

**THE NORTH 60**

HOSPITAL ROAD & ROUTE 9A, MOUNT PLEASANT, NEW YORK

**RETAINING WALL FOUNDATION  
RECOMMENDATIONS**

**Report No. 029GT21**

**DATED: March 25, 2021**

**Submitted to:**

**FARERI ASSOCIATES, INC.  
2 DEARFIELD DRIVE SUITE # 3  
GREENWICH, CT 06831**

**Submitted by:**

**MEKAEL ENGINEERING & CONSULTING, INC.  
59 AMITY ROAD SUITE 8  
NEW HAVEN, CT 06515  
Phone: (203) 684-8134  
E-mail: [esmat@mekaeleng.com](mailto:esmat@mekaeleng.com)**



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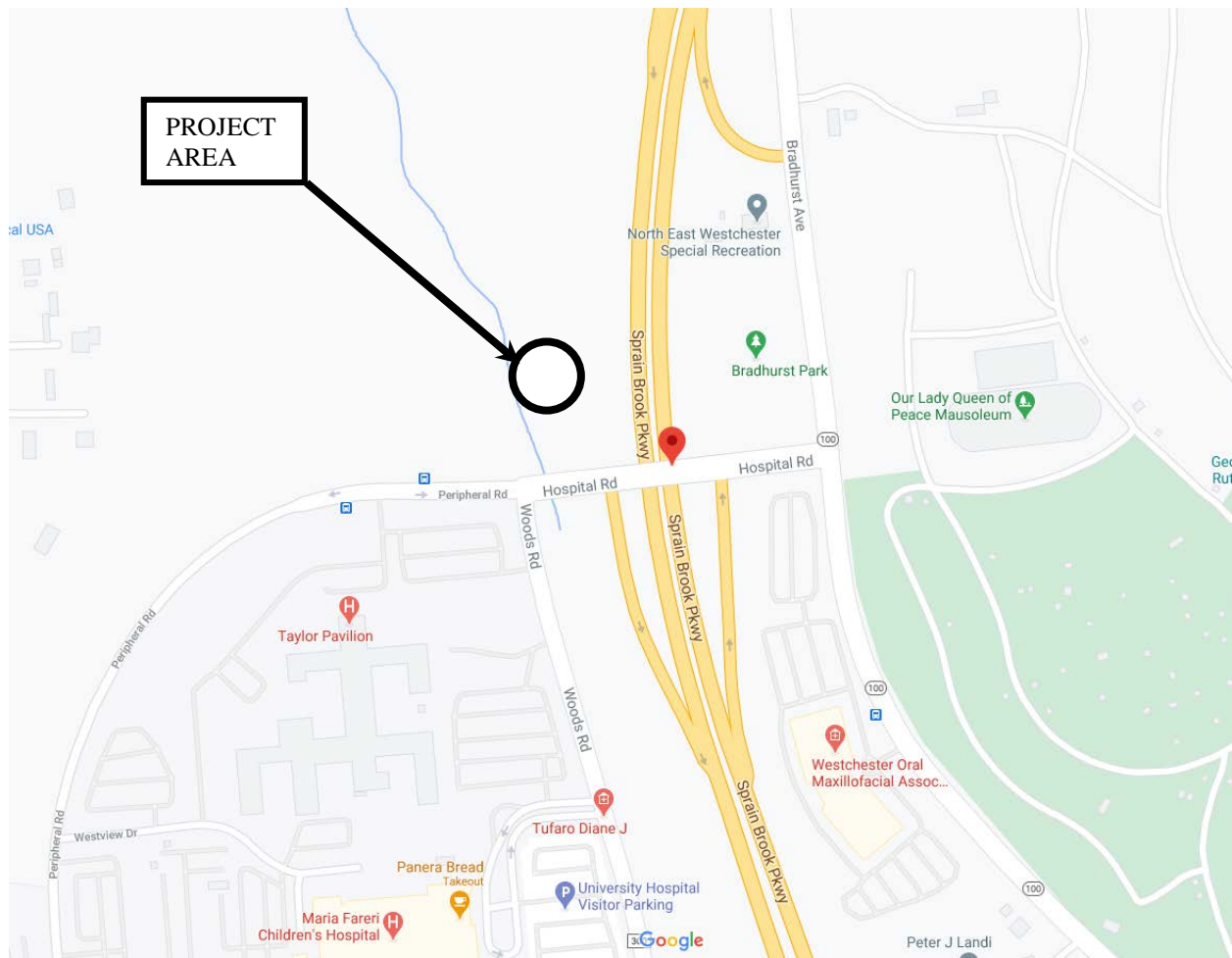
## 1.0 INTRODUCTION

