PATERSON GROUP

memorandum

re: **Grading and Site Servicing Plans Review**
Proposed 4-Storey Apartment Building
2928 Bank Street – Ottawa, Ontario

to: VIP Construction and Engineering – **Dimitri Zeidan** – dzeidanvip1@gmail.com

date: December 6, 2024

file: PG7073-MEMO.01

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide a review from a geotechnical perspective for the grading and site servicing plans for the proposed apartment building at the aforementioned site. The current memorandum should be read in conjunction with Paterson Group Report PG7073-1 dated April 1, 2024.

1.0 Grading Plan Review

The following grading plan drawing, prepared by D. B. Gray Engineering Inc., has been reviewed by Paterson in preparation for the current memorandum:

- ❑ Grading Plan – Proposed 4-Storey Apartment Building, 2928 Bank Street, Ottawa, ON - Job No. 23019 - Drawing No. C-3 of 8 – Revision 3 dated December 2, 2024.

Based on our review of the above-noted drawing and the subsurface conditions present at the subject site, the proposed grading is considered acceptable from a geotechnical perspective. A silty clay deposit was not encountered during the geotechnical investigation and therefore permissible grade raise restrictions are not applicable to the subject site.

Tree planting setbacks, based on the City of Ottawa 'Tree Planting in Sensitive Marine Clay Soils - 2017 Guideline', are not required. Further, the proposed development will be founded on an undisturbed, compact to dense silty sand based on the USF elevation (USF elevation is at 91.10 m) provided in the above noted grading plan.

Furthermore, based on our review of the above-noted grading plan, all the proposed retaining walls have heights of less than 1 m. Therefore, a global stability analysis is not required for the retaining walls at the subject site.

1.1 Protection of Footings Against Frost Action

Perimeter footings of heated structures are required to be insulated against the deleterious effects of frost action. A minimum 1.5 m thick soil cover alone, or a combination of soil cover in conjunction with foundation insulation should be provided in this regard. Other exterior unheated footings, such as those for isolated exterior piers, staircases, and retaining walls, are more prone to deleterious movement associated with frost action than the exterior walls of the proper structure. These footings should be provided with a minimum 2.1 m thick soil cover (or insulation equivalent) with the exception of segmental gravity walls, where the granular bedding layer and drainage system play a crucial role in lessening the impact of frost action along the bearing medium.

Based on our review of above noted grading plan, it should be noted that some of the perimeter footings for the proposed development are provided by insufficient soil cover. References should be made to Figure 1 – Mark Up Grading Plan Indicating The Location of Required Insulation for Footings.

It should be noted that to accommodate the absence of sufficient frost cover (minimum 1.5 m for heated footings) for the proposed footings, a different form of frost protection should be provided. This can be achieved by means of rigid insulation. Where insufficient soil cover is present above the underside of footings, the rigid insulation recommendations should be followed, as provided in Table 1 in the following.

Table 1 – Frost Protection Recommendations for Footings with Reduced Soil Cover

Thermal Condition	Soil Cover Provided (mm)	Insulation Dimensions	
		Thickness (mm)	Extension (mm)
Heated	1200-1500	50	Extend 900 mm horizontally beyond the exterior edge of the footing face and 600 mm beyond the interior edge of the footing face.
	900-1200	50	Extend 1200 mm horizontally beyond the exterior edge of the footing face and 600 mm beyond the interior edge of the footing face.
Unheated	1800-2100	50	Extend 900 mm horizontally beyond the exterior edge of the footing face and 600 mm beyond the interior edge of the footing face.
	1200-1800	50	Extend 600 mm horizontally beyond the exterior edge of the footing face and 600 mm beyond the interior edge of the footing face.
	900-1200	75	Extend 1200 mm horizontally beyond the exterior edge of the footing face and 600 mm beyond the interior edge of the footing face.

