



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: <ul style="list-style-type: none">- 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.

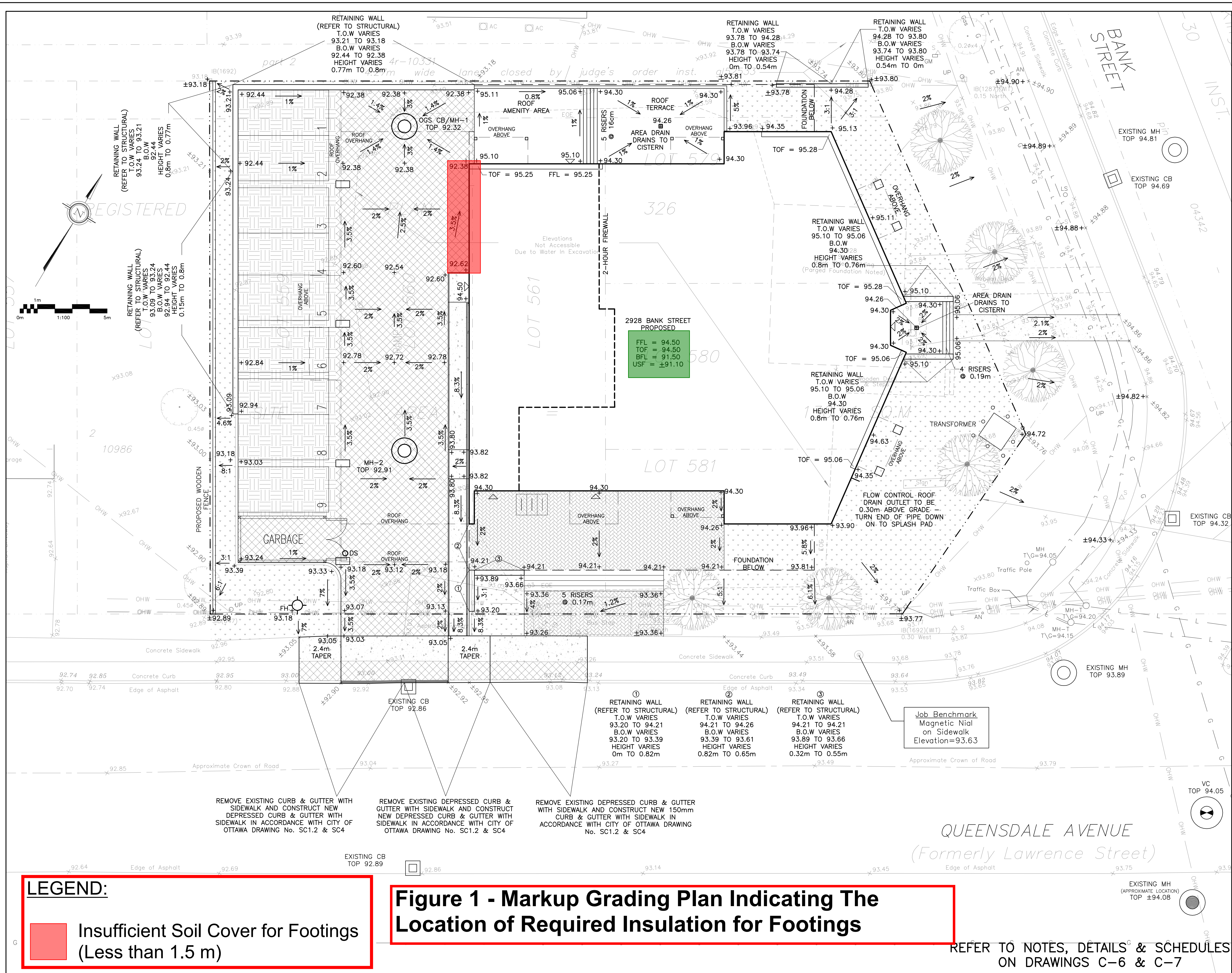
Yashar Ziaeimehr, M.Sc., EIT



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.



