Planning

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Feasibility Studies

Construction Engineering

Contract Administration and Tendering

Construction Inspection

Quality Verification Engineering (QVE)

25 GRANT STREET
Ottawa, ON

SERVICING AND STORM WATER MANAGEMENT REPORT

Kent Homes Inc
28 Chemin du Couvent
Bouctouche NB E4S 3B9
TEL.: (506) 743-2481

September 03, 2019

REMISZ Consulting Engineers

REMISZ Consulting Engineers Ltd.
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File No. 2019-158

September 03, 2019

Kent Homes Inc
28 Chemin du Couvent
Bouctouche, NB E4S 3B9
TEL.: (506) 743-2481

Re: 25 Grant Street
Ottawa, ON
Servicing and Storm Water Management Report

1) Introduction

Remisz Consulting Engineers Ltd. has been retained by Kent Homes Inc. to develop a site servicing plan, grade control plan, drainage plan, storm water management report, as well as a site servicing report for the proposed residential project located at 25 Grant Street in Ottawa. This report is a summary of the data, calculations, as well as design and support documentation required for the site servicing of this project.

Our servicing and site works design is done in accordance with the following documents and standards:

- *City of Ottawa Sewer Design Guidelines(CoOSDG)* complete with ISTDB 2012-01, 2014-01, *2016-01 & 2018-01 technical bulletin updates as well as current Sewer Material Specifications (MS Doc);*
- *City of Ottawa Water Distribution Design Guidelines (CoOWDDG) complete with ISTDB 2014-02 & 2018-02 technical bulletin updates as well as current Watermain/Services Material Specifications (MS Dos);*
- *City of Ottawa Standard Tender Documents*;
- *Ontario Provincial Standards for Road and Public Works*;
- *MTO Drainage Management Manual*;
- *MTO Highway Drainage Design Standards*;

2) Project Data

- Project address: 25 Grant Street, Ottawa, ON;
- The subject property is legally described as Part of Lot 14 Registered Plan 99, Part 1 5R-8927, City of Ottawa, Ontario as performed by Fairhall Moffatt & Woodland Ltd. 2019 and is located south of Armstrong Street and north of Wellington Street West. It consists of 1 ½ storey residence , paved areas as well as grass and a few establish trees.
- The subject property measures approximately 383.30 square meters (0.0383 ha) and is zoned R4H.

- Type of development: 3 storeys 9 units low rise apartment building (for site key plan and aerial map see Appendix A;
- Proposed connections: sanitary, water and storm services to be connected to existing main sewers on Grant Street shown on drawings C-01-Site Plan
- The following services exist across the property frontages within the adjacent municipal road.
    - 150mm diameter watermain located on Grant Street
    - 250mm diameter sanitary sewer located on Grant Street
    - 375mm diameter storm sewer located on Grant Street

3) Storm Water Management

3.1 Storm Water Criteria

The City of Ottawa storm water management criteria are as following:

i) The 5 year and 100 year storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier International Airport, collected from 1966 to 1997;
ii) The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less;
iii) A calculated time of concentration (Cannot be less than 10 minutes);
iv) Flows to the storm water sewer in excess of the 5 year storm release rate, up to and including the 100 year storm event, must be detailed on site;

.

The storm water flow calculations are provided in Appendix B.
Stormwater management for this site will be maintained through positive drainage away from the proposed building through a roof top drainage system, a new catch basin and a new storm drain channel.
Stormwater runoff flow from the site will be a combination of uncontrolled direct runoff and controlled flow.
The amount of water to be detained on site for a 100 year flood event is 6.6m^3.
The maximum allowable storm water release from the controlled areas A1 is 0.5L/s and A2 is 2.6L/s. For the new site layout/grading and post development drainage area see Appendix C

The pre-development runoff is directed south into the existing storm water drainage system located on Grant Street and north to the rear property line.

The proposed drainage is:
On Area 1 which is part of east and south side of the proposed building, drainage will be thorough a two new catch basin and new storm drain channel connected to the existing catch basin.
Area 2 (roofs) will be controlled by six roof drain restrictors prior to entering into the municipal storm sewer.
Area 3 is west side and part of the south side of the proposed building and runoff will flow uncontrolled towards storm water drainage system.

The release rates from controlled area A1 is 0.5L/s and A2 is 2.6L/s for a 100 years event which are the same as the allowed runoff for a 5 year storm event from pre-developed controlled portions of site.

4) Water Supply

A common rate used by the City of Ottawa for residential development is 280 L/capita/day. The population density for the proposed 9 unit low rise apartment building is 14 persons, consisting of 2 bachelor, 5 one bedroom and 2 two bedroom apartments.

For bachelor -1.4 persons/unit x 2 units=2.8 persons
One bedroom -1.4 persons/unit x 5 units = 7 persons
Two bedroom -2.1 persons/unit x 2 units = 4.2 persons
Total: 14 persons.
Therefore, the resulting water supply requirement is: $14p \times 280L/p/day = 3{,}920L/day$ or $Q = 0.045L/s$.

Peak factors for maximum daily usage and peak hourly usage are provided in MOE guidelines Table 3.3 and are 9.5 and 14.3 respectively.

$$Q_{DailyMax} = 0.045L/s \times 9.5 = 0.43L/s$$

$$Q_{HourlyMax} = 0.045L/s \times 14.3 = 0.64L/s$$

The anticipated fire flow as per Clause A-3.2.5.7 (OBC 2012) is calculated as:
$Q = K \times V \times S_{tot}$, where:
Q is the minimum supply of water in litres
K is the water supply coefficient from Table 1
V is the total building volume in cubic meters

S_{tot} is the total of spatial coefficient values from property line exposures on all sides as obtained from the formula: $S_{tot} = 1.0 + [S_{side1} + S_{side2} + S_{side3} + ...etc.]$

For the proposed development:

$$\begin{aligned} S_{tot} &= 1.0 + [S_{west} + S_{east} + S_{north} + S_{south}] \\ &= 1.0 + [0.5 + 0.5 + 0.5 + 0.0] \\ &= 2.5 \end{aligned}$$

S_{tot} need not to exceed 2.0

$$\begin{aligned} Q_{HYD1} &= 23 \times 2{,}090 \times 2.0 \\ &= 96{,}140.00L \end{aligned}$$

From Table 2, the required minimum water supply flow rate is 2,700 L/min or 45 L/s.
Therefore, the total water demand is $Q_1 = Q_{HYD1} + Q_{DailyMax} = 45 + 0.43 = 45.43L/s$

Fire Underwriters Survey (FUS) Fire calculations
From the Fire Underwriters Survey (FUS)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.

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

F = Required fire flow in liters per minute
C = Coefficient related to the type of construction
A = The total floor area in square meters

A. Determine The Coefficient Related To The Type Of Construction
The building is considered to be Class 2 (joisted masonry)
C = 1.00

B. Determine ground Floor Area
Floor Area Level 1 = 161.35 m^2
Floor Area Level 2 = 179.29 m^2
Floor Area Level 3 = 179.29 m^2

C. Determine Height in Storey
Number of Storeys = 3
Total Floor Area 161.35m^2 + 179.29m^2x2 = 519.93m^2

D. Calculate Required Fire Flow

$$F = 220 \times C \times \sqrt{A}$$
$$F = 220 \times 1.00 \times \sqrt{519.93}$$
$$F = 5{,}016.43 L/\min$$

Flow rounded to nearest 1000L/min

$$F = 5{,}000 L/\min$$

E. Determine Increase or Decrease Based on Occupancy
Occupancy Class – Limited combustible
Occupancy charge -15%

Occupancy Increase or Decrease 5,000.00L/min x -15% = -750L/min
Fire flow F= 5,000L/min + -750 L/min = 4,250 L/min

F. Determine the Decrease, if any for Sprinkler protection
The entire building will be installed with a fully automated, standardized with the City of Ottawa Fire Department and fully supervised.

Therefore the value obtain in Step E is reduced by 30%.
Reduction = 4.250 L/min x 30%
Reduction= 1,275 L/min

G. Determine the Total Increase for Exposures
Exposure distance to the existing buildings to the east and west of the proposed building is approximately 4.5m and 5.1m respectively. (20%)

Exposure distance to the existing buildings to the north of the proposed building is approximately 7.3m (20%)

Exposure distance to the existing buildings to the south of the proposed building is approximately 17m (15%)
The total percentage shall be the sum of the percentage for all sides, but shall not exceed 75%.
The fire flow shall not exceed 45,000 L/min nor be less than 2,000 L/min

Increase for exposure = 4250 x 75%
Increase =3,188 L/min

H. Determine the Total Fire Demand
To the answer obtained in step E, subtract the value obtained in F and add the value obtained in G

F=4,250 L/min - 1,275L/min + 3,188L/min = 6163L/min

Therefore, after rounding to the nearest 1,000L/min, the total required fire flow for the development is F=6000L/min=100L/s

Water demands have been submitted to the City of Ottawa and the following boundary conditions were provided:
Minimum HGL = 108.0m
Maximum HGL = 115.0m
MaxDay (0.43 L/s) + FireFlow (100 L/s) = 100.0m

The water analysis results are summarized in the table below:

Condition	Demand (L/s)	Min/Max Allowable Operating Pressures (psi)	Limits of Design Operating Pressures (psi)
High Pressure	0.43	80 (Max)	75.6
Maximum Daily Demand and *Fire Flow*	100.43	20 (Min)	54.1
Peak Hour	0.64	40 (Min)	65.6

Therefore, based on the boundary conditions provided by the City, the existing watermain system can provide adequate domestic flows and pressures for fire protection.
For water supply requirements and fire hydrants location data see Appendix E and for boundary conditions see Appendix F.

5.0 Sanitary Sewage:

Building service connection will be attached to the existing sanitary sewer main 250mm along Grant Street.

The peak design flow for sanitary services was calculated using the Ottawa Sewer Design Guidelines.

$$Q_{peak} = Q_i + PF \times Q_{ave}$$

Where $Q_i = 0.28L/s/ha$ is a constant allowance for infiltration.

$$PF = 1 + \left(\frac{14}{4 + \sqrt{\frac{P}{1000}}} \right) \times K$$

$$= 1 + \left(\frac{14}{4 + \sqrt{\frac{14}{1000}}} \right) \times 0.8$$

$$= 3.7$$

Maximum peaking factor is 4.0

$$Q_{ave} = \frac{280L/person/day \times 14 persons}{86{,}400s/day}$$

$$= 0.045L/s$$

$$Q_{peak} = 0.28L/s/ha \times 0.038ha + 3.7 \times 0.045L/s$$

$$= 0.18L/s$$

The difference in flow from a single family house compared to the proposed apartments is about 0.13L/s. The increase is minimal and should not impact the existing 250mm sanitary sewer in a negative way.

For sanitary services requirements and data see Appendix G.

6.0 Site Servicing:

Based on site configuration, the proposed new building is facing south and the existing main lines are located on the south side of the building. We propose to construct the new water service lines south of the building and to connect these services to the existing main lines.

Detailed layout and slopes are provided on the “Site Services Plan” in Appendix H.

7.0 Erosion and Sediment Control:

The following measures should be implemented as part of the Erosion and Sediment Control Plan. A copy of this plan is to be posted on the site. As a part of the requirements of this plan, we confirm that no wetlands exist on site and this site is not located on a flood plain.

The contractor shall implement best management practices, to provide for protection of the area drainage system and the receiving watercourse, during construction activities. The contractor acknowledges that failure to implement appropriate erosion and sediment control measures may be subject to penalties imposed by any applicable regulatory agency.

Erosion and Sediment Control

- Silt fences are to be installed around any areas under excavation.
- The contractor hired by the site owner is responsible for installation, inspections, maintenance and removals of control measures.
- Daily inspections of this fence will be carried out by owner's representative and any repair work will be done as soon as a problem is noticed.
- Run-off from construction materials and stockpiles will be contained and discharged so as to prevent entry of sediment into the watercourses. Accumulated silt material will be removed as required and disposed of off-site.
- Heavy-duty silt fence will be installed as per the attached OPSD 219.130. Silt fence is to be a woven Class I geotextile as per location shown on Erosion and Sediment Control Plan Drawing.
- Grading and placement of granular materials will be carried out in an expeditious manner and confined to the affected locations.
- Cut and fill slopes will be stabilized by seeding and mulching within 15 days of any phase of grading.
- All openings in manholes and catch basins are to be covered by filter cloth during construction to prevent the entrance of sediments.

Equipment Refueling, Maintenance and Washing

- All equipment will be cleaned of any excess surface oil, grease and dirt prior to its arrival on site.
- Equipment will be kept in good working order.
- Equipment with any leaks will stop work immediately until it is repaired.
- Streets in front of the project will be kept clean at all times.

Fire Protection Contingency

- There will be no burning of materials on the site. Construction debris will be picked up and

placed in dump boxes and/or pick-up truck boxes.
These measures are to be considered a **"Living Document"** which may be modified in the event that the control measures are insufficient.

Erosion and Sediment Control Plan shall be permanently posted on site and made available for review by inspecting authorities. For erosion and sediment control plan see Appendix J.

8.0 Conclusion

In this report, Remisz Consulting Engineers Ltd. has presented the calculations made for storm water management, water demand and for sanitary services.
The storm water management measures proposed will result in a 100 year release rates of 2.6L/s(Area A2) and 0.5L/s(Area A1) which are the same as the allowable 5 year pre-development release rate.
The expected sanitary peak flow 0.18L/s.

The water demand for peak hour and maximum daily with fire flow is respectively 0.64 L/s and 100.43L/s. The average daily water demand is expected to be 0.045 L/s.
The proposed building will be equipped with a sprinkler system for fire protection.
The required fire protection from the Ontario Building Code (OBC) is 2,700 L/min (45L/s)
The required fire protection from the Fire Underwriters Survey (FUS) is 6,000 L/min (100L/s)
We also provided site grading and site services layout including storm water sewer, sanitary sewer, and water service lines.

For pre-consultations and comments from reviewing agencies see Appendix K

For the Development Servicing Study Checklist see Appendix L.
We trust that this report is sufficient for your requirements. If you have any questions concerning this information or if we can be of further assistance to you on this project, please contact us.

Yours truly,

REMISZ Consulting Engineers Ltd.

