GEOTECHNICAL ENGINEERING SUMMARY

For the proposed

NYSTA Batavia Section Maintenance Facility
Vehicle Storage Building

located in the

Buffalo Division
Batavia, New York
MP 390.30

NYSTA Contract Number
D213678

Prepared for:
New York State Thruway Authority

Prepared by

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December 17, 2010

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1.0 Introduction

1.1 General

Fisher Associates, P.E., L.S., P.C. (Fisher Associates) was retained by the New York State Thruway Authority (NYSTA), to provide geotechnical engineering services for the proposed vehicle maintenance facility in Batavia, New York. Fisher Associates' work was performed in accordance with our April 1, 2010 proposal for services.

Fisher Associates conducted this geotechnical investigation to evaluate subsurface conditions and to provide geotechnical engineering design and construction comments to the NYSTA. This report presents the results of our evaluations and was prepared for the exclusive use of NYSTA and their design consultants for specific application to the proposed Vehicle Maintenance Building in Batavia, New York. The report has been prepared in accordance with generally accepted soil and foundation engineering practice, and no other warranty, expressed or implied, is made.

The proposed Vehicle Maintenance Building will be located at the existing NYSTA Maintenance Facility, located south of Interstate 90 and east of Route 98, just north of Batavia, New York, at the approximate location shown on Figure No. 1 – Site Location Map.

1.2 Proposed Building

It is Fisher Associates' understanding that the new Vehicle Maintenance Facility will be approximately 50 ft. x 160 ft. in plan. The building will be constructed as a pole barn, with a typical pole constructed of three 2" x 6" ply laminated wood members, fastened together to form a nominal 6" x 6" cross-sectional area.

The column poles will be supported by isolated spread foundations, continuous strip foundations or augered circular foundations, depending on subsurface conditions encountered. All foundations will be placed below the maximum depth of potential frost, as measured from the lowest exterior finished grade surrounding each foundation.

A reinforced concrete floor will be designed by the structural engineer to support the loading of the heavy trucks and other equipment that be stored inside the maintenance building.

2.0 Subsurface Conditions

2.1 Subsurface Explorations

The subsurface exploration program consisted of two (2) subsurface soil borings advanced at the site on July 20, 2010. The explorations were performed by Atlantic Testing Laboratories (ATL) of Canton, New York and were performed using a Truck-mounted, rotary drill rig. The test boring depths for boring FHX-1 and FHX-2 were 22.5 feet and 10.0 feet below the ground surface (bgs) elevations.

The test boring locations and ground surface elevations were established in the field by Fisher Associates' personnel and utility clearances were provided by ATL. The approximate as-advanced exploration locations are shown on Figure No. 2 - Subsurface Exploration Location Plan. ATL prepared subsurface test boring logs based on visual descriptions of recovered soil samples and the test boring logs are contained in Appendix A - Test Boring Logs.

2.2 Laboratory Testing of Soil Samples

ATL conducted laboratory testing on representative soil samples recovered from the test borings. The testing included natural moisture contents and mechanical grain size analyses on selected samples. ATL performed the testing to assist with determination of soil index properties, soil classification, and provide information regarding the soil strength and consolidation characteristics. The testing was conducted in accordance with ASTM standards. The prepared laboratory test results are contained in Appendix B - Analytical Laboratory Results.

2.3 Subsurface Conditions

Beneath approximately 8 inches of topsoil and organic material, boring FHX-1 encountered stiff, brown sandy silt with trace gravel to a depth of 2 feet bgs. From 2 to about 6 feet bgs, loose to medium compact brown sand with trace gravel and trace silt is present. Between 6 an 8 feet bgs, a medium compact grey silty sand was found. From 8 to 10 feet bgs, a very stiff to hard gravelly clay was encountered. Medium compact silty sand with varying amounts of gravel was found from 10 feet to a depth of about 15.4 feet bgs. Grey limestone rock was encountered at a depth of 15.4 feet. The grey limestone was cored from 17.5 to 22.5 feet bgs, where the boring was terminated. The rock core had 100% recovery and a Rock Quality Designation (RQD) of 58%. The RQD indicates that the rock is relatively sound.

It is noted that the boundaries between soil strata are approximate and the data suggests that actual soil transitions and conditions will vary between the subsurface exploration locations. In boring FHX-2, beneath about 4 inches of topsoil and organic material, medium compact to very compact, silty sand, gravel and cobbles exists to about 4 feet bgs. Very stiff sandy silt is present to a depth of 8 feet bgs. A stiff brown clay is found from a depth of 8 feet to the termination of boring B-2 at a depth of 10 feet bgs.

ATL observed groundwater levels during the test boring drilling and recorded them on the test boring logs. Based on the drill log notes, groundwater was observed at a depth of about 5.4 feet, after the casing was removed from FHX-1. Boring FHX-1 caved at a depth of 10.8 feet. After removal of the casing, boring FHX-2 caved at a depth of 4.4, where no groundwater was encountered. We anticipate that the groundwater levels may be impacted by regional and local site considerations and groundwater levels at the site may fluctuate over time. The fluctuations may be due to seasonal variations in precipitation and variations in soil conditions between exploration holes.

2.4 Environmental Sampling

Select soil samples were submitted for laboratory analysis of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), heavy metals, total petroleum hydrocarbons, and polychlorinated biphenyls (PCBs). The results of the analytical testing are contained in Appendix C and summarized in Table Nos. 2.1 through 2.3. The field screening and analytical laboratory analysis indicated that VOCs, several heavy metals, and lightweight hydrocarbons identified as mineral spirits were detected in the recovered samples above the laboratory method detection limit (MDL). None of the compounds were at levels that exceeded the New York State Department of Environmental Conservation (NYSDEC) CP / Soil Cleanup Guidance recommended soil cleanup objectives (RCSOs). The NYSTA has contacted the NYSDEC regarding the results of the laboratory analysis and the NYSDEC has assigned Spill Number 1005224 to the site. At this time the NYSDEC has not asked for additional investigation.

3.0 Environmental and Geotechnical Engineering Considerations

3.1 Environmental Considerations

Elevated levels of several compounds were detected in the fill soils at the site. As noted, the results of the soil testing and recommendations for materials handling procedures are contained in Appendix C. A summary of the handling procedures are provided below.

Although potential contaminants were found, the primary concern associated with the soils is related to non-hazardous concentrations of VOCs and metals; it is proposed that excavated soils be used for on-site fill in areas outside the building and beneath proposed paved areas to the extent practical. Soils that are excavated from the building area and moved to other areas of the project site should be spread and compacted on a daily basis to preclude the need for covering of stockpiled soils. Excess soil generated during construction shall be properly stockpiled, characterized and subsequently disposed by a NYSDEC Part 364 permitted waste hauler and placed in a NYSDEC approved and permitted facility.

Air monitoring should be conducted during all mass earthwork operations requiring excavation and placement of miscellaneous fill soils. The air monitoring should be conducted in accordance with separate soil management plan prepared for the site.

3.2 Site Preparation

The site should be properly stripped to remove all topsoil, large roots and any deleterious material prior to excavations and proofing operations. Details for the site preparation are included in section 3.4 Earthwork Construction Considerations.