Table 1 – Frost Protection Recommendations for Footings with Reduced Soil Cover - Continued

Thermal Condition	Soil Cover Provided (mm)	Insulation Dimensions	
		Thickness (mm)	Extension (mm)
Unheated	600-900	100	Extend 1800 mm horizontally beyond the exterior edge of the footing face and 600 mm beyond the interior edge of the footing face.
	300-600	150	Extend 2100 mm horizontally beyond the exterior edge of the footing face and 600 mm beyond the interior edge of the footing face.
	0-300	200	Extend 2100 mm horizontally beyond the exterior edge of the footing face and 600 mm beyond the interior edge of the footing face.

Note:
The rigid insulation thicknesses and extensions provided herein are site specific and should not be used on other sites without consulting Paterson Group for the sufficiency of the provided recommendations.

Rigid insulation should consist of HL-40 or equivalent and the rigid insulation boards should be placed below the proposed footings upon a level and flat surface and with no gaps between abutting boards. Consideration can be given to placing a thin leveling mat consisting of a layer of compacted OPSS Granular A crushed stone, stone dust, or sand below the insulation layer, as required. SM Rigid insulation can be used beyond the footing face in the same manner provided for the HI40 rigid insulation. Please refer to Figure 2 - Rigid Insulation Installation Detail.

It is recommended that Paterson review the proposed footing and/or insulation details once the final detail design drawings are available for the above noted items prior to construction to ensure the effects of frost action are mitigated appropriately.

2.0 Site Servicing Plan Review

The following site servicing plan drawing prepared by D. B. Gray Engineering Inc. has been reviewed by Paterson in preparation for the current memorandum:

- ❑ Site Servicing Plan – Proposed 4-Storey Apartment Building, 2928 Bank Street, Ottawa, ON - Job No. 23019 - Drawing No. C-1 of 8 – Revision 3 dated December 2, 2024.

Based on our review of the above-noted site service plan, it should be noted that all services will be constructed outside the lateral zones of the proposed footings of the building and are considered to be acceptable from a geotechnical perspective. However, insufficient frost protection has been provided for the proposed storm sewer pipe throughout the subject site.

Reference should be made to Figure 3 - Markup Site Servicing Plan for The Location of Pipes Where Insulation Will Be Required, attached to this memorandum.

It should be noted that the aforementioned storm sewer pipe is located within the frost zone, approximately within 2.1 m below the finished grade. In the following section, frost protection of the site servicing is recommended where insufficient frost cover has been provided.

Any portion of the services installed at a depth of 2.1 m below the finished grade or deeper is considered to have sufficient soil cover for frost protection. Where insufficient soil cover is present above the invert of storm sewer pipe, the following frost protection criteria should be followed:

Table 2 - Rigid Insulation Recommendations for Storm Sewer Pipes with Reduced Soil Cover

Thermal Condition	Soil Cover Provided (mm)	Insulation Dimensions	
		Thickness (mm)	Extension (mm)
Unheated	600 to 900	125	Extend 1200 mm horizontally beyond edge face of the pipe
	900 to 1200	100	Extend 1200 mm horizontally beyond edge face of the pipe
	1200 to 1500	75	Extend 900 mm horizontally beyond edge face of the pipe
	1500 to 1800	50	Extend 600 mm horizontally beyond edge face of the pipe
	1800 to <2100	25	Extend 300 mm horizontally beyond edge face of the pipe

Notes:
- All designs are based on a freezing index of 1000°C-days
- The rigid insulation thicknesses and extensions provided herein are site specific and should not be used on other sites without consulting Paterson Group for the sufficiency of the provided recommendations.

All rigid insulation should consist of either Dow Chemical High-Load 40 (HI-40), Styro Rail SR.P400, or equivalent approved by Paterson. The placement of all insulation within the service trenches must be reviewed and approved by Paterson personnel at the time of construction.

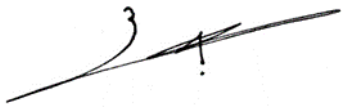
Reference should be made to Figure 4 - Typical Frost Insulation Detail, attached to this memorandum.

It should be noted that the invert elevation of the proposed watermain pipes has not been presented in the above-noted site servicing drawings. Therefore, if insufficient soil cover is provided for watermain pipes, rigid insulation should be installed for the proposed watermain pipes as recommended in the above table (Table 2).

We trust that the current submission meets your immediate requirements.

Best Regards,

Paterson Group Inc.

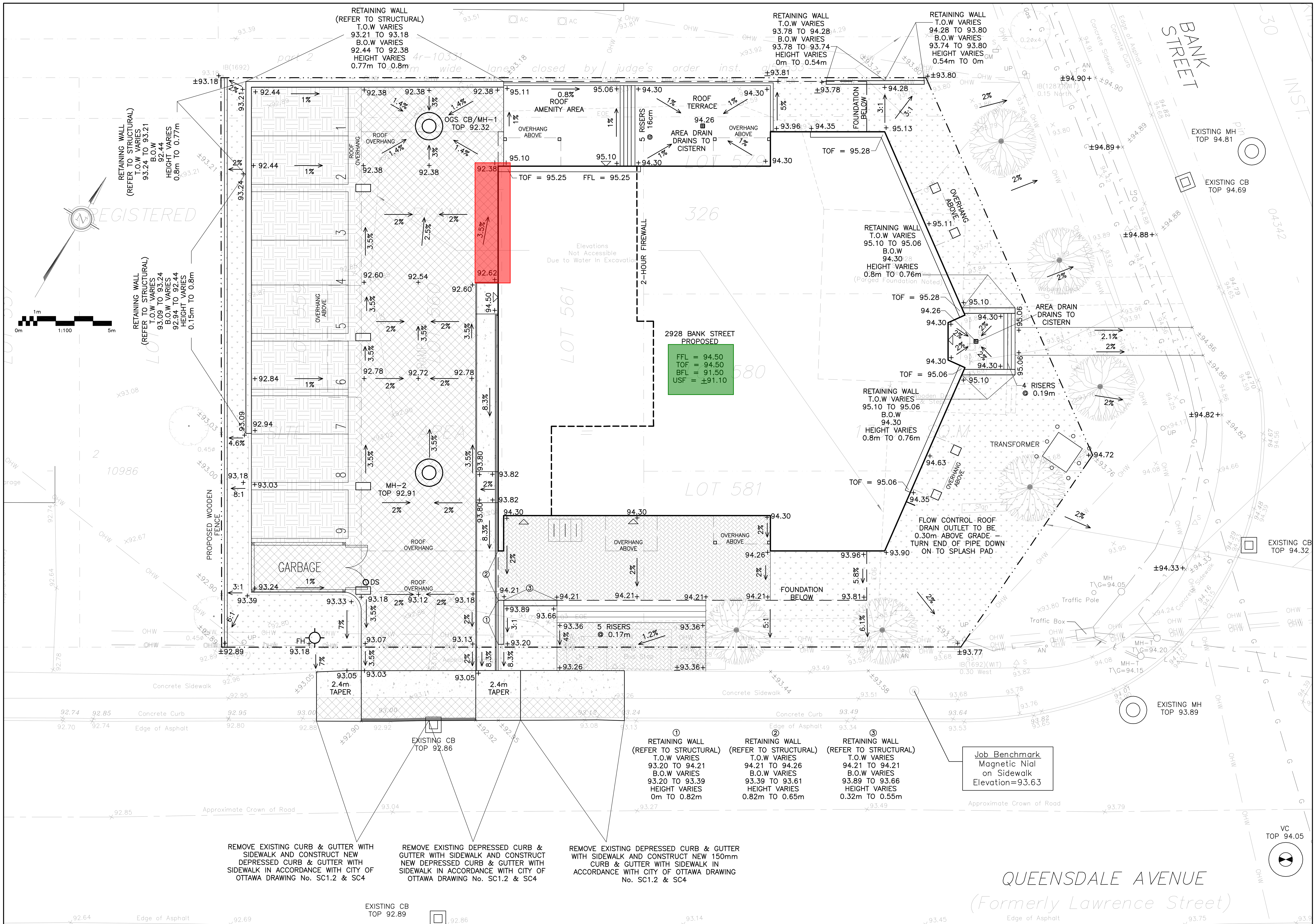


Yashar Ziaeimehr, M.Sc., EIT

Faisal I. Abou-Seido, P.Eng.

Attachments:

- ❑ Figure 1 – Markup Grading Plan Indicating The Location of Required Insulation for Footings.
- ❑ Figure 2 – Rigid Insulation Installation Detail.
- ❑ Figure 3 – Markup Site Servicing Plan for The Location of Pipes Where Insulation Will Be Required.
- ❑ Figure 4 – Typical Frost Insulation Detail.



BANK STREET
QUEENSDALE AVENUE
(Formerly Lawrence Street)
RETAINING WALL (REFER TO STRUCTURAL) T.O.W VARIES 93.21 TO 93.18 B.O.W VARIES 92.44 TO 92.38 HEIGHT VARIES 0.77m TO 0.8m
RETAINING WALL T.O.W VARIES 93.78 TO 94.28 B.O.W VARIES 93.78 TO 93.74 HEIGHT VARIES 0m TO 0.54m
RETAINING WALL T.O.W VARIES 94.28 TO 93.80 B.O.W VARIES 93.74 TO 93.80 HEIGHT VARIES 0.54m TO 0m
RETAINING WALL (REFER TO STRUCTURAL) T.O.W VARIES 93.24 TO 93.21 B.O.W 92.44 HEIGHT VARIES 0.8m TO 0.77m
RETAINING WALL (REFER TO STRUCTURAL) T.O.W VARIES 93.09 TO 93.24 B.O.W VARIES 92.94 TO 92.44 HEIGHT VARIES 0.15m TO 0.8m
OGS CB/MH-1 TOP 92.32
MH-2 TOP 92.91
ROOF AMENITY AREA
ROOF TERRACE
AREA DRAIN DRAINS TO CISTERN
5 RISERS @ 16cm
TOF = 95.25 FFL = 95.25
2-HOUR FIREWALL
Elevations Not Accessible Due to Water in Excavation
2928 BANK STREET PROPOSED
FFL = 94.50
TOF = 94.50
BFL = 91.50
USF = ±91.10
LOT 561
LOT 581
GARBAGE
PROPOSED WOODEN FENCE
RETAINING WALL T.O.W VARIES 95.10 TO 95.06 B.O.W 94.30 HEIGHT VARIES 0.8m TO 0.76m
AREA DRAIN DRAINS TO CISTERN
4 RISERS @ 0.19m
TRANSFORMER
FLOW CONTROL ROOF DRAIN OUTLET TO BE 0.30m ABOVE GRADE - TURN END OF PIPE DOWN ON TO SPLASH PAD
FOUNDATION BELOW
5 RISERS @ 0.17m
EXISTING MH TOP 94.81
EXISTING CB TOP 94.69
EXISTING CB TOP 94.32
EXISTING MH TOP 93.89
EXISTING CB TOP 92.86
EXISTING CB TOP 92.89
EXISTING MH (APPROXIMATE LOCATION) TOP ±94.08
VC TOP 94.05
2.4m TAPER
① RETAINING WALL (REFER TO STRUCTURAL) T.O.W VARIES 93.20 TO 94.21 B.O.W VARIES 93.20 TO 93.39 HEIGHT VARIES 0m TO 0.82m
② RETAINING WALL (REFER TO STRUCTURAL) T.O.W VARIES 94.21 TO 94.26 B.O.W VARIES 93.39 TO 93.61 HEIGHT VARIES 0.82m TO 0.65m
③ RETAINING WALL (REFER TO STRUCTURAL) T.O.W VARIES 94.21 TO 94.21 B.O.W VARIES 93.89 TO 93.66 HEIGHT VARIES 0.32m TO 0.55m
Job Benchmark Magnetic Nial on Sidewalk Elevation=93.63
REMOVE EXISTING CURB & GUTTER WITH SIDEWALK AND CONSTRUCT NEW DEPRESSED CURB & GUTTER WITH SIDEWALK IN ACCORDANCE WITH CITY OF OTTAWA DRAWING No. SC1.2 & SC4
REMOVE EXISTING DEPRESSED CURB & GUTTER WITH SIDEWALK AND CONSTRUCT NEW DEPRESSED CURB & GUTTER WITH SIDEWALK IN ACCORDANCE WITH CITY OF OTTAWA DRAWING No. SC1.2 & SC4
REMOVE EXISTING DEPRESSED CURB & GUTTER WITH SIDEWALK AND CONSTRUCT NEW 150mm CURB & GUTTER WITH SIDEWALK IN ACCORDANCE WITH CITY OF OTTAWA DRAWING No. SC1.2 & SC4

LEGEND:

Insufficient Soil Cover for Footings (Less than 1.5 m)

Figure 1 - Markup Grading Plan Indicating The Location of Required Insulation for Footings

REFER TO NOTES, DETAILS & SCHEDULES ON DRAWINGS C-6 & C-7

LEGEND

FFL	FIRST FLOOR ELEVATION
TOF	TOP OF FOUNDATION
BFL	BASEMENT FLOOR ELEVATION
USF	UNDERSIDE OF FOOTING
	PROPERTY LINE
CB	CATCH BASIN
MH	STORM MANHOLE
MH	SANITARY MANHOLE
VC	VALVE CHAMBER
DS	DOWNSPOUT
x99.99	EXISTING GRADE ELEVATION
+99.99	PROPOSED GRADE ELEVATION
2%	PROPOSED SLOPE OF GRADE
	150mm BARRIER CURB
D.C	DEPRESSED CURB
	ASPHALT PAVEMENT
	CONCRETE
	INTERLOCK
	PERMEABLE PAVERS
	LANDSCAPE

KEY PLAN

No.	DATE	REVISION
3	DEC 2-24	RE-ISSUED FOR APPROVAL
2	APR 26-24	ISSUED FOR APPROVAL
1	APR 4-24	ISSUED FOR COORDINATION

D. B. GRAY ENGINEERING INC.
Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains
700 Long Point Circle 613-425-8044
Ottawa, Ontario d.gray@dbgrayengineering.com

Project

PROPOSED 4-STOREY APARTMENT BUILDING
2928 BANK STREET
OTTAWA, ONTARIO

Drawing Title

GRADING PLAN

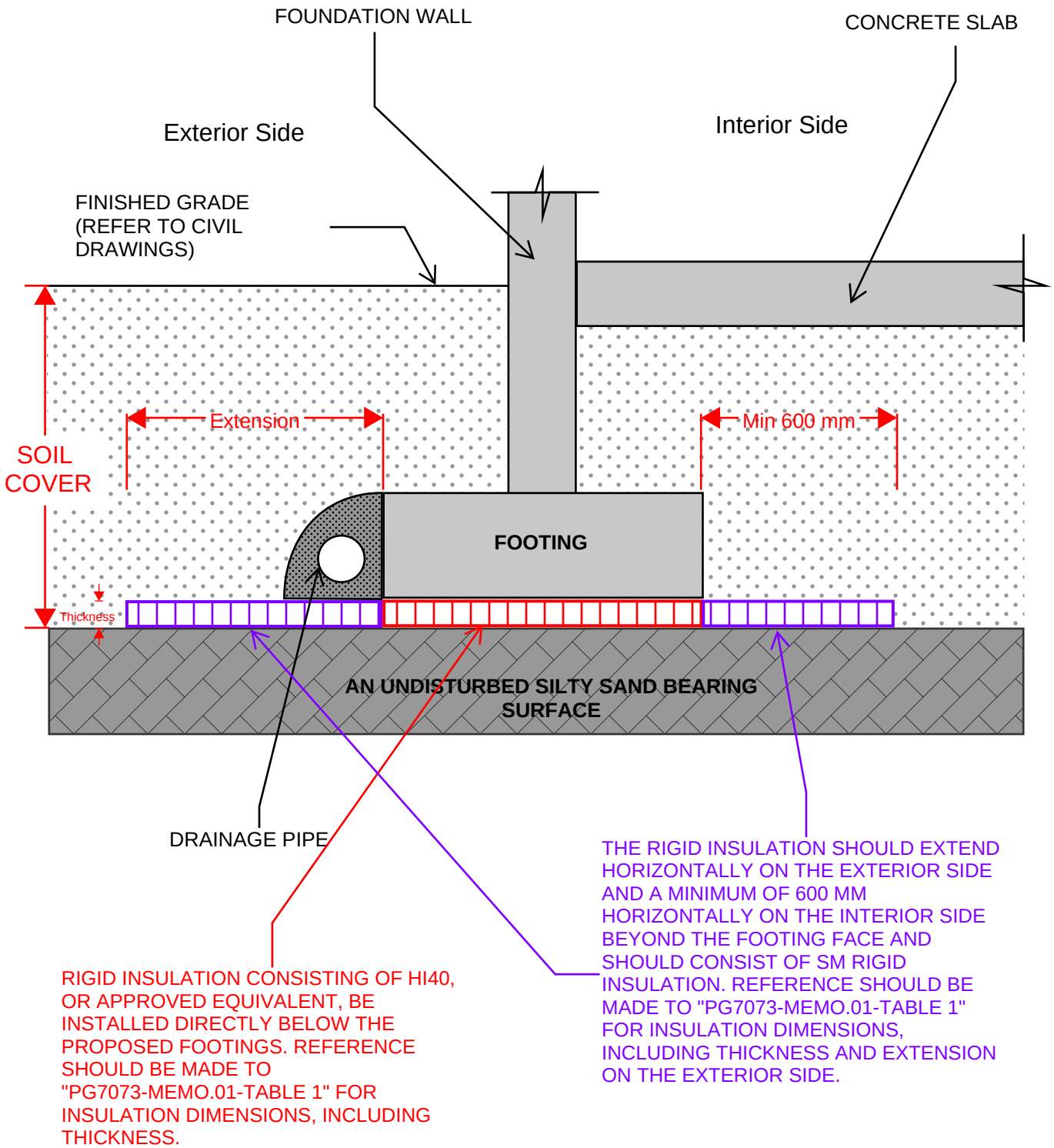
Engineer's Seal: LICENSED PROFESSIONAL ENGINEER D.B. GRAY 17016502 DEC 2-24 PROVINCE OF ONTARIO

NOT VALID UNLESS SIGNED & DATED

Drawn	D.B.G
H. Scale	1:100
V. Scale	
Date	MAR 22-24
Job No.	23019

Drawing No.

C-3 of 8



PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

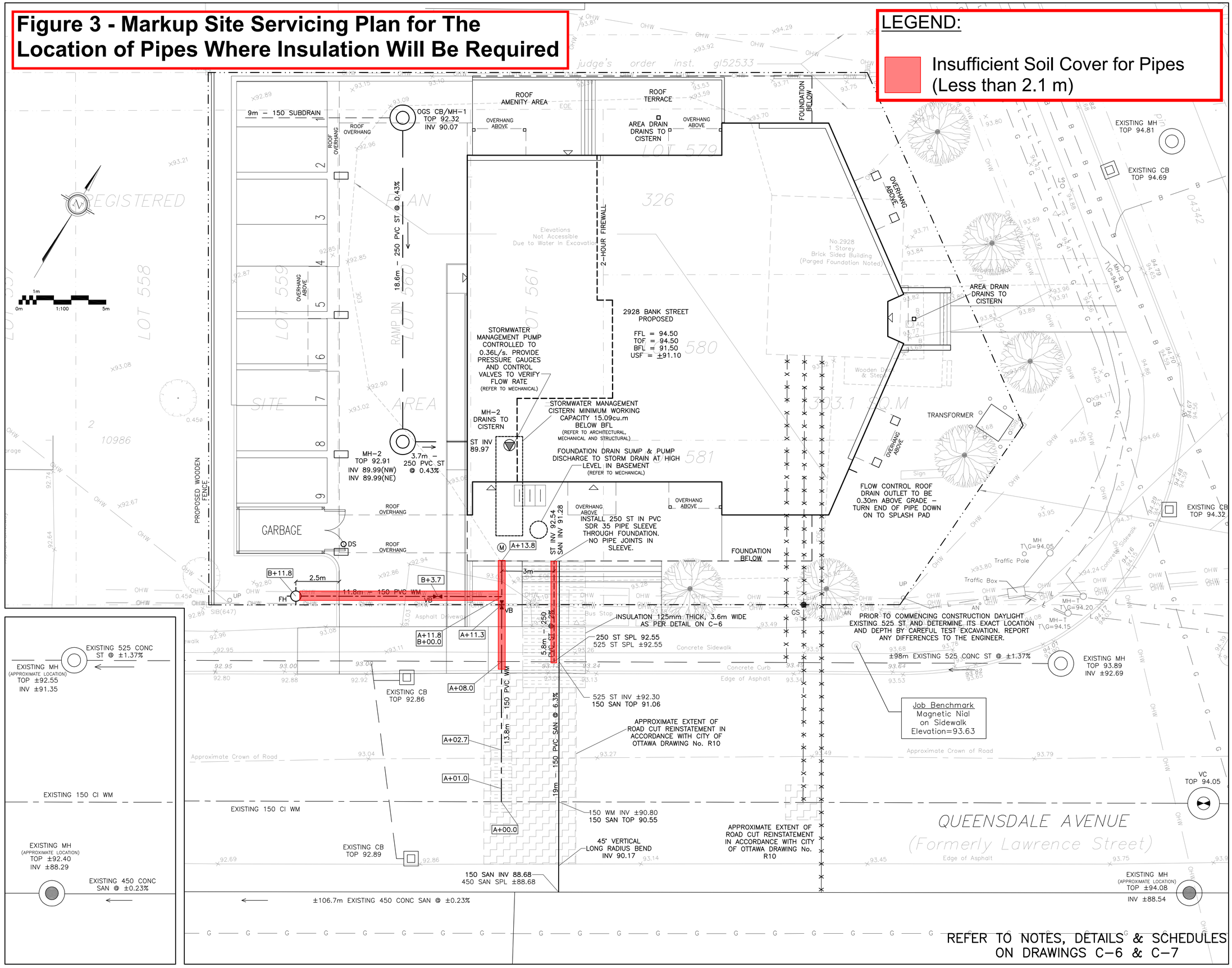
FIGURE 2 - RIGID INSULATION INSTALLATION DETAIL

Report No.:	Scale:	
PG7073-MEMO.01	N.T.S.	
Date:	Drawn:	Approved:
12/2024	YZ	FA

Figure 3 - Markup Site Servicing Plan for The Location of Pipes Where Insulation Will Be Required

LEGEND:

Insufficient Soil Cover for Pipes (Less than 2.1 m)



REFER TO NOTES, DETAILS & SCHEDULES ON DRAWINGS C–6 & C–7

LEGEND

FFL	FIRST FLOOR ELEVATION
TOF	TOP OF FOUNDATION
BFL	BASEMENT FLOOR ELEVATION
USF	UNDERSIDE OF FOOTING
	PROPERTY LINE
CB	CATCH BASIN
CB/MH	CATCH BASIN/MANHOLE
MH	SANITARY MANHOLE
VC	VALVE CHAMBER
DS	DOWNSPOUT
VB	VALVE & VALVE BOX
M	WATER METER
SAN	SANITARY SEWER
ST	STORM SEWER
WS/WM	WATER SERVICE/WATERMAIN
SPL	SPRINGLINE OF PIPE
INV	INVERT OF PIPE
×99.99	EXISTING GRADE ELEVATION

KEY PLAN

No.	DATE	REVISION
3	DEC 2–24	RE–ISSUED FOR APPROVAL
2	APR 26–24	ISSUED FOR APPROVAL
1	APR 4–24	ISSUED FOR COORDINATION

D. B. GRAY ENGINEERING INC.
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Ottawa, Ontario d.gray@dbgrayengineering.com

Project

PROPOSED 4–STOREY APARTMENT BUILDING
2928 BANK STREET
OTTAWA, ONTARIO

Drawing Title

SITE SERVICING PLAN

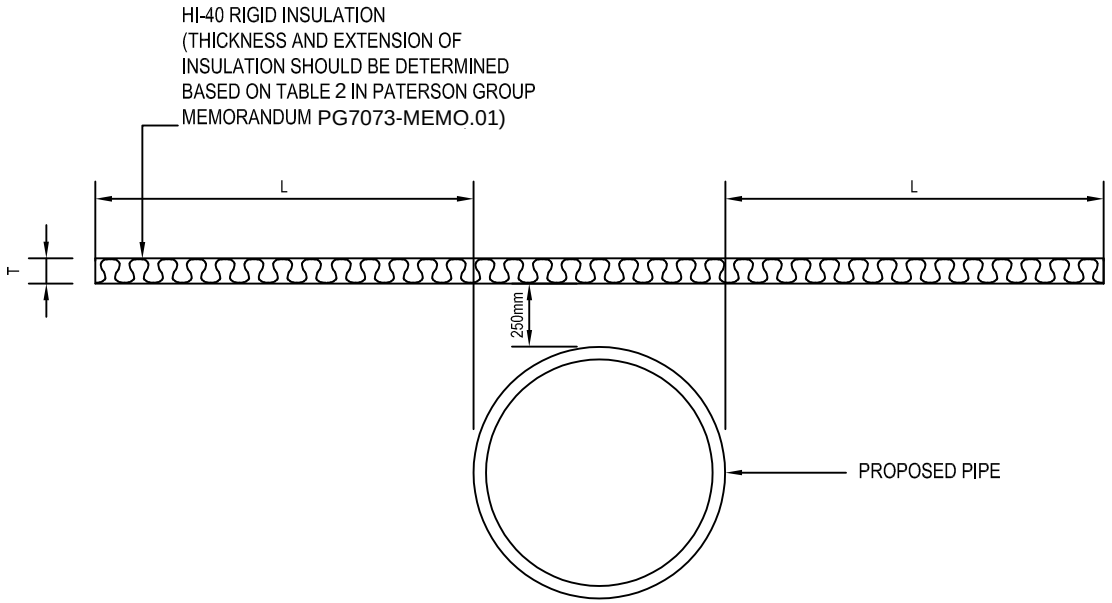
Engineer's Seal

LICENSED PROFESSIONAL ENGINEER
D.B. GRAY
17016502
DEC 2–24
PROVINCE OF ONTARIO
NOT VALID UNLESS SIGNED & DATED

Drawn	D.B.G
H. Scale	1:100
V. Scale	
Date	MAR 22–24
Job No.	23019

Drawing No.

C–1
of 8



PATERSON GROUP
SOLUTION ORIENTED ENGINEERING

TYPICAL FROST INSULATION DETAIL

Scale: N.T.S	Date: 11/2024
Drawn by: MPG	Report No.: PG7073-MEMO.01
Checked by: YZ	Drawing No.: Figure 4
Approved by: FA	Revision No.:

8-1/2x11