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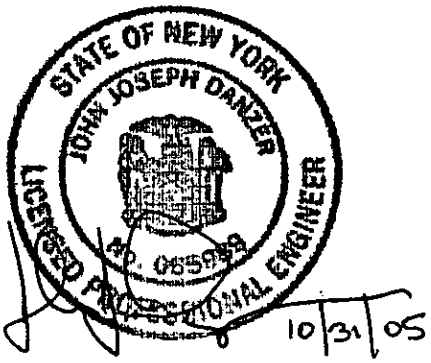
Subsurface Exploration and Geotechnical Evaluation for Proposed Addition to North Amherst Fire Station 2200 Tonawanda Creek Road Amherst, New York

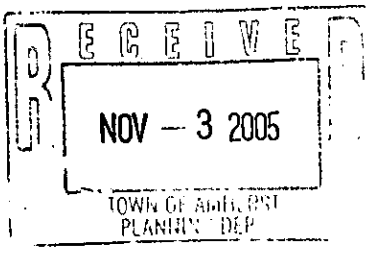
Prepared For:

Dean - Sutton Architects
3284 Walden Avenue
Depew, New York 14043

Prepared By:

Empire Geo-Services, Inc.
5167 South Park Avenue
Hamburg, New York 14075





Project No. BE-05-236
October 2005

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October 31, 2005
Project No. BE-05-236

Mr. Mark Dean, RA
Dean - Sutton Architects
3284 Walden Avenue
Depew, New York 14043

Re: Subsurface Exploration and
Geotechnical Evaluation for
Proposed Addition to
North Amherst Fire Station
2200 Tonawanda Creek Road
Amherst, New York

Dear Mr. Dean:

Empire Geo-Services, Inc. (Empire) is pleased to submit this letter report summarizing our subsurface exploration and geotechnical evaluation completed for the proposed addition to the North Amherst Fire Station located at 2200 Tonawanda Creek Road in the Town of Amherst, New York. The approximate location of the project site is shown on Figure 1. This work was completed in accordance with our proposal, dated October 25, 2005, which was authorized by Dean - Sutton Architects.

We understand the building addition will be a single story addition, that will be utilized for fire truck parking/maintenance. The addition is expected to consist of high bay masonry walls, approximately 28 feet in height. Floor construction will be slab-on-grade matching the finish floor elevation (El.) of the existing building (El. 100.00 feet). No basements or depressed structures are planned.

This letter report summarizes the subsurface exploration program completed, along with our findings and recommendations for design of foundations and slab-on-grade construction for the addition.

SUBSURFACE EXPLORATION

The subsurface exploration program consisted of two (2) test borings, drilled by our affiliated drilling company, SJB Services, Inc. on October 28, 2005. The borings are designated B-1 and B-2 and their approximate locations are shown on Figure 2.

The test boring locations were established on the site by SJB and recorded utilizing tape measurements referenced to the existing fire hall building. Optical survey level techniques were utilized to determine the existing ground elevations at the boring locations. The ground surface elevations were referenced to the finish floor of the existing fire hall building (benchmark), as shown on Figure 2. The benchmark was assigned an arbitrary datum of 100.00 feet.

The test borings, B-1 and B-2, were advanced in the overburden to depths of 49.9 feet and 20.0 feet, respectively. The test borings were made with a Central Mine Equipment (CME), model 45 trailer mounted drill rig, using hollow stem auger and split spoon sampling techniques. Split spoon samples and Standard Penetration Tests (SPTs) were taken continuously to a depth of 12 feet and in intervals of five feet or less for the remaining depth of the test borings. The split spoon sampling and SPTs were completed in general accordance with *ASTM D 1586 - "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils"*.

A geologist prepared the test boring logs based on visual observations of the recovered soil samples and a review of the driller's field notes. The soil samples were described based on a visual/manual estimation of the grain size distribution, along with characteristics such as color, relative density, consistency, moisture, etc. The test boring logs are presented in Appendix A, along with general information and a key of terms and symbols used to prepare the logs.

SUBSURFACE CONDITIONS

The general stratigraphy encountered in the test borings consisted of surface asphalt concrete (approximately 3-inches at boring B-1) and topsoil (approximately 2-inches at boring B-2) followed by about 2 feet of fill soils overlying an apparent buried topsoil layer and then indigenous sand, silty sand and silty clay soils. Sample spoon refusal (possible top of bedrock) was encountered in boring B-1 at a depth of 49.9 feet.

The indigenous soil deposits encountered beneath the fill and apparent buried topsoil consisted of a layer of medium to stiff silty clay and then loose to firm sand and silty sand soil that extends to depths of about 12.5 feet and 16.5 feet in borings B-1 and B-2, respectively. Beneath the upper silty sand soil, soft to very soft silty clay soil was encountered that extends to a depth of about 41.5 feet. Beneath the soft to very soft clay, compact to very compact silt and sand was encountered extending to the termination depth (49.9 feet) in boring B-1. The indigenous soils are classified as SM, ML and CL group soils using the Unified Soil Classification System (ASTM D2488).

Sample spoon refusal was encountered in boring B-1 at a depth of 49.9 feet. The sample spoon refusal may indicate the possible presence of bedrock. Bedrock coring, however, was not performed to confirm the actual nature of the refusal material encountered.

Water level measurements were made in the test borings at the completion of overburden drilling and sampling. These measurements are noted on the subsurface exploration logs in Appendix A.

Freestanding water was noted in test borings B-1 and B-2 at depths of 21.0 feet and 14.9 feet, respectively. The varying water levels measured suggest that water may not have had sufficient enough time to stabilize in the borings within the time period that had elapsed from the completion of drilling to the time of the measurement.

We note that moist to wet and wet samples were recovered from the indigenous soils at and below a depth of about 7 feet, which suggest the possible presence of a permanent groundwater zone within these soils. It also is possible that some localized perched groundwater could also be present in some of the more permeable fill soils, which overlie the less permeable upper clayey soil. Perched groundwater can be particularly more prevalent following heavy or extended precipitation and during seasonally wet periods. It should be expected that both permanent and perched groundwater conditions could vary with location and with changes in soil conditions, precipitation and seasonal conditions.

GEOTECHNICAL EVALUATION AND RECOMMENDATIONS

Based on the conditions encountered in the test borings, it is Empire's opinion that the addition can be constructed using a conventional spread foundation design and slab-on-grade construction. However the geotechnical issues, which must be addressed, include the removal of the existing fill and organic soils where present beneath proposed foundation bearing grades and slab-on-grade construction.

Fill soils with an underlying organic soil layer (apparent buried topsoil) were encountered in both borings. The fill and organic soils could potentially pose longer term settlement problems beneath the slab-on-grade construction. Therefore, we recommend that the fill soils and organic soils/possible buried topsoil layer observed in test borings B-1 and B-2 be removed from the building addition area (slab-on-grade area) and replaced with a suitable granular fill material, as discussed below.

Also, because of medium to stiff and loose to firm condition of the underlying indigenous silty clay, sand and silty sand soil deposits present, it will be necessary to design the foundations for a modest allowable bearing capacity and incorporate special procedures to prepare the spread foundation bearing grades.

Accordingly, we recommend the placement of a controlled engineered fill layer beneath the foundations, to provide a more uniform and stable bearing subgrade and to dissipate a portion of the foundation pressures acting on the medium or loose indigenous soils. Spread foundations, therefore, should bear on at least 18-inches of compacted crusher run stone Structural Fill which is placed and compacted over suitable indigenous soils, which are free of soft, wet or otherwise deleterious conditions. Alternatively, placement of an 18-inch thick layer of suitable flowable backfill material would also be acceptable for preparing the foundation bearing grades.

Spread Foundation Design

As discussed above, spread foundations should bear on at least 18-inches of engineered fill, which is placed over indigenous silty clay, sand or silty sand soil subgrades, following excavation and removal of the existing fill, organic soils and any unsuitable indigenous soils from beneath the foundation bearing subgrades.

Suitable indigenous soil bearing subgrades should consist of relatively firm and stable silty clay, sand or silty sand soil, which is free of organics, soft, loose, wet or otherwise deleterious conditions. The suitable bearing grade depths/elevations that were present in test borings are presented on the following table.

Recommended Suitable Bearing Subgrade Depth / Elevation for Placement of Engineered Fill		
Boring No.	Approximate Ground Surface Elevation (feet)	Suitable Bearing Subgrade Depth / Elevation (feet)
B-1	99.0	5.5 / 93.5
B-2	99.5	5.0 / 94.5

The engineered fill layer should bear at or below the suitable bearing subgrades noted above. Subsurface conditions between and away from the test boring locations may vary and require adjustments in the suitable subgrade elevation based on actual conditions encountered at the time of construction. Accordingly, close inspection of the engineered fill/foundation bearing grades, by qualified geotechnical personnel, is recommended at the time of construction.

If compacted crusher run stone Structural Fill is used as the engineered fill beneath spread foundations, it must be placed beyond the foundation limits a horizontal distance equal to 0.5 times the thickness of the Structural Fill layer beneath the foundation. Excavations, therefore, will need to be planned and sized accordingly. Recommendations for Structural Fill material along with its placement and compaction are presented below.

Flowable backfill material, if used, should be a non-swelling type material and should have a minimum 28-day compressive strength (f'c) of 250 pounds per square inch (psi). The flowable backfill should extend at least 12 inches horizontally beyond the foundation limits for its entire depth.

Where new foundations will abut the existing building foundations, the proposed new foundation should meet the bearing grade of the existing foundation, which it will adjoin, and then it may be stepped up or down away from the existing wall. In all cases, the existing foundations should be protected from undermining or loss of lateral support during excavation and construction of the new adjacent foundation.

Spread foundations constructed on engineered fill in conjunction with the above recommendations can be sized based on a maximum net allowable bearing pressure of 1,500 pounds per square foot (psf).

Continuous wall foundations should be at least 2.0 feet in width and column/individual foundations should be at least 3.0 feet in width. Exterior foundations should be embedded a minimum of 4.0 feet below finished exterior grades for frost protection. Interior foundations should be embedded a minimum of 2.0 feet below the finished floor elevation to develop adequate bearing capacity.

It is estimated that spread foundations sized and properly constructed in accordance with our recommendations will undergo total settlement of around1-inch or less.

Floor Slabs

The floor slabs can be constructed as slab-on-grade following proper subgrade preparation as outlined below. The organic soils (possible buried topsoil layer) should be removed from the slab-on-grade areas. Test pits should be made by the Contractor, with observations by Empire to better define the limits of the organic soils, which will need to be removed.

A minimum of 8 inches of Structural Fill, as described below, is recommended beneath floor slabs in the lightly loaded portions of the building addition (i.e. offices, storage areas, etc.). A minimum of 15 inches of Structural Fill is recommended beneath the fire truck parking/maintenance bay area floor slabs. We also recommend the use of a separation/stabilization geotextile (i.e. Mirafi 500X or suitable equivalent) beneath the Structural Fill course in the slab-on-grade areas.

The floor slabs can be designed in accordance with procedures recommended by the Portland Cement Association or the American Concrete Institute, using a modulus of subgrade reaction of 150 pounds per cubic inch at the top of the structural fill layer.

We note that the above subbase stone thicknesses are not designed for carrying construction vehicle loads. Therefore, it may be desirable for the Contractor to increase the Subbase thickness within the building pad to provide a suitable working surface to stage the construction, carry construction vehicle loads and protect the underlying subgrades. This will be particularly important if construction proceeds during seasonally wet periods. The additional subbase stone material can then be removed in preparation for the actual floor construction and re-used as foundation backfill or as appropriate.

It is understood that the finished floor grade will be established above the surrounding exterior grades. Therefore, the use of a moisture barrier does not appear warranted, unless recommended by the flooring manufacturer. It is recommended that the slab-on-grade be constructed such that it floats on the subbase and subgrades and is not structurally connected to, or resting directly on, perimeter walls or column footings in order to limit differential settlement effects.

Seismic Design Criteria

The subsurface profile, encountered at the fire station site, contains more than 10 feet of soft to very soft clay soil. Accordingly, the upper 100 feet of the site should be classified as Seismic Site Class "E" according to Table 1615.1.1 of the Building Code of New York State.

The spectral accelerations in the project areas for Site Class "B" were obtained from the United States Geological Survey (USGS) web site (www.usgs.gov) by using the Zip Code 14228 for the project site. The spectral response acceleration in the Amherst, New York area (Zip Code 14228) for Site Class "B" are approximately 0.325g for the short period (0.2 second) response (S_s) and 0.071g for the 1 second period response (S_1). For design purposes, these spectral

response accelerations must be adjusted for the Seismic Site Class "E" classifications as follows:

Adjusted Spectral Response Acceleration for Site Class "E":

- Short Period Response (S_{MS}) - 0.734g
- 1 Second Period Response (S_{M1}) - 0.248g

The corresponding five percent damped design spectral response accelerations (S_{DS} and S_{D1}) are as follows:

- S_{DS} - 0.489g
- S_{D1} - 0.166g

Construction Considerations

Foundation Construction

Excavation to the recommended foundation bearing subgrades should be performed using a method, which reduces disturbance to the indigenous soil subgrade soils, such as a backhoe equipped with a smooth blade bucket. Any soft, loose, wet or otherwise deleterious soil material exposed in the undercut subgrades should be further undercut and removed.

The proposed foundation bearing subgrades should be observed and evaluated by a representative of Empire, prior to placement of the engineered fill material. Placement and compaction of Structural Fill beneath foundations should also be observed and tested by a representative of Empire.

All subgrades for Structural Fill placement and foundation construction should be protected from precipitation and surface water. No water should be allowed to accumulate on the subgrades. The subgrades should not be allowed to freeze, either prior to or after construction of foundations. If the bearing grades are not protected and degrade, they must be undercut/removed accordingly.

It does not appear that permanent groundwater conditions will be encountered in the relatively shallow excavations (i.e. within a depth of about 5 to 6 feet); however, some localized perched groundwater may be present in the surficial soils, during seasonally wet periods. Therefore, it should be anticipated that some

dewatering of excavations, using conventional sump and pump methods, may be necessary during construction.

After completion of the foundation construction, the excavations should be backfilled as soon as possible and prior to construction of the superstructure. It is recommended that the foundation excavations, within slab on grade and pavement areas, be backfilled with a Structural Fill. On-site soils may be used for backfill and site grading in non-loaded landscape areas.

Subgrade Preparation for Slab-on-Grade Construction

Existing asphalt pavement, vegetation and topsoil, and any other deleterious materials (i.e. existing fill and organic soils) within the proposed slab on grade areas should be removed. Following removal of the surface materials and excavation to the proposed subgrades, the exposed subgrades should be observed by, a representative of Empire. Subgrade fill required to backfill undercuts associated with removing unsuitable materials, or to raise site grades should consist of a compacted Suitable Granular Fill material as described below.

During construction the contractor should take precautions to limit construction traffic over the subgrades for slab on grade and pavement construction. Any subgrades, including existing soil subgrades or fill subgrades, which become damaged, rutted or unstable should be undercut and repaired as necessary prior to placement of the subbase courses.

Structural Fill Material

Structural Fill, placed beneath foundations and slab-on-grade, should consist of crusher run stone, which should be free of clay, organics and friable or deleterious particles. As a minimum, the crusher stone should meet the requirements of New York State Department of Transportation, Standard Specifications, Item 304.12 M – Type 2 Subbase, with the following gradation requirements.

Sieve Size Distribution	Percent Finer by Weight
2 inch	100
¼ inch	25-60
No. 40	5-40
No. 200	0-10

The crusher run stone Structural Fill should be compacted to dense stable matrix, where its total thickness is less than 12-inches, and to a minimum of 95 percent of the maximum dry density as measured by the modified Proctor test (ASTM D1557), where its total thickness will exceed 12-inches. Placement of the fill should not exceed a maximum loose lift thickness of 6 to 8 inches. It may be necessary to reduce the loose lift thickness depending on the type of compaction equipment used so that the required density is attained. The crusher run stone should have a moisture content within two percent of the optimum moisture content prior to compaction.

Suitable Granular Fill Material

Suitable soil material, classified as GW, GP, GM, SW, SP and SM soils using the Unified Soil Classification System (ASTM D-2487) and having no more than 85-percent by weight material passing the No. 4 sieve, no more than 20- percent by weight material passing the No. 200 sieve and which is generally free of particles greater than 6 inches, will be acceptable as Suitable Granular Fill. It should also be free of topsoil, asphalt, concrete rubble, wood, debris, clay and other deleterious materials.

Suitable Granular Fill can be used as backfill and as subgrade fill to raise site grades beneath slab-on-grade construction. Material meeting the requirements of New York State Department of Transportation, Standard Specifications, Item 203.07M – Select Granular Fill is acceptable for use as Suitable Granular Fill.

The Suitable Granular Fill should be placed and compacted in accordance with the requirements for the Structural Fill as stated above.

CONCLUDING REMARKS

This report was prepared to assist in the planning and design of the proposed addition to the North Amherst Fire Station located at 2200 Tonawanda Creek Road in the Town of Amherst, New York. The report has been prepared for the exclusive use of Dean-Sutton Architects and other members of the design team, for specific application to this site and this project only.

The investigation program, geotechnical evaluation and recommendations were completed based on Empire Geo-Services, Inc.'s understanding of the proposed project, as described herein, and through the application of generally accepted soils and foundation engineering practices. No warranties, expressed or inferred, are made by the conclusions, opinions, recommendations or services provided.

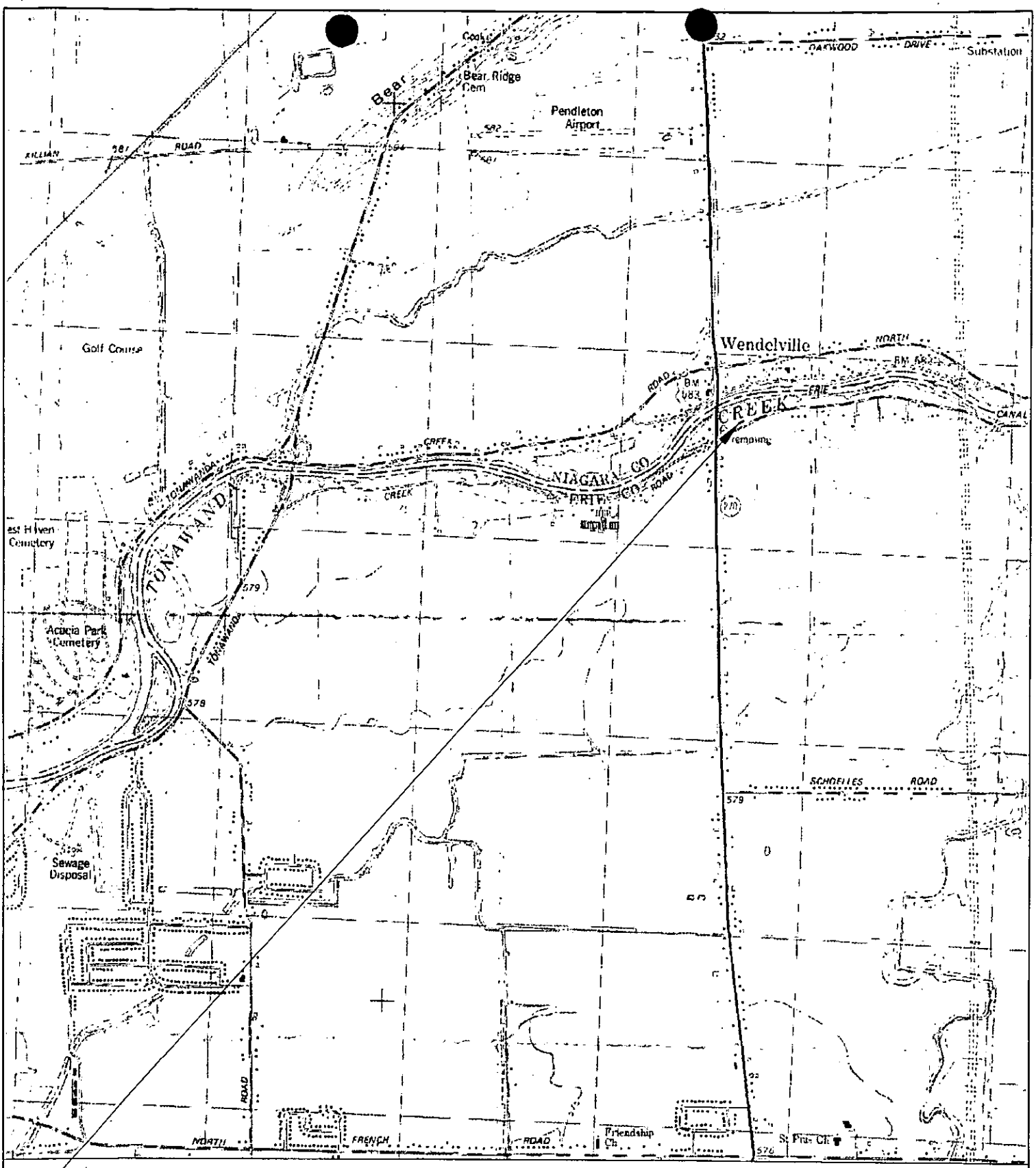
Additional important information regarding the use and interpretation of this report is presented in Appendix B.

Respectfully Submitted:

EMPIRE GEO-SERVICES, INC.

John J. Danzer, P.E.
Senior Geotechnical Engineer

FIGURES

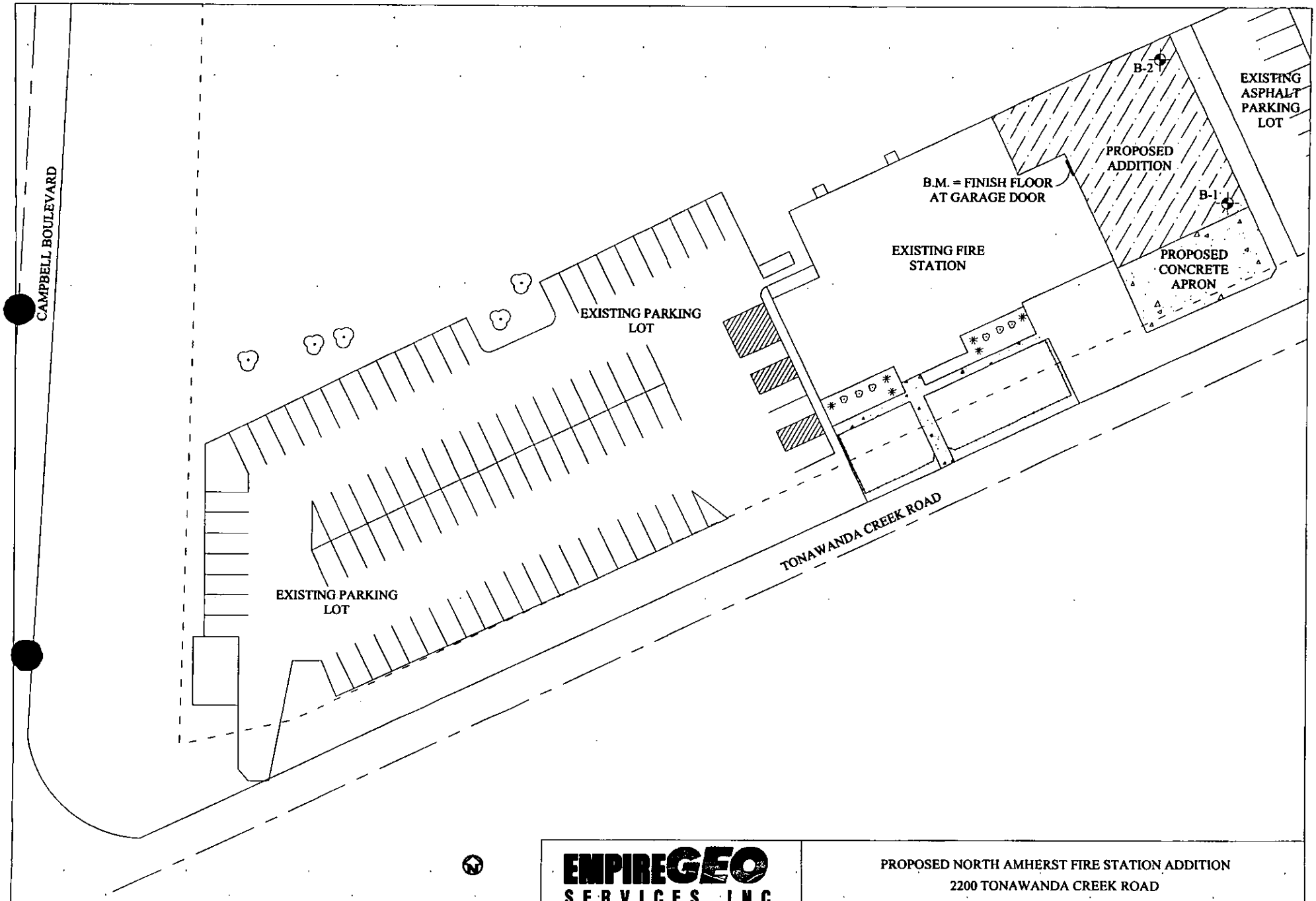


EMPIREGEO SERVICES INC
a subsidiary of SJB Services, Inc.

PROPOSED NORTH AMHERST FIRE STATION ADDITION
2200 TONAWANDA CREEK ROAD
TOWN OF AMHERST, NEW YORK

SITE LOCATION PLAN

DR BY: --	SCALE: NTS	PROJ. NO.: BE-05-236
CHKD BY: --	DATE: 10/27/05	FIGURE NO: 1



B.M. = BENCHMARK, ASSIGNED ARBITRARY DATUM = 100.00'

B-1 INDICATES APPROXIMATE TEST BORING LOCATION AND DESIGNATION

EMPIREGEO SERVICES INC
a subsidiary of SJB Services, Inc.

PROPOSED NORTH AMHERST FIRE STATION ADDITION
2200 TONAWANDA CREEK ROAD
TOWN OF AMHERST, NEW YORK

SUBSURFACE EXPLORATION PLAN	DR BY: WMP	SCALE: NTS	PROJ NO.: BE-05-236
	CK BY: TRS	DATE: 10/27/05	FIGURE NO.: 2

APPENDIX A

SUBSURFACE EXPLORATION LOGS

DATE
START 10/24/2005
FINISH 10/24/2005
SHEET 1 OF 2

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. B-1
SURF. ELEV 99.0'
G.W. DEPTH See Notes

PROJECT: PROPOSED ADDITION
PROJ. NO.: BE-05-236
LOCATION: NORTH AMHERST FIRE COMPANY
TONAWANDA CREEK RD., AMHERST, NY

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	SOIL OR ROCK CLASSIFICATION	NOTES
	1	14	15			ASPHALTIC CONCRETE (3")	
		6	5		21	Grey- Black f-c SAND, some Silt, tr. gravel (moist, FILL)	Possible Native Topsoil Horizon Encountered in Sample #2
	2	4	4				
		5	5		9	Black Organic Silty CLAY, tr. sand (moist, stiff, OL- CL)	
5	3	2	2				
		3	7		5	Grey Silty CLAY, tr.- little fine Sand, occasional fine Sand lenses (moist, medium, CL)	
	4	7	7				
		7	6		14	Orange- Brown Fine SAND, little- some Silt (moist- wet, firm, SM)	
	5	1	2				
10		2	2		4	Becomes Grey (wet, v. loose)	
	6	WOH/1.0					WOH= Weight of Hammer and Rods
		1	1		1	Becomes Brown- Grey	
	7	WOH	1			Red- Brown Silty CLAY, tr. sand (wet, soft, CL)	Driller Notes "Running Sands" Encountered at 13'
15		1	1		2		
	8	WOH/2.0				(v. soft)	
20					WOH		
	9	WOH/2.0					
25					WOH		
	10	WOH/2.0					
30					WOH		
	11	WOR/1.0					WOR= Weight of Rods
35		WOH/1.0			WOH		
	12	WOR/1.0				Contains occasional Silt seams	
40		WOH/1.0			WOH		

N = NO. BLOWS TO DRIVE 2-INCH SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFIED BY: Geologist

DRILLER: T. KILBURN

DRILL RIG TYPE : CME- 45C

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

DATE
START 10/24/2005
FINISH 10/24/2005
SHEET 2 OF 2

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. B-1
SURF. ELEV 99.0'
G.W. DEPTH See Notes

PROJECT: PROPOSED ADDITION
PROJ. NO.: BE-05-236
LOCATION: NORTH AMHERST FIRE COMPANY
TONAWANDA CREEK RD., AMHERST, NY

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	SOIL OR ROCK CLASSIFICATION	NOTES
45	13	WOH	14			Red- Brown f-m SAND, some Silt, tr. gravel (moist, firm, SM)	WOH= Weight of Hammer and Rods
		16	17		30		
50	14	12	23			Brown- Grey SILT, little f-c Sand (moist, v. compact, ML)	
		35	50/0.4		58		
						Boring Complete with Sample Spoon Refusal at 49.9'	Free Standing Water Recorded at 21.0' at Boring Completion
55							
60							
65							
70							
75							
80							

N = NO. BLOWS TO DRIVE 2-INCH SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFIED BY: Geologist

DRILLER: T. KILBURN

DRILL RIG TYPE : CME- 45C

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

DATE
START 10/24/2005
FINISH 10/24/2005
SHEET 1 OF 1

SJB SERVICES, INC.
SUBSURFACE LOG

HOLE NO. B-2
SURF. ELEV 99.5'
G.W. DEPTH See Notes

PROJECT: PROPOSED ADDITION
PROJ. NO.: BE-05-236
LOCATION: NORTH AMHERST FIRE COMPANY
TONAWANDA CREEK RD., AMHERST, NY

DEPTH FT.	SMPL NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	SOIL OR ROCK CLASSIFICATION	NOTES
	1	2	3			TOPSOIL (2")	
		4	4		7	Brown- Black Clayey SILT, tr. sand, tr. organics	
	2	4	5			(moist, FILL)	Possible Native Topsoil
		6	5		11	Brown- Black Silty CLAY, tr. sand, tr. organics	Horizon Encountered in
5	3	3	4			(moist, stiff, CL)	Sample #2
		6	6		10	Becomes Yellow- Brown	
	4	6	9				
		8	8		17	Brown- Grey Fine SAND, tr.- little Silt	
	5	1	1			(wet, v. loose, SP)	
10		1	4		2		
	6	2	3				
		3	4		6	(loose)	
	7	WOH/2.0					WOH= Weight of Hammer
15					WOH	(v. loose)	and Rods
	8	1	WOH/1.5			Red- Brown Silty CLAY, tr. sand (wet, v. soft, CL)	
20					WOH		
						Boring Complete at 20.0'	Free Standing Water Recorded at 14.9' at Boring Completion
25							
30							
35							
40							

N = NO. BLOWS TO DRIVE 2-INCH SPOON 12-INCHES WITH A 140 LB. PIN WT. FALLING 30-INCHES PER BLOW

CLASSIFIED BY: Geologist

DRILLER: T. KILBURN

DRILL RIG TYPE : CME- 45C

METHOD OF INVESTIGATION ASTM D-1586 USING HOLLOW STEM AUGERS

APPENDIX B

INFORMATION REGARDING THIS GEOTECHNICAL ENGINEERING REPORT

GEOTECHNICAL REPORT LIMITATIONS

Empire Geo-Services, Inc. (Empire) has endeavored to meet the generally accepted standard of care for the services completed, and in doing so is obliged to advise the geotechnical report user of our report limitations. Empire believes that providing information about the report preparation and limitations is essential to help the user reduce geotechnical-related delays, cost over-runs, and other problems that can develop during the design and construction process. Empire would be pleased to answer any questions regarding the following limitations and use of our report to assist the user in assessing risks and planning for site development and construction.

PROJECT SPECIFIC FACTORS: The conclusions and recommendations provided in our geotechnical report were prepared based on project specific factors described in the report, such as size, loading, and intended use of structures; general configuration of structures, roadways, and parking lots; existing and proposed site grading; and any other pertinent project information. Changes to the project details may alter the factors considered in development of the report conclusions and recommendations. *Accordingly, Empire cannot accept responsibility for problems which may develop if we are not consulted regarding any changes to the project specific factors that were assumed during the report preparation.*

SUBSURFACE CONDITIONS: The site exploration investigated subsurface conditions only at discrete test locations. Empire has used judgement to infer subsurface conditions between the discrete test locations, and on this basis the conclusions and recommendations in our geotechnical report were developed. It should be understood that the overall subsurface conditions inferred by Empire may vary from those revealed during construction, and these variations may impact on the assumptions made in developing the report conclusions and recommendations. *For this reason, Empire should be retained during construction to confirm that conditions are as expected, and to refine our conclusions and recommendations in the event that conditions are encountered that were not disclosed during the site exploration program.*

USE OF GEOTECHNICAL REPORT: Unless indicated otherwise, our geotechnical report has been prepared for the use of our client for specific application to the site and project conditions described in the report. *Without consulting with Empire, our geotechnical report should not be applied by any party to other sites or for any uses other than those originally intended.*

CHANGES IN SITE CONDITIONS: Surface and subsurface conditions are subject to change at a project site subsequent to preparation of the geotechnical report. Changes may include, but are not limited to, floods, earthquakes, groundwater fluctuations, and construction activities at the site and/or adjoining properties. *Empire should be informed of any such changes to determine if additional investigative and/or evaluation work is warranted.*

MISINTERPRETATION OF REPORT: The conclusions and recommendations contained in our geotechnical report are subject to misinterpretation. *To limit this possibility, Empire should review project plans and specifications relative to geotechnical issues to confirm that the recommendations contained in our report have been properly interpreted and applied.*

Subsurface exploration logs and other report data are also subject to misinterpretation by others if they are separated from the geotechnical report. This often occurs when copies of logs are given to contractors during the bid preparation process. *To minimize the potential for misinterpretation, the subsurface logs should not be separated from our geotechnical report and the use of excerpted or incomplete portions of the report should be avoided.*

OTHER LIMITATIONS: Geotechnical engineering is less exact than other design disciplines, as it is based partly on judgement and opinion. For this reason, our geotechnical report may include clauses that identify the limits of Empire's responsibility, or that may describe other limitations specific to a project. These clauses are intended to help all parties recognize their responsibilities and to assist them in assessing risks and decision making. Empire would be pleased to discuss these clauses and to answer any questions that may arise.