTH

LOOKING WEST



LOOKING NORTH

LOOKING EAST

100 Bayshore

PROPOSED MASSING IMAGES

SCALE 1:N/A

NOVEMBER 1ST, 2019

HOBIN ARCHITECTURE

KingSett CAPITAL

Ivanhoé Cambridge
CDP Capital
Groupe immobilier

APPENDIX

B EXTERNAL COMMUNICATIONS

APPENDIX

B-1 PRE-CONSULTATION MEETING MINUTES

From: "McCreight, Laurel" <Laurel.McCreight@ottawa.ca>
Date: Friday, October 25, 2019 at 1:24 PM
To: Lloyd Phillips <lloyd@lloydphillips.com>
Cc: Christine McCuaig <christine@lloydphillips.com>
Subject: Pre-Consultation Follow-Up: 100 Bayshore Drive

Hi Lloyd,

Please refer to the below regarding the Pre-Application Consultation Meeting held on Thursday October 17th, 2019 for 100 Bayshore Drive for a Official Plan Amendment Application in order to increase building heights and densities. I have also attached the required Plans & Study List for application submission.

Below are staff's preliminary comments based on the information available at the time of pre-consultation meeting:

Planning / Urban Design

- The Official Plan has a site specific policy that applies to this site (3.6.1.17):
  - "The existing rapid transit station and proposed extension of Light Rail to the Bayshore Shopping Centre and the Accora Village Community create a unique opportunity to encourage infill, redevelopment, and high-rise built form surrounding this station to support the TOD objectives of this plan. The area located generally within 800 metres walking distance of this station is identified as a special study area where a secondary planning process will be undertaken, by either the landowner or the City to determine the future land use, height, density, connectivity, and the overall character of the community and which may be implemented through a secondary plan and amendments to the applicable Zoning By-law. In the interim and notwithstanding the above policies to the contrary, High-rise buildings up to 12 storeys in height will continue to be permitted in those areas where zoning currently permits high-rise buildings." [Amendment #150, October 19, 2018]
  - The applicant is seeking to amend this policy to proceed without being tied to Ferguslea and a secondary planning process.
  - Relief is also required as the property does not front on an arterial road, which the OP requires.
- Discussion regarding submitting a zoning by-law amendment concurrently with an OPA; there seemed to be an appetite around the table to proceed in this fashion.
- The OPA must provide policy direction for height (ie. limit height to a certain amount of storeys).
- Attendance at the UDRP is not required (the site is not within a Design Priority Area); however, it may be beneficial to attend an informal pre-consultation with the Panel based on the size and scale of the development (and the complexity of the planning applications). Here is a link to the UDRP webpage for dates of upcoming meetings and submission deadlines.
- Attention to the City's High-Rise Guidelines will be beneficial in particular to guidance on tower separation distances (on-site as well as from lot lines), floor plate size and the design of the site at the ground level.

- The design of the podium parking will be very important to ensure an active frontage along Woodridge Crescent and access to the future LRT station from the site.
- Policy 4.11.1 states
    - "Development applications for all High-Rise 31+ buildings will demonstrate how the proposed building will contribute to and enhance the skyline of the city and existing prominent views or vistas or create new vistas. Community design plans or other plans approved by Council may identify prominent important views. Skyline is defined in Section 2.5.6, policy 14."
    - Perhaps this section could, too, be amended; rationale could be provided that this policy is not applicable to this site.
- Linkages, pedestrian movement, connections to light-rail, public realm are all aspects that must be considered and designed appropriately.
- Section 37 may apply depending on final configuration of the proposal.
    - Please provide an analysis on whether or not Section 37 applies.

Engineering

- The Servicing Study Guidelines for Development Applications are available here.
- Servicing and site works shall be in accordance with the following documents:
    - Ottawa Sewer Design Guidelines (October 2012)
    - Ottawa Design Guidelines – Water Distribution (2010)
    - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
    - City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
    - City of Ottawa Environmental Noise Control Guidelines (January, 2016)
    - City of Ottawa Park and Pathway Development Manual (2012)
    - City of Ottawa Accessibility Design Standards (2012)
    - Ottawa Standard Tender Documents (latest version)
    - Ontario Provincial Standards for Roads & Public Works (2013)
- Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).
- The Stormwater Management Criteria, for the subject site, is to be based on the following:
    - The IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
    - The existing storm system in the RoW was built pre-1970, as such the post-development peak flow rate for storm events up to and including the 100 year event will need to be controlled to the 2 year pre-development storm event. Runoff will need to be detained onsite to control all storm events, up to and including the 100 year event, with an allowable release rate calculated based on the peak flow for the pre-development 2 year event.
    - The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
    - A calculated time of concentration (cannot be less than 10 minutes).
    - Redevelopment will be expected to provide water quality protection at an enhanced level (minimum 80% TSS removal), as per the RVCA.