The project site is located at the north of Hospital road and west of Sprain Brook Parkway, Mount Pleasant, NY.

Approximate location of the project site is indicated in Figure 1.

Our office was provided with Grading plan key map/ phase 1 by Bibbo Associates, LLP. Our scope of work was limited to the two tier retaining wall running along proposed West Street supporting relatively steep slope and the retaining wall supporting the west parking lot and loading area for the proposed two (2) story fitness/grocery building

The purpose of this report is to perform sub-surface exploration, field and laboratory testing, and geotechnical engineering analysis to provide criteria for preparing the design of the retaining walls.



**Figure 1 Approximate Project Location**



## **2.0 INVESTIGATIONS**

### **2.1 Field Investigations**

As part of the geotechnical investigation, five (5) borings to the depth of twenty (20) feet or refusal were proposed for the site. Borings B-1, B-2, B-2A, B-3, B-3A & B-5 were drilled to refusal at the depth of 11, 6, 7, 4, 7 & 6.5 feet respectively from the existing grade. Borings B-4 & B-5A were drilled to the depth of 20.9 & 22 feet respectively from the existing grade. The borings conducted by Hardiman Co. & Associates, Inc., Shelton, CT.

Figure 2.0 indicates approximate locations of the borings (B-1 to B-5A).

Soil Samples were collected using split spoon sampler at five (5) feet intervals. Standard Penetration Test (SPT) values were noted and indicated on the corresponding boring logs. Apart from the refusal the SPT "N" values varied from 13 to 24.

The boring log (B-1 to B-5A) are represented in Appendix A.

### **2.2 Laboratory Investigations**

Based on the boring log and the type of soils encountered, no soil samples were tested at this time.

### **3.0 SUBSURFACE CONDITIONS**

Sub-surface conditions at the project site, as inferred from the boring logs, are described below.

#### **3.1 Soils**

Soils profile at the project site, at the time of field exploration consisted of 0.5 to 1 feet of top soil. Underlying the top soil medium dense to dense soil layers of brown sand with some silt and some gravel down to refusal.

#### **3.2 Groundwater:**

Groundwater observations were made during the boring operations. Groundwater was observed at the depth of 4 feet at borings B-4 & B-5A at this time. However, groundwater elevation is subject to seasonal variations.

### **4.0 FOUNDATION RECOMMENDATIONS**

#### **4.1 Type of Foundation**

Based on the sub-surface soil conditions, as described in Section 3.0, shallow footings are recommended for the proposed retaining walls. However, all unsuitable material (such as top soil) below the proposed bottom elevation of foundation shall be removed by over excavation. Footings can be carried on the natural ground or select fill and/or  $\frac{3}{4}$ " size stone up to the proposed bottom elevation of the footing.

#### **4.2 Bearing Capacity**

Based on the foundation recommendations per item 4.1 of this report, for shallow spread footings, a recommended allowable bearing capacity of;

- a. 6000 psf. for the shallow foundations at the area where foundation are carried on competent ledge.
- b. 4000 psf. for the shallow foundations on undisturbed natural ground.

All concrete foundation shall be extended minimum of 42 inches below adjacent finish grade.

If rock is encountered at/or above the proposed bottom elevation of the footing. Rock needs to be over excavated down to minimum of 8 inches below the proposed bottom elevation of the footing to allow installation of 8 inch thick layer of crushed stone, the rock surface shall be relatively even with excavated rock surface elevation not varying by more than two (2) inches. Footing water proximity, buoyancy and rapid drawdown water analysis shall be considered.

### 4.3 Retaining Wall

Based on the soil conditions encountered at the boring locations, the following parameters may be used in the design of new retaining walls for this site. Provided parameters assuming the use of on-site soils for retaining wall backfill. The near surface soils generally consist of fine to coarse sands and silty fine sands. The sand and silty sand materials are expected to possess a friction angle of at least 30 degrees when compacted to 95 percent of the ASTM-1557 maximum dry density.

An alternative select backfill material behind the retaining walls. The use of select backfill material could result in lower lateral earth pressures. In order to use the design parameters for the imported select fill, this material must be placed within the entire active failure wedge. This wedge is defined as extending from the heel of the retaining wall upwards at an angle of approximately 60° from horizontal.

RETAINING WALL DESIGN PARAMETERS

	On-site sand and silty sand
Unit weight	120 lbs./ft <sup>3</sup>
Internal Friction Angle ( $\phi$ )	30°
Equivalent Fluid Pressure: Active Condition (level backfill)	55 lbs./ft <sup>3</sup>
Equivalent Fluid Pressure: At Rest Condition (level backfill)	60 lbs./ft <sup>3</sup>

A 4-inch diameter perforated pipe surrounded by 2 cubic feet of gravel per linear foot of drain placed behind the wall, above the retaining wall footing. The gravel layer should be wrapped in a suitable geotextile fabric to reduce the potential for migration of fines. The footing drain should be extended to daylight or connected to a storm drainage system.

### 4.4 Backfilling

Select fill for the backfill shall be granular, free draining, structurally sound, free from deleterious and organic material, and meeting the following gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
3 1/2" (90mm)	100
3/4" (19mm)	50-80
#4 (4.75mm)	25-65
#200 (75µm)	0-10

Such fill shall be placed in no more than twelve (12) inch thick lifts, in the loose state, and compacted to no less than ninety-five (95) percent of its maximum dry density, as determined by Modified Proctor Density Test. Backfill with 3/4" size stone shall also be placed in maximum of twelve (12) inch thick compacted lifts.

Some of the existing fill material may be used for backfilling if it conforms with the specified gradation and subject to approval by a Geotechnical Engineer.

## **5.0 CONSTRUCTION CONSIDERATIONS**

The bottom of excavation shall be inspected by a Geotechnical Engineer or his representative prior to placement of any backfill.

During construction, footings shall be protected from frost in unheated areas during significant periods of freezing weather as per normal construction practices.

All backfill operations should be monitored for compliance with material gradation requirements and for required compaction.

If groundwater is encountered during excavation, required de-watering arrangements should be provided to ensure dry conditions during backfilling, compaction and placement of concrete.

## **6.0 EXCLUSIONS**

No environmental studies have been performed on any sample retrieved.

This report has been prepared for specific application to the subject project in accordance with general geotechnical and foundation engineering practices. No other warranty, expressed or implied, is made.

The analysis and recommendations submitted in this report are based in part upon data obtained from referenced explorations. The extent of variations between explorations may not be known until actual construction. Should variations be encountered, it will become necessary that recommendations contained in this report be reevaluated.

It is recommended that MEC be provided with an opportunity for a general review of final design contract documents and specifications to verify that the earthwork and foundation recommendations are properly interpreted and implemented in the design and specifications.

# APPENDICES

**APPENDIX A  
BORING LOGS  
(B-1 to B-5A)**







<b>MEKAEL ENGINEERING &amp; CONSULTING, LLC</b>		CLIENT: <b>Fareri Associates</b>				PROJECT NAME: <b>The North 60</b>							
<b>59 Amity Road, suite 8</b>		<b>2 Dearfield Dr. Suite 3</b>				LOCATION: <b>Hospital road, Mount Pleasant, NY</b>							
<b>New haven, CT 06515</b>		<b>Greenwich CT 06831</b>											
DRILLER:	<b>AS</b>			Line & Station:				JOB #:	BORING No: <b>B-3</b>				
INSPECTOR:				Offset:				DATE STARTED:	<b>3/9/2021</b>	Sheet No: <b>1 of 1</b>			
CONTRACTOR:				N. Coordinate:				DATE FINISHED:	<b>1/7/2019</b>				
				E. Coordinate:				SURFACE ELEV:	<b>459.7</b>	GROUND WATER ELEV:			
GROUND WATER OBSERVATIONS													
AT:	<b>0</b>	ft	AFTER:	<b>Tidal</b>	hours	Auger		Casing	Sampler	Core Bar			
						TYPE:		<b>H SA</b>	<b>SS</b>				
						SIZE I.D.(Inches):		<b>2 1/4"</b>	<b>1 3/8"</b>				
AT:		ft	AFTER:		hours	HAMMER WT (lbs.):		<b>140</b>					
						HAMMER FALL(inches):		<b>30</b>					
D	CASING	SAMPLE				BLOWS PER 6"				CORING	STRATA	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)	
E	BLOWS				DEPTH	ON SAMPLER				TIME	CHANGE		
P	PER	NO	TYPE	PEN.	REC.	IN FEET	-FORCE ON TUBE-				PER FT.		DEPTH /
T	FOOT			FEET	FEET	FROM - TO	0-6	6-12	12-18	18-24	(MIN.)		ELEV.
H													
												<b>1.0</b>	<b>Top so</b>
												<b>7.0</b>	<b>Refusal</b>
<b>5</b>													
<b>10</b>													
<b>15</b>													
<b>20</b>													
<b>25</b>													
<b>30</b>													
<b>35</b>													
GROUND SURFACE TO FT. USED * AUGER THEN * CASING TO FT.													
D = DRY, W = WASHED, C = CORED, P = PIT, A = AUGER													
PROPORTIONS USED: Trace = 1% - 10%, Little = 10% - 20%, Some = 20% - 35%, And = 35% - 50%													



<b>MEKAEL ENGINEERING &amp; CONSULTING, LLC</b>		CLIENT:		PROJECT NAME:										
59 Amity Road, suite 8 New haven, CT 06515		Fareri Associates 2 Dearfield Dr. Suite 3 Greenwich CT 06831		The North 60										
DRILLER: AS		Line & Station:		JOB #:										
INSPECTOR:		Offset:		BORING No: B-4										
CONTRACTOR:		N. Coordinate:		DATE STARTED: 3/9/2021										
		E. Coordinate:		DATE FINISHED: 1/7/2019										
				SURFACE ELEV: 459.7										
				GROUND WATER ELEV:										
GROUND WATER OBSERVATIONS														
AT: 4 ft		AFTER: Tidal hours		Auger										
				Casing										
				Sampler										
				Core Bar										
				TYPE: H SA SS										
				SIZE I.D.(Inches): 2 1/4" 1 3/8"										
AT: ft		AFTER: hours		HAMMER WT (lbs.): 140										
				HAMMER FALL(Inches): 30										
D	CASING	SAMPLE					BLOWS PER 6"				CORING	STRATA	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)	
E	BLOWS	NO	TYPE	PEN.	REC.	DEPTH	ON SAMPLER				TIME	CHANGE		
P	PER			FEET	FEET	IN FEET	-FORCE ON TUBE-				PER FT.	DEPTH /		
T	FOOT					FROM - TO	0-6	6-12	12-18	18-24	(MIN.)	ELEV.		
H														
												1.0	Top so	
													Orange & Brown silt & Sand	
												4.0		
5														
		1	SS	2	1.5	5.0 7.0	8	12	12	11			Brown fine to medium sand & silt trace gravel	
10														
		2	SS	2.0	1.5	10.0 12.0	2	2	3	3			Brown fine to medium sand & silt	
												13.0		
15														
		3	SS	2.0	1.5	15.0 17.0	11	23	23	28			Brown fine sand and gravelsome silt	
20														
		4	SS	2.0	1.5	20.0 22.0	28	29	48	42			22.0	
													End of Boring	
30														
35														
GROUND SURFACE TO FT. USED * AUGER THEN * CASING TO FT.														
D = DRY, W = WASHED, C = CORED, P = PIT, A = AUGER														
PROPORTIONS USED: Trace = 1% - 10%, Little = 10% - 20%, Some = 20% - 35%, And = 35% - 50%														





