Site Servicing & Storm Water Management Report

Proposed 12 Storey Apartment Building
20 Mountain Crescent

Ainley Group
Project No. 20048-1

Prepared for:
Surface Developments

November 25, 2020

Ainley CONSULTING ENGINEERS PLANNERS

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1.0 INTRODUCTION

The Ainley Group has been retained by Surface Developments to prepare a Site Servicing & Stormwater Management report addressing the Site Plan Approval process requirements of the City of Ottawa.

The subject site is located at 20 Mountain Crescent on the north side of Hunt Club Road, west side of Mountain Crescent, east side of Daze Street. (See Key Map in Appendix A).

The subject site is currently a residential lot (i.e. house / bungalow), with a total site area of 0.14 ha. The proposed development will be a 12 storey (38.1m) apartment building with a total combined floor area of 12,500sq.m and 152 units. The 152 units will be divided into 12 studios / bachelors, 75 one-bedroom apartments, and 65 two-bedroom apartments.

This report will address the sanitary, storm, and water servicing requirements for the proposed 12 storey apartment building as well as the stormwater management requirements.

2.0 MUNICIPAL DRINKING & FIRE PROTECTION WATER SERVICES

Two 150mm diameter water services are proposed to service the 12 storey apartment building off of the existing 300mm diameter watermain along Daze Street. A new isolation valve (i.e. valve chamber) is proposed on the existing 300mm diameter watermain along Daze Street between the two new building water services to avoid the creation of a vulnerable service area. The proposed layout can be seen on drawing 20048–S1 in Appendix E.

Using the City of Ottawa guidelines, this report considers that there will be a population of 258 persons (i.e. 12 bachelor units at 1.4 persons per unit, 75 one-bedroom units at 1.4 persons per unit, and 65 two-bedroom units at 2.1 persons per unit) at 350 L/person/day. Thus, the anticipated average daily demand for the 12 storey apartment building has been calculated at **1.05 L/s**. The anticipated maximum daily demand and maximum hourly daily demand (peak hour) based on 3.6 and 5.4 peaking factors (MOE Table 3.3 – Peaking Factors for Drinking-Water Systems Serving Fewer than 500 People) will be **3.78 L/s** and **5.67 L/s** respectfully.

Average Daily Demand: 258 persons X 350 L/person/day = 90,300 L/day = 1.05 L/s

Max. Daily Demand: 1.05 L/s X 3.6 (peaking factor for approx. 100 units and an equivalent population of 300) = 3.78 L/s

Max. Hourly Daily Demand (Peak Hour): 1.05 L/s X 5.4 (peaking factor for approx. 100 units and an equivalent population of 300) = 5.67 L/s

The anticipated fire flow (based on the Fire Underwriters Survey - 1999) was calculated to be 11,000 L/min or **183 L/s.** A detailed calculation can be seen in Appendix B.

An existing fire hydrant is located along the east side of Daze Street approximately 15m south of the southern property line; therefore, approx. 30m from the proposed siamese connection. The location of the existing fire hydrant can be seen on drawing 20048–S1 in Appendix E.

A complete boundary condition analysis from the City of Ottawa has been requested. The results will be reviewed and included in this report in subsequent submission.

3.0 SANITARY SEWER SERVICES

A 150mm diameter sanitary service is proposed to service the 12 storey apartment building off of the existing 450mm diameter sanitary sewer along Daze Street. The proposed layout can be seen on drawing 20048–S1 in Appendix E.

Based on the proposed population of 258 persons (i.e. 12 bachelor units at 1.4 persons per unit, 75 one-bedroom units at 1.4 persons per unit, and 65 two-bedroom units at 2.1 persons per unit) at 350 L/person/day, the anticipated peak sanitary flow has been calculated at **4.24 L/s**.

258 persons X 350 L/person/day = 90,300 L/day = 1.05 L/s

1.05 L/s X 4.0 (peaking factor) + (0.14 ha X 0.28 L/s/gross ha) = 4.24 L/s

A peaking factor of 4.0 was used for this area, and the standard 0.28 L/s/gross ha was used for infiltration allowance.

4.0 DRAINAGE & STORM SEWER SYSTEM

With regards to stormwater management requirements for the site, we note the following two statements come from the 2003 CH2MHILL Sawmill Creek Subwatershed Study Update and the Sawmill Creek Subwatershed Study Update Steering Committee Meeting #5, November 26, 2002 respectfully:

"… it is recommended that the updated development guidelines maintain the 1994 target that for events with return periods of 2 years to 100 years, peak flows from development sites be controlled to prevent an increase in pre-development (existing) flows anywhere downstream" (page 135).

"The pond has been sized for existing development only. New development within subwatershed will have to provide on-site control to mitigate the impact of development" (page 3).

Therefore, the storm water management facilities for this development have been designed to attenuate the release of storm water runoff from the site to a rate not greater than the 5 year pre-development runoff rate of **10.20 L/s.**

Rational Method

$Q = R \times A \times I \times N$

Total Site Area	A =	0.1374 hectares
Runoff Coefficient	R =	$\frac{(0.1109 \times 0.25) + (0.0215 \times 0.90) + (0.005 \times 0.9)}{0.1374}$
	R =	0.38
Time of Concentration	T_c =	20 min
5 year Rainfall Intensity	I =	70.25 mm/hr

5 year Pre-Development Flow: $Q = 0.38 \times 0.1374 \times 70.25 \times 2.78$

$Q = 10.20$ L/s

Thus, the total 100 year Post-Development release rate for the site shall be less or equal to **10.20 L/s**.

This has been achieved by providing a storm water tank (i.e. cistern) inside the building.
(Refer to the Storm Water Management Plan "Dwg. 20048 – SWM1" in Appendix 'E')

Storm water tank storage requirements including maximum release rate has been determined for the building and shall be implemented by the Mechanical Engineer as follows:

Storm Water Tank 100 year Storage volume requirements = **37.8 cu.m**
Storm Water Tank Controlled Release Rate = **7.45 L/s**

Storage volume requirements were determined by applying the 5-year and 100-year rainfall intensity values at 10-minute intervals until a peak storage volume was attained, (Refer to Storage tables 3 through 8 in Appendix 'C').

Table 1 "Stormwater Management Summary Sheet" in appendix 'C' summarizes the drainage areas, composite 'C' values, and controlled release rates. The resulting 100-year release rate from the site is **10.20 L/s**, which is equal to the allowable release rate of 10.20 L/s.

We note that the storm sewer (i.e. building service) and the catchbasin lead have been designed for the 1:5 year design regardless of the controlled release rates, (Refer to Table 2 – Storm Sewer Design Sheet in Appendix 'C').

5.0 EROSION AND SEDIMENT CONTROL

Erosion and sediment control measures shall be implemented during construction to minimize the migration of sediments from the proposed construction. To accomplish this task, items such as silt fences, and geo-textile membranes shall be installed to capture sediment before it leaves the construction areas. In addition, all stockpiles shall be covered and located away from waterways and exposed areas and shall be vegetated as soon as possible. During construction, all erosion control features shall be maintained and repaired as necessary and adjacent roadways kept free of debris and sediment as required. A mud mat may be required on construction entrances to the site, depending on frequency of heavy vehicle travel and condition of the site.
(Refer to the Erosion and Sediment Control Plan "Dwg. 20048 – SC1" in Appendix 'E').

6.0 CONCLUSION

1. The max daily and fire flow water demands for the site were calculated to be 3.78 L/s and 183 L/s respectfully. A building fire sprinkler system is anticipated in this development.

2. The peak wastewater flow for the site was calculated to be 4.24 L/s including the infiltration allowance.

3. The stormwater management measures proposed will result in a 100 year post-development release rate of 10.20 L/s, which is equal to the allowable release rate of 10.20 L/s. A storm water tank (i.e. cistern) will be constructed in the building to achieve the 100 year stormwater storage requirement of 37.8 cu.m.

We trust that this Site Servicing & Stormwater Management report meets all of your requirements. Should you have any questions or require further clarification, please do not hesitate to contact our office.

Sincerely,

Prepared by:

Ainley Graham and Associates Ltd.

