PROPOSED

THREE STOREY RESIDENTIAL APARTMENT BUILDING SITE

PATR OF LOT B

CONCESSION 11

GEOGRAPHIC TOWNSHIP OF CUMBERLAND

1670 TENTH LINE ROAD

CITY OF OTTAWA

SERVICEABILITY REPORT

REPORT No. R-825-8A

T.L. MAK ENGINEERING CONSULTANTS LTD.

JULY 2025

REFERENCE FILE NUMBER 825-8

Introduction

The developer of this property is proposing to redevelop the existing residential lot described as Part of Lot B Concession 11 Geographic Township of Cumberland City of Ottawa by constructing a three (3) storey residential apartment building plus a basement consisting of thirty (30)-units, including twelve (2)-bedroom units, nine (1)-bedroom and den units, seven (1)-bedroom units and two (2) bachelor units.

The municipal address of this property is referenced as 1670 Tenth Line Road and it is located in the City Ward (1 – Orleans East-Cumberland). The site is situated on the west side of Tenth Line Road, south of Amiens Street and north of Charlemagne Boulevard, see site plan and legal survey plan in Appendix A for details.

The area of this property is ±0.1858 hectares. In addition to the three (3) storey residential building, the other development features will comprise of an interlock paver access to the front entrance plus an interlock paver access along both north and south side yard with access to the waste storage, bike racks and access to the parking lot at the rear of the building including landscaped areas throughout the site, etc., to meet the City of Ottawa's site plan requirements.

A site geotechnical report was prepared by the owner's soils engineer Paterson Group entitled "Geotechnical Investigation – Proposed Residential Development" 1670 Tenth Line Road (Report No. PG7562-1) dated June 16, 2025 for this proposed development property.

This serviceability report will provide the City of Ottawa with our serviceability brief to address the proposed servicing scheme for this site.

Existing Site Conditions and Servicing

This property is presently occupied by a one (1) storey brick dwelling in which the house is located near the front of the lot with asphalt driveway. At the rear of the site, there is a 1 ½ - storey siding building which fronts Duvernay Drive and is connected to the municipal roadway by a gravel driveway. For additional details of the site's pre-development conditions, refer to the coloured Google Image (2021) and aerial photography from (GeoOttawa 2022) in Appendix B.

Approximately 40.0% of this site is currently permeable surface covered and consisting of grass/landscaped areas with the remaining areas being roof area, gravel laneway, concrete steps and deck. Currently, most of the landscape areas are concentrated at the north half of lot and along the north side yard.

The topography of the land is found to be graded primarily for split drainage of the lot, approximately one half to the east and outletting to Tenth Line Road and the remaining half to Duvernay Drive. The overall existing gradient of the property is sloping approximately 0.7 %.

The existing house water and sanitary service lateral currently servicing the existing dwelling at 1670 Tenth Line Road will be removed. The existing water services shall be blanked at the main and the existing house laterals shall be capped at the front property line for re-development of this lot.

As for the availability of underground municipal services, there are existing municipal services along Duvernay Drive that fronts this property consist of a 375mm diameter storm sewer, a 250mm diameter sanitary sewer, and a 200mm diameter watermain for development of this site. Refer to the City of Ottawa Duvernay Drive UCC drawing and As-Built plan and profile drawing included in Appendix C for details. No water and sewer lateral services are proposed to connect into the existing Tenth Line Road municipal mains.

Because the site will be connecting to and outletting into the separated Duvernay Drive storm sewer located within the Duvernay Drive road right of way in the City of Ottawa, therefore, the approval exemption under Ontario Regulations 525/98 would apply since storm water discharges from this site will outlet flow into a downstream storm sewer. Thus, an Environmental Compliance Approval (ECA) application will not be required to be submitted to the Ministry.

Proposed Residential Apartment Building Site

There are vehicle access and parking proposed for this site. Interlock pavers are proposed at the front and along both north and south side of the new building for pedestrian access to the rear parking lot, waste disposal and bicycle parking located at the west accessory part of the building.

A. Water Supply

The proposed building located within Pressure Zone 2E at 1670 Tenth Line Road is a 3-storey residential multi-unit building, with a basement. The building contains thirty (30) total units, including twelve (12) 2-bedroom units, nine (9) 1-bedroom and den units, seven (7) 1-bedroom units, and two (2) bachelor units. Each floor covers an average area of around 613 m^2, for a gross floor area of 1,859 m^2 (excluding the basement).

The building is to be serviced by the 200 mm diameter watermain along Duvernay Drive. The ground elevation along Duvernay Drive is approximately 87.9 m.

Demand Projections

The domestic demands were calculated using the City of Ottawa's Water Design Guidelines, where the residential consumption rate of 280 L/cap/d was used to estimate average day demands (AVDY). Persons per unit (PPU) for each unit were estimated based on the City of Ottawa's Water Design Guidelines.

Maximum day (MXDY) demands were calculated by multiplying AVDY demands by a factor of 2.5. Peak hour (PKHR) demands were calculated by multiplying AVDY by a factor of 2.2. Table 1 shows the estimated domestic demands of the proposed building.

As per the IWSTB-2024-05, the fire protection requirements on private property in urban areas are covered in Section A-3.2.5.7 of the Ontario Building Code (OBC), following the Office of the Fire Marshall (OFM) method. The proposed building will be of wood frame construction (combustible construction), with fire resistance ratings that are assumed to meet the criteria listed Section 3.2.2 of OBC. It is understood that the building will be without sprinklers. The resulting required fire flow is 6,300 L/min (105 L/s) for a duration of 50 minutes. Details are provided in the attached **Fire Flow Calculations** (See Appendix D). Furthermore, **Figure 1** found in Appendix D provides separation distances for the OFM calculations. The proposed **Site Plan** attached in Appendix D was used to determine distances from the proposed building to the property lines.

Table 1: Estimated Domestic Demand

Unit Type	Unit Count	PPU	Consumption	AVDY		MXDY		PKHR	
				L/d	L/s	L/d	L/s	L/d	L/s
Apartment, Bachelor / Studio	2	1.4	280	784	0.01	1,960	0.02	4,312	0.05
Apartment, 1-Bedroom	7	1.4	280	2,744	0.03	6,860	0.08	15,092	0.17
Apartment, 1-Bedroom + Den	9	1.4	280	3,528	0.04	8,820	0.10	19,404	0.22
Apartment, 2-Bedroom	12	2.1	280	7,056	0.08	17,640	0.20	38,808	0.45
Total	***30***			***14,112***	***0.16***	***35,280***	***0.41***	***77,616***	***0.90***

In summary, the estimated water demands for the proposed building are as follows:

- AVDY = 14,112 L/d (0.16 L/s)
- MXDY = 35,280 L/d (0.41 L/s);
- PKHR = 77,616 L/d (0.90 L/s); and,
- Fire Flow = 6,300 L/min (105L/s)

Boundary Conditions

The hydraulic gradeline (HGL) boundary conditions for 1670 Tenth Line Road, as presented in **Table 2**, were provided by the City on June 20, 2025 (see attached **Water Boundary Conditions** in Appendix D).

Table 2: Boundary Conditions

Demand Scenario	Head (m)
Minimum HGL (Peak Hour)	127.8
Maximum HGL (Average Day)	130.2
Maximum Day + Fire Flow	120.0

Hydraulic Analysis

Peak Hour & Average Day

During peak hour demands, the resulting minimum hydraulic gradeline of 127.8 m corresponds to a peak hour pressure of 391 kPa (57 psi). This value is above the minimum pressure objective of 276 kPa (40 psi) for residential buildings up to two storeys. Adding 5 psi per floor above two (2) stories, to account for headloss due to elevation and pipe losses, a minimum pressure of 310 kPa (45 psi) would be required for the third floor. The peak hour pressure at ground level is above this objective and therefore considered acceptable.

During average day demands, the resulting maximum hydraulic gradeline of 130.2 m corresponds to a maximum pressure of 415 kPa (60psi). This value is less than the maximum pressure objective of 552 kPa (80 psi) and therefore considered acceptable.

Supporting hydraulic calculations are attached in Appendix D.

Maximum Day + Fire Flow

A maximum day plus fire flow (6,300 L/min) hydraulic gradeline of 120.0 m corresponds to a residual pressure of 315 kPa (46 psi) at this location, which is above the minimal residual pressure requirement of 140 kPa (20 psi).

Based on Table 1 of Appendix I of the City of Ottawa Technical Bulletin ISTB-2018-02 and a desktop review (i.e., Google Street View) to confirm hydrant class, five (5) hydrants are located in the vicinity of the proposed building. Two (2) hydrants are Class AA hydrants is within 75 m, both with a capacity contribution of up to 5,700 L/min. Three (3) other Class AA hydrants are within 150 m from the site, both with a capacity contribution of up to 3,800 L/min. The

combined hydrant flow coverage for 1670 Tenth Line Road is therefore 22,800 L/min, which is above the RFF obtained from the OFM (6,300 L/min) method.

The hydrant coverage is illustrated in **Figure 2** attached in Appendix D. A breakdown of the hydrant coverage is summarized in **Table 3** below.

Table 3: Fire Hydrant Coverage

Building	Fire Flow Demand (L/min)	Fire Hydrants					Combined Hydrant Flow Coverage (L/min)
		Hydrant Class	Within 75 m		Between 76 m and 150 m		
			Quantity	Contribution to RFF	Quantity	Contribution to RFF	
1670 Tenth Line Road	6,300	AA	2	5,700	3	3,800	22,800
		A					
		B					
		C					

In conclusion, based on the boundary condition provided, the local watermain network along Duvernay Drive provides adequate fire flow capacity, as per the Office of the Fire Marshall (OFM) method, to the proposed development at 1670 Tenth Line Road. Resulting pressures during anticipated demand flows meet the pressure objectives during average and peak demand conditions, as per the City of Ottawa's Drinking Water Design Guidelines.

B. Sanitary Flow

The peak sanitary flow for the 30 units, which comprise of twelve (2)-bedroom, nine (1)-bedroom and den, seven (1)-bedroom and two bachelor apartment units, is estimated at Q = 0.66 L/s with an infiltration rate of 0.06 L/s. Refer to Appendix E sheet 1 of 1 regarding sanitary flow calculations. This flow will enter the existing 250mm diameter sanitary sewer on Duvernay Drive via the proposed 150 mm diameter PVC sanitary service lateral from the three (3)-storey residential apartment building.

The existing peak sanitary flow of the site for single detached dwelling unit is Q = 0.10 L/s with an infiltration rate of 0.06 L/s. The net increase in flow from this proposed development is 0.56 L/s which is not expected to negatively impact the existing 250mm dia. sanitary sewer.

Waste water from the Duvernay Drive 250mm dia. sanitary sewer then in turn outlets south and westward along Des Epinettes Avenue and into the existing downstream 375mm dia. concrete sanitary collector sewer located along the St. George Street corridor.

C. Storm Flow

The storm-water outlet for the proposed development property will be the existing 375mm diameter concrete storm sewer located on Duvernay Drive. Stormwater attenuation on site will be accomplished by means of rooftop storage with controlled roof drains and parking lot surface areas with a controlled ICD in CB/MH#1 that together will regulate flow off site.

The building foundation weeping-tile drainage system shall have its own separate pipe for gravity flow where weeping-tile water is outletted via a 150mm diameter storm pipe to the existing 375mm diameter Duvernay Drive storm sewer. The storm-water outlet for the rooftop water from roof drains will be a separately designated proposed 150mm diameter PVC pipe that will also be outletted directly into the existing 375mm diameter storm sewer. The 150mm dia. roof water drain pipe will "wye" into the 150mm dia. weeping tile storm lateral on private property and outlet to the existing Duvernay Drive storm sewer.

Four (4) roof drains are proposed for this apartment building to restrict flow at a rate of 0.95 L/s each or 4 x 0.95 L/s = 3.80 L/s into the Duvernay Drive storm sewer. The remainder of the site allowable release rate from ICD in CB/MH#1 is 19.84 L/s. The calculated net allowable controlled release rate from this site is estimated at 23.64 L/s.

Based on the residential site plan from the owner's architect, the average post-development runoff coefficient is estimated at C = 0.80 and A = 0.1858 hectares.

An estimation of the pre-development flow condition was carried out using the criteria accepted by the City of Ottawa. If post-development C valve exceeds the lesser of the C_{pre} = 0.61 or C_{allow} = 0.5 (max) then SWM is required. So from our calculations, the C_{allow} = 0.5 value will be used at t_c = 10 minutes for pre-development allowable flow calculation off-site.

The pre-development calculated flow rate into the 375mm dia. storm sewer for this residential area is the lesser of either the five (5)-year storm event where C_{allow} = 0.5 (max.) runoff value or the average C_{pre} value which is 0.61 using t_c = 10 minutes. Because this site C_{post} = 0.80 and C_{allow} = 0.5 then SWM measures are required.

Therefore, based on our calculation, on-site retention is required for this proposed development site, because the site post-development C value of 0.80 is greater than the C_{allow} = 0.5.

The storage volume for the five (5)-year and up to the 100-year storm event will be stored by means of flat rooftop at the top of the 3-storey apartment building and also utilizing the asphalt parking lot surface areas located at the west half of the site. Also refer to the site storm drainage report (Report No. R-825-8) for further details.

Conclusion

At this proposed residential site and to develop this lot to house a 30 unit apartment building on a 0.1858 ha. parcel of land, the estimated total allowable flow off-site is calculated at 26.91 L/s based on City of Ottawa Drainage and Stormwater Management (SWM) criteria of 5-Year pre-development flow at C_{allow} = 0.50. For on-site SWM attenuation, the flat roof top of the proposed apartment building will be utilized and (4) controlled roof drains are incorporated each with a controlled release rate of 0.95 L/s (15.0 U.S. gal/min.). The controlled flow from the flat roof totals to 3.80 L/s for the post development condition. The parking lot surface areas will be regulated with an ICD in CB/MH#1 using (Hydrovex Model 125-VHV-2) or equal to allow a release rate of 19.84 L/s under a head of 2.34m. The total controlled flow rate off-site is therefore 23.64 L/s. Uncontrolled flow rate off-site is estimated at 3.27 L/s at the 100-Year event.

During the 5-Year storm event for the flat rooftop storage, the ponding depth on this rooftop is estimated at 110 mm at Drain No. 1, 2, 3 and 4 and 0 mm at the roof perimeter assuming a 1.7% (min.) roof pitch to the drains. The rooftop storage available at Roof Area No. 1 is 3.19 m^3, Roof Area No. 2 is 3.19 m^3, Roof Area No. 3 is 3.19 m^3 and Roof Area No. 4 is 2.96 m^3 for a total of 12.53 m^3 which is greater than the required volume of 10.04 m^3.

As for the remaining storage volume of 3.85 m^3 (min.) required from the site development area for the 5-Year storm event, the estimated H.W.L. of 87.91 m will provide a total available asphalt surface storage volume of 4.83 m^3. In total, the 5-Year available site storage volume (roof and parking lot) is approximately 17.36 m^3 which is greater than the required site storage volume of 13.88 m^3. See Appendix "E" for details.

