GEOTECHNICAL ENGINEERING REPORT
U.S. INTERSTATE ROUTE 84 RECONSTRUCTION
BRIDGE NO. 01224, I-84 AND EAST BOUND EXIT 24
OFF RAMP OVER MAD RIVER, STATE PROJECT NO. 151-273
WATERBURY, CONNECTICUT

by

Haley & Aldrich, Inc.
East Hartford, Connecticut

for

Berger, Lehman Associates, P.C.
Wethersfield, Connecticut

File 91313-100
Revised May 2003

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HALEY & ALDRICH

Revised 12 May 2003
25 January 2001
File 91313-100

Berger, Lehman Associates, P.C.
20-30 Beaver Road
Wethersfield, Connecticut 06109

Attention: Thomas J. Bulzak, P.E.

Subject: U.S. Interstate Route 84 Reconstruction
Bridge No. 01224, I-84 and East Bound Exit 24 Off Ramp Over Mad River
State Project No. 151-273
Waterbury, Connecticut

Ladies and Gentlemen:

This report presents our evaluation of subsurface conditions and geotechnical engineering recommendations for Bridge No. 01224, I-84 and East Bound Exit 24 Off Ramp Over Mad River, for the I-84 Reconstruction project. This work was conducted in accordance with our agreement dated 26 December 2000.

In summary, subsurface conditions consist of fill, glaciofluvial sand and gravel, and glacial till over bedrock. Bridge No. 01224 is a single span bridge supported by two abutments. We recommend the structure be supported by end bearing piles. Our detailed recommendations follow.

PROPOSED CONSTRUCTION

Bridge No. 01224 (formerly referred to as Structure 4A&B) carries I-84 and east bound Exit 24 off ramp over the Mad River in Waterbury, Connecticut, see Figure 1, Project Locus. Bridge No. 01224 will replace the existing 37.4-m wide, four lane bridge with a 71.3-m wide, eight lane bridge and a 9.8-m wide eastbound Exit 24 off ramp. Abutments 1 and 2 will have skews of 45 to 50 degrees; the off ramp abutment skew angle is 39 degrees.

Bridge No. 01224 will be a single-span bridge with a welded steel plate girder structure. The bridge will be 46.7 m long, between Station EB 1+849.6 and Station EB 1+896.3. Wingwalls will extend along the alignment from the abutments. I-84 grade will be about EL. 113, and abutment subgrade is El. 104.8. The riverbanks of the Mad River through the

bridge opening will be riprapped with either new or existing stone. In addition, the exposed faces of each wingwall will be protected with slope protection. Elevations in this report are in meters and refer to NGVD 29.

SITE CONDITIONS

The existing bridge is a two-span structure with two abutments and a center pier located within the Mad River. Abutments and piers are supported on two rows of HP12x53 steel H-piles. Bottom of pile cap for Abutment 1 and 2 is El. 107.6. The abutments have a back row of vertical piles, and a front row of 4:1 (4 vertical to 1 horizontal) battered piles. Bottom of pile cap for the center pier is El. 102.41. The center pier is supported on two rows of 4:1 piles battered perpendicular to the pier. The existing bridge will be demolished prior to construction of the new bridge. A plan and profile view of the bridge is provided in Appendix D.

A pedestrian bridge crosses the Mad River near the southern limits of Bridge No. 01224, and a pedestrian underpass is located behind Abutment 2. The bridge will be removed prior to construction, and the underpass will be abandoned.

Bottom of Mad River channel is approximately El. 103.6 on design drawings for the existing bridge. Water level within the Mad River is about El. 104.5. The 100-yr. flood level is El. 107.5.

I-84 pavement grade is approximately El. 113. Existing grade at each abutment slopes up to I-84 from EL. 106 to the south and EL. 108 to the north. Ground surface slopes down between the abutments to the Mad River.

SUBSURFACE INVESTIGATIONS

Recent Explorations

Eight borings (S4-1 through S4-8), four at each abutment, were drilled by General Borings, Inc. of Prospect, Connecticut, between 15 and 27 November 2000 and between 7 and 11 December 2000. The test borings were drilled with 76 mm inner diameter casing to depths ranging from 11.6 to 22.6 m, including 3 m of rock coring. Bedrock was cored at each boring with a 55-mm inner dia. NX core barrel. Standard Penetration Tests were conducted at maximum 1.5-m intervals in the overburden soil. Boring locations are shown on Figure 2. As-drilled locations and elevations were surveyed by A-I Engineering of Middletown, Connecticut.

Previous Explorations

Previous subsurface explorations shown on a 1957 record drawing consisted of eleven test borings and one test pit. Nine test borings were drilled for the existing I-84 bridge over the Mad River; two auger borings and one test pit were conducted for the pedestrian bridge. The explorations encountered approximately 8.2 m to 13.3 m of soil overlying bedrock. Soils consist of glaciofluvial deposits (varying mixtures of sand, gravel, cobbles, and boulders) and glacial till. Bedrock is described as hard gray rock. Boulders were cored in several of the borings. Boring logs indicate water level within the Mad River was about EL. 104.5.

SUBSURFACE CONDITIONS

Subsurface conditions encountered in the explorations consist of fill, glaciofluvial deposits, and glacial till overlying bedrock. Soil strata are described below, in order of increasing depth. Subsurface profiles at each abutment are shown in Figures 3A and 3B. Subsurface conditions are summarized on Table I.

Thickness (m)	Generalized Description
Up to 4.6	**Fill** – Medium dense to very dense, brown SAND, trace to little gravel and silt, with few cobbles, roots and pieces of cinders and wood. A loose, dark brown SILT, some fine sand varying to a fine SAND, some silt, trace to some fine gravel with roots and pieces of wood was encountered in S4-4 and S4-5.
3.3 to 14.3	**Glaciofluvial Deposits** – Dense to very dense, brown to gray brown SAND and GRAVEL, trace silt, with cobbles and boulders.
Up to 6.1	**Glacial Till** – Very dense, brown fine SAND and SILT, trace gravel, with occasional cobbles and boulders, encountered in S4-6.

Bedrock – Bedrock is described as hard, gray, rock. Bedrock is part of the Waterbury Gneiss formation. Bedrock is 8.5 m to 18.9 m below ground surface, between EL. 92.3 to EL. 98.6. Elevations of the top of rock are in Table I and shown in Figures 3A and 3B.

Weathered rock overlies sound rock 1.2 m in boring S4-1.

Groundwater Conditions

Water was encountered in subsurface explorations at Abutment 1 between EL. 101.7 and 104.9. Water was encountered in subsurface explorations at Abutment 2 between EL. 103.2 and 106.5. The level of the Mad River will control groundwater levels.

Laboratory Testing

Three grain size analyses (ASTM D422) were performed on representative soil samples to confirm visual classification and to aid in determining engineering properties. Laboratory testing results are included in Appendix C.

GEOTECHNICAL ENGINEERING RECOMMENDATIONS

Foundation Design Criteria

We recommend that the abutments and wingwalls be founded on steel H-piles driven to refusal. We understand foundation design will follow LRFD methodology.

Pile Design Criteria

- H-piles should be HP310x1.079 (HP12x74), consisting of Grade 345 MPa (50 ksi) steel due to expected hard driving conditions.

- For LRFD design, H-piles should be designed for an ultimate capacity of 4,840 kN (544 tons) and a resistance factor of 0.35, using Grade 345 (50 ksi) steel. The recommended resistance criteria considers hard driving conditions due to the dense soil with numerous cobbles and boulders. We discussed this resistance factor with the Department and it was agreed that the recommended resistance factor provides an appropriate stress level in the piles for this application.

- Point reinforcement is recommended for all piles to assist in penetration and to protect tips during hard driving.

- Lateral loads may be resisted by a combination of shear and bending at the tops of the piles, and the horizontal component of axial loads in batter piles. The maximum batter should be taken at 4V:1H, however, 3V:1H batter may be considered on a limited basis if lateral loads are particularly high. For a maximum allowable horizontal deflection of 6 mm (1/4 in) at the top of the pile, the allowable lateral load in the strong axis for a hinged condition is 40 kN (9 kips).

- Piles should have a minimum center-to-center spacing of 2.5 times the pile width in

accordance with AASHTO requirements. Greater pile spacings are anticipated.

- Pile layout must avoid interference with piles for the existing structure, which is possible with battered piles under the toe of new abutment footings.

- For frost protection, bottom of pile caps should be at least 1.2 m below the lowest proposed adjacent grade. In addition, the top of footing should be set below the computed scour depth for the 100-yr discharge.

- Maximum total settlement is estimated at 6 mm. Maximum differential settlement between substructures will be less than 6 mm. This settlement will occur during construction.