LEGEND:

Insufficient Soil Cover for Footings (Less than 1.5 m)

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

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

EXISTING GRADE ELEVATION
PROPOSED GRADE ELEVATION
PROPOSED SLOPE OF GRADE

150mm BARRIER CURB
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 - Watermain

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613-425-8044
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Project

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

Drawing Title

GRADING PLAN

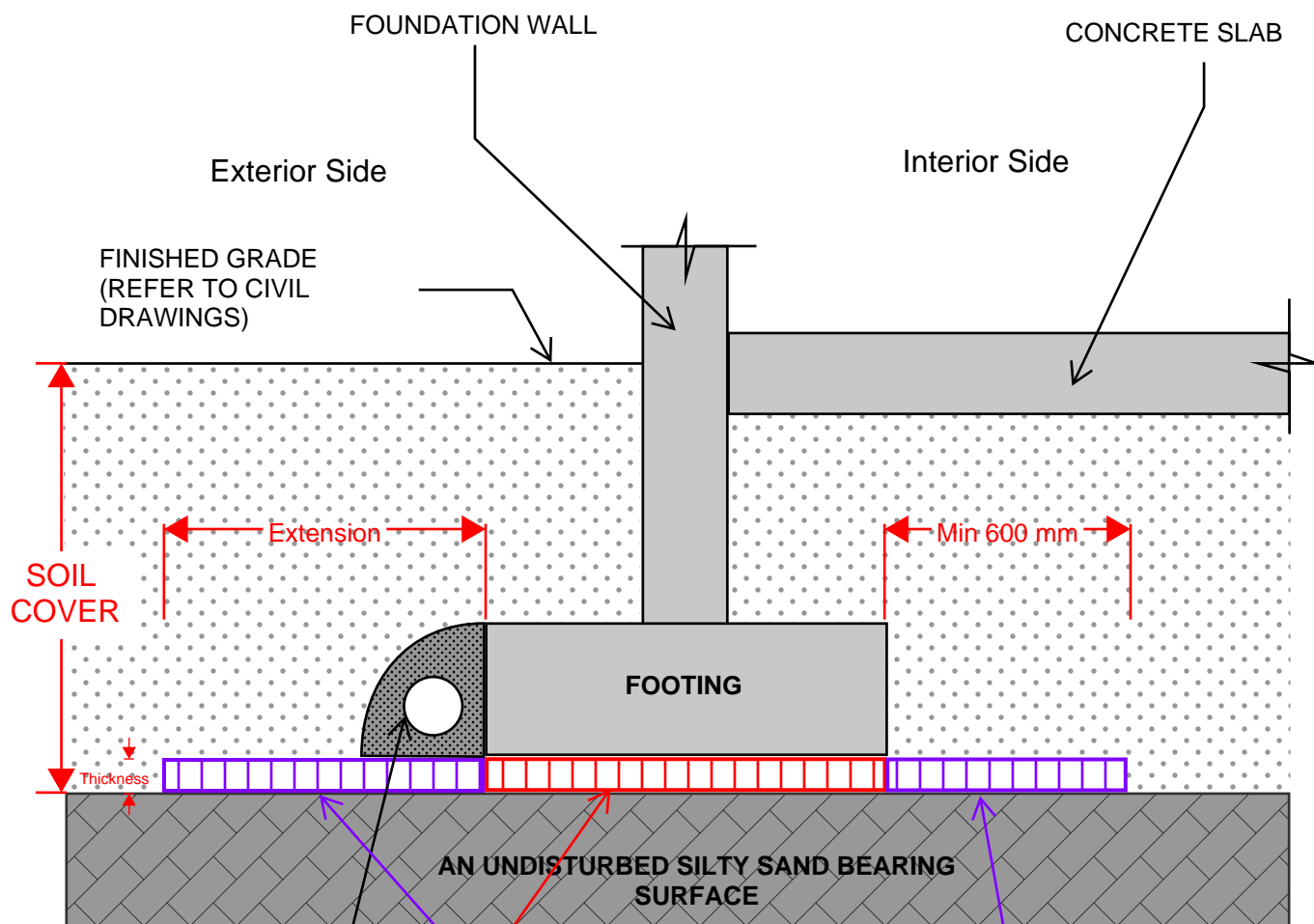
Engineer's Seal

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

Drawing No.