In order to control the 100-Year stormwater release rate off-site to an allowable rate of 26.91 L/s, a calculated site storage volume of approximately 39.76 m^3 (min.) is required during the 100-Year event. We estimate that the required storage volume of 23.84 m^3 (min.) of rooftop storage and 15.92 m^3 (min.) from the site asphalt parking lot surface area are necessary to attenuate the 100-Year storm event. See Table No. 6 to 10 inclusive.

During the 100-year storm event for the flat rooftop storage, the ponding depth on this rooftop is estimated at 150 mm at Drain No. 1, 2, 3 and 4 and 0 mm at the roof perimeter assuming a 1.7% (min.) roof pitch to the drains. The rooftop storage available at Roof Area No. 1 is 7.70 m^3, Roof Area No. 2 is 7.70 m^3, Roof Area No. 3 is 7.70 m^3 and Roof Area No. 4 is 7.54 m^3 for a total of 30.64 m^3 which is greater than the required volume of 23.84 m^3.

As for the remaining storage volume of 15.92 m^3 (min.) required from the asphalt parking area for the 100-Year storm event, the estimated H.W.L. of 87.96 m will provide a total available

asphalt surface storage volume of 16.24 m^3. In total, the 100-Year available site storage volume (roof and parking lot) is 46.88 m^3 which is greater than the required site storage volume of 39.76 m^3. See Appendix "E" for details.

Therefore, by means of flat building rooftop storage, grading the site to the proposed grades and constructing the proposed parking lot area and drainage system as shown on the Proposed Site Grading and Servicing Plan (Dwg. No. 825-8, G-1), the desirable 5-Year and 100-Year storm event attenuation volume of 17.36 m^3 and 46.88 m^3 respectively will be available on-site.

In order to control the release flow rate off-site from the controlled drainage areas of the lot, an inlet control device (ICD) will be installed at the outlet of CB/MH#1 in the 250 mm diameter storm pipe (outlet pipe) with Q = 19.84 L/s under a head of 2.34 m. A rooftop drain with a release rate of 0.95 L/s (under a maximum head of 150 mm) will be installed at Roof Drain #1, #2, #3 and #4 of the proposed residential apartment building flat rooftop as depicted on (Dwg. No. 825-8, G-1). The 5-Year and 100-Year flow off-site is restricted to 26.91 L/s.

An inlet control device (ICD) will be installed at the outlet of CB/MH#1 in the 250 mm diameter storm pipe (outlet pipe) with Q = 19.84 L/s under a head of 2.34 m. The ICD type recommended is a Hydrovex Regulator (125-VHV-2) or equivalent. See Appendix "C" for ICD details.

The building weeping tile drainage will outlet via its separate 150 mm diameter PVC storm lateral. The roof drains will be outletted also via a separate 150 mm diameter PVC storm lateral from the residential apartment building which "wye" into the proposed 150 mm dia. weeping tile storm lateral, where upon both laterals are outletting to the existing Duvernay Drive 375 mm diameter storm sewer with only one (1) connection. The City of Ottawa recommends that pressurized drain pipe material be used in the building for the roof drain leader pipe in the event of surcharging in the City storm sewer system. Refer to the proposed site grading and servicing plan (Dwg. No. 825-8, G-1) for details.

To achieve a minimum of 80 percent TSS removal, a Stormceptor structure (Model EFO-4) is proposed to be installed for the site development of this property. This Stormceptor structure shall be located downstream of the proposed CB/MH#1, which houses the site's inlet control device (ICD). Based on the Stormceptor system that is proposed for this site, size of the lot, and impervious ratio, a greater than 80 percent TSS removal is estimated for all rainfall events including large storms. (See Appendix "D" for details).

Erosion and Sediment Control

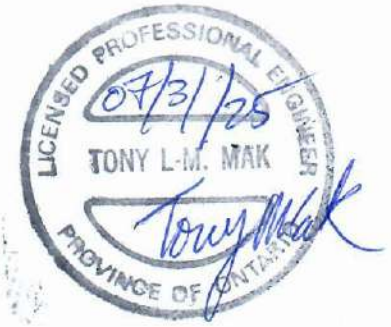
The contractor shall implement Best Management Practices to provide for protection of the receiving storm sewer during construction activities. These practices are required to ensure no sediment and/or associated pollutants are released to the receiving watercourse. These

practices include installation of a "siltsack" catch basin sediment control device or equal in catch basins as recommended by manufacturer on-site and off-site within the Duvernay Drive and Tenth Line Road road right of way adjacent to this property. Siltsack shall be inspected every 2 to 3 weeks and after major storm. The deposits will be disposed of as per the requirements of the contract. See Dwg. #825-8 ESC-1 for details.

Refer to Appendix G for the summary of the Development Servicing Study Checklist that is applicable to this development.

PREPARED BY T.L. MAK ENGINEERING CONSULTANTS LTD.

TONY L. MAK, P.ENG.



PROPOSED

THREE STOREY RESIDENTIAL APARTMENT BUILDING SITE

PATR OF LOT B

CONCESSION 11

GEOGRAPHIC TOWNSHIP OF CUMBERLAND

1670 TENTH LINE ROAD

CITY OF OTTAWA

APPENDIX A

SITE PLAN AND LEGAL SURVEY PLAN

Site Statistics	
Current Zoning Designation:	-
Lot Width:	30.48m
Total Lot Area:	1668.27m²
Average Existing Grade:	88.45m
Gross Floor Area (above grade):	1668.39m²

SITE PLAN BASED ON

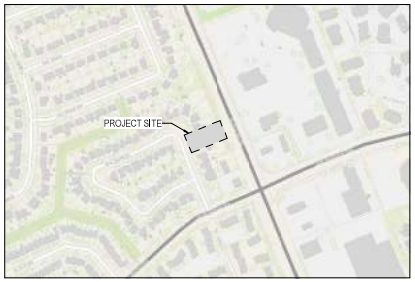
TOPOGRAPHIC PLAN OF SURVEY OF
PART OF LOT B
CONCESSION 11
GEOGRAPHIC TOWNSHIP OF CUMBERLAND
CITY OF OTTAWA

SURVEYED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

Proposed Development • 3 Storey Low-Rise Apartment Building

No. of units 39 Units

Zoning Mechanism	Required	Provided
Minimum Lot Width 109(a)	-	30.48m
Minimum Lot Area 109(a)	-	1668.27m²
Min. Front Yard Setback 109(a)	-	4.5m
Min. Interior Side Yard Setback 109(a)	-	1.5m
Min. Rear Yard Setback 109(a)	-	30.4m
Maximum Building Height 109(a)	-	11.4m
Parking Space Rates (Residents) 101(RH) (Sch. 1A - 4 rea C)	36 Spaces 1.2 spaces / unit for 31 units	17 Spaces
Minimum Visitor Parking Rates 102 (Sch. 1A - 4 rea C)	6 Spaces 0.2 spaces / unit for 31 units	6 Spaces
Bicycle Parking Rates (Residents) Table 111A(b) (Sch. 1 - 4 rea C)	16 Spaces 0.5 spaces / unit for 31 units	22 Spaces
Total Amenity Area Table 137(12)	180 m² 6m² / unit for 30 units	127.84m² - balconies
Communal Amenity Area Table 137(12)	90 m² Min. 50% of Total Amenity Area	0m²
Landscape Buffer for Parking Lot Table 110(1)	Min. 3m abutting a street Min. 0.6m not abutting a street	1.2m North side 1.2m West side 0.3m South side



2 SP-01 LOCATION PLAN
SCALE: NTS

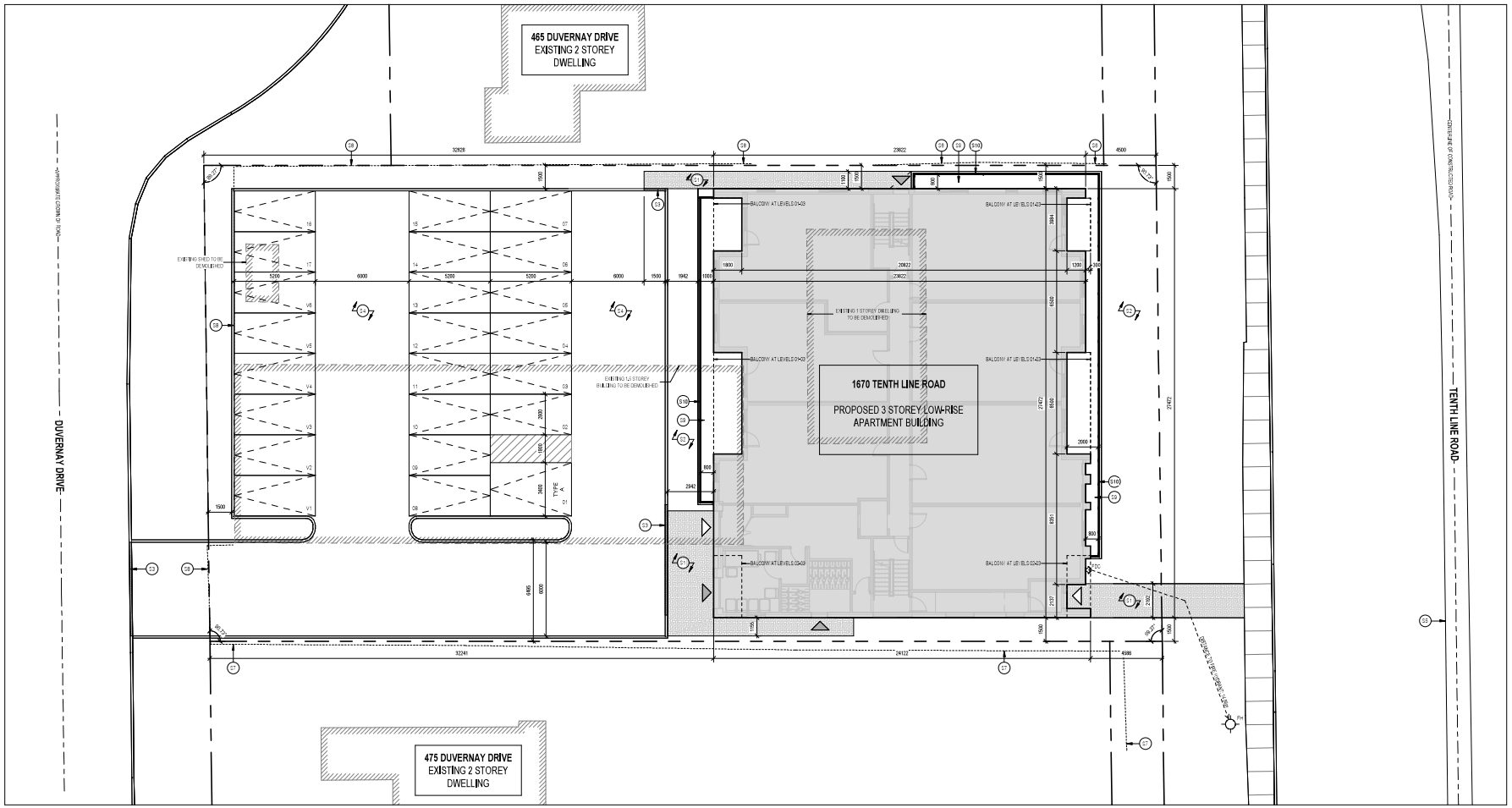
SITE PLAN SYMBOLS LEGEND

- BUILDING ENTRANCE
- BUILDING EXIT
- BICYCLE PARKING
- PROPERTY LINE
- SETBACK LINE
- AMENITY AREA
- FDC — FIRE DEPARTMENT CONNECTION
- FH — FIRE HYDRANT
- NEW STREET LIGHT

SITE PLAN SYMBOLS
SCALE: NTS

SITE PLAN NOTES

- S1 INTERLOCKING STONE PATHWAY
- S2 SOFT LANDSCAPING
- S3 DEPRESSED CURB
- S4 ASPHALT
- S5 CONCRETE MEDIAN
- S6 EXISTING CHAIN LINK FENCE
- S7 EXISTING BOARD FENCE
- S8 EXISTING BOARD FENCE TO BE DEMOLISHED
- S9 WINDOW WELLS
- S10 GLASS GUARD SYSTEM



1 SP-01 SITE PLAN
SCALE: 1 : 125

GENERAL ARCHITECTURAL NOTES:

1. This drawing is the property of the Architect and may not be reproduced or used without the expressed consent of the Architect.
2. Drawings are not to be scaled. The Contractor is responsible for checking and verifying all levels and dimensions and shall report all discrepancies to the Architect and obtain clarification prior to commencing work.
3. Upon notice in writing, the Architect will provide written/graphic clarification or supplementary information regarding the intent of the Contract Documents.
4. The Architectural drawings are to be read in conjunction with all other Contract Documents including Project Manual and the Structural, Mechanical and Electrical Drawings.
5. Positions of exposed or finished Mechanical or Electrical devices, fittings and fixtures are indicated on the Architectural Drawings. Locations shown on the Architectural Drawings shall govern over Mechanical and Electrical Drawings. Mechanical and Electrical items not clearly located within the room are directed by the Architect.
6. These documents are not to be used for construction unless specifically noted for such purpose.