Professional Engineers
Ontario
November 25, 2020
Limited Licensee
Name: J.W.XU
Number: 100171806
Category: CIVIL: see limitation
Limitations:
This licence is subject to the limitations as detailed on the certificate.
Association of Professional Engineers of Ontario

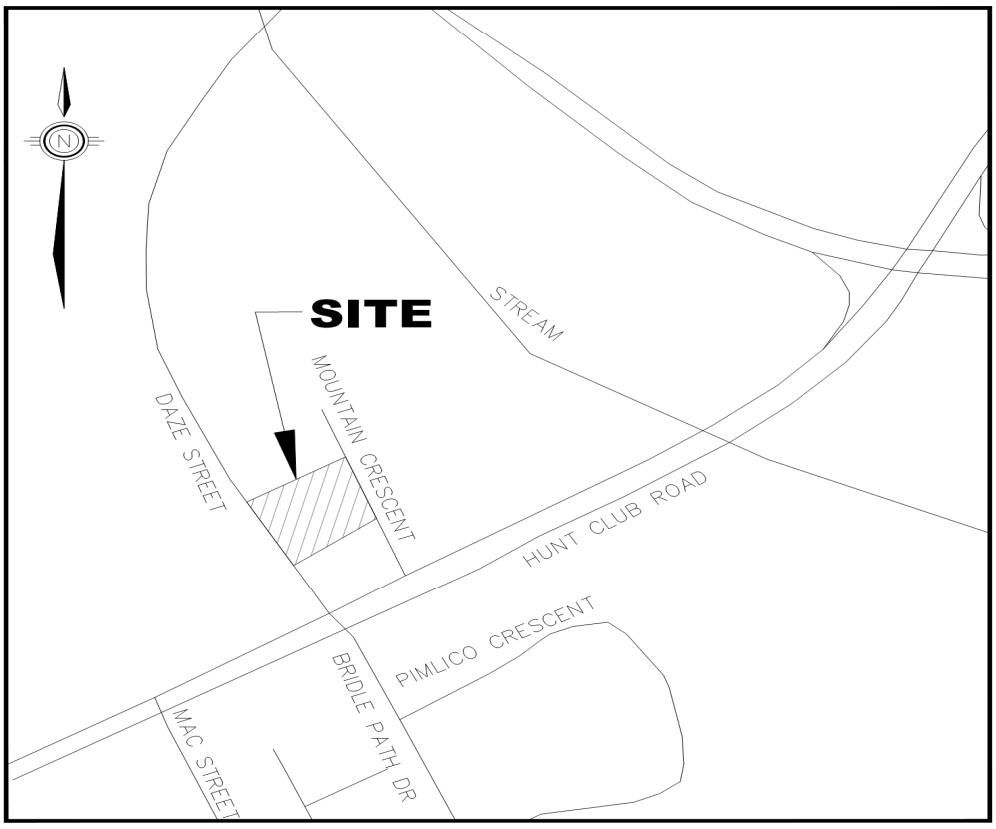
Jiawu Xu, LEL, C.E.T.
Project Manager

Reviewed by:

Ainley Graham and Associates Ltd.

Guy Ste-Croix, LEL, C.E.T., PMP
Branch Manager

APPENDIX A



KEY MAP
SCALE: N.T.S.

APPENDIX B

FUS Calculations

Proposed Building at 20 Mountain Crescent.

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

Where C = 0.6 for fire-resistive construction (fully protected frame, floors, roof)

For fire-resistive building, consider the two largest adjoining floors plus 50 percent of each of any floors immediately above them up to eight, when the vertical openings are inadequately protected. If the vertical openings and exterior vertical communications are properly protected (one hour rating), consider only the area of the largest floor plus 25 percent of each of the two immediately adjoining floors.

We note the following statements will apply for this project / building:

- The exterior will only have a fire rating of 1 hour if close to an interior property line, which is the case for the sides of the building. The exterior wall against the streets will not require a fire rating.
- Any opening in a wall that is under 1.2m from the interior property line will need a fire rated closer.
- All vertical opening (shafts and stairs) will have a 2 hour fire rating.

Therefore, it's our interpretation that the underlined requirement noted above shall apply for this project / building.

Largest floor area = 11,585 sq.ft (levels 2 to 9) = 1,076 m^2
Floors immediately above them = 9,478 sq.ft (levels 10 & 11) = 881 m^2
A = (2 X 1,076) + (0.5 X 6 X 1,076) + (0.5 X 2 X 881)
A = 6,261 m^2

$F = 220 \times 0.6 \times \sqrt{6{,}261}$

$F = 10{,}445\ L/min$

$F \sim 10{,}000\ L/min$

FUS Reductions / Increases:

Occupancy

It is noted that 'Apartments' are examples of Low Hazard Occupancies.

Therefore, a "*limited combustibility"* reduction of 15% (1,500 L/min) will be applied.

$F = 8{,}500\ L/min$

Modifier for Sprinkler System

A conservative modifier of 25% will be applied under the assumption that the sprinkler system will conform to the current standards required by the NFPA. It is possible to increase this credit by either providing a standard water supply for both the system and fire department hose lines, and/or providing a fully supervised system.

$M_1 = 2{,}125\ L/min$

Modifier for Exposure

The proposed building will have the following approximate clearances to existing structures:

East:	25 m	*10% increase*
West:	45 m	*5% increase*
North:	12 m	*15% increase*
South:	3 m	*25% increase*
Total Increase:		*55%*

$M_2 = 4{,}675\ L/min$

The final fire flow, according to the FUS, will be the fire flow as a result of the Occupancy reduction (8,500 L/s), minus the value M_1, and plus the value M_2.

$F = 8{,}500\ L/\min - 2{,}125\ L/\min + 4{,}675\ L/min$

$F = 11{,}050\ L/min$

$F \sim 11{,}000\ L/min$

$F \sim 183\ L/s$

Conclusion:

The conservative FUS fire flow requirement for this building (based on our assumptions noted above) is **183 L/s.**

APPENDIX C

AINLEY Project: 20048 - 1
Location:20 Mountain Crescent
Client: Surface Development

Table 1. Stormwater Management Summary Sheet

Sub Area I.D.	Sub Area (ha)	C = 0.25	C = 0.6	C = 0.9	Composite 'C'	Outlet Location	Controlled Release (L/s)	Top of Grate (m)	Ponding Depth (m)	Invert or Pan Elev. (m)	Pipe dia (if plug type (mm)	Head on Orifice (if plug) (m)	Diameter of Orifice (mm)
A1	0.111	0.000	0.000	0.111	0.90	BUILDING	7.45						See mechanical
A2	0.003	0.003	0.000	0.000	0.25	STREET	0.25						Free flow
A3	0.010	0.008	0.000	0.002	0.38	STREET	1.09						Free flow
A4	0.002	0.002	0.000	0.000	0.25	EX CB	0.16						Free flow
A5	0.005	0.004	0.000	0.001	0.40	STREET	0.55						Free flow
A6	0.006	0.005	0.000	0.001	0.40	CB 1	0.70						Free flow
	0.137	0.022	0.000	0.116	0.80		10.20						

Table 2 - Storm Sewer Design Sheet

Table 2. Storm Sewer Design Sheet

Q = 2.78 AIR

Q = peak flow in litres per second (L/s)
A = area in hectares (ha)
I = rainfall intensity in millimetres per hour (mm/hr)
R = runoff coefficient

rainfall intensity = "a" / (T + "c")^"b"

return period	10 year	**5 year**
parameter "a"	1174.184	**998.071**
parameter "b"	0.816	**0.814**
parameter "c"	6.014	**6.053**

N-value 0.013

LOCATION				AREAS (ha)							TIME OF	RAINFALL INTENSITY			PEAK	SEWER DATA						
						AREA			INDIVID	ACCUM	CONC.		DESIGN	CONTROLLED	FLOW	DIAMETER	SLOPE	LENGTH	CAPACITY	VELOCITY	TIME OF FLOW	% Full
STREET	FROM	TO	AREA NO.	0.20	0.35	0.50	0.64	0.90	AR	AR	Tc	I	FLOW	FLOW	Q (L/s)	(mm)	(%)	(m)	(l/s)	(m/s)	(min)	
	Building	MAIN	A1	0.000				0.111	0.100	0.100	10.00	104.19	28.96		28.96	300.00	1.00	18.50	96.69	1.37	0.23	29.95%
	CB 1	MAIN	A6	0.005				0.001	0.002	0.002	10.00	104.19	0.63		0.63	250.00	1.00	17.00	59.46	1.21	0.23	1.06%
				0.005	0.000	0.000	0.000	0.113														

Table 3 - Storage Requirements for Area A1 (Building)

Area **0.11** hectares
Runoff Coefficient = **0.90** post developmen 100 year ave C 1.00

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	28.96	7.45	21.51	12.9
	20	70.25	19.53	7.45	12.08	14.5
	30	53.93	14.99	7.45	7.54	13.6
	40	44.18	12.28	7.45	4.83	11.6
	50	37.65	10.47	7.45	3.02	9.0
100 Year	10	178.56	55.15	7.45	47.70	28.6
	20	119.95	37.05	7.45	29.60	35.5
	30	91.87	28.37	7.45	20.92	37.7
	40	75.15	23.21	7.45	15.76	37.8
	50	63.95	19.75	7.45	12.30	36.9

Table 4 - Storage Requirements for Area A2 (Street)

Area **0.003** hectares
Runoff Coefficient = **0.25** post developmen 100 year ave C 0.31

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	0.25	0.25	0.00	0.0
	20	70.25	0.17	0.25	-0.08	-0.1
	30	53.93	0.13	0.25	-0.12	-0.2
	40	44.18	0.10	0.25	-0.15	-0.3
	50	37.65	0.09	0.25	-0.16	-0.5
100 Year	10	178.56	0.53	0.53	0.00	0.0
	20	119.95	0.35	0.53	-0.18	-0.2
	30	91.87	0.27	0.53	-0.26	-0.5
	40	75.15	0.22	0.53	-0.31	-0.7
	50	63.95	0.19	0.53	-0.34	-1.0

Table 5 - Storage Requirements for Area A3 (Street)

Area **0.01** hectares
Runoff Coefficient = **0.38** post developmen 100 year ave C 0.48

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	1.09	1.09	0.00	0.0
	20	70.25	0.73	1.09	-0.36	-0.4
	30	53.93	0.56	1.09	-0.53	-1.0
	40	44.18	0.46	1.09	-0.63	-1.5
	50	37.65	0.39	1.09	-0.70	-2.1
100 Year	10	178.56	2.33	2.33	0.00	0.0
	20	119.95	1.56	2.33	-0.77	-0.9
	30	91.87	1.20	2.33	-1.13	-2.0
	40	75.15	0.98	2.33	-1.35	-3.2
	50	63.95	0.83	2.33	-1.50	-4.5

Table 6 - Storage Requirements for Area A4 (Ex CB)

Area **0.002** hectares
Runoff Coefficient = **0.25** post developmen 100 year ave C 0.31

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	0.16	0.16	0.00	0.0
	20	70.25	0.11	0.16	-0.05	-0.1
	30	53.93	0.08	0.16	-0.08	-0.1
	40	44.18	0.07	0.16	-0.09	-0.2
	50	37.65	0.06	0.16	-0.10	-0.3
100 Year	10	178.56	0.34	0.34	0.00	0.0
	20	119.95	0.23	0.34	-0.11	-0.1
	30	91.87	0.18	0.34	-0.16	-0.3
	40	75.15	0.14	0.34	-0.20	-0.5
	50	63.95	0.12	0.34	-0.22	-0.7

Table 7 - Storage Requirements for Area A5 (Street)

Area **0.005** hectares
Runoff Coefficient = **0.40** post developmen 100 year ave C 0.50

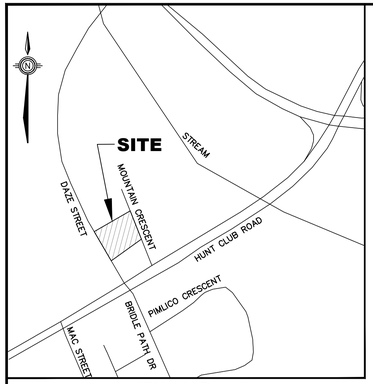
Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	0.55	0.55	0.00	0.0
	20	70.25	0.37	0.55	-0.18	-0.2
	30	53.93	0.28	0.55	-0.27	-0.5
	40	44.18	0.23	0.55	-0.32	-0.8
	50	37.65	0.20	0.55	-0.35	-1.1
100 Year	10	178.56	1.17	1.17	0.00	0.0
	20	119.95	0.79	1.17	-0.38	-0.5
	30	91.87	0.60	1.17	-0.57	-1.0
	40	75.15	0.49	1.17	-0.68	-1.6
	50	63.95	0.42	1.17	-0.75	-2.2

Table 8 - Storage Requirements for Area A6 (CB 1)

Area **0.01** hectares
Runoff Coefficient = **0.40** post developmen 100 year ave C 0.50

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Release	Net Runoff To Be Stored (L/s)	Storage Req'd m3
5 Year	10	104.19	0.70	0.70	0.00	0.0
	20	70.25	0.47	0.70	-0.23	-0.3
	30	53.93	0.36	0.70	-0.34	-0.6
	40	44.18	0.30	0.70	-0.40	-1.0
	50	37.65	0.25	0.70	-0.45	-1.3
100 Year	10	178.56	1.50	1.50	0.00	0.0
	20	119.95	1.00	1.50	-0.50	-0.6
	30	91.87	0.77	1.50	-0.73	-1.3
	40	75.15	0.63	1.50	-0.87	-2.1
	50	63.95	0.54	1.50	-0.96	-2.9

APPENDIX D



KEY MAP
SCALE: N.T.S.