- The proposed sanitary flows need to be provided to the City to confirm capacity / identify the impact on the downstream West Nepean Collector.
- Deep Services (Storm, Sanitary & Water Supply)
    - Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.
    - Connections to trunk sewers and easement sewers are typically not permitted.
    - Provide information on the monitoring manhole requirements – should be located in an accessible location on private property near the property line (ie. Not in a parking area).
    - Review provision of a high-level sewer.
    - Provide information on the type of connection permitted
        - Sewer connections to be made above the springline of the sewermain as per:
            - Std Dwg S11.1 for flexible main sewers – connections made using approved tee or wye fittings.
            - Std Dwg S11 (For rigid main sewers) – lateral must be less that 50% the diameter of the sewermain,
            - Std Dwg S11.2 (for rigid main sewers using bell end insert method) – for larger diameter laterals where manufactured inserts are not available; lateral must be less that 50% the diameter of the sewermain,
            - Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.
            - No submerged outlet connections.
- Please refer to ISDTB – 2014-2: individual residential facilities with a basic day demand greater than 50 m3/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid the creation of a vulnerable service area.
- Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:
    - Location of service
    - Type of development and the amount of fire flow required (as per FUS, 1999).
    - Average daily demand: ___ l/s.
    - Maximum daily demand: ___l/s.
    - Maximum hourly daily demand: ___ l/s.
    - Note that if Accora Village is proposed to re-develop in its entirety, the proponent may be required to (or may consider) modelling the loop along Woodridge Crescent to provide sub-division level details above.
- Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.
    - Please refer to Ontario Regulation 153/04:
        - “the date the last work on all of the records review, interviews and site reconnaissance required for the phase one environmental site assessment that is the subject of the report was done is no later than 18 months before the submission of the record of site condition or the commencement of the phase two environmental site assessment” and

        - "the date the last work on all of the planning the site investigation, conducting the site investigation and reviewing and evaluating the information gathered through the site investigation required for the phase two environmental site assessment that is the subject of the report was done is no later than 18 months before the submission of the record of site condition or the commencement of the risk assessment".
- MOECC ECA Requirements
    - Please note that an ECA is not required for zoning amendment however the following applies to the Site Plan Control process:
    - An MOECC Environmental Compliance Approval (Municipal/Private Sewage Works) will be required for the proposed development where the storm sewer network is designed to service more than one lot or parcel of land. The proposed development boundary appears to include two parcels of land.
- Although not required for the rezoning amendment, please note that for Site Plan Control, there is an existing public STM sewer running through the site. Please identify the easement associated with this sewer and provide details of how this will be taken into consideration in the proposed design.
- Although not required for the rezoning amendment, please note that for Site Plan Control, please ensure that all easements within the property and adjacent to the subject property are identified on the drawing set and please provide details for all easements identified.

Please contact Infrastructure Project Manager, Ghislaine Miliu for follow-up questions.

Transportation

- Follow Traffic Impact Assessment Guidelines
    - Screening form to start, full Traffic Impact Assessment if any of the triggers on the screening form are satisfied.
    - Start this process as soon as possible.
    - Applicant advised that their application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).

Please contact Transportation Project Manager, Mike Giampa for follow-up questions.

Other

Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-consultation comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please do not hesitate to contact me if you have any questions.

Regards,
Laurel

Laurel McCreight MCIP, RPP
Planner
Development Review West
Urbaniste
Examen des demandes d'aménagement ouest

City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 16587
ottawa.ca/planning / ottawa.ca/urbanisme

'

'

APPENDIX

B-2 WATER & SANITARY CAPACITY FROM CITY

McCaughey, Stephen

From: Miliu, Ghislaine <ghislaine.miliu@ottawa.ca>
Sent: Monday, December 02, 2019 12:14 PM
To: McCaughey, Stephen
Cc: Jafferjee, Ishaque; Miliu, Ghislaine; McCreight, Laurel
Subject: RE: 100 Bayshore Dr Development - Sanitary and Potable Adequacy & Storm Relocation
Attachments: 100 Bayshore Nov 2019.pdf; 18689-PRP_064e.pdf; 4R14855.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Stephen,

With respect to the existing easements (please find the 4R plan attached entitled 4R14855), it appears there are many easements on the site that are in favour of the City. Please also find a drawing attached (entitled 18689-PRP_064e), which highlights recent acquisitions which may impact the site servicing (and proposed design all together). Please propose how you want to proceed with servicing while considering existing easements and recent acquisitions (i.e. propose how the existing STM sewer running through the site will be re-located or whether this flow will be considered when designing the STM sewers / SWM for the proposed development).

With respect to Sanitary, the City confirms there is capacity for your proposed sanitary flow of 9.10 L/s.

With respect to Water are you proposing each tower has one connection the public WM or will you be adding a private loop servicing both towers?