3.3 Structure Foundation Considerations

3.3.1 Foundation Type and Bearing

It is our opinion that the proposed vehicle storage building can be supported on an augered foundation, shallow spread foundations or continuous strip foundations. We recommend that foundation elements bear on a minimum of 6 inches of compacted granular fill, meeting New York State DOT specifications for 304-2 Type 2 or Type 4 materials, placed over the inspected and accepted prepared natural silty sand and silty gravel subgrade. The augered foundations can be supported on a precast concrete base or a minimum of 6 inches of properly compacted granular fill. Existing topsoil or miscellaneous fills are not suitable for support of foundation elements. These soils should be removed during initial earth work operations at the site.

Spread footing foundations should be sized to bear on the layer of compacted granular fill that overlies the naturally occurring sand and silty sand and gravel soils. A net allowable bearing pressure of 2,500 pounds per square foot (psf) can be used for foundation design. Individual spread footing should be at least 3 ft. in least lateral dimension, and continuous strip footings should be at least 2 ft. wide. The circular augered foundations can be designed using an allowable bearing pressure of 2,500 psf and an allowable sidewall friction of 400 psf from a depth below grade of 1.5 feet and lower. All footings should bear at least 4 ft. below exterior grades exposed to freezing temperatures. Interior footings in permanently heated areas should bear at least 2.5 ft. below exterior building grades.

The floor slabs may be designed as slab-on-grade. Any encountered topsoil and miscellaneous fills are not suitable for support of the floor slab, and, as noted above, these soils should be removed during initial earth work operations at the site.

The slab-on-grade floor slabs should be isolated from the building walls and designed to bear on a layer of compacted granular fill or crushed stone that is at least 6 inches thick. Information about the requirements for compacted granular fill is presented in Section 3.3 – Earthwork Construction Considerations.

3.3.2 Foundation Backfill

We recommend that foundation elements be backfilled with compacted granular fill, meeting New York State DOT specification for 304-2 Type 2 or Type 4 material, to provide support for the overlying floor slabs, pavements and sidewalks, and other adjacent structures. Along the interior walls, and in areas of overlying or adjacent structures or facilities, the granular fill should be placed in lifts and compacted to 95% of maximum dry density as determined by modified proctor (ASTM D-1557). In exterior areas where there are no overlying structures or facilities and uplift is not a concern, the backfill should consist of the excavated clean natural soils or granular fill. The soils should be placed in lifts and compacted to 92% of maximum dry density as determined by ASTM D1557.

3.3.3 Foundation Drainage

We anticipate that the subsurface water levels will generally be below the proposed foundation bearing elevations. It is possible that a seasonal high groundwater level may require under-drains for the building foundations consisting of isolated spread foundations and continuous strip footings. Augered cast-in-place foundations will not require under-drains. The drains should be installed at the proposed foundation bearing elevations and the collection system should discharge to site storm-water management features. In addition, the site grading should be established such that the ground surface is sloped away from the building.

3.3.4 Anticipated Settlement

We anticipate that settlement of shallow foundations constructed to bear on undisturbed naturally occurring silty sand, sandy silt material or compacted granular fill, at the allowable bearing capacities noted above, will be within generally accepted tolerances. If constructed as recommended, differential settlements between foundation elements should be within generally accepted tolerances.

3.3.5 Seismic Site Classification

- The seismic design classification, in accordance with the Building Code of New York State, was developed based on the test boring information. We recommend that seismic site class "D" be used for design.

3.4 Earthwork Construction Considerations

Based on the soils encountered in the subsurface explorations, we anticipate that exposed shallow foundation subgrade materials will generally consist of sand and gravel with silt, or silt with sand and gravel. Futhermore, it is anticipated that the cohesive soil will be sensitive to disturbance and strength degradation in the presence of excess moisture, and will be frost susceptible if left open to inclement weather conditions during construction.

Site preparation for the building area should include excavation and removal of all surface topsoil and any miscellaneous materials that may be exposed. The prepared surface should be inspected, and all deleterious materials, including fill/debris and organic matter, should also be excavated and removed. The subgrade surface should be proof-rolled with at least three (3) sets of overlapping passes of a sheep's-foot and/or smooth-wheel vibratory compaction equipment weighing at least 7 tons. Areas that are wet or weave excessively during proof-rolling should be excavated and replaced with compacted granular fill or crushed stone.

Site preparation for the footings should include excavation and removal of all surface topsoil and fill such that natural soils are revealed. The subgrade surface should be proof-rolled with at least three (3) coverages of suitable, hand-operated, vibratory compaction equipment weighing no less than 200 pounds. Areas that are wet or weave excessively during proof-rolling should be excavated and replaced with compacted granular fill or crushed stone. If crushed stone is used to backfill areas of

over excavation, a layer of non-woven geotextile fabric should be placed over the prepared subgrade prior to stone placement.

Traffic over exposed subgrades should be minimized to the extent practical during construction. In addition, construction should be performed in a manner that protects the proposed bearing surfaces. It may be necessary to place a gravel working mat to protect the prepared bearing surfaces for the shallow foundation elements. Additional undercutting or over excavation may be required if the prepared bearing surfaces are disturbed by other construction activities. Areas of over excavation should be backfilled with compacted granular materials.

The on-site soils are suitable as backfill against foundation walls, or as backfill beneath paved areas. Excavated soils may be used for general site grading in areas where overlying structures or other facilities are not proposed. However, they are frost susceptible and sensitive to moisture and, therefore, may be difficult to place and compact.

We recommend that the granular fill, required for support of the proposed building foundation elements and beneath floor slabs, consist of Crusher Run Stone or Crushed Gravel and Sand mixture that is free of Clays, Organics, Snow, Ice and friable or deleterious particles. The granular fill should meet the material requirements of NYSDOT Standard Specifications, Subbase Item 304-Type 4 or Type 2 material.

Granular fill (NYSDOT Item 304) should be placed in nearly horizontal, uniform lifts not exceeding 9-inches in loose thickness and compacted with at least three (3) passes of suitable compaction equipment. All fill should be compacted to the minimum maximum dry density noted above. Granular fill should be placed and compacted at to within ±2% of optimum moisture content, and the equipment used to compact the granular materials must be compatible with the material type and lift thickness. The lift thickness should be reduced to 6-in. in excavations where hand operated compaction equipment will be utilized.

Based on the observed subsurface conditions and proposed bearing elevations, it appears that excavation below observed groundwater levels will not occur. However, inflows from perched water or surface water sources may occur. Therefore, dewatering sumps or wells may be required to control water inflow into the foundation excavations. Dewatering sumps and wells should be designed to prevent the loss of fines from the soils. In addition, the selected dewatering system should be designed such that the resulting well drawdown does not adversely impact the adjacent utilities and structure foundations. Discharges from the dewatering system should be in accordance with permitted site storm-water management practices.

4.0 Construction Observation

We recommend that a soils engineer, and/or an engineering technician that is qualified by training and experience, working under the direction of the geotechnical engineer, be retained during construction. The Engineer and/or his representative will make observations of the prepared subgrade and bearing surfaces to review that unsuitable materials have been removed. The Engineer or his representative will also observe the subsurface conditions exposed during construction for comparison the exploration data. This will allow for adjustments that may be necessary to accommodate actual soil conditions revealed at the building location.

We prepared this report to provide information about potential building foundation design and considerations for the proposed Vehicle Storage Building at the NYSTA Batavia, New York facility. Test borings were made at the site, and we utilized these exploration logs during this evaluation to prepare our design and construction recommendations. The recommendations provided herein are based on this information.