- The foundation should be designed assuming scour from the 100-yr design discharge, and be capable of withstanding scour from the 500-yr flood event.

Abutment 1

Abutment 1 is located at Sta. EB 1+850. Bottom of pile cap is El. 104.8 except for Wingwall 1A and the adjacent 23.5 m length of the abutment. The bottom of pile cap is lowered to EL. 103.2 due to scour concerns. Bedrock is between El. 92.3 and El. 98.3, as shown on Figure 3A.

Abutment 2

Abutment 2 is located at Sta. EB 1+896. Bottom of pile cap is El. 104.8. Bedrock is between EL. 93.7 and EL. 98.6.

Estimated lengths of vertical piles assuming the top of pile is 0.3 m above the bottom of pile cap are provided in Table II.

Lateral Earth Pressures

Design abutments and wingwalls for active earth pressure and traffic surcharge pressures as shown on Figure 4.

Seismic Design

The structure is single span and does not require seismic design. Although seismic design is not required for the structure we have considered earthquake effects on the subsurface conditions and our conclusions follow. The soils at the site are not considered to be liquefaction susceptible under the design earthquake event. Seismically induced settlement

should not be significant.

Structure Backfill and Drainage

Pervious structure backfill should be placed behind the abutments and abutment wingwalls above a line defined by a 1V:1.5H slope extending up from the heel of the footing and extending to the bottom of subgrade. Pervious structure backfill should meet the requirements of CONNDOT Form 815 M.02.05.

We recommend the abutment and wingwalls be drained by 100 mm dia. weep holes installed according to CONNDOT specifications. Maximum spacing between weep holes should be 3 m.

The existing soils to be excavated are generally not suitable for reuse as pervious structure backfill or granular fill. Excavated soils will generally be suitable for embankment fill.

CONSTRUCTION CONSIDERATIONS

This section provides comments related to foundation construction and other geotechnical aspects of the project. It will aid those responsible for preparation of contract plans and specifications and those involved with construction monitoring. Contractors should evaluate potential construction problems on the basis of their own knowledge and experience in the area and on the basis of similar localities, taking into account their own proposed construction methods and procedures.

Excavation and Temporary Lateral Support

Excavations up to about 8 m high will be required to construct the abutments. Staged construction and temporary lateral support of excavations will be required to maintain traffic flow on I-84, and protect I-84 and nearby utilities. Steel sheet piling may not be feasible due to boulders in the fill and glaciofluvial deposits. Soldier piles and lagging is feasible, although pre-excavation or rotary drilling will be required at some locations to penetrate boulders. Soil nail walls might also be feasible. However, vertical or near-vertical temporary slopes may not be stable in the coarse-grained site soils, and walls may need to be relatively flat, or construction procedures modified to compensate for the poor standup characteristics of site soils. Excavations for structures should be specified as Structure Excavation (Complete), which will include the contractor design of lateral support and dewatering.

Conventional excavation equipment appears practical for excavation these soils. However, cobbles and boulders are present in the fill and glaciofluvial deposits, and mechanical splitting or chiseling may be necessary for removal of large boulders.

Excavation geometry should conform to OSHA excavation regulations contained in 29 CFR Part 1926, latest edition. Temporary soil slopes of 1V:1H, or flatter, appear appropriate but should be confirmed during construction based on conditions at the time of excavation.

Dewatering

Excavation dewatering is to be included in the structural excavation item. Where bottom of pile cap has been lowered to El. 103.2, 1.3 m below the Mad River level, dewatering requirements will be greater than for the rest of the abutment and wingwall construction. Surface water should also be diverted away from excavations.

Pile Installation

The maximum hammer energy should be determined by a wave equation analysis by the contractor based on the specific hammer characteristics.

Due to boulders in the fill and glaciofluvial deposits, pre-excavation will likely be required to advance piles at some locations and should be anticipated.

Vibrations from pile driving should not affect the structural integrity of adjacent structures. During pile installation, vibration and noise will likely be noticeable inside buildings 100 m away, or more.

FINAL COMMENTS

This report has been prepared for specific application to the subject project, as understood at this time, in accordance with generally accepted geotechnical engineering practice common to the local area. In the event that changes in the nature, design or location of the project elements are planned, the conclusions and recommendations contained in this report should not be considered valid, unless the changes are reviewed by Haley & Aldrich, Inc. and the conclusions of this report modified or verified in writing.

The analyses and recommendations are based, in part, upon the data obtained from the referenced subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations then appear, it may be necessary to reevaluate the recommendations of this report.

We appreciate the opportunity to provide engineering services on this project. Please do not hesitate to call if you have any questions or comments.

Sincerely yours,
HALEY & ALDRICH, INC.

for Kurtis E. Amidon
Engineer

Dan T. Kinard, P.E.
Vice President

John P. Dugan, Jr., P.E.
Senior Vice President

Enclosures:

- Table I - Summary of Subsurface Data
- Figure 1 - Project Locus
- Figure 2 – Subsurface Exploration Plan
- Figure 3A – Abutment 1 Profile
- Figure 3B –Abutment 2 Profile
- Figure 4 – Recommended Lateral Loads on Restrained Abutments and Wingwalls
- Appendix A – Recent Test Borings Logs
- Appendix B – Previous Explorations
- Appendix C – Laboratory Results
- Appendix D – Existing Bridge Information

TABLE I
SUMMARY OF SUBSURFACE DATA
BRIDGE NO. 01224, I-84 AND EAST BOUND EXIT 24 OFF RAMP OVER MAD RIVER
U.S. INTERSTATE ROUTE 84 RECONSTRUCTION
STATE PROJECT NO. 151-0273
WATERBURY, CONNECTICUT

EXPLOR. NUMBER	ELEV. (m)	DEPTH (m)	THICKNESS OF SOIL STRATA (m)				BEDROCK LEVEL (m)		GROUNDWATER LEVEL (m)	
			FILL	GLACIO FLUVIAL	GLACIAL TILL	WEATHERED ROCK	DEPTH	ELEV.	DEPTH	ELEV.
Recent										
S4-1	106.63	13.72	3.00	6.45	--	1.22	10.67	95.96	4.57	102.06
S4-2	106.88	11.58	0.30	8.23	--	--	8.53	98.35	3.05	103.83
S4-3	106.73	16.15	1.50	4.60	6.09	--	12.19	94.54	5.03	101.70
S4-4	106.73	14.33	3.05	7.62	--	--	10.67	96.06	2.74	103.99
S4-5	106.20	11.58	1.52	6.10	--	--	7.62	98.58	0.91	105.29
S4-6	104.99	13.11	3.66	3.34	3.06	--	10.06	94.93	0.91	104.08
S4-7	111.20	22.56	4.57	14.33	--	--	18.90	92.30	--	--
S4-8	106.53	16.92	3.05	9.75	--	--	12.80	93.73	--	--
Previous										
1	106.07	12.19	1.52	8.38	--	--	9.90	96.17	1.52	104.55
2	108.51	12.19	2.44	7.77	--	--	10.21	98.30	3.66	104.85
3	107.59	15.24	1.52	8.99	1.68	--	12.19	95.40	3.35	104.24
4	103.63	9.75	--	3.57	3.66	--	7.32	96.31	-0.61	104.24[6]
5	103.63	11.28	--	8.22	--	--	8.23	95.40	-0.61	104.24[6]
6	103.33	10.06	--	7.62	--	--	7.62	95.71	-0.90	104.23[6]
7	106.07	10.97	0.91	8.54	--	--	9.45	96.62	1.52	104.55
8	106.83	11.58	--	7.20	1.94	--	9.14	97.69	3.66	103.17
9	106.38	13.11	--	5.18	4.88	--	10.06	96.32	2.13	104.24
P1	106.59	11.28	3.66	4.88	0.91	--	9.45	97.14	--	--
P2	105.46	0.91	0.30	>.61	--	--	--	--	--	--
P3	105.46	1.52	1.37	>.15	--	--	--	--	1.23	105.36

NOTES:

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1. "--" - indicates not encountered
2. " > " indicates greater than
3. Elevations are in meters and refer to the NGVD 29.
4. Refer to boring logs for detailed soil and rock descriptions.
5. Groundwater levels were measured shortly after drilling, except at groundwater observation wells.
6. Drilled within the Mad River, Elevation is the river level.