NOTES: GENERAL

1. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION
2. ALL ELEVATIONS / DIMENSIONS ARE IN METRIC UNITS.
3. JOB BENCH MARK – CONFIRM WITH LEGAL SURVEYOR PRIOR TO UTILIZATION.
4. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCHBASIN OUTLETS ARE PROVIDED.
5. ALL DISTURBED AREAS SHALL BE REINSTATED TO EQUAL OR BETTER CONDITION TO THE SATISFACTION OF THE ENGINEER AND/OR CITY OF OTTAWA.
6. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT.
7. CURBS TO BE AS PER CITY OF OTTAWA STANDARD SC1.1.
8. CONTRACTOR IS TO COMPLY WITH THE CITY OF OTTAWA REQUIREMENTS FOR TRAFFIC CONTROL WHEN WORKING ON PUBLIC ROAD.
9. RESTORE PAVEMENT STRUCTURE AND SURFACES ON PUBLIC ROAD TO EQUAL OR BETTER CONDITION TO THE SATISFACTION OF THE CITY OF OTTAWA.
10. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO OPSS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED. (CONSTRUCTION OPSS 206, 310 & 314 MATERIALS OPSS 1001, 1003 & 1010).
11. REFER TO ARCHITECT'S SITE PLAN FOR BUILDING DIMENSIONS AND SITE LAYOUT. DIMENSIONS AND LAYOUT INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
12. CONTRACTOR IS RESPONSIBLE FOR ALL DEWATERING, SUPPORT AND PROTECTION OF EXCAVATIONS.
13. REFER TO LANDSCAPE ARCHITECT'S PLAN FOR SIDEWALK, PATHWAYS, CONCRETE MEDIAN, WALLS, FENCES, GATES, PLANTING AND OTHER LANDSCAPE FEATURE MATERIALS AND LOCATIONS.
14. ALL CURB TO BE 150mm ABOVE FINISHED ASPHALT GRADE UNLESS OTHERWISE NOTED.
15. DESIGN ELEVATIONS AS GIVEN ON THIS PLAN ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY THE ENGINEER.
16. U/G CONTRACTOR TO INSTALL AND MAINTAIN A FILTER CLOTH "CATCH" ACROSS ALL MH/CB LIDS TO PREVENT SEDIMENTS AND GRANULARS FROM ENTERING STRUCTURES UNTIL SOD AND PAVING IS COMPLETE. ANY SEDIMENTS/GRANULARS ENTERING STRUCTURES AND SEWERS SHALL BE IMMEDIATELY REMOVED.
17. U/G CONTRACTOR TO CONFIRM LOCATION(S) AND ELEVATION(S) OF EXISTING SERVICES AND STRUCTURES TO BE CONNECTED TO AND EXISTING SERVICES THAT MAY CAUSE CONFLICTS PRIOR TO CONSTRUCTION OF ANY NEW SEWER, WATER AND/OR STORM WATER WORKS. THE ENGINEER SHALL BE INFORMED IMMEDIATELY OF ANY ERRORS, DISCREPANCIES, CONFLICTS, OMISSIONS etc THAT ARE FOUND.
18. THE CONTRACTOR SHALL VERIFY ALL SURFACE AND SUBSURFACE CONDITIONS PRIOR TO COMMENCING CONSTRUCTION BY REVIEWING THE GEOTECHNICAL INVESTIGATION REPORT PREPARED BY PATERSON GROUP, DATED AUGUST 25, 2020
19. THE CONTRACTOR SHALL APPRAISE HIS/HER SELF OF ALL SURFACE AND SUBSURFACE CONDITIONS TO BE ENCOUNTERED AND SHALL CARRY OUT THEIR OWN TEST PITS AS REQUIRED TO MAKE THEIR OWN INDEPENDENT ASSESSMENT OF GROUND CONDITIONS. THE CONTRACTOR SHALL NOT MAKE ANY CLAIM FOR ANY EXTRA COST DUE TO ANY SUCH GROUND CONDITIONS VARYING FROM THOSE ANTICIPATED BY THE CONTRACTOR.
20. THE CONTRACTOR SHALL COORDINATE AND PAY FOR ALL CONSTRUCTION RELATED PERMITS, FEES, INSPECTIONS AND APPROVALS REQUIRED BY THE CITY OF OTTAWA.
21. IN PREPARATION FOR THE CONSTRUCTION OF THE NEW ASPHALTIC CONCRETE SURFACED ROADWAYS AND PARKING AREAS, ALL TOPSOIL, ORGANIC MATERIAL AND ANY LOOSE/SOFT OR WET SOIL SHOULD BE REMOVED FROM THE PROPOSED SUBGRADE SURFACE AND REPLACED WITH SUITABLE COMPACTED EARTH BORROW OR GRANULAR FILL.
22. PRIOR TO PLACING GRANULAR FILL FOR THE ROADWAYS AND PARKING AREAS, THE EXPOSED SUBGRADE SHOULD BE HEAVILY PROOF ROLLED WITH A WITH A LARGE (10 TONNE) VIBRATORY STEEL DRUM ROLLER UNDER DRY CONDITIONS. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE, COMPACTED EARTH BORROW.
23. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND CONSTRUCTION OF ALL SEDIMENT AND EROSION CONTROL MEASURES TO ENSURE THAT SEDIMENT DOES NOT MIGRATE FROM THE CONSTRUCTION SITE. SEDIMENTS SHALL BE CONTAINED AND DISPOSED OF IN A MANNER CONSISTENT WITH THE CITY OF OTTAWA SPECIFICATIONS. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECIEVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER THE GRATES OF CATCHBASINS AND MANHOLES AND INSTALLING SILT FENCES (PER OPSD 219.110) AND OTHER EFFECTIVE SEDIMENT TRAPS.
24. THE CONTRACTOR IS TO PROVIDE 'AS–CONSTRUCTED' INFORMATION (i.e. ASPHALT GRADES, TOP OF CURB GRADES, WATERMAIN OBVERTS, SEWER INVERTS, ETC.) TO THE ENGINEER AND/OR CLIENT.
25. ASPHALTIC CONCRETE SHALL NOT BE PLACED UNTIL FINAL CCTV INSPECTION OF THE SEWERS IN ACCORDANCE WITH OPSS 409 HAVE BEEN COMPLETED AND TO THE ENGINEER AND/OR CLIENT.
26. THE CONTRACTOR IS RESPONSIBLE FOR ALL RE–CCTV RESULTING FROM DEFICIENCY REPAIRS AS DEEMED NECESSARY BY THE ENGINEER. CCTV INSPECTIONS WILL BE CONDUCTED UNTIL SUCH TIME AS THE RESULTS HAVE BEEN APPROVED BY THE ENGINEER AND/OR CITY OF OTTAWA AT NO ADDITIONAL COST TO THE CLIENT.

LEGEND

- PROPERTY LINE
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING STORM SEWER
- EXISTING FENCE
- EXISTING UTILITY POLE
- EXISTING CATCHBASIN
- EXISTING OVERHEAD HYDRO
- EXISTING STREET LIGHT
- EXISTING CABLE
- EXISTING GAS
- PROPOSED CATCHBASIN
- PROPOSED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED V&VB/V&VC
- PROPOSED WATERMAIN

NOTES: SEWER

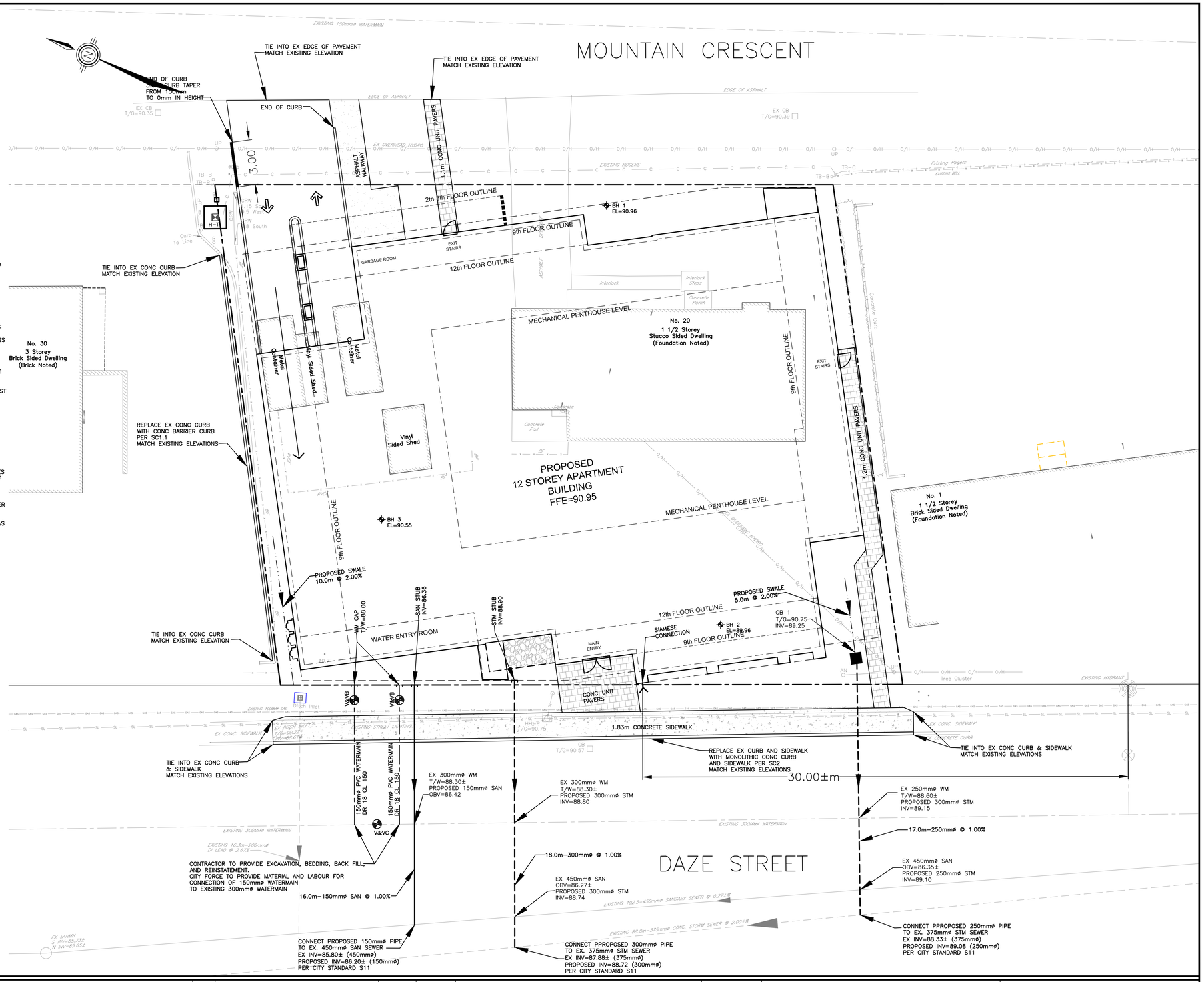
1. ALL SANITARY SERVICES ARE TO BE THE SIZES INDICATED AND THE MATERIAL SHALL BE PVC SDR 35.