ISSUE RECORD

project1 studio
Project1 Studio Incorporated
613.864.3939 | mail@project1studio.ca

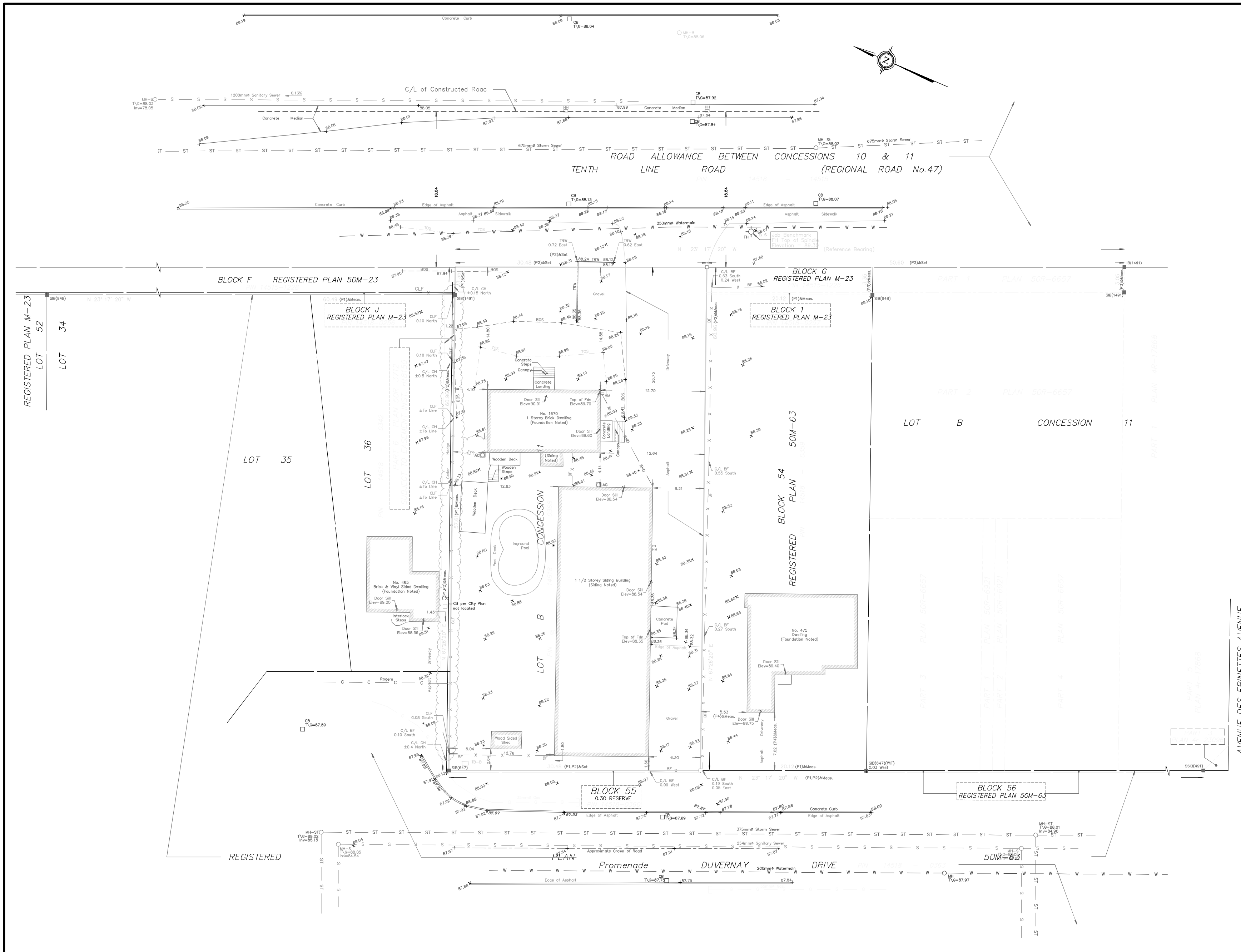
1670 Tenth Line Road

1670 Tenth Line Road
Ottawa, ON K1E 2H8

PROJ	SCALE	DRAWN	REVIEWED
2424	NOTED	AR	RMK

SITE PLAN

SP-01



TOPOGRAPHICAL PLAN OF SURVEY OF

PART OF LOT B
CONCESSION 11
GEOGRAPHIC TOWNSHIP OF CUMBERLAND
CITY OF OTTAWA

Prepared by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 200

8.0 6.0 4.0 2.0 0 4 8 Metres

Metric

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

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act and the Surveyors Act and the regulations made under them.
2. The survey was completed on the 30th day of April, 2021.

Date

E. H. Herweyer
Ontario Land Surveyor

Notes & Legend

	Denotes	
(symbol)	"	
(symbol)	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
CC	"	Cut Cross
CP	"	Concrete Pin
IB#	"	Round Iron Bar
S&W	"	Spike & Washer
SSIB*	"	Short Standard Iron Bar
IB*	"	Iron Bar
(WIT)	"	Witness
Meas.	"	Measured
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	"	Registered Plan 50M-63
(P2)	"	Registered Plan M-23
(P3)	"	Plan 4R-23096
(P4)	"	(647) Plan November 4, 1982
(symbol)	"	Deciduous Tree
(symbol)	"	Coniferous Tree
MH-ST	"	Maintenance Hole (Storm Sewer)
MH-S	"	Maintenance Hole (Sanitary)
— ST —	"	Underground Storm Sewer
— S —	"	Underground Sanitary Sewer
— OHW —	"	Overhead Wires
T/G	"	Top of Grate
Inv	"	Invert
FH	"	Fire Hydrant
WV	"	Water Valve
GM	"	Gas Meter
HM	"	Hydro Meter
HH	"	Handhole
TB-B	"	Bell Terminal Box
AC	"	Air Conditioner
Ø	"	Diameter
+85.00	"	Location of Elevations
+85.00	"	Top of Concrete Curb Elevation
C/L	"	Centreline
(line)	"	Property Line
Fdn	"	Foundation
CLF	"	Chain Link Fence
BF	"	Board Fence
BOS	"	Bottom of Slope
TOS	"	Top of Slope
CH	"	Cedar Hedge
TRW	"	Timber Retaining Wall

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-11514
THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29 (3).

SITE AREA = 1857.8 m²

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

For bearing comparisons, a rotation of 0°01'10" counter-clockwise was applied to bearings on P1,P2.

ELEVATION NOTES

1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum, derived from control monument No. 019680221 having an elevation of 87.623.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. Underground utility data derived from City of Ottawa utility sheet reference E-33-28 & E-33-29.
4. Sanitary and storm sewer grades and inverts were derived from drawings S-1474-2-10 & 82-7252-1.
5. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. E-1102-21 CLacroix PrtLtB Con11 POS F

PROPOSED

THREE STOREY RESIDENTIAL APARTMENT BUILDING SITE

PATR OF LOT B

CONCESSION 11

GEOGRAPHIC TOWNSHIP OF CUMBERLAND

1670 TENTH LINE ROAD

CITY OF OTTAWA

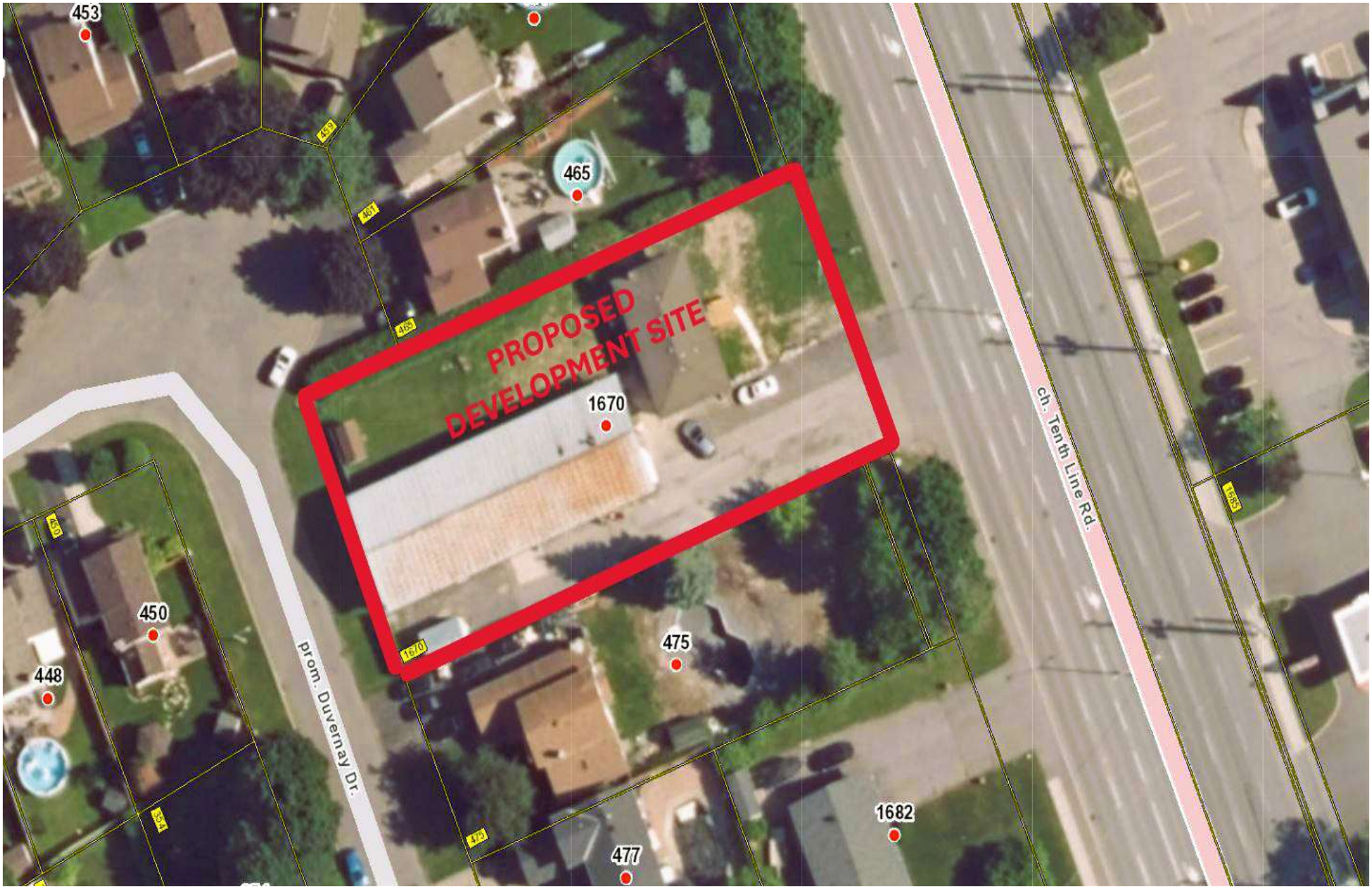
APPENDIX B

SITE PRE-DEVELOPMENT CONDITION

GOOGLE IMAGE (2021)

AND

AERIAL PHOTOGRAPHY 2022 (GEOOTTAWA)


453
465
PROPOSED
DEVELOPMENT SITE
1670
ch. Tenth Line Rd.
450
448
prom. Duvernay Dr.
475
1682
477

2022


453
465
PROPOSED
DEVELOPMENT SITE
1670
prom. Duvernay Dr.
450
448
475
1682
477
ch. Tenth Line Rd.

2022

1670 TENTH LINE ROAD

2021

FRONTING DUVERNAY DRIVE

2021

PROPOSED

THREE STOREY RESIDENTIAL APARTMENT BUILDING SITE

PATR OF LOT B

CONCESSION 11

GEOGRAPHIC TOWNSHIP OF CUMBERLAND

1670 TENTH LINE ROAD

CITY OF OTTAWA

APPENDIX C

DUVERNAY DRIVE

CITY OF OTTAWA

PLAN AND PROFILE

AND

UCC DRAWINGS

NOTE
THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE DURING CONSTRUCTION

W.M. HARDING — REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO
B. C. HARRIS — REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO
McNEELY ENGINEERING

NO	REVISION	BY	DATE
	AS BUILT		MAR 95

THE REGIONAL MUNICIPALITY OF OTTAWA - CARLETON
TRANSPORTATION DEPARTMENT
Design & Construction Division

REGIONAL ROAD 47 RECONSTRUCTION
TOMPKINS AVE. TO INNES RD.

