GEOTECHNICAL ENGINEERING SERVICES REPORT

for the

PROPOSED NEW YORK STATE THRUWAY AUTHORITY SENECA SERVICE CENTER ADDITION MILEPOST 350 WEST BOUND I-90 TOWN OF VICTOR, ONTARIO COUNTY, NEW YORK

prepared for

HUNT ENGINEERS, ARCHITECTS & LAND SURVEYORS, PC
2 WEST MAIN STREET, SUITE 300
VICTOR, NEW YORK 14564

by

PROFESSIONAL SERVICE INDUSTRIES, INC.
PSI PROJECT 806-15032

TABLE OF CONTENTS

Page

INTRODUCTION 1

PROPOSED CONSTRUCTION 1

TESTING PROCEDURES
- Field Operations 2
- Laboratory Testing 2

SITE AND SUBSURFACE CONDITIONS
- Site Location and Description 3
- Site Geology 3
- Subsurface Conditions 4
- Groundwater Conditions 4

SITE WORK RECOMMENDATIONS
- Site Preparation 5
- Structural Fill 5
- Drainage and Groundwater Considerations 6
- Floor Slab Subgrade Preparation 6
- Federal Excavation Safety Regulations 7

FOUNDATION AND FLOOR SLAB RECOMMENDATIONS
- Foundation Design 8
- Seismic Design 9
- Floor Slab Design 9

GENERAL COMMENTS 10

APPENDIX
- Boring Location Plans
- General Notes
- Boring Records (B-1 through B-5)
- PID Readings
- Analytical Test Results

GEOTECHNICAL ENGINEERING SERVICES REPORT

INTRODUCTION

Professional Service Industries. Inc. (PSI) has completed a subsurface exploration and geotechnical engineering evaluation for the proposed New York Sate Thruway Authority – Rehabilitation and Expansion of Service Center Building at Seneca project. PSI's services for this project were performed in accordance with PSI Proposal No. 806-080. dated March 30. 2001. Authorization to perform this exploration and analysis was in the form of a signed acceptance of the aforementioned proposal. acknowledged by Mr. John Collins. PE of Hunt Engineers. Architects and Land Surveyors. PC on April 16. 2001.

The purpose of this study was to explore the subsurface conditions at the site to develop geotechnical recommendations for design of foundation systems for the proposed additions. This report briefly outlines the testing procedures. describes the site and subsurface conditions. and discusses the foundation recommendations.

The scope of services did not include an environmental assessment for the presence or absence of wetlands or hazardous or toxic materials in the soil. surface water. ground water or air. on. or below or around this site. Any statement in this report or on the boring logs regarding odors. colors. unusual or suspicious items or conditions are strictly for the information of the client. Our environmental related services for this project were limited to scanning sample with a photo-ionization detector. and sending selected samples for analytical chemistry testing. Environmental consultation services were not included in our scope of services for this project.

PROPOSED CONSTRUCTION

At the time of this exploration. Mr. John F. Collins. Jr.. PE of Hunt Engineers. Architects and Land Surveyors. PC provided information regarding the proposed structure addition. It is understood that the project will consist of the construction of a single story. slab-on-grade. concrete masonry bearing wall addition to be located on the east side of the existing building. The addition will and have approximate plan dimensions of twenty-nine (29) feet by forty-nine (49) feet. An approximately sixteen (16) foot diameter octagonal tourist information center attached to an approximately ten (10) foot square information storage area are also planned as part of the project. It is expected that the tourist information and information storage area will be a single story. slab-on-grade. combination concrete masonry bearing wall and wood frame building. The new additions are assumed to contain of a wood truss and deck roof. The additions' maximum wall load was not provided but is assumed to be not more than five (5) kips per lineal foot.

Based on information provided by Hunt Engineers. Architects. and Land Surveyors. PC. the addition's finished floor is to match the existing structure's. For the purpose of developing foundation design recommendations and based on our visual observations of the site topography. the addition will require minimal grading operations (up to two (2) feet of fill) for the proposed development.

The site plans included with this report were photocopied from Hunt Engineers, Architects and Land Surveyors, PC and Foit-Albert Associates Architecture, Engineering and Surveying, PC, "Renovations to Service Areas Seneca", dated March 8, 2001. The recommendations provided in this report are based on the provided plan and our understanding of the project as outlined above. If any of the above information should change significantly or be in error, it should be brought to our attention so that we may review the recommendations made in this report.

TESTING PROCEDURES

Field Operations

Five (5) soil test borings were performed at the site at the approximate locations shown on the Boring Location Plan presented in the Appendix. Hunt Engineers, Architects and Land Surveyors, PC selected the borings' positions and depths. All borings were located in the field by representatives of PSI by measuring distances from known reference points. Ground surface elevations for the boring locations were not performed or provided for this report.

The borings were advanced into the ground using hollow stem augers. At regular intervals throughout the boring depths, soil samples were obtained with a split spoon sampler. The split spoon sampler was first seated 6 inches to penetrate any loose cuttings and then driven an additional foot, where possible, with blows of a 140 pound hammer falling 30 inches. The number of hammer blows required to drive the sampler each six-inch increment is recorded in the field. The penetration resistance "N-value" is designated as the number of hammer blows required to drive the sampler the final foot and, when properly evaluated, is an index to cohesion for clays and relative density for sands. The split spoon sampling procedures used during this exploration are in basic accordance with ASTM Designation D-1586. Water levels were checked in the borehole with the augers in the ground and following removal of the augers.

Laboratory Testing

The soil samples obtained during the field exploration were transported to the laboratory and visually examined. The soil samples obtained from the drilling operation were classified in general accordance with ASTM D-2488 (Visual-Manual Procedure for Description of Soils). Soil classifications include the use of the Unified Soil Classification System described in ASTM D-2487 (Classification of Soils for Engineering Purposes). Water content determinations (ASTM D-2211) were conducted on the samples Strength tests utilizing a calibrated spring-loaded hand penetrometer were also conducted on all samples. Descriptions of the soils encountered in the test borings are provided on the Boring Records included in the Appendix. Groundwater conditions, standard penetration resistances and other pertinent information are also included. The soil samples that were not altered by laboratory testing will be retained at our office for 60 days from the date of this report and then discarded.

As requested by Hunt Engineers, Architects and Land Surveyors, PC, PSI performed a limited scan for volatile organic vapors on all soil samples using a Photo Ionization Detector. The volatile organic compound (VOC) readings ranged from 1 to 2.8 parts per million (PPM). Readings were taken in the field during sample collection. Odors were not noted during visual examination of the soil samples. Also at two (2) boring locations, one sample was collected from the elevation in each boring where the highest VOC readings were found, for further analytical testing consisting of EPA Test Methods 8015 GRO/DRO and 8021. The results of the VOC scan and analytical testing are presented in the Appendix.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The proposed Seneca Center Additions are to be located adjacent to the east side and south sides of the existing building at New York State Thruway Milepost 350 West Bound I-90 in Seneca, Ontario County, New York. The Boring Location Plan in the Appendix indicates the location of the structure with respect to the existing building. Asphaltic cement concrete and portland cement concrete pavements along with an existing concrete stairwell are located within the proposed construction area. Generally surrounding properties consist of asphaltic cement and portland cement concrete pavements, the existing Service Center and/or gas and diesel canopy areas.

The existing Service Center is a single story, slab-on-grade combination wood frame and masonry wall structure supported on shallow continuous wall footings. No distressed areas of the existing building from a geotechnical viewpoint were observed at the time of the drilling operations. Visual observation of the existing asphaltic cement concrete pavement indicated limited longitudinal cracking.

No topographical information was provided at the time of this report. However, based on visual observations, the proposed construction area is fairly flat with maximum elevational differences estimated at two (2) feet or less. Lateral surface drainage at the site appeared to be fair with no ponded surface water and catch basins observed within the site at the time of the field operations. During the field operations, the truck-mounted drill rig experienced no difficulty traversing the paved site surface. Underground utilities were observed within the limits of the property. It is recommended that all utilities be marked prior to construction.

Site Geology

The Town of Victor, New York area is located within the glaciated portion of the "Erie-Ontario Lowlands Physiographic Province. As Noted on the 1986 "Surficial Geologic Map of New York", surface soils in the area generally consist of variable textured till. Bedrock in the general site area is part of the Upper Silurian age Akron Dolomite, Bertie Group's Dolomitic Shale. The landscape features of Central New York bear a dominantly glacial imprint. Only parts remain of landforms that existed prior to Pleistocene glaciation. Flood plains and valley walls have been re-shaped only very incompletely by post-glacial processes. Except in areas of steep slope, bedrock is generally mantled by a cover of drift, which ranged from a few feet thick over the uplands to several hundred feet thick in valleys.

Subsurface Conditions

The following subsurface description is of a generalized nature, provided to highlight the major soil strata encountered. The Boring Records should be reviewed for specific information as to individual boring locations. The stratifications shown on the Boring Records represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the transition may be gradual.

Subsurface conditions within the proposed footprint of the new addition may vary significantly from conditions encountered at the boring locations, due to the site development history. Although no old foundations were specifically encountered in the borings, it would not be uncommon for old foundations to have been left in place during past phases of demolition at this site.

At the boring locations, an asphaltic cement concrete pavement having an approximate thickness ranging from three (3) to five (5) inches underlain by a an approximate three (3) to five (5)-inch thick stone base was encountered. The asphaltic cement concrete pavement and stone base thickness should be expected to vary across the site.

The upper soils at B-3 and B-5 were identified as possible fill on the basis of the low N-values. However, underlying the pavement sections, granular soils consisting of sandy silt containing varying fractions of gravel and clay and/or silty sand were encountered to depths ranging from approximately nine and one-half (9-1/2) to fourteen (14) feet below existing site grades. Standard Penetration resistance, N-values, for these soil strata ranged from five (5) to forty-five (45) blows per foot indicating relative densities ranging from loose to dense. The majority of the N-values were twenty (20) and over, except in the upper five (5) to eight (8) feet at B-3 and B-5, where N-values were five (5) to nine (9). Moisture contents of selected samples from the sandy silt ranged from ten (10) to twenty-two (22) percent.

Beneath the granular upper soils, cohesive soil consisting of silty clay was encountered to depths ranging from approximately sixteen and one-half (16-1/2) feet to twenty-one (21) feet below existing site grades. Standard Penetration resistance, N-values, for these soil strata ranged from fifteen (15) to thirty-four (34) blows per foot indicating relative densities ranging from loose to dense. Based on calibrated penetrometer measurements, which are an approximate measure of soil strength, the unconfined compressive strength measured from approximately 1.75 to 4.0 tsf. Moisture contents of selected samples from these soils ranged from seventeen (17) to twenty-one (21) percent.

Underlying the silty clay, sandy silt and/or silty sand were encountered to the borings' approximate termination depth of twenty-five (25) feet below existing site grades. Standard Penetration resistance, N-values, for these soil strata ranged from forty-eight (48) blows per foot to fifty (50) blows per three (3) inches indicating relative densities ranging from dense to very dense. It must be recognized that, because of the cobbles and boulders encountered in the soil profile, the N-values for the lower sandy silt/silty sand stratum may not be indicative of the actual relative density of the soil. Moisture contents of selected samples from these soils ranged from seven (7) to twenty (20) percent

Groundwater Conditions

Groundwater infiltration was measured in test borings B-1, B-3 and B-4 prior to auger withdrawal at the time of the soil boring operations at depths ranging from approximately twenty-three (23) to twenty-five (25) feet below existing site grades. However, groundwater was first encountered in test borings B-3 and B-4 at depths ranging from approximately eight and one-half (8-1/2) to eighteen and one-half (18-1/2) feet below grade. Infiltrating groundwater was not encountered in test borings B-2 and B-5 at the time of the soil boring operations. However based on the moisture condition of the recovered soil samples in boring B-5, it appeared that the water level may not have yet stabilized in the boreholes prior to backfilling. In general, it appears perched water may be present in the upper sandy silt, with the continuous groundwater table at or below about eighteen (18) feet at the time of the borings. For safety purposes, all test borings were backfilled at the time of drilling completion. We note that groundwater levels will fluctuate and may occur at higher elevations at some time in the future.

SITEWORK RECOMMENDATIONS

It is recommended that PSI be retained to provide observation and testing of construction activities involved in the foundation, earthwork, and related activities of this project. PSI cannot accept responsibility for any conditions that deviate from those described in this report, nor for the performance of the foundation system if not engaged to also provide construction observation and testing for this project.

Site Preparation

Areas of the site where the buildings are to be located shall have any existing asphaltic and portland cement concrete pavements, fill, utilities, loose and wet soils and any deleterious materials, completely removed and disposed of off site, as directed by the owner. Under no circumstances should any topsoil or other organic-laden soil be placed as fill beneath the building areas.

Prior to the beginning of fill placement activities, we recommend that all areas receiving any new fill be proofrolled and compacted. Proofrolling should be performed using a loaded dump truck, or similar rubber-tired equipment weighing at least twenty (20) tons. Proofrolling operations should be observed by a representative of PSI and should continue until a firm and unyielding condition exists. Unstable soils which are revealed by proofrolling and which cannot be adequately densified in place, should be removed and replaced under the recommendations of the PSI representative. Areas to be cut to achieve subgrade elevation should be excavated prior to performing the proofrolling and compaction operation.

During site preparation, filled sidewalk vaults, burn pits, trash pits or other isolated disposal areas may be encountered. All too frequently such buried material occurs in isolated areas outside boring locations. Any such material encountered during site work or foundation construction should be excavated and removed from the site.

Structural Fill

Materials selected for use as structural fill should not contain more than two (2) percent by weight of organic matter, waste construction debris, or other deleterious materials. Because the near surface site soils generally consist of granular soils it is recommended that any imported fill consist of granular material that is relatively well graded having no more than ten (10) percent by weight passing the U.S. Standard No. 200 sieve. Fill materials should generally have a modified Proctor maximum dry density greater than 115 pounds per cubic foot (pcf) and not be a single size material, and a maximum particle size of four (4) inches or less with the maximum particle size reduced to two (2) inches where compaction with hand-held, walk-behind equipment will be required.

Based on the results of soil classifications, the existing near surface soils at the project site generally consist of sandy silt with varying fractions of gravel and clay and should generally be suitable for reuse as structural fill, based on the soil borings and laboratory test results. Careful attention to moisture content and compactive effort are important in dealing with such soils. As a result, it is not unusual for wet or cools season grading operations to be hindered by the continual need to dry back the on-site natural soils during placement. If fill placement must proceed during other than the summer months, the use of imported granular fill with less than ten (10) percent passing the No. 200 sieve may be necessary.

Fill material in "mass" fill areas should be placed and compacted in individual lifts of eight (8) inches or less loose measurement using a vibratory roller. Within small excavations such as in utility trenches, around manholes, or behind retaining walls, we recommend the use of smaller, hand or remote-guided equipment. Loose lift thickness of four (4) inches or less is recommended when using such equipment.

We recommend that structural fill be compacted to a minimum of ninety-five (95) percent of the maximum dry density and within plus or minus three (3) percent of the optimum moisture content as determined by ASTM D-1557. A representative of PSI should observe fill placement operations and perform density tests concurrently to indicate if the specified compaction is being achieved.

Drainage and Groundwater Considerations

Water should not be allowed to collect near or below the foundation or floor slab areas of the building either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater or surface runoff. Positive site drainage should be provided at all times to reduce infiltration of surface water around the perimeter of the building and beneath the floor slabs. All grades should be sloped away from the building and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill of the building.

Even though groundwater was encountered in the test borings at depth deeper than the proposed bottom of footing elevation during the field operations, it may be encountered at the bottom of deeper excavations such as sanitary sewer lines. It is also possible that seasonal variations will cause fluctuations or a water table to be present in the upper soils during the spring months or after a prolonged period of rain. It is recommended that adequate dewatering systems be incorporated to keep any excavations free of water at all times. For foundation excavations, if construction control of water is necessary, we anticipate it can be accomplished by pumping from properly filtered open sumps.

Floor Slab Subgrade Preparation

The near surface soils present at this site are somewhat sensitive to softening due to rainfall and traffic. When damp or wet, it is our experience that these soils tend to rut under rubber tire vehicle traffic. Appropriate maintenance of entrance roads and other areas subjected to construction traffic, such as floor slab areas, is typically required until floor slab construction is completed. If near surface soils become wet and disturbed, they should be promptly disced, aerated and re-compacted to restore stable conditions. In some instances during wet or cool seasons, it is advantageous to place a working course of compacted graded aggregate base over building and road way areas between the time of initial grading and final floor slab construction. The graded aggregate base may need periodic replenishment depending on weather and traffic conditions during construction.

We recommend that immediately prior to placement of stone and the beginning of floor slab construction, a representative of the Geotechnical Engineer evaluate the floor slab subgrades. If low density soils are encountered which cannot be adequately densified in place, such soils should be removed and replaced with well-compacted fill material placed in accordance with the *Structural Fill* section of this report or with well-compacted crushed stone materials.

Federal Excavation Safety Regulations

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, part 1926, Subpart P". This document was issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that all excavations, whether they be utility trenches, basement excavation or footing excavations, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. PSI is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred. Materials removed from the excavation should not be stockpiled immediately adjacent to the excavation, inasmuch as this load may cause a sudden collapse of the embankment.

FOUNDATION AND FLOOR SLAB RECOMMENDATIONS

Foundation Design

The results of the test borings and our evaluation indicate that the building structure addition may be supported on continuous wall footing foundations bearing on medium dense natural soils or on compacted engineered fill placed on suitable soils. Continuous footings for bearing walls should be designed for a maximum bearing pressure of 2,000 psf based on dead load plus design live load. Interior footings, in heated areas, to be supported on natural soils, suitable existing fill or engineered fill should be placed at least eighteen (18) inches below finished floor grade. Exterior footings, and footings in unheated areas, should be placed at least four (4) feet below the final exterior grade on natural soils or engineered fill for frost protection. Minimum foundation widths for wall footings should be eighteen (18) inches, even if the bearing pressure is less than the recommended values.

The recommended soil bearing pressure includes a factor of safety of at least 3.0 against shear failure. We estimate maximum total and differential settlements of less than 1-inch and ¾-inch, respectively.

Where any new footings for the additions are to be situated within a distance of 2B (B=footing width) from the edge of the footings of the presently existing functional foundation members, caution must be exercised to ensure that the superimposition of the foundation stresses will not result in detrimental settlements of either foundation member. The new footing's bearing elevations should match the existing footing's bearing elevations. Also the additions should be structurally separated from the existing building with expansion joints provided. Further it is considered imperative that the structural integrity of the existing structures be maintained during undercut operations to remove any encountered objectionable soils and the installation of the new foundation system.

The foundation walls may not be free standing in the overburden soils: therefore the sides of the cut excavation for the footings may need to be sloped and the footings formed and backfilled in order to maintain a vertical concrete face.

The bottom of the footing excavations should be critically observed and the surface compacted with either a vibratory or an impact compactor, i.e. jumping jack. These measures are particularly critical where new footings will be in the vicinity of borings B-3 and B-5, where partial-depth over-excavation and replacement of loose soils may be necessary. Foundation bearing surface evaluations should be performed in the shallow foundation excavations to identify isolated poor quality soils and to enable the development of remedial measures, if needed. A representative of PSI should perform foundation bearing surface evaluations in each excavation prior to placement of reinforcing steel. Soft of loose soil zones encountered at the foundation subgrades should be remediated as directed by the Geotechnical Engineer.

After opening, footings should be evaluated and concrete placed as quickly as possible to avoid exposure of the footing bottoms to disturbance due to construction traffic or water accumulation. If concrete will not be placed the same day a foundation excavation is cut to grade, the contractor should be required to place three (3) to five (5) inches of compacted crushed aggregate within the footing excavation.

Seismic Design

The site is located within Town of Victor, Ontario County, New York. Based upon the 1997 Uniform Building Code (UBC), the seismic zone for this site is zone "1" (UBC Figure 16-2). This corresponds to a seismic factor (Z) of 0.075 (UBC Table 16-I). The soil profile is considered a Type Sd soil (UBC Table 16-J). This corresponds to a seismic coefficient (Ca) of 0.12 (UBC Table 16-Q). No active faults are known to pass through or immediately adjacent to the site.

Floor Slab Design

An on-grade floor slab supported on natural soils or engineered fill may be used for this structure. We recommend that a subgrade modulus (k) of 150 pci be used in floor slab design calculations.

We recommend that a minimum eight (8)-inch thick, free-draining granular material, such as AASHTO No. 57 stone, be placed beneath the floor slab to enhance drainage. The floor slab should be jointed in accordance with ACI specifications to reduce cracking resulting from any differential movement and shrinkage. We also suggest that, where practical, the floor slabs not be rigidly connected to columns, walls, or foundations.

Impermeable vapor barriers under concrete slabs may be required for this structure. The final decision to use a vapor barrier is left to the owner and designers. If used, however, we recommend that a 10-mil thick polyethylene sheeting as recommended by ACI's *Guide for Concrete and Floor Slab Construction*, be utilized as a vapor barrier, and be placed between the crushed stone materials and the concrete slab. The structural engineer may include a layer of sand between the vapor barrier and concrete slab to reduce the potential for curling. Appropriate curing practices are essential to reduce the risk of curling of the floor slab.

We recommend that a PSI representative evaluate the floor slab subgrades immediately prior to placing stone and beginning of floor slab construction. If low consistency soils are encountered which cannot be adequately densified in place, such soils should be removed and replaced with well-compacted soil or crushed stone material placed in accordance with the *Structural Fill* section of this report.

GENERAL COMMENTS

The recommendations submitted are based on the available soil information obtained by PSI and preliminary design details furnished by Mr. John Collins, Jr., PE of Hunt Engineers, Architects and Land Surveyors, PC for the proposed structure. If there are any revisions to the plans for the proposed structure, or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI should be retained to determine if changes in the foundation recommendations are required. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the performance of the structure.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made after being prepared in accordance with generally accepted professional engineering practices in the local areas. No other warranties are implied or expressed.

After the plans and specifications are more complete, it is recommended that the geotechnical engineer be provided the opportunity to review the final design and specifications to determine if the engineering recommendations have been properly interpreted and implemented. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of Hunt Engineers, Architects and Land Surveyors, PC for the specific application to the proposed New York State Thruway Authority – Rehabilitation and Expansion of Service Center Building at Seneca to be located at Milepost 350 Westbound I-90 in the Town of Victor, Ontario County, New York.

APPENDIX

Boring Location Plans

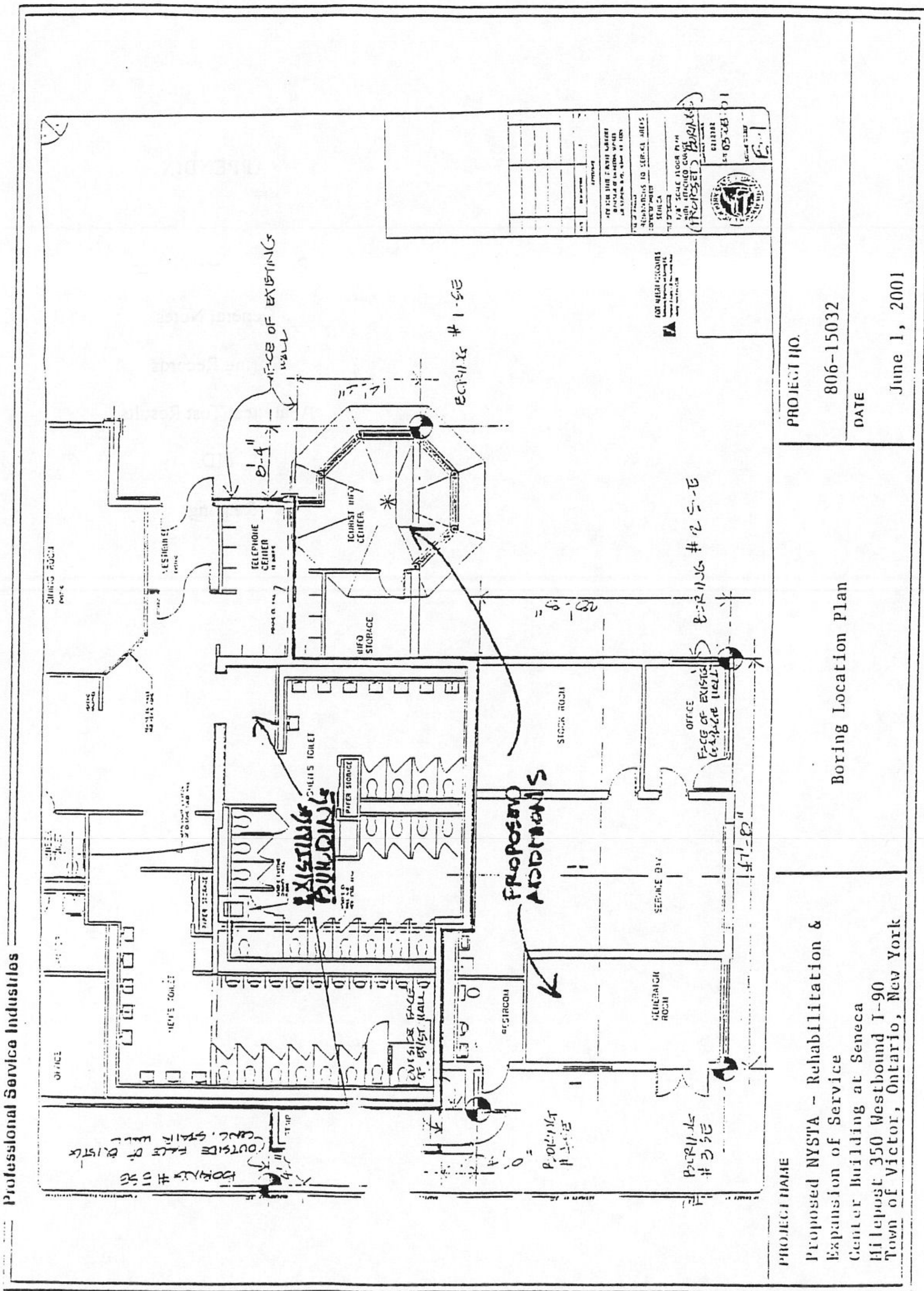
General Notes

Boring Records

Analytical Test Results

PID

Readings


Professional Service Industries
PROJECT NO.
806-15032
DATE
June 1, 2001
Boring Location Plan
PROJECT NAME
Proposed NYSTA - Rehabilitation &
Expansion of Service
Center Building at Seneca
Milepost 350 Westbound I-90
Town of Victor, Ontario, New York
EXISTING BUILDING
PROPOSED ADDITIONS
BORING #1-SE
BORING #2-SE
TOURIST INFO CENTER
TELEPHONE CENTER
INFO STORAGE
STOCK ROOM
OFFICE
SERVICE BAY
GENERATOR ROOM
MEN'S TOILET
PAPER STORAGE

PROFESSIONAL SERVICE INDUSTRIES, INC.
RECORD OF SUBSURFACE EXPLORATION

Boring: B-1

Project Name: SENECA SERVICE CENTER ADDITION   Date of Boring: MAY 3, 2001

Site: NYS THRUWAY MILEPOST 350 WEST SENECA, NY   Project No.: 306-15032

DESCRIPTION	DEPTH	SAMPLE	N	Recovery	Qp	Mc	REMARKS
SURFACE							
Sandy Silt trace Gravel and Clay, brown, medium dense, moist to wet. (ML/SM)		1-SS	23	1.5		10	6" ASPHALT 4" STONE
	5'	2-SS	25	1.5		11	
		3-SS	22	1.5		12	
	10'	4-SS	26	0.4		14	
Silty Clay, brown, very stiff, moist. (CL)	15'	5-SS	23	1.5	4.0	20	HOLE CAVED AT 15.5 FEET
	20'	6-SS	31	1.5	1.75	19	
Sandy Silt little Gravel trace Clay, brown, dense, moist. (ML/SM)							
Cobbles Noted.	25'	7-SS	48	1.5		7	
BORING TERMINATED AT 25 FEET.							
WATER LEVEL OBSERVATIONS: AUGER IN: 25.0 FEET; AUGER OUT: NONE							
	30'						

