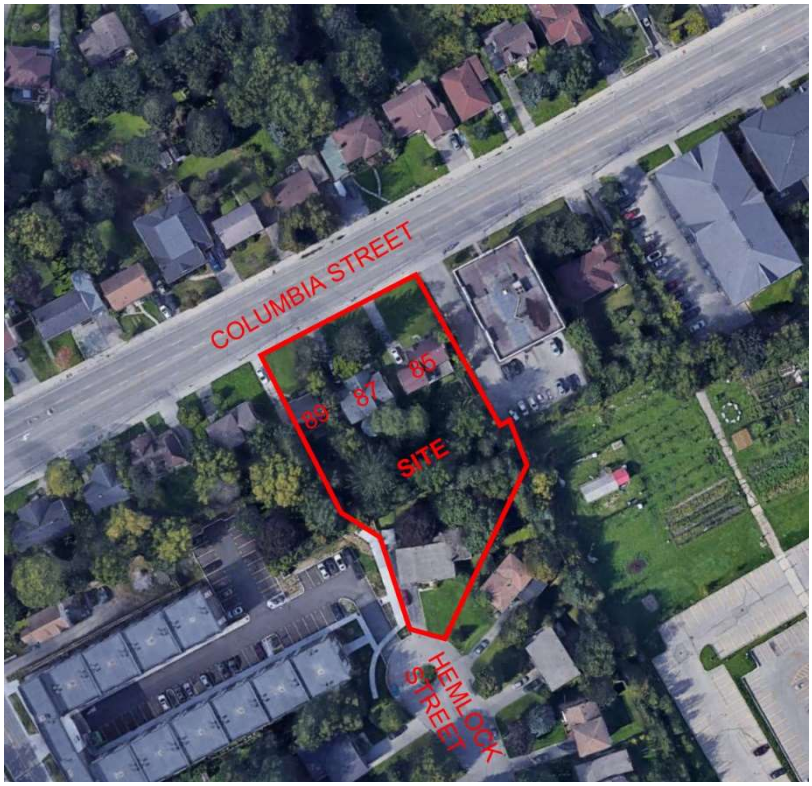
SERVICING REPORT

In support of a Site Plan Application



LOUIE 2 CONDOMINIUMS

89 COLUMBIA STREET W.

WATERLOO, ONTARIO

CITY FILE No. TBD

KWA Project No. 21664

July 19th, 2022

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1.0 INTRODUCTION

KWA Site Development Consulting Inc. ("KWA") was retained by Edgemont Homes to prepare this Servicing Report in support of a Site Plan Application (SPA) for a proposed residential infill development located at 85-89 Columbia Street West and 300 Hemlock Street in the City of Waterloo, Ontario. Refer to Figure 1.

In preparing this report, the following documents were reviewed:

1. Existing Condition Plan by IBI Group, dated December 24, 2015
2. Site Plan A-101 prepared by Arsenault Architect Inc., Project No, 21-103, dated May 20, 2022
3. City of Waterloo Development Engineering Manual, 2013
4. Region of Waterloo and Area Municipalities Design Guidelines and Supplemental Specifications ('DGSSMS'), dated January 2018
5. Design Guidelines for Drinking Water ('DGDWS' System 2008, Ministry of Environment (2008)
6. Region of Waterloo Regional Official Plan Review, dated December 2020

Based on the above noted site plan A-101, the gross site area is 3,960.93m^2 (0.98ac, 0.37 ha). The proposal includes one 8-storey apartment building with a total of 136 residential units and 340 m^2 of commercial space, associated landscaping, above-ground parking, and one (1) level of below ground parking.

2.0 EXISTING SITE DESCRIPTION

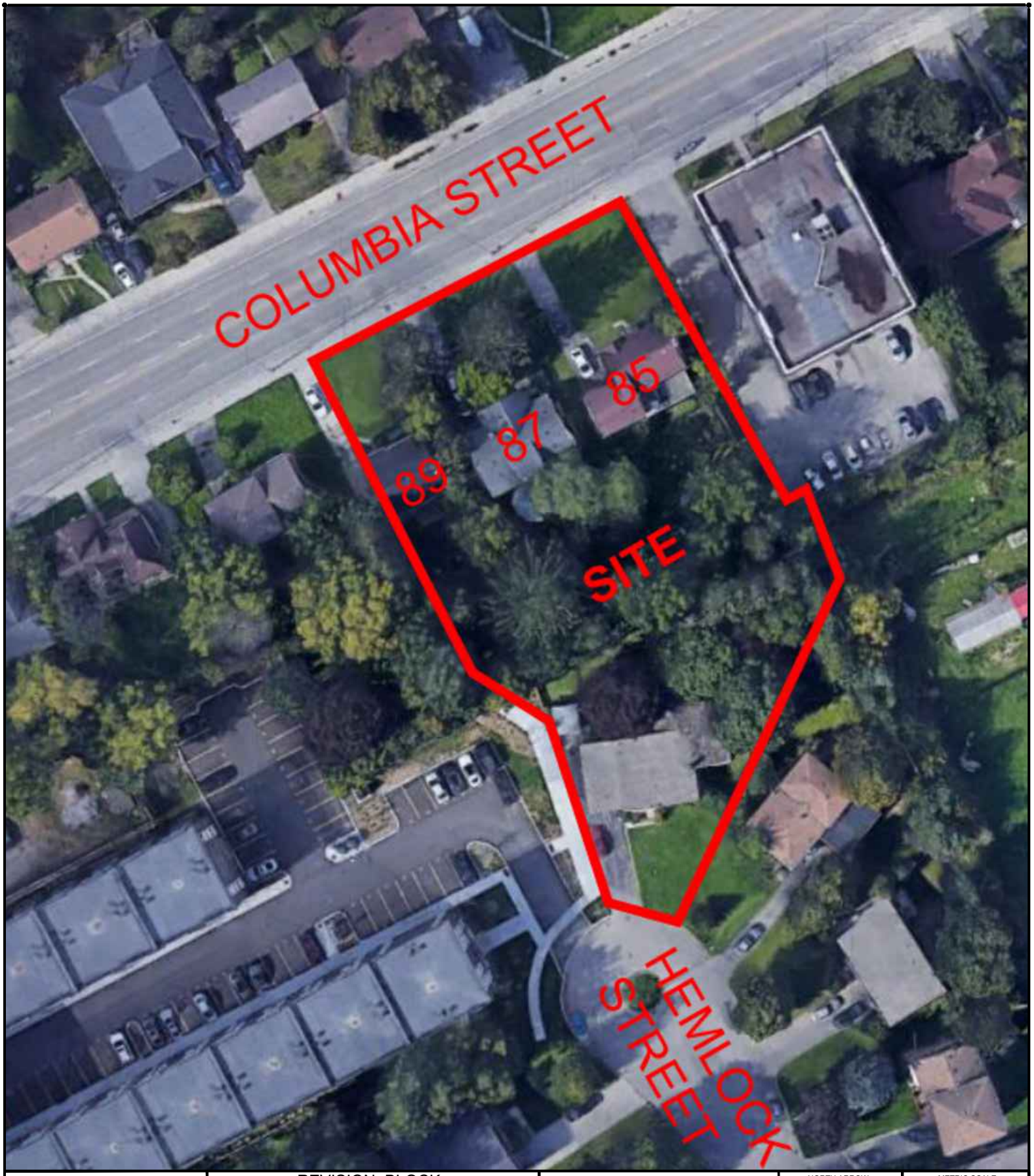
The site's municipal address is 85, 87, & 89 Columbia Street West ('Columbia Street') and 300 Hemlock Street, Waterloo, Ontario. The site is located approximately 100m east of the intersection of Columbia Street West and Albert Street. The existing site consists of four (4) 2-storey residential homes with associated driveway connections and landscaping. The subject property is bound by existing residential homes to the northwest and southeast, and two (2) 4-storey residential buildings to the northeast and southwest, see Existing Condition Plan by IBI Group.

3.0 WATER SERVICING

3.1 EXISTING WATER SERVICING

An existing 200mm diameter watermain located on the south side of Columbia Street services the three existing residential homes at 85, 87, and 89 Columbia Street. Additionally, a 150mm diameter cement mortar lined ('CML') watermain on Hemlock Street services the existing home at 300 Hemlock Street. Each building has a 19mm diameter copper service connection in the locations shown on the Existing Condition Plan.

Region of Waterloo and Area Municipalities Design Guidelines and Supplemental Specifications ('DGSSMS') indicates a per capita rate of 225 L/capita/day applies. Based on a conservative population estimate of 3.5 persons per dwelling, the existing water demand is summarized in Table 1 below.



KWA SITE DEVELOPMENT CONSULTING INC.
2453 Auckland Drive
Burlington, ON L7L 7A9
Burlington Woodstock Vancouver

REVISION BLOCK

#	DATE	DESCRIPTION

FIGURE - 1
SITE LOCATION PLAN

LOUIE CONDOMINIUM 2
89 COLUMBIA ST.
WATERLOO, ONTARIO

PROJECT No: 21664 | DRAWN BY: BJ | CHECKED BY: CDB

NORTH ARROW

METRIC SCALE
N.T.S.

1


Ex. Centreline of Road Right-of-way
Ex. 85.0m 200mmø SAN @ ±0.55%
Ex. 200mmø SAN.
Ex. 200mmø WTM (Approximate Location Only)
Ex. 51.3m-200mmø STM @ 1.55%
Ex. 200mmø STM
Ex. 2.0m-250mmø STM
Ex. SAN-MH T/Gr=343.70m N.INV.=340.38m E.INV.=340.13m
Ex. STM-MH T/Gr=344.08m N.INV.=342.45m S.INV.=342.45m W.INV.=341.48m E.INV.=341.14m
Ex. STM-MH T/Gr=343.19m N.INV.=341.30m S.INV.=341.30m W.INV.=340.34m E.INV.=340.00m
Ex. SICB T/Gr=344.13m N.INV.=342.65m
LOCAL BENCHMARK TOP OF HYD=345.67m
Ex. CONC. SIDEWALK
Ex. HPLS
Ex. TV
Ex. Ped
Ex. CB
Ex. CLE
Ex. WV
Ex. HYD
ROAD WIDENING
N63°30'10"E
52.888
52.765
93 COLUMBIA STREET WEST
Ex. Driveway
Ex. Conc. Driveway
Ex. 150mmø COPPER WATER SERVICE (LOCATION ASSUMED)
Ex. 100mmø BLACK PVC SAN SERVICE (LOCATION ASSUMED)
Ex. 150mmø BLACK PVC SAN SERVICE (LOCATION ASSUMED)
Ex. 200mmø BLACK PVC SAN SERVICE (LOCATION ASSUMED)
Ex. CSW
EX. DWELLING 89 COLUMBIA ST. W.
EX. DWELLING 87 COLUMBIA ST. W.
EX. DWELLING 85 COLUMBIA ST. W.
81 COLUMBIA STREET WEST EX. APARTMENT BUILDING
Ex. ASPHALT DRIVEWAY
Ex. Wood Fence
Ex. Gazebo
Ex. Gate
Ex. Shed
SHED
Ex. Post
Ex. Pole
Ex. Hydro Pole
Ex. Retaining Wall
CHAINLINK FENCE
ASPHALT PARKING
Ex. Gross
EXISTING POOL
EX. SHED
EX. DWELLING 299 Hemlock St.
EX. DWELLING 300 HEMLOCK ST.
EX. DWELLING 298 HEMLOCK ST.
PORCH & STAIRS
CONCRETE SWK
Ex. 150mmø COPPER WATER SERVICE (LOCATION ASSUMED)
Ex. 100mmø BLACK PVC SAN SERVICE (LOCATION ASSUMED)
Ex. SAN-MH T/Gr=342.478m N.INV.=339.52m S.INV.=339.51m
Ex. Rock
Fd. RB
TOP OF BANK
BOTTOM OF BANK
CREEK
N63°30'10"E 10.650
N63°30'10"E 47.12
N63°30'10"E 47.12
N63°30'10"E 47.12
R=172.00m A=13.64m CH=13.36m N48°42'55"E
R=172.00m A=13.64m CH=13.36m N48°42'55"E
R=172.00m A=13.64m CH=13.36m N48°42'55"E

SITE DATA

SITE AREA:
GROSS 3,860.93 M2 (41,557 FT2)
ROAD WIDENING 294.23 M2 (3,166 FT2)
RAILWAY DEDICATED TO CITY 170.50 M2 (1,843 FT2)
NET 3,575.20 M2 (38,488 FT2)

THE MAXIMUM NUMBER OF BEDROOMS PERMITTED WITHIN EACH RESIDENTIAL UNIT SHALL BE CONSISTENT WITH THE ISSUED BUILDING PERMIT AND ASSOCIATED SITE PLAN AND DRAWINGS

THE SPACE LABELLED 'BUILDING OFFICE' SHALL BE USED EXCLUSIVELY AS ADMINISTRATIVE SPACE FOR THE RESIDENTIAL BUILDING AND SHALL NOT BE USED AS A RETAIL UNIT OR COMMERCIAL SPACE OF ANY KIND. IT SHALL BE CONSIDERED AS A COMMON ELEMENT SPACE IN THE EVENT THE BUILDING IS CONVERTED TO A CONDOMINIUM, UNLESS THERE IS A WRITTEN CONSENT FROM THE CITY OF WATERLOO OTHERWISE

THAT WITH THE EXCEPTION OF THE BEDROOMS REFERENCED WITHIN THE SITE DATA CHART OF THE APPROVED SITE PLAN, NO FLOOR AREA IN THE RESIDENTIAL UNIT, INCLUDING THOSE ROOMS LABELLED AS DEN, SHALL BE USED AS A BEDROOM OR CONVERTED TO A BEDROOM WITHOUT THE WRITTEN CONSENT OF THE CITY OF WATERLOO

BUILDING COVERAGE

2,288.03 M2 (24,626 FT2) - 59.34% (NET SITE AREA)

PROPOSED 8 STOREY BUILDING

G.F.A.		T.G.A.	
PARKING LEVEL	2,074.82 M2 (13,098 FT2)		
GROUND FLOOR	1,756.30 M2 (18,256 FT2)	GROUND FLOOR	633.55 M2 (6,737 FT2) - 31.24%
2ND FLOOR	598.51 M2 (6,443 FT2)	2ND FLOOR	247.72 M2 (2,667 FT2) - 41.38%
3RD FLOOR	1,866.26 M2 (20,416 FT2)	3RD FLOOR	1,556.49 M2 (16,757 FT2) - 83.22%
4TH FLOOR	1,730.06 M2 (18,624 FT2)	4TH FLOOR	1,455.06 M2 (15,241 FT2) - 83.76%
5TH FLOOR	1,615.70 M2 (16,272 FT2)	5TH FLOOR	1,245.02 M2 (13,448 FT2) - 82.53%
6TH FLOOR	1,573.10 M2 (16,795 FT2)	6TH FLOOR	1,068.24 M2 (11,833 FT2) - 76.86%
7TH FLOOR	1,330.90 M2 (13,241 FT2)	7TH FLOOR	998.63 M2 (10,810 FT2) - 80.29%
8TH FLOOR	1,330.90 M2 (13,241 FT2)	8TH FLOOR	998.63 M2 (10,810 FT2) - 80.29%
9TH FLOOR	1,293.77 M2 (13,930 FT2)	9TH FLOOR	760.63 M2 (8,453 FT2) - 77.57%
TOTAL	15,369.79 M2 (165,337 FT2) (EXCLUDING PARKING)	TOTAL	8,209.85 M2 (97,358 FT2) - 71.38%

SUMMARY OF RESIDENTIAL UNITS

UNIT COUNT		BARRIER FREE UNITS
GROUND FLOOR	9 UNITS	0
2ND FLOOR	9 UNITS	0
3RD FLOOR	24 UNITS	4 UNITS (INCLUDED IN COUNT)
4TH FLOOR	22 UNITS	4 UNITS (INCLUDED IN COUNT)
5TH FLOOR	20 UNITS	4 UNITS (INCLUDED IN COUNT)
6TH FLOOR	18 UNITS	4 UNITS (INCLUDED IN COUNT)
7TH FLOOR	18 UNITS	4 UNITS (INCLUDED IN COUNT)
8TH FLOOR	18 UNITS	4 UNITS (INCLUDED IN COUNT)
9TH FLOOR	11 UNITS	3 UNITS (INCLUDED IN COUNT)
TOTAL	139 UNITS	27 UNITS (INCLUDED IN COUNT)

SUMMARY OF LOCKERS

UNDERGROUND	27 LOCKERS
GROUND FLOOR	10 LOCKERS
2ND FLOOR	0 LOCKERS
3RD FLOOR	16 LOCKERS
4TH FLOOR	16 LOCKERS
5TH FLOOR	16 LOCKERS
6TH FLOOR	16 LOCKERS
7TH FLOOR	16 LOCKERS
8TH FLOOR	16 LOCKERS
9TH FLOOR	16 LOCKERS
TOTAL	165 LOCKERS

SUMMARY OF BIKE PARKING

REQUIRED PARKING	
RESIDENTS	28 SPACES
VISITORS	7 SPACES
COMMERCIAL	15 SPACES
TOTAL	42 SPACES

SUMMARY OF PARKING

PROVIDED PARKING	
RESIDENTS	97 SPACES
VISITORS	9 SPACES
COMMERCIAL	15 SPACES
TOTAL	76 SPACES

RN-8 ZONING UNIT BREAKDOWN	STUDIO	1 BED	1 + DEN	2 BED	2 + DEN	TOTAL	BEDS
GROUND FLOOR	1	4	3	0	0	8	8
2ND FLOOR	0	6	3	0	0	9	9
3RD FLOOR	0	4	14	6	0	24	30
4TH FLOOR	0	4	14	4	0	22	30
5TH FLOOR	0	4	12	4	0	20	28
6TH FLOOR	0	4	10	4	0	18	26
7TH FLOOR	0	4	10	4	0	18	26
8TH FLOOR	0	4	10	4	0	18	26
9TH FLOOR	0	3	8	1	0	11	13
TOTAL	1	41	84	27	0	153	196

RN-6 ZONING UNIT BREAKDOWN	STUDIO	1 BED	1 + DEN	2 BED	2 + DEN	TOTAL	BEDS
GROUND FLOOR	0	1	5	0	0	6	6
2ND FLOOR	0	0	6	0	0	6	6
3RD FLOOR	0	2	2	0	0	4	4
4TH FLOOR	0	2	2	0	0	4	4
5TH FLOOR	0	2	2	0	0	4	4
6TH FLOOR	0	0	0	0	0	0	0
7TH FLOOR	0	0	0	0	0	0	0
8TH FLOOR	0	0	0	0	0	0	0
9TH FLOOR	0	0	0	0	0	0	0
TOTAL	0	7	17	0	0	24	24