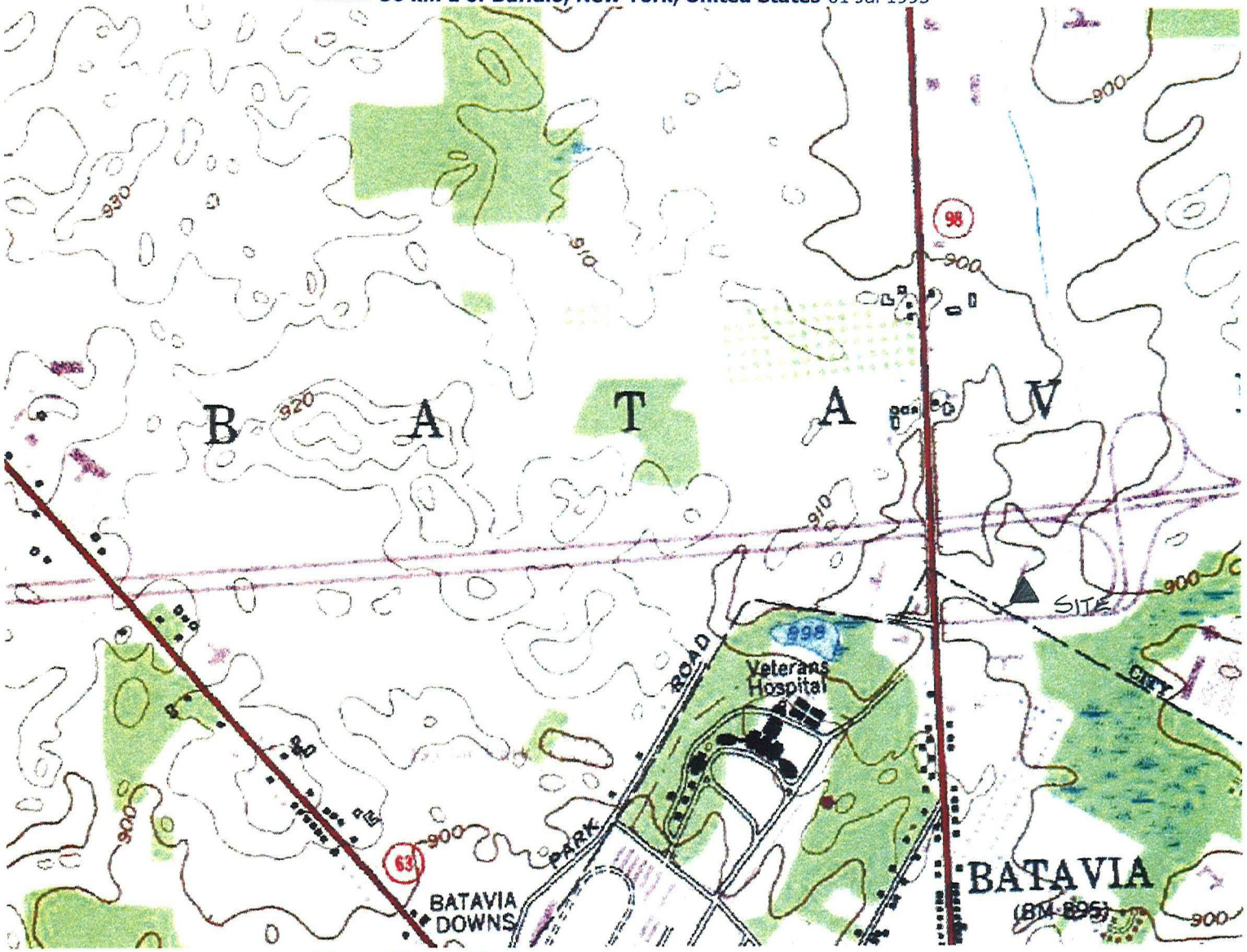
FIGURES

Figure No. 1

SITE LOCATION MAP

Send To Printer Back To MSR Maps Change to 11x17 Print Size Show Grid Lines Change to Portrait

USGS **56 km E of Buffalo, New York, United States** 01 Jul 1995



m 200 400 600
yds 200 400 600

Image courtesy of the U.S. Geological Survey

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BATAVIA

Rte 98
oak orchard

Figure No. 2

SUBSURFACE EXPLORATION PLAN

Notes:

1. Plan based on survey mapping compiled by Fisher Associates.
2. Test boring locations established in the field by Fisher Associates' personnel.
3. Test borings drilled by Atlantic Testing Laboratories, Limited on July 20, 2010.
4. Test boring logs prepared by Atlantic Testing Laboratories are contained in Appendix A of the attached report text.
5. See accompanying report for additional information.

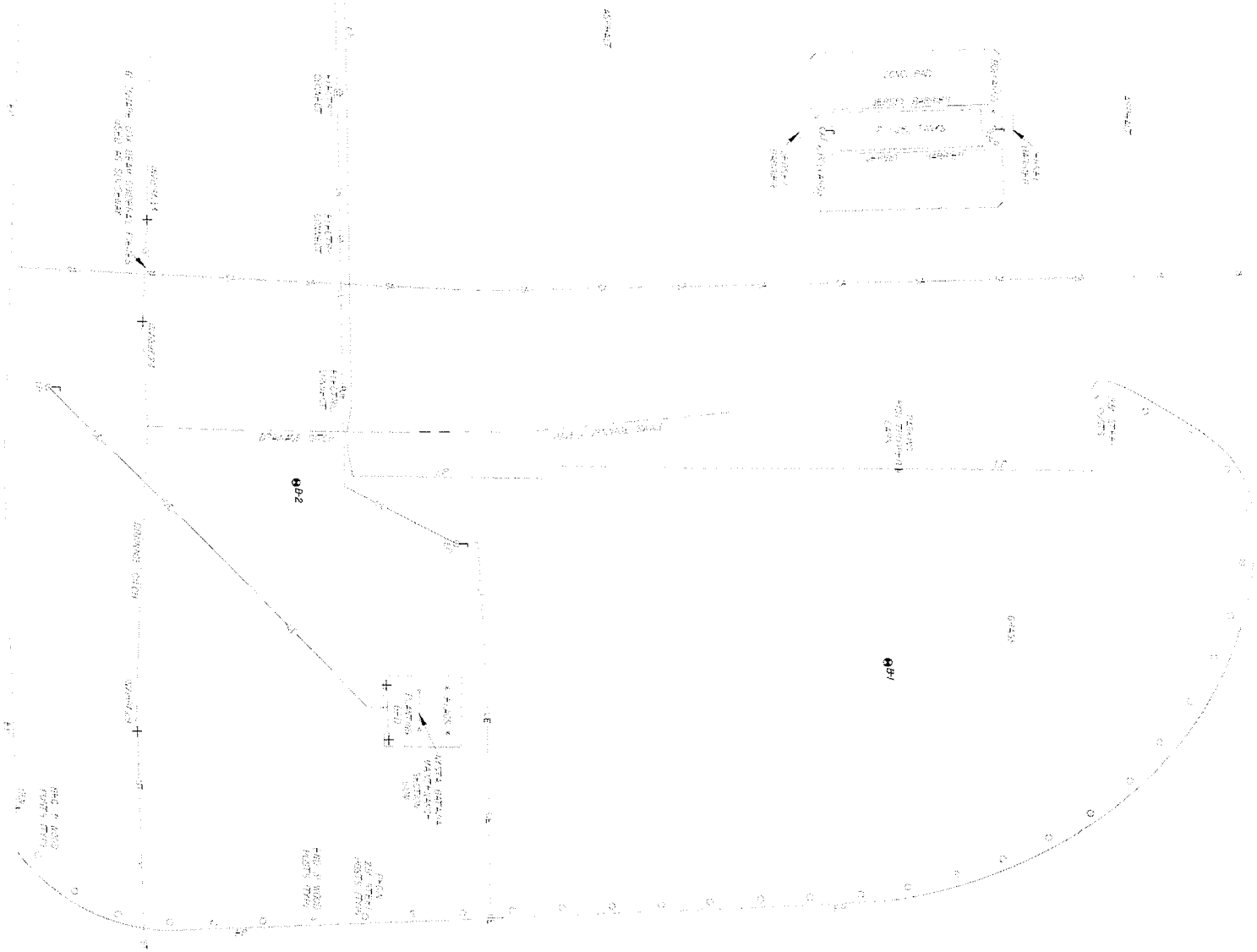
Legend:

w *B-1* Number and approximate location of test boring.

