SJB SERVICES, INC.

Contract Drilling and Testing

1951-1 Hamburg Turnpike
Buffalo, NY 14218
Phone: (716) 821-
Fax: (716) 821-

55 Oliver Street
Cohoes, New York 12047
Phone: (518) 238-
Fax: (518) 238-

P.O. Box 416 • 208 Le Fevre Road
Stockertown, PA 18083
Phone: (610) 746-
Fax: (610) 746-

TOLL FREE: 1-800-821-5911

SITE INVESTIGATION REPORT

NYS THRUWAY - ANGOLA TRAVEL PLAZA
#D211995
ANGOLA, NEW YORK

PREPARED FOR:

HUNT ENGINEERS
185 EAST CORNING ROAD
CORNING, NEW YORK 14830

PREPARED BY:

SJB SERVICES, INC.
MAY 1995

SJB-D598

F. A. DENTE ENGINEERING, P.C.
GEOTECHNICAL, CONSTRUCTION MATERIALS, ASBESTOS

☐ 57 Sherwood Trail Saratoga Springs, New York 12866 Phone: 518-587-2295 Fax: 518-587-2399
☐ 65 Oliver Street Cohoes, New York 12047 Phone: 518-238-2915 Fax: 518-238-2614

June 5, 1995

Mr. Stanley Blas
SJB Services, Inc.
1951-1 Hamburg Turnpike
Buffalo, New York 14218

Re: Geotechnical Evaluation
Service Center Expansion
MP-447.11, I-90 NYS Thruway
Angola, New York
File No. FDE-95-71

Gentlemen:

Pursuant to your request, we have completed a Geotechnical Evaluation of the subsurface conditions in the area of a planned addition to the Angola Service Center situated at Mile Post 447.11 of I-90 in Angola, New York. This report was prepared for specific application to the project on the basis of our understanding of it. Changes in location, grades, loads, etc., other than as may be recommended, should be brought to our attention so we may evaluate their effect, if any, upon the recommendations offered.

As we understand it, the project entails the design and construction of an approximately 1,000 square foot single story slab on grade addition to the east face of the Angola Service Center Facility to expand restroom facilities. The existing facility is supported with drilled concrete filled shafts which reportedly extend to bedrock. The addition is sited in a maintained lawn area with two (2) above ground storage tanks sited to the east. Water, fuel oil and sanitary sewer lines traverse the building area which is about one (1) foot lower than the existing facility floor slab.

As a method of investigation, we understand that two (2) conventional exploratory test borings were advanced at the approximate locations depicted upon the plan supplied with the Subsurface Logs. The Subsurface Logs depict that relatively uniform conditions

prevail at the site beneath the surficial sod and topsoil. Surficial fill extends to depths of about four (4) feet and is composed of medium to stiff brown Clayey Silt with lessor amounts of Sand, Gravel, Shale and Slag. Beneath the surficial fills are Brown Silt with embedded weathered Shales which grade to Gray and become wet at depths of about eight (8) to ten (10) feet. These generally compact soils extend to depths of about 12 feet where bedrock was encountered. A thin (two feet) granular stratum was found above the bedrock at location B-2 composed of fine to coarse Sand with some Silt of a very compact relative density. Bedrock, recovered at both investigated locations, was a slightly weathered thin to laminated bedded Shale which was soft to medium hard. Core recovery ranged from 90 to 100 percent.

The Rock Quality Designation was 0 % as a result of the thin to laminated bedding and the low interbed bond.

Groundwater was measured within the borings prior to the introduction of core water at depths of nine (9) feet at location B-1. At location B-2 it did not accumulate to measurable depths within the time allowed. We believe that groundwater occurs at this site within the depths explored as perched saturated seams and zones. The depth to, existence and aerial extent of these zones would be dependent upon seasonal variations in precipitation, runoff and utility exfiltration at the site.

On the basis of the information available, it is our opinion that the addition should be supported with a drilled shaft system similar to that employed for support of the existing facility in order to limit differential settlements between them. The following recommendations concerning site earthwork and foundation design and construction are offered.

- Site development should commence with the removal of sod and topsoil from the planned addition area and its associated walkways and pavements. The exposed subgrades will consist of cohesive fill soils which should be sloped and crowned to prevent ponding of precipitation and runoff and saturation of the fills. Soils which become saturated during construction should be excavated and replaced as recommended subsequently.

- All subgrades should be proof compacted using a smooth drum vibratory compactor with a minimum static weight of four (4) tons. At least five (5) overlapping passes of the compactor should be completed with areas that either fail to stabilize or which become unstable undercut and backfilled as discussed subsequently. Proofcompacting immediately adjacent to the existing structure should be performed

with the compactor operating in its static mode and supplemented with lighter impacting type hand guided equipment to assure that all existing grade beam backfills are compact.

- Structural fill for support of floor slabs, backfill of excavations, walks or pavements should consist of NYSDOT Section 304 Type 4 material placed in loose lifts no more than one (1) foot thick and compacted to at least 95 percent of its maximum dry density established through ASTM D-698 Standard Proctor procedures. A minimum of one (1) foot of the compacted granular fill should underlie all floor slabs and walks planned.

- The addition may be supported upon drilled concrete filled shafts which extend to the underlying Shale Bedrock. The shafts may be proportioned using an allowable bedrock bearing pressure of 10 tons per square foot when seated upon sound Shale, anticipated at depths of about 12 feet beneath existing grades. The shafts should have a minimum diameter of 30 inches to allow their thorough cleaning as no more than one (1) inch of loose rock or soil should overlie the bedrock prior to concrete placement. Perched groundwaters may accumulate within the shafts and should be dewatered to allow cleaning of the bearing grades. Grade beams should be designed to provide at least four (4) feet of cover to preclude frost penetration concerns.

- Interior floor slabs may be designed in accord with the procedures of the American Concrete Institute using a Modulus of Subgrade Reaction equal to 200 pounds per cubic inch when supported by the structural fill type and thicknesses recommended.

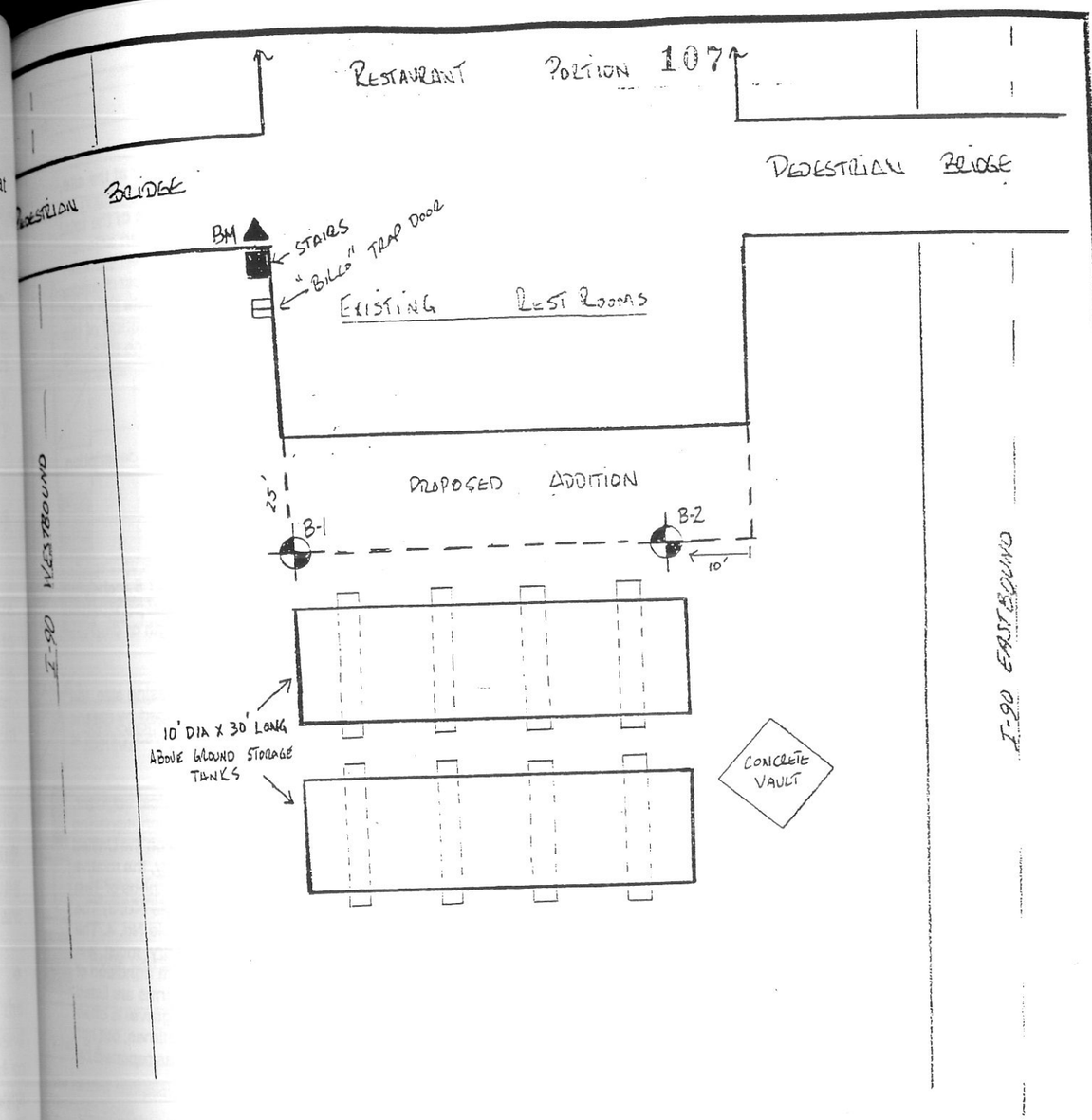
- All site grading should be completed to direct runoff away from the structure and thus prevent the saturation of the granular backfills.

We appreciate the opportunity to be of service. This report was prepared for specific application to the project and site discussed using generally accepted Geotechnical Engineering practices. No other warranty, expressed or implied, is made. Inspection of the construction activities associated with this report is strongly recommended as it forms the final phase of the Geotechnical Design. We should be allowed the opportunity to review and comment upon appropriate plans and specifications prior to their release for bidding.

Should questions arise or if we may be of any other assistance, please contact us at your convenience.

Yours Truly,
F. A. Dente Engineering, P.C.

Fred A. Dente, P.E.
President



BENCHMARK: Finished Floor
Elevation at Door
Top of Steps 100.00'

SJB Services, Inc.
SUBSURFACE INVESTIGATION PLAN

PROPOSED RESTROON ADDITION
ANGOLA SERVICE CENTER
ANGOLA, NEW YORK

DR. BY: --	SCALE: NONE	PROJ. NO.: D-598
CK'D BY: FRM	DATE: 5/95	DRWG NO.: 1

GENERAL INFORMATION & KEY TO SUBSURFACE LOGS

The Subsurface Logs attached to this report present the observations and mechanical data collected by the driller at the site, supplemented by classification of the material removed from the borings as determined through visual identification by technicians in the laboratory. It is cautioned that the materials removed from the borings represent only a fraction of the total volume of the deposits at the site and may not necessarily be representative of the subsurface conditions between adjacent borings or between the sampled intervals. The data presented on the Subsurface Logs together with the recovered samples will provide a basis for evaluating the character of the subsurface conditions relative to the project. The evaluation must consider all the recorded details and their significance relative to each other. Often analyses of standard boring data indicate the need for additional testing or sampling procedures to more accurately evaluate the subsurface conditions. Any evaluation of the contents of this report and recovered samples must be performed by Professionals. The information presented in the following defines some of the procedures and terms used on the Subsurface Logs to describe the conditions encountered.

1. The figures in the Depth column defines the scale of the Subsurface Log.

2. The sample column shows, graphically, the depth range from which a sample was recovered See Table 1 for a description of the symbols used to signify the various types of samples.

3. The Sample No. is used for identification on sample containers and/or Laboratory Test Reports.

4. Blows on Sampler — shows the results of the "Penetration Test", recording the number of blows required to drive a split spoon sampler into the soil. The number of blows required for each six inches of penetration is recorded. The first 6 inches of penetration is considered to be a seating drive. The number of blows required for the second and third 6 inches of penetration is termed the penetration resistance, N. The outside diameter of the sampler, the hammer weight and the length of drop are noted at the bottom of the Subsurface Log.

5. Blows on Casing — shows the number of blows required to advance the casing a distance of 12 inches. The casing size, the hammer weight and the length of drop are noted at the bottom of the Subsurface Log. If the casing is advanced by means other than driving, the method of advancement will be indicated in the Notes column or under the Method of Investigation at the bottom of the Subsurface Log.

6. All recovered soil samples are reviewed in the laboratory by an engineering technician, geologist or geotechnical engineer, unless noted otherwise. The visual descriptions are made on the basis of a combination of the driller's field descriptions and observations and the sample as received in the laboratory. The method of visual classification is based primarily on the Unified Soil Classification (ASTM D 2487-83) with regard to the particle size and plasticity (See Table No. 2) Additionally, the relative portion, by weight, of two or more soil types is described for granular soils in accordance with "Suggested Methods of Test for Identification of Soils" by D M. Burmister, ASTM Special Technical Publication 479, June 1970. (See Table No. 3) The description of the relative soil density or consistency is based upon the penetration records as defined on Table No. 4. The description of the soil moisture is based upon the relative wetness of the soil as recovered and is described as dry, moist, wet and saturated. Water introduced in the boring either naturally or during drilling may have affected the moisture condition of the recovered sample. Special terms are used as required to describe materials in greater detail several such terms are listed in Table 5. When sampling gravelly soils with a standard two inch diameter split spoon,the true percentage of gravel is often not recovered due to the relatively small sampler diameter. The presence of boulders and large gravel is sometimes, but not necessarily, detected by an evaluation of the casing and samplers blows or through the "action" of the drill rig as reported by the driller.

7 .The description of the rock shown is based on the recovered rock core and the driller's observations. The terms frequently used in the description are included in Table 6.

8. The stratification lines represent the approximate boundary between soil types end the transition may be gradual. Solid stratification lines are based on the driller's field observations.

9. Miscellaneous observations and procedures noted by the driller are shown in this column, including water level observations. It is important to realize the reliability of the water level observations depends upon the soil type (water does not readily stabilize in a hole through fine grained soils), and that drill water used to advance the boring may have influenced the observations. The ground water level typically will fluctuate seasonally. One or more perched or trapped water levels may exist in the ground seasonally. All the available readings should be evaluated. If definite conclusions cannot be made, it is often prudent to examine the conditions more thoroughly through test pit excavations or water observation wells.

10. The length of core run is defined as the length of penetration of the core barrel. Core recovery is the length of core recovered divided by the core run. The RQD (Rock Quality Designation) is the total pieces of NX core exceeding 4 inches in length divided by the core run. The size core barrel used is also noted.

SUBSURFACE LOG KEY

Project _____ Date Started _____

Project# _____ Date Finished _____

Location _____ Surf. Elv. _____

Driller _____ G.W. Depth _____

Hole # _____ Sheet ____ of ____

SJB SERVICES, INC. — Contract Drilling and Testing

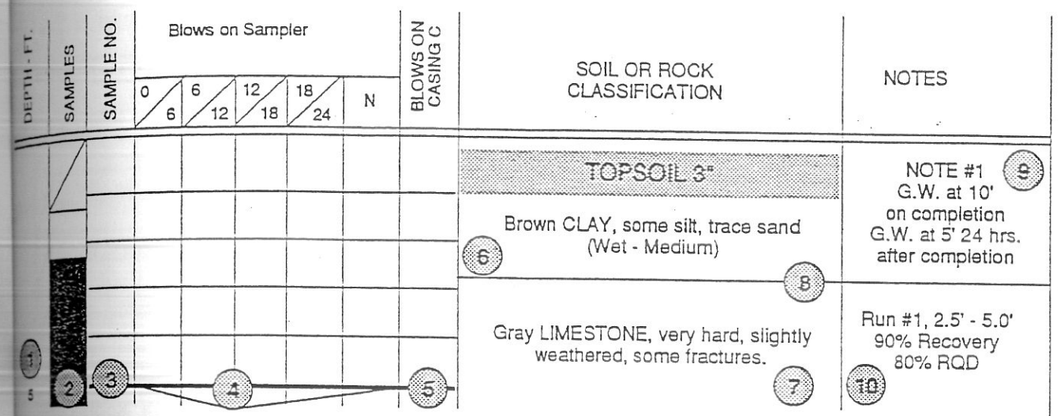


TABLE 1

	Split Spoon Sample
	Shelby Tube Sample
	Auger or Test Pit Sample
	Rock Core

TABLE 2

Identification of soil type is made on basis of an estimate of particle sizes, and in the case of fine grained soils also on the basis of plasticity.

Soil Type	Soil Particle Size	
Boulder	>12"	
Cobble	3" - 12"	
Gravel - Course	3" - 3/4"	Coarse Grained (Granular)
- Fine	3/4" - #4	
Sand - Coarse	#4 - #10	
- Medium	#10 - #40	
- Fine	#40 - #200	
Silt - Non Plastic (Granular)		
Clay-Plastic (Cohesive)	<#200	Fine Grained

TABLE 3

The following terms are used in classifying soils consisting of mixtures of 2 or more soil types. The estimate is based on weight of total sample.

Term	% of Total Sample
"and"	35-50
"some"	20-35
"little"	10-20
"trace"	less than 10

(When sampling gravelly soils with a standard split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter.)

TABLE 4

The relative compactness or consistency is described in accord with the following terms:

Granular Soils		Cohesive Soils	
Term	Blows per Foot, N	Term	Blows per Foot, N
Loose	<11	Very Soft	<3
Firm	11-30	Soft	3-15
Compact	31-50	Stiff	16-25
Very Compact	>51	Hard	>26

(Large particles in the soils will often significantly influence the blows per foot recorded during the Penetration Test)

TABLE 5

Varved - Horizontal uniform layers or seams of soil(s).
Layer - Soil deposit more than 6" thick.
Seam - Soil deposit more than 6" thick.
Parting - Soil deposit less than 1/8" thick.
Laminated- Irregular, horizontal and angled seams and partings of soil(s).

TABLE 6

Rock Classification Terms		Meaning
Hardness	Soft	Scratched by fingernail
	Medium Hard	Scratched easily by penknife
	Hard	Scratched very difficultly with penknife
	Very Hard	Cannot be scratched by penknife
Weathering	Very Weathered	Judged from relative amounts
	Weathered, Sound	of disintegration, iron staining, core recovery, clay seams, etc.

Rock Classification Terms			Meaning
Bedding	Laminated	(<1")	Natural breaks in Rock Layers
	Thin Bedded	(1"-4")	
	Bedded	(4"-12")	
	Thick Bedded	(12" - 36")	
	Massive	(>36")	

Fracturing- natural breaks in the rock oriented at an angle to the rock layers

SUBSURFACE LOG

Project PROPOSED RESTROOM ADDITIONS
Project# D-598
Location ANGOLA SERVICE CENTER
Driller: J. LEAVELL

Date Started 5-18-95
Date Finished 5-18-95
Surf. Elv. 97.6
G.W. Depth SEE NOTE

SJB SERVICES, INC.

Hole # B-2
Sheet 1 of 1
Contract Drilling and Testing

Depth Ft	Samples	Sample #	Blows on Sampler 0/6 6/12 12/18 18/24 N	Blows on Casing C	Soil or Rock Classification	Notes
0		1	3 5 3 4 8		TOPSOIL Brown Clayey SILT, little f-c Sand, tr. gravel, tr. shale, tr. slag (Moist, FILL)	
		2	4 5 5 5 10			
5		3	8 23 15 15 38		Brown SILT and Weathered Shale Rock (Moist, Compact, ML)	
		4	16 18 14 13 32			
		5	8 5 5 18 10		(Wet, Loose)	
10		6	6 14 18 50/.3 32		Becomes Gray (Moist, Compact)	
		7	50/0.1 REF		Black SHALE Rock (Moist)	NQ'2' Size Rock Core
15					Gray-Black SHALE Rock, soft, to medium hard, slightly weathered, laminated to thinly bedded	RUN #1=13.7'-17.6' REC=90% RQD=0% RUN #2=17.6'-18.8' REC=100% RQD=0%
20					BORING COMPLETE AT 18.8'	Free Standing Water recorded approx. 9.0' prior to Coring
25						
30						
35						

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 " per blow. Classification: BY
C = No. blows to drive _____ " casing _____ " with _____ lb. weight falling _____ " per blow. GEOLOGIST

SUBSURFACE LOG

Project PROPOSED RESTROOM ADDITIONS
Project# D-598
Location ANGOLA SERVICE CENTER
Driller: J. LEAVELL

Date Started 5-18-95
Date Finished 5-18-95
Surf. Elv. 97.4
G.W. Depth SEE NOTE

SJB SERVICES, INC.

Hole # B-2
Sheet 1 of 1
Contract Drilling and Testing

Depth Ft	Samples	Sample #	Blows on Sampler 0/6 6/12 12/18 18/24 N	Blows on Casing C	Soil or Rock Classification	Notes
0		1	2 3 8 16 11		TOPSOIL Brown-Gray SHALE and Silt, tr. slag, (Moist, FILL)	
		2	8 7 9 10 16		Orange-Brown Clayey SILT, little f-c Sand, tr. shale, tr. roots (Moist, Stiff, ML)	
5		3	10 16 16 18 32		Brown SILT and Weathered Shale (Moist, Compact, ML)	
		4	10 16 15 14 31		Becomes Olive-Brown	
		5	14 14 14 16 28			
10		6	10 25 30 60 55		Gray f-c SAND, some Silt (Moist, Very Compact, SM)	
		7	3 25 50/0 REF		Black SHALE Rock (Moist)	NQ'2' Size Rock Core
15					Gray-Black SHALE Rock, soft to medium hard, slightly weathered laminated to thinly bedded	RUN #1=13.5'-15.9' REC=100% RQD=0% RUN #2=15.9'-18.5' REC=100% RQD=0%
20					BORING COMPLETE AT 18.5'	No Free Standing Water encountered prior to Coring
25						
30						
35						

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 " per blow. Classification: BY
C = No. blows to drive _____ " casing _____ " with _____ lb. weight falling _____ " per blow. GEOLOGIST
Method of Investigation HOLLOW STEM AUGERS