C-3
of 8

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



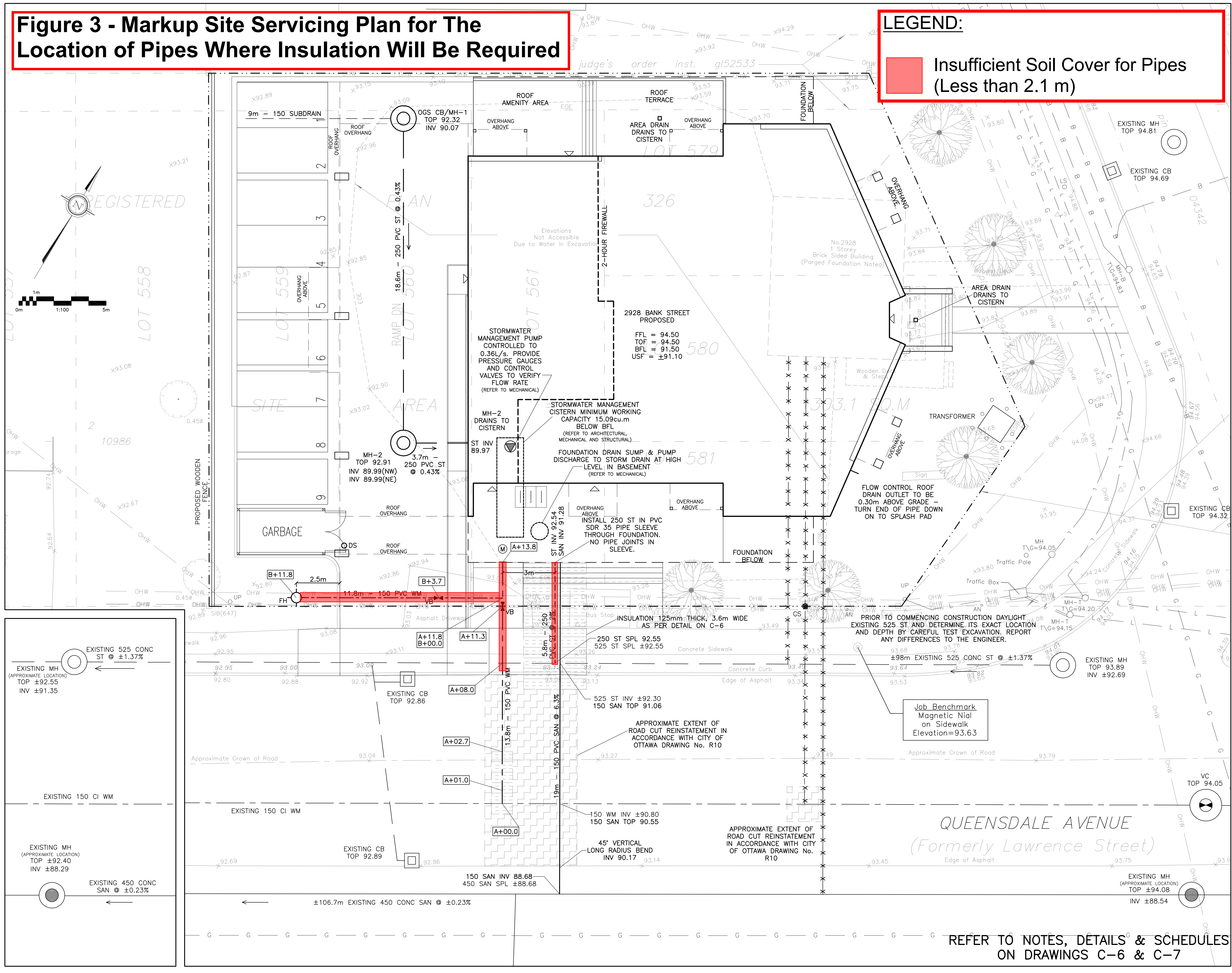
RIGID INSULATION CONSISTING OF HI40, OR APPROVED EQUIVALENT, BE INSTALLED DIRECTLY BELOW THE PROPOSED FOOTINGS. REFERENCE SHOULD BE MADE TO "PG7073-MEMO.01-TABLE 1" FOR INSULATION DIMENSIONS, INCLUDING THICKNESS.

THE RIGID INSULATION SHOULD EXTEND HORIZONTALLY ON THE EXTERIOR SIDE AND A MINIMUM OF 600 MM HORIZONTALLY ON THE INTERIOR SIDE BEYOND THE FOOTING FACE AND SHOULD CONSIST OF SM RIGID INSULATION. REFERENCE SHOULD BE MADE TO "PG7073-MEMO.01-TABLE 1" FOR INSULATION DIMENSIONS, INCLUDING THICKNESS AND EXTENSION ON THE EXTERIOR SIDE.

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)



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
--- EXISTING GRADE ELEVATION

KEY PLAN

3 DEC 2-24 RE-ISSUED FOR APPROVAL
2 APR 26-24 ISSUED FOR APPROVAL
1 APR 4-24 ISSUED FOR COORDINATION

No. DATE REVISION

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Project
PROPOSED 4-STORY APARTMENT BUILDING
2928 BANK STREET
OTTAWA, ONTARIO

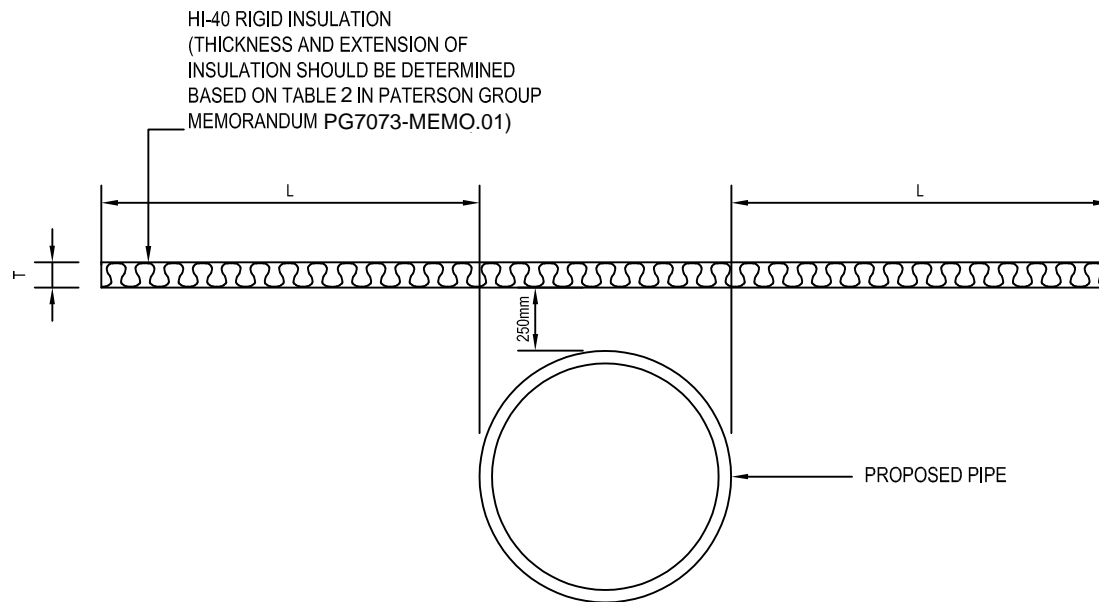
Drawing Title
SITE SERVICING PLAN

Engineer's Seal
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

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



**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.: