# FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

*Better Life Retirement Residence (c/o 2564905 Ontario Inc.)*

**Type of Document:**
Final Report

**Project Name:**
441 Maple Avenue
City of Burlington

**Project Number:**
ALL-00251529-A1

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**Date + Time Submitted:**
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# 1. Introduction

EXP Services Inc. has been retained by Better Life Retirement Residence (c/o 2564905 Ontario Inc.) ("Owner") to prepare a Functional Servicing and Stormwater Report (FSR/SWM) in support of Official Plan Amendment and Zoning By-Law Amendment (ZBA) applications to permit an 11-storey apartment building on approximately 0.29 ha of land in the City of Burlington, Region of Halton. The subject land is municipally known as 441 Maple Avenue, located on the north side of Maple Avenue, bound by an existing parking lot (Burlington Hydro) to the north, and existing developments to the east and west. Refer to Figure 1 for site location plan.

The subject lot is 2,863 square metres ($m^2$) in area and is currently occupied by a 2-storey long term care facility. The proposed development will be in the form of an 11-storey building containing approximately 140 units with 15,018 $m^2$ of Gross Floor Area (GFA). Currently, there are three levels of underground parking proposed for approximately 162 parking spots. Refer to the Owner's Site Plan in Figure 2 for reference.

The objective of this combined FSR/SWM Report is to give an overview of the proposed servicing and SWM strategy for the site including outlining the required demands on the municipal system while addressing any corresponding capacity concerns including demonstrating how the City of Burlington criteria have been met.

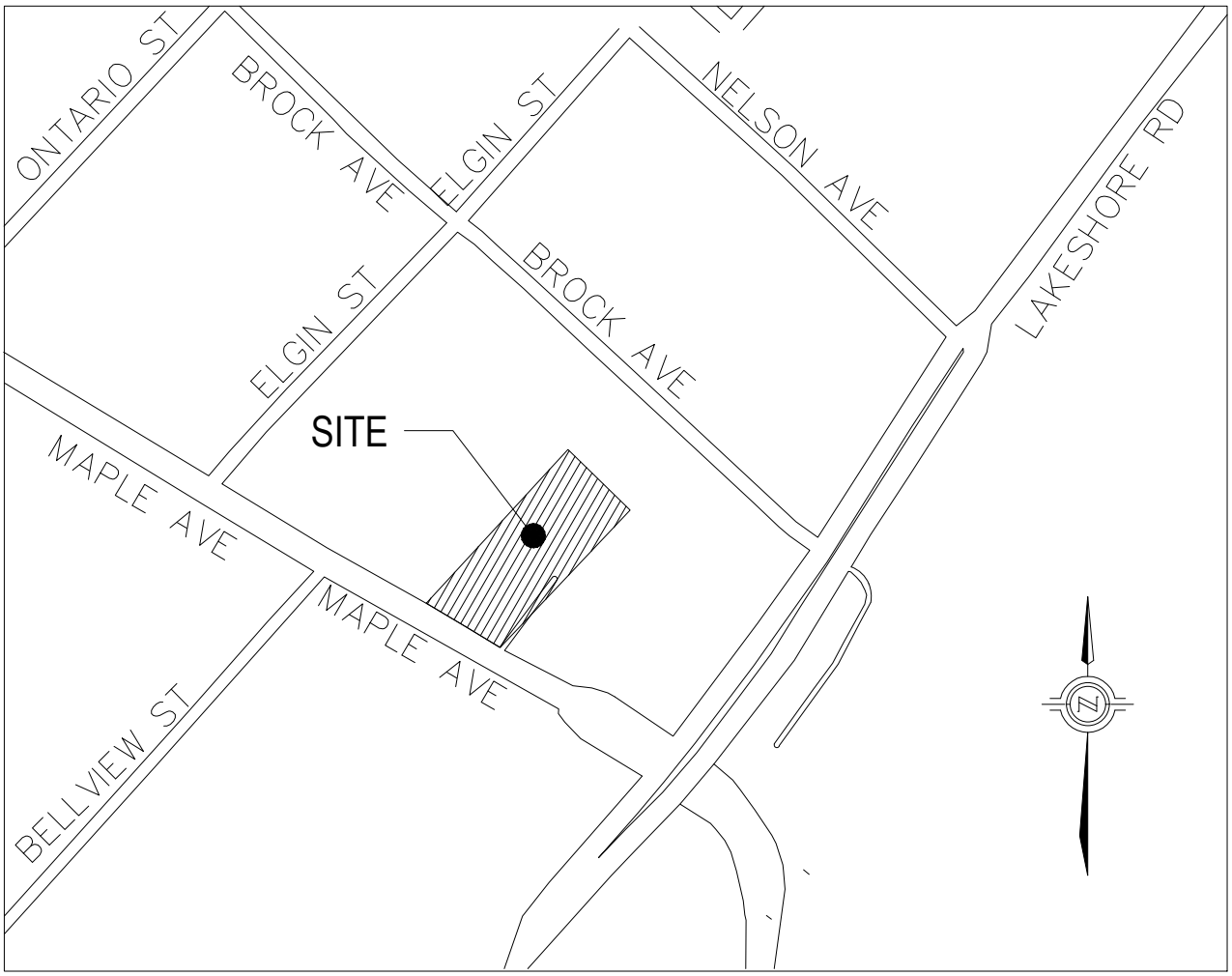
*This report has been revised to address the comments received from both City of Burlington and Region of Halton staff dated March 22, 2021 as part of the 3rd engineering submission for the ZBA application.*

# 2. Site Characteristics and Grading

The site is characterized by the neighbouring developments and perimeter features along the property. Along the east side of the site there is an existing shared driveway easement for the neighbouring development located at 421 Maple Avenue. Some parking spots directly connect to the shared driveway access (through an access easement) including portions of the parking that utilizes precast curbs to control traffic flow and allow sheet flow drainage through the curbs. Along the north side of the site, surface parking is currently utilized by the long-term care facility with the neighbouring property owned by Burlington Hydro through a licensed lease agreement. Along the east side of the Burlington Hydro property, an existing gate access is observed which could provide an access to the City of Burlington parking lot adjacent to Brock Avenue. Finally, along the west side of the site, an existing poured concrete retaining wall addresses a grade change between the neighbouring parking lot which is at a higher elevation.

The existing topography across the site shows a high point located in approximately the middle of the site which essentially splits the major overland flow drainage to the north and south towards Maple Avenue. Generally, the site is flat showing a maximum fall of 0.75m within the north catchment.

The proposed grading design ensures all existing elevations along the perimeter of the property are met to ensure no negative impact to the neighbouring properties. Along the west side of the property, a new retaining wall integrated with the underground structure is proposed that does not required reconstructing or disturbing the neighbouring owner's existing retaining wall along the property line. The proposed drainage strategy is further described within the stormwater section of this report. Refer to drawing SG-01 in Appendix D for the proposed site grading details.




| | | | | |
|---|---|---|---|---|
| exp. | Project: | 441 MAPLE AVENUE, BURLINGTON<br>BURLINGTON, ON | | |
| | Title: | LOCATION PLAN | | |
| | Approved by: S.P | Date: JUNE, 2020 | Project No.: ALL-00251529-A0 | |
| | Drawn by: J.L | Scale: N.T.S. | Figure no.: FIG-01 | |

E:\MRK\ALL-00251529-A0\60 Execution\65 Drawings_Civil\2251529-FIG-01 LOCATION PLAN.dwg

# 3. Water Servicing

There is an existing 200 mm diameter watermain located on Maple Avenue adjacent to the site, where the site is located within the Region of Halton's pressure Zone OB1. Record drawings for Maple Avenue show that there is currently an existing water service for the site. An existing fire hydrant also is located immediately fronting the site. Refer to Appendix E for the Region Water Operating Map and Maple Avenue record drawings.

The proposed water service connection to the existing 200 mm diameter watermain is shown with two separate connections, 200 mm diameter for fire protection and 150 mm diameter for domestic service as per Region of Halton standards. The existing water service is proposed to be abandoned within the Maple Avenue right-of-way in accordance to the Region standards. The future building plumbing design is to include a sprinkler system for fire protection, with a siamese connection located near the entrance to the building within 45 m of the existing fire hydrant as per OBC requirements. Refer to Drawing SG-1 for the proposed watermain servicing details.

To determine the post development domestic water demand on the municipal watermain, the water consumption calculations were prepared in accordance to the Region of Halton criteria. The calculations show that under maximum day conditions, a proposed demand of 1.50 L/s should be considered for the site. Then using the Fire Underwriter's Survey, a fire demand was calculated to be in the range of 117 L/s, giving a maximum day plus fire demand of 118.5 L/s to be used for the purposes of reviewing required fire protection measures. Refer to the supporting calculations in Appendix B.

To verify existing flows and pressures within the municipal watermain, EXP staff coordinated a hydrant flow test on the two closest hydrants to the site location. The flow test results showed that adequate flow can be obtained to meet the maximum day plus fire demand of 118.5 L/s while still maintaining the minimum required 20 psi for the surrounding system. Refer to Appendix B for the hydrant flow test results completed on August 11, 2020.

# 4. Sanitary Servicing

There is an existing 825 mm diameter trunk sanitary sewer on Maple Avenue which flows in the easterly direction towards Lakeshore Road. Record drawings show an existing sanitary service connection to the site. Refer to Appendix E for the Region Wastewater Operating Map.

The proposed sanitary service connection for the site includes re-using the existing sanitary service connection to the existing 825mm diameter trunk sanitary sewer on Maple Avenue to mitigate any unnecessary new penetrations into the Region's trunk sewer. A CCTV video inspection during the detailed design phase for the site plan application is recommended to verify the diameter and condition of the sanitary service prior to commissioning the service. Refer to the Drawing SG-1 for the proposed sanitary servicing details.

In order to review the existing sanitary demand from the current development, the Region of Halton standards were referenced where a peak sanitary flow of 4.86 L/s was calculated and allocated to the Maple Avenue sanitary sewer. EXP staff then reviewed the Owner's proposed development concept and using Region standards, an equivalent population of 210 persons was calculated generating a peak sanitary flow of 2.85 L/s, for an overall theoretical post-development decrease of 2.01 L/s to the Maple Avenue sanitary sewer. Through discussions with Region staff, they have not identified any concerns with the proposed sanitary demand based on the negligible impact on the capacity of the trunk sewer. Please refer to Appendix C for the sanitary demand calculations.

# 5. Storm Servicing

There is an existing 1050 mm diameter trunk storm sewer located on Maple Avenue which flows in the southerly direction towards Lakeshore Road. Record drawings show that two existing storm services for the site are connected to the trunk storm sewer. Refer to Appendix E for the record drawings.

As part of the proposed storm servicing design, the existing storm services are to be abandoned in accordance to the City of Burlington standards. A new 300 mm diameter storm service is proposed to connect to the existing 1050 mm diameter trunk sewer. An overview of the proposed stormwater management strategy for the site is provided in the next section of this report. Refer to Drawing SG-01 for the proposed storm servicing details.

# 6. Groundwater

It has been confirmed with the Owner and the consultant team that the proposed groundwater management strategy is to include a perimeter weeping tile with a permanent drainage system (PDS) where all intercepted groundwater is to be collected in a groundwater sump located in the lowest level parking that provides a passive settlement treatment system within the future mechanical design before being pumped to the SWM tank. The groundwater system will also be equipped with backup pumps and a generator in the event of a power failure. The hydrogeology study completed for the site (prepared by EXP) provided a preliminary estimate for the long-term discharge rate in the range of 160 $m^3$/day or 1.9 L/s. EXP staff then assessed the required peak flow pumping rate for the groundwater based on the estimated discharge rate and the required hydraulic lift. A groundwater peak pumping rate of 2.5 L/s was then conservatively calculated, where the flows (after treated through the passive settlement system) are proposed to be directed through the proposed SWM tank on the P1 level before outletting through the proposed storm service connection to the Maple Avenue system.

# 7. Stormwater Management

## 7.1 Existing Drainage Conditions

In order to calculate the theoretical peak flow runoff rates for the site under existing conditions, the catchment boundaries were determined based on the existing topography and runoff coefficients selected based on the percentage of imperviousness. The existing conditions drainage plan is shown on Figure 3 for reference.

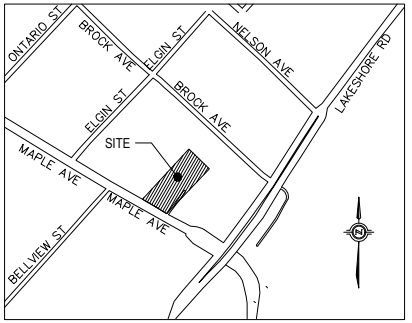
Using a time of concentration of 10 min, the peak flows were calculated and are summarized in Table 2 below:

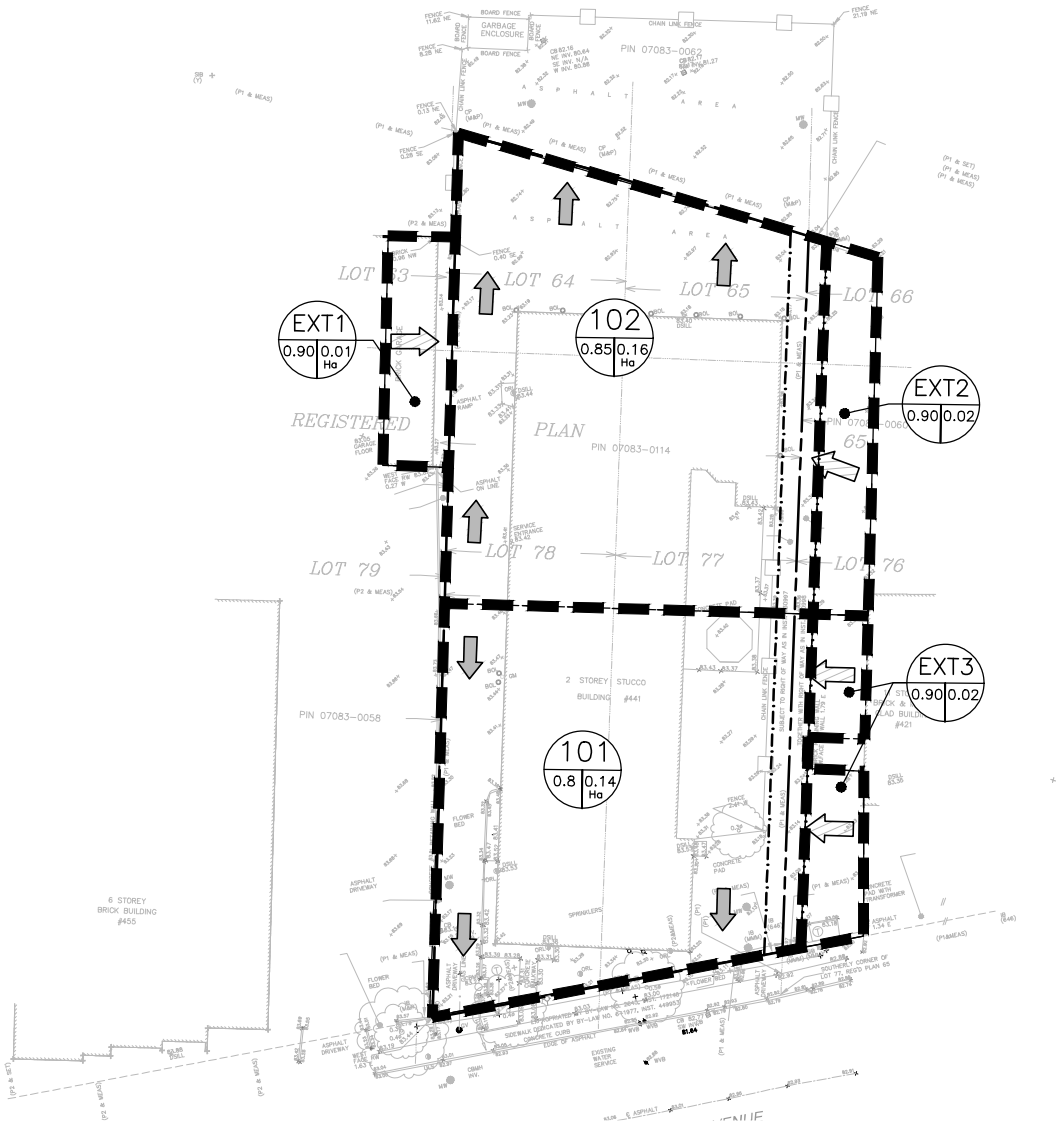
**Table 1: Peak Flows (Existing Conditions):**

| Contributing Area | ID# | Area (ha) | Peak Flow -5 Year (L/sec) | Peak Flow -25 Year (L/sec) | Peak Flow -100 Year (L/sec) |
|---|---|---|---|---|---|
| **South Catchment (Maple Avenue)** | 101 | 0.14 | 31.6 | 46.4 | 63.5 |
| **North Catchment (Brock Avenue)** | 102 | 0.16 | 38.1 | 56.1 | 72.5 |

The peak flow runoff calculations can be found in Appendix D.

KEY PLAN




LEGEND

- PROPERTY LINE
- 227.00 EXISTING GRADE
- MAJOR OVERLAND FLOW DIRECTION
- INCOMING EXTERNAL FLOW DIRECTION
- 101 / 0.5 | 0.13 — STORM DRAINAGE ID NUMBER; AREA (ha); RUNOFF COEFFICIENT
- CATCHMENT BOUNDARY

| | | | | | |
|---|---|---|---|---|---|
| Project: | 441 MAPLE AVENUE<br>BURLINGTON, ON | | | | |
| Title: | EXISTING CONDITIONS DRAINAGE PLAN | | | | |
| Approved by: | S.P | Date: | AUG. 2020 | Project No.: | ALL-00251529-A0 |
| Drawn by: | J.L | Scale: | N.T.S. | Figure no.: | FIG-02 |

## 7.2 Proposed Drainage Conditions

### 7.2.1 Proposed Grading

The existing topography across the site shows a high point located in approximately the middle of the site which essentially splits the major overland flow drainage to the north and south towards Maple Avenue. The proposed grading design generally maintains the existing high point location through the middle of the site while ensuring all existing elevations along the perimeter of the property are met.

A network of area drains are proposed to capture all storm events up to and including the 100-year storm where the flows are conveyed through the plumbing design and outlet into the proposed SWM tank. Any possible incoming external drainage from neighbouring properties is accommodated within the proposed grading and servicing design. For any extreme storm events greater than the 100-year event, the proposed grading design provides safe conveyance for the major overland flow without any negative impact to neighbouring properties. Refer to drawing SG-01 for the proposed site grading details.

### 7.2.2 Methodology

The following is a summary of the key design standards that have been referenced as part of the proposed SWM strategy for the site:

- City of Burlington Site Plan Application Guideline (Dec, 2019)
- City of Burlington Standard Specifications dated (Jan, 2020)
- MECP Stormwater Management Planning and Design Manual (Mar, 2019)

Through various correspondence with City staff, some of the key SWM criteria can be summarized as follows:

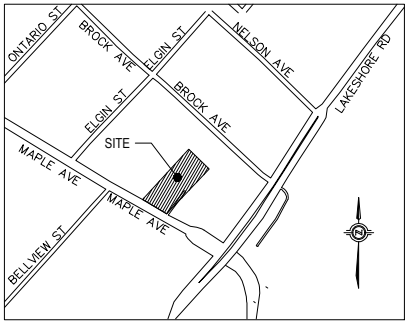
- The post-development peak flows are to be controlled to pre-development rates for the current catchment that discharges to the Maple Avenue storm system for all storms events up to and including 100-year storm
- Stormwater retention on the roof tops of the proposed building is not permitted as per City of Burlington standards
- An emergency overland flow route is to be provided to direct runoff from flows in excess of the 100-year storm event to a safe outlet
- Stormwater is to be treated to Enhanced Quality Controls achieving 80% Total Suspended Solids Removal as defined in the MECP Stormwater Management Planning and Design Manual (Mar, 2019) where oil grit separators are to be designed such that 50% credit is provided by the City of Burlington
- If permanent groundwater dewatering is proposed within the proposed foundation drainage design, incorporate the dewatering requirements into the proposed SWM design

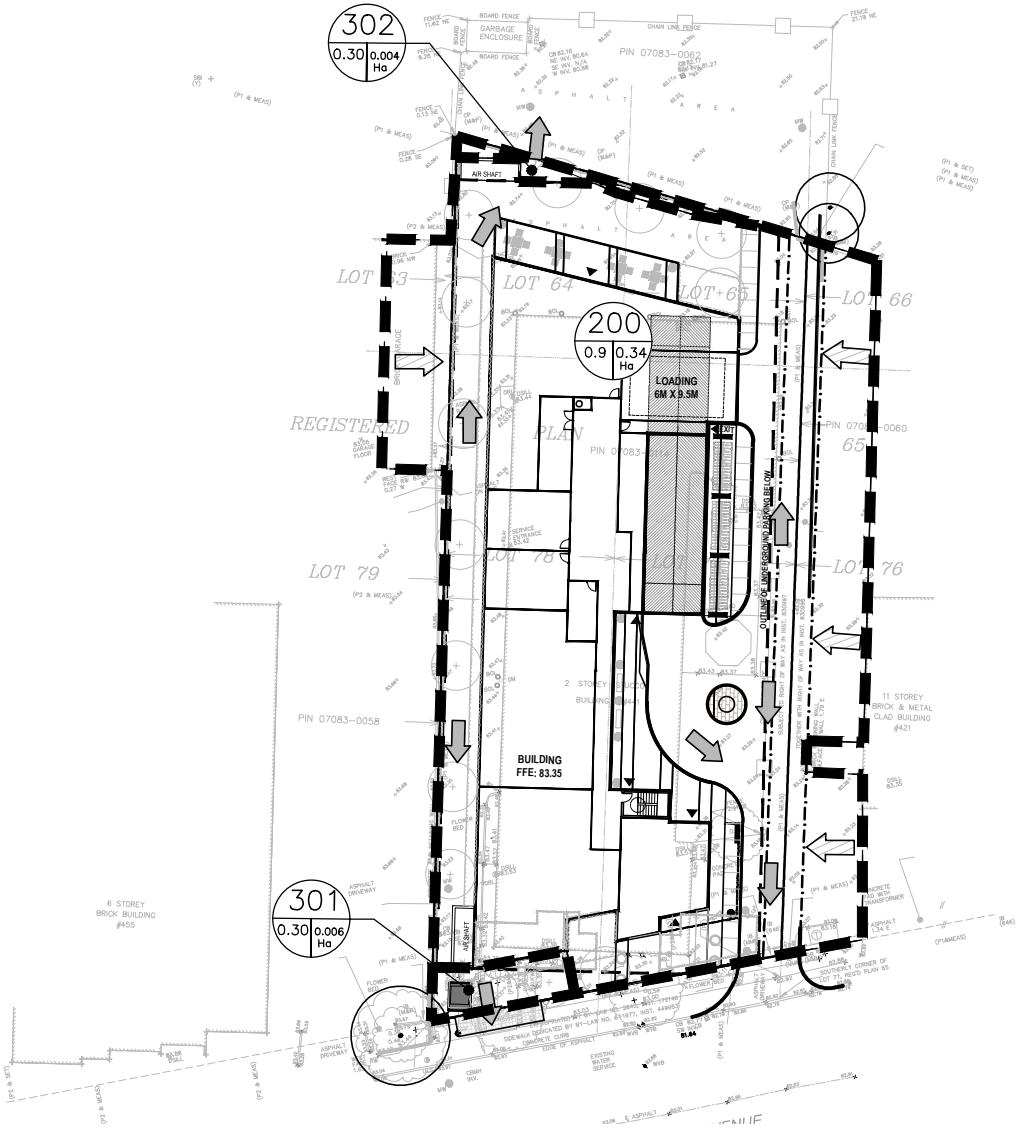
For the required peak storm runoff and SWM storage calculations, the Modified Rational Method was selected which is deemed appropriate for the size of the subject site.

### 7.2.3 Proposed Conditions Peak Flows

Based on the proposed grading and servicing design for the site, the drainage areas were reviewed to assess the runoff coefficients for each catchment. The proposed conditions drainage areas and runoff coefficients are shown on Figure 3 for reference.

KEY PLAN




LEGEND

- PROPERTY LINE
- 227.00 EXISTING GRADE
- EMERGENCY OVERLAND FLOW DIRECTION (>100 YEAR STORM)
- INCOMING EXTERNAL FLOW DIRECTION (BY-PASSED)
- 101 STORM DRAINAGE ID NUMBER
- 0.5 AREA (ha)
- 0.13 RUNOFF COEFFICIENT
- CATCHMENT BOUNDARY

| | |
|---|---|
| Project: | 441 MAPLE AVENUE<br>BURLINGTON, ON |
| Title: | PROPOSED CONDITIONS DRAINAGE PLAN |
| Approved by: S.P | Date: OCT. 2020 — Project No.: ALL-00251529-A0 |
| Drawn by: J.L | Scale: N.T.S. — Figure no.: FIG-03 |

The theoretical peak flow runoff rates were then calculated for each under proposed conditions using a time of concentration of 10min for each catchment where the peak flows are summarized in Table 2 below.

**Table 2: Peak Flows (Proposed Conditions – No SWM Controls)**

| Contributing Area | ID# | Area (ha) | Peak Flow -5 Year (L/sec) | Peak Flow -25 Year (L/sec) | Peak Flow -100 Year (L/sec) |
|---|---|---|---|---|---|
| **Controlled Area (SWM Tank)** | 200 | 0.34 | 86.1 | 126.6 | 173.4 |
| **Uncontrolled Area (South)** | 301 | 0.006 | 0.5 | 0.7 | 1.0 |
| **Uncontrolled Area (North)** | 302 | 0.004 | 0.3 | 0.5 | 0.7 |
| **Total:** | | **0.35** | **86.9** | **127.8** | **175.1** |

The peak flow runoff calculations can be found in Appendix D.

### 7.2.4 Proposed SWM Quantity Controls

As previously mentioned, the proposed SWM design for the site requires all flows up to and including the 100-year storm event are to be controlled to the pre-development rates for the existing catchment tributary to the Maple Avenue system (63.5 L/s).

Therefore, the maximum allowable release rate for the proposed SWM tank was then calculated as follows:

| | |
|---|---|
| 100-year pre-development peak flow to Maple Avenue (101) = | 63.5 L/s |
| minus 100-year post-development uncontrolled peak flows from site (301 & 302) = | - 1.7 L/s |
| minus proposed groundwater peak pumping rate = | - 2.5 L/s |
| gives maximum release rate for proposed SWM tank (200) = | **59.3 L/s** |

The results of the SWM storage calculations showed the SWM tank requiring a minimum volume of 62 $m^3$ with an orifice tube of 130 mm diameter before outletting to the Maple Avenue system for the 100-year storm event. However, after reviewing the requirements to meet the lower 5-year storm allowable release rate, it was determined that a SWM tank of volume 98 $m^3$ with an orifice diameter of 90 mm diameter will satisfy all storms up to and including the 100-year storm event including the external drainage areas meeting the City's request. The SWM storage calculations have been provided in Appendix D. Refer to the Drawing SG-01 in Appendix D for the SWM tank and orifice tube details.

After implementing the required SWM controls the overall maximum allowable release rate is met, where the peak flow rates for the site can be summarized in Table 3 below:

**Table 3: Peak Flows (Proposed Conditions – with SWM Controls)**

| Contributing Area | ID# | Area (ha) | Peak Flow -5 Year (L/sec) | Peak Flow -25 Year (L/sec) | Peak Flow - 100 Year (L/sec) |
|---|---|---|---|---|---|
| **Controlled Area (SWM Tank)** | 200 | 0.34 | 29.1 | 29.1 | 29.1 |
| **Uncontrolled Area (South)** | 301 | 0.006 | 0.5 | 0.7 | 1.0 |
| **Uncontrolled Area (North)** | 302 | 0.004 | 0.3 | 0.5 | 0.7 |
| **Total:** | | **0.35** | **29.9** | **30.3** | **30.8** |

The peak flow runoff calculations can be found in Appendix D.

### 7.2.5 Proposed SWM Quality Controls

The City of Burlington requires the long-term average removal of 80% total suspended solid (TSS) on an annual loading basis from all runoff leaving the proposed development site based on the post development level of imperviousness. This is required for the long-term removal average of 80% TSS and is consistent with the "Enhanced Protection" levels recommended in MECP Stormwater Management Planning and Design Manual (Mar, 2019). Also as previously mentioned, any proposed oil grit separators (OGS) are only given 50% credit towards meeting this 80% TSS removal requirement.

The proposed SWM quality measures include an OGS where the Jellyfish Filter Unit installed downstream of the SWM tank, upstream of the storm control manhole with exterior access for future maintenance and inspections. Refer to drawing SG-01 for the proposed OGS location. The Jellyfish oil and grit separator Model JF6-3-1-L1 specifications have also been provided in Appendix D for reference.

### 7.2.6 Water Balance

Low impact development (LID) measures such as bioswales to promote infiltration or rainwater harvesting/reuse, are encouraged by the City of Burlington for water balance purposes. However, due to the Owner's development concept including an underground parking structure that consumes the majority of the property, promoting infiltration within the site is not practical. It has also been confirmed with the Owner that an irrigation system is not likely to be used for this site, therefore rainwater harvesting is not included within the servicing design. However, in order to optimize the initial abstraction from each rainfall event across the site, the proposed landscaping has been optimized within the development concept to address the water balance for the site.

For the proposed landscaping design details refer to the Landscape Plans prepared by Baker Turner Landscape Architects.

# 8. Erosion and Sediment Control during Construction

During construction it is imperative that the contractor installs and maintains all the necessary erosion and sediment control (ESC) measures to ensure there is no negative impact to surrounding properties and the local municipal sewer systems.

Outside the site, sediment control measures such as catchbasin silt sacks are to be installed inside the existing catchbasins along Maple Avenue immediately adjacent to the site. These silt sacks are to be monitored and maintained after all rainfall events.

Within the site, silt fencing is required to be installed around the perimeter of the sediment to ensure during grading and building activity, that sediment is not transported overland during a rainfall event to neighbouring properties. Similar to the required silt sacks within the catchbasins along Maple Avenue, the silt fence is to be monitored after every rainfall event and repaired as necessary. Mud tracking from construction truck transport is to be mitigated through the use of a proposed mud mat and any other maintenance requirements necessary by the contractor before driving back on municipal roads.

Additional ESC measures not mentioned may be required through the development of the detailed design for the site and the permitting process through the City of Burlington.

# 9. Utilities

Through correspondence with the active utility agencies in the area, all the required utilities are located within the Maple Avenue right-of-way adjacent to the site. Based on the nature of the proposed development and estimated load demands, utility staff have not indicated any issues to date with providing the necessary utility services for the development.

## 10 Conclusions

In summary, our findings outlined in this FSR/SWM report demonstrate that the proposed development can be adequately serviced and meet the required City of Burlington and Region of Halton criteria, where the results can be summarized as follows:

- The proposed grading design can adequately meet all surrounding property line elevations without any negative impact to neighbouring properties.
- Water servicing can be provided with a new 200 mm diameter fire and 150 mm diameter domestic connection to the existing 200 mm diameter watermain located on Maple Avenue.
- Adequate fire protection can be provided based on the required maximum day plus fire flow demand of 118.5 L/s and the observed hydrant flow testing results.
- Sanitary servicing can be provided by using the existing sanitary service lateral (pending results of CCTV inspection) which is connected to the existing 825 mm diameter sanitary sewer on Maple Avenue.
- Sanitary capacity is available for the proposed development based on the completed pre-development and post-development calculations.
- Storm servicing can be provided with a new 300 mm diameter storm service connection into the existing 1050 mm diameter storm sewer on Maple Avenue.
- Groundwater management can be addressed with proposed foundation drains, a passive settlement treatment system and pumping to the proposed SWM tank at a maximum pumping rate of 2.5 L/s.
- Based on the correspondence with City of Burlington staff the Maple Avenue storm system is the appropriate outlet for the development, where a pre-development runoff coefficient of C=0.80 gives a maximum allowable release rate of 63.5 L/s for the site.
- The required SWM quantity storage can be obtained with the use of an underground cistern of minimum volume 98 $m^3$ and orifice tube of 90 mm diameter.
- The required SWM quality controls can be met with the use of a proposed oil and grit separator (Jellyfish Model JF6-3-1-L1) designed to the City's TSS removal specifications.
- Emergency overland flow is directed safely away from the buildings through the site from the proposed grading design without negative impact to surrounding developments.

Sincerely,

EXP Services Inc.

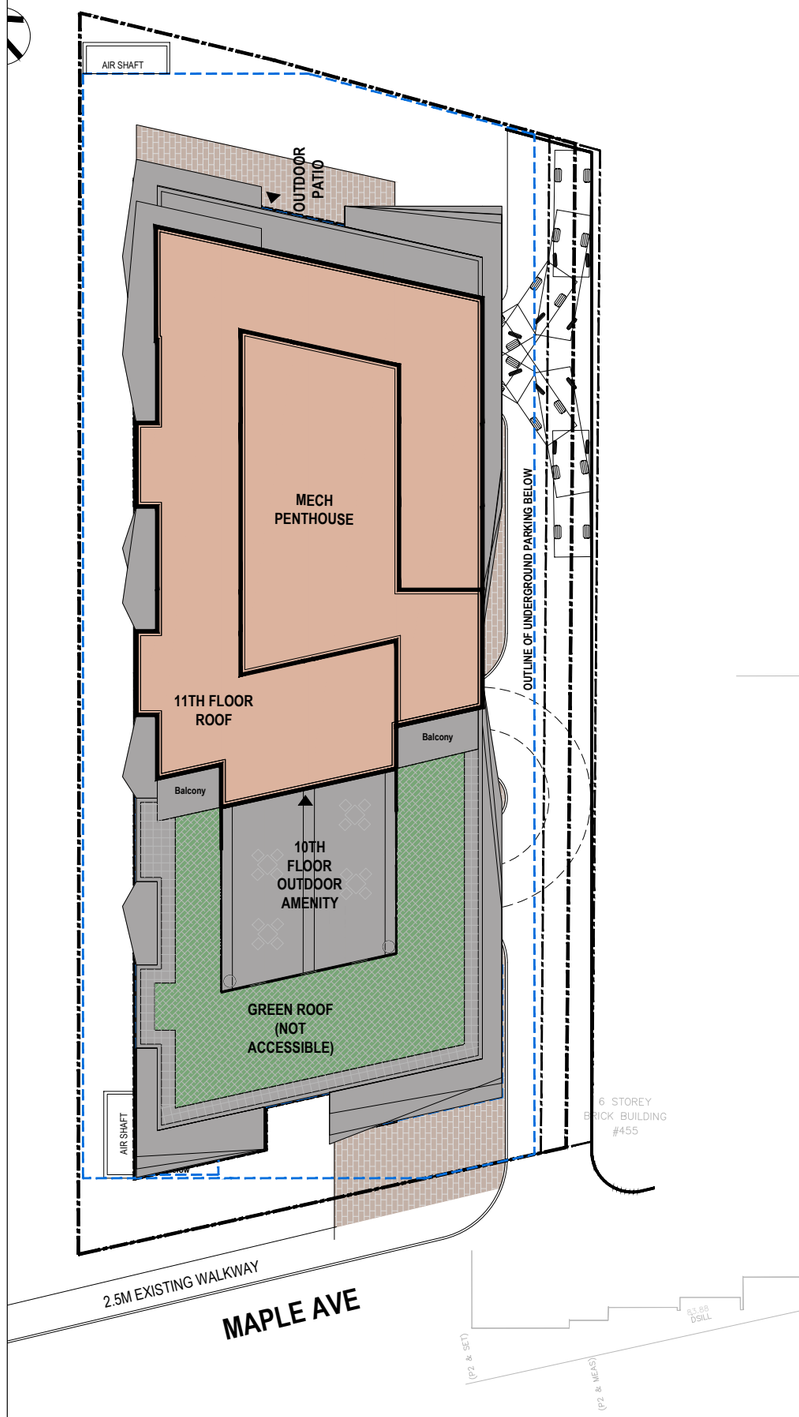



Scott W. Passmore, P.Eng.
Senior Manager, Land Development

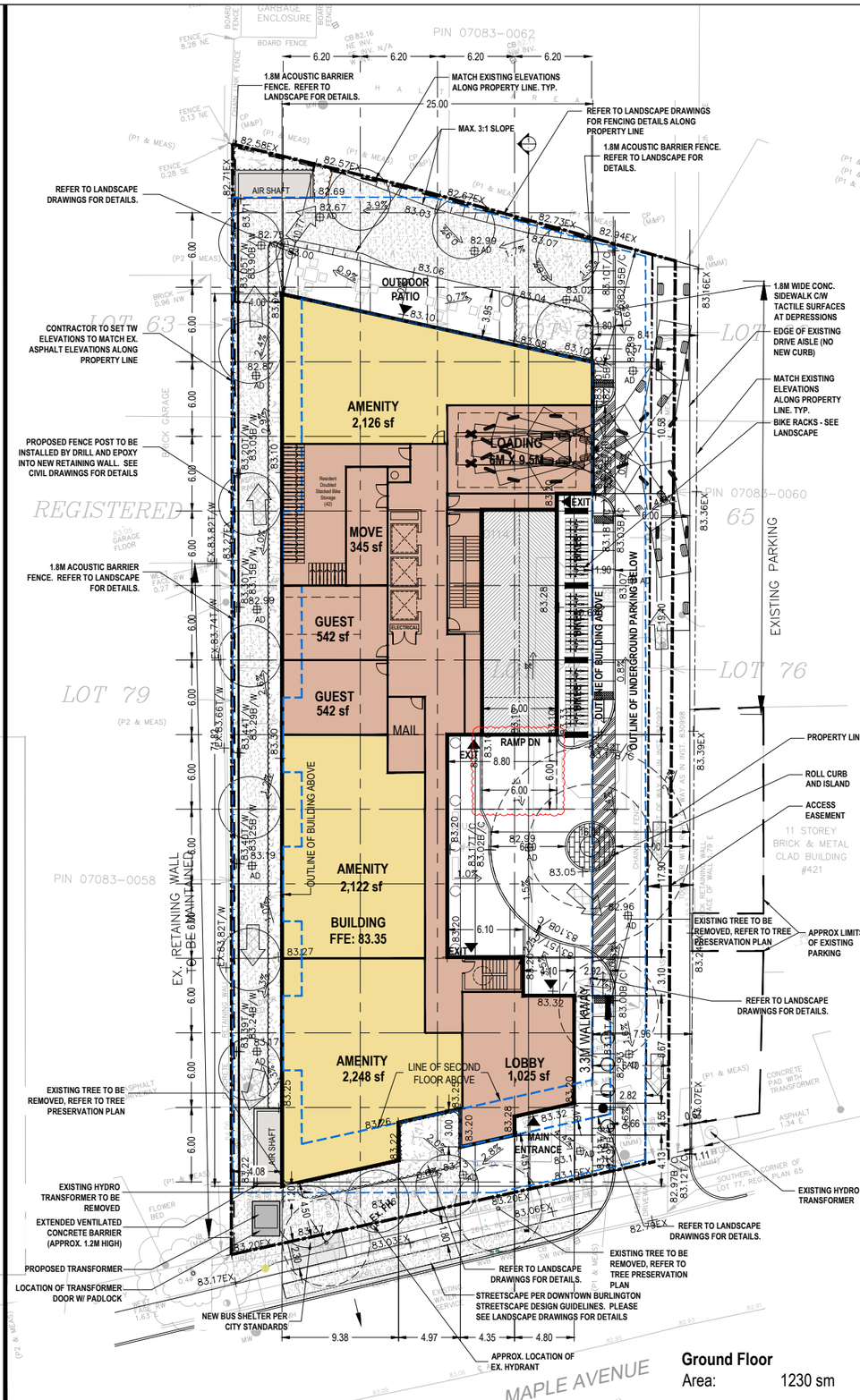



Steve Park, P.Eng.
Project Manager, Land Development

# Appendix A – Site Plan and Topographic Survey

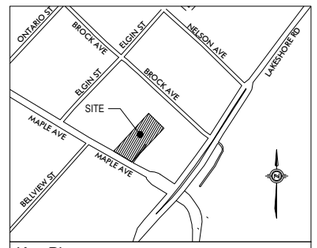



ROOF PLAN - 1:200




SITE PLAN SHOWING GROUND FLOOR - 1:200

**Ground Floor**
Area: 1230 sm




Key Plan

## SITE STATISTICS

| | |
|---|---|
| PROPOSED USE | Multi - Residential |
| SITE AREA | 0.28 HA (2, 863.19 sq.m) |
| STOREYS | 11 Storeys |
| UNITS | 140 Units |
| PARKING | 162 Cars on Site |
| RATIO | 1.16 |
| LONG TERM BIKE PARKING | 70 |
| RATIO | 0.5 |
| SHORT TERM BIKE PARKING | 24 |
| RATIO | 0.17 |

## AREA CALCULATION

**AREA BREAK DOWN PER FLOOR**

| | AREA (SQ.M) | AREA (SQ.FT) |
|---|---|---|
| Ground Floor | 1,230 | 13,240 |
| Second Floor | 1,507 | 16,220 |
| Third Floor | 1,507 | 16,220 |
| Forth Floor | 1,507 | 16,220 |
| Fifth Floor | 1,507 | 16,220 |
| Sixth Floor | 1,507 | 16,220 |
| Seventh Floor | 1,507 | 16,220 |
| Eighth Floor | 1,507 | 16,220 |
| Ninth Floor | 1,507 | 16,220 |
| Tenth Floor | 866 | 9,322 |
| Eleventh Floor | 866 | 9,322 |
| TOTAL AREA ABOVE GRADE: | 15,018 | 161,644 |
| P1 | 2,540 | 27,287 |
| P2 | 2,540 | 27,287 |
| P3 | 2,540 | 27,287 |
| TOTAL AREA BELOW GRADE: | 7,620 | 81,861 |

## UNIT COUNT

**UNIT BREAK DOWN PER FLOOR**

| | 1 BED | 1 BED + D | 2 BED | 2 BED + D | TOTAL |
|---|---|---|---|---|---|
| Ground Floor | - | - | - | - | - |
| Second Floor | 8 | 4 | 3 | 2 | 17 |
| Third Floor | 4 | 4 | 3 | 4 | 15 |
| Forth Floor | 4 | 4 | 3 | 4 | 15 |
| Fifth Floor | 4 | 4 | 3 | 4 | 15 |
| Sixth Floor | 4 | 4 | 3 | 4 | 15 |
| Seventh Floor | 4 | 4 | 3 | 4 | 15 |
| Eighth Floor | 4 | 4 | 3 | 4 | 15 |
| Ninth Floor | 4 | 4 | 3 | 4 | 15 |
| Tenth Floor | 3 | 2 | 2 | 1 | 8 |
| Eleventh Floor | 3 | 4 | 2 | 1 | 10 |
| TOTAL UNITS: | 42 | 38 | 28 | 32 | 140 |
| PERCENTAGE: | 30% | 27% | 20% | 23% | 100% |


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Planning | Development | Urban Design | Architecture

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| 6 | | |
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| 3 | Issued for OPA/ZBA Re-Sub | Jun 09, '22 |
| 2 | Issued for OPA / ZBA | Oct 26, '20 |
| 1 | Issued for OPA / ZBA | Dec 07, '18 |


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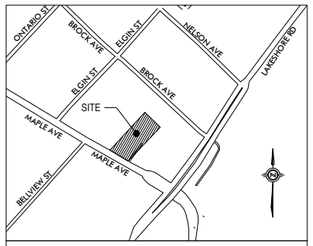

CLIENT:
Better Life Retirement Residence Inc.
(c/o 2564905 Ontario Inc.)

PROJECT:
441 Maple Street

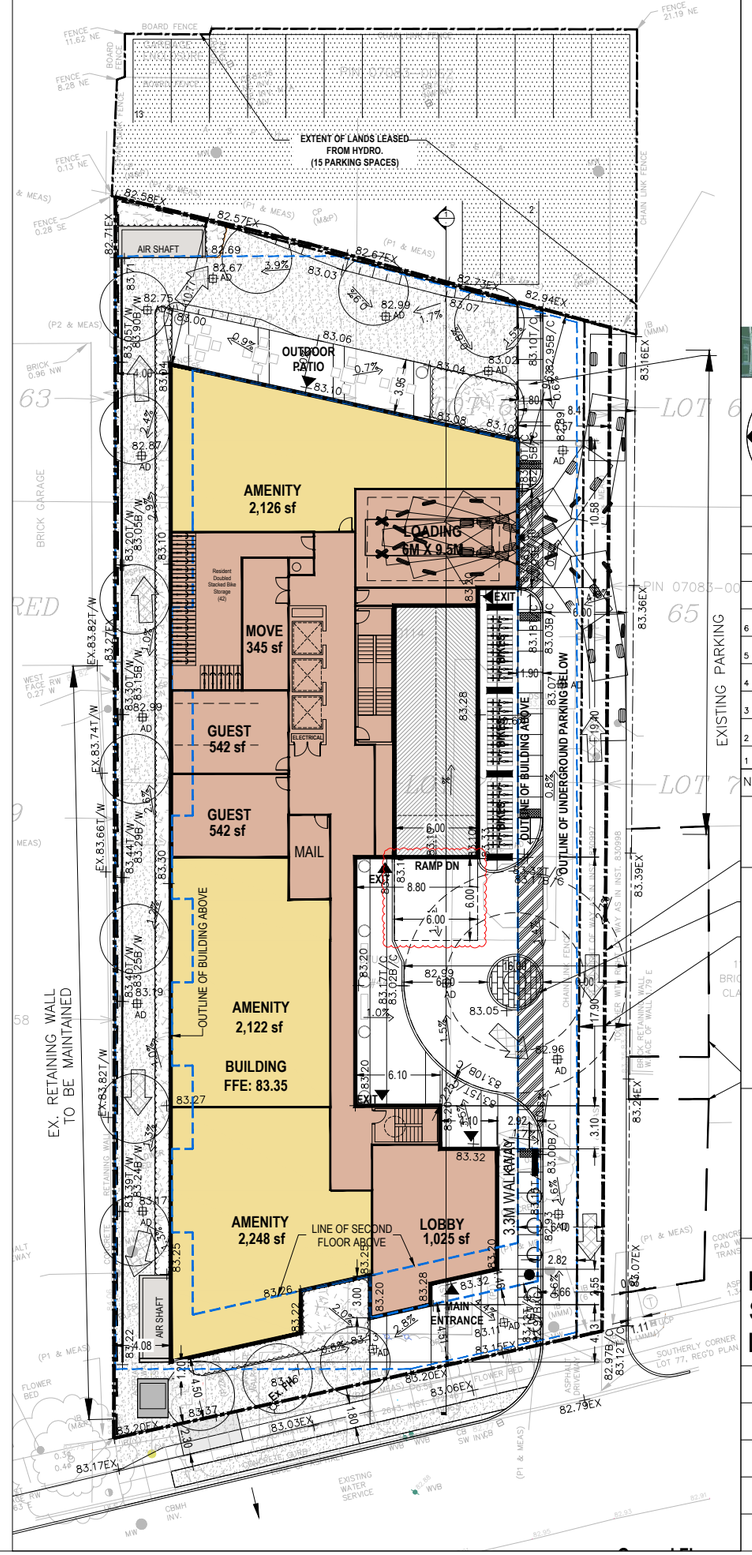
Burlington, ON

SHEET TITLE:
Proposed Site Plan

| | |
|---|---|
| PROJECT NO. C6075 | |
| SCALE: 1:200 | DATE: Nov, '18 |
| DRAWN: msai | SHEET NO: SP1 |
| CHECKED: ms | |
| FILE NO. | |




Key Plan




# MSAi

MICHAEL SPAZIANI ARCHITECT INC
6 Helene Street N, Suite 100
Port Credit, Mississauga ON L5G 3B2
T 905 891 0691 F 905 891 0514

Planning Development Urban Design Architecture

ONTARIO ASSOCIATION OF ARCHITECTS
MICHAEL SPAZIANI
LICENCE 7431

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| 4 | | |
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| 2 | Issued for OPA / ZBA | Oct 26, '20 |
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CLIENT:

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(c/o 2564905 Ontario Inc.)

PROJECT:

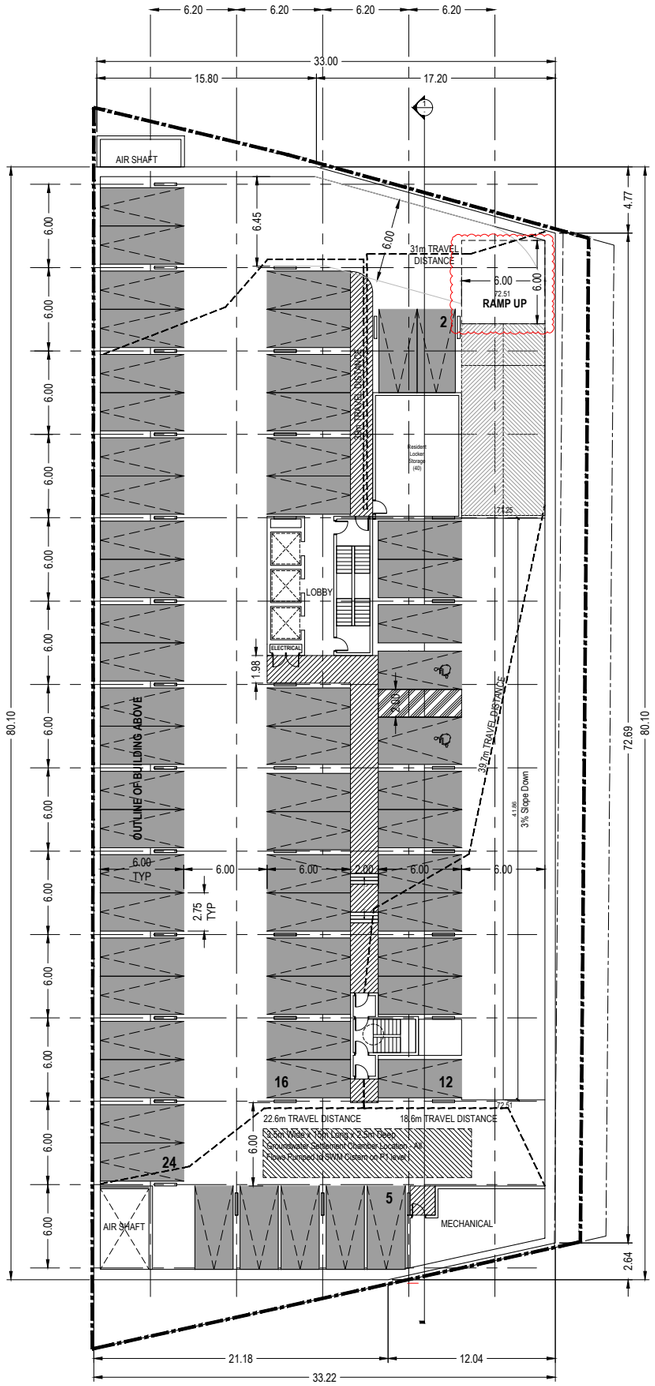
## 441 Maple Street

Burlington, ON

SHEET TITLE:

## Proposed Site Plan Showing Hydro Lands Parking Plan

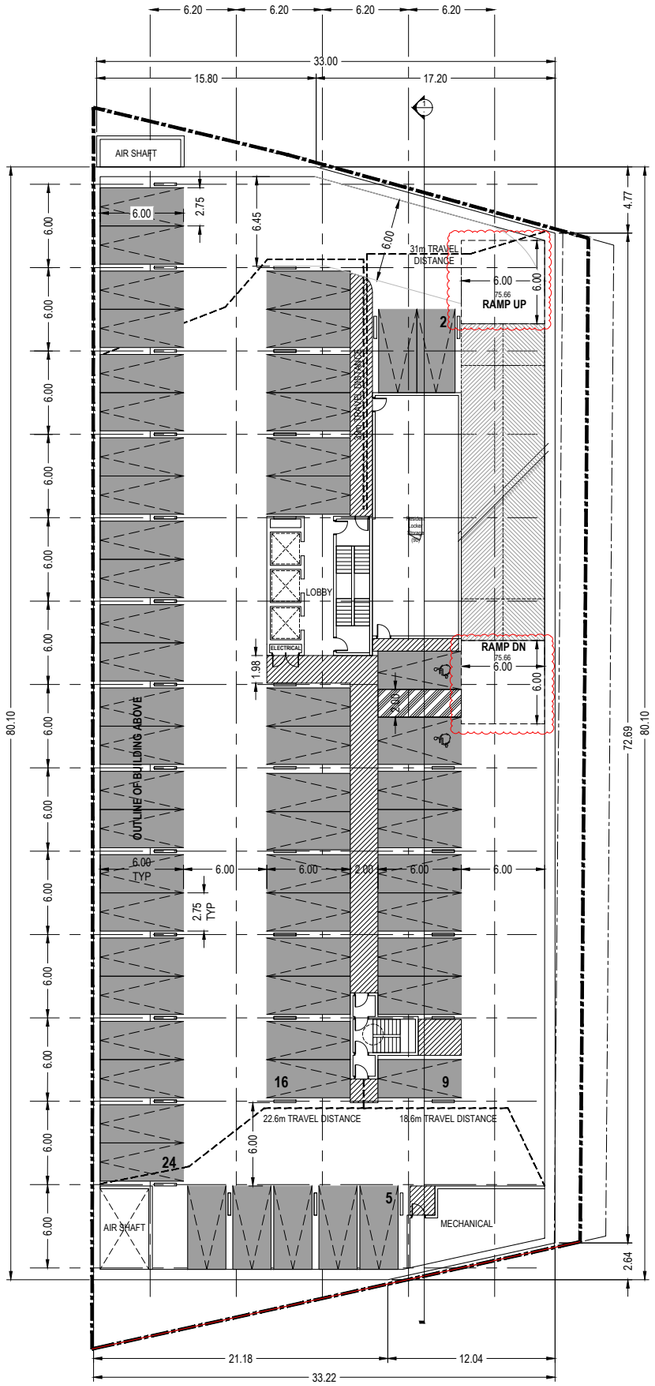
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| PROJECT NO.: C6075 | |
| SCALE: 1:200 | DATE: Nov, '18 |
| DRAWN: msai | SHEET NO.: SP1a |
| CHECKED: ms | |
| FILE NO. | |




**P3 (Lower) - Underground Parking**

Area: 2540 sm

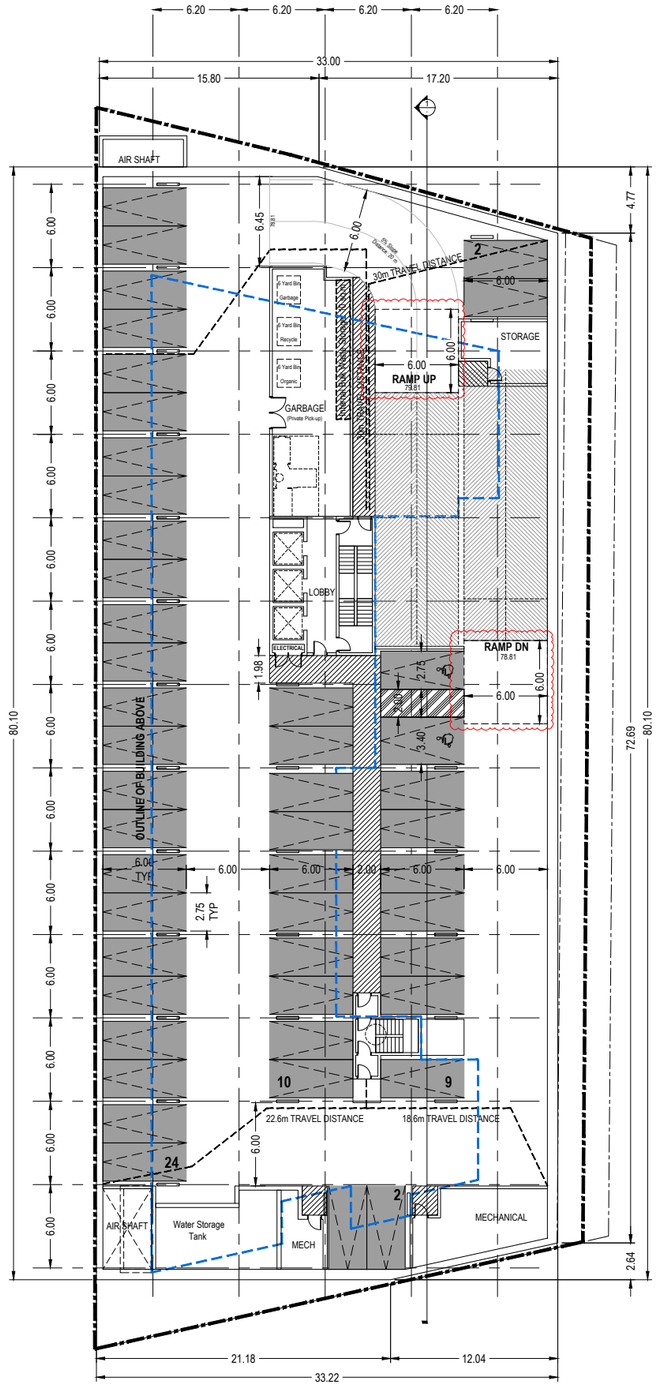
Parking: 59 Cars




**P2 (Lower) - Underground Parking**

Area: 2540 sm

Parking: 56 Cars




**P1 (Typical) - Underground Parking**

Area: 2540 sm

Parking: 47 Cars


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CLIENT:

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(c/o 2564905 Ontario Inc.)

PROJECT:

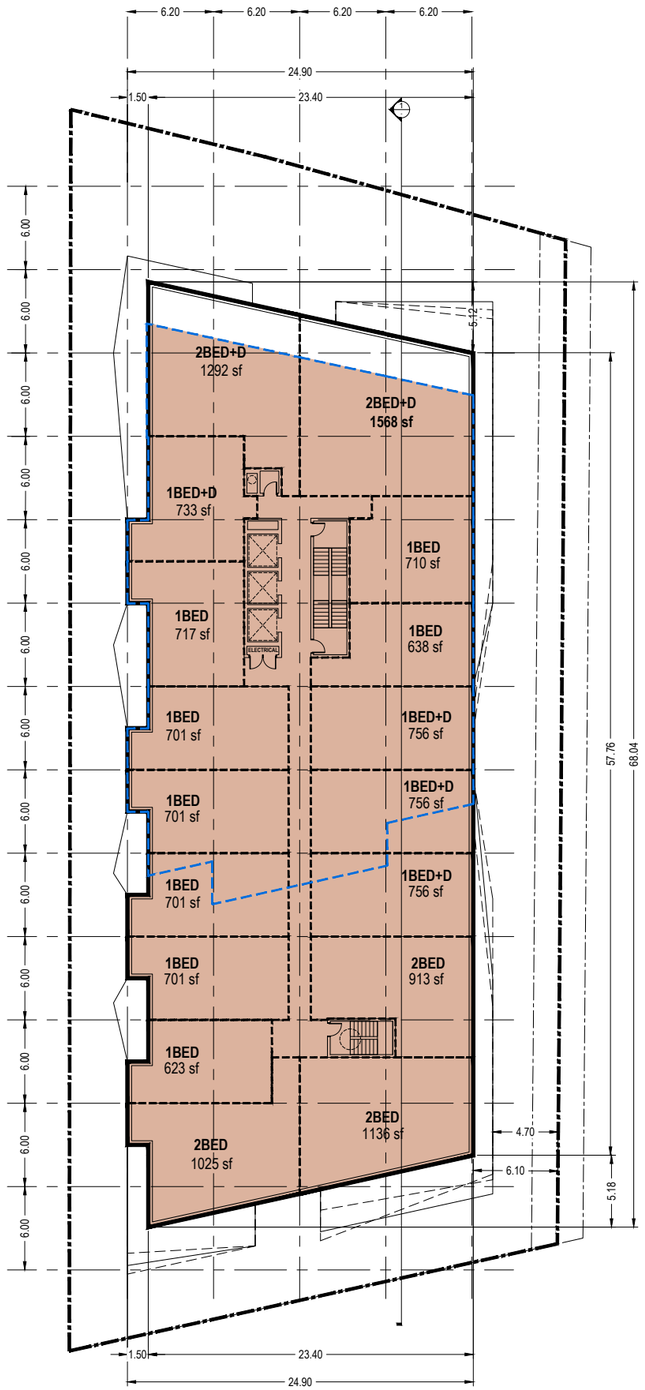
441 Maple Street

Burlington, ON

SHEET TITLE:

Proposed Floor Plans

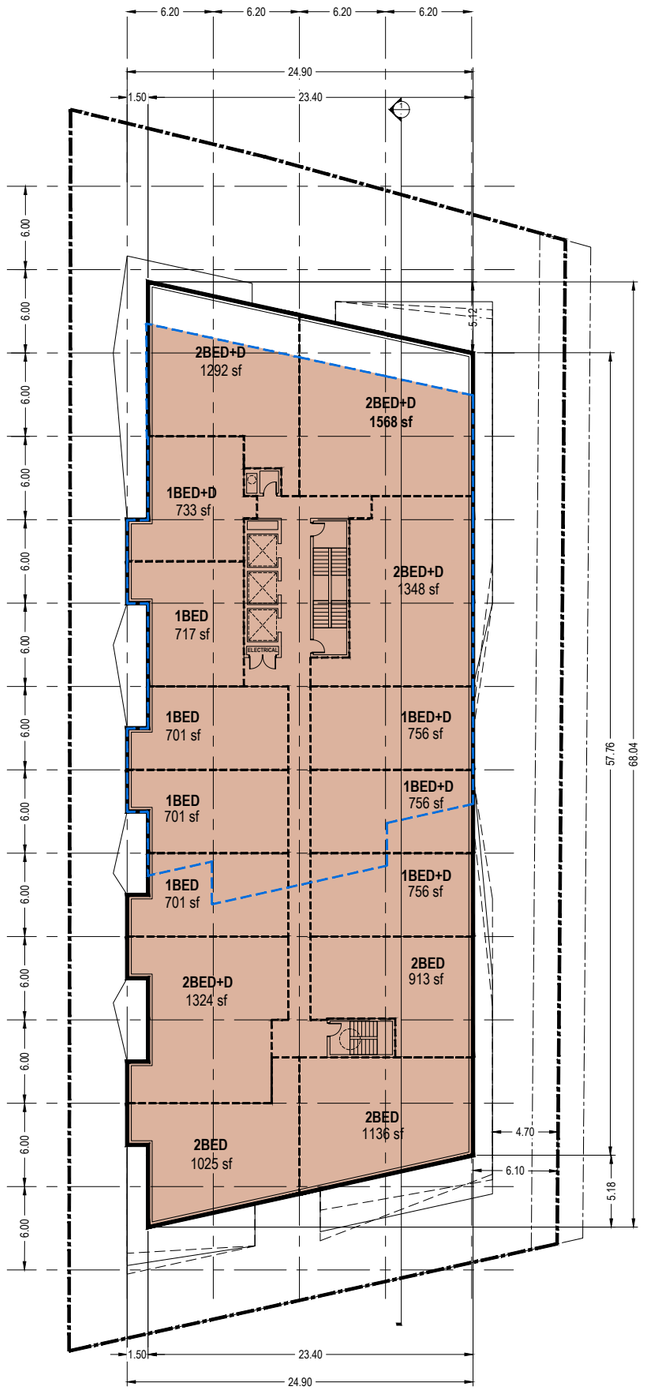
| | |
|---|---|
| PROJECT NO. C6075 | |
| SCALE: 1:200 | DATE: Nov, '18 |
| DRAWN: msai | SHEET NO: A01 |
| CHECKED: ms | |
| FILE NO. | |




**2nd Floor**

Area: 1507 sm

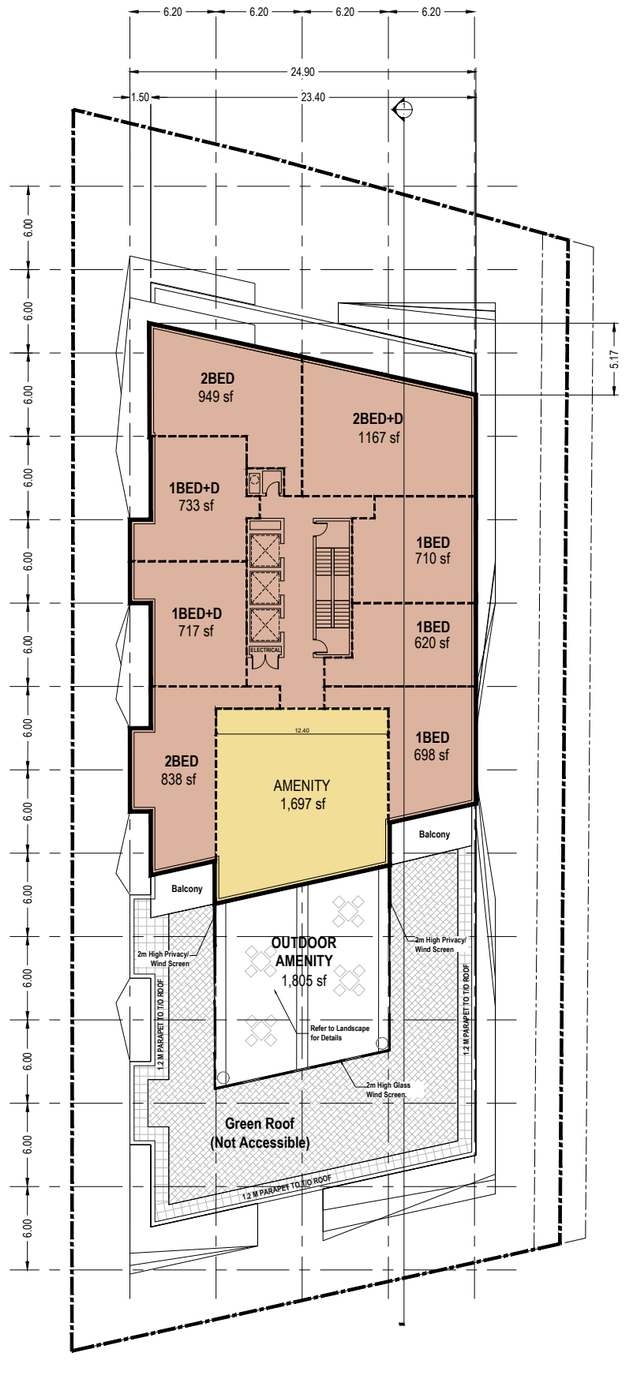
Units: 17 Units




**Typical Floor - 3rd-9th Floor**

Area: 1507 sm x 7 = 10,549 sm

Units: 15 Units x 7 = 105 Units




**10th Floor**

Area: 866 sm

Units: 8 Units


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PROJECT:

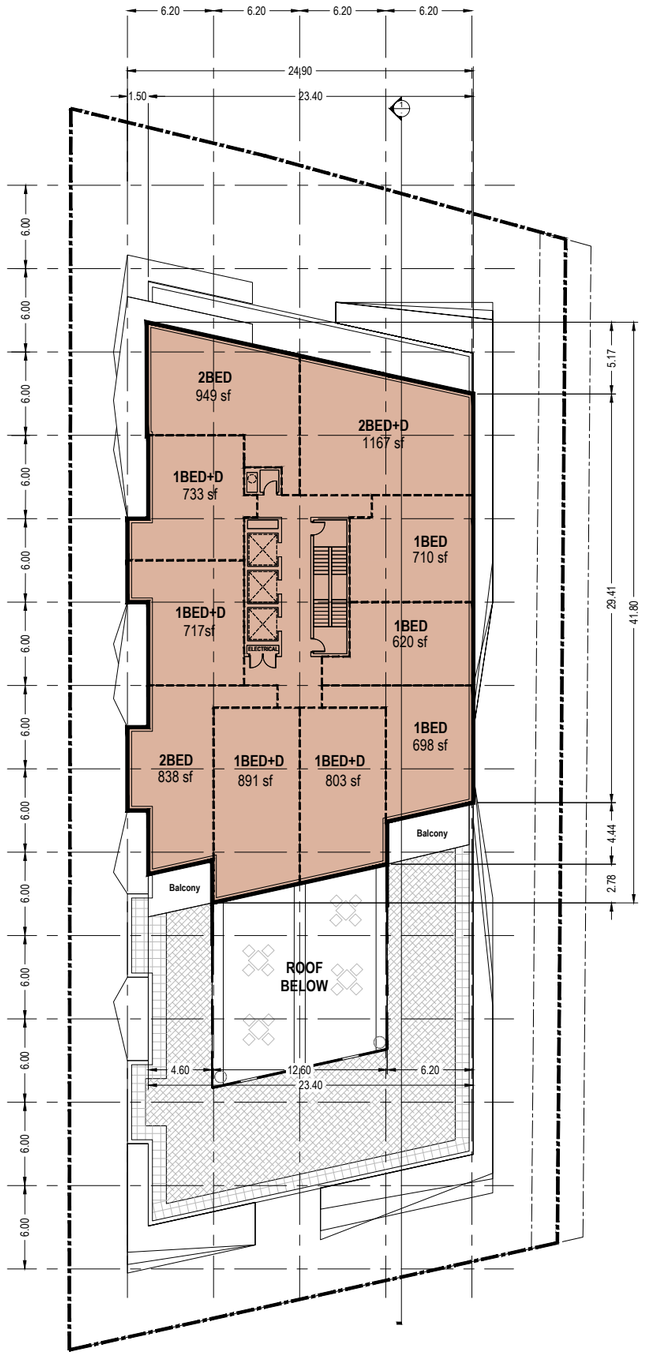
441 Maple Street

Burlington, ON

SHEET TITLE:

Proposed Floor Plans

| | |
|---|---|
| PROJECT NO.: C6075 | |
| SCALE: 1:200 | DATE: Nov, '18 |
| DRAWN: msai | SHEET NO: A02 |
| CHECKED: ms | |
| FILE NO. | |




**11th Floor**

Area: 866 sm

Units: 10 Units


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PROJECT:

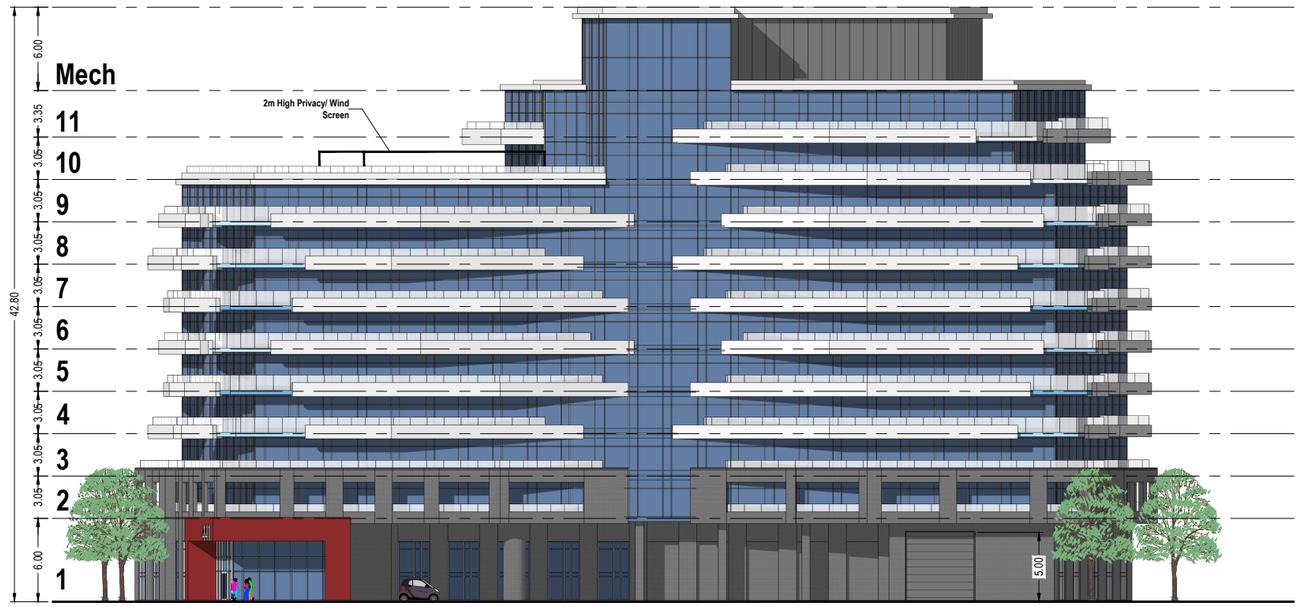
441 Maple Street

Burlington, ON

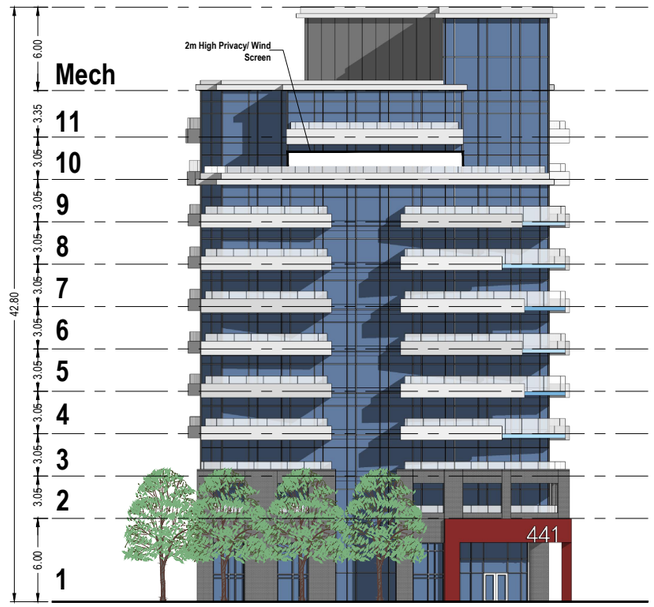
SHEET TITLE:

Proposed Floor Plans

| | |
|---|---|
| PROJECT NO. C6075 | |
| SCALE: 1:200 | DATE: Nov, '18 |
| DRAWN: msai | SHEET NO: A03 |
| CHECKED: ms | |
| FILE NO. | |



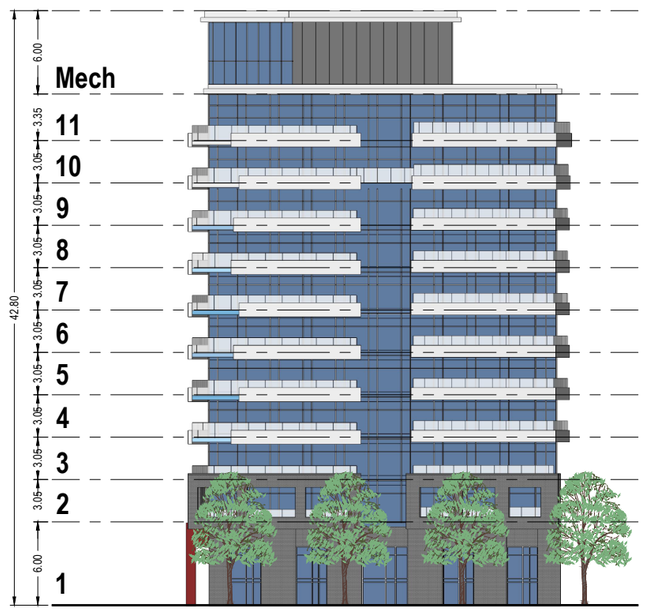

South Elevation




West Elevation




North Elevation




East Elevation


MSAi

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6 Helene Street N, Suite 100
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PROJECT:

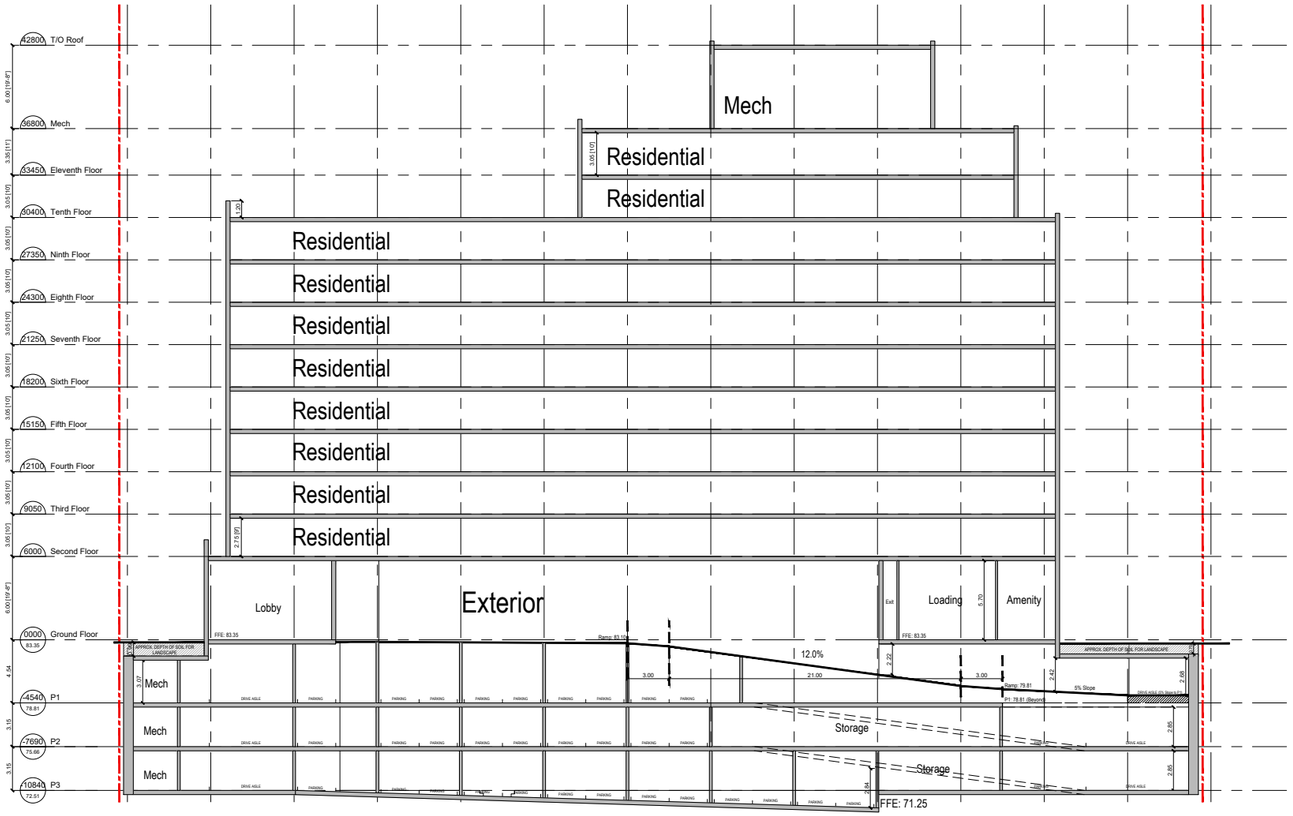
441 Maple Street

Burlington, ON

SHEET TITLE:

Proposed Elevations

| | |
|---|---|
| PROJECT NO.: C6075 | |
| SCALE: 1:200 | DATE: Nov, '18 |
| DRAWN: msai | SHEET NO: A04 |
| CHECKED: ms | |
| FILE NO. | |




# BUILDING SECTION


**MSAi**

MICHAEL SPAZIANI ARCHITECT INC
6 Helene Street N, Suite 100
Port Credit, Mississauga ON L5G 3B2
T 905 891 0691 F 905 891 0514





ONTARIO ASSOCIATION OF ARCHITECTS
MICHAEL SPAZIANI
LICENCE
2631

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CLIENT:
Better Life Retirement Residence Inc.
(c/o 2564905 Ontario Inc.)

PROJECT:
441 Maple Street

Burlington, ON

SHEET TITLE:
Proposed Building Section

PROJECT NO.
C6075

SCALE:
1:200

DATE:
Nov, '18

DRAWN:
msai

CHECKED:
ms

FILE NO.

SHEET NO:
A05

**PLAN BEING PART 1**
MUST BE READ IN CONJUNCTION WITH
SURVEY REPORT (BEING PART 2)

# SURVEYOR'S REAL PROPERTY REPORT
WITH TOPOGRAPHICAL FEATURES
PLAN OF

# PART OF LOTS 64, 65, 77 & 78 REGISTERED PLAN 65

BEING IN THE

# CITY OF BURLINGTON

REGIONAL MUNICIPALITY OF HALTON

SCALE 1 : 250

0 5 10 20 metres

MacKAY, MacKAY & PETERS LIMITED – ONTARIO LAND SURVEYORS
© 2018

**KNOWN AS MUNICIPAL No. 441 MAPLE AVENUE**

## SURVEY REPORT (BEING PART 2) ( to be read in conjunction with plan being Part 1 )

LAND REGISTRY OFFICE TITLE INFORMATION ON SUBJECT PROPERTY INCLUDING BOUNDARIES, EASEMENTS AND RIGHT OF WAYS – JULY 24, 2018

### REGISTERED EASEMENTS AND/OR RIGHTS–OF–WAY:

SUBJECT TO A RIGHT OF WAY OVER PART 2, PLAN 20R–20090 AS IN INST. 830997
TOGETHER WITH AN EASEMENT OVER PART 1, PLAN 20R–20090 AS IN INST. 830998
SUBJECT TO AN EASEMENT OVER PART 2, PLAN 20R–20091 IN FAVOUR OF PART OF LOT 79, REGISTERED PLAN 65, PART 1, PLAN 20R–7466 AS IN INST. No. HR1256622
TOGETHER WITH AN EASEMENT OVER PART 1, PLAN 20R–20091 AS IN INST. No. HR1256623

### ADDITIONAL REMARKS:

REFER TO PART 1 OF PROPERTY REPORT FOR LOCATION OF BUILDINGS AND OTHER SETBACKS

*Note :*

MacKAY, MacKAY & PETERS LIMITED grants MAPLE AVE BETTER LIFE ["The Client(s)"], their solicitor and other related parties permission to use "Original Copies" of the Surveyor's Real Property Report in transactions involving "The Client(s)".

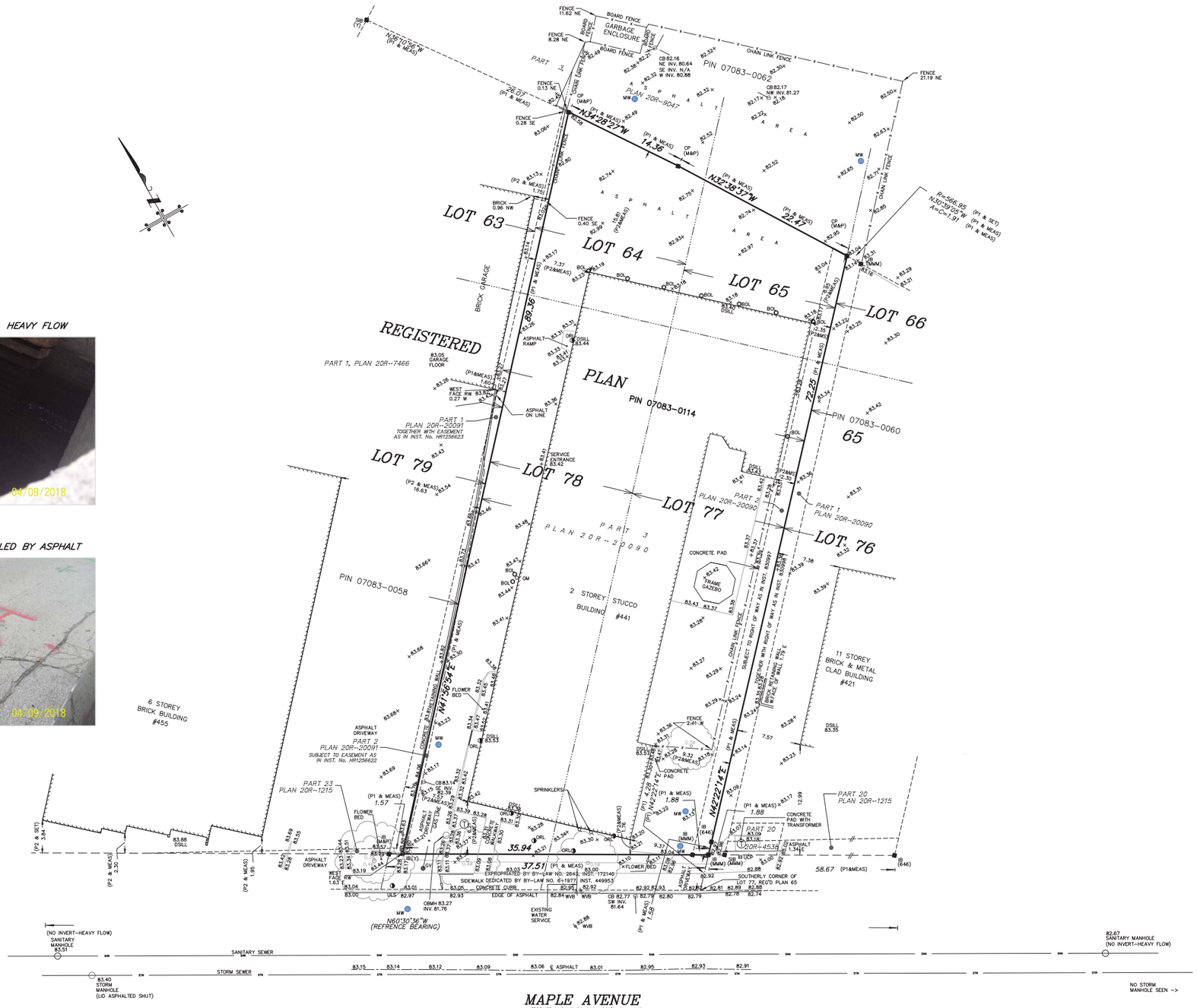
*"METRIC"* DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

*MAPLE AVENUE SANITARY SEWER – HEAVY FLOW*




*MAPLE AVENUE STORM SEWER – SEALED BY ASPHALT*




*Legend :*

- ■ DENOTES A SURVEY MONUMENT FOUND
- SIB DENOTES STANDARD IRON BAR
- IB DENOTES IRON BAR
- ℄ DENOTES CENTRE LINE
- P1 DENOTES PLAN 20R–20090
- P2 DENOTES PLAN BY MACKAY, MACKAY & PETERS LIMITED, DATED MAY 24, 2014 (FILE 14–025–1)
- # DENOTES ROUND
- CP DENOTES CONCRETE PIN
- PIN DENOTES PROPERTY IDENTIFICATION NUMBER
- WVB DENOTES WATER VALVE BOX
- CB DENOTES CATCH BASIN
- UCP DENOTES UTILITY CABLE PEDESTAL
- T DENOTES TRANSFORMER
- MH DENOTES MANHOLE
- DSILL DENOTES ELEVATION AT DOOR SILL
- MW DENOTES MONITORING WELL
- GV DENOTES GAS VALVE
- BOL DENOTES BOLLARDS
- GM DENOTES GAS METER
- ULS DENOTES UTILITY LIGHT STANDARD
- RW DENOTES RETAINING WALL

*BUILDING TIES SHOWN HEREON ARE TO FOUNDATION UNLESS OTHERWISE NOTED.*

*Benchmark Note:*

CITY OF BURLINGTON BENCHMARK No. 314 — ELEVATION = 84.163 METRES (CGVD 1929: 1978 READJUSTMENT)

BRASS CAP IN THE TOP OF CURB AT THE NORTHWESTERLY END OF THE PARAPLEGIC RAMP LOCATED AT THE NORTHEAST INTERSECTION OF MAPLE AVENUE AND ELGIN STREET.

*Bearing Reference :*

BEARINGS ARE UTM GRID AND ARE REFERRED TO THE NORTHEASTERLY LIMIT OF MAPLE AVENUE, HAVING A BEARING OF N60°30'36"W, AS SHOWN ON PLAN 20R–20090.

*Surveyor's Certificate :*

I CERTIFY THAT :

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH *THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT* AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 6th DAY OF SEPTEMBER, 2018.

MACKAY, MACKAY & PETERS LIMITED

DECEMBER 5, 2018
DATE

PER: ROSS A. CLARKE, O.L.S.

**ASSOCIATION OF ONTARIO LAND SURVEYORS**
*PLAN SUBMISSION FORM*
2063989

**THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR**
In accordance with Regulation 1026, Section 29(3)

CAD FILE: E:\(20) Halton\Registered Plans\RP0065\Lots 64–66 and 76–78\18–200\18–200.dwg


MACKAY MACKAY & PETERS LIMITED
Established 1906

ONTARIO LAND SURVEYORS
3380 SOUTH SERVICE ROAD
BURLINGTON, ONTARIO L7N 3J5
PHONE: (905) 639–1375
FAX: (905) 333–9544
e–mail: halton@mmplimited.com
Records of Sewell & Sewell and Yates & Yates LTD.


| | |
|---|---|
| DRAWN BY: | M.S. |
| PARTY CHIEF: | C.M. |
| CHECKED BY: | K.J.D. |
| PROJECT NO.: | 18–200 |

# Appendix B – Water Servicing Calculations

**Domestic Water Demand Calculations**

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A0**
CREATED BY: **J.L**
CHECKED BY **S.P**

**Average Day**

*Halton Water Wastewater Linear Design Manual - Design Factors page 5*

Per Capita Demand = 275 L/caps/d 0.00318287 L/cap/s

*Halton Region 2017 Development Charge Study*

| Unit Category | Population Density | Number of Units |
|---|---|---|
| Apartments < 2 Bedrooms | 1.329 | 80 |
| Apartments > 2 Bedrooms | 1.725 | 60 |

Population total = 210 People

**Average Day Demand = 0.67 L/s**

*Halton Water Wastewater Linear Design Manual - Max Daily Demand Peaking Factor page 5*

| | |
|---|---|
| Maximum Daily Demand Peaking Factor | 2.25 |
| Maximum Hourly Demand Peaking Factor | 4 |

**Max Daily Demand 1.50 L/s**

**Fire Flow Calculation**

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A0**
CREATED BY: **J.L**
CHECKED BY **S.P**

*Fire Underwriters Survey 1999 Water Supply for Public Fire Protection - Page 17*

**1** **Estimate of the required fire flow for a given area can be determined by the formula:** $F = 220C\sqrt{A}$

Where F = required fire flow in litres/minute
C = coefficient related to the type of construction
A = total floor area in square meters

For Type of Construction: C = 0.8
**fire resistive construction**

Total Floor Area: A = 3,014 m²
**largest floor plate + 50% top and 50% below** 1507 m2 largest floor plate

| | | |
|---|---|---|
| Therefore F = 220 x **0.6** x (A)½ = | **9,662** | **L/min** |
| Rounded Fire Demand (Nearest 1,000 L/min) as per FUS | **10,000** | **L/min** |

*Fire Underwriters Survey 1999 Water Supply for Public Fire Protection - Page 18*

**2** **Reduction for fire hazard content**

| | | |
|---|---|---|
| Non-Combustible | 25% | |
| (1) - 25% = | **7,500** | **L/min** |

**3** **Reduction for Sprinkler protection**

| | | |
|---|---|---|
| Sprinkler Conforming to NFPA 13 | 30% | |
| Fully Supervised system | 10% | |
| Standard Water Supply for hose and system | 10% | |
| (2) - 50% = | **3,750** | **L/min** |

**4** **Addition for Structures exposed within 45m**

| | | |
|---|---|---|
| 3.1-10m | 20% | Conservative - does not account for protected openings or sprinklers |
| 10.1-20m | 15% | Conservative - does not account for protected openings or sprinklers |
| 20.1-30m | 10% | Conservative - does not account for protected openings or sprinklers |
| | **45%** | |
| | **3,375** | **L/min** |

**5** **Total Estimated Fire flow**

| | | |
|---|---|---|
| (2) - (3) + (4) = | **7,125** | **L/min** |

| | | |
|---|---|---|
| **Estimated Fire Flow (Nearest 1000 L/min) =** | **7,000** | **L/min** |
| | **117** | **L/s** |

JACKSON WATERWORKS

Telephone: 905.229.3176
Toll Free: 800.734.5732
email: jww@bellnet.ca
Website: www.jacksonwaterworks.ca

Mr. Steve Park
**EXP**
220 Commerce Valley Drive West, Suite 110
Markham Ontario **L3T 0A8**

**11 August 2020**

Jackson Waterworks has recently completed fire hydrant flow testing at 441 Maple Avenue in Burlington.

We define the Test Hydrants as the ones being flowed, and the Base Hydrant as the one where static and residual pressures are recorded. Wherever possible, we inspect the secondary valve for the Test Hydrants to make sure it is in the fully open position. Likewise, we count the number of turns needed to open the Test Hydrants (to make sure it is opening completely).

We do not use pitot conversion factors for different nozzle profiles. The Engineer may use these factors if desired and warranted.

The secondary valve for the Test Hydrant was not accessible for inspection at the time of test.

Testing was completed in accordance with NFPA 291 guidelines.

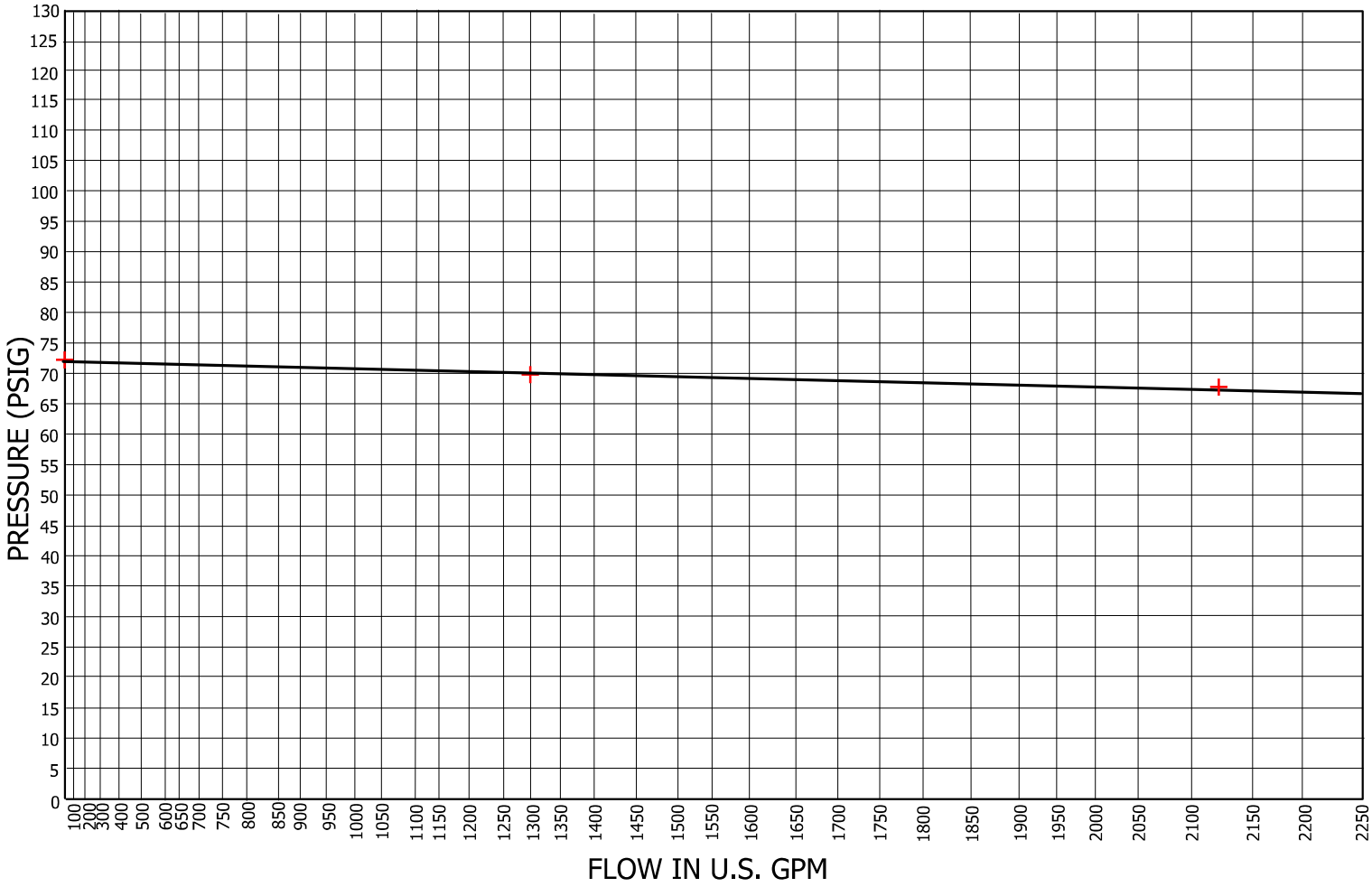
There were no irregularities to report.

Trusting this meets with your approval, we are...

Yours truly,



Mark Schmidt
Jackson Waterworks




| # of Ports | PORT DIA. (in/mm) | PITOT (psig) | FLOW (usgpm) | RESIDUAL (psig) |
|---|---|---|---|---|
| 1 | 2.50/63 | 60 | 1300 | 70 |
| 2 | 2.50/63 | 40/40 | 2122 | 67 |
| **THEORETICAL FLOW @ 20psi** | | | 7550 | |

| General Data | |
|---|---|
| Test Date | 06 August 2020 |
| Test Time | 1:00pm |
| Pipe Dia. | 12" |
| Static | 72 |

| Site Information | |
|---|---|
| Site or Developer Name | EXP |
| Site Address/Municipality | 441 Maple Avenue, Burlington |
| Location of Test Hydrant | Front of 441 Maple Avenue |
| Location of Base Hydrant | Front of 421 Maple Avenue |
| Technician's Comments | No conversion factor used for flow calculation based on round and flush internal nozzle configuration. Flow testing has been conducted in accrodance with NFPA 291 guidelines wherever possible. Refer to attached report for further information. Verified By: Mark Schmidt |

# Appendix C – Sanitary Servicing Calculations

**Sanitary Flow Calculations**
Ex. Building

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A0**
CREATED BY: **J.L**
CHECKED BY **S.P**

**Average Day**

*Halton Water Wastewater Linear Design Manual - Equivalent Population Density demand page 20*

| **Type of Development** | **Population Density** | | | |
|---|---|---|---|---|
| Hospitals | 4 | Person/bed | | |
| Beds: | 93 | bed | | |
| Unit Sewage Flow | 1.1 | m3/bed/day | | |
| Population total = | 372 | People | | |
| **Flow** | **102.3** | **m3/day** | **1.18** | **L/s** |

1 | **Average Day Demand =** | **1.18** | **L/s**

*Halton Water Wastewater Linear Design Manual - Peak Wastewater Flow Factor page 22*
Peak Factor = 1+(14/(4+(P/1000)^1/2))

2 | **Peaking Factor** | **4.04**

*City of Toronto Sewer and Watermain manual 1st Revision March 2014 - infiltration allowance page 37*

| | | |
|---|---|---|
| Infiltration allowance | 0.286 | L/s/ha |
| Total Area | 0.28 | ha |

3 | **Infiltration** | **0.080** | **L/s**

*City of Toronto Sewer and Watermain manual 1st Revision March 2014 - Peak Desgin Flow page 36*

Design Flow = average flow x peaking factor + infiltration allowance

4 | **Design Flow =** | **4.86** | **L/s**

**Sanitary Flow Calculations**
Prop. Building

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A0**
CREATED BY: **J.L**
CHECKED BY **S.P**

**Average Day**

*Halton Region 2017 Development Charge Study*

| Unit Category | Population Density | Number of Units |
|---|---|---|
| Apartments < 2 Bedrooms | 1.329 | 80 |
| Apartments > 2 Bedrooms | 1.725 | 60 |

Population total = 210 People
Residential Average Flow 0.275 m3/cap/d

**Flow** **57.7 m3/day** **0.67 L/s**

1 | **Average Day Demand =** | **0.67** | **L/s**

*Halton Water Wastewater Linear Design Manual - Peak Wastewater Flow Factor page 22*
Peak Factor = 1+(14/(4+(P/1000)^1/2))

2 | **Peaking Factor** | **4.14**

*City of Toronto Sewer and Watermain manual 1st Revision March 2014 - infiltration allowance page 37*

Infiltration allowance 0.286 L/s/ha
Total Area 0.28 ha

3 | **Infiltration** | **0.080** | **L/s**

*City of Toronto Sewer and Watermain manual 1st Revision March 2014 - Peak Desgin Flow page 36*

Design Flow = average flow x peaking factor + infiltration allowance

4 | **Design Flow =** | **2.85** | **L/s**

# Appendix D – Stormwater Management Calculations

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A1**
CREATED: **7-Jun-22**
PRINTED: **7-Jun-22**

# Pre-Development Runoff Coefficients and Peak Flows (Existing Conditions)
# City of Burlington

| Contributing Area | ID# | Runoff Coefficient | AREA (ha) |
|---|---|---|---|
| South Parcel (To Maple Avenue) | 101 | 0.80 | 0.14 |
| North Parcel (To Brock Avenue) | 102 | 0.85 | 0.16 |
| **Total** | | 0.83 | 0.30 |

Runoff Coefficients

| | |
|---|---|
| Rooftops | 0.9 |
| Asphalt/Concrete | 0.9 |
| Parks and Open Space | 0.3 |

---

Pre-Development Flows for Maple Avenue

| | | | | |
|---|---|---|---|---|
| Time of Concentration | 10 | minutes | | |
| 5 Year Intensity | 101.31 | mm/hr | $Q_{(5\ Year)}$ = C*I*A/360 | 31.6 l/s |
| 25 Year Intensity | 135.38 | mm/hr | $Q_{(25\ Year)}$ = C*(1.1)*I*A/360 | 46.4 l/s |
| 100 Year Intensity | 163.18 | mm/hr | $Q_{(100\ Year)}$ = C*(1.0)*I*A/360 | 63.5 l/s |

---

Pre-Development Flows for Brock Avenue

| | | | | |
|---|---|---|---|---|
| Time of Concentration | 10 | minutes | | |
| 5 Year Intensity | 101.31 | mm/hr | $Q_{(5\ Year)}$ = C*I*A/360 | 38.1 l/s |
| 25 Year Intensity | 135.38 | mm/hr | $Q_{(25\ Year)}$ = C*(1.1)*I*A/360 | 56.1 l/s |
| 100 Year Intensity | 163.18 | mm/hr | $Q_{(100\ Year)}$ = C*(1.0)*I*A/360 | 72.5 l/s |

---

Pre-Development Flows for the Site

| | | | | |
|---|---|---|---|---|
| Time of Concentration | 10 | minutes | | |
| 5 Year Intensity | 101.31 | mm/hr | $Q_{(5\ Year)}$ = C*I*A/360 | 69.7 l/s |
| 25 Year Intensity | 135.38 | mm/hr | $Q_{(25\ Year)}$ = C*(1.1)*I*A/360 | 102.4 l/s |
| 100 Year Intensity | 163.18 | mm/hr | $Q_{(100\ Year)}$ = C*(1.0)*I*A/360 | 136.0 l/s |

---

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A1**
CREATED: **7-Jun-22**
PRINTED: **7-Jun-22**

## Post-Development Runoff Coefficients and Peak Flows
## City of Burlington

Runoff Coefficients
Rooftops: 0.90
Pavement/Concrete: 0.90
Landscape: 0.30

| Contributing Area | ID# | Runoff Coefficient | AREA (Ha) |
|---|---|---|---|
| Impervious/Paved Area of Controlled Area | 200 | 0.90 | 0.34 |
| Uncontrolled Area to Maple Avenue | 301 | 0.30 | 0.006 |
| Uncontrolled Area to Brock Avenue | 302 | 0.30 | 0.004 |
| **Total Area Controlled** | | **0.90** | **0.34** |
| **Total Area Uncontrolled** | | **0.30** | **0.01** |
| **Total** | | **0.88** | **0.35** |

**Post-Development Controlled Flows**

| | | | |
|---|---|---|---|
| Time of Concentration | 10 minutes | | |
| 5 Year Intensity | 101.31 mm/hr | $Q_{(5\ Year)} = C*I*A/360$ | 86.1 l/s |
| 25 Year Intensity | 135.38 mm/hr | $Q_{(25\ Year)} = C*(1.1)*I*A/360$ | 126.6 l/s |
| 100 Year Intensity | 163.18 mm/hr | $Q_{(100\ Year)} = C*(1.0)*I*A/360$ | 173.4 l/s |

**Post-Development Uncontrolled Flows to Maple Ave**

| | | | |
|---|---|---|---|
| Time of Concentration | 10 minutes | | |
| 5 Year Intensity | 101.31 mm/hr | $Q_{(5\ Year)} = C*I*A/360$ | 0.5 l/s |
| 25 Year Intensity | 135.38 mm/hr | $Q_{(25\ Year)} = C*(1.1)*I*A/360$ | 0.7 l/s |
| 100 Year Intensity | 163.18 mm/hr | $Q_{(100\ Year)} = C*(1.25)*I*A/360$ | 1.0 l/s |

**Post-Development Uncontrolled Flows to Brock Avenue**

| | | | |
|---|---|---|---|
| Time of Concentration | 10 minutes | | |
| 5 Year Intensity | 101.31 mm/hr | $Q_{(5\ Year)} = C*I*A/360$ | 0.3 l/s |
| 25 Year Intensity | 135.38 mm/hr | $Q_{(25\ Year)} = C*(1.1)*I*A/360$ | 0.5 l/s |
| 100 Year Intensity | 163.18 mm/hr | $Q_{(100\ Year)} = C*(1.25)*I*A/360$ | 0.7 l/s |

441 Maple Ave
City of Burlington
5 Year Allowable Release

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A1**
CREATED: **7-Jun-22**
PRINTED: **7-Jun-22**

## INPUT

| | |
|---|---|
| **Required Discharge (l/s) =** | **27.40** |
| **Max. Water Surface Elev. (m) =** | **82.600** |
| **Discharge Pipe Invert (m) =** | **80.230** |
| **Discharge Pipe Diameter (mm) =** | **300** |
| **Orifice Diameter (mm) =** | **90** |
| **Orifice Flow Loss (C) =** | **0.62** |

## OUTPUT

| | | |
|---|---|---|
| **H =** | **2.325** | **m** |
| **g =** | **9.806** | |
| **V = (2*g*H)^0.5 =** | **6.753** | **m/s** |
| **A = X-section Area =** | **0.0064** | **m2** |

| | | |
|---|---|---|
| **Orifice Flow = Q = C * A * V * 1000 =** | **26.6** | **l/s** |

441 Maple Ave
City of Burlington
100 Year Allowable Release

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A1**
CREATED: **7-Jun-22**
PRINTED: **7-Jun-22**

## INPUT

| | |
|---|---|
| **Required Discharge (l/s) =** | **59.30** |
| **Max. Water Surface Elev. (m) =** | **82.600** |
| **Discharge Pipe Invert (m) =** | **80.230** |
| **Discharge Pipe Diameter (mm) =** | **300** |
| **Orifice Diameter (mm) =** | **130** |
| **Orifice Flow Loss (C) =** | **0.62** |

## OUTPUT

| | | |
|---|---|---|
| **H =** | **2.305** | **m** |
| **g =** | **9.806** | |
| **V = (2*g*H)^0.5 =** | **6.724** | **m/s** |
| **A = X-section Area =** | **0.0133** | **m2** |

| | | |
|---|---|---|
| **Orifice Flow = Q = C * A * V * 1000 =** | **55.3** | **l/s** |

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A1**
CREATED: **7-Jun-22**
PRINTED: **7-Jun-22**

## Required Storage Volume

## City of Burlington

Control 100 year Post Development to 5 Year Pre Development

| | | |
|---|---|---|
| Controlled Site Area | 0.34 | Ha |
| Allowable Release From Site | 31.6 | l/s |
| Uncontrolled Runoff From Site (100 year) | 1.7 | l/s |
| Groundwater Pumping Rate | 2.5 | l/s |
| Net Allowable Release From Site | **27.4** | l/s |
| Orifice Release From Site | **26.6** | l/s |
| Composite Runoff Coefficient (Controlled Area) | 0.9 | |
| Time of Concentration | 10 | minutes |

100 Year Storm I = 1281.34/(t+5)^0.761

| Storm Duration (minutes) | Rainfall Intensity (mm/hr) | Total Runoff Q (l/s) | Required Storage Volume ($m^3$) |
|---|---|---|---|
| 2 | 291.437 | 275.2 | 29.8 |
| 4 | 240.705 | 227.3 | 48.2 |
| 6 | 206.616 | 195.1 | 60.7 |
| 8 | 181.951 | 171.8 | 69.7 |
| 10 | 163.177 | 154.1 | 76.5 |
| 12 | 148.352 | 140.1 | 81.7 |
| 14 | 136.312 | 128.7 | 85.8 |
| 16 | 126.315 | 119.3 | 89.0 |
| 18 | 117.866 | 111.3 | 91.5 |
| 20 | 110.620 | 104.5 | 93.4 |
| 22 | 104.327 | 98.5 | 94.9 |
| 24 | 98.805 | 93.3 | 96.1 |
| 26 | 93.916 | 88.7 | 96.9 |
| 28 | 89.552 | 84.6 | 97.4 |
| 30 | 85.631 | 80.9 | 97.7 |
| 32 | 82.085 | 77.5 | **97.8** |
| 34 | 78.861 | 74.5 | 97.7 |
| 36 | 75.916 | 71.7 | 97.4 |
| 38 | 73.214 | 69.1 | 97.0 |
| 40 | 70.724 | 66.8 | 96.5 |
| 42 | 68.422 | 64.6 | 95.8 |
| 44 | 66.287 | 62.6 | 95.1 |
| 46 | 64.299 | 60.7 | 94.2 |
| 48 | 62.444 | 59.0 | 93.2 |
| **98$m^3$ of Storage is required** | | | |

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A1**
CREATED: **7-Jun-22**
PRINTED: **7-Jun-22**

## Required Storage Volume

## City of Burlington

Control 100 year Post Development to 100 Year Pre Development

| | | |
|---|---|---|
| Controlled Site Area | 0.34 | Ha |
| Allowable Release From Site | 63.5 | l/s |
| Uncontrolled Runoff From Site (100year) | 1.7 | l/s |
| Groundwater Pumping Rate | 2.5 | l/s |
| Net Allowable Release From Site | **59.3** | l/s |
| Orifice Release From Site | **55.3** | l/s |
| Composite Runoff Coefficient (Controlled Area) | 0.9 | |
| Time of Concentration | 10 | minutes |

100 Year Storm I = 1281.34/(t+5)^0.761

| Storm Duration (minutes) | Rainfall Intensity (mm/hr) | Total Runoff Q (l/s) | Required Storage Volume ($m^3$) |
|---|---|---|---|
| 1 | 327.711 | 309.5 | 15.3 |
| 2 | 291.437 | 275.2 | 26.4 |
| 3 | 263.277 | 248.7 | 34.8 |
| 4 | 240.705 | 227.3 | 41.3 |
| 5 | 222.159 | 209.8 | 46.4 |
| 6 | 206.616 | 195.1 | 50.3 |
| 7 | 193.378 | 182.6 | 53.5 |
| 8 | 181.951 | 171.8 | 55.9 |
| 9 | 171.973 | 162.4 | 57.8 |
| 10 | 163.177 | 154.1 | 59.3 |
| 11 | 155.356 | 146.7 | 60.3 |
| 12 | 148.352 | 140.1 | 61.1 |
| 13 | 142.037 | 134.1 | 61.5 |
| 14 | 136.312 | 128.7 | 61.7 |
| 15 | 131.093 | 123.8 | **61.7** |
| 16 | 126.315 | 119.3 | 61.4 |
| 17 | 121.922 | 115.1 | 61.0 |
| 18 | 117.866 | 111.3 | 60.5 |
| 19 | 114.110 | 107.8 | 59.8 |
| **62.0$m^3$ of Storage is required** | | | |

## GENERAL NOTES:

UNLESS OTHERWISE NOTED ON THIS DRAWING THE FOLLOWING REQUIREMENTS SHALL APPLY.

GENERAL

1. CONSTRUCTION OF SEWERS, AND RELATED APPURTENANCES SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE CURRENT STANDARD DRAWINGS OF THE CITY OF BURLINGTON, THE REGIONAL MUNICIPALITY OF HALTON, AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD).
2. ONTARIO PROVINCIAL STANDARD DRAWINGS TO BE READ IN CONJUNCTION WITH THE REGION OF HALTON REVISIONS.
3. ALL DIMENSIONS ARE IN METRES AND ALL DIAMETERS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
4. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH "THE OCCUPATIONAL HEALTH & SAFETY ACT". THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONTRACTOR AS DEFINED IN THE ACT.
5. THE CONTRACTOR SHALL OBTAIN ALL PERMITS FOR CONSTRUCTION.
6. ALL TEMPORARY TRAFFIC CONTROL AND SIGNAGE DURING CONSTRUCTION, PERMANENT SIGNS AND LANE MARKINGS SHALL BE IN ACCORDANCE WITH ONTARIO TRAFFIC MANUAL FOR TEMPORARY CONDITIONS AND MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
7. FOR ALL SEWERS AND WATERMAIN IN FILL SECTIONS, THE COMPACTION SHALL BE VERIFIED PRIOR TO LAYING OF PIPE.
8. ALL EXCAVATIONS TO BE BACKFILLED WITH NATIVE MATERIAL, APPROVED BY THE ENGINEER, TO 95% SPD.
9. ALL UNDERGROUND SERVICE CONNECTIONS AND TRENCHES WITHIN PAVED PORTION OF AN EXISTING ROAD ARE TO BE BACKFILLED WITH UNSHRINKABLE MATERIAL.
10. ALTERNATIVE CONSTRUCTION MATERIALS MAY BE ACCEPTABLE, PROVIDED THAT APPROVAL HAS BEEN OBTAINED FROM THE REGIONAL ENGINEER, CITY OF BURLINGTON AND THE ENGINEER.
11. MUNICIPAL APPROVAL OF THESE DRAWINGS IS FOR MATERIAL AND COMPLIANCE WITH CITY OF BURLINGTON AND PROVINCIAL SPECIFICATIONS AND STANDARDS ONLY. APPROVAL AND INSPECTION OF THE WORKS BY THE CITY OF BURLINGTON STAFF DOES NOT CERTIFY THE LINE AND GRADE OF THE WORKS NOR RELIEVE THE CONTRACTOR OF CERTIFICATION OF ALL WORKS BY THE OWNER'S ENGINEER.
12. ALL DIMENSIONS TO BE CHECKED BY THE CONTRACTOR FOR ACCURACY PRIOR TO CONSTRUCTION AND ANY DISCREPANCIES REPORTED TO THE ENGINEER.
13. ALL SERVICES TO MEET ALL REQUIREMENTS OF THE ONTARIO BUILDING CODE PART 7 CURRENT EDITION

LOCATES AND LIABILITY

1. THE CONTRACTOR SHALL RECTIFY ALL DISTURBED AREAS TO THE ORIGINAL CONDITION OR BETTER AND TO THE SATISFACTION OF THE CITY.
2. THE LOCATION OF ALL UNDER/ABOVE GROUND UTILITIES AND STRUCTURES ARE APPROXIMATE ONLY, AND WHERE SHOWN ON THE DRAWING(S) THE ACCURACY OF THE LOCATION OF SUCH UTILITIES ARE NOT GUARANTEED THE CONTRACTOR SHALL DETERMINE THE LOCATION OF ALL SUCH UTILITIES AND STRUCTURES BY CONSULTING THE APPROPRIATE AUTHORITIES OR UTILITY COMPANIES CONCERNED. THE CONTRACTORS SHALL PROVE THE LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE OR RESTORATION TO SAME.
3. THE OWNER SHALL BE NOTIFIED IMMEDIATELY OF ANY CONFLICTS WITH EXISTING SERVICES.
4. ANY UTILITY WHICH CONFLICTS WITH THE CONSTRUCTION IS TO BE RELOCATED BY THE PROPER AUTHORITY AT THE OWNER'S EXPENSE.

CONSTRUCTION RESPONSIBILITIES

1. LOCATION OF EXISTING UTILITIES SHOWN AND ALL OTHER EXISTING UTILITIES TO BE ESTABLISHED BY CONTRACTOR IN THE FIELD. THE CONTRACTOR HAVING UNCOVERED ANY UTILITIES THAT ARE NOT SHOWN ON THE PLAN OR STAKED OUT BY BELL, HYDRO, CABLE & GAS UTILITY COMPANIES WILL IMMEDIATELY ADVISE THE ENGINEER FOR APPROPRIATE ACTION. THE CONTRACTOR IS RESPONSIBLE FOR TRACING AND IDENTIFYING ALL EXISTING PRIVATE UTILITIES WITHIN THE WORK AREAS.
2. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE FOR LOCATING, SUPPORTING AND PROTECTING ALL UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF HIS WORK, WHETHER SHOWN ON THE PLANS OR NOT, AND FOR ALL REPAIRS AND CONSEQUENCES RESULTING FROM DAMAGE TO SAME.
3. TWO LANES OF TRAFFIC ARE TO BE MAINTAINED AT ALL TIMES DURING THE PERFORMANCE OF THE WORK ON MAPLE AVENUE. THE CONTRACTOR SHALL ADVISE THE CITY OF BURLINGTON IN WRITING NOT LESS THAN 48 HRS IN ADVANCE OF START OF CONSTRUCTION AND SHALL ACQUIRE THE APPROPRIATE PARTIAL ROAD CLOSURE PERMITS AS NECESSARY.
4. ALL EXISTING PAVEMENTS, CURBS, SIDEWALKS, DRIVEWAYS AND SODDED BOULEVARD AREAS DISTURBED BY THE WORK ARE TO BE REINSTATED EQUAL TO EXISTING AND TO THE SATISFACTORY OF THE CITY OF BURLINGTON.
5. NEW MANHOLES AND VALVE BOXES, EXISTING VALVE AND CHAMBERS, HYDRANT AND BELL PEDESTALS AND UTILITIES TO BE SET TO FINAL BOULEVARD AND PAVEMENT GRADES.
6. THE CONTRACTOR SHALL NOTIFY IN ADVANCE, AS REQUIRED, THE APPROPRIATE AUTHORITY HAVING JURISDICTION FOR THE ROAD PRIOR TO COMMENCING ANY WORK AND SHALL ACQUIRE AND SATISFY THE REQUIREMENTS OF THE APPROPRIATE PERMITS (FEES, INSPECTIONS, SIGNAGE, TRAFFIC MAINTENANCE, DIVERSION, ETC) FROM THE AUTHORITY.
7. THE CONTRACTOR SHALL SUPPLY AND PLACE TRAFFIC SIGNAGE IN CONFORMANCE WITH THE MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES PRIOR TO COMMENCING ANY WITHIN THE MUNICIPAL ROAD/LANE ALLOWANCE.

SILTATION CONTROL

1. CHECK DAMS AND SILTATION CONTROL FENCES SHALL BE INSTALLED AND MAINTAINED AS REQUIRED TO PREVENT SILT FROM FLOWING ONTO THE ADJACENT LANDS.
2. ALL SILTATION CONTROL MEASURES SHALL BE CLEANED AND MAINTAINED AFTER EACH RAINFALL AS DIRECTED AND TO THE SATISFACTION OF THE CITY OF BURLINGTON AND/OR CONSERVATION HALTON.
3. ADDITIONAL SILT CONTROL LOCATIONS MAY BE REQUIRED AS DETERMINED BY THE ENGINEER, THE CITY OF BURLINGTON AND/OR CONSERVATION HALTON.
4. HOARDING OR SILT FENCING SHALL BE ERECTED AND MAINTAINED PRIOR TO ANY GRADING OR CONSTRUCTION AND SHALL REMAIN IN PLACE AND IN GOOD REPAIR THROUGHOUT THE CONSTRUCTION GRADING PHASE.
5. TERRAFIX SILTSACKS SHALL BE PLACED IN ALL CATCHBASINS. SILT TRAPS ARE TO BE CLEANED REGULARLY AND ARE NOT TO BE REMOVED UNTIL CURBS ARE CONSTRUCTED AND BOULEVARDS AND BACKYARDS ARE GRADED AND SODDED. FILTER FABRIC USED FOR SILT CONTROL SHALL BE TERRA FIX 270R OR AN APPROVED EQUAL.
6. MUD TRACKING AND DUST MUST BE CONTROLLED ON ALL ROADWAYS TO THE SATISFACTION OF THE CITY.

INSPECTIONS AND NOTIFICATIONS

1. THE CITY OF BURLINGTON IS TO BE NOTIFIED 48 HOURS PRIOR TO THE COMMENCEMENT OF ANY UNDERGROUND INSTALLATIONS OR WORK WITHIN THE ROAD IN ORDER TO ARRANGE FOR INSPECTION.
2. THE CONTRACTOR IS TO NOTIFY BURLINGTON HYDRO PRIOR TO BACKFILLING IN THE CASE WHERE ANY BURIED HYDRO HAS BEEN EXPOSED.

ROADWORKS

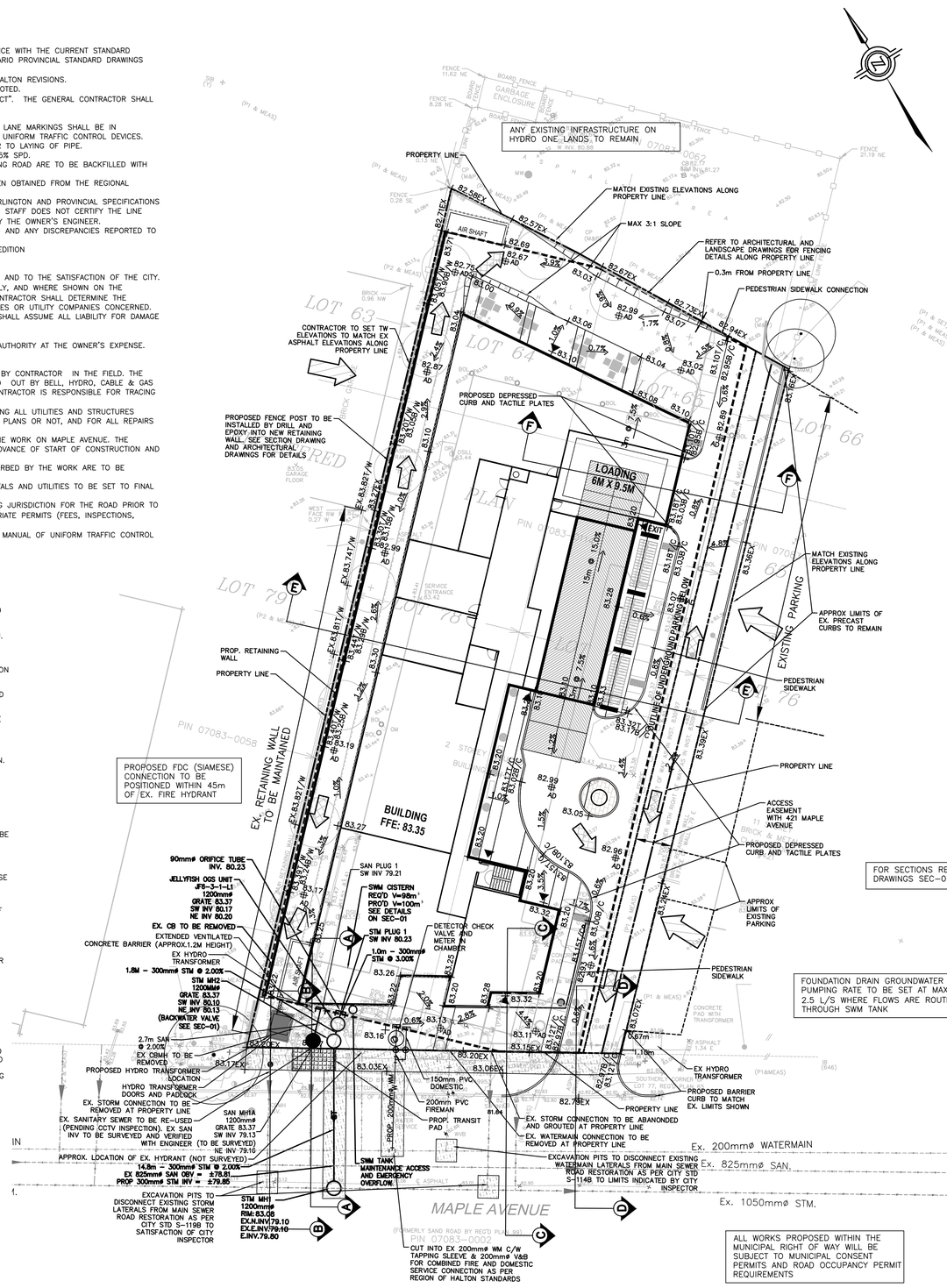
1. APPROVED FILL, FREE OF DELETERIOUS AND ORGANIC MATERIAL AND BOULDERS SHALL BE COMPACTED TO A DRY DENSITY NOT LESS THAN 95% THAN THE SPD. AFTER COMPACTION, SOIL DENSITY TESTS SHALL BE CONDUCTED TO ENSURE ADEQUATE COMPACTION AND STABILITY OF THE FILL AND TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER.
2. SUBGRADE TO BE PROOF ROLLED PRIOR TO PLACEMENT TO SUB BASE. UNSUITABLE MATERIAL TO BE REMOVED AND REPLACED WITH SELECT FILL OF GRANULAR "B" AND COMPACTED TO 98% SPD.
3. PRIOR TO THE INSTALLATION OF ANY GRANULAR MATERIAL THE SOILS CONSULTANT MUST ISSUE A COMPACTION CERTIFICATE AND OBTAIN APPROVAL FROM THE CITY.
4. BOULEVARDS TO BE SODDED WITH #1 NURSERY SOD ON A MINIMUM 100mm OF SELECT TOPSOIL.
5. MANHOLE FRAMES AND COVERS AND WATER VALVE BOXES SHALL BE SET FLUSH WITH BASE COURSE ASPHALT AND ADJUSTED TO FINAL GRADE AFTER INSTALLATION OF SURFACE ASPHALT AS PER CITY OF BURLINGTON STANDARD DRAWING S-130.
6. STANDARD PARKING SPACES SHALL BE 2.75mx6.0m. ACCESSIBLE PARKING SPACES SHALL BE 2.75mx6.0m AND SHALL HAVE AN ADJACENT ACCESS AISLE AT LEASE 2.0m WIDE, AS PER CITY OF BURLINGTON ACCESSIBILITY DESIGN STANDARD (SECTION 4.3.12).

RESTORATIONS

1. ALL TRENCH EXCAVATIONS WITHIN EXISTING ROAD ALLOWANCES SHALL BE AS BACKFILLED AS PER CITY OF BURLINGTON STANDARD DRAWINGS S-114, S-114A, AND S-114B
2. EXISTING PRIVATE FENCING IS TO BE MAINTAINED THROUGHOUT CONSTRUCTION, WHERE REMOVAL OR RELOCATION OF FENCING IS NECESSARY IT SHALL BE RESTORED OR REPLACED TO ORIGINAL CONDITIONS OR BETTER UNDER THE DIRECTION OF THE ENGINEER.
3. DAMAGED CURB, GUTTER AND SIDEWALK TO BE REPLACED WITH 28 MPa CONCRETE TO EXISTING CONDITIONS OR BETTER.
4. PAVEMENT SURFACE ON EXISTING MAPLE AVENUE TO BE REPAIRED BY CONTRACTOR AT THEIR EXPENSE IF DAMAGED BY CONSTRUCTION TRAFFIC.
5. MUNICIPAL CONSENT PERMIT AND ROAD OCCUPANCY PERMIT REQUIRED FOR WORK WITHIN THE MUNICIPAL ROW

SITE GRADING

1. PRIOR TO ANY GRADING THE CONTRACTOR SHALL CHECK AND VERIFY ALL EXISTING AND PROPOSED UTILITIES AND SERVICES FOR THEIR LOCATIONS AND ELEVATIONS REPORTING ANY DISCREPANCIES TO THE ENGINEER.
2. THE EXISTING GROUND ELEVATIONS, SERVICING AND SURVEY INFORMATION SHOWN ON THIS DRAWING ARE SUPPLIED FOR THE GENERAL INFORMATION ONLY. IT SHALL BE THE CONSTRACTOR'S RESPONSIBILITY TO VERIFY THE ACCURACY OF ALL INFORMATION OBTAINED FROM THIS DRAWING.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE SUPPLY AND PLACEMENT OF CERTIFIED CLEAN EARTH FILL AND GRANULAR MATERIALS AS NECESSARY TO COMPLETE THE LANDSCAPING GRADING WORKS.
4. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT LOW POINTS AND PONDING AREAS EXCEPT WHERE AREA DRAINS AND CATCHBASIN OUTLETS ARE PROVIDED.
5. SITE GRADING IS TO BE COMPLETED TO CONFORM TO THE LANDSCAPE DESIGN. REFER TO THE LANDSCAPE DRAWINGS FOR DETAILS.
6. AREA DRAINS AND CATCHBASINS TO BE SET TO ELEVATIONS DETAILED ON THIS DRAWING BY CONTRACTOR.
7. MINIMUM SURFACE GRADES (EXCLUDING SWALES) (A) GRASS YARD AREAS – 2.0% (B) PAVED DRIVEWAY AND PARKING AREAS – 0.6%
8. THE GRADING OF THE SITE IS TO BE PERFORMED TO PROVIDE FINISHED PERIMETER SURFACES WHICH ARE FLUSH WITH GIVEN STREETLINE, PUBLIC LANE AND AND SIDE LINE ELEVATIONS.




PROPOSED FDC (SIAMESE) CONNECTION TO BE POSITIONED WITHIN 45m OF EX. FIRE HYDRANT

FOR SERVICING AND STORMWATER MANAGEMENT DETAILS REFER TO FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT PREPARED BY EXP

FOR SECTIONS REFER TO EXP DRAWINGS SEC–01

A BACK–UP PUMPING AND GENERATOR SYSTEM TO BE IMPLEMENTED FOR THE GROUNDWATER PUMP SYSTEM. REFER TO MECHANICAL DRAWINGS

FOUNDATION DRAIN GROUNDWATER PUMPING RATE TO BE SET AT MAXIMUM 2.5 L/S WHERE FLOWS ARE ROUTED THROUGH SWM TANK

GROUNDWATER TO BE TREATED BY PASSIVE SETTLEMENT SYSTEM WITH BACKUP PUMPING AND STANDBY POWER GENERATOR AND PUMPED TO SWM CISTERN AS MAXIMUM PUMPING RATE OF 2.5 L/s IN ACCORDANCE TO CITY OF BURLINGTON GROUNDWATER PERMIT

ENTRANCE DRIVEWAY PAVEMENT STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE TO GEOTECHNICAL REPORT PREPARED BY TERRAPROBE

ALL WORKS PROPOSED WITHIN THE MUNICIPAL RIGHT OF WAY WILL BE SUBJECT TO MUNICIPAL CONSENT PERMITS AND ROAD OCCUPANCY PERMIT REQUIREMENTS

SANITARY SEWERS

1. SANITARY SEWERS SHALL BE PVC. PVC PIPE IS TO BE BELL AND SPIGOT AND COMPLY TO ASTM D–3034 WITH MINIMUM SDR 35.
2. MINIMUM BEDDING REQUIREMENTS FOR ALL SANITARY SEWER MAINS AND RELATED CONNECTIONS IN A SINGLE TRENCH SHALL BE CLASS B GRANULAR BEDDING AS PER OPSD 802.010 UNLESS OTHERWISE NOTED.
3. SANITARY SEWER MANHOLES FRAME AND COVER AS PER OPSD 401.01.
4. ALL PVC LATERALS TO BE SDR 28 AND SHALL BE ANY COLOUR EXCEPT WHITE. MINIMUM SLOPE OF LATERAL TO BE 2.0%.
5. SINGLE SERVICE CONNECTIONS TO BE MINIMUM 125mm DIA PIPE.
6. TAPPING AT EXISTING SANITARY SEWERS SHALL BE UNDERTAKEN IN ACCORDANCE WITH REGION OF HALTON REQUIREMENTS.
7. ALL SEWERS TO BE VIDEO INSPECTED.
8. ALL SEWERS TO BE FLUSHED PRIOR TO VIDEO INSPECTION.
9. ALL PVC SEWERS ARE TO BE TESTED FOR DEFLECTION (MANDREL PASSAGE) AFTER INSTALLATION. SANITARY SEWERS SHALL ALSO BE TESTED FOR LEAKAGE (LOW AIR PRESSURE). PRIOR TO ASSUMPTION BY THE CITY, PIPE DEFLECTION TESTING SHALL BE REPEATED.

STORM SEWERS

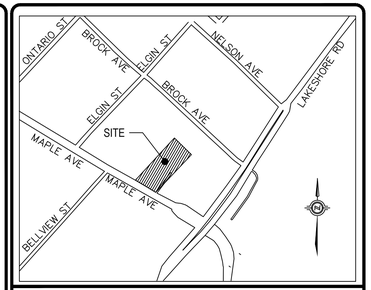
1. ALL SEWER PIPE UP TO AND INCLUDING 375mm DIA SHALL BE PVC, BELL AND SPIGOT AND SHALL COMPLY TO ASTM D–3034 WITH MINIMUM SDR 35.
2. MINIMUM BEDDING REQUIREMENTS FOR ALL SINGLE STORM SEWER MAINS AND ALL RELATED CONNECTIONS SHALL BE HIGH PERFORMANCE CLEAR STONE (HL–8 GRADED) AS PER CITY OF BURLINGTON STANDARD DRAWING S–18B.
3. STORM SEWER MANHOLES SHALL BE IN ACCORANCE WITH OPSD 701.010 AND 703.010. FRAME AND COVER AS PER OPSD 401.01 TYPE A. FRAMES TO BE STAMPED "DANGER" AND "STORM".
4. MANHOLE TOPS SHALL BE INITIALLY SET TO BASE COURSE ASPHALT ELEVATION AND ADJUSTED TO GRADE PRIOR TO PLACEMENT OF TOP LIFT OF ASPHALT.
5. ALL TRENCH EXCAVATIONS ARE TO BE BACKFILLED WITH SELECT NATIVE MATERIAL PLACED IN MAXIMUM 200mm LIFT THICKNESS WITHIN 3% OF THE OPTIMUM MOISTURE CONTENT AND COMPACTED TO A MINIMUM OF 95% SPD, UNLESS OTHERWISE SPECIFIED.
6. ALL SEWERS TO BE VIDEO INSPECTED.
7. ALL SEWERS TO BE FLUSHED PRIOR TO VIDEO INSPECTION.
8. ALL PVC SEWERS ARE TO BE TESTED FOR DEFLECTION (MANDREL PASSAGE) AFTER INSTALLATION. PRIOR TO ASSUMPTION BY THE CITY, PIPE DEFLECTION TESTING SHALL BE REPEATED.

WATERMAINS

1. FLEXIBLE WATERMAIN PIPE UP TO 300mm DIAMETER TO BE PVC DR–18 AND CONFORM TO A.W.W.A. C–900 WITH MECHANICAL JOINTS AS PER A.W.W.A. C–110, AND TO BE INSTALLED WITH A 10 GAUGE TRACER WIRE.
2. FLEXIBLE PIPE BEDDING TO BE OPSD 802.010 WITH COMPACTED GRANULAR B MATERIAL.
3. MINIMUM COVER TO BE 1.7m TO TOP OF PIPE.
4. DEFLECTION AT JOINTS NOT TO EXCEED 2.5 DEGREES AND SHALL BE EQUAL AT ALL JOINTS.
5. GATE VALVES AND BOXES FOR 150mm DIAMETER WATERMAINS AS PER A.W.W.A. STANDARD C–500 AND ARE TO OPEN TO THE LEFT (COUNTER CLOCKWISE).
6. HYDRANTS SHALL MEET THE REQUIREMENTS OF A.W.W.A. STANDARD C–502 AND SHALL BE SET IN ACCORDANCE WITH REGION OF HALTON, AND CITY OF BURLINGTON BUILDING DEPARTMENT STANDARDS, COMPLETE WITH STEAMER CONNECTIONS. THE 100mm STEAMER PORT SHALL FACE THE FIRE ROUTE AND SHALL BE UNOBSTRUCTED BY ANY PROPOSED LANDSCAPING.
7. ALL FITTINGS TO HAVE MECHANICAL RESTRAINTS THAT MEET UNI–B–13–92.
8. ALL TEMPORARY AND PERMANENT WATERMAIN PLUGS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH OPSD 1103.01.
9. TAPPING AT EXISTING WATERMAINS SHALL BE UNDERTAKEN IN ACCORDANCE WITH REGION OF HALTON REQUIREMENTS.
10. ALL WATER CUSTOMERS SUPPLIED BY A WATERMAIN TO BE SHUT DOWN SHALL BE NOTIFIED BY THE CONTRACTOR AT LEAST 48 HOURS IN ADVANCE OF THE SHUT DOWN AS PER REGION OF HALTON SPECIFICATIONS. NOTIFICATION SHALL TAKE PLACE UNDER THE ENGINEER'S DIRECTION.
11. MINIMUM HORIZONTAL SEPARATION BETWEEN WATERMAINS (INCLUDING PRIVATE SERVICES) AND STORM AND SANITARY SEWERS SHALL BE 2.5m. WATERMAINS MUST HAVE A MINIMUM VERTICAL CLEARNACE OF 150mm OVER AND 500mm UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.

**NOTES:**

- BACKGROUND LEGAL AND TOPOGRAPHIC SURVEY PREPARED BY MACKAY MACKAY & PETERS LIMITED. DATED DEC 05, 2018.
- SITE PLAN INFORMATION TAKEN FROM ARCHITECTURAL DRAWINGS PREPARED BY MICHAEL SPAZIANI ARCHITECTS INC.
- BACKGROUND MUNICIPAL SERVICING INFORMATION TAKEN FROM RECORD DRAWINGS PROVIDED BY CITY OF BURLINGTON AND REGION OF HALTON
- LANDSCAPE INFORMATION TAKEN FROM LANDSCAPE PLANS PREPARED BY BAKER TURNER INC




## LEGEND:

- EXISTING CONTOUR (1.0m)
- NEW SWM TANK MAINTENANCE ACCESS
- NEW STORM MANHOLE
- NEW SANITARY MANHOLE
- PROPOSED AREA DRAIN
- EXISTING CATCHBASIN
- EXISTING MANHOLE
- NEW / EXISTING WATER VALVE AND BOX
- EXISTING HYDRANT
- PROPOSED ELEVATION
- EXISTING ELEVATION
- DRAINAGE ARROW / SLOPE (MAX 3:1)
- EXISTING LIGHT / UTILITY POLE
- PROPERTY LINE
- ACCESS EASEMENT LINE
- SWALE
- INCOMING EXTERNAL OVERLAND FLOW DIRECTION (BY–PASSED)
- EMERGENCY OVERLAND FLOW DIRECTION (>100–YR STORM)
- DISTURBED AREA WITHIN CITY RIGHT–OF–WAY
- NEW RETAINING WALL

| No. | REVISIONS | Date | By | App. |
|---|---|---|---|---|
| B | 3RD ZBA SUBMISSION | JUNE 2022 | JL | SP |
| A | 2ND ZBA SUBMISSION | OCT 2020 | JL | SP |

LICENCED PROFESSIONAL ENGINEER
S.W.P.ASSMORE
90539925
2022/06/09
PROVINCE OF ONTARIO

LICENCED PROFESSIONAL ENGINEER
CHUEMIN PARK
100168818
2022/06/09
PROVINCE OF ONTARIO


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Markham, ON L3T 0A8
Canada
www.exp.com


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• INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

Owner/Client:

BETTER LIFE RETIREMENT RESIDENCE
(C/O 2564905 ONTARIO INC.)

Location:

441 MAPLE AVENUE
CITY OF BURLINGTON

Title:

SITE SERVICING AND GRADING PLAN

| Designed By: JL | Drawn By: JL | Checked By: SP |
|---|---|---|
| Scale: 1:250 | Date: OCT, 2020 | Drawing No.: SG-01 |
| Project No.: ALL-00251529-A0 | | |

# ON-LINE
# Jellyfish Filter Sizing Report

## Project Information

| | |
|---|---|
| Date | Friday, November 02, 2018 |
| Project Name | 441 Maple Ave |
| Project Number | |
| Location | Burlington |

## Jellyfish Filter Design Overview

This report provides information for the sizing and specification of the Jellyfish Filter. When designed properly in accordance to the guidelines detailed in the Jellyfish Filter Technical Manual, the Jellyfish Filter will exceed the performance and longevity of conventional horizontal bed and granular media filters.

*Please see* ***www.ImbriumSystems.com*** *for more information.*

## Jellyfish Filter System Recommendation

The Jellyfish Filter model JF6-3-1-L1 is recommended to meet the water quality objective by treating a flow of 17.7 L/s, which meets or exceeds 90% of the average annual rainfall runoff volume based on 18 years of TORONTO CENTRAL rainfall data for this site. This Jellyfish Model has a Peak Flow Capacity of 131 L/s. This model has a sediment capacity of 199 kg, which meets or exceeds the estimated average annual sediment load.

| Jellyfish Model | Number of High-Flo Cartridges | Number of Draindown Cartridges | Manhole Diameter (m) | Treatment Flow Rate (L/s) | Peak Capacity (L/s) | Bypass MAW | Sediment Capacity (kg) |
|---|---|---|---|---|---|---|---|
| **JF6-3-1-L1** | 3 | 1 | 1.8 | 17.7 | 131 | Yes | 199 |

## The Jellyfish Filter System

The patented Jellyfish Filter is an engineered stormwater quality treatment technology featuring unique membrane filtration in a compact stand-alone treatment system that removes a high level and wide variety of stormwater pollutants. Exceptional pollutant removal is achieved at high treatment flow rates with minimal head loss and low maintenance costs. Each lightweight Jellyfish Filter cartridge contains an extraordinarily large amount of membrane surface area, resulting in superior flow capacity and pollutant removal capacity.

## Maintenance

Regular scheduled maintenance is necessary to assure proper functioning of the Jellyfish Filter. The maintenance inverval is designed to be a minimum of 12 months, but this will vary significantly with on-line desings based on storm event conditions, site loading conditions and upstream pretreatment measures. Quarterly inspections and inspections after all storms beyond the 5-year event are recommended until enough historical performance data has been logged to comfortably initiate an alternative inspection interval.

*Please see* ***www.ImbriumSystems.com*** *for more information.*

Thank you for the opportunity to present this information to you and your client.

## Performance

Jellyfish efficiently captures a high level of Stormwater pollutants, including:

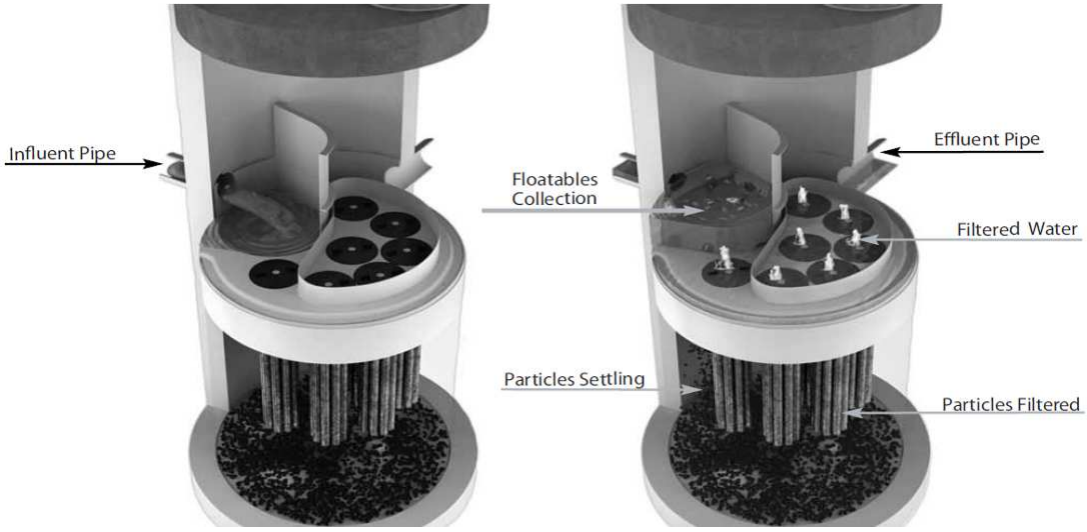
- ☑ 89% of the total suspended solids (TSS) load, including particles less than 5 microns
- ☑ 59% TP removal & 51% TN removal
- ☑ 90% Total Copper, 81% Total Lead, 70% Total Zinc
- ☑ Particulate-bound pollutants such as nutrients, toxic metals, hydrocarbons and bacteria
- ☑ Free oil, Floatable trash and debris

## Field Proven Peformance

The Jellyfish filter has been field tested on an urban site with 25 TARP qualifying rain events and field monitored according to the TARP field test protocol, demonstrating:

- A median TSS removal efficiency of 89%, and a median SSC removal of 99%;
- The ability to capture fine particles as indicated by an effluent d50 median of 3 microns for all monitotred storm events, and a median effluent turbidity of 5 NTUs;
- A median Total Phosphorus removal of 59%, and a median Total Nitrogen removal of 51%.

## Jellyfish Filter Treatment Functions




*Pre-treatment and Membrane Filtration*

◆ Verification Statement ◆ Verification Statement ◆ Verification Statement ◆

# VERIFICATION STATEMENT

## GLOBE Performance Solutions

Verifies the performance of

## Jellyfish® Filter

Developed by Imbrium Systems, Inc.,
Whitby, Ontario, Canada

**Registration: GPS-ETV_V2022-03-01**

In accordance with

## ISO 14034:2016

**Environmental Management —**
**Environmental Technology Verification (ETV)**

John D. Wiebe, PhD
Executive Chairman
GLOBE Performance Solutions

March 1, 2022
Vancouver, BC, Canada

GLOBE PERFORMANCE SOLUTIONS

Verification Body
GLOBE Performance Solutions
404 – 999 Canada Place | Vancouver, B.C | Canada |V6C 3E2

# Technology description and application

The Jellyfish® Filter is an engineered stormwater quality treatment technology designed to remove a variety of stormwater pollutants including floatable trash and debris, oil, coarse and fine suspended sediments, and particulate-bound pollutants such as nutrients, heavy metals, and hydrocarbons. The Jellyfish Filter combines gravitational pre-treatment (sedimentation and floatation) and membrane filtration in a single compact structure. The system utilizes membrane filtration cartridges comprised of multiple detachable pleated filter elements ("filtration tentacles") that provide high filtration surface area with the associated advantages of high flow rate, high sediment capacity, and low filtration flux rate.

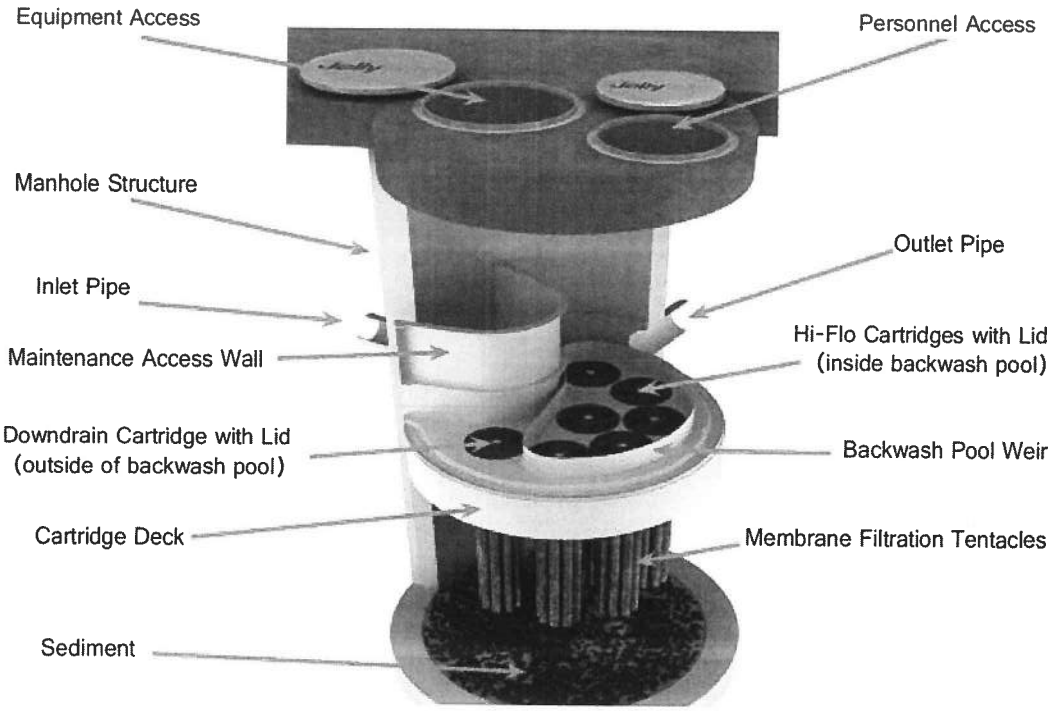



**Figure 1. Cut-away graphic of a Jellyfish® Filter manhole with 6 hi-flo cartridges and 1 draindown cartridge**

**Figure 1** depicts a cut-away graphic of a typical 6-ft diameter Jellyfish® Filter manhole with 6 hi-flo cartridges and 1 draindown cartridge (JF6-6-1). Stormwater influent enters the system through the inlet pipe and builds a pond behind the maintenance access wall, with the pond elevation providing driving head. Flow is channeled downward into the lower chamber beneath the cartridge deck. A flexible separator skirt surrounds the filtration zone where the filtration tentacles of each cartridge are suspended, and the volume between the vessel wall and the outside surface of the separator skirt comprises a pre-treatment channel. As flow spreads throughout the pre-treatment channel, floatable pollutants accumulate at the surface of the pond behind the maintenance access wall and also beneath the cartridge deck in the pre-treatment channel, while coarse sediments settle to the sump. Flow proceeds under the separator skirt and upward into the filtration zone, entering each filtration tentacle and depositing fine suspended sediment and associated particulate-bound pollutants on the outside surface of the membranes. Filtered water proceeds up the center tube of each tentacle, with the flow from each tentacle combining under the cartridge lid, and discharging to the top of the cartridge deck through the cartridge lid orifice. Filtered effluent from the hi-flo cartridges enters a pool enclosed by a 15-cm high weir, and if storm intensity and resultant driving head is sufficient, filtered water overflows the weir and proceeds across the cartridge deck to the outlet pipe. Filtered effluent discharging from the draindown cartridge(s) passes directly to the outlet pipe, and requires only a minimal amount of driving head (2.5 cm) to provide forward flow. As

storm intensity subsides and driving head drops below 15 cm, filtered water within the backwash pool reverses direction and passes backward through the hi-flo cartridges, and thereby dislodges sediment from the membrane which subsequently settles to the sump below the filtration zone. During this passive backwashing process, water in the lower chamber is displaced only through the draindown cartridge(s). Additional self-cleaning processes include gravity, as well as vibrational pulses emitted when flow exits the orifice of each cartridge lid, and these combined processes significantly extend the cartridge service life and maintenance cleaning interval. Sediment removal from the sump by vacuum is required when sediment depths reach 30 cm, and cartridges are typically removed, externally rinsed, and recommissioned on an annual basis, or as site-specific maintenance conditions require. Filtration tentacle replacement is typically required every 3 – 5 years.

## Performance conditions

The data and results published in this Verification Statement were obtained from the field testing conducted on a Jellyfish Filter JF6-6-1 (6-ft diameter manhole with 6 hi-flo cartridges and 1 draindown cartridge), in accordance with the requirements outlined by the Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol – Ecology (TAPE) as written by the Washington State Department of Ecology, (WADOE, 2011). The drainage area providing stormwater runoff to the test unit was 86 acres and was 32% impervious. Throughout the monitoring period (March 2017 – April 2020), a total of 25 individual storm events were sampled. The Basic Treatment standard outlined in the TAPE requires ≥ 80% total suspended solids (TSS) removal at influent TSS concentrations ranging from 100 to 200 mg/L. In addition, the Phosphorus Treatment standard outlined in the TAPE requires ≥ 50% removal of total phosphorus (TP) at influent concentrations ranging from 0.10 to 0.5 mg/L. For this verification, the performance claim for TSS removal is for influent TSS concentration ≥ 100 mg/L, and the performance claim for TP removal is for influent TP concentration ≥ 0.1 mg/L. Based on these requirements, 15 and 18 sample pairs deemed qualified for evaluating the removal performance of TSS and TP, respectively. Prior to starting the performance testing program, a quality assurance project plan (QAPP) was submitted to and approved by the State of Washington Department of Ecology.

**Table 1** shows the specified and achieved TAPE criteria for storm selection and sampling.

**Table 1. Specified and achieved TAPE criteria for storm selection and sampling**

| Description | TAPE criteria value | Achieved value |
|---|---|---|
| Total rainfall | > 3.8 mm (0.15 in) | > 3.8 mm (0.15 in)[1] |
| Minimum inter-event period | 6 hours | 6 hours |
| Minimum flow-weighted composite sample storm coverage | Minimum 70% including as much of the first 20% of the storm | > 70% |
| Minimum influent/effluent samples | 10, but a minimum of 5 subsamples for composite samples | 10, except for two events that had 9 aliquots |
| Total sampled rainfall | N/A | 8.29 in |
| Number of storms | Minimum 15 (preferably 20) | 25 |

[1]N.B. Storm event depth was greater than the TAPE rainfall depth guideline of 0.15 inches for all events sampled, except for the 3/21/2017, 3/22/2019, 3/26/2019, and 04/13/2019 events. Given the size of the drainage basin, storm events below this threshold produced adequate runoff volume for sampling. Only two of these events were used to evaluate performance, and all had rainfall depths of 0.11 inches or greater. These events were included as their runoff volumes, precipitation durations, and influent TSS concentrations were all within range of the total data set.

The 6-ft diameter test unit has sedimentation surface area of 2.62 $m^2$ (28.26 $ft^2$). Each of the seven filter cartridges employed in the test unit uses filtration tentacles of 137 cm (54 in) length, with filter surface area of 35.4 $m^2$ (381 $ft^2$) per cartridge, and total filter surface area of 247.8 $m^2$ (2667 $ft^2$) for the seven cartridges combined. The design treatment flow rate is 5 L/s (80 gal/min) for each of the six hi-flo

cartridges and 2.5 L/s (40 gal/min) for the single draindown cartridge, for a total design treatment flow rate of 32.5 L/s (520 gal/min) at design driving head of 457 mm (18 in). This translates to a filtration flux rate (flow rate per unit filter surface area) of 0.14 L/s/m² (0.21 gal/min/ft²) for each hi-flo cartridge and 0.07 L/s/m² (0.11 gal/min/ft²) for the draindown cartridge. The design flow rate for each cartridge is controlled by the sizing of the orifice in the cartridge lid. The distance from the bottom of the filtration tentacles to the sump is 61 cm (24 in).

# Performance claim(s)

The Jellyfish® Filter demonstrated the removal efficiencies indicated in **Table 2** for TSS and TP during field monitoring conducted in accordance with the Washington State Department of Ecology's Technology Assessment Protocol – Ecology (TAPE), and using the following design parameters:

- System hydraulic loading rate (system treatment flow rate per unit of sedimentation surface area) of 12.5 L/s/m² (18.4 gal/min/ft²) or lower
- Filtration flux rate (flow rate per unit filter surface area) of 0.14 L/s/m² (0.21 gal/min/ft²) or lower for each hi-flo cartridge and 0.07 L/s/m² (0.11 gal/min/ft²) or lower for each draindown cartridge
- Distance from the bottom of the filtration tentacles to the sump of 61 cm (24 in) or greater
- Driving head of 457 mm (18 in) or greater

**Table 2. Bootstrapped mean, median, and 95% confidence interval (median) for removal efficiencies of Total Suspended Solids (TSS) and Total Phosphorus (TP)**

| Parameter | Mean (%) | Median (%) | Median – 95% Lower Limit | Median – 95% Upper Limit |
|---|---|---|---|---|
| TSS [1] | 87.6 | 90.1 | 85.1 | 91.6 |
| TP [2] | 77.3 | 77.5 | 70.8 | 85.6 |

[1] TSS influent concentration ≥ 100 mg/L
[2] TP influent concentration ≥ 0.1 mg/L

N.B. As with any field test of stormwater treatment devices, removal efficiencies will vary based on pollutant influent concentrations and other site-specific conditions.
The performance claims can be applied to other Jellyfish® Filter models smaller or larger than the tested model as long as the untested models are designed in accordance with the design parameters specified in the performance claims.

# Performance results

### Performance Claims – Removal Efficiency for Total Suspended Solids

Raw data summarizing the percent removal of total suspended solids (TSS) by the Jellyfish® Filter at the design system hydraulic loading rate of 12.5 L/s/m² (18.4 gal/min/ft²) for 15 sample pairs deemed qualified are presented in **Table 3**. Data were analyzed and evaluated using a bootstrap approach of random sampling by replacement to estimate population distribution and thereby the upper and lower limit of the confidence interval.

**Table 3. Raw data summarizing the percent removal of total suspended solids (TSS)**

| Event ID | TSS Influent (mg/L) | TSS Effluent (mg/L) | TSS Removal (%) (Inf ≥ 100 mg/L) |
|---|---|---|---|
| 3/21/2017 | 102.0 | 22.0 | 78.4 |
| 4/7/2017 | 201.0 | 30.8 | 84.7 |
| 4/12/2017 | 108.0 | 24.4 | 77.4 |
| 4/19/2017 | 452.0 | 44.6 | 90.1 |
| 4/26/2017 | 257.0 | 10.0 | 96.1 |

| | | | |
|---|---|---|---|
| 6/15/2017 | 134.0 | 10.4 | 92.2 |
| 3/8/2018 | 755.0 | 47.2 | 93.8 |
| 3/14/2018 | 181.0 | 27.0 | 85.1 |
| 3/22/2018 | 224.0 | 20.0 | 91.1 |
| 4/5/2019 | 171.0 | 23.0 | 86.6 |
| 4/13/2019 | 117.0 | 25.0 | 78.6 |
| 5/18/2019 | 254.0 | 20.0 | 92.1 |
| 12/7/2019 | 200.0 | 17.0 | 91.5 |
| 3/30/2020 | 605.0 | 51.0 | 91.6 |
| 4/20/2020 | 210.0 | 29.0 | 86.2 |
| **n** | 15 | 15 | 15 |
| **Min** | 102.0 | 10.0 | 77.4 |
| **Max** | 755.0 | 51.0 | 96.1 |
| **Median** | 201.0 | 24.4 | 90.1 |
| **Mean** | 264.7 | 26.8 | 87.7 |
| **SD** | 190.9 | 12.3 | 5.9 |

### Performance Claims – Removal Efficiency for Total Phosphorus

Raw data summarizing the percent removal of total phosphorus (TP) by the Jellyfish® Filter at the design system hydraulic loading rate of 12.5 L/s/m² (18.4 gal/min/ft²) for 18 sample pairs deemed qualified are presented in **Table 4**. Data were analyzed and evaluated using a bootstrap approach of random sampling by replacement to estimate population distribution and thereby the upper and lower limit of the confidence interval.

**Table 4. Raw data summarizing the percent removal of total phosphorus (TP)**

| Event ID | TP Influent (mg/L) | TP Effluent (mg/L) | TP Removal (%) (Inf ≥ 0.1 mg/L) |
|---|---|---|---|
| 4/7/2017 | 0.706 | 0.092 | 87.0 |
| 4/12/2017 | 0.338 | 0.076 | 77.5 |
| 4/19/2017 | 0.500 | 0.036 | 92.8 |
| 4/26/2017 | 0.504 | 0.042 | 91.7 |
| 5/13/2017 | 0.256 | 0.110 | 57.0 |
| 6/8/2017 | 0.256 | 0.104 | 59.4 |
| 6/15/2017 | 0.362 | 0.052 | 85.6 |
| 3/8/2018 | 1.75 | 0.130 | 92.6 |
| 3/14/2018 | 0.652 | 0.094 | 85.6 |
| 3/22/2018 | 0.364 | 0.072 | 80.2 |
| 3/27/2019 | 0.226 | 0.070 | 69.1 |
| 4/5/2019 | 0.337 | 0.092 | 72.9 |
| 4/13/2019 | 0.249 | 0.087 | 65.1 |
| 5/18/2019 | 1.09 | 0.173 | 84.1 |
| 12/7/2019 | 0.335 | 0.105 | 68.7 |
| 12/19/2019 | 0.211 | 0.093 | 56.2 |
| 3/30/2020 | 1.05 | 0.092 | 91.2 |
| 4/20/2020 | 0.451 | 0.112 | 75.2 |
| **n** | 18 | 18 | 18 |
| **Min** | 0.211 | 0.036 | 56.2 |
| **Max** | 1.75 | 0.173 | 92.8 |
| **Median** | 0.363 | 0.092 | 78.9 |
| **Mean** | 0.535 | 0.091 | 77.3 |
| **SD** | 0.400 | 0.032 | 12.5 |

## Verification

The verification was completed by the Verification Expert, the Centre for Advancement of Water and Wastewater Technologies ("CAWT"), contracted by GLOBE Performance Solutions, using the International Standard ***ISO 14034:2016 Environmental management -- Environmental technology verification (ETV)***. Data and information provided by Imbrium Systems to support the performance claim included the performance monitoring report "General Use Level Designation Technical Evaluation Report" prepared by CONTECH Engineered Solutions, Portland, OR, USA, and dated December 28, 2020. This report is based on a field testing completed by CONTECH personnel at a site in Dundee, Oregon between March 2017 and April 2020 in accordance with the Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol – Ecology (TAPE) as written by the Washington State Department of Ecology (WADOE, 2011).

## What is ISO14034:2016 Environmental management – Environmental technology verification (ETV)?

ISO 14034:2016 specifies principles, procedures and requirements for environmental technology verification (ETV) and was developed and published by the *International Organization for Standardization (ISO)*. The objective of ETV is to provide credible, reliable and independent verification of the performance of environmental technologies. An environmental technology is a technology that either results in an environmental added value or measures parameters that indicate an environmental impact. Such technologies have an increasingly important role in addressing environmental challenges and achieving sustainable development.

**For more information on the Jellyfish® Filter please contact:**

Imbrium Systems Inc.,
407 Fairview Drive
Whitby, Ontario
L1N 3A9, Canada
Tel: 416-960-9900
info@imbriumsystems.com

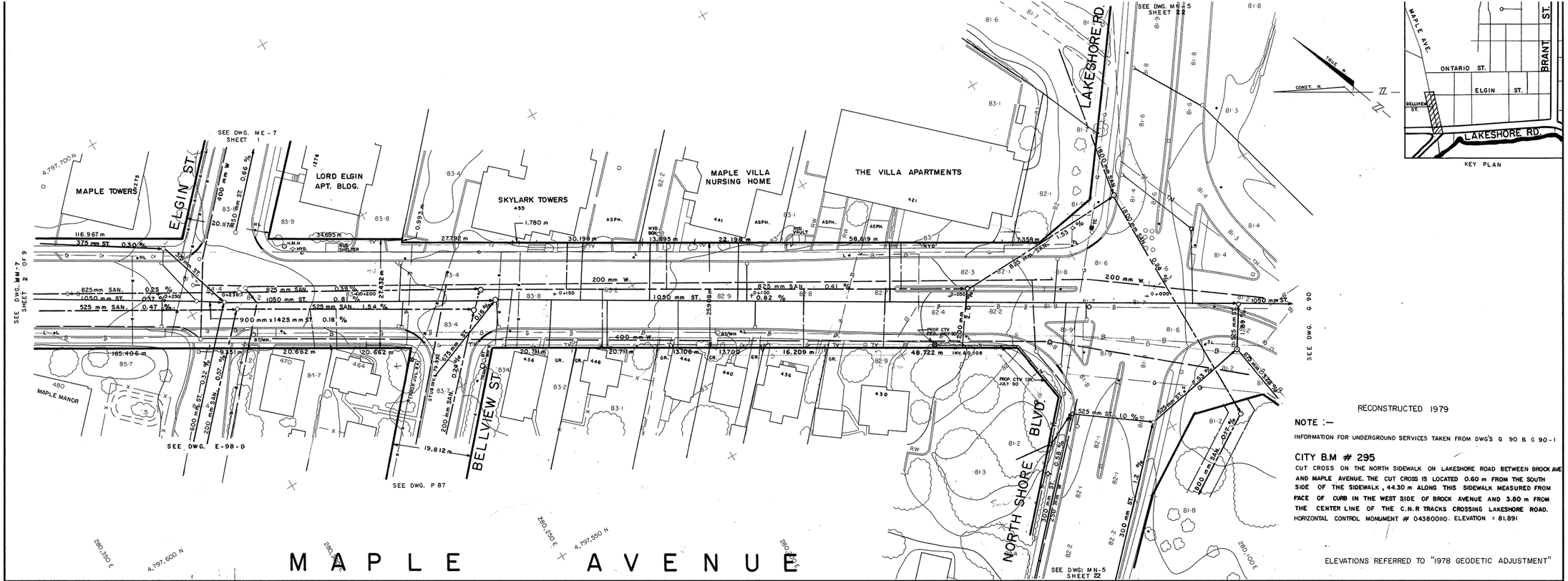
**For more information on ISO 14034:2016 / ETV please contact:**

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404 – 999 Canada Place
Vancouver, BC
V6C 3E2, Canada
Tel: 604-695-5018 / Toll Free: 1-855-695-5018
etv@globeperformance.com
www.globeperformance.com

**Limitation of verification - Registration: GPS-ETV_V2022-03-01**
GLOBE Performance Solutions and the Verification Expert provide the verification services solely on the basis of the information supplied by the applicant or vendor and assume no liability thereafter. The responsibility for the information supplied remains solely with the applicant or vendor and the liability for the purchase, installation, and operation (whether consequential or otherwise) is not transferred to any other party as a result of the verification.

# Appendix E – Additional Background Documents

MM-7
SH 1




RECONSTRUCTED 1979

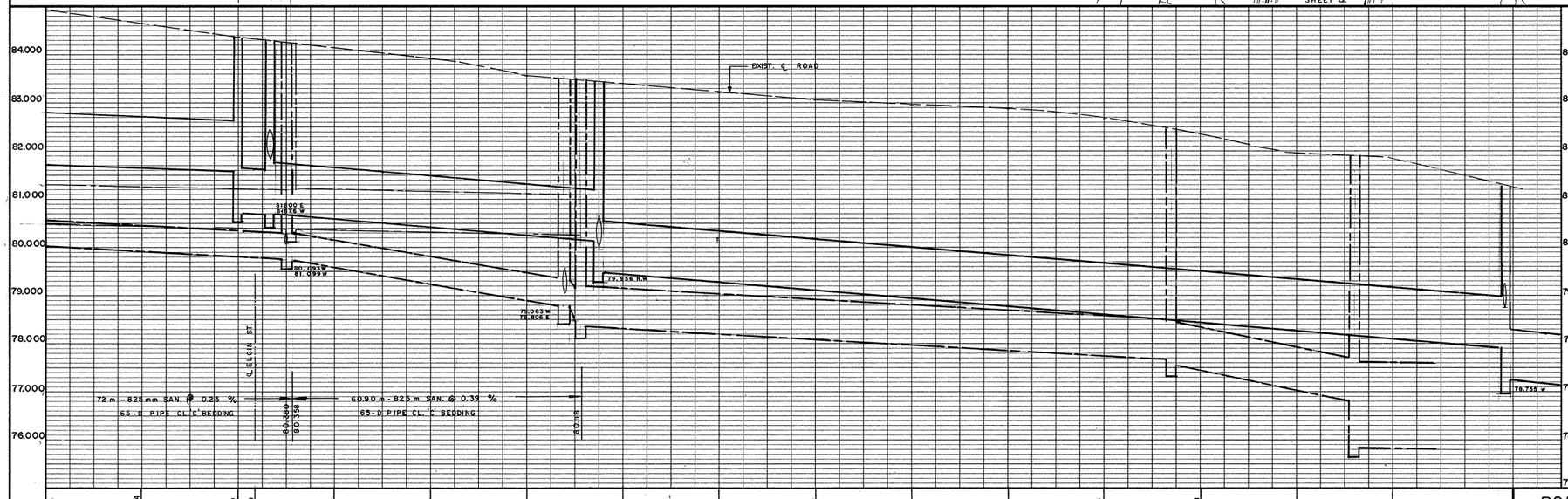
NOTE :–

INFORMATION FOR UNDERGROUND SERVICES TAKEN FROM DWG'S G 90 8 G 90-1

CITY B.M # 295

CUT CROSS ON THE NORTH SIDEWALK ON LAKESHORE ROAD BETWEEN BROCK AVE AND MAPLE AVENUE. THE CUT CROSS IS LOCATED 0.60 m FROM THE SOUTH SIDE OF THE SIDEWALK, 44.30 m ALONG THIS SIDEWALK MEASURED FROM FACE OF CURB IN THE WEST SIDE OF BROCK AVENUE AND 3.80 m FROM THE CENTER LINE OF THE C.N.R TRACKS CROSSING LAKESHORE ROAD. HORIZONTAL CONTROL MONUMENT # 043800110. ELEVATION = 81.891

ELEVATIONS REFERRED TO "1978 GEODETIC ADJUSTMENT"




| | | | |
|---|---|---|---|
| ROAD GRADE | 84.920 | 84.664 | 84.380 | 84.330 | 84.176 | 83.921 | 83.556 | 83.408 | 83.201 | 83.083 | 82.961 | 82.871 | 82.694 | 82.381 | 81.971 | 81.848 |
| STORM SEWER | 133 m – 1050 mm ST. @ 0.37 % 65-D PIPE CL.'B' BEDDING | | | 81.556 80.706 | 80.694 80.694 | 68.60 m – 1050 mm ST. @ 0.81 % 65-D PIPE CL. 'B' BEDDING | | 80.136 79.469 | 189 m – 1050 mm ST. @ 0.82 % 65-D PIPE CL.'B' BEDDING | | | | | | 77.917 77.216 | |
| SANITARY SEWER | 70 m – 525 mm SAN. @ 0.47 % 100-D PIPE CL.'B' BEDDING | | | | 79.724 79.372 | 59.80 m – 525 mm SAN. @ 1.54 % 100-D PIPE CL. 'B' BEDDING | | 78.732 | 78.493 78.340 | 123 m – 825 mm SAN. @ 0.41 % 65-D PIPE CL. 'C' BEDDING | | | 77.694 77.542 | 46 m – 825 mm SAN. @ 1.53 % 65-D PIPE CL. 'C' BEDDING | | 76.838 76.805 |
| CHAINAGE | 0+280 | 0+260 | 0+240 | 0+236.1 | 0+220 | 0+200 | 0+180 | 0+160 | 0+140 | 0+120 | 0+100 | 0+080 | 0+060 | 0+040 | 0+020 | 0+000 |

| Nº | DATE | BY | REVISIONS |
|---|---|---|---|
| 1 | OCT./80 | D.MIS | AS CONSTRUCTED (CONTR. 79-7), FIELD NOTE M-194 |

DESIGN | CHECKED | DATE OCT. /84

DRAWN M. Al-I | CHECKED

SCALE HOR 1:500 (5 m 0 10 20 m) VER 1:50 (0.5 m 0 1 2 m)

REFERENCES
S-03-133-E
S-0427-E
G 90, G 90-1
TYP. X-SEC. G 90 SP SH. 1 & 2

APPROVALS

Municipal

DIRECTOR OF PUBLIC WORKS

DATE

Regional

FIELD NOTES M-233

STAMP

CONSULTANT

# CITY OF BURLINGTON

DEPARTMENT OF PUBLIC WORKS

# MAPLE AVENUE

LAKESHORE RD. — 50 m N. ELGIN ST.

MUNICIPAL DRAWING Nº MM-7

REGIONAL DRAWING Nº

CONTRACT Nº

CONSULTANT DRAWING Nº

SHEET 1 OF

MM-7 SH 1




REGIONAL MUNICIPALITY OF HALTON
Department of Public Works

# WATER OPERATING MAPS

## TOWN OF BURLINGTON

**Protection Valve Type**
- Q Air Release
- N Check
- Pressure Reducing
- Surge
- Vacuum

**Control Valve**
- Valve In Chamber
- System
- Zone Isolation, No ByPass
- Zone Isolation, With ByPass

**Fittings**
- o Cap
- p Cross
- q Reducer
- v Sleeve
- r Tee
- s Tapping Sleeve

**System Structure**
- K Booster Station
- L Intake
- J Municipal Well
- I Reservoir
- H Tank
- G Water Purification Plant

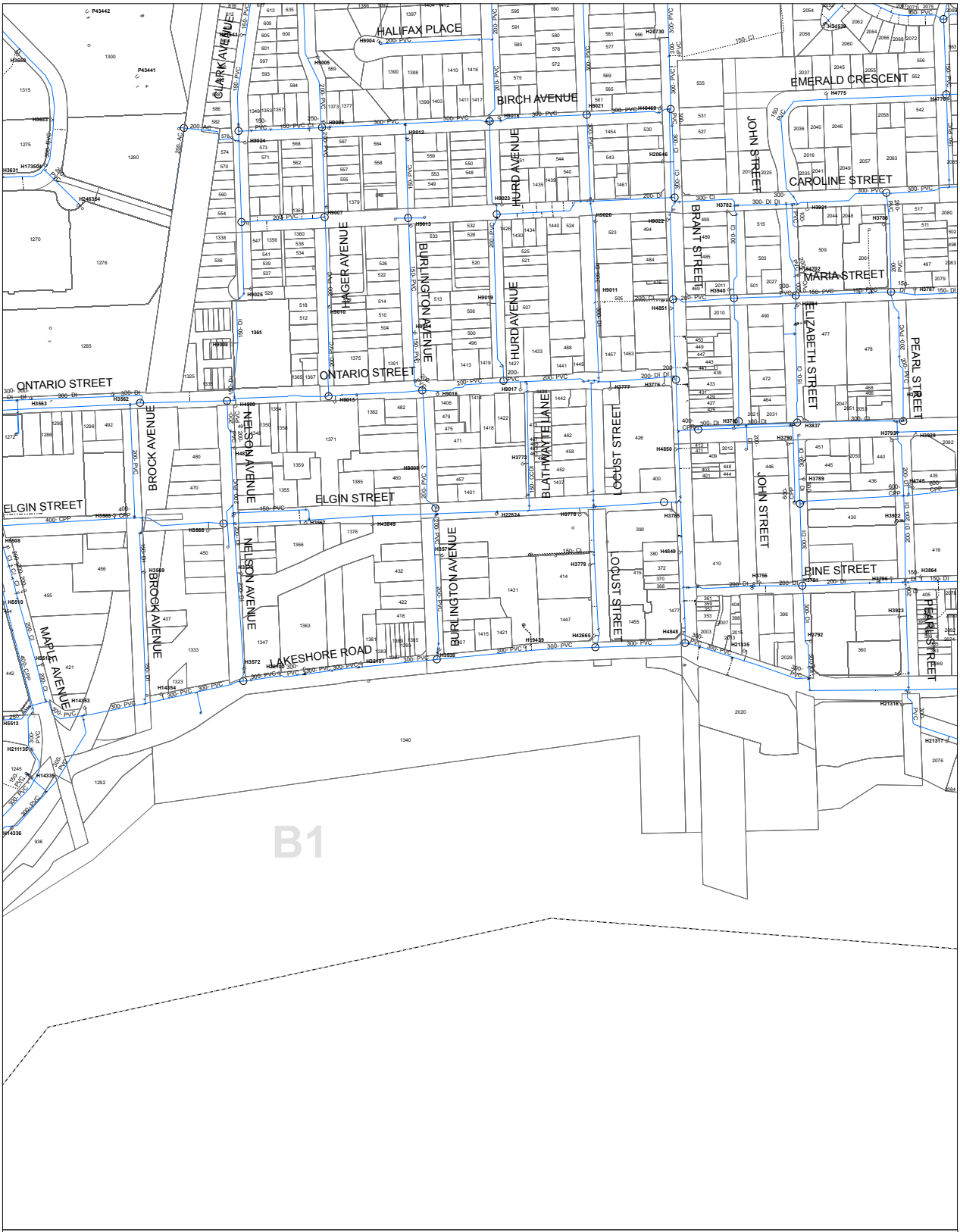
**Other**
- In Service Watermain
- Proposed Watermain
- Private Watermain/Service Lead
- M System Meter
- U Hydrant
- Chamber
- Pressure Zone
- Municipal Boundary

0 25 50 100 150 200 Meters

Map Index

Grid Number: 202C
Print Date: Oct 26, 2018

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REGIONAL MUNICIPALITY OF HALTON
Department of Public Works

# WATER OPERATING MAPS

## TOWN OF BURLINGTON

**Protection Valve Type**
- Q Air Release
- N Check
- Pressure Reducing
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**Control Valve**
- Valve In Chamber
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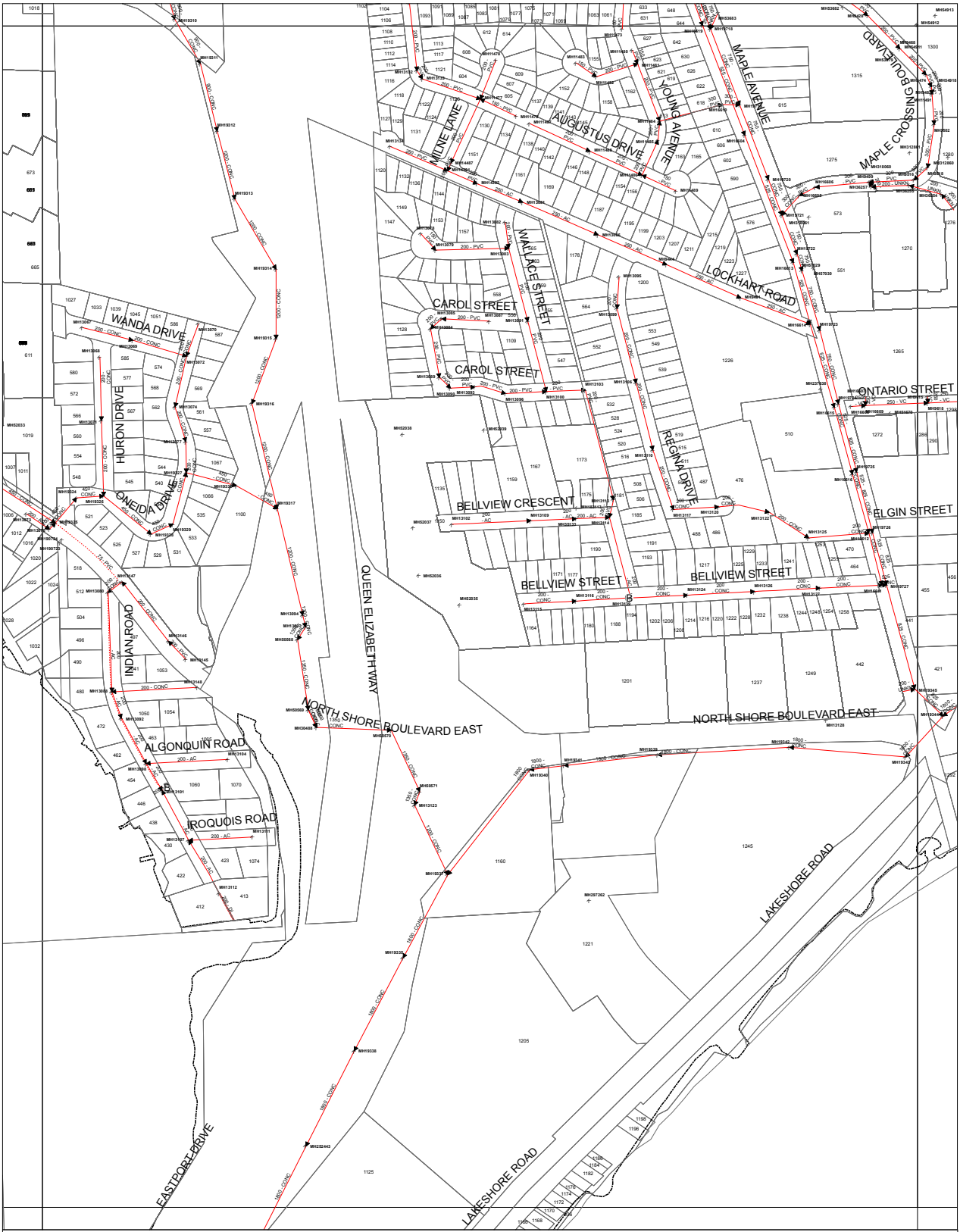
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REGIONAL MUNICIPALITY OF HALTON
Department of Public Works

# SANITARY OPERATING MAPS

## TOWN OF BURLINGTON

**Sewer Types**

- Treated Discharge Sewer
- Untreated Discharge Sewer
- ForceMain
- Proposed ForceMain
- Gravity Sewer (In Service)
- Gravity Sewer (Out of Service)
- Proposed Gravity Sewer

**Maintenance Hole Types**

- K Maintenance Hole
- J Chamber

**Major System Facilities**

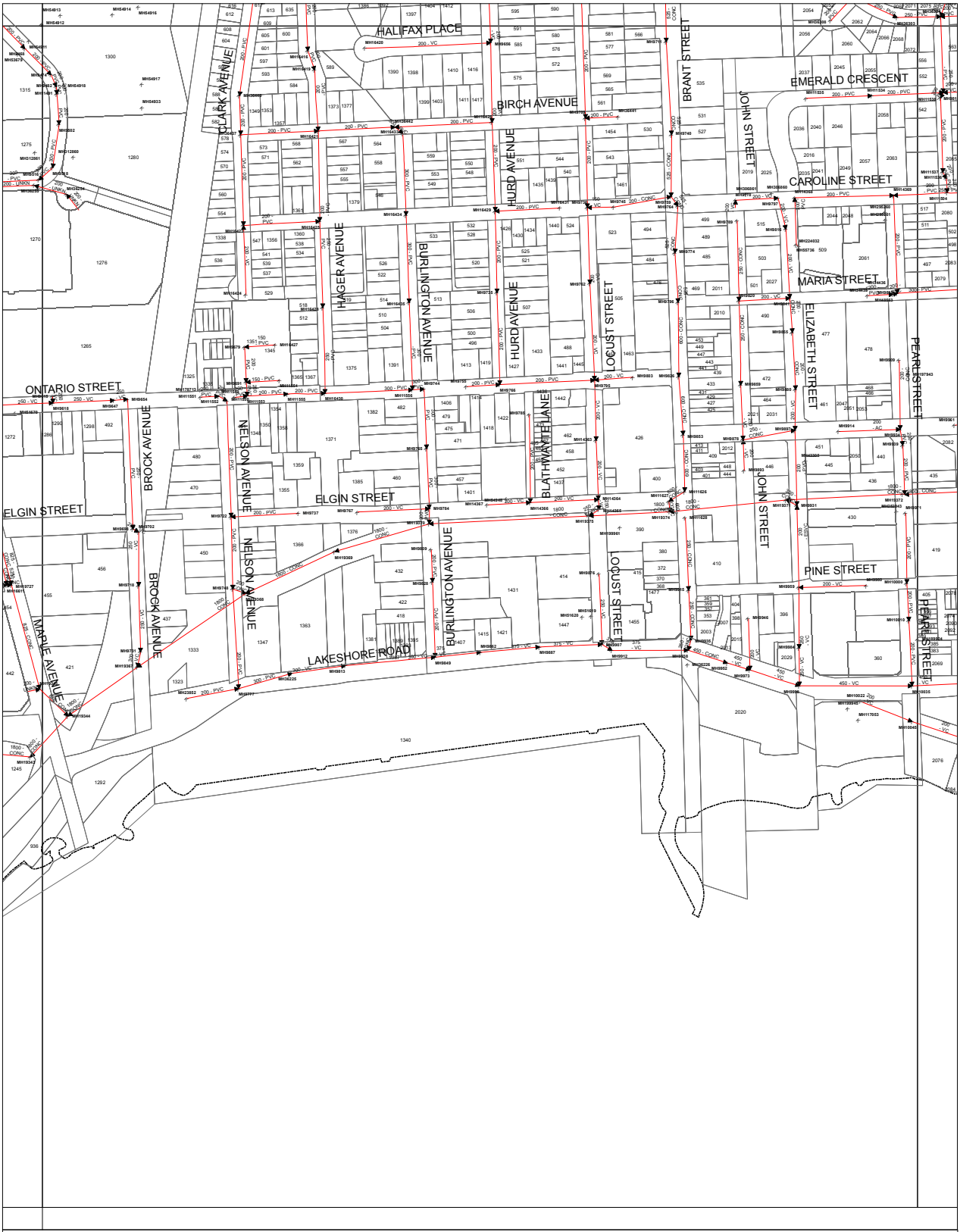
- E Wastewater Storage Tank
- G Wastewater Treatment Plant
- B Pumping Station
- Municipal Boundary

0 25 50 100 150 200 Meters

Map Index

Grid Number: 202D
Print Date: Oct 19, 2018

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Halton REGION

REGIONAL MUNICIPALITY OF HALTON
Department of Public Works

# SANITARY OPERATING MAPS

## TOWN OF BURLINGTON

**Sewer Types**

- Treated Discharge Sewer
- Untreated Discharge Sewer
- ForceMain
- Proposed ForceMain
- Gravity Sewer (In Service)
- Gravity Sewer (Out of Service)
- Proposed Gravity Sewer

**Maintenance Hole Types**

- K Maintenance Hole
- J Chamber

**Major System Facilities**

- E Wastewater Storage Tank
- G Wastewater Treatment Plant
- B Pumping Station
- Municipal Boundary

0 25 50 100 150 200 Meters

Map Index

Grid Number: 203C
Print Date: Oct 19, 2018

REGIONAL MUNICIPALITY OF HALTON IT"S EMPLOYEES, OFFICERS AND AGENTS ARE NOT RESPONSIBLE FOR ANY ERRORS, OMISSIONS OR INACCURACIES WHETHER DUE TO THEIR NEGLIGENCE OR OTHERWISE. ALL INFORMATION SHOULD BE VERIFIED.
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## Scott Passmore

**From:** Malik, Umar <Umar.Malik@burlington.ca>
**Sent:** Monday, July 27, 2020 1:20 PM
**To:** Steve Park; Simpson, Annette
**Cc:** Scott Passmore; Kim Harrison
**Subject:** RE: 441 Maple Avenue - Follow up email for Today's conf. call and CIty's catchment plans

exp. CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Steve,

Please see our responses in highlight in your email below.

Umar

---

**From:** Steve Park <Steve.Park@exp.com>
**Sent:** Thursday, July 16, 2020 2:32 PM
**To:** Malik, Umar <Umar.Malik@burlington.ca>; Simpson, Annette <Annette.Simpson@burlington.ca>
**Cc:** Scott Passmore <Scott.Passmore@exp.com>; Kim Harrison <kharrison@blretirement.com>
**Subject:** 441 Maple Avenue - Follow up email for Today's conf. call and CIty's catchment plans

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Annette, as per our discussion in the conf. call today, please see the attached PDFs of the City's original storm catchment plan and current catchment plan based on the Topo survey.

Once you review those catchment plans, please provide your responses in principle on the following questions that we've asked in the meeting.

1. In the event that we can not drain into Brock Avenue, would it be possible to control our entire site catchment in post-development condition to the catchment ID 101 (0.125ha) in pre-development condition as indicated in the current catchment plan? Yes, please control to pre-development conditions.

2. Considering the drainage restrictions, the site needs to be over-controlled. Would it be allowable to have a Rooftop storage for the SWM quantity control since we are far away from the MTO regulation? The City prefers site storage to be located on the ground. We can consider rooftop storage if it is necessary for technical reasons or as a BMP. Please refer to the City's new SWM guidelines available on our website for guidance in this regard.

I copied this email to Umar as well.

Thanks,

**Steve Park, P.Eng.**
EXP | Project Manager, Land Development
t : +1.905.695.3217, 3629 | m : +1.647.984.7642 | e : steve.park@exp.com
220 Commerce Valley Drive West, Suite 110
Markham, ON  L3T 0A8
CANADA

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*keep it green, read from the screen*

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**INTEROFFICE MEMORANDUM**
**Engineering Services**
**Development and Infrastructure Group**

Date: March 22, 2021

TO: Melissa Morgan
Planner, Development Review

CC: Kyle Plas,
Coordinator/Acting Manager, Development Review

Angelo Capone
Coordinator of Site Engineering, Engineering Services

FROM: Annette Simpson
Engineering Services, Development and Infrastructure Division

**Re:** **441 Maple Avenue**
**Better Life Retirement Residence**
SITE ENGINEERING COMMENTS (2nd Submission)
Application to amend Official Plan and Zoning By-law to permit an 11 Storey residential building with 153 units and three storey's of underground parking

**File:** **505-02/19, 520-03/19**

---

Site Engineering has completed the review of the November 2, 2020 (2nd) submission to amend the Official Plan and Zoning By-Law to permit the development of an 11 Story residential building with 140 units and three levels of underground parking (162 spaces) on a 0.28 hectare site, plus an additional 15 parking spaces on leased Hydro One lands directly adjacent east of the site. **Site Engineering is unable to provide a recommendation at this time as we require revisions to the submitted reports and drawings that may affect the site layout, to confirm that City requirements and standards can be met and all Site Engineering concerns have been addressed. A summary of the materials required is as follows:**

- **Provide a Record of Site Condition (alternatively a "Hold" zone could be placed over the development parcel until such time as the Record of Site**

**Condition is acknowledged by the Ministry of Environment Conservation and Parks. Please review comments under item 1.2 below for details.**

- **Provide an updated Hydrogeological Investigation report (to address comments in item 1.3 below)**
- **Provide an updated Stormwater Management Report (to address comments in Section 1.4 below)**
- **Provide updated civil engineering drawings (to address comments in Section 1.5 below)**
- **Provide an addendum letter to the noise feasibility study (to address comments in item 1.5 below)**
- **Provide updated architectural drawings (to address comments in item 1.6 below)**

Please be advised that Site Engineering's review of this application is considered preliminary at this time. Please note that Site Engineering may provide additional comments, raise additional concerns, or request additional information upon receiving the outstanding information, and upon further comprehensive review of its contents**.**

Please also understand that some of the comments below may be duplicated in the various sections as often the same comments apply to different reports and drawings prepared by different consultants. Please ensure comments are shared between consultants are addressed consistently across all reports and drawings, i.e. if there was a change to site layout on the engineering drawings please ensure it is also reflected on the architectural drawings, and if the building footprint changes please ensure that information is also shared with the noise and environmental consultants. Site Engineering would also request that the Applicant receive comments from all vested departments and agencies prior to making any changes to ensure a comprehensive revision to the design is achieved.

### 1.1 Right of Way

1. The deemed Right of Way (ROW) of Maple Avenue is 26m, it is a City of Burlington owned road, the actual width meets deemed, no widening required.

### 1.2 Environmental Site Condition

Please note that the Region of Halton also comments on Environmental, therefore please be advised that in case of discrepancy between comments, the most stringent shall apply.

1. The executed Environmental Site-Screening Questionnaire has been provided.
2. A Phase One Environmental Site Assessment prepared by Blue Frog Environmental

Consulting Inc. dated January 9, 2019, and an Environmental Update Letter prepared by Blue Frog Environmental Consulting Inc. dated December 12, 2018, **and a (revised) Phase One Environmental Site Assessment dated October 21, 2020** have been submitted for this application. Additionally, a previous Phase 1 Environmental Assessment prepared by Trow Consulting Engineering Ltd. Dated April 29, 1994 has been provided. Blue Frog Environmental Consulting Inc. extended reliance to the City of Burlington on the January 9, 2019 report in a letter dated February 11, 2019 signed by Gerry Parrott. The City was not excluded from relying on the October 21, 2020 report in the body of the report.

3. A Phase Two Environmental Site Assessment prepared by Blue Frog Environmental Consulting Inc. dated October 26, 2020, and a letter of reliance dated October 26, 2020 was also provided, we offer the following comments:
    *a.* The executive summary, Section 5.6, Table 2, and Table 4, indicates soil exceedances for Petroleum Hydrocarbon Fraction F2 in BH1 at 2.2m, additionally Borehole Lot BH1 indicates *"petroleum odour from 2.0m to 2.1m, wet at 2.0m."*
    b. Section 5.1 indicates there are combustible soil vapour up to 240ppmv and organic soil vapours up to 24ppmv.
    *c.* Section 6 *states "there is potential concern for human health from the inhalation of PHC impacted vapour from soil. As part of the future development to a residential condominium building, a three-level underground parking garage will be constructed. We understand the parking garage will be located coincident with the PHC impacts, as such it is expected that all of the PHC impacts will be removed and disposed off-site at a MECP approved waste receiving facility."*
    d. We acknowledge that the proposed development is not a change of use to a more sensitive use, and therefore an RSC is not mandatory under O. Reg.153/04, however, **considering there is contaminated soil on site, and Blue frog Environmental has concluded that the PHC impacted vapour from the soil has potential concern for human health, we require a Record of Site Condition be obtained for the subject property. We recommend a "Hold" zone be place on the property until such time as an RSC is acknowledged by the Ministry of Environment, Conservation & Parks, and a copy of the RSC is provided to the City.** We previously advised that an RSC could be required, depending on the test results in the Phase Two ESA. Additionally, please provide copies of all materials listed in the RSC document to the City for our records (when available).
    e. Furthermore, we will require a report from the Environmental QP, summarizing vapour testing during excavation for the underground parking structure, as well as post excavation, to confirm vapors are no longer present (after impacted material has been removed). Depending on the results of the vapour testing after construction further action may be required.

## 1.3 Hydrogeological Investigation

We have reviewed the Hydrogeological Investigation Report prepared by EXP. dated October 27, 2020 and have the following comments/questions:

1. Section 3.2 indicates groundwater monitoring wells were installed in 2017, and elevations were recorded in February 2018, it is our experience that seasonally high groundwater is typically in spring. Since the monitoring wells have been installed for about 3 years there should be more information available and we would ask that the spring information (seasonally high) be included and utilized for calculations and recommendations.
2. Section 4.1.2 indicates the radius of influence for dewatering is 25m, is there any risk of settlement to adjacent existing structures, underground parking, utilities, etc. from dewatering? Please provide discussion and any recommendations. Section 6.3 indicated it would be provided under separate cover, however we did not see anything in the circulation in this regard.
3. Section 6.4 indicates that the groundwater will be discharged to the municipal sewer system and it conforms to the Region of Halton Sewer Use by-law. It further states *"that based on the water quality test results, the water is suitable to discharge without a treatment system".* It is our understanding that the Region of Halton does not allow groundwater to be discharged to the sanitary sewer, however we would ask that you confirm with the Region of Halton. The stormwater management report indicated that the groundwater would be managed in the storm system for the site, and presumably discharged to the municipal storm sewer system. The City of Burlington is a two tiered municipal government, where the Region of Halton oversees sanitary and water and the City of Burlington oversees storm sewers. Please compare the chemical analysis of the groundwater to the City's storm sewer discharge bylaw (included at the end of this correspondence) and confirm it meets discharge criteria to the City's storm sewer without treatment. Please be advised that the City will not accept filtering groundwater to outlet to the municipal storm sewer on a permanent basis.
4. Section 8 excludes anyone but Better Life Retirement Residence Inc from relying on the report, please provide a letter of reliance extending reliance on the report to the City of Burlington.
5. Appendix D Maxam certificate of analysis does not look to include the City of Burlington Storm Sewer Discharge Criteria (included at end of this memo). Please provide an updated chemical analysis of groundwater compared to the City's criteria.

### 1.4 Stormwater Management

We have reviewed the Functional Servicing and Stormwater Management Report prepared by EXP. dated 2020-10-21, Stormwater Management Section (Region of Halton will review Sanitary and Water information) and have the following comments/questions:

1. Since our original comments in March 2019, the City has adopted new Stormwater Management Design Guidelines, including new IDF information, please reference and use the updated IDF information in the guidelines in the SWM report for the project: https://www.burlington.ca/uploads/92/Doc_637285861251414490.pdf
2. FIG-03 and FIG-04 do not look to incorporate external drainage areas – are there external drainage areas? There are overland flow arrows from both the north and south neighboring properties pointed towards the development site.
3. Please provide the ETV certification for the proposed Jellyfish unit to confirm it provides min. 80% TSS removal.
4. The calculated required storage is 71.8m3, the provided storage is 72m3, typically we see an allowance for a margin of error in the estimated calculated values, was it considered to provide a bit of a buffer for storage?
5. Please confirm the groundwater meets the municipal storm sewer discharge criteria (attached at the end of the comment document), please be advised that the City of Burlington does not accept filtered groundwater into the municipal storm system on a permanent basis. If the groundwater chemical analysis does not meet the municipal storm sewer discharge criteria please confirm the foundation will be waterproofed without foundation drainage collection, or an alternative resolution which does not involve filtering and outlet to the municipal storm sewer. Please note that it is our understanding that the Region will not accept groundwater into the sanitary system, however we would ask that you confirm with the Region.
6. If the groundwater meets municipal discharge criteria and is to be accommodated in the sites SWM, please discuss the emergency overflow for the pumping system in the report, i.e. advise where an emergency outlet would be located, it should overland to Maple Ave., we see on the drawing a “SWM tank maintenance access” is this also an emergency overflow? Please also advise of emergency controls for the pumping, i.e. is there a back up pump? Generator? Etc.

### 1.4 Servicing & Grading

We have reviewed the following EXP. Drawings and have the following comments/questions:

Site Servicing and Grading Plan, Drawing SG-01, revision A, dated 2020/10/21:

1. In the notes section, under “construction responsibilities”, there are several references to the City of Toronto and a reference to Wabush Avenue. Please remove references

to the City of Toronto and only reference City of Burlington and/or Halton Region, as well as ensure Maple Ave. is referenced (not Wabush Ave.)

2. In the notes section under "locates and liability", it states that the locations of all underground/aboveground utilities and structures are approximate, as advised at the 2018 pre-consultation this (daylighting) will have to be done before a site plan submission and the information included in the site plan set of drawings, we would however, strongly recommend that it be completed now. Please note that for future applications (on other sites) this is now a requirement for RZ/OPA applications and cannot be deferred to site plan.
3. In the notes section under "restoration", please also add S-114B to note 1, and also delete the reference to Palladium Way and replace with Maple Ave. under note 4. Additionally, a note will be needed for Municipal Consent permit and Road Occupancy permit requirements for work within the Municipal ROW
4. The notes were not reviewed in detail, but will be at the site plan stage, please ensure all notes reference City of Burlington, OPSD and Region of Halton standards, and Maple Ave.
5. Advisory: at the site plan stage, please ensure any required notes regarding working within close proximity of the TransCanada Pipeline and Hydro One Inc. are included, including contact numbers, etc.
6. The existing storm lines are to be disconnected at the main (as noted on the drawing), but the line itself also has to either be removed from the ROW or at minimum filled with grout, please clearly note this on the drawing, and the approach will need to be confirmed in the field with the roads inspector at the time of construction.
7. There is a note referencing S-119B for the existing storm sewer removal/disconnection, this should reference S-11**4**B, my apologies, this was my typo on my March 26, 2019 comments
8. Site Engineering defers to Transportation staff to determine acceptability of underground parking ramp grades
9. The SP1 drawing looks to show curbing along the south property line about mid property line easterly, but the SG-01 drawing does not. Is curbing proposed? will the easement agreement allow it?
10. The architectural drawings look to show a bit of an offset from the property line to the underground parking structure, please dimension it on the drawing. (the CMMP does show and dimension)
11. There is a split overland flow route for the site proposed, with approximately half the site overland flow to the rear (east) through the hydro lands. We acknowledge there is a new 5 year agreement with Her Majesty the Queen (Hydro One Network Inc.) for the parking area, but we don't see an easement for overland flow in our GIS mapping. We cannot approve overland flow from a redeveloped site through an adjacent parcel of non-owned land without confirmation of a formal easement. Please either provide confirmation from Hydro One Network Inc. that there is a formal agreement (not limited to 5 years) for overland flow, or direct all overland flow to Maple Ave.
12. Please either include or provide a drawing for the leased Hydro One lands showing the parking configuration for the proposed 15 spaces, will they remain exactly the same or will there be changes, if changes, we would need confirmation from Hydro One that they are agreeable to the changes. Please also show any existing or proposed curbing, fencing, etc.

13. It is our understanding that Transit Staff have advised a new transit shelter/pad is required fronting this building, please show it on the drawing.
14. Provide a clear delineated pedestrian connection (sidewalk) from the leased (Hydro One) parking lot lands to the entrance of the building.

Cross Sections, Drawing SEC-01, revision A, signed and dated 2020/10/21:

1. Section A-A shows a gravity connection for the stormwater storage tank in the underground parking structure, the outlet appears higher than the base of the tank, how will the tank drain if the outlet is higher? Typically we see some sort of pump system, not a gravity connection, with an emergency overflow to grade.
2. Section A-A, notes the 75mm orifice tube, but the section seems like it's a plate. Can the proposed 1m of 300mm storm be replaced with 1m of 75mm storm? The city does not allow orifice plates.
3. Is a storm back water valve proposed/required to ensure no backflow from the municipal storm sewer into the site's swm tank?
4. Section A-A shows the storm maintenance hole at the property line, please be advised that the contractor will need to ensure the maintenance hole is installed fully on private property, no encroachments into the municipal ROW will be allowed. We suggest that a bit of a buffer be proposed, rather than risk having to reinstall a maintenance hole after construction.
5. Sections C and D show the underground parking right to the property line, but the architectural drawings look to show a bit of an offset, please dimension the offset from the property line to the underground parking structure. The CMMP does provide a dimension, please also provide on this drawing.

Construction Management and Mobility Plan, Drawing CMMP-01, revision A, signed and dated 2020/10/21:

1. There is a note that states *"Any groundwater dewatering pumping rates are not to exceed approved 2.85 L/s rate to sanitary sewer approved by Region of Halton".* Has the Region confirmed they will allow temporary pumped groundwater outlet to the sanitary sewer? Our experience is that they do not allow groundwater to be pumped to the sanitary sewer, but maybe on a temporary basis they will allow as long as the flow is less that the sanitary flow expected from a completed development? Please provide written confirmation from Halton that they will allow. And if not, please revise the note
2. Please include a typical detail for shoring, there is a note that references drawing SEC-01 but that drawing does not show shoring, tiebacks, rakers, etc. Please provide a detail for each side to demonstrate that the structure is either built within property limits (north and south sides according to notes using raker system) or what the permanent encroachments could look like (west side and east side?). We appreciate that details specific to this building may not yet be available, however we trust your team of consultants has worked on similar buildings and can provide typical details showing the components of underground parking structure and shoring/tiebacks/anchor rods/etc. needed to construct it. At this stage we need to evaluate feasibility and impact to the public road allowance.

3. The proposed entrance through Hydro One lands is not supported by Transportation Staff, as this area is a public parking lot, on lands leased by the City from Hydro One. The construction entrance will need to be through Maple Ave., as confirmed by Transportation staff. Care will need to be taken as the entrance from Maple is within an easement and shared access with the neighboring south property, we ask for a detail on how the shared access will work during construction, i.e. construction fencing between properties, reconfiguration of entrance, etc.
4. There is a note that indicates a sidewalk closure on Maple Ave. for 4 months and a lane closure of Maple for 2 months, Site Engineering defers to Transportation staff to confirm if the closures are acceptable, and if so, to advise of any fees required for use of the municipal ROW.
5. Please include an estimated area in which all structures (including buried infrastructure/utilities) will need to have a precondition survey undertaken, and also include an estimate for locations and number of vibration monitoring stations for the duration of construction. additional details would be re3quired at the site plan stage.
6. The CMMP will need to be revised with more detail at the site plan stage including the following:
    i. Show all existing above/below grade services/utilities (i.e. actual locations and elevations as would typically be determined by daylighting)
    ii. Show proposed location of mud mat (revised location) and vehicle wash down area
    iii. Sanitary facilities will need to be shown
    iv. Details of sidewalk and lane closure traffic control measures will be required
    v. Advisory: an encroachment agreement will be needed for any permanent encroachments (i.e. anchor rods/tie backs, etc.) in the municipal right of way (if approved)
    vi. Advisory: additional chemical analysis of temporary pumped groundwater will be required at the Site Plan stage to determine it meets municipal discharge criteria to the storm sewer. Please note that permanent filtering of groundwater to discharge to the municipal storm sewer is not permitted.

### 1.5 Environmental Noise

We have reviewed the Environmental Noise Feasibility Study dated October 23, 2020 prepared by RWDI, and offer the following comments/questions:

1. Section 2.1.3 indicates that the ground level outdoor patio was not assessed because it is less than 4m deep, the City would consider the whole at-grade exterior area on the east side of the building as an OLA, not just the patio, as presumably residents will also use the landscape area for recreation. Please provide confirmation that the outdoor living area can be mitigated to comply with NPC-300. Please also note that although NPC-300 indicates that 60dBA would be acceptable with warning clauses, we do not automatically accept. If 55dBA cannot be achieved with mitigation, please provide table outlining barrier heights to achieve 55dBA, it has to be demonstrated

that it is not feasible either physically to construct or financially, to accept more than 55dBA for the OLA. The City has not generally accepted less than 58dBA for an OLA.

2. Please provide an addendum letter to address the at-grade OLA

**1.6 <u>Architectural Drawings</u>**

Please ensure that all revised drawings coordinate, some comments below may be duplicated as similar information appears on multiple drawings. Please also refer to the Servicing & Grading notes above, and incorporate any site layout changes into the architectural drawings.

1. There looks to be a curb shown along the south property line, from about midway easterly, does the easement agreement allow for this? It is not shown this way on the SG-01 drawing. Please ensure drawings coordinate.
2. The entrance curb needs to stop at the municipal sidewalk then restart to join the Maple Ave. curbing.
3. It is our understanding that Transit Staff have advised a new transit shelter/pad is required fronting this building, please show it on the drawing.
4. Show the leased lands (Hydro One) parking configuration for the 15 spaces and any other changes that may be proposed, i.e. curbing, landscaping, etc.
5. Provide a pedestrian connection (sidewalk) from the leased Hydro One parking lot lands to the entrance of the building.
6. Please revise architectural drawings/site plan layout to address the above comments.
7. Please also note (comments unchanged):
    a. At the site plan stage lighting will be looked at closely, for both vehicle laneways and pedestrian walkways, please ensure there is room for lighting, i.e. poles for laneways will need to maintain min. 1.2m setback from back of curb, the walkways and other public areas will also require lighting allowing for facial recognition (i.e. not bollard lighting). The Burlington Guidelines for Outdoor Lighting and the Burlington Accessibility Design Standards can be found on the City of Burlington website.

    b. Further to above, lighting trespass will be looked at closely, please consult with a lighting designer early on in the design process to ensure lighting trespass of maximum 2 lux can be adhered to, and zero trespass would be strongly encouraged.

    c. At the site plan stage snow storage areas will need to be identified, these areas cannot be located in required parking spaces, amenity areas or in laneways/fire routes. The City's strong preference is for snow storage to be located in landscaped (grass) areas adjacent to curbing to allow for pretreatment prior to release into the storm sewer system. Please note that stating "snow to be removed from site" will not be accepted.

**Please also note the following:**

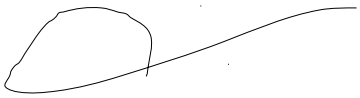
The Applicant/Developer is cautioned that notwithstanding the above a full detailed review of all documents, reports and drawings will be completed at the time of Site Plan Application(s).

Site Engineering's review of this application is considered preliminary at this time. Please note that Site Engineering may provide additional comments, raise additional concerns, or request additional information upon receiving the aforementioned information, and upon further comprehensive review of its contents.

If you have any questions, please do not hesitate to call or email. Please advise the Applicant that I am happy discuss the comments above if they have questions or require clarification on the site engineering comments, or to meet with them or their consultants prior to resubmission of updated materials, to ensure our comments have been addressed satisfactorily.

We would ask, as was provided with this submission, that a written summary/response matrix be provided with the next submission outlining how each of the comments in sections 1.2 to 1.7 have been addressed.

Yours truly,



***Annette Simpson, B.A., C.Tech.***

*Senior Engineering Technologist* Engineering Services
Development and Infrastructure Division
905-335-7600 x7634
annette.simpson@burlington.ca

The City of Burlington is in the process of updating our Storm Sewer Discharge By-law. The following is the proposed revision to the storm sewer discharge requirements:

**STORM SEWER REQUIREMENTS**

No person shall discharge directly or indirectly or deposit or cause or permit the discharge or deposit of sewage directly or indirectly into a storm sewer or municipal or private sewer connection to any storm sewer in circumstances where water or any chemical, agent or additive has been added to the discharge or deposit for the purposes of dilution to achieve compliance with this Section or the consequences of which is dilution, to achieve or result in compliance with this Section.

No person shall discharge or deposit or cause or permit the discharge or deposit of matter of any type into a storm sewer, watercourse, municipal or private sewer connection to any storm sewer which may or could:

A. Interfere with proper operation of a storm sewer.
B. Obstruct or restrict a storm sewer or the flow therein.
C. Damage a storm sewer.
D. Result in any hazard or other adverse impact to any person, animal, property or vegetation.
E. Contravene or result in the contravention of a certificate of approval or provisional certificate of approval issued under the *Ontario Water Resources Act* or the *Environmental Protection Act* (Ontario) with respect to the storm sewer, its discharge, or both the sewer and its discharge.
F. Have one or more of the following characteristics:
    (1) Visible film, sheen or discolouration.
    (2) Two or more separate layers.
G. Contain one or more of the following:
    (1) Acute hazardous waste chemicals.
    (2) Blowdown water.
    (3) Combustible liquids.
    (4) Floating debris.
    (5) Fuel.
    (6) Hauled sewage.
    (7) Hauled waste.
    (8) Hazardous industrial waste.
    (9) Hazardous waste chemicals.
    (10) Ignitable waste.
    (11) Pathological waste.

    (12) PCBs, except where approved by an Ontario Provincial Ministry as part of a legal instrument, such as a valid Environmental Compliance Approval, a valid Certificate of Approval or order, and that legal instrument has been complied with.
    (13) Pesticides, except for those used by the City of Toronto for the following purposes:
        (a) health and safety; or
        (b) protection of the natural environment; or
        (c) other uses in compliance with the Ontario Ministry of the Environment and Climate Change legislation.
    (14) Reactive waste.
    (15) Severely toxic waste.
    (16) Sewage.
    (17) Waste radioactive prescribed substances.
    (18) Waste disposal site leachate.
    (19) A substance from raw materials, intermediate or final product, used or produced in, through or from an industrial process.
    (20) A substance used in the operation or maintenance of an industrial site.
H. Contain E. coli colonies in excess of 200 per 100 mL.
I. Contain contaminants from raw materials, intermediate or final products or wastewater from an industrial operation.
J. Contain a concentration in excess of any one or more of the limits in Table 1 of this chapter entitled "Limits for Storm Sewer Discharge."

**Table 1 - Limits for Storm Sewer Discharge**

| Parameter | Limit | Unit | Parameter | Limit | Unit |
|---|---|---|---|---|---|
| Arsenic (total) | 0.02 | mg/L | Methylene chloride | 0.0052 | mg/L |
| Benzene | 0.002 | mg/L | Nickel (total) | 0.08 | mg/L |
| Biochemical Oxygen Demand | 15 | mg/L | Nonylphenol ethoxylates | 0.01 | mg/L |
| Bis (2-ethylhexyl) phthalate | 0.0088 | mg/L | Nonylphenols | 0.001 | mg/L |
| Cadmium (total) | 0.008 | mg/L | PCBs | 0.0004 | mg/L |
| Chloroform | 0.002 | mg/L | Pentachlorophenol | 0.002 | mg/L |
| Chromium (hexavalent) | 0.04 | mg/L | pH | 6.5 to 8.5 | |
| Chromium (total) | 0.08 | mg/L | Phenolics (4AAP) | 0.008 | mg/L |
| Copper (total) | 0.04 | mg/L | Phosphorus (total) | 0.4 | mg/L |
| Cyanide (total) | 0.02 | mg/L | Selenium (total) | 0.02 | mg/L |
| Dichlorobenzene, 1, 2 - | 0.0056 | mg/L | Silver (total) | 0.12 | mg/L |
| Dichlorobenzene, 1, 4 - | 0.0068 | mg/L | Suspended Solids (total) | 15 | mg/L |
| Dichlorobenzidine, 3,3'- | 0.0008 | mg/L | Temperature | < 30 | °C |
| Dichloroethylene, Cis-1,2- | 0.0056 | mg/L | Tetrachlorethane, 1, 1, 2, 2 - | 0.017 | mg/L |
| Dichloropropylene, Trans-1,3- | 0.0056 | mg/L | Tetrachloroethylene | 0.0044 | mg/L |
| Di-n-butyl phthalate | 0.015 | mg/L | Toluene | 0.002 | mg/L |
| Ethyl benzene | 0.002 | mg/L | Total PAHs | 0.002 | mg/L |
| Lead (total) | 0.12 | mg/L | Trichloroethylene | 0.0076 | mg/L |
| Manganese (total) | 0.05 | mg/L | Xylenes (total) | 0.0044 | mg/L |
| Mercury (total) | 0.0004 | mg/L | Zinc (total) | 0.04 | mg/L |

## Steve Park

**From:** Scott Passmore
**Sent:** Friday, June 3, 2022 1:35 PM
**To:** Steve Park; Jake Lee
**Subject:** FW: 441 Maple Ave, Burlington

Please include this confirmation email from Hydro One in the appendix in the updated FSR/SWM report.


**Scott Passmore, P.Eng.**
EXP | Vice President, Land Development, Central Canada E&E
t : +1.905.695.3217, 63697 | m : +1.905.512.7542 | e : scott.passmore@exp.com
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**From:** Joan.Zhao@HydroOne.com <Joan.Zhao@HydroOne.com>
**Sent:** Monday, April 12, 2021 5:37 PM
**To:** Scott Passmore <Scott.Passmore@exp.com>
**Cc:** kharrison@blretirement.com; Dennis.DERANGO@HydroOne.com
**Subject:** RE: 441 Maple Ave, Burlington


exp. CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.


Hi Scott,

Thanks for your call and email confirmation. No work will occur on Hydro lands.


Joan Zhao SR/WA
Sr. Real Estate Coordinator
Facilities & Real Estate
Hydro One Networks Inc.
C: (416) 573-7987|F: (905) 946-6242
P.O. Box 4300 | Markham ON | L3R 5Z5
Courier: 185 Clegg Road | Markham ON | L6G 1B7
joan.zhao@hydroone.com



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**From:** Scott Passmore <Scott.Passmore@exp.com>
**Sent:** Monday, April 12, 2021 5:13 PM
**To:** ZHAO Joan <Joan.Zhao@HydroOne.com>
**Cc:** Kim Harrison <kharrison@blretirement.com>
**Subject:** 441 Maple Ave, Burlington


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Hello Joan,

It was good speaking with you earlier today about the development application for the site located at 441 Maple Ave in Burlington. As discussed, the current engineering design for the site includes a drainage design such that all flows up to and including the 100-year storm event are captured and controlled with an underground SWM tank that outlets to the west towards Maple Avenue (not Hydro One lands). The proposed grading design also maintains the existing perimeter property line elevations as well.

I trust this meets your requirements. If you have any questions please feel free to contact me.

Regards,



**Scott Passmore, P.Eng.**
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