PROFESSIONAL SERVICE INDUSTRIES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring: B-2

Project Name: SENECA SERVICE CENTER ADDITION   Date of Boring: MAY 8, 2001

Site: NYS THRUWAY MILEPOST 350 WEST SENECA, NY   Project No.: 206-15032

DESCRIPTION	DEPTH	SAMPLE	N	Recovery	Qp	Mc	REMARKS
SURFACE							
Sandy Silt little to trace Clay and Gravel, brown, medium dense to dense, moist. (ML/SM)		1-SS	19	1.5		13	5" ASPHALT 3" STONE
		2-SS	31	1.2		12	
	5'						
		3-SS	31	1.5		13	
		4-SS	39	0.14		19	
	10'						
							HOLE CAVED AT 13 FEET
Silty Clay, brown, stiff, moist. (CL)	15'	5-SS	15	1.5	3.0	17	
Silty Sand, little Gravel trace Clay, brown, very dense, moist. (SM)	20'	6-SS	50/4"	1.3		21	
Cobbles Noted.							
	25'	7-SS	50/5"	0.5		8	
BORING TERMINATED AT 25 FEET.							
WATER LEVEL OBSERVATIONS:							
AUGER IN: NONE							
AUGER OUT: NONE							
	30'						

PROFESSIONAL SERVICE INDUSTRIES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring: B-3

Project Name: SENECA SERVICE CENTER ADDITION   Date of Boring: MAY 7, 2001

Site: NYS THRUWAY MILEPOST 350 WEST SENECA, NY   Project No.: 306-15032

DESCRIPTION	DEPTH	SAMPLE	N	Recovery	Qp	Mc	REMARKS
SURFACE							
Sandy Silt little to trace Gravel, brown, loose, moist. (ML/SM) Possible Fill		1-SS	8	1.3		12	7" ASPHALT 1" STONE
	5'	2-SS	5	0.5		13	HOLE CAVED AT 5 FEET
Silty Sand some to little Clay and Gravel, brown, dense, moist. (SM)		3-SS	45	1.5		10	
Silty Clay, brown, very stiff, wet to saturated. (CL)	10'	4-SS	29	1.5	4.5	18	FIRST ENCOUNTERED WATER AT 8.5 FEET
	15'	5-SS	25	1.5	2.75	22	
Silty Sand trace to little Gravel and Clay, brown, very dense, wet. (SM)	20'	6-SS	50/4"	0.9		20	
Cobbles Noted.	25'	7-SS	50/3"	0.9		11	
BORING TERMINATED AT 25 FEET.							
WATER LEVEL OBSERVATIONS:							
AUGER IN: 23.0 FEET							
AUGER OUT: NONE							
	30'						

PROFESSIONAL SERVICE INDUSTRIES, INC.

RECORD OF SUBSURFACE EXPLORATION

Boring: B-4

Project Name: SENECA SERVICE CENTER ADDITION — Date of Boring: MAY 8, 2001

Site: NYS THRUWAY MILEPOST 350 WEST SENECA, NY — Project No.: 306-15032

DESCRIPTION	DEPTH	SAMPLE	N	Recovery	Qp	Mc	REMARKS
SURFACE							
Sandy Silt little Gravel and Clay, brown, medium dense to dense, moist to wet. (ML/SM)		1-SS	20	1.5		7	6" ASPHALT 2" STONE
2-SS wet.	5'	2-SS	21	1.0		11	
		3-SS	26	1.5		12	
	10'	4-SS	49	1.5		10	
							HOLE CAVED AT 13 FEET
Silty Clay, brown, hard, moist. (CL)	15'	5-SS	34	1.5	3.0	21	
Silty Sand little Gravel trace Clay, brown, very dense, saturated. (SM)	20'	6-SS	50/4"	1.0		7	ENCOUNTERED WATER AT 18.5 FEET
Cobbles Noted.	25'	7-SS	50/5"	0.6		8	
BORING TERMINATED AT 25 FEET.	30'						

WATER LEVEL OBSERVATIONS:

AUGER IN: 23.5 FEET
AUGER OUT: NONE

PROFESSIONAL SERVICE INDUSTRIES, INC.
RECORD OF SUBSURFACE EXPLORATION

Boring: B-5

Project Name: SENECA SERVICE CENTER ADDITION   Date of Boring: MAY 7, 2001

Site: NYS THRUWAY MILEPOST 350 WEST SENECA, NY   Project No.: 306-15032

DESCRIPTION	DEPTH	SAMPLE	N	Recovery	Qp	Mc	REMARKS
SURFACE							
Sandy Silt little Gravel and Clay, brown, loose to dense, wet. (ML/SM) (Possible Fill to 8 Feet)		1-SS	6	0.5		22	4" CONCRETE 2" STONE
	5'	2-SS	5	0.5		20	HOLE CAVED AT 5 FEET
		3-SS	9	0.5		15	
	10'	4-SS	35	1.5		10	
Silty Clay, brown, very stiff to hard, moist. (CL)	15'	5-SS	22	1.5	3.25	21	
		6-SS	50/4"	1.5		22	
Silty Sand little to trace Clay and Gravel, brown, very dense, moist. (SM)	20'						
	25'	7-SS	85	1.5		7	
BORING TERMINATED AT 25 FEET. WATER LEVEL OBSERVATIONS: AUGER IN: NONE AUGER OUT: NONE							
	30'						

PID READINGS –SENECA SERVICE CENTER ADDITION

Sample	Reading	Sample	Reading
B-1 1-SS	1.2 ppm	B-4 1-SS	1.3 ppm
B-1 2.SS	2.0 ppm	B-4 2-SS	1.9 ppm
B-1 3-SS	1.5 ppm	B-4 3-SS	1.8 ppm
B-1 4-SS	1.7 ppm	B-4 4-SS	1.5 ppm
B-1 5-SS	2.2 ppm	B-4 5-SS	1.0 ppm
B-1 6-SS	2.8 ppm	B-4 6-SS	2.1 ppm
B-1 7-SS	2.0 ppm	B-4 7-SS	1.9 ppm
B-2 1-SS	2.0 ppm	B-5 1-SS	1.4 ppm
B-2 2.SS	1.9 ppm	B-5 2-SS	1.9 ppm
B-2 3-SS	1.5 ppm	B-5 3-SS	2.1 ppm
B-2 4-SS	1.6 ppm	B-5 4-SS	1.5 ppm
B-2 5-SS	2.2 ppm	B-5 5-SS	1.1 ppm
B-2 6-SS	2.4 ppm	B-5 6-SS	2.2 ppm
B-2 7-SS	1.3 ppm	B-5 7-SS	1.9 ppm
B-3 1-SS	1.2 ppm		
B-3 2-SS	1.9 ppm		
B-3 3-SS	1.5 ppm		
B-3 4-SS	1.7 ppm		
B-3 5-SS	2.2 ppm		
B-3 6-SS	2.0 ppm		
B-3 7-SS	2.1 ppm		

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
7726 Moller Road
Indianapolis, IN 46268
Phone: 317.875.5894
Fax: 317.872.6189

May 17, 2001

Mr. David Sabol
PSI
605 Young St.
Tonawanda, NY 14150

RE: Lab Project Number: 5014659
Client Project ID: NYS Thruway Seneca

Dear Mr. Sabol:

Enclosed are the analytical results for sample(s)received by the laboratory on May 12, 2001. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jill Kofoed

Jill Kofoed
Project Manager

Enclosures

REPORT OF LABORATORY ANALYSIS

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
7726 Moller Road
Indianapolis, IN 46268
Phone: 317.875.5894
Fax: 317.872.6189

PSI
605 Young St.
Tonawanda, NY 14150

Lab Project Number: 5014659
Client Project ID: NYS Thruway Seneca

Attn: Mr. David Sapol
Phone: 716-694-8657

Solid results are reported on a wet weight basis

Lab Sample No: 501043210 Project Sample Number: 5014659-001 Date Collected: 05/07/01 14:30
Client Sample ID: B5S3SENECA Matrix: Soil Date Received: 05/12/01 11:45

Parameters	Results	Units	PRL	Analyzed	Analyst	CAS#	Ftnote	Limit
GC Semivolatiles								
TPH-Diesel, Soil Mod. 8015		Method: EPA 8015 Mod Ext		Prep Method: EPA 8015 Mod Ext				
TPH - Diesel	ND	mg/kg	10.	05/16/01 05:09	SRS		1	
o-Terphenyl (S)	82	%		05/16/01 05:09	SRS	84-15-1		
Date Extracted				05/14/01				
GC Volatiles								
TPH, Low (tphg)Purge Mod. 8015		Method: EPA 8015 Mod Pur		Prep Method: EPA 8015 Mod Pur				
TPH - Gasoline	ND	mg/kg	1.0	05/16/01 16:38	JAH			
4-Bromofluorobenzene (S)	95	%		05/16/01 16:38	JAH	460-00-4		
Aromatic Volatile Organics		Method: EPA 8021		Prep Method: EPA 8021				
Benzene	ND	ug/kg	1.0	05/15/01 01:38	JAH1	71-43-2		
Ethylbenzene	ND	ug/kg	5.0	05/15/01 01:38	JAH1	100-41-4		
Toluene	ND	ug/kg	5.0	05/15/01 01:38	JAH1	108-88-3		
Methyl-tert-butyl ether	ND	ug/kg	4.0	05/15/01 01:38	JAH1	1634-04-4		
m&p-Xylene	ND	ug/kg	5.0	05/15/01 01:38	JAH1			
o-Xylene	ND	ug/kg	5.0	05/15/01 01:38	JAH1	95-47-6		
Xylene (Total)	ND	ug/kg	10.	05/15/01 01:38	JAH1	1330-20-7		
a,a,a-Trifluorotoluene (S)	103	%		05/15/01 01:38	JAH1	2164-17-2		

Date: 05/17/01 Page: 1

REPORT OF LABORATORY ANALYSIS

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
7726 Moller Road
Indianapolis, IN 46268
Phone: 317.875.5894
Fax: 317.872.6189

Lab Project Number: 5014659
Client Project ID: NYS Thruway Seneca

Lab Sample No: 501043228 Project Sample Number: 5014659-002 Date Collected: 05/07/01 12:30
Client Sample ID: B3S3SENECA Matrix: Soil Date Received: 05/12/01 11:45

Parameters	Results	Units	PRL	Analyzed	Analyst	CAS#	Ftnote	Limit
GC Semivolatiles								
TPH-Diesel, Soil Mod. 8015		Method: EPA 8015 Mod Ext		Prep Method: EPA 8015 Mod Ext				
TPH - Diesel	ND	mg/kg	10.	05/16/01 04:01	SRS			
o-Terphenyl (S)	85	%		05/16/01 04:01	SRS	84-15-1		
Date Extracted				05/14/01				
GC Volatiles								
TPH, Low (tphg)Purge Mod. 8015		Method: EPA 8015 Mod Pur		Prep Method: EPA 8015 Mod Pur				
TPH - Gasoline	ND	mg/kg	1.0	05/16/01 00:10	JAH1			
4-Bromofluorobenzene (S)	98	%		05/16/01 00:10	JAH1	460-00-4		
Aromatic Volatile Organics		Method: EPA 8021		Prep Method: EPA 8021				
Benzene	ND	ug/kg	1.0	05/16/01 01:36	JAH1	71-43-2		
Ethylbenzene	ND	ug/kg	5.0	05/16/01 01:36	JAH1	100-41-4		
Toluene	ND	ug/kg	5.0	05/16/01 01:36	JAH1	108-88-3		
Methyl-tert-butyl ether	7.9	ug/kg	4.0	05/16/01 01:36	JAH1	1634-04-4		
m&p-Xylene	ND	ug/kg	5.0	05/16/01 01:36	JAH1			
o-Xylene	ND	ug/kg	5.0	05/16/01 01:36	JAH1	95-47-6		
Xylene (Total)	ND	ug/kg	10.	05/16/01 01:36	JAH1	1330-20-7		
a,a,a-Trifluorotoluene (S)	90	%		05/16/01 01:36	JAH1	2164-17-2		

Date: 05/17/01

REPORT OF LABORATORY ANALYSIS

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
7726 Moller Road
Indianapolis, IN 46268
Phone: 317.875.5894
Fax: 317.872.6189

Lab Project Number: 5014659
Client Project ID: NYS Thruway Seneca

PARAMETER FOOTNOTES

ND	Not Detected
NC	Not Calculable
PRL	Pace Reporting Limit
(S)	Surrogate
[1]	The reported value is for the area in the diesel range only. the sample appeared to contain a heavier oil. The estimated total TPH value of the sample is 15.3 mg/kg. SRS 5-16-01

Date: 05/17/01

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
7726 Moller Road
Indianapolis, IN 46268
Phone: 317.875.5894
Fax: 317.872.6189

QUALITY CONTROL DATA

Lab Project Number: 5014659
Client Project ID: NYS Thruway Seneca

QC Batch: 24192 QC Batch Method: EPA 8015 Mod Ext
Analysis Method: EPA 8015 Mod Ext Analysis Description: TPH-Diesel, Soil Mod. 8015
Associated Lab Samples: 501043210 501043228

METHOD BLANK: 501043632
Associated Lab Samples: 501043210 501043228

Parameter	Units	Method Blank Result	PRL	Footnotes
TPH - Diesel	mg/kg	ND	10	
o-Terphenyl (S)	%	78		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 501044150 501044168

Parameter	Units	501043210	Spike Conc.	Matrix Spike Result	Spike % Rec	Matrix Sp. Dup. Result	Spike Dup % Rec	RPD	Footnotes
TPH - Diesel	mg/kg	8.613	83.33	71.27	75	68.31	72	4	
o-Terphenyl (S)					105		103		

LABORATORY CONTROL SAMPLE: 501043640

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	Footnotes
TPH - Diesel	mg/kg	83.33	60.81	73	
o-Terphenyl (S)				100	

Date: 05/17/01 Page: 4

REPORT OF LABORATORY ANALYSIS

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
7726 Moller Road
Indianapolis, IN 46268
Phone: 317.875.5894
Fax: 317.872.6189

QUALITY CONTROL DATA

Lab Project Number: 5014659
Client Project ID: NYS Thruway Seneca

QC Batch: 24277 QC Batch Method: EPA 8021
Analysis Method: EPA 8021 Analysis Description: Aromatic Volatile Organics
Associated Lab Samples: 501043210

METHOD BLANK: 501046767
Associated Lab Samples: 501043210

Parameter	Units	Method Blank Result	PRL	Footnotes
Benzene	ug/kg	ND	1	
Ethylbenzene	ug/kg	ND	5	
Toluene	ug/kg	ND	5	
Methyl-tert-butyl ether	ug/kg	ND	4	
m&p-Xylene	ug/kg	ND	5	
o-Xylene	ug/kg	ND	5	
Xylene (Total)	ug/kg	ND	10	
a.a.a-Trifluorotoluene (S)	%	95		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 501046742 501046759

Parameter	Units	501039390	Spike Conc.	Matrix Spike Result	Spike % Rec	Matrix Sp. Dup. Result	Spike Dup % Rec	RPD	Footnotes
Benzene	ug/kg	0	100.00	69.02	69	70.43	70	2	
Ethylbenzene	ug/kg	0	100.00	54.30	54	56.22	56	3	
Toluene	ug/kg	0	100.00	60.34	60	61.95	62	3	
m&p-Xylene	ug/kg	0	200.00	99.12	50	104.2	52	5	
o-Xylene	ug/kg	0	100.00	51.12	51	53.14	53	4	
a.a.a-Trifluorotoluene (S)					113		117		

LABORATORY CONTROL SAMPLE & LCSD: 501046775 501046783

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Benzene	ug/kg	100	94.99	95	100.0	100	5	
Ethylbenzene	ug/kg	100	96.86	97	98.42	98	2	
Toluene	ug/kg	100	97.16	97	99.11	99	2	
m&p-Xylene	ug/kg	200	190.5	95	190.5	95	0	

Date: 05/17/01 Page: 5

REPORT OF LABORATORY ANALYSIS

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
7726 Moller Road
Indianapolis, IN 46268

Phone: 317.875.5894
Fax: 317.872.6189

QUALITY CONTROL DATA

Lab Project Number: 5014659
Client Project ID: NYS Thruway Seneca

LABORATORY CONTROL SAMPLE & LCSD: 501046775 501046783

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
o-Xylene	ug/kg	100	95.13	95	96.52	96	1	
a.a.a-Trifluorotoluene (S)				112		117		

Date: 05/17/01

REPORT OF LABORATORY ANALYSIS

Pace Analytical™
www.pacelabs.com

QUALITY CONTROL DATA

Pace Analytical Services, Inc.
7726 Moller Road
Indianapolis, IN 46268
Phone: 317.875.5894
Fax: 317.872.6189

Lab Project Number: 5014659
Client Project ID: NYS Thruway Seneca

QC Batch: 24304
QC Batch Method: EPA 8015 Mod Pur
Analysis Method: EPA 8015 Mod Pur
Analysis Description: TPH, Low (tphg)Purge Mod. 8015
Associated Lab Samples: 501043228

METHOD BLANK: 501047855
Associated Lab Samples:
501043228

Parameter	Units	Method Blank Result	PRL	Footnotes
TPH - Gasoline	mg/kg	ND	1	
4-Bromofluorobenzene (S)	%	95		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 501047880 501047898

Parameter	Units	501042667	Spike Conc.	Matrix Spike Result	Spike % Rec	Matrix Sp. Dup. Result	Spike Dup % Rec	RPD	Footnotes
TPH - Gasoline	mg/kg	0	25.00	22.58	90	24.54	98	8	
4-Bromofluorobenzene (S)					89		71		

LABORATORY CONTROL SAMPLE & LCSD: 501047864 501047872

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
TPH - Gasoline	mg/kg	25	27.34	111	22.79	91	20	
4-Bromofluorobenzene (S)				99		87		

Date: 05/17/01

REPORT OF LABORATORY ANALYSIS

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
7726 Moller Road
Indianapolis, IN 46268
Phone: 317.875.5894
Fax: 317.872.6189

QUALITY CONTROL DATA

Lab Project Number: 5014659
Client Project ID: NYS Thruway Seneca

QC Batch: 24318
Analysis Method: EPA 8021
Associated Lab Samples: 501043228

QC Batch Method: EPA 8021
Analysis Description: Aromatic Volatile Organics

METHOD BLANK: 501048458
Associated Lab Samples:
501043228

Parameter	Units	Method Blank Result	PRL	Footnotes
Benzene	ug/kg	ND	1	
Ethylbenzene	ug/kg	ND	5	
Toluene	ug/kg	ND	5	
Methyl-tert-butyl ether	ug/kg	ND	4	
m&p-Xylene	ug/kg	ND	5	
o-Xylene	ug/kg	ND	5	
Xylene (Total)	ug/kg	ND	10	
a,a,a-Trifluorotoluene (S)	%	104		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 501048433 501048441

Parameter	Units	501038905	Spike Conc.	Matrix Spike Result	Spike % Rec	Matrix Sp. Dup. Result	Spike Dup % Rec	RPD	Footnotes
Benzene	ug/kg	0	100.00	78.26	78	98.77	99	23	
Ethylbenzene	ug/kg	0	100.00	67.93	68	82.87	83	20	
Toluene	ug/kg	0	100.00	73.54	74	90.73	91	21	
m&p-Xylene	ug/kg	0	200.00	127.6	64	155.9	78	20	
o-Xylene	ug/kg	0	100.00	64.10	64	78.31	78	20	
a,a,a-Trifluorotoluene (S)					117		119		

LABORATORY CONTROL SAMPLE & LCSD: 501048466 501048474

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Benzene	ug/kg	100	95.96	96	92.77	93	3	
Ethylbenzene	ug/kg	100	97.29	97	88.89	89	9	
Toluene	ug/kg	100	97.18	97	90.14	90	8	
m&p-Xylene	ug/kg	200	186.6	93	168.3	84	10	

Date: 05/17/01

REPORT OF LABORATORY ANALYSIS

WORK

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
7726 Moller Road
Indianapolis, IN 46268
Phone: 317.875.5894
Fax: 317.872.6189

QUALITY CONTROL DATA

Lab Project Number: 5014659
Client Project ID: NYS Thruway Seneca

LABORATORY CONTROL SAMPLE & LCSD: 501048466 501048474

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
o-Xylene	ug/kg	100	93.19	93	86.00	86	8	
a.a.a-Trifluorotoluene (S)				112		110		

Date: 05/17/01

Pace Analytical™
www.pacelabs.com

QUALITY CONTROL DATA

Pace Analytical Services, Inc.
7726 Moller Road
Indianapolis, IN 46268
Phone: 317.875.5894
Fax: 317.872.6189

Lab Project Number: 5014659
Client Project ID: NYS Thruway Seneca

QC Batch: 24361
QC Batch Method: EPA 8015 Mod Pur
Analysis Method: EPA 8015 Mod Pur
Analysis Description: TPH, Low (tpng)Purge Mod. 8015
Associated Lab Samples: 501043210

METHOD BLANK: 501050231
Associated Lab Samples: 501043210

Parameter	Units	Method Blank Result	PRL	Footnotes
TPH - Gasoline	mg/kg	ND	1	
4-Bromofluorobenzene (S)	%	94		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 501050264 501050272

Parameter	Units	501044978	Spike Conc.	Matrix Spike Result	Spike % Rec	Matrix Sp. Dup. Result	Spike Dup % Rec	RPD	Footnotes
TPH - Gasoline	mg/kg	0	25.00	24.03	96	26.48	106	10	
4-Bromofluorobenzene (S)					93		97		

LABORATORY CONTROL SAMPLE & LCSD: 501050249 501050256

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
TPH - Gasoline	mg/kg	25	25.45	102	25.15	101	1	
4-Bromofluorobenzene (S)				90		94		

Date: 05/17/01

REPORT OF LABORATORY ANALYSIS

Pace Analytical™
www.pacelabs.com

Pace Analytical Services, Inc.
7726 Moller Road
Indianapolis, IN 46268
Phone: 317.875.5894
Fax: 317.872.6189

Lab Project Number: 5014659
Client Project ID: NYS Thruway Seneca

QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

ND	Not Detected
NC	Not Calculable
PRL	Pace Reporting Limit
RPD	Relative Percent Difference
(S)	Surrogate

REPORT OF LABORATORY ANALYSIS

Unified Soil Classification System
ASTM Designation D - 2487

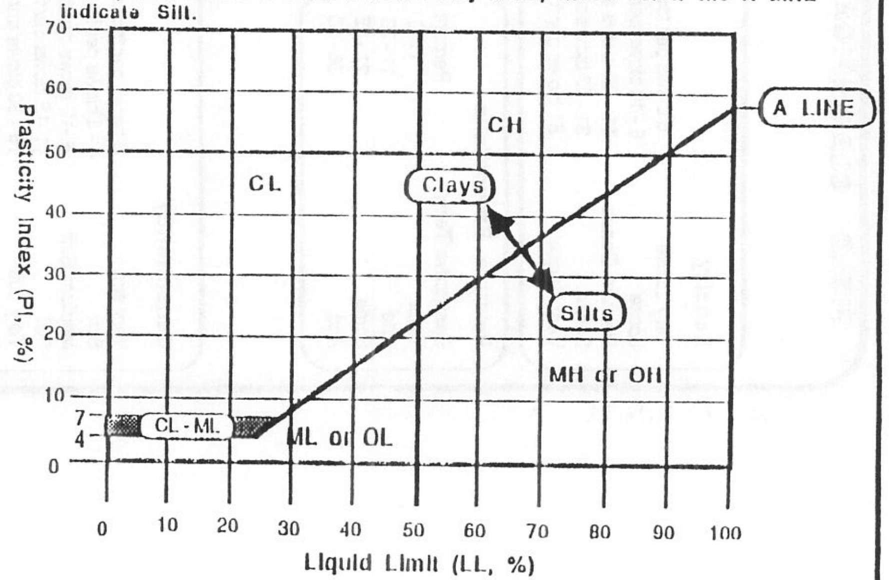
Professional Service Industries, Inc.

Major Divisions		Group Symbol	Typical Names	Classification Criteria	
Coarse Grained Soils (More than half of material is larger than No. 200 sieve)	Gravels (More than 50% retained on No. 4 sieve)	GW	Well graded gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}} > 4$	$1 < C_c = \frac{[D_{30}]^2}{D_{10} \cdot D_{60}} < 3$
		GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Does not meet all requirements for GW	
		GM	Silty gravels, gravel sand-silt mixtures	below A Line, PI < 4	In shaded area 4 < PI < 7 Dual Symbols
		GC	Clayey gravels, gravel-sand-clay mixtures	above A Line, PI > 7	
	Sands (More than a 50% passing No. 4 sieve)	SW	Well graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}} > 6$	$1 < C_c = \frac{[D_{30}]^2}{D_{10} \cdot D_{60}} < 3$
		SP	Poorly graded sands, gravelly sands, little or no fines	Does not meet all requirements for SW	
		SM	Silty sands, sand silt mixtures	below A Line, PI < 4	In shaded area 4 < PI < 7 Dual Symbols
		SC	Clayey sands, sand-clay mixtures	above A Line, PI > 7	
Fine Grained Soils (More than half of material is smaller than No. 200 sieve)	Silts & Clays (LL less than 50)	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity		
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
		OL	Organic silts and organic silty clays of low plasticity		
	Silts & Clays (LL greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, plastic silts		
		CH	Inorganic clays of high plasticity fat clays		
		OH	Organic clays of medium to high plasticity		
Highly Organic Soil		Pt	Peat and other highly organic soils		

Based upon percentage of material passing No. 200 sieve classify as:

Less than 5%	GW, GP, SW, SP
More than 12%	GM, GC, SM, SC
5% to 12%	Borderline, use dual symbols

Plot intersection of PI and LL as determined by Atterberg Limits tests. Data points above A LINE indicate Clay soils, those below the A LINE indicate Silt.



FIELD CLASSIFICATION SYSTEM FOR SOIL EXPLORATION

COHESIONLESS SOILS

(Silt, Sand, Gravel and Combinations)

Density

Very Loose	5 blows per foot or less
Loose	6 - 10 blows per foot
Medium Dense	11 - 30 blows per foot
Dense	31 - 50 blows per foot
Very Dense	51 blows per foot or more

Relative Proportions

Descriptive Term	Percent
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

Particle Size Identification

Boulders	8 inch diameter or more	
Cobbles	3 - 8 inch diameter	
Gravel	Coarse	1 - 3 inches
	Medium	1/2 - 1 inch
	Fine	1/4 - 1/2 inch
Sand	Coarse	0.6 mm - 1/4 inch (diameter of pencil lead)
	Medium	0.2 mm - 0.6 mm (diameter of broom straw)
	Fine	0.05 mm - 0.2 mm (diameter of human hair)
Silt		0.002 mm - 0.05 mm (cannot see particles)

COHESIVE SOILS

(Clay, Silt and Combinations)

Consistency

Very soft	3 blows per foot or less
Soft	4 - 5 blows per foot
Medium Stiff	6 - 10 blows per foot
Stiff	11 - 15 blows per foot
Very Stiff	16 - 30 blows per foot
Hard	31 blows per foot or more

Plasticity

Degree of Plasticity	Plasticity Index
None to slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to very high	over 22

CLASSIFICATION ON LOGS ARE MADE BY VISUAL EXAMINATION OF SAMPLES.

Standard Penetration Test Driving a 2.0" O.D., 1 3/8" I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30 inches. It is customary for ITL to drive the spoon 6.0 inches to seat into undisturbed soil, then perform the test. The quantity of hammer blows for seating the sampler and performing the test are recorded for each 6.0 inches of penetration on the Field Exploration Log (example: $\frac{6}{10 - 13}$). The standard penetration test result can be obtained by adding the lower two figures (i.e. 10 + 13 = 23). The reader is referenced to ASTM D1586.

Strata Changes Boundaries between soil layers are considered approximate based upon observed changes during the drilling operations or noted changes within representative samples.

Groundwater Observations were made to determine either the depth or elevation of water at the times indicated on the Soil Exploration Logs. The water so encountered may be groundwater or perched water. The depth or elevations indicated for water may fluctuate due to seasonal changes or other unknown factors.

PSI Professional Service Industries, Inc.

END OF SECTION 02300