TABLE II
SUMMARY OF ESTIMATED PILE QUANTITIES
BRIDGE NO. 01224, I-84 AND EAST BOUND EXIT 24 OFF RAMP OVER MAD RIVER
U.S. INTERSTATE ROUTE 84 RECONSTRUCTION
STATE PROJECT NO. 151-0273
WATERBURY, CONNECTICUT

LOCATION	BOTTOM OF FOOTING ELEVATION	ASSUMED PILE CUT OFF ELEVATION	PILE TIP ELEVATION (RANGE)	PILE TIP ELEVATION (AVERAGE)	ESTIMATED PILE ORDER LENGTH, (m)	RECOMMENDED NUMBER OF TEST PILES	RECOMMENDED LENGTH TEST PILE (m)
Abutment No. 1	104.8	105.1	92.3 - 98.3	95	12	1	14.5
N.W. Portion Abut 1 and Wingwall 1A	103.2	103.5	95 - 98.3	96	9	--	--
Abutment No. 2	104.8	105.1	93.7 - 98.6	96	11	1	13

NOTES:

1. For estimating purposes, assume the number of splices to be one per pile.
2. Assume point rienforcement for all piles.
3. Elevations are in meters and refer to NGVD 29.
4. Estimated pile lengths include a contingency of 1.2 m.

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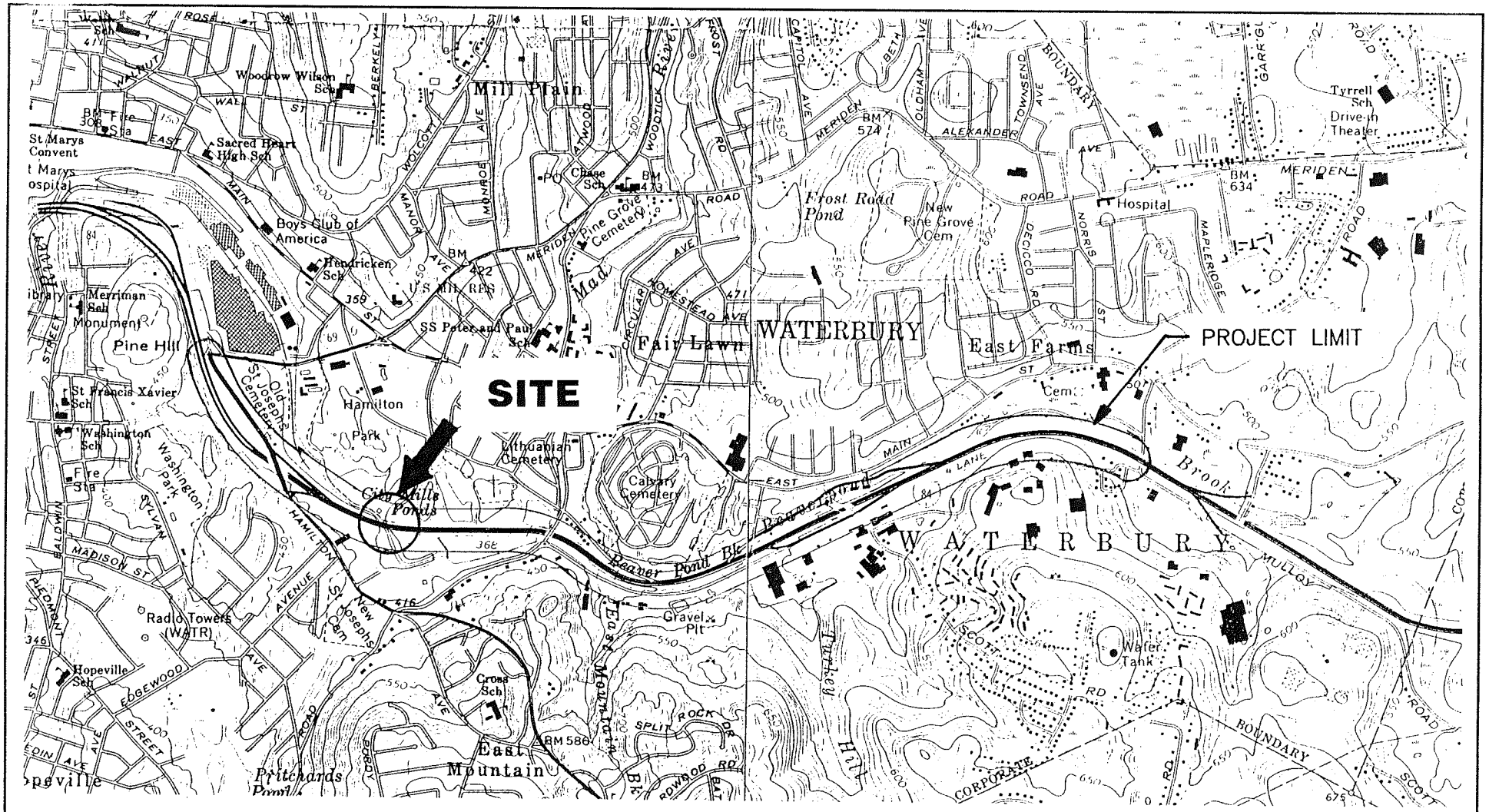
91313-100 A01



SITE COORDINATES: 041°32'23.25"N 073°01'5.01"W

U.S.G.S. QUADRANGLES: WATERBURY & SOUTHINGTON, CONNECTICUT

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UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

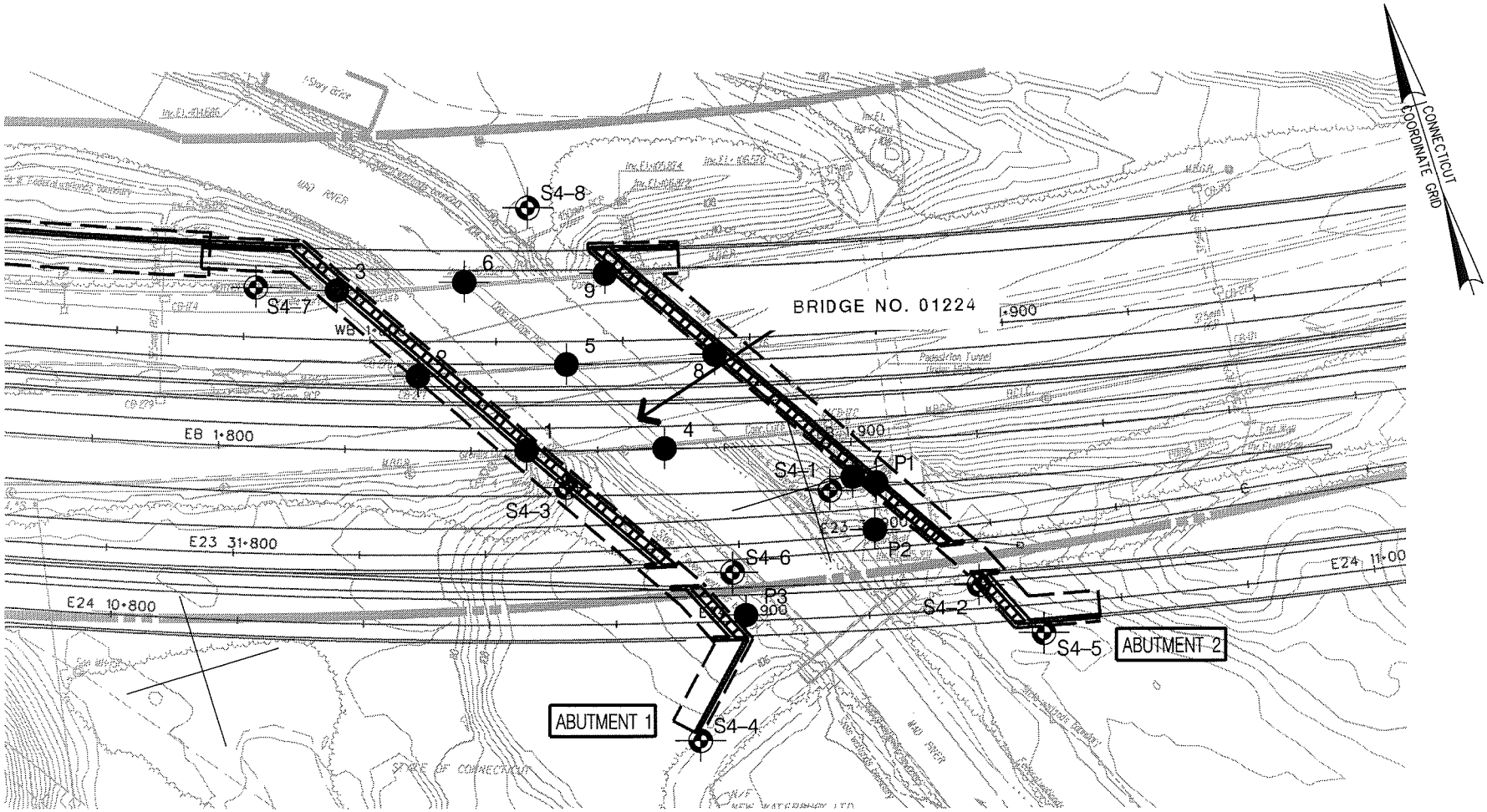
U.S. INTERSTATE 84 RECONSTRUCTION
STATE PROJECT NO. 151-273
WATERBURY, CONNECTICUT

PROJECT LOCUS

SCALE: 1:24,000

JANUARY 2001

FIGURE 1



PLAN LEGEND

LOCATION OF RECENT TEST BORING DRILLED BY GENERAL BORINGS, INC. OF PROSPECT, CONNECTICUT.

LOCATION OF PREVIOUS TEST BORING

NOTES:

1. BASE PLAN PROVIDED BY BERGER, LEHMAN ASSOCIATES. BORING LOCATIONS WERE SURVEYED BY A-I ENGINEERS.
2. ELEVATIONS ARE IN METERS, REFER TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.
3. REFER TO THE TEXT AND APPENDICES.

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UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

U.S. INTERSTATE ROUTE 84 RECONSTRUCTION
STATE PROJECT NO. 151-0223
WATERBURY, CONNECTICUT

BRIDGE NO. 01224

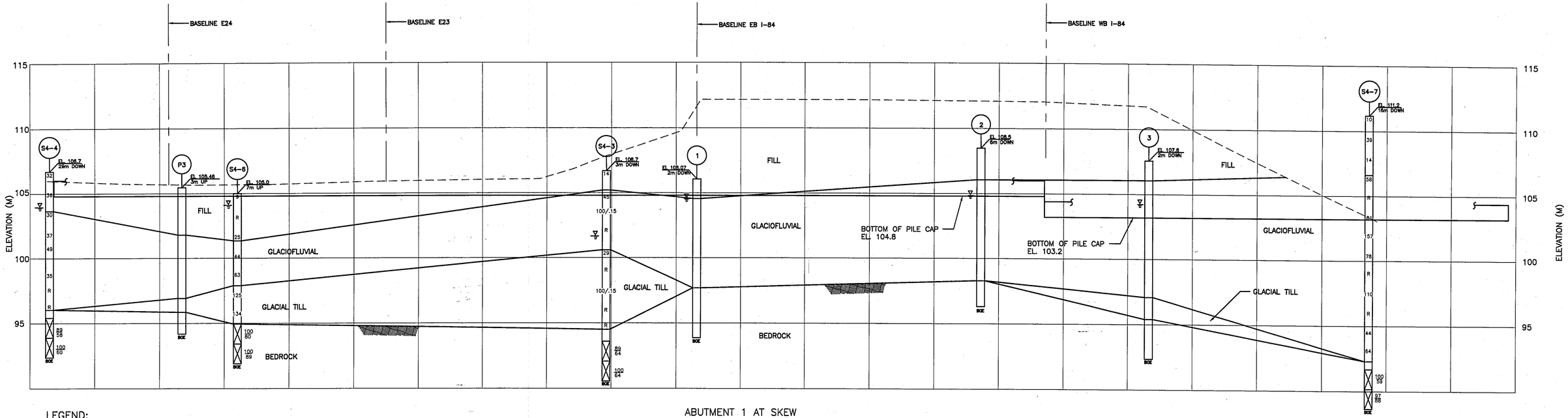
SUBSURFACE EXPLORATION PLAN

SCALE: 1:1000

JANUARY 2001

91313-100

FIGURE 2



ABUTMENT 1 AT SKEW
FACING THE ABUTMENT

LEGEND:

S-1
EL. 5.6 2m UP — APPROXIMATE GROUND SURFACE ELEVATION
OFFSET DISTANCE AND DIRECTION FROM BASELINE

MAJOR STRATUM BOUNDARY

WATER LEVEL NOTED DURING OR SHORTLY AFTER DRILLING.

LOCATION OF SAMPLE OBTAINED BY DRIVING A 50 mm O.D. SPLIT-SPOON SAMPLER WITH A 63.5 kg WEIGHT FALLING 762 mm. NUMBER INDICATES STANDARD PENETRATION RESISTANCE "N" VALUE, IN BLOWS PER 0.30 m.

INDICATES SPLIT SPOON REFUSAL

SAMPLER DRIVEN <0.30 m, FRACTION INDICATES: NUMBER BLOWS TO DRIVE SAMPLER / DEPTH SAMPLER WAS DRIVEN (m)

CORE SAMPLE, 50 mm DIA., FRACTION INDICATES: % CORE RECOVERY / ROCK QUALITY DESIGNATION (%RQD)

BOE/R — BOTTOM OF EXPLORATION/REFUSAL

NOTES:

1. SEE FIGURE 2, SUBSURFACE EXPLORATION PLAN, FOR TEST BORING AND FOUNDATION LOCATIONS.
2. FOR DETAILED DESCRIPTION OF SUBSURFACE MATERIAL REFER TO TEST BORING LOGS CONTAINED IN APPENDIX A AND B OF THIS REPORT.
3. LINES REPRESENTING CHANGES IN STRATA ARE BASED UPON INTERPOLATION BETWEEN SUBSURFACE EXPLORATIONS AND MAY NOT REPRESENT ACTUAL FIELD CONDITIONS AT OTHER THAN SPECIFIED EXPLORATION LOCATIONS.
4. THE STRATIFICATION LINES SHOWN ON THE GRAPHIC REPRESENTATION OF THE TEST BORINGS REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL OR ROCK TYPES. THE TRANSITION BETWEEN MATERIALS IS APPROXIMATE.

0 5 10
SCALE IN METERS
1:200

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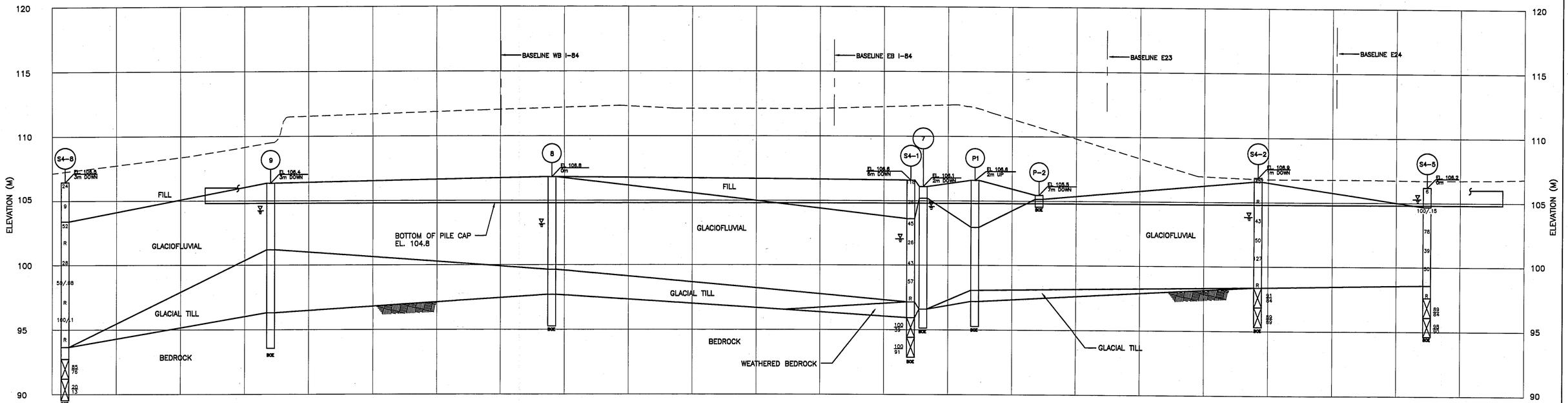
U.S. INTERSTATE ROUTE 84 RECONSTRUCTION
STATE PROJECT NO. 151-273
WATERBURY, CONNECTICUT

ABUTMENT 1 PROFILE
BRIDGE NO. 01224,
I-84 AND EAST BOUND EXIT 24
OFF RAMP OVER MAD RIVER

SCALE: AS SHOWN
JANUARY 2001

FIGURE 3A

91313-100 B06



OFF RAMP OVER MAD RIVER

ABUTMENT 2 AT SKEW
FACING THE ABUTMENT

LEGEND:

S-1
EL 5.6
2m UP
APPROXIMATE GROUND SURFACE ELEVATION
OFFSET DISTANCE AND DIRECTION FROM BASELINE

MAJOR STRATUM BOUNDARY

WATER LEVEL NOTED DURING OR SHORTLY AFTER DRILLING.

LOCATION OF SAMPLE OBTAINED BY DRIVING A 50 mm O.D. SPLIT-SPOON SAMPLER WITH A 63.5 kg WEIGHT FALLING 762 mm. NUMBER INDICATES STANDARD PENETRATION RESISTANCE "N" VALUE, IN BLOWS PER 0.30 m.

INDICATES SPLIT SPOON REFUSAL

SAMPLER DRIVEN <0.30 m, FRACTION INDICATES:
NUMBER BLOWS TO DRIVE SAMPLER / DEPTH SAMPLER WAS DRIVEN (m)

CORE SAMPLE, 50 mm DIA., FRACTION INDICATES:
% CORE RECOVERY / ROCK QUALITY DESIGNATION (%RQD)

BOE/R BOTTOM OF EXPLORATION/REFUSAL

NOTES:

1. SEE FIGURE 2, SUBSURFACE EXPLORATION PLAN, FOR TEST BORING AND FOUNDATION LOCATIONS.
2. FOR DETAILED DESCRIPTION OF SUBSURFACE MATERIAL REFER TO TEST BORING LOGS CONTAINED IN APPENDIX A AND B OF THIS REPORT.
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4. THE STRATIFICATION LINES SHOWN ON THE GRAPHIC REPRESENTATION OF THE TEST BORINGS REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL OR ROCK TYPES. THE TRANSITION BETWEEN MATERIALS IS APPROXIMATE.

0 5 10
SCALE IN METERS
1:200

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

U.S. INTERSTATE ROUTE 84 RECONSTRUCTION
STATE PROJECT NO. 151-273
WATERBURY, CONNECTICUT

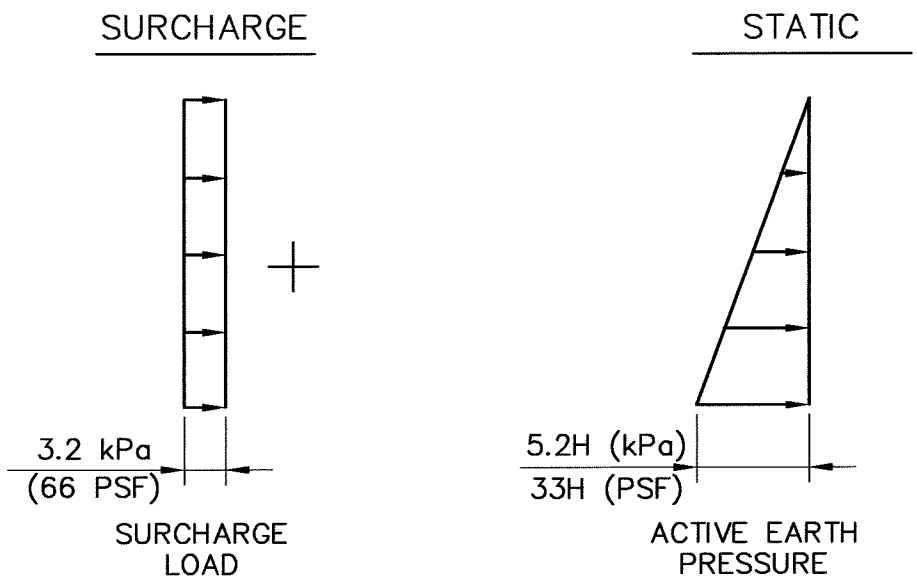
ABUTMENT 2 PROFILE
BRIDGE NO. 01224,
I-84 AND EAST BOUND EXIT 24
OFF RAMP OVER MAD RIVER

SCALE: AS SHOWN
JANUARY 2001

FIGURE 3B

91313-100 B06

STRUCT4/91313-100 A03



NOTES:

1. H IS IN METERS FOR S.I. CALCULATIONS AND FT. FOR ENGLISH CALCULATIONS.
2. THE WALL SHOULD BE DRAINED BY PERVIOUS STRUCTURE BACKFILL AND A STRUCTURE UNDERDRAIN OR WEEPHOLES, THEREFORE A HYDROSTATIC PRESSURE DIAGRAM IS OMITTED FROM THIS FIGURE.
3. THESE PRESSURE DISTRIBUTIONS ASSUME HORIZONTAL BACKFILL BEHIND THE WALL.
4. SLIDING:
   COEFF. OF FRICTION BETWEEN FOOTING AND BASE = 0.60
   RESISTANCE FACTOR = 0.80
5. STABILITY:
   RESISTANCE FACTOR = 0.65
6. IGNORE PASSIVE RESISTANCE IN FRONT OF FOOTING.

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

U.S. ROUTE INTERSTATE 84 RECONSTRUCTION
STATE PROJECT NO. 151-273
WATERBURY, CONNECTICUT

RECOMMENDED LATERAL LOADS ON UNRESTRAINED WINGWALLS

NOT TO SCALE

MARCH 2003

FIGURE 4

APPENDIX A

Recent Test Borings Logs

E. Del Priore	SM - 001 - M REV. 1/94 BORING REPORT	Hole No. **S4-1**
DRILLER	STATE OF CONNECTICUT	Line & Station
P. Carrera	DEPARTMENT OF TRANSPORTATION	Offset
INSPECTOR	TOWN: **Waterbury, Connecticut**	N. Coordinate **230892.93**
Haley & Aldrich, Inc.	PROJECT NAME: **Reconstruction of I-84**	E. Coordinate **282501.54**
SOILS ENGINEER	PROJECT NUMBER: **State: 151-273/H&A: 91313-100**	**Berger, Lehman Associates, P.C.**
	BORING CONTRACTOR: **General Borings, Inc.**	PRIME DESIGNER

Surface Elevation: **106.63**		Casing				Auger		Mud	Sampler		Core Barrel			
Date Started: **22 November 2000**	Utilized		X						X					X
Date Finished: **22 November 2000**	Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Groundwater Observations	Size I.D. (mm)	60	76	100	64				35	X	35	35	55	55
@ **4.57** m after **0** days	Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
@ m after days	Fall (m)	0.6	0.6	0.6	0.6				0.76		of bit		Carbide	

DEPTH	Casing blows per half meter	SAMPLE DEPTH IN METERS FROM - TO	NO.	PEN. m	REC m	Type	BLOWS PER 0.15 METERS ON SAMPLER 0-0.15	0.15-0.30	0.30-0.45	0.45-0.60	STRATA CHANGE ELEV./ DEPTH (m)	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0.00-0.45	1	0.45	0.15	D	6	18	100			Very dense brown coarse to fine SAND, trace fine gravel
		1.52-2.13	2	0.61	0.35	D	11	9	17	29		Medium dense brown coarse to fine SAND, little fine gravel, silt
											103.63	-FILL-
		3.05-3.66	3	0.61	0.15	D	27	23	22	24	3.00	Dense brown coarse to fine SAND, some fine gravel, trace silt
5		4.57-5.18	4	0.61	0.20	D	9	11	15	17		Same as S3
		6.10-6.71	5	0.61	0.18	D	16	19	24	21		Dense brown coarse to fine SAND and medium to fine GRAVEL, trace silt
		7.62-8.23	6	0.61	0.20	D	25	27	30	36		No recovery boulder form 9.14 m. to 9.45 m.
		9.14-9.29	7	0.15	0.00	D	100				97.18	-GLACIOFLUVIAL DEPOSITS-
10											9.45	Weathered rock at 9.45 m.
											95.96	-WEATHERED BEDROCK-
		10.67-12.19	1	1.52	1.52	C		[RQD = 39%]			10.67	C1- Hard, fresh, gray and white coarse to fine grained GNEISS. Foliation is vertical, extremely close. Joints are low angle to vertical, close to moderate, rough, planar to undulating, fresh to discolored, open
		12.19-13.71	2	1.52	1.52	C		[RQD = 91%]				C2- Same as C1, except joint are low angle, undulating
											92.92	-BEDROCK-
											13.71	Bottom of Exploration at 13.71 m.
15												

Casing			Meters of	
Size	From	To	Earth	Rock
NW	**0.0**	**10.6**	**10.67** m	**3.04** m
			No. of Samples	
			7D, 2C	

NOTES: **Bomb mounted Diedrich D-50 with wire winch to drive safety hammer. Borehole backfilled with drill cuttings upon completion.**

SAMPLE TYPE CODING: D=Driven C=Core A=Auger UP=Undisturbed Piston V=Vane Test SS=Split Spoon
PROPORTIONS USED: Trace=1-10% Little=10-20%, Some=20-35%, And=35-50%

Hole No. **S4-1**
Sheet **1** of **1**

E. Del Priore	SM - 001 - M REV. 1/94 BORING REPORT	Hole No. **S4-2**
DRILLER	STATE OF CONNECTICUT	Line & Station
P. Carrera	DEPARTMENT OF TRANSPORTATION	Offset
INSPECTOR	TOWN: **Waterbury, Connecticut**	N. Coordinate **230871.49**
Haley & Aldrich, Inc.	PROJECT NAME: **Reconstruction of I-84**	E. Coordinate **282519.67**
SOILS ENGINEER	PROJECT NUMBER: **State: 151-273/H&A: 91313-100**	**Berger, Lehman Associates, P.C.**
	BORING CONTRACTOR: **General Borings, Inc.**	PRIME DESIGNER

		Casing				Auger		Mud	Sampler		Core Barrel			
Surface Elevation: **106.88**	Utilized		X						X					
Date Started: **20 November 2000**	Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Date Finished:	Size I.D. (mm)	60	76	100	64				35	X	35	35	55	55
Groundwater Observations	Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
@ **3.05** m after **0** days	Fall (m)	0.6	0.6	0.6	0.6				0.76		of bit		Carbide	
@ m after days														

DEPTH	Casing blows per half meter	SAMPLE DEPTH IN METERS FROM - TO	NO.	PEN. m	REC m	Type	BLOWS PER 0.15 METERS ON SAMPLER 0-0.15	0.15-0.30	0.30-0.45	0.45-0.60	STRATA CHANGE ELEV./DEPTH (m)	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0.00-0.61	1	0.61	0.15	D	6	8	37	59	106.58 / 0.30	Dense brown coarse to fine SAND, some gravel, little silt -FILL-
		1.52-1.67	2	0.15	0.08	D	100					Very dense gray brown coarse GRAVEL, trace silt, sand
		3.05-3.66	3	0.61	0.45	D	19	23	20	25		Dense brown coarse to fine SAND, trace fine gravel
5		4.57-5.18	4	0.61	0.45	D	18	26	24	32		Very dense brown coarse to fine SAND and medium to fine GRAVEL, trace silt
		6.10-6.55	5	0.45	0.30	D	18	27	100/.15			Same as D4
		7.62-7.64	6	0.02	0.00	D	100/.02					No recovery
		8.53-10.05	1	1.52	1.38	C		[RQD = 84%]			98.35 / 8.53	-GLACIOFLUVIAL DEPOSITS- C1: Hard, fresh, dark gray, medium to fine grained GNEISS. Foliation is indeterminate. Joints are low angle, close to moderate, rough, undulating, fresh to discolored, open
10		10.06-11.58	2	1.52	1.35	C		[RQD = 89%]				C2: Same as C1 -BEDROCK-
											95.30 / 11.58	BOTTOM OF EXPLORATION 11.58 m
15												

Casing Size	From	To	Meters of Earth	Rock
NW	**0.0**	**7.6**	**8.53** m	**3.05** m
			No. of Samples	
			6D, 2C	

NOTES: **Bomb mounted Diedrich D-120 with wire winch to drive safety hammer. Borehole backfilled with drill cuttings upon completion**

SAMPLE TYPE CODING: D=Driven C=Core A=Auger UP=Undisturbed Piston V=Vane Test SS=Split Spoon
PROPORTIONS USED: Trace=1-10% Little=10-20%, Some=20-35%, And=35-50%

Hole No. **S4-2**
Sheet **1** of **1**

E. Del Priore	SM - 001 - M REV. 1/94 BORING REPORT	Hole No. **S4-3**
DRILLER	STATE OF CONNECTICUT	Line & Station
P. Carrera	DEPARTMENT OF TRANSPORTATION	Offset
INSPECTOR	TOWN: **Waterbury, Connecticut**	N. Coordinate **230905.58**
Haley & Aldrich, Inc.	PROJECT NAME: **Reconstruction of I-84**	E. Coordinate **282461.88**
SOILS ENGINEER	PROJECT NUMBER: **State: 151-273/H&A: 91313-100**	**Berger, Lehman Associates, P.C.**
	BORING CONTRACTOR: **General Borings, Inc.**	PRIME DESIGNER

Surface Elevation: **106.73**		Casing				Auger		Mud	Sampler		Core Barrel			
Date Started: **21 November 2000**	Utilized		X						X					X
Date Finished:	Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Groundwater Observations	Size I.D. (mm)	60	76	100	64				35	X	35	35	55	55
@ **5.03** m after **0** days	Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
@ m after days	Fall (m)	0.6	0.6	0.6	0.6				0.76		of bit		Carbide	

DEPTH	Casing blows per half meter	SAMPLE DEPTH IN METERS FROM - TO	NO.	PEN. m	REC m	Type	BLOWS PER 0.15 METERS ON SAMPLER 0-0.15	0.15-0.30	0.30-0.45	0.45-0.60	STRATA CHANGE ELEV./ DEPTH (m)	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0.00-0.61	1	0.61	0.61	D	3	6	8	11		Medium dense brown coarse to fine SAND, little gravel, trace silt
											105.23	-FILL-
		1.52-2.13	2	0.61	0.45	D	17	20	25	28	1.50	Dense brown coarse to fine SAND, little fine gravel with cobbles
		3.05-3.35	3	0.30	0.00	D	29	100/0.15				No Recovery
5		4.57-4.72	4	0.15	0.15	D	100					Very dense brown medium to fine GRAVEL, some coarse to fine sand, trace silt with cobbles
											100.63	
		6.10-6.71	5	0.61	0.45	D	14	14	15	13	6.10	Medium dense brown coarse to fine SAND, trace silt Boulder from 7.7 m - 8.53 m
		7.62-7.70	6	0.08	0.00	D	100/.08					
10		9.14-9.45	7	0.31	0.15	D	31	100				Very dense brown coarse to fine SAND, some medium to fine gravel with cobbles
		10.67-10.82	8	0.15	0.15	D	100/.15					Very dense brown coarse to fine SAND and fine gravel, trace medium gravel
											94.54	-GLACIOFLUVIAL DEPOSITS-
		12.19-12.19	9	0.00	0.00	D	100/0				12.19	C1: Hard, fresh, gray and white coarse to fine grained granitic GNEISS. Foliation is moderately dipping, extremely close. Joints are moderately dipping to high angle, close to moderate, rough, undulating, fresh, open
		13.11-14.63	1	1.52	1.36	C		[RQD = 64%]				
15												

Casing			Meters of	
Size	From	To	Earth	Rock
NW	**0.0**	**13.1**	**13.11** m	**3.04** m
			No. of Samples	
			9D, 2C	

NOTES: **Bomb mounted Diedrich D-120 with wire winch to drive safety hammer. Borehole backfilled with drill cuttings upon completion.**

SAMPLE TYPE CODING: D=Driven C=Core A=Auger UP=Undisturbed Piston V=Vane Test SS=Split Spoon
PROPORTIONS USED: Trace=1-10% Little=10-20%, Some=20-35%, And=35-50%

Hole No. **S4-3**
Sheet **1** of **2**

E. Del Priore	SM - 001 - M REV. 1/94 BORING REPORT	Hole No. **S4-3**
DRILLER	STATE OF CONNECTICUT	Line & Station
P. Carrera	DEPARTMENT OF TRANSPORTATION	Offset
INSPECTOR	TOWN: **Waterbury, Connecticut**	N. Coordinate **230905.58**
Haley & Aldrich, Inc.	PROJECT NAME: **Reconstruction of I-84**	E. Coordinate **282461.88**
SOILS ENGINEER	PROJECT NUMBER: **State: 151-273/H&A: 91313-100**	**Berger, Lehman Associates, P.C.**
	BORING CONTRACTOR: **General Borings, Inc.**	PRIME DESIGNER

		Casing				Auger		Mud	Sampler		Core Barrel			
Surface Elevation: **106.73**														
Date Started: **21 November 2000**	Utilized		X						X					X
Date Finished:	Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Groundwater Observations	Size I.D. (mm)	60	76	100	64				35	X	35	35	55	55
@ **5.03** m after **0** days	Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
@ m after days	Fall (m)	0.6	0.6	0.6	0.6				0.76		of bit		Carbide	

DEPTH	Casing blows per half meter	SAMPLE DEPTH IN METERS FROM - TO	NO.	PEN. m	REC m	Type	BLOWS PER 0.15 METERS ON SAMPLER 0-0.15	0.15-0.30	0.30-0.45	0.45-0.60	STRATA CHANGE ELEV./ DEPTH (m)	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		14.63-16.15	2	1.52	1.52	C		[RQD = 64%]				C2: Same as C1 except joints are low to high angle, fresh to discolored.
											90.58	
											16.15	BOTTOM OF EXPLORATION 16.15 m
20												
25												
30												

Casing Size	From	To	Meters of Earth	Rock
NW	**0.0**	**13.1**	**13.11** m	**3.04** m
			No. of Samples	
			9D, 2C	

NOTES: **Bomb mounted Diedrich D-120 with wire winch to drive safety hammer. Borehole backfilled with drill cuttings upon completion.**

SAMPLE TYPE CODING: D=Driven C=Core A=Auger UP=Undisturbed Piston V=Vane Test SS=Split Spoon
PROPORTIONS USED: Trace=1-10% Little=10-20%, Some=20-35%, And=35-50%

Hole No. **S4-3**
Sheet **2** of **2**

E. Del Priore	SM - 001 - M REV. 1/94 BORING REPORT	Hole No. **S4-4**
DRILLER	STATE OF CONNECTICUT	Line & Station
P. Carrera	DEPARTMENT OF TRANSPORTATION	Offset
INSPECTOR	TOWN: **Waterbury, Connecticut**	N. Coordinate **230860.69**
Haley & Aldrich, Inc.	PROJECT NAME: **Reconstruction of I-84**	E. Coordinate **282470.32**
SOILS ENGINEER	PROJECT NUMBER: **State: 151-273/H&A: 91313-100**	**Berger, Lehman Associates, P.C.**
	BORING CONTRACTOR: **General Borings, Inc.**	PRIME DESIGNER

Surface Elevation: **106.73**		Casing				Auger		Mud	Sampler		Core Barrel			
Date Started: **15 November 2000**	Utilized		X						X					X
Date Finished: **16 November 2000**	Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Groundwater Observations	Size I.D. (mm)	60	76	100	64				35	X	35	35	55	55
@ **2.74** m after **0** days	Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
@ m after days	Fall (m)	0.6	0.6	0.6	0.6				0.76		of bit		Carbide	

DEPTH	Casing blows per half meter	SAMPLE DEPTH IN METERS FROM - TO	NO.	PEN. m	REC m	Type	BLOWS PER 0.15 METERS ON SAMPLER 0-0.15	0.15-0.30	0.30-0.45	0.45-0.60	STRATA CHANGE ELEV./DEPTH (m)	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0.00-0.61	1	0.61	0.45	D	9	14	18	17		Dense dark brown to tan fine SAND, some silt, medium to fine gravel, trace coarse sand, wood, roots
		1.52-2.13	2	0.61	0.30	D	27	21	15	11		Dense tan to orange brown coarse to fine SAND, some coarse to fine gravel, trace silt, wood, roots
											103.68	-FILL-
		3.05-3.66	3	0.61	0.45	D	17	16	14	13	3.05	Medium dense tan fine SAND, little coarse sand, trace silt
												-GLACIOFLUVIAL DEPOSITS-
5		4.57-5.18	4	0.61	0.30	D	10	16	21	23		Dense tan fine SAND, little silt, trace coarse sand
		~~5.79-6.40~~	~~5~~	~~0.61~~	~~0.30~~	~~D~~	~~63~~	~~27~~	~~22~~	~~25~~		Same as S4 except trace gravel
		7.62-8.23	6	0.61	0.15	D	14	14	21	26		Dense brown coarse to fine SAND and fine gravel, trace silt
10		9.14-9.29	7	0.15	0.00	D	100					No recovery. Gravel in tip.
											96.06	
		10.67-10.67	8	0.00	0.00	D	100				10.67	No recovery
		11.28-12.80	1	1.52	1.36	C	1.36	[RQD = 58%]				C1: Hard, fresh, gray and white, medium to fine grained muscovite, biotite, quartz, orthoclase GNEISS. Foliation is moderately dipping, extremely to very close. Joints are high angle, perpendicular to foliation, spacing is close to moderate, rough, planar, discolored, open, Pyrite growth on joint surface.
		~~12.80-14.32~~	~~2~~	~~1.52~~	~~1.52~~	~~C~~	~~1.52~~	~~[RQD = 60%]~~				
											92.40	C2: Same as C1 except medium to fine grained joints are moderately dipping to low angle, close to moderate
15											14.33	

Casing			Meters of	
Size	From	To	Earth	Rock
NW	**0.0**	**10.7**	**11.28** m	**3.05** m
			No. of Samples	
			8D, 2C	

NOTES: **Bomb mounted Diedrich D-120 with wire winch to drive safety hammer. Borehole backfilled with drill cuttings upon completion.**

SAMPLE TYPE CODING: D=Driven C=Core A=Auger UP=Undisturbed Piston V=Vane Test SS=Split Spoon
PROPORTIONS USED: Trace=1-10% Little=10-20%, Some=20-35%, And=35-50%

Hole No. **S4-4**
Sheet **1** of **2**

E. Del Priore	SM - 001 - M REV. 1/94 BORING REPORT	Hole No. **S4-4**
DRILLER	STATE OF CONNECTICUT	Line & Station
P. Carrera	DEPARTMENT OF TRANSPORTATION	Offset
INSPECTOR	TOWN: **Waterbury, Connecticut**	N. Coordinate **230860.69**
Haley & Aldrich, Inc.	PROJECT NAME: **Reconstruction of I-84**	E. Coordinate **282470.32**
SOILS ENGINEER	PROJECT NUMBER: **State: 151-273/H&A: 91313-100**	**Berger, Lehman Associates, P.C.**
	BORING CONTRACTOR: **General Borings, Inc.**	PRIME DESIGNER

		Casing				Auger		Mud	Sampler		Core Barrel			
Surface Elevation: **106.73**	Utilized		X						X					X
Date Started: **15 November 2000**	Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Date Finished: **16 November 2000**	Size I.D. (mm)	60	76	100	64				35	X	35	35	55	55
Groundwater Observations	Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
@ **2.74** m after **0** days	Fall (m)	0.6	0.6	0.6	0.6				0.76		of bit		Carbide	
@ m after days														

DEPTH	Casing blows per half meter	SAMPLE DEPTH IN METERS FROM - TO	NO.	PEN. m	REC m	Type	BLOWS PER 0.15 METERS ON SAMPLER 0-0.15	0.15-0.30	0.30-0.45	0.45-0.60	STRATA CHANGE ELEV./ DEPTH (m)	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
												-BEDROCK- BOTTOM OF EXPLORATION 14.33 m
											89.51 / 17.22	
20												
25												
30												

Casing Size	From	To	Meters of Earth	Rock
NW	**0.0**	**10.7**	**11.28** m	**3.05** m
			No. of Samples	
			8D, 2C	

NOTES: **Bomb mounted Diedrich D-120 with wire winch to drive safety hammer. Borehole backfilled with drill cuttings upon completion.**

SAMPLE TYPE CODING: D=Driven C=Core A=Auger UP=Undisturbed Piston V=Vane Test SS=Split Spoon
PROPORTIONS USED: Trace=1-10% Little=10-20%, Some=20-35%, And=35-50%

Hole No. **S4-4**
Sheet **2** of **2**

E. Del Priore	SM - 001 - M REV. 1/94 BORING REPORT	Hole No. **S4-5**
DRILLER	STATE OF CONNECTICUT	Line & Station
P. Carrera	DEPARTMENT OF TRANSPORTATION	Offset
INSPECTOR	TOWN: **Waterbury, Connecticut**	N. Coordinate **230861.14**
Haley & Aldrich, Inc.	PROJECT NAME: **Reconstruction of I-84**	E. Coordinate **282527.26**
SOILS ENGINEER	PROJECT NUMBER: **State: 151-273/H&A: 91313-100**	**Berger, Lehman Associates, P.C.**
	BORING CONTRACTOR: **General Borings, Inc.**	PRIME DESIGNER

		Casing				Auger		Mud	Sampler		Core Barrel			
Surface Elevation: **106.20**	Utilized		X						X					X
Date Started: **17 November 2000**	Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Date Finished:	Size I.D. (mm)	60	76	100	64				35	X	35	35	55	55
Groundwater Observations	Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
@ **0.91** m after **0** days	Fall (m)	0.6	0.6	0.6	0.6				0.76		of bit		Carbide	
@ m after days														

DEPTH	Casing blows per half meter	SAMPLE DEPTH IN METERS FROM - TO	NO.	PEN. m	REC m	Type	BLOWS PER 0.15 METERS ON SAMPLER 0-0.15	0.15-0.30	0.30-0.45	0.45-0.60	STRATA CHANGE ELEV./ DEPTH (m)	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0.00-0.61	1	0.61	0.46	D	2	3	3	6		Loose dark brown SILT, some fine sand, trace fine gravel with common roots, wood
											104.68	-FILL-
		1.52-2.13	2	0.61	0.20	D	53	100			1.52	Very dense gray brown fine GRAVEL and coarse to fine SAND, trace silt, medium gravel
		3.05-3.66	3	0.61	0.30	D	19	31	47	32		Very dense gray brown medium to fine GRAVEL, some coarse to fine sand, trace silt
5		4.57-5.18	4	0.61	0.30	D	21	20	19	16		Dense brown coarse to fine SAND, trace fine gravel, silt
		6.10-6.71	5	0.61	0.45	D	21	23	27	32		Very dense brown coarse to fine SAND, some fine gravel, trace silt
											98.58	-GLACIOFLUVIAL DEPOSITS-
		7.62-7.70	6	0.08	0.00	D	100/.08				7.62	No recovery
		8.58-10.10	1	1.52	1.36	C		[RQD = 84%]				C1: Hard, fresh, gray and white, coarse to fine grained biotite GNEISS. Foliation is high angle, extremely to very close. Joints moderately dipping to low angle, close to moderate, rough, undulating, fresh to discolored, open.
10												
		10.06-11.58	2	1.52	1.49	C		[RQD = 90%]				C2: Same as C1
											94.62	-BEDROCK-
											11.58	BOTTOM OF EXPLORATION 11.58 m
15												

