FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

IN SUPPORT OF A REZONING APPLICATION

PROPOSED 7 STOREY MEMORY CARE BUILDING

3255-3265 New St and 454-462 Cumberland Ave

City of Burlington

City File Number:

counterpoint ENGINEERING

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Prepared For:

Traditions Seniors Housing Ltd.

1	1st Submission	Sept. 11th, 2023
No.	**Revision**	**Date**

EXECUTIVE SUMMARY

Traditions Senior Housing Ltd. has retained Counterpoint Engineering Inc. to prepare this Functional Servicing and Stormwater Management Report in support of a rezoning application to permit the redevelopment of five existing single-family dwellings into a seven-storey retirement home.

The subject measures a total of **0.359** hectares and is located at the northwest corner of New Street and Cumberland Avenue. The proposed development consists of a seven story senior care home with 124 residential units and an underground parking structure.

The proposed servicing strategy for this site is summarized as follows:

Water Servicing:

The proposed development will be serviced through a proposed 200mm connection to the existing 300 mm diameter watermain on Cumberland Avenue. The combined fire flow and maximum day demand is **3,093 L/min**. The capacity of the existing municipal water system will be confirmed in the future with a hydrant test.

Sanitary Servicing:

A new 200mm diameter sanitary connection is proposed to connect to the existing 200mm diameter municipal sewer along Cumberland Avenue. A single sanitary connection is proposed for the subject site. The sanitary design flow for the subject property will increase from **0.72 L/s** under existing conditions to **3.27 L/s** under proposed conditions. Per the preliminary assessment completed by Counterpoint, the existing 200mm sanitary sewer on Cumberland Avenue has sufficient capacity to accommodate the projected sanitary flows for the proposed development.

Stormwater Servicing:

A new 250mm diameter storm connection is proposed to connect to the existing 825mm diameter municipal sewer on New Street. The proposed release rate for Area 201 for all storm events up to and including the 100-year storm event will be controlled to the 5-year pre-development peak run-off rate of **18 L/s** and will require **76m^3** of storage within the proposed SWM tank in the underground parking structure of the building.

During the 100-year storm event, run-off from Area 202 will drain uncontrolled at a peak run-off rate of **7 L/s**. This run-off rate is lower than the existing peak run-off rate of **42 L/s** generated by Area 102 during the 100-year storm event.

An 'Enhanced' level of quality control (80% TSS Removal) is required for the development and is proposed to be achieved through initial TSS removal from landscape and roof areas and an OGS unit, resulting in an overall TSS removal rate of 81.6%. The site water balance target of 5mm retention 17.9m^3 shall be met through the use of landscape areas and a water reuse cistern inside the building.

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1.0 INTRODUCTION

Traditions Seniors Housing Ltd. has retained Counterpoint Engineering Inc. to prepare this Functional Servicing and Stormwater Management Report (FSSR) in support of a rezoning application to permit the redevelopment of five existing single-family dwellings into a seven-storey retirement home.

The purpose of this report is to address conceptually the provision of site grading, storm and sanitary sewers, stormwater management, and water distribution for the proposed residential-use development. The report will provide details on stormwater management in conformance with the City of Burlington's Storm Drainage and Stormwater Management Policies and Design Guidelines, as well as the Conservation Halton's Technical Guidelines for Stormwater Management Submissions.

1.1 Background

The existing properties are municipally known as 3255-3265 New Street and 454-462 Cumberland Avenue, in the City of Burlington, Region of Halton. The properties are currently legally described as, Lot 1 and Lot 13, Registered Plan 291, City of Burlington.

The subject site is a total of 0.359 ha and is located on the northwest corner of New Street and Cumberland Avenue. The property has approximately 56 m of frontage on New Street and, approximately 72 m of frontage on Cumberland Avenue.

The property is currently occupied by single and multi-story residential buildings with surface parking covering a small percentage of the property. Currently, vehicular access is provided via private driveways along New Street and Cumberland Avenue. The total driveway area encompasses 0.0354 ha of the 0.359 ha site (approximately 9.9%).

Traditions Seniors Housing Ltd. intends to redevelop the property into a seven-storey retirement home. A Rezoning permit is required for this proposed development plan.

A summary of the proposed development is as follows:

Table 1.1 – Summary of Site Statistics

Overall Property Development	
Building Area	0.1337 ha
Impervious Surface	0.0844 ha
Landscaped Area	0.1407 ha
Total Property	0.3589 ha
a) Development Block	
Total GFA	11, 019 m^2
b) Proposed Residential Component	
Total Units	124
Storeys	7
c) Proposed Parking Summary	
Underground Parking	42 spaces
Underground Accessible Parking	2 spaces

Refer to **Figure 1 – Site Location Plan** for the site in the context of its surroundings. Refer to the architectural Site Plan included in **Appendix A** for the layout of the proposed development.

1.2 Study Parameters

This servicing assessment is based on:

- Topographic Survey, prepared by Cunningham McConnell Limited
- Architectural Plans, prepared by Mcknight Charron Limited
- As-constructed Plan & Profile Plans, provided by Halton Region
- Fire Underwriters Survey (FUS), 2020
- City of Burlington Engineering Department Design Criteria
- City of Burlington Stormwater Management Guidelines, May 2020

- Halton Region Water and Wastewater Linear Design Manual, October 2019 (Version 5)
- Conservation Halton Guidelines for Stormwater Management Engineering Submissions, November 2021

2.0 WATER SUPPLY

2.1 Existing Water Supply

The existing water services surrounding the site include two watermains on New Street and one 300mm watermain on Cumberland Avenue. The existing watermains on New Street are sized; 750 mm diameter on the west side of the street and 300 mm diameter on the east side. The existing 300mm diameter on Cumberland crosses New Street and is connected to the existing 300mm diameter watermain along the east side of New Street.

Based on drawings provided by Halton Region, it appears that two of the existing houses along Cumberland are serviced by the 300mm watermain along Cumberland. The remaining three existing houses are serviced by the same 300mm watermain but from the east side of New Street. It is also important to note that the watermain servicing the current two properties along Cumberland Avenue crosses New Street and is the same watermain that services the 3 existing properties on New Street. The closest and most accessible fire hydrant to the site is along the west side of New Street. This hydrant is located approximately 24m southwest of the site's boundary.

Refer to **Figure 2 – Schematic Water Servicing Plan** for the existing watermain network.

2.2 Proposed Water Supply

The proposed development will be serviced through a 200mm connection to the existing 300mm watermain on Cumberland Avenue. This proposed connection will split into a 200mm fire line and a 100mm domestic line, which will terminate at the streetline in accordance with Halton Region standards. Per Halton Region standards, a water meter chamber and backflow preventer will be installed within the property near the property line.

A Siamese connection is proposed outside the building above the south mechanical room (the same mechanical room where the domestic and fire services are proposed to enter the building).

Refer to **Figure 3 – Schematic Water Servicing Plan** for the proposed watermain layout.

During the detailed design stage, the mechanical engineer will evaluate the need for booster pumps to provide adequate pressure to the upper floors of the proposed retirement home. The mechanical engineer will also be required to ensure that the mechanical room has enough area to accommodate the water meters and backflow preventers as required by the Region of Halton.

The City of Burlington's Engineering Design Criteria states that governing flows shall be the greater of a) maximum day demand plus fire flow, or b) maximum hour demand. An average design flow of 275 L/cap/day and peaking factors of 4.0 and 2.25, were used to calculate the residential maximum hour and maximum day demand as per Halton Region's Water and Wastewater Linear Design Manual. The residential daily demands are as follows:

- Maximum Day Demand = **93 L/min**
- Maximum Hour Demand = **165 L/min**

The Fire Underwriter's Survey (FUS) guidelines were used to estimate the required fire flow for the proposed building located within the subject site. The governing fire flow was found to be 3,000 L/min, resulting in a maximum day demand plus fire flow of 3,093 L/min. Therefore, the governing flow is 3,093 L/min.

Halton Region has indicated that the anticipated water capacity requirements will be acceptable. However, a formal pre-consultation will still be required to confirm. Hydrant flow testing should be completed to ensure a minimum residual pressure of 20psi is achievable under fire flow conditions (assumed 9,000 L/min, to be confirmed).

Refer to **Appendix B** for the supporting calculations of the proposed water demand and fireflow calculations.

3.0 SANITARY SERVICING

3.1 Existing Sanitary Servicing

Per the record drawings provided by Halton Region, existing sanitary sewers are situated in the vicinity of the subject site. The existing sanitary sewers on New Street are sized; 1800 mm diameter (sanitary trunk sewer) on the west side of the street and 200 mm diameter on the east side. The existing 200mm diameter on Cumberland Avenue begins at the north limit of the site boundary and connects to the existing 1800mm sanitary sewer trunk along New Street. A 250mm sanitary sewer is situated on the east side of Cumberland Avenue and it connects to the 1800mm sanitary sewer trunk. Three of the existing dwellings along Cumberland Avenue are serviced by the 200mm sanitary sewer along Cumberland Avenue. The remaining two existing houses are serviced by the 200mm sanitary sewer from the east side of New Street. There are no existing sanitary sewer connections from the subject property to the existing 250mm sanitary sewer on the north side of Cumberland Avenue.

Refer to **Figure 3 – Schematic Sanitary Servicing Plan** for the existing sanitary network.

As per Halton Region's standards for sanitary demand, the existing residential development produces a sanitary flow of 275L/person/day, resulting in an existing sanitary flow of **0.72 L/s**. Refer to **Appendix C** for pre-development sanitary calculations. All internal sanitary service connections within the existing site are to be removed.

3.2 Proposed Sanitary Servicing

The proposed development includes a common underground which occupies most of the site area. Therefore, a single sanitary service connected to the existing system will provide sanitary servicing for the entirety of the proposed development. Ultimately, all sanitary flows from the proposed development will be discharged to the 200mm Cumberland Avenue sanitary sewer.

The sanitary connection is proposed at the north side of the development. The new 200 mm diameter sanitary connection is proposed to connect to existing MH13A which is the beginning of an existing 200mm Cumberland Avenue sanitary sewer. Refer to **Figure 3 – Schematic Sanitary Servicing Plan** for the layout of the proposed sanitary service connection.

As per Halton Region's equivalent population density, the equivalent proposed population of the proposed development is 123 persons. However, the proposed site will have 124 units of which 20 will be double bedroom. Counterpoint has taken a more conservative approach and assigned a density factor of 1.5 people per single bedroom unit and 3 people per double bedroom unit. Using Counterpoint's conservative approach, the equivalent population of the proposed development will be **216 persons.** As per Halton Region's design criteria, the average daily flow is 275 L/c/day. With a peaking factor of 4.00 and an infiltration rate of 0.286 L/s/Ha, the resultant sanitary design flow is **3.27 L/s**. Refer to **Appendix C** for sanitary demand calculations.

A preliminary capacity assessment of the existing 200mm Cumberland Avenue sanitary sewer to the 1800mm New Street trunk has been undertaken. Under existing conditions, the three dwellings on Cumberland and the City of Burlington fire station contribute sanitary flows to the Cumberland Avenue sanitary sewer (no connection to the 250mm Cumberland Avenue is proposed). Under proposed conditions, the proposed development and the fire station will contribute sanitary flows to the 200mm Cumberland Avenue sanitary sewer. The preliminary assessment indicated the 200mm Cumberland Avenue sanitary sewer has sufficient capacity to accommodate the proposed development. Refer to **Figure 3A – Pre-Development Sanitary Drainage Plan** and **Figure 3B – Post-Development Sanitary Drainage Plan** included in **Appendix A** and the sanitary sewer design sheet included in **Appendix C**.

4.0 STORMWATER SERVICING

4.1 Existing Stormwater Drainage

Per the record drawings provided by Halton Region, there is an existing 300mm storm sewer on Cumberland Avenue. This existing 300mm storm sewer drains southwards into the existing 825mm storm sewer on New Street.

The existing site is comprised of two drainage areas that convey runoff to two different outlets. The majority of the site drains uncontrolled onto the adjacent property located west of the site. The remaining area, which contains most of the existing dwellings and driveways, drains easterly and uncontrolled onto New Street and Cumberland Avenue. This drainage likely enters the municipal storm sewer system through catchbasins within the road allowances. Refer to **Figure 4 – Pre-Development Storm Drainage Area Plan** for existing drainage patterns, areas, and runoff coefficients.

Table 4.1 summarizes the pre-development drainage conditions based on runoff coefficients and the IDF curves per City of Burlington stormwater management design guidelines. Refer to **Appendix D** for existing release rate calculations.

Table 4.1 – Pre-Development Drainage Areas

ID	Area (ha)	Runoff Coefficient	5-Yr Peak Flow (L/s)	100-Yr Peak Flow (L/s)	Description
Area 101	0.129	0.50	18	37	Drains uncontrolled onto adjacent road allowances
Area 102	0.230	0.32	21	42	Drains uncontrolled onto the adjacent Centennial Bikeway
TOTAL	**0.359**	**0.596**	**42**	**85**	

4.2 Allowable Release Rate

City of Burlington stormwater management design guidelines require flood control to development sites to be accordance with the specified level of control outlined within a governing Subwatershed Study (SWS), Master Drainage Plan (MDP), or Master Environmental

Servicing Plan (MESP) that encompasses the subject site. In cases where a SWS, MDP, or MESP does not exist, the following flood control is required as a minimum:

- Where a site discharges to a watercourse system: post-development to pre-development peak flow control for the 2 through 100-year return periods.
- Where a site discharges to a storm sewer: 100-year return period post-development to the allotted capacity of storm sewer.
- Where the allotted capacity of storm sewer is unknown: 100-year return period post development to 5-year return period pre-development peak flow control. Per **Section 4.1** of this report, the subject site partially discharges to a municipal storm sewer system
- Regional Storm Controls (i.e. Hurricane Hazel) may also be required at the discretion of the City of Burlington and its partners (i.e. Conservation Halton)

It is not unknown whether as to whether SWS or MESP exists for the area encompassing the subject site. The allotted capacity of the receiving storm sewer is also not known and as such the 100-year return period post development to the 5-year return period pre-development peak flow control to the municipal storm sewer (Area 102) shall be considered as the required flood control and the allowable release rate.

The allowable release rate is 18 L/s (5-year peak flow for Areas 101/ municipal storm sewer). Refer to **Appendix D** for the allowable release rate calculation.

4.3 Proposed Storm Servicing

The proposed development will be serviced through a new 375mm storm sewer connection to the existing 825mm storm sewer on New Street. Stormwater runoff will be captured by area drains and directed to a SWM tank located within the underground parking structure. Due to the adjacent property line grades, the high water level of the SWM tank will need to be relatively low and thus requiring the bottom of the SWM tank to be much lower than invert elevation of the storm sewer service to New Steet. As such stormwater is proposed to be discharged from

the SWM tank to the storm sewer system using a pump. Discharged stormwater will be controlled to a maximum flow rate of 18L/s.

4.4 Proposed Quantity Controls

The subject site is divided into two drainage areas; the proposed development area (Area 201) that will be provided with stormwater management and a small grass area (Area 202) that will drain uncontrolled onto the adjacent Centennial Bikeway.

Area 201 will be released to the same outlet as **Area 101**, which is to the existing storm sewers on New Street and Cumberland Avenue. Therefore, the proposed release rate for Area 201 for all storms up to and including the 100-year storm event will be controlled to the 5-year pre-development peak run-off rate for Area 101.

Area 202 will drain to the same outlets as Area 102 – to Centennial Bikeway to the west and to New Street at the south corner of the subject site. Stormwater from Area 201 will be discharged by a pump at a controlled rate of 21 L/s to the Cumberland Avenue storm sewer. Area 202 will consist of grassed surfaces and as such the 100-year release rate will be 7L/s. Therefore combined 100-year release rate of Areas 201 and 202 under post development conditions will be 28 L/s, which is less than the allowable release rate of 18 L/s as determined in **Section 4.2**. Approximately **76m^3** of SWM storage will be required to attenuate the peak flows within Area 201.

Table 4.2 provides a preliminary allocation of the allowable release rate and associated storage requirements for the site.

Table 4.2– Peak Flow and Storage Summary –100-Year Storm Event

Area ID	Area (ha)	Runoff Coefficient	Storage Available (m^3)	Storage Required (m^3)	100- Year Release Rate (L/s)	Description
201	0.31	0.81	76.5	76	18	Pumped
202	0.05	0.25	N/A	N/A	7	Uncontrolled

NOTES: On-site storage will be provided via a tank located on the P1 level.

Refer to **Appendix D** proposed release rate and storage calculations.

4.5 Proposed Quality Controls and Water Balance

Per the City of Burlington stormwater management guidelines, Level 1 Protection (80% TSS removal) is required for the proposed development. The subject development will include landscape areas and a relatively large building canopy that will produce relatively clean runoff (i.e. equivalent to 100% TSS removal) and driveways, walkways and other impervious surfaces that will produce TSS laden stormwater runoff. Based on the architectural site statistics included in **Appendix A**, the un-mitigated TSS removal rate is only 68.6%. An STC-300 OGS unit is proposed downstream of the SWM tank to provide TSS removal (at a 50% TSS removal credit in accordance with City accreditation of non-ETV certified devices) for the remaining TSS (31.8%) and as such the subject site will achieve the 84.3% TSS removal.

City of Burlington stormwater management guidelines recommend that the first 5mm of rainfall which land lands on the site be retained and infiltrated on site. For a 0.359 ha site, the 5mm rainfall depth equates to 17.9 m^3. The required retention volume will be achieved using landscape areas and a water re-use cistern. Landscape areas will provide 5.8m^3 of water balance storage. The remaining 15.0m^3 will be stored within a water re-use cistern within the proposed building. Calculations to demonstrate onsite water demand and utilization within 48 hours in accordance with the City of Burlington and Conservation Halton policies will be provided at the detailed design stage/SPA application.

Refer to water quality and water balance volume calculations included in **Appendix D.**

5.0 SITE GRADING

An emergency overland flow route will be provided for rainfall events in excess of the 100-year storm. This route will direct major system flows to the southwest corner of the subject site and Centennial Bikeway and to the south corner at New Street. The maximum stormwater ponding elevation is 87.65 and in the case of pump failure, the SWM tank will overflow through Area

Drain 08 and onto New Street. The grading plan will ensure that adequate cover is maintained over underground servicing, site grading is self-contained with no adverse impacts on adjacent properties and meets the requirements for pedestrian and vehicular access and the Ontario Building Code. It should be noted that stormwater runoff from the driveway area leading to the trench drain will be pumped to the SWM tank within the building.

Refer to **Drawing C1- Grading Plan** and **Drawing C2- Servicing Plan** included in **Appendix E** for the proposed grading and servicing plans.

6.0 EROSION AND SEDIMENT CONTROL

Construction activity, especially operations involving the handling of earthen material, dramatically increases the availability of particulate matter for erosion and transport by surface drainage. In order to mitigate the adverse environmental impacts caused by the release of silt-laden stormwater runoff into receiving watercourses, measures for erosion and sediment control (ESC) are required for construction sites.

The impact of construction on the environment is recognized by the Greater Golden Horseshoe Area Conservation Authorities. In December 2006 they released their document titled “Erosion & Sediment Control Guidelines for Urban Construction”. This document guides the preparation of effective erosion and sediment control plans.

Control measures must be selected that are appropriate for the erosion potential of the site and they must be implemented and modified on a staged basis to reflect the site activities. Furthermore, their effectiveness decreases with sediment loading and therefore inspection and maintenance are required.

6.1 Control Measures

The following is a description of the sediment controls to be implemented on the subject site:

- Silt fences are to be installed adjacent to all property limits subject to drainage from the development area prior to topsoil stripping and in other locations, such as at the bases of topsoil stockpiles.
- A mud mat is to be installed at the construction entrance prior to commencing garage excavation to minimize the tracking of mud onto municipal roads.
- Sediment traps are to be installed at all onsite and adjacent municipal roadway catchbasins; and at area drain locations to prevent silt-laden runoff from entering the municipal storm sewer system or Beaver Creek.
- Temporary storm sewer bulkheads are proposed to be installed in the storm sewer manholes at key locations to provide additional sediment control of storm runoff prior to being conveyed to the infiltration trench and SWM facilities. The temporary bulkhead will be installed to the springline elevation of the storm sewer and will remain in place until all surfaces are stabilized. All accumulated sediment is to be removed from the manhole/catchbasin prior to removing the bulkhead.
- All landscaped areas are to be stabilized as quickly as possible with hydroseed to prevent erosion. If the landscaping works are undertaken outside the growing season, an erosion blanket will be required to be installed over the surface.

6.2 ESC Inspection & Maintenance

To ensure that the erosion and sediment control measures operate effectively, they are to be regularly monitored and they will require periodic cleaning (e.g., removal of accumulated silt), maintenance and/or re-construction. Inspections of all of the ESC measures on the construction site should be undertaken with the following frequency:

- On a weekly basis
- After every rainfall event
- After significant snow melt events
- Prior to forecasted rainfall events

If damaged control measures are found, they should be repaired and/or replaced within 48 hours. Site inspection staff and construction managers should refer to the Erosion and

Sediment Control Inspection Guide (2008) prepared by the Greater Golden Horseshoe Area Conservation Authorities. This document provides information related to inspection reporting, problem response and proper installation techniques. Records are to be kept for each inspection and maintenance operation during construction.

7.0 CONCLUSIONS

Based on the assessment provided above, the existing municipal water and storm services are adequate to service the proposed development without improvements to the downstream municipal sanitary and storm system.

The proposed design meets the stormwater management objectives required by the City of Burlington, Halton Region and Conservation Halton criteria for SWM quantity and quality control; and water balance.

We trust that the information provided herein is sufficient for your review and approval of the servicing strategy implemented for the site.

Sincerely,

Counterpoint Engineering Inc.

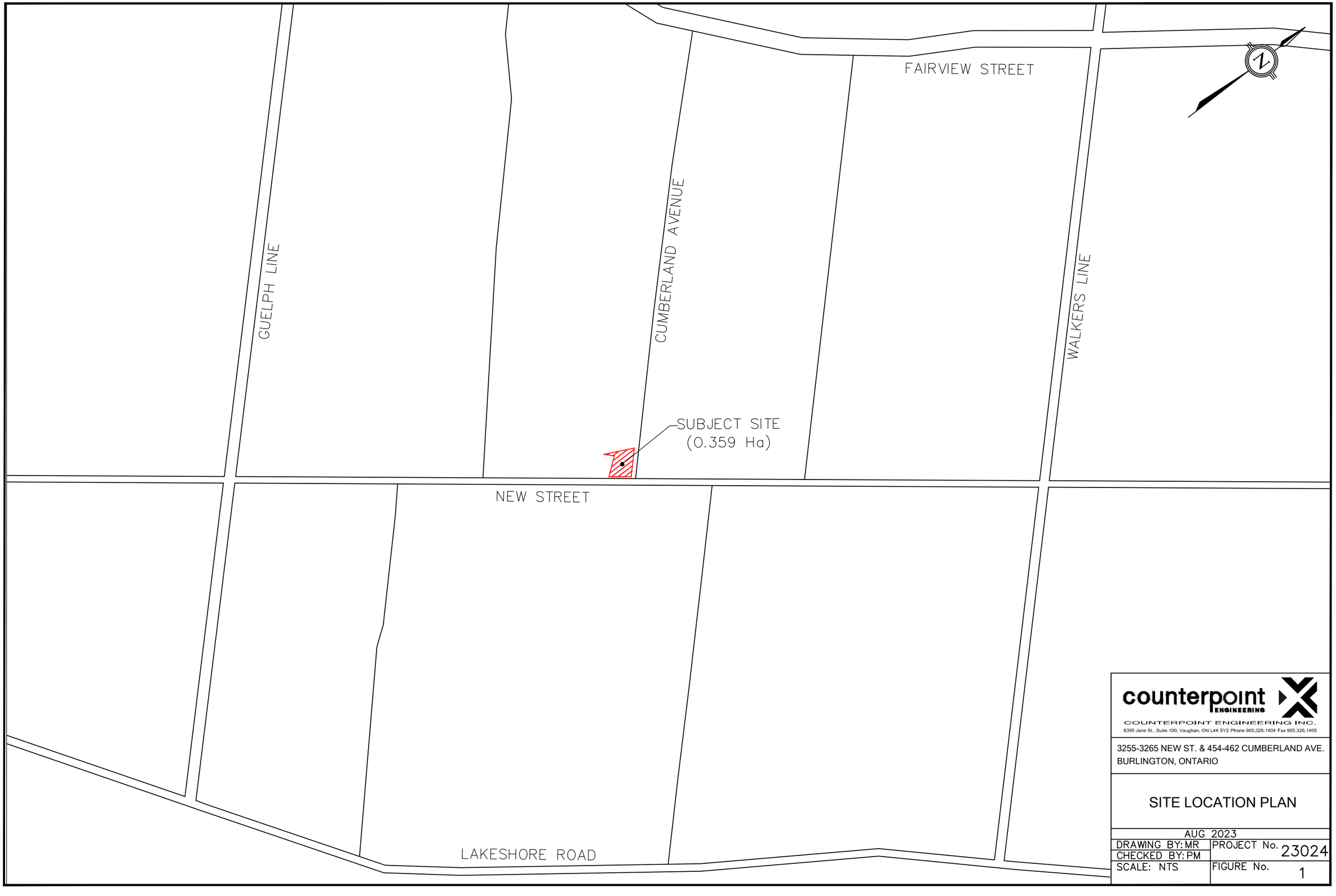


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APPENDIX A

FIGURES & ARCHITECTURAL SITE PLAN



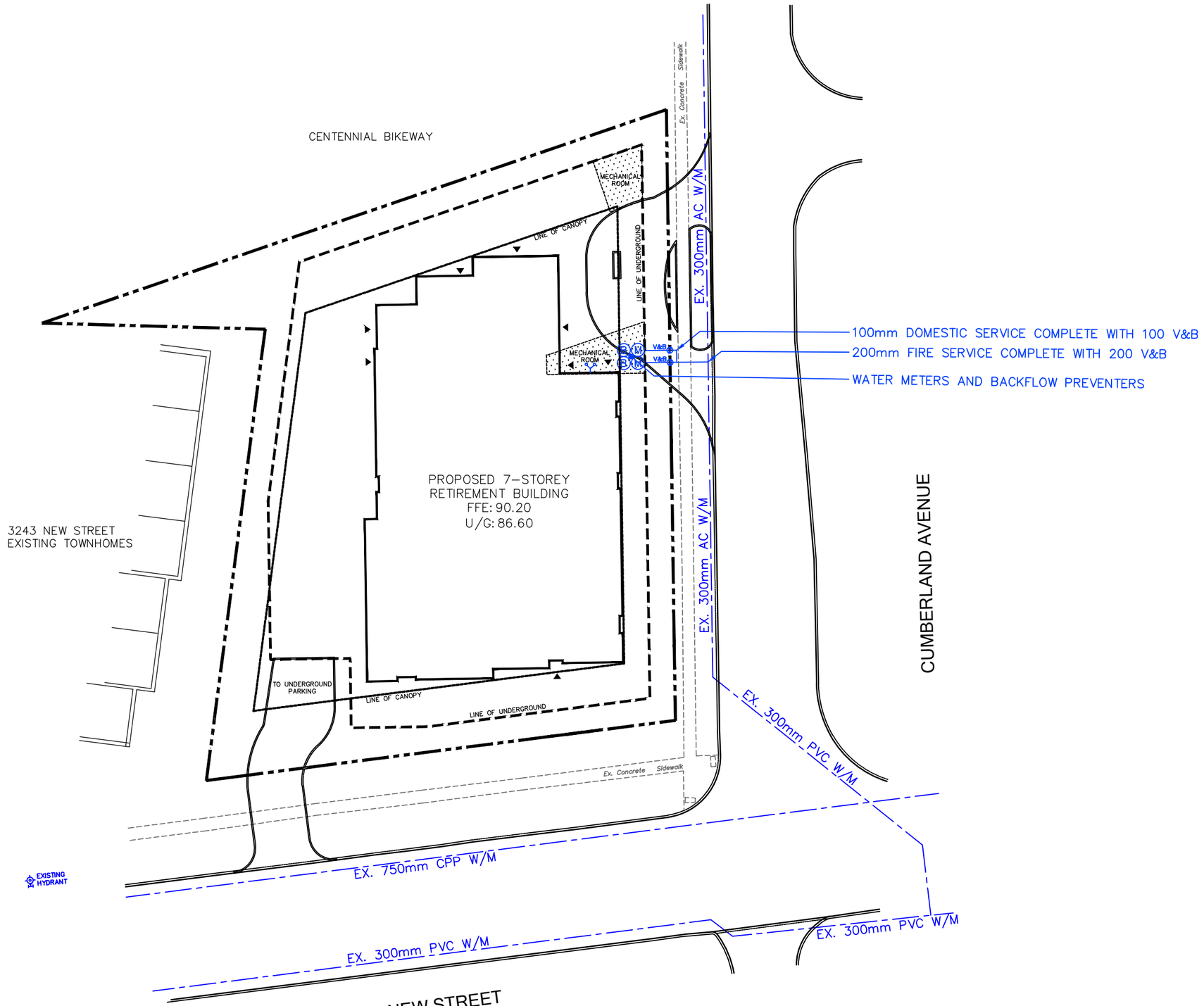
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3255-3265 NEW ST. & 454-462 CUMBERLAND AVE.
BURLINGTON, ONTARIO

SITE LOCATION PLAN

AUG 2023	
DRAWING BY: MR	PROJECT No. 23024
CHECKED BY: PM	
SCALE: NTS	FIGURE No. 1



LEGEND

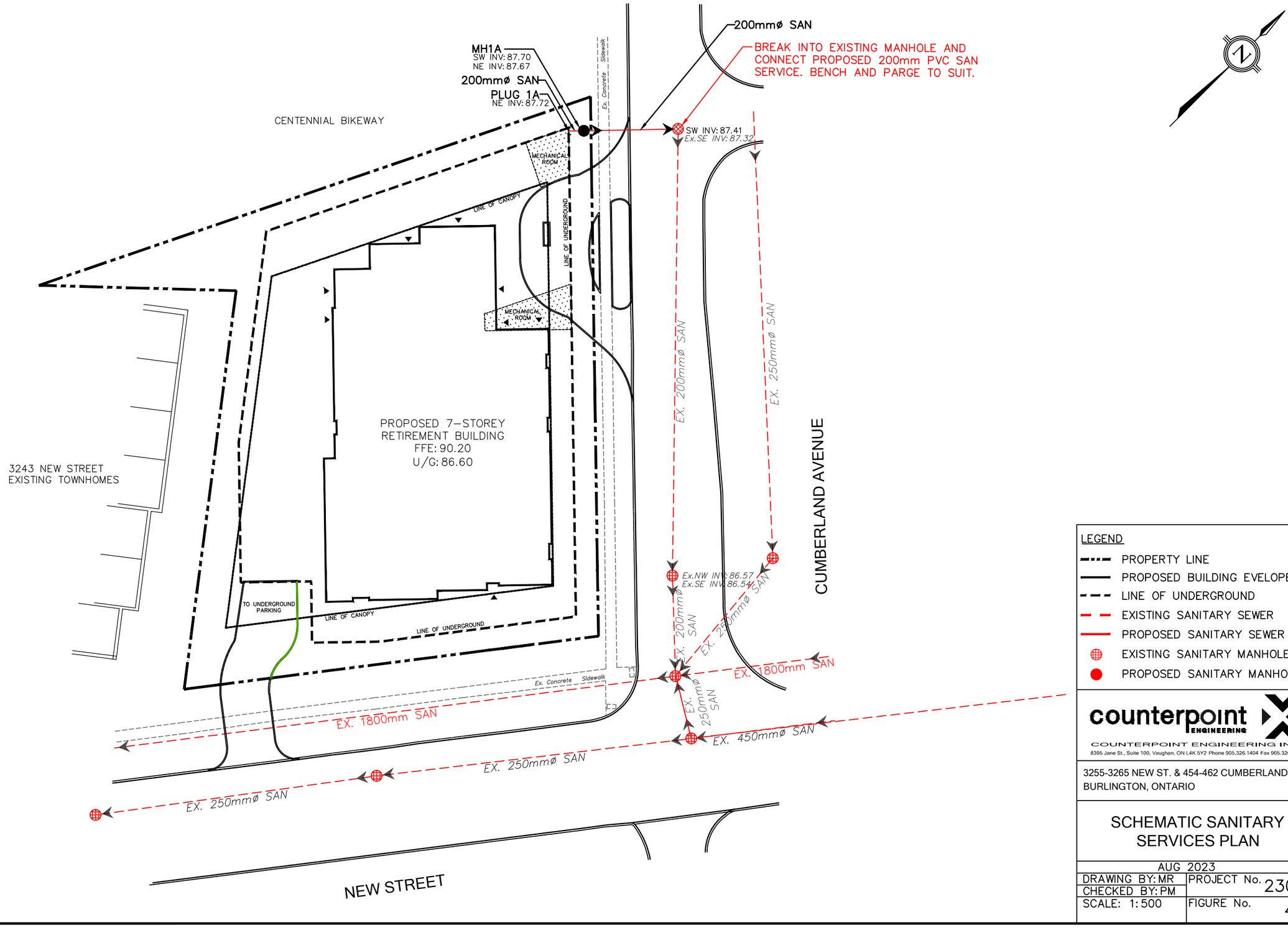
- PROPERTY LINE
- PROPOSED BUILDING EVELOPE
- LINE OF UNDERGROUND
- EXISTING WATER SUPPLY
- PROPOSED WATER SUPPLY
- (B) PROPOSED BACKFLOW PREVENTER
- (M) PROPOSED WATER METER
- PROPOSED VALVE AND BOX
- SIAMESE CONNECTION

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3255-3265 NEW ST. & 454-462 CUMBERLAND AVE.
BURLINGTON, ONTARIO

SCHEMATIC WATER SERVICING PLAN

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CHECKED BY: PM	
SCALE: 1:500	FIGURE No. 3



LEGEND

- PROPERTY LINE
- PROPOSED BUILDING EVELOPE
- LINE OF UNDERGROUND
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- EXISTING SANITARY MANHOLE
- PROPOSED SANITARY MANHOLE

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SCHEMATIC SANITARY SERVICES PLAN

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SCALE: 1:500	FIGURE No. 4



LEGEND

101
A=0.13
R=0.50
CATCHMENT AREA (Ha)
RUNOFF COEFFICIENT

CATCHMENT PERIMETER

OVERLAND FLOW ROUTE

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PRE-DEVELOPMENT STORM DRAINAGE AREA PLAN

AUG 2023

DRAWING BY: MR	PROJECT No. 23024
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SCALE: 1:500	FIGURE No. 8

CENTENNIAL BIKEWAY

Ex. Concrete Sidewalk

200mmø PVC. SAN

SITE
Area = 0.431
D = 285
P = 123

PROPOSED 7-STOREY
RETIREMENT BUILDING
FFE: 90.20
U/G: 86.60

101A
A= 0.500
D = 40
P = 20

1 Storey Brick
Fire Station No.6

3243 NEW STREET
EXISTING TOWNHOMES

TO UNDERGROUND
PARKING

CUMBERLAND AVENUE

EX. 200mmø SAN

EX. 200mmø SAN

EX. 1800mm SAN

Ex. Concrete Sidewalk

EX. 1800mm SAN

EX. 250mmø SAN

EX. 450mmø SAN

EX. 250mmø SAN

EX. 250mmø SAN

NEW STREET

LEGEND

100	AREA ID
A = 1.00	AREA (Ha)
D = 3.5	POPULATION DENSITY (ppl/Ha)
P = 75	POPULATION
	EXISTING DRAINAGE BOUNDARY
	PROPERTY LINE
	PROPOSED BUILDING ENVELOPE
	EXISTING SANITARY SEWER
	EXISTING SANITARY MANHOLE

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3255-3265 NEW ST. & 454-462 CUMBERLAND AVE.
BURLINGTON, ONTARIO

POST-DEVELOPMENT SANITARY DRAINAGE PLAN

AUG 2023

DRAWING BY: MR	PROJECT No. 23024
CHECKED BY: PM	
SCALE: 1:500	FIGURE No. 3B



LEGEND

AREA 1 / A=0.13 / R=0.58 — CATCHMENT AREA (Ha) / RUNOFF COEFFICIENT

CATCHMENT PERIMETER

OVERLAND FLOW ROUTE

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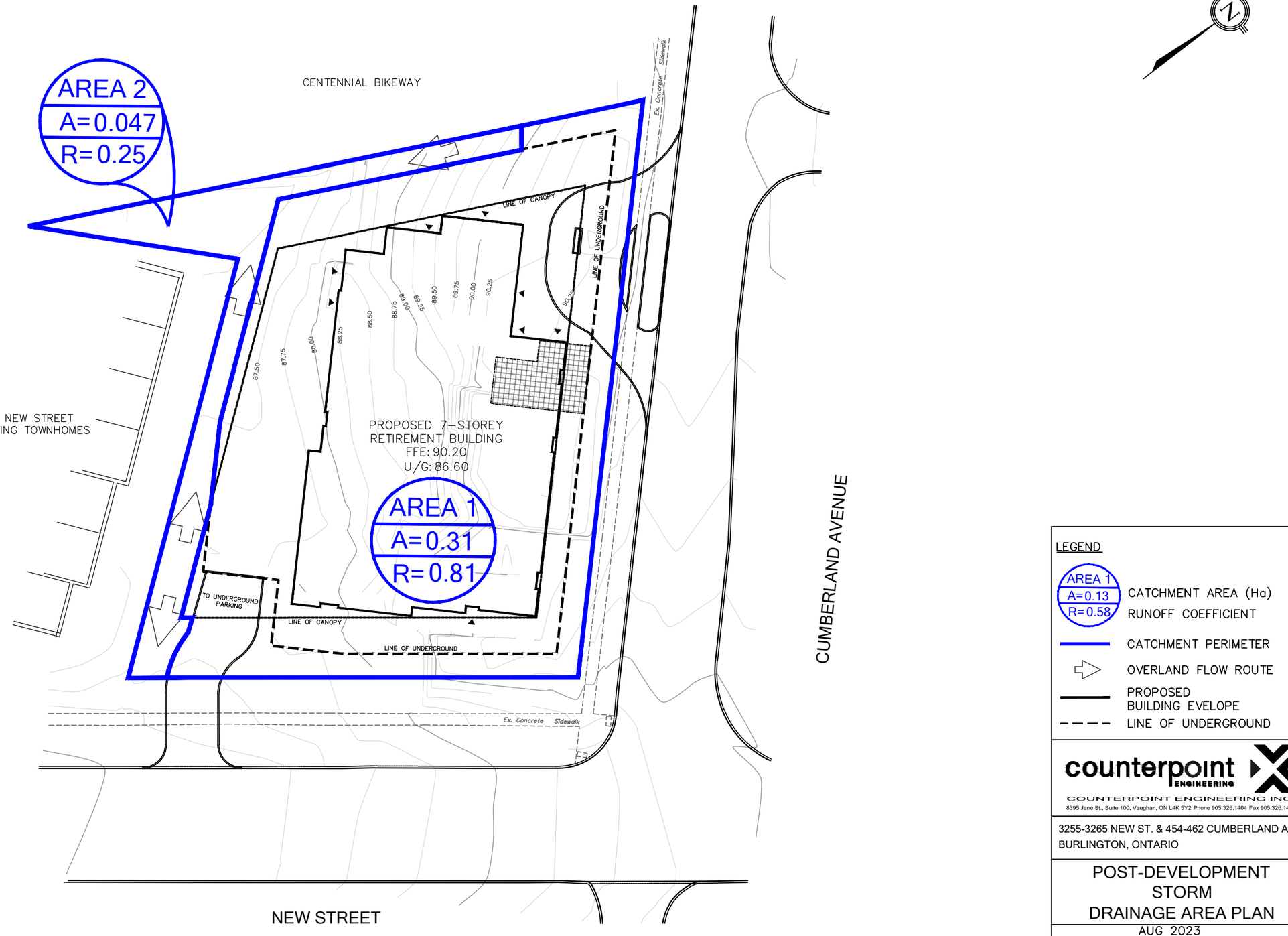
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BURLINGTON, ONTARIO

PRE-DEVELOPMENT STORM DRAINAGE AREA PLAN

AUG 2023

DRAWING BY: MR	PROJECT No. 23024
CHECKED BY: PM	
SCALE: 1:500	FIGURE No. 8



LEGEND

AREA 1 / A=0.13 / R=0.58 — CATCHMENT AREA (Ha) / RUNOFF COEFFICIENT

CATCHMENT PERIMETER

OVERLAND FLOW ROUTE

PROPOSED BUILDING EVELOPE

LINE OF UNDERGROUND

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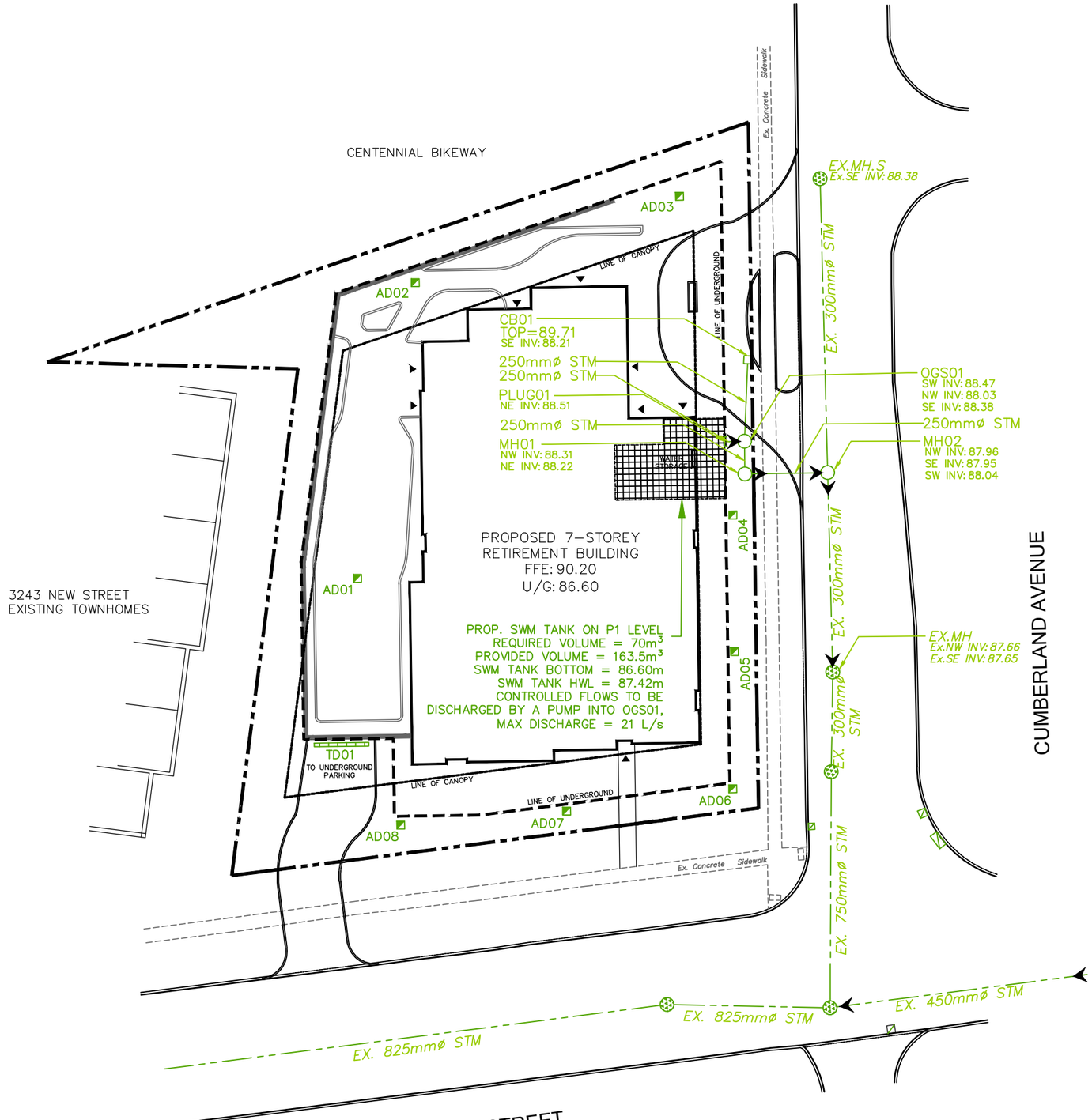
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POST-DEVELOPMENT STORM DRAINAGE AREA PLAN

AUG 2023

DRAWING BY: MR	PROJECT No. 23024
CHECKED BY: PM	
SCALE: 1:500	FIGURE No. 9



LEGEND

- PROPERTY LINE
- PROPOSED BUILDING EVELOPE
- LINE OF UNDERGROUND
- PROPOSED RETAINING WALL
- EXISTING STORMWATER SEWER
- PROPOSED STORMWATER SEWER
- EXISTING STORM MANHOLE
- PROPOSED STORM MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN
- PROPOSED AREA DRAIN
- PROPOSED TRENCH DRAIN

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BURLINGTON, ONTARIO

SCHEMATIC STORM SERVICING PLAN

AUG 2023	
DRAWING BY: MR	PROJECT No. 23024
CHECKED BY: PM	
SCALE: 1:500	FIGURE No. 7



LEGEND

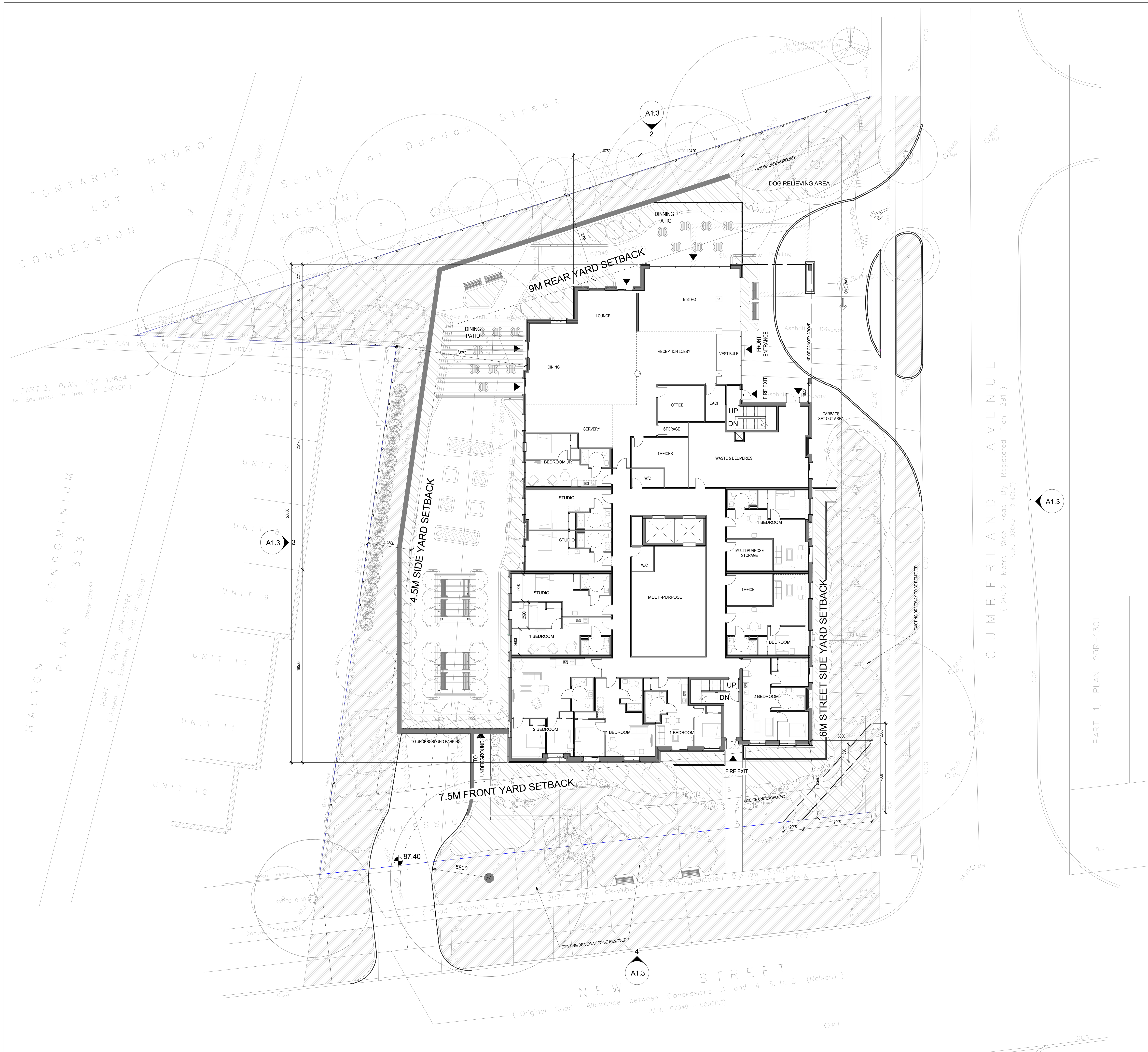
- PROPERTY LINE
- PROPOSED BUILDING EVELOPE
- PROPOSED RETAINING WALL
- PROPOSED ENTRANCE
- ×246.80EX. EXISTING ELEVATION
- ×246.80 PROPOSED ELEVATION
- 1.0% PROPOSED SLOPE
- OVERLAND FLOW ROUTE
- EXISTING SANITARY MANHOLE
- PROPOSED SANITARY MANHOLE
- EXISTING STORM MANHOLE
- PROPOSED STORM MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN
- PROPOSED AREA DRAIN
- PROPOSED TRENCH DRAIN
- PROP. SIAMESE CONNECTION

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CONCEPTUAL GRADING PLAN

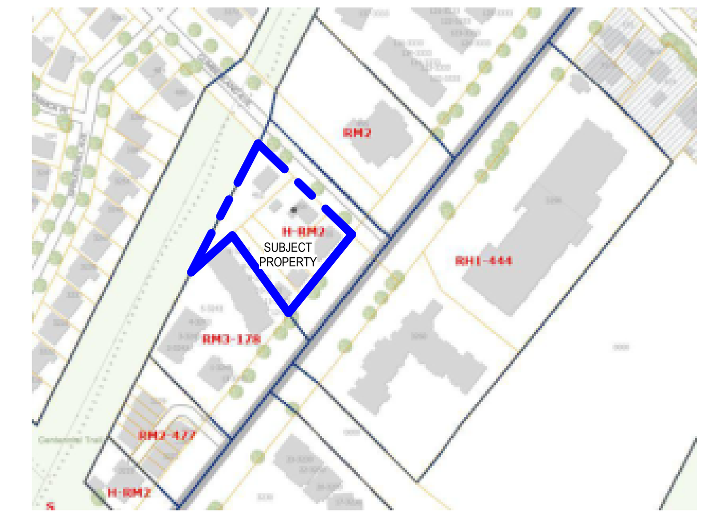
AUG 2023	
DRAWING BY: MR	PROJECT No. 23024
CHECKED BY: PM	
SCALE: 1:500	FIGURE No. 10



OVERALL - SITE PLAN W/ GROUND FLOOR

1 / A1.0

1 : 200



Key Plan

1 : 2

GROSS FLOOR AREA	
Level	Area
U/G PARKING LVL	2325 m²
GROUND FLOOR	1296 m²
2ND FLOOR	1320 m²
3RD FLOOR	1320 m²
4TH FLOOR	1320 m²
5TH FLOOR	1320 m²
6TH FLOOR	1320 m²
7TH FLOOR	798 m²
	11019 m²

SITE AREA	
Name	Area
BUILDING AREA	1337 m²
IMPERVIOUS SURFACE	844 m²
LANDSCAPED AREA	1407 m²
	3589 m²

SUITE SCHEDULE		
Name	Area	TOTAL
GROUND FLOOR		
1 BEDROOM	42 m² ... 52 m²	5
1 BEDROOM JR	40 m²	1
2 BEDROOM	55 m² ... 74 m²	2
STUDIO	34 m² ... 35 m²	3
		11
2ND FLOOR		
1 BEDROOM	42 m² ... 52 m²	4
2 BEDROOM	61 m² ... 76 m²	3
STUDIO	33 m² ... 37 m²	14
		21
3RD TO 6TH FLOOR		
1 BEDROOM	42 m² ... 52 m²	4 PER FLOOR
2 BEDROOM	61 m² ... 74 m²	3 PER FLOOR
STUDIO	34 m² ... 36 m²	12 PER FLOOR
		76
7TH FLOOR		
1 BEDROOM	37 m² ... 50 m²	3
2 BEDROOM	57 m² ... 68 m²	3
STUDIO	28 m² ... 35 m²	10
		16
TOTAL 124 UNITS		

4	REVISED FROM BUD PANEL	AUG 17, 2023
3	BUD PANEL & COMMUNITY MEETING	MAY 9, 2023
2	Revision	APR 13, 2023
1	OPA/ZBA PRE-APPLICATION SUBMISSION	JAN 31, 2023

ISSUES/REVISIONS

ALL DIMENSIONS TO BE CHECKED AND VERIFIED ON SITE. DISCREPANCIES TO BE REPORTED TO THE ARCHITECT. LATEST APPROVED STAMPED DRAWINGS ONLY TO BE USED FOR CONSTRUCTION.

MCLARCHITECTS
MCKNIGHT CHARRON LIMITED
48 ALLIANCE BLVD., UNIT 110
BARRIE, ONTARIO L4M 5K3
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F 705 726 5418

DRAWING TITLE:
SITE W/ GROUND FLOOR

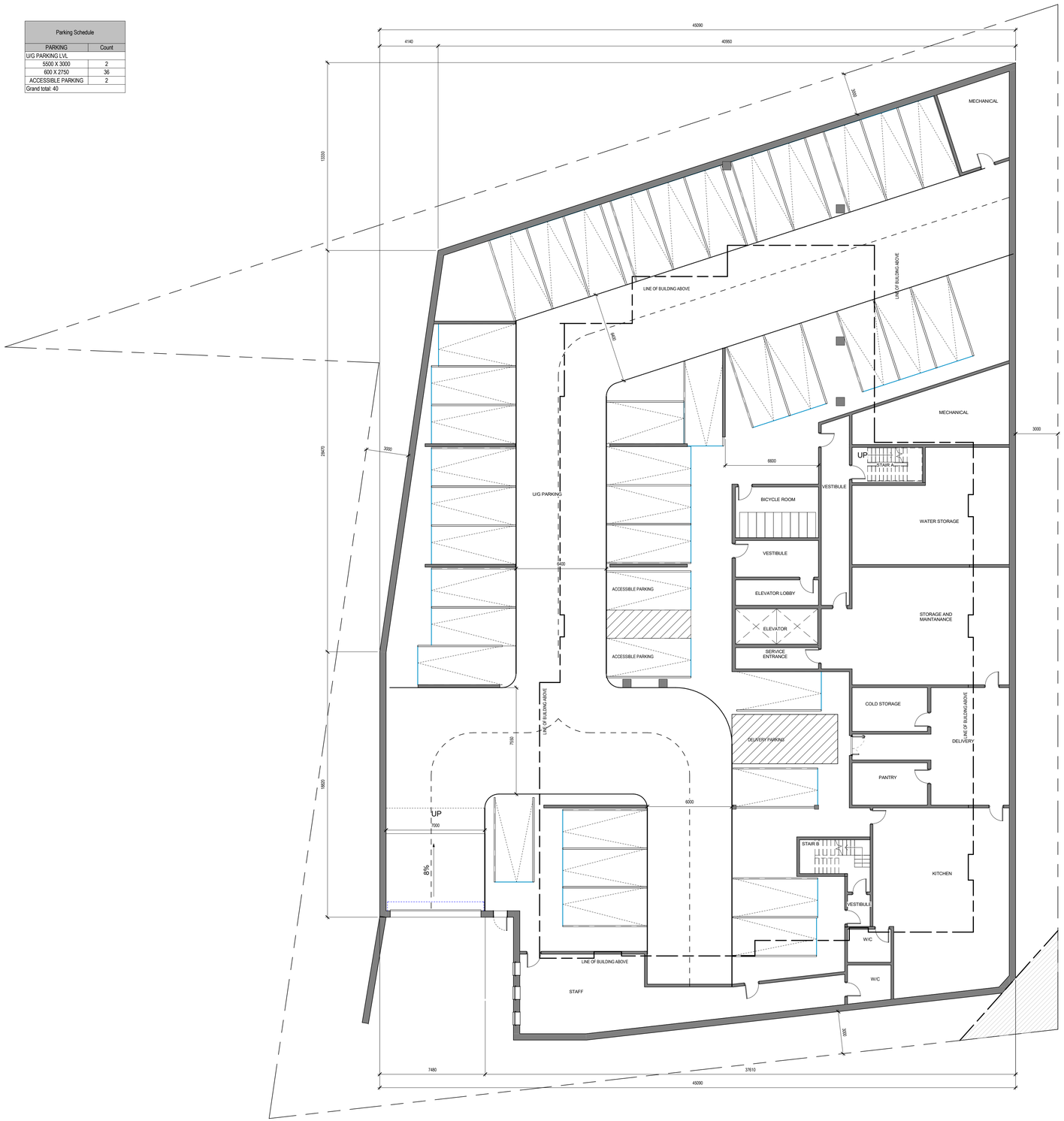
PROJECT NAME:
7 Storey, Memory Care Building

454-462 Cumberland Avenue & 3255 New Street, 3259 and 3265 New Street, Burlington

Traditions Senior Housing Ltd.

DATE:	May 19, 2023	PROJECT #	SHEET #
DRAWN BY:	MW	23-0118	A1.0
SCALE:	As indicated		

Parking Schedule	
PARKING	Count
U/G PARKING LVL	
5500 X 3000	2
600 X 2750	36
ACCESSIBLE PARKING	2
Grand total: 40	



1
A1.1

OVERALL - P1 PARKING LVL

1 : 150

4	REVISED FROM BUD PANEL	AUG 17, 2023
3	BUD PANEL & COMMUNITY MEETING	MAY 9, 2023
2	Revision	APR 13, 2023
1	OPA/ZBA PRE-APPLICATION SUBMISSION	JAN 31, 2023

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DRAWING TITLE:
U/G PARKING - BLP

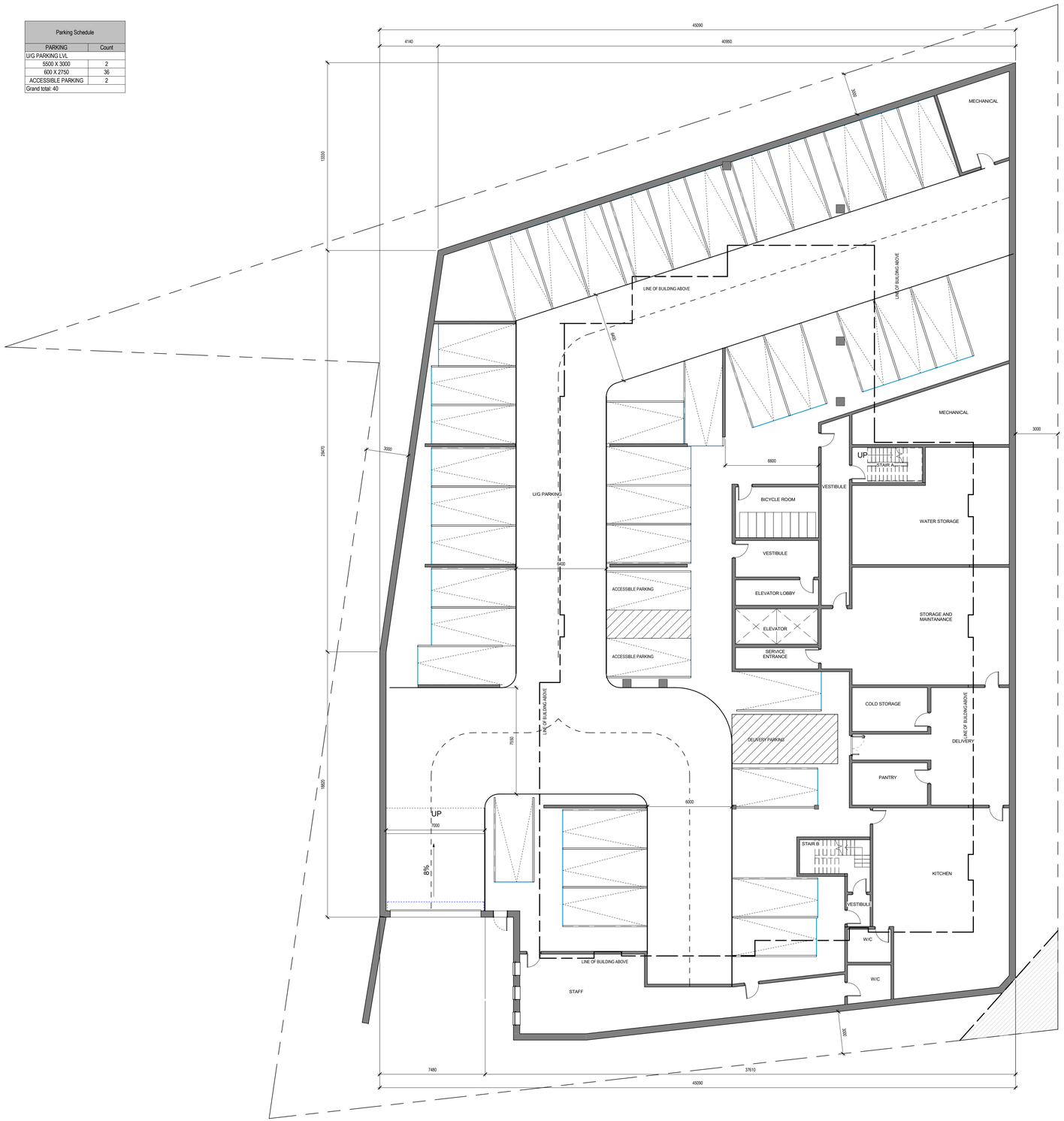
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Traditions Senior Housing Ltd.

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DRAWN BY:	MW	23-0118	A1.1
SCALE:	1 : 150		

Parking Schedule	
PARKING	Count
U/G PARKING LVL	
5500 X 3000	2
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Grand total: 40	



1
A1.1

OVERALL - P1 PARKING LVL

1 : 150

4	REVISED FROM BUD PANEL	AUG 17, 2023
3	BUD PANEL & COMMUNITY MEETING	MAY 9, 2023
2	Revision	APR 13, 2023
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ISSUES/REVISIONS

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DRAWING TITLE:
U/G PARKING - BLP

PROJECT NAME:
7 Storey, Memory Care Building

454-462 Cumberland Avenue & 3255 New Street, 3259 and 3265 New Street, Burlington

Traditions Senior Housing Ltd.

DATE:	May 19, 2023	PROJECT #	SHEET #
DRAWN BY:	MW	23-0118	A1.1
SCALE:	1 : 150		

APPENDIX B

WATER SERVICING DESIGN CALCULATIONS

counterpoint ENGINEERING

Domestic Water Demand Design Calculations

Project:	**3255-3265 New St and 454-462 Cumberland Ave**
Project No:	**23024**
Client:	**Traditions Senior Housing Ltd.**
Location:	**Burlington, Ontario**
Site Area:	0.36 ha
Rev Date:	2023-08-29

Per Capita Demand*

Average Daily Consumption Rate	275	L/person/day

Peaking Factors*

Conditions	Residential	Non-Residential
Maximum Daily Demand	2.25	1.4
Maximum Hour Demand	4	0.8

Population Densities*

Single Family	55	ppl/Ha

Site Statistics (Circulated July 7th, 2023)

Total Hectares	Ha
Single Family Homes	0.326

Total Equivalent Population	**18**	**people**

Water Demand based on Equivalent Population

Land Use	Population	Nominal Demand (L/min)	Max. Hour Demand (L/min)	Max Daily Demand (L/min)
Residential	18	3	14	8

counterpoint ENGINEERING

REQUIRED FIRE FLOW WORKSHEET - PROPOSED DEVELOPMENT

Fire Underwriters Survey

Project : 3255-3265 New St and 454-462 Cumberland Ave
Project No: 23024
Rev. Date: August 29, 2023

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

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

Where:

RFF = the Required Fire Flow in litres per minutes (LPM)
C = the Construction Coefficient is related to the type of construction of the building
A = the Total Effective Floor Area (effective building area) in square metres of the building

Type of Construction		Coefficient
Type V	Wood Frame	1.5
Type IV-A	Encapsulated Mass Timber	0.8
Type IV-B	Rated Mass Timber	0.9
Type IV-C	Ordinary Mass Timber	1.0
Type IV-D	Un-Rated Mass Timber	1.5
Type III	Ordinary	1.0
Type II	Noncombustible	0.8
Type I	Fire Resistive	0.6

Contents		Factor
NC	Non-Combustible	-25%
LC	Limited Combustible	-15%
C	Combustible	0%
FB	Free Burning	15%
RB	Rapid Burning	25%

1) Required Fire Flow

Type of Construction:	Type I		
C=	0.6		
A*=	1,980	m^2	*Largest floor area plus 25 percent of the next two floors
F=	**5,874**	**L/min**	

2) Occupancy and Contents Adjustment Factor

Type of Occupancy	LC				
Contents Adjustment Factor	-15%		=	-881	L/min
F=	**5874L/min +**	**-881**	**L/min =**	**4,993**	**L/min**

3) System Type Reduction

NFPA 13 Sprinkler:	YES	30%			
Standard Water Supply:	YES	10%			
Fully Supervised:	YES	10%			
Total Credit		50%			
Reduction of:	50%	L/min	=	2,496	L/min
F=	**4993L/min -**	**2,496**	**L/min =**	**2,496**	**L/min**

4) Exposure Adjustment Charge

Building Face	Dist(m)	Charge
North	30+	0%
East	30+	0%
South	30+	0%
West	17.5	15%
Total		15% **of 4992.6 L/min = 749 L/min**

(max exposure charge can be 75%)

Separation Distance	Maximum Exposure Adjustment Charge
0 m to 3 m	25%
3.1 m to 10 m	20%
10.1 m to 20 m	15%
20.1 m to 30 m	10%
Greater than 30	0%

F= 2496L/min + 749L/min = 3,245 L/min

F=	**3,000**	**L/min**	(round to the nearest 1,000L/min)
F=	**50**	**L/s**	
F=	**793**	**gpm**	

counterpoint ENGINEERING

Domestic Water Demand Design Calculations

Project:	**3255-3265 New St and 454-462 Cumberland Ave**
Project No:	**23024**
Client:	**Traditions Senior Housing Ltd.**
Location:	**Burlington, Ontario**
Site Area:	0.36 ha
Rev Date:	2023-08-29

Per Capita Demand*

Average Daily Consumption Rate	275	L/person/day

Peaking Factors*

Conditions	Residential	Non-Residential
Maximum Daily Demand	2.25	1.4
Maximum Hour Demand	4	0.8

Population Densities*

Single Bedroom	1.5	ppu
Double Bedroom	3	ppu

Site Statistics (Circulated July 7th, 2023)

Proposed Unit Type	Total
Total 1 Bed Units	104
Total 2 Bed Units	20
Total Residential Units	124

Equivalent Population

Land Use	Podium
Total Equivalent Population	**216**

Water Demand based on Equivalent Population

Land Use	Population	Nominal Demand (L/min)	Max. Hour Demand (L/min)	Max Daily Demand (L/min)	Max Day + Fire Flow Demand (L/min)	Max Day + Fire Flow Demand (ML/day)
Residential	216	41	165	93	3093	4.45

APPENDIX C

SANITARY SERVICING DESIGN CALCULATIONS

Counterpoint Engineering Inc.

Project: 3265 New Street
Project No: 23024
Location: Burlington, Ontario
Site Area: 0.36 ha

Existing Sanitary Flow Calculations

As per Region of Halton's Water and Wastewater Linear Design Manual Section 3.2 (October, 2019)
Design flow = (Population in Thousands x Average Daily Flow x Peaking Factor)/86.4 + (Infiltration Rate x Area)

Persons Per Hectare Approach (Halton Region)			
Type of Development	**Equivalent Population Density (ppl/ha)**	**Sanitary Drainage Area (ha)**	**Population**
Single Family	55	0.326	18
Community Services	40	0.5	20
		Total Population	**38**

Halton Region Peak Flow Design Parameters		
Residential Average flow	275	litres/person/day
Infiltration	0.286	litres/second/ha

Harmon Peaking Factor

PF = 1 + (14/(4+(P/1000)$^{1/2}$))

Residential Population	Harmon Peak Factor
38	**4.00**

Residential Flow	0.48	**L/s**
Infiltration	0.236	**L/s**
Groundwater Flows	0.00	**L/s**
Flow	**0.72**	**L/s**

Michael Russo, E.I.T.
Counterpoint Engineering Inc.
Direct: 437-929-1676
MRusso@counterpointeng.com

Counterpoint Engineering Inc.

Project: 3265 New Street
Project No: 23024
Location: Burlington, Ontario
Site Area: 0.36 ha

Proposed Sanitary Flow Calculations

As per Region of Halton's Water and Wastewater Linear Design Manual Section 3.2 (October, 2019)
Design flow = (Population in Thousands x Average Daily Flow x Peaking Factor)/86.4 + (Infiltration Rate x Area)

Persons Per Hectare Approach (Halton Region)			
Type of Development	**Equivalent Population Density (ppl/ha)**	**Sanitary Drainage Area (ha)**	**Population**
Apartment (over 6 stories high)	285	0.43	123
Community Services	40	0.5	20
		Total Population	**143**

Persons Per Unit Approach (Counterpoint Engineering - Conservative Approach)				
Single Bedroom People per Unit	**Double Bedroom People per Unit**	**Total Single Units**	**Total Double Units**	**Proposed Site Population (Governs)**
1.5	3	104	20	216
Community Services (as determined above using Halton Region's equivalent population density)				20
			Total Population	**236**

Halton Region Peak Flow Design Parameters		
Residential Average flow	275	litres/person/day
Infiltration	0.286	litres/second/ha

Harmon Peaking Factor
PF = 1 + (14/(4+(P/1000)$^{1/2}$))

Total Population	**Harmon Peak Factor**
236	**4.00**

Residential Flow	3.00	**L/s**
Infiltration	0.266	**L/s**
Groundwater Flows	0.00	**L/s**
Flow	**3.27**	**L/s**

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Counterpoint Engineering Inc.
Direct: 437-929-1676
MRusso@counterpointeng.com

Counterpoint Engineering Inc.

SANITARY SEWER CALCULATION SHEET

Project: 3265 New Street
Project No: 23024
Location: Burlington, Ontario

Prepared by: LC
Date: 17-Mar-14
Rev Date:

LOCATION				RESIDENTIAL AREA AND POPULATION						INFILTRATION			TOTAL	PIPE							
AREA ID.	STREET	FROM M.H.	TO M.H.	AREA (ha)	POP.	CUMMULATIVE AREA (ha)	CUMMULATIVE POP.	PEAKING FACTOR (M)	PEAK FLOW (L/s)	TOTAL AREA (ha)	ACCUM. AREA (ha)	INFILT. FLOW (L/s)	TOTAL FLOW Qa (L/s)	LENGTH (m)	NOM. DIA (mm)	ACT. DIA (mm)	SLOPE (%)	CAPACITY (FULL) Qf (L/s)	VELOCITY (FULL) (m/s)	VELOCITY (ACTUAL) (m/s)	FLOW FULL RATIO Qa/Qf
EXISTING CONDITIONS																					
100A, 101A	Cumberland Ave	EX MH	EX MH	0.83	38	0.83	38	4.0	0.48	0.83	0.83	0.24	0.72	116.5	200	201.16	0.50%	23.57	0.74	0.32	0.03
	Cumberland Ave	EX MH	EX MH	0.00	0	0.83	38	4.0	0.48	0.83	0.83	0.24	0.72	20.5	200	201.16	0.70%	27.88	0.88	0.37	0.03
POST-DEVELOPMENT CONDITIONS																					
SITE, 101A	Cumberland Ave	EX MH	EX MH	0.93	143	0.93	143	4.0	1.82	0.93	0.93	0.27	2.09	116.5	200	201.16	0.50%	23.57	0.74	0.46	0.09
10A	Cumberland Ave	EX MH	EX MH	0.00	0	0.93	143	4.0	1.82	0.93	0.93	0.27	2.09	20.5	200	201.16	0.70%	27.88	0.88	0.51	0.07

NOTE: REFER TO FIGURE 3A AND 3B

APPENDIX D

SWM DESIGN QUANTITY CONTROL CALCULATIONS

counterpoint ENGINEERING

SWM DESIGN CALCULATIONS
Existing Conditions Release Rate Calculations (Rational Method)
Area 101

Project Name: 3265 New Street
Municipality: City of Burlington
Project No.: 23034
Date: 30-Aug-23

Prepared by: L.C.
Checked by:
Last Revised: 30-Aug-23

Area 101

Location	**Burlington**
Area (ha)	**0.13**
Runoff Coefficient	**0.50**

Adjustment Factor

Up to 10-Year	**1.00**
25-Year	**1.10**
50-Year	**1.20**
100-Year	**1.25**

Rational Method

$$Q = KRCIA$$

Where:

Q = Design flow (m^3 / sec)
K = Conversion factor (0.00278)
R = Return period factor
C = Runoff coefficient
I = Rainfall intensity (mm / hour)
A = Contributing drainage area (ha)

Event:	**2-Year**
a	681.520
b	6.000
c	0.780
Runoff Coefficient	**0.50**
AC	0.06
Tc (min)	**10**
Rainfall Intensity (mm/hr)	**78**
Rational Flow Rate (l/s)	**14**

Event:	**5-Year**
a	802.04
b	5
c	0.764
Runoff Coefficient	**0.50**
AC	0.06
Tc (min)	**10**
Rainfall Intensity (mm/hr)	**101**
Rational Flow Rate (l/s)	**18**

Event:	**10-Year**
a	918.280
b	5.000
c	0.763
Runoff Coefficient	**0.50**
AC	0.06
Tc (min)	**10**
Rainfall Intensity (mm/hr)	**116**
Rational Flow Rate (l/s)	**21**

Event:	**25-Year**
a	1065.950
b	5.000
c	0.762
Runoff Coefficient	**0.55**
AC	0.07
Tc (min)	**10**
Rainfall Intensity (mm/hr)	**135**
Rational Flow Rate (l/s)	**27**

Event:	**50-Year**
a	1172.340
b	5.000
c	0.761
Runoff Coefficient	**0.60**
AC	0.08
Tc (min)	**10**
Rainfall Intensity (mm/hr)	**149**
Rational Flow Rate (l/s)	**32**

Event:	**100-Year**
a	1281.340
b	5.000
c	0.761
Runoff Coefficient	**0.63**
AC	0.08
Tc (min)	**10**
Rainfall Intensity (mm/hr)	**163**
Rational Flow Rate (l/s)	**37**

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8395 Jane Street, Suite 100 Vaughan, Ontario L4K 5Y2
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counterpoint ENGINEERING

SWM DESIGN CALCULATIONS
Existing Conditions Release Rate Calculations (Rational Method)
Area 102

Project Name: 3265 New Street
Municipality: City of Burlington
Project No.: 23034
Date: 29-Aug-23

Prepared by: L.C.
Checked by:
Last Revised: 29-Aug-23

Area 102

Location	Burlington
Area (ha)	0.23
Runoff Coefficient	0.32

Adjustment Factor

Up to 10-Year	1.00
25-Year	1.10
50-Year	1.20
100-Year	1.25

Rational Method

$$Q = KRCIA$$

Where:

Q = Design flow (m^3 / sec)
K = Conversion factor (0.00278)
R = Return period factor
C = Runoff coefficient
I = Rainfall intensity (mm / hour)
A = Contributing drainage area (ha)

Event:	2-Year
a	681.520
b	6.000
c	0.780
Runoff Coefficient	0.32
AC	0.07
Tc (min)	10
Rainfall Intensity (mm/hr)	78
Rational Flow Rate (l/s)	16

Event:	5-Year
a	802.04
b	5
c	0.764
Runoff Coefficient	0.32
AC	0.07
Tc (min)	10
Rainfall Intensity (mm/hr)	101
Rational Flow Rate (l/s)	21

Event:	10-Year
a	918.280
b	5.000
c	0.763
Runoff Coefficient	0.32
AC	0.07
Tc (min)	10
Rainfall Intensity (mm/hr)	116
Rational Flow Rate (l/s)	24

Event:	25-Year
a	1065.950
b	5.000
c	0.762
Runoff Coefficient	0.35
AC	0.08
Tc (min)	10
Rainfall Intensity (mm/hr)	135
Rational Flow Rate (l/s)	30

Event:	50-Year
a	1172.340
b	5.000
c	0.761
Runoff Coefficient	0.38
AC	0.09
Tc (min)	10
Rainfall Intensity (mm/hr)	149
Rational Flow Rate (l/s)	37

Event:	100-Year
a	1281.340
b	5.000
c	0.761
Runoff Coefficient	0.40
AC	0.09
Tc (min)	10
Rainfall Intensity (mm/hr)	163
Rational Flow Rate (l/s)	42

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SWM DESIGN CALCULATIONS
Required Storage Calculations

Project Name: 3265 New Street
Municipality: City of Burlington
Project No.: 23034
Date: 30-Aug-23

Prepared by: M.R.
Last Revised: 30-Aug-23

Rainfall Data

Location:	**Burlington**	a	**1281.34**
Event	**100-year**	b	**5**
		c	**0.761**

Site Data

Area (ha)	**0.31**
Runoff Coefficient	**0.81**
AC	0.25
Tc (min)	**10**
Time Increment (min)	**5**
Release Rate (l/s)	**18**
Storage Required (m^3)	**76**

The Rational Equation:

$$Q = \frac{(C)(i)(A)}{360}$$

where,

Q = the design flow (m^3/s)
C = the site specific runoff coefficient
A = the drainage area (ha)
i = rainfall intensity (mm/hr)

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	163	0.11	69	11	58	
15	131	0.09	83	16	66	
20	111	0.08	93	22	71	
25	96	0.07	101	27	74	
30	86	0.06	108	33	75	
35	77	0.05	114	38	76	********
40	71	0.05	119	44	75	
45	65	0.05	123	49	75	
50	61	0.04	128	54	73	
55	57	0.04	131	60	72	
60	53	0.04	135	65	70	
65	51	0.04	138	71	67	
70	48	0.03	141	76	65	
75	46	0.03	144	82	62	
80	44	0.03	147	87	60	
85	42	0.03	149	93	57	
90	40	0.03	152	98	54	
95	39	0.03	154	103	50	
100	37	0.03	156	109	47	
105	36	0.03	158	114	44	
110	35	0.02	160	120	40	
115	34	0.02	162	125	37	
120	33	0.02	164	131	33	

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SWM DESIGN CALCULATIONS
Required Storage Calculations

Project Name: 3265 New Street
Municipality: City of Burlington
Project No.: 23034
Date: 29-Aug-23

Prepared by: M.R.
Last Revised: 29-Aug-23

Rainfall Data

Location:	**Burlington**	a	**1281.34**
Event	**100-year**	b	**5**
		c	**0.761**

Site Data

Area (ha)	**0.31**
Runoff Coefficient	**0.81**
AC	0.25
Tc (min)	**10**
Time Increment (min)	**5**
Release Rate (l/s)	**21**
Storage Required (m^3)	**70**

The Rational Equation:

$$Q = \frac{(C)(i)(A)}{360}$$

where,

Q = the design flow (m^3/s)
C = the site specific runoff coefficient
A = the drainage area (ha)
i = rainfall intensity (mm/hr)

Time	Rainfall Intensity	Storm Runoff	Runoff Volume	Released Volume	Storage Volume	
(min)	(mm/hr)	(m^3/s)	(m^3)	(m^3)	(m^3)	
10	163	0.11	69	13	56	
15	131	0.09	83	19	64	
20	111	0.08	93	25	68	
25	96	0.07	101	32	69	
30	86	0.06	108	38	70	********
35	77	0.05	114	44	69	
40	71	0.05	119	51	68	
45	65	0.05	123	57	66	
50	61	0.04	128	63	64	
55	57	0.04	131	70	62	
60	53	0.04	135	76	59	
65	51	0.04	138	82	56	
70	48	0.03	141	89	52	
75	46	0.03	144	95	49	
80	44	0.03	147	102	45	
85	42	0.03	149	108	41	
90	40	0.03	152	114	37	
95	39	0.03	154	121	33	
100	37	0.03	156	127	29	
105	36	0.03	158	133	25	
110	35	0.02	160	140	21	
115	34	0.02	162	146	16	
120	33	0.02	164	152	12	

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SWM DESIGN CALCULATIONS
Post-Development Release Rate Calculations (Rational Method)
Area 202

Project Name: 3265 New Street
Municipality: City of Burlington
Project No.: 23034
Date: 29-Aug-23

Prepared by: L.C.
Checked by:
Last Revised: 29-Aug-23

Area 202

Location	**Burlington**
Area (ha)	**0.05**
Runoff Coefficient	**0.25**

Adjustment Factor

Up to 10-Year	**1.00**
25-Year	**1.10**
50-Year	**1.20**
100-Year	**1.25**

Rational Method

$$Q = KRCIA$$

Where:

Q = Design flow (m^3 / sec)
K = Conversion factor (0.00278)
R = Return period factor
C = Runoff coefficient
I = Rainfall intensity (mm / hour)
A = Contributing drainage area (ha)

Event:	**2-Year**
a	681.520
b	6.000
c	0.780
Runoff Coefficient	**0.25**
AC	0.01
Tc (min)	**10**
Rainfall Intensity (mm/hr)	**78**
Rational Flow Rate (l/s)	**3**

Event:	**5-Year**
a	802.04
b	5
c	0.764
Runoff Coefficient	**0.25**
AC	0.01
Tc (min)	**10**
Rainfall Intensity (mm/hr)	**101**
Rational Flow Rate (l/s)	**3**

Event:	**10-Year**
a	918.280
b	5.000
c	0.763
Runoff Coefficient	**0.25**
AC	0.01
Tc (min)	**10**
Rainfall Intensity (mm/hr)	**116**
Rational Flow Rate (l/s)	**4**

Event:	**25-Year**
a	1065.950
b	5.000
c	0.762
Runoff Coefficient	**0.28**
AC	0.01
Tc (min)	**10**
Rainfall Intensity (mm/hr)	**135**
Rational Flow Rate (l/s)	**5**

Event:	**50-Year**
a	1172.340
b	5.000
c	0.761
Runoff Coefficient	**0.30**
AC	0.01
Tc (min)	**10**
Rainfall Intensity (mm/hr)	**149**
Rational Flow Rate (l/s)	**6**

Event:	**100-Year**
a	1281.340
b	5.000
c	0.761
Runoff Coefficient	**0.31**
AC	0.01
Tc (min)	**10**
Rainfall Intensity (mm/hr)	**163**
Rational Flow Rate (l/s)	**7**

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APPENDIX E

SWM DESIGN QUALITY AND WATER BALANCE CALCULATIONS

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SWM DESIGN CALCULATIONS
Water Balance Calculation

Project Name: 3265 New Street
Municipality: City of Burlington
Project No.: 23034
Date: 29-Aug-23

Prepared by: LC
Checked by:
Last Revised: 29-Aug-23

1. VOLUME TO BE RETAINED

Total Area of Site (A) =	3,586	sq.m.
Target Retention Depth (D) =	0.005	(m)
Storage Volume Required = V = A x D =	**17.9**	(cu.m.)

2. STORAGE VOLUME PROVIDED

Landscape Areas

Area (A) =	1,407	sq.m.
Initial Abstraction =	0.005	
Storage Volume Provided = V = A x *v* x d =	**7.0**	(cu.m.)

Water Re-use Cistern

Storage Volume Provided =	**15.0**	(cu.m.)

Total

Storage Volume Provided =	**22.0**	(cu.m.)

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SWM DESIGN CALCULATIONS
Post-development TSS Removal Calculation

Project Name: 8435 Woodbine Avenue
Municipality: City of Markham
Project No.: 22084
Date: 31-Jan-23

Prepared by: L.C
Checked by:
Last Revised: 29-Aug-23

Mitigated TSS Removal Rates with Landscape Areas, Roof and OGS Unit Treatment Train

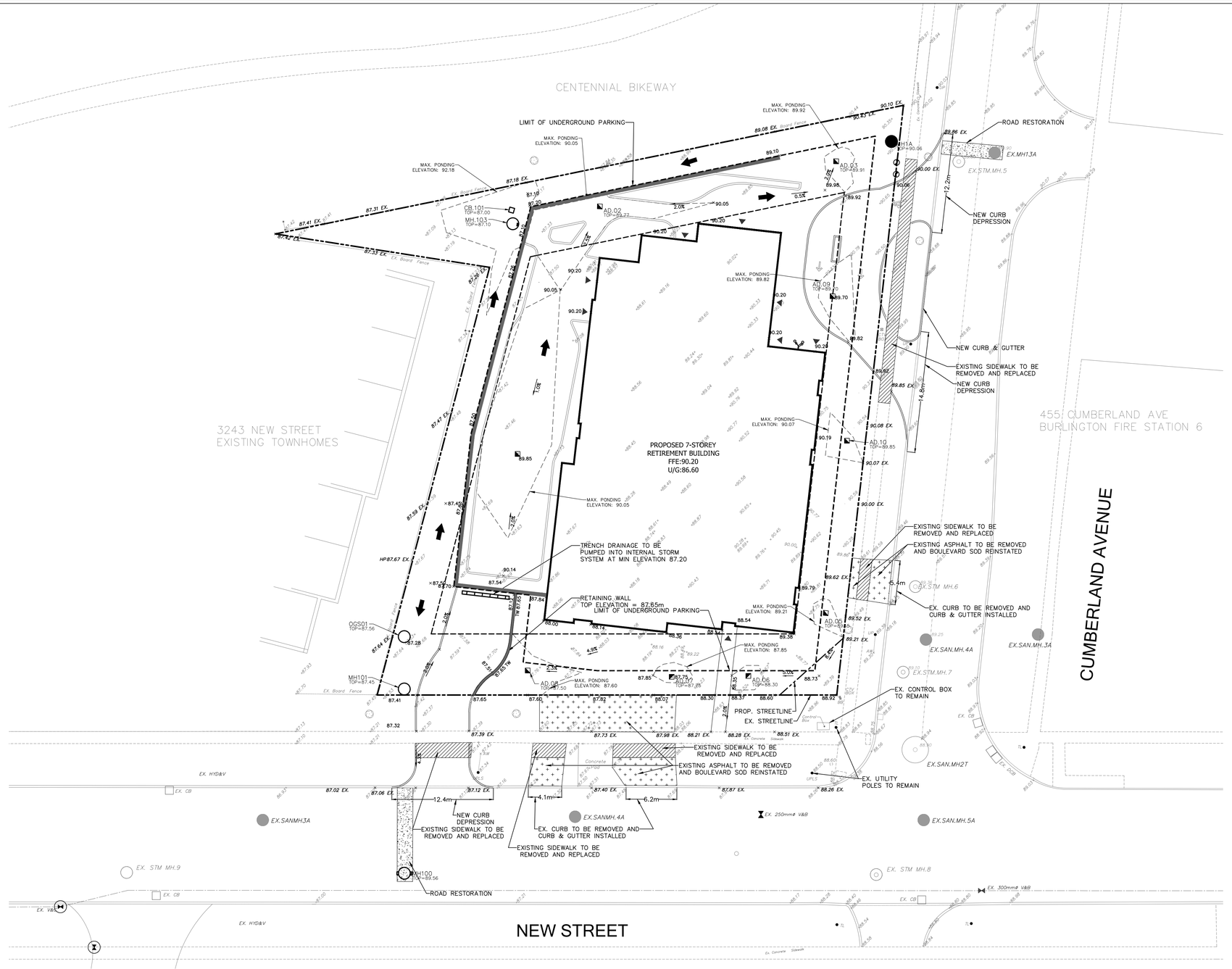
Mitigated	Area (Ha)	TSS Removal Credit	% Area of Site	Overall TSS Removal
Conventinal Roof Area	**0.134**	100.0%	37.3%	37.3%
Conventional Pavement Area	**0.084**	0.0%	23.5%	0.0%
Landscaped Area	**0.141**	80.0%	39.2%	31.4%
Sub-Total Onsite TSS removal before OGS	**0.359**		100.0%	**68.6%**
Untreated TSS remaining %				31.4%
50% TSS Removal Credit for Remaining Untreated TSS STC-300				15.7%
Total TSS removal				**84.3%**

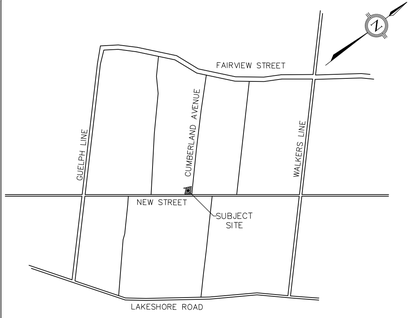
Reference: New Jersey Stormwater Best Management Practices Manual
Chapter 4 - TSS Removal Rates for BMP's in Series

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APPENDIX F

ENGINEERING DRAWINGS





KEY PLAN
NTS

LEGEND

×XXX.XXEX.	EXISTING ELEVATION
XXX.XX	EXISTING CONTOUR
×104.35	PROPOSED ELEVATION
×104.35 TC	PROPOSED TOP/BOTTOM OF CURB ELEVATION
×104.35 TW	PROPOSED TOP/BOTTOM OF WALL ELEVATION
	EXISTING STORM MANHOLE
	EXISTING SANITARY MANHOLE
	PROPOSED FIRE HYDRANT AND VALVE
	PROPOSED VALVE AND BOX
	PROPOSED STORM MANHOLE
	PROPOSED SANITARY MANHOLE
	PROPOSED CATCHBASIN
	PROPOSED DOUBLE CATCHBASIN
	PROPOSED CATCHBASIN MANHOLE
	PROPERTY LINE
0.0%	PROPOSED GRADE
	OVERLAND FLOW
	RETAINING WALL
	LIMIT OF P1 PARKING LEVEL
	SWALE

LEGAL & TOPOGRAPHY

PROVIDED BY: CUNNINGHAM McCONNELL LIMITED
1200 SPEERS ROAD, UNIT 38
OAKVILLE, ONTARIO L6L 2X4
PHONE:(905) 845-3497

BENCHMARK AND ELEVATION

ELEVATIONS SHOWN HEREON ARE GEODETIC AND WERE DERIVED FROM THE CITY OF BURLINGTON BENCH MARK No.138 HAVING AN ELEVATION OF 89.021 METRES (CGVD-1928). (1978 RE-ADJUSTMENT).

TOPOGRAPHIC DETAIL SHOWN HEREON WAS ACQUIRED ON 10th DAY OF NOVEMBER, 2021.

No.	REVISIONS/ISSUED	DATE	BY	CITY
1.0	1ST SUBMISSION – REZONING	2023-09-11	PM	

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COUNTERPOINT ENGINEERING INC.
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LICENSED PROFESSIONAL ENGINEER
P. G. MATHUMD
100175607
2023-09-11
PROVINCE OF ONTARIO
ENGINEER'S STAMP

APPLICANT:

TRADITIONS SENIORS HOUSING LTD.
505-223 ST CLAIR AVE W
TORONTO ONTARIO M4V 0A5
(416) 309-1927

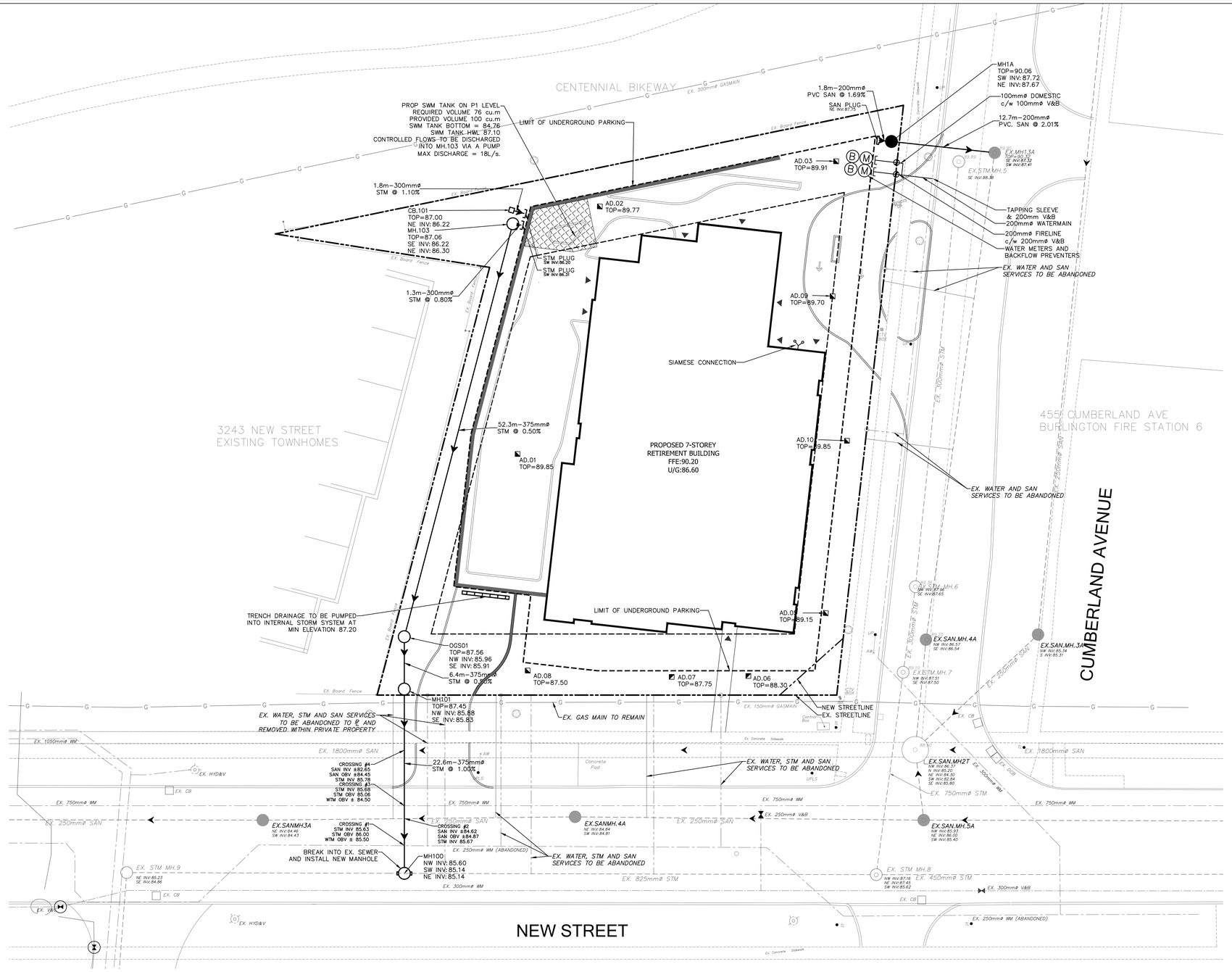
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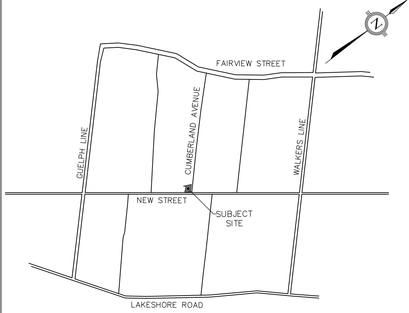
3255-3265 NEW STREET
& 454-462 CUMBERLAND AVE
BURLINGTON ONTARIO, L7N 1M9
REGIONAL MUNICIPALITY OF HALTON
SITE PLAN FILE No.:

GRADING PLAN

DESIGNED BY:	P.M	CHECKED BY:	P.W	DATE:	SEPTEMBER 2023
DRAWING BY:	P.M	CHECKED BY:	P.W	PROJECT NO.	23024
SWM BY:	P.M	CHECKED BY:	P.T		
SCALE:	1:250m	0m 5m 10m		DRAWING NO.	C1

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KEY PLAN
NTS

LEGEND

- EXISTING FIRE HYDRANT
- EXISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
- PROPOSED FIRE HYDRANT AND VALVE
- PROPOSED VALVE AND BOX
- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPERTY LINE
- EX. WATERMAIN
- WATERMAIN
- EX. STORM PIPE
- STORM PIPE
- EX. SANITARY PIPE
- SANITARY PIPE
- EX. HEADWALL
- CATCHBASIN
- DOUBLE CATCHBASIN
- CATCHBASIN MANHOLE
- RETAINING WALL
- LIMIT OF P1 PARKING LEVEL
- UNDERGROUND SWM TANK
- SWALE

LEGAL & TOPOGRAPHY

PROVIDED BY: CUNNINGHAM McCONNELL LIMITED
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1.0	1ST SUBMISSION – REZONING	2023-09-11	PM	

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LICENSED PROFESSIONAL ENGINEER
P. G. MATHUMD
100179667
2023-09-11
PROVINCE OF ONTARIO
ENGINEER'S STAMP

APPLICANT:
TRADITIONS SENIORS HOUSING LTD.
505-223 ST CLAIR AVE W
TORONTO ONTARIO M4V 0A5
(416) 309-1927

SITE LOCATION:
3255-3265 NEW STREET
& 454-462 CUMBERLAND AVE
BURLINGTON ONTARIO, L7N 1M9
REGIONAL MUNICIPALITY OF HALTON
SITE PLAN FILE No.:

SERVICING PLAN

DESIGNED BY:	P.M	CHECKED BY:	P.W	DATE:	SEPTEMBER 2023
DRAWING BY:	P.M	CHECKED BY:	P.W	PROJECT NO.	23024
SWM BY:	P.M	CHECKED BY:	P.T		
SCALE:	1: 250m (0m 5m 10m)			DRAWING NO.	C2

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