Based on the information provided for Water connections:

The following are boundary conditions, HGL, for hydraulic analysis at 100 Bayshore (zone 1W) assumed to be connected to the 203 mm on Woodridge (see attached PDF for location).
Minimum HGL = 105.5m
Maximum HGL = 115.5 m
Available Flow @20psi = 145 L/s assuming a ground elevation of 66.0m

These are for current conditions and are based on computer model simulation.
Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Ghislaine Miliu, P.Eng, LEED AP BD+C
Project Manager – Infrastructure Approvals
Development Review | Examen des projets d'aménagement
City of Ottawa | Ville d'Ottawa

APPENDIX

B-3 FIRE-RESISTIVITY FROM ARCHITECT

December 12th, 2019

WSP
Stephen McCaughey
Stephen.Mccaughey@wsp.com

Re: 100 Bayshore – Fire flow's and confirmation of building classification

Good morning Stephen,

As per your request, This letter is to confirm that both buildings proposed for 100 Bayshore – lob B will have a building classification of O.B.C. 3.2.2.42 Group C, Any Height, Any area, Sprinklered

O.B.C. 3.2.2.42 Group C, Any Height, Any area, Sprinklered

(1) Except as permitted by Articles 3.2.2.43. to 3.2.2.48., a building classified as Group C other than a retirement home shall conform to Sentence (2).

(2) Except as permitted by Article 3.2.2.16., the buildingreferred to in Sentence (1) shall be of noncombustible construction, and,

(a) except as permitted by Sentence 3.2.2.7.(1), the building shall be sprinklered,

***(b)** except as permitted by Sentence (3), **floor assemblies shall be fire separationswith a fire-resistance rating not less than 2 h**,*

(c) mezzanines shall have a fire-resistance rating not less than 1 h, and

(d) loadbearing walls, columns and arches shall have a fire-resistance rating not less than that required for the supported assembly.

***(3)** In a building that contains dwelling units that have more than 1 storey, subject to the requirements of Sentence 3.3.4.2.(3), the floor assemblies, including floors over basements, which are entirely contained within these dwelling units, shall have a fire-resistance rating not less than 1 h but need not be constructed as fire separations.*

HOBIN
ARCHITECTURE

Partners
Barry J. Hobin
OAA, FRAIC, Hon. Fellow AIA
William A. Davis
OAA, MRAIC, Associate AIA
Gordon Lorimer
OAA, FRAIC, Associate AIA
Wendy Brawley
OAA, MRAIC, Associate AIA
Douglas Brooks
Senior Arch. Tech.

Directors
Marc Thivierge, OAA
Reinhard Vogel

Associates
Bryan Bonell, OAA
William Ritcey
Dan Henhoeffer
Melanie Lamontagne, OAA
Rheal Labelle
Patrick Bisson, OAA

Hobin Architecture Incorporated
63 Pamilla Street
Ottawa, Ontario
Canada K1S 3K7
t 613-238-7200
f 613-235-2005

hobinarc.com

HOBIN
ARCHITECTURE

The current assumption is that the the floors, structural frame and the roofs will be constructed of non-combustible construction and composed of poured concrete which will meet the fire resistance ratings requirements described in the O.B.C. section stated above.

Please let me know if you require any more information with respect to the fire rating requirements for this proposed development.

Regards,

Patrick Bisson, OAA

APPENDIX

B-4 ELECTRICAL CAPACITY FROM HYDRO OTTAWA

From: "Murphy, Christopher" <ChristopherMurphy@hydroottawa.com>
Date: November 22, 2019 at 1:48:07 PM EST
To: "tconroy@anew-electrical.com" <tconroy@anew-electrical.com>
Cc: "Mcguire, Carmen" <Carmen.McGuire@wsp.com>
Subject: RE: New Apartment Buildings, Woodridge Crescent - Concept Stage

Hi Todd,

This area is supplied from our 8kV system. our maximum transformer size and service entrance on the 8kV is 1000kVA. With the information you provided on the 2 buildings, this would not work for the site.

Alternative options:

1) 44kV substation – addressing because it was on the drawing, but there is 44kV (substation nearby) which is used to supply some customers. However this would not be an application to provide to a residential building and the requirements are for customers to have 44kV customer owned substations which I can't imagine is a desire.
2) 13kV – we are currently investigating bringing the 13kV system out this way for the LRT station. A high level estimate to get the system to them is $4.5M. The cost is offset by the forecasted load they bring on. If a customer (yourselves) were to come in and connect to this system then a calculation taking into effect, timing of connections, amount of system expansion used, and differences in load is completed and a capital contribution for the new customer's connection onto the system expansion is required.

To your other questions, typically from the 8kV (if 1000kVA can be achieved and the system can accommodate the load increase) is serviced through padmounted transformers. A single service would be provided to each individual building. On the 13kV we have a maximum padmount transformer supply of 1500kVA, but can provide a vault supply option where a bank can be sized to 4500kVA. Depending on the building we could look at a single large vault supply.

Not the best news I expect, but please feel free to give me a call to review/discuss.

Thanks,

Chris Murphy
Supervisor, Distribution Design
Superviseur, Conception Distribution

christophermurphy@hydroottawa.com
Tel./tél.: 613 738-5499 | ext./poste 7114
Cell.: 613 868-1548

HydroOttawa

APPENDIX

C CONCEPTUAL SITE SERVICING PLAN

Prop. 150mm dia. sanitary service lateral c/w monitoring MH

Prop. stormwater management tank, storm service lateral c/w monitoring MH

Prop. twinned 150mm dia. valved potable water service laterals.

MAIN ENTRANCE

MOVE-IN ROOM

MAIN LOBBY

GARBAGE AND RECYCLING

BIKE ROOM

BIKE ROOM

MOVE-IN ROOM

MAIN LOBBY

16 PARKING SPACES

15% RAMP

36 PARKING SPACES

GARBAGE AND RECYCLING

ELEV. LOBBY

STORAGE

STORAGE

5x

6x

100 Bayshore

GROUND LEVEL

SCALE 1:300

NOVEMBER 1ST, 2019

Conceptual Site Servicing Plan

WSP Canada Group Ltd.

HOBIN ARCHITECTURE

KingSett CAPITAL

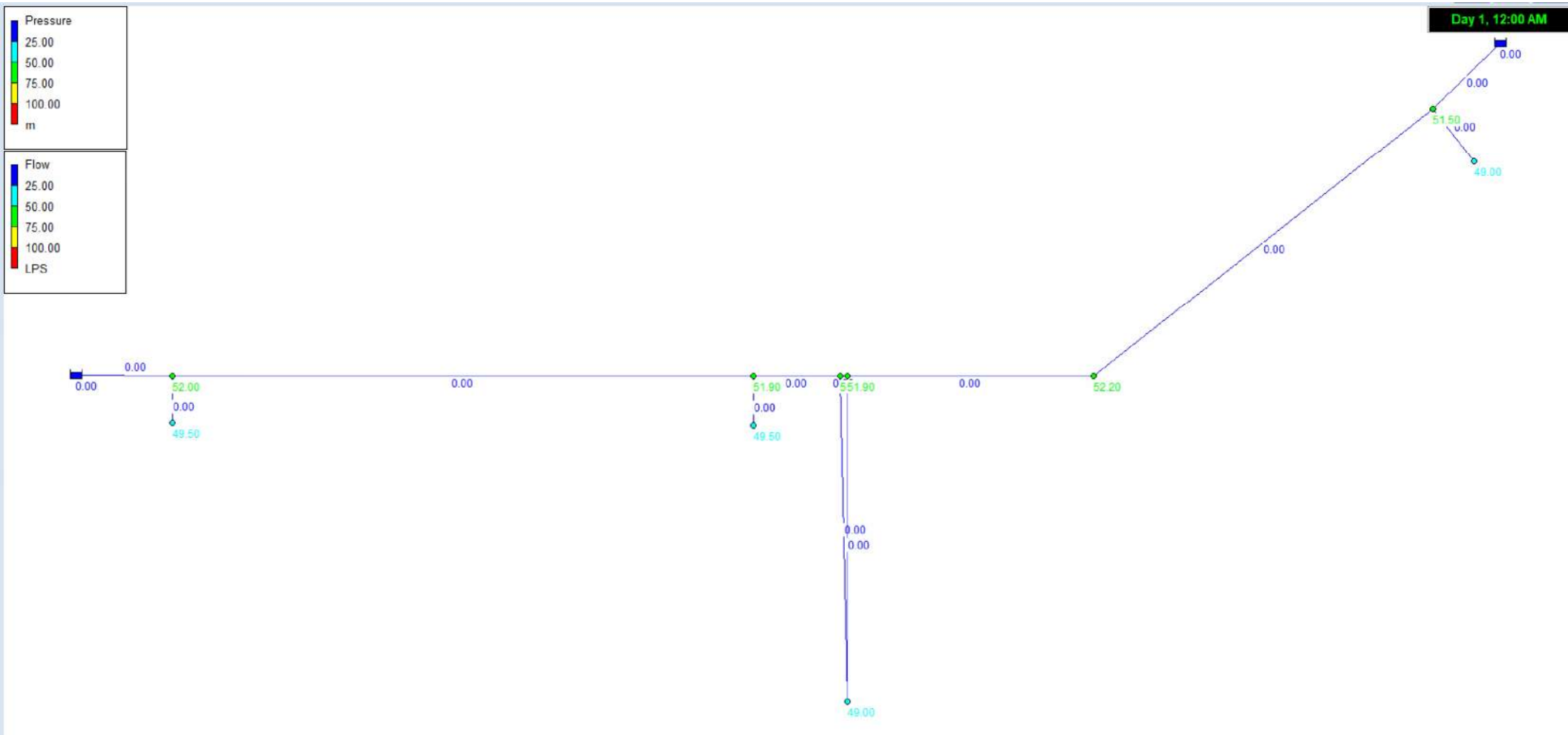
Ivanhoé Cambridge

CDP Capital
Groupe immobilier

APPENDIX

D EPANET MODEL OUTPUT

100 Bayshore Dr., No Flow Condition, 115.5m Boundary Head



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*                  Hydraulic and Water Quality                   *
*                  Analysis for Pipe Networks                    *
*                        Version 2.0                             *
******************************************************************

Input File: 100 Bayshore Dr - Model.net
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Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	WestSupply	WestHydrantConnection	13.41	600
2	WestHydrantConnection	WestHydrant	6.50	152
3	WestHydrantConnection	SiteHydrantConnection	80.50	203
4	SiteHydrantConnection	SiteHydrant	6.90	152
5	SiteHydrantConnection	SiteConnection1	12.00	203
6	SiteConnection1	SiteConnection2	1.00	203
7	SiteConnection2	Bend	34.00	203
8	SiteConnection1	Building	45.01	152
9	SiteConnection2	Building	45.00	152
10	Bend	EastHydrantConnection	59.82	203
11	EastHydrantConnection	EastHydrant	9.26	152
12	EastHydrantConnection	EastSupply	13.02	600

Node Results:

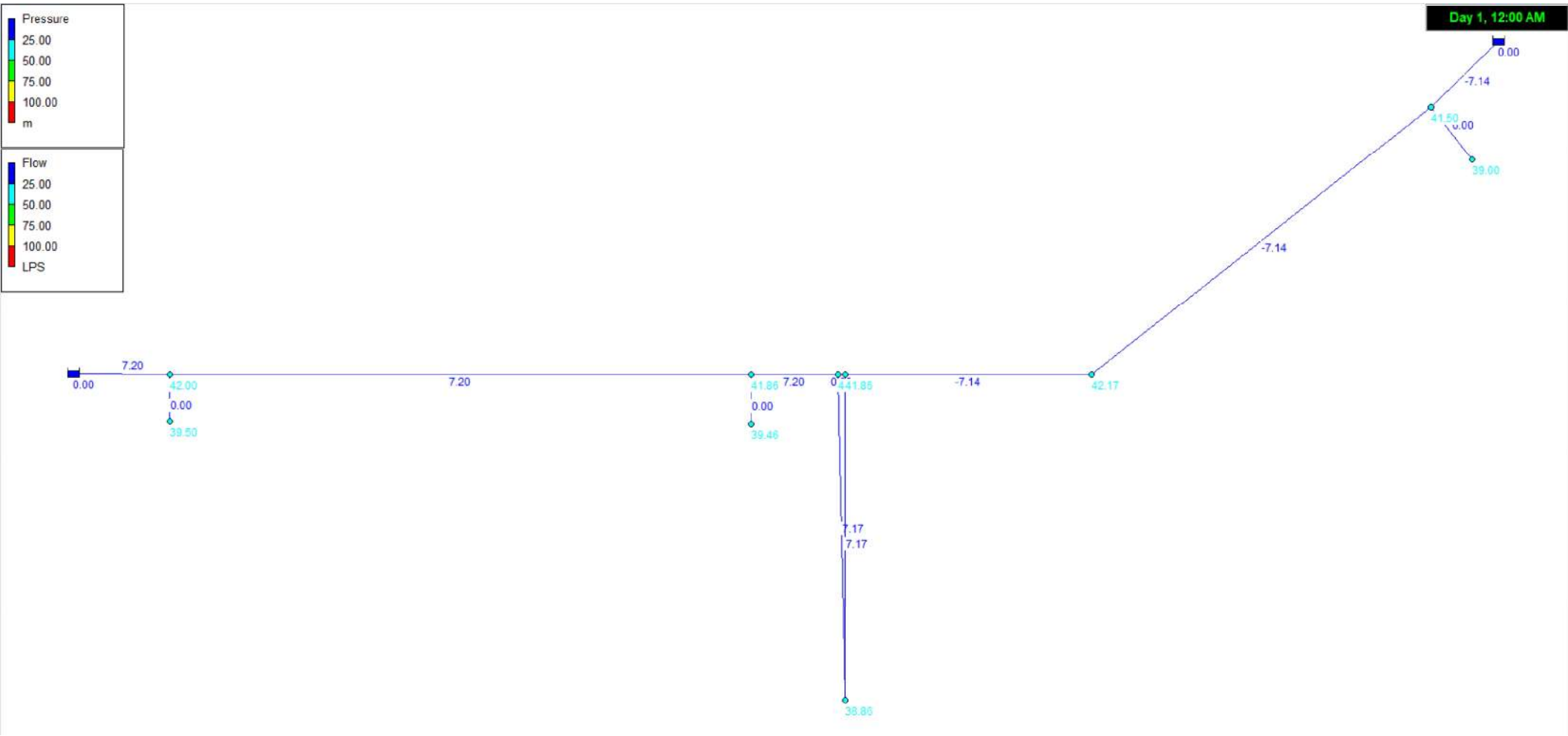
Node ID	Demand LPS	Head m	Pressure m	Quality	
WestHydrantConnection	0.00	115.50	52.00	0.00	
WestHydrant	0.00	115.50	49.50	0.00	
SiteHydrantConnection	0.00	115.50	51.90	0.00	
Bend	0.00	115.50	52.20	0.00	
SiteConnection1	0.00	115.50	51.90	0.00	
SiteConnection2	0.00	115.50	51.90	0.00	
Building	0.00	115.50	49.00	0.00	
EastHydrantConnection	0.00	115.50	51.50	0.00	
EastHydrant	0.00	115.50	49.00	0.00	
SiteHydrant	0.00	115.50	49.50	0.00	
WestSupply	0.00	115.50	0.00	0.00	Reservoir
EastSupply	0.00	115.50	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	0.00	0.00	0.00	Open
2	0.00	0.00	0.00	Open
3	0.00	0.00	0.00	Open
4	0.00	0.00	0.00	Open
5	0.00	0.00	0.00	Open
6	0.00	0.00	0.00	Open
7	0.00	0.00	0.00	Open
8	0.00	0.00	0.00	Open
9	0.00	0.00	0.00	Open

10	0.00	0.00	0.00	Open
11	0.00	0.00	0.00	Open
12	0.00	0.00	0.00	Open

100 Bayshore Dr., Peak Hour Condition, 105.5m Boundary Head



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******************************************************************
*                          E P A N E T                           *
*                  Hydraulic and Water Quality                   *
*                  Analysis for Pipe Networks                    *
*                        Version 2.0                             *
******************************************************************
```

Input File: 100 Bayshore Dr - Model.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	WestSupply	WestHydrantConnection	13.41	600
2	WestHydrantConnection	WestHydrant	6.50	152
3	WestHydrantConnection	SiteHydrantConnection	80.50	203
4	SiteHydrantConnection	SiteHydrant	6.90	152
5	SiteHydrantConnection	SiteConnection1	12.00	203
6	SiteConnection1	SiteConnection2	1.00	203
7	SiteConnection2	Bend	34.00	203
8	SiteConnection1	Building	45.01	152
9	SiteConnection2	Building	45.00	152
10	Bend	EastHydrantConnection	59.82	203
11	EastHydrantConnection	EastHydrant	9.26	152
12	EastHydrantConnection	EastSupply	13.02	600

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
WestHydrantConnection	0.00	105.50	42.00	0.00	
WestHydrant	0.00	105.50	39.50	0.00	
SiteHydrantConnection	0.00	105.46	41.86	0.00	
Bend	0.00	105.47	42.17	0.00	
SiteConnection1	0.00	105.46	41.86	0.00	
SiteConnection2	0.00	105.46	41.86	0.00	
Building	14.34	105.36	38.86	0.00	
EastHydrantConnection	0.00	105.50	41.50	0.00	
EastHydrant	0.00	105.50	39.00	0.00	
SiteHydrant	0.00	105.46	39.46	0.00	
WestSupply	-7.20	105.50	0.00	0.00	Reservoir
EastSupply	-7.14	105.50	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	7.20	0.03	0.00	Open
2	0.00	0.00	0.00	Open
3	7.20	0.22	0.45	Open
4	0.00	0.00	0.00	Open
5	7.20	0.22	0.45	Open
6	0.03	0.00	0.00	Open
7	-7.14	0.22	0.44	Open
8	7.17	0.40	2.18	Open
9	7.17	0.40	2.18	Open

10	-7.14	0.22	0.44	Open
11	0.00	0.00	0.00	Open
12	-7.14	0.03	0.00	Open

APPENDIX

E STORMWATER MANAGEMENT CALCULATIONS

TABLE 1 - PRE-DEVELOPMENT RUNOFF

Area Description	Area (ha)	Time of Conc, Tc (min)	Storm = 2 yr			Storm = 5 yr			Storm = 100 yr		
			I_2 (mm/hr)	Cavg	Q_2 (L/sec)	I_5 (mm/hr)	Cavg	Q_5 (L/sec)	I_{100} (mm/hr)	Cavg	Q_{100} (L/sec)
Proposed site	0.6000	20	52.03	0.20	**17.4**	70.25	0.20	23.4	119.95	0.20	40.0
Allowable Capture Rate is based on 2-year storm at Tc=20 mins											
Q (L/sec) = 2.78 C I A											

2-year Storm $C_{ASPH/ROOF/CONC}$ 0.90 C_{GRASS} = 0.20
5-year Storm $C_{ASPH/ROOF/CONC}$ 0.90 C_{GRASS} = 0.20
100-year Storm $C_{ASPH/ROOF/CONC}$ 1.00 C_{GRASS} = 0.25
$C_{(100\text{-}yr)}$ for post development flows is increased by 25% to a maximum of 1.00

TABLE 2- POST DEVELOPMENT AVERAGE RUNOFF COEFFICIENTS

Area No.	Asphalt/ Roof/ Conc Areas (m^2)	A * C_{ASPH}	Grassed Areas (m^2)	A * C_{GRASS}	Sum AC	Total Area (m^2)	$C_{2\text{-}yr}$	$C_{5\text{-}yr}$	$C_{100\text{-}yr}$
A1	5700.0	5130.0	300.0	60.0	5190.0	6000.0	0.87	0.87	1.00
Total	5,700		300		5,190	6,000			

TABLE 3- POST DEVELOPMENT RUNOFF

Area No	Area (ha)	Storm = 2 yr				Storm = 5 yr				Storm = 100 yr			
		I_2 (mm/hr)	C_{AVG}	Q (l/s)	Q_{MAX} (l/s)	I_5 (mm/hr)	C_{AVG}	Q (l/s)	Q_{MAX} (l/s)	I_{100} (mm/hr)	C_{AVG}	Q (l/s)	Q_{MAX} (l/s)
A1	0.600	76.81	0.87	110.8	**17.4**	104.19	0.87	150.3	**17.4**	178.56	1.00	297.8	**17.4**
Totals	**0.6000**			110.8	17.4			150.3	17.4			297.8	17.4

$I_2 = 732.951 / (Tc + 6.199)^{0.810}$
$I_5 = 998.071 / (Tc + 6.053)^{0.814}$
$I_{100} = 1735.688 / (Tc + 6.014)^{0.820}$
Time of Concentration (min), Tc = 10 mins

TABLE 4 - STORAGE VOLUME REQUIRED (2-YEAR and 100-YEAR STORMS)

C_{AVG} = 0.87 (2-year)
C_{AVG} = 1.00 (100-year)
Time Interval = 5 (mins)
Drainage Area = 0.60000 (hectares)

	2-YEAR STORM					100-YEAR STORM				
	Release Rate = **17.4** (L/sec) Return Period = 2 (years) IDF Parameters, A = 732.951, B = 0.810 (I = A/(T_c+C), C = 6.199					Release Rate = **17.4** (L/sec) Return Period = 100 (years) IDF Parameters, A = 1735.688, B = 0.820 (I = A/(T_c+C), C = 6.014				
Time (min)	**Intensity, I (mm/hr)**	**Peak Flow (L/s)**	**Release Rate (L/s)**	**Storage Rate (L/s)**	**Storage Volume (m^3)**	**Intensity, I (mm/hr)**	**Peak Flow (L/s)**	**Release Rate (L/s)**	**Storage Rate (L/s)**	**Storage Volume (m^3)**
0	167.2	241.3	17.4	223.9	0.00	398.6	664.9	17.4	647.5	0.00
5	103.6	149.4	17.4	132.1	39.62	242.7	404.8	17.4	387.5	116.24
10	76.8	110.8	17.4	93.5	56.07	178.6	297.8	17.4	280.5	168.29
15	61.8	89.1	17.4	71.8	64.59	142.9	238.3	17.4	221.0	198.89
20	52.0	75.1	17.4	57.7	69.26	120.0	200.1	17.4	182.7	219.26
25	45.2	65.2	17.4	47.8	71.72	103.8	173.2	17.4	155.9	233.79
30	40.0	57.8	17.4	40.4	72.75	91.9	153.2	17.4	135.9	244.58
35	36.1	52.0	17.4	34.7	72.81	82.6	137.7	17.4	120.4	252.81
40	32.9	47.4	17.4	30.1	72.14	75.1	125.3	17.4	108.0	259.16
45	30.2	43.6	17.4	26.3	70.94	69.1	115.2	17.4	97.8	264.11
50	28.0	40.5	17.4	23.1	69.30	64.0	106.7	17.4	89.3	267.95
55	26.2	37.8	17.4	20.4	67.33	59.6	99.5	17.4	82.1	270.91
60	24.6	35.4	17.4	18.1	65.07	55.9	93.2	17.4	75.9	273.15
65	23.2	33.4	17.4	16.0	62.58	52.6	87.8	17.4	70.5	274.78
70	21.9	31.6	17.4	14.3	59.89	49.8	83.0	17.4	65.7	275.90
75	20.8	30.0	17.4	12.7	57.02	47.3	78.8	17.4	61.5	276.59
80	19.8	28.6	17.4	11.3	54.02	45.0	75.0	17.4	57.7	276.90
85	18.9	27.3	17.4	10.0	50.88	43.0	71.6	17.4	54.3	276.88
90	18.1	26.2	17.4	8.8	47.62	41.1	68.6	17.4	51.2	276.56
95	17.4	25.1	17.4	7.8	44.27	39.4	65.8	17.4	48.4	275.99
100	16.7	24.2	17.4	6.8	40.83	37.9	63.2	17.4	45.9	275.19
105	16.1	23.3	17.4	5.9	37.30	36.5	60.9	17.4	43.5	274.18
110	15.6	22.5	17.4	5.1	33.70	35.2	58.7	17.4	41.4	272.98
115	15.0	21.7	17.4	4.4	30.03	34.0	56.7	17.4	39.4	271.61
120	14.6	21.0	17.4	3.7	26.30	32.9	54.9	17.4	37.5	270.08
Max =					**72.81**					**276.90**

Notes

1) Peak flow is equal to 2.78 x C x I x A
2) Intensity, $I = A/(Tc+C)^B$
3) Release Rate = Min (Release Rate, Peak Flow)
4) Storage Rate = Peak Flow - Release Rate
5) Storage = Time x Storage Rate
6) Maximum Storage = Max Storage Over Time

APPENDIX

F

ELECTRICAL LOAD CALCULATIONS

Units between 45 & 90 SQ. M. (with one heat pump @ units)				
Item/Description		**Load - Watts**		
	Code	**Actual**	**Design**	
Code 8-202 (1) (a) (i) (ii) by Area				
First 45 sq.m.	3500		3500	
Next 45 sq.m. or part thereof	1500		1500	
Each additional 90 sq. m.	0		0	
1 (a) (iv) A/C loads - demand factor at 100%				
Allow AC_-Heat pump	2000		2000	
1 (a) (v) Elec. Range:				
For single Range	6000		6000	
+ 40%(Range rating – 12000W)	0		0	
1 (a) (vi) Additional loads:			0	
25% of each load rated in excess of 1500W (dryer)	4000		1000	
OR				
25% of each load rated in excess of 1500W				
+ 6000W if an Elec. Range not provided above				
Total design Load for UNIT			14000	Watts
Feeder Ampacity = Design Load/240V =			58.33	Amps.
Breaker size = Design amps/80% rated			73	Amps.
Selected Breaker size (min.)			100	Amps. 2P.

15/12/2019				
	Phase 1: 264 units Woodridge Crescent			
Code	**Item/Description**		**Load - Watts**	
Reference		**Load**	**Code Div.**	**Design Load**
OESC 8-202(3)	(excludes electric/a/c loads at suites)			
(a)(i)	100% of largest unit =1 x 14000W	14000	1	14000
(a)(ii)	Sum of next 2 units = 2 x 14000W	28000	0.65	18200
(a)(iii)	Sum of next 2 units = 2 x 14000W	28000	0.4	11200
(a)(iv)	Sum of next 15 units = 15 x 14000W	210000	0.25	52500
(a)(v)	244 x 14000W	3416000	0.1	341600
(a) (v)				0
	Subtotal	**3696000**		**437500**
(b)	Electric Space Heating - N/A			
	10 KW @ 100%	0	1	0
	Remainder = 10KW @75% (see note 1)	0	0.75	0
(c)	Fluid Cooler Air Conditioning (Note 1) 36.5KW/600/3	36,500	1	36500
	Suites - Heat Pumps (264 Suites included in apartments loads		1	0
	Heat Pumps - Public spaces	20,000	1	20000
	Corridor Make-up (Indoor & Outdoor) 80kW	60,000	1	60000
(d)	Lighting, miscell. and power not part of the Units:			
	Lighting public areas and garage	15000	0.95	14250
	Miscellaneous equipment (continuous)	10000	1	10000
	Pumps, Ventilation equipment (Note 2)	50000	0.75	37500
	Elevators - 2 @ 30hp	54000	0.9	48600
	Car recharging stations 2 @ 7.2KW	14400	1	14400
	Totals	**3955900**		**678750**
Note 1	Fluid Cooler A/C loads offset heating load.			
Note 2	Fire Pump, sump pumps loads are non-continuous			
	and heating pumps are not included in loading			
Total KW Building		3955900		678750

Dec 4 2019				
	Phase 2 235 units Woodridge Crescent			
Code	**Item/Description**		**Load - Watts**	
Reference		**Load**	**Code Div.**	**Design Load**
OESC 8-202(3)	(excludes electric/a/c loads at suites)			
(a)(i)	100% of largest unit =1 x 14000W	14000	1	14000
(a)(ii)	Sum of next 2 units = 2 x 14000W	28000	0.65	18200
(a)(iii)	Sum of next 2 units = 2 x 14000W	28000	0.4	11200
(a)(iv)	Sum of next 15 units = 15 x 14000W	210000	0.25	52500
(a)(v)	215 x 14000W	3010000	0.1	301000
(a) (v)				0
	Subtotal	**3290000**		**396900**
(b)	Electric Space Heating - N/A			
	10 KW @ 100%	0	1	0
	Remainder = 10KW @75% (see note 1)	0	0.75	0
(c)	Fluid Cooler Air Conditioning (Note 1) 36.5KW/600/3	36,500	1	36500
	Suites - Heat Pumps (235 Suites included in apartments loads		1	0
	Heat Pumps - Public spaces	20,000	1	20000
	Corridor Make-up (Indoor & Outdoor) 80kW	60,000	1	60000
(d)	Lighting, miscell. and power not part of the Units:			
	Lighting public areas and garage	15000	0.95	14250
	Miscellaneous equipment (continuous)	10000	1	10000
	Pumps, Ventilation equipment (Note 2)	50000	0.75	37500
	Elevators - 2 @ 30hp	54000	0.9	48600
	Car recharging stations 2 @ 7.2KW	14400	1	14400
	Totals	**3549900**		**638150**
Note 1	Fluid Cooler A/C loads offset heating load.			
Note 2	Fire Pump, sump pumps loads are non-continuous			
	and heating pumps are not included in loading			
Total KW Building		3549900		638150