   ALL STORM SEWERS 375mm OR SMALLER SHALL BE PVC SDR 35. STORM SEWERS LARGER THAN 375mm SHALL BE CONCRETE CLASS 65D. UNLESS OTHERWISE NOTED.
2. THE BEDDING FOR THE PROPOSED STORM AND SANITARY SEWERS AND WATERMAIN SHOULD CONSIST OF AT LEAST 150mm OF CRUSHED STONE MEETING OPSS REQUIREMENTS FOR GRANULAR 'A'. ALLOWANCE SHOULD BE MADE FOR A 150 TO 300 MILLIMETRE THICK SUBBEDDING LAYER OF OPSS GRANULAR 'B' TYPE II IF THE SUBGRADE SOIL BECOMES DISTURBED DURING EXCAVATION.
3. COVER MATERIAL, FROM PIPE SPRING LINE TO AT LEAST 300mm ABOVE THE TOPS OF THE PIPES, SHOULD CONSIST OF OPSS GRANULAR 'A'. THE GRANULAR BEDDING AND COVER MATERIALS FOR THE SERVICE PIPES SHOULD BE COMPACTED IN MAXIMUM 150mm THICK LIFTS TO AT LEAST 95 PERCENT OF THE STANDARD PROCTOR DRY DENSITY VALUE.
4. ALL WORK SHALL BE PERFORMED, AS APPLICABLE, IN ACCORDANCE WITH CITY OF OTTAWA STANDARD SPECIFICATIONS AND IN PARTICULAR WITH O.P.S.S. 407, AND 410.
5. CATCHBASIN SHALL BE PRECAST 600X600 AS PER OPSD STD. 705.010. FRAMES AND COVERS SHALL BE PER CITY OF OTTAWA STANDARDS S19.
6. ALL MANHOLES, CATCHBASINS AND CATCHBASIN MANHOLES TO BE BACKFILLED WITH MIN. 0.3m HORZ. THICKNESS OF GRANULAR "A".
7. ALL STORM MANHOLES TO BE OPSD 701.010 AND OPSD 701.011 C/W 300mm SUMP. COVERS TO BE PER CITY OF OTTAWA STANDARDS S24.1.
8. SUPPLY AND INSTALL ALL PIPING AND APPURTENANCES AS SHOWN TO WITHIN 1.0m OF BUILDING WALLS. PROVIDE TEMPORARY CAPS.
9. THE CONTRACTOR IS RESPONSIBLE FOR ALL COSTS AND COORDINATION FOR ALL INSPECTION AND TESTING.
10. THE FOUNDATION DRAIN IS TO BE CONNECTED TO THE STORM SEWER (IF APPLICABLE).

.

NOTES: WATERMAIN

1. ALL WATERMAIN WORK AND MATERIAL SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS. NO WORK SHALL COMMENCE UNLESS A CITY WATER WORKS INSPECTOR IS ON SITE.
2. INSTALLATION OF WATER METER AND REMOTE RECEPTACLE SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS (REFER TO MECHANICAL DRAWNGS).
3. ALL WATERMAIN TO BE INSTALLED AT MINIMUM COVER OF 2.4m. IF COVER IS LESS THAN 2.4m, REFER TO CITY STANDARD W21 & W22.
4. WATERMAIN BEDDING IS TO BE AS PER CITY STANDARD DETAIL W17.
5. THRUST BLOCKS AND RESTRAINT AS PER CITY OF OTTAWA DWGS: W25.3 AND W25.4, W25.5 AND W25.6.
6. WATERMAIN VALVE BOX AS PER CITY OF OTTAWA STANDARD W24.
   WATERMAIN VALVE CHAMBER AS PER CITY OF OTTAWA STANDARD W3.
7. CATHODIC PROTECTION REQUIRED FOR ALL IRON FITTINGS PER CITY OF OTTAWA DWGS: W39 , W40, W41
8. UNLESS OTHERWISE NOTED WATER SERVICE LATERAL TO BUILDING & HYDRANT SHALL BE PVC DR 18 AT SIZES INDICATED.
9. THE CONTRACTOR IS RESPONSIBLE FOR ALL COSTS AND COORDINATION FOR ALL INSPECTION AND TESTING.
10. CONTRACTOR TO VERIFY THE EXACT LOCATION OF THE EXISTING WATER SERVICES AND PROVIDE EXCAVATION, BEDDING, BACKFILL AND REINSTATEMENT. THE EX WATER SERVICES SHALL BE BLANKED AT CITY WATERMAIN BY CITY FORCES.



NO.	REVISIONS	DATE	INITIAL
2	ISSUED FOR SITE PLAN APPROVAL	NOV 25/20	JX
1	ISSUED FOR PRELIMINARY DESIGN REVIEW	NOV 23/20	JX

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Professional Engineers Ontario
NOVEMBER 25, 2020
Limited Licensee
Name: J.W.XU
Number: 100171806
Category: CIVIL see limitation
Limitations:
This licence is subject to the limitations as detailed on the certificate.
Association of Professional Engineers of Ontario

SCALE: 1 : 125
DESIGN: JX
DRAWN: MH
CHECKED: GSC/JX
DATE: OCT 2020

PROPOSED 12 STOREY APARTMENT BUILDING
20 MOUNTAIN CRESCENT
CITY OF OTTAWA

SITE SERVICING PLAN

Ainley GROUP — CONSULTING ENGINEERS PLANNERS

CONTRACT No. 20048 | 20048–S1

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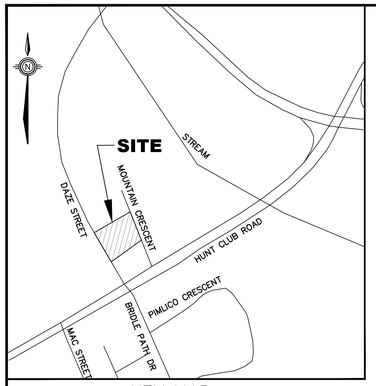
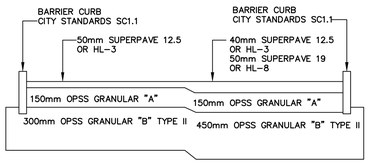


KEY MAP
SCALE: N.T.S.

LEGEND

- PROPERTY LINE
- EXISTING ELEVATION
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING STORM SEWER
- EXISTING FENCE
- EXISTING UTILITY POLE
- EXISTING CATCHBASIN
- EXISTING OVERHEAD HYDRO
- EXISTING STREET LIGHT
- EXISTING CABLE
- EXISTING GAS
- PROPOSED GRADE
- DIRECTION AND SLOPE
- PROPOSED CATCHBASIN
- PROPOSED V&VB/V&VC
- HEAVY DUTY ASPHALT PAVEMENT
- RIDGE LINE



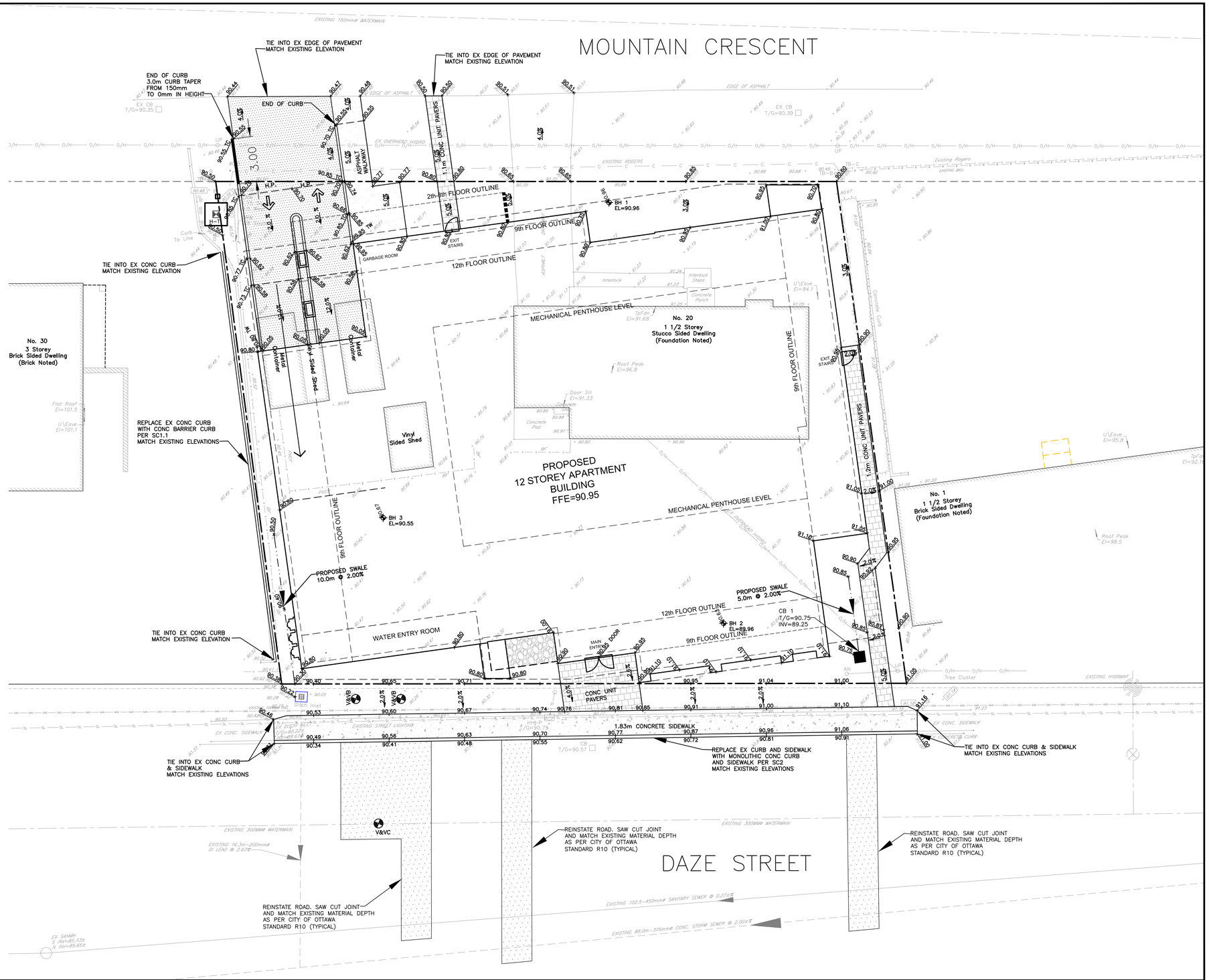
PARKING AREAS (LIGHT DUTY) N.T.S.

ACCESS LANES (HEAVY DUTY) N.T.S.

(REFER TO GEOTECHNICAL INVESTIGATION REPORT PREPARED BY PATERSON GROUP DATED AUGUST 25, 2020)

NOTES: GENERAL

1. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION
2. ALL ELEVATIONS / DIMENSIONS ARE IN METRIC UNITS.
3. JOB BENCH MARK – CONFIRM WITH LEGAL SURVEYOR PRIOR TO UTILIZATION.
4. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCHBASIN OUTLETS ARE PROVIDED.
5. ALL DISTURBED AREAS SHALL BE REINSTATED TO EQUAL OR BETTER CONDITION TO THE SATISFACTION OF THE ENGINEER AND/OR CITY OF OTTAWA.
6. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT.
7. CURBS TO BE AS PER CITY OF OTTAWA STANDARD SC1.1.
8. CONTRACTOR IS TO COMPLY WITH THE CITY OF OTTAWA REQUIREMENTS FOR TRAFFIC CONTROL WHEN WORKING ON PUBLIC ROADS .
9. RESTORE PAVEMENT STRUCTURE AND SURFACES ON PUBLIC ROADS TO EQUAL OR BETTER CONDITION TO THE SATISFACTION OF THE CITY OF OTTAWA.
10. ALL MATERIAL SUPPLIED AND PLACED FOR PARKING LOT AND ACCESS ROAD CONSTRUCTION SHALL BE TO OPSS STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE NOTED. (CONSTRUCTION OPSS 206, 310 & 314 MATERIALS OPSS 1001, 1003 & 1010).
11. REFER TO ARCHITECT'S SITE PLAN FOR BUILDING DIMENSIONS AND SITE LAYOUT. DIMENSIONS AND LAYOUT INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
12. CONTRACTOR IS RESPONSIBLE FOR ALL DEWATERING, SUPPORT AND PROTECTION OF EXCAVATIONS.
13. REFER TO LANDSCAPE ARCHITECT'S PLAN FOR SIDEWALK, PATHWAYS, CONCRETE MEDIAN, WALLS, FENCES, GATES, PLANTING AND OTHER LANDSCAPE FEATURE MATERIALS AND LOCATIONS.
14. ALL CURB TO BE 150mm ABOVE FINISHED ASPHALT GRADE UNLESS OTHERWISE NOTED.
15. DESIGN ELEVATIONS AS GIVEN ON THIS PLAN ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY THE ENGINEER.
16. U/G CONTRACTOR TO INSTALL AND MAINTAIN A FILTER CLOTH "CATCH" ACROSS ALL MH/CB LIDS TO PREVENT SEDIMENTS AND GRANULARS FROM ENTERING STRUCTURES UNTIL SOD AND PAVING IS COMPLETE. ANY SEDIMENTS/GRANULARS ENTERING STRUCTURES AND SEWERS SHALL BE IMMEDIATELY REMOVED.
17. U/G CONTRACTOR TO CONFIRM LOCATION(S) AND ELEVATION(S) OF EXISTING SERVICES AND STRUCTURES TO BE CONNECTED TO AND EXISTING SERVICES THAT MAY CAUSE CONFLICTS PRIOR TO CONSTRUCTION OF ANY NEW SEWER, WATER AND/OR STORM WATER WORKS. THE ENGINEER SHALL BE INFORMED IMMEDIATELY OF ANY ERRORS, DISCREPANCIES, CONFLICTS, OMISSIONS etc THAT ARE FOUND.
18. THE CONTRACTOR SHALL VERIFY ALL SURFACE AND SUBSURFACE CONDITIONS PRIOR TO COMMENCING CONSTRUCTION BY REVIEWING THE GEOTECHNICAL INVESTIGATION REPORT PREPARED BY PATERSON GROUP, DATED AUGUST 25, 2020.
19. THE CONTRACTOR SHALL APPRAISE HIS/HER SELF OF ALL SURFACE AND SUBSURFACE CONDITIONS TO BE ENCOUNTERED AND SHALL CARRY OUT THEIR OWN TEST PITS AS REQUIRED TO MAKE THEIR OWN INDEPENDENT ASSESSMENT OF GROUND CONDITIONS. THE CONTRACTOR SHALL NOT MAKE ANY CLAIM FOR ANY EXTRA COST DUE TO ANY SUCH GROUND CONDITIONS VARYING FROM THOSE ANTICIPATED BY THE CONTRACTOR.
20. THE CONTRACTOR SHALL COORDINATE AND PAY FOR ALL CONSTRUCTION RELATED PERMITS, FEES, INSPECTIONS AND APPROVALS REQUIRED BY THE CITY OF OTTAWA.
21. IN PREPARATION FOR THE CONSTRUCTION OF THE NEW ASPHALTIC CONCRETE SURFACED ROADWAYS AND PARKING AREAS, ALL TOPSOIL, ORGANIC MATERIAL AND ANY LOOSE/SOFT OR WET SOIL SHOULD BE REMOVED FROM THE PROPOSED SUBGRADE SURFACE AND REPLACED WITH SUITABLE COMPACTED EARTH BORROW OR GRANULAR FILL.
22. PRIOR TO PLACING GRANULAR FILL FOR THE ROADWAYS AND PARKING AREAS, THE EXPOSED SUBGRADE SHOULD BE HEAVILY PROOF ROLLED WITH A LARGE (10 TONNE) VIBRATORY STEEL DRUM ROLLER UNDER DRY CONDITIONS. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE, COMPACTED EARTH BORROW.
23. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND CONSTRUCTION OF ALL SEDIMENT AND EROSION CONTROL MEASURES TO ENSURE THAT SEDIMENT DOES NOT MIGRATE FROM THE CONSTRUCTION SITE. SEDIMENTS SHALL BE CONTAINED AND DISPOSED OF IN A MANNER CONSISTENT WITH THE CITY OF OTTAWA SPECIFICATIONS. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECIEVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER THE GRATES OF CATCHBASINS AND MANHOLES AND INSTALLING SILT FENCES (PER OPSD 219.110) AND OTHER EFFECTIVE SEDIMENT TRAPS.
24. THE CONTRACTOR IS TO PROVIDE 'AS-BUILT' INFORMATION (i.e. ASPHALT GRADES, TOP OF CURB GRADES, WATERMAIN OBVERTS, SEWER INVERTS, ETC.) TO THE ENGINEER AND/OR CLIENT.
25. ASPHALTIC CONCRETE SHALL NOT BE PLACED UNTIL FINAL CCTV INSPECTION OF THE SEWERS IN ACCORDANCE WITH OPSS 409 HAVE BEEN COMPLETED AND TO THE ENGINEER AND/OR CLIENT.
26. THE CONTRACTOR IS RESPONSIBLE FOR ALL RE-CCTV RESULTING FROM DEFICIENCY REPAIRS AS DEEMED NECESSARY BY THE ENGINEER. CCTV INSPECTIONS WILL BE CONDUCTED UNTIL SUCH TIME AS THE RESULTS HAVE BEEN APPROVED BY THE ENGINEER AND/OR CITY OF OTTAWA AT NO ADDITIONAL COST TO THE CLIENT.
27. A MUD MAT IS TO BE INSTALLED AT EACH CONSTRUCTION ENTRANCE AND SHALL BE MAINTAINED UNTIL THE PLACEMENT OF THE GRANULAR SUB-BASE. MUD MAT SHALL BE CONSTRUCTED OF 100mm ø CLEAR STONE, 400mm THICK. MUD MAT SHALL BE OF SUFFICIENT LENGTH TO ENSURE THAT A MINIMUM AMOUNT OF MATERIALS IS TRUCKED OFF SITE ONTO ADJACENT ROADS.



NO.	REVISIONS	DATE	INITIAL
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1	ISSUED FOR PRELIMINARY DESIGN REVIEW	NOV 20/20	JX

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Professional Engineers Ontario

NOVEMBER 25, 2020

Limited Licensee

Name: J.W.XU
Number: 100171806
Category: CIVIL: see limitation
Limitations:
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Association of Professional Engineers of Ontario

SCALE: 1 : 125
DESIGN: JX
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CHECKED: GSC/JX
DATE: OCT 2020

PROPOSED 12 STOREY APARTMENT BUILDING
20 MOUNTAIN CRESCENT
CITY OF OTTAWA

GRADING AND DRAINAGE PLAN

Ainley GROUP — CONSULTING ENGINEERS PLANNERS

CONTRACT No. 20048 | 20048-GR1

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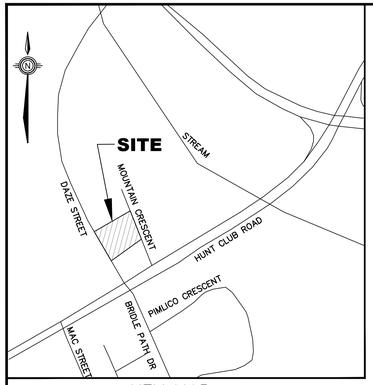
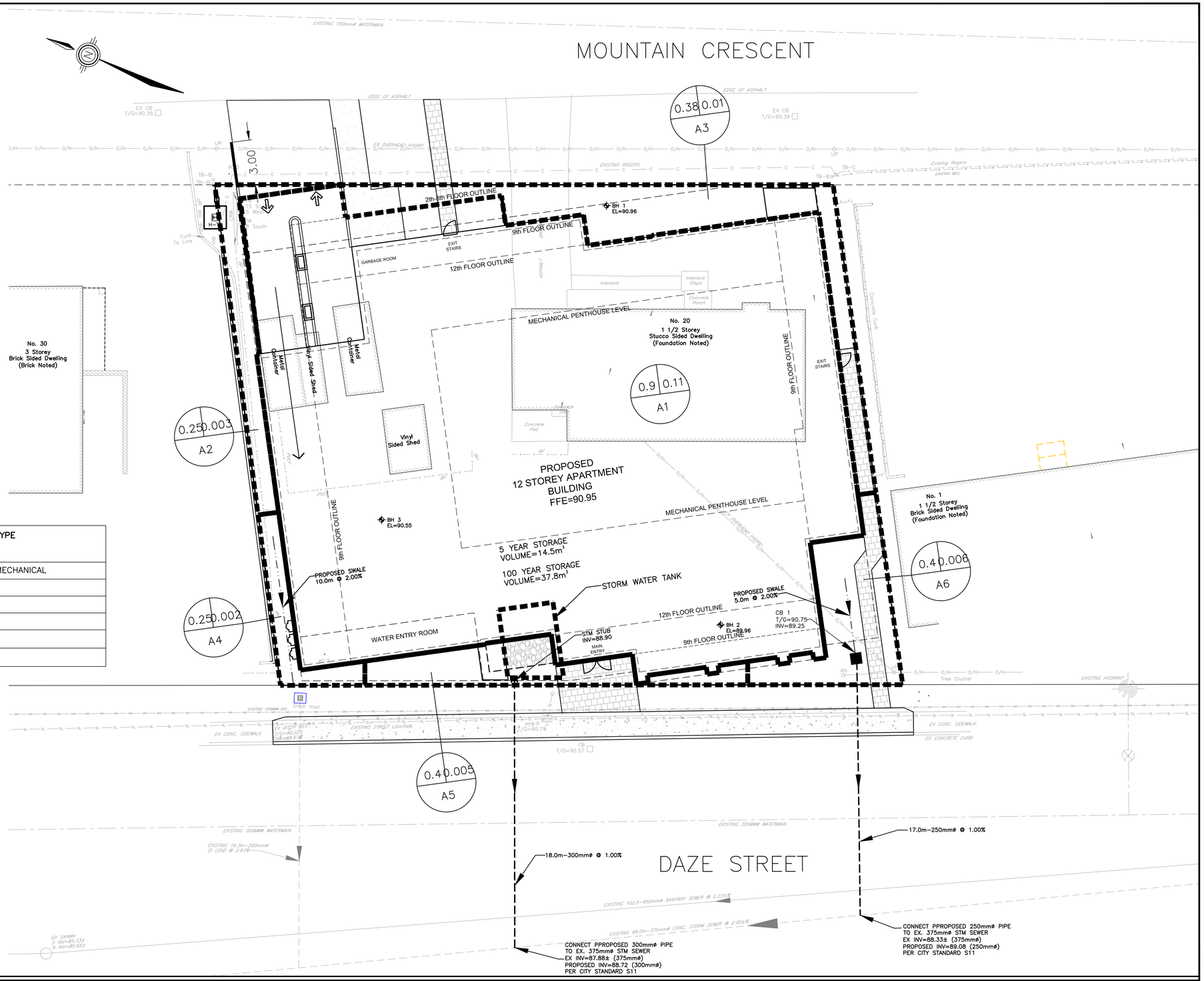


KEY MAP
SCALE: N.T.S.

LEGEND

STORM DRAINAGE AREA

RUNOFF COEFFICIENT
AREA (ha)
0.90 0.11
A1
AREA NUMBER



100 YEAR PONDING VOLUME, DEPTH & SPILL ELEVATION

AREA NO	100 YEAR STORAGE VOLUME	PONDING DEPTH	SPILL ELEVATION	OUTLET LOCATION	CONTROLLED RELEASE RATE	ORIFICE TYPE
A1	37.8m³	N/A	N/A	BUILDING	7.45 L/S	REFER TO MECHANICAL
A2	0.0m³	N/A	N/A	STREET	0.25 L/S	FREE FLOW
A3	0.0m³	N/A	N/A	STREET	1.09 L/S	FREE FLOW
A4	0.0m³	N/A	N/A	EX CB	0.16 L/S	FREE FLOW
A5	0.0m³	N/A	N/A	STREET	0.55 L/S	FREE FLOW
A6	0.0m³	N/A	N/A	CB 1	0.70 L/S	FREE FLOW

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PROPOSED 12 STOREY APARTMENT BUILDING
20 MOUNTAIN CRESCENT
CITY OF OTTAWA

STORMWATER MANAGEMENT PLAN

Ainley GROUP CONSULTING ENGINEERS PLANNERS

CONTRACT No. 20048 | 20048-SWM1

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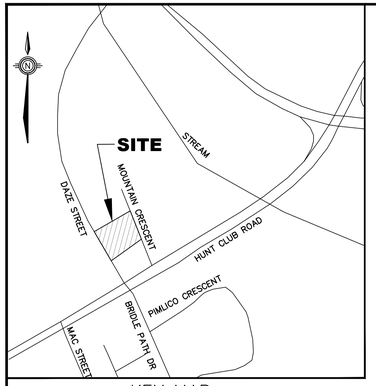


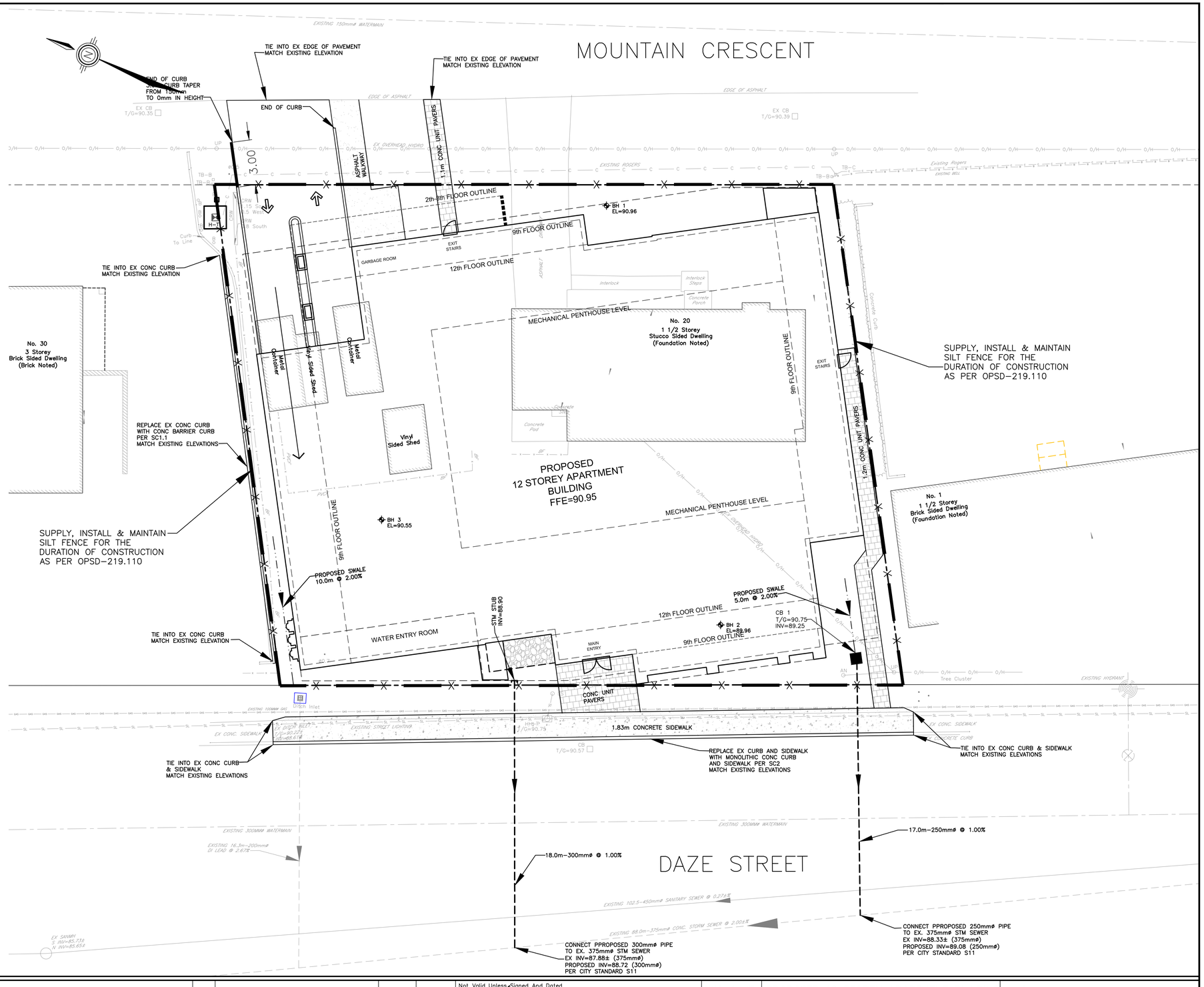
KEY MAP
SCALE: N.T.S.

LEGEND

X — SILT FENCE (PER OPSD–219.110)

NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION AND CONSTRUCTION OF ALL SEDIMENT AND EROSION CONTROL MEASURES TO ENSURE THAT SEDIMENT DOES NOT MIGRATE FROM THE CONSTRUCTION SITE. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER THE GRATES OF CATCHBASINS AND MANHOLES (SEE NOTE 2) AND INSTALLING SILT FENCES (PER OPSD 219.110) AND OTHER EFFECTIVE SEDIMENT TRAPS.
2. THE CONTRACTOR IS TO SUPPLY, INSTALL AND MAINTAIN FILTER CLOTH BETWEEN THE FRAME AND COVER ON ALL PLANNED CATCH BASINS AND MANHOLES FOR THE DURATION OF CONSTRUCTION.
3. A MUD MAT IS TO BE INSTALLED AT EACH CONSTRUCTION ENTRANCE AND SHALL BE MAINTAINED UNTIL THE PLACEMENT OF THE GRANULAR SUB–BASE. MUD MAT SHALL BE CONSTRUCTED OF 100mmø CLEAR STONE, 400mm THICK. MUD MAT SHALL BE OF SUFFICIENT LENGTH TO ENSURE THAT A MINIMUM AMOUNT OF MATERIALS IS TRUCKED OFF SITE ONTO ADJACENT ROADS.
4. IN ORDER TO AVOID POLLUTANTS FROM BEING DISCHARGED, THE CONTRACTOR MUST MINIMIZE THE GENERATION OF DUST THROUGH APPROPRIATE APPLICATION OF WATER OR OTHER DUST SUPPRESSION TECHNIQUES.
5. THE CONTRACTOR IS PROHIBITED FROM DISCHARGING GROUND WATER OR ACCUMULATED STORMWATER THAT IS REMOVED FROM EXCAVATIONS, TRENCHES, FOUNDATIONS, ETC. UNLESS SUCH WATERS ARE FIRST EFFECTIVELY TREATED BY APPROPRIATE CONTROLS AS SEDIMENT SOCKS, DEWATERING TANKS, ETC.
6. THE CONTRACTOR MUST INITIATE SOIL STABILIZATION MEASURES IMMEDIATELY WHENEVER EARTH–DISTURBING ACTIVITIES HAVE PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE.



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PROPOSED 12 STOREY APARTMENT BUILDING
20 MOUNTAIN CRESCENT
CITY OF OTTAWA

EROSION AND SEDIMENT CONTROL PLAN

Ainley GROUP — CONSULTING ENGINEERS PLANNERS

CONTRACT No. 20048 | 20048–SC1

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