TOTAL UNIT BREAKDOWN	STUDIO	1 BED	1 + DEN	2 BED	2 + DEN	TOTAL	BEDS
GROUND FLOOR	1	5	8	0	0	14	14
2ND FLOOR	0	6	9	0	0	15	15
3RD FLOOR	0	6	16	6	0	28	34
4TH FLOOR	0	6	16	4	0	26	34
5TH FLOOR	0	6	14	4	0	24	32
6TH FLOOR	0	4	10	4	0	18	26
7TH FLOOR	0	4	10	4	0	18	26
8TH FLOOR	0	4	10	4	0	18	26
9TH FLOOR	0	3	8	1	0	12	13
TOTAL	1	48	101	27	0	177	220

GARAGE FREE UNIT BREAKDOWN	1 BED	1 + DEN	TOTAL
GROUND FLOOR	1	0	1
2ND FLOOR	0	0	0
3RD FLOOR	1	2	3
4TH FLOOR	1	2	3
5TH FLOOR	1	2	3
6TH FLOOR	1	2	3
7TH FLOOR	1	2	3
8TH FLOOR	1	2	3
9TH FLOOR	1	2	3
TOTAL	7	14	21

NUMBER OF PARKING SPACES PROVIDED
AT GRADE 10 SPACES (COMMERCIAL)
UNDERGROUND 67 SPACES (9 VISITORS, 58 RESIDENTIAL)
TOTAL 77 SPACES

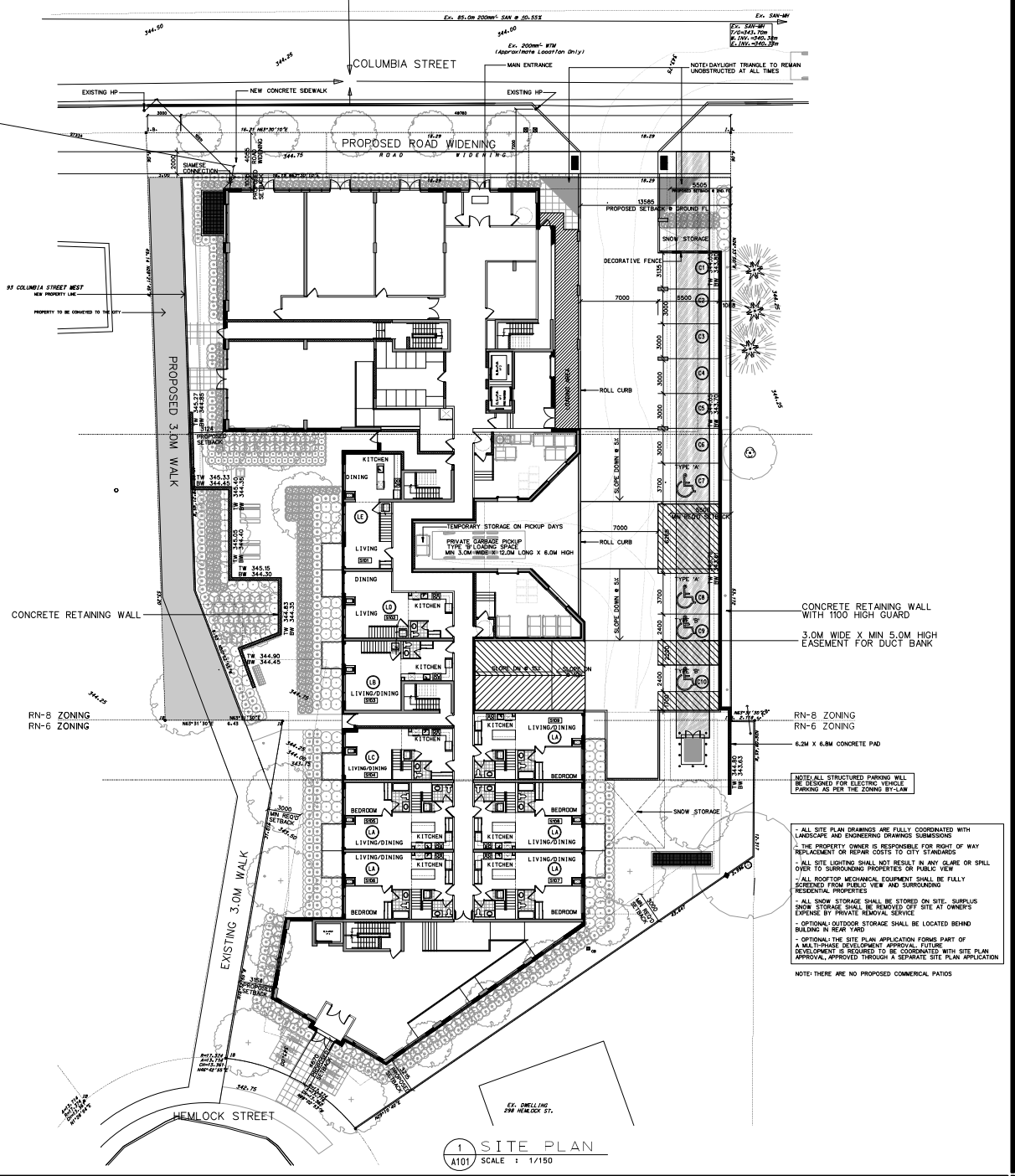
BIKE PARKING
REQUIRED
RESIDENTIAL - 137 UNITS X 0.25 SPACES = 34.25 SPACES
COMMERCIAL - 1 PER 100 M2 = 3.7 SPACES
TOTAL REQUIRED - 38 SPACES
PROVIDED
UNDERGROUND - 20 SPACES
GROUND FLOOR - 18 SPACES
TOTAL - 38 SPACES

RN-8 ZONING

REGULATION FOR CONVERTIBLE FRONTAGE AREA	REQUIRED (RN8)	PROVIDED (RN8)
MIN LOT FRONTAGE	20 M	46.760M (-3.2M RETAINED BY CITY)
MIN LOT AREA	1,000 M2	3,767.32 M2
ROAD WIDENING AREA FOR COLUMBIA STREET WEST		214.23 M2
WALKWAY - DEDICATED TO CITY OF WATERLOO		170.10 M2
NET LOT AREA		3,381.89 M2
FRONT YARD (COLUMBIA STREET WEST) - MAXIMUM PERMISSIBLE FRONTAGE AREA SEE TABLE 7B SETBACKS	MIN 1.0 M MAX 3.0 M	LO @ 0.260 FLOOR (1,009 M @ GROUND FL)
ARCHITECTURAL PROJECTIONS CLASS B ALONG COLUMBIA STREET	600 MAX	28M
SIDE YARD SETBACK (EASTERLY)	3.0 M	5.500 M (M 2ND FL)
SIDE YARD SETBACK (WESTERLY)	3.0 M	3.0 M
REAR YARD SETBACK	N/A	THROUGH SITE
MINIMUM GROUND FLOOR STORIES HEIGHT OF THE BUILDING/STRUCTURE FRONTING A CONVERTIBLE FRONTAGE AREA (APPLIES TO SOUTH ALBERT STREET AND COLUMBIA STREET WEST)	4.5 M	6.5 M
UNDERGROUND PARKING STRUCTURE SETBACK TO ALBERT STREET AND COLUMBIA STREET WEST	UNDERGROUND PARKING STRUCTURE WITHIN 45 DEGREE ANGLE OF THE FOUNDATION WALL MUST ADHERE TO THE SETBACK TO THE MAIN BUILDING FRONT YARD SETBACK SIDE YARD 0 M SIDE YARD 0 M REAR YARD N/A	1,500 M (NORTH SETBACK) 0.000 M (WEST SETBACK) 1,500 M (EAST SETBACK) N/A
MINIMUM BUILDING STEPBACKS	REQUIREMENTS PER TABLE 7B	3.0 M SETBACK @ 12.4 M HEIGHT
MINIMUM LANDSCAPED OPEN SPACE	300 M2 + NET LOT AREA - 1,000 M2 X 0.25 = 794.27 M2	546.85 M2
DENSITY NOTE: THE RN8 ZONE SHALL NOT BE APPLIED TO ANY LANDS THAT APPLIES TO ALL DWELLING UNITS CONTAINED ZONE	NET AREA - 0.33382 Ha MAX. 450 BEDROOMS/Ha MAX. 107 BEDROOMS	98 BEDROOMS
MINIMUM NUMBER OF BUILDING/STREET ENTRANCES TO THE GROUND FLOOR (FIRST STOREY) ON THE FRONT COLUMBIA STREET	COLUMBIA FACADE: 120M/15M = 4 ENTRANCES	3 COMMERCIAL 1 RESIDENTIAL
MAXIMUM NUMBER OF VEHICULAR ENTRANCES/ DRIVEWAY WITHIN THE FRONTAGE ALONG COLUMBIA STREET WEST	1	1
PODIUM REQUIREMENT COLUMBIA STREET FRONTAGE	MIN - 8 M MIN 13.5 M MAX 30 M	12.4 M
STOREYS	MIN - 8 MAXIMUM 9 STOREYS	9 STOREYS
BUILDING HEIGHT	MIN - 8 MIN 10.5M MAX 27.5 M	27.3 M
PARKING REQUIREMENT/ PARKING - RESIDENTIAL	0.2 SPACES PER BEDROOM (0.2 X 119 = 24 SPACES) 0.05 VISITORS SPACES PER UNIT (0.05 X 139 = 6 SPACES) TOTAL RESIDENTIAL PARKING REQUIREMENT = 30 SPACES	
NON RESIDENTIAL PARKING REQUIREMENT	300.84 M2 / 100 X 3 = 9 SPACES TOTAL PARKING REQUIRED = 40 SPACES	RESIDENTIAL - 63 SPACES VISITOR - 8 SPACES COMMERCIAL - 10 SPACES 71 SPACES
ACCESSIBLE PARKING SPACES (MINIMUM)	TABLE 8B MINIMUM PARKING SPACES REQUIRED BY ZONING CATEGORY FOR THE RESIDENTIAL COMPONENT 1 TYPE A AND 1 TYPE B FOR THE COMMERCIAL COMPONENT 1 TYPE A AND 1 TYPE B OVERALL (RESIDENTIAL + COMMERCIAL) 2 TYPE A AND 2 TYPE B	FOR THE RESIDENTIAL COMPONENT 1 TYPE A AND 2 TYPE B FOR THE COMMERCIAL COMPONENT 1 TYPE A AND 1 TYPE B OVERALL 3 TYPE A AND 4 TYPE B
MINIMUM BIKE PARKING	RESIDENTIAL 0.25 SPACES PER BEDROOM (0.25 X 119 = 30 SPACES) COMMERCIAL 1 PER 100M2 = 3.00 TOTAL REQUIRED 33 BIKE SPACES	30 RESIDENTIAL (P) 3 COMMERCIAL (OUTDOOR) 33 SPACES
REQUIRED GROUND FLOOR COMMERCIAL	300.00 M2 MINIMUM	308.84 M2 PROVIDED
REQUIRED LOADING SPACE TYPE 'B'	3.0 M WIDE X 7.5 M LONG X 4.4 M CLEAR HEIGHT	3.0 M WIDE X 8.0 M LONG X 6.0 M CLEAR HEIGHT
PARKING SPACE DIMENSIONS	2.8 M X 5.5 M 90 DEGREE WHEN ONE SIDE ABUTS WALL OR COLUMN - 3.0 M X 5.5 M 90 DEGREE WHEN BOTH SIDES ABUT A WALL OR COLUMN 3.2 M X 5.5 M	
AMENITY SPACE	3.0 M2 / 1 BEDROOMS 137 UNITS X 3 = 411 M2 5.0 M2 / 2 BEDROOMS 1 UNIT X 5 = 5 M2	INDOOR - SOUTH AMENITY - 200.56 M2 INDOOR - 2ND FL - 186.89 M2 OUTDOOR - 2ND FL TERRACE - 175.78 M2 TOTAL - 843.24 M2

RN-6 ZONING

REGULATION FOR CONVERTIBLE FRONTAGE AREA	REQUIRED (RN6)	PROVIDED (RN6)
MIN LOT FRONTAGE	20 M	13.79 M
MIN LOT AREA	1,000 M2	1,193.71 M2
FRONT YARD - HEMLOCK STREET	MIN 3.0 M, MAX 6.0M	GROUND FL - 4.66 M 2ND FL - 4.66 M 3RD FL - 12.35 M 4TH FL - 28.473 M
ARCHITECTURAL PROJECTIONS CLASS B ALONG HEMLOCK	N/A	N/A
SIDE YARD SETBACK (EASTERLY)	3.0 M	3.215 M
SIDE YARD SETBACK (WESTERLY)	3.0 M	3.15 M
REAR YARD SETBACK	N/A	N/A
UNDERGROUND PARKING STRUCTURE SETBACK TO ALBERT STREET AND COLUMBA STREET WEST	UNDERGROUND PARKING STRUCTURE WITHIN 45 DEGREE ANGLE OF THE FOUNDATION WALL MUST ADHERE TO THE SETBACK TO THE MAIN BUILDING FRONT YARD SETBACK SIDE YARD 0 M SIDE YARD 0 M REAR YARD N/A	4.870 M (SOUTH SETBACK) 0.000 M (WEST SETBACK) 3.215 M (EAST SETBACK) N/A
MINIMUM BUILDING STEPBACKS	N/A	N/A
MINIMUM LANDSCAPED OPEN SPACE	300 M2 NET LOT AREA - 1,000 M2 X 0.25 = 546.78 M2	546.12 M2
DENSITY NOTE: THE RN6 SHALL NOT BE APPLIED TO ANY LANDS THAT APPLIES TO ALL DWELLING UNITS CONTAINED ZONE	NET AREA - 0.07979 Ha MAX. 200 BEDROOMS/Ha MAX. 30 BEDROOMS	18 BEDROOMS
MINIMUM NUMBER OF BUILDING/STREET ENTRANCES TO THE GROUND FLOOR (FIRST STOREY) ON THE FRONT HEMLOCK STREET	1 RESIDENTIAL	1 RESIDENTIAL
MAXIMUM NUMBER OF VEHICULAR ENTRANCES/ DRIVEWAY WITHIN THE FRONTAGE ALONG COLUMBIA STREET WEST	1	0
PODIUM REQUIREMENT HEMLOCK STREET FRONTAGE	N/A	N/A
STOREYS	MIN - 8 MAXIMUM 8 STOREYS	8 STOREYS
BUILDING HEIGHT	MIN - 8 MAX 25.5 M	17.200 M
PARKING REQUIREMENT/ PARKING - RESIDENTIAL	0.2 SPACES PER BEDROOM (0.2 X 18 = 4 SPACES) 0.05 VISITORS SPACES PER UNIT (0.05 X 1 = 1 SPACES) TOTAL RESIDENTIAL PARKING REQUIREMENT = 5 SPACES	PARKING REQUIREMENT= RESIDENTIAL - 5 SPACES VISITOR - 1 SPACE COMMERCIAL - N/A 6 SPACES
ACCESSIBLE PARKING SPACES (MINIMUM)	TABLE 8B MINIMUM PARKING SPACES REQUIRED BY ZONING CATEGORY FOR THE RESIDENTIAL COMPONENT 1 TYPE A AND 1 TYPE B FOR THE COMMERCIAL COMPONENT 1 TYPE A AND 1 TYPE B OVERALL (RESIDENTIAL + COMMERCIAL) 2 TYPE A AND 2 TYPE B	FOR THE RESIDENTIAL COMPONENT SEE RN-8 STATS FOR THE COMMERCIAL COMPONENT SEE RN-8 STATS OVERALL SEE RN-8 STATS
MINIMUM BIKE PARKING	RESIDENTIAL 0.25 SPACES PER BEDROOM (0.25 X 18 = 5 SPACES)	5 SPACES (P)
REQUIRED GROUND FLOOR COMMERCIAL	N/A	N/A
REQUIRED LOADING SPACE TYPE 'B'	N/A	N/A
PARKING SPACE DIMENSIONS	2.8 M X 5.5 M 90 DEGREE WHEN ONE SIDE ABUTS WALL OR COLUMN - 3.0 M X 5.5 M 90 DEGREE WHEN BOTH SIDES ABUT A WALL OR COLUMN 3.2 M X 5.5 M	



1 / A101 SITE PLAN
SCALE : 1/150

- ALL SITE PLAN DRAWINGS ARE FULLY COORDINATED WITH LANDSCAPE AND ENGINEERING DRAWINGS SUBMISSIONS
- THE PROPERTY OWNER IS RESPONSIBLE FOR RIGHT OF WAY REPLACEMENT OR REPAIR COSTS TO CITY STANDARDS
- ALL SITE LIGHTING SHALL NOT RESULT IN ANY GLARE OR SPILL OVER TO SURROUNDING PROPERTIES OR PUBLIC VIEW
- ALL ROOFTOP MECHANICAL EQUIPMENT SHALL BE FULLY SCREENED FROM PUBLIC VIEW AND SURROUNDING RESIDENTIAL PROPERTIES
- ALL SNOW STORAGE SHALL BE STORED ON SITE. SURPLUS SNOW STORAGE SHALL BE REMOVED OFF SITE AT OWNER'S EXPENSE BY PRIVATE REMOVAL SERVICE
- OPTIONAL OUTDOOR STORAGE SHALL BE LOCATED BEHIND BUILDING IN REAR YARD
- OPTIONAL THE SITE PLAN APPLICATION FORMS PART OF A MULTI-PHASE DEVELOPMENT APPROVAL. FUTURE DEVELOPMENT IS REQUIRED TO BE COORDINATED WITH SITE PLAN APPROVAL, APPROVED THROUGH A SEPARATE SITE PLAN APPLICATION

NOTE: THERE ARE NO PROPOSED COMMERCIAL PATIOS

DATE	ISSUED FOR
JUN 16 21	FOR CON SUBMISSION
AUG 06 21	ISSUED FOR 2ND PUB CON SUBMISSION
NOV 03 21	ISSUED FOR SPA
MAR 01 22	ISSUED FOR SPA #2
MAY 20 22	ISSUED FOR SPA #3

No	Date	Revisions

CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME; REPORTING ANY DISCREPANCIES TO THE ARCHITECT BEFORE COMMENCING WORK.

ALL DRAWINGS, PRINTS AND SPECIFICATIONS ARE THE PROPERTY OF THE ARCHITECT AND MUST BE RETURNED TO HIM ON COMPLETION OF WORK.

LATEST APPROVED DRAWINGS ONLY TO BE USED FOR CONSTRUCTION.

PRINTS ARE NOT TO BE SCALED.

EDGEMONT HOMES

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JOB CAPTAIN	:	D.ARSENAULT
DRAWN BY	:	
DATE OF PLOT	:	MAY 20 2022
SCALE	:	1 : 150

CLIENT'S NAME :
ALBERT STREET (WATERLOO) CORP
#32-100 BASS PRO MILLS DRIVE
VAUGHAN ONTARIO

PROJECT NAME :
COLUMBIA CONDOMINIUMS 2
89 COLUMBIA STREET
WATERLOO, ONTARIO

DRAWING TITLE :
SITE PLAN

PROJECT NO.: 21-103
DRAWING NO.: A-101
PATH NO.

TABLE 1 – EXISTING AVERAGE WATER DEMAND

Building ID	Dwellings	Population (3.5 ppu)	Average Daily Water Use (L/capita/day)	Population Flow (L/s)
85, 87, 89 Columbia Street	3	11	225	0.03
300 Hemlock Street	1	4	225	0.01
			TOTAL	**0.04**

3.2 PROPOSED WATER SERVICING

In accordance with Region of Waterloo Guidelines, water main should be sized to accommodate the greater of maximum day plus fire flow or maximum hour demand.

The proposed buildings will be serviced by extending a 200 mm water service from the existing 200mm diameter mainline watermain in Columbia Street to the east side of the proposed underground parking level. The existing 19 mm water services on the subject site will be plugged and abandoned as per Region of Waterloo DGSSMS. Refer to Appendix D for the Site Servicing Plan.

3.2.1 DOMESTIC DEMAND

According to the Region of Waterloo Guidelines, population equivalents for proposed developments shall be based on actual or projected information unless otherwise provided by the municipality. For the purpose of this application, a factor of 1.85 persons per unit has been applied to estimate population based on the PPU for high density dwellings in Waterloo as per Figure 3-11 of the Region of Waterloo Official Plan Review (December 2020). Additionally, commercial water demand is estimated at 0.50 L/s/ha as per section 3.1.2.3 of the DGSSMS. Therefore, the domestic demand of the proposed buildings can be calculated as:

TABLE 2 – PROPOSED WATER DEMAND

Building ID	Units	Floor Space (ha)	Population (1.85 ppu)	Average Daily Water Use (L/cap/day)	Population Flow (L/s)
Residential	136	N/A	252	225 L/cap/day	0.66
Commercial	N/A	0.034	N/A	0.5 l/s/ha	0.02
				TOTAL	**0.68**

To determine the maximum hour and maximum day demands, a peaking factor must be applied. In lieu of a Region of Waterloo peaking factor, the Ministry of the Environment DGDWS Table 3-3 Peaking Factors are used. This table applies to drinking-water systems servicing fewer than 500 people.

TABLE 3 – PEAKING FACTORS (MOE DGDWS TABLE 3-3)

DWELLING UNITS SERVICED	EQUIVALENT POPULATION	NIGHT MINIMUM HOUR FACTOR	MAXIMUM DAY FACTOR	PEAK HOUR FACTOR
10	30	0.1	9.5	14.3
50	150	0.1	4.9	7.4
100	300	0.2	3.6	5.4
150	450	0.3	3.0	4.5
167	500	0.4	2.9	4.3

Utilizing the above highlighted peaking factors for the residential flow, and a peak of 2.5 for commercial flow as per section B.3.1.2.3 of the DGSSMS, the maximum hour (peak hour) and maximum day domestic water demands for the total site can be calculated as:

Maximum Day = Res. Avg. Demand * Maximum Day Factor + Comm. Demand*Peaking Factor

= 0.66 L/s*3.6 + 0.02*2.5

= 2.41 L/s

Maximum Hour = Res. Avg. Demand * Maximum Hour Factor + Comm. Demand*Peaking Factor

= 0.66 L/s*5.4 + 0.02*2.5

= 3.54 L/s

Therefore, the peak day demand is **2.41 L/s** and the peak hour demand is **3.54 L/s**.

3.2.2 FIRE DEMAND

Fire flows have been estimated in accordance with the Fire Underwriters Survey of the Insurance Bureau of Canada. Based on a 1st Floor area of 1897m^2 + 25% of the largest two adjoining floors, non-combustible construction class, fully supervised sprinkler system, and the exposure charges of the surrounding buildings, the expected fire flow for the proposed development is **10,350 L/min** or **172.5 L/s**. Refer to the Fire Underwriters Survey Calculations in the Appendix A.

The fire flows for the subject property will be provided by the existing hydrant on Columbia Street West to the northwest within the south boulevard. Refer to Appendix D for the Site Servicing Plan.

The total water demand shall be the greater of maximum day plus fire flow or maximum hour demand. Therefore, the governing rate is **174.9 L/s** (Maximum Day + Fire Flow)

A hydrant flow test was completed by Lozzi Aqua Check on the nearby hydrants located at 81 and 93 Columbia Street. As per the results, the theoretical flowrate at 20 psi is 4,411 gpm or 16,697 L/min (**278.3 L/s**). This is greater than the required 174.9 L/s and therefore the available pressures are adequate to service the proposed development without the need for upgrades.

4.0 SANITARY SERVICING

4.1 EXISTING SANITARY SERVICING

An existing 200mm diameter PVC sanitary sewer draining east and located in the centre of Columbia Street services the three existing residential homes fronting the North. Additionally, a 200mm diameter PVC sanitary sewer on Hemlock Street services the existing home fronting the south. Each building utilizes a 100mm diameter PVC service connection in the locations shown on the Existing Condition Plan.

Based on a conservative population estimate of 3.5 persons per dwelling and an average residential flow rate of 275 L/person/day as per the Region of Waterloo DGSSMS, the existing sanitary wastewater production is summarized in Table 4 below.

TABLE 4 – EXISTING AVERAGE SANITARY FLOWS

Building ID	Units	Population (3.5ppu)	Average Daily Sewage Flow (L/cap/day)	Population Flow (L/s)
85, 87, 89 Columbia Street	3	11	275	0.04
300 Hemlock Street	1	4	275	0.01
			TOTAL	**0.05**

4.2 PROPOSED SANITARY SERVICING

The proposed building will be serviced by extending a 200mm sanitary service from the existing 200mm diameter mainline sewer in Columbia Street to the east side of the proposed parking level. The existing 100mm sanitary services on the subject site will be plugged and abandoned as per Region of Waterloo DGSSMS. Refer to Appendix D for the Site Servicing Plan.

4.2.1 SANITARY FLOW CALCULATIONS

In accordance with the Region of Waterloo's DGSSMS, the sewage flows shall be calculated based on an average residential flow rate of 275 L/person/day and commercial flow rate of 0.5 L/s/ha. An infiltration allowance will not be applied as the majority of the site is covered by underground parking and there will not be opportunity for stormwater inflows into the sanitary system.

The residential peaking factor can be determined using the Harmon Equation.

$$K_h = 1 + \frac{14}{4 + \sqrt{P}}$$

Where:

K_h = Harmon peaking factor
P = population in thousands

$$K_h = 1 + \frac{14}{4 + \sqrt{60/1000}}$$

$$K_h = 4.1$$

Therefore, with a population of 239 persons, the residential peaking factor is **4.10**.

Based on the Regional average flow of 275 L/person/day and a commercial peaking factor of 2.5 as per section B.3.1.2.3 of the DGSSMS, the expected peak sanitary flow from the development is:

TABLE 5 – TOTAL PEAK SANITARY FLOWS

Building ID	Units	Floor Space (ha)	Population (1.85 ppu)	Average Daily Sewage Flow (L/cap/day)	Population Flow (L/s)
Residential	136	N/A	252	275 (L/cap/day)	0.80
Commercial	N/A	0.0340	N/A	0.5 (L/s/ha)	0.02
				Average Daily Total	**0.82**
				Peak Total	**3.34**

Therefore, the resulting average daily sewage flow is **0.82 L/s** and **peak sewage flow is 3.34 L/s**, an increase of 0.77 L/s and 3.29 L/s over the existing condition.

The receiving sewer in Columbia Street is 200 mm in diameter at 1.55% slope, with a full flow capacity of 40.8 L/s. Therefore, the increase in proposed average and peak sewage flow is 1.9% and 8.2% of the sewer's full flow capacity respectively.

5.0 STORMWATER MANAGEMENT

In accordance with the City of Waterloo's Engineering Design Criteria, Section 7.2.4 Servicing, the stormwater drainage facilities criteria are as follows:

Quantity Control — Control of post-development peak flows to pre-development levels.

Quality Control — In the absence of prescribed criteria by the City of Waterloo, "Enhanced" level of controlled based on MOE (2003) Guidelines (80% Total Suspended Solids ['TSS'] removal) will be achieved.

Water Balance — If Subsurface conditions are suitable, at-source infiltration of roof drainage is encouraged.

5.1 EXISTING CONDITIONS

The site currently drains to the north and south with a drainage divide located roughly north-of-centre. As shown on the Existing Drainage Figure, 0.12 ha of area at a runoff coefficient of 0.55 drains to Columbia Street (area 100), and 0.25 ha at a runoff coefficient of 0.33 drains to Hemlock Street (area 101).

5.1.1 ALLOWABLE RELEASE RATES

In accordance with the City of Waterloo Engineering Manual, Section 7.2.4, post-development peak flows shall be controlled to pre-development levels. The following Intensity-Duration Frequency (IDF) data is summarized in Table 6 below:

TABLE 6 – IDF CURVE COEFFICIENTS

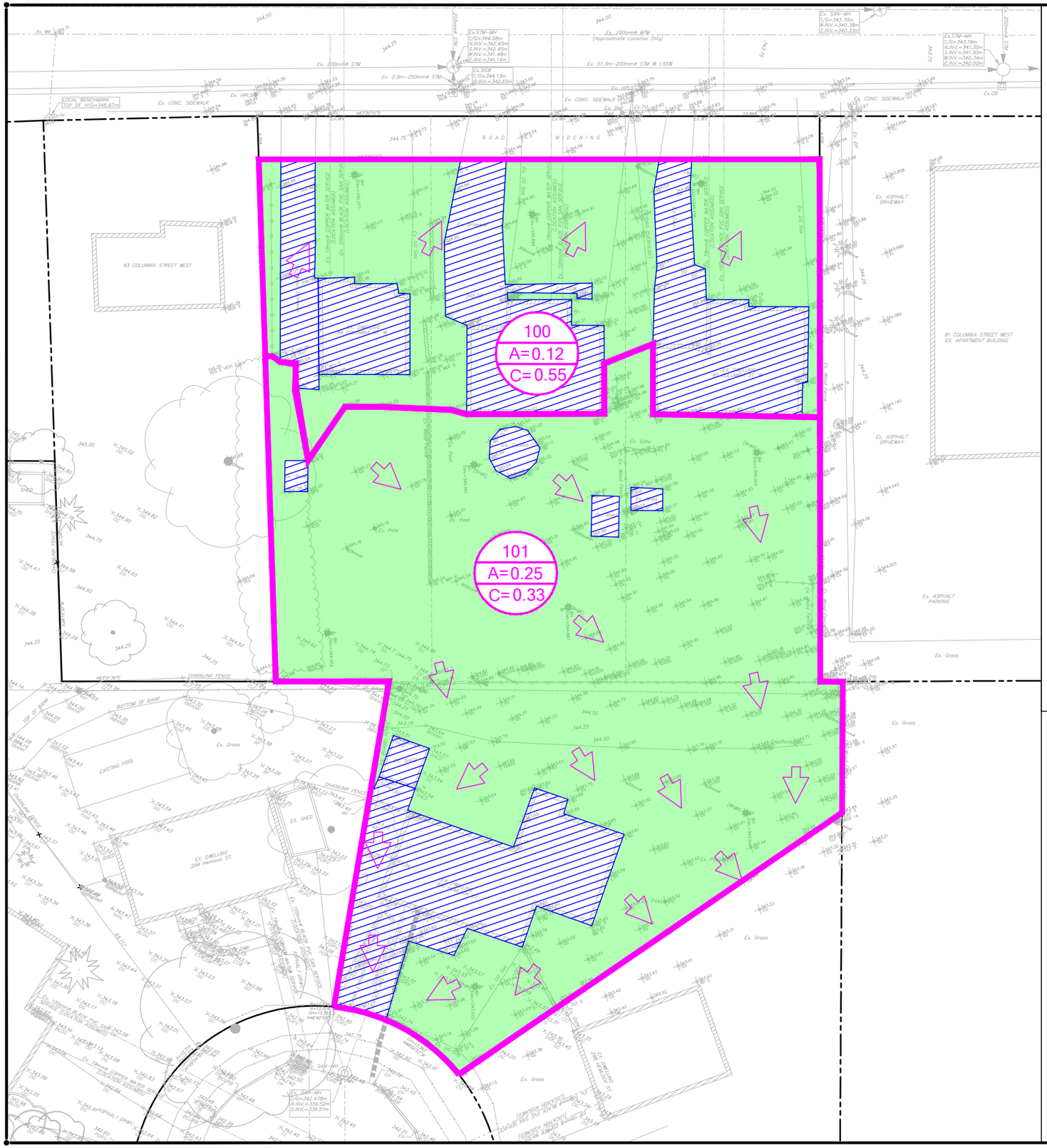
Return Period	a	b	c
2-Yr Event	1101	9.258	0.882
100-Yr Event	4692	17.437	0.956

In accordance with the City of Waterloo Engineering Manual, a runoff coefficient value of 0.25 was selected for pervious surfaces which is consistent with the value for Parks under 4.0 ha. A runoff coefficient value of 0.90 was selected for impervious surfaces. Based on the small size of the catchment area, a time of concentration of 10 minutes applies.

Based on the runoff coefficients, IDF Curve data, time of concentration and existing drainage areas shown on the Figure 2 - Existing Drainage Figure, the allowable release rate to Columbia and Hemlock Street is calculated as follows:

Area 100 (DWG EDP)- Towards Columbia Street West

Release Rate Type	Pre-Development	
Event	2-Yr Event	
Area	0.12	ha
Runoff Coefficient	0.55	dimensionless
Time of Concentration	10	min
Intensity	81.05	mm/hr



LEGEND

100
A=0.12
C=0.55

EXISTING DRAINAGE AREA ID

EXISTING DRAINAGE AREA (ha)

EXISTING DRAINAGE RUNOFF COEFFICIENT

EXISTING DRAINAGE AREA
=+/-3,700m²

EXISTING PERVIOUS AREA
=+/-2,800m²

EXISTING IMPERVIOUS AREA
=+/-900m²

REVISION BLOCK

#	DATE	DESCRIPTION

KWA SITE DEVELOPMENT CONSULTING INC.
2040 Lakeshore Rd.
Burlington, ON L7L 7A9

NORTH ARROW

METRIC SCALE

N.T.S

FIGURE 2 - EXISTING DRAINAGE PLAN

RESIDENTIAL DEVELOPMENT
89 COLUMBIA STREET
WATERLOO, ONTARIO

PROJECT No.21804 | DRAWN BY:BZ | CHECKED BY:CDB

Allowable Release Rate	15.0	L/s

Area 101 (DWG EDP)- Towards Hemlock Street West

Release Rate Type	Pre-Development	
Event	2-Yr Event	
Area	0.25	ha
Runoff Coefficient	0.33	dimensionless
Time of Concentration	10	min
Intensity	81.05	mm/hr
Allowable Release Rate	19.0	L/s

Therefore, the pre-development 2-year release rates to Columbia Street and Hemlock Street are **15 L/s** and **19 L/s** respectively.

Due to the grading constraints of the site and the impact of uncontrolled drainage on the allowable release rate, the preferred outlet for stormwater is towards Columbia Street to the north. Therefore, the 100-year post development release rate will be controlled to **15.0 L/s**. Controlling down to the 2-year pre-development release rate for all events is more stringent than the allowable criteria as described the Section 5.0 resulting in a conservative design.

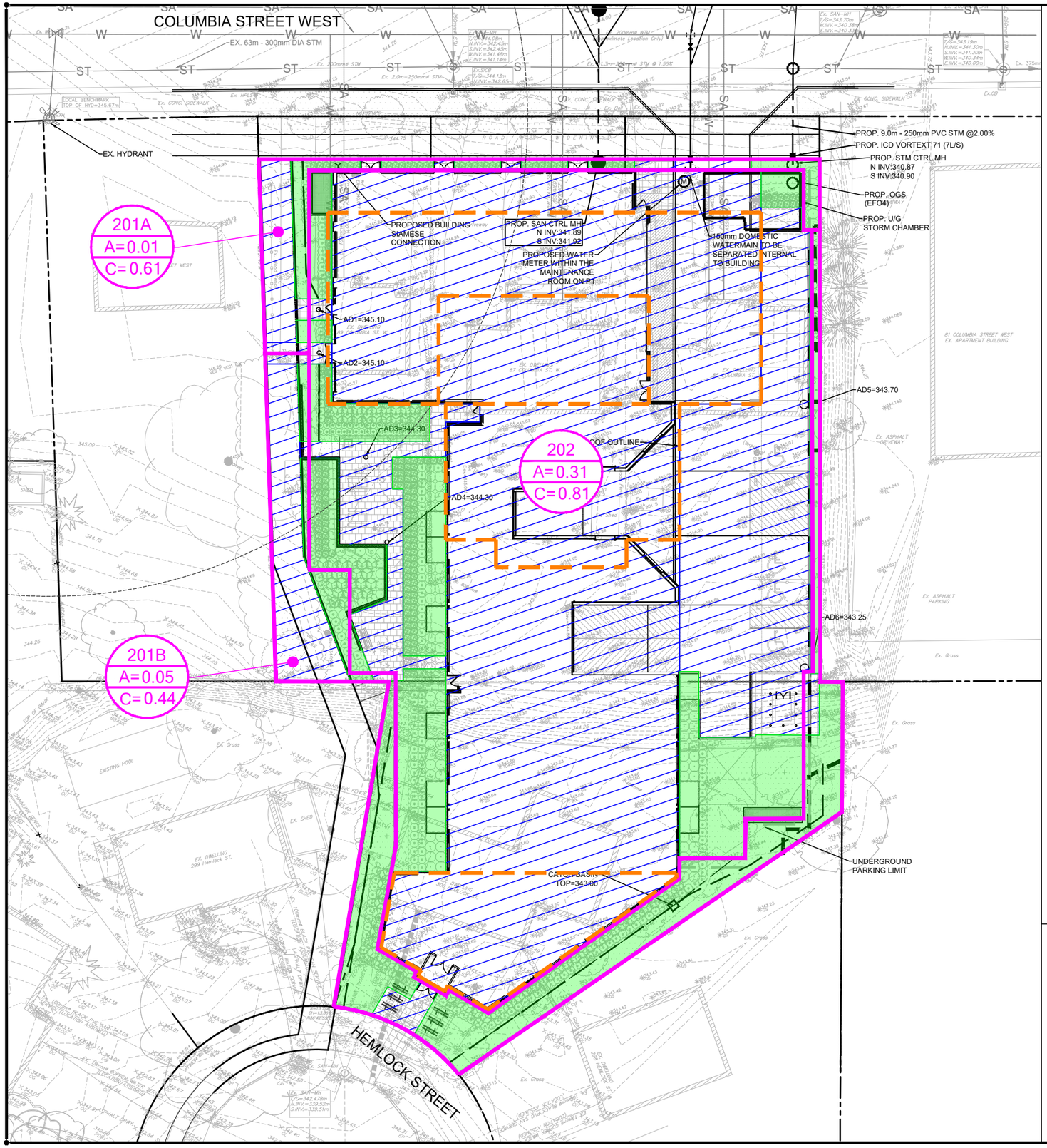
5.2 Proposed Conditions

The overall stormwater management strategy will capture runoff from the proposed 8-storey mixed-use building, roof, amenity area and associated above-ground parking areas into a proposed storage tank within the underground parking structure. The roof leaders will be controlled at a rate of 42 L/s/ha and connected directly to the underground mechanical system. The runoff will be discharged at a controlled rate to the municipal 200mm storm sewer on Columbia Street, and a portion will be retained for re-use. The remaining site area will drain uncontrolled to Columbia Street and Hemlock Street. These areas are predominantly landscaping where capture is difficult or not possible. Refer to Appendix D for the Site Grading Plan. Refer to Figure 3 – Proposed Drainage Figure.

5.2.1 Post Development Quantity Control

Under proposed conditions, the runoff from the proposed development will be captured and conveyed by the mechanical system through the proposed underground parking structure to a 250 mm diameter storm sewer. Approximately 0.01 ha of site area drains uncontrolled to Columbia Street resulting in a flow rate of **3.0 l/s** during the 100-year event. Subtracting the 100-year uncontrolled flow from the allowable 2-year release rate of 15.0 L/s gives us a controlled release rate of **12.0 L/s**.

The proposed building will utilize controlled roof drains that capture and convey stormwater up to the 100-year event to the underground chamber at a rate of 42L/s/ha. The total release rate for the 0.11 ha of controllable roof drainage is **5 L/s** with **56 m^3** of required storage. The remaining 0.20 ha of stormwater captured by the onsite area drains will be attenuated by a Tempest inlet



LEGEND

202
A=0.31
C=0.81

PROPOSED DRAINAGE AREA ID

PROPOSED DRAINAGE AREA (ha)

PROPOSED DRAINAGE RUNOFF COEFFICIENT

PROPOSED DRAINAGE AREA
=+/-3,700m²

PROPOSED PERVIOUS AREA
=+/-850m²

PROPOSED IMPERVIOUS AREA
=+/-2,850m²

PROPOSED ROOF STORAGE AREA
=+/-1,100m²

REVISION BLOCK

#	DATE	DESCRIPTION

KWA SITE DEVELOPMENT CONSULTING INC.
2453 Auckland Drive
Burlington, ON L7L 7A9

NORTH ARROW

METRIC SCALE

N.T.S

FIGURE 3 -
PROPOSED DRAINAGE PLAN

RESIDENTIAL DEVELOPMENT
89 COLUMBIA STREET

WATERLOO, ONTARIO

PROJECT No:21664 | DRAWN BY:BC2 | CHECKED BY:CDB

3

control device at a rate of **7.0 L/s** during the 100-year event with **94 m³** of underground storage upstream. The proposed ICD will provide flow control while using a larger orifice than a conventional orifice plate, making it less likely to clog. All rational method and runoff coefficient calculations can be found in the Appendix C.

TABLE 7 – 100 YEAR STORMWATER MANAGEMENT DESIGN

Area ID	Area (ha)	Runoff Coefficient	t_c (min)	Storage Available (m3)	Storage Required (m3)	Release Rate (m3/s)	Description	Release Rate (m3/s)
202-ROOF	0.20	0.81	10	0	94	0.007	Tempest ICD	0.007
ROOF	0.11	0.90	10	66	56	0.005	Controlled Roof @ 42 L/s/ha	0.005
201A	0.01	0.61	10	0	N/A	0.003		0.003
	0.31			66	150	0.015		

The associated storage requirements will be achieved in an underground stormwater management tank. The locations of the ICD can be found on the Site Servicing Plan and detailed calculations and underground storage volumes can be found in the Appendix.

In addition to drainage being directed to Columbia Street, there is also a small 0.05 ha area of uncontrolled drainage that will convey uncontrolled to Hemlock Street, see Area 201B on the Proposed Drainage Plan. As shown in the appendix calculations, the 100-year release rate for this uncontrolled drainage is **12.1 L/s** which is less than the allowable rate to Hemlock Street of 19.0 L/s calculated previously.

Therefore, the proposed stormwater drainage during a 100-year storm event is controlled to the 2-year pre-development release rates for both outlets.

5.2.2 QUALITY CONTROL

For the purpose of quality control, the entire property area of 0.37 ha is considered as the 'subject site'. Approximately 0.05 ha and 0.01 ha of drainage area from landscaping and walkways drains uncontrolled to Hemlock Street and Columbia Street respectively, leaving 0.31 ha of captured stormwater drainage for treatment.

The proposed rooftop, ground level landscaping and pedestrian walkways cover 0.26 ha of the captured drainage area and can be considered "clean" and receive a TSS removal credit of 80%. The remaining 0.05 ha of runoff from the main drive aisle will require treatment to achieve 80% TSS removal for the entire site. All stormwater captured in onsite area drains will be conveyed to the stormwater management tank within the underground, and then to a quality control structure located downstream of the Tempest inlet control device. Given a 50% TSS removal credit for an oil grit separator, the total TSS removal for the stormwater effluent can be calculated as follows:

Efficiency (%) = [(1-(100%-80%)*50%)*CleanArea + 50%*DirtyArea]÷TotalArea
= [90%*0.26ha + 50%*0.05ha] ÷ 0.31ha
= 84%

Therefore, a quality control structure providing 80% TSS removal (credited with 50%) will provide 84% TSS removal for the subject site and therefore meets the MOE Enhanced Level 1 quality control criteria. Based on a drainage area of 0.31 ha and a runoff coefficient of 0.81, the quality structure has been sized as an EFO-8 stormceptor or equivalent, refer to the calculations in Appendix C.

5.2.3 WATER BALANCE

The subject site is mostly covered by an underground parking structure and there are limited opportunities for infiltration. However, stormwater re-use may be a feasible option. As informed by the landscape architects, approximately 12.39 m^3 of water will be required for irrigation over a 7-day period in the growing season (May – September). This is equivalent to retention of 3mm of rainfall over the entire site area.

6.0 CONCLUSIONS

Based on the information presented in this report, the site will be serviced as follows:

Water Servicing

The proposed buildings will be serviced by extending a new 200 mm water service from the existing 200 mm diameter mainline watermain in Columbia Street West. The existing services to the properties will be abandoned according to municipal standards. The fire flows for the subject property will be provided by an existing hydrant on Columbia Street. The expected water demand is 174.9 L/s (Maximum Day + Fire Flow) and the theoretical flow available at 20 psi is 278.3 L/s.

Sanitary Servicing

The proposed buildings will be serviced by extending a new 200 mm water service from the existing 200 mm diameter mainline watermain in Columbia Street West. The existing services to the properties will be abandoned according to municipal standards. The expected additional peak sanitary discharge is 3.29 L/s

Stormwater Management

The stormwater quantity requirements will be met by installing a Tempest Inlet Control Device to control post development runoff from the new impervious areas down to the 2-year pre-development level. The associated storage requirements will be provided in a stormwater management tank within the underground parking structure.

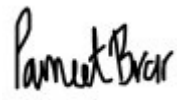
An EFO-4 stormceptor or equivalent structure will provide quality control for the captured stormwater drainage to provide a minimum 80% TSS removal.

The proposed development is not suitable for infiltration measures and therefore water balance objectives are not recommended.

We trust that this information is adequate to support the site plan approval of this project. If you have any questions, please don't hesitate to call.

Regards,

KWA Site Development Consulting Inc.





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Appendix A

Water Demand Calculations

Water Demand

Project Name:	Louie Condomium 2
Project Number:	21664
Location:	Waterloo, Ontario
Date:	11/2/2021
Prepared By:	BJ

Average Daily Demand

Source:	Region DGSSMS 2018	
Residential Average Daily Demand:	225.0	Litres / capita / day
Commercial Average Daily Demand:	0.5	Litres /second/hectare

Peaking Factor

Source:	Region DGSSMS 2018	
Units:	136	
Population:	252	(Units*1.76 PPU)
area (commercial):	0.034	(hectare)
Max Day (res):	3.6	MOE Design Guidelines for Drinking-Water Systems 2008
Peak Hour (res):	5.4	MOE Design Guidelines for Drinking-Water Systems 2008
Max Day (comm):	2.5	Region DGSSMS 2018
Peak Hour (comm):	2.5	Region DGSSMS 2018

Peak Flows

Max Day:	2.36	Litres / second
Peak Hour:	3.54	Litres / second

Fire Underwriters Survey - Fire Demand Calculations

Project Name: Louie Condominium 2
Project Number: 21664
Location: Waterloo, Ontario
Date: 3/1/2022
Prepared By: PB

Guide for Determination of Required Flow Copyright I.S.O

Building Information					System Type							Contents Information		Exposure Charge												Unadjusted Flow (F=220C sqrt A)			Correction Factors				Required Flow	
														East			West			North			South										
Building	NBC Occupancy	Total Floor Area (m^2)	# of Storeys	Construction Class	NFPA 13 Sprinkler	Credit	Standard Water Supply	Credit	Fully Supervised	Credit	**Total Credits**	Contents Factor	**Contents Charge**	Distance (m)	L-Ht^2 (ft)	Charge	Distance (m)	L-Ht^2 (ft)	Charge	Distance (m)	L-Ht^2 (ft)	Charge	Distance (m)	L-Ht^2 (ft)	Charge	**Total Charges (Maximum 75%)**	C	A (m^2)	**F (L/min)**	Occupancy	FF Adjusted for Occupancy	Sprinkler Decrease	Exposure Charge	**L/min**	**L/s**
BLDG	C	2844.87	8*	NC	YES	30%	YES	10%	YES	10%	**50%**	C	**0%**	16	over 120	15%	10	over 120	20%	35	over 120	5%	20	over 120	25%	65%	0.8	2844.87	**9000**	0	9000	4500	65%	**10350**	**172.5**
																																	Total:	**172.5**

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

*Total Floor Area based on 1st Floor +25% of 2 adjoining floors

where
F = the required fire flow in litres per minute.
C = coefficient related to the type of construction.
= 1.5 for wood frame construction (structure essentially all combustible).
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior).
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls).
= 0.6 for fire-resistive construction (fully protected frame, floors, roof).

A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building being considered.

Legend

Construction Class
- WF wood frame construction
- OC ordinary construction
- NC non-combustible construction
- FC fire-resistive construction

Contents Factor
- NC non-combustible
- LC limited combustible
- C combustible
- FB free burning
- RB rapid burning

Calculation Notes:
1 Includes all storeys, but excluding basements at least 50% below grade in the building being
2 Length - Height of Facing Wall of Exposure Building determined by multiplying the length of the facing wall of the exposure in feet by the height of the exposure in stories.
3 Maximum exposure charge = 75%
4 Round to Nearest 1,000 L/min

Non-Combustible	-25%	Free Burning	+15%
Limited Combustible	-15%	Rapid Burning	+25%
Combustible	No Charge		

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

Lozzi Aqua Check

4820 18th Sideroad

Schomberg, Ontario

L0G-1T0

Massimo Lozzi Cell: 416 990-2131

E-mail: lozziaquacheck@gmail.com

Hydrant Flow Test Form

Job Location: 93 Columbia St W,Waterloo

Date: October 13,2020

Test Date

Time of Test: 8:00 am

Location of Flow Hydrant: 93 Columbia St W.

Residual hydrant: in front of 81 Columbia St W.

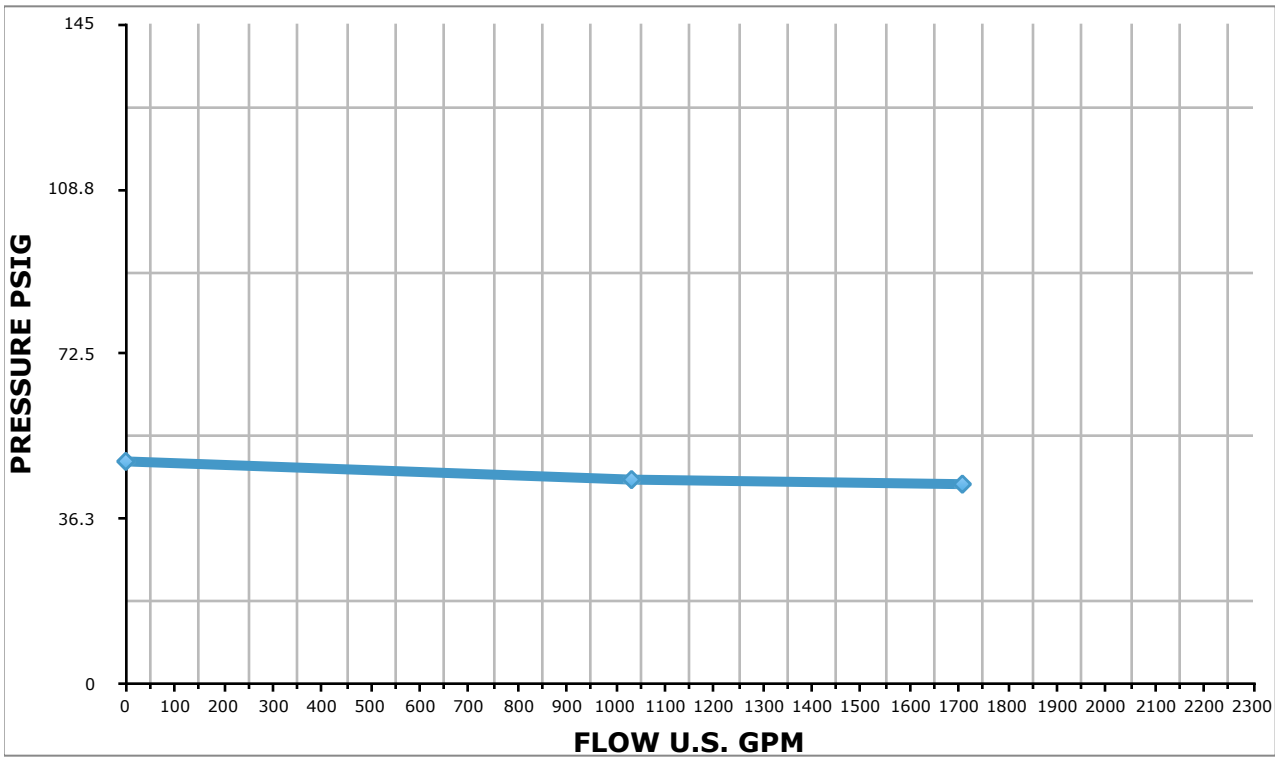
Main Size:

Static Pressure: 49 psi

Theoretical GPM at 20 psi - 4411 gpm

	Number of Outlets & Orifice Size	Pitot Pressure (psi)	Flow (U.S. G.P.M.)	Residual Pressure (psi)
1.	Static	0	0	49
2.	1 x 2 ½	38	1032	45
3.	2 x 2 ½	26	1707	44

Note :Flow test conducted in accordance with NFPA Std 294



Appendix B

Sanitary Demand Calculations

Sanitary Demand

Project Name:	Louie Condominium 2
Project Number:	21664
Location:	Waterloo
Date:	2-Nov-21
Prepared by:	

Total Site Area	0.37	ha

Equivalent Population based on per unit density			
Type of Development	**Units**	**Persons/ unit**	**Persons**
BLDG A	136	1.85	252

Residential Demand (L/s)

Average Flow (Lpcd)	275	Region DGSSMS 2018 3.1.2.1
Population	252	
Demand (L/s)	0.80	

Peaking Factor

Harmon Peaking Factor	4.1	Region DGSSMS 2018 3.1.2.1

RESIDENTIAL FLOW (L/s)	3.30

Commercial Areas

General (m2)	340.0
TOTAL (m2)	**340**

Demand (L/s)

Average Flow (litres/second/hectare)	0.5	
Peaking Factor	2.50	Region DGSSMS 2018 3.1.2.3
Commercial Flow (L/s)	0.04	

FINAL FLOW (L/s)	3.34

Note: Extraneous flows shall not be considered when underground levels cover the majority of development site and there is no opportunity for inflow of stormwater to the sanitary system.

Appendix C

Stormwater Management Calculations

Rational Method - Allowable Release Rate to Columbia Street

Area =	0.12	ha
R =	0.55	
AR =	0.066	
T =	10	min
T =	0.167	hours

Storm	A	B	C
2	1101.0	9.258	0.882
5	1755.0	12.347	0.895
100	4692.0	17.437	0.956

Storm	Rainfall Intensity (mm/hr)	Peak Flow (cms)
2	81	0.015
5	109	0.020
100	198	0.036

Rational Method - Allowable Release Rate to Hemlock Street

Area =	0.25	ha
R =	0.33	
AR =	0.0825	
T =	10	min
T =	0.167	hours

Storm	A	B	C
2	1101.0	9.258	0.882
5	1755.0	12.347	0.895
100	4692.0	17.437	0.956

Storm	Rainfall Intensity (mm/hr)	Peak Flow (cms)
2	81	0.019
5	109	0.025
100	198	0.045

Modified Rational Calculation

Project Name: Louie Condominium 2
Project Number: 21664

Rainfall Data			
Location:	Region of Waterloo	a	4692
Event	100-year	b	17.437
		c	0.956

Area ID	Area (ha)	Runoff Coefficient	t_c (min)	Storage Available (m3)	Storage Required (m3)	Release Rate (m3/s)	Description	Orifice Size (mm)	Orifice Release Rate (m3/s)
202-ROOF	0.20	0.81	10	0	94	0.007	Tempest ICD	71	0.007
ROOF	0.11	0.90	10	66	56	0.005		0	0.005
201A	0.01	0.61	10	0	N/A	0.003		0	0.003
	0.32			66	150	0.015			

NOTES:
Area ROOF is rooftop flow controlled to an assumed depth of 6cm and a release rate of 42 L/s/ha
IPEX Tempest ICD 71 for Area 202 controls Area's 202, A to D
Area 201 A is uncontrolled flow to Columbia Street West

Modified Rational **Area:** **202-ROOF**

Project Name: Louie Condominium 2
Project Number: 21664

Rainfall Data			
Location:	Region of Waterlo	a	4692.000
Event	100-year	b	17.437
		c	0.956

Site Data		
Area	0.20	ha
Runoff Coefficient	0.81	
AC	0.16	
Tc	10	
Time Increment	10	
Release Rate	7	l/s
Storage Required	94	m^3

Time (min)	Rainfall Intensity (mm/hr)	Storm Runoff (m3/s)	Runoff Volume (m3)	Released Volume (m3)	Storage Volume (m3)	
10	198	0.09	53	4	49	
20	147	0.07	79	8	71	
30	117	0.05	95	13	82	
40	98	0.04	106	17	89	
50	84	0.04	113	21	92	
60	73	0.03	119	25	94	
70	65	0.03	124	29	94	********
80	59	0.03	127	33	94	
90	54	0.02	130	38	93	
100	49	0.02	133	42	91	
110	46	0.02	135	46	90	
120	42	0.02	137	50	87	
130	40	0.02	139	54	85	
140	37	0.02	141	58	82	
150	35	0.02	142	63	80	
160	33	0.01	144	67	77	
170	32	0.01	145	71	74	
180	30	0.01	146	75	71	
190	29	0.01	147	79	68	
200	27	0.01	148	83	64	
210	26	0.01	149	88	61	

Modified Rational **Area:** **ROOF**

Project Name: Louie Condominium 2
Project Number: 21664

Rainfall Data			
Location:	Region of Waterlo	a	4692.000
Event	100-year	b	17.437
		c	0.956

Site Data		
Area	0.11	ha
Runoff Coefficient	0.90	
AC	0.10	
Tc	10	
Time Increment	10	
Release Rate	5	l/s
Storage Required	56	m^3

Time (min)	Rainfall Intensity (mm/hr)	Storm Runoff (m3/s)	Runoff Volume (m3)	Released Volume (m3)	Storage Volume (m3)	
10	198	0.05	33	3	30	
20	147	0.04	49	6	43	
30	117	0.03	58	8	50	
40	98	0.03	64	11	53	
50	84	0.02	69	14	55	
60	73	0.02	73	17	56	
70	65	0.02	76	19	56	********
80	59	0.02	78	22	56	
90	54	0.01	80	25	55	
100	49	0.01	81	28	54	
110	46	0.01	83	30	52	
120	42	0.01	84	33	51	
130	40	0.01	85	36	49	
140	37	0.01	86	39	47	
150	35	0.01	87	42	45	
160	33	0.01	88	44	43	
170	32	0.01	88	47	41	
180	30	0.01	89	50	39	
190	29	0.01	90	53	37	
200	27	0.01	90	55	35	
210	26	0.01	91	58	33	

Rational Method - Uncontrolled Release Rate to Columbia Street

Area =	0.01	ha
R =	0.61	
AR =	0.0061	
T =	10	min
T =	0.167	hours

Storm	A	B	C
2	1101.0	9.258	0.882
5	1755.0	12.347	0.895
100	4692.0	17.437	0.956

Storm	Rainfall Intensity (mm/hr)	Peak Flow (cms)
2	81	0.001
5	109	0.002
100	198	0.003

Rational Method - Uncontrolled Release Rate to Columbia Street

Area =	0.05	ha
R =	0.44	
AR =	0.022	
T =	10	min
T =	0.167	hours

Storm	A	B	C
2	1101.0	9.258	0.882
5	1755.0	12.347	0.895
100	4692.0	17.437	0.956

Storm	Rainfall Intensity (mm/hr)	Peak Flow (cms)
2	81	0.005
5	109	0.007
100	198	0.012

TEMPEST Product Submittal Package



Date: October 27, 2021

Customer: KWA Site Development Consulting

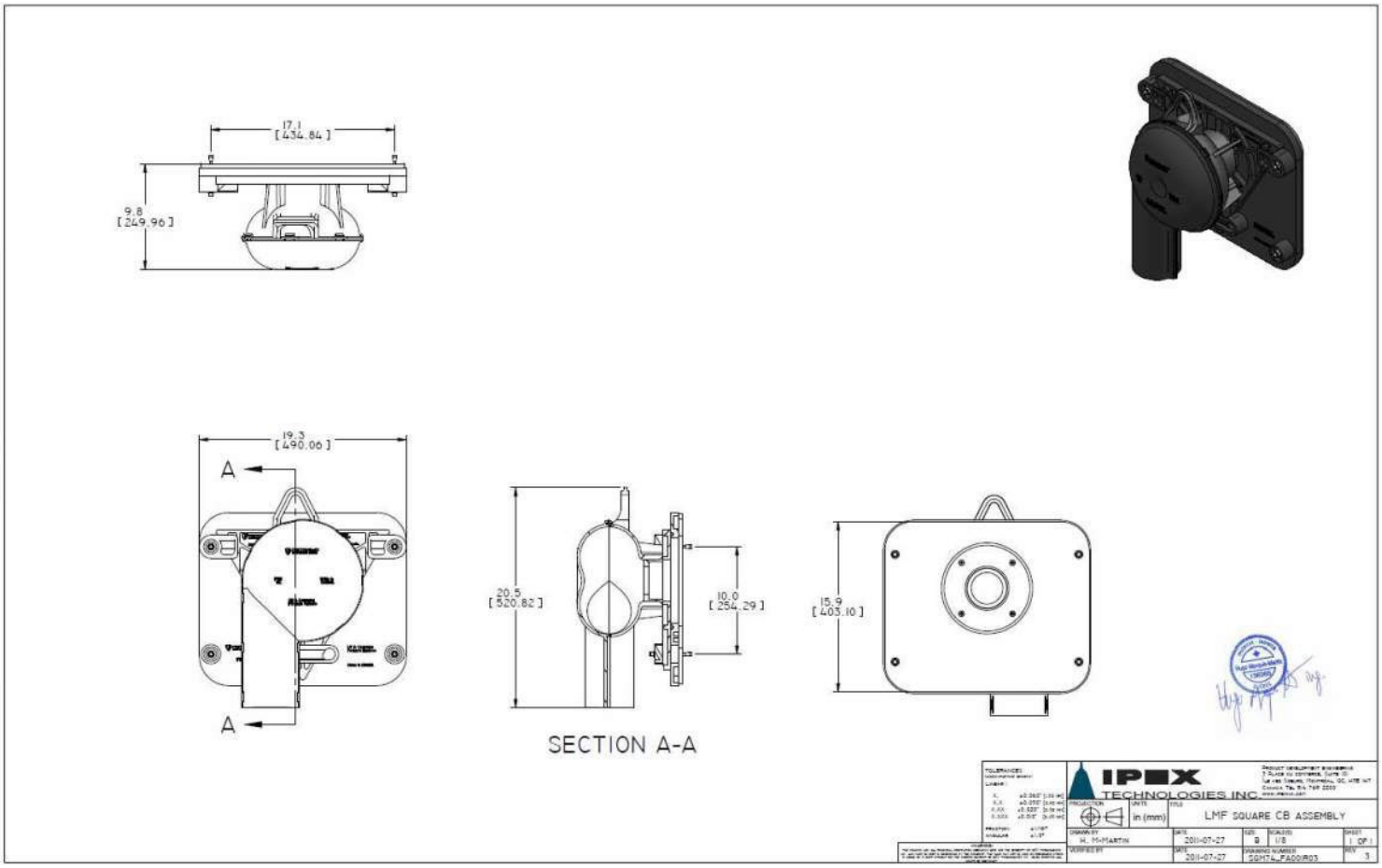
Contact: Ben Jackson

Location: Waterloo

Project Name: Columbia Condo 2

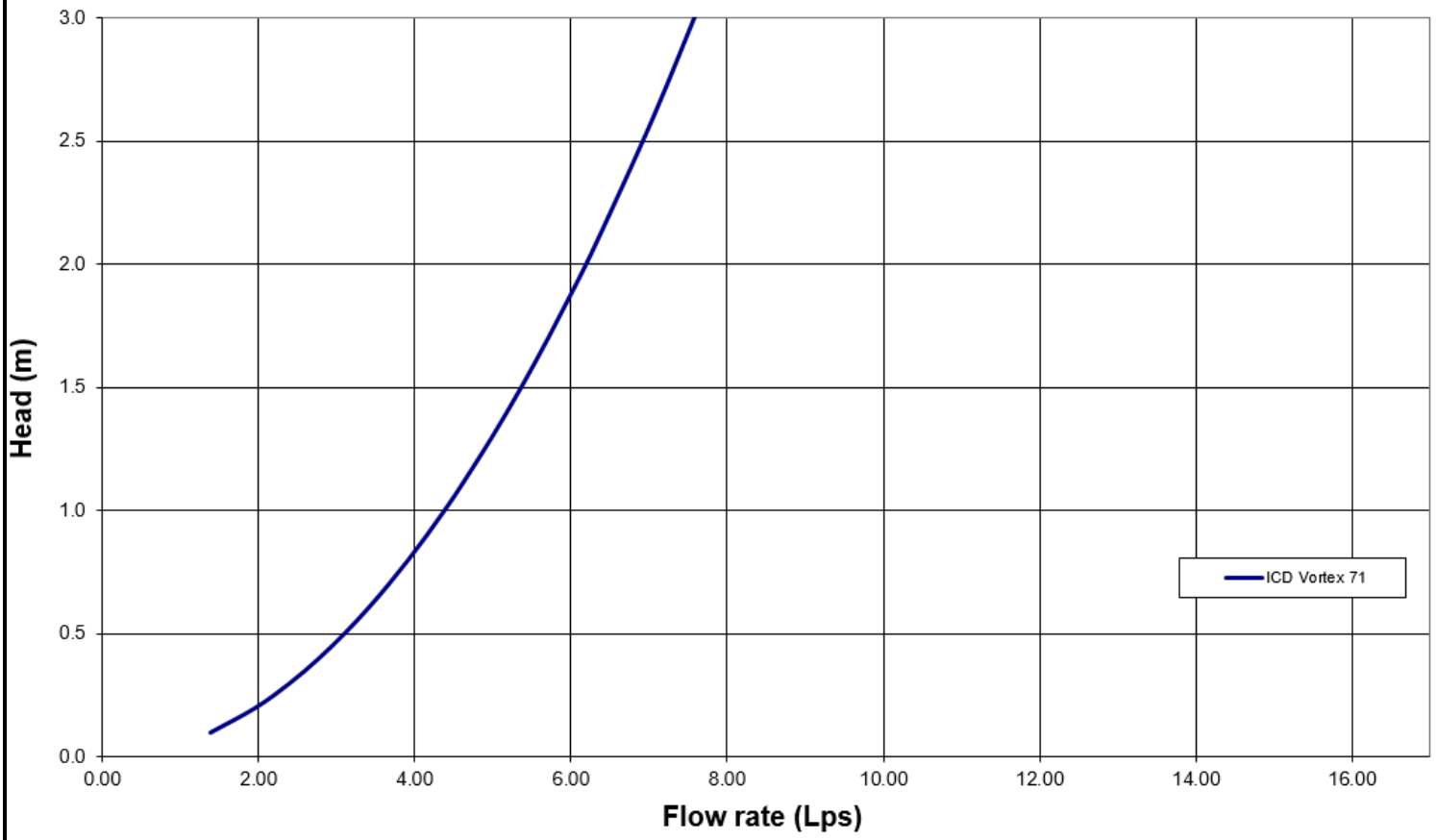
IPEX

<u>Tempest LMF ICD Sq</u> Shop Drawing



Tempest LMF ICD Flow Curve

Flow: **7.0 L/s**
Head: **2.5 m**

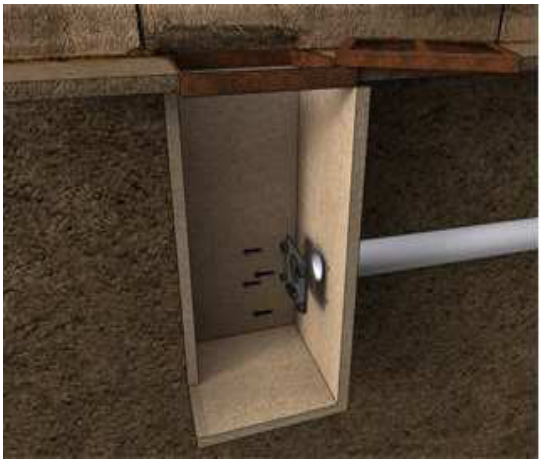


IPEX

Square CB Installation Notes:

1. Materials and tooling verification:
   - Tooling: impact drill, 3/8'' concrete bit, torque wrench for 9/16''nut, hand hammer, level, and marker.
   - Material: (4) concrete anchor 3/8x3-1/2, (4) washers, (4) nuts
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8'' concrete bit to make the four holes at a minimum of 1-1/2'' depth up to 2-1/2''. Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Put the nuts on the top of the anchors to protect the threads when you will hit the anchors with the hammer. Remove the nuts on the ends of the anchors
5. Install the wall mounting plate on the anchors and screw the nut in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From ground above using a reach bar, lower the device by hooking the end of the reach bar to the handle of the LMF device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the wall mounting plate and has created a seal.





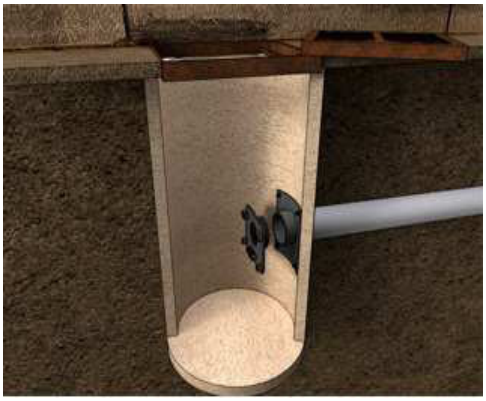


IPEX

Round CB Installation Notes: (Refer to square install notes above for steps 1 , 3, & 4)

2. Use spigot catch basin wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
5. Install the CB spigot wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lb-ft). There should be no gap between the CB spigot wall plate and the catch basin wall.
6. Apply solvent cement on the hub of the universal mounting plate and the spigot of the spigot CB wall plate. Slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the universal mounting plate hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered into the mounting plate and has created a seal.






CAUTION/WARNING/DISCLAIM:

- Verify that the inlet(s) pipe(s) is not protruding into the catch basin. If it is, cut it back so that the inlet pipe is flush with the catch basin wall.
- Any required cement in the installation must be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Please refer to the IPEX solvent cement guide to confirm required curing times or attend the IPEX **Online Solvent Cement Training Course**.
- Call your IPEX representative for more information or if you have any questions about our products.

IPEX

IPEX TEMPEST Inlet Control Devices Technical Specification

General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control where specified. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook will be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above must not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices will consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's must have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

All hardware will be made from 304 stainless steel.

Dimensioning

The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

IPEX

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

11/02/2021

Province:	Ontario
City:	Waterloo
Nearest Rainfall Station:	WATERLOO WELLINGTON AP
Climate Station Id:	6149387
Years of Rainfall Data:	34
Site Name:	
Drainage Area (ha):	0.31
Runoff Coefficient 'c':	0.81
Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	
Estimated Water Quality Flow Rate (L/s):	10.00
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	7.00
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Project Name:	Louie Condominium 2
Project Number:	46825
Designer Name:	Ben Jackson
Designer Company:	KWA
Designer Email:	ben.jackson@kwasitedev.com
Designer Phone:	416-984-0970
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	80
EFO6	89
EFO8	92
EFO10	93
EFO12	93

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 80

Water Quality Runoff Volume Capture (%): > 90

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

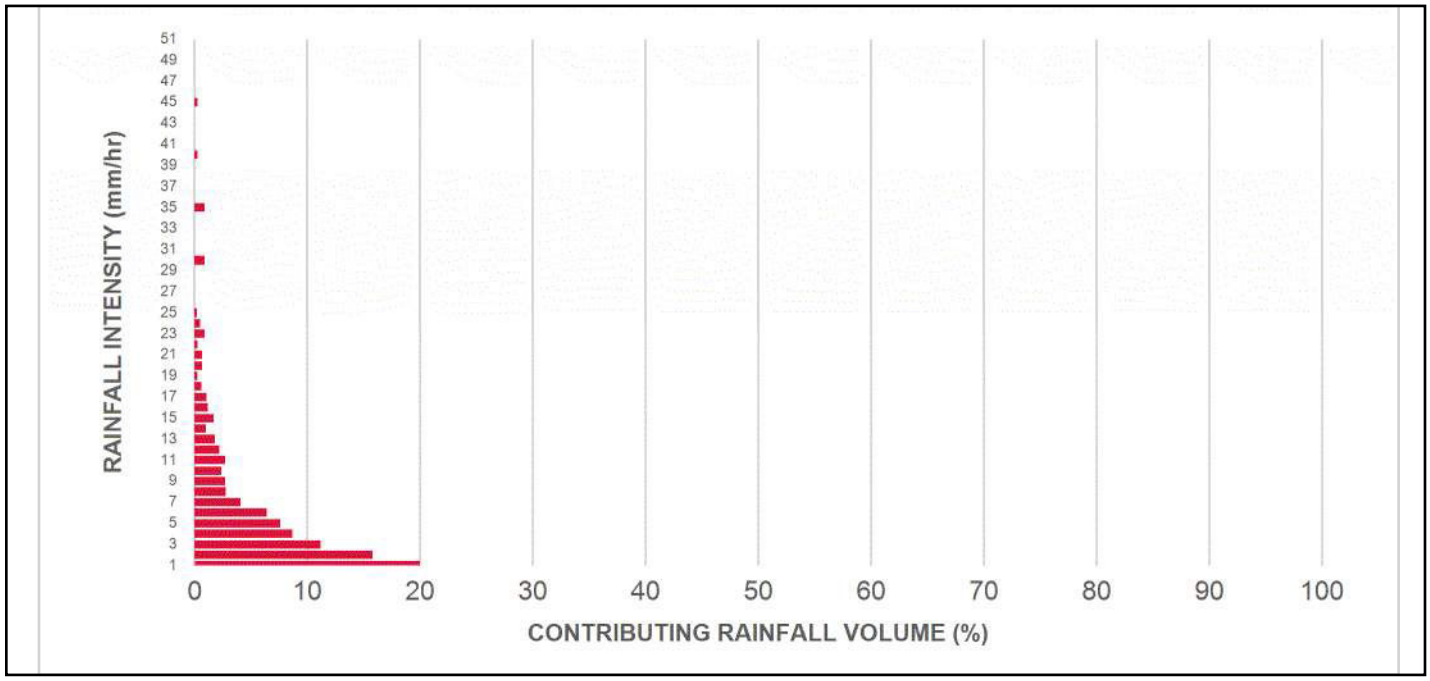
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

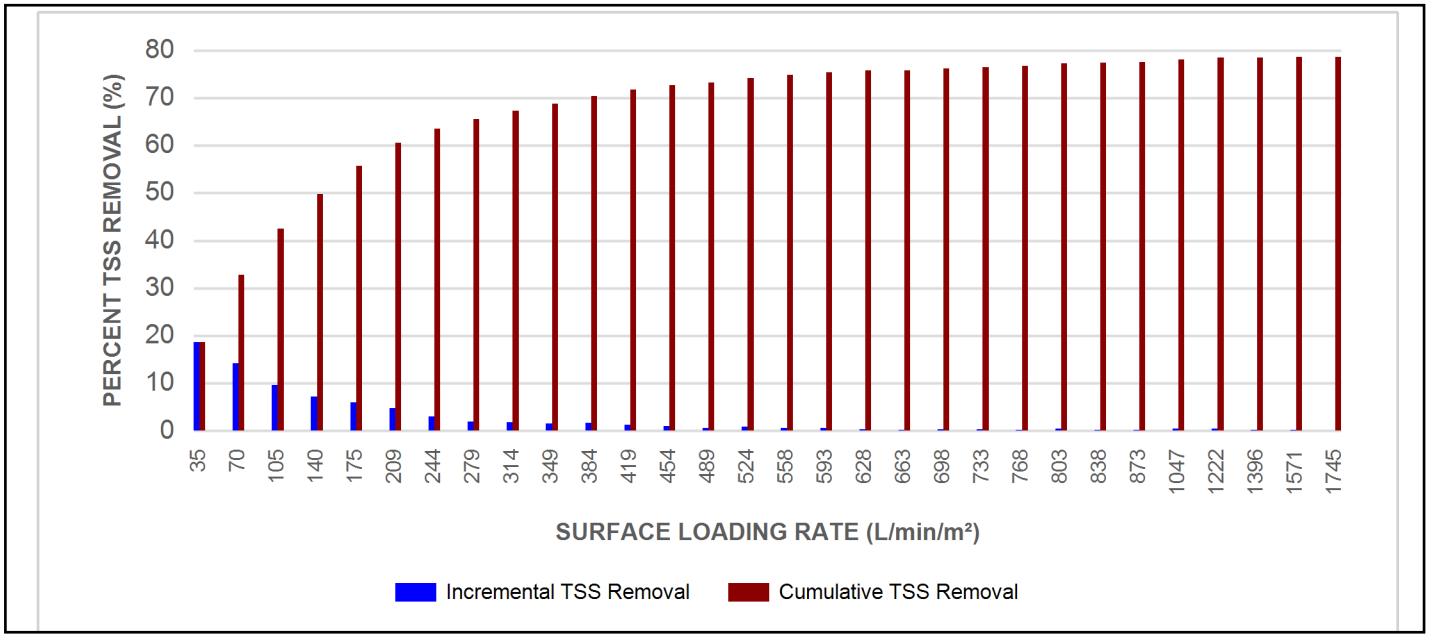
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	20.0	20.0	0.70	42.0	35.0	93	18.6	18.6
2	15.8	35.8	1.40	84.0	70.0	90	14.2	32.8
3	11.2	47.0	2.09	126.0	105.0	87	9.7	42.5
4	8.7	55.7	2.79	168.0	140.0	83	7.2	49.7
5	7.6	63.3	3.49	209.0	175.0	79	6.0	55.7
6	6.4	69.7	4.19	251.0	209.0	75	4.8	60.5
7	4.1	73.8	4.89	293.0	244.0	72	3.0	63.5
8	2.8	76.7	5.58	335.0	279.0	69	1.9	65.5
9	2.7	79.4	6.28	377.0	314.0	66	1.8	67.3
10	20.6	100.0	6.98	419.0	349.0	63	12.9	80.2
11	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
12	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
13	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
14	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
15	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
16	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
17	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
18	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
19	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
20	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
21	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
22	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
23	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
24	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
25	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
30	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
35	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
40	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
45	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
50	0.0	100.0	7.00	420.0	350.0	63	0.0	80.2
Estimated Net Annual Sediment (TSS) Load Reduction =								**80 %**

Climate Station ID: 6149387 *Years of Rainfall Data*: 34

RAINFALL DATA FROM WATERLOO WELLINGTON AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

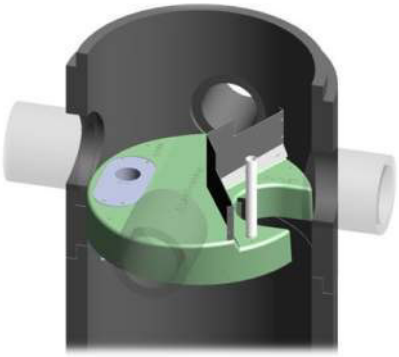
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

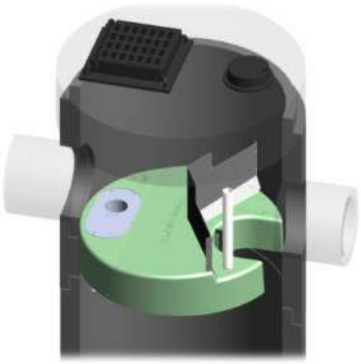
DESIGN FLEXIBILITY

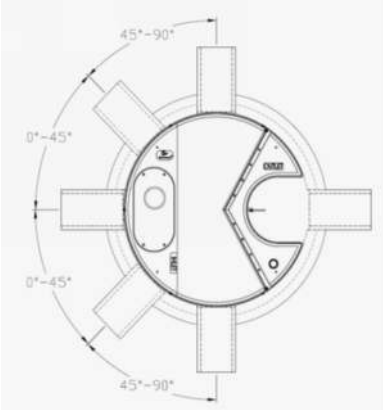
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing shall be determined using historical rainfall data and a sediment removal performance curve derived from the actual third-party verified laboratory testing data. The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

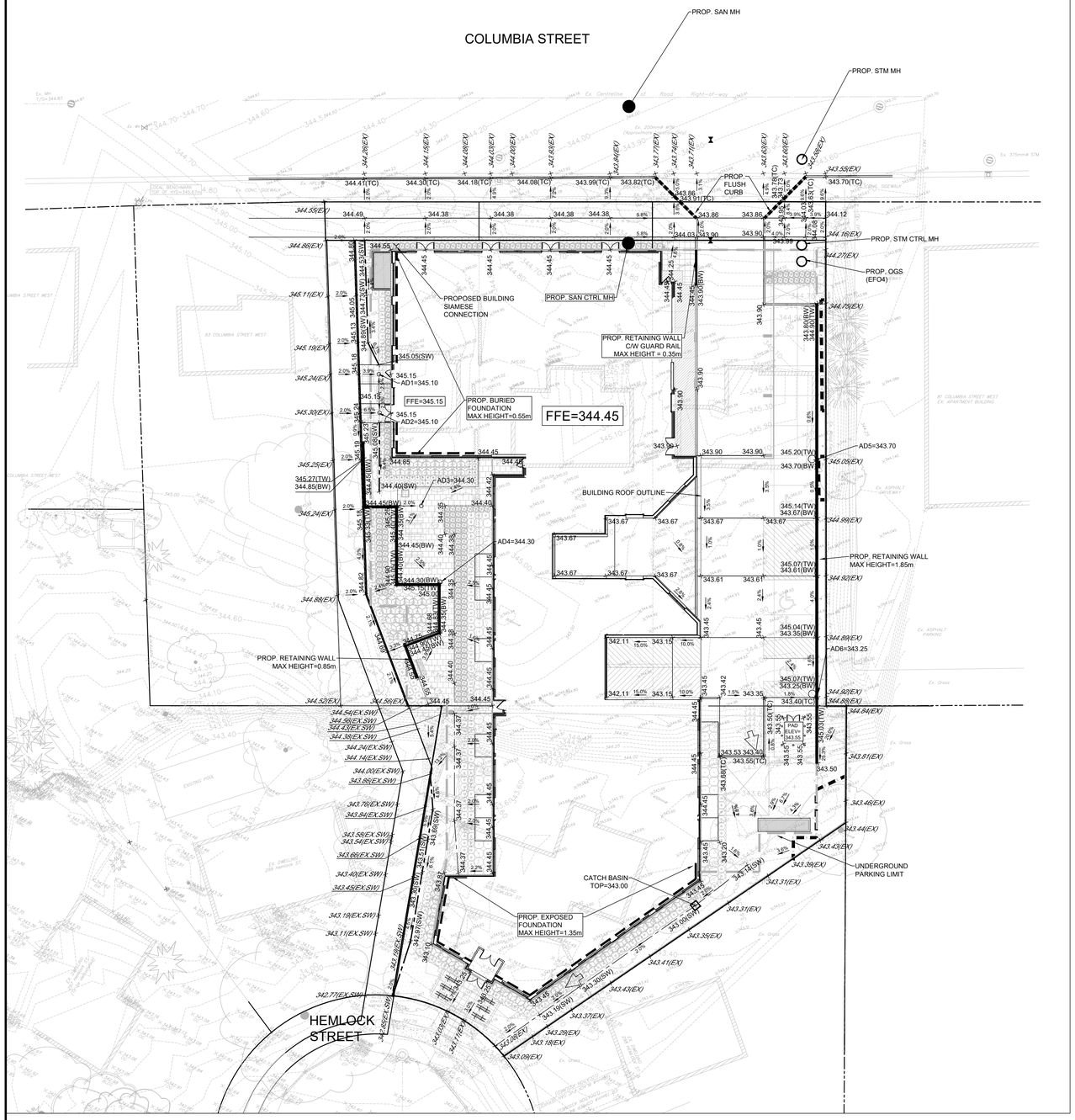
3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m2 to 2600 L/min/m2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

Appendix D

Proposed Drawings



BENCHMARK NOTE:

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DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999560.

GENERAL NOTES

1. ALL WORK WITHIN THE CITY RIGHT-OF-WAY SHALL BE CONSTRUCTED ACCORDING TO THE LATEST CITY OF WATERLOO AND WATERLOO REGION STANDARD DRAWINGS AND SPECIFICATIONS, ONTARIO PROVINCIAL STANDARD DRAWINGS AND SPECIFICATIONS MAY, SUBJECT TO THE APPROVAL OF THE CITY OF WATERLOO, BE USED WHERE NO CITY STANDARD OR SPECIFICATION IS AVAILABLE.
2. ALL WORK SHALL BE COMPLETED ACCORDING TO THE CURRENT OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS. THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.
3. ALL MATERIALS FOR SEWER, WATERMAIN AND APPURTENANCES, SHALL BE ACCORDING TO CITY OF WATERLOO'S ACCEPTABLE PRODUCTS LIST IN THE STANDARD CONTRACT DOCUMENTS FOR MUNICIPAL CONSTRUCTION.
4. ALL SURVEY STAKE LAYOUT POINTS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE LAYOUT SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER.
5. ALL DIMENSIONS ARE EXPRESSED IN METERS(m) AND PIPE SIZES ARE EXPRESSED IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.
6. ALL TEMPORARY CONSTRUCTION FENCING, TRAFFIC CONTROL AND SIGNAGE DURING CONSTRUCTION (INCLUDING ALL NECESSARY SIGNALS, SIGNS, DELINEATORS, MARKERS AND BARRIERS) SHALL BE IN ACCORDANCE WITH CURRENT ONTARIO TRAFFIC MANUAL BOOK 7: TEMPORARY CONDITIONS FIELD EDITION.
7. INFORMATION REGARDING ALL EXISTING UNDERGROUND UTILITIES AND SERVICES SHOWN ON THE DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS AND/OR AVAILABLE HISTORICAL DRAWINGS. THE ACCURACY OF THIS INFORMATION HAS NOT BEEN CONFIRMED BY KWA SITE DEVELOPMENT CONSULTING AND ALL UNDERGROUND INFORMATION NEEDS TO BE VERIFIED IN THE FIELD PRIOR TO BIDDING AND CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE TO ACQUIRE ALL UTILITY LOCATES PRIOR TO CONSTRUCTION AND TO NOTIFY THE ENGINEER OF ANY DISCREPANCIES. ANY LOST TIME DUE TO FAILURE TO IDENTIFY DISCREPANCIES OR NOTIFY THE ENGINEER SHALL BE AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING INFRASTRUCTURE.
8. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE ALL REQUIRED INSPECTIONS WITH THE CITY OF WATERLOO AND ANY OTHER REGULATORY AGENCIES. ALL WORK ON CITY EASEMENTS OR RIGHT-OF-WAY AND ALL WATERMAIN WORK SHALL BE INSPECTED BY THE CITY PRIOR TO BACKFILLING.
9. CONTRACTOR IS RESPONSIBLE TO SUPPLY AND INSTALL ALL NECESSARY CONSTRUCTION FENCING.
10. THIS DRAWING SET SHOULD BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANT'S PLANS AND ANY DISCREPANCIES REPORTED TO THE ENGINEER PRIOR TO CONSTRUCTION.
11. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION AND ANY DISCREPANCIES REPORTED TO THE ENGINEER.
12. NO SUBSTITUTIONS SHALL BE ALLOWED WITHOUT ENGINEERS APPROVAL AND ACCEPTANCE BY THE CITY OF WATERLOO.
13. ALL DISTURBED AREAS ON PRIVATE LANDS SHALL BE REPAIRED TO ORIGINAL CONDITION OR BETTER AND TO THE SATISFACTION OF THE ENGINEER. WITHIN CITY RIGHT-OF-WAY AND EASEMENTS, REPAIRS TO ORIGINAL CONDITION OR BETTER MUST BE TO THE SATISFACTION OF THE CITY OF WATERLOO.
14. THE CONTRACTOR IS ADVISED THAT WORKS AND OPERATIONS BY OTHERS MAY BE ONGOING AT THE SAME TIME AS THIS CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES AND PREVENT CONSTRUCTION CONFLICTS.
15. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL PERMITS INCLUDING ROAD OCCUPANCY PERMITS AND THIRD PARTY UTILITY COSTS.
16. THE CONTRACTOR IS TO PROVIDE A WEEKLY REDLINE AS-BUILT SURVEY TO THE ENGINEER FOR REVIEW. AS-BUILT TO SHOW PIPE ALIGNMENT AND INVERT, PIPE SIZE, PIPE MATERIAL, MAINTENANCE HOLES, HYDRANTS, VALVES AND BENDS.
17. THE CONTRACTOR IS TO PROVIDE AN AS-BUILT SURVEY OF COMPLETED SERVICING AND GRADING WORKS, INCLUDING INVERTS, ALL ABOVE GROUND WORKS, AND SPOT ELEVATIONS AT A MAXIMUM 10m GRID INTERVAL. ALL ABOVEGROUND ITEMS, INCLUDING CURBS, SIDEWALKS, WALLS, BUILDING APRONS, STAIRS, ETC. TO INCLUDE ADEQUATE SPOT ELEVATIONS TO CONFIRM DESIGN INTENT (IE. DRAINAGE AROUND CURBED ISLANDS, TOP & BOTTOM OF CURB, SHOTS ON EACH RISER, ETC.). SURVEY TO BE PREPARED BY LICENSED ONTARIO LAND SURVEYOR.
18. ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE GEOTECHNICAL RECOMMENDATIONS
19. THE CONTRACTOR IS RESPONSIBLE TO INSTALL AND MAINTAIN EROSION AND SEDIMENT CONTROLS AS REQUIRED BY THIS CONTRACT AND CITY AND PROVINCIAL STANDARDS.

GRADING

1. ALL SUBGRADE TO BE PROOF-ROLLED BY A FULLY LOADED TRI-AXLE TRUCK AND INSPECTED PRIOR TO PLACEMENT OF GRANULAR MATERIALS. THE CONTRACTOR IS TO ENSURE THAT THE GEOTECHNICAL CONSULTANT WITNESSES THE PROOF-ROLL AND GIVES APPROVAL TO PROCEED FORWARD. ANY SOFT SPOTS IDENTIFIED WILL BE CORRECTED BY THE CONTRACTOR BASED UPON GEOTECHNICAL RECOMMENDATIONS IN THE FIELD. ADDITIONAL COSTS FOR REMEDIAL WORK MUST BE APPROVED BY THE ENGINEER PRIOR TO PROCEEDING. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL INSPECTIONS.
2. ANY POTENTIAL RE-USE TO BE IN ACCORDANCE WITH GEOTECHNICAL RECOMMENDATIONS AND APPROVAL.
3. GRADES TO MEET EXISTING OR PROPOSED ELEVATIONS SHALL BE AT 3:1 SLOPE OF FLATTER UNLESS OTHERWISE NOTED.
4. ALL TREE AND SHRUB RELOCATION SHALL BE IN ACCORDANCE WITH THE LANDSCAPE PLANS.
5. ALL ITEMS FOR REMOVAL SHALL BE TAKEN AWAY FROM SITE AND DISPOSED OF AT AN APPROVED DISPOSAL FACILITY.
6. ALL DISTURBED AREAS TO BE REINSTATED TO ORIGINAL CONDITION OR BETTER.
7. DIMENSIONS AND LOCATION OF ALL RAMPS, PAINTED LINES, WALKWAYS, SIDEWALKS, CURBS, CONCRETE PADS, AND ISLANDS SHALL BE TAKEN FROM THE SITE PLAN.
8. SAW CUT EXISTING PAVEMENT, SIDEWALK, CURB, GUTTER, DRIVEWAYS, WALKWAYS, ETC. AT CONSTRUCTION LIMITS TO PROVIDE A CLEAN JOINT FOR THE PROPOSED WORK.
9. PAVEMENT STRUCTURES TO BE AS PER GEOTECHNICAL RECOMMENDATIONS.

LEGEND

345.30(EX)	PROPOSED ELEVATION TO MATCH EXISTING
345.09	PROPOSED SURFACE ELEVATION
344.40(TW)	PROPOSED TOP OF WALL ELEVAITON
344.25(BW)	PROPOSED BOTTOM OF WALL ELEVATION
344.89(SW)	PROPOSED BOTTOM OF SWALE ELEVATION
344.54(EX.SW)	EXISTING SIDEWALK ELEVATION
	EXISTING STORM MANHOLE
	PROPOSED STORM MANHOLE
	EXISTING SANITARY MANHOLE
	PROPOSED SANITARY MANHOLE
	EXISTING WATER VALVE
	PROPOSED WATER VALVE
	EXISTING HYDRANT
	PROPOSED AREA DRAIN
	PROPOSED RETAINING WALL
	PROPOSED BOTTOM OF SWALE
	EXISTING CATCH BASIN
	PROPOSED CATCH BASIN
343.40	EXISTING CONTOUR
	TREE PROTECTION FENCING (REFER TO VEGETATION MANAGEMENT PLAN VM-1 PREPARED BY MHBC, DATED OCTOBER 2021)
	PROPOSED UNDERGROUND PARKING LIMIT
	PROPOSED BUILDING ROOF OUTLINE

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LICENSED PROFESSIONAL ENGINEER
C. DEL BUONO
100137127
07/19/22
PROVINCE OF ONTARIO

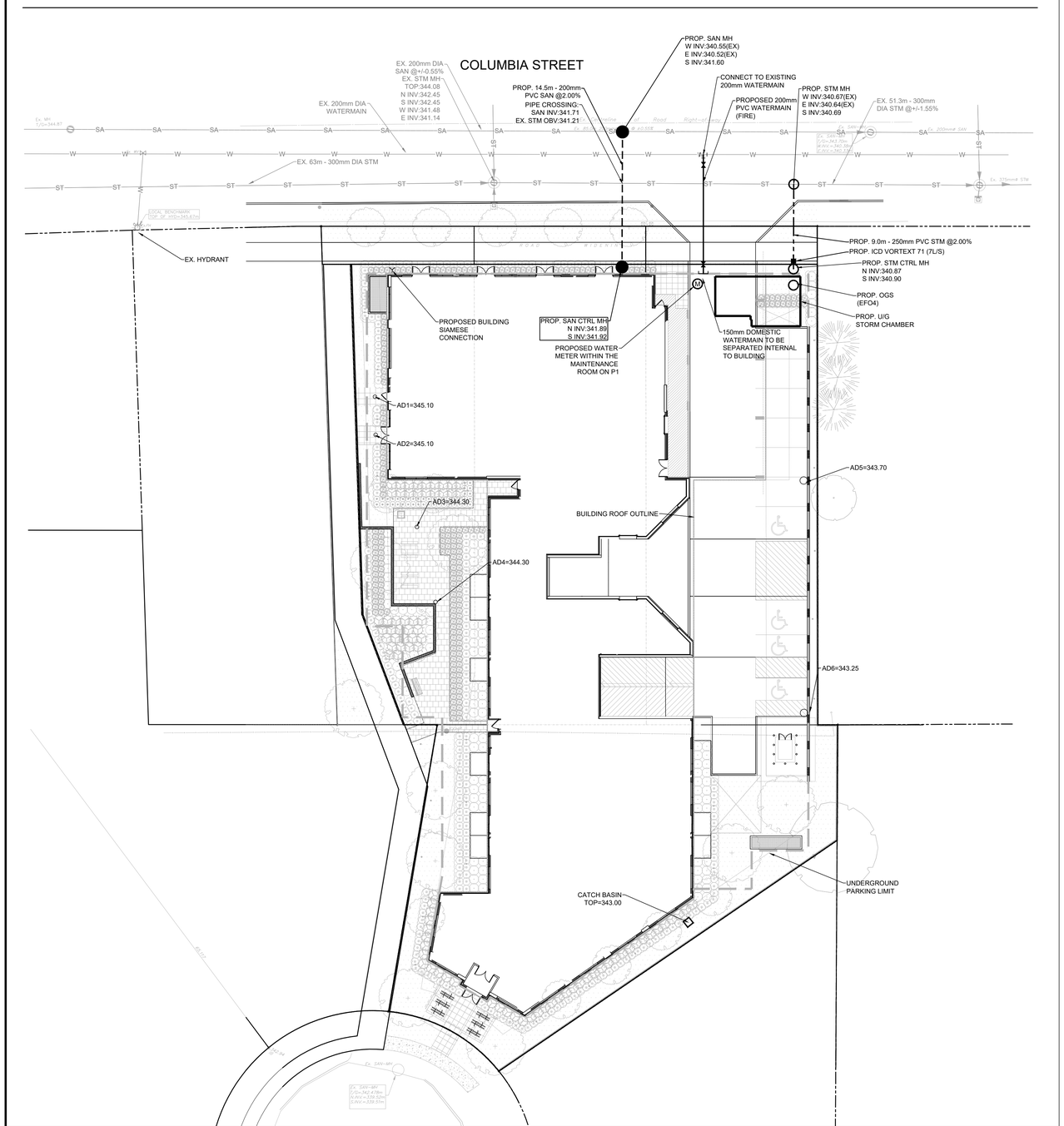
KWA SITE DEVELOPMENT CONSULTING INC.
2355 Main Street, Unit 2
Burlington, ON L7L 7A9

NORTH ARROW

METRIC SCALE
0 7.5 Metres
1:250

SITE GRADING PLAN
RESIDENTIAL DEVELOPMENT
89 COLUMBIA STREET
WATERLOO, ONTARIO
PROJECT No: 21664 | DRAWN BY: BC2 | CHECKED BY: CDB

SGP



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19. THE CONTRACTOR IS RESPONSIBLE TO INSTALL AND MAINTAIN EROSION AND SEDIMENT CONTROLS AS REQUIRED BY THIS CONTRACT AND CITY AND PROVINCIAL STANDARDS.

WATERMAINS

1. ALL WATERMAIN CONSTRUCTION IS TO BE DONE IN ACCORDANCE WITH THE CITY OF WATERLOO STANDARD CONTRACT DOCUMENTS FOR MUNICIPAL CONSTRUCTION.
2. WATERMAINS TO BE PVC C-900 CLASS 150 (DR 18), WATERMAIN SHALL INCLUDE #12 TRACER WIRE.
3. CAST IRON MECHANICAL JOINT FITTINGS MEETING AWWA SPECFICIATIONS C-907 AND CSA B138.2 SHALL BE USED ON PVC WATERMAINS.
4. PIPE BEDDING, COVER, BACKFILL, MATERIAL AND COMPACTION TESTING TO BE COORDINATED WITH THE GEOTECHNICAL ENGINEER.
5. MINIMUM COVER ON WATERMAINS SHALL BE 1.8m UNLESS SHOWN OTHERWISE ON APPROVED DRAWINGS. .
6. THE CONTRACTOR IS TO SUPPLY TAPPING SLEEVE AND VALVE. ALL WATERMAIN TAPPING TO COMMISSIONED CITY OF WATERLOO WATERMAIN SHALL BE MADE BY CITY OF WATERLOO FORCES ONLY.
7. MECHANICAL JOINT RESTRAINTS ARE TO BE INSTALLED ON BELL AND SPIGOT JOINTS FOR ALL WATERMAINS CONSTRUCTED IN FILL MATERIAL AND AT ALL TEES, HORIZONTAL BENDS, VERTICAL BENDS, AND END OFMAINS NAD VALVES. CONCRETE THRUST BLOCKS ARE NOT PERMITTED UNLESS EXPRESSLY APPROVED BY THE CITY.
8. ALL MECHANICAL FITTINGS SHALL HAVE ZINC ANODES AS PER CITY STANDARDS.
9. THE CONTRACTOR SHALL INFORM THE CITY 48 HOURS IN ADVANCE PRIOR TO COMMENCING WORK ON ANY PART OF THE WATER SYSTEM.
10. UNLESS SPECIFIED OR APPROVED BY THE TOWN, ALL VALVES SHALL BE MUELLER RESILIENT WEDGE GATE VALVES OR APPROVED EQUIVALENT. VALVES SHALL HAVE A NON-RISING STEM AND A 50mM SQUARE OPERATING NUT, OPENING COUNTER CLOCKWISE.
11. HYDROSTATIC PRESSURE TEST SHALL BE CONDUCTED UNDER THE SUPERVISION OF THE CITY OF WATERLOO WASTEWATER REPRESENTATIVE AND THE ENGINEER.
12. SWABBING, FLUSHING, DISINFECTION, AND BACTERIOLOGICAL TESTING OF NEW WATERMAIN SHALL BE AS PER CITY OF WATERLOO STANDARDS. NEW WATERMAIN SHALL BE ISOLATED FROM EXISTING MAINS THROUGH PHYSICAL SEPARATION UNTIL BACTERIOLOGICAL TESTS ARE SATISFACTORILY COMPLETED, REVIEWED, AND APPROVED BY THE CITY.
13. CITY IN-SERVICE WATER VALVES, CURB STOPS, FIRE HYDRANTS CAN ONLY BE OPERATED BY CITY OF WATERLOO WATER STAFF.

SANITARY AND STORM SEWERS

1. ALL SANITARY AND STORM SEWER CONSTRUCTION IS TO BE DONE IN ACCORDANCE WITH THE CITY OF WATERLOO STANDARD CONTRACT DOCUMENTS FOR MUNICIPAL CONSTRUCTION.
2. ALL SANITARY SEWERS TO BE PVC DR35 OR APPROVED EQUIVALENT, WITH RUBBER GASKET TYPE JOINTS AND SHALL CONFORM TO CSA B182.1 AND B182.2.
3. ALL CIRCULAR PVC STORM SEWERS TO BE PVC DR35 AND CONFORM TO CSA SPECIFICATION B182.1 OR B182.2 OR LATEST REVISION THEREOF. RIBBED PVC PIPE WILL NOT BE PERMITTED.
4. ALL SINGLE CATCHBASIN LEADS TO BE 250mm DIAMETER UNLESS OTHERWISE NOTED.
5. PIPE BEDDING, COVER, BACKFILL, MATERIAL, AND COMPACTION TO BE COORDINATED WITH THE GEOTECHNICAL ENGINEER.
6. MAINTENANCE HOLES SHALL BE ACCORDING TO OPSD 701.010 (1200 DIAMETER) TO 701.015 (3600 DIAMETER) UNLESS OTHERWISE SPECIFIED. FRAME AND COVER SHALL BE ACCORDING TO OPSD 401.010 TYPE A CLOSED (SANITARY AND STORM) UNLESS STATED OTHERWISE. INCLUDE SAFETY PLATFORM WHERE DEPTHS EXCEED 5.0m AS PER OPSD 404.020.
7. MAINTENANCE HOLE CHAMBER OPENINGS MUST BE LOCATED ON THE UPSTREAM SIDE OF THE MAINTENANCE HOLE.
8. MAINTENANCE HOLE STEPS TO BE AS PER SOLID ALUMINUM AS PER OPSD 405.020.
9. BENCHING DETAILS SHALL BE ACCORDING TO OPSD 701.021, MODIFIED SO BENCHING IS TO THE OBVERT OF THE PIPE. CATCHBASIN MANHOLES ARE NOT TO BE BENCHED.
10. SANITARY MAINTENANCE HOLES IN PONDING AREAS SHALL HAVE WATERTIGHT FRAMES AND COVERS AS PER OPSD 401.030.
11. SINGLE CATCHBASINS SHALL BE ACCORDING TO OPSD 705.010. FRAME AND GRATE SHALL BE OPSD 401.020 WITHIN PARKING FIELDS.
12. THE CONTRACTOR IS TO PROVIDE CCTV CAMERA INSPECTION OF ALL STORM SEWERS (INCLUDING CB LEADS) PRIOR TO ASPHALT PLACEMENT AND AT THE 1-YEAR MAINTENANCE PERIOD INCLUDING PICTORIAL REPORT AND TWO (2) CD'S IN A FORMAT SATISFACTORY TO THE ENGINEER AND THE CITY OF LONDON. ALL SEWERS TO BE FLUSHED PRIOR TO CAMERA INSPECTION.
13. PERFORATED SUBDRAINS ARE TO BE CONNECTED TO INTERNAL CATCH BASINS AND CATCHBASIN MANHOLES IN A QUADRANT FORMATION AT THE SUBGRADE INTERFACE EXCEPT IN THE BOULEVARD AREAS. CONTRACTOR IS TO ENSURE A MINIMUM 3% SLOPE OF THE SUBDRAINS TOWARDS THE CATCH BASIN AND CATCHBASIN MANHOLES. SUBDRAIN PIPE TO BE 100mmØ PERFORATED, CORRUGATED, POLYETHYLENE ENCASED IN FILTER FABRIC 'SOCK'. BACKFILL WITH 20mmØ WELL GRADED FREE DRAINING GRANULAR MATERIAL APPROVED BY THE ENGINEER. SUBDRAINS SHALL BE CAPPED AT UPSTREAM ENDS.

LEGEND

- EXISTING STORM MANHOLE
- PROPOSED STORM MANHOLE
- EXISTING STORM SEWER (ST)
- PROPOSED STORM SEWER
- EXISTING SANITARY MANHOLE
- PROPOSED SANITARY MANHOLE
- EXISTING SANITARY SEWER (SA)
- PROPOSED SANITARY SEWER
- EXISTING WATERMAIN (W)
- PROPOSED WATERMAIN
- EXISTING WATER VALVE
- PROPOSED WATER VALVE
- EXISTING HYDRANT
- PROPOSED AREA DRAIN
- PROPOSED RETAINING WALL
- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN
- PROPOSED WATER METER
- TREE PROTECTION FENCING (REFER TO VEGETATION MANAGEMENT PLAN VM-1 PREPARED BY MHBC, DATED OCTOBER 2021)
- PROPOSED UNDERGROUND PARKING LIMIT
- PROPOSED BUILDING ROOF OUTLINE

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LICENSED PROFESSIONAL ENGINEER
C. DEL BUONO
100137127
07/19/22
PROVINCE OF ONTARIO

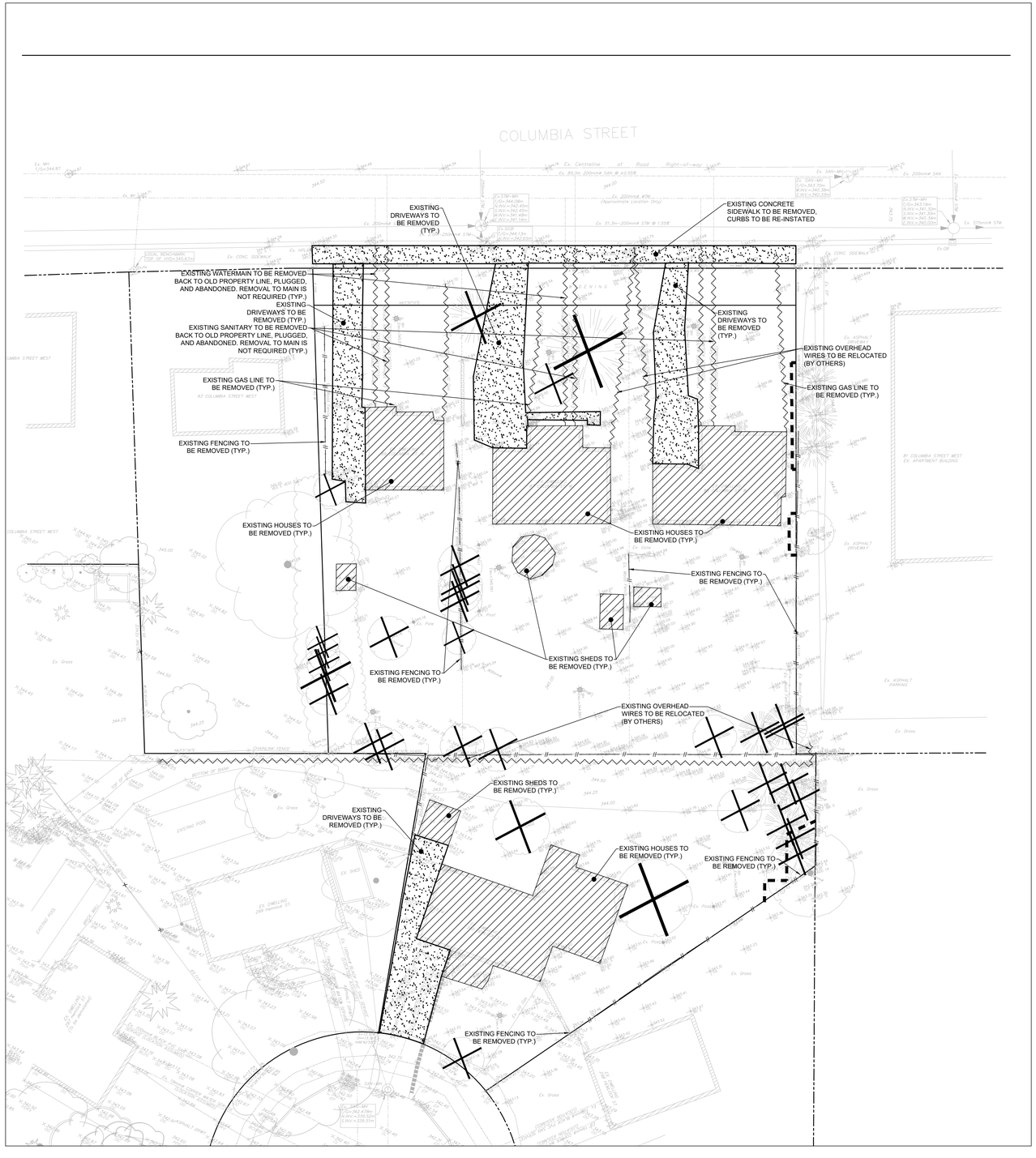
KWA SITE DEVELOPMENT CONSULTING INC.
4259 Upper Middle Road
Burlington, ON L7L 7A9

NORTH ARROW

METRIC SCALE
0 7.5 Metres
1:250

SITE SERVICING PLAN
RESIDENTIAL DEVELOPMENT
89 COLUMBIA STREET
WATERLOO, ONTARIO
PROJECT No.21664 | DRAWN BY:BCZ | CHECKED BY:CDB

SSP



LEGEND

- EXISTING UTILITY TO BE REMOVAL
- EXISTING FENCING TO BE REMOVED
- EXISTING HOUSE TO BE REMOVED
- EXISTING PAVEMENT / CONCRETE SIDEWALK TO BE REMOVED
- EXISTING TREES TO BE REMOVED (REFER TO VEGETATION MANAGEMENT PLAN VM-1 PREPARED BY MHBC, DATED OCTOBER 2021)
- TREE PROTECTION FENCING (REFER TO VEGETATION MANAGEMENT PLAN VM-1 PREPARED BY MHBC, DATED OCTOBER 2021)

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LICENSED PROFESSIONAL ENGINEER
C. DEL BUONO
100137127
07/19/22
PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC.
2055 Appleby Line
Burlington, ON L7L 7A9

NORTH ARROW

METRIC SCALE
0 7.5 Metres
1:250

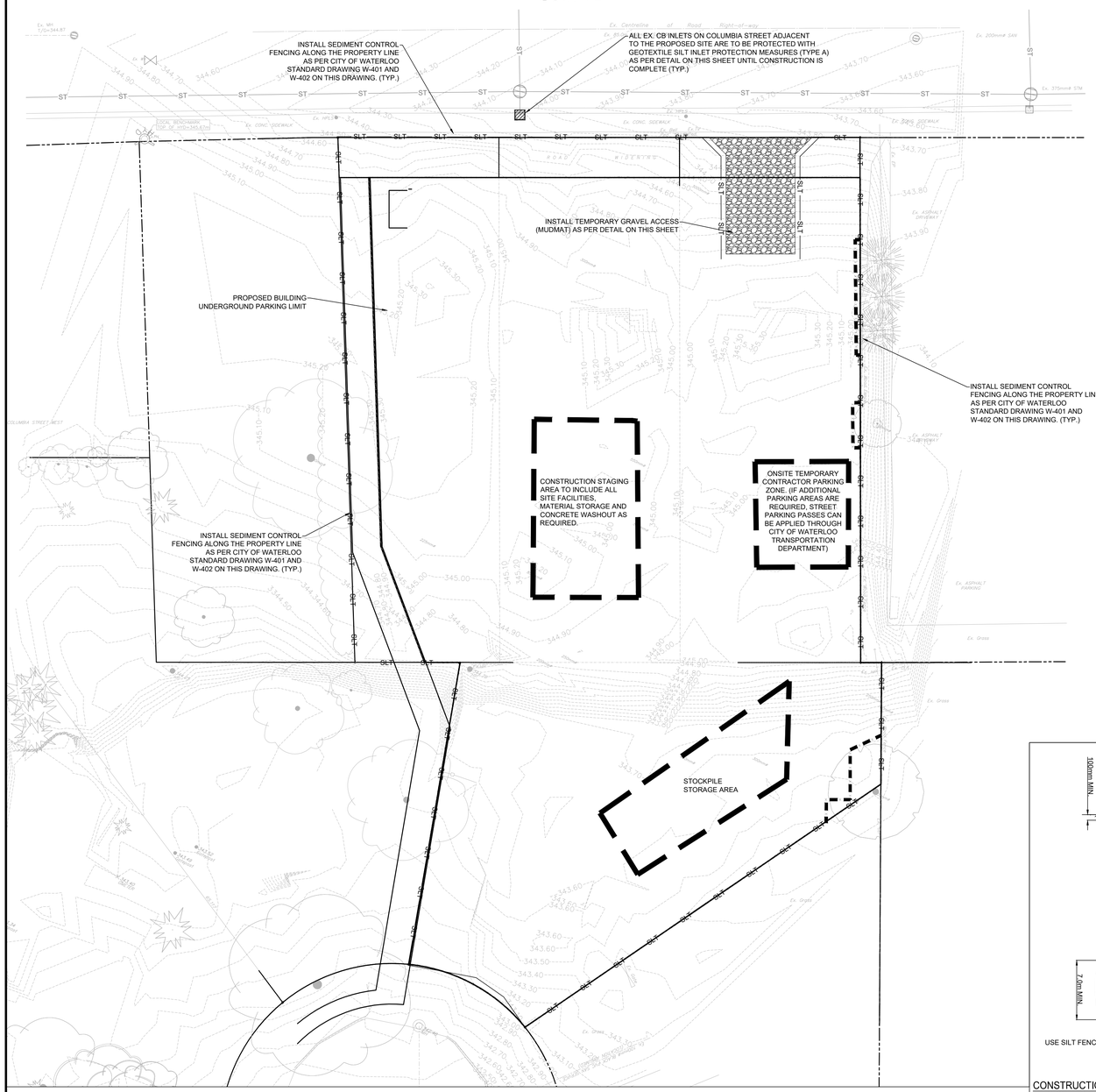
EXISTING CONDITIONS AND REMOVALS PLAN

RESIDENTIAL DEVELOPMENT
89 COLUMBIA STREET
WATERLOO, ONTARIO

PROJECT No.21664 | DRAWN BY:RCZ | CHECKED BY:CDB

EX.RMV

LOCATIONS OF CONSTRUCTION STAGING AREA, TEMPORARY CONTRACTOR PARKING AREA, AND STOCKPILE STORAGE AREA TO BE ULTIMATELY DETERMINED BY THE CONTRACTOR ONCE THE PROJECT IS AWARDED



BENCHMARK NOTE:

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (2010.0).

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999560.

GENERAL NOTES

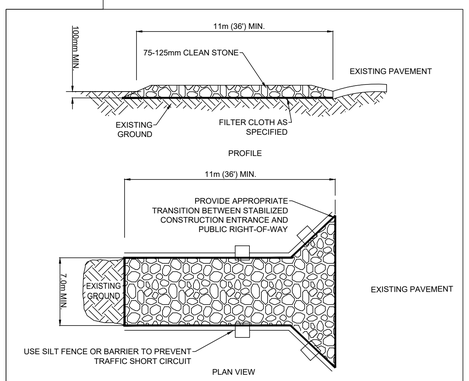
1. ALL WORK WITHIN THE CITY RIGHT-OF-WAY SHALL BE CONSTRUCTED ACCORDING TO THE LATEST CITY OF WATERLOO AND WATERLOO REGION STANDARD DRAWINGS AND SPECIFICATIONS. ONTARIO PROVINCIAL STANDARD DRAWINGS AND SPECIFICATIONS MAY, SUBJECT TO THE APPROVAL OF THE CITY OF WATERLOO, BE USED WHERE NO CITY STANDARD OR SPECIFICATION IS AVAILABLE.
2. ALL WORK SHALL BE COMPLETED ACCORDING TO THE CURRENT OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS. THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.
3. ALL MATERIALS FOR SEWER, WATERMAIN AND APPURTENANCES, SHALL BE ACCORDING TO CITY OF WATERLOO'S ACCEPTABLE PRODUCTS LIST IN THE STANDARD CONTRACT DOCUMENTS FOR MUNICIPAL CONSTRUCTION.
4. ALL SURVEY STAKE LAYOUT POINTS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE LAY-OUT SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER.
5. ALL DIMENSIONS ARE EXPRESSED IN METERS(m) AND PIPE SIZES ARE EXPRESSED IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.
6. ALL TEMPORARY CONSTRUCTION FENCING, TRAFFIC CONTROL AND SIGNAGE DURING CONSTRUCTION (INCLUDING ALL NECESSARY SIGNALS, SIGNS, DELINEATORS, MARKERS AND BARRIERS) SHALL BE IN ACCORDANCE WITH CURRENT ONTARIO TRAFFIC MANUAL BOOK 7: TEMPORARY CONDITIONS FIELD EDITION.
7. INFORMATION REGARDING ALL EXISTING UNDERGROUND UTILITIES AND SERVICES SHOWN ON THE DRAWINGS IS BASED ON INFORMATION PROVIDED BY OTHERS AND/OR AVAILABLE HISTORICAL DRAWINGS. THE ACCURACY OF THIS INFORMATION HAS NOT BEEN CONFIRMED BY KWA SITE DEVELOPMENT CONSULTING AND ALL UNDERGROUND INFORMATION NEEDS TO BE VERIFIED IN THE FIELD PRIOR TO BIDDING AND CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE TO ACQUIRE ALL UTILITY LOCATES PRIOR TO CONSTRUCTION AND TO NOTIFY THE ENGINEER OF ANY DISCREPANCIES. ANY LOST TIME DUE TO FAILURE TO IDENTIFY DISCREPANCIES OR NOTIFY THE ENGINEER SHALL BE AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING INFRASTRUCTURE.
8. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE ALL REQUIRED INSPECTIONS WITH THE CITY OF WATERLOO AND ANY OTHER REGULATORY AGENCIES. ALL WORK ON CITY EASEMENTS OR RIGHT-OF-WAY AND ALL WATERMAIN WORK SHALL BE INSPECTED BY THE CITY PRIOR TO BACKFILLING.
9. CONTRACTOR IS RESPONSIBLE TO SUPPLY AND INSTALL ALL NECESSARY CONSTRUCTION FENCING.
10. THIS DRAWING SET SHOULD BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANT'S PLANS AND ANY DISCREPANCIES REPORTED TO THE ENGINEER PRIOR TO CONSTRUCTION.
11. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION AND ANY DISCREPANCIES REPORTED TO THE ENGINEER.
12. NO SUBSTITUTIONS SHALL BE ALLOWED WITHOUT ENGINEERS APPROVAL AND ACCEPTANCE BY THE CITY OF WATERLOO.
13. ALL DISTURBED AREAS ON PRIVATE LANDS SHALL BE REPAIRED TO ORIGINAL CONDITION OR BETTER AND TO THE SATISFACTION OF THE ENGINEER. WITHIN CITY RIGHT-OF-WAY AND EASEMENTS, REPAIRS TO ORIGINAL CONDITION OR BETTER MUST BE TO THE SATISFACTION OF THE CITY OF WATERLOO.
14. THE CONTRACTOR IS ADVISED THAT WORKS AND OPERATIONS BY OTHERS MAY BE ONGOING AT THE SAME TIME AS THIS CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES AND PREVENT CONSTRUCTION CONFLICTS.
15. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL PERMITS INCLUDING ROAD OCCUPANCY PERMITS AND THIRD PARTY UTILITY COSTS.
16. THE CONTRACTOR IS TO PROVIDE A WEEKLY REDLINE AS-BUILT SURVEY TO THE ENGINEER FOR REVIEW. AS-BUILT TO SHOW PIPE ALIGNMENT AND INVERT, PIPE SIZE, PIPE MATERIAL, MAINTENANCE HOLES, HYDRANTS, VALVES AND BENDS.
17. THE CONTRACTOR IS TO PROVIDE AN AS-BUILT SURVEY OF COMPLETED SERVICING AND GRADING WORKS, INCLUDING INVERTS, ALL ABOVE GROUND WORKS, AND SPOT ELEVATIONS AT A MAXIMUM 10m GRID INTERVAL. ALL ABOVEGROUND ITEMS, INCLUDING CURBS, SIDEWALKS, WALLS, BUILDING APRONS, STAIRS, ETC. TO INCLUDE ADEQUATE SPOT ELEVATIONS TO CONFIRM DESIGN INTENT (IE. DRAINAGE AROUND CURBED ISLANDS, TOP & BOTTOM OF CURB, SHOTS ON EACH RISER, ETC.). SURVEY TO BE PREPARED BY LICENSED ONTARIO LAND SURVEYOR.
18. ALL WORK TO BE COMPLETED IN ACCORDANCE WITH THE GEOTECHNICAL RECOMMENDATIONS
19. THE CONTRACTOR IS RESPONSIBLE TO INSTALL AND MAINTAIN EROSION AND SEDIMENT CONTROLS AS REQUIRED BY THIS CONTRACT AND CITY AND PROVINCIAL STANDARDS.

EROSION & SEDIMENT CONTROL NOTES

1. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE INSTALLED PRIOR TO THE COMMENCEMENT OF WORK, MAINTAINED THROUGHOUT CONSTRUCTION, AND ONLY REMOVED UPON STABILIZATION OF THE DISTURBED AREAS.
2. SEDIMENT CONTROLS SHOULD BE INSPECTED ON A REGULAR BASIS WITH A MINIMUM FREQUENCY OF:
   2.1. ON A WEEKLY BASIS
   2.2. BEFORE AND AFTER EVERY RAINFALL EVENT (>12mm)
   2.3. AFTER SIGNIFICANT SNOWMELT EVENTS
   2.4. MONTHLY DURING INACTIVE PERIODS (> 30 DAYS), AND
   2.5. DAILY DURING EXTENDED RAIN OR SNOWMELT PERIODS.
3. REPAIRS TO ESC MEASURES MUST BE COMPLETED IN A TIMELY MANNER TO PREVENT SEDIMENT MIGRATION.
4. ADDITIONAL MATERIALS SUCH AS CLEAR STONE (12mm OR GREATER), FILTER FABRIC, PUMPS, HOSES AND SILTSOXX TO BE KEPT ONSITE AT ALL TIMES FOR CONDUCTING REPAIRS TO SEDIMENT CONTROL MEASURES.
5. ALL DISTURBED AREAS THAT WILL BE LEFT INACTIVE FOR MORE THAN THIRTY (30) DAYS ARE TO BE STABILIZED WITH THE EXCEPTION OF THE PREGRADED AREAS WHERE DRAINAGE IS COLLECTED IN AN APPROPRIATE EROSION CONTROL SYSTEM (IE. POND, SEDIMENT BASIN).
6. ENGINEERED CHANGES TO THE ESC MEASURES MAY BE NEEDED AS SITE CONDITIONS CHANGE THROUGHOUT THE CONSTRUCTION PROCESS. THESE UPDATES MUST REFLECT BEST MANAGEMENT PRACTICES TO CONTROL SEDIMENT CONTROL AND EROSION ONSITE AND SHOULD BE COMPLETED BASED ON DIRECTION FROM THE SITE ENGINEER. ADDITIONAL MEASURES MAY BE REQUIRED AS DIRECTED BY AN ENGINEER THROUGHOUT THE CONSTRUCTION PROCESS.
7. REFUELING IS TO TAKE PLACE ONLY WITHIN DESIGNATED AREAS AND SHALL BE A MINIMUM OF THIRTY METRES FROM ANY WATERCOURSE OR ENVIRONMENTALLY SENSITIVE AREA.
8. SILT CLEANUP EQUIPMENT SUCH AS ABSORPTIVE MEDIA IS TO BE MAINTAINED ON-SITE FOR IMMEDIATE USE IN THE EVENT OF A SPILL.
9. THE CONTRACTOR WILL BE RESPONSIBLE FOR CLEAN-UP AND RESTORATION, INCLUDING ALL COSTS, DUE TO THE RELEASE OF SEDIMENT FROM THE SITE.
10. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS (EG. ROAD OCCUPANCY PERMIT, ACCESS PERMIT, ETC).
11. SPILLED OR TRACKED MATERIALS FROM THE CONTRACTOR'S HAULING VEHICLES ON ROADS WILL BE CLEANED UP AND THE SITE WILL BE LEFT IN A NEAT CONDITION AT THE END OF EACH WORKING DAY. THE CONTRACTOR WILL ARRANGE FOR OFF-SITE DISPOSAL OF ALL WASTE MATERIAL AND RUBBISH IN A MANNER THAT COMPLIES WITH ALL LAWS AND REGULATIONS.
12. SECONDARY CONTAINMENT IS REQUIRED FOR ALL STATIONARY NON-SELF-PROPELLED PETROLEUM FILLED EQUIPMENT (I.E. PUMPS, GENERATORS, ETC.)
13. THE CONTRACTOR WILL KEEP THE SITE FREE FROM ACCUMULATIONS OF WASTE MATERIALS, SURPLUS FILL, TOPSOIL AND ALL DEBRIS SUCH AS BOULDERS, BROKEN ASPHALT, BROKEN CONCRETE OR UNSUITABLE EARTH MATERIALS.
14. PROVIDE TERRAFIX SILT SACK (OR APPROVED EQUIVALENT) ON ANY EXISTING OR PROPOSED CATCH BASINS / CATCHBASIN MANHOLES WITHIN THE INFLUENCE OF THE CONSTRUCTION REFER TO DETAIL ON SD..
15. SEDIMENT TO BE REMOVED FROM THE SEDIMENT BASINS BEFORE IT IS 25% FULL AND FROM SILT FENCE BEFORE IT IS 33% FULL.
16. ALL STOCKPILE AREAS LEFT EXPOSED FOR MORE THAN 30 DAYS SHALL BE STABILIZED WITH APPROPRIATE NON-INVASIVE SPECIES. WINTER CONTINGENCY MEASURES SHALL BE IMPLEMENTED AS EROSION CONTROL FOR APPROPRIATE STABILIZATION OUTSIDE THE GROWING SEASON.
17. DUST CONTROL IS TO BE PROVIDED AS REQUIRED THROUGHOUT THE DURATION OF THE PROJECT TO PREVENT SIGNIFICANT DUST WITHIN THE AIR DURING CONSTRUCTION.
18. GOOD HOUSEKEEPING PRACTICES ARE TO BE FOLLOWED ON SITE DURING CONSTRUCTION AND MONITORED ON A DAILY BASIS. THIS INCLUDES, BUT IS NOT LIMITED TO:
   18.1. APPROPRIATE STORAGE AND DISPOSAL OF CONSTRUCTION MATERIALS,
   18.2. APPROPRIATE STORAGE AND DISPOSAL OF GARBAGE AND DEBRIS,
   18.3. APPROPRIATE DISPOSAL OF CONCRETE WASTE TO AN APPROVED DISPOSAL FACILITY, AND
   18.4. SECONDARY CONTAINMENT OF PETROLEUM-BASED PRODUCTS (JERRY CANS, OIL, ETC.).

LEGEND

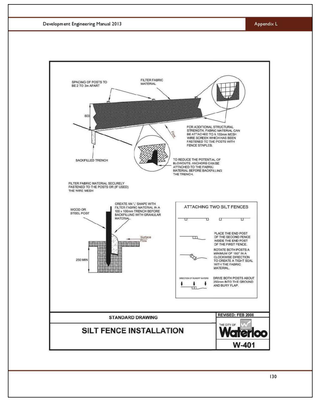
- PROPOSED GEOTEXTILE INLET PROTECTION
- SLT SLT SLT — PROPOSED SILT FENCE
- 345.50 — EXISTING CONTOUR
- ST ST — EXISTING STORM SEWER
- EXISTING STORM MANHOLE
- EXISTING CATCHBASIN
- EXISTING HYDRANT
- EXISTING VALVE AND BOX
- TREE PROTECTION FENCING (REFER TO VEGETATION MANAGEMENT PLAN VM-1 PREPARED BY MHBC, DATED OCTOBER 2021)
- PROPOSED UNDERGROUND PARKING LIMIT



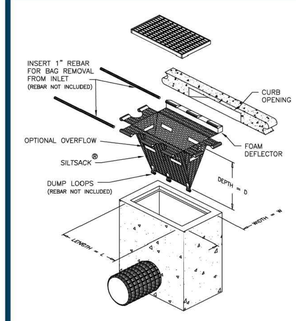
CONSTRUCTION SPECIFICATIONS

1. STONE - USE COARSE AGGREGATE (75mm - 125mm STONE).
2. LENGTH - AS EFFECTIVE, BUT NOT LESS THAN 14m.
3. THICKNESS - NOT LESS THAN 200mm.
4. WIDTH - NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
5. WASHING - WHEN NECESSARY, WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN, ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH, OR WATERCOURSE THROUGH USE OF SAND BAGS, GRAVEL, BOARDS OR OTHER APPROVED METHODS.
6. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO ADJACENT PAVED ROAD SURFACES MUST BE REMOVED IMMEDIATELY.

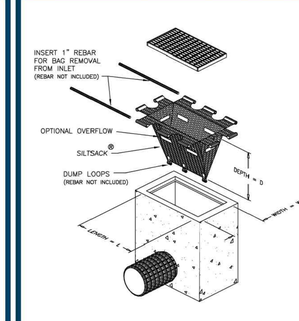
CONSTRUCTION ENTRANCE OR EXIT ("MUD MAT")



Typical Siltsack® Construction - Type A



Typical Siltsack® Construction - Type B



REVISION BLOCK

#	DATE	DESCRIPTION
1.	11/02/21	ISSUED FOR SPA
2.	03/01/22	ISSUED FOR 2ND SPA
3.	05/20/22	ISSUED FOR 3RD SPA
4.	07/19/22	ISSUED FOR 4TH SPA

LICENSED PROFESSIONAL ENGINEER — C. DEL BIONO — 100137127 — 07/19/22 — PROVINCE OF ONTARIO

KWA SITE DEVELOPMENT CONSULTING INC.
1255 Main Street East, Unit 6
Burlington, ON L7L 7A9

NORTH ARROW

METRIC SCALE
0 7.5 Metres
1:250

EROSION AND SEDIMENT CONTROL / CONSTRUCTION MANAGEMENT PLAN
RESIDENTIAL DEVELOPMENT
89 COLUMBIA STREET
WATERLOO, ONTARIO
PROJECT No.21664 | DRAWN BY:BCZ | CHECKED BY:CDB

ESC/CMP