Proposed VSB

North

Not to Scale



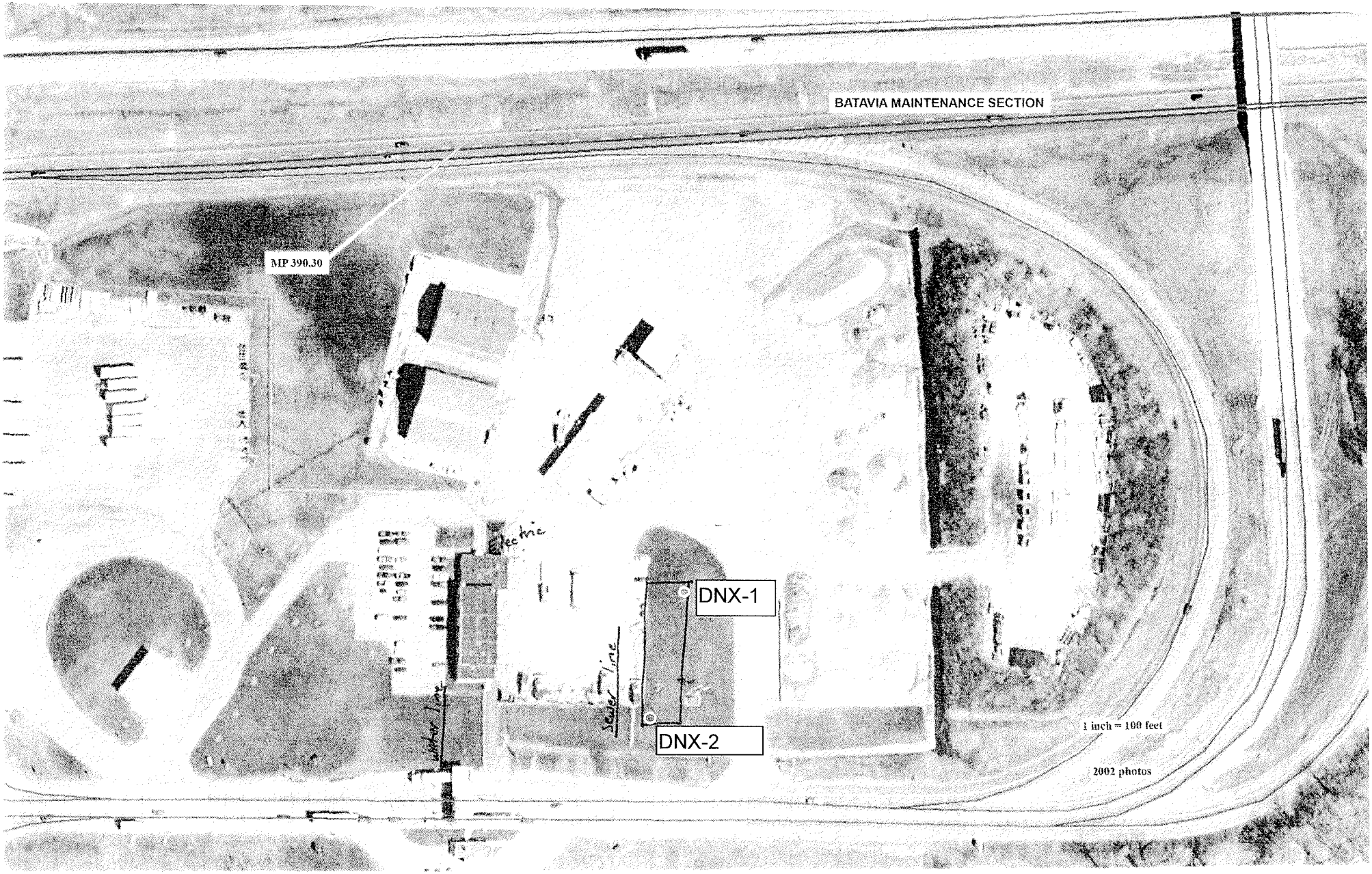
FISHERASSOCIATES

Figure No. 2

Subsurface Exploration Location Plan
Proposed NYSTA VSB
Batavia Maintenance Area
Town of Batavia, Genesee County, New York

FA #07701J

August 2010


BATAVIA MAINTENANCE SECTION
MP 390.30
Electric
DNX-1
Sewer Line
DNX-2
Water Line
1 inch = 100 feet
2002 photos

APPENDICES

APPENDIX A

TEST BORING LOGS

SM 282 E 12/02

PSN _____ BORNUM FHX-1

REGION Buffalo Division

COUNTY Genesee

PIN Batavia Maintenance Facility

PROJECT New York State Thruway Vehicle Storage Buildings FA#00701J

NEW YORK STATE THRUWAY AUTHORITY
NEW YORK STATE CANAL CORPORATION
SUBSURFACE EXPLORATION LOG

HOLE FH-X
LINE Thruway Mainline
STA MP390.30
OFFSET ft
SURF. ELEV. 902.05

ACTUAL COORDINATES (N) 1,099,465.260 (E) 1,253,832.740 **DATUM** NAD83 **DEPTH TO WATER** _____

DATE START 7/20/2010 **DATE FINISH** 7/20/2010

CASING	**O. D.**		in	**I. D.**		in	**WT OF HAMMER-CASING**		lb	**HAMMER FALL-CASING**	in
SAMPLER	**O. D.**	2	in	**I. D.**	1-3/8	in	**WT OF HAMMER-SAMPLER**	140	lb	**HAMMER FALL-SAMPLER**	30 in

CASING BLOWS/ft	DEPTH ft BELOW SURFACE	SAMPLE NO.	BLOWS ON SAMPLER in 0/6	6/12	12/18	18/24	MOIST. CONT. (%)		DESCRIPTION OF SOIL AND ROCK	
	0.0	SS1	3	4	8	9	10.2%	(0.00)	8" TOPSOIL & ORGANIC MATERIAL	
								(0.70)	Brown SILT; some cmf SAND; trace mf GRAVEL Soil Recovery= 16"	(M-NPL)
		SS2	6	7	7	6	3.5%		Brown cmf SAND; trace SILT; trace f GRAVEL Soil Recovery= 12"	(M-NPL)
	5.0	SS3	8	4	3	2	10.7%	(4.00)	Similar Soil; mf GRAVEL Soil Recovery= 14"	(M-NPL)
		SS4	10	13	7	6	19.4%	(6.00)	Grey f SAND; some SILT Soil Recovery= 24"	(W-NPL)
	10.0	SS5	6	3	20	44	22.8%	(8.00)	Brown CLAY; some cm GRAVEL; trace SILT; trace cmf SAND (Cobble Fragments) Soil Recovery= 16"	(W-PL)
	15.0	SS6	3	11	12	6	7.6%		Brown cmf SAND; some SILT; trace f GRAVEL Soil Recovery= 6"	(W-NPL)
		SS7	5	2	100/5"		11.9%	(15.00)	Greyish-Brown cmf SAND; some cmf GRAVEL; some SILT; trace ORGANIC MATERIAL (root hairs) Soil Recovery= 4" Encountered auger refusal at 15.4 feet. Advanced wet rotary 3-7/8" roller bit from 15.4 to 17.5 feet.	(S-NPL)
	20.0	SS8 CORERUN1	100/1"				2.3%	(17.40) (17.50)	ROCK FRAGMENTS Soil Recovery= 1" Grey Limestone 60" or 100% Recovery 8 Pieces (44") - 27% Chips and Fragments 5 Pieces longer than 4" (35") - RQD = 58%	(M-NPL)

