Appendix A WATER SUPPLY SERVICING

A.1 DOMESTIC WATER DEMAND ESTIMATE

Holland Cross Phase 3 Residential

Project #160410274

3-Jun-22

	Number of Units	Density	Population
Studio	18	1.4	25.2
1 BR	110	1.4	154.0
1BR + Den	51	2.1	107.1
2 BR	101	2.1	212.1
2BR + Den	0	3.1	0.0
Guest	1	1.4	1.4

Building ID	Area (m^2)	Population	Daily Rate of Demand [1 2] (L/m^2/day)	Avg Day Demand		Max Day Demand [3,4]		Peak Hour Demand [3,4]	
				(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Residential		500	350	121.5	2.02	303.7	5.06	668.1	11.14
Commercial, Lobby and Amenity Space	1,282		28000	2.5	0.04	3.7	0.06	6.7	0.11
Total Site :				**124.0**	**2.07**	**307.4**	**5.12**	**674.9**	**11.25**

1 Average day water demand for residential areas are equal to 350 L/cap/d

2 28,000 L/gross ha/day is used to calculate water demand for commercial facilities.

3 Water demand criteria used to estimate peak demand rates for residential areas are as follows:

maximum day demand rate = 2.5 x average day demand rate

peak hour demand rate = 2.2 x maximum day demand rate

4 Water demand criteria used to estimate peak demand rates for commercial and institutional areas are as follows:

maximum day demand rate = 1.5 x average day demand rate

peak hour demand rate = 1.8 x maximum day demand rate

A.2 HYDRAULIC ANALYSIS SHEET

Stantec	Project:	**Holland Cross**	No. **160410274**
	SITE PLAN HYDRAULIC ANALYSIS		
	Revision:	00	Prepared By: AM
	Revision Date:	24-Nov-2022	Checked By: NC

BOUNDARY CONDITIONS (BC)	
Connection at Hamilton Avenue	
Site Plan Revision Date	14-Oct-2022
Min. HGL (m)	107.9
Max. HGL (m)	114.6
Max. Day + Fire Flow (150 L/s)	104.4

Ground Floor Elevation (GFE) (Level 01) (m)	62.95

GROUND FLOOR (GF) PRESSURE RANGE				
	GF HGL (m)	**GF Pressure (kPa)**	**GF Pressure (psi)**	**Outcome**
	= BC HGL (m) - FFE (m)	= GF HGL (m) x 9.804 (kPa/m)	= GF Pressure (kPA) x 0.145 (psi/kPa)	If min <50 psi: booster pump If max >100 psi: pressure reducer
Minimum Normal	44.95	440.7	63.9	No Booster Pump Required
Maximum Normal	51.65	506.4	73.4	No Pressure Reducer Required

Number of Floors Not Below Ground	25
Approximate Height of One Storey (m)	3.21
Pressure Drop Per Floor (kPa)	31.5
Pressure Drop Per Floor (psi)	4.6

RESIDUAL PRESSURE RANGE IN MULTI-LEVEL BUILDINGS			
	Residual Pressure (kPa)	**Residual Pressure (psi)**	**Outcome**
Top Floor Min	-314.6	-45.6	Booster Pump Required
Top Floor Max	-248.9	-36.1	
Maximum Number of Floors Above Ground at Minimum Pressure	5		

RESIDUAL PRESSURE FROM FIRE FLOW				
	Residual HGL (m)	**Residual Pressure (kPa)**	**Residual Pressure (psi)**	**Outcome**
Ground Floor	41.45	406.4	58.9	Fire Pump Required
Top Floor	-35.59	-348.9	-50.6	

Pressure Check		
	Pressure (kPa)	**Pressure (psi)**
Pressure Below Minimum	<138	<20
Pressure Below Normal	138-345	20-50
Pressure Within Normal Range	345-552	50-80
Pressure Above Normal Range	552-690	80-100
Pressure Above Maximum	>690	>100

A.3 FIRE FLOW REQUIREMENTS PER FUS

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160410274
Project Name: Holland Cross
Date: 2/24/2023
Fire Flow Calculation #: 1
Description: 25 Floor Apartment Building with Fire Separations between floors

Notes: 1356m2 Floorplate

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction										0.8	-
2	Determine Effective Floor Area	Sum of Two Largest Floors + 50% of Eight Additional Floors					Vertical Openings Protected?					NO	-
		1356										1356	-
3	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min										-	6000
4	Determine Occupancy Charge	Limited Combustible										-15%	5100
5	Determine Sprinkler Reduction	Conforms to NFPA 13										-30%	-2040
		Standard Water Supply										-10%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?				-	-
		North	0 to 3	49.3	1	41-60	Type III-IV - Unprotected Openings	YES				0%	1020
		East	20.1 to 30	26.5	5	> 100	Type III-IV - Unprotected Openings	NO				5%	
		South	10.1 to 20	49.8	3	> 100	Type V	NO				15%	
		West	0 to 3	23.1	1	21-49	Type III-IV - Unprotected Openings	YES				0%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											4000
		Total Required Fire Flow in L/s											66.7
		Required Duration of Fire Flow (hrs)											1.50
		Required Volume of Fire Flow (m^3)											360

A.4 FIRE FLOW REQUIREMENTS PER OBC

Fire Flow Calculations as per Ontario Building Code (Appendix A)

Job#	1604-10274	Designed by:	WJ
Date	24-Feb-23	Checked by:	NC
		Description:	25 Floor Apt

$Q = KVS_{tot}$

Q = Volume of water required (L)
V = Total building volume (m3)
K = Water supply coefficient from Table 1
S_{tot} = Sotal of spatial coefficeint values from property line exposures on all sides as obtained from the formula

$S_{tot} = 1.0 + [S_{side1} + S_{side2} + S_{side3} + S_{side4}]$

1	Type of construction	Building Classification		Water Supply Coefficient
	Non-Combustible with Fire-Resistance Ratings	A-2, B-1, B-2, B-3, C, D		10

2	Area of one floor (m^2)	number of floors	height of ceiling (m)	Total Building Volume (m^3)
	1356	25	3.0	102,284

3	Side	Exposure Distance (m)	Spatial Coefficient	Total Spatial Coeffiecient
	North	0	0.5	2
	East	26	0	
	South	19.1	0	
	West	0	0.5	

4	Established Fire Safety Plan?	Reduction in Volume (%)		Total Volume Reduction
	no	0%		0%

5		**Total Volume 'Q' (L)**
		2,045,680
		Minimum Required Fire Flow (L/min)
		9,000

A.5 BOUNDARY CONDITIONS


Boundary Conditons for Hamilton Avenue - 29 Storey Condo
1565
1067
SCOTT ST
1530
1546
1560
1560
268
272
274
15
13
11
9
265
275
277
279
52
50
48
N
BULLMAN ST
152
102
BULLMAN ST
152
16
20
1
283
287
299
301
305
309
8
PARKDALE AVE
152
300
203
HAMILTON AVE N
102
312
45
PANORAMA PRIV
15
13
11
9
7
5
3
2
14
12
10
8
6
4
2
11
9
7
5
3
Legend
PRIVATE
PUBLIC

From: Wu, John
To: Rathnasooriya, Thakshika
Subject: RE: Boundary Conditions
Date: Thursday, July 30, 2020 4:07:21 PM
Attachments: Hamilton Avenue July 2020.pdf

Here is the result:

The following are boundary conditions, HGL, for hydraulic analysis on Hamilton Avenue (zone 1E) assumed to be connected to the 203mm on Hamilton Avenue (see attached PDF for location).

Minimum HGL = 107.9m

Maximum HGL = 114.6m

Max Day + FF = 104.4m

These are for current conditions and are based on computer model simulation.

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

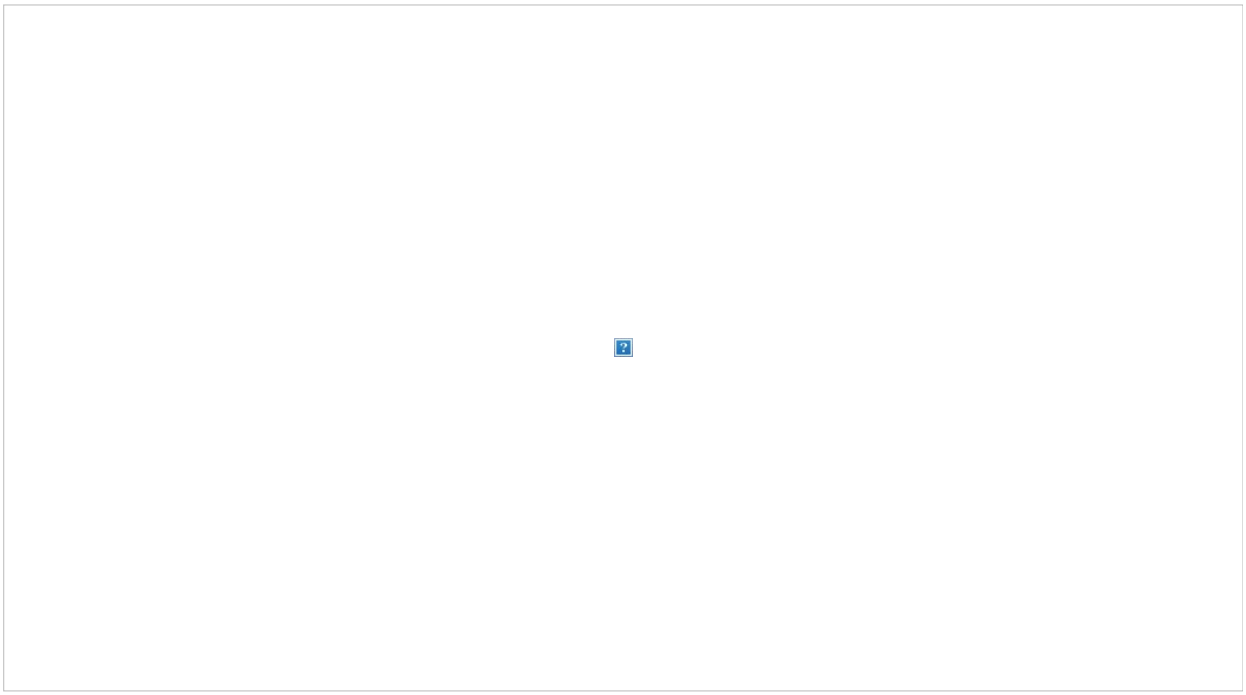
John

From: Rathnasooriya, Thakshika <Thakshika.Rathnasooriya@stantec.com>
Sent: July 29, 2020 2:46 PM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Kilborn, Kris <kris.kilborn@stantec.com>
Subject: Boundary Conditions

Hi John,

I am looking for watermain hydraulic boundary conditions for Holland Cross Phase 3 residential. The proposed residential building consists of 29 storeys. We anticipate connecting to the existing 150mm watermain service in addition to constructing a secondary connection(basic day demand is greater than 50 m3/day). The service is connected to the exiting 200mm diameter watermains on Hamilton Avenue North and Bullman Street. (please see attached figure).

Please see the estimated domestic demands and fire flow requirements for the site as mentioned below:
Average Day Demand – 2.63 L/s
Max Day Demand - 6.55 L/s
Peak Hour Demand - 14.41 L/s
Fire Flow Requirement per OBC were used for the apartment building - 150 L/s (9,000 L/min)



Thank you,
Shika Rathnasooriya , P.Eng.

Direct: 613 724-4081
Thakshika.Rathnasooriya@stantec.com

Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

'

'

A.6 ARCHITECT CONFIRMATIONS

Johnson, Warren

From: Robert Matthews <robertm@n45.ca>
Sent: Friday, February 17, 2023 2:20 PM
To: Shahzadeh, Serene; Yin, David; Holmes, Keith; Johnson, Warren; Cody, Neal
Cc: Barbieri, Sam; Ghajar, Sonia; Meloshe, Nancy
Subject: RE: 1560 Scott - Resubmission Comments

Follow Up Flag: Follow up
Flag Status: Flagged

Serene,

In respect to your letter and item nos. 9 & 10, we respond as follows:-

Item 9
On the Ground Floor attached, the RED line is the fire separation.

Item 10

- The building construction will be non-combustible – concrete.
- Unsupervised sprinklers conforming to NFPA 13 will be provided, the design will be designed by a professional mechanical engineer.
- The floors will be designed as 2hr fire separations as per FUS guidelines.
- The building envelope will be designed at a minimum as a 1hr fire separation. This includes walls, decorative elements, structure, and floors, all as per FUS guidelines.
- The fire hazard of the building contents will conform to FUS guidelines.
- The gross floor area of the largest floor is +/- 970m2.

Robert Matthews
Partner
N45 ARCHITECTURE Inc.

I will be out of the office from Tuesday, 21 February, returning on Monday, 13 March.

N45 ARCHITECTURE Inc.
The Sovereign Building
71 Bank St., 7th Floor
Ottawa, ON.
K1P 5N2
O 613-224-0095 x 234
C 613-858-2789

From: Shahzadeh, Serene <Serene.Shahzadeh@stantec.com>
Sent: Monday, January 30, 2023 2:35 PM
To: Robert Matthews <robertm@n45.ca>; Yin, David <david.yin@stantec.com>; Holmes, Keith <Keith_Holmes@golder.com>; Johnson, Warren <Warren.Johnson@stantec.com>; Cody, Neal <Neal.Cody@stantec.com>
Cc: Barbieri, Sam <Sam.Barbieri@lasalle.com>; Ghajar, Sonia <Sonia.Ghajar@lasalle.com>; Meloshe, Nancy <Nancy.Meloshe@stantec.com>
Subject: 1560 Scott - Resubmission Comments

Good afternoon all,

We have received the resubmission comments for the Site Plan Control application on 1560 Scott Street. I have attached the draft response letter for your reference, flagging which comments are to be addressed by whom.

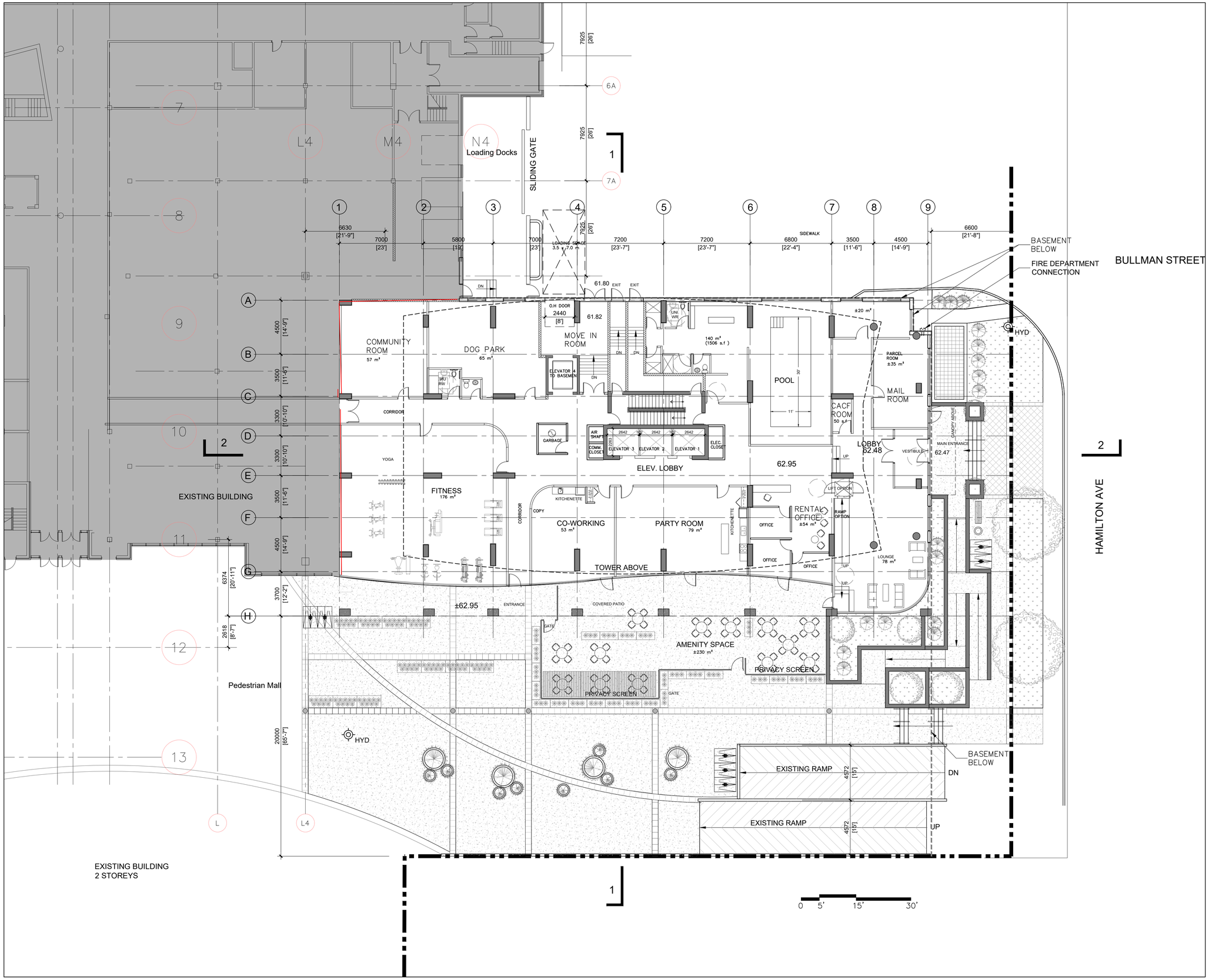
Please have the updates and comments addressed by February 17. Let me know if you have any questions, or if there is anything you need to address the comments.

Thanks,

Serene Shahzadeh
Planner

Serene.Shahzadeh@stantec.com

Stantec
300 - 1331 Clyde Avenue
Ottawa ON K2C 3G4



1 GROUND FLOOR PLAN
A-101 SCALE 1:150

LaSalle INVESTMENT MANAGEMENT

no.	revision	date
4	RE-ISSUE FOR SITE PLAN APP.	11 Oct. 2022
3	ISSUED FOR SITE PLAN APPLICATION	14 Jan. 2022
2	REISSUED FOR ZONING AMENDMENT	17 Sept. 2021
1	ISSUED FOR ZONING AMENDMENT	30 July 2020

N45 ARCHITECTURE INC.
71 Bank Street, 7th Floor - Ottawa, Ontario, K1P 5N2
tel. 613.224.0095 fax 613.224.9811

project
HOLLAND CROSS
PHASE 3 RESIDENTIAL

HOLLAND AVE, OTTAWA, ON.

construction north
N true north W E S

seal
ONTARIO ASSOCIATION OF ARCHITECTS
ROBERT C. MATTHEWS
LICENCE 2966

drawing title
GROUND FLOOR PLAN

scale AS SHOWN	drawn by J. J
date MAY 2020	checked by R.M
project number 20-540	drawing number A-101

CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ARCHITECT OF ANY DISCREPANCIES BEFORE WORK COMMENCES.
DO NOT SCALE DRAWINGS.

revision

CITY'S FILE NO.: Dxx-xx-xx-xxxx

PLAN NO.: xxxxx

Appendix B WASTEWATER SERVICING

B.1 SANITARY SEWER DESIGN SHEET

Stantec

SUBDIVISION: **HOLLAND CROSS**

DATE: 2023-02-24
REVISION: 3
DESIGNED BY: WAJ
CHECKED BY:

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160410274

DESIGN PARAMETERS

MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	280 L/p/day	MINIMUM VELOCITY	0.60 m/s
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	28,000 L/ha/day	MAXIMUM VELOCITY	3.00 m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000 L/ha/day	MANNINGS n	0.013
PEAKING FACTOR (ICI >20%):	1.5	INDUSTRIAL (LIGHT)	35,000 L/ha/day	BEDDING CLASS	B
PERSONS / STUDIO	1.4	INSTITUTIONAL	28,000 L/ha/day	MINIMUM COVER	2.50 m
PERSONS / 1 BEDROOM	1.4	INFILTRATION	0.33 L/s/ha	HARMON CORRECTION FACTOR	0.8
PERSONS / 1 BEDROOM + DEN	2.1	PERSONS / 2 BEDROOM + DEN	3.1		
PERSONS / 2 BEDROOM	2.1	PERSONS / GUEST	1.4		

LOCATION			RESIDENTIAL AREA AND POPULATION											COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE					
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA	STUDIO	1 BEDROOM	1 BEDROOM + DEN	2 BEDROOM	2 BEDROOM + DEN	GUEST	POP.	CUMULATIVE AREA	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	PEAK FLOW	TOTAL AREA	ACCU. AREA	INFILT. FLOW	FLOW	LENGTH	DIA	MATERIAL	CLASS	SLOPE	CAP. (FULL)
			(ha)								(ha)			(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(m)	(mm)			(%)	(l/s)
SITE	BLDG	SAN 2	0.360	18	110	51	101	0	1	500	0.360	500	3.97	6.44	0.0054	0.005	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.00	0.365	0.365	0.12	6.56	4.7	250	PVC	SDR 35	1.00	60.6
	SAN 2	SAN 1	0.000	0	0	0	0	0	0	0	0.360	500	3.97	6.44	0.0000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.000	0.365	0.12	6.56	11.1	250	PVC	SDR 35	1.00	60.6
																															250				

CAP. V PEAK FLOW (%)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
10.82%	1.22	0.67
10.82%	1.22	0.67

Appendix C STORMWATER MANAGEMENT

C.1 STORM SEWER DESIGN SHEET

Stantec

HOLLAND CROSS

DATE: 2022-01-19
REVISION: 2
DESIGNED BY: WAJ
CHECKED BY:

STORM SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160410274

DESIGN PARAMETERS

$I = a / (t+b)^c$ (As per City of Ottawa Guidelines, 2012)

	1:2 yr	1:5 yr	1:10 yr	1:100 yr
a =	732.951	998.071	1174.184	1735.688
b =	6.199	6.053	6.014	6.014
c =	0.810	0.814	0.816	0.820

MANNING'S n = 0.013
MINIMUM COVER: 2.00 m
TIME OF ENTRY 10 min
BEDDING CLASS B

LOCATION			DRAINAGE AREA																					PIPE SELECTION											
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (2-YEAR) (ha)	AREA (5-YEAR) (ha)	AREA (10-YEAR) (ha)	AREA 100-YEAR (ha)	AREA (ROOF) (ha)	C (2-YEAR) (-)	C (5-YEAR) (-)	C (10-YEAR) (-)	C 100-YEAR (-)	A x C (2-YEAR) (ha)	ACCUM AxC (2YR) (ha)	A x C (5-YEAR) (ha)	ACCUM. AxC (5YR) (ha)	A x C (10-YEAR) (ha)	ACCUM. AxC (10YR) (ha)	A x C (100-YEAR) (ha)	ACCUM. AxC (100YR) (ha)	T of C (min)	$I_{2\text{-YEAR}}$ (mm/h)	$I_{5\text{-YEAR}}$ (mm/h)	$I_{10\text{-YEAR}}$ (mm/h)	$I_{100\text{-YEAR}}$ (mm/h)	$Q_{CONTROL}$ (L/s)	ACCUM. $Q_{CONTROL}$ (L/s)	Q_{ACT} (CIA/360) (L/s)	LENGTH (m)	PIPE WIDTH OR DIAMETE (mm)	PIPE HEIGHT (mm)	PIPE SHAPE (-)	MATERIAL (-)	CLASS (-)	SLOPE %	Q_{CAP} (FULL) (L/s)	% FULL (-)	VEL. (FULL) (m/s)	VEL. (ACT) (m/s)	TIME OF FLOW (min)
BLDG, L101A	BLDG	MAIN	0.100	0.00	0.00	0.00	0.13	0.90	0.00	0.00	0.00	0.090	0.090	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	9.5	9.5	28.7	14.0	200	200	CIRCULAR	PVC	SDR 28	1.00	33.3	**86.0%**	1.05	1.05	0.22
																				10.22									200	200									

C.2 RATIONAL METHOD CALCULATIONS

Stormwater Management Calculations

File No: **160410274**
Project: **Holland Cross**
Date: **19-Jan-22**

SWM Approach:
Post-development to Pre-development flows

Post-Development Site Conditions:

Overall Runoff Coefficient for Site and Sub-Catchment Areas

Runoff Coefficient Table

Catchment Type	Sub-catchment Area ID / Description		Area (ha) "A"		Runoff Coefficient "C"	"A x C"		Overall Runoff Coefficient
Controlled - Tributary	L101A	Hard	0.100		0.9	0.090		
		Soft	0.000		0.2	0.000		
		Subtotal		0.1			0.09	0.900
Uncontrolled - Non-Tributary	UNC-1	Hard	0.039		0.9	0.035		
		Soft	0.011		0.2	0.002		
		Subtotal		0.05			0.0375	0.750
Roof	BLDG	Hard	0.130		0.9	0.117		
		Soft	0.000		0.2	0.000		
		Subtotal		0.13			0.117	0.900
Total			**0.280**				**0.245**	
Overall Runoff Coefficient= C:								**0.87**

Total Roof Areas	**0.130 ha**
Total Tributary Surface Areas (Controlled and Uncontrolled)	**0.100 ha**
Total Tributary Area to Outlet	**0.230 ha**
Total Uncontrolled Areas (Non-Tributary)	**0.050 ha**
Total Site	**0.280 ha**

Project #160410274, Holland Cross
Roof Drain Design Sheet, Area BLDG
Standard Watts Model R1100 Accutrol Roof Drain

Rating Curve				Volume Estimation				
Elevation (m)	Discharge Rate (cu.m/s)	Outlet Discharge (cu.m/s)	Storage (cu. m)	Elevation (m)	Area (sq. m)	Volume (cu. m) Increment	Volume (cu. m) Accumulated	Water Depth (m)
0.000	0.0000	0.0000	0	0.000	0	0	0	0.000
0.025	0.0003	0.0047	0	0.025	29	0	0	0.025
0.050	0.0006	0.0095	2	0.050	116	2	2	0.050
0.075	0.0006	0.0095	7	0.075	260	5	7	0.075
0.100	0.0006	0.0095	15	0.100	462	9	15	0.100
0.125	0.0006	0.0095	30	0.125	722	15	30	0.125
0.150	0.0006	0.0095	52	0.150	1040	22	52	0.150

Drawdown Estimate			
Total Volume (cu.m)	Total Time (sec)	Vol (cu.m)	Detention Time (hr)
0.0	0.0	0.0	0
1.7	178.1	1.7	0.04946
6.3	483.3	4.6	0.18372
15.2	941.2	8.9	0.44518
29.9	1551.8	14.7	0.87622
51.8	2314.9	21.9	1.51926

Rooftop Storage Summary

Total Building Area (sq.m)		1300	
Assume Available Roof Area (sq.	80%	1040	
Roof Imperviousness		0.99	
Roof Drain Requirement (sq.m/Notch)		232	
*** Number of Roof Notches*		15	
Max. Allowable Depth of Roof Ponding (m)		0.15	* As per Ontario Building Code section OBC 7.4.10.4.(2)(c).
Max. Allowable Storage (cu.m)		52	
Estimated 100 Year Drawdown Time (h)		1.3	

From Watts Drain Catalogue

Head (m)	L/s Open	0.75	0.5	0.25	**Closed**
0.025	0.3155	0.3155	0.3155	0.3155	**0.3155**
0.05	0.6309	0.6309	0.6309	0.6309	**0.6309**
0.075	0.9464	0.8675	0.7886	0.7098	**0.6309**
0.1	1.2618	1.1041	0.9464	0.7886	**0.6309**
0.125	1.5773	1.3407	1.1041	0.8675	**0.6309**
0.15	1.8927	1.5773	1.2618	0.9464	**0.6309**

* Note: Number of drains can be reduced if multiple-notch drain used.

Calculation Results	2yr	100yr	Available
Qresult (cu.m/s)	0.009	0.009	-
Depth (m)	0.083	0.139	0.150
Volume (cu.m)	9.3	42.7	52.0
Draintime (hrs)	0.3	1.3	

Stormwater Management Calculations

Project #160410274, Holland Cross
Modified Rational Method Calculatons for Storage

2 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	732.951
b =	6.199
c =	0.81

t (min)	I (mm/hr)
10	76.81
20	52.03
30	40.04
40	32.86
50	28.04
60	24.56
70	21.91
80	19.83
90	18.14
100	16.75
110	15.57
120	14.56

2 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 0.2800
C: 0.86

Typical Time of Concentration

tc (min)	I (2 yr) (mm/hr)	Qtarget (L/s)
10	76.81	**51.46**

2 YEAR Modified Rational Method for Entire Site

Subdrainage Area: L101A — Controlled - Tributary
Area (ha): 0.10
C: 0.90

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	19.22	18.77	0.45	**0.27**
20	52.03	13.02	18.77	0.00	0.00
30	40.04	10.02	18.77	0.00	0.00
40	32.86	8.22	18.77	0.00	0.00
50	28.04	7.02	18.77	0.00	0.00
60	24.56	6.14	18.77	0.00	0.00
70	21.91	5.48	18.77	0.00	0.00
80	19.83	4.96	18.77	0.00	0.00
90	18.14	4.54	18.77	0.00	0.00
100	16.75	4.19	18.77	0.00	0.00
110	15.57	3.90	18.77	0.00	0.00
120	14.56	3.64	18.77	0.00	0.00

Storage: Above CB

Orifice Equation: Q = CdA(2gh)^0.5 — Where C = 0.61
Orifice Diameter: 133.00 mm
Invert Elevation 62.53 m
T/G Elevation 62.71 m
Max Ponding Depth 0.07 m
Downstream W/L 58.20 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	62.78	0.25	18.77	0.27	19.00	OK

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.05
C: 0.75

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.81	8.01	8.01		
20	52.03	5.42	5.42		
30	40.04	4.17	4.17		
40	32.86	3.43	3.43		
50	28.04	2.92	2.92		
60	24.56	2.56	2.56		
70	21.91	2.28	2.28		
80	19.83	2.07	2.07		
90	18.14	1.89	1.89		
100	16.75	1.75	1.75		
110	15.57	1.62	1.62		
120	14.56	1.52	1.52		

Subdrainage Area: BLDG — Roof
Area (ha): 0.13 — Maximum Storage Depth: 150 mm
C: 0.90

tc (min)	I (2 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	76.81	24.98	9.46	15.52	**9.31**	82.9	0.00
20	52.03	16.92	9.46	7.46	8.95	81.9	0.00
30	40.04	13.02	9.46	3.56	6.41	74.5	0.00
40	32.86	10.69	9.46	1.23	2.94	55.6	0.00
50	28.04	9.12	8.58	0.54	1.61	45.3	0.00
60	24.56	7.99	7.63	0.35	1.27	40.3	0.00
70	21.91	7.13	6.89	0.24	1.01	36.4	0.00
80	19.83	6.45	6.28	0.17	0.79	33.2	0.00
90	18.14	5.90	5.79	0.11	0.62	30.6	0.00
100	16.75	5.45	5.37	0.08	0.47	28.4	0.00
110	15.57	5.06	5.01	0.05	0.34	26.5	0.00
120	14.56	4.74	4.70	0.03	0.24	24.8	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
2-year Water Level	82.89	0.08	9.46	9.31	52.00	0.00

Project #160410274, Holland Cross
Modified Rational Method Calculatons for Storage

100 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	1735.688
b =	6.014
c =	0.820

t (min)	I (mm/hr)
10	178.56
20	119.95
30	91.87
40	75.15
50	63.95
60	55.89
70	49.79
80	44.99
90	41.11
100	37.90
110	35.20
120	32.89

100 YEAR Predevelopment Target Release from Portion of Site

Subdrainage Area: Predevelopment Tributary Area to Outlet
Area (ha): 0.2800
C: 0.86

100 YEAR Modified Rational Method for Entire Site

Subdrainage Area: L101A — Controlled - Tributary
Area (ha): 0.10
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	49.64	18.77	30.87	**18.52**
20	119.95	33.35	18.77	14.58	17.49
30	91.87	25.54	18.77	6.77	12.19
40	75.15	20.89	18.77	2.12	5.09
50	63.95	17.78	18.77	0.00	0.00
60	55.89	15.54	18.77	0.00	0.00
70	49.79	13.84	18.77	0.00	0.00
80	44.99	12.51	18.77	0.00	0.00
90	41.11	11.43	18.77	0.00	0.00
100	37.90	10.54	18.77	0.00	0.00
110	35.20	9.79	18.77	0.00	0.00
120	32.89	9.14	18.77	0.00	0.00

Storage: Surface Storage Above CB

Orifice Equation: Q = CdA(2gh)^0.5 — Where C = 0.61
Orifice Diameter: 133.00 mm
Invert Elevation 62.53 m
T/G Elevation 62.71 m
Max Ponding Depth 0.07 m
Downstream W/L 58.20 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	62.78	0.25	18.77	18.52	19.00	OK
					0.48	

Subdrainage Area: UNC-1 — Uncontrolled - Non-Tributary
Area (ha): 0.05
C: 0.94

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.56	23.27	23.27		
20	119.95	15.63	15.63		
30	91.87	11.97	11.97		
40	75.15	9.79	9.79		
50	63.95	8.33	8.33		
60	55.89	7.28	7.28		
70	49.79	6.49	6.49		
80	44.99	5.86	5.86		
90	41.11	5.36	5.36		
100	37.90	4.94	4.94		
110	35.20	4.59	4.59		
120	32.89	4.29	4.29		

Subdrainage Area: BLDG — Roof
Area (ha): 0.13 — Maximum Storage Depth: 150 mm
C: 1.00

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)	Depth (mm)	
10	178.56	64.53	9.46	55.07	33.04	128.4	0.00
20	119.95	43.35	9.46	33.89	40.66	137.1	0.00
30	91.87	33.20	9.46	23.74	**42.73**	139.4	0.00
40	75.15	27.16	9.46	17.69	42.47	139.1	0.00
50	63.95	23.11	9.46	13.65	40.95	137.4	0.00
60	55.89	20.20	9.46	10.74	38.65	134.8	0.00
70	49.79	17.99	9.46	8.53	35.83	131.5	0.00
80	44.99	16.26	9.46	6.80	32.62	127.9	0.00
90	41.11	14.86	9.46	5.39	29.13	123.4	0.00
100	37.90	13.70	9.46	4.23	25.41	117.0	0.00
110	35.20	12.72	9.46	3.26	21.51	110.4	0.00
120	32.89	11.89	9.46	2.42	17.46	103.5	0.00

Storage: Roof Storage

	Depth (mm)	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Discharge Check
100-year Water Level	139.42	0.14	9.46	42.73	52.00	0.00

Stormwater Management Calculations

Project #160410274, Holland Cross
Modified Rational Method Calculatons for Storage

SUMMARY TO OUTLET

		Vrequired	Vavailable*	
Tributary Area	0.230 ha			
Total 2yr Flow to Sewer	28.2 L/s	10	71 m^3	Ok
Non-Tributary Area	0.050 ha			
Total 2yr Flow Uncontrolled	8.0 L/s			
Total Area	0.280 ha			
Total 2yr Flow	36.2 L/s			
Target	51.5 L/s			

Project #160410274, Holland Cross
Modified Rational Method Calculatons for Storage

SUMMARY TO OUTLET

		Vrequired	Vavailable*	
Tributary Area	0.230 ha			
Total 100yr Flow to Sewer	28.2 L/s	61	71 m^3	Ok
Non-Tributary Area	0.050 ha			
Total 100yr Flow Uncontrolled	23.3 L/s			
Total Area	0.280 ha			
Total 100yr Flow	51.5 L/s			
Target	51.5 L/s			

Appendix D DESIGN CRITERIA AND REPORT EXCERPTS

D.1 2013 HOLLAND CROSS EXPANSION SWM REPORT EXCERPTS

NOVATECH

Engineers, Planners & Landscape Architects

Engineering

- Land / Site Development
- Municipal Infrastructure
- Environmental / Water Resources
- Traffic/ Transportation
- Structural
- Recreational

Planning

- Land/Site Development
- Planning Application Management
- Municipal
- Planning Documents & Studies
- Expert Witness (OMB)
- Wireless Industry

Landscape Architecture

- Urban Design & Streetscapes
- Recreation & Parks Planning
- Environmental Restoration
- Sustainable Design

32 Years

HOLLAND CROSS EXPANSION
CITY OF OTTAWA

SERVICING & STORMWATER MANAGEMENT REPORT

HOLLAND CROSS EXPANSION
CITY OF OTTAWA

SERVICING & STORMWATER MANAGEMENT REPORT

Prepared For:

Colonnade Development Ltd.
16 Concourse Gate, Suite 200
Ottawa, Ontario
K2E 7S8

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

December 2013
Revised August 2014

Novatech File: 113150
Ref: R-2013-108

NOVATECH
Engineers, Planners & Landscape Architects

August 25, 2014

City of Ottawa
Planning and Growth Management Department
Development Review (Urban) Services Branch
Infrastructure Approvals Division
110 Laurier Avenue West
Ottawa, ON K1P 1J1

Attention: Kristin Bazinet

Dear Madam:

Re: 1560 Scott Street – Holland Cross Expansion
Servicing Design Brief
Our File No.: 113150

Please find enclosed six (6) copies of the Holland Cross Expansion – Servicing and Stormwater Management Report, dated August 2014. This report has been revised per City comments and is hereby submitted for approval.

If you have any questions, please contact the undersigned.

Yours truly,

NOVATECH

Cara Ruddle, P.Eng.
Project Manager

cc: Kelly Rhodenizer, Colonnade Development Ltd.

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1.0 INTRODUCTION

Novatech Engineering Consultants Ltd. has been retained by Colonnade Development Ltd. to prepare a Servicing and Stormwater Management Report in support of the re-zoning and site plan applications. The site is located at 1560 Scott Street on the southeast corner of the intersection of Scott Street and Holland Street in the City of Ottawa. Figure 1 is a Key Plan showing the site location.

2.0 EXISTING AND PROPOSED DEVELOPMENT

The property is approximately 3.2 hectares in size and is currently occupied by an existing seven storey tall complex consisting of two six storey office towers on top of a 1 storey retail podium. The site is bounded by office buildings to the north (Holland Cross), residential housing to the east and west, and residential condominiums to the south. Figure 2 shows the existing conditions of the site.

It is proposed to demolish part of the existing 1 storey retail building, and to construct a 12 storey office building (approximately 18,000ft^2 per floor) over the existing parking garage. Therefore, the building footprint will remain the same. Underground parking is already provided as part of the previous development. Refer to Figure 3 – Proposed Site Plan for details.

3.0 WATERMAIN SERVICING

The existing building complex is serviced by two 150mm diameter water services from Holland Ave and Bullman St, and one 50mm diameter water service from Scott Street. These existing water services connect to the municipal water system surrounding the existing development. The internal building water system will be extended to service the proposed development. Refer to Figure 4 – Existing Services for details on the existing water system.

Hydraulic boundary conditions were provided by the City of Ottawa and are as follows:

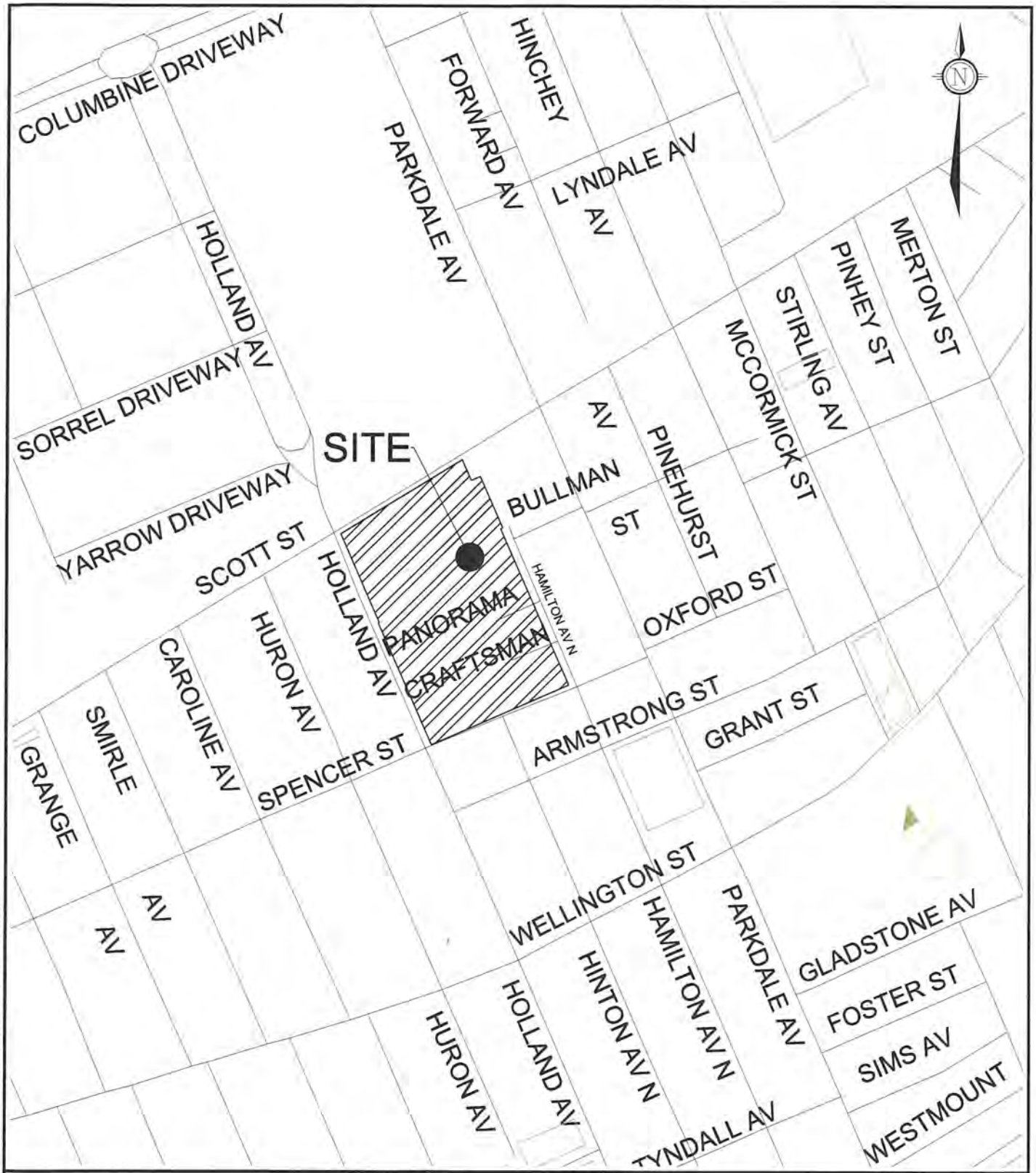
Minimum HGL = 107.4m
Maximum HGL = 115.8m
Max Day + FF = 77.5m

3.1 Domestic Water Demand

The following domestic water demands are based on the City of Ottawa Water Distribution Guidelines (Gross Site Area), and the Ontario Building Code, OBC, (Gross Floor Area). The Gross Floor Area method results in a more conservative value, which is used for this report. Refer to Appendix A for detailed calculations.

Estimated water demands for the entire complex including the proposed expansion are as follows:

$Q_{avg\ day}$ = (47,409m^2 / 9.3 m^2/pers) x 75L/pers/day
$Q_{avg\ day}$ = 382,331L/day = 4.43 L/s



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CONSULTANTS LTD.
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Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

1560 SCOTT STREET - HOLLAND CROSS PHASE 3

KEY PLAN

DEC 2013 113150 FIGURE 1

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SCALE

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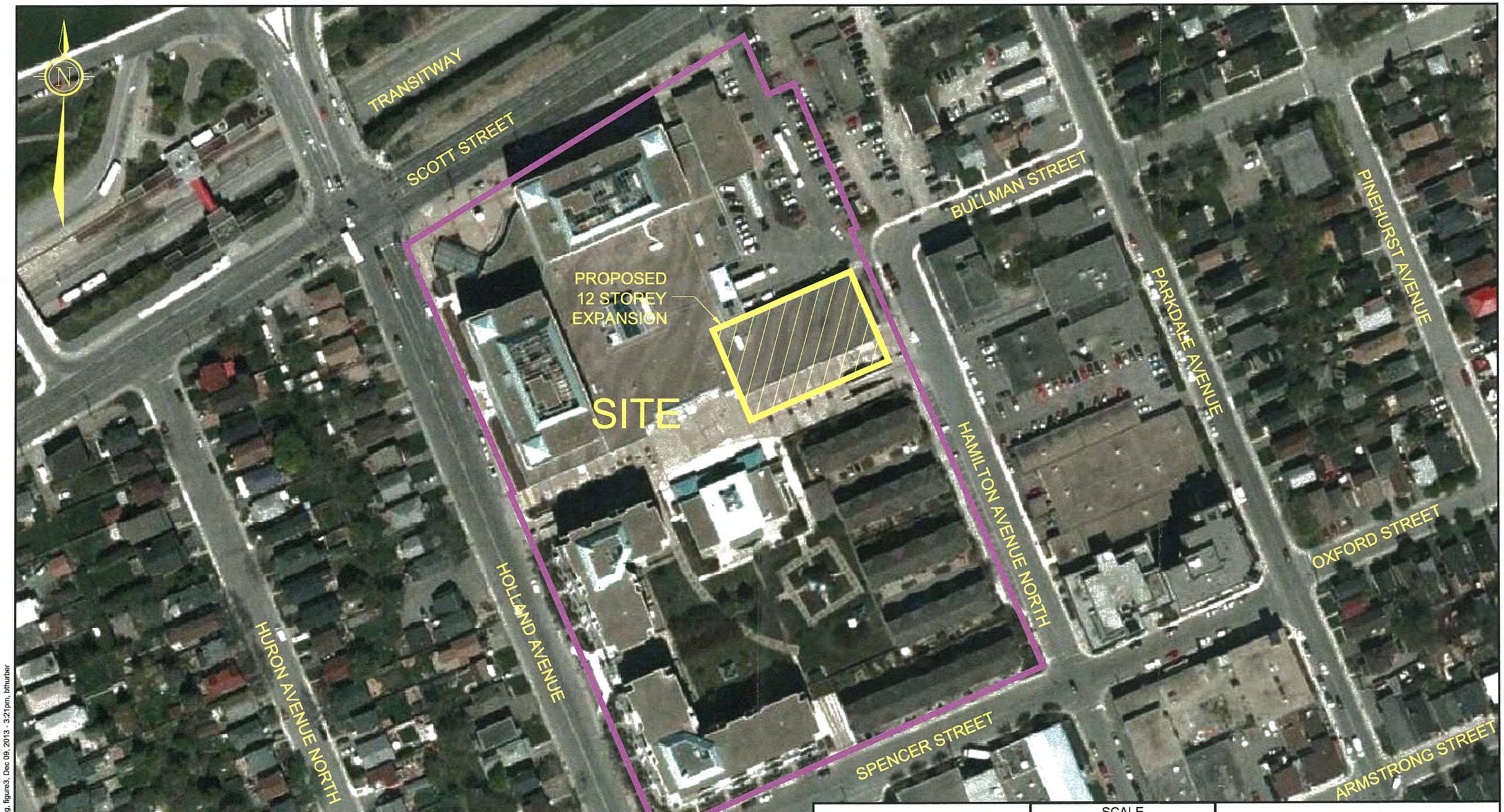
1560 SCOTT STREET - HOLLAND CROSS PHASE 3

EXISTING SITE CONDITIONS

DEC 2013 113150 FIGURE 2



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1560 SCOTT STREET - HOLLAND CROSS PHASE 3

PROPOSED SITE PLAN

DEC 2013 113150 FIGURE 3

364-029

SCOTT

BULLMAN

PINEHURST

HOLLAND

PANORAMA

CRAFTSMAN

HURON

OXFORD

CAVE CREEK TRUNK COLLECTOR

1650mm

1500mm

SA1050mm

SA375mm

SA300mm

SA250mm

SA900mm

ST1650mm

ST1800mm

ST1750mm

ST1450mm

ST600mm

ST525mm

ST375mm

ST300mm

1050mm

SA600mm

203 PVC-1994

406 PVC

406 DI

1067 STC-1950

152 UCI

152 PVC-1992

152 PVC-1997

203 PVC-1998

203 PVC-2000

203 PVC

208 PVC-1998

315 PVC

V083 V084 V085 V086 L V087 L V088 V090 V122 V124 V134 V261 V318 V372 V373 V374 V375 V398 V399 V427 V428 V459

H017 H018 H019 H022 H023 H080 H115 H118 H150 H178

P009 A P352

LEGENDS:

SANITARY

STORMWATER

WATERMAIN

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1560 SCOTT STREET - HOLLAND CROSS PHASE 3

EXISTING SERVICING

DEC 2013 113150 FIGURE 4

3.2 Fire Demand

For this type of building, the existing underground parking garage is classified as "Ordinary Hazard" (Group 1), and the new office building is classified as "Light Hazard." The calculations for required fire flow are based on the existing garage; therefore there is only a marginal increase in the required fire flow for the new addition.

The required fire demand is calculated using the Fire Underwriters Survey (FUS) Guidelines. The required fire demand is calculated to be 100L/s using the FUS method. Using the National Fire Protection Association (NFPA) Standard for Sprinkler Systems the supply requirement is 41.0L/s for the sprinklers and hoses. Refer to Appendix A for detailed calculations.

According to the hydraulic boundary conditions provided by the City, the existing 200mm dia. watermain on Hamilton Street and Bullman Avenue has a hydraulic grade line of 77.5m at the maximum day demand plus a fire demand of 92.7L/s. This results in 92.7L/s of fire flow available at 22.4psi. Therefore the existing municipal watermain can provide the fire demand at a pressure greater than 20 psi.

4.0 SANITARY SERVICING

The existing building is serviced by a 150mm diameter sanitary which connects to an existing 250mm diameter sanitary sewer within the Hamilton Street right-of-way. It is proposed to extend the internal plumbing to service the proposed development.

A review of the existing downstream sewer system is required to ensure there are no capacity issues. The sanitary flows from the proposed development are calculated to be 2.8L/s. Drainage areas and flows have been calculated for the downstream area and input into a sanitary sewer design sheet. There appears to be no issue with capacity in the existing sanitary sewer system due to the proposed development. Refer to Appendix B for flow calculations, the drainage area plan and sanitary sewer design sheet.

5.0 STORM SERVICING

5.1 Existing Drainage and Servicing

As indicated previously, the site is currently developed with single storey building as part of an existing office and retail development. The existing building is serviced by an existing 200mm storm service that connects to a 450mm diameter storm sewer at the Hamilton Avenue / Bullman Street intersection.

Stormwater from the building areas flow into roof drains and outlets to storm services which connect to the City storm sewer system along Scott Street, Holland Avenue and Hamilton Avenue. The remaining parking area sheet drains to catchbasins which outlet to the City storm sewer system on Scott Street.

5.2 Proposed Site Drainage

Stormwater from the proposed development will drain to roof drains and outlet to the existing storm service per existing conditions and continue to outlet to the existing storm sewer on Hamilton Avenue.

5.3 Stormwater Management

The building footprint will not change from existing conditions. Therefore, there is no increase in storm flows from the proposed development and stormwater management is not required.

6.0 EROSION AND SEDIMENT CONTROL MEASURES

6.1 Temporary Measures

Temporary erosion and sediment control measures will be implemented during construction. Silt fence and filter cloth catches will be used as erosion and sediment control measures. Details are provided on Figure 7.

Filter cloth catches should be inspected daily, and after every rain event to determine maintenance, repair or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions of this report are as follows:

- Water servicing, including both domestic and fire protection, can be provided by connection to the existing watermain infrastructure along Bullman Street.
- Sanitary flows for the proposed development have been calculated and there is sufficient capacity within the existing City sanitary sewer system along Bullman Street to service the development.
- Quantity and quality control of stormwater is not required, as there will be no change to the existing stormwater drainage.
- The existing overland flow route will be maintained.
- Erosion and sediment control measures will be implemented during construction.

NOVATECH

Prepared by:

Cara Ruddle, P.Eng.
Project Manager

Reviewed by:

J. Lee Sheets, CET
Sr. Project Manager

APPENDIX A

Watermain Information

The following are boundary conditions (provided by the City of Ottawa), HGL, for hydraulic analysis at 150 Holland Avenue assumed to be connected to the 200mm on Hamilton Street and Bullman Avenue.

Minimum HGL = 107.4m

Maximum HGL = 115.8m

Max Day + FF (92.7 L/s) = 77.5m

These are for current conditions and are based on computer model simulation.

Pressure Check:

Centreline of road at the intersection of Hamilton Street and Bullman Avenue = 61.7m (refer to the City as-built drawings)

2.31ft = 1 psi

Maximum HGL = (115.8m - 61.7m) x 3.281ft/m ÷ 2.31ft/1psi = 76.8psi

Minimum HGL = (107.4m - 61.7m) x 3.281ft/m ÷ 2.31ft/1psi = 64.9psi

- The system has adequate pressure under peak hour demand condition.

Fire Flow Check

Max Day + FF (92.7L/s) = (77.5m - 61.7m) x 3.281ft/m ÷ 2.31ft/1psi = 22.4psi

- The system has adequate pressure for fire flow conditions.

NOVATECH ENGINEERING CONSULTANTS LTD. ENGINEERS & PLANNERS

1560 Scott Street
HYDRAULIC ANALYSIS

Job no. 113150

12 Storey New Expansion
Water Demand

Node	Area	Demand (L/s)		
		Average Day	Max. Daily	Peak Hour
Gross Floor Area (m^2)				
New	19564	1.83	2.74	3.29
Existing	27845	2.60	3.90	7.02
Total	**47409**	**4.43**	**6.64**	**10.30**
Gross Site Area (ha)				
New	0.0	0.00	0.00	0.00
Existing	1.7	0.53	0.80	1.44
Total	**1.7**	**0.53**	**0.80**	**1.44**

Notes:

1. All water demand calculations based on the City of Ottawa Design Guidelines for Water Distribution Table 4.2.
2. Water Demand is based assuming all lands to be Other Commercial with a demand of 28,000L/gross ha/d.
3. Peaking Factors: Maximum Daily Demand = 1.5 average daily demand ; Peak Hour = 1.8 max daily demand.
4. Gross Floor Area demand calculations based on Ontario Building Code; 9.3 m^2/pers and 75 L/pers/day

Prepared By:
NOVATECH ENGINEERING CONSULTANTS LTD.
Date: December 9, 2013

12 Storey Office Building
Fire Flow Calculations - Holland Cross Expansion

As per Fire Underwriter's Survey Guidelines

PROJECT: Holland Cross Expansion **DATE: December 12, 2013**

JOB#: 113150

C Coefficient related to type of construction [yes/no]

• Wood frame		1.5
• Ordinary construction		1
• Non-combustible construction		0.8
• Fire resistive construction (> 3 hrs)	yes	0.6
• Interpolation (Using FUS Tables)		

Foot Print of New Tower	18,610 ft^2
Gross Floor area of Expanded Common Podium	99,060 ft^2
Gross Floor area of Existing Garage	129,920 ft^2

A Area of structure considered (m^2) 5,320 <==> **57,269** ft^2

(All floors excluding Basement, under 2-Storeys)

*Note: This assumes protected openings, and considers 40% of the common 1 storey podium, plus 25% of the GFA of each of the two adjacent floors (New Tower + 40% of Garage)

F Required fire flow (L/min)

$F = 220\ C\ (A)^{0.5}$ ***10,000 L/min***

Occupancy hazard reduction of surcharge [yes/no]

• Non-combustible		-25%	
• Limited combustible	yes	-15%	* Due to Parking Garage
• Combustible		0%	
• Free burning		15%	
• Rapid burning		25%	

8,500 L/min (1)

Sprinkler Reduction

• Non-combustible - Fire Resistive (3)	yes	50%	***4,250 L/min*** (2)

Exposure surcharge (cumulative (%)) [yes/no]

0 - 3 m		25%		
3.1 - 10 m		20%		
10.1 - 20 m	yes	15%	1 side	15%
20.1 - 30 m	yes	10%	1 side	10%
30.1- 45 m	no	5%	1 side	
		Cumulative Total		**25%**

2,125 L/min

Fire Wall Separation

• Number of Party Walls * 1000 L/min

(As per City of Ottawa Standard) ***2,125 L/min*** (3)

REQUIRED FIRE FLOW [(1) - (2) + (3)]		***6,000 L/min***
(2,000 L/min < Fire Flow < 45,000 L/min)	***or***	***100 L/s***
Rounded to nearest 1000L/min	***or***	***1,321 IGPM***

BY: *Alex McAuley*

6-4.5.9* For individual fasteners, the loads determined in 6-4.5.6 shall not exceed the allowable loads provided in Figure 6-4.5.9.

The type of fasteners used to secure the bracing assembly to the structure shall be limited to those shown in Figure 6-4.5.9. For connections to wood, through bolts with washers on each end shall be used. Holes for through bolts shall be $^1/_{16}$ in. (1.6 mm) greater than the diameter of the bolt.

Exception No. 1: Where it is not practical to install through bolts due to the thickness of the member or inaccessibility, lag screws shall be permitted. Holes shall be pre-drilled $^1/_8$ in. (3.2 mm) smaller than the maximum root diameter of the lag screw.

Exception No. 2: Other fastening methods are acceptable for use if certified by a registered professional engineer to support the loads determined in accordance with the criteria in 6-4.5.9. Calculations shall be permitted where required by the authority having jurisdiction.

6-4.5.10 Sway bracing assemblies shall be listed for a maximum load rating. The loads shall be reduced as shown in Table 6-4.5.10 for loads that are less than 90 degrees from vertical.

Exception: Where sway bracing utilizing pipe, angles, flats, or rods as shown in Table 6-4.5.8 is used, the components do not require listing. Bracing fittings and connections used with those specific materials shall be listed.

Table 6-4.5.10 Allowable Horizontal Load on Brace Assemblies Based on the Weakest Component of the Brace Assembly

Brace Angle	Allowable Horizontal Load
30–40 degrees from vertical	Listed load rating divided by 2.000
45–59 degrees from vertical	Listed load rating divided by 1.414
60–89 degrees from vertical	Listed load rating divided by 1.155
90 degrees from vertical	Listed load rating

6-4.5.11 Bracing shall be attached directly to feed and cross mains. Each run of pipe between changes in direction shall be provided with both lateral and longitudinal bracing.

Exception: Pipe runs less than 12 ft (3.6 m) in length shall be permitted to be supported by the braces on adjacent runs of pipe.

6-4.5.12 A length of pipe shall not be braced to sections of the building that will move differentially.

6-4.6 Restraint of Branch Lines.

6-4.6.1* Restraint is considered a lesser degree of resisting loads than bracing and shall be provided by use of one of the following:

(1) A listed sway brace assembly
(2) A wraparound U-hook satisfying the requirements of 6-4.5.3, Exception No. 3
(3) No. 12, 440-lb (200-kg) wire installed at least 45 degrees from the vertical plane and anchored on both sides of the pipe
(4) Other approved means

Wire used for restraint shall be located within 2 ft (610 mm) of a hanger. The hanger closest to a wire restraint shall be of a type that resists upward movement of a branch line.

6-4.6.2 The end sprinkler on a line shall be restrained against excessive vertical and lateral movement.

6-4.6.3* Where upward or lateral movement would result in an impact against the building structure, equipment, or finish materials, branch lines shall be restrained at intervals not exceeding 30 ft (9 m).

6-4.6.4* Sprig-ups 4 ft (1.2 m) or longer shall be restrained against lateral movement.

6-4.7 Hangers and Fasteners Subject to Earthquakes.

6-4.7.1 C-type clamps (including beam and large flange clamps) used to attach hangers to the building structure in areas subject to earthquakes shall be equipped with a restraining strap. The restraining strap shall be listed for use with a C-type clamp or shall be a steel strap of not less than 16 gauge thickness and not less than 1 in. (25.4 mm) wide for pipe diameters 8 in. (203 mm) or less and 14 gauge thickness and not less than $1^1/_4$ in. (31.7 mm) wide for pipe diameters greater than 8 in. (203 mm). The restraining strap shall wrap around the beam flange not less than 1 in. (25.4 mm). A lock nut on a C-type clamp shall not be used as a method of restraint. A lip on a "C" or "Z" purlin shall not be used as a method of restraint.

Where purlins or beams do not provide an adequate lip to be secured by a restraining strap, the strap shall be through-bolted or secured by a self-tapping screw.

6-4.7.2 C-type clamps (including beam and large flange clamps), with or without restraining straps, shall not be used to attach braces to the building structure.

6-4.7.3 Powder-driven fasteners shall not be used to attach braces to the building structure.

Exception: Powder-driven fasteners shall be permitted where they are specifically listed for service in resisting lateral loads in areas subject to earthquakes.

6-4.7.4 Powder-driven fasteners shall not be used to attach hangers to the building structure where the systems are required to be protected against earthquakes using a horizontal force factor exceeding 0.50 W_p, where W_p is the weight of the water-filled pipe.

Exception: Powder-driven fasteners shall be permitted where they are specifically listed for horizontal force factors in excess of 0.50 W_p.

Chapter 7 Design Approaches

7-1 General.

7-1.1 Water demand requirements shall be determined from the occupancy hazard fire control approach of Section 7-2.

Exception: Special design approaches as permitted in Section 7-9.

7-1.2 For buildings with two or more adjacent occupancies that are not physically separated by a barrier or partition capable of delaying heat from a fire in one area from fusing sprinklers in the adjacent area, the required sprinkler protection for the more demanding occupancy shall extend 15 ft (4.6 m) beyond its perimeter.

7-2 Occupancy Hazard Fire Control Approach.

7-2.1 Occupancy Classifications.

7-2.1.1 Occupancy classifications for this standard relate to sprinkler installations and their water supplies only. They shall not be used as a general classification of occupancy hazards.

7-2.1.2 Occupancies or portions of occupancies shall be classified according to the quantity and combustibility of contents, the expected rates of heat release, the total potential for energy release, the heights of stockpiles, and the presence of flammable and combustible liquids, using the definitions contained in Section 1-4. Classifications are as follows:

Light hazard

Ordinary hazard (Groups 1 and 2)

Extra hazard (Groups 1 and 2)

Special occupancy hazard *(see Section 7-10)*

7-2.2 Water Demand Requirements — Pipe Schedule Method.

7-2.2.1 Table 7-2.2.1 shall be used in determining the minimum water supply requirements for light and ordinary hazard occupancies protected by systems with pipe sized according to the pipe schedules of Section 8-5. Pressure and flow requirements for extra hazard occupancies shall be based on the hydraulic calculation methods of 7-2.3. The pipe schedule method shall be permitted only for new installations of 5000 ft² (465 m²) or less or for additions or modifications to existing pipe schedule systems sized according to the pipe schedules of Section 8-5. Table 7-2.2.1 shall be used in determining the minimum water supply requirements.

Exception No. 1: The pipe schedule method shall be permitted for use in systems exceeding 5000 ft² (465 m²) where the flows required in Table 7-2.2.1 are available at a minimum residual pressure of 50 psi (3.4 bar) at the highest elevation of sprinkler.

Exception No. 2: The pipe schedule method shall be permitted for additions or modifications to existing extra hazard pipe schedule systems.

7-2.2.2 The lower duration value of Table 7-2.2.1 shall be acceptable only where remote station or central station waterflow alarm service is provided.

7-2.2.3* The residual pressure requirement of Table 7-2.2.1 shall be met at the elevation of the highest sprinkler. *(See the Exceptions to 7-2.2.1).*

7-2.2.4 The lower flow figure of Table 7-2.2.1 shall be permitted only where the building is of noncombustible construction or the potential areas of fire are limited by building size or compartmentation such that no open areas exceed 3000 ft² (279 m²) for light hazard or 4000 ft² (372 m²) for ordinary hazard.

Table 7-2.2.1 Water Supply Requirements for Pipe Schedule Sprinkler Systems

Occupancy Classification	Minimum Residual Pressure Required (psi)	Acceptable Flow at Base of Riser (Including Hose Stream Allowance) (gpm)	Duration (minutes)
Light hazard	15	500–750	30–60
Ordinary hazard	20	850–1500	60–90

For SI units, 1 gpm = 3.785 L/min; 1 psi = 0.0689 bar.

7-2.3 Water Demand Requirements — Hydraulic Calculation Methods.

7-2.3.1 General.

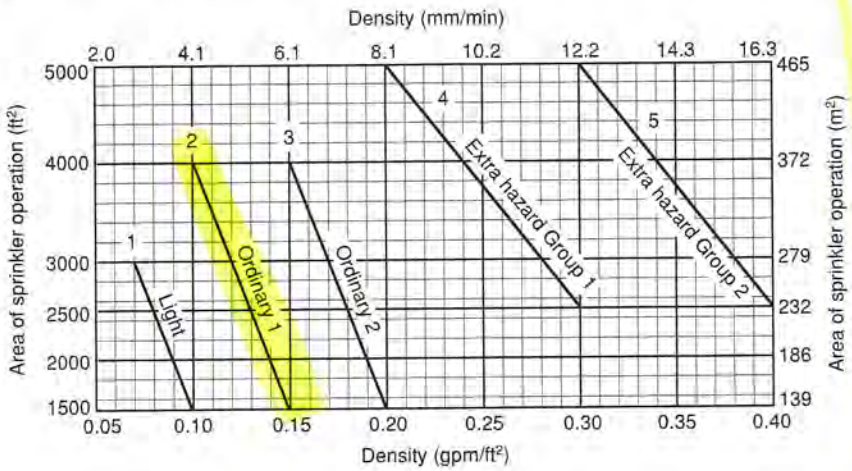
7-2.3.1.1* The minimum water supply requirements for a hydraulically designed occupancy hazard fire control sprinkler system shall be determined by adding the hose stream demand from Table 7-2.3.1.1 to the water supply for sprinklers determined in 7-2.3.1.2. This supply shall be available for the minimum duration specified in Table 7-2.3.1.1.

Exception No. 1: An allowance for inside and outside hose shall not be required where tanks supply sprinklers only.

Exception No. 2: Where pumps taking suction from a private fire service main supply sprinklers only, the pump need not be sized to accommodate inside and outside hose. Such hose allowance shall be considered in evaluating the available water supplies.

7-2.3.1.2 The water supply for sprinklers only shall be determined either from the area/density curves of Figure 7-2.3.1.2 in accordance with the method of 7-2.3.2 or be based upon the room design method in accordance with 7-2.3.3, at the discretion of the designer. For special areas under consideration, as described in 7-2.3.4, separate hydraulic calculations shall be required in addition to those required by 7-2.3.2 or 7-2.3.3.

Figure 7-2.3.1.2 Area/density curves.



TO BE CONSERVATIVE
-CURVE 2
4000ft² x 0.10 gpm/ft² = 400gpm

SPRINKLERS
400gpm => 25.2 L/s

HOSE DEMAND
250gpm => 15.8 L/s

TOTAL SUPPLY REQUIREMENT
650gpm => 41.0 L/s

7-2.3.1.3 Regardless of which of the two methods is used, the following restrictions shall apply:

(a) For areas of sprinkler operation less than 1500 ft² (139 m²) used for light and ordinary hazard occupancies, the density for 1500 ft² (139 m²) shall be used. For areas of sprinkler operation less than 2500 ft² (232 m²) for extra hazard occupancies, the density for 2500 ft² (232 m²) shall be used.

(b) *For buildings having unsprinklered combustible concealed spaces (as described in 5-13.1.1 and 5-13.7), the minimum area of sprinkler operation shall be 3000 ft² (279 m²).

Exception No. 1: Combustible concealed spaces filled entirely with noncombustible insulation.

*Exception No. 2: *Light or ordinary hazard occupancies where noncombustible or limited combustible ceilings are directly attached to the bottom of solid wood joists so as to create enclosed joist spaces 160 ft³ (4.8 m³) or less in volume.*

*Exception No. 3: *Concealed spaces where the exposed surfaces have a flame spread rating of 25 or less and the materials have been demonstrated to not propagate fire in the form in which they are installed in the space.*

(c) Water demand of sprinklers installed in racks or water curtains shall be added to the ceiling sprinkler water demand at the point of connection. Demands shall be balanced to the higher pressure. *(See Chapter 8.)*

(d) Water demand of sprinklers installed in concealed spaces or under obstructions such as ducts and cutting tables need not be added to ceiling demand.

(e) Where inside hose stations are planned or are required, a total water allowance of 50 gpm (189 L/min) for a single hose station installation or 100 gpm (378 L/min) for a multiple hose station installation shall be added to the sprinkler requirements. The water allowance shall be added in 50-gpm (189-L/min) increments beginning at the most remote hose station, with each increment added at the pressure required by the sprinkler system design at that point.

(f) When hose valves for fire department use are attached to wet pipe sprinkler system risers in accordance with 5-15.5.2, the water supply shall not be required to be added to standpipe demand as determined from NFPA 14, *Standard for the Installation of Standpipe and Hose Systems.*

Exception No. 1: Where the combined sprinkler system demand and hose stream allowance of Table 7-2.3.1.1 exceeds the requirements of NFPA 14, Standard for the Installation of Standpipe and Hose Systems, this higher demand shall be used.

Exception No. 2: For partially sprinklered buildings, the sprinkler demand, not including hose stream allowance, as indicated in Table 7-2.3.1.1 shall be added to the requirements given in NFPA 14, Standard for the Installation of Standpipe and Hose Systems.

(g) Water allowance for outside hose shall be added to the sprinkler and inside hose requirement at the connection to the city water main or a yard hydrant, whichever is closer to the system riser.

(h) The lower duration values in Table 7-2.3.1.1 shall be permitted where remote station or central station waterflow alarm service is provided.

(i) Where pumps, gravity tanks, or pressure tanks supply sprinklers only, requirements for inside and outside hose need not be considered in determining the size of such pumps or tanks.

7-2.3.1.4 Total system water supply requirements shall be determined in accordance with the hydraulic calculation procedures of Section 8-4.

7-2.3.2 Area/Density Method.

7-2.3.2.1 The water supply requirement for sprinklers only shall be calculated from the area/density curves in Figure 7-2.3.1.2 or from Section 7-10 where area/density criteria is specified for special occupancy hazards. When using Figure 7-2.3.1.2, the calculations shall satisfy any single point on the appropriate area/density curve as follows:

(1) Light hazard area/density curve 1
(2) Ordinary hazard (Group 1) area/density curve 2
(3) Ordinary hazard (Group 2) area/density curve 3
(4) Extra hazard (Group 1) area/density curve 4
(5) Extra hazard (Group 2) area/density curve 5

It shall not be necessary to meet all points on the selected curve.

Exception: Sprinkler demand for storage occupancies as determined in Sections 7-3 through 7-8.

7-2.3.2.2 For protection of miscellaneous storage, miscellaneous tire storage, and storage up to 12 ft (3.7 m) in height, the discharge criteria in Table 7-2.3.2.2 shall apply.

Table 7-2.3.1.1† Hose Stream Demand and Water Supply Duration Requirements for Hydraulically Calculated Systems

Occupancy or Commodity Classification	Inside Hose (gpm)	Total Combined Inside and Outside Hose (gpm)	Duration (minutes)
Light hazard	0, 50, or 100	100	30
Ordinary hazard	0, 50, or 100	250	60–90
Extra hazard	0, 50, or 100	500	90–120
Rack storage, Class I, II, and III commodities up to 12 ft (3.7 m) in height	0, 50, or 100	250	90
Rack storage, Class IV commodities up to 10 ft (3.1 m) in height	0, 50, or 100	250	90
Rack storage, Class IV commodities up to 12 ft (3.7 m) in height	0, 50, or 100	500	90
Rack storage, Class I, II, and III commodities over 12 ft (3.7 m) in height	0, 50, or 100	500	90
Rack storage, Class IV commodities over 12 ft (3.7 m) in height and plastic commodities	0, 50, or 100	500	120
General storage, Class I, II, and III commodities over 12 ft (3.7 m) up to 20 ft (6.1 m)	0, 50, or 100	500	90
General storage, Class IV commodities over 12 ft (3.7 m) up to 20 ft (6.1 m)	0, 50, or 100	500	120
General storage, Class I, II, and III commodities over 20 ft (6.1 m) up to 30 ft (9.1 m)	0, 50, or 100	500	120
General storage, Class IV commodities over 20 ft (6.1 m) up to 30 ft (9.1 m)	0, 50, or 100	500	150
General storage, Group A plastics ≤ 5 ft (1.5 m)	0, 50, or 100	250	90
General storage, Group A plastics over 5 ft (1.5 m) up to 20 ft (6.1 m)	0, 50, or 100	500	120
General storage, Group A plastics over 20 ft (6.1 m) up to 25 ft (7.6 m)	0, 50, or 100	500	150

For SI units, 1 gpm = 3.785 L/min.

Alex McAuley

From: White, Joshua <Joshua.White@ottawa.ca>
Sent: October-29-13 3:49 PM
To: Alex McAuley
Cc: Cara Ruddle
Subject: RE: Holland Cross - 1560 Scott Street

Good eye Alex. There was a mistake in the model. We are looking into it please find the revision below to the HGL.

The Max Day + FF HGL is actually 77.5m, not 112.2m.

Cheers

Josh

From: Alex McAuley [mailto:a.mcauley@novatech-eng.com]
Sent: October 11, 2013 11:28 AM
To: White, Joshua
Cc: Cara Ruddle
Subject: RE: Holland Cross - 1560 Scott Street

Josh,

Can you please double check the HGL below? The Max Day + Fire Flow is 4.8m above the Min HGL, which is unusual.

Thank you,

Alex McAuley, P.Eng
Project Engineer
****
Novatech Engineering Consultants Ltd
200-240 Michael Cowpland Drive
Ottawa . Ontario . Canada . K2M 1P6

Office: 613-254-9643
Fax: 613-254-5867

From: Alex McAuley
Sent: October-11-13 11:22 AM
To: 'White, Joshua'
Cc: Cara Ruddle
Subject: RE: Holland Cross - 1560 Scott Street

Thank you Josh,

Regards,

Alex McAuley, P.Eng
Project Engineer
****
Novatech Engineering Consultants Ltd
200-240 Michael Cowpland Drive
Ottawa . Ontario . Canada . K2M 1P6

Office: 613-254-9643
Fax: 613-254-5867

From: White, Joshua [mailto:Joshua.White@ottawa.ca]
Sent: October-11-13 9:44 AM
To: Alex McAuley
Cc: Cara Ruddle
Subject: RE: Holland Cross - 1560 Scott Street

Hi Alex,

I have received the revised boundary conditions.

Cheers

Josh

Please find attached the revised boundary conditions for the above noted

******The following information may be passed on to the consultant, but do NOT forward this e-mail directly.******

The following are boundary conditions, HGL, for hydraulic analysis at 1560 Scott Street (zone 1W) assumed to be connected to the existing 152mm on Bullman (see attached PDF for location).

Minimum HGL = 107.4 m

Maximum HGL = 115.8 m

Max Day + FF (92.7 L/s) = 112.2 m

These are for current conditions and are based on computer model simulation.

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

From: Alex McAuley [mailto:a.mcauley@novatech-eng.com]
Sent: October 08, 2013 10:04 AM
To: White, Joshua
Cc: Cara Ruddle
Subject: RE: Holland Cross - 1560 Scott Street

Hi Josh,

Thank you for the information.

We will be reusing the existing 150mm diameter water service that is fed from the corner of Bullman Street and Hamilton Ave N. The information provided below is for the Holland Street service, and gives us approximately 22.8psi during fire flow conditions which is sufficient. We are close to the Scott Street trunk watermain, so I wouldn't anticipate a major drop, but will there be any change to the HGL at that location?

I attached a sketch with the location of the service we are proposing to use.

Regards,

Alex McAuley, P.Eng
Project Engineer
****
Novatech Engineering Consultants Ltd
200-240 Michael Cowpland Drive
Ottawa . Ontario . Canada . K2M 1P6

Office: 613-254-9643
Fax: 613-254-5867

From: White, Joshua [mailto:Joshua.White@ottawa.ca]
Sent: October-07-13 11:10 AM
To: Alex McAuley
Subject: RE: Holland Cross - 1560 Scott Street

Hi Alex,

Here is the results of the water boundary condition modeling.

Cheers

Josh

The following are boundary conditions, HGL, for hydraulic analysis at 1560 Scott Street (zone 1W) assumed to be connected to the existing 152mm on Holland Avenue (see attached PDF for location).

Minimum HGL = 108.8 m

Maximum HGL = 115.3 m

Max Day + FF (92.7 L/s) = 77.0 m

These are for current conditions and are based on computer model simulation.

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

From: Alex McAuley [mailto:a.mcauley@novatech-eng.com]
Sent: September 27, 2013 10:36 AM
To: White, Joshua
Subject: RE: Holland Cross - 1560 Scott Street

Hi Josh,

We will be reusing the existing water connection.

Alex McAuley, P.Eng
Engineer
****
Novatech Engineering Consultants Ltd
200-240 Michael Cowpland Drive
Ottawa . Ontario . Canada . K2M 1P6

Office: 613-254-9643
Fax: 613-254-5867

From: White, Joshua [mailto:Joshua.White@ottawa.ca]
Sent: September-26-13 1:19 PM
To: Alex McAuley
Subject: RE: Holland Cross - 1560 Scott Street

Hi Alex,

Just to confirm the water connection will be from the internal private water main, or are you planning on installing a connection to the water main in the street.

Cheers

Josh

From: Alex McAuley [mailto:a.mcauley@novatech-eng.com]
Sent: September 26, 2013 11:44 AM
To: White, Joshua
Cc: Cara Ruddle
Subject: RE: Holland Cross - 1560 Scott Street

Josh,

Per our phone conversation yesterday, I have revised our fire flow calculations for the new addition based on FUS for a sprinklered office building with fire resistive construction.

I have calculated the fire flows and demands based on the new expansion only, as the existing two towers have independent services.

Fire Flow (FUS) = 92.7 L/s
Average Daily Flow = 1.88 L/s
Max Day Flow = 2.81 L/s
Max hourly Flow = 3.38 L/s

Please let me know if you require additional information.

Regards,

Alex McAuley, P.Eng
Engineer
****
Novatech Engineering Consultants Ltd
200-240 Michael Cowpland Drive
Ottawa . Ontario . Canada . K2M 1P6

Office: 613-254-9643
Fax: 613-254-5867

From: Cara Ruddle
Sent: September-19-13 11:02 AM
To: Alex McAuley
Subject: FW: Holland Cross - 1560 Scott Street

Cara Ruddle, P.Eng.
Project Manager
****
Novatech Engineering Consultants Ltd
200-240 Michael Cowpland Drive
Ottawa . Ontario . Canada . K2M 1P6

Office: 613-254-9643 x 220
Fax: 613-254-5867

From: White, Joshua [mailto:Joshua.White@ottawa.ca]
Sent: September-19-13 11:05 AM
To: Cara Ruddle
Subject: RE: Holland Cross - 1560 Scott Street

Hi Cara,

The fire flow should be based off of the Fire Under Writers Survey. Also the may I please have the following information;

Average Daily Flow: l/s
Max Day Flow: l/s
Max hourly Flow: l/s

I have put in a request to our ISD regarding possible servicing constraints in the area and I will relay them to you once I have received them.

Cheers

Josh

From: Cara Ruddle [mailto:c.ruddle@novatech-eng.com]
Sent: September 19, 2013 10:43 AM
To: White, Joshua
Subject: Holland Cross - 1560 Scott Street

Josh:
Using the NFPA 13 Sprinkler/Hose demands and a max day office demand we have calculated a fire flow requirement of 650gpm (43.82L/s) for the new 12 storey building. We would use the existing 150mm water service at the corner of Bullman and Hamilton.

Sanitary flows are calculated to be just less than 3.0 L/s. The sanitary connection for the building is also by the intersection of Bullman and Hamilton.

As discussed, please provide boundary conditions for the water system and any servicing constraints that you are aware of for this development.

Please call or email if you have any questions. Thanks.

Cara Ruddle, P.Eng.
Project Manager
****
Novatech Engineering Consultants Ltd
200-240 Michael Cowpland Drive
Ottawa . Ontario . Canada . K2M 1P6

Office: 613-254-9643 x 220
Fax: 613-254-5867

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APPENDIX B

Sanitary Sewer Information

SANITARY SEWER DESIGN SHEET

PROJECT : 113150
DESIGNED BY: ARM
CHECKED BY: CJR
DATE: 09-Dec-13
DATE REVISED:

NOVATECH ENGINEERING CONSULTANTS LTD.

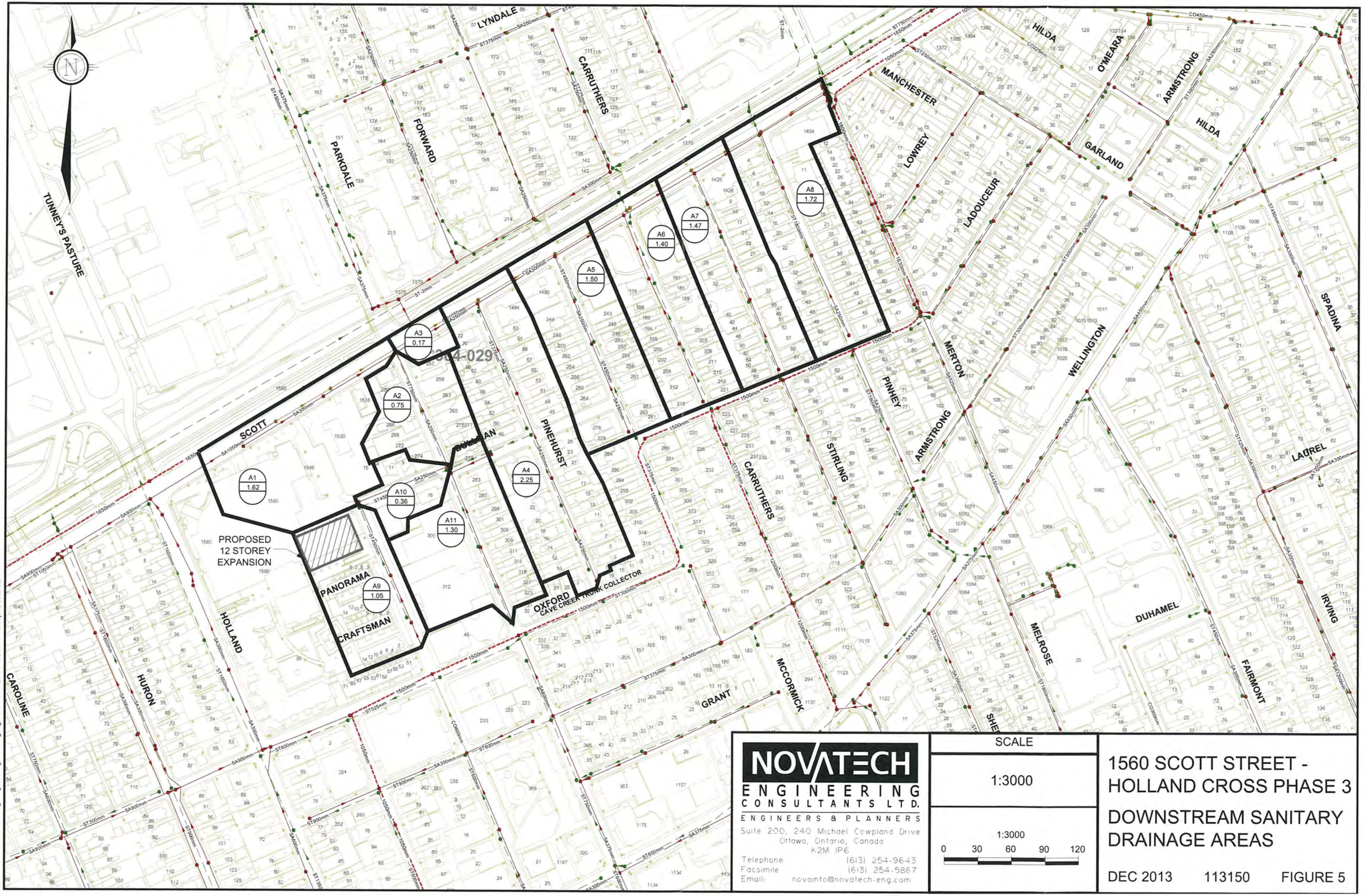
LOCATION				JOBS & POPULATION										PROPOSED SEWER PIPE						CHECK
STREET	FROM	TO	AREA (ha)	Jobs (per ha)	Population (per ha)	CUMULATIVE			Jobs/Commercial		Population		PEAK EXTRAN. FLOW Q(i) (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	DIA. (mm)	PIPE ID (mm)	TYPE OF PIPE	SLOPE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/ Qcap
				207	48	Jobs	POP.	AREA (ha)	PEAK FACTOR (M)	FLOW Q(p) (L/s)	PEAK FACTOR (M)	POP. FLOW Q(p) (L/s)	0.28								
Hamilton Av N	Oxford	Bullman	1.05	217	50	217	50	1.05	1.50	0.28	4.00	0.81	0.29	1.39	250	251.5	DR 35	0.24	29.6	0.60	4.7%
12 Storey Office	Bullman			2161	0	2161	0	1.05	1.50	2.81	4.00	0.00	0.29	3.11	250	251.5	DR 35	0.24	29.6	0.60	10.5%
Bullman	Hamilton	Parkdale	0.36	75	17	2453	67	2.46	1.50	3.19	4.00	1.09	0.69	4.97	250	251.5	DR 35	0.24	29.6	0.60	16.8%
Parkdale	Oxford	Bullman	1.30	269	62	2722	129	3.76	1.50	3.54	4.00	2.09	1.05	6.69	250	251.5	DR 35	0.24	29.6	0.60	22.6%
Parkdale	Bullman	Scott	0.75	155	36	2877	165	4.51	1.50	3.75	4.00	2.67	1.26	7.68	250	251.5	DR 35	0.24	29.6	0.60	26.0%
Scott		Parkdale	1.62	335	78	335	78	1.62	1.50	0.44	4.00	1.26	0.45	2.15	250	251.5	DR 35	0.24	29.6	0.60	7.3%
Scott	Parkdale	Pinehurst	0.17	35	8	3247	251	6.30	1.50	4.23	4.00	4.07	1.76	10.06	250	251.5	DR 35	0.24	29.6	0.60	34.0%
Scott	Pinehurst		2.25	466	108	3713	359	8.55	1.50	4.83	4.00	5.82	2.39	13.05	300	299.4	DR 35	0.19	41.9	0.60	31.1%
Scott		Carruthers	1.50	311	72	4024	431	10.05	1.50	5.24	4.00	6.98	2.81	15.04	300	299.4	DR 35	0.19	41.9	0.60	35.9%
Scott	Carruthers	Stirling	1.40	290	67	4314	498	11.45	1.50	5.62	3.98	8.02	3.21	16.84	300	299.4	DR 35	0.19	41.9	0.60	40.2%
Scott	Stirling	Pinhey	1.47	304	71	4618	569	12.92	1.50	6.01	3.94	9.09	3.62	18.72	300	299.4	DR 35	0.19	41.9	0.60	44.7%
Scott	Pinhey	Merton	1.72	356	83	4974	652	14.64	1.50	6.48	3.91	10.33	4.10	20.91	300	299.4	DR 35	0.19	41.9	0.60	49.9%

* Note: Assumed minimum slope

Notes:

1. Q(d) = Q(p) + Q(i) , where
   - Q(d) = Design Flow (L/sec)
   - Q(p) = Population Flow (L/sec)
   - Q(i) = Extraneous Flow (L/sec)
2. Q(i) = 0.28 L/sec/ha
3. Q(p) = (PxqxM/86.4), where
   - P = Persons (Population = 48/ha, Jobs=207/ha)
   - q = Average per capita flow = 350 L/cap/day
   - M = Harmon Formula (maximum of 4.0)
4. Depth of flow/Diameter from Hydraulic properties of circular pipes flowing partially full
5. Population/Jobs Target Density 2031 = 250/ha (17915 jobs, 4204 pop = 255/ha density at 2031) per Figure 30 for Tunney's-Quad area (*Residential Land Strategy for Ottawa 2006-2031, City of Ottawa Feb 2009*)

Breakdown	Jobs	Population
Projected	17915	4204
Percentage	81.0%	19.0%
At 255/ha =	207	48



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1560 SCOTT STREET - HOLLAND CROSS PHASE 3

DOWNSTREAM SANITARY DRAINAGE AREAS

DEC 2013 113150 FIGURE 5

APPENDIX C

Engineering Figures

EXISTING 7 STOREY OFFICE BUILDING (ABOVE RETAIL MALL) TOWER A

EXISTING SINGLE STOREY RETAIL MALL (PARKING GARAGE BELOW) BUILDING C

EX. ±59.8m-±375mmØ STM @ ±1.0%

EX. CB TG=±61.41 INV.=±59.99

EX. STM MH TG=±61.76 SW INV.=±59.67 W INV.=±59.91 N INV.=±58.83

EX. STM CONNECTION INV.=±60.20

CC

EX. ±29.3m-±250mmØ STM @ ±1.0%

CP

Eave

Concrete Slab

CC

Frame Chip Wagon Stand

Sign

UP

EX. ±20.0m-±300mmØ STM @ ±0.9%

SSIB

SSIB (857)

EX. STM MH TG=±61.41 S INV.=±59.91 E INV.=±59.85 W INV.=±59.97

CB

Asphalt

EX. STM MH TG=±61.51 S INV.=±60.15 E INV.=±60.12

EX.SAN MH 1 TG=±61.67 S INV.=±58.37 E INV.=±58.34

EX.STM MH

EX.45°

EX.45°

EX. TEE

EX. 203mmØ WM

EX. 83.4m-250mmØ SAN @ 0.19%

EX. 83.5m-450mmØ STM @ 0.57%

Concrete Retaining Wall

EX. ±225mmØ STM

EX. 153mmØ WM

EX. 45°

EX. VVB

±9.0m-±250mmØ STM @ ±6.0%

EX. 203mmØ WM

EX. ±9.8m-±200mmØ STM @ ±0.8%

EX. ±7.2m-±200mmØ STM @ ±0.8%

EX. 45°

Concrete Walk

BULLMAN STREET

EX. HYD

SSIB

EX. STM CONNECTION INV.=±59.99

EX. STM CONNECTION INV.=±60.21

EX. CB

EX. VVB

EX. WM CONNECTION

EX.STM MH 5 TG=±61.68 NW INV.=±59.61 S INV.=±59.27 E INV=±59.20

EX. CB

EX. SAN CONNECTION INV.=±59.58

Planter

EX. 150mmØ STM

EX. 150mmØ SAN

Vent

Concrete Sidewalk

PROPOSED 12 STOREY OFFICE BUILDING

PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDING. MATCH EXISTING GRADES AT BACK OF EXISTING SIDEWALK.

Open @ Ground Floor

Line of Brick Wall Above

Brick Wall Above

PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDING, TIE INTO EXISTING GRADES (TYPICAL)

PROPOSED FIRST STOREY BUILDING OUTLINE

Vent

Planter

Planter

Planter

Planter

Planter

Planter

Planter

Planter

Vent

Planter

Sign

HAMILTON AVENUE

DC

EX. 105.0m-450mmØ STM @ 0.34%

EX. 70.4m-250mmØ SAN @ 0.15%

EX. 203mmØ WM

Planter

CP (WIT)

Ramp Down

Ramp Up

Concrete Median

PROPOSED SECOND STOREY OVERHANG

Concrete Wall with Metal Fence on Top ± to Line

CC

UNDERGROUND PARKING EXIT

CP (WIT)

Wall ± to Line

Wall to Line

Mechanical Room

EXISTING BUILDING D

Concrete Wall (to Line)

EX. CB

EX. CB

EX. SAN MH 2 TG=±61.70 N INV.=±58.47 S INV.=±58.48 W INV.=±59.00

EX. 45.0m-250mmØ SAN @ 0.24%

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1560 SCOTT STREET- HOLLAND CROSS PHASE 3

GRADING AND SERVICING

DEC 2013 113150 FIGURE 6

NOTE:

ALL UNDERGROUND INFORMATION WITHIN PROPERTY LIMITS OBTAINED FROM RYBKA, SMITH AND GINSLER LIMITED CONSULTING ENGINEERS PLAN TITLED "SITE PLAN-MECHANICAL" DATED AUGUST 26, 1987. ALL UNDERGROUND INFORMATION WITHIN CITY OF OTTAWA RIGHT OF WAY OBTAINED FROM CITY OF OTTAWA PLAN AND PROFILE RECORD DRAWINGS 2032-1 & 2032-2 (CITY OF OTTAWA RECORD NUMBER 14274) DATED JULY 13, 2006.

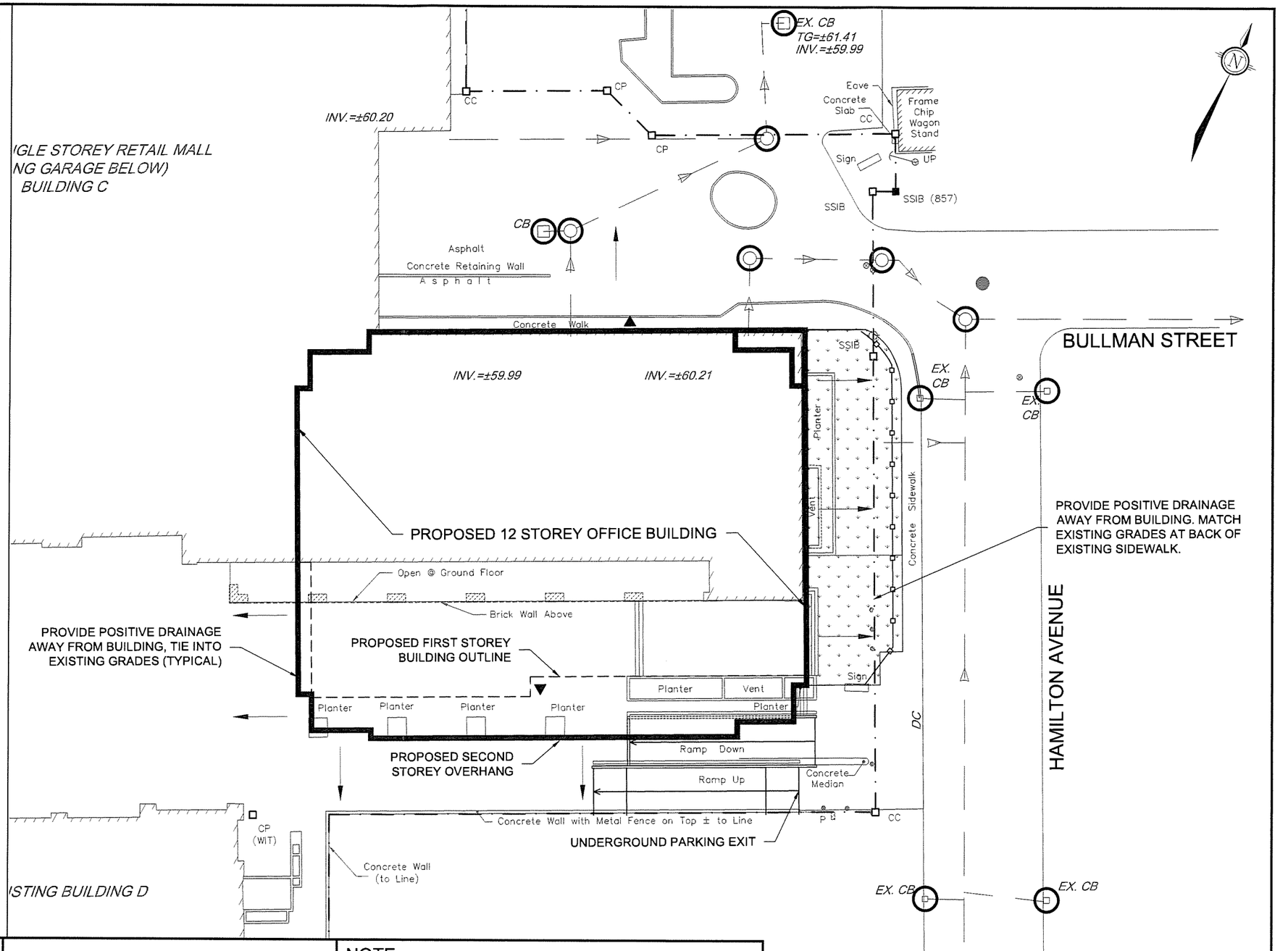
ALL INFORMATION CONTAINED ON THIS PLAN IS APPROXIMATE. ALL SERVICE LOCATIONS AND ELEVATIONS ARE TO BE CONFIRMED ON SITE AT THE TIME OF CONSTRUCTION.

EROSION AND SEDIMENT CONTROL NOTES:

1. THE OWNER AGREES TO PREPARE AND IMPLEMENT AN EROSION AND SEDIMENT CONTROL PLAN TO THE SATISFACTION OF THE CITY OF OTTAWA, APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL SUCH AS BUT NOT LIMITED TO INSTALLING FILTER CLOTHS ACROSS MANHOLE/CATCHBASIN LIDS TO PREVENT SEDIMENTS FROM ENTERING STRUCTURES AND INSTALL AND MAINTAIN A LIGHT DUTY SILT FENCE BARRIER AS REQUIRED.
2. THE CONTRACTOR SHALL PLACE FILTER CLOTH UNDER THE CATCHBASIN AND MANHOLE GRATES FOR THE DURATION OF CONSTRUCTION AND WILL REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION.
3. SILT FENCING FOR ENTIRE PERIMETER OF SITE, SHALL BE UTILIZED TO CONTROL EROSION FROM THE SITE DURING CONSTRUCTION.
4. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

LEGEND

- FILTER CLOTH CATCH
- SILT FENCE PER OPSD 219.110
- EXISTING STORM PIPE
- EXISTING CB
- EXISTING STORM MH
- EXISTING SANITARY MH



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1560 SCOTT STREET-
HOLLAND CROSS PHASE 3

EROSION AND SEDIMENT CONTROL PLAN

DEC 2013 113150 FIGURE 7

NOTE:

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APPENDIX D

City of Ottawa Checklist

Development Servicing Study Checklist

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

Development Servicing Study Checklist

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	NA		
Proposed phasing of the development, if applicable.	NA		
Reference to geotechnical studies and recommendations concerning servicing.	NA		
All preliminary and formal site plan submissions should have the following information:			
Metric scale	Y		
North arrow (including construction North)	Y		
Key plan	Y		
Name and contact information of applicant and property owner	Y		
Property limits including bearings and dimensions	Y		
Existing and proposed structures and parking areas	Y		
Easements, road widening and rights-of-way	Y		
Adjacent street names	Y		

Development Servicing Study Checklist

4.2 Water	Addressed (Y/N/NA)	Section	Comments
Confirm consistency with Master Servicing Study, if available.	N		None Known
Availability of public infrastructure to service proposed development.	Y		
Identification of system constraints.	N		None Known
Identify boundary conditions.	Y		City supplied
Confirmation of adequate domestic supply and pressure.	Y		
Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Y		
Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Y		
Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design.	NA		No phasing planned
Address reliability requirements such as appropriate location of shut-off valves.	Y		
Check on the necessity of a pressure zone boundary modification.	NA		
Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Y		
Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Y		
Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	NA		
Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Y		
Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	NA		

Development Servicing Study Checklist

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

Development Servicing Study Checklist

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Description of drainage outlets and downstream constraints including legality of outlet (i.e. municipal drain, right-of-way, watercourse, or private property).	Y		
Analysis of the available capacity in existing public infrastructure.	N		Hard surface areas and theferore, storm flows are not being increased.
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns and proposed drainage patterns.	N		Drainage patterns are not being altered.
Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Y		
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	N		The site will be roof and underground parking (sanitary sewer)
Description of stormwater management concept with facility locations and descriptions with references and supporting information.	Y		
Set-back from private sewage disposal systems.	NA		
Watercourse and hazard lands setbacks.	NA		
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	NA		
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	NA		
Storage requirements (complete with calcs) and conveyance capacity for 5 yr and 100 yr events.	Y		
Identification of watercourse within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	NA		
Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	NA		
Any proposed diversion of drainage catchment areas from one outlet to another.	NA		
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and SWM facilities.	NA		
If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	NA		

Development Servicing Study Checklist

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Identification of municipal drains and related approval requirements.	NA		
Description of how the conveyance and storage capacity will be achieved for the development.	NA		
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	NA		
Inclusion of hydraulic analysis including HGL elevations.	NA		
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	NA		
Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	NA		
Identification of fill constrains related to floodplain and geotechnical investigation.	NA		

Development Servicing Study Checklist

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

4.6 Conclusion	Addressed (Y/N/NA)	Section	Comments
Clearly stated conclusions and recommendations.	Y		
Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	Y		
All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario.	Y		

D.2 JUNE 14, 2022 CITY MEETING MINUTES

Johnson, Warren

From: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Sent: Friday, June 17, 2022 12:06 PM
To: Johnson, Warren
Cc: Kilborn, Kris; Shahzadeh, Serene; Cody, Neal
Subject: RE: 1560 Scott Street
Attachments: Roof Drain Control Letter - Template.docx

Follow Up Flag: Follow up
Flag Status: Completed

Hi Warren,

Thank you for the summary.

I've attached the Roof Drain Control Letter, which I kindly ask to be completed and signed and attached as an appendix in the servicing report. Regarding the hydrant classifications and flow that can be considered from a given hydrant, please refer to City of Ottawa Technical Bulletin IST-2018-02 Appendix I Table 1.

Let me know if you wish to discuss further. Thank you.

Best Regards,

Mohammed Fawzi, P.Eng.
Project Manager
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - Central Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 20120, Mohammed.Fawzi@ottawa.ca

Please note that due to the current situation, I am working remotely. Email is currently the best way to contact me

---

From: Johnson, Warren <Warren.Johnson@stantec.com>
Sent: June 14, 2022 2:37 PM
To: Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Cc: Kilborn, Kris <kris.kilborn@stantec.com>; Shahzadeh, Serene <Serene.Shahzadeh@stantec.com>; Cody, Neal <Neal.Cody@stantec.com>
Subject: 1560 Scott Street

Hi Mohammad,

As a follow up from today's meeting see below items discussed:

- FUS is required when OBC calculations exceed 9000 L/min. New boundary conditions will be requested with the revised calculation. A sketch should be provided illustrating the distance from the existing hydrants to the proposed building. Mohammad to provide information regarding hydrant classifications.
- The comment regarding the allowable release rate using a runoff coefficient of 0.5 can be deleted. As per discussion in the previous meeting, given that this is not a full modification to the property a post to pre swim analysis is acceptable (pre-development C being 0.86). We will review correspondence to see if there was an email to this effect from the meeting with Eric.
- The northern drainage area (EXT-1) can be discounted from the allowable release rate since only minor revisions are being made to this area.
- Rooftop storage plans are not required given that the roof plan is subject to change prior to building permit and the servicing report provides a very conservative volume estimate. A line will be added to the report to indicate that the mechanical consultant is required to provide a sign-off letter confirming that they will respect the requirements outlined in the servicing report.
- It was noted that dual water services are required for the building. Pending mechanical confirmation, the secondary service will be provided by the existing water stub off of the Bullman Street access to the north of the proposed building.

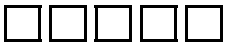
If you have any questions let me know.

Thanks,

Warren Johnson C.E.T.
Civil Engineering Technologist

Direct: 613 784-2272
Warren.Johnson@stantec.com

Stantec



Appendix E DRAWINGS