## **APPENDIX B**

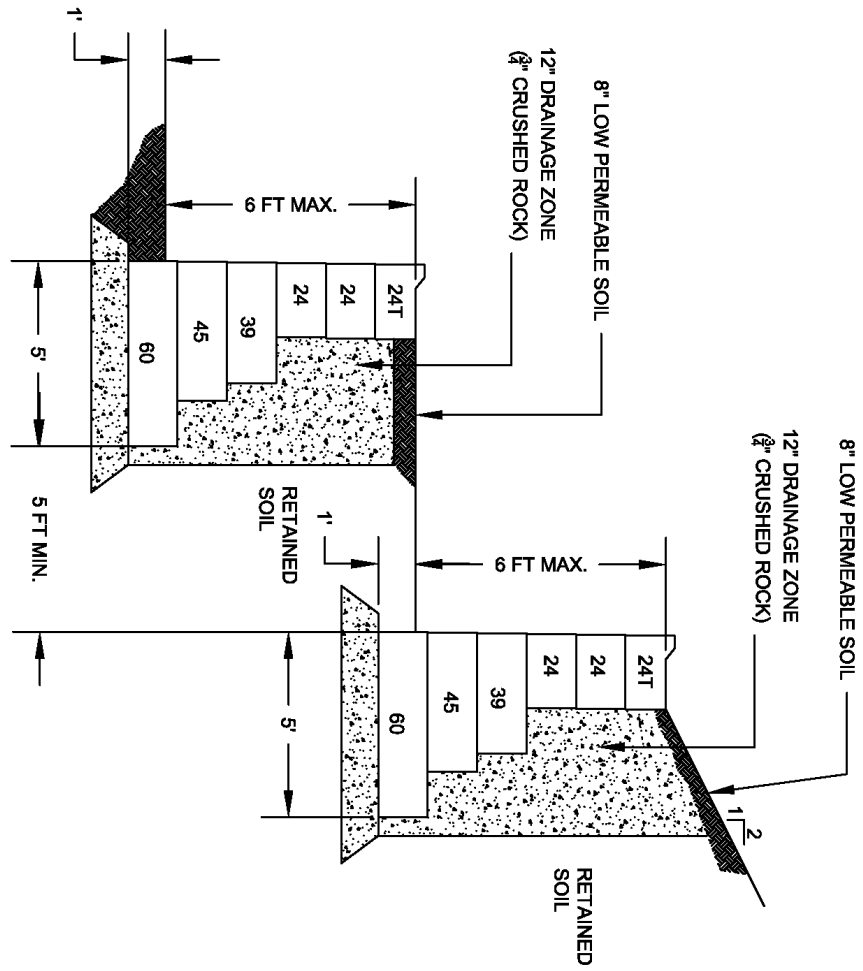
### **RETAINING WALL DESIGN**

Gravity and reinforced retaining walls design are based on RECON wall product other equivalent manufacturer products can be used. Detailed shop drawings prepared by professional engineer licensed in the state of NY shall be provided.

#### **DESIGN METHOD**

1. This drawings shall be used in conjunction with the site plan.
2. The retaining wall design meets the following structural  
Stability factor of safety:

Sliding (static condition)	1.5
Overturning	2.0
Geogrid pullout	1.5
Bearing capacity	2.0
Hydrostatic	none--- drainage provided



TWO TIER WALL BASED ON RECON SEGMENTAL WALLS OTHER MANUFACTURER EQUIVALENT PRODUCT CAN BE INSTALLED DETAILED SHOP DRAWING PREPARED BY PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NY SHALL BE PROVIDED