BOTTOM OF HOLE AT 22.50 ft

Notes:
1. Borehole was backfilled with on-site soils and the surface was patched with asphalt cold patch.
2. An automatic hammer was used to advance the 2-inch OD split spoon sampler.

The subsurface information shown here was obtained for design and estimate purposes. It is made available so that users may have access to the same information available to the State. It is presented in good faith. By the nature of the exploration process, the information represents only a small fraction of the total volume of the material at the site. Interpolation between data samples may not be indicative of the actual material encountered.

DRILL RIG OPERATOR Neil Kenny; Andy Conant
SOIL & ROCK DESCRIPTION Drue Cline (ATL)
REG GEOTECHNICAL ENGINEER Adam Schneider, PE (ATL)
DATE APPROVED _____
RESIDENT ENGINEER _____
STRUCTURE NAME _____ **B.I.N.** _____

CONTRACT D213678 **CONTRACTOR** ATL

SHEET 1 OF 2 HOLE FH-X

SM 282 E 12/02

PSN _____ BORNUM FHX-1
REGION Buffalo Division
COUNTY Genesee
PIN Batavia Maintenance Facility
PROJECT New York State Thruway Vehicle Storage Buildings FA#00701J

NEW YORK STATE THRUWAY AUTHORITY
NEW YORK STATE CANAL CORPORATION
SUBSURFACE EXPLORATION LOG

HOLE FH-X
LINE Thruway Mainline
STA MP390.30
OFFSET ft
SURF. ELEV. 902.05

ACTUAL COORDINATES (N) 1,099,465.260 (E) 1,253,832.740 **DATUM** NAD83 **DEPTH TO WATER** _____

DATE START 7/20/2010 **DATE FINISH** 7/20/2010

CASING	**O. D.**		in	**I. D.**		in	**WT OF HAMMER-CASING**		lb	**HAMMER FALL-CASING**	in
SAMPLER	**O. D.**	2	in	**I. D.**	1-3/8	in	**WT OF HAMMER-SAMPLER**	140	lb	**HAMMER FALL-SAMPLER**	30 in

CASING BLOWS/ft	DEPTH ft BELOW SURFACE	SAMPLE NO.	BLOWS ON SAMPLER in (0/6 6/12 12/18 18/24)	MOIST. CONT. (%)	DESCRIPTION OF SOIL AND ROCK

3. 4 1/4-inch ID hollow stem augers were used to advance the borehole.
4. Water level readings may be affected by water introduced during coring operations.
5. Drilling Inspector: David Glover, Fisher Associates

DATE	TIME	DEPTH ft			ARTESIAN HEAD HEIGHT ABOVE GROUND	FILLED WITH WATER AT END OF DAY
		HOLE	CASING	WATER		
20-Jul-10	13:30	8.00	4.00	6.00		
20-Jul-10	14:00	10.00	8.00	DRY		
20-Jul-10	14:30	15.00	15.00	10.00		
20-Jul-10	15:00	22.50	17.40	7.80		
20-Jul-10	15:30	10.80	OUT	5.40		

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CONTRACT D213678 **CONTRACTOR** ATL

DRILL RIG OPERATOR Neil Kenny; Andy Conant
SOIL & ROCK DESCRIPTION Drue Cline (ATL)
REG GEOTECHNICAL ENGINEER Adam Schneider, PE (ATL)
DATE APPROVED _____
RESIDENT ENGINEER _____
STRUCTURE NAME _____ **B.I.N.** _____

SM 282 E 12/02

PSN _____ BORNUM FHX-2

REGION Buffalo Division

COUNTY Genesee

PIN Batavia Maintenance Facility

PROJECT New York State Thruway Vehicle Storage Buildings FA#00701J

NEW YORK STATE THRUWAY AUTHORITY
NEW YORK STATE CANAL CORPORATION

SUBSURFACE EXPLORATION LOG

HOLE FH-X

LINE Thruway Mainline

STA MP390.30

OFFSET ft

SURF. ELEV. 910.59

ACTUAL COORDINATES (N) 1,099,316.360 (E) 1,253,788.100 **DATUM** NAD83 **DEPTH TO WATER** _____

DATE START 7/20/2010 **DATE FINISH** 7/20/2010

CASING O. D. _____ in I. D. _____ in **WT OF HAMMER-CASING** _____ lb **HAMMER FALL-CASING** _____ in

SAMPLER O. D. 2 in I. D. 1-3/8 in **WT OF HAMMER-SAMPLER** 140 lb **HAMMER FALL-SAMPLER** 30 in

CASING BLOWS/ft	DEPTH ft BELOW SURFACE	SAMPLE NO.	BLOWS ON SAMPLER in 0/6	6/12	12/18	18/24	MOIST. CONT. (%)		DESCRIPTION OF SOIL AND ROCK	
	0.0	SS1	2	6	17	32	6.0%	(0.00)	4" TOPSOIL & ORGANIC MATERIAL	
								(0.30)	Brown mf SAND; and SILT; trace f GRAVEL; trace ORGANIC MATERIAL (root hairs) Soil Recovery= 16"	(M-NPL)
		SS2	25	32	36	26	5.6%	(2.00)	Brown cmf SAND; and mf GRAVEL; some SILT (Cobble Fragments) Soil Recovery= 8"	(M-NPL)
	5.0	SS3	21	14	7	8	15.5%		Greyish-Brown SILT; some mf SAND; little CLAY; trace mf GRAVEL Soil Recovery= 6"	(W-LPL)
		SS4	14	12	9	7	16.2%	(6.00)	Brown SILT; trace f SAND Soil Recovery= 20"	(W-NPL)
	10.0	SS5	2	8	10	16	23.1%	(8.00)	Brown CLAY; some SILT; trace f SAND Soil Recovery= 18"	(W-PL)

BOTTOM OF HOLE AT 10.00 ft

Notes:
1. *Borehole was backfilled with on-site soils and the surface was patched with asphalt cold patch.*
2. *An automatic hammer was used to advance the 2-inch OD split spoon sampler.*
3. *4 1/4-inch ID hollow stem augers were used to advance the borehole.*
4. *Drilling Inspector: David Glover, Fisher Associates*

DATE	TIME	DEPTH ft			ARTESIAN HEAD HEIGHT ABOVE GROUND	FILLED WITH WATER AT END OF DAY
		HOLE	CASING	WATER		
20-Jul-10	16:00	10.00	8.00	8.50		
20-Jul-10	16:30	4.40	OUT	DRY		

The subsurface information shown here was obtained for design and estimate purposes. It is made available so that users may have access to the same information available to the State. It is presented in good faith. By the nature of the exploration process, the information represents only a small fraction of the total volume of the material at the site. Interpolation between data samples may not be indicative of the actual material encountered.