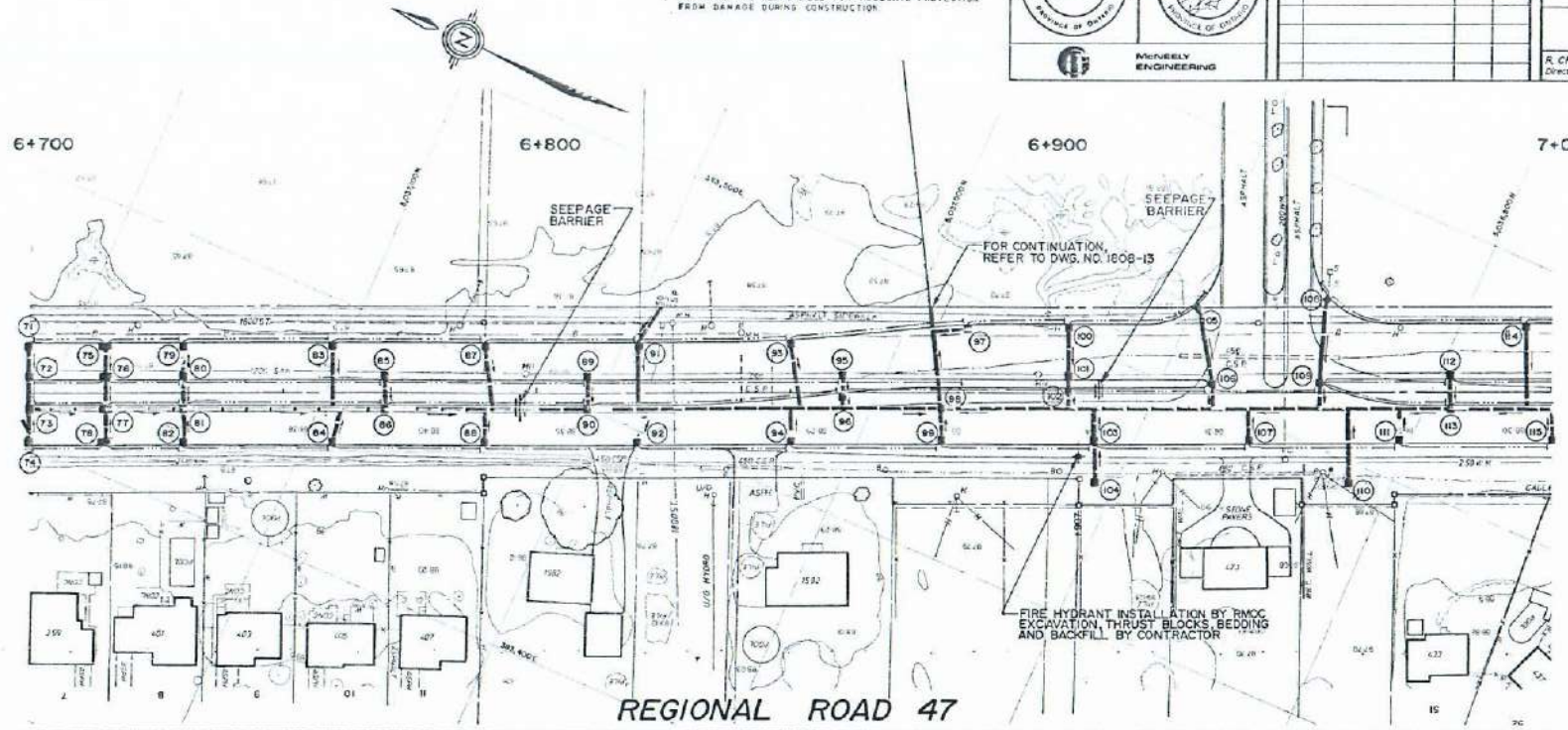
STORM SEWER
STA. 6+700 to STA. 7+000

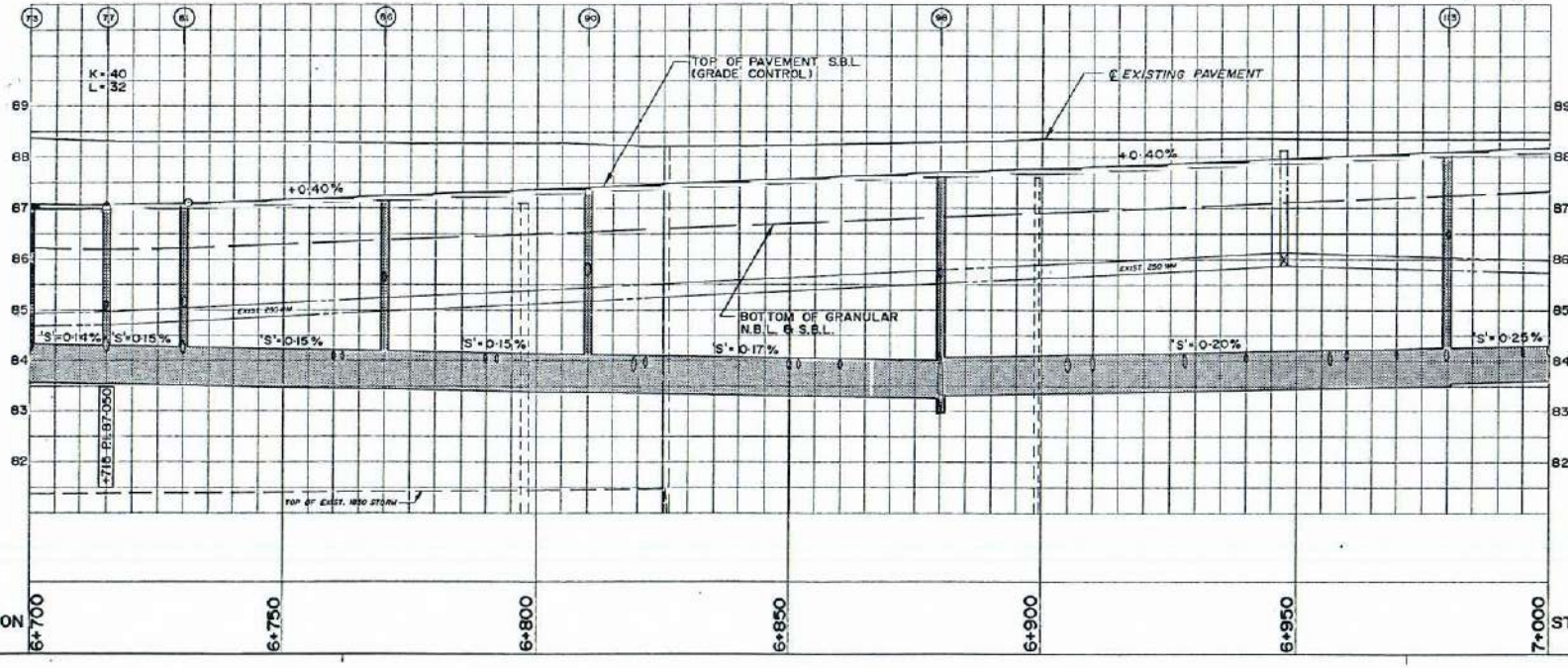
R. CHARTRAND, P.ENG. — Director Roadways & Structures
M.M. SEP, P.ENG. — Chief Design Engineer

DWG. NO. R-1808-09
SHEET 9 OF 64
CONTRACT NO. 90-521
DATE: JUNE 1990
HORIZ. 1 0 2 10
VERT. .5 0 .5 1

SEWER NOTES:

1. FOR SEWER AND MANHOLE TABLES, REFER TO DRAWING NO. 1808-14
2. OFFSETS AND GRATE ELEVATIONS REFER TO CENTRE OF GRATE.
3. RIGID PIPE BEDDING SHALL BE CLASS B AS PER O.P.S.D. 802.03 MODIFIED AND BACKFILL AS PER O.P.S.D. 803.04.
4. FLEXIBLE PIPE BEDDING SHALL BE TYPE 2 AS PER O.P.S.D. 802.04 MODIFIED AND BACKFILL AS PER O.P.S.D. 803.04.
5. LATERAL CONNECTIONS ARE TO BE MADE WITH MANUFACTURED TEES AS PER O.P.S.D. 708.01. "**" DENOTES OUTLET INVERT ELEVATION GIVEN AT TOP OF RISER.





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W.M. HARDING — REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO
B.C. HARRIS — LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO
McNEELY ENGINEERING

NO.	REVISION	BY	DATE
2	PLACE CHARLEMAGNE ENTR.	A.K.	MAY 91
	AS BUILT		MAR. 92

THE REGIONAL MUNICIPALITY OF OTTAWA - CARLETON
TRANSPORTATION DEPARTMENT
Design & Construction Division

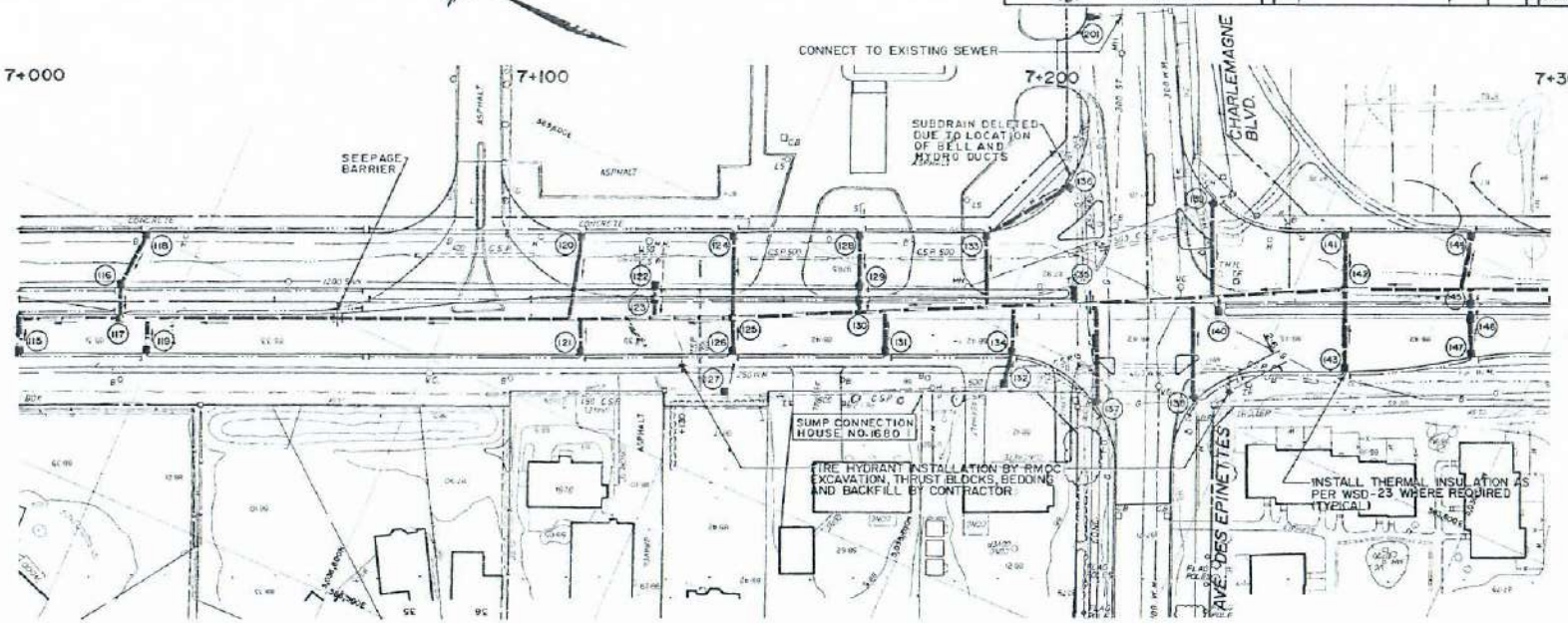
DWG. NO. R-1808-10
SHEET 10 OF 64
CONTRACT NO. 90-521
DATE: JUNE 1990

REGIONAL ROAD 47 RECONSTRUCTION
TOMPKINS AVE. TO INNES RD.

STORM SEWER
STA. 7+000 to STA. 7+300

R. CHARTRAND, P.ENG. — Director Roadways & Structures
M.M. SEP, P.ENG. — Chief Design Engineer

HORIZ. 1:500
VERT. 1:50



SEWER NOTES:

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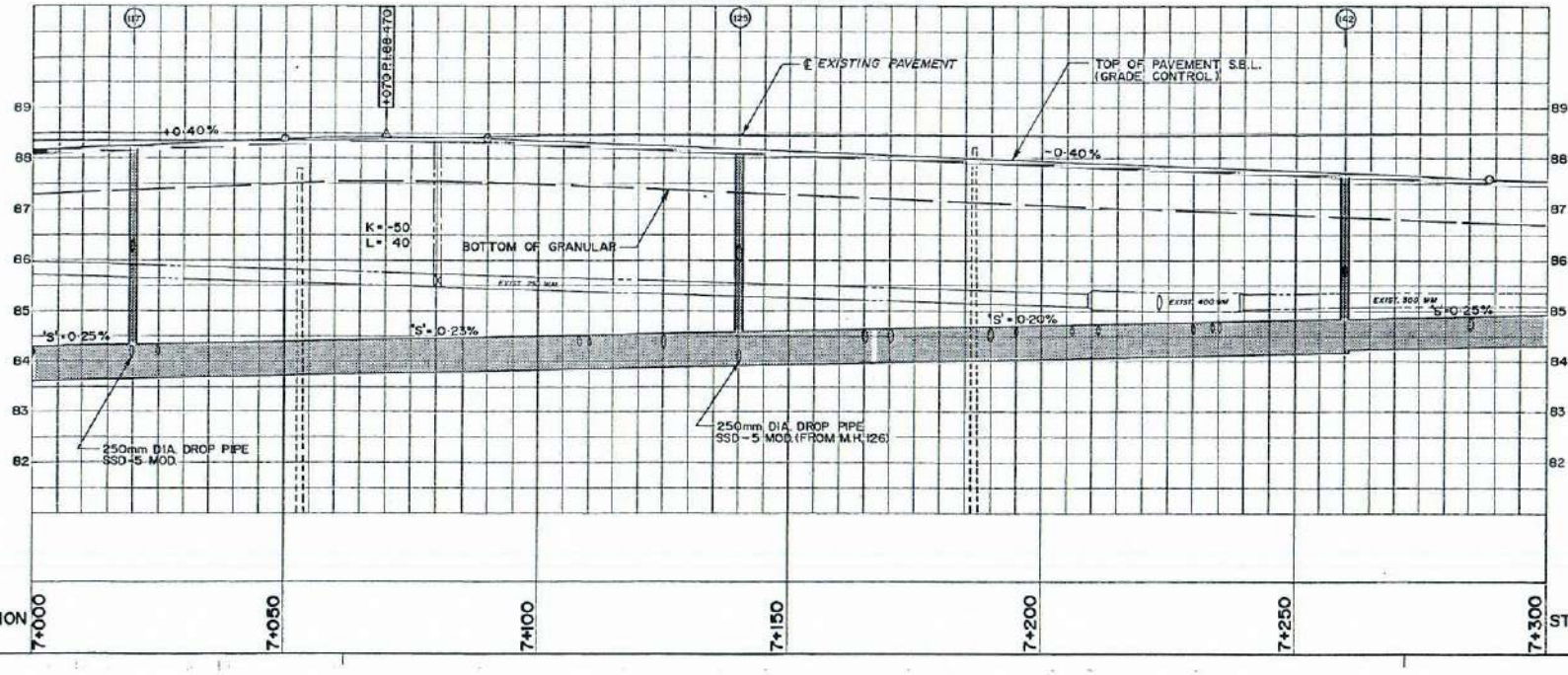
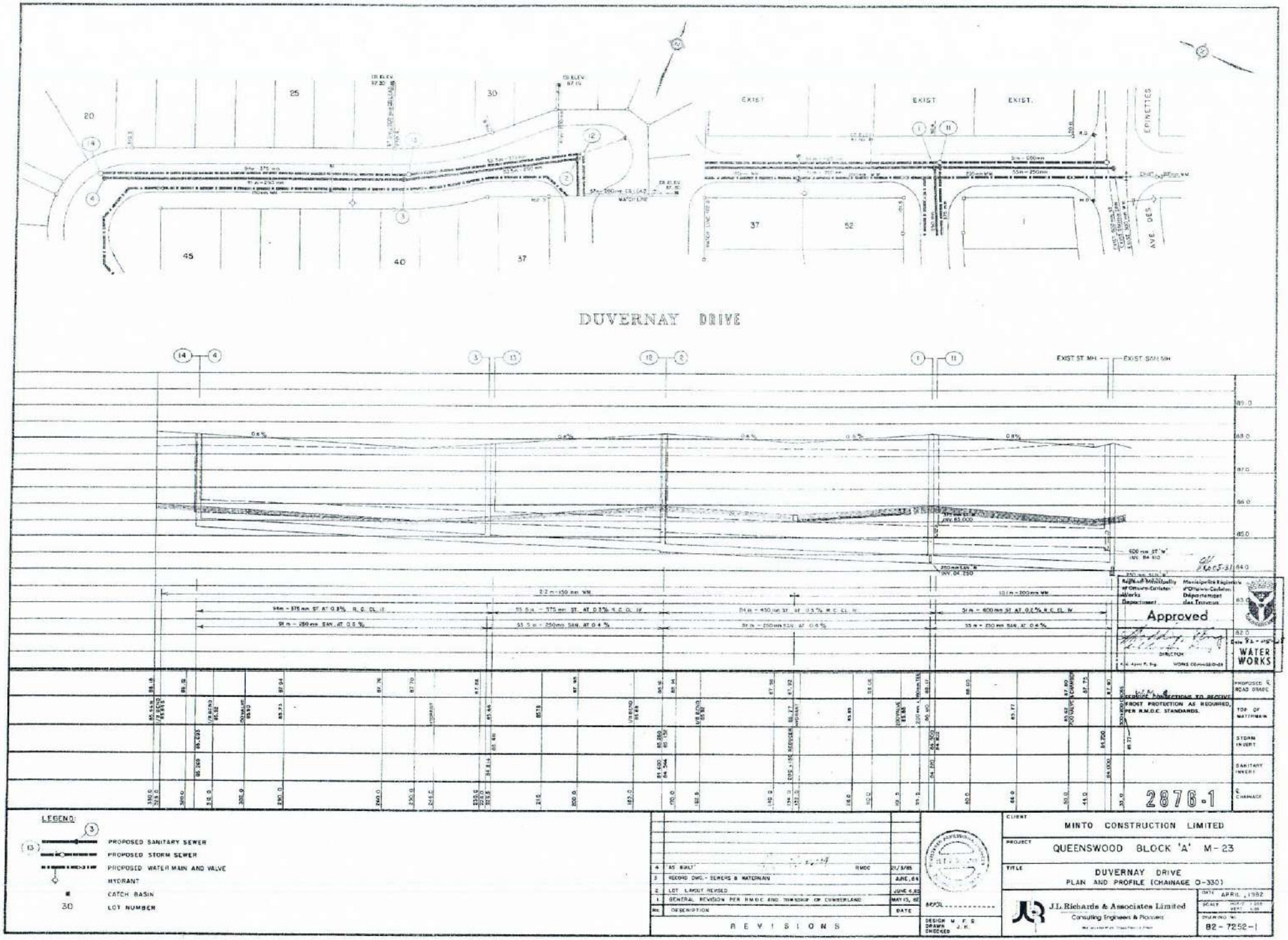
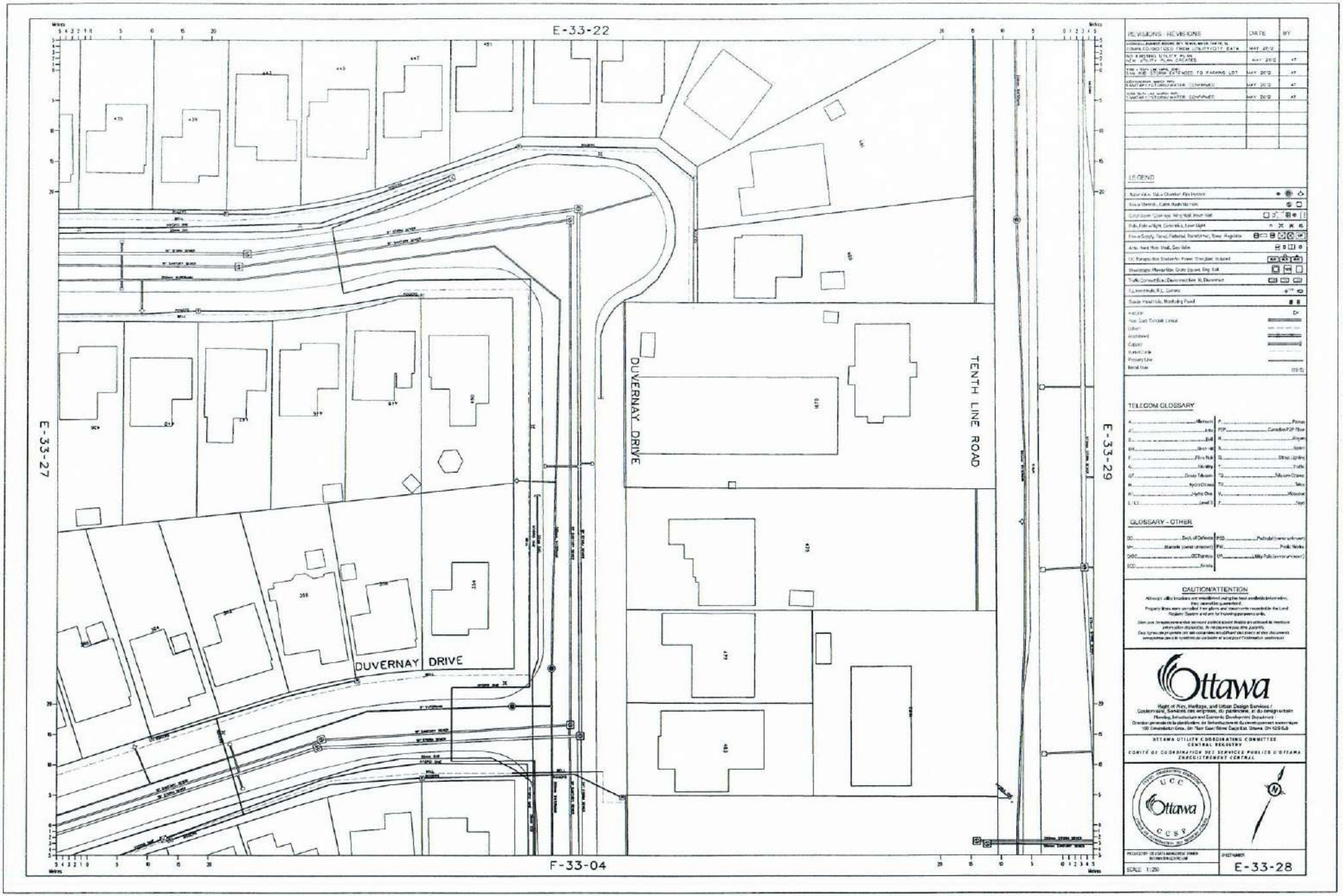
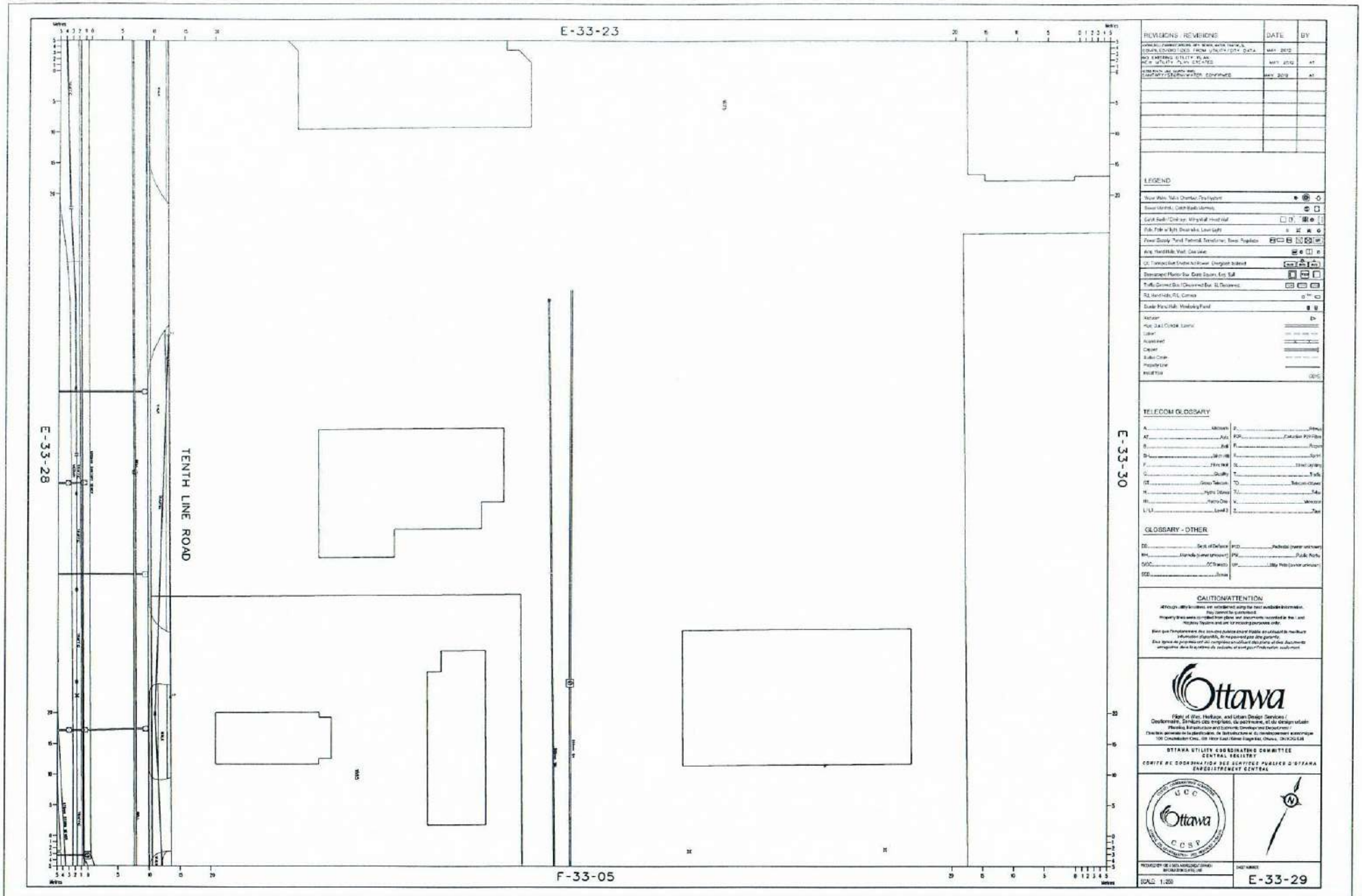
5. LATERAL CONNECTIONS ARE TO BE MADE WITH MANUFACTURED TEES AS PER O.P.S.D. 708.01. "A" DENOTES OUTLET INVERT ELEVATION GIVEN AT TOP OF RISER.

REGIONAL ROAD 47




DUVERNAY DRIVE
EXIST
EXIST
EXIST.
EXIST ST MH
EXIST SAN MH
Approved
WATER WORKS
LEGEND:
PROPOSED SANITARY SEWER
PROPOSED STORM SEWER
PROPOSED WATER MAIN AND VALVE
HYDRANT
CATCH BASIN
LOT NUMBER
REVISIONS
MINTO CONSTRUCTION LIMITED
QUEENSWOOD BLOCK 'A' M-23
DUVERNAY DRIVE
PLAN AND PROFILE (CHAINAGE 0-330)
J.L. Richards & Associates Limited
Consulting Engineers & Planners
APRIL, 1982
82-7252-1
2876-1


E-33-22
E-33-27
E-33-29
F-33-04
DUVERNAY DRIVE
DUVERNAY DRIVE
TENTH LINE ROAD
REVISIONS: REVISIONS
DATE
BY
MAY 2012
MAY 2012
AT
MAY 2012
AT
MAY 2012
AT
MAY 2012
AT
LEGEND
TELECOM GLOSSARY
GLOSSARY - OTHER
CAUTION/ATTENTION
Ottawa
OTTAWA UTILITY COORDINATING COMMITTEE
CENTRAL REGISTRY
COMITÉ DE COORDINATION DES SERVICES PUBLICS D'OTTAWA
ENREGISTREMENT CENTRAL
SCALE: 1:250
E-33-28



REVISIONS / REVISIONS	DATE	BY
[illegible]	MAY. 2012	
NO EXISTING UTILITY PLAN [illegible] NOT IN UTILITY PLANS CREATED	MAY. 2012	AT
[illegible] CONFIRMED	MAY. 2013	AT

LEGEND

TELECOM GLOSSARY

GLOSSARY - OTHER

CAUTION/ATTENTION

Ottawa

Right of Way, Heritage, and Urban Design Services / Gestionnaire, Services des emprises, du patrimoine, et du design urbain
Planning, Infrastructure and Economic Development Department / Direction générale de la planification, de l'infrastructure et du développement économique
100 Constellation Crescent, 6th Floor East / Rideau Ridge Rd, Ottawa, ON K2G 6J8

OTTAWA UTILITY COORDINATING COMMITTEE
CENTRAL REGISTRY
COMITE DE COORDINATION DES SERVICES PUBLICS D'OTTAWA
ENREGISTREMENT CENTRAL

SCALE: 1:250

E-33-29

PROPOSED

THREE STOREY RESIDENTIAL APARTMENT BUILDING SITE

PATR OF LOT B

CONCESSION 11

GEOGRAPHIC TOWNSHIP OF CUMBERLAND

1670 TENTH LINE ROAD

CITY OF OTTAWA

APPENDIX D

CITY OF OTTAWA

- SITE PLAN AND ARCHITECTURAL DRAWINGS
- WATER BOUNDARY CONDITIONS
- FIRE FLOW CALCULATIONS
- OFM EXPOSURE DISTANCES – FIGURE 1
- SUPPORTING HYDRAULIC CALCULATIONS
- HYDRANT SPACING – FIGURE 2

ATTACHMENT 1 : SITE PLAN AND ARCHITECTURAL DRAWINGS

Site Statistics	
Current Zoning Designation:	-
Lot Width:	30.48m
Total Lot Area:	1668.27m²
Average Existing Grade:	88.45m
Gross Floor Area (above grade):	1668.39m²

SITE PLAN BASED ON

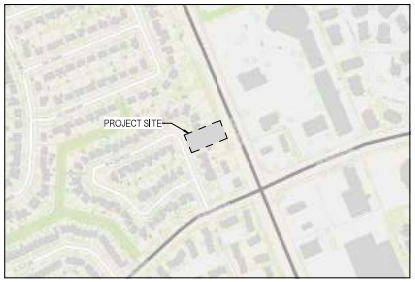
TOPOGRAPHIC PLAN OF SURVEY OF
PART OF LOT B
CONCESSION 11
GEOGRAPHIC TOWNSHIP OF CUMBERLAND
CITY OF OTTAWA

SURVEYED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

Proposed Development • 3 Storey Low-Rise Apartment Building

No. of units 39 Units

Zoning Mechanism	Required	Provided
Minimum Lot Width 109(a)	-	30.48m
Minimum Lot Area 109(a)	-	1668.27m²
Min. Front Yard Setback 109(a)	-	4.5m
Min. Interior Side Yard Setback 109(a)	-	1.5m
Min. Rear Yard Setback 109(a)	-	30.4m
Maximum Building Height 109(a)	-	11.4m
Parking Space Rates (Residents) 101(RH) (Sch. 1A - 4 rea C)	36 Spaces 1.2 spaces / unit for 31 units	17 Spaces
Minimum Visitor Parking Rates 102 (Sch. 1A - 4 rea C)	6 Spaces 0.2 spaces / unit for 31 units	6 Spaces
Bicycle Parking Rates (Residents) Table 111A(b) (Sch. 1 - 4 rea C)	16 Spaces 0.5 spaces / unit for 31 units	22 Spaces
Total Amenity Area Table 137(12)	180 m² 6m² / unit for 30 units	127.84m² - balconies
Communal Amenity Area Table 137(12)	90 m² Min. 50% of Total Amenity Area	0m²
Landscape Buffer for Parking Lot Table 110(1)	Min. 3m abutting a street Min. 0.6m not abutting a street	1.2m North side 1.2m West side 0.3m South side



2 SP-01 LOCATION PLAN
SCALE: NTS

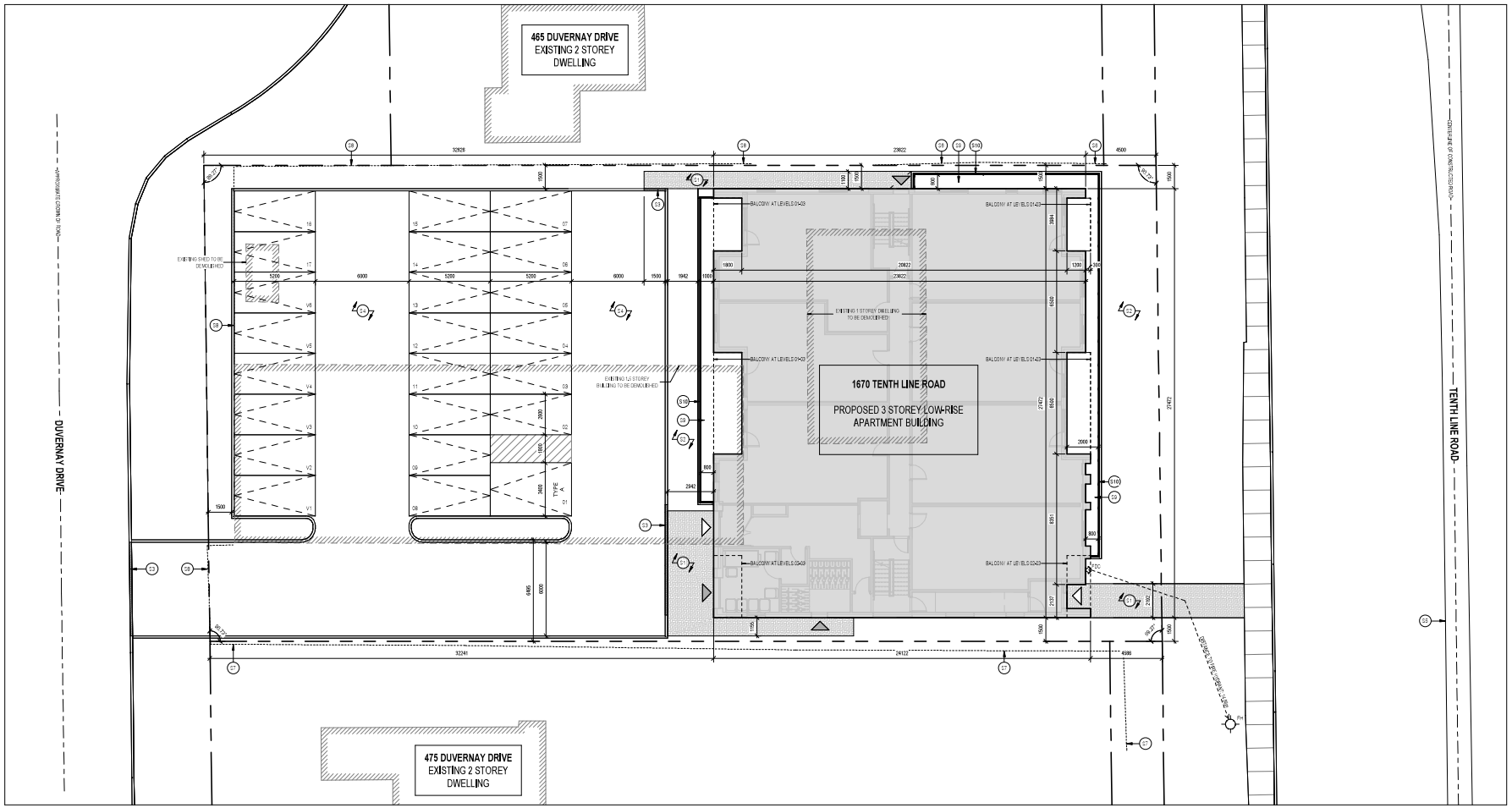
SITE PLAN SYMBOLS LEGEND

- BUILDING ENTRANCE
- BUILDING EXIT
- BICYCLE PARKING
- PROPERTY LINE
- SETBACK LINE
- AMENITY AREA
- FDC — FIRE DEPARTMENT CONNECTION
- FH — FIRE HYDRANT
- NEW STREET LIGHT

SITE PLAN SYMBOLS
SCALE: NTS

SITE PLAN NOTES

- S1 INTERLOCKING STONE PATHWAY
- S2 SOFT LANDSCAPING
- S3 DEPRESSED CURB
- S4 ASPHALT
- S5 CONCRETE MEDIAN
- S6 EXISTING CHAIN LINK FENCE
- S7 EXISTING BOARD FENCE
- S8 EXISTING BOARD FENCE TO BE DEMOLISHED
- S9 WINDOW WELLS
- S10 GLASS GUARD SYSTEM



1 SP-01 SITE PLAN
SCALE: 1 : 125

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6. These documents are not to be used for construction unless specifically noted for such purpose.

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project1 studio
Project1 Studio Incorporated
613.864.3939 | mail@project1studio.ca

1670 Tenth Line Road

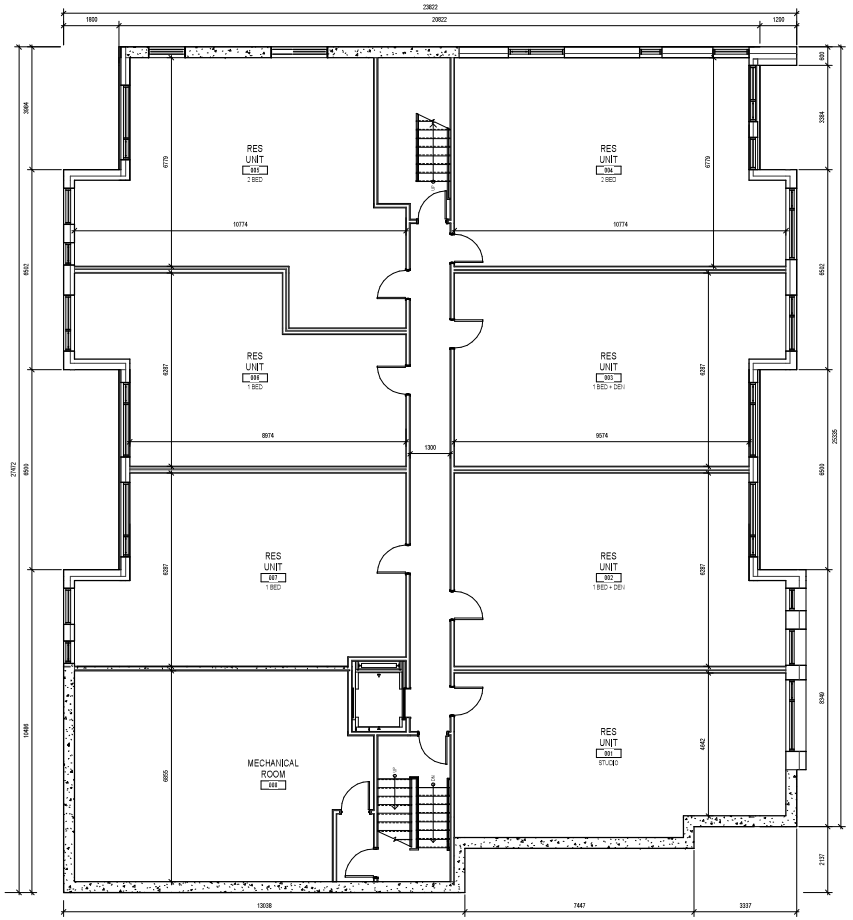
1670 Tenth Line Road
Ottawa, ON K1E 2H8

PROJ	SCALE	DRAWN	REVIEWED
2424	NOTED	AR	RMK

SITE PLAN

SP-01

FLOOR/ROOF PLAN NOTES



1 / A100 LEVEL 00 FLOOR PLAN
SCALE: 1 : 75

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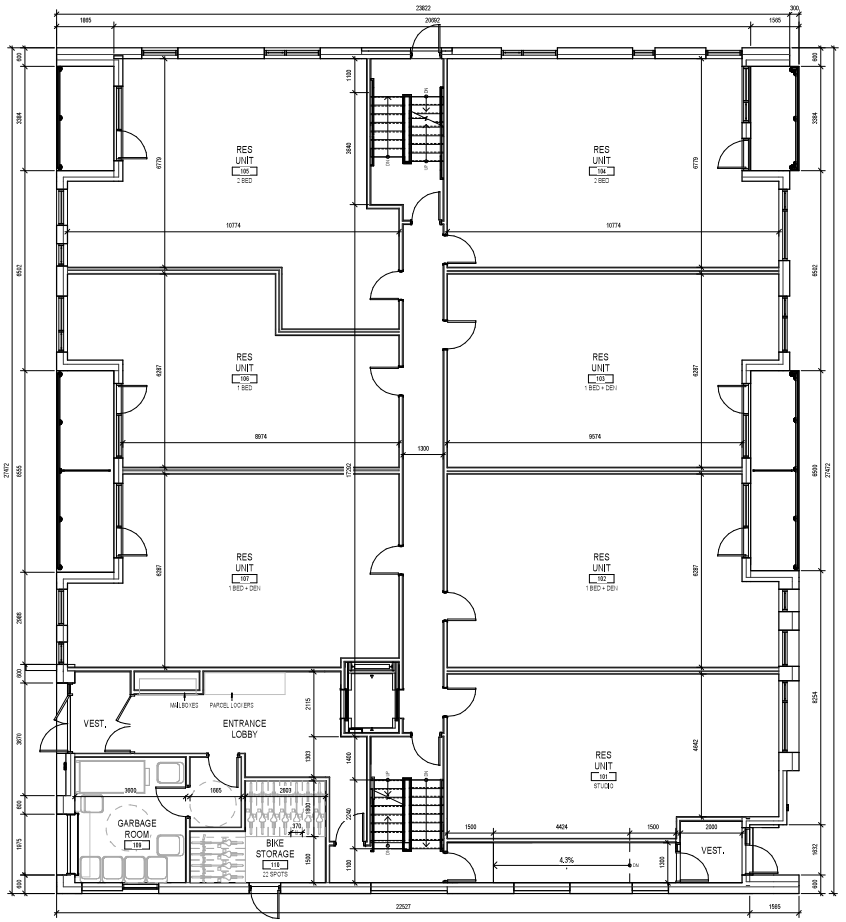
2424	NOTED	AR	RMK

FLOOR PLAN LEVEL 00

A100

FLOOR/ROOF PLAN NOTES



1 A101 LEVEL 01 FLOOR PLAN
SCALE: 1 : 75

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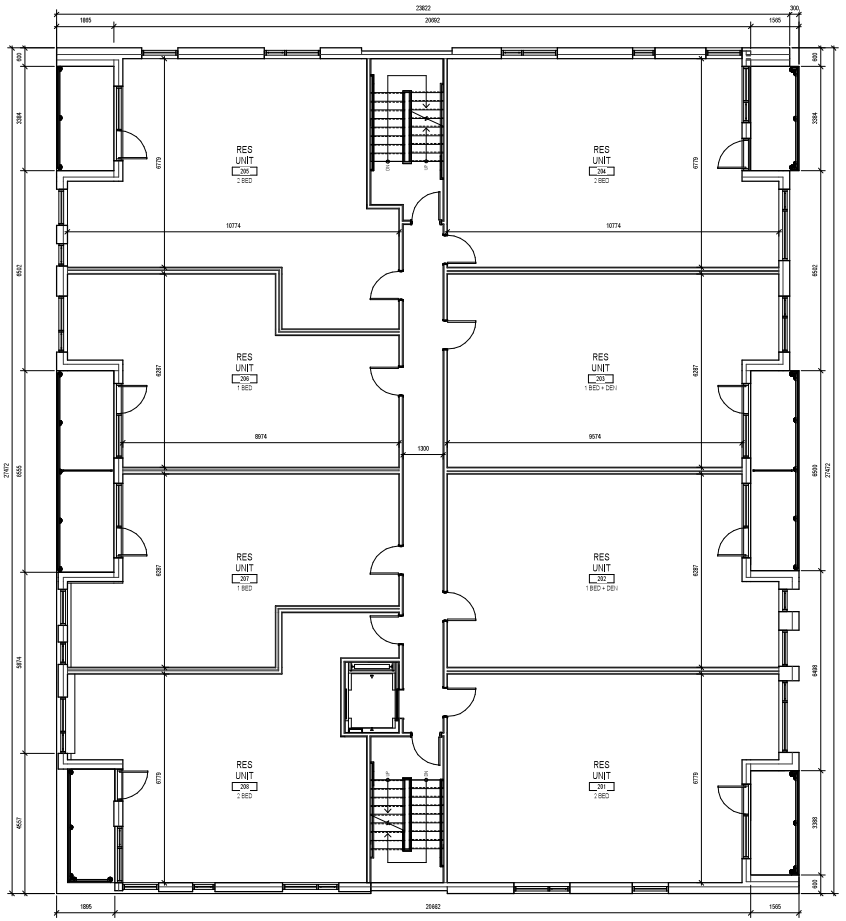
2424	NOTED	AR	RMK

FLOOR PLAN LEVEL 01

A101

FLOOR/ROOF PLAN NOTES



1 A102 LEVEL 02 FLOOR PLAN
SCALE: 1 : 75

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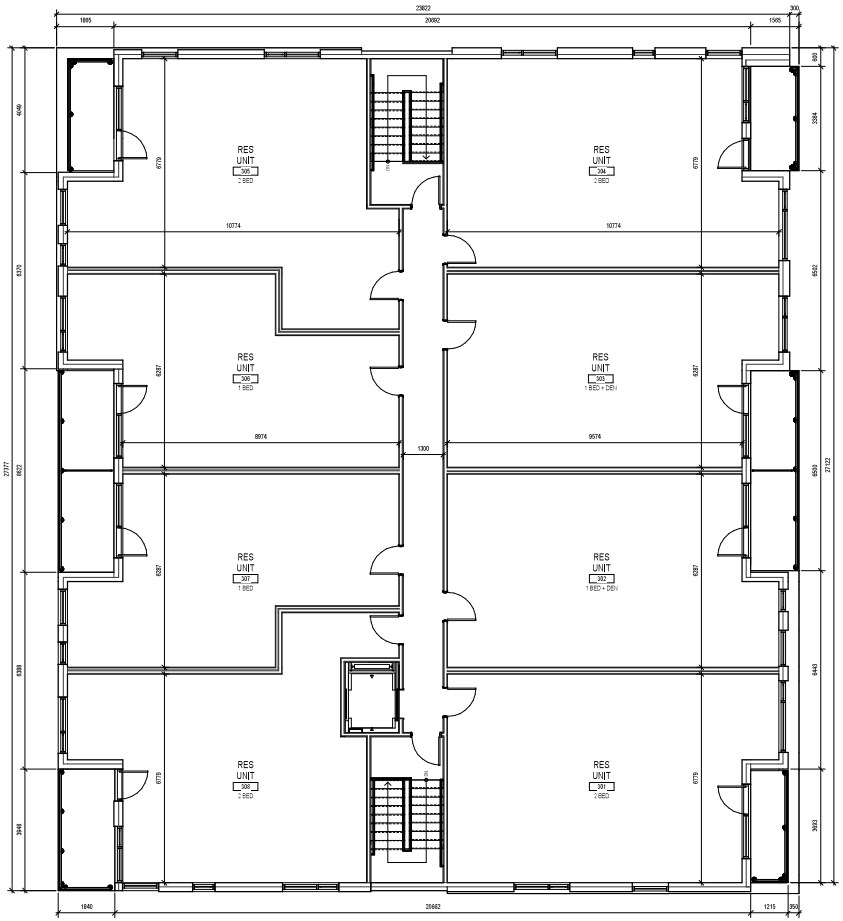
2424	NOTED	AR	RMK

FLOOR PLAN LEVEL 02

A102

FLOOR/ROOF PLAN NOTES



1 A103 LEVEL 03 FLOOR PLAN
SCALE: 1 : 75

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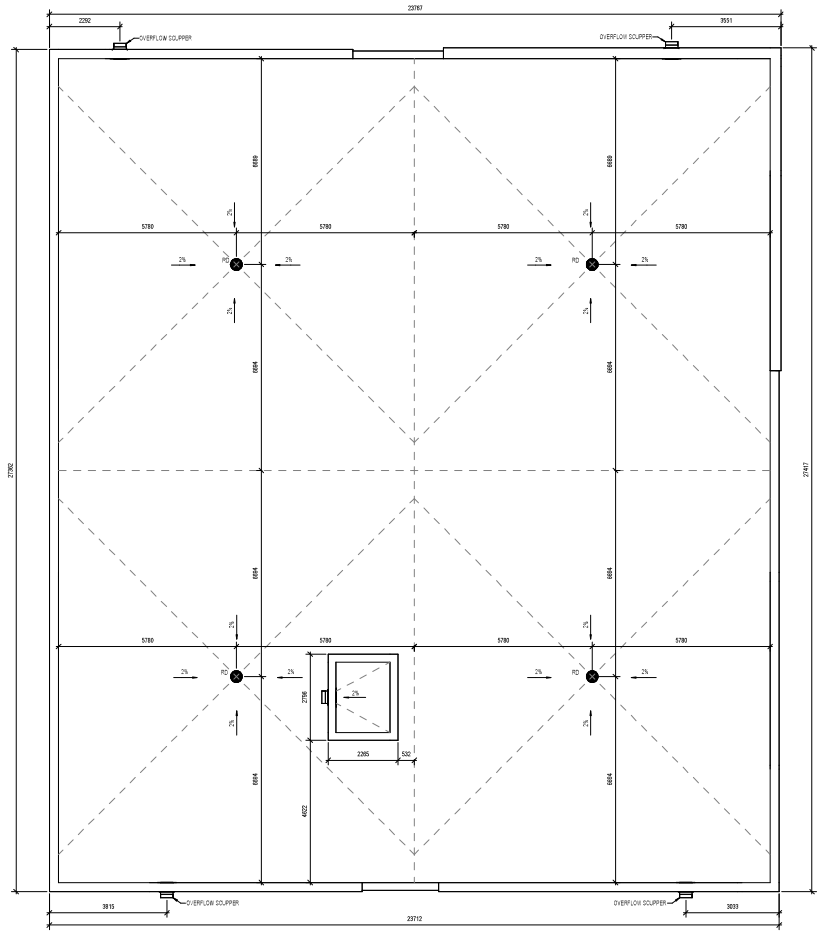
2424	NOTED	AR	RMK

FLOOR PLAN LEVEL 03

A103

FLOOR/ROOF PLAN NOTES



1 / A104 ROOF PLAN
SCALE: 1 : 75

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2424	NOTED	AR	RMK

ROOF PLAN

A104

1 / A201 WEST ELEVATION
SCALE: 1 : 50

2 / A201 EAST ELEVATION
SCALE: 1 : 50

CLADDING LEGEND:

1. BRICK MASONRY
   COLOUR: RED
2. FIBER CEMENT
   COLOUR: CHARCOAL
3. FIBER CEMENT PLANKS
   COLOUR: CHARCOAL
4. WOOD SIDING
   COLOUR: CEDAR
5. ALUMINUM AND GLASS RAILING

ELEVATION NOTES

GENERAL ARCHITECTURAL NOTES:

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1670 Tenth Line Road

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Ottawa, ON K1E 2H8

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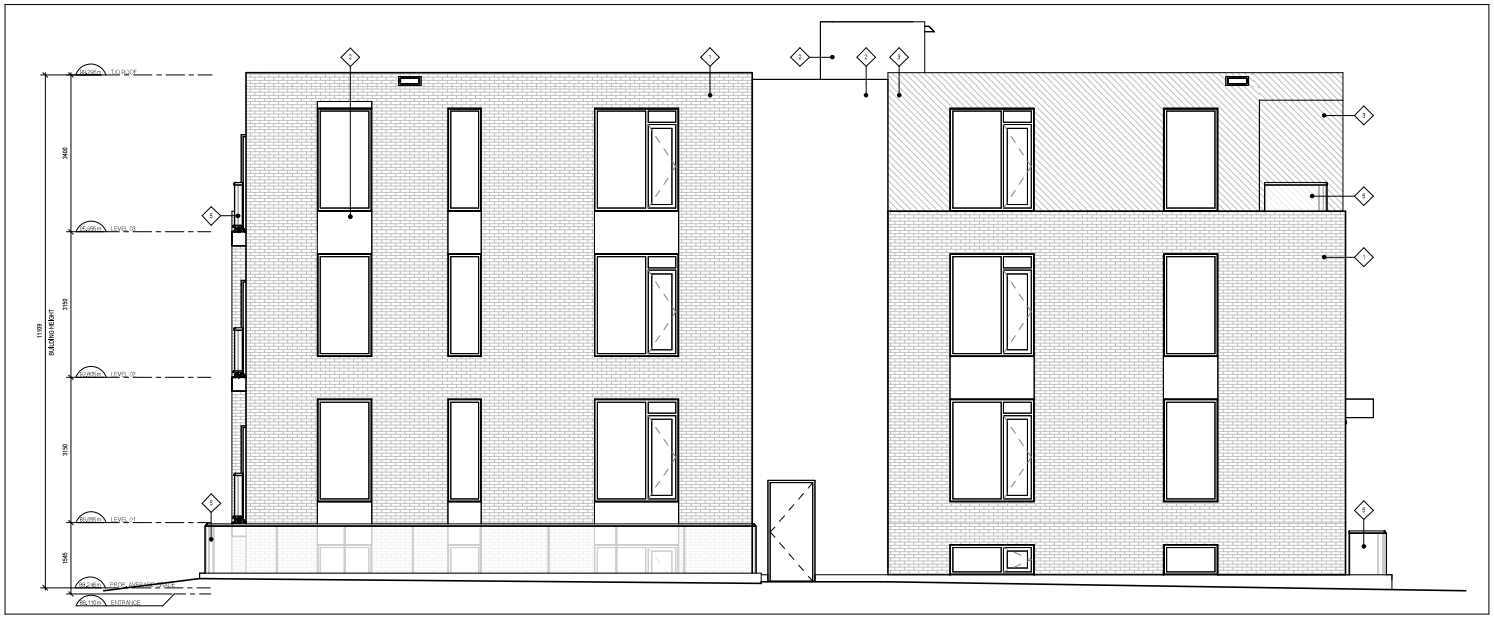
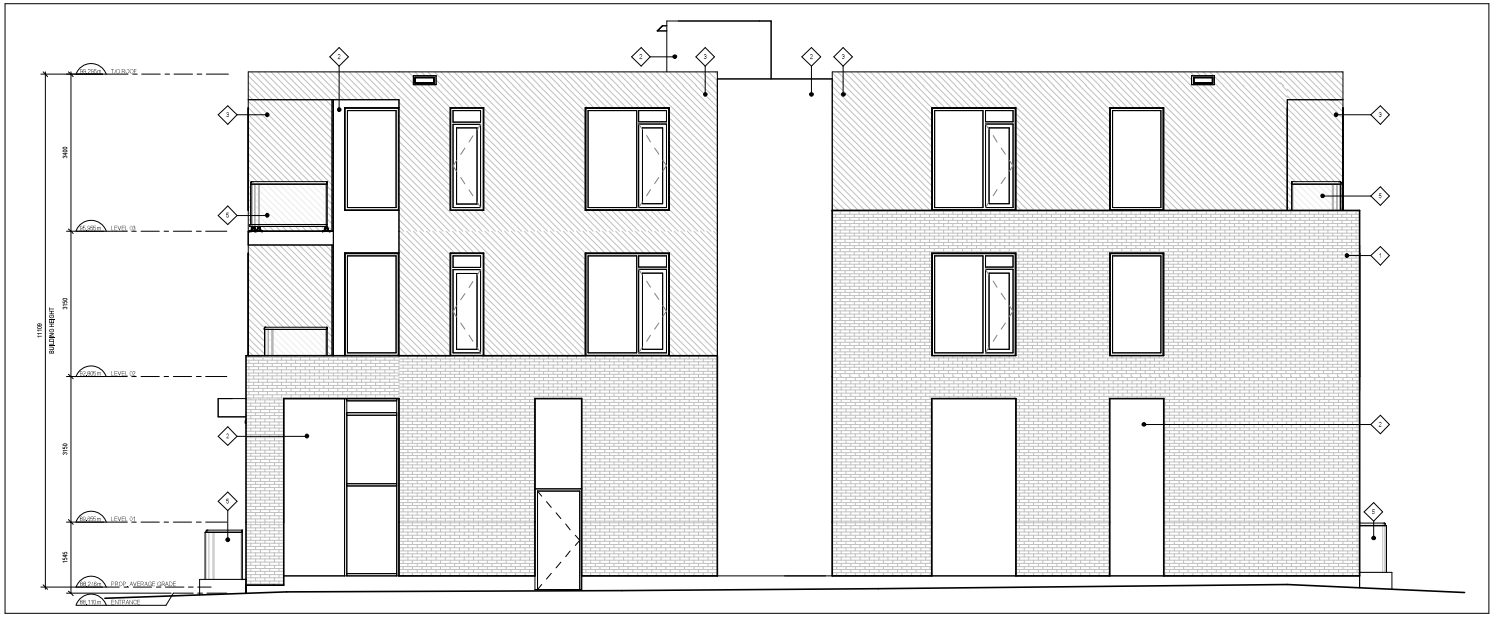
2424	NOTED	AR	RMK

WEST & EAST ELEVATIONS

A201



1 / A202 NORTH ELEVATION
SCALE: 1 : 50



2 / A202 SOUTH ELEVATION
SCALE: 1 : 50

CLADDING LEGEND:

1. BRICK MASONRY
   COLOUR: RED
2. FIBER CEMENT
   COLOUR: CHARCOAL
3. FIBER CEMENT PLANKS
   COLOUR: CHARCOAL
4. WOOD SIDING
   COLOUR: CEDAR
5. ALUMINUM AND GLASS RAILING

ELEVATION NOTES

GENERAL ARCHITECTURAL NOTES:

1. This drawing is the property of the Architect and may not be reproduced or used without the expressed consent of the Architect.
2. Drawings are not to be scaled. The Contractor is responsible for checking and verifying all levels and dimensions and shall report all discrepancies to the Architect and obtain clarification prior to commencing work.
3. Upon notice in writing, the Architect will provide written/graphic clarification or supplementary information regarding the intent of the Contract Documents.
4. The Architectural drawings are to be read in conjunction with all other Contract Documents including Project Manual and the Structural, Mechanical and Electrical Drawings.
5. Positions of exposed or finished Mechanical or Electrical devices, fittings and fixtures are indicated on the Architectural Drawings. Locations shown on the Architectural Drawings shall govern over Mechanical and Electrical Drawings. Mechanical and Electrical items not clearly located within Architectural are directed by the Architect.
6. These documents are not to be used for construction unless specifically noted for such purpose.

ISSUE RECORD

project1 studio
Project1 Studio Incorporated
| 613.864.3939 | mail@project1studio.ca

1670 Tenth Line Road

1670 Tenth Line Road
Ottawa, ON K1E 2H8

PROJ	SCALE	DRAWN	REVIEWED
2424	NOTED	AR	RMK

NORTH & SOUTH ELEVATIONS

A202

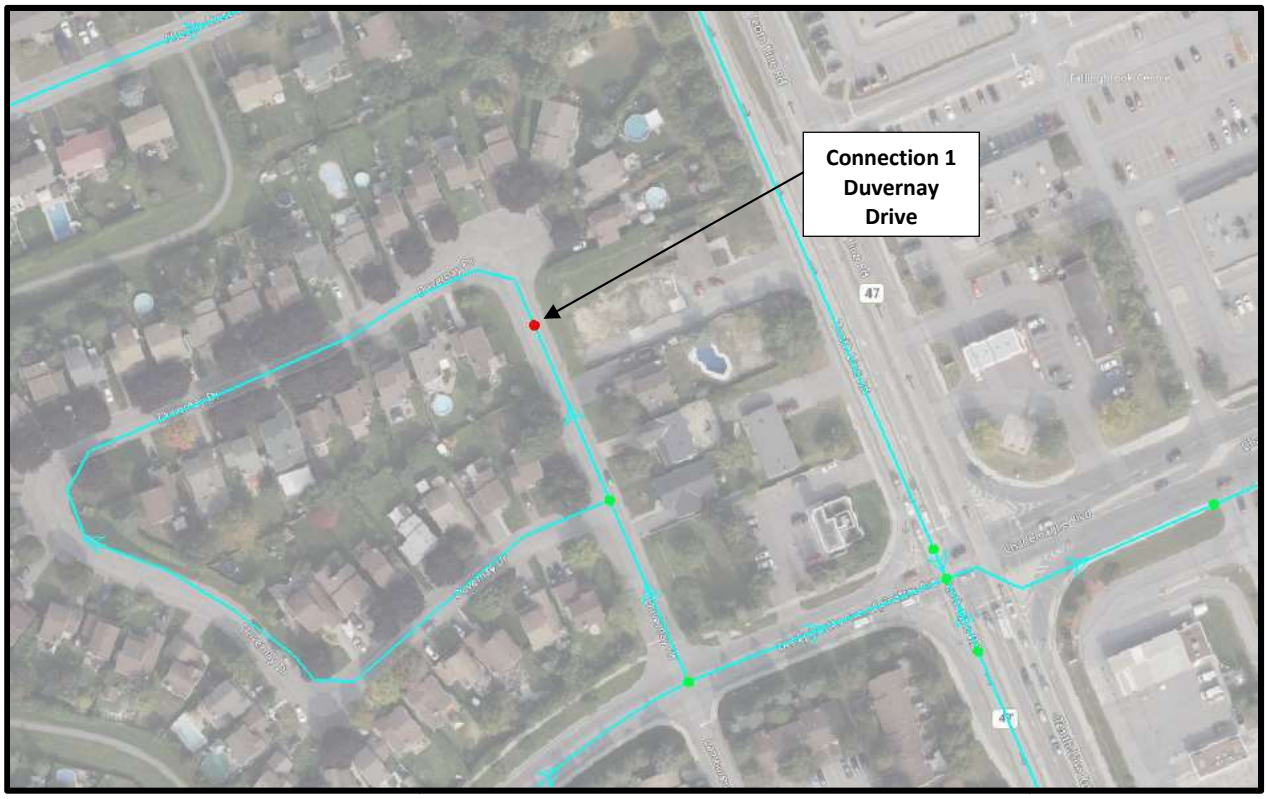
ATTACHMENT 2 : WATER BOUNDARY CONDITIONS

Boundary Conditions
1670 Tenth Line Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	10	0.16
Maximum Daily Demand	25	0.41
Peak Hour	55	0.91
Fire Flow Demand #1	6,300	105.00

Location



Results

Connection 1–Duvernay Drive

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.2	60.1
Peak Hour	127.8	56.7
Max Day plus Fire Flow #1	120.0	45.6

[1] Ground Elevation = 87.9 m

Notes

1. The IWSD has recently updated their water modelling software. Any significant difference between previously received BC results and newly received BC results could be attributed to this update.

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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

ATTACHMENT 3 : FIRE FLOW CALCULATIONS

Stantec

OFM Fire Flow Calculation

Calculations based on *Fire Protection Water Supply Guideline for Part 3 in the Ontario Building Code* by the Office of the Fire Marshal (OFM 1999)

Stantec Project #: 163401084
Project Name: 1670 Tenth Line Road Servicing Analysis
Date: 6/16/2025
Fire Flow Calculation #: 1
Description: Residential

Data inputted b Hamidreza Mohabbat MASc., EIT
Data reviewed b Alexandre Mineault-G, P.Eng.

Notes: *The required fire flow is calculated using the Ontario Building Code (OBC). The buidling details are extracted from the Proposed Site Plan submitted by the Project Studio. The apartment building is planned to comprise a total of 30 units with an average total gross area of approx. 613 square meter per floor.Additionally, the building is constructed with wood and per OBC it was selected as Type IV, with a residential occupancy or Classification C. Per proposed plans, the total height of the buidling was calculated at 12.0 m. The exposure distances were calculated based on the submitted site plans and GeoOttawa webpage.*

Office of the Fire Marshal Determination of Required Fire Protection Water Supply

Step	Task	Notes		Multiplier Associated with Option		Value Used	
1	**General Building Details**						
1.1	Enter Number of Storeys	Number of Floors/Storeys in the Unit (incl. basement):			4	4	Storeys
1.2	Choose Type of Housing (if TH, Enter Number of Units Per TH Block)	Type of Housing	Single Family	0	Other (Comm, Ind, Apt etc.)	30	Units
			Townhouse - indicate # of units	0			
			Other (Comm, Ind, Apt etc.)	30			
1.3	Choose Presence of Sprinklers	Sprinklers?			None	None	N/A
1.4	Choose Presence of Firewalls	Firewall separations?			None	None	N/A
1.5	Choose Presence of Stand-Pipe System	Stand-pipe system?			None	None	N/A
2	**Determining Water Supply Coefficient K**						
2.1	Choose Type of Construction	**Type of Construction**					
		Type of Construction	Non-combustible construction + fire separations + fire-resistance ratings in accordance with Section 3.2.2 of OBC	Type I	Type III	N/A	N/A
			Non-combustible construction + fire separations + no fire-resistance rating	Type II			
			Combustible construction + fire separations + fire-resistance ratings in accordance with Section 3.2.2 of OBC	Type III			
			Combustible construction + fire separations + no fire-resistance rating	Type IV			
2.2	Choose Classification	**Building Classification**					
		Occupancy Classification (OBC)	A-2, B-1, B-2, B-3, C, D	18	C	A-2, B-1, B-2, B-3, C, D	N/A
			A-4, F-3	22			
			A-1, A-3	25			
			E, F-2	31			
			F-1	41			
2.3	Water Supply Coefficient (K)	Water Supply Coefficient K				18	N/A
3	**Determining Building Volume V**						
3.1	Enter Ground Floor Area of One Unit	**Floor Space Area**					
		Average Floor Area (A) :			613 Square Metres (m2)	613	Area in Square Meters (m^2)
3.2	Building Height (h)	**Building Height**					
		Bottom Elevation :			86.4 Meters (m)	12.0	Height in Meters (m)
		Top Elevation :			98.4 Meters (m)		
3.3	Building Volume (V)	Building Volume V = A * h				7,360	Volume in Meters Cube (m^3)
4	**Determining Spatial Coefficient S**						
4.1	Choose Exposure Distances from Building to Property Line	Exposure Distance from Building to Property Line in Meters (m)	**North Side**	1.5	0.50	1.00	Distance in Meters (m)
			Property Line to Street Centreline (Street Facing)	0			
			Total Exposure Distance	**1.5**			
			East Side	4.5	0.00		
			Property Line to Street Centreline (Street Facing)	19.0			
			Total Exposure Distance	**23.5**			
			South Side	1.5	0.50		
			Property Line to Street Centreline (Street Facing)	0			
			Total Exposure Distance	**1.5**			
			West Side	32.2	0.00		
			Property Line to Street Centreline (Street Facing)	8.3			
			Total Exposure Distance	**40.5**			
4.2	Total Spatial Coefficient (S_{tot})	Total Spatial Coefficient $S_{tot} = 1 + \Sigma S_x$				2.00	N/A
5	**Determining Required Minimum Supply of Water Q and Fire Flow**						
5.1	Obtain Required Fire Volume, Flow & Duration	**Minimum Supply of Water, rounded to nearest 1,000 L; $Q = K*V*S_{tot}$**				**265,000 L**	
		Required Minimum Water Supply Flow Rate (L/min)				**6,300 L/min**	
		Required Minimum Water Supply Flow Rate (L/s)				**105 L/s**	
		Required Minimum Duration of Fire Flow (min)				**50 min**	

ATTACHMENT 4 : FIGURE 1 – OFM EXPOSURE DISTANCES

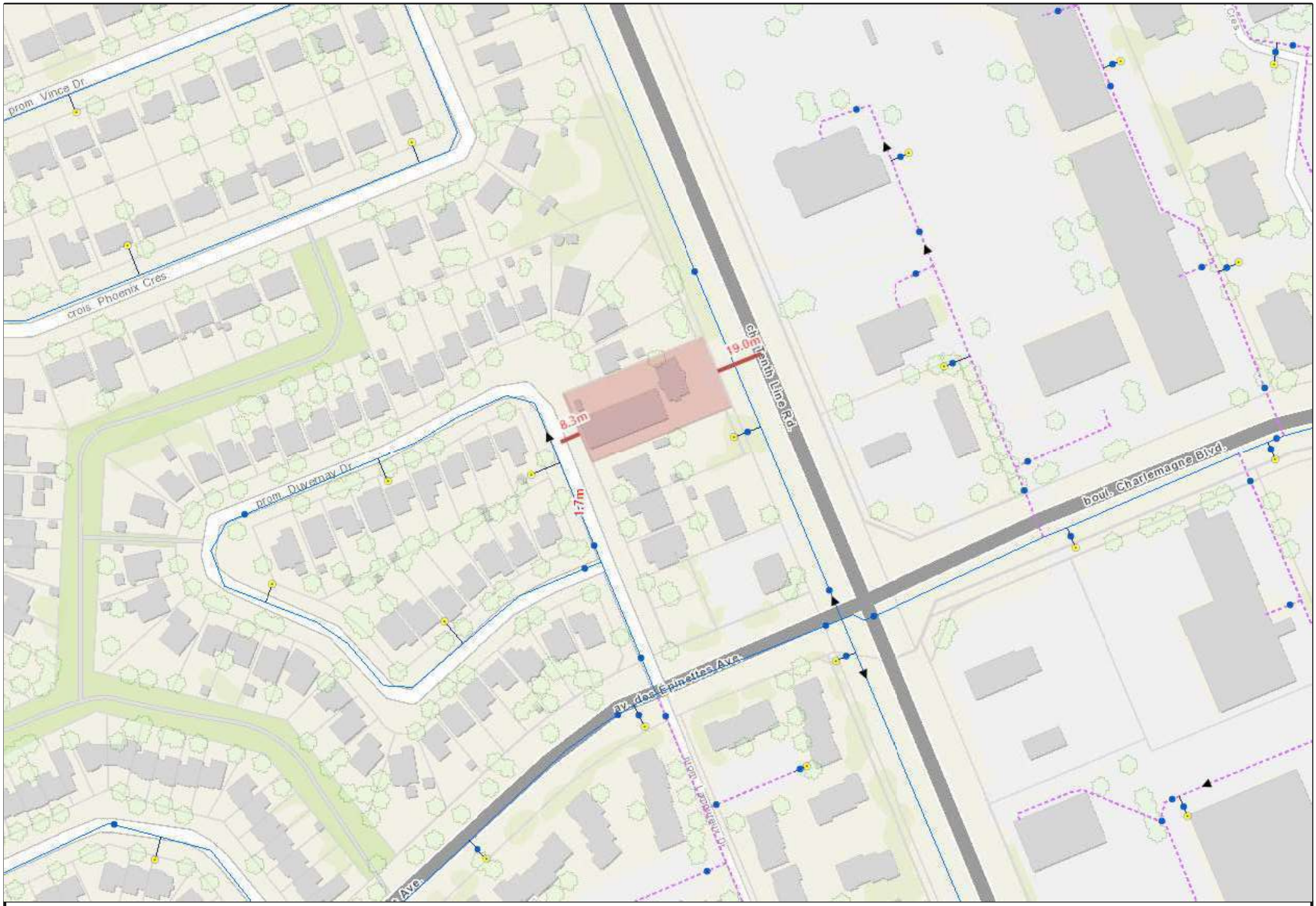


Figure 1: OBC Exposure Distances (Exposure Distance from Property Line to Street Centreline)

Source: geoOttawa 2021; *Contains information licensed under the Open Government Licence – City of Ottawa.*

ATTACHMENT 5 : SUPPORTING HYDRAULIC CALCULATIONS

Stantec

Supporting Hydraulic Calculations

Stantec Project #: 163401084
Project Name: 1670 Tenth Line Road
Date: June 24, 2025
Data inputted by: Melissa Nelson, P.Eng.
Data reviewed by: Alexandre Mineault-Guitard, P.Eng.

Boundary Conditions provided by the City:

Scenario 1: Peak Hour (Min HGL): 127.8 m;
Scenario 2: Average Day (Max HGL): 130.2 m; and
Scenario 3: Maximum Day plus Fire Flow: 120.0 m.

Sample Calculations

$HGL\ (m) = hp + hz$ *(1)*

where: hp = Pressure Head (m); and hz = Elevation Head (m), estimated from topography.

For Scenario 1, we have:

HGL(m) = 127.8 and hz (m) = 87.9.

Rearranging Equation 1, we can calculate the Pressure Head (hp) as follow:

$hp\ (m) = HGL - hz$

$\therefore$ hp = 127.8 - 87.9 m = 39.9 m.

To convert from Pressure Head (m) to a pressure value (kPa), the following equation can be used:

$P\ (kPa) = (\rho * g * hp) / 1000$ *(2)*

where: ρ = density of water = 1000 kg/m^3; and g = gravitational acceleration = 9.81 m/s^2.

Using Equation 2, we can calculate the Pressure Head (hp) as follow:

P (kPa) = (1000 * 9.81 * 39.9) / 1000

$\therefore$ P = 391 kPa.

Considering that 1 kPa = 0.145 psi, the pressure under Scenario 1 is equal to:

P = 57 psi.

Applying the same procedures, the pressures under Scenario 2 and Scenario 3 are calculated as follows:
Scenario 2: P = 60 psi; and Scenario 3: P = 46 psi.

To summarize:

Scenario 1: Minimum Pressure under Peak Hour Demand: 391 kPa (57 psi)
Scenario 2: Maximum Pressure under Average Day Demand: 415 kPa (60 psi)
Scenario 3: Minimum Pressure under Maximum Day + Fire Flow Demand: 315 kPa (46 psi)

ATTACHMENT 6 : FIGURE 2 – HYDRANT SPACING

Figure 2: Hydrant Spacing

Source: geoOttawa 2021; *Contains information licensed under the Open Government Licence – City of Ottawa.*

PROPOSED

THREE STOREY RESIDENTIAL APARTMENT BUILDING SITE

PATR OF LOT B

CONCESSION 11

GEOGRAPHIC TOWNSHIP OF CUMBERLAND

1670 TENTH LINE ROAD

CITY OF OTTAWA

APPENDIX E

CITY OF OTTAWA

SANITARY SEWER DESIGN SHEET

SHEET No. 1 OF 1

SANITARY SEWER DESIGN SHEET

q = average daily per capita flow (280 L/cap. d)
I = unit of peak extraneous flow (0.33 L/ha. s)
M = peaking factor
Q (p) = peak population flow (L/s)
Q (i) = peak extraneous flow (L/s)
Q (d) = peak design flow

DENSITY
- 2 BEDROOM = 2.1 ppu
- 1 BEDROOM = 1.4 ppu
- BACHELOR = 1.4 ppu

$M = 1 + \frac{14}{4 + \sqrt{P}} \times K$ where P population in 1000's

$K_1 = 0.8$

$Q(p) = \frac{PqM}{86.4}$ (L/s)

$Q(i) = IA$ (L/s) where A = area in hectares

$Q(d) = Q(p) + Q(i)$ (L/s)

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Pop. flow Q(p) (L/s)	Peak extraneous flow Q(i) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER						
STREET	FROM	TO	Pop.	Area A (hectares)	Pop.	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n=0.013	Full flow velocity (m/s)	Actual velocity at Q(d)
1670 TENTH LINE ROAD	SITE	EX. 250ø SANITARY SEWER @ DIVERNAY DRIVE	50.4	0.186	50.4	0.186	3.65	0.60	0.06	0.66	42.0	150	PVC	1.0 (min)	19.8	1.12	

(FILE# 825-8)

DESIGN	TLM
CHECKED	TLM
DATE	JULY 2025

PROJECT 1670 TENTH LINE ROAD
PROPOSED THREE STOREY APARTMENT BUILDING SITE - CITY OF OTTAWA

SHEET No. 1 of 1

PROPOSED

THREE STOREY RESIDENTIAL APARTMENT BUILDING SITE

PATR OF LOT B

CONCESSION 11

GEOGRAPHIC TOWNSHIP OF CUMBERLAND

1670 TENTH LINE ROAD

CITY OF OTTAWA

APPENDIX F

DEVELOPMENT SERVICING STUDY CHECKLIST SUMMARY

Servicing study guidelines for development applications

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- ☐ Executive Summary (for larger reports only).
- ☒ Date and revision number of the report.
- ☒ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☒ Plan showing the site and location of all existing services.
- ☐ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- ☐ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☐ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.
- ☒ Statement of objectives and servicing criteria.
- ☒ Identification of existing and proposed infrastructure available in the immediate area.
- ☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- ☐ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- ☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- ☐ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

☒ All preliminary and formal site plan submissions should have the following information:
- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

4.2 Development Servicing Report: Water

☐ Confirm consistency with Master Servicing Study, if available
☒ Availability of public infrastructure to service proposed development
☒ Identification of system constraints
☒ Identify boundary conditions
☒ Confirmation of adequate domestic supply and pressure
☒ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.
☒ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.
☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
☐ Address reliability requirements such as appropriate location of shut-off valves
☒ Check on the necessity of a pressure zone boundary modification.
☒ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

- ☒ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- ☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- ☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- ☒ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- ☒ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- ☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.
- ☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- ☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- ☐ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- ☒ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.
- ☐ Description of proposed sewer network including sewers, pumping stations, and forcemains.
- ☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).
- ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- ☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- ☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- ☐ Analysis of available capacity in existing public infrastructure.
- ☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- ☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.
- ☐ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- ☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- ☐ Set-back from private sewage disposal systems.
- ☐ Watercourse and hazard lands setbacks.
- ☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- ☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- ☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- ☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- ☒ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- ☐ Any proposed diversion of drainage catchment areas from one outlet to another.
- ☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- ☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.
- ☐ Identification of potential impacts to receiving watercourses
- ☐ Identification of municipal drains and related approval requirements.
- ☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.
- ☒ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- ☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.
- ☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- ☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- ☐ Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

- ☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.
- ☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- ☐ Changes to Municipal Drains.
- ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

- ☒ Clearly stated conclusions and recommendations
- ☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.
- ☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario