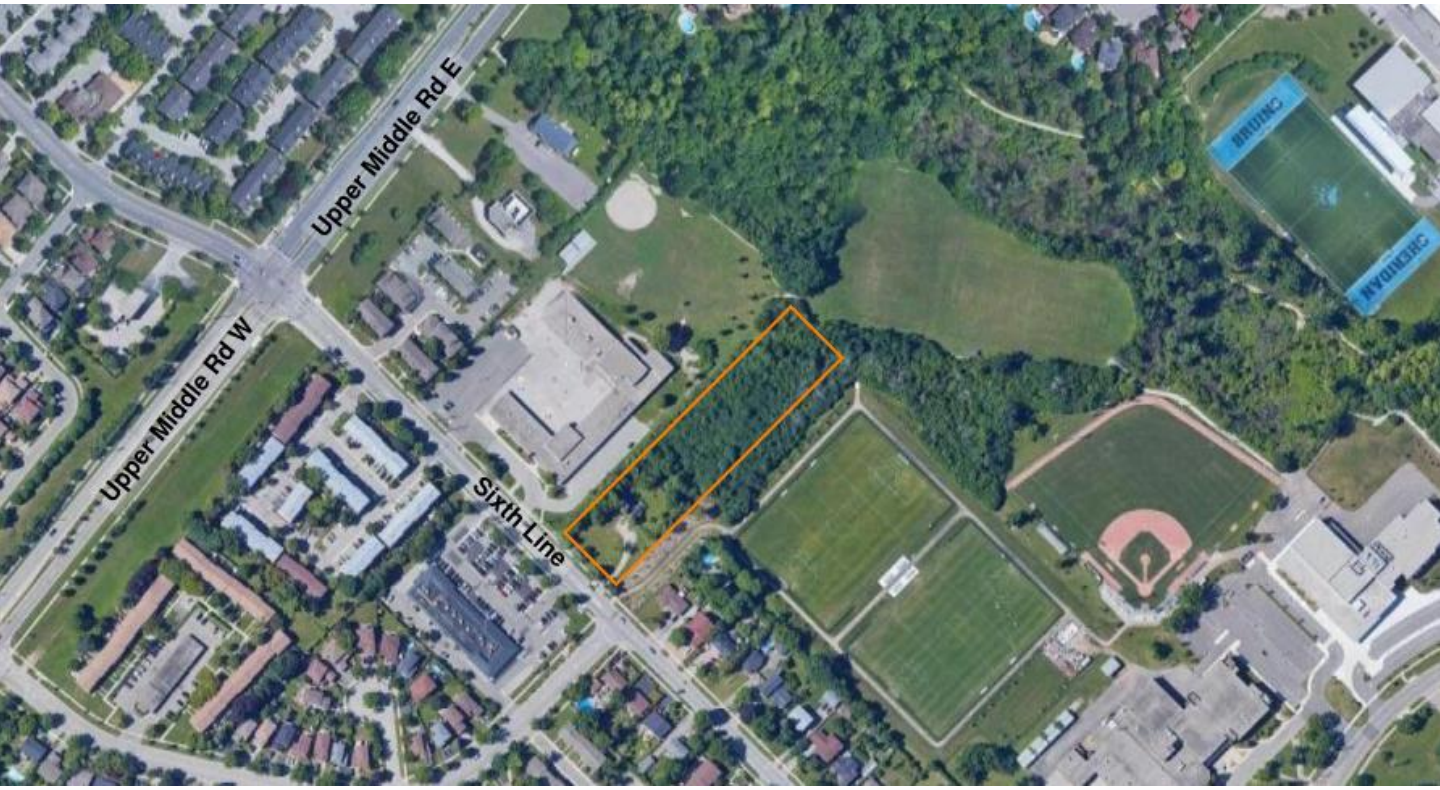


APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING

INNOVATIVE SHS

1493 Sixth Line, Oakville, ON

Functional Servicing & Stormwater Management Report

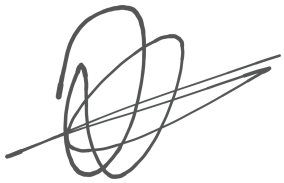
354 Davis Road, Unit 403, Oakville, ON L6J 2X2
WWW.APLINMARTIN.COM | (905) 582-0630

Project No: 25-7018

January 16, 2026

Aplin & Martin Consultants Ltd.

Quality Information



Prepared By:
Aplin & Martin Consultants

Name: Ibraheem Alqadhi
Title: Engineering Designer

Approved By:
Aplin & Martin Consultants

Name: Julian Cesario
Title: Project Manager

Revision History

Revision	Date	Details	Name	Title
1	03 -Sep-2025	SPA	Chesley Blahut	Engineering Lead
2	16 -Jan-2026	SPA	Chesley Blahut	Engineering Lead

Distribution List

# Hard Copies	PDF Submission	Company/Association
N/A	1	INNOVATIVE SHS

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1.0 INTRODUCTION

1.1 SITE DESCRIPTION

Aplin Martin has been retained by INNOVATIVE SHS to prepare a Functional Servicing and Stormwater Management Report (FSRSWM) in support of the Site Plan Approval (SPA) application for the proposed development of the grassy plain located at 1493 Sixth Line, Oakville, ON (the Site).

Currently, the 0.81 ha site is an open grassy plan with a single shed. It is bordered by Munn's Public School to the north, McCraney Valley Trail to the south, Sixth Line to the west, and wooded area to the east.

Figure 1: Aerial View (Source: Google Maps Imagery 2025)

1.2 PROPOSED DEVELOPMENT

The proposed development consists of a 6-storey mixed-use residential building located on Sixth Line, designed to provide 190 affordable rental housing units. The project features a mix of 1-, 2-, and 3-bedroom independent living units, all of which will remain affordable for at least 25 years. Notably, 30% of these units are designed to be fully accessible, and 35 are designated as "deeply affordable" through a partnership with the Region of Halton. To ensure long-term stability, the developer intends to lease blocks of units to community partner organizations that will manage the housing for their clients.

Beyond residential space, the ground floor will include a 278 sq.m. daycare facility and a 111 sq.m. office space dedicated to a community partner's on-site operations. The site plan incorporates a total of 103 parking spaces—split between underground and surface levels—and preserves 0.19 hectares of natural area at the rear. By combining affordable housing with childcare, the development aims to create a supportive, transit-oriented community that reduces the overall cost of living for residents.

Vehicular access into the Site will maintain the existing driveway connection to Sixth Line following the 2.94 m road widening of Sixth Line towards the site. For the site plan, please refer to Appendix A.

1.3 BACKGROUND INFORMATION

The following documents and drawings were available for review and used to prepare this report. Relevant excerpts from these documents (denoted in *italics*) are included in Appendix A.

- *Topographic Survey prepared by David B. Searles Surveying Ltd. dated May 12, 2025*
- *Proposed Site Plan and Floor Plan prepared by Patrick Markus Luckie Architect dated June 17, 2025*
- *Geotechnical Investigation prepared by Forward Engineering and Associates Inc. dated June 05, 2025*
- *As-constructed drawings provided by Halton Region dated June 04, 2003*

2.0 DOMESTIC AND FIREFIGHTING WATER SUPPLY

2.1 EXISTING WATER SERVICING

Based on the as-constructed information provided by Halton Region, there is an existing operational 300 mm diameter watermain located on Sixth Line as well as an abandoned 300 mm diameter watermain. There is one existing fire hydrant located at the south corner of the site.

2.2 PROPOSED WATER SERVICING

Site statistics for the proposed expansions were used to determine the domestic water demands and fire flow requirements for the Site. Based on a water consumption of 265 L/cap/day for residential and 250 L/cap/day for commercial, the domestic water demands for the Site were calculated using the peaking factors listed below:

- 2.25 (Maximum Day)
- 4.00 for Residential and 2.25 for Commercial (Peak Hour)
- 0.85 (Minimum Hour)

A summary of domestic water consumption rates for the Site has been provided in *Table 1*. Detailed calculations for domestic water consumption rates can be found in Appendix B.

Peak Flows	Hotel Total
Maximum Day	2.94 L/s
Peak Hour	4.98 L/s
Minimum Hour	1.10 L/s

Table 1: Domestic Water Consumption Rate Summary

A hydrant flow test on the existing municipal water distribution system will be conducted to confirm that adequate pressures are available to service the site such that the maximum available water supply meets municipal criteria for minimum fire flow requirements.

The projected total water demands (Max Day + Fire Flow) total approximately 252.94 L/s for the proposed development. A hydrant flow test will be performed in the spring of 2026 to confirm existing water pressures. Therefore, the existing municipal watermain has sufficient water supply. Refer to Appendix B for detailed calculations for fire flow requirements.

Proposed water servicing to the Site will consist of a single 200 mm connection to the existing 300 mm municipal watermain on Sixth Line. This service will be split using an "H" configuration (Region Standard Drawing 409.010) into a 200 mm fire service and a 150 mm domestic service.

Refer to Appendix E for the Site Servicing Plan for the existing and proposed watermain connections.

3.0 SANITARY SERVICING

3.1 EXISTING SANITARY SERVICING

Based on the as-constructed information provided by Halton Region, there is an existing 300 mm diameter municipal sanitary sewer located on Sixth Line.

Refer to Appendix A for the record drawings provided by Halton Region and Appendix C for detailed calculations.

3.2 PROPOSED SANITARY SERVICING

The peak sanitary flow from the Site has been determined in accordance with Halton Region's design guidelines, using the following criteria:

- Average Residential wastewater flow of 215 L/cap/day
- Average Commercial wastewater flow of 185 L/cap/day
- Residential density of 1.7 persons per unit
- Commercial population of 48 persons
- Infiltration and Inflow of 0.286 L/s/ha

The resulting peak sanitary discharge rate is estimated to be 3.89 L/s. The sanitary service for the proposed building will be provided by a 200 mm diameter sewer with a slope of 2.00% which connects into a proposed control manhole, which then connects into a proposed manhole on top of the existing sanitary sewer.

Refer to Appendix C for detailed calculations and Appendix E for the Site Servicing Plan.

3.3 DOWNSTREAM SANITARY CAPACITY

Aplin Martin has completed a downstream sanitary sewer capacity assessment to confirm that adequate servicing capacity exists for the proposed development. The analysis was undertaken using the most recent Town of Oakville InfoWorks ICM sanitary model (Oakville Export – July 2025). The assessment extended from the proposed site connection to the nearest downstream trunk sewer (SMN44490).

The downstream system was evaluated under both dry weather flow (DWF) and extreme wet weather flow (WWF) conditions for pre- and post-development scenarios. The results indicate that no sewer surcharging occurs under DWF conditions and that there is no incremental impact to downstream sewer performance under WWF conditions attributable to the proposed development. Accordingly, the existing downstream sanitary sewer system has sufficient capacity to service the proposed development. Detailed modelling outputs are provided in Appendix C for reference.

4.0 STORM DRAINAGE

4.1 EXISTING STORM SERVICING

Based on the as-constructed information provided by Halton Region, there is an existing 300 mm and 375 mm diameter municipal storm sewer located on Sixth Line.

Refer to Appendix A for record drawings provided by Halton Region.

4.2 PROPOSED STORM SERVICING

Catch basin manholes and catch basins are proposed within the site to collect drainage, which will be conveyed via private storm sewers to a proposed infiltration gallery and underground stormwater management tank (EZStorm) prior to being discharged into the municipal storm system. A 300mm diameter storm service connection is proposed to connect the control manhole MH D2 to proposed manhole MH D1 overtop the existing storm sewer.

.

Refer to Appendix E for the Site Servicing Plan.

5.0 STORMWATER MANAGEMENT

5.1 DESIGN CRITERIA

Stormwater Management for the proposed development is designed in accordance with the Oakville Development Engineering Procedures and Guidelines. The following is a summary of the Stormwater Management criteria applicable to this project:

- Quantity Control – post-development peak runoff from the site should be limited to 1:5-year pre-development levels for storms up to the 1:100-year level.
- Quality Control– the site shall treat stormwater runoff to enhanced level protection achieving 80% Total Suspended Solids (TSS) removal efficiency and 90% of the average annual runoff shall be treated without bypass.
- Water Balance - on-site retention of the 25 mm storm event to satisfy both water balance and erosion control measures through infiltration, evapotranspiration, or water re-use techniques.

5.2 QUANTITY CONTROL

5.2.1 PRE-DEVELOPMENT CONDITIONS

Under existing conditions, site runoff from area A1 Pre (uncontrolled) is conveyed overland and collected along Sixth Line, while site runoff from area A2 Pre (uncontrolled) are conveyed overland to the wooded area northeast of the site.

Refer to pre-development drainage area plan Fig-01 in Appendix D.

As noted above, Oakville design criteria require that post-development site runoff be controlled to the 1:5-year pre-development runoff rates. Refer to *Table 2* below for a summary of the target release rate established for this development using the Town of Oakville's IDF parameters.

Storm Event	A1 Pre-Flow (L/s)	A2 Pre-Flow (Uncontrolled) (L/s)	Total Site Release Rate (L/s)
5-Year	28.12	49.53	77.66
100-Year	49.45	87.09	136.53

Table 2: Pre-Development Peak Flow Summary

5.2.2 POST-DEVELOPMENT CONDITIONS

Proposed site conditions consist of two (2) catchment areas, namely:

- A1 Post consisting of paved areas, rooftop areas, and landscaped areas.
- A2 Post consisting of wooded area and a concrete walkway (uncontrolled flow).

Refer to the post-development drainage area plan (Fig-02) in Appendix D.

Rational method calculations were performed using the Town of Oakville's IDF parameters to determine the peak flows to be experienced from the catchment areas under post-development conditions. See *Table 3* below for a summary of the post-development peak flows.

Storm Event	A1 Post Controlled Flow (L/s)	A2 Post (Uncontrolled) Flow (L/s)	Total Site Release Rate (L/s)
100-Year	12.97	14.30	27.27

Table 3: Post-Development Peak Flow Summary

As indicated above, the proposed SWM scheme achieves the target release rates established for this development. Refer to Appendix D for detailed calculations.

The quantity control measures proposed include:

- 223.80 m^3 of storage provided in an underground storage tank located on the south side of the site.
- 75 mm orifice tube is proposed to restrict flows exiting the site.

See *Table 4* for details on the proposed SWM strategy.

Storm Frequency (years)	Uncontrolled Release Rate (L/s)	Controlled Release Rate (L/s)	Total Site Release Rate (L/s)	Storage Required (m3)	Allowable Release Rate (L/s)	Storage Provided (m^3)
2	5.85	9.35	15.20	75.66	28.15	223.80
5	8.14	11.04	19.18	110.17		
10	9.60	11.65	21.25	133.42		
25	11.55	12.60	24.15	162.96		
50	12.97	13.05	26.02	185.57		
100	14.30	12.97	27.27	209.23		

Table 4: Post-Development Discharge/Storage Summary

As indicated above in *Table 4*, the proposed 75mm orifice tube will restrict flows during all storm events to below the pre-development limits. Refer to detailed calculations for each storm event in Appendix D.

See *Table 5* for details on the 100-Year Capture of the proposed catch basins and catch basin manholes on site.

100 Year Drainage from A1					
Outlet	Area[1]	Runoff	Time	Intensity	Double Area Drain Flow (50% Blockage)
ID	ha	Coefficient C	t min	i=A*(t^C) mm/hr	L/s
CBMH1	0.099	0.85	10.00	200.8	47
CBMH2	0.081	0.85	10.00	200.8	38
CBMH3	0.092	0.85	10.00	200.8	44
CB1	0.063	0.55	10.00	200.8	19
CB2	0.012	0.30	10.00	200.8	2
CB3	0.016	0.85	10.00	200.8	8
				TOTAL (L/s)	158

Table 5: 100-year Capture of Catch Basins/Catch Basin Manholes with 50% Blockage

Refer to detailed 100-year capture and ponding elevation calculations for each outlet in *Appendix D*.

5.3 WATER QUALITY

As previously noted, per the Town of Oakville's criteria, the water quality objective for the site is to achieve a minimum of 80% TSS removal. Controlled storm runoff will be conveyed through a UFF-7 Up-Flo Filter which has a removal efficiency of 80% and treats 90% of annual runoff without bypass. Landscaped areas and rooftops have been deemed inherently clean and have been credited at an 80% removal efficiency. The specific removal efficiencies and their corresponding treatment train removal efficiencies for each catchment area are as follows:

- A1 Post has an 80.0% treatment train removal efficiency achieved by the proposed UFF-7 Up-Flo Filter

As a result of the proposed water quality measures noted above, the site will achieve a total TSS removal of 80.0% in the post-development conditions, satisfying the Town of Oakville's water quality control target.

Refer to Appendix D for detailed water quality calculations and Up-Flo Filter shop drawings.

5.4 WATER BALANCE

Retention of the 25 mm design storm event by means of infiltration, evapotranspiration or reuse is required to achieve water balance requirements. The total water balance retention volume requirement for this site is 202.5 m^3. After subtracting initial abstraction of pervious areas from the total water balance retention volume required, the resulting total retention volume required is approximately 185.7 m^3 for the site. The following measures are proposed to provide the required volume control to meet the site-specific water balance requirements:

- Drainage directed to a bottomless tank
- Drainage directed to an infiltration gallery

A gravel infiltration gallery and bottomless tank are proposed to infiltrate drainage from the proposed building to meet the water balance requirement in accordance with applicable guidelines. The total infiltration volume provided by the bottomless tank and infiltration gallery is 189.3 m^3, which exceeds the water balance retention requirement of 185.7 m^3 See *Table 6* below for a detailed summary of the proposed infiltration gallery.

Refer to **Appendix D** for detailed water balance calculations.

LID	Retention Volume Required (m^3)	Infiltration Rate (mm/hr)	Area Provided to Infiltrate (m^2)	Infiltration Volume Provided (m^3)
Bottomless Tank	185.7	15.0	246.4	127.7
Infiltration Gallery		15.0	140.0	61.6

Table 6: Water Balance Summary

See Site Servicing Plan in **Appendix E** for details.

5.5 SWM SUMMARY

Refer to *Table 7* below for a site SWM summary of the quantity, quality and water balance design objectives for this development.

SWM Measure	Design Criteria	
	Required	Provided
Quantity - 100-Yr Peak Flow	Min. 209.23 m^3	**223.80 m^3**
	Max. 28.15 L/s	**26.49 L/s**
Water Balance – Infiltration Gallery and Bottomless Tank	185.7 m^3	**189.3 m^3**
Quality – UFF-7 Up-Flo Filter	80%	**80%**

Table 7: SWM Summary

6.0 ON-SITE HYDROGEOLOGICAL CONDITIONS

6.1 GROUNDWATER TABLE

A geotechnical investigation report was prepared by Forward Engineering & Associates Inc. dated June 05, 2025, to confirm sub-surface conditions and groundwater levels. No groundwater was observed beneath the site. Results from the field testing and monitoring wells confirmed that the sub-surface conditions are suitable for infiltration purposes.

Refer to Appendix A for the complete geotechnical investigation report prepared by Forward Engineering & Associates Inc. Borehole data from the geotechnical investigation report has been provided in Appendix D.

7.0 EROSION AND SEDIMENT CONTROL MEASURES

An Erosion and Sediment Control program will be implemented throughout the duration of the construction in accordance with GGHA Conservation Authorities' Erosion & Sediment Control Guidelines for Urban Construction (December 2006). The proposed Erosion and Sediment Control program for the site will include the following temporary measures:

- A siltation control barrier around the perimeter of the site;
- Sediment traps on catch basins or area drains internal to the site;
- Sediment traps on external catch basins adjacent to the site;
- Mud mat at the access point of construction to prevent / minimize mud tracking by construction vehicles;
- On-site dust control measures;
- Regular maintenance of the above-listed Erosion / Sediment Control measures; and,
- Inspection of the above-listed Erosion / Sediment Control measures before and after rainfall events.

Once all phases of construction have been completed, removal of the erosion and sediment control measures will take place.

9.0 CONCLUSION

Based on our analysis of the proposed redevelopment and supporting documentation, the following conclusions and recommendations are being made:

- Water servicing for the proposed site will be achieved via a 200mm water service connection into the existing 300 mm diameter municipal watermain on Sixth Line.
- Sanitary servicing for the proposed site will be achieved via a 200mm sanitary service connection into the existing 300mm diameter municipal sewer located on Sixth Line.
- A downstream sanitary sewer capacity assessment confirms that the existing municipal sanitary sewer system has sufficient capacity to service the proposed development.
- Storm servicing for the proposed site will be achieved via a 300mm storm sewer connection into the existing 300mm diameter municipal sewer on Sixth Line.
- SWM quantity control objectives are satisfied by utilizing an underground stormwater chamber (EZStorm) totaling 220.82m^3 and a 75 mm orifice tube.
- SWM quality control objectives are to be met via the use of an Up-Flo Filter unit (UFF-7) for a Total Suspended Solids (TSS) removal of 80.0%, satisfying the minimum requirement of 80% TSS removal.
- SWM water balance objectives are to be achieved by retaining the 25 mm storm event in an infiltration gallery and bottomless tank.

APPENDIX A

SUPPORTING DOCUMENTATION

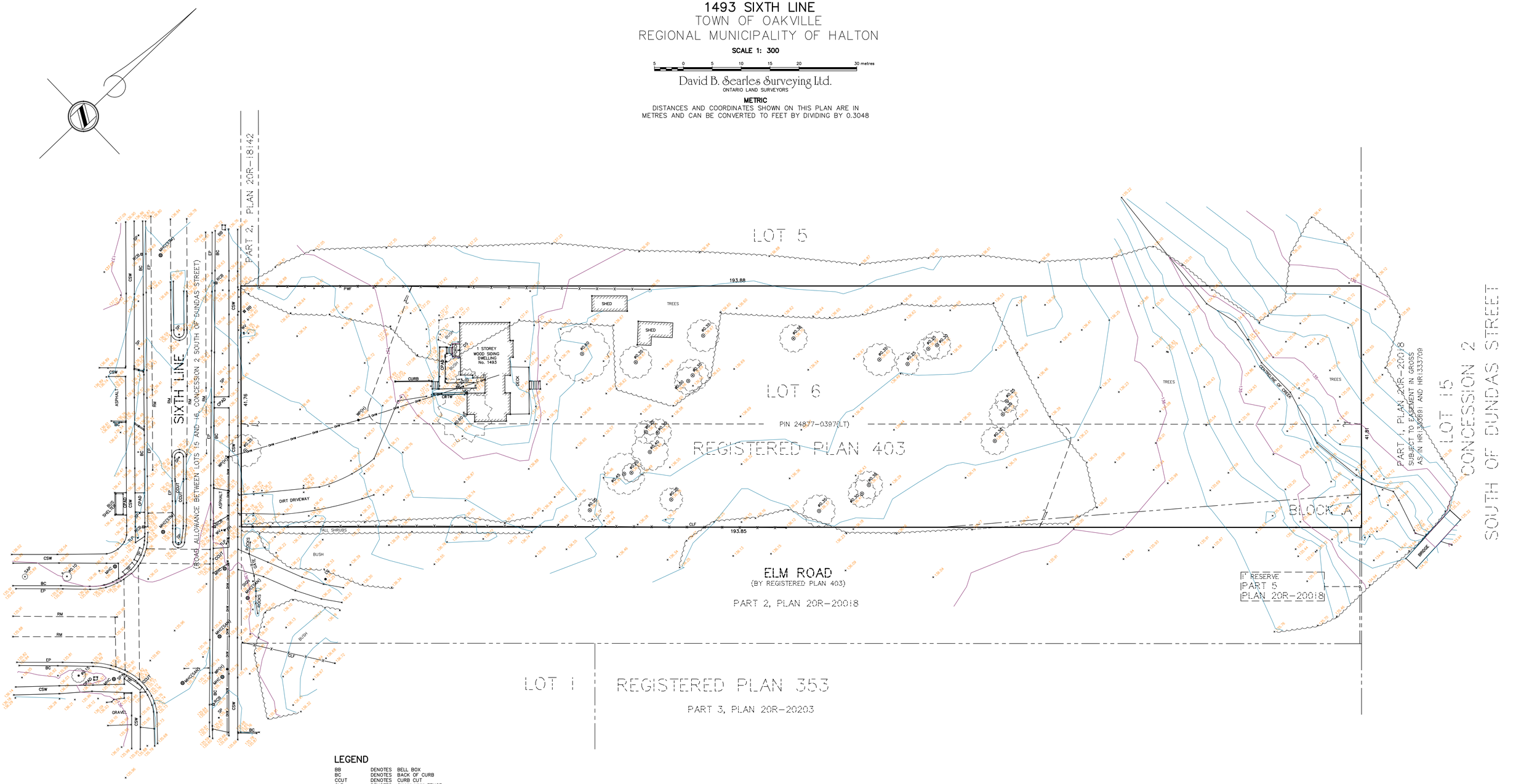
SKETCH ILLUSTRATING
TOPOGRAPHIC INFORMATION
FOR PURPOSE OF SITE DESIGN
1493 SIXTH LINE
TOWN OF OAKVILLE
REGIONAL MUNICIPALITY OF HALTON

SCALE 1: 300

5 0 5 10 15 20 30 metres

David B. Searles Surveying Ltd.
ONTARIO LAND SURVEYORS

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



BENCHMARK NOTE

ELEVATIONS ARE REFERRED TO THE TOWN OF OAKVILLE BENCHMARK No. 227, LOCATED ON SOUTH END OF CONCRETE DOOR SILL AT 1334 SIXTH LINE, HAVING AN ELEVATION OF 131.831 m.

VERTICAL DATUM: CANADIAN GEODETIC DATUM, 1928
(PRE: 1978 SOUTHERN ONTARIO READJUSTMENT)

CAUTION

LOCATIONS OF ALL UTILITIES ARE APPROXIMATE. ALL UTILITIES SHOULD BE CONTACTED PRIOR TO ANY DIGGING OR CONSTRUCTION.

THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED EXCEPT FOR THE PURPOSE INDICATED IN THE TITLE BLOCK.

BOUNDARY INFORMATION ILLUSTRATED HEREON HAS BEEN COMPILED FROM REGISTRY OFFICE INFORMATION AND HAS NOT BEEN VERIFIED BY FIELD MEASUREMENT.

LEGEND

BB	DENOTES	BELL BOX
BC	DENOTES	BACK OF CURB
CCUT	DENOTES	CURB CUT
CLF	DENOTES	CHAIN LINK FENCE
CPAD	DENOTES	CONCRETE PAD
CRTW	DENOTES	CONCRETE RETAINING WALL
CSW	DENOTES	CONCRETE SIDEWALK
DS	DENOTES	DOOR SILL
EP	DENOTES	EDGE OF PAVEMENT
FH	DENOTES	FIRE HYDRANT
LS	DENOTES	LIGHT STANDARD
MHC	DENOTES	MAINTENANCE HOLE COVER
MHC(SAN)	DENOTES	MAINTENANCE HOLE COVER (SANITARY)
MHC(STM)	DENOTES	MAINTENANCE HOLE COVER (STORM)
PWF	DENOTES	POST AND WIRE FENCE
RCB	DENOTES	RECESSED CATCH BASIN
RM	DENOTES	ROAD MARKING
SP	DENOTES	SIGN POST
TLP	DENOTES	TRAFFIC LIGHT POLE
TP	DENOTES	TACTILE PLATE
WP(H)	DENOTES	WOODEN POLE (HYDRO)
WV	DENOTES	WATER VALVE
ø	DENOTES	DIAMETER
OHW	DENOTES	OVERHEAD WIRES
	DENOTES	CONIFEROUS TREE
	DENOTES	DECIDUOUS TREE
	DENOTES	TREE LINE

NOTE

FIELDWORK COMPLETED 12 MAY, 2025.

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Calculator	Draftsperson
BJ	IV
Editor	Plan Index No.
BJ	F21
Calculation File	Drawing File
21-0-25CALC.DWG	21-1-25.DWG
File No.	
21-1-25	

ARCHITECTURAL DRAWINGS

ARTISTS CONCEPT
NORTH SIDE (MAIN ENTRANCE & PARKING)

ARTISTS CONCEPT
SOUTH SIDE (FACING PARK)

pml.A

patrick markus luckie, Architect
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PENALTA

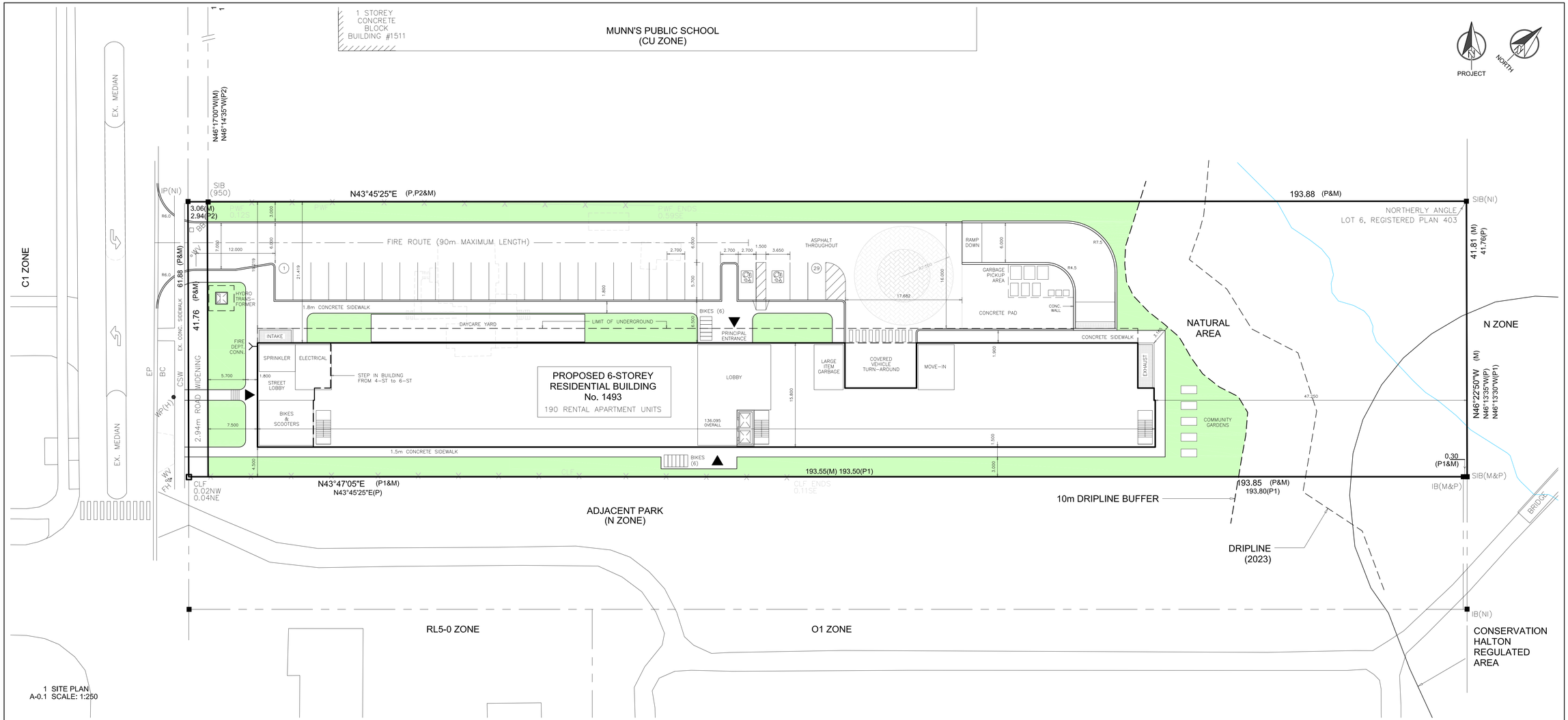
Revisions:	
Date:	Particular:

Issue:	
Date:	Particular:
JUN.26.25	ISSUED FOR REVIEW
AUG.08.25	ISSUED FOR APPLICATION
JAN.01.26	ISSUED FOR S.P. APPLICATION

SIXTH LINE
HOUSING

1493 SIXTH LINE, OAKVILLE

A-0.0



1 SITE PLAN
A-0.1 SCALE: 1:250

RH ZONE REQUIREMENTS	REQUIREMENT	PROPOSED
Minimum lot area*	1,858.0 m2	6,288.8 m2
Minimum lot frontage	24.0 m	41.8 m
Minimum front yard*	7.5 m	7.5 m
Minimum interior side yard (north)	4.5 m	19.2 m
Minimum interior side yard (south)	4.5 m	4.5 m
Minimum rear yard (from lot line)	7.5 m	47.2 m
Minimum rear yard (from 10m buffer)	-	3.1 m
Maximum height	n/a	24.0 m
Maximum lot coverage*	35%	2,131.9 m2 (34%)
Minimum landscaping coverage*	10%	1,531.3 m2 (24%)
Landscape buffer adjacent parking area	3.0 m	3.0 m

*based on NET lot area (less natural area and buffer)

PROPOSED 6-STOREY RESIDENTIAL HOUSING

LOT AREA

GROSS AREA	8,092.4 m2 (0.8092 ha)
NATURAL AREA + 10m BUFFER	1,803.6 m2 (0.1804 ha)
NET LOT AREA*	6,288.8 m2 (0.6289 ha)
ROAD WIDENING	122.6 m2 (0.0123 ha)

GROSS FLOOR AREA

6th FLOOR	1,979.8 m2	21,310 sf
5th FLOOR	1,979.8 m2	21,310 sf
4th FLOOR	2,131.9 m2	22,945 sf
3rd FLOOR	2,131.9 m2	22,945 sf
2nd FLOOR	2,131.9 m2	22,945 sf
1st FLOOR	2,057.5 m2	22,145 sf
TOTAL	12,412.8 m2	133,600 sf

UNIT BREAKDOWN

6th FLOOR	23 1br,	11 2br,	1 3br =	35
5th FLOOR	23 1br,	11 2br,	1 3br =	35
4th FLOOR	23 1br,	12 2br,	2 3br =	37
3rd FLOOR	23 1br,	12 2br,	2 3br =	37
2nd FLOOR	23 1br,	12 2br,	2 3br =	37
1st FLOOR	2 1br,	7 2br,	0 3br =	9
TOTAL	117 1br,	65 2br,	8 3br =	190 UNITS @ 0.6289 ha = 302 uph

ACCESSIBLE UNITS

1br UNITS	32
2br UNITS	22
3br UNITS	3
TOTAL	57 (30% OF 190)

RENTABLE AREA

117 1br @ 425 = 49,725 sf
65 2br @ 635 = 41,275 sf
8 3br @ 860 = 6,880 sf
TOTAL = 97,880 sf

PARKING

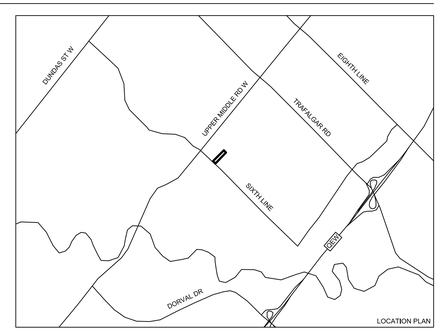
190 RENTAL UNITS @ 0.47 = 90 SPACES
450 m2 OFFICE & DAYCARE @ 1/35 = 13 SPACES
TOTAL = 103 PARKING SPACES
74 SPACES PROVIDED UNDERGROUND
29 SPACES ON SURFACE
ACCESSIBLE PARKING @ 1, PLUS 3% = 5 REQUIRED, 6 PROVIDED

FLOOR AREA BREAKDOWN

FLOOR AREA, RESIDENTIAL (INCLUDES AREA OF ALL SUITES (INCLUDING EXTERIOR WALLS), CORRIDORS, STAIRS, ELEVATORS, LOBBY, ABOVE GRADE SERVICE ROOMS AND RESIDENTIAL AMENITY AREAS.	11,962.8 m2	128,775 sf
FLOOR AREA, NON-RESIDENTIAL (INCLUDES 1st FLOOR AREAS DEDICATED TO "HSH" OFFICE, DAYCARE, AND MANAGEMENT OFFICE	450.0 m2	4,825 sf
FLOOR AREA, GROSS	12,412.8 m2	133,600 sf

ADDITIONAL FLOOR AREAS (NOT INCLUDED IN GROSS AREA)

BASEMENT PARKING LEVEL	2,442.4 m2	26,290 sf
MECHANICAL PENTHOUSE	192.2 m2	2,070 sf



LOCATION PLAN

pml.A
patrick markus luckie, Architect
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PENALTA

Revisions:	
Date:	Particular:
DEC.10.25	REVISED CONCEPT, BUILDING ALONG SOUTH LOT LINE

Issue:	
Date:	Particular:
JUN.17.25	ISSUED FOR REVIEW
AUG.08.25	ISSUED FOR APPLICATION
JAN.01.26	ISSUED FOR S.P. APPLICATION

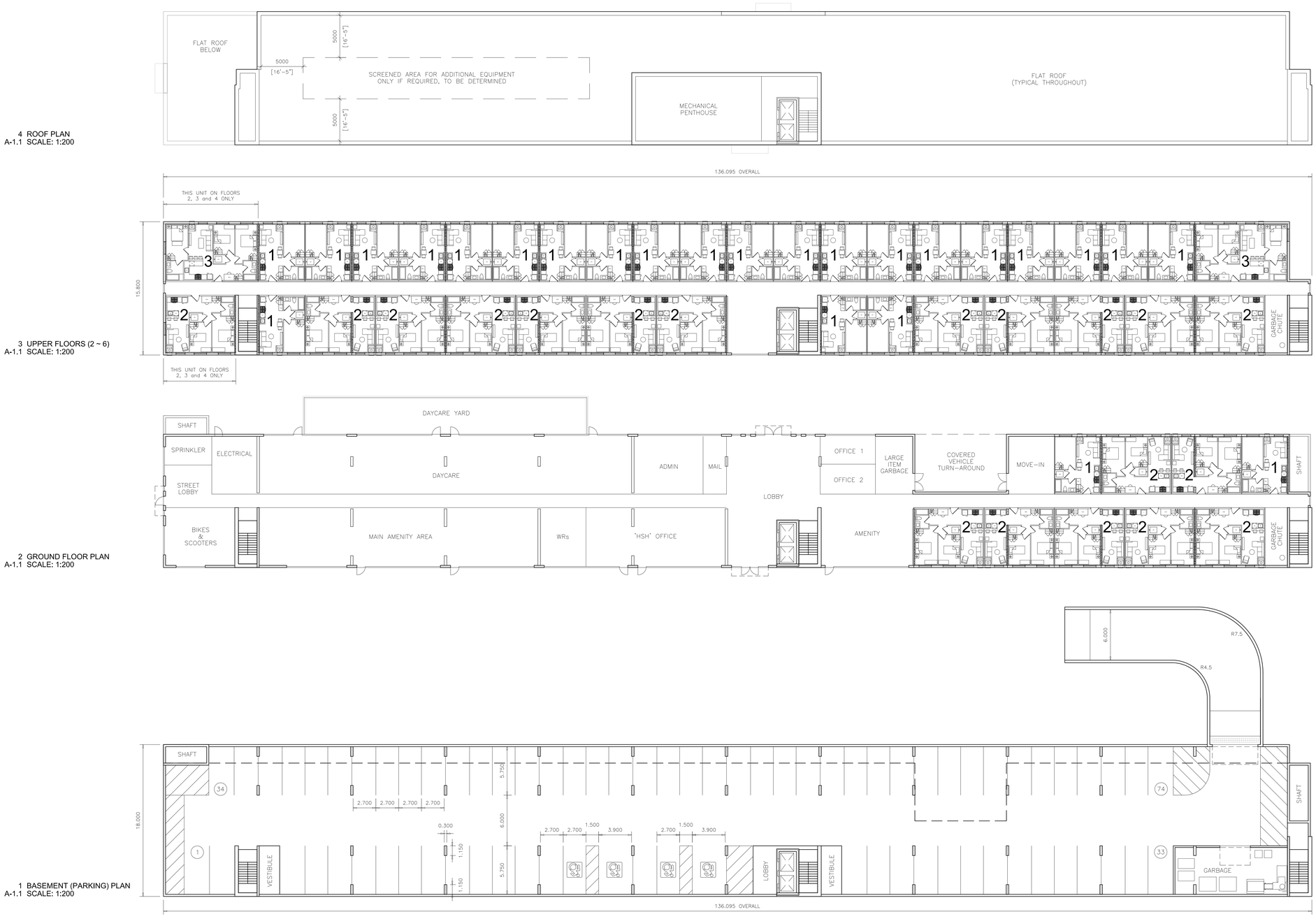
SIXTH LINE HOUSING

1493 SIXTH LINE, OAKVILLE

SITE PLAN

SCALE 1:250

A-0.1



4 ROOF PLAN
A-1.1 SCALE: 1:200

3 UPPER FLOORS (2 ~ 6)
A-1.1 SCALE: 1:200

2 GROUND FLOOR PLAN
A-1.1 SCALE: 1:200

1 BASEMENT (PARKING) PLAN
A-1.1 SCALE: 1:200

PROJECT NORTH

pml.A

patrick markus luckie, Architect
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PENALTA

Revisions:	
Date:	Particular:

Issue:	
Date:	Particular:
JUN.17.25	ISSUED FOR REVIEW
AUG.08.25	ISSUED FOR APPLICATION
JAN.01.26	ISSUED FOR S.P. APPLICATION

SIXTH LINE HOUSING

1493 SIXTH LINE, OAKVILLE

FLOOR PLANS

SCALE 1:200

A-1.1

1 SOUTH ELEVATION
A-2.1 SCALE: 1:150

2 WEST ELEVATION (SIXTH LINE)
A-2.1 SCALE: 1:150

3 EAST ELEVATION
A-2.1 SCALE: 1:150

4 NORTH ELEVATION
A-2.1 SCALE: 1:150

pml.A

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Revisions:	
Date:	Particular:

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Date:	Particular:
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AUG.08.25	ISSUED FOR APPLICATION
JAN.01.26	ISSUED FOR S.P. APPLICATION

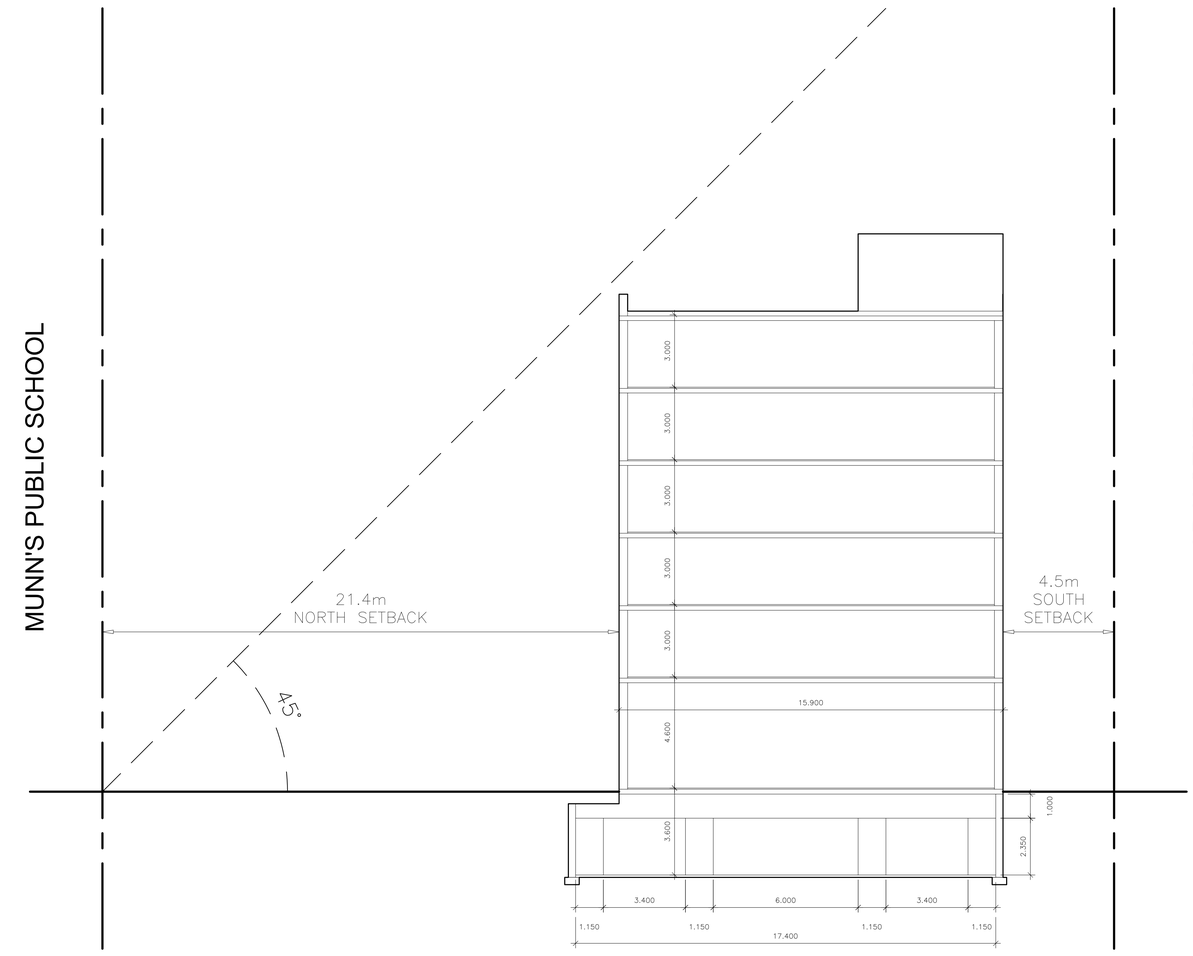
SIXTH LINE
HOUSING

1493 SIXTH LINE, OAKVILLE

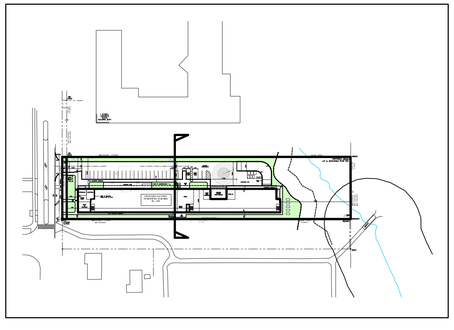
CONCEPT ELEVATIONS

SCALE 1:150

A-2.1



1 SITE SECTION
A-3.1 SCALE: 1:100



pml.A

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PENALTA

Revisions:

Date:	Particular:

Issue:

Date:	Particular:
APR.09.25	ISSUED FOR REVIEW
AUG.08.25	ISSUED FOR APPLICATION
JAN.01.26	ISSUED FOR S.P. APPLICATION

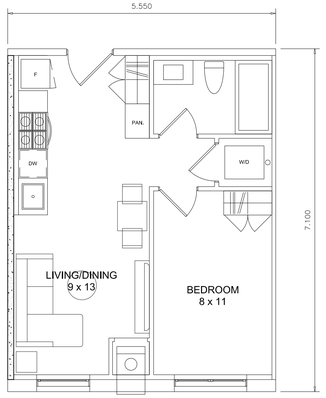
SIXTH LINE HOUSING

1493 SIXTH LINE, OAKVILLE

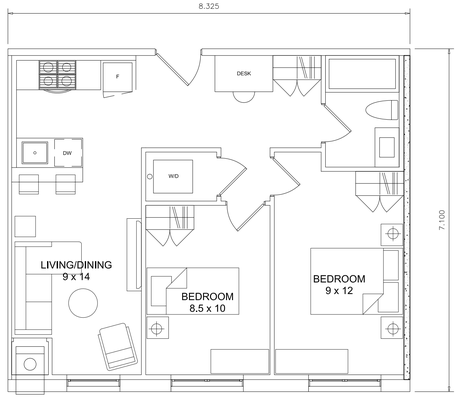
SITE SECTION

SCALE 1:100

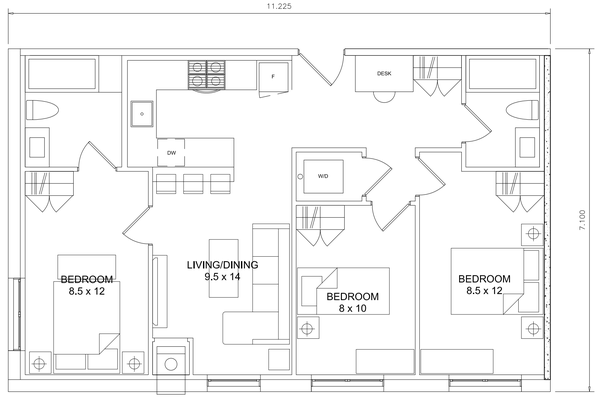
A-3.1



1 1br STANDARD UNIT (425 sf)
A-5.1 SCALE: 1:50



2 2br STANDARD UNIT (635 sf)
A-5.1 SCALE: 1:50



3 3br STANDARD UNIT (860 sf)
A-5.1 SCALE: 1:50

pml.A

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PENALTA

Revisions:

Date:	Particular:

Issue:

Date:	Particular:
MAY.22.25	ISSUED FOR REVIEW
AUG.08.25	ISSUED FOR APPLICATION
JAN.01.26	ISSUED FOR S.P. APPLICATION

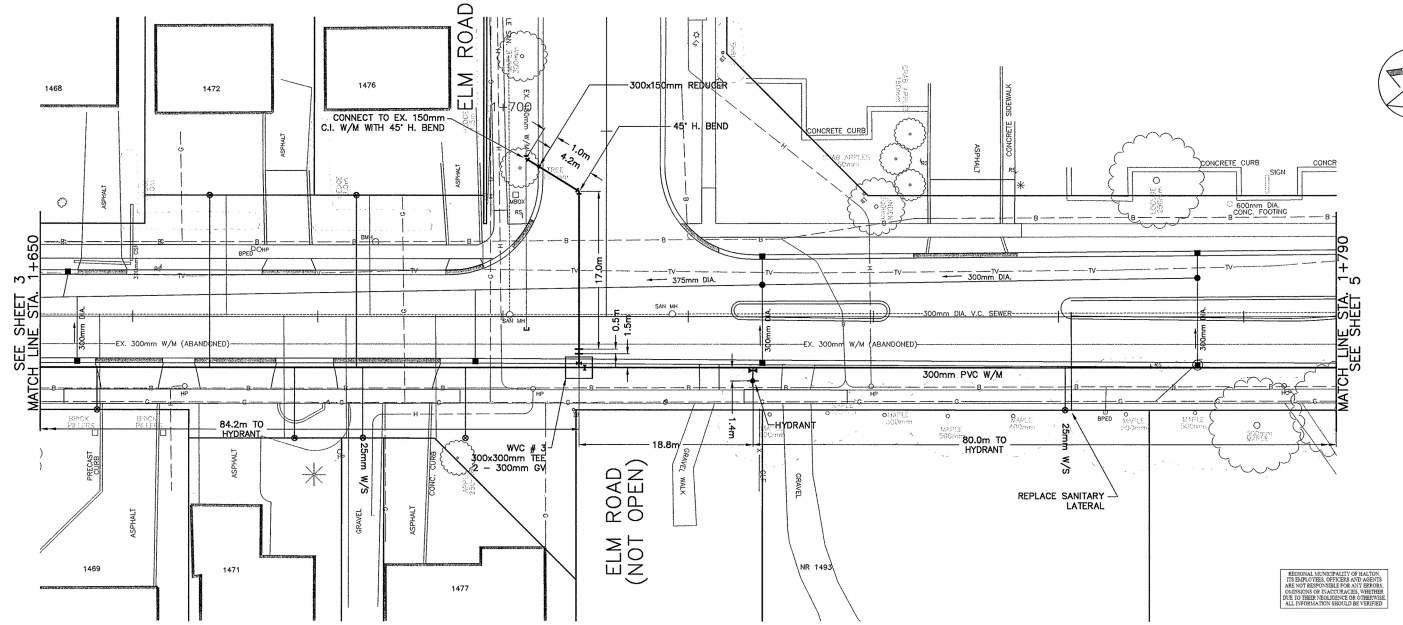
SIXTH LINE
HOUSING

1493 SIXTH LINE, OAKVILLE

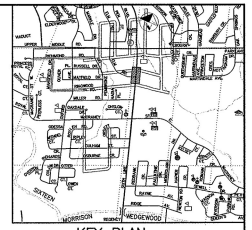
UNIT PLANS

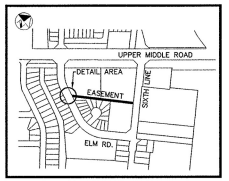
SCALE 1:50

A-5.1

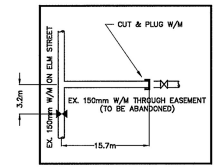


SIXTH LINE

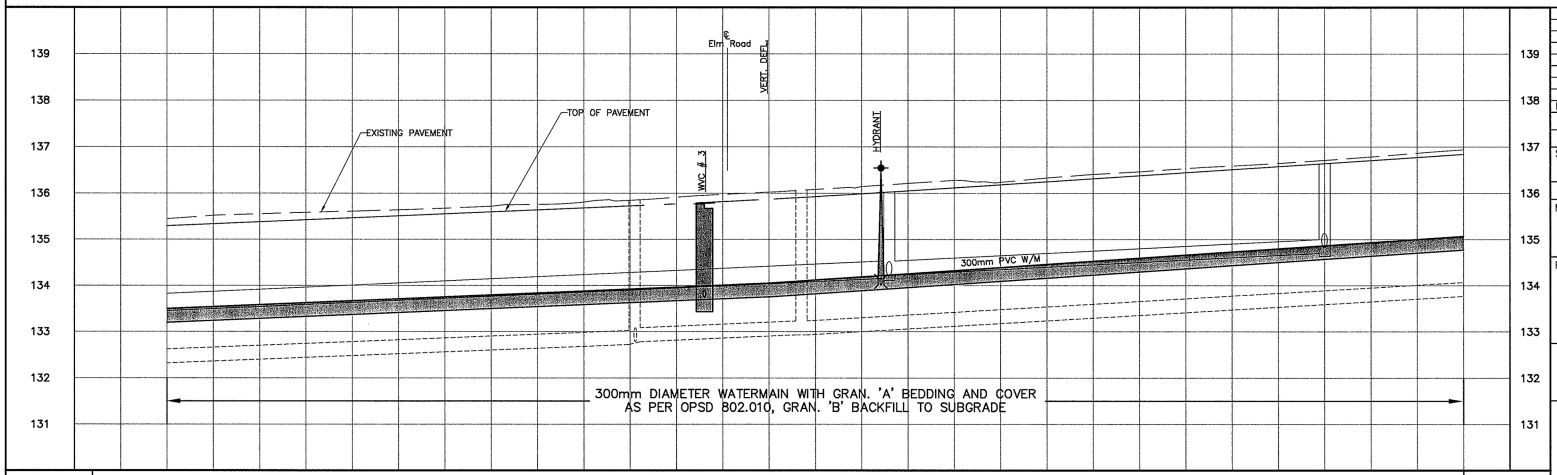




LOCATION OF W/M ABANDONMENT
N.T.S.



DETAIL OF W/M ABANDONMENT ON ELM STREET AT END OF EASEMENT
N.T.S.



CENTRELINE ELEVATIONS		CENTRELINE ELEVATIONS
WATERMAIN INVERTS	160.0m @ 0.85% — 133.75 — 165.0m @ 1.36%	WATERMAIN INVERTS
STORM SEWER INVERTS		STORM SEWER INVERTS
CHAINAGE	1+650, 1+660, 1+680, 1+700, 0+715, 1+720, 1+740, 1+760, 1+780	CHAINAGE

O- 12110

NO	Date	By	REVISIONS		MANU CAD
	JUNE '04	D.C.	AS CONSTRUCTED		X
Design	B.K.	Ch'kd	B.K.	Date	APRIL, 2003
Drawn	D.C.	Ch'kd	B.K		
Scale	Horiz. 1:2.5 0 2.5 5			References	
	Vert. 1:0.5 0 0.5 1.0				
APPROVALS				Field Notes	
Municipal					
Regional				Stamp	
Director, Engineering Services					
Manager, Design Services					

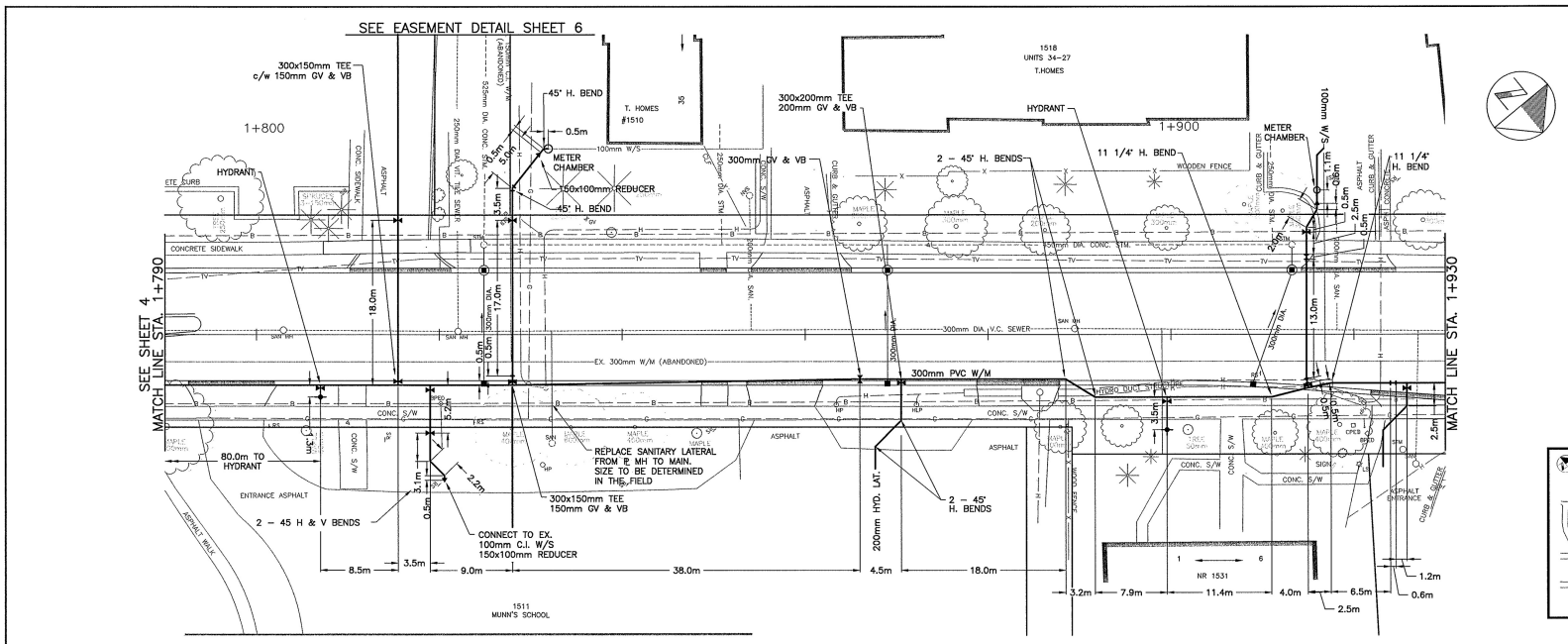
MUNICIPALITY

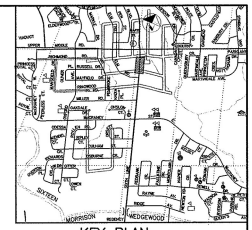
REGIONAL MUNICIPALITY OF Halton — TOWN OF OAKVILLE

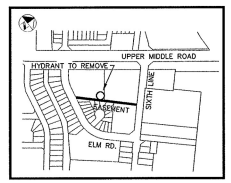
TITLE

WATERMAIN REPLACEMENT ON SIXTH LINE
FROM MCCRANEY STREET TO UPPER MIDDLE ROAD
IN THE TOWN OF OAKVILLE

Consultant File NO	Regional Drawing NO O- 12110
CONTRACT NO (PR-2199) R-375-02	Drawing NO SHEET 4 OF 6

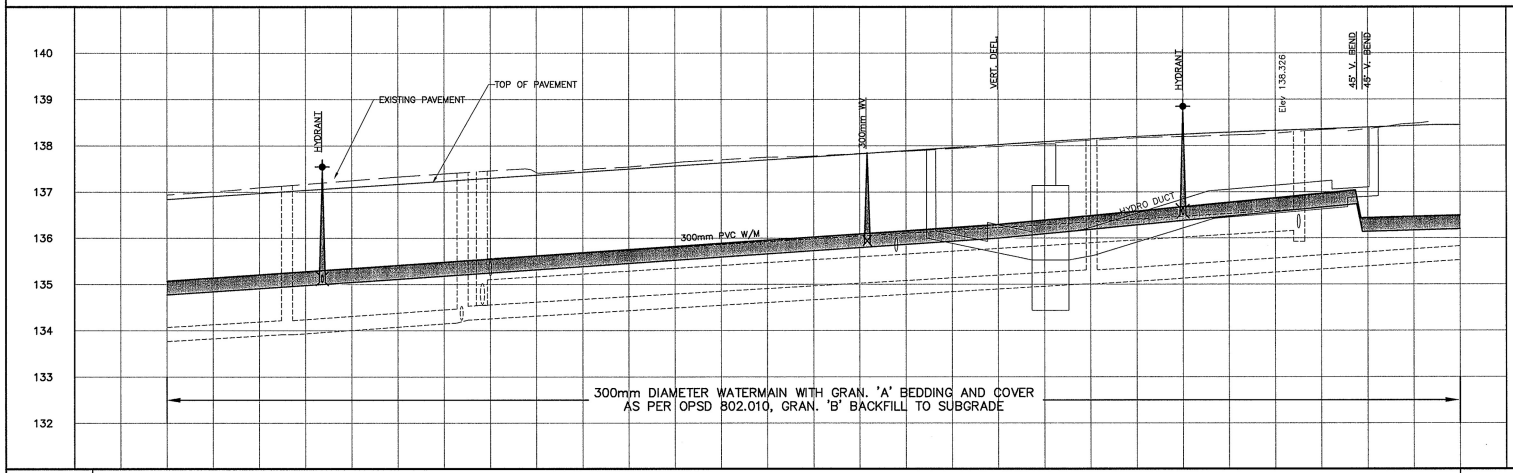






LOCATION OF EX. HYDRANT TO BE REMOVED
HALTON CONDO # 11
N.T.S.

SIXTH LINE



CENTRELINE ELEVATIONS		CENTRELINE ELEVATIONS
WATERMAIN INVERTS	165.0m @ 1.36% — 136.00 — 44.0m @ 1.68% — 136.74 — 136.14	WATERMAIN INVERTS
STORM SEWER INVERTS	0.60m @ 100% — 17.9m @ 0.71%	STORM SEWER INVERTS
CHAINAGE	1+790, 1+800, 1+820, 1+840, 1+860, 1+880, 1+900, 1+920, 1+924, 1+924.6	CHAINAGE

NO	Date	By	REVISIONS	MANU CAD
	JUNE 04	D.C.	AS CONSTRUCTED	X
1	JUNE 03	D.C.	PLAZA CON. LOCATION CHANGED	X

Design	B.K.	Ch'kd	B.K.	Date APRIL, 2003
Drawn	D.C.	Ch'kd	B.K	
Scale Horiz. Vert.				References
APPROVALS				Field Notes
Municipal				Stamp
Regional				

Director, Engineering Services

Manager, Design Services

MUNICIPALITY

REGIONAL MUNICIPALITY OF Halton

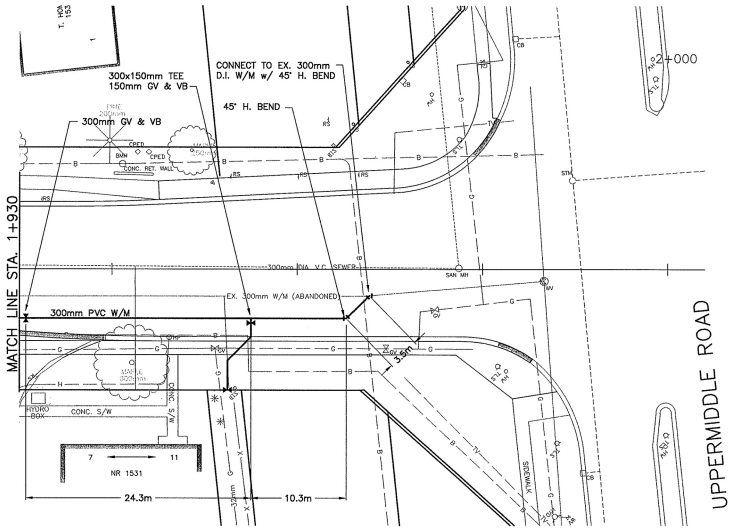
TOWN OF OAKVILLE

TITLE

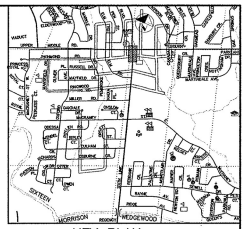
WATERMAIN REPLACEMENT ON SIXTH LINE
FROM MCCRANEY STREET TO UPPER MIDDLE ROAD
IN THE TOWN OF OAKVILLE

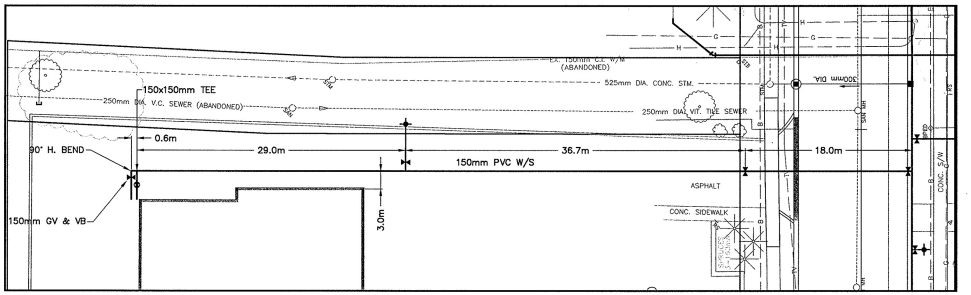
Consultant File NO	Regional Drawing NO O- 12111
CONTRACT NO (PR-2199) R-375-02	Drawing No. SHEET 5 OF 6

O- 12111

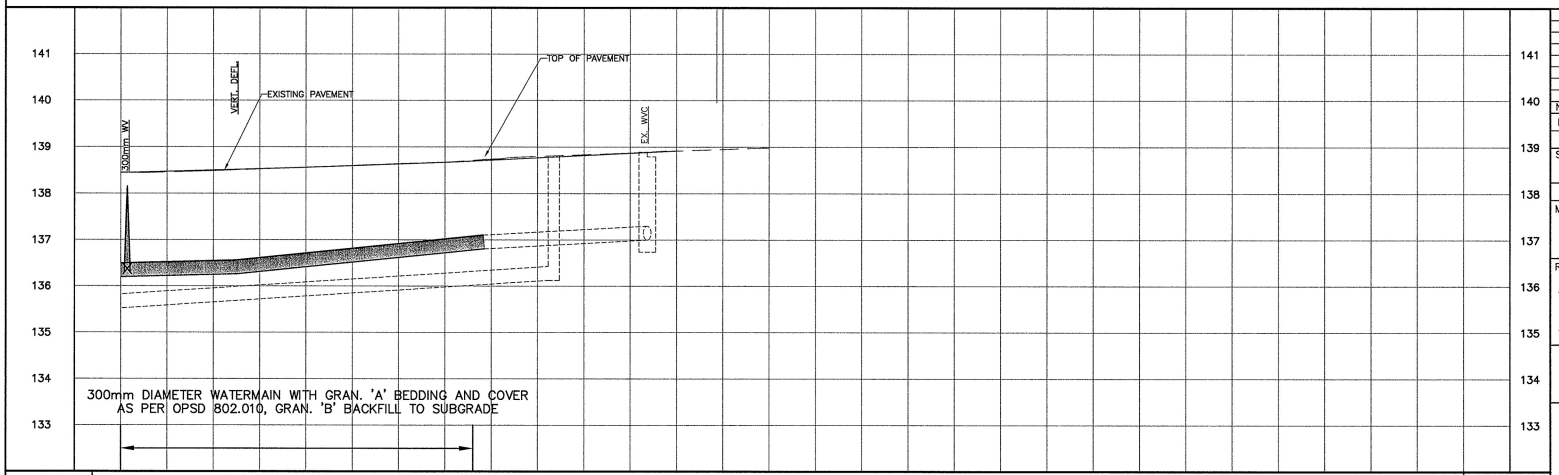


SIXTH LINE





DETAIL OF 150mm WATER SERVICE
FOR 1500 SIXTH LINE
FROM SHEET 5



CENTRELINE ELEVATIONS	
WATERMAIN INVERTS	17.9m @ 0.71% — 135.06 — 25.5m @ 1.73% — 135.70
STORM SEWER INVERTS	
CHAINAGE	1+930, 1+940, 1+942.5, 1+960, 1+968, 1+980, 2+000

O- 12112

NO	Date	By	REVISIONS	MANU CAD
	JUNE 04	D.C.	AS CONSTRUCTED	X
2	JUNE 03	D.C.	SIZE OF W/S HAS CHANGED	X
1	JUNE 03	D.C.	PLAZA CON. LOCATION CHANGED	X

Design B.K. Ch'kd B.K. Date APRIL, 2003
Drawn D.C. Ch'kd B.K
Scale Horiz. Vert.
References
Field Notes
Stamp

APPROVALS
Municipal
Regional
Director, Engineering Services
Manager, Design Services

MUNICIPALITY
REGIONAL MUNICIPALITY OF Halton
TOWN OF OAKVILLE

TITLE
WATERMAIN REPLACEMENT ON
SIXTH LINE
FROM MCCRANEY STREET
TO UPPER MIDDLE ROAD
IN THE TOWN OF OAKVILLE

Consultant File NO
Regional Drawing NO O- 12112
CONTRACT NO (PR-2199) R-375-02
Drawing No SHEET 6 OF 6

FORWARD ENGINEERING
& ASSOCIATES INC.
Geotechnical, Environmental, Inspection & Material Testing Services
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9, Tel: (416)798-3500, Fax:(416)798-8481

REPORT

GEOTECHNICAL INVESTIGATION

PROPOSED MULTI-STOREY RESIDENTIAL DEVELOPMENT
1493 SIXTH LINE
OAKVILLE, ONTARIO

PREPARED FOR:

PENALTA GROUP LTD.
504 Iroquois Shore Road, Unit 12B
Oakville, Ontario
L6H 3K4

June 05, 2025
Ref. No. G7481

Distribution: 1 PDF Copy – PENALTA GROUP LTD.
1 PDF Copy – FORWARD ENGINEERING & ASSOCIATES INC.

Contents

LIST OF ENCLOSURES:

BOREHOLE LOCATION PLAN - DRAWING NO. 1

PERMANENT DRAINAGE - DRAWINGS NOS. 2

LOG OF BOREHOLE SHEETS (1 to 12) - APPENDIX A

INTRODUCTION

This report presents the results of the geotechnical investigation carried out by Forward Engineering & Associates Inc. for the proposed residential development at 1493 Sixth Line in Oakville, Ontario.

The location of the proposed development in relation to the property boundaries, and adjacent roadways is shown on Drawing No. 1, which also depicts the proposed Site Plan as well. The locations of the boreholes carried out during this investigation are also presented on Drawing No. 1.

This investigation was authorized by Mr. Alen Ghaderi of Penalta Group Ltd.

PURPOSE AND SCOPE

The objectives (purpose) of this investigation were to determine the following:

- The extent, depth and properties of the predominant fill/soil strata as they affect the design and construction of the proposed development.
- The short-term groundwater levels, if encountered.
- The appropriate geotechnical design criteria for building foundations, excavations, backfill, slab construction, utilities and pavement.

To achieve the above noted objectives, the field program consisted of twelve [12] boreholes extended to a depth ranged from 1.65 to 4.67 m below the Existing Ground Surface Level (EGSL).

On completion of the field and laboratory work, an engineering analysis was carried out, and this summary report was prepared.

PROPOSED DEVELOPMENT

We understand, based on the reviewed Site Plan, that the proposed new development will consist of the following:

- Demolition of the existing detached wood-framed dwelling, with a basement and an attached garage, at 1493 Sixth Line property site in Oakville, ON.

- Construction of [five] 5-storey housing development, with a single level of basement.
- In addition, the first floor and remaining spaces will be utilized for amenity space, daycare, parking spaces, as well as landscaped and natural areas.

FIELD AND LABORATORY TESTING

Field Works

Borehole Investigation:

The field work for the borehole investigation consisted of twelve [12] boreholes (BH-1 to BH-12), drilled on March 27 and 28, 2025, under the supervision of a member of our staff.

The drilled boreholes were located at the approximate locations shown on Drawing No. 1 and extended to a depth ranging from about 1.60 to 4.67 m below the EGSL.

Soils were sampled in the boreholes following the Standard Penetration Test (SPT) method using a D-50 Track Mounted Auger Drill Rig using Rotary Drilling with Split Spoon Samplers.

The samples were logged in the field and appropriately stored in plastic bags and re-examined in more detail in the laboratory. The samples will be stored for a period of three months and then discarded, unless we are instructed differently.

Groundwater observations were made in the open boreholes, during and upon completion of the drilling operation. The results are recorded on the Log of Borehole sheets attached in Appendix A.

Elevations referred to in this report are metric and geodetic. The ground level elevations at the borehole locations were interpolated from the *Sketch Illustrating Topographic Information* drawing dated May 12, 2025, by David B. Searles Surveying Ltd., and provided to us by the client.

Laboratory Testing

Laboratory testing consisted of determination of the in-situ moisture content of the retrieved and representative soil samples.

SITE CONDITIONS

Surface Conditions

The site is located at 1493 Sixth Line, Oakville, Ontario.

For this description it will be assumed that the north bearing is parallel to the nearest road which is Sixth Line. At the time of this investigation the dwelling on site was vacant.

The site condition, as observed during our site visit April 27, 2025, is presented in the following *Table No. 1*.

Table 1 - Site Surface Observations

East Boundaries:	Oakville Park.
North Boundaries:	Institutional building (Munn's Public School).
West Boundaries:	Sixth Line.
South Boundaries:	Oakville Park.
Surface Coverage:	The site predominantly consists of landscaping. A small portion consists of a gravel driveway and house footprint. The landscaping at the rear contains mature trees.
Ground Level:	The topography of the site is generally flat. *It should be noted that the east side of the property (rear of existing house), which previously contained significant number of mature trees, recently had trees removed resulting in uneven ground.*
Ditches:	None observed.
Berms/Stockpiles:	None observed.
Existing Structures:	Vacant residential dwelling with single level basement.
Proposed/Intended Land Use:	Residential.

Subsurface Conditions

Borehole Investigation Findings:

The subsurface conditions encountered at the borehole locations are shown on the

Log of Borehole sheets, presented in Appendix A, and can be summarized as follows:

Topsoil/Organic Soil	A layer of topsoil/organic soil was encountered at the surface of all the boreholes, except BH-6 and BH-9, with a thickness ranging from about 150 to 350 mm. *The east side of the property (rear of existing house), which had a significant number of mature trees removed, had uneven ground with varying organic soil thicknesses. It should be noted that the measurements of this layer are not considered accurate to be used for estimate purposes.*
Fill/Disturbed Soil	A layer of Fill/Disturbed soil was found at the surface or below the topsoil layer in all the boreholes and extended to a depth ranging from about 0.76 to 1.52 m below the EGSL. This stratum generally consisted of reddish-brown clayey silt/silty clay with minor traces of rootlets and occasional organics and gravel in the upper zone. This stratum was observed in mostly very moist to wet state and in very loose to loose state of packing. *For more accurate description of this layer, and for a more accurate depth, test pits are required.*
Shale Till	Shale Till was encountered below the fill/disturbed soil in all the boreholes, except BH-6, BH-8, BH-9 and BH-12, and extended to a depth ranging from about 1.52 to 3.05 m below the EGSL. Occasionally in some of the boreholes this till encountered shale fragments. This red till was observed in moist state and found in hard consistency.
Highly Weathered Shale	Hard, red, and moist Highly Weathered Shale was below the fill/disturbed soil or shale till layers, and it extended to the maximum explored depth

Groundwater	Groundwater level observations were made during and immediately upon the completion of the drilling investigation. The results are summarized in the following *Table 2*, as shown:

Table 2a: Groundwater &Cave-in Observations Upon Completion of Drilling

Borehole No.	Borehole Depth (m)	Cave-in Depth Below EGSL (m)	Groundwater Depth Below EGSL (m)
BH-1	3.10	Open	Dry
BH-2	2.34	Open	Dry
BH-3	2.41	Open	Dry
BH-4	2.36	Open	Dry
BH-5	4.67	4.3	Dry
BH-6	1.60	Open	Dry
BH-7	1.65	Open	Dry
BH-8	1.91	Open	Dry
BH-9	1.65	Open	Dry
BH-10	1.98	Open	Dry
BH-11	1.65	Open	Dry
BH-12	1.65	Open	Dry

It should be noted, however, that the groundwater levels are subject to seasonal fluctuations. Consequently, definitive information on the long-term groundwater levels could not be obtained at the present time.

GEOTECHNICAL DISCUSSION AND RECOMMENDATIONS

Foundations

We understand that the proposed multi-storey building will consist of [five] 5-storey housing units and commercial building levels with a single basement/underground level. The ground Finished Floor Elevation (FFE), basement/underground) finished floor level, and structural loads are not known at this stage.

Conventional Spread/Strip Footings

The proposed building(s) can be supported on the conventional strip/spread footings established mainly within the native undisturbed, hard weathered shale [bedrock] at/or below the founding depths/elevations presented in Table 3, shown below.

The size of the footings can be proportioned to the following bearing resistances**:**

Factored Bearing Resistance at Ultimate Limit State (ULS) = 1050 kPa

Bearing Resistance at Serviceability Limit State (SLS) = 750 kPa

Table 3 –Founding Depth/Elevation of Strip/Spread Footings

Borehole No.	*Borehole Ground Surface Elevation (m)*	*Founding Depth Below EGSL at/or below*	*Founding Elevation (at/or below)*
1	136.55	2.30 m	134.25 m
2	136.75	1.50 m	135.25 m
3	136.65	1.50 m	135.15 m
4	136.5	1.50 m	135.00 m
5	136.47	3.05 m	133.42 m
6	137.25	1.50 m	135.75 m
7	136.65	1.50 m	135.15 m
8	136.29	1.50 m	134.79 m

Foundations Notes

When exposed to weathering and atmospheric actions, the otherwise freshly excavated intact and sound shale surfaces will suffer from degradation/deterioration and time-dependent loss of strength/stiffness. Therefore, it is imperative to place the concrete for readily excavated footings without delay or applying a high compressive strength concrete levelling layer/mud mat, at least 75 mm thick, to be poured on approved bearing surface of the sound bedrock prior to actual footing construction. In summary exposure of the shale bedrock should be kept to a minimum.

Adjacent footings founded at different elevations should be stepped at 10 horizontal to 7 vertical. For frost protection requirements, all exterior footings and footings unheated areas, must have a minimum soil cover of 1.2 m.

Maximum total settlements of conventional strip/spread footings designed and constructed in accordance with the above recommendations should be less than the total tolerable limit of 25 mm. The differential settlements are expected to be less than 19 mm.

Furthermore, the recommended bearing capacity and foundation depths have been calculated from the limited borehole information and are intended for design purposes only.

More specific information, with respect to founding conditions between the boreholes will become available when the proposed construction is underway. Therefore, the encountered founding conditions must be verified in the field, and all footings must be inspected by this office, before placement of concrete.

Earthquake Considerations

For structural design seismic consideration, the seismic provisions of the Ontario Building Code (**OBC** 2024) outline the Classification of sites for Seismic Site Response in Table 4.1.8.4.-B of the National Building Code of Canada (**NBC**) 2020.

According to Table 4.1.8.4.-B of the code, and this investigation findings, the subject Seismic Site Class is selected as Class “C”.

Basement and Underground Walls

Basement and underground/retaining walls should be designed to resist a pressure "p", at any depth, "h" below the surface, as given by the expression **:**

$$p = 0.45 [\gamma h + q]$$

where; 0.45 is the earth pressure coefficient considered applicable

$\gamma = 21.0$ kN/m^3 is the unit weight of granular backfill

q = an allowance for surcharge.

The foregoing equation assumes that perimeter drains will be provided and that the backfill against the subsurface walls would be a free draining granular material.

Excavation and Backfill

No major problems should be encountered for the anticipated depth of excavation. The excavation should be back sloped at 45 degrees or flatter in accordance with the current Ontario Occupational Health and Safety Act.

The excavation in the till and weathered shale can be carried out with a heavy duty back-hoe. Some of the relatively harder limestone slabs or seams, interbedded in the weathered shale (shale till), may require the use of jack hammer or hoe ram.

The anticipated water seepage, if any, into the excavations from the more permeable seams/lenses or surface run-off can be handled by conventional pumping methods.

The material to be used for backfilling under floor slab or in-service trenches should be suitable for compaction, i.e., free of organics and with natural moisture content, which is within 2 percent of its optimum moisture content, and no pieces larger than 100 mm in size. The backfill material should be compacted to at least 98 percent of the SPMDD. However, the excavated materials will be very sensitive to moisture content, and the use of Granular B/C is preferred.

The backfill against the subsurface walls, and confined spaces, should be free draining granular fill, preferably conforming to the Ontario Provincial Standard Specification for granular base course, Granular B.

Slab Construction and Permanent Drainage

The floor slabs can be supported and constructed following the standard slab-on-grade technique, provided that any vegetation, organic soil and/or fill with organics must be removed and the base should be thoroughly proof-rolled. Any soft spots revealed during proof-rolling should be sub-excavated and backfilled with suitable materials, compacted to at least 98 % SPMDD.

The ground surface should be adequately and thoroughly compacted to densify the near surface disturbed and loose soils. If needed, raising the grades thereafter should be achieved using suitable fill free of organics and any other deleterious materials or Granular B material, and to be placed in shallow lifts i.e., ±200 mm thick and thoroughly compacted to 98 % SPMDD i.e. "engineered fill"

The floor slabs should rest on a well compacted layer of "19 mm clear stone" at least 200 mm thick when compacted. The stone bed would act as a barrier and prevent capillary rise of moisture from the subgrade to the floor slab.

Permanent perimeter and sub-floor drainage system, as shown in Drawing No. 2, shall be provided. The sub-floor system may be eliminated based on observations during construction.

Underground Utilities

The problem areas of pavement settlement largely occur adjacent to manholes, catch basins and service crossings. The on-site materials would generally be difficult to compact in these areas, and it is therefore recommended that a sand backfill be used in confined areas.

The upper 1.0 m of the trench backfill should be compacted to 98 % SPMDD. Below this zone, a 95 % SPMDD compaction is considered acceptable.

Pavement Design

In the proposed pavement areas any vegetation, topsoil/organic soil and/or fill with noticeable amount of organics should be removed, and the base should be thoroughly proof-rolled. Any soft spots revealed during proof-rolling should be sub-excavated and backfilled with suitable materials, compacted to at least 98 % SPMDD.

The subgrade soil is frost susceptible. The design of pavement is therefore mainly influenced by the need to minimize the effects of freezing and thawing. Consequently, the ground must not be unnecessarily disturbed.

The subgrade should be sloped to facilitate drainage towards catch basins and the final subgrade should be compacted before pavement is constructed.

It should be noted that the subgrade should be dry and firm, not spongy, during compaction and during the construction of the [sub] base. Soft or spongy subgrade areas should also be sub-excavated and properly replaced with suitable approved backfill compacted to 98 % SPMDD.

The subgrade will suffer strength regression if water is allowed to infiltrate into the mantle. Therefore, sub-drains should be installed along the edge of all pavement areas to prevent surface water from infiltrating into the subgrade.

Based on the engineering properties of the subgrade soil, climatic conditions and the anticipated use of the pavement, typical flexible asphaltic pavement designs for this development are as shown in the following Table:

Table 3 - Typical Flexible Asphaltic Pavement Design

Pavement Components	Heavy Duty	Medium Duty
Asphaltic Concrete	40 mm HL3	40 mm HL3
	60 mm HL8	40 mm HL8
19 mm Crushed Limestone	150 mm	150 mm
Granular B Sub-base	300 mm	200 mm

All granular materials used in the construction of pavement should be compacted to 98 % of Standard Proctor maximum dry density.

If the proposed pavements are to be constructed during wet seasons, the moisture content in the subgrade will probably be above the optimum, and this will render its shear strength inadequate to support paving equipment traffic. In this case, the granular sub/base should consist of 50 mm Crusher-Run Limestone.

It should be noted that all pavement materials should meet their relevant OPSS, Halton Region, and Town of Oakville Standard Specification requirements for placement and quality.

General Comments

This geotechnical report is provided based on the terms of reference provided above and, on the assumption, that the design will be in accordance with the applicable codes and standards.

If there is any change in the design features relevant to the geotechnical analyses, or if any questions arise regarding the geotechnical aspects of the codes and standards, this office should be contacted to review the design.

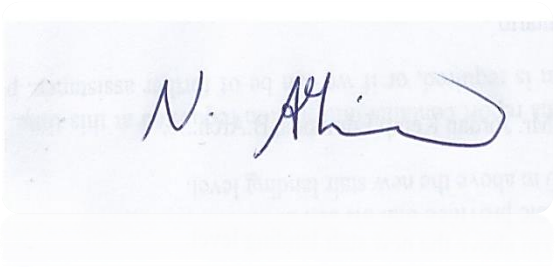
The comments given in this report are intended only for the guidance of design engineers.

Contractors bidding on or undertaking the works should, in this light, decide on their own investigations, as well as their own interpretations of the factual borehole results. This concern specifically applies to the classification of the fill/organic/topsoil cover and the potential reuse of these soils on/off site.

The prospective contractors must draw their own conclusions as to how the near surface and subsurface conditions may affect them.

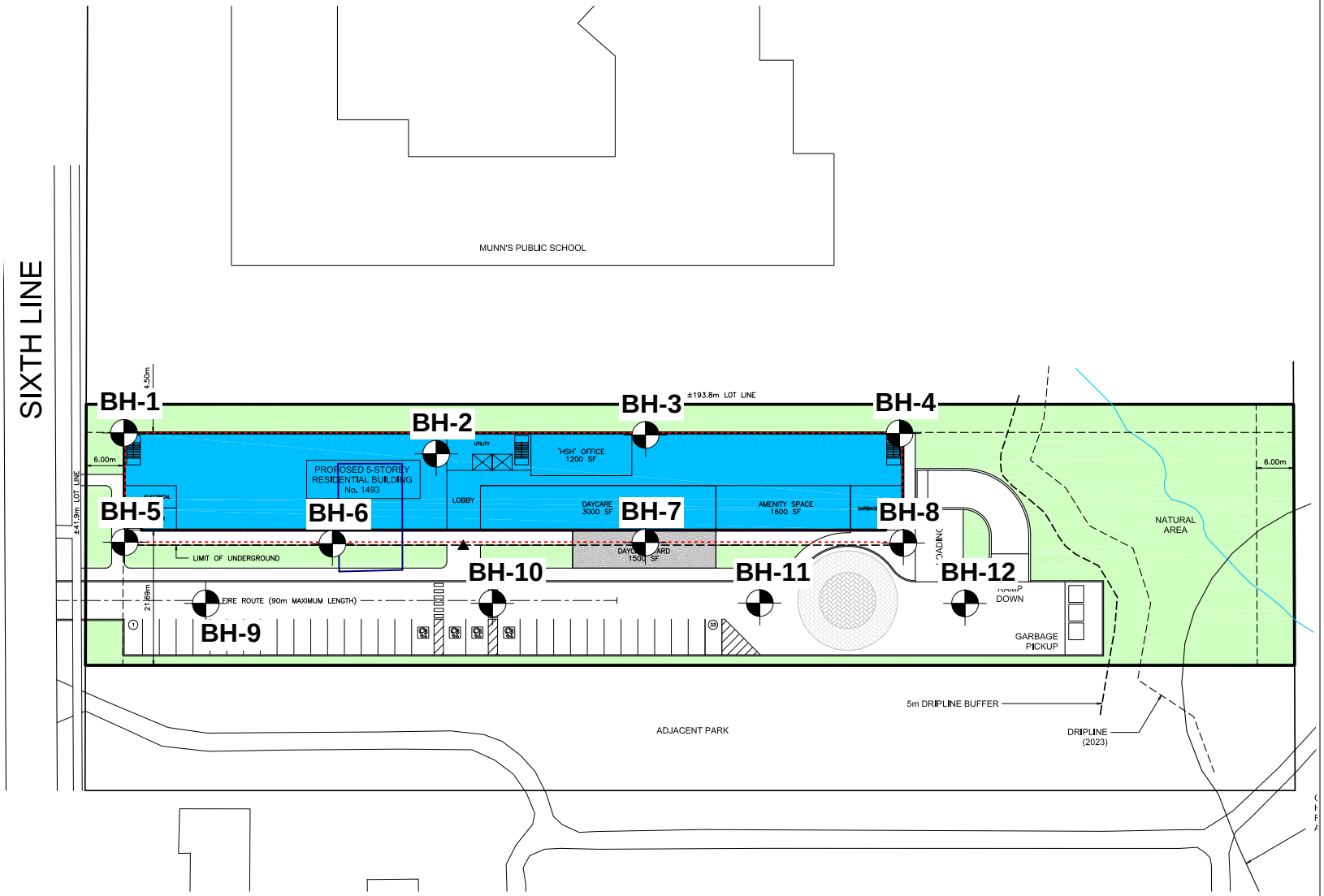
We trust this report contains information requested at this time. However, if any clarification is required, or if we can be of further assistance, please contact this office.

Yours truly,
Forward Engineering & Associates Inc.



Nasser Abdelghani, M.Sc., P.Eng.
Project Geotechnical Engineer

G. S. Semaan, M.Eng., P.Eng.
Principal



NOTES:

BH = BOREHOLE LOCATION

DRAWING No. 1

BOREHOLE LOCATION PLAN

Rev.	DATE	REVISION / ISSUE
04		
03		
02		
01		

Project Name: PROPOSED RESIDENTIAL DEVELOPMENT

Address: 1493 SIXTH LINE, OAKVILLE, ONTARIO

PROJECT No.	:7481
DRAWING DATE	:APR. 14, 2025
DRAWN BY: P.R.	PAGE 1 of 1
CHECKED BY: G.S.	

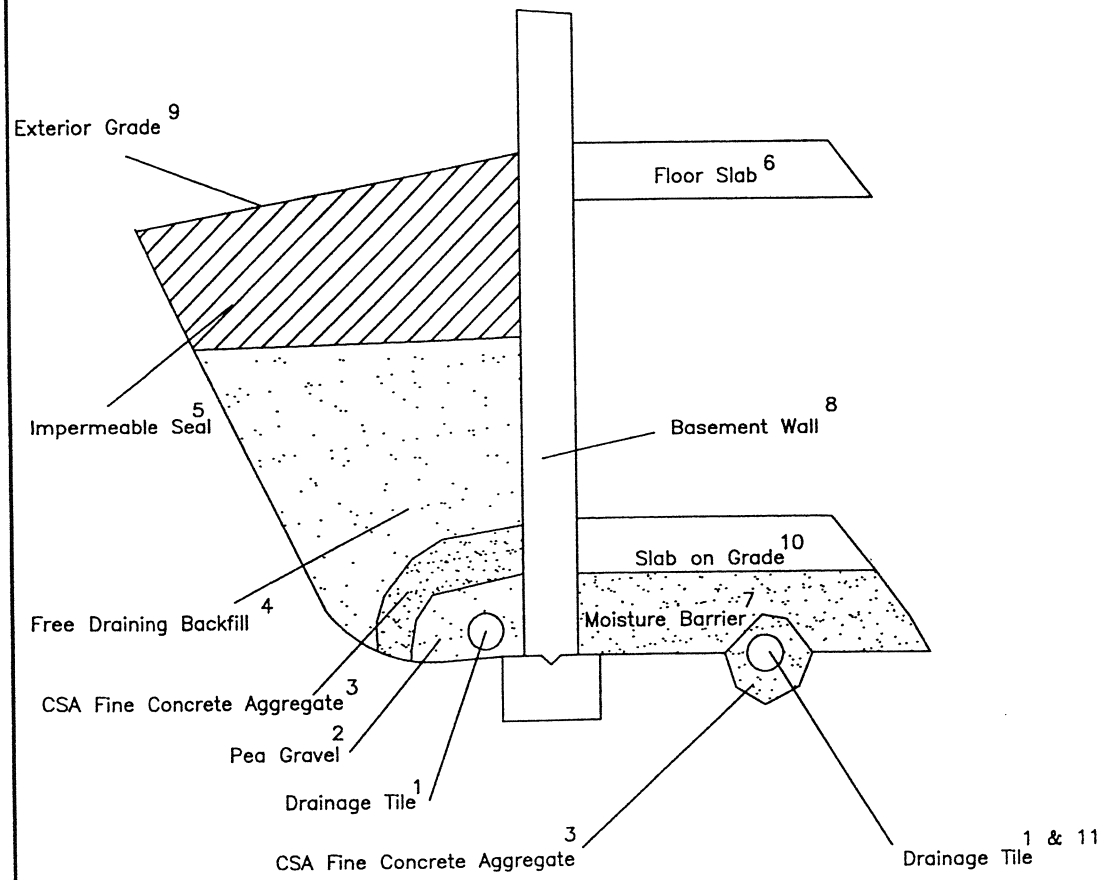
FORWARD ENGINEERING & Associates Inc.

Forward Engineering & Associates Inc.
244 Brockport Drive, Unit 15
Toronto, Ontario M9W 6X9
Tel: 416-798-3500 Fax: 416-798-8481

www.forwardengineering.ca

DRAINAGE AND BACKFILL RECOMMENDATIONS

(Not to Scale)



TYPICAL SECTION

NOTES:

1. Drainage tile to consist of 100 (4") diam. Weeping tile or equivalent perforated pipe leading to a positive sump or outlet. Invert to be minimum 150mm (6") below underside of floor slab.
2. Pea gravel 150mm (6") top and sides of drain. If drain is not on footing, 100 mm (4") of pea gravel below drain. Clear 20mm (3/4") crushed stone may be used provided it is covered by an approved porous membrane (Terrafix 270R or equivalent).
3. C.S.A. Fine aggregate to act as filter material. Minimum 300 mm (12") top and sides of tile drain. This may be replaced by an approved porous plastic membrane as indicated in 2.
4. Free draining backfill - Class B pit-run gravel or equivalent compacted to 93 – 95 % Standard Proctor Maximum Dry Density (SPMDD).
5. Impermeable backfill seal compacted clay, clay silt or equivalent. If original soil is free draining seal may be omitted.
6. Do not backfill until wall is supported by basement and floor slab or adequate bracing.
7. Moisture barrier to consist of 20mm (3/4") compacted crushed stone. Layer to be 200mm (8") thick.
8. Basement walls to be damp proofed.
9. Exterior grade to slope away from wall.
10. Slab on grade should not be structurally connected to wall or footing.
11. Underfloor drain invert to be at least 300 (1') below underside of floor slab. Tiles to be placed in parallel rows 6-8m (20' – 25') centres one way.
12. do not connect the underfloor drains to perimeter drains.
13. If the 20mm (3/4") stone requires surface blinding, use 6mm (1/4") stone chips.

DRAWING NO. 2

APPENDIX A

BOREHOLE LOG SHEETS
(1 – 12)

Project No: 7481

Log of Borehole BH-1

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: PENALTA GROUP LTD.

Enclosure: 2

Location: 1493 SIXTH LINE, OAKVILLE, ONTARIO

Depth (m)	Description of strata	Elevation (m)	Sample No.	Type	Blows/ft	Recovery
0	Ground Surface	136.55				
	TOPSOIL/ORGANIC SOIL (±300 mm)	0.00				
	FILL/DISTURBED SOIL reddish brown clayey silt and silty clay, loose, very moist to wet.	136.25 0.30	1	SS	5	
		135.79 0.76				
1	SHALE TILL with occasional shale fragments. hard, red, moist.		2	SS	41	
			3	SS	100	
2						
	HIGHLY WEATHERED SHALE hard, red, damp to moist.	134.26 2.29	4	SS	100	
3		133.45 3.10	5		100	
	End of Borehole					
4						

Blows/ft: 20 40 60 80

Water Content %: 10 20 30

Monitoring Well

Blows/ft values: 5, 41, 100, 100, 100

Water Content % values: 31.5, 12.0, 8.7, 6.2, 4.0

Remarks: Upon completion of drilling, the borehole was open and dry.

Drill Method: D-50

Drill Date: 27 MARCH 2025

Datum: GEODETIC

FORWARD ENGINEERING & ASSOCIATES INC.
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7481

Log of Borehole BH-2

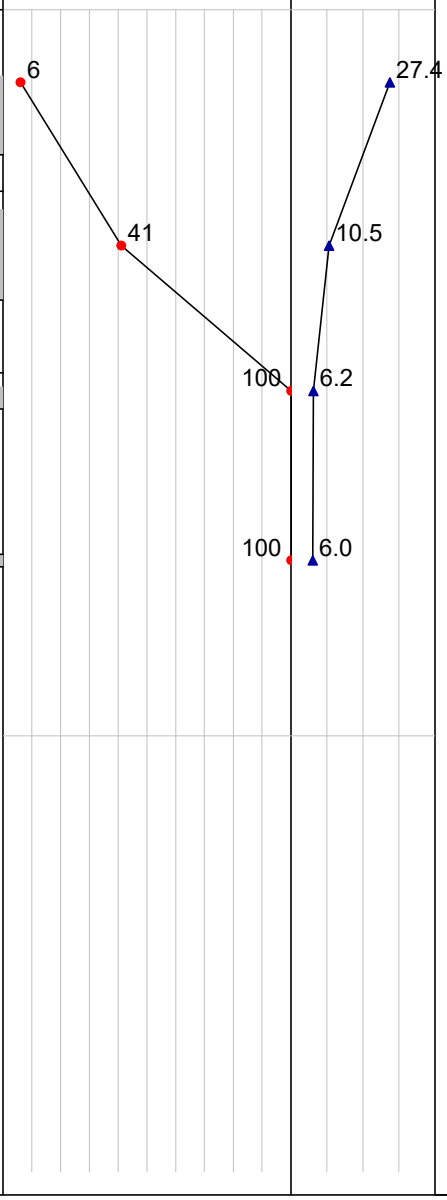
Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: PENALTA GROUP LTD.

Enclosure: 3

Location: 1493 SIXTH LINE, OAKVILLE, ONTARIO

Depth (m)	Description of strata	Elevation (m)	Sample No.	Type	Blows/ft	Recovery
	Ground Surface	136.75				
0	TOPSOIL/ORGANIC SOIL (±230 mm)	0.00				
	FILL/DISTURBED SOIL reddish brown clayey silt with traces of rootlets, loose, very moist to wet.	136.52 0.23	1	SS	6	
		135.99 0.76				
1	SHALE TILL hard, red, moist.		2	SS	41	
	HIGHLY WEATHERED SHALE hard, red, moist.	135.22 1.52	3	SS	100	
2		134.41 2.34	4		100	
	End of Borehole					
3						
4						



Monitoring Well

Remarks: Upon completion of drilling, the borehole was open and dry.

Drill Method: D-50

Drill Date: 27 MARCH 2025

Datum: GEODETIC

FORWARD ENGINEERING & ASSOCIATES INC.
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7481

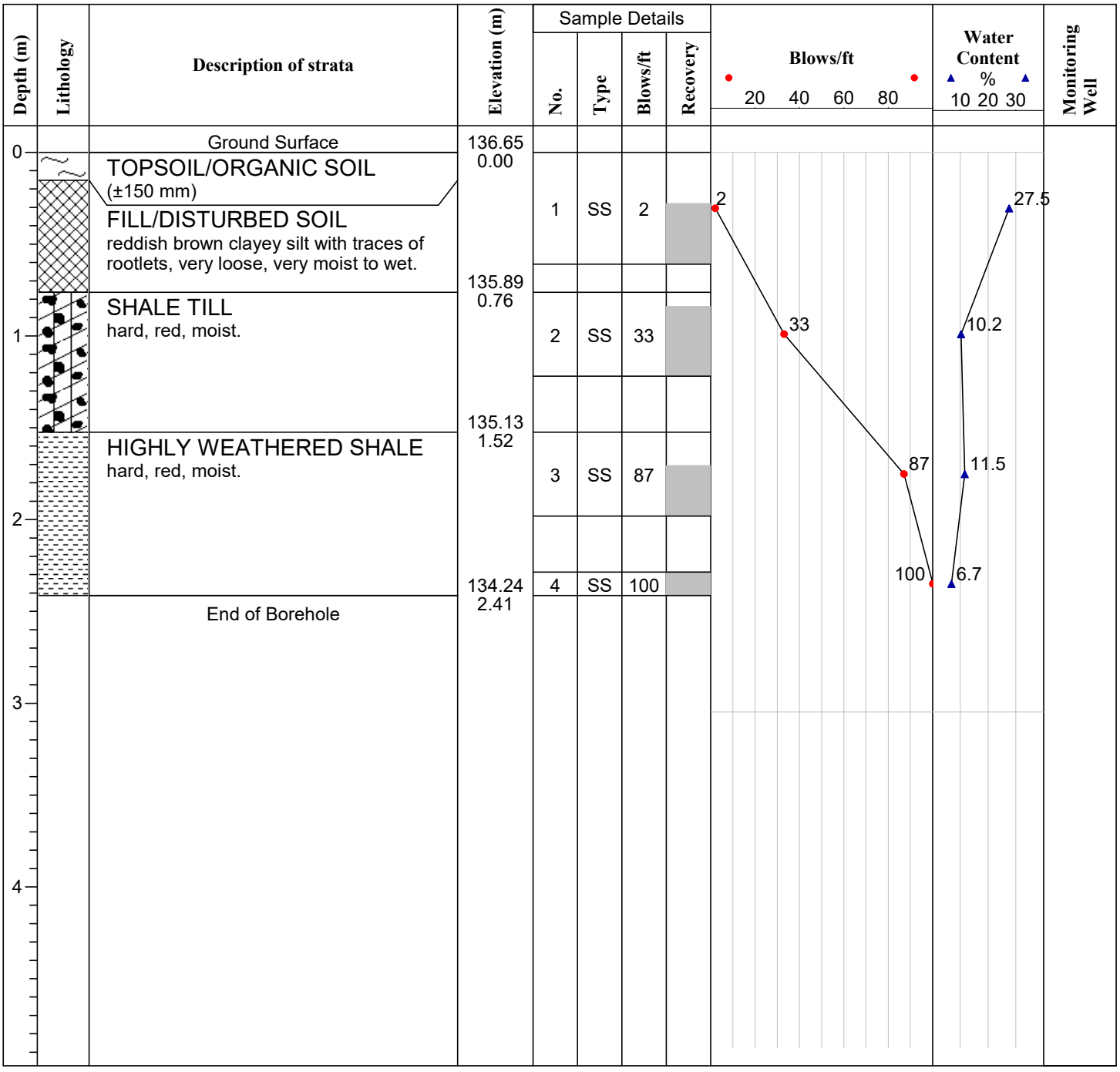
Log of Borehole BH-3

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: PENALTA GROUP LTD.

Enclosure: 4

Location: 1493 SIXTH LINE, OAKVILLE, ONTARIO



Remarks: Upon completion of drilling, the borehole was open and dry.

Drill Method: D-50

Drill Date: 28 MARCH 2025

Datum: GEODETIC

FORWARD ENGINEERING & ASSOCIATES INC.
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7481

Log of Borehole BH-4

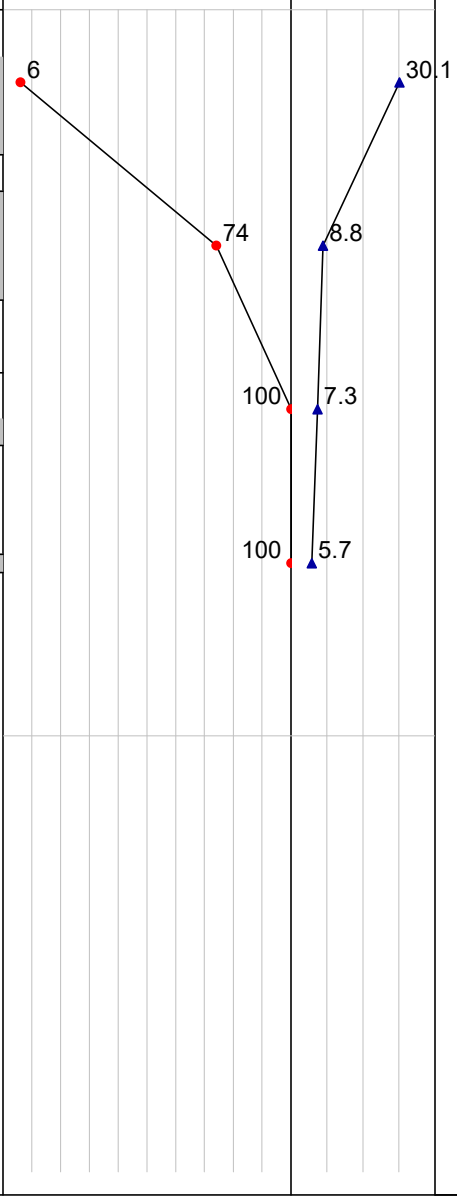
Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: PENALTA GROUP LTD.

Enclosure: 5

Location: 1493 SIXTH LINE, OAKVILLE, ONTARIO

Depth (m)	Description of strata	Elevation (m)	Sample No.	Type	Blows/ft	Recovery
	Ground Surface	136.50				
0	TOPSOIL/ORGANIC SOIL (±350 mm)	0.00				
		136.15	1	SS	6	
	FILL/DISTURBED SOIL reddish brown clayey silt with traces of rootlets, loose, very moist to wet.	0.35				
		135.74				
1	SHALE TILL hard, red, moist.	0.76	2	SS	74	
		134.97				
	HIGHLY WEATHERED SHALE hard, red, moist.	1.52	3	SS	100	
2						
		134.14	4		100	
	End of Borehole	2.36				
3						
4						



Monitoring Well

Remarks: Upon completion of drilling, the borehole was open and dry.

Drill Method: D-50

Drill Date: 28 MARCH 2025

Datum: GEODETIC

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244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7481

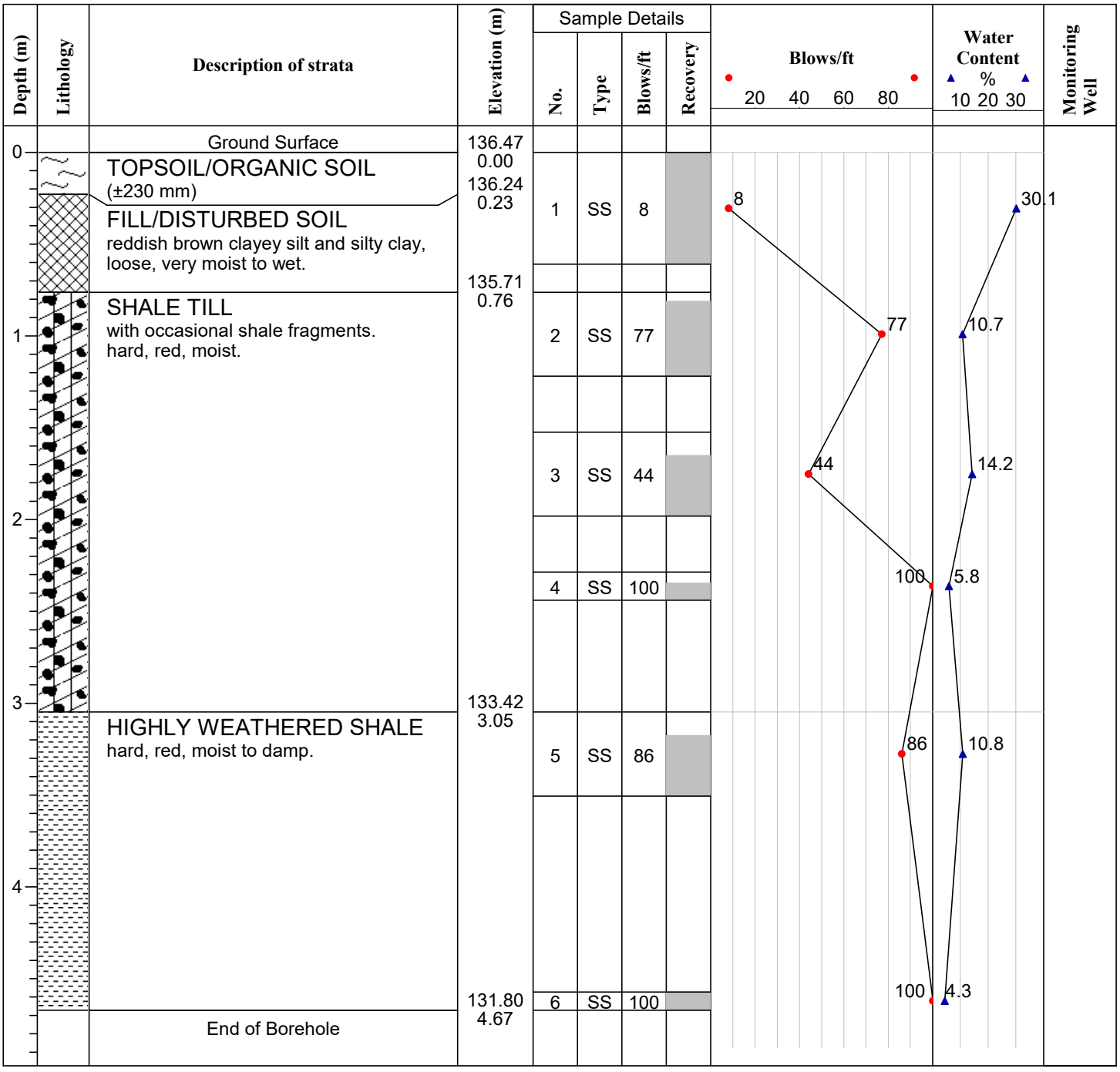
Log of Borehole BH-5

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: PENALTA GROUP LTD.

Enclosure: 6

Location: 1493 SIXTH LINE, OAKVILLE, ONTARIO



Remarks: Upon completion of drilling, the borehole was open to 4.3 m below EGSL and dry.

Drill Method: D-50

Drill Date: 27 MARCH 2025

Datum: GEODETIC

FORWARD ENGINEERING & ASSOCIATES INC.
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7481

Log of Borehole BH-6

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: PENALTA GROUP LTD.

Enclosure: 7

Location: 1493 SIXTH LINE, OAKVILLE, ONTARIO

Depth (m)	Description of strata	Elevation (m)	Sample Details: No.	Type	Blows/ft	Recovery	Blows/ft (20 40 60 80)	Water Content % (10 20 30)	Monitoring Well
0	Ground Surface	137.25							
	FILL/DISTURBED SOIL ±180 mm of crushed granular followed by reddish brown clayey silt with traces of rootlets, very loose, moist.	0.00	1	SS	3		3	12.0	
1	HIGHLY WEATHERED SHALE hard, red, moist.	136.49 0.76	2	SS	100		100	7.9	
		135.65	3		100		100	8.1	
	End of Borehole	1.60							
2									
3									
4									

Remarks: Upon completion of drilling, the borehole was open and dry.

Drill Method: D-50

Drill Date: 28 MARCH 2025

Datum: GEODETIC

FORWARD ENGINEERING & ASSOCIATES INC.
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7481

Log of Borehole BH-7

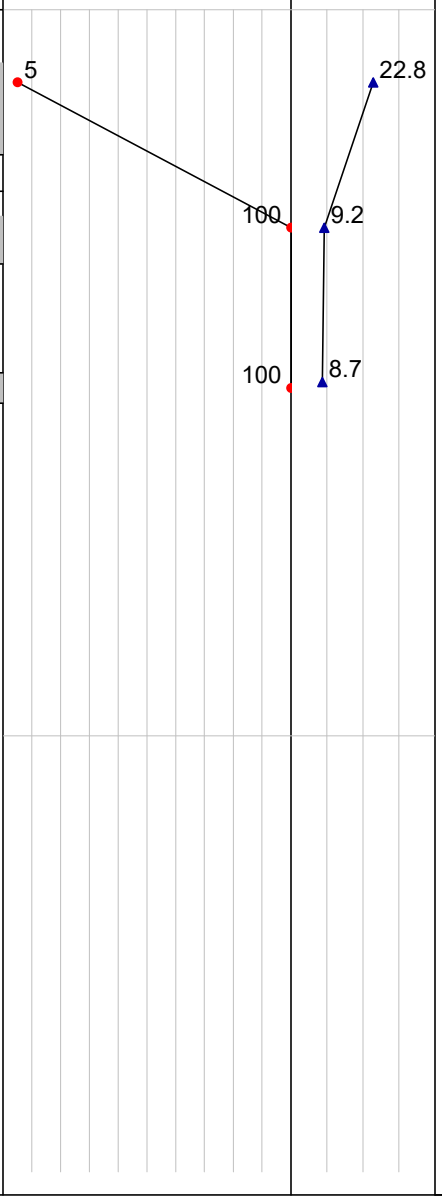
Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: PENALTA GROUP LTD.

Enclosure: 8

Location: 1493 SIXTH LINE, OAKVILLE, ONTARIO

Depth (m)	Description of strata	Elevation (m)	Sample No.	Sample Type	Blows/ft	Recovery
0	Ground Surface	136.65				
	TOPSOIL/ORGANIC SOIL (±350 mm)	0.00				
	FILL/DISTURBED SOIL reddish brown clayey silt with traces of rootlets, loose, very moist.	136.30 0.35	1	SS	5	
	SHALE TILL hard, red, moist.	135.89 0.76	2	SS	100	
1	HIGHLY WEATHERED SHALE hard, red, moist.	135.13 1.52	3	SS	100	
	End of Borehole					
2						
3						
4						



Remarks: Upon completion of drilling, the borehole was open and dry.

Drill Method: D-50

Drill Date: 28 MARCH 2025

Datum: GEODETIC

FORWARD ENGINEERING & ASSOCIATES INC.
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7481

Log of Borehole BH-8

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: PENALTA GROUP LTD.

Enclosure: 9

Location: 1493 SIXTH LINE, OAKVILLE, ONTARIO

Depth (m)	Description of strata	Elevation (m)	Sample Details: No.	Type	Blows/ft	Recovery
0	Ground Surface	136.29				
	TOPSOIL/ORGANIC SOIL (±250 mm)	0.00				
	FILL/DISTURBED SOIL: reddish brown clayey silt with traces of rootlets, loose, very moist to wet.	136.04 0.25	1	SS	7	
		135.53 0.76				
1	HIGHLY WEATHERED SHALE: hard, red, moist.		2	SS	100	
			3	SS	100	
2	End of Borehole	134.39 1.91				
3						
4						

Blows/ft: 20 40 60 80 — 7, 100, 100

Water Content % (10 20 30): 28.2, 13.5, 14.7

Monitoring Well

Remarks: Upon completion of drilling, the borehole was open and dry.

Drill Method: D-50

Drill Date: 28 MARCH 2025

Datum: GEODETIC

FORWARD ENGINEERING & ASSOCIATES INC.
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7481

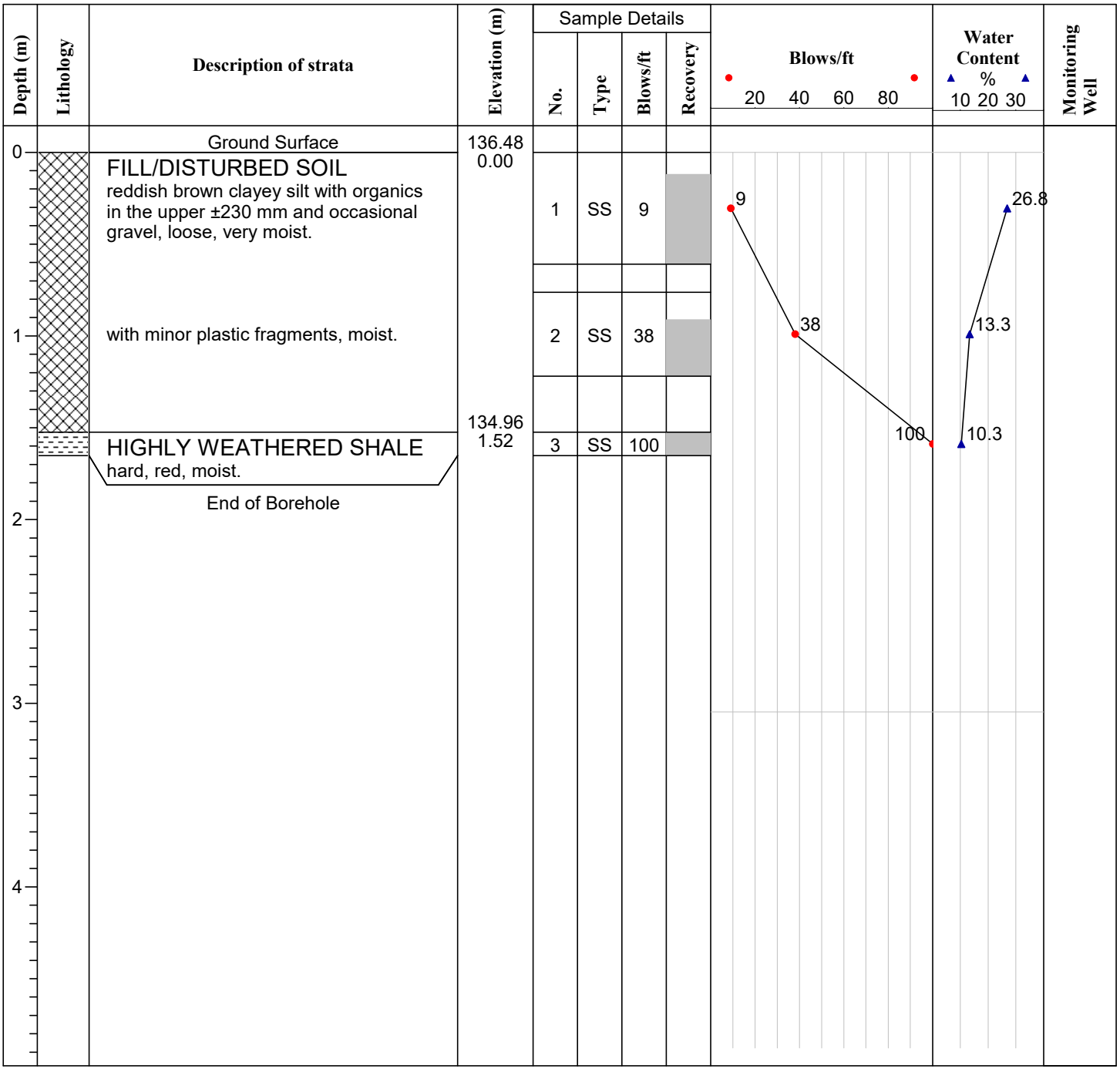
Log of Borehole BH-9

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: PENALTA GROUP LTD.

Enclosure: 10

Location: 1493 SIXTH LINE, OAKVILLE, ONTARIO



Remarks: Upon completion of drilling, the borehole was open and dry.

Drill Method: D-50

Drill Date: 27 MARCH 2025

Datum: GEODETIC

FORWARD ENGINEERING & ASSOCIATES INC.
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9

Engineer: P.R.

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Sheet No. 1 of 1

Project No: 7481

Log of Borehole BH-10

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: PENALTA GROUP LTD.

Enclosure: 11

Location: 1493 SIXTH LINE, OAKVILLE, ONTARIO

Depth (m)	Description of strata	Elevation (m)	Sample No.	Sample Type	Blows/ft	Recovery	Blows/ft (20 40 60 80)	Water Content % (10 20 30)	Monitoring Well
0	Ground Surface	136.50							
	TOPSOIL/ORGANIC SOIL (±300 mm)	0.00	1	SS	3		3	32.6	
	FILL/DISTURBED SOIL reddish brown clayey silt, very loose, very moist to wet.	136.19 0.30							
		135.74 0.76							
1	SHALE TILL hard, red, moist.		2	SS	46		46	9.9	
		134.97 1.52							
	HIGHLY WEATHERED SHALE hard, red, moist.		3	SS	81		81	9.3	
2		134.52 1.98							
	End of Borehole								
3									
4									

Remarks: Upon completion of drilling, the borehole was open and dry.

Drill Method: D-50

Drill Date: 27 MARCH 2025

Datum: GEODETIC

FORWARD ENGINEERING & ASSOCIATES INC.
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7481

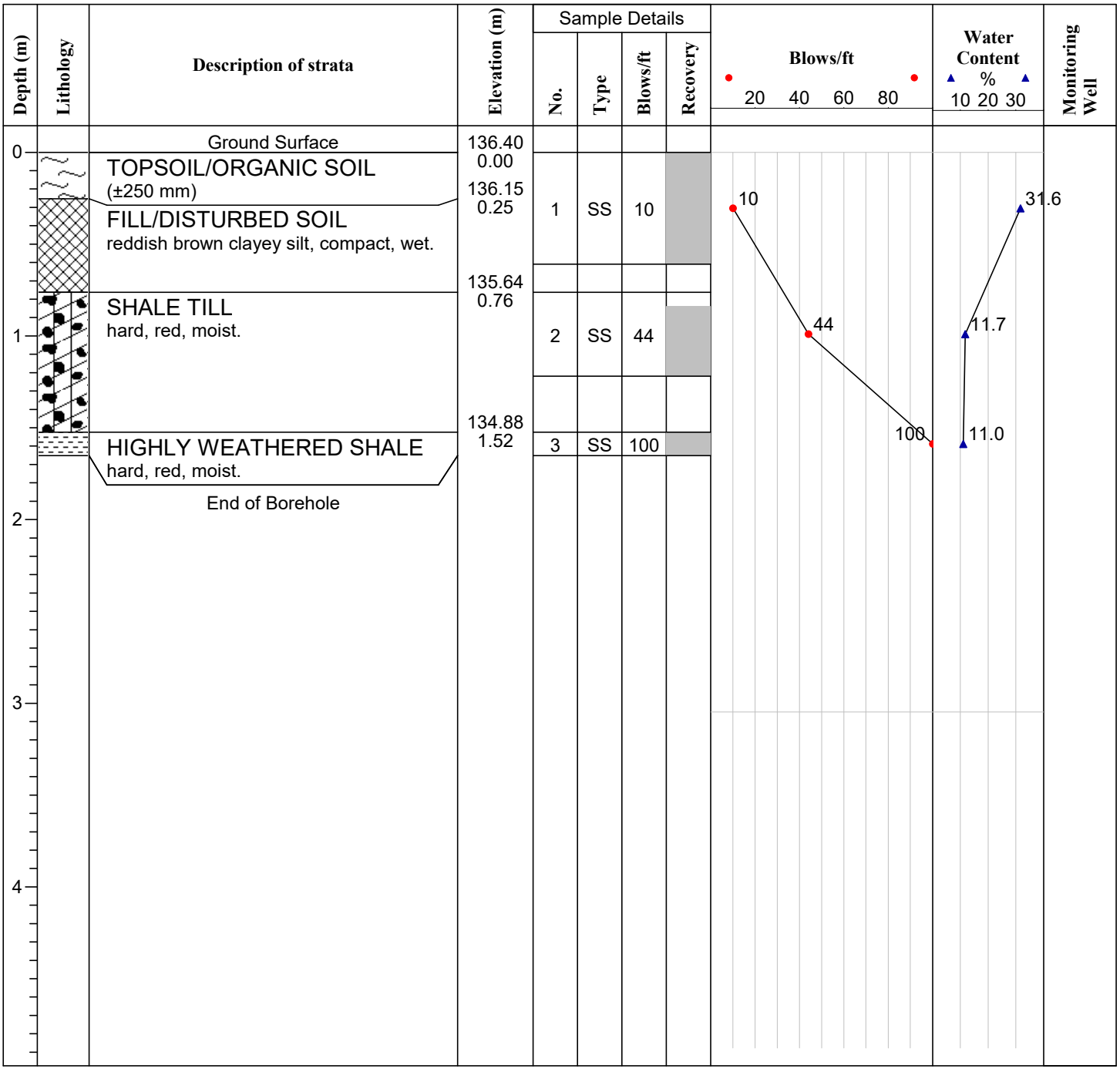
Log of Borehole BH-11

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: PENALTA GROUP LTD.

Enclosure: 12

Location: 1493 SIXTH LINE, OAKVILLE, ONTARIO



Remarks: Upon completion of drilling, the borehole was open and dry.

Drill Method: D-50

Drill Date: 28 MARCH 2025

Datum: GEODETIC

FORWARD ENGINEERING & ASSOCIATES INC.
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

Project No: 7481

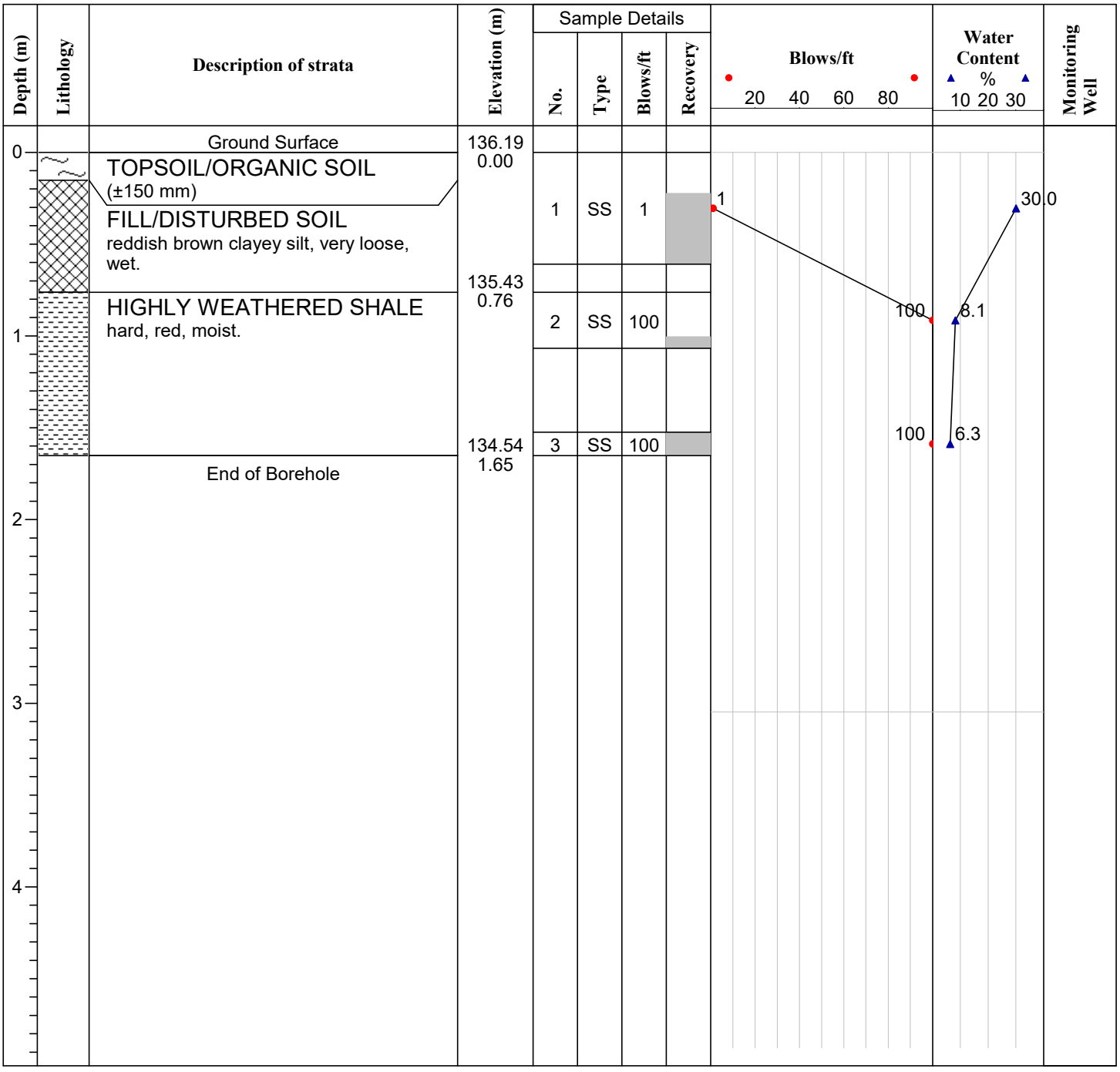
Log of Borehole BH-12

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Client: PENALTA GROUP LTD.

Enclosure: 13

Location: 1493 SIXTH LINE, OAKVILLE, ONTARIO



Remarks: Upon completion of drilling, the borehole was open and dry.

Drill Method: D-50

Drill Date: 28 MARCH 2025

Datum: GEODETIC

FORWARD ENGINEERING & ASSOCIATES INC.
244 Brockport Drive, Unit 15, Toronto, Ontario, M9W 6X9

Engineer: P.R.

Checked by: G.S.

Sheet No. 1 of 1

APPENDIX B

WATER SUPPLY DESIGN

APLIN MARTIN

Project Description: Mixed-Use Residential
A&M File: 25-7018

Date: July 18, 2025
By: IA

MIXED-USE WATER DEMAND SUPPLY

Region of Halton

Occupancy Data

Gross Floor Area (GFA)

Lot Area	0.80	ha
Building Area	0.21	ha

Residential Occupancy Density

Apartments		
1BR, 2BR, and 3BR	1.75	persons per unit (PPU)

Average Day Consumption

Residential	265.00	L/cap/day
Commercial	250.00	L/cap/day

Site Statistics

Land Use	No of Units	Population	Water Demand (L/day)	Water Demand (L/s)
Residential				
Apartments				
1BR, 2BR, and 3BR	190	333	88113	1.02
Commercial				
Commercial	N/A	48	12000	0.14
	Total	381		

Peaking Factors

Land Use	Maximum Day	Peak Hour	Minimum Hour
Residential	2.25	4.00	0.85
Commercial	2.25	2.25	0.85

Peak Demand (L/cap/day)

Land Use	Maximum Day	Peak Hour
Residential	596.25	1060
Commercial	562.5	562.5

Peak Flows

Criterias	L/d	L/hr	L/s
Average Day	100,113	4171.4	1.16
Maximum Day	253,873	10578.0	2.94
Peak Hour	430,330	17930.4	4.98
Minimum Hour	95,296	3970.7	1.10

APLIN MARTIN

Project: Mixed-Use Development
A&M File: 23-7015

Date: 18-Jul-25
By : IA

FIRE FLOW CALCULATION SHEET

1 Type of Construction: Type V - Wood Frame

Level	Area
1st Floor =	2057.5 sq.m.
2nd Floor=	2131.9 sq.m.
3rd Floor=	2131.9 sq.m.
4th Floor=	2131.9 sq.m.
5th Floor=	1979.8 sq.m.
6th Floor=	1979.8 sq.m.
Effective Floor Area	6,206.4 sq.m.
Coefficient (C) - based on type of construction =	1.5

Fire Flow From Formula ($F=220\ CA^{\wedge 0.5}$): (rounded) 26000 l/min (a)

2 Type of Occupancy: Limited Combustible Residential

Hazard Allowance: -15% x (a) = -3900 l/min
Sub-Total: 22100 l/min (b)

3 Automatic Sprinklers:

1. None	No
2. Automatic Sprinklers - NFPA 13	Yes
3. Water supply is standard for both system and Fire Department	No
4. Fully Supervised System	Yes

Sprinkler Allowance: 40% x (b) = 8840 l/min.
(System is fully alarmed)

4 Exposures:

	m	%
North	>30	0%
East	>30	0%
South	27.53	10%
West	>30	0%

Exposure Allowance: (Not to exceed 75%) 10% x (b) = 2210 l/min.(c)

TOTAL FIRE FLOW REQUIRED (rounded): 15000 l/min

TOTAL FIRE FLOW REQUIRED: 250 l/s

REQUIRED FIRE FLOW DURATION: 4.75 hrs

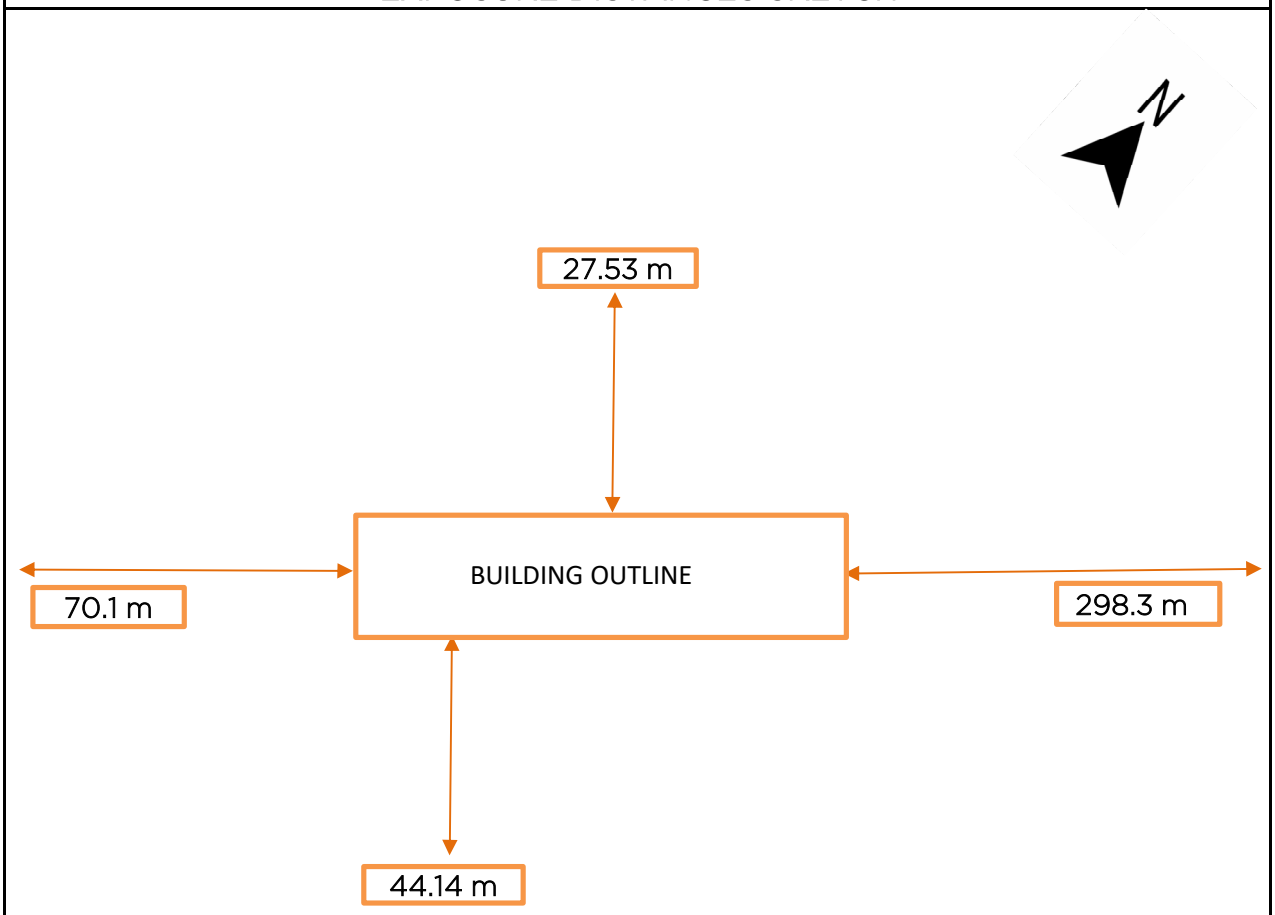
Notes:
Fire flow required as per the Fire Underwrites Survey of Canada 2020 guidelines
1. Total floor area and building construction as per architectural drawing pml.A, SITE PLAN, dated JUNE, 2025
2. Type of Occupancy information as per pml.A CORRESPONDENCE, dated JULY, 2025
3. Automatic sprinklers information as per pml.A CORRESPONDENCE, dated JULY, 2025
4. Exposures distances are calculated per existing conditions via Google Maps, refer to the Exposure Distance Sketch

APLIN MARTIN

Project: Mixed-Use Development
A&M File: 23-7015

Date: 18-Jul-25
By : IA

EXPOSURE DISTANCES SKETCH



APPENDIX C

SANITARY DESIGN

Land Use Equivalent Population Calculation		
Apartment (Five or more Storey)	1.7	PE/unit
Sanitary Design Flows		
Residential Average Day Consumption	215	L/d/cap
Commercial Average Day Consumption	185	L/d/cap
Infiltration & Inflow	0.286	L/s/Ha
Average Dry Weather Flow (ADWF)	Average Daily Flow * Total population	
Peak Dry Weather Flow (PDWF)	ADWF * Peaking Factor	
Peak Wet Weather Flow (PWWF)	ADWF * Peaking Factor + I&I	
Harmon Peaking Factor	$PF = 1 + \frac{14}{4 + \sqrt{\frac{Population}{1000}}}$	

Capacity Analysis	
Criteria	*Description*
1	Design Function: To verify that, under proposed design flow conditions, there will be no surcharge in the sewer system. (or dry weather flow condition)
2	Basement Flooding Protection: To verify that, under proposed extreme Wet Weather Flow (WWF) conditions, which includes I&I generated under the May 12, 2000, storm event, the HGL in the sewer will be at least 1.8 m below grade.
3	[Not applicable if Criterion 2 is met] Under proposed extreme WWF conditions, WWF mitigation measures will ensure that the proposed HGL will be no higher than the existing HGL. The proposed peak flow rate will be no greater than the existing peak flow rate at the connection to the trunk sewer or pumping station.

Design Sanitary Load		
Residential		
Number of Units inside the building	190	units
Population per unit	1.7	Cap/unit
Total Residential (Design) Population	323	
Residential Average Day Consumption	215	L/cap/day
Average Dry Weather Flow (ADWF)	0.804	L/sec
Commercial		
Total Commercial (Design) Population	48	
Commercial Average Day Consumption	185	L/cap/day
Average Dry Weather Flow (ADWF)	0.103	L/sec
Total - Residential + Commercial		
Average Dry Weather Flow (ADWF)	0.907	L/s
Peaking Factor (Harmon)	4.04	
Peak Dry Weather Flow (PDWF)	3.66	L/s
I&I*	0.23	L/s

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING

TECHNICAL MEMORANDUM

To:	Penalta Group Ltd.	**File No:**	25-7018
From:	Harjot Cheema, M. Eng., EIT	**Date:**	2025-12-24
Re:	**Mixed-Used Residential Development – 1493 Sixth Line, Oakville, ON.** **Functional Servicing Report - Development Downstream Sanitary Sewer Analysis**		

1.0 INTRODUCTION

Penalta Group Ltd. has proposed mixed-used residential development, located at 1493 Sixth Line, Oakville, ON. The subject property (referred to as project/development site in this Technical Memorandum) is currently zoned Natural Area (N) and is proposed to be developed into mixed-use residential six (6) storey building with 190 residential units, and 450 sqm of non-residential space. The subject property has a total gross area of 0.8092 ha. Refer to **Figure 1** for project site.

As per the request from Penalta Group Ltd., Aplin & Martin Consultants Ltd. (Aplin Martin) has been retained to conduct hydraulic modelling to assess the adequacy of sanitary services for the proposed development and to evaluate the potential impact on the existing City of Oakville sanitary collection system. This technical memorandum summarizes the findings and recommendations of the sanitary servicing analysis.

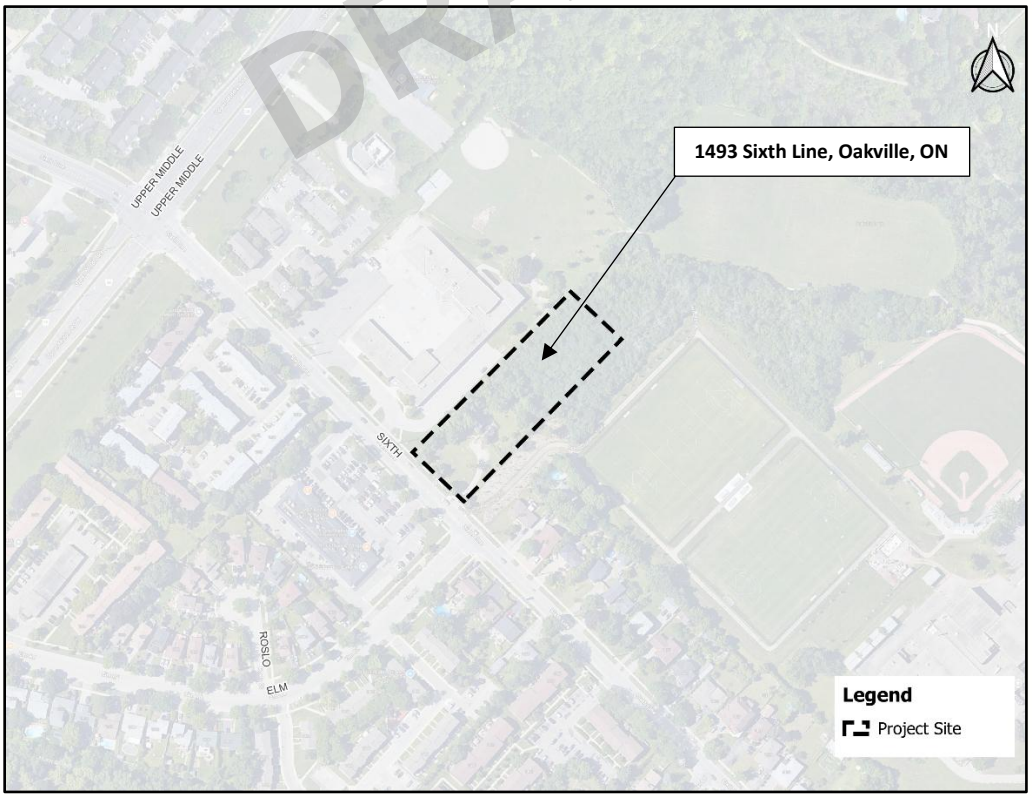


Figure 1: Proposed Development

Figure 1 illustrates the location of the proposed development site, situated northeast of Sixth Line. The site is located within a mixed-use neighbourhood and is bounded by a school to the east, west side is partially adjacent to residential lots and partially to a football pitch, commercial lot to the north, and natural area to the south.

2.0 EXISTING SANITARY SERVICING

Fronting the project site, a 300 mm diameter VC sanitary sewer runs southeast along Sixth Line, as shown in **Figure 2**. Since the site is currently designated as a natural area with only a small house at its frontage, it is assumed that negligible sanitary flow is assigned to this lot in the existing sanitary model.

To reflect post-development conditions, a new scenario was created in the sanitary model. In this scenario, the proposed development's sanitary load was assigned to the existing upstream manhole (SMH15828), located upstream of the 300 mm sanitary main (SMN14034), in accordance with the servicing plan (refer to **Appendix-A**), which proposes a connection to the existing 300 mm sanitary main along Sixth Line. **Figure 2** illustrates the project site along with the surrounding existing sanitary sewers and manholes.

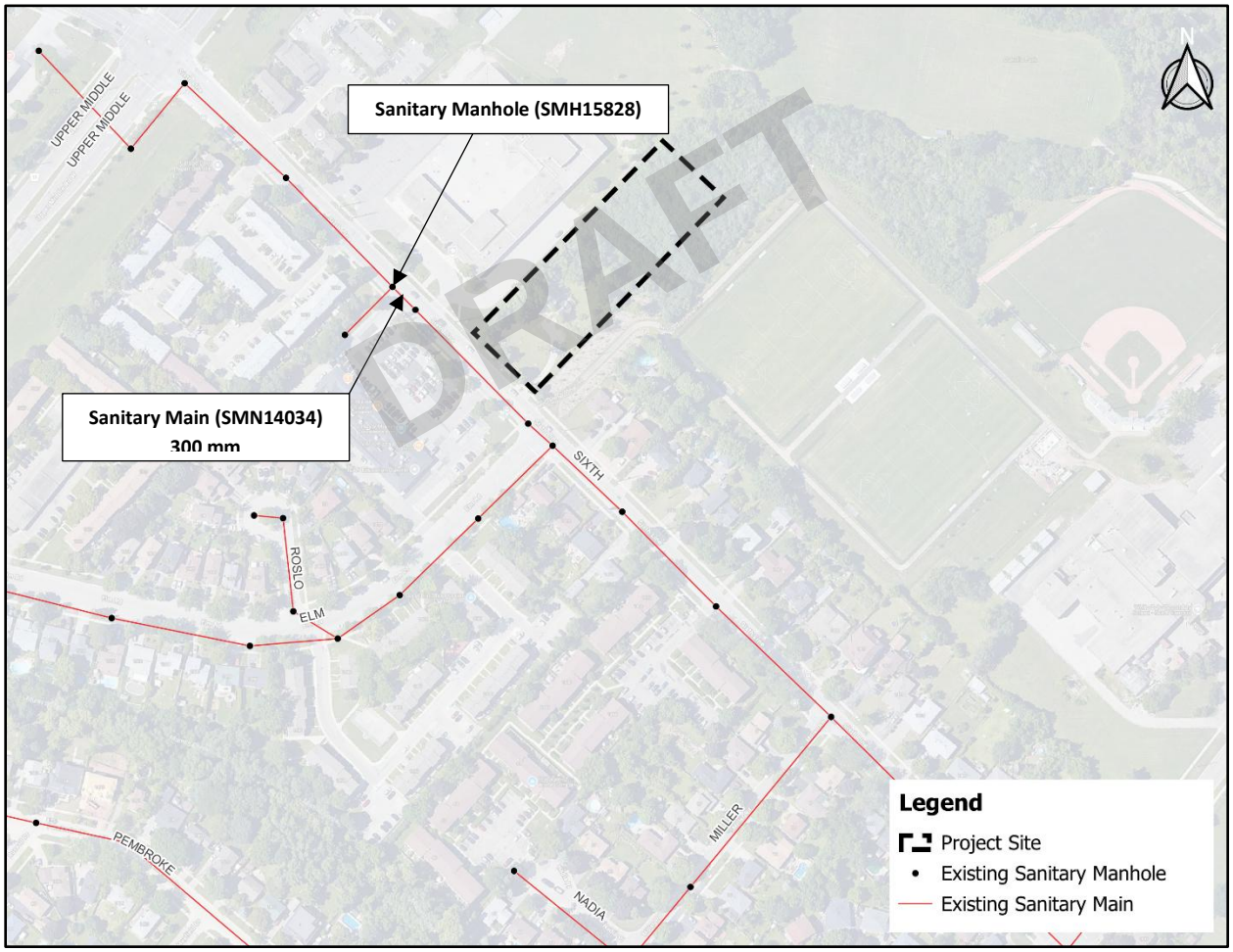


Figure 2: Proposed Development and Fronting Sanitary Main

2.1 DOWNSTREAM SANITARY REVIEW & ANALYSIS

A hydraulic assessment was conducted to evaluate the impact of the proposed development on the existing sanitary sewer system downstream of the project site. For this analysis, Aplin Martin used the latest Town of Oakville (East) Base 2022 InfoWorks ICM model (*Oakville Export_July2025*). It should be noted that the model contains only one base scenario, which was used to analyze the impact of the additional sanitary load generated by the proposed development on the downstream system.

The sanitary analysis area extends downstream from the project site and terminates at the 675 mm diameter trunk sewer (SMN44490) at manhole SMH40454, located on North Service Road East, as shown in **Figure 3**.

Figure 3 illustrates the project site, the existing sanitary mains (slope labeled on the mains), the associated manholes, and the downstream sanitary mains included in the analysis. **Table 1** summarizes the size, length, slope, and upstream/downstream inverts of the downstream sanitary mains analyzed.

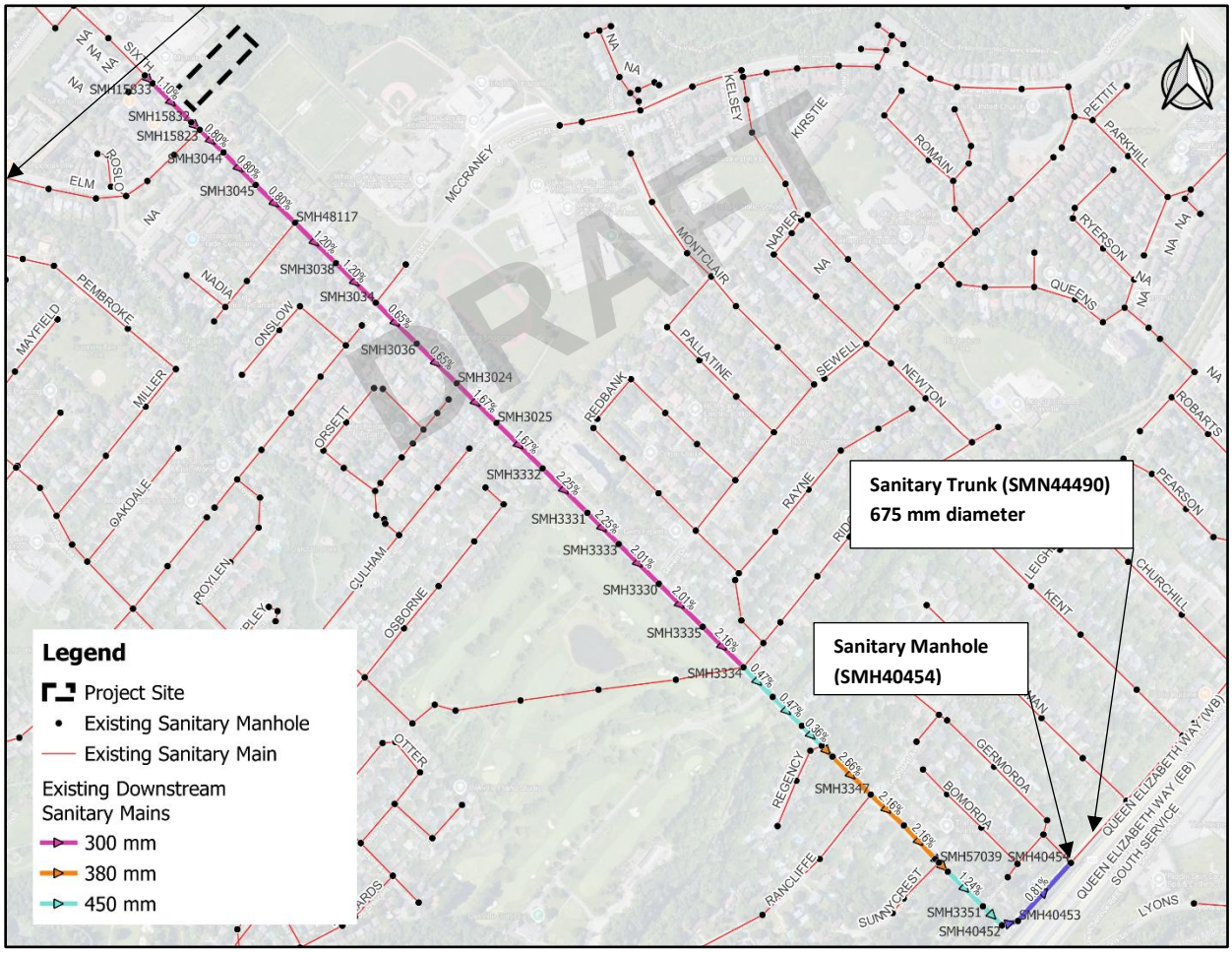


Figure 3: Downstream Sanitary Servicing

Table 1: Proposed Downstream Sanitary Mains Data

Sewer ID	US Manhole	DS Manhole	Dia (mm)	Length (m)	Slope (%)	Upstream Elevation (m)	Downstream Elevation (m)
SMN14034	SMH15828	SMH15833	300	17.30	1.10	133.81	133.62
SMN13904	SMH15833	SMH15832	300	85.30	1.10	133.62	132.68
SMN14035	SMH15832	SMH15823	300	17.50	1.10	132.68	132.49
SMN13902	SMH15823	SMH3044	300	51.10	0.80	132.45	132.04
SMN3725	SMH3044	SMH3045	300	71.00	0.80	132.04	131.48
SMN3742	SMH3045	SMH48117	300	84.90	0.80	131.45	130.77
SMN3767	SMH48117	SMH3038	300	89.30	1.20	130.75	129.68
SMN3804	SMH3038	SMH3034	300	87.60	1.20	129.68	128.63
SMN3828	SMH3034	SMH3036	300	89.90	0.65	128.56	127.98
SMN3849	SMH3036	SMH3024	300	87.50	0.65	127.98	127.41
SMN20969	SMH3024	SMH3025	300	87.40	1.67	127.39	125.93
SMN20968	SMH3025	SMH3332	300	100.60	1.67	125.93	124.25
SMN3893	SMH3332	SMH3331	300	98.20	2.25	124.24	122.03
SMN3919	SMH3331	SMH3333	300	68.90	2.25	122.03	120.48
SMN3935	SMH3333	SMH3330	300	87.70	2.01	120.48	118.71
SMN3948	SMH3330	SMH3335	300	95.50	2.01	118.71	116.79
SMN3961	SMH3335	SMH3334	300	89.20	2.16	116.76	114.83
SMN3970	SMH3334	SMH3344	450	64.90	0.47	114.11	113.81
SMN3983	SMH3344	SMH3343	450	63.60	0.47	113.81	113.51
SMN3999	SMH3343	SMH3341	450	43.90	0.36	113.48	113.32
SMN58068	SMH3341	SMH54058	380	23.80	2.66	113.30	112.67
SMN4013	SMH54058	SMH3347	380	83.80	2.66	112.67	110.44
SMN4021	SMH3347	SMH3354	380	70.30	2.16	110.39	108.87
SMN4386	SMH3354	SMH3352	380	71.50	2.16	108.87	107.33
SMN61292	SMH3352	SMH57039	380	7.90	0.38	107.30	107.27
SMN21114	SMH57039	SMH16560	380	19.70	1.24	107.05	106.81
SMN21115	SMH16560	SMH3351	450	76.80	1.24	106.74	105.78
SMN4045	SMH3351	SMH40452	450	41.80	1.06	105.74	105.30
SMN44488	SMH40452	SMH40453	525	25.70	1.06	105.22	104.95
SMN44489	SMH40453	SMH40454	525	122.30	0.81	104.91	103.92

The following sections summarize the sanitary applicable design criteria, sanitary loading, modelling scenarios, and model analysis results.

2.2 DESIGN AND ASSESSMENT CRITERIA

The *Town of Oakville Development Engineering Procedures and Guidelines* (September 2023) refer to the Halton Region Public Works Department's design criteria and standards for sanitary servicing. The *Halton Region Water and Wastewater Linear Design Manual (2024)* states that, for existing areas, existing flows should be validated using the wastewater hydraulic model. This approach was applied in the current analysis. Since the manual does not specify detailed criteria for sanitary capacity analysis, the *Toronto Sewer Capacity Assessment Guidelines* were used as a reference.

Table 2 summarizes the design and assessment criteria applied in this analysis, sourced from the following documents:

- *Planning, Design, and Development Persons Per Unit (PPU) Memo* (planning-midtown-council-memo-persons-per-unit-april-11-2024)
- *Regional Municipality of Halton 2022 Development Charges Update Water/Wastewater Technical Report*
- *Toronto Sewer Capacity Assessment Guidelines*

Table 2: Design Standards for Sanitary Assessment

Land Use Equivalent Population Calculation			**Reference**
Apartment (Five or more Storey)	1.7	PE/unit	PPU Memo
Sanitary Design Flows			**Reference**
Residential Average Day Consumption	215	L/d/cap	Halton 2022 Development Charges Update Water/Wastewater Technical Report
Commercial Average Day Consumption	185	L/d/cap	
Infiltration & Inflow	0.286	L/s/Ha	
Average Dry Weather Flow (ADWF)	Average Daily Flow * Total population		Halton Region Water and Wastewater Linear Design Manual
Peak Dry Weather Flow (PDWF)	ADWF * Peaking Factor		
Peak Wet Weather Flow (PWWF)	ADWF * Peaking Factor + I&I		
Harmon Peaking Factor	$PF = 1 + \frac{14}{4 + \sqrt{\frac{Population}{1000}}}$		
Capacity Analysis			**Reference**
Criteria	***Description***		Toronto Sewer Capacity Assessment Guidelines.
1	**Design Function:** To verify that, under proposed design flow conditions, there will be no surcharge in the sewer system.		
2	**Basement Flooding Protection:** To verify that, under proposed extreme Wet Weather Flow (WWF) conditions, which includes I&I generated under the May 12, 2000, storm event*, the HGL in the sewer will be at least 1.8 m below grade.		
3	[Not applicable if *Criterion 2* is met] Under proposed extreme WWF conditions, WWF mitigation measures will ensure that the proposed HGL will be no higher than the existing HGL. The proposed peak flow rate will be no greater than the existing peak flow rate at the connection to the trunk sewer or pumping station.		
**** Estimate equivalent 25-YR design storm, where no WWF I&I for May 12, 2000 storm event is available from BFPP studies.***			

2.3 SANITARY LOADING

Sanitary loads from the proposed development site were estimated based on the proposed total dwelling units from architectural design (Refer to **Appendix B**), population equivalent and load assumption presented in **Section 2.2**. Sanitary loads from the new development are summarized in **Table 3.**

Table 3: Sanitary Load Summary

Design Sanitary Load		
Residential		
Number of Units inside the building	190	units
Population per unit	1.7	Cap/unit
Total Residential (Design) Population	323	
Residential Average Day Consumption	215	L/cap/day
Average Dry Weather Flow (ADWF)	0.804	L/sec
Commercial		
Total Commercial (Design) Population*	48	
Commercial Average Day Consumption	185	L/cap/day
Average Dry Weather Flow (ADWF)	0.103	L/sec
Total - Residential + Commercial		
Average Dry Weather Flow (ADWF)	0.907	L/s
Peaking Factor (Harmon)	4.04	
Peak Dry Weather Flow (PDWF)	3.66	L/s
I&I**	0.23	L/s
Peak Wet Weather Flow (PDWF)	3.89	L/s
•Added 48 persons to account for Daycare (based on information provided by the architect). **Gross area used for I&I is 0.81 ha.		

The estimated sanitary loads (PWWF) were added to sanitary manhole SMH15828 (**Figure 2**) as baseflow, located at the upstream end of the 300 mm sanitary main (SMN14034), which the proposed site sanitary service will connect to. It is assumed that negligible sanitary flow is currently assigned to this lot in the existing sanitary model.

2.4 ASSESSMENT CRITERIA AND MODEL SCENARIOS

The downstream sanitary system was assessed both with and without the proposed development loads, using the base scenario available in the Town's model, under dry weather flow (DWF) and wet weather flow (WWF) conditions. Since data for the May 12, 2000 storm event was not available in the Town's model, an equivalent SCS Type II 24-hour, 25-year design storm, available within the model, was used to represent extreme wet weather flow (WWF) conditions, including inflow and infiltration (I&I), in accordance with the City's sanitary capacity criteria.

1. Base Pre-Development under the Design Flow (or Dry Weather Flow) Condition
1. Base Post-Development under the Design Flow (or Dry Weather Flow) Condition
2. Base Pre-Development under the Extreme Wet Weather Flow Condition
3. Base Post-Development under the Extreme Wet Weather Flow Condition

2.5 MODEL ANALYSIS

The hydraulic sewer capacity of the downstream system was evaluated under all modelling scenarios, based on the criteria summarized in **Section 2.2**. **Table 4** present a comparison of the modeled results for downstream sewer, both with and without the proposed development's load. Similarly, **Table 5** present a comparison of the modeled results for downstream manholes. Detailed modeling sewer results are provided in **Appendix C**, while peak hydraulic grade line (HGL) profiles for wet weather flow conditions are shown in **Figures D.1** and **D.2** (**Appendix D**).

Table 4: Base Scenario Downstream Sanitary Sewers Results Summary

Sewer ID	US Node	DS Node	Dia (mm)	Design Flow Condition (Dry Weather Flow)				Extreme Wet Weather Flow Condition*			
				Pre-Dev		Post-Dev		Pre-Dev		Post-Dev	
				q/Q	d/D	q/Q	d/D	q/Q	d/D	q/Q	d/D
SMN14034	SMH15828	SMH15833	300	0.016	0.130	0.055	0.190	0.136	0.270	0.174	0.300
SMN13904	SMH15833	SMH15832	300	0.016	0.130	0.055	0.190	0.136	0.270	0.174	0.300
SMN14035	SMH15832	SMH15823	300	0.016	0.130	0.055	0.190	0.136	0.270	0.174	0.300
SMN13902	SMH15823	SMH3044	300	0.039	0.160	0.085	0.210	0.317	0.410	0.363	0.440
SMN3725	SMH3044	SMH3045	300	0.043	0.160	0.088	0.210	0.349	0.410	0.394	0.440
SMN3742	SMH3045	SMH48117	300	0.044	0.160	0.088	0.210	0.357	0.420	0.402	0.450
SMN3767	SMH48117	SMH3038	300	0.042	0.170	0.079	0.210	0.368	0.440	0.405	0.460
SMN3804	SMH3038	SMH3034	300	0.043	0.170	0.080	0.210	0.381	0.440	0.417	0.460
SMN3828	SMH3034	SMH3036	300	0.063	0.180	0.113	0.240	0.614	0.590	0.664	0.620
SMN3849	SMH3036	SMH3024	300	0.064	0.180	0.114	0.240	0.631	0.580	0.682	0.610
SMN20969	SMH3024	SMH3025	300	0.041	0.170	0.072	0.210	0.403	0.460	0.435	0.480
SMN20968	SMH3025	SMH3332	300	0.042	0.170	0.073	0.210	0.413	0.460	0.445	0.480
SMN3893	SMH3332	SMH3331	300	0.042	0.170	0.069	0.200	0.373	0.440	0.400	0.460
SMN3919	SMH3331	SMH3333	300	0.043	0.170	0.069	0.210	0.376	0.450	0.403	0.470
SMN3935	SMH3333	SMH3330	300	0.045	0.180	0.074	0.210	0.402	0.460	0.431	0.470
SMN3948	SMH3330	SMH3335	300	0.046	0.180	0.074	0.210	0.406	0.460	0.436	0.470
SMN3961	SMH3335	SMH3334	300	0.045	0.170	0.072	0.210	0.395	0.720	0.424	0.830
SMN3970	SMH3334	SMH3344	450	0.150	0.270	0.170	0.280	1.214	2.000	1.231	2.000
SMN3983	SMH3344	SMH3343	450	0.150	0.270	0.171	0.280	1.217	2.000	1.234	2.000
SMN3999	SMH3343	SMH3341	450	0.170	0.280	0.193	0.300	1.380	2.000	1.399	2.000
SMN58068	SMH3341	SMH54058	380	0.099	0.230	0.113	0.250	0.808	0.750	0.820	0.760
SMN4013	SMH54058	SMH3347	380	0.099	0.230	0.113	0.250	0.808	0.720	0.819	0.750
SMN4021	SMH3347	SMH3354	380	0.112	0.250	0.128	0.260	0.916	0.960	0.927	1.000
SMN4386	SMH3354	SMH3352	380	0.113	0.270	0.128	0.290	0.917	1.000	0.928	1.000
SMN61292	SMH3352	SMH57039	380	0.268	0.350	0.304	0.370	2.186	2.000	2.211	2.000
SMN21114	SMH57039	SMH16560	380	0.149	0.280	0.169	0.300	1.219	2.000	1.233	2.000
SMN21115	SMH16560	SMH3351	450	0.095	0.230	0.108	0.240	0.778	0.680	0.787	0.680
SMN4045	SMH3351	SMH40452	450	0.103	0.240	0.117	0.250	0.846	0.720	0.856	0.730
SMN44488	SMH40452	SMH40453	525	0.068	0.200	0.077	0.210	0.561	0.550	0.567	0.550
SMN44489	SMH40453	SMH40454	525	0.078	0.200	0.089	0.210	0.642	0.590	0.649	0.590

*25YR-24Hr design storm used for WWF I&I

Table 5: Base Scenario Downstream Sanitary Manholes Results Summary

Manhole ID	Design Flow Condition (Dry Weather Flow)		Extreme Wet Weather Flow Conditions	
	Pre-Dev	Post-Dev	Pre-Dev	Post-Dev
	Freeboard (m)	Freeboard (m)	Freeboard (m)	Freeboard (m)
SMH15828	3.420	3.403	3.379	3.369
SMH15833	3.265	3.248	3.224	3.214
SMH15832	3.010	2.993	2.969	2.959
SMH15823	3.178	3.161	3.105	3.096
SMH3044	3.150	3.134	3.073	3.065
SMH3045	3.206	3.190	3.127	3.119
SMH48117	3.104	3.091	3.024	3.017
SMH3038	3.241	3.228	3.160	3.153
SMH3034	3.194	3.177	3.075	3.066
SMH3036	3.070	3.054	2.949	2.94
SMH3024	3.171	3.160	3.085	3.08
SMH3025	3.915	3.904	3.828	3.822
SMH3332	3.881	3.871	3.801	3.796
SMH3331	4.209	4.199	4.129	4.123
SMH3333	3.412	3.402	3.328	3.322
SMH3330	3.305	3.295	3.221	3.216
SMH3335	3.935	3.925	3.852	3.847
SMH3334	4.660	4.652	3.844	3.812
SMH3344	4.132	4.124	3.572	3.547
SMH3343	4.307	4.298	3.901	3.89
SMH3341	3.770	3.765	3.573	3.57
SMH54058	3.426	3.421	3.231	3.227
SMH3347	3.278	3.273	3.051	3.04
SMH3354	2.964	2.959	2.695	2.666
SMH3352	3.091	3.082	2.701	2.696
SMH57039	3.189	3.183	2.767	2.756
SMH16560	3.305	3.300	3.095	3.092
SMH3351	3.280	3.274	3.053	3.05
SMH40452	2.946	2.940	2.739	2.735
SMH40453	3.077	3.071	2.858	2.855
SMH40454*	3.756	3.749	3.509	3.506

***Connection to 675 mm trunk main**

The mains modelling results (**Table 4** and **Table 5)** indicate that no downstream sewer is surcharging (d/D > 1) under design flow (Dry Weather Flow) conditions for both pre- and post-development scenarios. Therefore, Criterion 1 of the Sewer Capacity Assessment Guidelines is satisfied, confirming that the proposed development does not cause any new downstream main surcharging under dry weather conditions.

Under Wet Weather Flow (WWF) conditions, eleven (11) downstream sewers exhibit a d/D ratio greater than 0.7 in both pre- and post-development scenarios, indicating no additional impact from the proposed development's sanitary load. According to Criterion 2 of the Sewer Capacity Assessment Guidelines, the hydraulic grade line (HGL) must remain at least 1.8 m below ground level during WWF events. The manhole modelling results (**Table 5**) show that the freeboard between the maximum HGL and ground level exceeds 1.8 m at all downstream sanitary manholes for both pre- and post-development scenarios. Therefore, Criterion 2 is satisfied. Since both Criterion 1 and Criterion

2 are met, Criterion 3 “WWF Mitigation”, is not applicable in this case. Consequently, the proposed development does not worsen HGL conditions in the downstream sanitary sewers.

It should be noted that six downstream sanitary sewers (380 mm diameter) are located between 450 mm diameter sewers upstream and downstream. To maintain hydraulic consistency, these 380 mm sewers should be upsized to 450 mm.

3.0 SANITARY SERVICING REVIEW SUMMARY

Aplin Martin conducted a downstream sanitary servicing review for the proposed mixed-use residential development at 1493 Sixth Line, Oakville, using the Town of Oakville (East) Base 2022 InfoWorks ICM model. The proposed development sanitary load was assigned to upstream manhole SMH15828, and the downstream assessment extended to the 675 mm trunk sewer (SMN44490) at SMH40454.

Sanitary flows were calculated based on 190 residential units, associated non-residential space, and applicable Halton Region design standards, including an allowance for infiltration and inflow (I&I). The downstream system was assessed under dry weather flow (DWF) and extreme wet weather flow (WWF) conditions for both pre- and post-development scenarios. An equivalent SCS Type II, 24-hour, 25-year design storm was used to represent extreme WWF conditions.

The modelling results indicate that no downstream sanitary sewers surcharge under DWF conditions, and that elevated depth-to-diameter (d/D) ratios observed for same sewers under WWF conditions occur in both pre- and post-development scenarios, indicating no incremental impact from the proposed development. In all cases, the hydraulic grade line (HGL) remains more than 1.8 m below ground level at downstream manholes.

Based on the results, the proposed development satisfies Criteria 1 and 2 of the Sewer Capacity Assessment Guidelines, and no downstream sanitary upgrades are required to support the development.

4.0 CLOSING

We trust the above technical memorandum meets the Town's requirement for sanitary servicing review for the proposed development. If you have any questions or require further information, please do not hesitate to contact the undersigned at 604-803-3578.

Yours truly,
APLIN & MARTIN CONSULTANTS LTD.

Prepared by:

Harjot Cheema, M.Eng., E.I.T.
Junior Water Resource Engineer

Ben Loewan, P.Eng., GDBA, PMP.
Project Manager

BL:
Downstream Sanitary Sewer Analysis for Mixed-Use Residential Development – 1493 Sixth Line, Oakville, ON _25-7018

STATEMENT OF LIMITATIONS

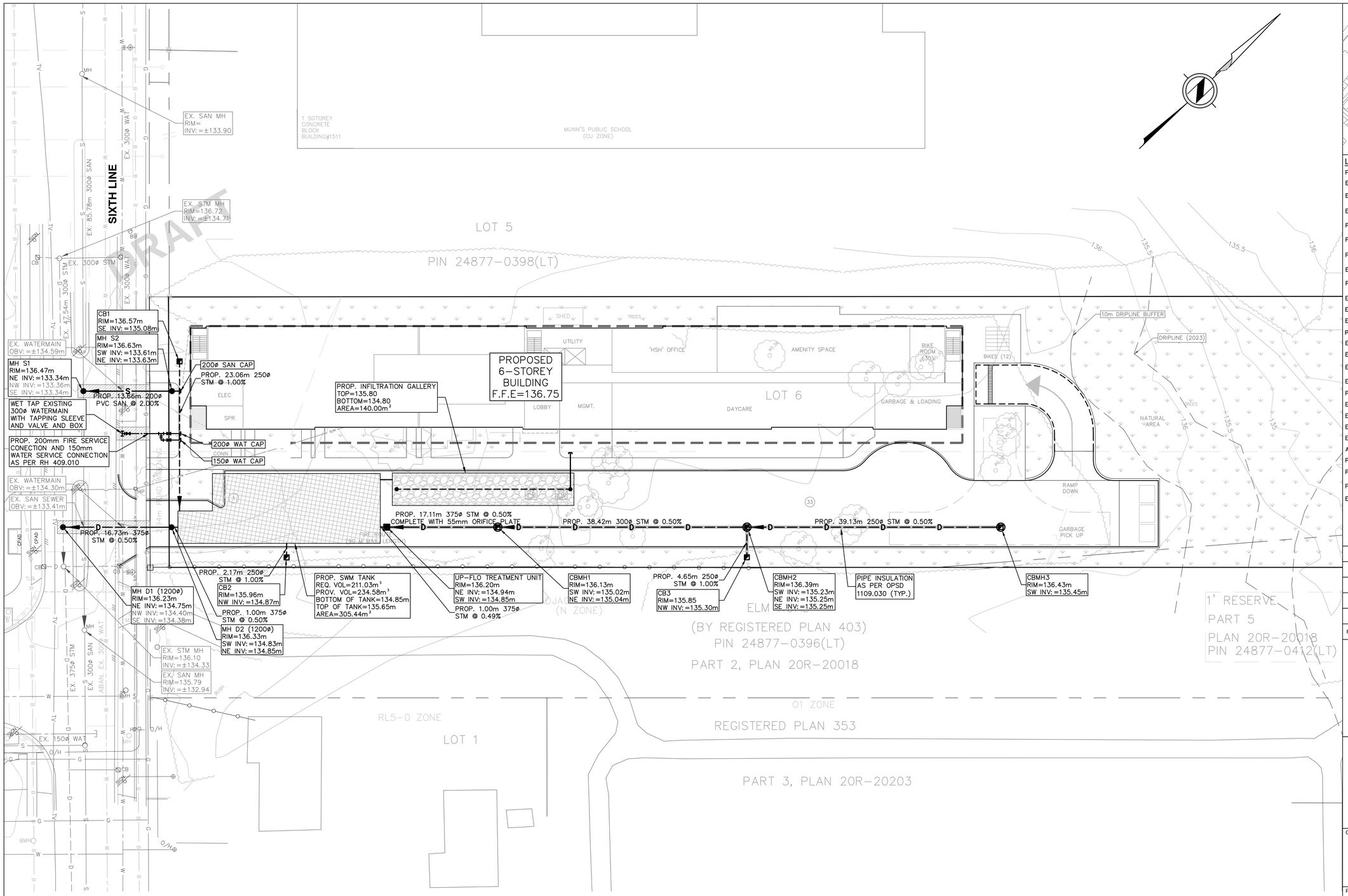
Aplin & Martin Consultants Ltd. prepared this technical memorandum for the Penalta Group Ltd. The material in this technical memorandum reflects the best judgment of Aplin & Martin Consultants Ltd. in the light of the information available at the time of preparation. Any use of, or reliance placed upon, the material contained in this report by third parties, or decisions based upon this report are the sole responsibility of those third parties. Aplin & Martin Consultants Ltd. accepts no responsibility for damages suffered by any third parties because of decisions made, or actions taken, based upon information contained within this technical memorandum.

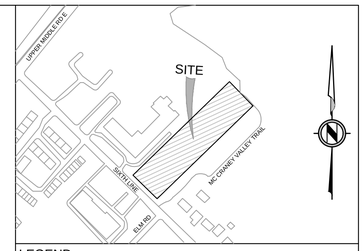
REVISION HISTORY

Revision	Date	Details	Name	Title
0	2025-12-24	Draft - Tech Memo	Ben Loewen, P.Eng., GDBA, PMP	Project Manager, Infrastructure Planning

APPENDIX A:

Preliminary Site Servicing Plan





LEGEND

- PROPERTY LINE
- EXISTING SANITARY — S —
- EXISTING STORM — D —
- EXISTING WATER — W —
- PROPOSED STORM — D —
- PROPOSED SANITARY — S —
- PROPOSED WATER SERVICE
- EXISTING OVERHEAD HYDRO — o/h —
- PROPOSED PIPE INSULATION
- EXISTING/PROPOSED SAN MANHOLE
- EXISTING/PROPOSED STM MANHOLE
- EXISTING/PROPOSED CATCH BASIN
- PROPOSED CATCH BASIN MANHOLE
- EXISTING HYDRO POLE
- EXISTING FIRE HYDRANT
- EXISTING METER CHAMBER (M)
- EXISTING GATE VALVE
- PROPOSED GATE VALVE
- EXISTING GAS — G —
- EXISTING UG BELL NETWORK — B — B —
- EXISTING UG TV NETWORK — TV —
- EXISTING WATERMAIN — W —
- ABANDONED WATERMAIN — W —
- PROPOSED WATERMAIN — W —
- PROPOSED WATER SERVICE
- PROPOSED BARRIER CURB
- EXISTING CONCRETE SIDEWALK

REV	MM/DD/YY	DESCRIPTION	BY	APP
2	08/29/2025	FIRST SPA SUBMISSION	IA	JC
1	07/04/2025	ISSUED FOR COORDINATION	IA	JC

LICENSED PROFESSIONAL ENGINEER
J.M. CESARIO
100525531
2025-09-02
PROVINCE OF ONTARIO

ENGINEER STAMP

PLAN OF SURVEY OF LOT 6 AND BLOCK A, REGISTERED PLAN 403 TOWN OF OAKVILLE REGIONAL MUNICIPALITY OF HALTON

LEGAL DESCRIPTION

ELEVATIONS ARE REFERRED TO THE TOWN OF OAKVILLE BENCHMARK No 227, LOCATED ON SOUTH END OF CONCRETE DOOR SILL AT 1334 SIXTH LINE, HAVING AN ELEVATION OF 131.831m; VERTICAL DATUM: CANADIAN GEODETIC DATUM, 1928 (PRE: 1978 SOUTHERN ONTARIO READJUSTMENT)

BENCHMARK

APLIN MARTIN

Aplin & Martin Consultants Ltd.
354 Davis Road, Suite 403, Oakville, ON, L6J 2X2
Tel: (905) 582-0630, Fax: (416) 644-1889, Email: general@aplinmartin.com

CLIENT

innovative s|h|s

PROJECT

MIXED USE RESIDENTIAL DEVELOPMENT

1493 SIXTH LINE, OAKVILLE, ON, L6H 1X8

DRAWING TITLE

SERVICING PLAN

NOTICE TO CONTRACTOR
IT IS THE RESPONSIBILITY OF THE CONTRACTOR'S SURVEYOR TO VERIFY THAT ALL LEGAL SURVEY DIMENSIONS SHOWN ON THE ENGINEERS DRAWINGS AGREE WITH THOSE ON THE REGISTERED LEGAL SURVEY PLAN. SHOULD THERE BE ANY DISCREPANCIES, THEN IMMEDIATELY NOTIFY THE ENGINEER OF RECORD

THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY & HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

DESIGN	IA	DATE	JUNE 2025
DRAWN	HS	PROJECT NO.	25-7018
CHECKED	JC	DRAWING NO.	C02
APPROVED	JC	REV.	2

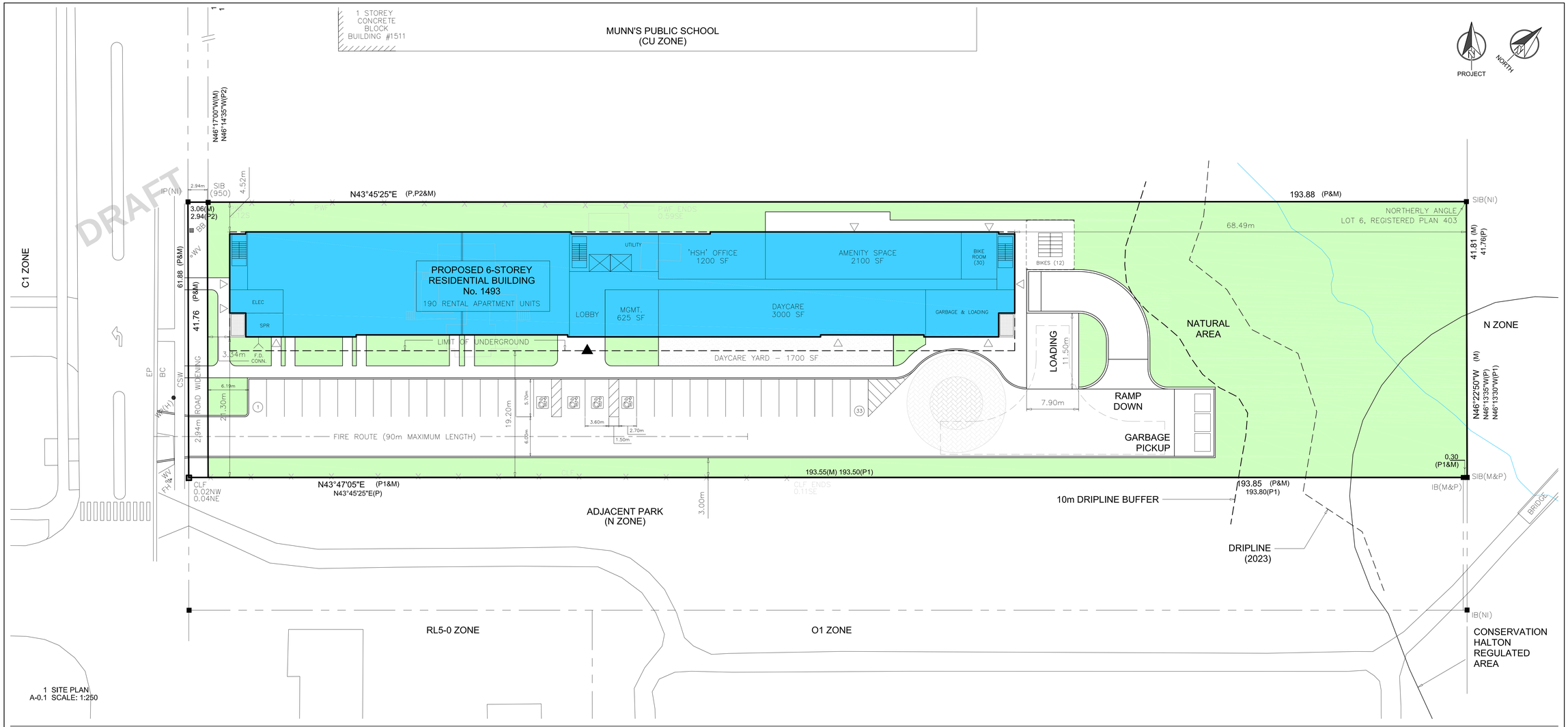
SCALE 1:300

0 3 1:300 15m

Sep 01, 2025 - 11:17am M:\JOBS\2025\25-7018\DWG\ONSITE PRODUCTION\25-7018_C02_SERVICING PLAN.dwg, SERVICING PLAN, pmarin

APPENDIX B:

Architectural Site Plan



1 SITE PLAN
A-0.1 SCALE: 1:250

RH ZONE REQUIREMENTS	REQUIREMENT	PROPOSED
Minimum lot area*	1,858.0 m2	7,969.8 m2
Minimum lot frontage	24.0 m	41.8 m
Minimum front yard*	7.5 m	3.34 m
Minimum interior side yard (north)	4.5 m	4.52 m
Minimum interior side yard (south)	4.5 m	21.30 m
Minimum rear yard	7.5 m	68.49 m
Maximum height	n/a	24.0 m
Maximum lot coverage*	35%	1,852.5 m2 (23%)
Minimum landscaping coverage*	10%	3,340 m2 (41%)
Landscape buffer adjacent parking area	3.0 m	3.0 m

*based on total lot area (less widening). No deduction for natural area or buffer.

PROPOSED 6-STOREY RESIDENTIAL HOUSING

LOT AREA

GROSS AREA	8,092.4 m2 (0.8092 ha)
ROAD WIDENING	122.6 m2 (0.0123 ha)
LOT AREA:	7,969.8 m2 (0.7969 ha)
NATURAL AREA + 10m BUFFER	1,803.6 m2 (0.1804 ha)
NET LOT AREA:	6,166.2 m2 (0.6166 ha)

GROSS FLOOR AREA

6th FLOOR	1,852.5 m2	19,940 sf
5th FLOOR	1,852.5 m2	19,940 sf
4th FLOOR	1,852.5 m2	19,940 sf
3rd FLOOR	1,852.5 m2	19,940 sf
2nd FLOOR	1,852.5 m2	19,940 sf
1st FLOOR	1,852.5 m2	19,940 sf
TOTAL	11,115.0 m2	119,640 sf

UNIT BREAKDOWN

6th FLOOR	27 1br,	7 2br,	1 3br = 35
5th FLOOR	27 1br,	7 2br,	1 3br = 35
4th FLOOR	27 1br,	7 2br,	1 3br = 35
3rd FLOOR	27 1br,	7 2br,	1 3br = 35
2nd FLOOR	27 1br,	7 2br,	1 3br = 35
1st FLOOR	11 1br,	4 2br,	0 3br = 15
TOTAL	146 1br, 39 2br, 5 3br = 190 UNITS @ 0.6166 ha = 308 uph		

ACCESSIBLE UNITS

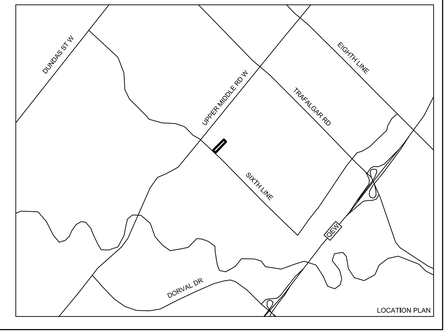
1br UNITS	40 (70%)
2br UNITS	17 (30%)
TOTAL	57 (30% OF 190)

RENTABLE AREA

146 1br @ 415 = 60,590 sf
39 2br @ 600 = 23,400 sf
5 3br @ 850 = 4,250 sf
TOTAL = 88,240 sf

PARKING

190 RENTAL UNITS @ 0.47 = 90 SPACES
450 m2 OFFICE & DAYCARE @ 1/35 = 13 SPACES
TOTAL = 103 PARKING SPACES
70 SPACES PROVIDED UNDERGROUND (2,142.0 m2, 23,055 sf)
33 SPACES ON SURFACE
ACCESSIBLE PARKING @ 1, PLUS 3% = 5 REQUIRED, 8 PROVIDED



LOCATION PLAN

pml.A

patrick markus luckie, Architect
7200 BENDIGO CIRCLE • MISSISSAUGA, ON • L5N 1Z4 • TEL: 416 885 0108

BLACK DOG DEVELOPMENT

PENALTA

Revisions:	
Date:	Particular:

Issue:	
Date:	Particular:
JUN.17.25	ISSUED FOR REVIEW

SIXTH LINE AFFORDABLE HOUSING

1493 SIXTH LINE, OAKVILLE

SITE PLAN

SCALE 1:250

A-0.1

APPENDIX C:

Detailed Sanitary Modelling Results Tables

Table C.1: Detailed Downstream Sanitary Sewers Results Summary (Dry Weather Flow)

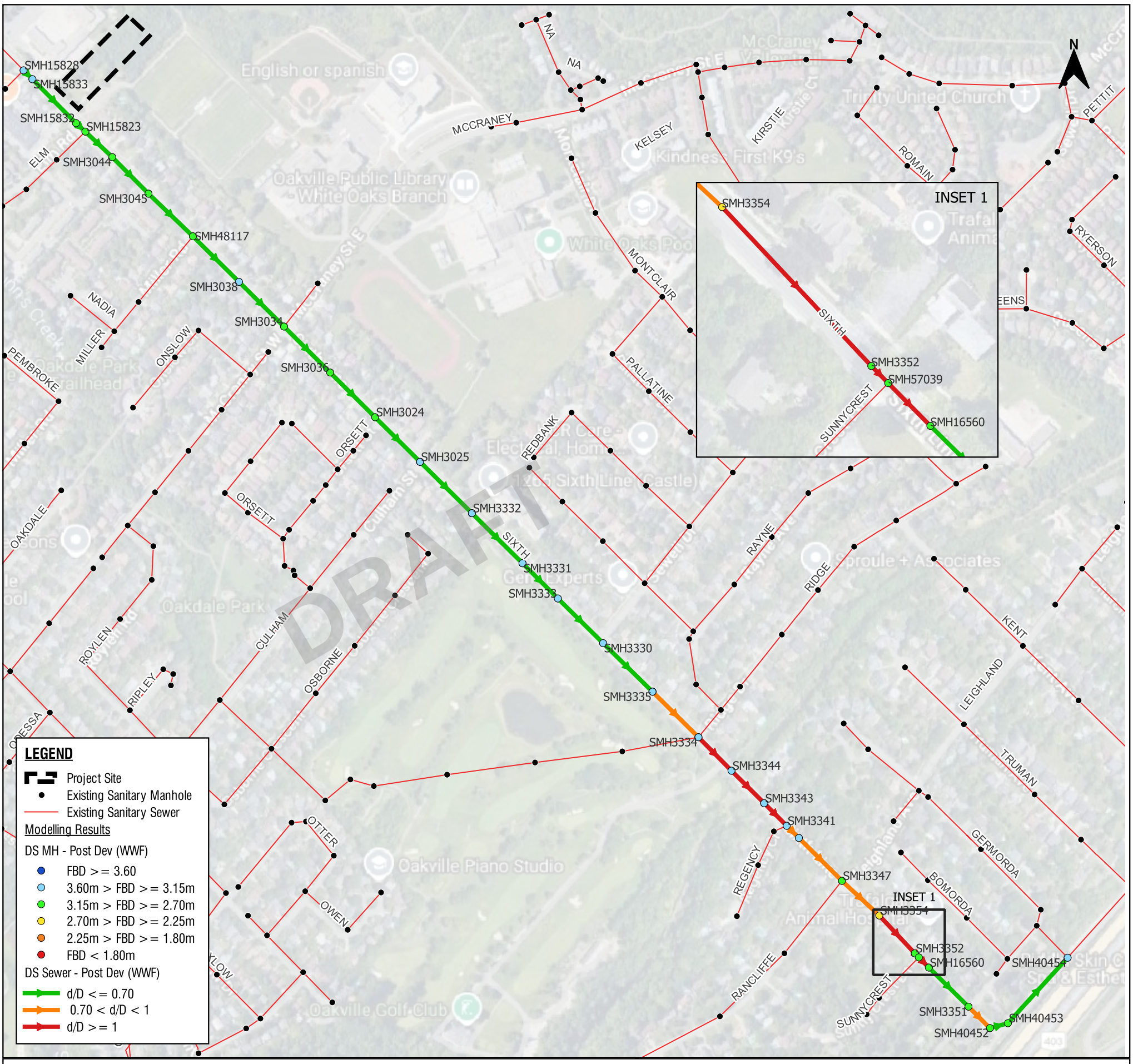
Conduit ID	US Node	DS Node	Dia (mm)	Full Flow Capacity (L/s)	Pre-Development Condition (Dry Weather Flow)					Post-Development Condition (Dry Weather Flow)				
					Max Flow (L/s)	q/Q	d/D	HGL (m)	Velocity (m/s)	Max Flow (L/s)	q/Q	d/D	HGL (m)	Velocity (m/s)
SMN14034	SMH15828	SMH15833	300	101	1.630	0.016	0.130	133.849	0.297	5.520	0.055	0.190	133.866	0.610
SMN13904	SMH15833	SMH15832	300	101	1.630	0.016	0.130	133.659	0.297	5.520	0.055	0.190	133.676	0.610
SMN14035	SMH15832	SMH15823	300	101	1.630	0.016	0.130	132.722	0.297	5.520	0.055	0.190	132.739	0.610
SMN13902	SMH15823	SMH3044	300	86	3.380	0.039	0.160	132.495	0.485	7.270	0.085	0.210	132.512	0.671
SMN3725	SMH3044	SMH3045	300	86	3.720	0.043	0.160	132.091	0.534	7.610	0.088	0.210	132.107	0.703
SMN3742	SMH3045	SMH48117	300	87	3.790	0.044	0.160	131.497	0.539	7.680	0.088	0.210	131.513	0.707
SMN3767	SMH48117	SMH3038	300	106	4.480	0.042	0.170	130.801	0.555	8.370	0.079	0.210	130.814	0.753
SMN3804	SMH3038	SMH3034	300	106	4.560	0.043	0.170	129.730	0.566	8.450	0.080	0.210	129.743	0.761
SMN3828	SMH3034	SMH3036	300	78	4.900	0.063	0.180	128.614	0.552	8.790	0.113	0.240	128.631	0.685
SMN3849	SMH3036	SMH3024	300	78	5.010	0.064	0.180	128.032	0.565	8.900	0.114	0.240	128.048	0.694
SMN20969	SMH3024	SMH3025	300	125	5.130	0.041	0.170	127.441	0.644	9.020	0.072	0.210	127.452	0.852
SMN20968	SMH3025	SMH3332	300	125	5.250	0.042	0.170	125.982	0.659	9.140	0.073	0.210	125.993	0.864
SMN3893	SMH3332	SMH3331	300	145	6.120	0.042	0.170	124.291	0.763	10.010	0.069	0.200	124.301	0.973
SMN3919	SMH3331	SMH3333	300	145	6.170	0.043	0.170	122.082	0.746	10.060	0.069	0.210	122.092	0.945
SMN3935	SMH3333	SMH3330	300	137	6.230	0.045	0.180	120.532	0.749	10.120	0.074	0.210	120.542	0.947
SMN3948	SMH3330	SMH3335	300	137	6.290	0.046	0.180	118.767	0.757	10.190	0.074	0.210	118.777	0.955
SMN3961	SMH3335	SMH3334	300	142	6.350	0.045	0.170	116.812	0.774	10.240	0.072	0.210	116.822	0.976
SMN3970	SMH3334	SMH3344	450	195	29.180	0.150	0.270	114.230	0.859	33.230	0.170	0.280	114.238	0.894
SMN3983	SMH3344	SMH3343	450	195	29.230	0.150	0.270	113.927	0.879	33.270	0.171	0.280	113.935	0.914
SMN3999	SMH3343	SMH3341	450	172	29.170	0.170	0.280	113.607	0.881	33.230	0.193	0.300	113.616	0.916
SMN58068	SMH3341	SMH54058	380	296	29.420	0.099	0.230	113.389	1.453	33.460	0.113	0.250	113.394	1.531
SMN4013	SMH54058	SMH3347	380	296	29.410	0.099	0.230	112.757	1.456	33.450	0.113	0.250	112.762	1.534
SMN4021	SMH3347	SMH3354	380	267	30.020	0.112	0.250	110.484	1.376	34.050	0.128	0.260	110.489	1.446
SMN4386	SMH3354	SMH3352	380	267	30.040	0.113	0.270	108.967	1.236	34.080	0.128	0.290	108.972	1.251
SMN61292	SMH3352	SMH57039	380	112	30.040	0.268	0.350	107.431	0.926	34.070	0.304	0.370	107.440	0.962
SMN21114	SMH57039	SMH16560	380	203	30.290	0.149	0.280	107.156	1.169	34.320	0.169	0.300	107.162	1.224
SMN21115	SMH16560	SMH3351	450	318	30.280	0.095	0.230	106.839	1.095	34.270	0.108	0.240	106.844	1.152
SMN4045	SMH3351	SMH40452	450	293	30.310	0.103	0.240	105.847	1.045	34.310	0.117	0.250	105.853	1.099
SMN44488	SMH40452	SMH40453	525	443	30.340	0.068	0.200	105.328	0.970	34.330	0.077	0.210	105.334	1.025
SMN44489	SMH40453	SMH40454	525	387	30.300	0.078	0.200	105.013	1.020	34.290	0.089	0.210	105.019	1.063

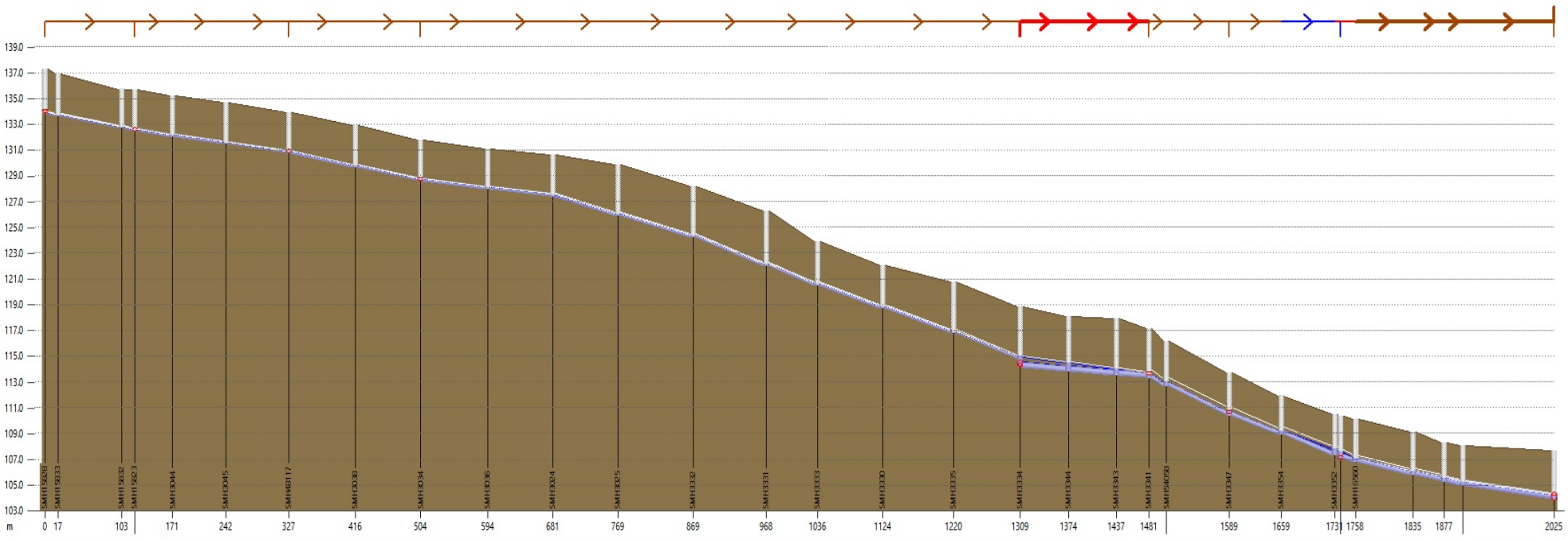
Table C.2: Detailed Downstream Sanitary Sewers Results Summary (Wet Weather Flow)

Conduit ID	US Node	DS Node	Dia (mm)	Full Flow Capacity (L/s)	Pre-Development Condition (Wet Weather Flow)					Post-Development Condition (Wet Weather Flow)				
					Max Flow (L/s)	q/Q	d/D	HGL (m)	Velocity (m/s)	Max Flow (L/s)	q/Q	d/D	HGL (m)	Velocity (m/s)
SMN14034	SMH15828	SMH15833	300	101	13.730	0.136	0.270	133.890	0.904	17.620	0.174	0.300	133.900	0.991
SMN13904	SMH15833	SMH15832	300	101	13.700	0.136	0.270	133.700	0.903	17.600	0.174	0.300	133.710	0.991
SMN14035	SMH15832	SMH15823	300	101	13.700	0.136	0.270	132.763	0.904	17.590	0.174	0.300	132.773	0.992
SMN13902	SMH15823	SMH3044	300	86	27.300	0.317	0.410	132.568	0.991	31.180	0.363	0.440	132.577	1.037
SMN3725	SMH3044	SMH3045	300	86	29.980	0.349	0.410	132.168	1.089	33.860	0.394	0.440	132.176	1.127
SMN3742	SMH3045	SMH48117	300	87	31.050	0.357	0.420	131.576	1.103	34.940	0.402	0.450	131.584	1.140
SMN3767	SMH48117	SMH3038	300	106	39.060	0.368	0.440	130.881	1.298	42.950	0.405	0.460	130.888	1.338
SMN3804	SMH3038	SMH3034	300	106	40.340	0.381	0.440	129.811	1.342	44.240	0.417	0.460	129.818	1.380
SMN3828	SMH3034	SMH3036	300	78	47.880	0.614	0.590	128.733	1.110	51.820	0.664	0.620	128.742	1.129
SMN3849	SMH3036	SMH3024	300	78	49.210	0.631	0.580	128.153	1.166	53.160	0.682	0.610	128.162	1.200
SMN20969	SMH3024	SMH3025	300	125	50.370	0.403	0.460	127.527	1.582	54.340	0.435	0.480	127.532	1.619
SMN20968	SMH3025	SMH3332	300	125	51.610	0.413	0.460	126.069	1.623	55.580	0.445	0.480	126.075	1.659
SMN3893	SMH3332	SMH3331	300	145	54.020	0.373	0.440	124.371	1.813	58.020	0.400	0.460	124.376	1.853
SMN3919	SMH3331	SMH3333	300	145	54.460	0.376	0.450	122.162	1.744	58.470	0.403	0.470	122.168	1.782
SMN3935	SMH3333	SMH3330	300	137	55.080	0.402	0.460	120.616	1.750	59.090	0.431	0.470	120.622	1.787
SMN3948	SMH3330	SMH3335	300	137	55.680	0.406	0.460	118.851	1.773	59.730	0.436	0.470	118.856	1.810
SMN3961	SMH3335	SMH3334	300	142	56.150	0.395	0.720	116.895	1.823	60.180	0.424	0.830	116.900	1.861
SMN3970	SMH3334	SMH3344	450	195	236.760	1.214	2.000	115.046	1.420	240.070	1.231	2.000	115.078	1.438
SMN3983	SMH3344	SMH3343	450	195	237.380	1.217	2.000	114.487	1.439	240.700	1.234	2.000	114.512	1.457
SMN3999	SMH3343	SMH3341	450	172	237.350	1.380	2.000	114.013	1.822	240.680	1.399	2.000	114.024	1.835
SMN58068	SMH3341	SMH54058	380	296	239.260	0.808	0.750	113.586	2.611	242.580	0.820	0.760	113.589	2.613
SMN4013	SMH54058	SMH3347	380	296	239.240	0.808	0.720	112.952	2.813	242.450	0.819	0.750	112.956	2.816
SMN4021	SMH3347	SMH3354	380	267	244.620	0.916	0.960	110.711	2.345	247.380	0.927	1.000	110.722	2.345
SMN4386	SMH3354	SMH3352	380	267	244.830	0.917	1.000	109.236	2.071	247.670	0.928	1.000	109.265	2.094
SMN61292	SMH3352	SMH57039	380	112	244.830	2.186	2.000	107.821	2.277	247.670	2.211	2.000	107.826	2.304
SMN21114	SMH57039	SMH16560	380	203	247.480	1.219	2.000	107.578	2.302	250.340	1.233	2.000	107.589	2.328
SMN21115	SMH16560	SMH3351	450	318	247.460	0.778	0.680	107.049	2.162	250.320	0.787	0.680	107.052	2.167
SMN4045	SMH3351	SMH40452	450	293	247.990	0.846	0.720	106.074	2.026	250.860	0.856	0.730	106.077	2.030
SMN44488	SMH40452	SMH40453	525	443	248.410	0.561	0.550	105.535	2.046	251.280	0.567	0.550	105.539	2.052
SMN44489	SMH40453	SMH40454	525	387	248.360	0.642	0.590	105.232	1.887	251.250	0.649	0.590	105.235	1.892

APPENDIX D:

Wet Weather Flow (WWF) Condition Hydraulic Grade Line (HGL) Profiles





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width (mm)	-	300	-	300	300	300	300	300	300	300	300	300	300	300	300	300	300	450	450	450	380	380	380	380	-	450	450	525	525
length (m)	-	85.3	-	51.1	71.0	84.9	89.3	87.6	89.9	87.5	87.4	100.6	98.2	68.9	87.7	95.5	89.2	64.9	63.6	43.9	23.8	83.8	70.3	71.5	-	76.8	41.8	25.7	122.3
surc	-	0.27	-	0.41	0.41	0.42	0.44	0.44	0.59	0.58	0.46	0.46	0.44	0.45	0.46	0.46	0.72	2.00	2.00	2.00	0.75	0.72	0.96	1.00	-	0.68	0.72	0.55	0.59
US depth (m)	-	0.080	-	0.118	0.124	0.126	0.130	0.132	0.172	0.175	0.136	0.138	0.131	0.131	0.136	0.137	0.135	0.832	0.652	0.514	-	0.264	0.293	0.330	-	0.304	0.323	-	0.307
US flow (m3/s)	-	0.01373	-	0.02732	0.03002	0.03110	0.03908	0.04037	0.04798	0.04931	0.05040	0.05164	0.05405	0.05448	0.05510	0.05572	0.05617	0.23677	0.23738	0.23737	-	0.23926	0.24543	0.24496	-	0.24748	0.24800	-	0.24841
DS depth (m)	-	0.080	-	0.124	0.124	0.126	0.132	0.132	0.176	0.173	0.138	0.138	0.131	0.136	0.137	0.137	0.217	0.683	0.504	0.344	-	0.273	0.366	0.496	-	0.304	0.323	-	0.307
DS flow (m3/s)	-	0.01370	-	0.02730	0.02998	0.03105	0.03906	0.04034	0.04788	0.04921	0.05037	0.05161	0.05402	0.05446	0.05508	0.05568	0.05615	0.23676	0.23738	0.23735	-	0.23924	0.24462	0.24483	-	0.24746	0.24799	-	0.24836
Node		-		-	SMH3044	SMH3045	SMH48117	SMH3038	SMH3034	SMH3036	SMH3024	SMH3025	SMH3332	SMH3331	SMH3333	SMH3330	SMH3335	SMH3334	SMH3344	-	-	-	SMH3347	SMH3354	-	-	SMH3351	-	SMH40453	

OAKVILLE

Town of Oakville
Downstream Sanitary Servicing for
Mixed-Use Residential Development

1493 Sixth Line

FIGURE D.1

Sewer Peak HGL Profile for Pre-Development Scenario (WWF)

Proj. No: 25-7018
Creator: HC
Reviewer: BL
Revision: A
Date: 2025-12-18

0 20 40 60 m

Scale: 1:5,800
Coordinate System:
EPSG:26917 - NAD83 / UTM Zone 17N

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING

EGBC Permit to Practice #1001018

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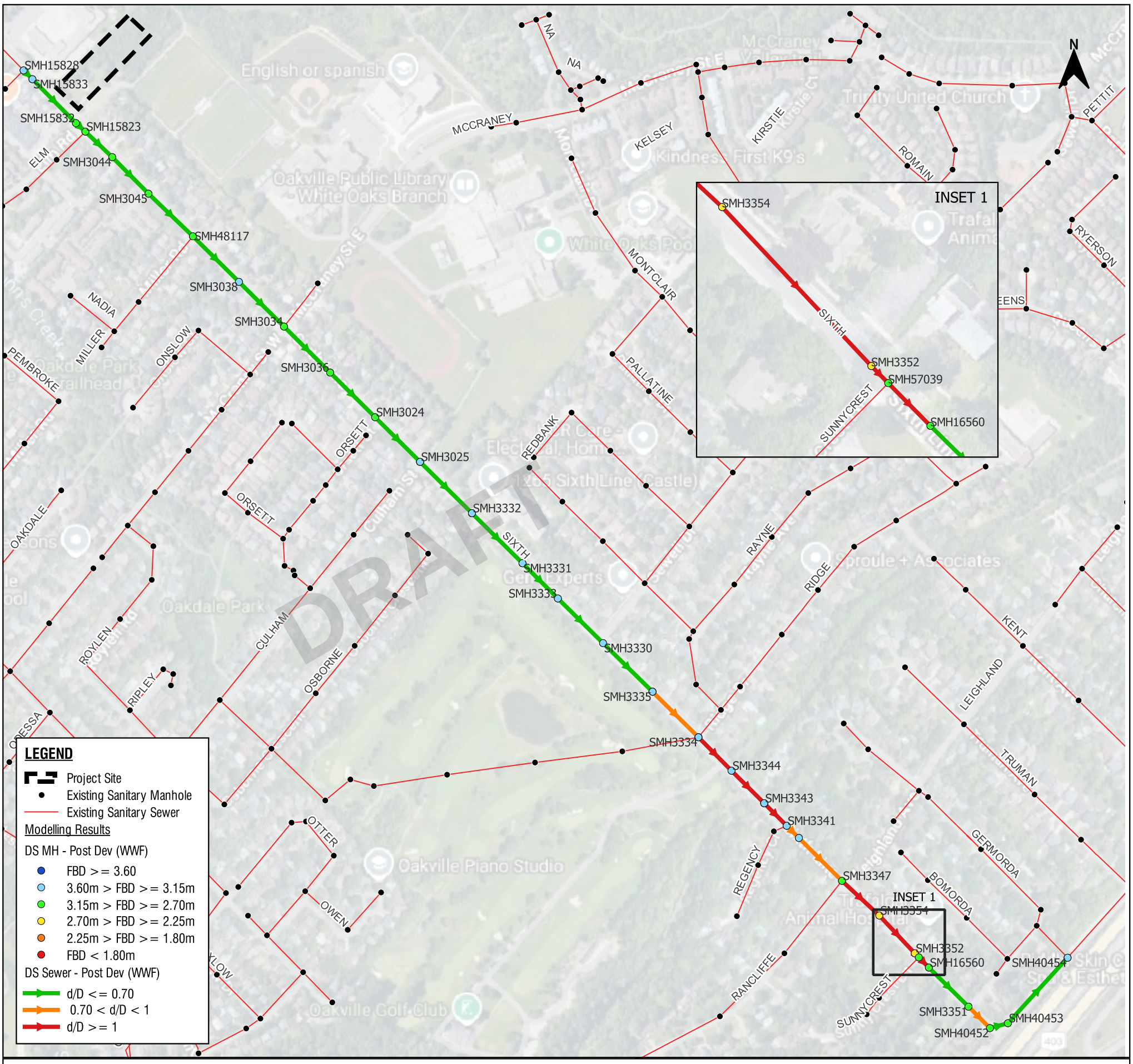
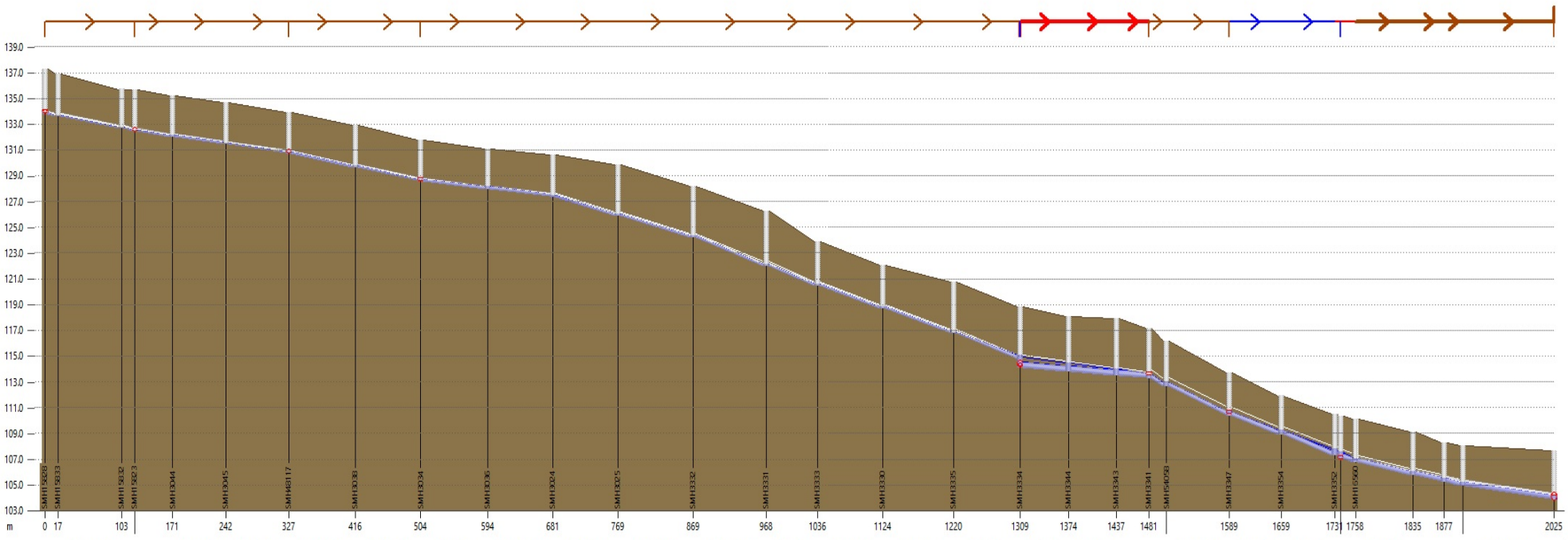
M:\TOR\2025\25-7018\AM INFP\3. GIS Mapping\3. Sanitary\25-7018 - Sanitary Analysis.qgz "D.1_Town of Oakville_Downstream Sanitary Servicing for Mixed-Use Residential Development_Sewer Peak HGL Profile for Pre-Development Scenario (WWF)"





Link	-	SMH15833.1	-	-	SMH3044.1	SMH3045.1	SMH48117.1	SMH3038.1	SMH3034.1	SMH3036.1	SMH3024.1	SMH3025.1	SMH3332.1	SMH3331.1	SMH3333.1	SMH3330.1	SMH3335.1	SMH3334.1	SMH3344.1	-	-	SMH54058.1	SMH3347.1	SMH3354.1	-	SMH16560.1	-	-	SMH40453.1
width (mm)	-	300	-	300	300	300	300	300	300	300	300	300	300	300	300	300	300	450	450	450	380	380	380	380	-	450	450	525	525
length (m)	-	85.3	-	51.1	71.0	84.9	89.3	87.6	89.9	87.5	87.4	100.6	98.2	68.9	87.7	95.5	89.2	64.9	63.6	43.9	23.8	83.8	70.3	71.5	-	76.8	41.8	25.7	122.3
surc	-	0.30	-	0.44	0.44	0.45	0.46	0.46	0.62	0.61	0.48	0.48	0.46	0.47	0.47	0.47	0.83	2.00	2.00	2.00	0.76	0.75	1.00	1.00	-	0.68	0.73	0.55	0.59
US depth (m)	-	0.090	-	0.126	0.132	0.134	0.137	0.139	0.181	0.184	0.142	0.144	0.136	0.136	0.141	0.142	0.140	0.869	0.677	0.524	-	0.267	0.303	0.354	-	0.307	0.326	-	0.310
US flow (m3/s)	-	0.01762	-	0.03120	0.03390	0.03500	0.04298	0.04428	0.05190	0.05325	0.05436	0.05562	0.05804	0.05848	0.05912	0.05975	0.06022	0.24009	0.24070	0.24069	-	0.24258	0.24855	0.24772	-	0.25034	0.25086	-	0.25128
DS depth (m)	-	0.090	-	0.132	0.132	0.134	0.139	0.139	0.185	0.180	0.144	0.144	0.137	0.142	0.142	0.142	0.248	0.707	0.516	0.346	-	0.284	0.395	0.502	-	0.307	0.326	-	0.310
DS flow (m3/s)	-	0.01760	-	0.03118	0.03386	0.03494	0.04295	0.04424	0.05182	0.05316	0.05434	0.05558	0.05802	0.05847	0.05909	0.05973	0.06018	0.24007	0.24070	0.24068	-	0.24245	0.24738	0.24767	-	0.25032	0.25086	-	0.25125
Node	-		-	-	SMH3044	SMH3045	SMH48117	SMH3038	SMH3034	SMH3036	SMH3024	SMH3025	SMH3332	SMH3331	SMH3333	SMH3330	SMH3335	SMH3334	SMH3344	-	-	-	SMH3347	SMH3354	-	-	SMH3351	-	SMH40453	-

OAKVILLE

Town of Oakville
Downstream Sanitary Servicing for
Mixed-Use Residential Development

1493 Sixth Line

FIGURE D.2

Sewer Peak HGL Profile for Post-Development Scenario (WWF)

Proj. No: 25-7018
Creator: HC
Reviewer: BL
Revision: A
Date: 2025-12-18

0 20 40 60 m

Scale: 1:5,800
Coordinate System:
EPSG:26917 - NAD83 / UTM Zone 17N

APLIN MARTIN
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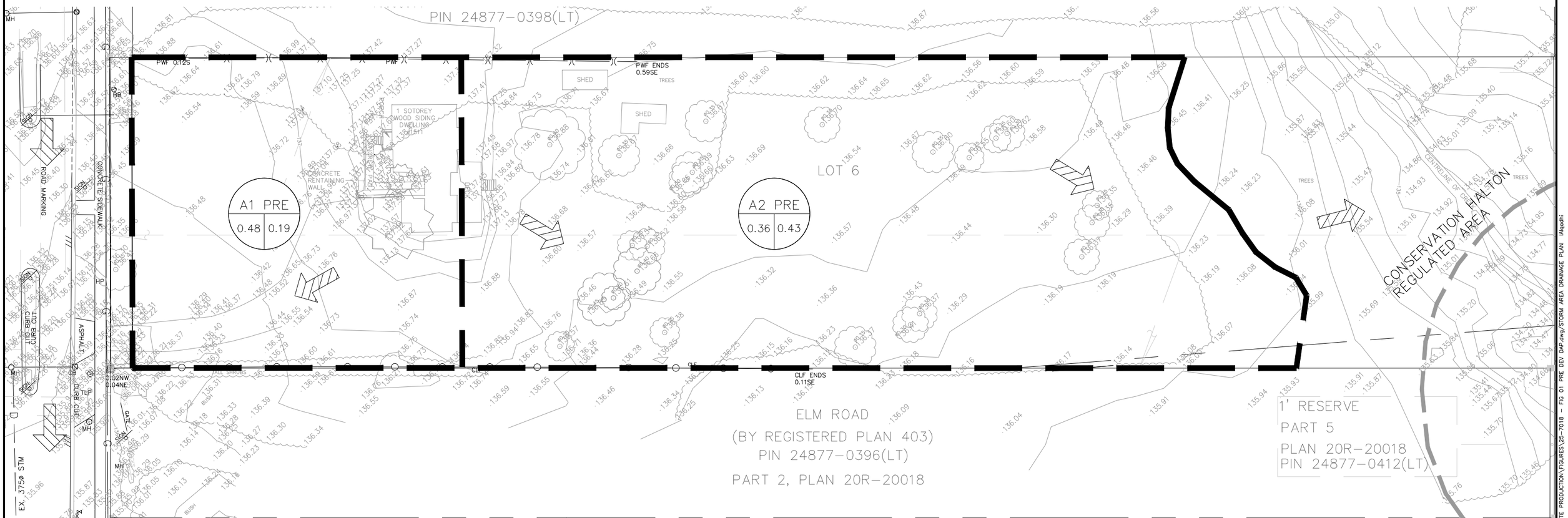
M:\TOR\2025\25-7018\AM INFP\3. GIS Mapping\3. Sanitary\25-7018 - Sanitary Analysis.qgz "D.2_Town of Oakville_Downstream Sanitary Servicing for Mixed-Use Residential Development_Sewer Peak HGL Profile for Post-Development Scenario (WWF)"

APPENDIX D

Stormwater Management Design



APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING

CLIENT: **PENALTA GROUP LTD.**
504 IROQUOIS SHORE ROAD, UNIT 12B,
OAKVILLE, ON, L6H 3K4

PROJECT:
MIXED USE RESIDENTIAL DEVELOPMENT
1493 SIXTH LINE, OAKVILLE, ON, L6H 1X8

LEGEND:

PRE-DEVELOPMENT DRAINAGE AREA

EX. GRADE ×168.25

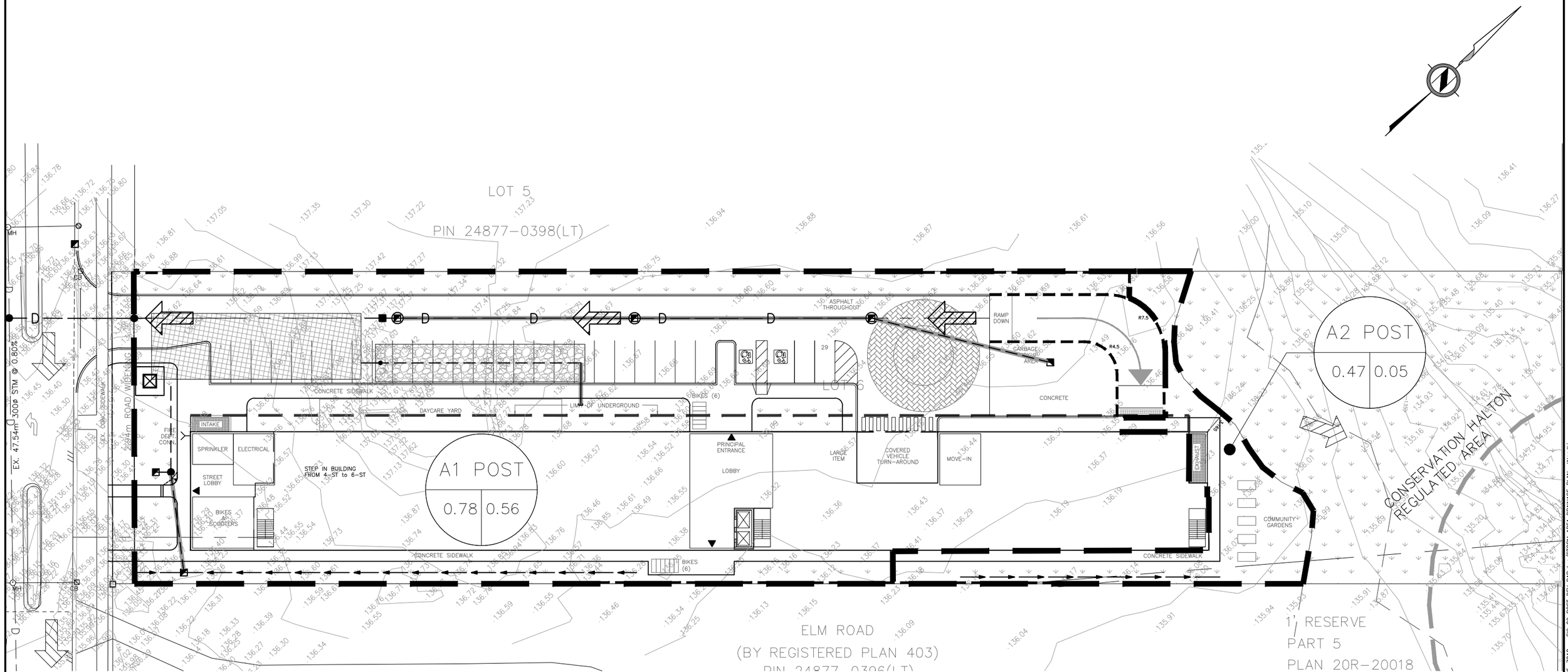
EX. OVERLAND FLOW DIRECTION

A1 PRE (DRAINAGE AREA ID)
0.25 | 0.27 (RUN OFF COEFFICIENT | DRAINAGE AREA (ha))

TITLE:
PRE-DEVELOPMENT DRAINAGE AREA PLAN

PROJECT NO. 25-7018	DRAWING DATE: JUNE, 2025
FIGURE NO. FIG. -01	SCALE : 1:500

Jan 14 2026 - 5:05pm N:\TOR\2025\25-7018\DWG\ONSITE PRODUCTION\FIGURES\25-7018 - FIG 01 PRE DEV DAP.dwg/STORM AREA DRAINAGE PLAN (Appdh)



APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING

CLIENT: **PENALTA GROUP LTD.**
504 IROQUOIS SHORE ROAD, UNIT 12B,
OAKVILLE, ON, L6H 3K4

PROJECT:
MIXED USE RESIDENTIAL DEVELOPMENT
1493 SIXTH LINE, OAKVILLE, ON, L6H 1X8

LEGEND:
POST-DEVELOPMENT DRAINAGE AREA
EX. GRADE ×168.25
EX. OVERLAND FLOW DIRECTION
PR. OVERLAND FLOW DIRECTION

A1 POST (DRAINAGE AREA ID)
0.78 (RUN OFF COEFFICIENT) 0.56 (DRAINAGE AREA (ha))

TITLE: **POST-DEVELOPMENT DRAINAGE AREA PLAN**

PROJECT NO.	DRAWING DATE:
25-7018	**JUNE, 2025**
FIGURE NO.	SCALE :
FIG.-02	**1:500**

Jan 16 2026 - 11:55am M:\TOR\2025\25-7018\DWG\ONSITE PRODUCTION\FIGURES\25-7018 - FIG 02 POST DEV DAP.dwg/STORM AREA DRAINAGE PLAN (Aplphi

APLIN MARTIN

Project: Mixed-Use Residential Development
A&M File: 25-7018
Date: 17Jan/26
By: AH

Post-Development Runoff Coefficient

			C (2-10 YR)	C (25-50 YR)	C (100 YR)
A1 Post	Total Area	0.56			
	Pervious	0.08	0.35	0.35	0.35
	Impervious	0.48	0.85	0.85	0.85
	Composite 'C'		0.78	0.78	0.78
A2 Post	Total Area	0.05	C (2-10 YR)	C (25-50 YR)	C (100 YR)
	Pervious	0.04	0.35	0.35	0.35
	Impervious	0.01	0.85	0.85	0.85
	Composite 'C'		0.47	0.47	0.47

Post-Development Peak Flows

Area ID	A (ha)	C	Tc (min)
A1 Post	0.56	0.78	10.00
A2 Post	0.05	0.47	10.00

City/Town of: Oakville

Storm Frequency (Yr)	a	b	c
2	725	4.80	0.81
5	1170	5.80	0.84
10	1400	5.80	0.85
25	1680	5.60	0.85
50	1960	5.80	0.86
100	2150	5.70	0.86

Storm Frequency: 2 Year

Area ID	AC	I (mm/hr)	Q (m^3/s)	Q (L/s)
A1 Post	0.44	82.18	0.10	99.56
A2 Post	0.03	82.18	0.01	5.85
A1 + A2 Post	0.46	82.18	0.11	105.41

Storm Frequency: 5 Year

Area ID	AC	I (mm/hr)	Q (m^3/s)	Q (L/s)
A1 Post	0.44	114.21	0.14	138.36
A2 Post	0.03	114.21	0.01	8.14
A1 + A2 Post	0.46	114.21	0.15	146.50

Storm Frequency: 10 Year

Area ID	AC	I (mm/hr)	Q (m^3/s)	Q (L/s)
A1 Post	0.44	134.79	0.16	163.29
A2 Post	0.03	134.79	0.01	9.60
A1 + A2 Post	0.46	134.79	0.17	172.90

Storm Frequency: 25 Year

Area ID	AC	I (mm/hr)	Q (m^3/s)	Q (L/s)
A1 Post	0.44	162.17	0.20	196.46
A2 Post	0.03	162.17	0.01	11.55
A1 + A2 Post	0.46	162.17	0.21	208.01

Storm Frequency: 50 Year

Area ID	AC	I (mm/hr)	Q (m^3/s)	Q (L/s)
A1 Post	0.44	182.06	0.22	220.56
A2 Post	0.03	182.06	0.01	12.97
A1 + A2 Post	0.46	182.06	0.23	233.52

Storm Frequency: 100 Year

Area ID	AC	I (mm/hr)	Q (m^3/s)	Q (L/s)
A1 Post	0.44	200.80	0.24	243.26
A2 Post	0.03	200.80	0.01	14.30
A1 + A2 Post	0.46	200.80	0.26	257.57

2 Year Peak Flow Calculations

	Tc min	Runoff Coefficient	Area Ha	Intensity mm/hour	n	Q cms
$Q_{pre\ (5\text{-}YR)}$	10.0	0.48	0.19	114.2	0.00278	0.028
Q2-YR $_{Post}$	10.0	0.78	0.56	82.2	0.00278	0.100

Storage Volume Required (Modified Rational Method)

A2 Post (Uncontrolled)

Area	0.05	ha
C	0.47	
AC	0.026	
Release Rate	0.006	m^3/s

A1 Post (Controlled)

Area	0.56	ha
C	0.78	
AC	0.44	
Allowable Release Rate	0.028	m^3/s
Uncontrolled Release Rate	0.006	m^3/s
Controlled Release Rate	0.009	m^3/s
Total Release Rate	0.015	m^3/s
Storage Required	75.66	m^3
Storage Provided	#REF!	m^3

City's IDF Data		Uncontrolled Runoff			Controlled Runoff			
Rainfall Duration Tr min	Rainfall Intensity I mm/hour	Storm Runoff cms	Runoff Volume cm	Released Volume cm	Storm Runoff cms	Runoff Volume cm	Released Volume cm	Required Storage cm
10	82.18	0.01	3.51	3.51	0.10	59.73	5.61	54.12
15	64.96	0.00	4.16	5.27	0.08	70.82	8.42	62.41
20	54.15	0.00	4.63	7.02	0.07	78.72	11.22	67.50
25	46.68	0.00	4.99	8.78	0.06	84.83	14.03	70.81
30	41.19	0.00	5.28	10.54	0.05	89.81	16.83	72.98
35	36.95	0.00	5.53	12.29	0.04	94.01	19.64	74.37
40	33.58	0.00	5.74	14.05	0.04	97.64	22.44	75.20
45	30.83	0.00	5.93	15.80	0.04	100.84	25.25	75.60
50	28.54	0.00	6.10	17.56	0.03	103.71	28.05	75.66
55	26.59	0.00	6.25	19.32	0.03	106.31	30.86	75.46
60	24.92	0.00	6.39	21.07	0.03	108.69	33.66	75.03
65	23.47	0.00	6.52	22.83	0.03	110.88	36.47	74.42
70	22.19	0.00	6.64	24.59	0.03	112.92	39.27	73.65
75	21.06	0.00	6.75	26.34	0.03	114.83	42.08	72.75
80	20.05	0.00	6.86	28.10	0.02	116.61	44.88	71.73
85	19.15	0.00	6.96	29.85	0.02	118.29	47.69	70.61
90	18.33	0.00	7.05	31.61	0.02	119.89	50.49	69.40
95	17.58	0.00	7.14	33.37	0.02	121.40	53.30	68.10
100	16.90	0.00	7.22	35.12	0.02	122.84	56.10	66.74
105	16.28	0.00	7.30	36.88	0.02	124.22	58.91	65.31
110	15.70	0.00	7.38	38.63	0.02	125.53	61.71	63.82
115	15.17	0.00	7.46	40.39	0.02	126.79	64.52	62.28
120	14.68	0.00	7.53	42.15	0.02	128.01	67.32	60.68
125	14.22	0.00	7.60	43.90	0.02	129.18	70.13	59.05
130	13.79	0.00	7.66	45.66	0.02	130.30	72.93	57.37
135	13.39	0.00	7.73	47.41	0.02	131.39	75.74	55.65
140	13.01	0.00	7.79	49.17	0.02	132.44	78.54	53.90
145	12.66	0.00	7.85	50.93	0.02	133.46	81.35	52.11
150	12.33	0.00	7.91	52.68	0.01	134.45	84.15	50.29
155	12.02	0.00	7.96	54.44	0.01	135.41	86.96	48.45
160	11.72	0.00	8.02	56.20	0.01	136.34	89.76	46.57
165	11.44	0.00	8.07	57.95	0.01	137.24	92.57	44.67
170	11.18	0.00	8.12	59.71	0.01	138.12	95.38	42.75
175	10.93	0.00	8.17	61.46	0.01	138.98	98.18	40.80
180	10.69	0.00	8.22	63.22	0.01	139.82	100.99	38.84

5 Year Peak Flow Calculations

	Tc min	Runoff Coefficient	Area Ha	Intensity mm/hour	n	Q cms
$Q_{pre\ (5\text{-}YR)}$	10.0	0.48	0.19	114.2	0.00278	0.028
Q5-YR $_{Post}$	10.0	0.78	0.56	114.2	0.00278	0.138

Storage Volume Required (Modified Rational Method)

A2 Post (Uncontrolled)

Area	0.05	ha
C	0.47	
AC	0.026	
Release Rate	0.008	m^3/s

A1 Post (Controlled)

Area	0.56	ha
C	0.78	
AC	0.44	
Allowable Release Rate	0.028	m^3/s
Uncontrolled Release Rate	0.008	m^3/s
Controlled Release Rate	0.011	m^3/s
Total Release Rate	0.019	m^3/s
Storage Required	110.17	m^3
Storage Provided	223.80	m^3

City's IDF Data		Uncontrolled Runoff			Controlled Runoff			
Rainfall Duration Tr min	Rainfall Intensity I mm/hour	Storm Runoff cms	Runoff Volume cm	Released Volume cm	Storm Runoff cms	Runoff Volume cm	Released Volume cm	Required Storage cm
10	114.21	0.01	4.88	4.88	0.14	83.02	6.63	**76.39**
15	90.59	0.01	5.81	7.32	0.11	98.77	9.94	**88.83**
20	75.54	0.01	6.46	9.76	0.09	109.82	13.25	**96.57**
25	65.06	0.00	6.95	12.20	0.08	118.23	16.56	**101.67**
30	57.31	0.00	7.35	14.64	0.07	124.98	19.88	**105.10**
35	51.33	0.00	7.68	17.08	0.06	130.59	23.19	**107.40**
40	46.57	0.00	7.96	19.52	0.06	135.39	26.50	**108.89**
45	42.67	0.00	8.21	21.97	0.05	139.58	29.82	**109.76**
50	39.43	0.00	8.42	24.41	0.05	143.28	33.13	**110.16**
55	36.67	0.00	8.62	26.85	0.04	146.61	36.44	**110.17**
60	34.31	0.00	8.80	29.29	0.04	149.63	39.75	**109.88**
65	32.26	0.00	8.96	31.73	0.04	152.40	43.07	**109.33**
70	30.45	0.00	9.11	34.17	0.04	154.95	46.38	**108.57**
75	28.86	0.00	9.25	36.61	0.03	157.31	49.69	**107.62**
80	27.43	0.00	9.38	39.05	0.03	159.52	53.01	**106.51**
85	26.15	0.00	9.50	41.49	0.03	161.58	56.32	**105.26**
90	25.00	0.00	9.62	43.93	0.03	163.53	59.63	**103.90**
95	23.95	0.00	9.72	46.37	0.03	165.37	62.94	**102.42**
100	22.99	0.00	9.83	48.81	0.03	167.11	66.26	**100.85**
105	22.11	0.00	9.92	51.25	0.03	168.77	69.57	**99.20**
110	21.30	0.00	10.02	53.69	0.03	170.34	72.88	**97.46**
115	20.56	0.00	10.10	56.13	0.02	171.85	76.20	**95.66**
120	19.87	0.00	10.19	58.57	0.02	173.30	79.51	**93.79**
125	19.23	0.00	10.27	61.02	0.02	174.68	82.82	**91.86**
130	18.63	0.00	10.35	63.46	0.02	176.02	86.13	**89.88**
135	18.07	0.00	10.42	65.90	0.02	177.30	89.45	**87.85**
140	17.54	0.00	10.50	68.34	0.02	178.53	92.76	**85.77**
145	17.05	0.00	10.57	70.78	0.02	179.73	96.07	**83.66**
150	16.59	0.00	10.64	73.22	0.02	180.88	99.39	**81.50**
155	16.15	0.00	10.70	75.66	0.02	182.00	102.70	**79.30**
160	15.74	0.00	10.76	78.10	0.02	183.08	106.01	**77.07**
165	15.35	0.00	10.83	80.54	0.02	184.14	109.32	**74.81**
170	14.98	0.00	10.89	82.98	0.02	185.16	112.64	**72.52**
175	14.63	0.00	10.95	85.42	0.02	186.15	115.95	**70.20**
180	14.30	0.00	11.00	87.86	0.02	187.12	119.26	**67.85**

10 Year Peak Flow Calculations

	Tc min	Runoff Coefficient	Area Ha	Intensity mm/hour	n	Q cms
$Q_{pre\ (5\text{-}YR)}$	10.0	0.48	0.19	114.2	0.00278	0.028
Q10-YR $_{Post}$	10.0	0.78	0.56	134.8	0.00278	0.163

Storage Volume Required (Modified Rational Method)

A2 Post (Uncontrolled)

Area	0.05	ha
C	0.47	
AC	0.026	
Release Rate	0.010	m^3/s

A1 Post (Controlled)

Area	0.56	ha
C	0.78	
AC	0.44	
Allowable Release Rate	0.028	m^3/s
Uncontrolled Release Rate	0.010	m^3/s
Controlled Release Rate	0.012	m^3/s
Total Release Rate	0.021	m^3/s
Storage Required	133.42	m^3
Storage Provided	223.80	m^3

City's IDF Data		Uncontrolled Runoff			Controlled Runoff			
Rainfall Duration Tr min	Rainfall Intensity I mm/hour	Storm Runoff cms	Runoff Volume cm	Released Volume cm	Storm Runoff cms	Runoff Volume cm	Released Volume cm	Required Storage cm
10	134.79	0.01	5.76	5.76	0.16	97.98	6.99	**90.99**
15	106.76	0.01	6.84	8.64	0.13	116.40	10.49	**105.92**
20	88.94	0.01	7.60	11.52	0.11	129.29	13.98	**115.31**
25	76.53	0.01	8.18	14.40	0.09	139.07	17.48	**121.59**
30	67.37	0.00	8.64	17.28	0.08	146.90	20.97	**125.92**
35	60.30	0.00	9.02	20.16	0.07	153.40	24.47	**128.93**
40	54.67	0.00	9.35	23.04	0.07	158.94	27.96	**130.98**
45	50.07	0.00	9.63	25.92	0.06	163.77	31.46	**132.31**
50	46.24	0.00	9.88	28.80	0.06	168.04	34.95	**133.09**
55	42.99	0.00	10.11	31.68	0.05	171.87	38.45	**133.42**
60	40.20	0.00	10.31	34.56	0.05	175.34	41.94	**133.40**
65	37.78	0.00	10.50	37.44	0.05	178.51	45.44	**133.07**
70	35.66	0.00	10.67	40.33	0.04	181.44	48.93	**132.50**
75	33.78	0.00	10.83	43.21	0.04	184.15	52.43	**131.72**
80	32.10	0.00	10.98	46.09	0.04	186.67	55.93	**130.75**
85	30.60	0.00	11.11	48.97	0.04	189.04	59.42	**129.62**
90	29.24	0.00	11.25	51.85	0.04	191.26	62.92	**128.35**
95	28.00	0.00	11.37	54.73	0.03	193.36	66.41	**126.95**
100	26.88	0.00	11.49	57.61	0.03	195.35	69.91	**125.45**
105	25.84	0.00	11.60	60.49	0.03	197.24	73.40	**123.84**
110	24.89	0.00	11.70	63.37	0.03	199.05	76.90	**122.15**
115	24.02	0.00	11.80	66.25	0.03	200.77	80.39	**120.37**
120	23.21	0.00	11.90	69.13	0.03	202.41	83.89	**118.52**
125	22.45	0.00	11.99	72.01	0.03	203.99	87.38	**116.61**
130	21.75	0.00	12.08	74.89	0.03	205.51	90.88	**114.63**
135	21.09	0.00	12.17	77.77	0.03	206.97	94.37	**112.59**
140	20.48	0.00	12.25	80.65	0.02	208.38	97.87	**110.51**
145	19.90	0.00	12.33	83.53	0.02	209.73	101.37	**108.37**
150	19.36	0.00	12.41	86.41	0.02	211.05	104.86	**106.19**
155	18.85	0.00	12.48	89.29	0.02	212.32	108.36	**103.96**
160	18.36	0.00	12.56	92.17	0.02	213.55	111.85	**101.70**
165	17.91	0.00	12.63	95.05	0.02	214.74	115.35	**99.40**
170	17.47	0.00	12.69	97.93	0.02	215.90	118.84	**97.06**
175	17.06	0.00	12.76	100.81	0.02	217.03	122.34	**94.69**
180	16.67	0.00	12.83	103.69	0.02	218.13	125.83	**92.29**

25 Year Peak Flow Calculations

	Tc min	Runoff Coefficient	Area Ha	Intensity mm/hour	n	Q cms
$Q_{pre\ (5\text{-}YR)}$	10.0	0.48	0.19	114.2	0.00278	0.028
Q25-YR $_{Post}$	10.0	0.78	0.56	162.2	0.00278	0.197

Storage Volume Required (Modified Rational Method)

A2 Post (Uncontrolled)

Area	0.05	ha
C	0.47	
AC	0.026	
Release Rate	0.012	m^3/s

A1 Post (Controlled)

Area	0.56	ha
C	0.78	
AC	0.44	
Allowable Release Rate	0.028	m^3/s
Uncontrolled Release Rate	0.012	m^3/s
Controlled Release Rate	0.013	m^3/s
Total Release Rate	0.024	m^3/s
Storage Required	162.96	m^3
Storage Provided	223.80	m^3

City's IDF Data		Uncontrolled Runoff			Controlled Runoff			
Rainfall Duration Tr min	Rainfall Intensity I mm/hour	Storm Runoff cms	Runoff Volume cm	Released Volume cm	Storm Runoff cms	Runoff Volume cm	Released Volume cm	Required Storage cm
10	162.17	0.01	6.93	6.93	0.20	117.87	7.56	**110.31**
15	128.00	0.01	8.21	10.40	0.16	139.56	11.34	**128.22**
20	106.39	0.01	9.09	13.86	0.13	154.66	15.12	**139.54**
25	91.40	0.01	9.77	17.33	0.11	166.10	18.90	**147.20**
30	80.36	0.01	10.30	20.79	0.10	175.23	22.68	**152.55**
35	71.85	0.01	10.75	24.26	0.09	182.80	26.46	**156.34**
40	65.09	0.00	11.13	27.72	0.08	189.25	30.24	**159.01**
45	59.58	0.00	11.46	31.19	0.07	194.87	34.02	**160.85**
50	54.99	0.00	11.75	34.65	0.07	199.84	37.80	**162.04**
55	51.10	0.00	12.01	38.12	0.06	204.29	41.58	**162.71**
60	47.77	0.00	12.25	41.58	0.06	208.32	45.36	**162.96**
65	44.87	0.00	12.47	45.05	0.05	212.01	49.14	**162.87**
70	42.33	0.00	12.66	48.51	0.05	215.40	52.92	**162.48**
75	40.09	0.00	12.85	51.98	0.05	218.54	56.70	**161.84**
80	38.09	0.00	13.02	55.45	0.05	221.47	60.48	**160.99**
85	36.29	0.00	13.18	58.91	0.04	224.22	64.26	**159.96**
90	34.67	0.00	13.34	62.38	0.04	226.80	68.04	**158.76**
95	33.20	0.00	13.48	65.84	0.04	229.23	71.82	**157.41**
100	31.85	0.00	13.61	69.31	0.04	231.54	75.60	**155.94**
105	30.62	0.00	13.74	72.77	0.04	233.73	79.38	**154.35**
110	29.49	0.00	13.87	76.24	0.04	235.82	83.16	**152.66**
115	28.45	0.00	13.98	79.70	0.03	237.81	86.94	**150.87**
120	27.48	0.00	14.09	83.17	0.03	239.72	90.72	**149.00**
125	26.59	0.00	14.20	86.63	0.03	241.55	94.50	**147.05**
130	25.75	0.00	14.31	90.10	0.03	243.31	98.28	**145.03**
135	24.97	0.00	14.41	93.56	0.03	245.00	102.06	**142.94**
140	24.24	0.00	14.50	97.03	0.03	246.63	105.84	**140.79**
145	23.55	0.00	14.59	100.49	0.03	248.20	109.62	**138.58**
150	22.90	0.00	14.68	103.96	0.03	249.72	113.40	**136.32**
155	22.30	0.00	14.77	107.42	0.03	251.19	117.18	**134.01**
160	21.72	0.00	14.85	110.89	0.03	252.62	120.96	**131.66**
165	21.18	0.00	14.93	114.36	0.03	254.00	124.74	**129.26**
170	20.66	0.00	15.01	117.82	0.03	255.34	128.52	**126.82**
175	20.18	0.00	15.09	121.29	0.02	256.65	132.30	**124.35**
180	19.71	0.00	15.16	124.75	0.02	257.92	136.08	**121.84**

50 Year Peak Flow Calculations

	Tc min	Runoff Coefficient	Area Ha	Intensity mm/hour	n	Q cms
$Q_{pre\ (5\text{-}YR)}$	10.0	0.48	0.19	114.2	0.00278	0.028
Q50-YR $_{Post}$	10.0	0.78	0.56	182.1	0.00278	0.221

Storage Volume Required (Modified Rational Method)

A2 Post (Uncontrolled)

Area	0.05	ha
C	0.47	
AC	0.026	
Release Rate	0.013	m^3/s

A1 Post (Controlled)

Area	0.56	ha
C	0.78	
AC	0.44	
Allowable Release Rate	0.028	m^3/s
Uncontrolled Release Rate	0.013	m^3/s
Controlled Release Rate	0.013	m^3/s
Total Release Rate	0.026	m^3/s
Storage Required	185.57	m^3
Storage Provided	223.80	m^3

City's IDF Data		Uncontrolled Runoff			Controlled Runoff			
Rainfall Duration Tr min	Rainfall Intensity I mm/hour	Storm Runoff cms	Runoff Volume cm	Released Volume cm	Storm Runoff cms	Runoff Volume cm	Released Volume cm	Required Storage cm
10	182.06	0.01	7.78	7.78	0.22	132.33	7.83	**124.50**
15	143.68	0.01	9.21	11.67	0.17	156.66	11.74	**144.91**
20	119.36	0.01	10.20	15.56	0.14	173.52	15.66	**157.86**
25	102.47	0.01	10.95	19.45	0.12	186.21	19.57	**166.64**
30	90.02	0.01	11.54	23.34	0.11	196.31	23.49	**172.82**
35	80.44	0.01	12.03	27.23	0.10	204.65	27.40	**177.24**
40	72.82	0.01	12.45	31.12	0.09	211.72	31.32	**180.41**
45	66.61	0.00	12.81	35.01	0.08	217.86	35.23	**182.63**
50	61.43	0.00	13.13	38.90	0.07	223.27	39.15	**184.12**
55	57.06	0.00	13.41	42.79	0.07	228.10	43.06	**185.04**
60	53.30	0.00	13.67	46.68	0.06	232.47	46.97	**185.50**
65	50.05	0.00	13.90	50.58	0.06	236.45	50.89	**185.57**
70	47.19	0.00	14.12	54.47	0.06	240.11	54.80	**185.31**
75	44.67	0.00	14.32	58.36	0.05	243.50	58.72	**184.78**
80	42.42	0.00	14.50	62.25	0.05	246.64	62.63	**184.01**
85	40.40	0.00	14.67	66.14	0.05	249.59	66.55	**183.04**
90	38.57	0.00	14.84	70.03	0.05	252.35	70.46	**181.89**
95	36.92	0.00	14.99	73.92	0.04	254.95	74.38	**180.57**
100	35.41	0.00	15.14	77.81	0.04	257.41	78.29	**179.12**
105	34.03	0.00	15.27	81.70	0.04	259.75	82.21	**177.54**
110	32.76	0.00	15.40	85.59	0.04	261.97	86.12	**175.85**
115	31.59	0.00	15.53	89.48	0.04	264.09	90.03	**174.06**
120	30.51	0.00	15.65	93.37	0.04	266.11	93.95	**172.17**
125	29.50	0.00	15.76	97.26	0.04	268.05	97.86	**170.19**
130	28.56	0.00	15.87	101.15	0.03	269.92	101.78	**168.14**
135	27.69	0.00	15.98	105.04	0.03	271.71	105.69	**166.01**
140	26.87	0.00	16.08	108.93	0.03	273.43	109.61	**163.82**
145	26.10	0.00	16.17	112.82	0.03	275.09	113.52	**161.57**
150	25.38	0.00	16.27	116.71	0.03	276.70	117.44	**159.26**
155	24.70	0.00	16.36	120.60	0.03	278.25	121.35	**156.90**
160	24.05	0.00	16.45	124.49	0.03	279.75	125.27	**154.49**
165	23.45	0.00	16.53	128.38	0.03	281.21	129.18	**152.03**
170	22.87	0.00	16.62	132.27	0.03	282.62	133.09	**149.52**
175	22.33	0.00	16.70	136.16	0.03	283.99	137.01	**146.98**
180	21.81	0.00	16.78	140.05	0.03	285.32	140.92	**144.40**

100 Year Peak Flow Calculations

	Tc min	Runoff Coefficient	Area Ha	Intensity mm/hour	n	Q cms
$Q_{pre\ (5\text{-}YR)}$	10.0	0.48	0.19	114.2	0.00278	0.028
Q100-YR $_{Post}$	10.0	0.78	0.56	200.8	0.00278	0.243

Storage Volume Required (Modified Rational Method)

A2 Post (Uncontrolled)

Area	0.05	ha
C	0.47	
AC	0.026	
Release Rate	0.014	m^3/s

A1 Post (Controlled)

Area	0.56	ha
C	0.78	
AC	0.44	
Allowable Release Rate	0.028	m^3/s
Uncontrolled Release Rate	0.014	m^3/s
Controlled Release Rate	0.013	m^3/s
Total Release Rate	0.027	m^3/s
Storage Required	209.23	m^3
Storage Provided	223.80	m^3

City's IDF Data		Uncontrolled Runoff			Controlled Runoff			
Rainfall Duration Tr min	Rainfall Intensity I mm/hour	Storm Runoff cms	Runoff Volume cm	Released Volume cm	Storm Runoff cms	Runoff Volume cm	Released Volume cm	Required Storage cm
10	200.80	0.01	8.58	8.58	0.24	145.96	7.78	**138.18**
15	158.27	0.01	10.15	12.87	0.19	172.56	11.67	**160.89**
20	131.37	0.01	11.23	17.16	0.16	190.97	15.56	**175.41**
25	112.72	0.01	12.04	21.45	0.14	204.84	19.45	**185.39**
30	98.99	0.01	12.69	25.75	0.12	215.86	23.34	**192.52**
35	88.43	0.01	13.23	30.04	0.11	224.96	27.23	**197.73**
40	80.03	0.01	13.68	34.33	0.10	232.68	31.12	**201.57**
45	73.19	0.01	14.08	38.62	0.09	239.38	35.01	**204.38**
50	67.49	0.00	14.42	42.91	0.08	245.29	38.90	**206.40**
55	62.68	0.00	14.73	47.20	0.08	250.57	42.79	**207.79**
60	58.55	0.00	15.01	51.49	0.07	255.34	46.68	**208.67**
65	54.97	0.00	15.27	55.78	0.07	259.69	50.56	**209.13**
70	51.82	0.00	15.50	60.07	0.06	263.69	54.45	**209.23**
75	49.05	0.00	15.72	64.36	0.06	267.39	58.34	**209.04**
80	46.57	0.00	15.92	68.65	0.06	270.82	62.23	**208.59**
85	44.35	0.00	16.11	72.95	0.05	274.04	66.12	**207.92**
90	42.35	0.00	16.29	77.24	0.05	277.06	70.01	**207.05**
95	40.53	0.00	16.46	81.53	0.05	279.90	73.90	**206.00**
100	38.88	0.00	16.62	85.82	0.05	282.60	77.79	**204.80**
105	37.36	0.00	16.77	90.11	0.05	285.15	81.68	**203.47**
110	35.97	0.00	16.91	94.40	0.04	287.58	85.57	**202.01**
115	34.68	0.00	17.05	98.69	0.04	289.90	89.46	**200.44**
120	33.49	0.00	17.18	102.98	0.04	292.11	93.35	**198.76**
125	32.38	0.00	17.30	107.27	0.04	294.23	97.24	**196.99**
130	31.35	0.00	17.42	111.56	0.04	296.27	101.13	**195.14**
135	30.39	0.00	17.53	115.86	0.04	298.23	105.02	**193.21**
140	29.49	0.00	17.65	120.15	0.04	300.11	108.91	**191.20**
145	28.65	0.00	17.75	124.44	0.03	301.93	112.80	**189.13**
150	27.85	0.00	17.86	128.73	0.03	303.69	116.69	**187.00**
155	27.11	0.00	17.96	133.02	0.03	305.38	120.58	**184.81**
160	26.40	0.00	18.05	137.31	0.03	307.03	124.47	**182.56**
165	25.73	0.00	18.15	141.60	0.03	308.62	128.36	**180.26**
170	25.10	0.00	18.24	145.89	0.03	310.17	132.25	**177.92**
175	24.50	0.00	18.33	150.18	0.03	311.67	136.14	**175.53**
180	23.93	0.00	18.41	154.47	0.03	313.13	140.03	**173.10**

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING

AM Proj #	25-7018
Project Title:	Mixed-Use Residential Development
Project Location:	Oakville, Ontario
Developer:	Penalta Group

Orifice Calculations

Orifice Equation: $Q = C \times A \times \sqrt{2 \times g \times h}$

Storm Frequency	Coefficient	Post-Development Flowrate	Pre-Development Target	Head	Proposed Diameter	Area	Release Rate
Yr		m^3/s	m^3/s	m	mm	m^2	m^3/s
2	0.78	0.10	0.022	0.38	75	0.004	0.009
5	0.78	0.138	0.020	0.53	75	0.004	0.011
10	0.78	0.163	0.019	0.59	75	0.004	0.012
25	0.78	0.196	0.017	0.69	75	0.004	0.013
50	0.78	0.221	0.015	0.74	75	0.004	0.013
100	0.76	0.24	0.014	0.76	75	0.004	0.0130

APLIN MARTIN

Project: Mixed Use Residential Development
A&M File: 25-7018

Date: 17Jan/26
By: AH

Water Balance Volume Retention Requirement

Site Area (ha)	Depth (mm)	Volume (m^3)
0.81	25.0	202.5

Initial Abstraction Volume

Landuse	Area (m^2)	Depth (mm)	IA Volume (m^3)
Green Roof	2057.54	5.0	10.3
Landscape	1303.45	5.0	6.5
		Sum	16.8
	Water Balance Volume Required		**185.7**

Infiltration Rate

Borehole/ Monitoring Well ID	Soil Description*	Hydraulic Conductivity* (cm/s)	Infiltration Rate** (mm/hour)	Safety Correction Factor	Design Infiltration Rate (mm/hour)
-	-	-	37.6	2.50	15.0

* Assumed

Reference - CVC/TRCA LID SWM Planning and Design Guide Version 1.0

Bottomless Tank

Infiltration Facility - Required			Infiltration Facility - Provided		
Required Volume (WQV)	124.1	m^3	Infiltration Facility Depth (d)	0.54	m
Infiltration Rate (I)	15.0	mm/hr	Infiltration Facility Area (A)	246.4	m^2
Porosity (n)	0.96		Infiltration Facility Volume (V)	**127.7**	m^3
Drawdown Time (T)	72.0	hr	Drawdown Time (T)	**35.0**	hr
Max. Stone Resevoir Depth (d)	1.13	m $d = \frac{IT}{1000n}$			$A = \frac{WQV}{(d * n)}$

Secondary Gallery

Infiltration Facility - Required			Infiltration Facility - Provided		
Required Volume (WQV)	61.6	m^3	Infiltration Facility Depth (d)	1.10	m
Infiltration Rate (I)	15.0	mm/hr	Infiltration Facility Area (A)	140.0	m^2
Porosity (n)	0.4		Infiltration Facility Volume (V)	**61.6**	m^3
Drawdown Time (T)	72.0	hr	Drawdown Time (T)	**73.3**	hr
Max. Stone Resevoir Depth (d)	2.70	m $d = \frac{IT}{1000n}$			$A = \frac{WQV}{(d * n)}$

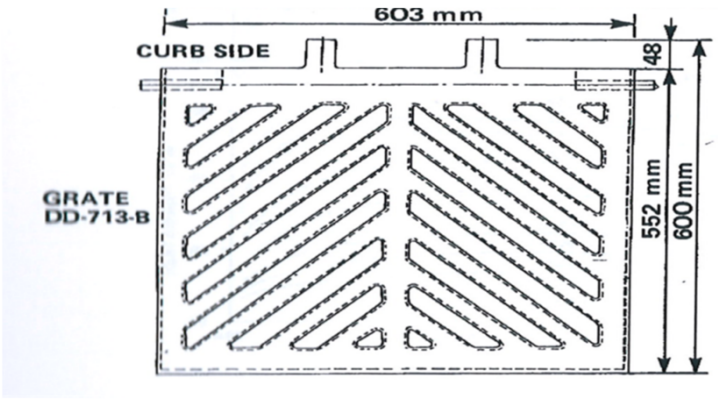
APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING

AM Proj #	25-7018
Project Title:	Mixed-Use Residential Development
Project Location:	Oakville, Ontario
Developer:	Penalta Group

Water Quality

Catchment	Process	TSS Removal Efficciency	Area of Site	% Area of Site	TSS Removal
		(%)	(ha)	(%)	(%)
A1 Post	Up-Flo Filter	80	0.56	91	80
A2 Post	Uncontrolled (existing vegetation)	80	0.05	9	Inherently Clean
		Total	0.62	100	80

Grate DD-713B Inlet Capacity Evaluation -CBMH1



Inlet Capture Rate (m^3/s) for Grate DD-713B inlet (on Sag) and Curb and Gutter Type B

Depth of Ponding (m)	Inlet Capacity (m^3/s)	50% blockage
0	0	0.0000
0.01	0.0004	0.0002
0.02	0.0017	0.0009
0.03	0.0040	0.0020
0.04	0.0070	0.0035
0.05	0.0110	0.0055
0.06	0.0171	0.0086
0.07	0.0250	0.0125
0.08	0.0347	0.0174
0.09	0.0464	0.0232
0.1	0.0600	0.0300
0.11	0.0726	0.0363
0.12	0.0853	0.0427
0.13	0.0971	0.0486
0.14	0.1082	0.0541
0.15	0.1184	0.0592
0.2	0.1569	0.0785
0.25	0.1811	0.0906
0.3	0.2027	0.1014
0.35	0.2260	0.1130
0.4	0.2434	0.1217
0.45	0.2589	0.1294
0.5	0.2726	0.1363
0.55	0.2851	0.1426
0.6	0.2965	0.1482
0.65	0.3070	0.1535
0.7	0.3166	0.1583
0.75	0.3257	0.1628
0.8	0.3341	0.1671
0.85	0.3420	0.1710
0.9	0.3495	0.1748
0.95	0.3566	0.1783
1	0.3633	0.1817

Notes: For flow depth less than or equal to 0.3 m, capture rates derived from laboratory testing of full experimental roadway; for flow depth greater than 0.3 m, capture rates extrapolated by using experimental data.

Runoff from A1 Post

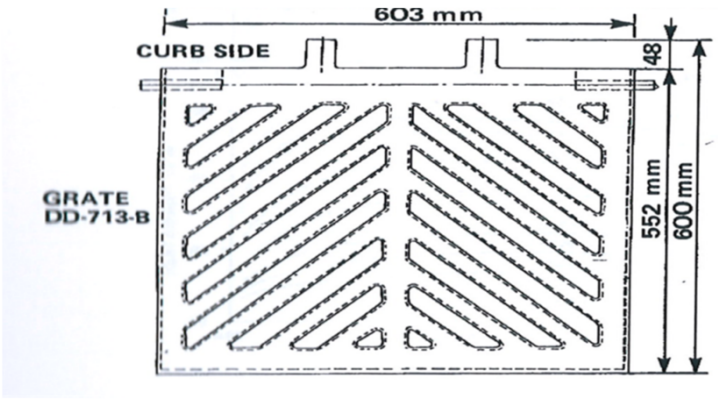
Area	0.099	ha
RC	0.85	
100-Year Intensity	200.8	mm/hour
Flow	0.047	m3/s

Therefore, the proposed CB in the swale can capture all runoff from drainage area A2 Post accounting for 50% blockage of the CB

Catch Basin Lead Capacity

Size	300	mm
Slope	1.00	%
Mannings N	0.013	
Capacity	0.3833	m^3/s

Grate DD-713B Inlet Capacity Evaluation -CBMH2



Inlet Capture Rate (m^3/s) for Grate DD-713B inlet (on Sag) and Curb and Gutter Type B

Depth of Ponding (m)	Inlet Capacity (m^3/s)	50% blockage
0	0	0.0000
0.01	0.0004	0.0002
0.02	0.0017	0.0009
0.03	0.0040	0.0020
0.04	0.0070	0.0035
0.05	0.0110	0.0055
0.06	0.0171	0.0086
0.07	0.0250	0.0125
0.08	0.0347	0.0174
0.09	0.0464	0.0232
0.1	0.0600	0.0300
0.11	0.0726	0.0363
0.12	0.0853	0.0427
0.13	0.0971	0.0486
0.14	0.1082	0.0541
0.15	0.1184	0.0592
0.2	0.1569	0.0785
0.25	0.1811	0.0906
0.3	0.2027	0.1014
0.35	0.2260	0.1130
0.4	0.2434	0.1217
0.45	0.2589	0.1294
0.5	0.2726	0.1363
0.55	0.2851	0.1426
0.6	0.2965	0.1482
0.65	0.3070	0.1535
0.7	0.3166	0.1583
0.75	0.3257	0.1628
0.8	0.3341	0.1671
0.85	0.3420	0.1710
0.9	0.3495	0.1748
0.95	0.3566	0.1783
1	0.3633	0.1817

Runoff from A1 Post

Area	0.081	ha
RC	0.85	
100-Year Intensity	200.8	mm/hour
Flow	0.038	m3/s

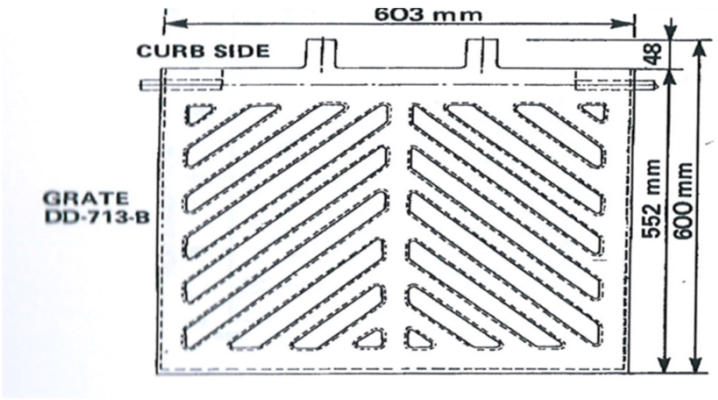
Therefore, the proposed CB in the swale can capture all runoff from drainage area A2 Post accounting for 50% blockage of the CB

Catch Basin Lead Capacity

Size	300	mm
Slope	0.50	%
Mannings N	0.013	
Capacity	0.2710	m^3/s

Notes: For flow depth less than or equal to 0.3 m, capture rates derived from laboratory testing of full experimental roadway; for flow depth greater than 0.3 m, capture rates extrapolated by using experimental data.

Grate DD-713B Inlet Capacity Evaluation -CBMH3



Inlet Capture Rate (m^3/s) for Grate DD-713B inlet (on Sag) and Curb and Gutter Type B

Depth of Ponding (m)	Inlet Capacity (m^3/s)	50% blockage
0	0	0.0000
0.01	0.0004	0.0002
0.02	0.0017	0.0009
0.03	0.0040	0.0020
0.04	0.0070	0.0035
0.05	0.0110	0.0055
0.06	0.0171	0.0086
0.07	0.0250	0.0125
0.08	0.0347	0.0174
0.09	0.0464	0.0232
0.1	0.0600	0.0300
0.11	0.0726	0.0363
0.12	0.0853	0.0427
0.13	0.0971	0.0486
0.14	0.1082	0.0541
0.15	0.1184	0.0592
0.2	0.1569	0.0785
0.25	0.1811	0.0906
0.3	0.2027	0.1014
0.35	0.2260	0.1130
0.4	0.2434	0.1217
0.45	0.2589	0.1294
0.5	0.2726	0.1363
0.55	0.2851	0.1426
0.6	0.2965	0.1482
0.65	0.3070	0.1535
0.7	0.3166	0.1583
0.75	0.3257	0.1628
0.8	0.3341	0.1671
0.85	0.3420	0.1710
0.9	0.3495	0.1748
0.95	0.3566	0.1783
1	0.3633	0.1817

Runoff from A1 Post

Area	0.092	ha
RC	0.85	
100-Year Intensity	200.8	mm/hour
Flow	0.044	m3/s

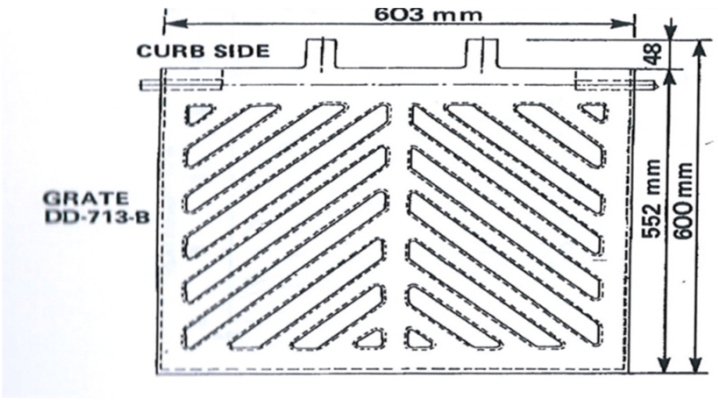
Therefore, the proposed CB in the swale can capture all runoff from drainage area A2 Post accounting for 50% blockage of the CB

Catch Basin Lead Capacity

Size	300	mm
Slope	0.50	%
Mannings N	0.013	
Capacity	0.2710	m^3/s

Notes: For flow depth less than or equal to 0.3 m, capture rates derived from laboratory testing of full experimental roadway; for flow depth greater than 0.3 m, capture rates extrapolated by using experimental data.

Grate DD-713B Inlet Capacity Evaluation -CB1



Inlet Capture Rate (m^3/s) for Grate DD-713B inlet (on Sag) and Curb and Gutter Type B

Depth of Ponding (m)	Inlet Capacity (m^3/s)	50% blockage
0	0	0.0000
0.01	0.0004	0.0002
0.02	0.0017	0.0009
0.03	0.0040	0.0020
0.04	0.0070	0.0035
0.05	0.0110	0.0055
0.06	0.0171	0.0086
0.07	0.0250	0.0125
0.08	0.0347	0.0174
0.09	0.0464	0.0232
0.1	0.0600	0.0300
0.11	0.0726	0.0363
0.12	0.0853	0.0427
0.13	0.0971	0.0486
0.14	0.1082	0.0541
0.15	0.1184	0.0592
0.2	0.1569	0.0785
0.25	0.1811	0.0906
0.3	0.2027	0.1014
0.35	0.2260	0.1130
0.4	0.2434	0.1217
0.45	0.2589	0.1294
0.5	0.2726	0.1363
0.55	0.2851	0.1426
0.6	0.2965	0.1482
0.65	0.3070	0.1535
0.7	0.3166	0.1583
0.75	0.3257	0.1628
0.8	0.3341	0.1671
0.85	0.3420	0.1710
0.9	0.3495	0.1748
0.95	0.3566	0.1783
1	0.3633	0.1817

Notes: For flow depth less than or equal to 0.3 m, capture rates derived from laboratory testing of full experimental roadway; for flow depth greater than 0.3 m, capture rates extrapolated by using experimental data.

Runoff from A1 Post

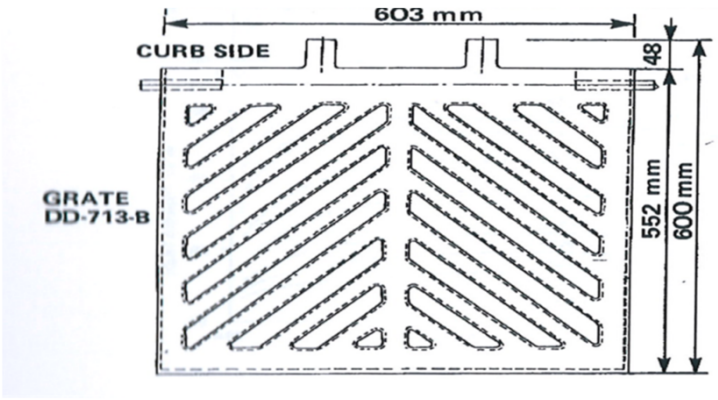
Area	0.063	ha
RC	0.55	
100-Year Intensity	200.8	mm/hour
Flow	0.019	m3/s

Therefore, the proposed CB in the swale can capture all runoff from drainage area A2 Post accounting for 50% blockage of the CB

Catch Basin Lead Capacity

Size	250	mm
Slope	1.00	%
Mannings N	0.013	
Capacity	0.2356	m^3/s

Grate DD-713B Inlet Capacity Evaluation -CB2



Inlet Capture Rate (m^3/s) for Grate DD-713B inlet (on Sag) and Curb and Gutter Type B

Depth of Ponding (m)	Inlet Capacity (m^3/s)	50% blockage
0	0	0.0000
0.01	0.0004	0.0002
0.02	0.0017	0.0009
0.03	0.0040	0.0020
0.04	0.0070	0.0035
0.05	0.0110	0.0055
0.06	0.0171	0.0086
0.07	0.0250	0.0125
0.08	0.0347	0.0174
0.09	0.0464	0.0232
0.1	0.0600	0.0300
0.11	0.0726	0.0363
0.12	0.0853	0.0427
0.13	0.0971	0.0486
0.14	0.1082	0.0541
0.15	0.1184	0.0592
0.2	0.1569	0.0785
0.25	0.1811	0.0906
0.3	0.2027	0.1014
0.35	0.2260	0.1130
0.4	0.2434	0.1217
0.45	0.2589	0.1294
0.5	0.2726	0.1363
0.55	0.2851	0.1426
0.6	0.2965	0.1482
0.65	0.3070	0.1535
0.7	0.3166	0.1583
0.75	0.3257	0.1628
0.8	0.3341	0.1671
0.85	0.3420	0.1710
0.9	0.3495	0.1748
0.95	0.3566	0.1783
1	0.3633	0.1817

Notes: For flow depth less than or equal to 0.3 m, capture rates derived from laboratory testing of full experimental roadway; for flow depth greater than 0.3 m, capture rates extrapolated by using experimental data.

Runoff from A1 Post

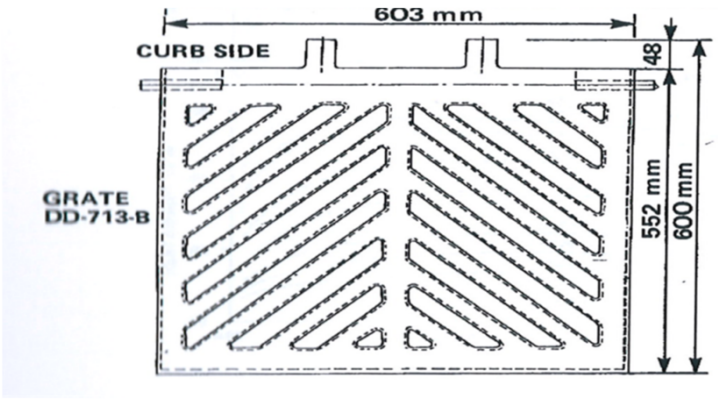
Area	0.012	ha
RC	0.3	
100-Year Intensity	200.8	mm/hour
Flow	0.002	m3/s

Therefore, the proposed CB in the swale can capture all runoff from drainage area A2 Post accounting for 50% blockage of the CB

Catch Basin Lead Capacity

Size	250	mm
Slope	1.00	%
Mannings N	0.013	
Capacity	0.2356	m^3/s

Grate DD-713B Inlet Capacity Evaluation -CB3



Inlet Capture Rate (m^3/s) for Grate DD-713B inlet (on Sag) and Curb and Gutter Type B

Depth of Ponding (m)	Inlet Capacity (m^3/s)	50% blockage
0	0	0.0000
0.01	0.0004	0.0002
0.02	0.0017	0.0009
0.03	0.0040	0.0020
0.04	0.0070	0.0035
0.05	0.0110	0.0055
0.06	0.0171	0.0086
0.07	0.0250	0.0125
0.08	0.0347	0.0174
0.09	0.0464	0.0232
0.1	0.0600	0.0300
0.11	0.0726	0.0363
0.12	0.0853	0.0427
0.13	0.0971	0.0486
0.14	0.1082	0.0541
0.15	0.1184	0.0592
0.2	0.1569	0.0785
0.25	0.1811	0.0906
0.3	0.2027	0.1014
0.35	0.2260	0.1130
0.4	0.2434	0.1217
0.45	0.2589	0.1294
0.5	0.2726	0.1363
0.55	0.2851	0.1426
0.6	0.2965	0.1482
0.65	0.3070	0.1535
0.7	0.3166	0.1583
0.75	0.3257	0.1628
0.8	0.3341	0.1671
0.85	0.3420	0.1710
0.9	0.3495	0.1748
0.95	0.3566	0.1783
1	0.3633	0.1817

Notes: For flow depth less than or equal to 0.3 m, capture rates derived from laboratory testing of full experimental roadway; for flow depth greater than 0.3 m, capture rates extrapolated by using experimental data.

Runoff from A1 Post

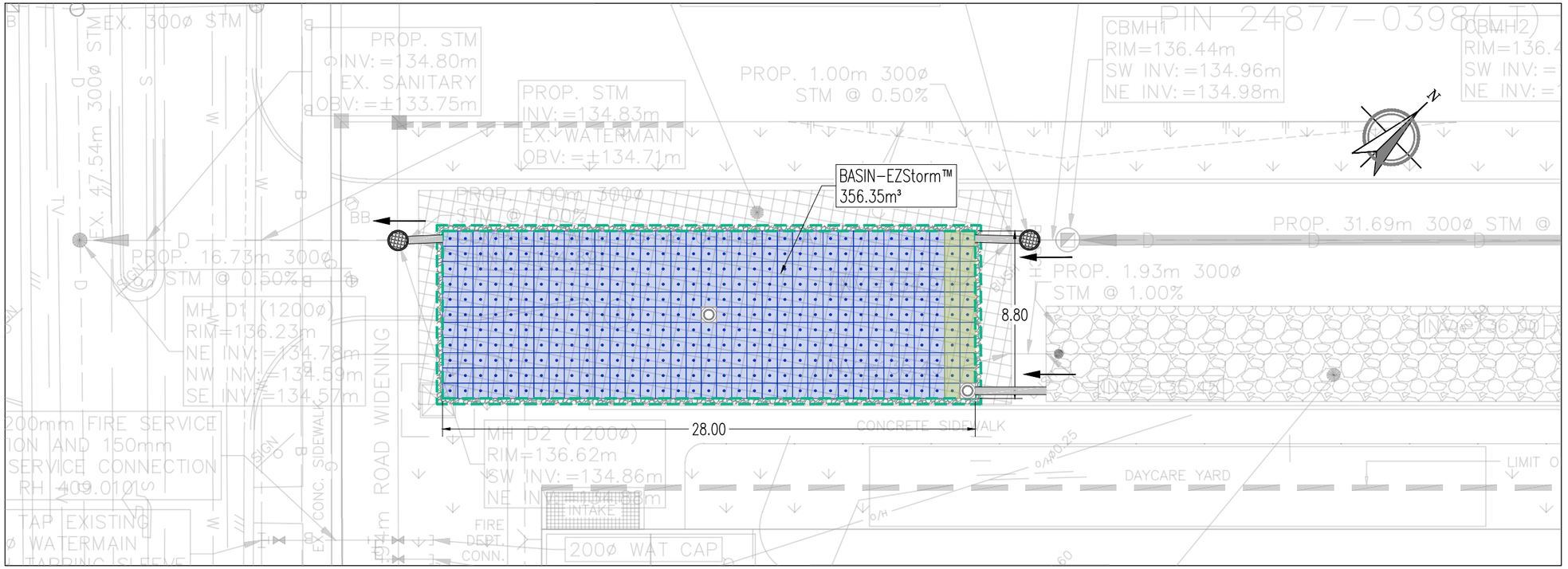
Area	0.016	ha
RC	0.85	
100-Year Intensity	200.8	mm/hour
Flow	0.008	m3/s

Therefore, the proposed CB in the swale can capture all runoff from drainage area A2 Post accounting for 50% blockage of the CB

Catch Basin Lead Capacity

Size	250	mm
Slope	1.00	%
Mannings N	0.013	
Capacity	0.2356	m^3/s

1493 SIXTH LINE, OAKVILLE, ON



1/01 IMPLANTATION

SCALE 1:250

INDEX

CONTACTS			
SITE CONTACT	PARTH PUSHKARNA	647 278-7339	ppushkarna@brunet.cc
SALES REPRESENTATIVE	PARTH PUSHKARNA	647 278-7339	ppushkarna@brunet.cc
TECNICAL SUPPORT	NEXTSTORM	450 322-6260	info@nextstorm.ca

NOTE :

- These drawings may contain components, including but not limited to manholes, catch basins, storm pipes, fittings, manifolds, castings or other necessary appurtenances that may not be supplied by Nextstorm.
- It is the responsibility of the contractor to confirm all the material required is provided before installation.
- This drawing was prepared to support the project engineer of record for the proposed system. It is the ultimate responsibility of the project engineer of record to ensure that the EZSTORM™ System's design is in full compliance with all applicable laws and regulations. It is the contractor of record's responsibility to ensure that the Nextstorm products are designed in accordance with Nexstorm's minimum requirements. Nextstorm does not approve plans, sizings or systems designs.
- All measurements are in meters unless otherwise indicated.

N°.	REVISION	DATE	BY
C	ISSUED FOR APPROVAL	15/01/2026	S.M.
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A	ISSUED FOR APPROVAL	13/01/2026	S.M.

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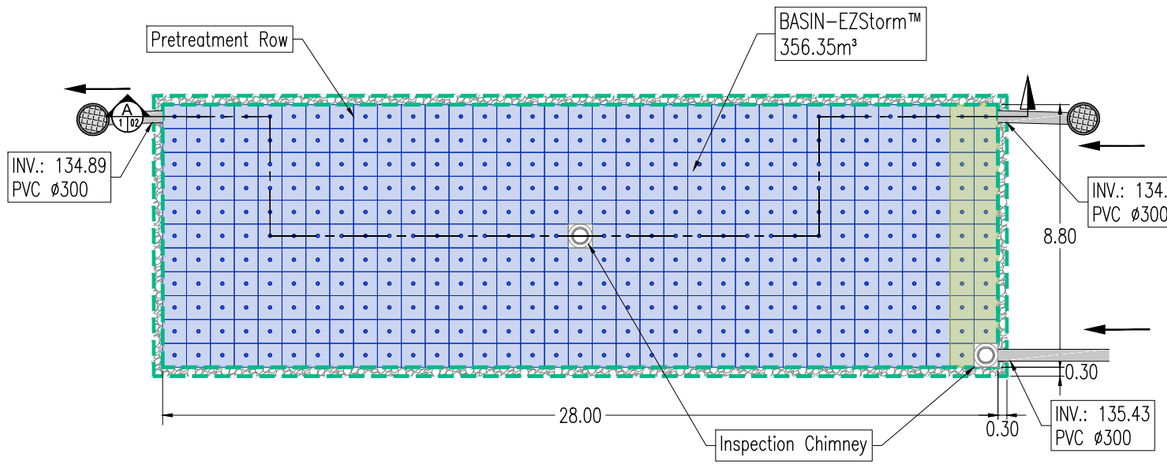
COVER

BASIN-EZSTORM™

PROJECT NAME:
1493 SIXTH LINE, OAKVILLE, ON

PROJECT N°:	DATE:
260112-07	13/01/2026
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 1/9

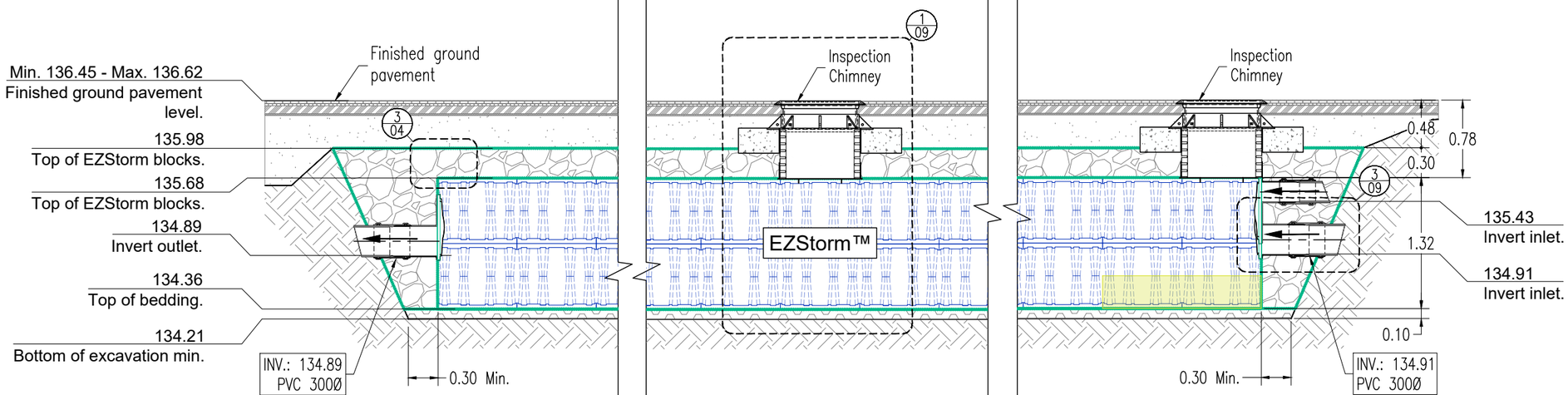
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec



1 / 02 — 2 LAYER PLAN VIEW

SCALE 1:200

EZSTORM™ SYSTEM	
Total volume storage capacity	360.15m³
EZSTORM™ Storage Volume	312.24m³
clear Stone Storage Volume	44.11m³
System Area	268.84m²
Number of blocks length	35
Number of blocks width	11
System's height	1.32m



2 / 02 — SECTION A-A

SCALE 1:50

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ–226.
- B. Geomembrane EZ–LLDPE–30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B — Thickness of this layer may vary according to project requirements
- C — Paving bed

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BASIN'S PLAN AND SECTION VIEW

BASIN-EZSTORM™-B1-356.35M³

PROJECT NAME:
1493 SIXTH LINE, OAKVILLE, ON

PROJECT N°:	DATE:
260112-07	13/01/2026
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SCALE: SCALE	SHEET N°: 2/9

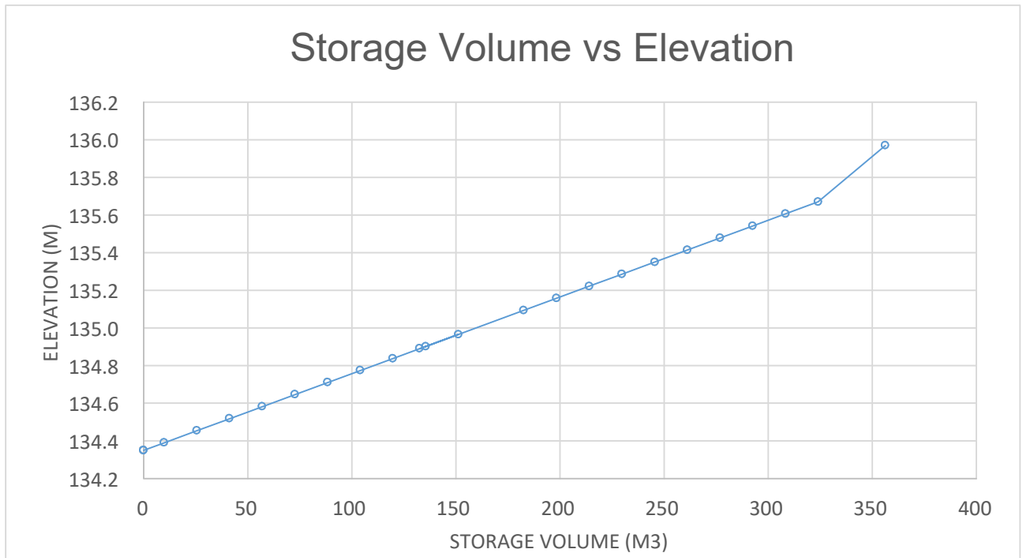
NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

SYSTEM CHARACTERISTICS			
Model	EZSTORM™ system B1		
	Number of blocks (unit)	Dimensions / blocks (m)	Dimensions EZStorm (m)
Height	2.0	0.66	1.32
Length	35	0.80	28.00
Width	11	0.80	8.80

EZSTORM area (m2)	246.4		
EZSTORM + Clear stone area (m2)	268.8	Quantity Control	Infiltration Vol.
Total storage volume (m3)	356.3	223.8	132.6
Invert (m)	134.39		
Min finished ground level (m)	136.45		

EZSTORM volume (m3)	312.2	Clear stone volume (m3)	44.1
Void in EZSTORM (%)	96%	Void in Clear stone (%)	40%

System height (m)	Storage volume (m3)	Elevation (m)	Notes
1.62	356.35	135.970	Top clear stone
1.32	324.09	135.670	Top EZSTORM
1.26	308.37	135.606	
1.19	292.66	135.542	
1.13	276.95	135.478	
1.06	261.23	135.414	
1.00	245.52	135.350	
0.94	229.81	135.286	
0.87	214.09	135.222	
0.81	198.38	135.158	
0.74	182.67	135.094	
0.68	166.95	135.030	
0.56	137.49	134.910	Invert
0.54	132.58	134.890	
0.49	119.81	134.838	
0.42	104.10	134.774	
0.36	88.39	134.710	
0.30	72.67	134.646	
0.23	56.96	134.582	
0.17	41.25	134.518	
0.10	25.53	134.454	
0.04	9.82	134.390	
0.00	0.00	134.350	Bottom EZSTORM



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VOLUME CALCULATION

BASIN-EZSTORM™-B1-356.35M³

PROJECT NAME:
1493 SIXTH LINE, OAKVILLE, ON

PROJECT N°:	DATE:
260112-07	13/01/2026
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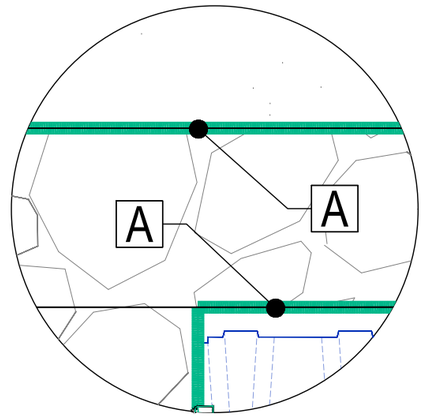
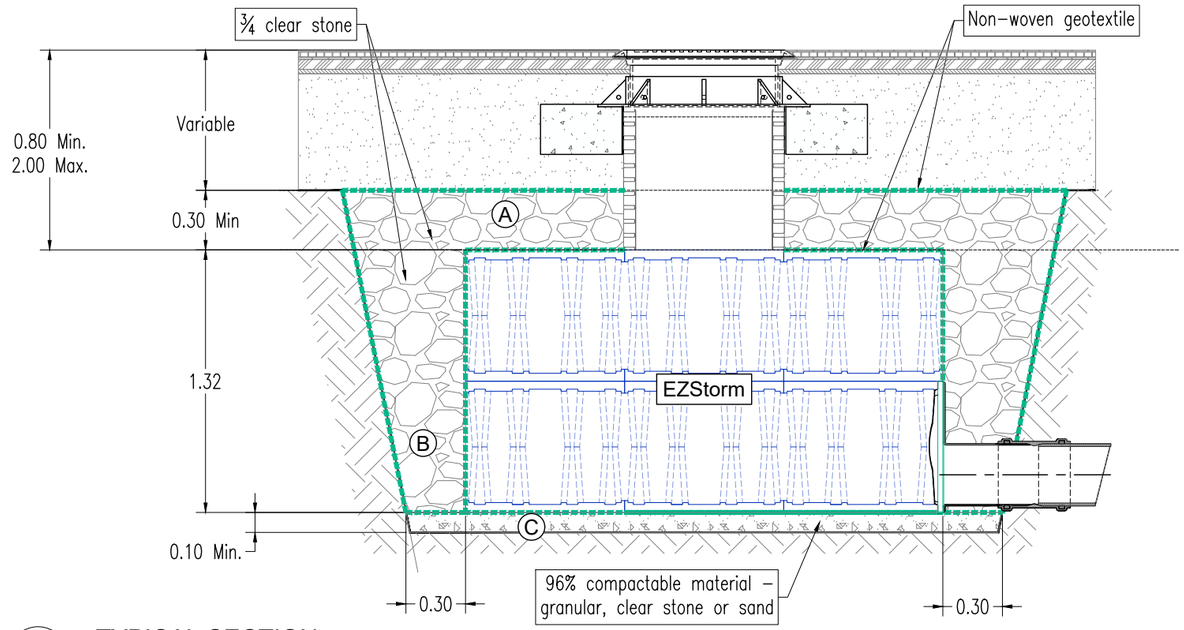
SCALE: SCALE	SHEET N°: 3/9

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

Acceptable backfill materials for this project			
Live Load: CL-625 / HS-25 (CSA-S6: 19)			
	Layer location	Backfill material	Density requirements
Ⓐ	Top embakment: Embakment located directly above the EZStorm chambers abd below the road structure.	3/4" Clear stone at a 40% void ratio	No compaction needed.
Ⓑ	Lateral backfill: Located between the lateral faces of the EZStorms and the limits of the excavated volume.	3/4" Clear stone at a 40% void ratio	No compaction needed.
Ⓒ	Laying bed: located under the EZStorm blocks, between the foundation floor and the base of the blocks.	Subgrade granular material 100 mm Min. 3/4 (20mm) granular material, clean stone or sand to 96% M.P.	Compact to 90% M.P. using a vibrating plate or roller compactor. Place the system on a flat, solid, horizontal and stable surface.



3/04 DETAIL
SCALE NOT AT SCALE



1/04 TYPICAL SECTION
SCALE 1:30

LEGEND

- Inspection Chimney
- Catch basin
- Connection–access concrete manhole
- Manhole
- A. Geotextile EZ-226.
- B. Geomembrane EZ-LLDPE-30
- Drain HDPE 150Ø (By others)
- Clean Stone with maximum grain size of 20mm at 40% void ratio
- A / B: Thickness of this layer may vary according to project requirements
- C: Paving bed

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STANDARD BACKFILL REQUIREMENTS

BASIN-EZSTORM™-B1-356.35M³

PROJECT NAME:
1493 SIXTH LINE, OAKVILLE, ON

PROJECT N°:	DATE:
260112-07	13/01/2026
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SCALE: SCALE	SHEET N°: 4/9

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

List of materials

CODE DE L'ARTICLE	DESCRIPTION	B1
EZ-SHD	EZStorm - half block 2 units/block (units)	1540
FL-EZSHD	EZSTORM Sidewall grid (units)	184
FL-EZSHD 1/2	EZSTORM Sidewall grid for half block (units)	0
PR-EZSHD	EZSTORM Cover plate	0
CONNECTEUR EZS-1	EZSTORM Single layer-connector (units)	0
CONNECTEUR EZS-2	EZSTORM Multi layer-connector (units)	800
R-P	EZSTORM Pre-treatment row (0.8m / unit)	0
EZSTORM adapters		
FC-200mm-PVC	EZSTORM Adapter 200 mm PVC (units)	1
FC-250mm-PVC	EZSTORM Adapter 250 mm PVC (units)	0
FC-300mm-PVC	EZSTORM Adapter 300 mm PVC (units)	2
FC-375mm-PVC	EZSTORM Adapter 375 mm PVC (units)	0
FC-450mm-PVC	EZSTORM Adapter 450 mm PVC (units)	0
FC-450mm-TBA	EZSTORM Adapter 450 mm PCP (units)	0
FC-525mm-PVC	EZSTORM Adapter 525 mm PVC (units)	0
FC-600mm-PEHD	EZSTORM Adapter 600 mm HDPE (units)	0
Inspection Chimney		
EZSTORM-ACCES	EZSTORM half-elements with opening (units)	4
PP-EZSTORM	EZSTORM half-elements with positioning plate (units)	2
PP-EZSTORM 1/2	EZSTORM Cover plate with positioning plate (units)	0
REHAUSSE-PEHD-600	EZSTORM Extension Pipe - Chimney (units) - Ø 600mm - 1.5 m /unit	2
Dalle-répartition	EZSTORM Support concrete ring (units)	2
OPSD401.01ST	Cast iron frame and cover (unit)	2
OPSD400.02	Catch basin Frame and grates (unités)	0
Rectangulare concrete inspection manhole 1200mm x 1200mm		
R1212	EZSTORM rectangular inspection concrete manhole	0
EZ-226	EZSTORM Protection geotextile (226g/m2) - Rolls of 6 m x 100 m	3
EZ-450	EZSTORM Protection geotextile (450g/m2) -Rolls of 6 m x 50 m	0
EZ-LLDPE30	LLDPE 30 mils liner - Rolls of 4m x 50m	0
Clear Stone (by others)		
	Quantity of 20 mm (3/4 in) clear stone required (m3) (by others)	110

LEGEND

- **ACCESSORIES not included in all projects**
- **Drawings for guidance only. For more details please refer to the DETAILS project plans**

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LIST OF MATERIALS

BASIN-EZSTORM™

PROJECT NAME:
1493 SIXTH LINE, OAKVILLE, ON

PROJECT N°:	DATE:
260112-07	13/01/2026
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 5/9

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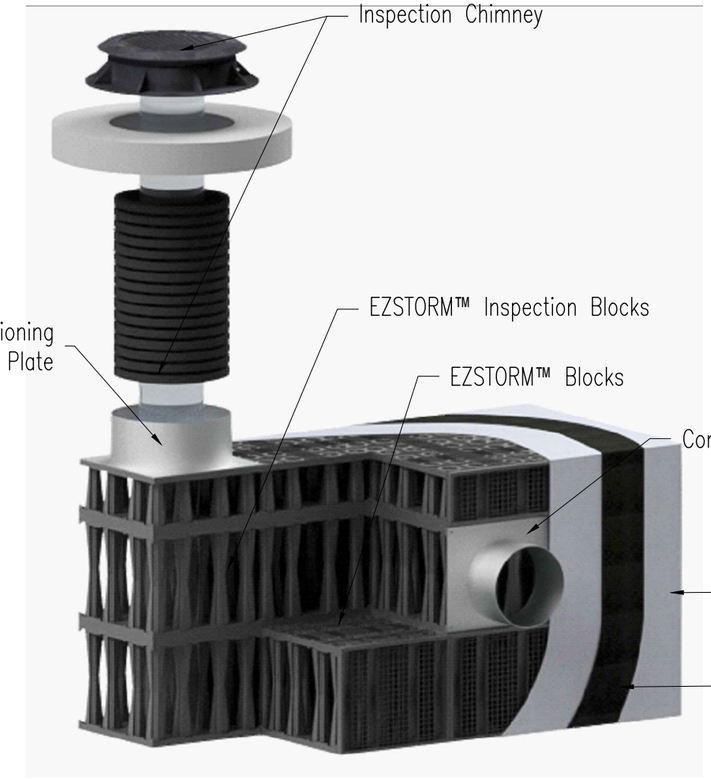
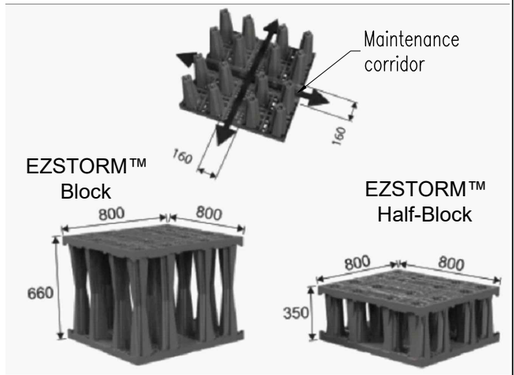
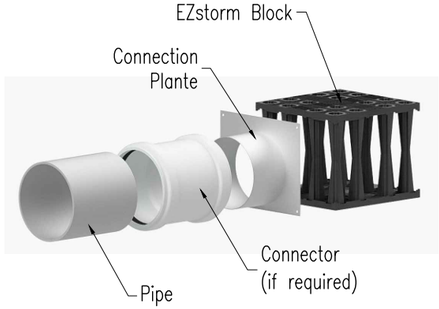
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec



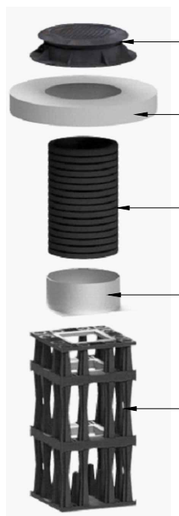
1. EZSTORM™ Components and Accessories (According on each project)



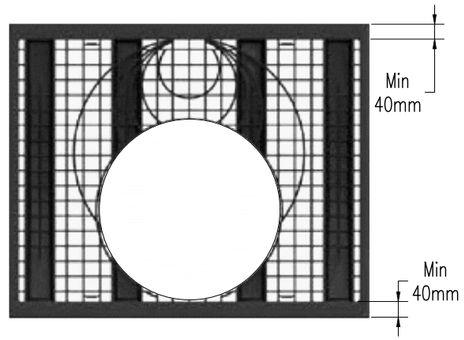
2. EZSTORM™ Block Standard Dimensions



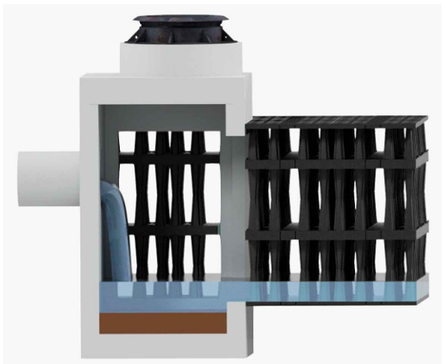
3.Connection Accessories Configuration



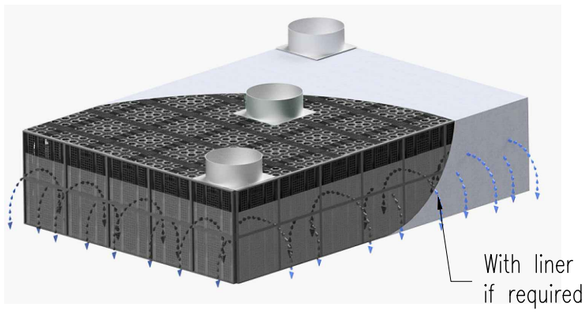
4. EZSTORM™ Block and Inspection Chimney



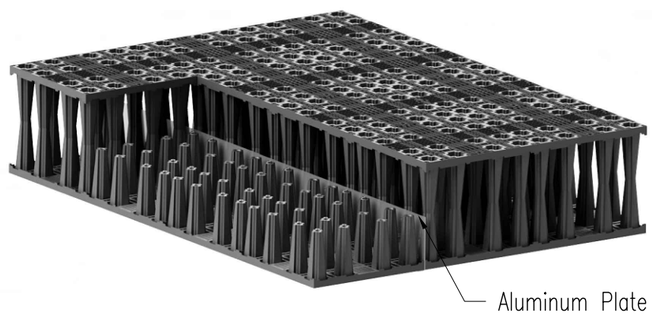
5. sidewall Grid with Connection Opening



6. Concrete Manhole for Access and Connection (if required)



7. Infiltration Basin Typical 3D Section View



8. Pretreatment Row (if required)

LEGEND

- **ACCESSORIES not included in all projects**
- **Drawings for guidance only. For more details please refer to the DETAILS project plans**

N°.	REVISION	DATE	BY
C	ISSUED FOR APPROVAL	15/01/2026	S.M.
B	ISSUED FOR APPROVAL	14/01/2026	S.M.
A	ISSUED FOR APPROVAL	13/01/2026	S.M.

ISSUED FOR APPROVAL
NOT FOR PRODUCTION

ACCESSORIES

BASIN-EZSTORM™

PROJECT NAME:
1493 SIXTH LINE, OAKVILLE, ON

PROJECT N°:	DATE:
260112-07	13/01/2026
DRAWN BY: S.M.	CHECKED BY: S.K.
SCALE: SCALE	SHEET N°: 6/9

NEXT
1625, Boulevard Monseigneur-Langlois
Salaberry-de-Valleyfield
J6S 1C2, Québec

September 3, 2025

ADS UFF Sizing Summary

Project Name: 1493 Sixth Line

Consulting Engineer: Aplin Martin

Location: Oakville, ON

Sizing Completed By: Haider Nasrullah **Email:** haider.nasrullah@ads-pipe.com

Recommended Unit	
Recommended Model:	UFF-7
TSS Removal Percentage:	80.9%
Total Site Volume Treated:	90.1%

Site Details	
Site Area:	0.62 ha
% Impervious:	-
Rational C:	0.79
Rainfall Station:	Toronto, ONT
Particle Size Distribution:	ETV

Unit Specifications:	
Number of Filter Modules:	7
Maximum Treatment Flowrate:	11.2 L/s
Inlet - Outlet Drop:	240 mm*
Max. Pipe Diameter:	600 mm
Operating Head:	760 mm

* Drop across unit can be reduced when required.

Site Elevations:	
Rim Elevation:	PER SITE PLAN
Inlet Pipe Elevation:	PER SITE PLAN
Outlet Pipe Elevation:	PER SITE PLAN

Consult approved shop drawings for final elevations. Riser sections (and/or grade rings) may be required to reach final grade on site.

Rainfall Intensity[1]	Fraction of Rainfall[1]	Removal Efficiency[2]	Weighted Net-Annual Removal Efficiency
mm/hr	%	%	%
0.50	0.2%	92.3%	0.2%
1.00	14.8%	91.3%	13.5%
1.50	15.1%	90.4%	13.6%
2.00	13.6%	89.4%	12.2%
2.50	3.9%	88.5%	3.5%
3.00	1.3%	87.6%	1.1%
3.50	8.9%	86.6%	7.7%
4.00	5.3%	85.7%	4.5%
4.50	1.2%	84.8%	1.0%
5.00	5.2%	83.8%	4.3%
6.00	4.2%	81.9%	3.5%
7.00	4.6%	80.1%	3.7%
8.00	3.1%	78.2%	2.4%
9.00	2.3%	76.3%	1.7%
10.00	2.2%	74.4%	1.6%
20.00	9.3%	55.7%	5.2%
30.00	2.7%	36.9%	1.0%
40.00	1.1%	18.2%	0.2%
50.00	0.5%	0.0%	0.0%
100.00	0.6%	0.0%	0.0%
150.00	0.1%	0.0%	0.0%
Net Annual Treatment			**80.9%**
Total Runoff Volume Treated:			**90.1%**

Rainfall Data: 1953:2007, HLY03, Toronto , ON, 6158350 & 6158355

Notes:

Removal efficiencies are based on NJDEP Test Protocols and independently verified.

All units supplied by ADS have numerous local, provincial, and international certifications (copies of which can be provided upon request). The design engineer is responsible for ensuring compliance with applicable regulations.

APPENDIX E

Engineering Plans