DRILL RIG OPERATOR Neil Kenny; Andy Conant
SOIL & ROCK DESCRIPTION Drue Cline (ATL)
REG GEOTECHNICAL ENGINEER Adam Schneider, PE (ATL)
DATE APPROVED _____
RESIDENT ENGINEER _____
STRUCTURE NAME _____ **B.I.N.** _____

CONTRACT D213678 **CONTRACTOR** ATL

SHEET 1 OF 1 HOLE FH-X

APPENDIX B

LABORATORY TESTING OF SELECTED SOIL SAMPLES

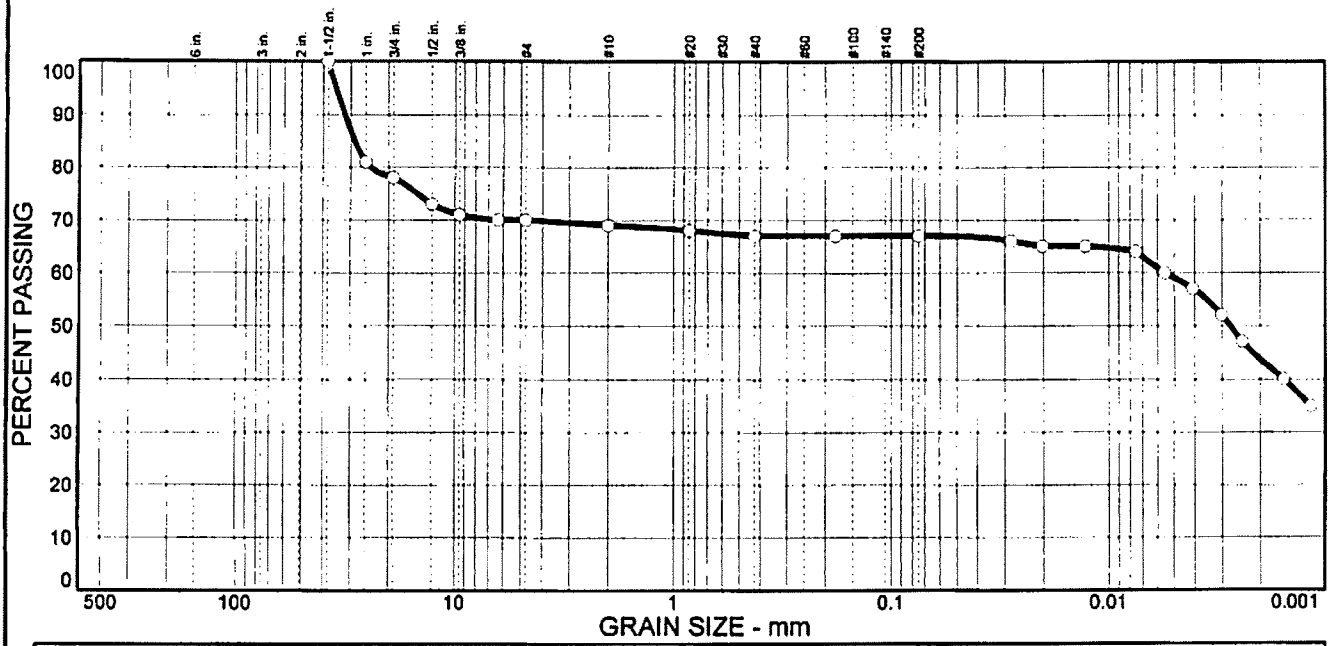
Particle Size Distribution Report

Project: Thruway VSB's **Report No.:** CD3165SL-11-08-10

Client: Fisher Associates **Date:** 8/16/10

Sample No: FHX-1; S-5 **Source of Sample:** Boring Sample Batavia

Location: In-Situ **Elev./Depth:** 8.0 - 10.0'



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0	22	8	1	2	0	8	59

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
1.5 in.	100		
1 in.	81		
3/4 in.	78		
1/2 in.	73		
3/8 in.	71		
1/4 in.	70		
#4	70		
#10	69		
#20	68		
#40	67		
#80	67		
#200	67		

Soil Description

Brown CLAY; some cm GRAVEL; trace SILT; trace cmf SAND

Atterberg Limits

PL= -- LL= -- PI= --

Coefficients

D_{85}= 28.7 D_{60}= 0.0055 D_{50}= 0.0028
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Moisture content 22.8%

* (no specification provided)

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: Date: 9/30/10

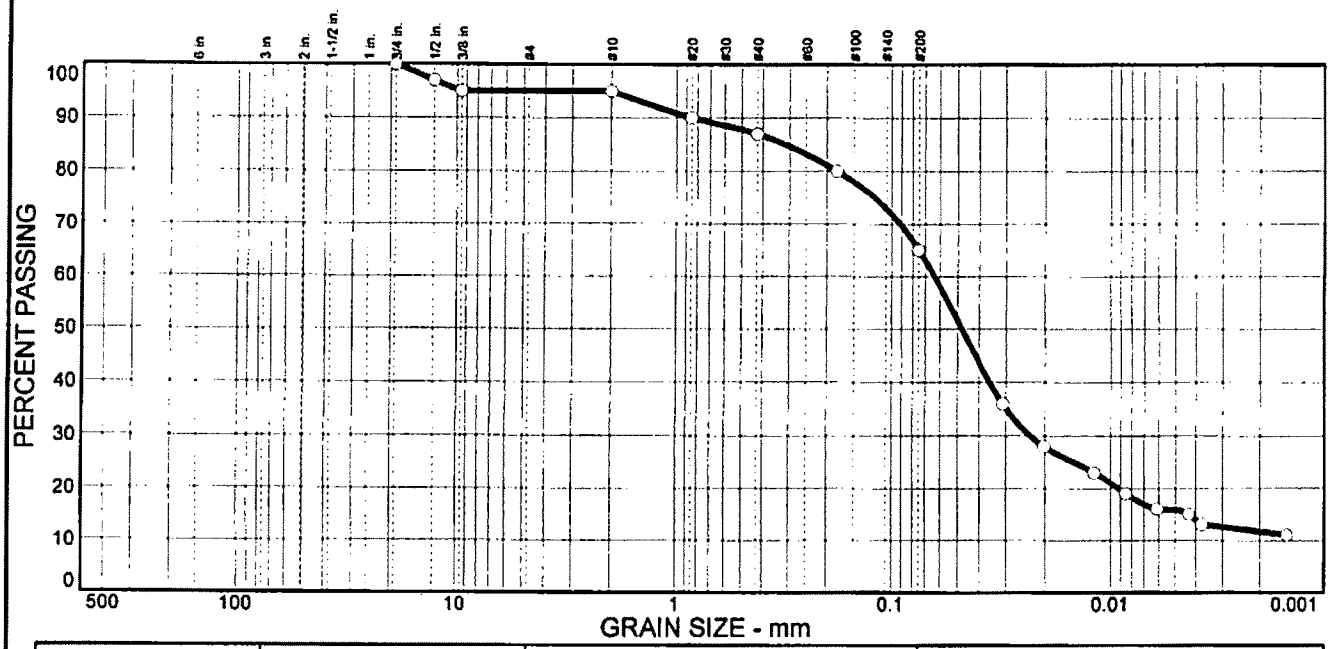
Particle Size Distribution Report

Project: Thruway VSB's **Report No.:** CD3165SL-12-08-10

Client: Fisher Associates **Date:** 8/16/10

Sample No: FHX-2; S-3 **Source of Sample:** Boring Sample Batavia

Location: In-Situ **Elev./Depth:** 4.0 - 6.0'



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0	0	5	0	8	22	49	16

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC. (X)
3/4 in.	100		
1/2 in.	97		
3/8 in.	95		
#10	95		
#20	90		
#40	87		
#80	80		
#200	65		

* (no specification provided)

Soil Description

Greyish/Brown SILT; some mf SAND; little CLAY; trace mf GRAVEL

Atterberg Limits

PL= -- LL= -- PI= --

Coefficients

D_{85}= 0.312 D_{60}= 0.0638 D_{50}= 0.0479
D_{30}= 0.0233 D_{15}= 0.0043 D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Moisture content 15.5%

ATLANTIC TESTING LABORATORIES, LIMITED

Reviewed by: _____ Date: 9/30/10

APPENDIX C

ENVIRONMENTAL LABORATORY TESTING RESULTS

FISHERASSOCIATES

TABLE 2.1
Vehicle Storage Buildings - Subsurface Soil Investigation
Batavia Maintenance Facility
SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS

Detected Compounds	Sample and Location Concentration in ug/Kg (ppb)	NYSDEC CP / Soil Cleanup Guidance (11/09 Draft) (ppb)	NYSDEC Part 375-6 Retricted Use Level - Groundwater Protection (ppm)
	B-1 5.5-ft.		
8260B VOCs			
Benzene	ND<10.9	60	60
n-Butylbenzene	ND<54.7	12,000	12,000
sec-Butylbenzene	55.2	11,000	11,000
tert-Butylbenzene	ND<27.4	5,900	5,900
Ethylbenzene	ND<10.9	1,000	1,000
n-Propylbenzene	96.1	3,900	3,900
Isopropylbenzene	ND<54.7	2,300	NA
p-Isopropyltoluene	93.6	10,000	NA
Naphthalene	57.7	12,000	12,000
Toluene	ND<10.9	700	700
1,2,4-Trimethylbenzene	1,040	3,600	3,600
1,3,5-Trimethylbenzene	568	8,400	8,400
m,p-Xylene	35.6	260	1,600
o-Xylene	ND<10.9	260	1,600
Methyl tert-butyl Ether	ND<10.9	930	930

FISHERASSOCIATES

TABLE 2.2
Vehicle Storage Buildings - Subsurface Soil Investigation
Batavia Maintenance Facility
SUMMARY OF DETECTED RCRA METALS

Compounds Detected	Sample Location and Concentration in mg/Kg	Eastern United States Background Levels (ppm)	NYSDEC CP / Soil Cleanup Guidance (11/09 Draft)	NYSDEC Part 375-6 Retricted Use Level - Groundwater Protection (ppm)
	B-1 5.5-ft.			
Arsenic	2.83	3 - 12**	7.5 or SB	16
Barium	40.8	15 - 600	300 or SB	820
Cadmium	0.509	0.1 - 1.0	1 or SB	7.5
Chromium	6.76	1.5 - 40**	10 or SB	19
Lead	10	200 - 500	SB	450
Mercury	0.0264	0.001 - 0.2	0.1	0.73
Selenium	<0.372	0.1 - 3.9	2 or SB	4
Silver	0.802	NA	SB	8.3

Notes:

1. Compound detections based on laboratory method detection limits.
2. ** - NYS Background levels
3.
4.

Legend:

FISHERASSOCIATES

TABLE 2.3
Vehicle Storage Buildings - Subsurface Soil Investigation
Batavia Maintenance Dividion
SUMMARY OF DETECTED PETROLEUM HYDROCARBONS

Compounds Detected	Sample and Location Concentration in ppm	NYSDEC CP / Soil Cleanup Guidance (Draft 11/09) (ppm)**	NYSDEC Part 375-6 Restricted Use Levels - Groundwater Protection (ppm)***
	B-1 5.5-ft.		
Light Weight Petroleum Hydrocarbon as Mineral Spirits	60.00	500.00	1000.00

Notes:

1. Only compounds detected above laboratory quantification limits are shown.

** 500 ppm maximum concentration

*** Maximum value of 1,000 for industrial use and protection of groundwater

PARADIGM
ENVIRONMENTAL SERVICES, INC.

Analytical Report Cover Page

Fisher Associates

For Lab Project # 10-2985
Issued July 28, 2010
This report contains a total of 7 pages

The reported results relate only to the samples as they have been received by the laboratory.

Any noncompliant QC parameters having impact on the data are flagged or documented on the final report.

All soil/sludge samples have been reported on a dry weight basis, unless qualified "reported as received". Other solids are reported as received.

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The Chain of Custody provides additional information, including compliance with sample condition requirements upon receipt. Sample condition requirements are defined under the 2003 NELAC Standard, sections 5.5.8.3.1 and 5.5.8.3.2.

NYSDOH ELAP does not certify for all parameters. Paradigm Environmental Services or the indicated subcontracted laboratory does hold certification for all analytes where certification is offered by ELAP unless otherwise specified.

Data qualifiers are used, when necessary, to provide additional information about the data. This information may be communicated as a flag or as text at the bottom of the report. Please refer to the following list of frequently used data flags and their meaning:

"ND" = analyzed for but not detected.
"E" = Result has been estimated, calibration limit exceeded.
"Z" = See case narrative.
"D" = Duplicate results outside QC limits. May indicate a non-homogenous matrix.
"M" = Matrix spike recoveries outside QC limits. Matrix bias indicated.
"B" = Method blank contained trace levels of analyte. Refer to included method blank report.

PARADIGM
ENVIRONMENTAL SERVICES, INC. 179 Lake Avenue Rochester, New York 14608 (585) 647 - 2530 FAX (585) 647 - 3311

Volatile STARS Analysis Report for Soils/Solids/Sludges

Client: Fisher Associates

Client Job Site:	NYSTA VSB - Batavia Site	**Lab Project Number:**	10-2985
		Lab Sample Number:	9968
Client Job Number:	N/A		
Field Location:	B1 Comp	**Date Sampled:**	07/20/2010
Field ID Number:	N/A	**Date Received:**	07/21/2010
Sample Type:	Soil	**Date Analyzed:**	07/26/2010

Aromatics	Results in ug / Kg
Benzene	ND< 10.9
n-Butylbenzene	ND< 54.7
sec-Butylbenzene	55.2
tert-Butylbenzene	ND< 27.4
Ethylbenzene	ND< 10.9
n-Propylbenzene	96.1
Isopropylbenzene	ND< 54.7
p-Isopropyltoluene	93.6
Naphthalene	57.7
Toluene	ND< 10.9
1,2,4-Trimethylbenzene	1,040
1,3,5-Trimethylbenzene	568
m,p-Xylene	35.6
o-Xylene	ND< 10.9
Miscellaneous	
Methyl tert-butyl Ether	ND< 10.9

ELAP Number 10958 Method: EPA 8260B Data File: V76983.D

Comments: ND denotes Non Detect
ug / Kg = microgram per Kilogram
Matrix spike outliers indicate probable matrix interference

Signature: Val M Miller for
Bruce Hoogesteger: Technical Director

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102985V1.XLS

PARADIGM
ENVIRONMENTAL SERVICES, INC. 179 Lake Avenue Rochester, New York 14608 (585) 647 - 2530 FAX (585) 647 - 3311