Boris Uriev, M.Sc., P.Eng.
Senior Civil Engineer

Appendix A

SITE KEY PLAN AND AERIAL MAP


rue Armstrong St
rue Grant St
rue Grant St
rue McCormick St
McCormick St
25 GRANT STREET
180
184
186
188
190
196
202
204
206
1
5
9
11
13
15
23
25
29
31
1145
30 m
100 ft
© 2019 - City Of Ottawa/Mlle d'Ottawa, © Teranet Enterprises Inc.


rue Armstrong St.
25 GRANT STREET
rue Grant St.
rue McCormick St.
rue McCormick St.
rue Wellington St. O/W.

Appendix B

STORM WATER FLOW CALCULATIONS

REMISZ Consulting Engineers Ltd.
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File No. 2019-158

Strom Water Management Calculations:
The quantitative properties of the storm runoff for both pre-development and post-development flows are detailed below.

1) The total property area is 383m^2 or 0.0383*ha*, and pre-development condition had the following types of surfaces and their corresponding run-off coefficients "C".
Drainage Areas A1, A2, A3 and A4 are shown on drawing C-03-Drainage Plan.

- A_1 - Part of the east side and the south side of the proposed building
A_1– 40m^2, C = 0.45;
The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less
Driveway- 6m^2, C = 0.90
Porch and Steps - 6 m^2, C = 0.90
Grass – 28 m^2, *C=0.25*

The resulting run-off coefficient for the pre-developed A_1 is:

$$C_{old} = \frac{12 \times 0.9 + 28 \times 0.25}{40}$$
$$= \frac{10.8 + 7.0}{40}$$
$$= 0.45$$

- A_2 - Roofs– 179m^2, C = 0.61;
The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less.
Roofs - 56m^2, C = 0.9
Deck - 14m^2, C = 0.9
Driveway - 26m^2, C = 0.9
Grass - 79m^2, C = 0.25
Concrete Steps – 4 m^2, C = 0.9

- A_3 – West side and part of the south side of the proposed building
A_3 - 39 m^2, C = 0.27;
The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less.
Driveway - 1m^2, C = 0.9
Grass - 38m^2, C = 0.25

- A_4 - North side and part of the east side of the proposed building will not be taken into account in storm water management report. Area A_4 will sheet flow to the rear property line.
  A_4– 125m^2, C = 0.33;

2) The post-development condition has the following types of surfaces and their corresponding run-off coefficients "C":

- Area A_1 - Part of the east side and the south side of the proposed building
- Area A_1 = 40 m^2 with C = 0.80;
  Driveway – 16m^2, C=0.9
  Concrete Steps – 18m^2, C=0.9
  Grass – 6m^2, C=0.25

- Area A_2 - Roofs
- Area A_2 = 179 m^2 with C = 0.9;

- Area A_3 - West side and part of the south side of the proposed building
- Area A_3 = 39 m^2 with C = 0.25;
  Grass – 39m^2

The time of storm water concentration for such a small area is significantly less than 10 minutes, therefore, 10 minutes is assumed as the time of concentration.

Area A1 – Part of east and the south side of the proposed building

Pre-development conditions

- Site Area, $A = 0.0040ha$
- Run-off Coefficient (pre-development), C_{old} = 0.45
- Time of Concentration, $t_c = 10\min$
- Rainfall Intensity, $I = 104.4mm/hour$ for $t_c = 10\min$ and 5 year storm

$$Q_{existing} = 2.78 \times A \times I \times C$$
$$= 2.78 \times 0.004ha \times 104.4mm/hour \times 0.45$$
$$= 0.5L/s$$

The allowable release rate is 0.5 L/s for Area A_1 for the 5 year storm using the Rational Method.

Post-development conditions

- Site Area, $A = 0.004ha$
- Run-off Coefficient (post-development), C_{new} = 0.80

Water Volume Storage Table:

t_c (min)	I (100 yr)	Q_{new} (L/s)	$Q_{existing}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
5	242.6	2.7	0.5	2.2	0.66
10	179.0	2.0	0.5	1.5	0.90
15	146.8	1.6	0.5	1.1	0.99
20	**128.5**	**1.4**	**0.5**	**0.9**	**1.08**
25	110.2	1.2	0.5	0.7	1.05
30	91.0	1.0	0.5	0.5	0.9

Therefore, t_c = 20 min will yield the greatest volume of water requiring storage.
Sample calculations for t_c = 20 min:

- Time of Concentration, $t_c = 20\min$
- Rainfall Intensity, $I = 128.5mm/hour$ for $t_c = 20\min$ and 100 year storm

$$Q_{new} = 2.78 \times A \times I \times C$$
$$= 2.78 \times 0.0040ha \times 128.5mm/hour \times (0.80 \times 125\%) \text{ As per MTO Drainage Management Manual}$$
$$= 1.4L/s$$

$$Q_{stored} = Q_{new} - Q_{existing}$$
$$= 1.4 - 0.5$$
$$= 0.9L/s$$

The required volume of water stored on front yards:

$$V_{stored} = Q_{stored} \times t_c$$
$$= 0.9L/s \times 20\min \times \frac{60\sec}{1\min} \times \frac{1m^3}{1000L}$$
$$= 1.08m^3$$

Area A2 Roofs:
Pre-development conditions

- Site Area, $A = 0.0179ha$
- Run-off Coefficient (pre-development), C_{old} = 0.50
- Time of Concentration, $t_c = 10\min$

- Rainfall Intensity, $I = 104.4 mm/hour$ for $t_c = 10 \min$ and 5 year storm

$$Q_{existing} = 2.78 \times A \times I \times C$$
$$= 2.78 \times 0.0179 ha \times 104.4 mm/hour \times 0.50$$
$$= 2.6 L/s$$

Post-development conditions:

- Site Area, $A = 0.0179 ha$
- Run-off Coefficient (post-development), C_{new} = 0.9

Water Volume Storage Table:

t_c (min)	I (100 yr)	Q_{new} (L/s)	$Q_{existing}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
5	242.6	13.6	2.6	11.0	3.30
10	179.0	10.0	2.6	7.4	4.44
15	146.8	8.2	2.6	5.6	5.04
20	**128.5**	**7.2**	**2.6**	**4.6**	**5.52**
25	110.2	6.2	2.6	3.6	5.40
30	91.0	5.1	2.6	2.5	4.50

Therefore, t_c = 20 min will yield the greatest volume of water requiring storage.
Sample calculations for t_c = 20 min:

- Time of Concentration, $t_c = 20 \min$
- Rainfall Intensity, $I = 128.5 mm/hour$ for $t_c = 20 \min$ and 100 year storm

$$Q_{new} = 2.78 \times A \times I \times C$$
$$= 2.78 \times 0.0179 ha \times 128.5 mm/hour \times (0.9 \times 125\%)$$
$$= 7.2 L/s$$

$$Q_{stored} = Q_{new} - Q_{existing}$$
$$= 7.2 - 2.6$$
$$= 4.6 L/s$$

The required volume of water stored from the roofs is:

$$V_{stored} = Q_{stored} \times t_c$$
$$= 4.6 L/s \times 20 \min \times \frac{60 \sec}{1 \min} \times \frac{1 m^3}{1000 L}$$
$$= 5.52 m^3$$

Area A3 – Grass on the west side and part of the south side of the proposed building:

Pre-development conditions

- Site Area, $A = 0.0039ha$
- Run-off Coefficient (pre-development), C_{old} = 0.27
- Time of Concentration, $t_c = 10\min$
- Rainfall Intensity, $I = 104.4mm/hour$ for $t_c = 10\min$ and 5 year storm

$$Q_{existing} = 2.78 \times A \times I \times C$$
$$= 2.78 \times 0.0039ha \times 104.4mm/hour \times 0.27$$
$$= 0.3L/s$$

Post-development conditions

- Site Area, $A = 0.0039ha$
- Run-off Coefficient (post-development), C_{new} = 0.25

Water Volume Storage Table:

t_c (min)	I (100 yr)	Q_{new} (L/s)	$Q_{existing}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
5	242.6	0.82	0.3	0.52	0.15
10	**179.0**	**0.60**	**0.3**	**0.30**	**0.18**
15	146.8	0.49	0.3	0.19	0.17
20	128.5	0.43	0.3	0.13	0.15
25	110.2	0.37	0.3	0.07	0.10
30	91.0	0.30	0.3	0.00	0.00

Sample calculations for t_c = 10 min:

- Time of Concentration, $t_c = 10\min$
- Rainfall Intensity, $I = 179.0mm/hour$ for $t_c = 10\min$ and 100 year storm

$$Q_{new} = 2.78 \times A \times I \times C$$
$$= 2.78 \times 0.0039ha \times 179.0mm/hour \times 0.25 \times 1.25$$
$$= 0.6L/s$$
$$Q_{stored} = Q_{new} - Q_{existing}$$
$$= 0.6 - 0.3$$
$$= 0.3L/s$$

The required volume of water stored on west side and part of the south side of the proposed building is:

$$V_{stored} = Q_{stored} \times t_c$$
$$= 0.3L/s \times 10\,\text{min} \times \frac{60\,\text{sec}}{1\,\text{min}} \times \frac{1m^3}{1000L}$$
$$= 0.18m^3$$

The amount of required storage is negligible, therefore area A3 is excluded from storage detailed design.

Stormwater management Best Management Practices (BMP's) were incorporated into the proposed design for area A1 and A2.
Stormwater release rate and total storage volume are calculated for areas A1 and A2.

The allowable storm water release from area A1 is 0.5L/s and from area A2 is 2.6L/s.

The total volume of water to be stored on site is:

$V_{storedtotal} = V_{stored1} + V_{stored2}$
= 1.08 m^3 + 5.52 m^3
= 6.6 m^3

On area A1 drainage will be through a new drainage channel and a new catch basin connected to the existing catch basin. A new catch basin is proposed for the additional flow control.

On area A2, water is stored on the sloped roof. The proposed depth of ponding on the roof is 0.05m.
H_1=0.05m
The area of the building roof is 179 m^2 (excluding portions not capable of storing water, the area is reduced to 172 m^2).

$$Vpond = \frac{1}{3}Ah$$
$$Vpond = \frac{1}{3} \times 172 \times 0.05$$
$$Vpond = 2.85m^3$$

The required volume of water to be stored on roof is V_{stored}=5.52m^3.

Vstored – Vpond = 5.52m^3-2.85m^3=2.67m^3

H_2=2.67m^3/172m^2=0.016m

Maximum depth of ponding is $H_{max}=H_1 + H_2$=0.05m + 0.016m

H_{max}=0.066m

The allowable storm water release from area A2 is 2.6 L/s.
Runoff from the roof will be restricted before leaving the roof top and being directed to the existing storm sewer in Grant Street. The restriction devices will maximize roof storage to reduce the 100-year post-development flows leaving the site.

The proposed roof drains for roof drain area R2, area R3 and roof deck drain area R5 and area R6 are Watts RD-100 at the closed setting, head of water 0.025m.The flow capacity of the roof drain at the closed setting is 0.32L/s

The proposed roof drain for roof drain area R1 is Watts RD-100 with adjustable Accutrol Weir, head of water 0.050m. The weir opening has to be on 1/2 setting and the flow capacity of the roof drain is 0.63L/s.

The proposed roof drain for roof drain area R4 is Watts RD-100 with adjustable Accutrol Weir, head of water 0.076m. The weir opening has to be on 1/4 setting and the flow capacity of the roof drain is 0.70L/s.

$$Q_{total} = 0.32L/s * 4 + 0.63L/s * 1 + 0.70L/s * 1 = 1.28L/s + 0.63L/s + 0.70 = 2.6L/s$$

The flow capacity of the roof drain it will be 2.6 L/s, therefore the roof has the capacity to store the required volume of water.

For storm water restriction devices including roof drain and front yard catch basin ICD see Appendix D.

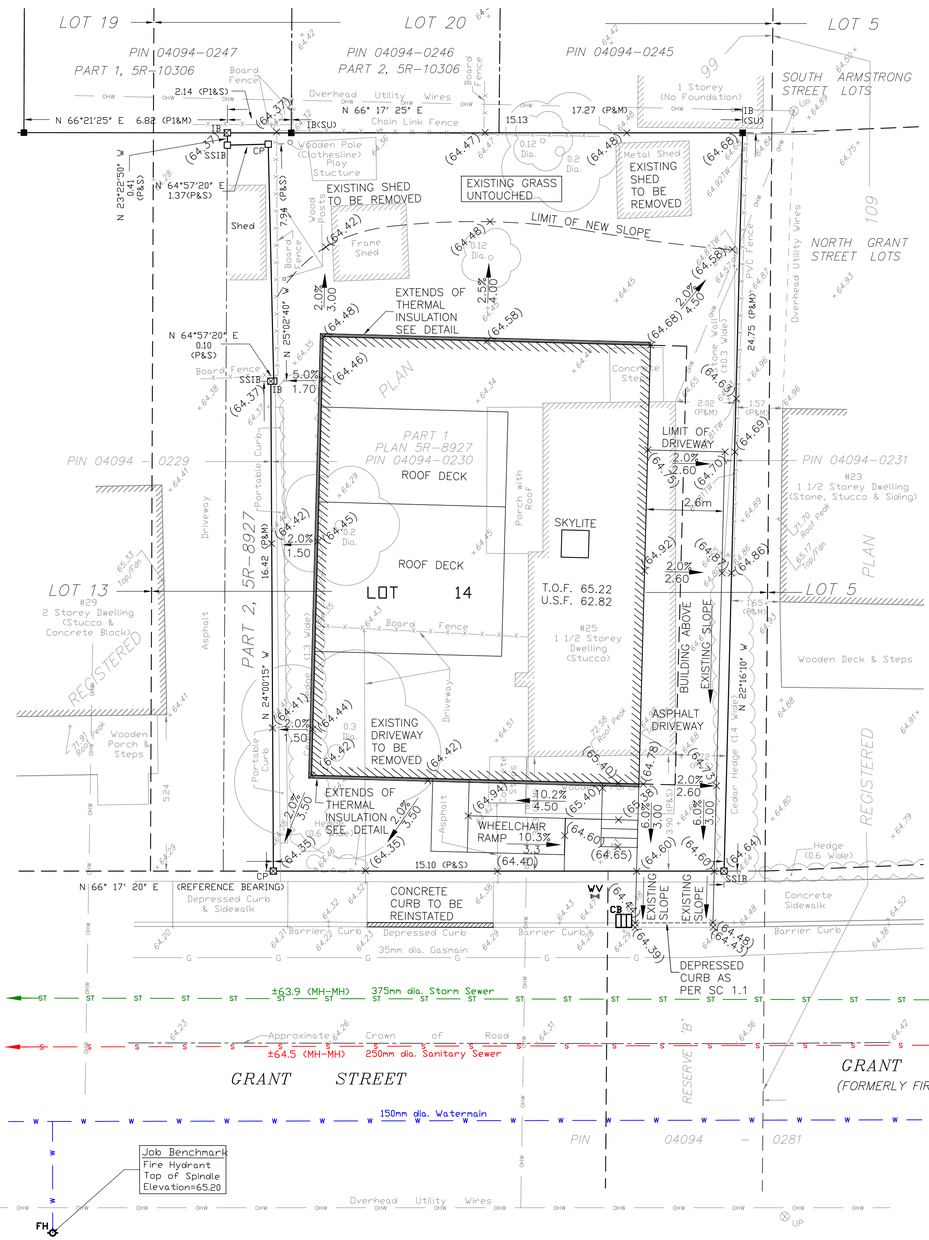
The storm water release rates from areas A1 and A2 during a 100 years return period storm event are 0.5L/s and 2.6L/s which are the same as the predevelopment storm water release from areas A1 and A2 during 5 years return period storm event.

Boris Uriev, M.Sc., P.Eng.
Senior Civil Engineer

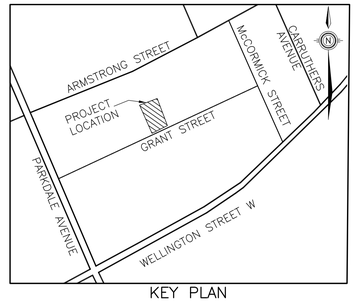
Appendix C

PROPOSED SITE LAYOUT / GRADINGS

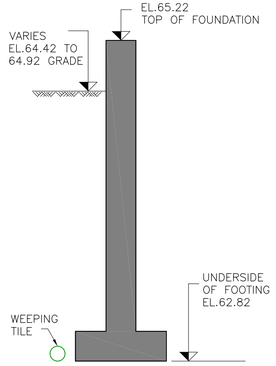
AND POST DEVELOPMENT DRAINAGE AREA PLANS



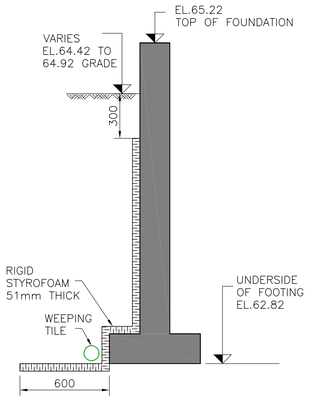
PLAN
1:100



KEY PLAN
N.T.S.



FOUNDATION DETAIL
1:20



THERMAL INSULATION DETAIL
1:20

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

GENERAL NOTES:

1. DIMENSIONS ARE SHOWN IN MILLIMETRES, ELEVATIONS ARE SHOWN IN METRES.

LEGEND:

- x(80.00) PROPOSED ELEVATIONS
- x76.07 EXISTING ELEVATIONS
- 2% SLOPES & DRAINAGE DIRECTION
- CB–CATCH BASIN
- FH FIRE HYDRANT – BENCH MARK
- UP UTILITY POLE
- WV WATER VALVE

LICENSED PROFESSIONAL ENGINEER
B. URIEV
100061510
Oct 1, 2019
PROVINCE OF ONTARIO

No.	Date	Revision	By:

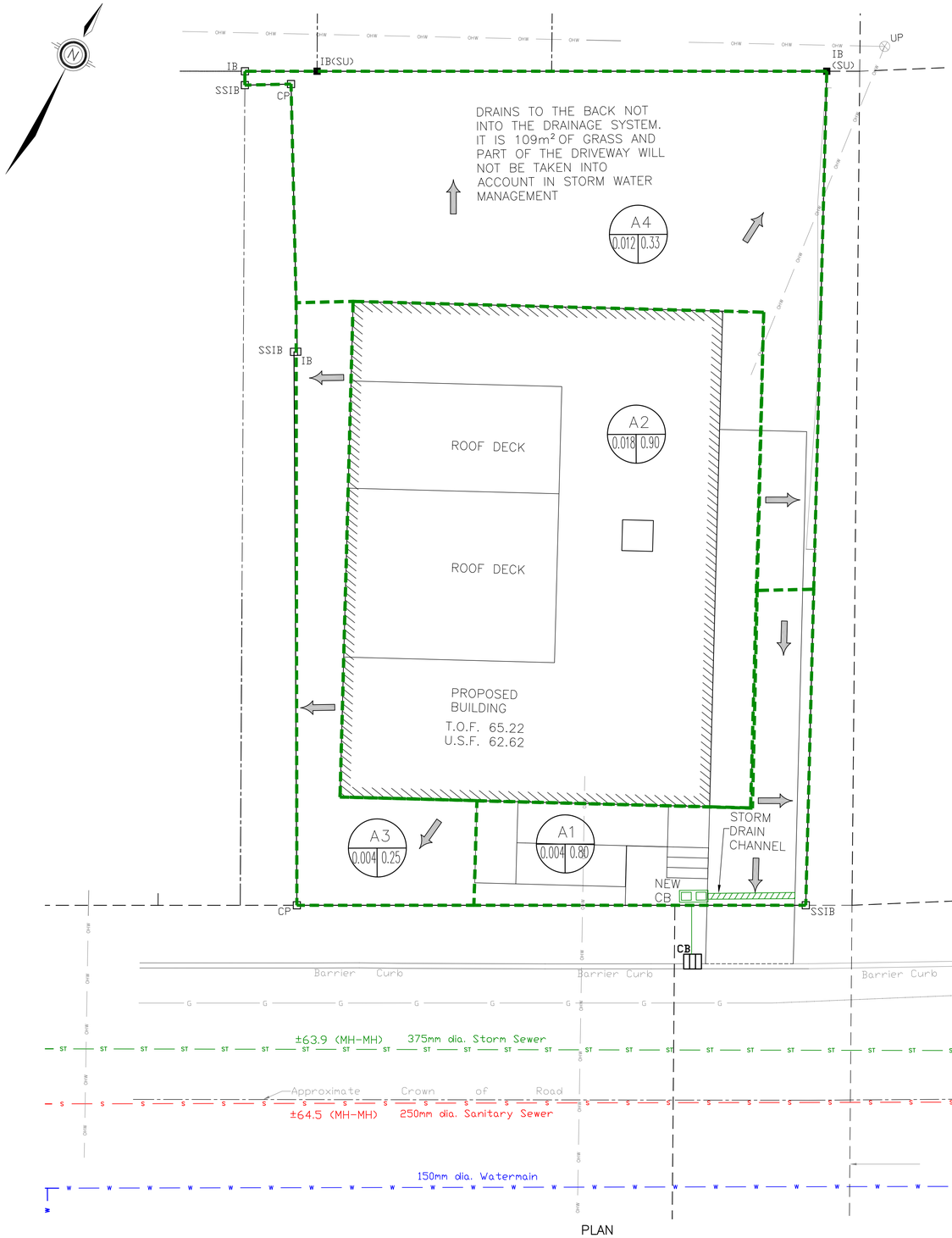
REMISZ Consulting Engineers Ltd.
57 Auriga Dr. Suite 102
Ottawa, ON, K2E 8B2
tel.: (613) 225-1162
fax: (613) 225-4529

Client
KENT HOMES INC
28 CHEMIN DU COUVENT
BOUCTOUCHE, NB

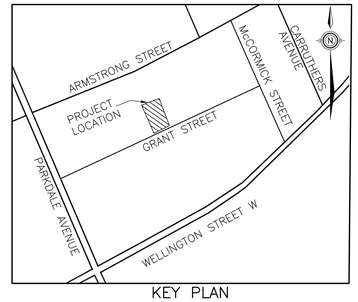
Project
25 GRANT STREET
OTTAWA, ON

Drawing
GRADING PLAN

Designed	B.U.	Date	AUGUST 2019
Drawn	N.I.	Scale	AS SHOWN
Checked	–	Sheet	2 OF 4
Project No.	2019–158	Dwg. No.	C–02



PLAN
1:75



KEY PLAN
N.T.S.

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

GENERAL NOTES:

1. DIMENSIONS ARE SHOWN IN MILLIMETRES, ELEVATIONS ARE SHOWN IN METRES.

LEGEND:

A3 — DRAINAGE AREA NO.
1.12 | 0.56 — RUNOFF COEFFICIENT
STORM DRAINAGE AREA (ha)
DRAINAGE DIVIDE
DIRECTION OF OVERLAND FLOW

LICENSED PROFESSIONAL ENGINEER
B. URIEV
100061510
Oct 1, 2019
PROVINCE OF ONTARIO

No.	Date	Revision	By:

REMISZ
Consulting Engineers Ltd.
57 Auriga Dr. Suite 102
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tel.: (613) 225-1162
fax: (613) 225-4529

Client
KENT HOMES INC
28 CHEMIN DU COUVENT
BOUCTOUCHE, NB

Project
25 GRANT STREET
OTTAWA, ON

Drawing
POST DEVELOPMENT DRAINAGE PLAN

Designed	B.U.	Date	AUGUST 2019
Drawn	N.I.	Scale	AS SHOWN
Checked	–	Sheet	3 OF 4
Project No.	2019–158	Dwg. No.	C–03

0 10 20 40 60 80 100 120 140 160 180 200

Appendix D

STORM WATER RESTRICTION DEVISES

RD-100

Tag: _____

Large Capacity Roof Drain

Components:

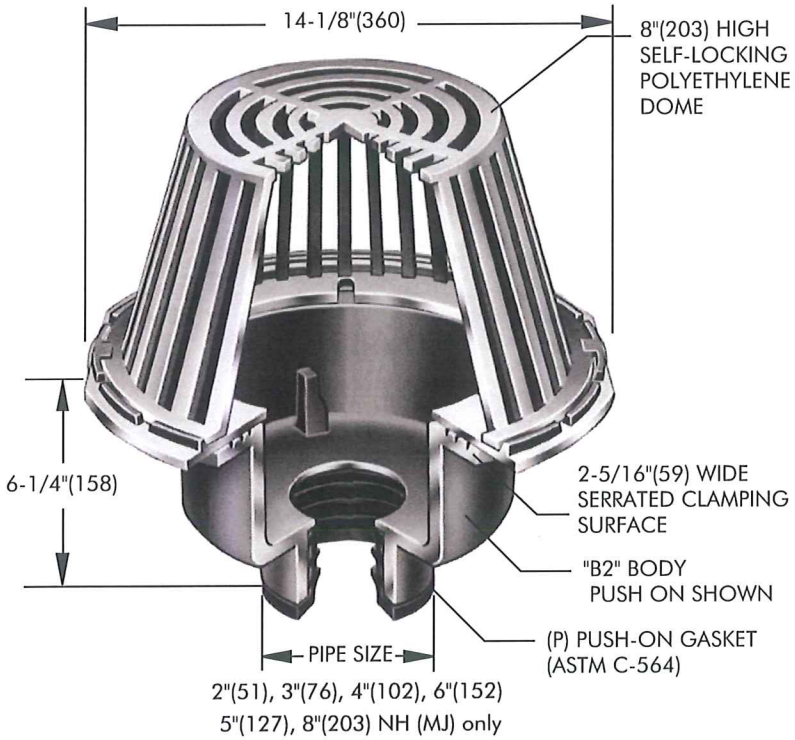

B2


B2-DM


B2-FLG


FC-2

SPECIFICATION: Watts Drainage Products RD-100 epoxy coated cast iron roof drain with deep sump, wide serrated flashing flange, flashing clamp device with integral gravel stop and self-locking polyethylene (standard) dome strainer.



Free Area Sq. In.
137

Deck opening 10" (254) with sump receiver 13-1/4" (337)

** Side Outlet (-SO) option only available in 2"(51), 3"(76), 4"(102) pipe sizes. Underdeck Clamp (-BED and -D options) are not available when -SO is selected.

Order Code: RD-10☐☐-☐-☐

Ex. RD-102P-K

Pipe Sizing (Select One)		
Suffix	Description	
2	2"(51) Pipe Size	☐
3	3"(76) Pipe Size	☐
4	4"(102) Pipe Size	☐
5	5"(127) Pipe Size	☐
6	6"(152) Pipe Size	☐
8	8"(203) Pipe Size	☐

Outlet Type (Select One)		
Suffix	Description	
NH	No Hub (MJ)	☐
P	Push On	☐
T	Threaded Outlet	☐
X	Inside Caulk	☐

Options (Select One or More)		
Suffix	Description	
-A	Accutrol weir (specify # 1-6 slots)	☐
-B	Sump Receiver Flange	☐
-BED	Sump Receiver, Adj Ext., Deck Clamp	☐
-C	Secondary Membrane Clamp	☐
-D	Underdeck Clamp	☐
-E	Adjustable Extension	☐
-GSS	Stainless Steel Ballast Guard	☐
-H	Adj. to 6" IRMA Ballast Guard	☐
-K	Ductile Iron Dome	☐
-K80	Aluminum Dome	☐
-L	Vandal Proof Dome	☐
-R	2" High External Water Dam	☐
-SO	Side Outlet**	☐
-V	Fixed Extension (1-1/2",2",3",4")	☐
-W	Adj. Water Level Regulator	☐
-W-1	Waterproofing Flange	☐
-Z	Extended Integral Wide Flange	☐
-5	Sediment Bucket	☐
-12	Galvanized Dome	☐
-13	All Galvanized	☐
-83	Mesh Covered Dome	☐
-113M	Special Epoxy from 3M Range	☐

Optional Body Material (NH Only)		
Suffix	Description	
-60	PVC Body w/Socket Outlet	☐
-61	ABS Body w/Socket Outlet	☐

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

WATTS DRAINAGE
CANADA: 5435 North Service Road, Burlington, ON, L7L 5H7 TEL: 905-332-6718 TOLL-FREE: 1-888-208-8927 Website: www.wattsdrainage.ca
CANADA

WATTS® DRAINAGE	Adjustable Accutrol Weir Tag: _____	Adjustable Flow Control for Roof Drains

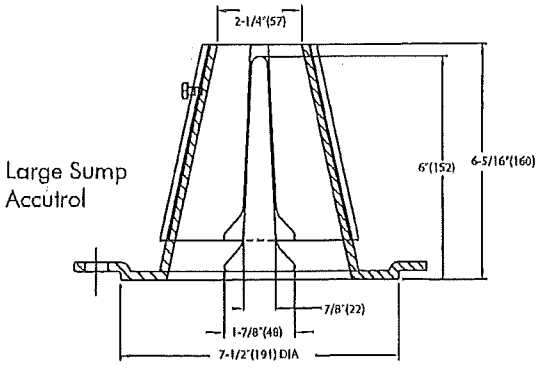
ADJUSTABLE ACCUTROL(for Large Sump Roof Drains only)

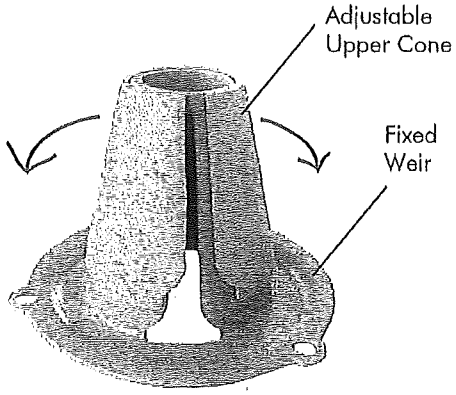
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2" of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3" of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm(per inch of head) x 2 inches of head] + 2-1/2 gpm(for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	Head of Water 1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	(10)	12.5	15	17.5	20
1/4	5	10	(11.25)	12.5	13.75	15
Closed	(5)	10	10	10	10	10

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

WATTS DRAINAGE CANADA: 5435 North Service Road, Burlington, ON, L7L 5H7 TEL: 905-332-6718 TOLL-FREE: 1-888-208-8927 Website: www.wattsdrainage.ca

PRODUCT INFORMATION: TEMPEST LOW, MEDIUM FLOW (LMF) ICD

Purpose

To control the amount of storm water runoff entering a sewer system by allowing a specified flow volume out of a catch basin or manhole at a specified head. This approach conserves pipe capacity so that catch basins downstream do not become uncontrollably surcharged, which can lead to basement floods, flash floods and combined sewer overflows.

Product Description

Our LMF ICD is designed to accommodate catch basins or manholes with sewer outlet pipes 6" in diameter and larger. Any storm sewer larger than 12" may require custom modification. However, IPEX can custom build a TEMPEST device to accommodate virtually any storm sewer size.

Available in 14 preset flow curves, the LMF ICD has the ability to provide flow rates: 2lps – 17lps (31gpm – 270gpm)

Product Function

The LMF ICD vortex flow action allows the LMF ICD to provide a narrower flow curve using a larger orifice than a conventional orifice plate ICD, making it less likely to clog. When comparing flows at the same head level, the LMF ICD has the ability to restrict more flow than a conventional ICD during a rain event, preserving greater sewer capacity.

Product Construction

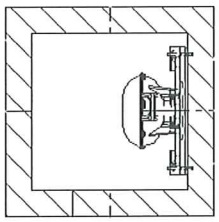
Constructed from durable PVC, the LMF ICD is light weight 8.9 Kg (19.7 lbs).

Product Applications

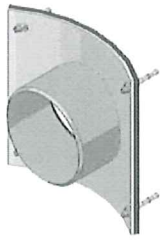
Will accommodate both square and round applications:

Square Application

Universal Mounting Plate



Round Application

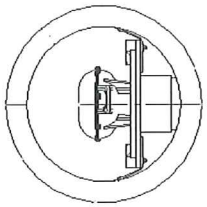


+

Spigot CB Wall Plate

=

Universal Mounting Plate Hub Adapter



PRODUCT INSTALLATION

Instructions to assemble a TEMPEST LMF ICD into a Square Catch Basin:

STEPS:

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 3/8 x 3-1/2, (4) washers, (4) nuts, universal mounting plate, ICD device.
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. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the universal mounting plate on the anchors and screw the 4 nuts 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 the 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 in to the universal mounting plate and has created a seal.

⚠ WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- Call your IPEX representative for more information or if you have any questions about our products.

Instructions to assemble a TEMPEST LMF ICD into a Round Catch Basin:

STEPS:

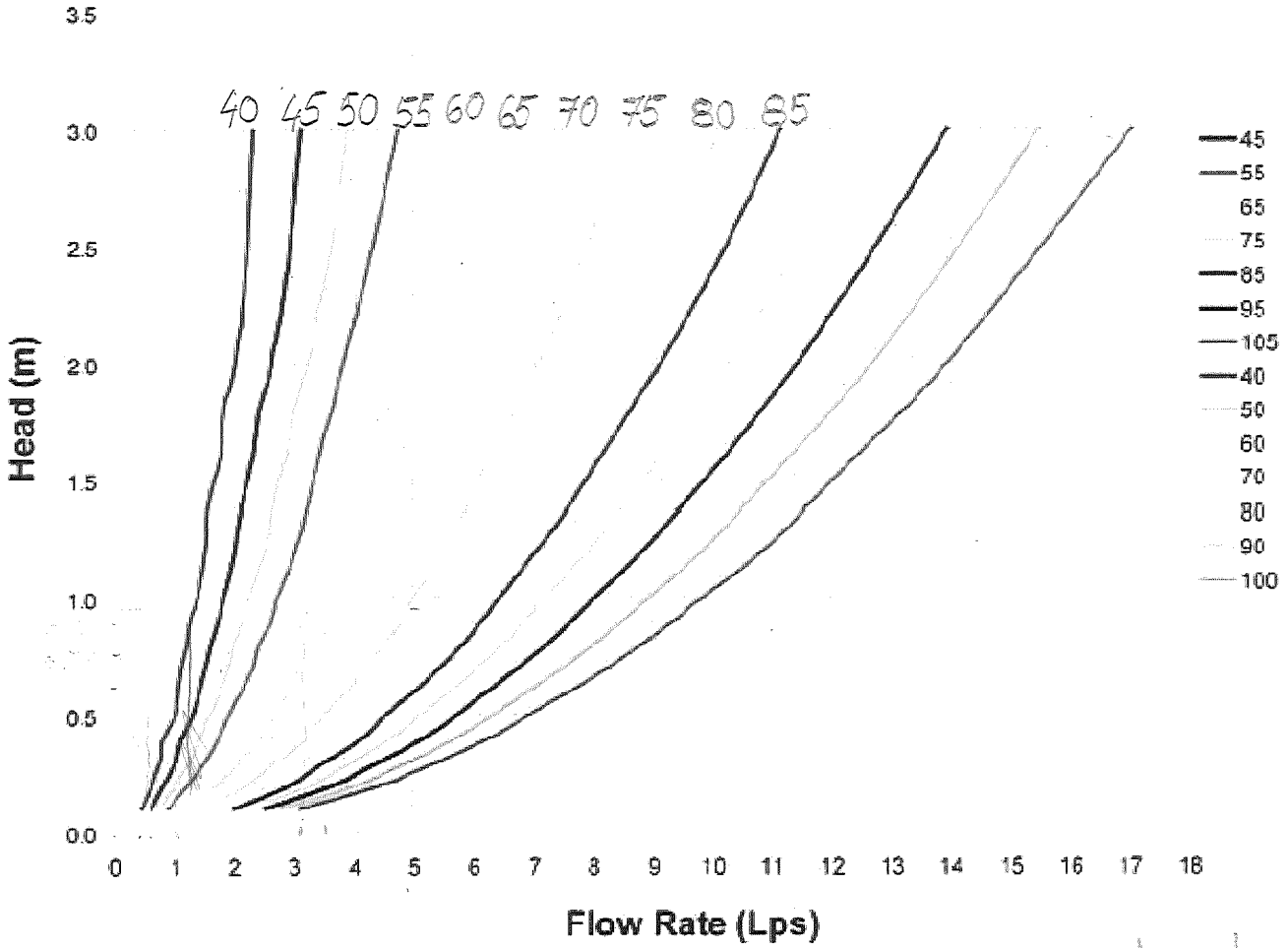
1. Materials and tooling verification.
   - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level and marker.
   - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers and (4) nuts, spigot CB wall plate, universal mounting plate hub adapter, ICD device.
2. Use the 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.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a depth between 1-1/2" to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
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 lbf-ft). There should be no gap between the spigot wall plate and the catch basin wall.
6. Apply solvent cement on the hub of the universal mounting plate, hub adapter and the spigot of the CB wall plate, then 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 in to the mounting plate and has created a seal.

⚠ WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut back the pipe flush to the catch basin wall.
- The solvent cement which is used in this installation is to be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at www.ipexinc.com.
- Call your IPEX representative for more information or if you have any questions about our products.

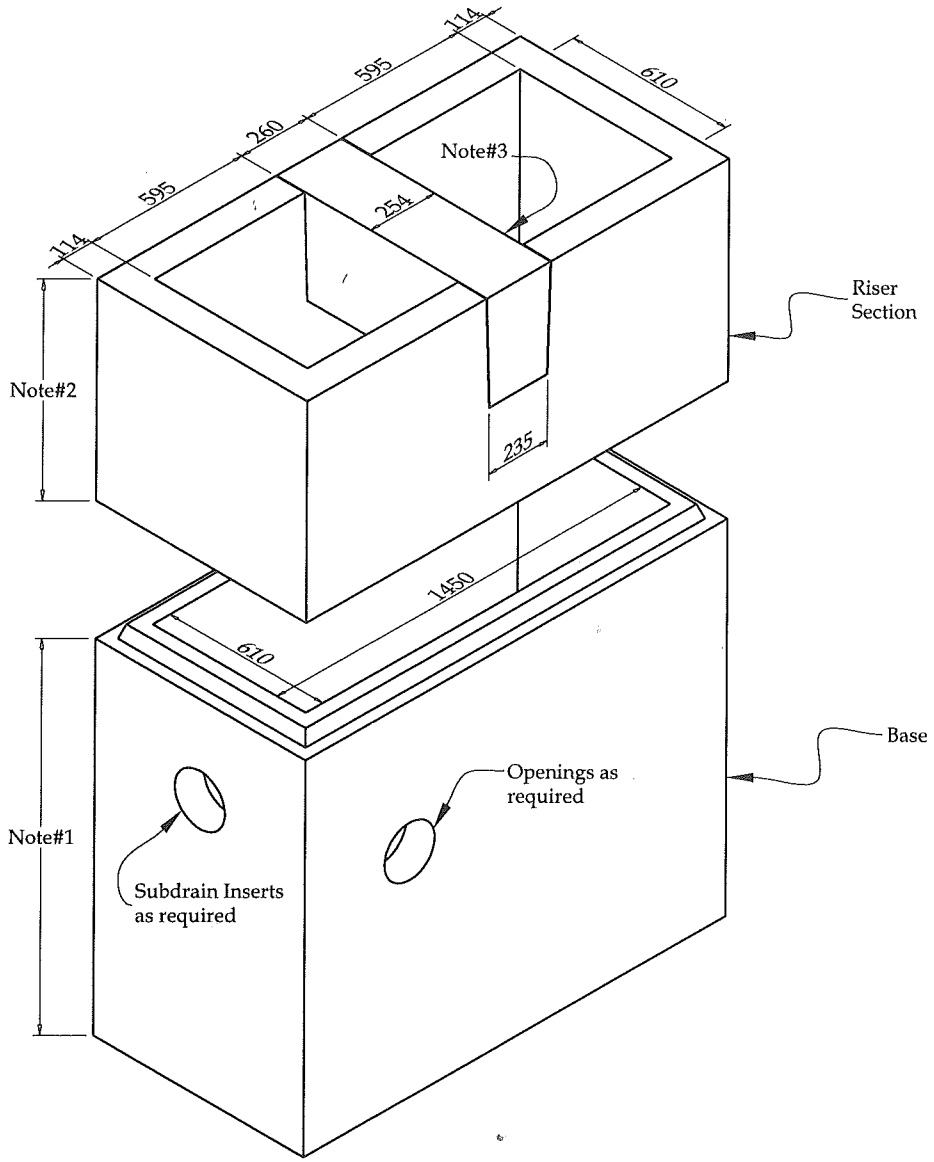
NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

Chart 1: LMF 14 Preset Flow Curves



Minimum allowed is LMF 14 - 40 Restriction Device

M CON
OTTAWA: (800) 267-5515
AYR: (866) 537-3338
WWW.MCONPRODUCTS.COM



NOTES:

1 - Base heights as follows (Structures can be made in 1 piece):
.61m - 2.13m @ .15m increments
2 - Riser Section heights as Follows:
.76m - 1.68m @ .15m increments
3 - Removable catch basin beam
to support Frame & Covers

General Notes:

-Manufactured in accordance with OPSD 705.020
-All pieces c/w lifting anchors
-Standard sump of 600mm is provided
-Pipe gaskets available upon request
-For adjusters refer to Drawing# F-1

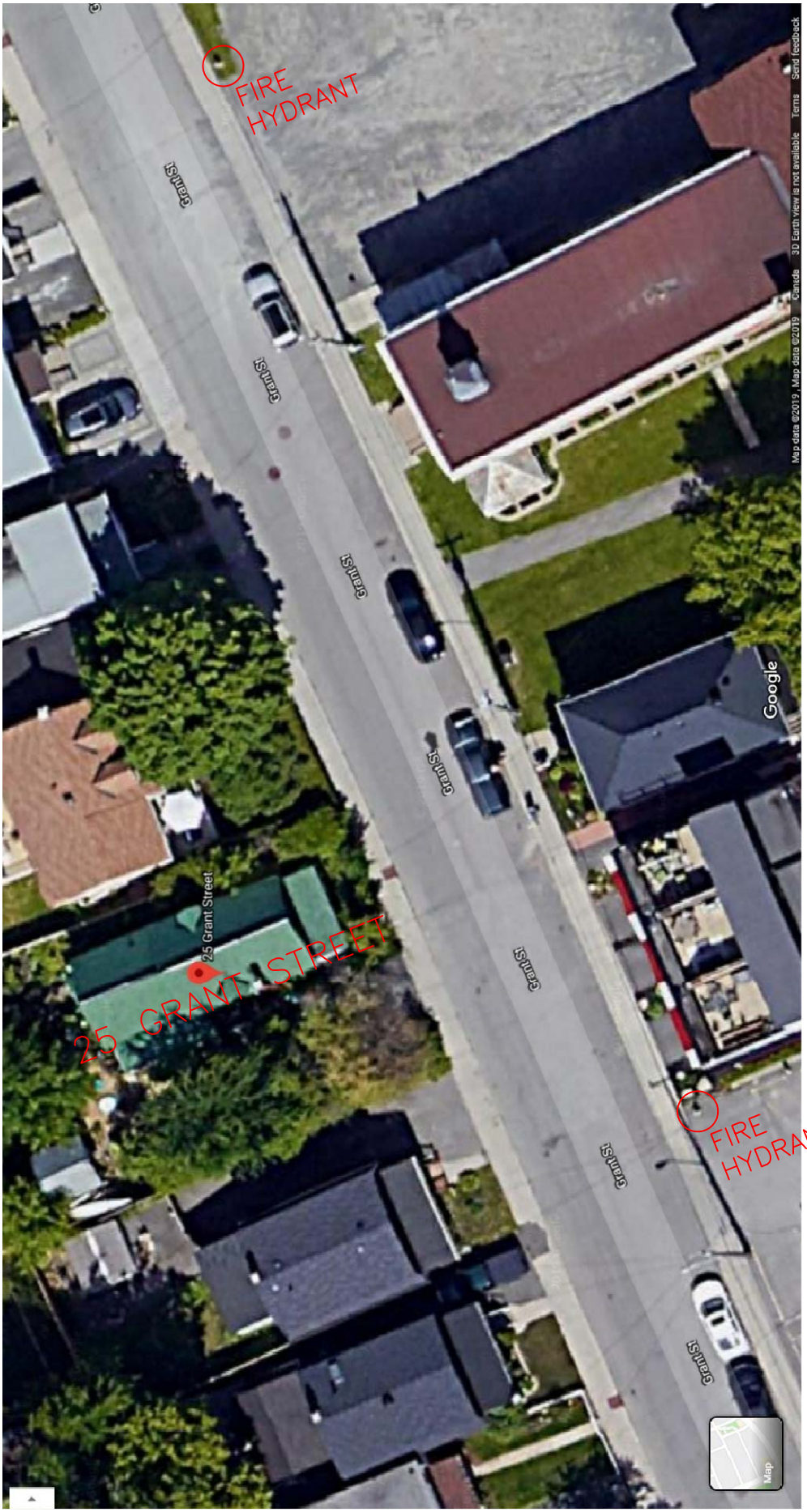
ISSUE DATE	PRODUCT	DRAWING #
MARCH 2005	600mm x 1450mm Twin Inlet Catch Basin	B-3

E. & O.E.

Appendix E

FIRE HYDRANT WATER SUPPLY REQUIREMENTS AND

FIRE HYDRANTS LOCATION DATA


FIRE HYDRANT
25 GRANT STREET
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Google
Map data ©2019 , Map data ©2019
3D Earth View is not available
Terms
Send feedback
Map

A-3.2.5.6.(1) Fire Department Access Route.

The design and construction of fire department access routes involves the consideration of many variables, some of which are specified in the requirements in the Building Code. All these variables should be considered in relation to the type and size of fire department vehicles available in the municipality or area where the building will be constructed. It is appropriate, therefore, that the local fire department be consulted prior to the design and construction of access routes.

A-3.2.5.7. Water Supply.

This Article requires that an adequate water supply for firefighting is to be provided for every building. However, farm buildings of low human occupancy under the National Farm Building Code of Canada 1995 are exempted. The water supply requirements for interior fire suppression systems such as sprinkler systems and standpipe and hose systems are contained in other standards, for example, NFPA Standard 13, "Installation of Sprinkler Systems", and NFPA Standard 14, "Installation of Standpipe and Hose Systems". This Appendix note focuses only on water supplies that are considered essential to firefighting by fire department or other trained personnel using fire hoses.

Minimum requirements for water supply for firefighting are relevant mainly to building sites not serviced by municipal water supply systems. For building sites serviced by municipal water supply systems where the water supply duration is not a concern, water supply flow rates at minimum pressures would be the main focus of this Appendix note. However, where municipal water supply capacities are limited, it would be necessary for buildings to have on-site supplemental water supply.

An adequate water supply for firefighting should be an immediately available and accessible water supply with sufficient volume and/or flow to enable fire department personnel using fire hoses to control fire growth until the building is safely evacuated, prevent the fire from spreading to adjacent buildings, limit environmental impact of the fire, and provide a limited measure of property protection.

The sources of water supply for firefighting purposes may be natural or man-made. Natural sources may include ponds, lakes, rivers, streams, bays, creeks, springs, artesian wells, and irrigation canals. Man-made sources may include aboveground tanks, elevated gravity tanks, cisterns, swimming pools, wells, reservoirs, aqueducts, tankers, and hydrants served by a public or private water system. It is imperative that such sources of water be accessible to fire department equipment under all climate conditions.

The available water supply would allow arriving fire department personnel to use the water at their discretion when entering a burning building with hose lines. During the search and evacuation operation, hose streams may be needed for fire suppression to limit fire spread. The duration of the water supply should be sufficient to allow complete search and evacuation of the building. Once the search and rescue operations are complete, additional water may be required for exposure protection or fire suppression to limit property damage.

Fire departments serving remote or rural areas often have to respond to a fire with a transportable water supply of sufficient volume for approximately 5 to 10 minutes when using one or two 38 mm hose lines. This would provide minimal hose streams allowing immediate search and rescue operations in small buildings with simple layouts but limited fire suppression capabilities, especially if a fire is already well-established.

For larger more complex buildings, an on-site water supply for firefighting would be needed to provide an extended duration of hose stream use by the fire department to allow search and evacuation of the building, exposure protection and fire suppression. The volume of this on-site water supply would be dependent on the building size, construction, occupancy, exposure and environmental impact potential, and should be sufficient to allow at least 30 minutes of fire department hose stream use.

The recommendations of this Appendix note are predicated on prompt response by a well equipped fire department using modern firefighting techniques, and buildings being evacuated in accordance with established building fire safety plans and fire department pre-fire plans. For buildings constructed in areas where fire department response is not expected at all or in a reasonable time, sprinkler protection should be considered to ensure safe evacuation.

Elementary and secondary schools usually have a record of well established and practiced fire safety plans which would allow complete evacuations within 4 minutes. Because of this and the inherent high level of supervision in these buildings, a reduction of the water supply for firefighting may be considered. It is suggested that the level of reduction should be

determined by the local enforcement authority based on the resources and response time of the fire department, and the size and complexity of the buildings.

When designing open, unheated reservoirs as sources of fire protection water, a 600 mm ice depth allowance should be included in the water volume calculations, except where local winter temperature conditions result in a greater ice depth (as typically found on local lakes or ponds). As well, make-up water supplies should be provided to maintain the design volumes, taking into account volume loss due to evaporation during drought periods.

1. Buildings not Requiring an On-Site Water Supply
   (a) A building would not require an on-site water supply for firefighting if the building satisfies the criteria set out in Item 1(b) or Item 1(c) provided that:
      (i) the building is serviced by a municipal water supply system that satisfies Item 3(b), or
      (ii) the fire department can respond with a transportable water supply of sufficient quantity to allow them to conduct an effective search and evacuation of the building, determined on the basis of other guidelines or standards (such as, NFPA 1231, "Standard on Water Supplies for Suburban and Rural Fire Fighting").
   (b) A building would not require an on-site water supply for firefighting where all of the following criteria are met:
      (i) the building area is 200 m^2 or less,
      (ii) the building height is 2 storeys or less,
      (iii) the building does not contain a care or detention occupancy,
      (iv) the building does not require a sprinkler system or a standpipe and hose system,
      (v) the limiting distance from the property line is at least 13 m if the building contains a high hazard industrial occupancy, and
      (vi) the building constitutes no significant environmental contamination potential due to fire.
   (c) A building that exceeds 200 m^2 in building area or 2 storeys in building height and that contains a low hazard industrial occupancy may not require an on-site water supply for firefighting if the combustible loading in the building is insignificant (such as that found in cement plants, steel stock storage sheds, etc.), as determined by the chief building official.

2. Sprinklered Buildings
   For sprinklered buildings, water supply additional to that required by the sprinkler systems should be provided for firefighting using fire hoses in accordance with the hose stream demands and water supply durations for different hazard classifications as specified in NFPA 13, "Installation of Sprinkler Systems".

3. Buildings Requiring On-Site Water Supply
   (a) Except for sprinklered buildings and as required by Items 3(c) and 3(e), buildings should have a supply of water available for firefighting purposes not less than the quantity derived from the following formula:

$$Q = K \cdot V \cdot S_{tot}$$

where

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

S_{tot} = total of spatial coefficient values from property line exposures on all sides as obtained from the formula:

$$S_{tot} = 1.0 + [S_{side1} + S_{side2} + S_{side3} + \text{... etc.})]$$

where

S_{side} values are established from Figure 1, as modified by Items 3(d) and 3(f), and

S_{tot} need not exceed 2.0.

   (b) Water supply flow rates should not be less than that specified in Table 2. Where the water supply is from a municipal or industrial water supply system, the required flow rate should be available at a minimum pressure of 140 kPa.

(c) The water supply as required in Item 3(a) should not be less than that needed to provide the minimum flow rate specified in Table 2 for a minimum duration of 30 minutes.
(d) Where a masonry wall with a minimum fire-resistance rating of 2 h, and no unprotected openings is provided as an exterior wall, the spatial coefficient (S_{side}) for this side of the building may be considered equal to 0. This masonry wall should be provided with a minimum 150 mm parapet. Firewalls that divide a structure into two or more buildings may be given similar consideration when evaluating the exposure of the buildings to each other.
(e) In elementary or secondary schools, the water supply determined in accordance with Items 3(a) and 3(b) may be reduced. The level of reduction to be applied would be at the discretion of the local enforcement authority, and should not exceed 30 per cent.
(f) The spatial coefficient S_{side} may be considered equal to 0 when the exposed building is on the same property and is less than 10 m^2 in building area.

4. Additions to Existing Buildings
(a) Except as permitted in Items 4(b) and 4(c), additions to existing buildings should be provided with a water supply for firefighting as required in Items 3(a) to 3(e). Although under Part 11, Renovation, the required water supply is to be based only on the building volume of the addition, it is recommended that the entire building volume of the expanded facility be used to ensure complete evacuation and safety of all the occupants.
(b) Buildings with new additions falling within any one of the following criteria would not require an additional water supply for firefighting where:
(i) the expanded building complies with all the requirements of Item 1(a),
(ii) the new addition does not exceed 100 m^2 in building area, or
(iii) the new addition exceeds 100 m^2 but does not exceed 400 m^2 in building area, contains an assembly, business and personal services, mercantile or low hazard industrial occupancy, is of noncombustible construction, does not result in a significant increase in exposure to other existing buildings, has no combustible storage or process, and is separated from the existing building by a fire separation with a fire-resistance rating of at least 1 h.
(c) Where a firewall is provided between the new addition and the existing building, the water supply for firefighting may be determined in accordance with Items 1(a) and 3(a), using only the building volume of the new addition.

Table 1					
Water Supply Coefficient - K					
Type of Construction	Classification by Group or Division in Accordance with Table 3.1.2.1. of the Building Code				
	A-2 B-1 B-2 B-3 C D	A-4 F-3	A-1 A-3	E F-2	F-1
Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches.	10	12	14	17	23
Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	16	19	22	27	37
Building is of combustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire-resistance rating where permitted in Subsection 3.2.2.	18	22	25	31	41
Building is of combustible construction. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	23	28	32	39	53
Column 1	2	3	4	5	6

Table 2	
Part 3 Buildings under the Building Code	Required Minimum Water Supply Flow Rate, L/min
One-storey building with building area not exceeding 600 m²	1 800
All other buildings	2 700 (if Q ≤ 108 000 L)(1) 3 600 (if Q > 108 000 L and ≤ 135 000 L)(1) 4 500 (if Q > 135 000 L and ≤ 162 000 L)(1) 5 400 (if Q > 162 000 L and ≤ 190 000 L)(1) 6 300 (if Q > 190 000 L and ≤ 270 000 L)(1) 9 000 (if Q > 270 000 L)(1)

Notes to Table 2:
(1) $Q = KVS_{tot}$ as referenced in Paragraph 3(a)

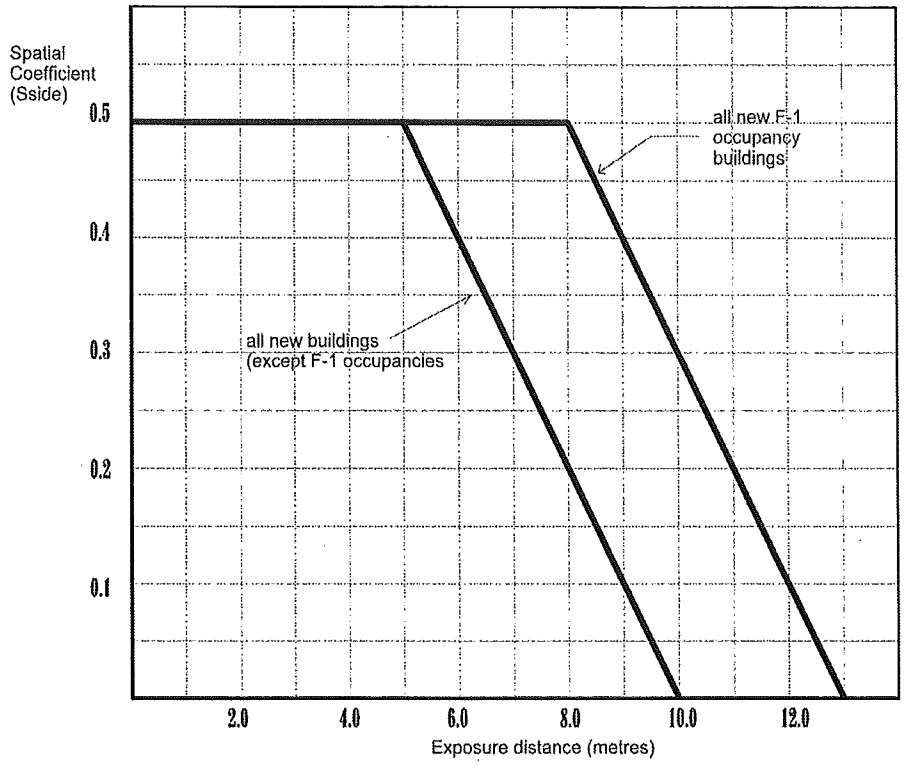


Figure 1
Spatial Coefficient vs Exposure Distance

Further clarification of intent and sample problems and solutions are contained in the "Fire Protection Water Supply Guideline for Part 3 in the Ontario Building Code". This guideline may be obtained through the Office of the Fire Marshal's web site at: "www.ofm.gov.on.ca"

A-3.2.5.13.(1) Sprinkler System Design.

In NFPA 13, "Installation of Sprinkler Systems", reference is made to other NFPA standards which contain additional sprinkler design criteria. These criteria apply to industrial occupancies with high fire loads, including warehouses with high piled storage, and industrial occupancies intended for the use, manufacture or storage of highly flammable materials. Therefore, while only NFPA 13 is called up directly by Sentence 3.2.5.13.(1), the additional criteria in the other NFPA standards are included automatically.

In some NFPA standards, certain aspects of sprinkler protection are dependent on the fire-resistance rating of the vertical structural members. In these cases, the sprinkler system design options can be affected by the fire-resistance rating of these elements. For example, in buildings used for the storage of rubber tires, sprinklers directed at the sides of a column are required if the column does not have the required fire-resistance rating.

Other NFPA standards may require that certain occupancies be sprinklered in conformance with NFPA 13, as in the case of some garages. These requirements do not supersede the requirements in the Building Code. An occupancy is required to be sprinklered only when this is specified in the Building Code, but when it is so required, it must be sprinklered in conformance with NFPA 13 and its referenced standards.

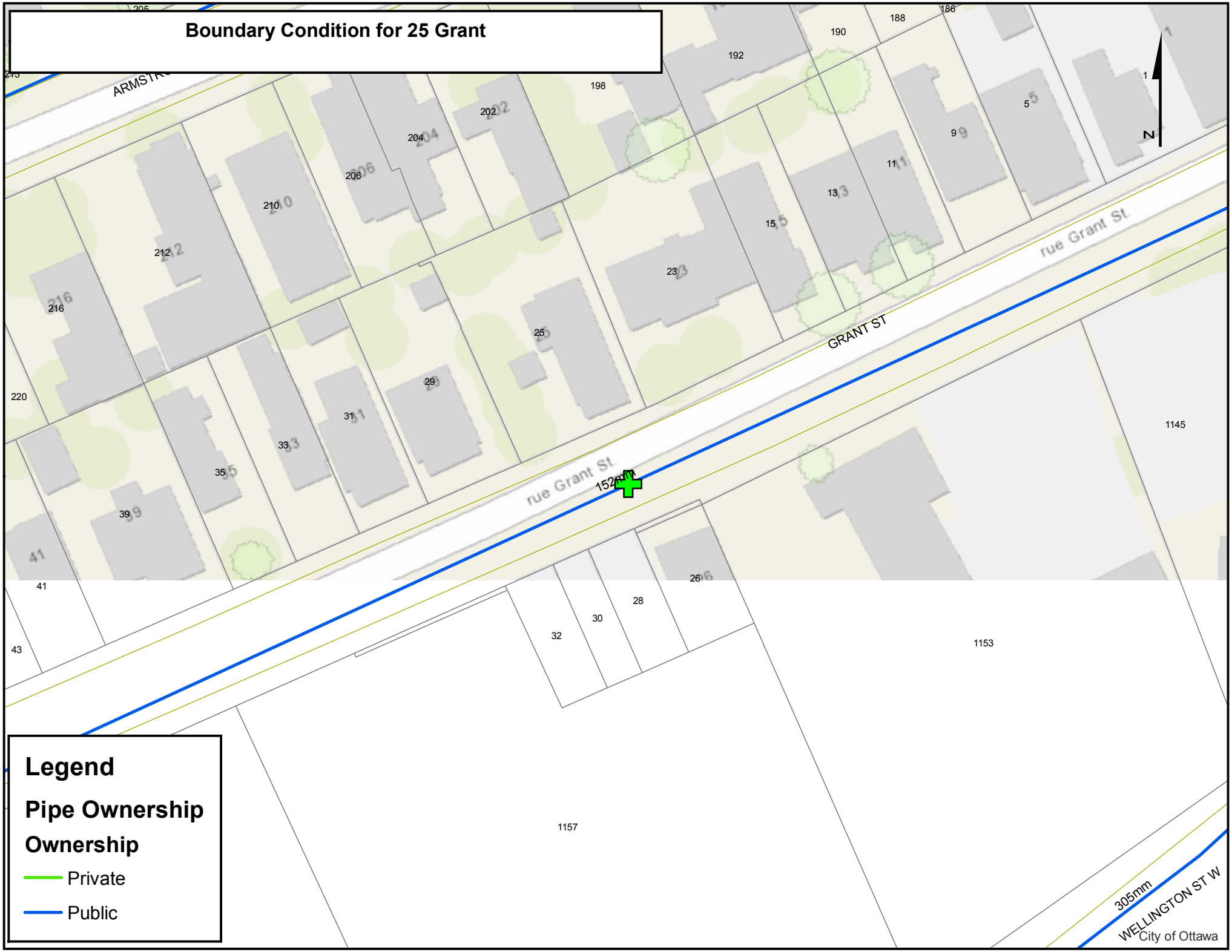
A-3.2.5.13.(6) Sprinklering of Roof Assembly.

Sprinkler protection for roof assemblies in lieu of fire resistance is based on the assumption that the sprinklers will protect the roof assembly from the effects of fire in spaces below the roof. If a ceiling membrane is provided, the sprinklers would have to be located below the membrane in order to react quickly to the fire. In certain instances, however, sprinklers may be

Appendix F

BOUNDARY CONDITIONS

Boundary Condition for 25 Grant



From:	Fraser, Mark
To:	boris.uriev@remisz.com
Cc:	Nicoleta.Istrate@remisz.com; natalie_mariani@hotmail.com; cjalk52@gmail.com
Subject:	RE: Water supply report -25 GRANT STREET
Date:	Thursday, September 26, 2019 4:27:19 PM
Attachments:	image001.png image003.png image004.png image005.png 25 Grant Sept 2019.pdf 25 Grant Street.pdf

Hi Boris,

Please find below boundary conditions for hydraulic analysis at 25 Grant Street (zone 1W) assumed to be connected the 152mm dia. watermain on Grant Street (see attached for connection location):

Site Address: **25 Grant Street**
Type of Development: Residential (3-Storey 9 Unit low-Rise Apartment)
Average Day Demand: 0.045 L/s
Maximum Daily Demand: 0.43 L/s
Maximum Hourly Demand: 0.64 L/s
Fire Flow: 6000 L/min. (100 L/s)

Connection [152mm dia.-Grant Street]
Minimum HGL = 108.0m
Maximum HGL = 115.0m
MaxDay + FireFlow (100 L/s) = 100.0m

These are for current conditions and are based on computer model simulation.
Please refer to *City of Ottawa, Ottawa Design Guidelines – Water Distribution, First Edition, July 2010, WDG001 Clause 4.2.2* for watermain pressure and demand objectives.
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.

If you have any questions please let me know.

Regards,

Mark Fraser
Project Manager, Planning Services
Development Review Central Branch
City of Ottawa | Ville d'Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Avenue West. 4th Floor, Ottawa ON, K1P 1J1
Tel:613.580.2424 ext. 27791
Fax: 613-580-2576
Mail: Code 01-14
Email: Mark.Fraser@ottawa.ca

From: Fraser, Mark
Sent: September 17, 2019 3:35 PM
To: 'Boris Uriev' <boris.uriev@remisz.com>
Cc: Nicoleta Istrate <Nicoleta.Istrate@remisz.com>; Natalie Mariani <natalie_mariani@hotmail.com>; Chris Jalkotzy <cjalk52@gmail.com>
Subject: RE: Water supply report -25 GRANT STREET

Hi Boris,

Please accept this email as confirmation that boundary conditions have been requested from the Water Resources Assets Unit. Please note that it can take approximately 5-10 business days to receive and provide you with boundary conditions for hydraulic analysis.

Regards,

Mark Fraser
Project Manager, Planning Services
Development Review Central Branch
City of Ottawa | Ville d'Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Avenue West. 4th Floor, Ottawa ON, K1P 1J1
Tel:613.580.2424 ext. 27791
Fax: 613-580-2576
Mail: Code 01-14
Email: Mark.Fraser@ottawa.ca

From: Boris Uriev <boris.uriev@remisz.com>
Sent: September 17, 2019 11:26 AM
To: Fraser, Mark <Mark.Fraser@ottawa.ca>
Cc: Nicoleta Istrate <Nicoleta.Istrate@remisz.com>; Natalie Mariani <natalie_mariani@hotmail.com>; Chris Jalkotzy <cjalk52@gmail.com>
Subject: RE: Water supply report -25 GRANT STREET

Mr. Fraser, good day!

Please find attached our Report containing all required information.

We need to obtain boundary conditions (see page 6) to finalize the assignment.

Thank you,

Boris Uriev, M. Sc., P. Eng.
Senior Civil Engineer

REMISZ Consulting Engineers Ltd.

57 Auriga Drive, Suite 102, Ottawa ON, K2E 8B2
Tel. (613) 225-1162 ext. 207 Fax (613) 225-4529
http://www.remisz.com

From: Fraser, Mark [mailto:Mark.Fraser@ottawa.ca]
Sent: Thursday, September 12, 2019 9:15 AM
To: Nicoleta.Istrate@remisz.com
Subject: RE: Water supply report -25 GRANT STREET

Hi Nicoleta,

Appendix G

SANITARY SERVICES REQUIREMENTS AND DATA

21 March 2018

TECHNICAL BULLETIN ISTB-2018-01

This Technical Bulletin amends the *Ottawa Design Guidelines – Sewer*, Second Edition, dated October 2012 and all subsequent Technical Bulletins. All criteria presented in the *Ottawa Design Guidelines – Sewer* and all subsequent Technical Bulletins are considered valid and remain unchanged unless modified per the specific changes as outlined within this bulletin.

Criteria Review

This review deals with design flow parameters, pumping station overflows and storm and sanitary sewer manhole spacing criteria.

Specifically, the following criteria have been reviewed and revised:

1. Wastewater design flow parameter for the design of sanitary sewers
2. Sanitary pumping station overflows criteria
3. Manhole spacing as per MOECC *Design Guidelines for Sewage Works* (IBS 6879)

Summary Description of Changes

1. Design of Sanitary Sewers

Table 1: Comparison of Previous and Current Parameters provides a comparison of previous (no longer applicable) and current (revised) parameters. Under the current (revised) requirements, all new sanitary pipes are to be designed under free flow conditions using the flows as detailed under the Proposed Design Flow column in Table 1.

Table 1: Comparison of Previous and Current Parameters

Parameters	Previous (no longer applicable)			Current (revised)		
	Design	Annual	Rare	Design	Annual	Rare
Res. Per Capita	350	300	300	280	200	200
Commercial	50000	17000	17000	28000	17000	17000
Institutional	50000	17000	17000	28000	17000	17000
Industrial	35000	10000	10000	35000[4]	10000	10000
I/I dry	n/a	n/a	n/a	0.05	0.02[a]	0.02[a]
I/I wet	0.28	0.28[a]	0.5[a]	0.28	0.28[a]	0.53[a]
Total I/I	0.28	0.28[a]	0.5[a]	0.33	0.3[a]	0.55[a]
Harmon – Correction Factor	1	0.4-0.6	0.4-0.6	0.8	0.6	0.6
ICI Peak Factor	1.5	1	1	1.5/1[b]	1	1

Notes

[a] or higher with the support of monitoring data

[b] ICI Peak Factor = 1.5 if ICI in contributing area is >20%; ICI Peak Factor =1.0 if ICI in contributing area <20%

Ottawa

TECHNICAL BULLETIN ISTB-2018-01

Revised Section 4.4.1 Calculation of Peak Design Flows

The formulae and parameters to be applied in the calculation of peak design flows (standard peak flow design parameters) for new or infill developments are illustrated in Figure 4.3 and described as follows:

Figure 4.3 Peak Flow Design Parameters Summary

AVERAGE WASTEWATER FLOWS:

Residential Average Flow:	280 L/c/day
Commercial Average Flow:	28,000 L/gross ha/d
Institutional Average Flow:	28,000 L/gross ha/d
Average Light Industrial Flow:	35,000 L/gross ha/d
Average Heavy Industrial Flow	55,000 L/gross ha/d

PEAKING FACTORS:

Residential Peak factor: Harmon Equation

$$P.F. = 1 + \left(\frac{14}{4 + \left(\frac{P}{1000} \right)^{\frac{1}{2}}} \right) * K$$

where:

P=Population

K=Correction Factor = ~~1~~ 0.8

Commercial Peak factor: 1.5 if commercial contribution >20%, otherwise use 1.0

Institutional Peak factor: 1.5 if institutional contribution >20%, otherwise use 1.0

Industrial Peak Factor: Per Figure in Appendix 4-B

PEAK EXTRANEOUS FLOWS: (design event)

Infiltration Allowance: (Dry weather) 0.05 L/s/effective gross ha (for all areas)

Infiltration Allowance: (Wet weather) 0.28 L/s/effective gross ha (for all areas)

Infiltration Allowance: (Total I/I) 0.33 L/s/effective gross ha (for all areas)

Unit Type (Min Lot Area M^2)	Zoning (And all similar zonings)	Persons per unit[1]	Units per net ha avg. [2]	Persons (per net ha)[3]	Persons (per gross ha) [4]
Res-Triplex (330)	R3D-E*, H-J*, L*, N*, R4C-E*	2.3	90.9	209	127
Apartments:					
Low Density		1.8	100	180	
Medium Density		1.8	300	540	
High Density		1.8	1000	1800	
Very High Density[5]		1.8	1000 +	1800 +	

*) former City of Ottawa zoning designation.
1) from 1996 census data.
2) new suburban construction, 5-year average (1997-2001), except apartments data which is based on site plans & duplex density which is an assumed average.
3) "net ha" refers to population densities per hectare of purely residential land (i.e. area of the building lots only including private parking and roads but excluding all public road rights-of-way and all other non-residential uses such as parks, stormwater management facilities, commercial developments, schools, community centres, etc.).
4) "gross ha" refers to population densities per hectare of residential and all other non-residential land uses such as streets, schools and parks. Numbers provided apply to large subdivision situations. For smaller residential situations the persons per gross ha will be higher, about 75% of the persons per net ha.
5) apartment densities in the downtown have been as high as 4,000 units/net ha. Proposals with a units/net ha density greater than 1000 will be evaluated on a case-by-case basis.

Development Proposed Land – When the number and type of housing units within a proposed development are known, the calculation of population for the proposed development shall be based on the following:

Table 4.2 Per Unit Populations

Unit Type	Persons Per Unit
Single Family	3.4
Semi-detached	2.7
Duplex	2.3
Townhouse (row)	2.7
Apartments:	
Bachelor	1.4
1 Bedroom	1.4
2 Bedroom	2.1
3 Bedroom	3.1
Average Apt.	1.8

4.4.1 Calculation of Peak Design Flows

The formulae and parameters to be applied in the calculation of peak design flows (standard peak flow design parameters) for new or infill developments are illustrated in Figure 4.3 and described as follows:

Figure 4.3 Peak Flow Design Parameters Summary

AVERAGE WASTEWATER FLOWS:

Residential Average Flow:	350 L/c/day
Commercial Average Flow:	50,000 L/gross ha/d
Institutional Average Flow:	50,000 L/gross ha/d
Average Light Industrial Flow:	35,000 L/gross ha/d
Average Heavy Industrial Flow	55,000 L/gross ha/d

PEAKING FACTORS:

Residential Peak factor: Harmon Equation

$$P.F. = 1 + \left(\frac{14}{4 + \left(\frac{P}{1000} \right)^{\frac{1}{2}}} \right) * K$$

where: P=Population
K=Correction Factor = 1

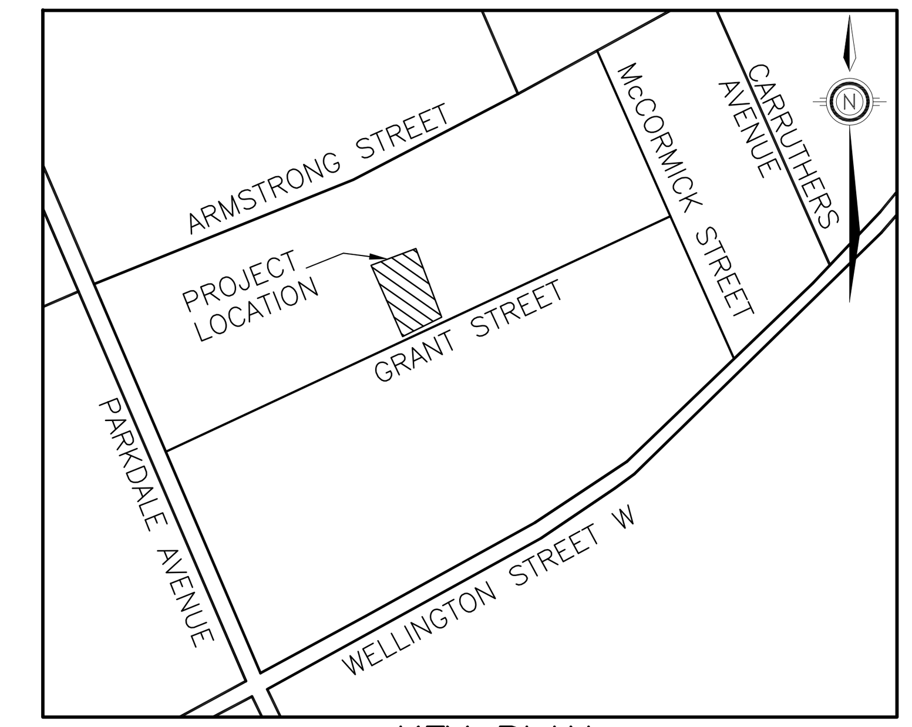
Commercial Peak factor:	1.5
Institutional Peak factor:	1.5
Industrial Peak Factor:	Per Figure in Appendix 4-B

PEAK EXTRANEOUS FLOWS: (design event)

Infiltration Allowance:	0.28 L/s/effective gross ha (for all areas)
Less than 10 ha.	
Foundation Drain Allowance:	5.0 L/s/gross ha (if necessary for existing partially separated and combined areas only)
10 ha – 100 ha	
Foundation Drain Allowance:	3.0 L/s/gross ha (if necessary for existing partially separated and combined areas only)
Greater than 100 ha	
Foundation Drain Allowance:	2.0 L/s/gross ha (if necessary for existing partially separated and combined areas only)

Appendix H

PROPOSED SITE SERVICES PLAN



KEY PLAN
N.T.S.

LEGEND:

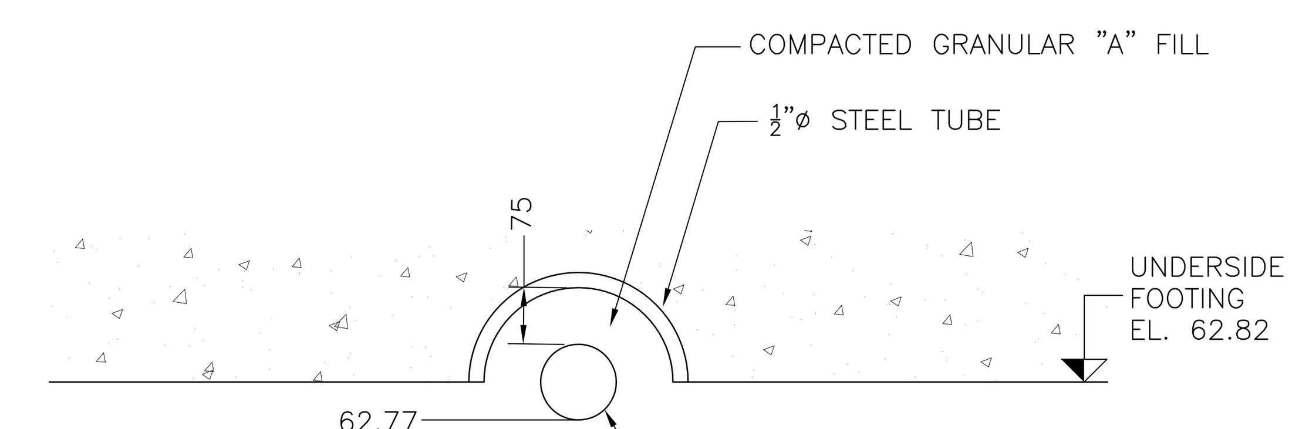
- SANITARY SEWER
- STORM SEWER
- WATERMAIN
- 125mm PVC SDR 28 SANITARY SERVICE MIN. SLOPE 1%
- 38mm COPPER TYPE "K" WATER SERVICE
- 100mm PVC SDR 28 STORM SERVICE MIN. SLOPE 1%
- OVERHEAD WIRES
- GAS
- WV-WATER VALVE
- UP-UTILITY POLE
- CB-CATCH BASIN
- MH-ST STORM MANHOLE
- MH-S SANITARY MANHOLE
- FH FIRE HYDRANT – BENCH MARK
- ROOF DRAIN – RD-100 C/W SMALL SUMP ACCUTROL WEIR DESIGN HEAD 0.025m, RELEASE RATE = 0.32L/s (FOR ROOF DRAIN AREA R2 AND R3) (FOR ROOF DECK DRAIN AREA R5 AND R6)
- ROOF DRAIN – RD-100 C/W SMALL SUMP ACCUTROL WEIR DESIGN HEAD 0.050m, RELEASE RATE = 0.63L/s (FOR ROOF DRAIN AREA R1)
- ROOF DRAIN – RD-100 C/W SMALL SUMP ACCUTROL WEIR DESIGN HEAD 0.076m, RELEASE RATE = 0.70L/s (FOR ROOF DRAIN AREA R4)

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

GENERAL NOTES:

1. DIMENSIONS ARE SHOWN IN MILLIMETRES, ELEVATIONS ARE SHOWN IN METRES.
2. THE SITE/GRADING PLAN IS BASED ON AND TO BE READ IN CONJUNCTION WITH SURVEY OF PART OF LOT 14 REGISTERED PLAN 99, PART1 5R-8927, AS PERFORMED BY FAIRHALL MOFFATT & WOODLAND LTD. 2019.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED TO COMPLETE THE WORK AND ENSURE PROPER CONNECTIONS ARE MADE TO EXISTING MUNICIPAL SERVICES.
4. CONNECTIONS OF SERVICES TO THE MAIN LINES TO BE AS PER CITY STANDARD DRAWINGS S11, S11.1 AND S11.2.
5. THE SITE/GRADING PLAN AS PROPOSED IS UNDER THE DIRECTION OWNER/AGENT AND THEY ASSUME FULL RESPONSIBILITY OF THE DEVELOPMENT AS PROPOSED.
6. BACKWATER VALVE IS TO BE INSTALLED AS PER CITY STANDARDS S14, S14.1, AND S14.2.
7. SANITARY SERVICE TO BE VERTICALLY BENT TO FIT DESIGN ELEVATIONS ALONG FRONT WALL.
8. THIS DRAWING CANNOT BE ACCEPTED AS ACKNOWLEDGING ALL OF THE UTILITIES AND IT WILL BE THE RESPONSIBILITY OF THE USER TO CONTACT THE RESPECTIVE UTILITY AUTHORITIES FOR CONFIRMATION.
9. PROVIDE 2.4m COVER TO WATER SERVICE OR INSULATION AS PER CITY STANDARD DRAWING W22.
10. EXISTING WATER SERVICE IS TO BE BLANKED AT THE MAIN AND THE EXISTING STORM AND SANITARY SERVICES ARE TO BE CAPPED AT THE PROPERTY LINE.

LICENSED PROFESSIONAL ENGINEER B. JURIEV 100061510 Oct 1, 2019 PROVINCE OF ONTARIO



DETAIL OF SERVICE PROTECTION
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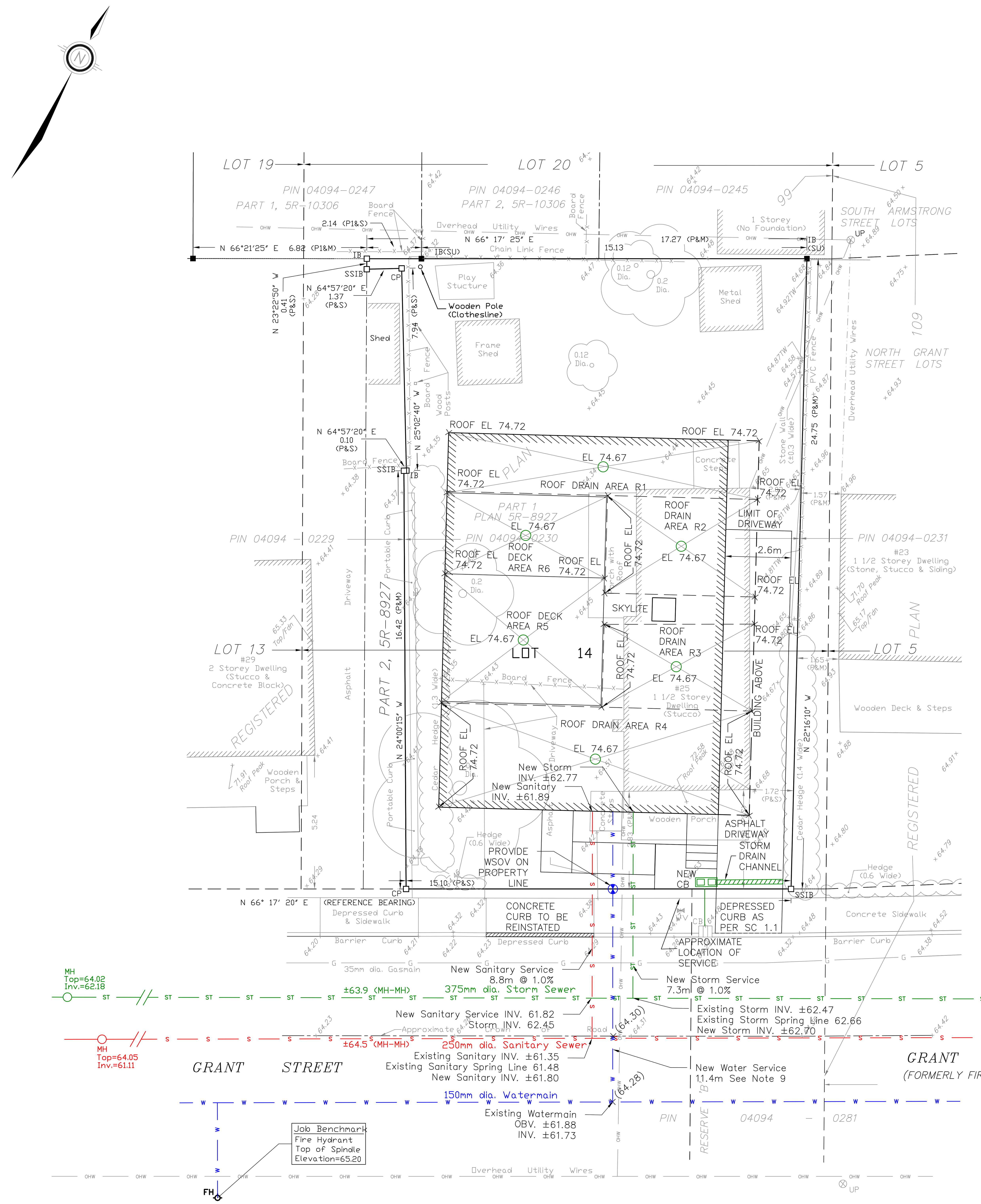


PLAN
1:100

No.	Date	Revision	By:

REMISZ Consulting Engineers Ltd.

57 Auriga Dr. Suite 102
Ottawa, ON, K2E 8B2
tel.: (613) 225-1162
fax: (613) 225-4529

Client: KENT HOMES INC, 28 CHEMIN DU COUVENT, BOUCTOUCHE, NB

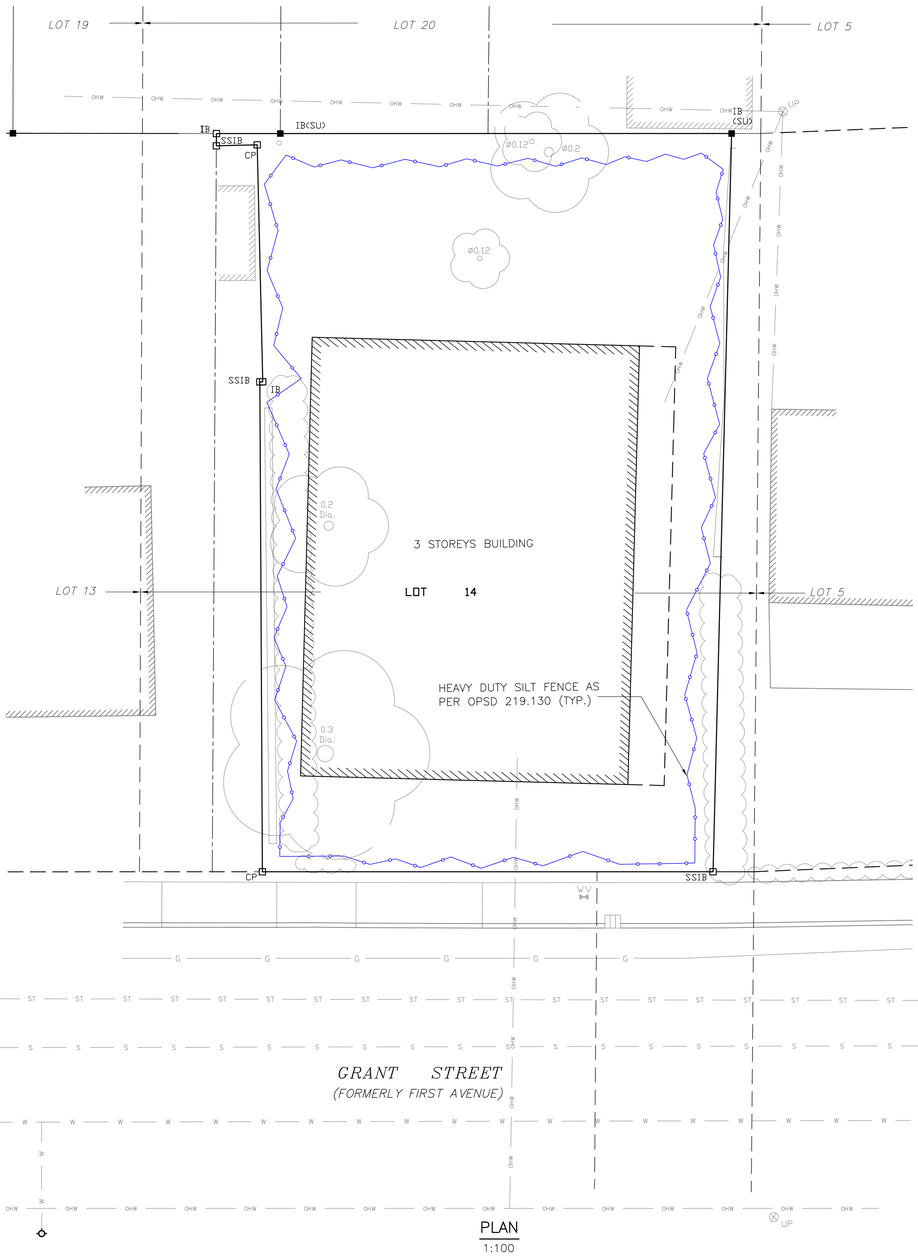
Project: 25 GRANT STREET, OTTAWA, ON

Drawing: SITE SERVICING PLAN

Designed	B.U.	Date	AUGUST 2019
Drawn	N.I.	Scale	AS SHOWN
Checked	–	Sheet	1 OF 4
Project No.	2019–158	Dwg. No.	C–01

Appendix J

EROSION AND SEDIMENT CONTROL PLAN



PLAN
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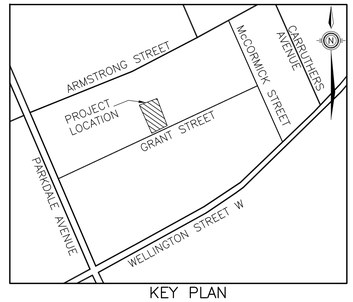
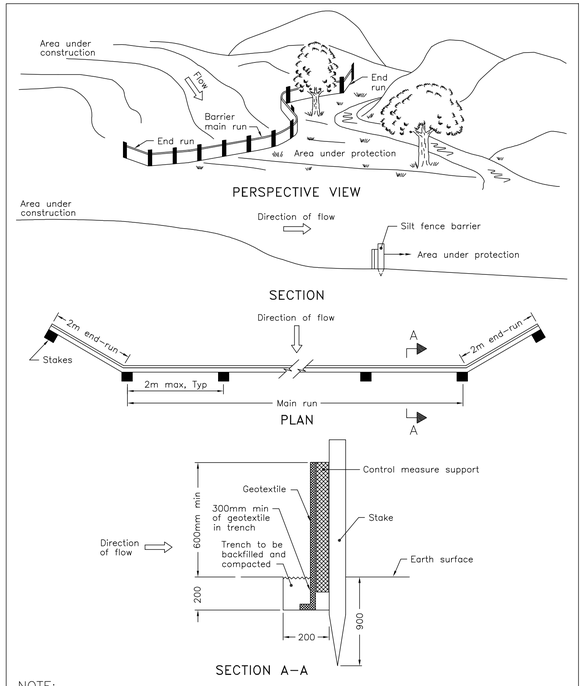


KEY PLAN
N.T.S.



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2006	Rev	1
HEAVY-DUTY SILT FENCE BARRIER			
	OPSD 219.130		

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

GENERAL NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATER COURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCIES.
2. THIS PLAN IS TO BE CONSIDERED A LIVING DOCUMENT WHICH MAY BE MODIFIED IN THE EVENT THAT THE CONTROL MEASURES ARE INSUFFICIENT.
3. EROSION AND SEDIMENT CONTROL PLAN SHALL BE PERMANENTLY POSTED ON SITE AND MADE AVAILABLE FOR REVIEW BY INSPECTING AUTHORITIES.

LICENSED PROFESSIONAL ENGINEER
B. URIEV
100061510
Oct 1, 2019
PROVINCE OF ONTARIO

No.	Date	Revision	By:

REMISZ
Consulting Engineers Ltd.
57 Auriga Dr. Suite 102
Ottawa, ON, K2E 8B2
tel.: (613) 225-1162
fax: (613) 225-4529

Client
KENT HOMES INC
28 CHEMIN DU COUVENT
BOUCTOUCHE, NB

Project
25 GRANT STREET
OTTAWA, ON

Drawing
EROSION AND SEDIMENT CONTROL PLAN

Designed	B.U.	Date	AUGUST 2019
Drawn	N.I.	Scale	AS SHOWN
Checked	–	Sheet	4 OF 4
Project No.	2019-158	Dwg. No.	C-04

Appendix K

PRE-CONSULTATIONS AND COMMENTS FROM REVIEWING AGENCIES

MEMO

Date: Jan 17, 2019

To / Destinataire	Kim Baldwin, Planner	
From / Expéditeur	Richard Buchanan, Project Manager, Infrastructure Approvals	
Subject / Objet	**Pre-Application Consultation 25 Grant St., Ward No.15, 10 unit low rise apartment building**	File No. PC2019-0003

Please note the following information regarding the engineering design submission for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-study-guidelines-development-applications

2. Servicing and site works shall be in accordance with the following documents:

   - ⇨ Ottawa Sewer Design Guidelines (October 2012)
   - ⇨ Ottawa Design Guidelines – Water Distribution (2010)
   - ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - ⇨ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
   - ⇨ City of Ottawa Park and Pathway Development Manual (2012)
   - ⇨ City of Ottawa Accessibility Design Standards (2012)

- ⇨ Ottawa Standard Tender Documents (latest version)
- ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

4. The Stormwater Management Criteria, for the subject site, is to be based on the following:

   i. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

   ii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

   iii. A calculated time of concentration (Cannot be less than 10 minutes).

   iv. Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.

5. Deep Services (Storm, Sanitary & Water Supply)

   i. Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.

   ii. Provide information on the type of connection permitted

   Sewer connections to be made above the springline of the sewermain as per:

   a. Std Dwg S11.1 for flexible main sewers – *connections made using approved tee or wye fittings.*

   b. No submerged outlet connections.

6. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

    i. Location of service

    ii. Type of development and the amount of fire flow required (as per FUS, 1999).

    iii. Average daily demand: ___ l/s.

    iv. Maximum daily demand: ___l/s.

    v. Maximum hourly daily demand: ___ l/s.

7. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

8. Noise Study required, in conformance to the City of Ottawa Noise Control Quidelines.

9. Existing services to be capped and water service blanked at the main.

10. Existing sidewalks to replaced to reflect needs of the new development.

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, x 27801 or by email at Richard.Buchanan@Ottawa.ca.

APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend:

The letter **S** indicates that the study or plan is required with application submission.
The letter **A** indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information on preparing required studies and plans refer to:

http://ottawa.ca/en/city-hall/planning-and-development/guide-preparing-studies-and-plans

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S	5	1. Site Servicing Plan	2. Assessment of Adequacy of Public Services / Site Servicing Brief	S	3
S	5	3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study	S	3
	2	5. Composite Utility Plan	6. Groundwater Impact Study		6
	5	7. Servicing Options Report	8. Wellhead Protection Study		6
	9	9. Community Transportation Study and / or Transportation Impact Study / Brief	10. Erosion and Sediment Control Plan / Brief	S	3
S	3	11. Storm water Management Brief	12. Hydro geological and Terrain Analysis		8
	3	13. Hydraulic Water main Analysis	14. Noise / Vibration Study	S	3
	10	15. Roadway Modification Design Plan	16. Confederation Line Proximity Study		9

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
	50	17. Draft Plan of Subdivision	18. Plan Showing Layout of Parking Garage		2
	30	19. Draft Plan of Condominium	20. Planning Rationale	S	2
S	5	21. Site Plan	22. Minimum Distance Separation (MDS)		3
	10	23. Concept Plan Showing Proposed Land Uses and Landscaping	24. Agrology and Soil Capability Study		5
	3	25. Concept Plan Showing Ultimate Use of Land	26. Cultural Heritage Impact Statement		3
S	5	27. Landscape Plan	28. Archaeological Resource Assessment Requirements: **S** (site plan) **A** (subdivision, condo)		3
S	2	29. Survey Plan	30. Shadow Analysis		3
S	3	31. Architectural Building Elevation Drawings (dimensioned)	32. Design Brief (includes the Design Review Panel Submission Requirements)		Available online
	6	33. Wind Analysis			

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S	3	34. Phase 1 Environmental Site Assessment	35. Impact Assessment of Adjacent Waste Disposal/Former Landfill Site		6
A	3	36. Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37. Assessment of Landform Features		7
	4	38. Record of Site Condition	39. Mineral Resource Impact Assessment		4
S	5	40. Tree Conservation Report *(can be provided on the landscape plan)*	41. Scoped Environmental Impact Statement		11
	4	42. Mine Hazard Study / Abandoned Pit or Quarry Study			

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
		43.	44.		

Meeting Date: January 17, 2019

Application Type: ,*Site Plan Control , with Public Consultation and Minor variance or Minor Zoning By-law Amendment*

File Lead: Kimberley Baldwin

Engineer/Project Manager: Richard Buchanan

Site Address: 25 Grant Street

*Preliminary Assessment: 1☐ 2☐ 3☐ 4☐ 5☐

*One (1) indicates that considerable revisions are required before a planning application is submitted, while five (5) suggests that proposal appears to meet the City's key land use policies and guidelines. This assessment is purely advisory and does not consider technical aspects of the proposal, or in any way guarantee application approval.

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, City Planning will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the City.

Appendix L

CHECKLIST

4. Development Servicing Study Checklist

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

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

4.1 General Content

- ☐ Executive Summary (for larger reports only).
- ☑ Date and revision number of the report.
- ☑ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☑ Plan showing the site and location of all existing services.
- ☐ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- ☑ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☐ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.
- ☑ Statement of objectives and servicing criteria.
- ☐ Identification of existing and proposed infrastructure available in the immediate area.

- ☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- ☐ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighboring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- ☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- ☐ Proposed phasing of the development, if applicable.
- ☐ Reference to geotechnical studies and recommendations concerning servicing.
- ☑ All preliminary and formal site plan submissions should have the following information:

    - ☑ Metric scale
    - ☑ North arrow (including construction North)
    - ☑ Key plan
    - ☑ Name and contact information of applicant and property owner
    - ☑ Property limits including bearings and dimensions
    - ☑ Existing and proposed structures and parking areas
    - ☑ Easements, road widening and rights-of-way
    - ☑ Adjacent street names

4.2 Development Servicing Report: Water

- ☐ Confirm consistency with Master Servicing Study, if available
- ☑ Availability of public infrastructure to service proposed development
- ☑ Identification of system constraints
- ☑ Identify boundary conditions (To be verified)
- ☑ Confirmation of adequate domestic supply and pressure (To be verified)

- [x] Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.
- [ ] Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.
- [ ] Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
- [ ] Address reliability requirements such as appropriate location of shut-off valves
- [x] Check on the necessity of a pressure zone boundary modification.
- [x] 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
- [x] Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- [ ] Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- [x] Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- [x] Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- [x] Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- [ ] Confirm consistency with Master Servicing Study and/or justifications for deviations.

- ☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- ☑ Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- ☐ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- ☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.
- ☐ Description of proposed sewer network including sewers, pumping stations, and forcemains.
- ☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).
- ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- ☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- ☐ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- ☑ Analysis of available capacity in existing public infrastructure.
- ☑ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.

- [x] 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.
- [x] Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- [x] Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- [ ] Set-back from private sewage disposal systems.
- [ ] Watercourse and hazard lands setbacks.
- [x] Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- [ ] Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- [x] Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- [ ] Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- [x] Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- [ ] Any proposed diversion of drainage catchment areas from one outlet to another.
- [ ] Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- [ ] If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.
- [ ] Identification of potential impacts to receiving watercourses

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

4.5 Approval and Permit Requirements: Checklist

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

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

4.6 Conclusion Checklist

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

Bridges, Dams, Culverts

Retaining Walls

Falsework, Formwork, Temporary Structures

Parking Garages, Parking Lots

Sewage and Storm Water Management

Piles, Platforms

Condominiums, Apartments Buildings, Office Buildings

PROFESSIONAL SERVICES PROVIDED WITH CARE,
COMPETENCE AND INTEGRITY THAT DELIVER
PRACTICAL SOLUTIONS TO COMPLEX PROBLEMS

REMISZ Consulting Engineers Ltd. 57 Auriga Drive, Suite 102 Ottawa, ON K2E 8V2