Semi-Volatile STARS Analysis Report for Soils/Solids/Sludges

Client: **Fisher Associates**

Client Job Site:	NYSTA VSB - Batavia Site	**Lab Project Number:**	10-2985
		Lab Sample Number:	9968
Client Job Number:	N/A		
Field Location:	B1 Comp	**Date Sampled:**	07/20/2010
Field ID Number:	N/A	**Date Received:**	07/21/2010
Sample Type:	Soil	**Date Analyzed:**	07/22/2010

Base / Neutrals	Results in ug / Kg
Acenaphthene	ND< 371
Acenaphthylene	ND< 371
Anthracene	ND< 371
Benzo (a) anthracene	ND< 371
Benzo (a) pyrene	ND< 371
Benzo (b) fluoranthene	ND< 371
Benzo (g,h,i) perylene	ND< 371
Benzo (k) fluoranthene	ND< 371
Chrysene	ND< 371
Dibenz (a,h) anthracene	ND< 371
Fluoranthene	ND< 371
Fluorene	ND< 371
Indeno (1,2,3-cd) pyrene	ND< 371
Naphthalene	ND< 371
Phenanthrene	ND< 371
Pyrene	ND< 371

ELAP Number 10958 Method: EPA 8270C Data File: S52084.D

Comments: ND denotes Non Detect
ug / Kg = microgram per Kilogram

Signature:
Bruce Hoogesteger: Technical Director

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102985S1.XLS

PARADIGM
ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue, Rochester, NY 14608 Office: (585) 647-2530 Fax: (585) 647-3311

LAB REPORT FOR RCRA METALS ANALYSIS IN SOLIDS

Client: Fisher Associates

Client Job Site: NYSTA VSB - Batavia Site

Client Job No.: N/A

Field Location: B1 Comp
Field ID No.: N/A

Lab Project No.: 10-2985
Lab Sample No.: 9968

Sample Type: Water

Date Sampled: 07/20/2010
Date Received: 07/21/2010

Parameter	Date Analyzed	Analytical Method	Result (mg/kg)
Arsenic	07/28/2010	SW846 6010	2.83
Barium	07/28/2010	SW846 6010	40.8
Cadmium	07/28/2010	SW846 6010	0.509
Chromium	07/28/2010	SW846 6010	6.76
Lead	07/28/2010	SW846 6010	10.0
Mercury	07/28/2010	SW846 7471	0.0264
Selenium	07/28/2010	SW846 6010	<0.372
Silver	07/28/2010	SW846 6010	0.802

ELAP ID No.:10958

Comments:

Approved By: Val Mills for:
Bruce Hoogesteger, Technical Director

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File ID:102985

PARADIGM
ENVIRONMENTAL SERVICES, INC. 179 Lake Avenue Rochester, New York 14608 (585) 647 - 2530 FAX (585) 647 - 3311

PHC Analysis Report for Soils/Solids/Sludges

Client: Fisher Associates

Client Job Site:	NYSTA VSB - Batavia Site	**Lab Project Number:**	10-2985
		Lab Sample Number:	9968
Client Job Number:	N/A		
Field Location:	B1 Comp	**Date Sampled:**	07/20/2010
Field ID Number:	N/A	**Date Received:**	07/21/2010
Sample Type:	Soil	**Date Analyzed:**	07/27/2010

PHC Classification	Results in ug / Kg
Light Weight PHC as: Mineral Spirits	60,000

ELAP Number 10958 Method: NYSDOH 310.13

Comments: ND denotes Non Detect
ug / Kg = microgram per Kilogram
PHC = Petroleum Hydrocarbon
Sample chromatogram not an exact match to reference chromatogram. Closest match made.

Signature: Bruce Hoogesteger: Technical Director

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102985P2.XLS

PARADIGM
ENVIRONMENTAL SERVICES, INC. 179 Lake Avenue Rochester, New York 14608 (585) 647 - 2530 FAX (585) 647 - 3311

PCB Analysis Report for Soils/Solids/Sludges

Client: **Fisher Associates**

Client Job Site: NYSTA VSB - Batavia Site
Client Job Number: N/A
Field Location: B1 Comp
Field ID Number: N/A
Sample Type: Soil

Lab Project Number: 10-2985
Lab Sample Number: 9968
Date Sampled: 07/20/2010
Date Received: 07/21/2010
Date Analyzed: 07/23/2010

PCB Identification	Results in mg / Kg
Aroclor 1016	ND< 0.386
Aroclor 1221	ND< 0.386
Aroclor 1232	ND< 0.386
Aroclor 1242	ND< 0.386
Aroclor 1248	ND< 0.386
Aroclor 1254	ND< 0.386
Aroclor 1260	ND< 0.386

ELAP Number 10958 Method: EPA 8082

Comments: ND denotes Non Detect
mg / Kg = milligram per Kilogram

Signature: Val M Miller for
Bruce Hoogesteger: Technical Director

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102985P1.XLS

179 Lake Avenue, Rochester, NY 14608 Office (585) 647-2530 Fax (585) 647-3311

PARADIGM ENVIRONMENTAL SERVICES, INC.

CHAIN OF CUSTODY

REPORT TO:	INVOICE TO:	
COMPANY: FISHER ASSOCIATES	COMPANY: Same	LAB PROJECT #: 10-2985
ADDRESS: 135 CALKINS ROAD	ADDRESS:	CLIENT PROJECT #:
CITY: ROCHESTER STATE: NY ZIP: 14623	CITY: STATE: ZIP:	TURNAROUND TIME: (WORKING DAYS)
PHONE: 585-334-1310 FAX:	PHONE: FAX:	STD ☒ 1 ☐ 2 ☐ 3 ☐ 5 OTHER ☐
ATTN: JOSEPH DOREY / CARL ELLER	ATTN:	
COMMENTS:		Quotation #

PROJECT NAME/SITE NAME: per client 7/22AM NYSTA VSB Batavia Site

REQUESTED ANALYSIS

	DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER CONTAINERS	STARS-8021B	STARS-8270D	RCRA METALS	PCB							REMARKS	PARADIGM LAB SAMPLE NUMBER
1	7/20/10	145P	SS		B1 @ 5.5-ft	Soil	1	X	X	X	X							Comp 2 to 1	9968
2	7/20/10	155P	SS		B1 @ 7-ft	Soil	1												
3																		*Added TPH-310	
4					Composite													to test list	
5					to TEST													per Carl Eller	
6																		email 7/22AM	
7		SPLIT SPOON SAMPLE																	
8																		NM.	
9																			
10																			

LAB USE ONLY BELOW THIS LINE

Sample Condition: Per NELAC/ELAP 210/241/242/243/244

Receipt Parameter	NELAC Compliance	
Container Type:	Y ☒	N ☐
Comments:		
Preservation: N/A	Y ☐	N ☐
Comments:		
Holding Time:	Y ☒	N ☐
Comments:		
Temperature: 6°C iced	Y ☒	N ☐

Sampled By: Recd → [signature]	Date/Time: 07/21/11:45A	Total Cost:
Relinquished By: [signature]	Date/Time: 7/21/10 4:45	
~~Received By~~ Rel. p 7/21/10	Date/Time:	P.I.F.
Jane J Balera	7/21/10 16:45	
Received @ Lab By: Elizabeth A. Honch	Date/Time: 7/21/10 1735	