Casing Size	From	To	Meters of Earth	Rock
NW	**0.0**	**7.6**	**8.58** m	**3.05** m
			No. of Samples	
			6D, 2C	

NOTES: **Bomb mounted Diedrich D-120 with wire winch to drive safety hammer. Borehole backfilled with drill cuttings upon completion.**

SAMPLE TYPE CODING: D=Driven C=Core A=Auger UP=Undisturbed Piston V=Vane Test SS=Split Spoon
PROPORTIONS USED: Trace=1-10% Little=10-20%, Some=20-35%, And=35-50%

Hole No. **S4-5**
Sheet **1** of **1**

E. Del Priore	SM - 001 - M REV. 1/94 BORING REPORT	Hole No. **S4-6**
DRILLER	STATE OF CONNECTICUT	Line & Station
P. Carrera	DEPARTMENT OF TRANSPORTATION	Offset
INSPECTOR	TOWN: **Waterbury, Connecticut**	N. Coordinate **230884.83**
Haley & Aldrich, Inc.	PROJECT NAME: **Reconstruction of I-84**	E. Coordinate **282482.99**
SOILS ENGINEER	PROJECT NUMBER: **State: 151-273/H&A: 91313-100**	**Berger, Lehman Associates, P.C.**
	BORING CONTRACTOR: **General Borings, Inc.**	PRIME DESIGNER

		Casing				Auger		Mud	Sampler		Core Barrel			
Surface Elevation: **104.99**	Utilized		X						X					X
Date Started: **16 November 2000**	Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Date Finished: **17 November 2000**	Size I.D. (mm)	60	76	100	64				35	X	35	35	55	55
Groundwater Observations	Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
@ **0.91** m after **0** days	Fall (m)	0.6	0.6	0.6	0.6				0.76		of bit		Carbide	
@ m after days														

DEPTH	Casing blows per half meter	SAMPLE DEPTH IN METERS FROM - TO	NO.	PEN. m	REC m	Type	BLOWS PER 0.15 METERS ON SAMPLER 0-0.15	0.15-0.30	0.30-0.45	0.45-0.60	STRATA CHANGE ELEV./DEPTH (m)	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0.00-0.61	1	0.61	0.45	D	4	5	4	4		Loose dark brown coarse to fine SAND, some fine gravel, trace silt
		1.52-1.60	2	0.08	0.00	D	100/.08					No recovery. Boulder from 1.52 m - 2.59 m
		3.05-3.66	3	0.61	0.15	D	14	13	12	15	101.33 / 3.66	Medium dense brown coarse to fine SAND, little silt
												-FILL-
5		4.57-5.18	4	0.61	0.30	D	22	21	23	29		Dense gray brown medium to fine GRAVEL, little coarse to fine sand, trace silt
		6.10-6.71	5	0.61	0.30	D	19	25	38	47	97.99 / 7.00	Very dense brown coarse to fine SAND and fine GRAVEL, trace coarse to medium gravel, silt
												-GLACIOFLUVIAL DEPOSITS-
		7.62-8.23	6	0.61	0.45	D	34	61	64	76		Very dense brown fine SAND and SILT, trace medium gravel
10		9.14-9.75	7	0.61	0.45	D	58	63	71	112	94.93 / 10.06	Very dense brown fine SAND, some silt, trace coarse sand, fine gravel
		10.06-11.58	1	1.52	1.52	C		[RQD = 80%]				-GLACIAL TILL-
		11.58-13.10	2	1.52	1.52	C		[RQD = 89%]			91.88 / 13.11	C1: Hard, fresh, gray and white, coarse to fine grained GRANITIC GNEISS. Foliation is high angle, extremely close. Joints are moderately dipping to vertical, moderate, rough, planar, discolored, open. C2: Same as C1 * Last 2 m Bx core
												-BEDROCK- BOTTOM OF EXPLORATION 13.11 m
15												

Casing Size	From	To	Meters of Earth	Rock
NW	**0.0**	**7.6**	**10.06** m	**3.05** m
			No. of Samples	
			7D, 2C	

NOTES: **Bomb mounted Diedrich D-120 with wire winch to drive safety hammer. Borehole backfilled with drill cuttings upon completion.**

SAMPLE TYPE CODING: D=Driven C=Core A=Auger UP=Undisturbed Piston V=Vane Test SS=Split Spoon
PROPORTIONS USED: Trace=1-10% Little=10-20%, Some=20-35%, And=35-50%

Hole No. **S4-6**
Sheet **1** of **1**

E. Del Priore	SM - 001 - M REV. 1/94 BORING REPORT	Hole No. **S4-7**
DRILLER	STATE OF CONNECTICUT	Line & Station
P. Carrera	DEPARTMENT OF TRANSPORTATION	Offset
INSPECTOR	TOWN: **Waterbury, Connecticut**	N. Coordinate **230950.46**
Haley & Aldrich, Inc.	PROJECT NAME: **Reconstruction of I-84**	E. Coordinate **282424.27**
SOILS ENGINEER	PROJECT NUMBER: **State: 151-273/H&A: 91313-100**	**Berger, Lehman Associates, P.C.**
	BORING CONTRACTOR: **General Borings, Inc.**	PRIME DESIGNER

		Casing				Auger		Mud	Sampler		Core Barrel			
Surface Elevation: **111.20**	Utilized								X					X
Date Started: **7 December 2000**	Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Date Finished: **11 December 2000**	Size I.D. (mm)	60	76	100	64				35	X	35	35	55	55
Groundwater Observations	Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
@ _____ m after _____ days	Fall (m)	0.6	0.6	0.6	0.6				0.76		of bit		Carbide	
@ _____ m after _____ days														

DEPTH	Casing blows per half meter	SAMPLE DEPTH IN METERS FROM - TO	NO.	PEN. m	REC m	Type	BLOWS PER 0.15 METERS ON SAMPLER 0-0.15	0.15-0.30	0.30-0.45	0.45-0.60	STRATA CHANGE ELEV./ DEPTH (m)	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0.00-0.61	1	0.61	0.45	D	4	5	5	5		Medium dense brown fine sand, brown fine gravel, coarse sand
		1.52-2.13	2	0.61	0.10	D	5	9	30	13		Dense brown coarse to fine SAND, some coarse to fine gravel, trace silt
		3.05-3.66	3	0.61	0.15	D	5	7	7	16		Medium dense dark to brown coarse to fine SAND, trace silt
											106.63	-FILL-
5		4.57-5.18	4	0.61	0.15	D	19	27	31	25	4.57	Very dense brown coarse to fine SAND, and medium to fine gravel
		6.10-6.10	5	0.00	0.00	D	50/0					On boulder
		7.62-8.23	6	0.61	0.30	D	65	38	43	100		Very dense dark gray brown coarse to fine SAND, some coarse to fine gravel, trace silt
10		9.14-9.59	7	0.45	0.10	D	29	57	100			Very dense brown coarse to fine GRAVEL, and coarse to fine sand, trace silt
		10.67-11.28	8	0.61	0.10	D	32	47	31	29		Very dense gray brown coarse to fine SAND, and medium to fine gravel
		12.19-12.19	9	0.00	0.00	D	50					Boulder
15		13.72-14.33	10	0.61	0.30	D	29	57	53	47		Very dense brown coarse to fine SAND, and fine gravel, trace medium gravel -GLACIOFLUVIAL DEPOSITS-

Casing Size	From	To	Meters of Earth	Rock
NW	**0.0**	**18.9**	**19.51** m	**3.04** m
			No. of Samples	
			13D, 2C	

NOTES: **Bomb mounted Diedrich D-50 with wire winch to drive safety hammer. Borehole backfilled with drill cuttings upon completion.**

SAMPLE TYPE CODING: D=Driven C=Core A=Auger UP=Undisturbed Piston V=Vane Test SS=Split Spoon
PROPORTIONS USED: Trace=1-10% Little=10-20%, Some=20-35%, And=35-50%

Hole No. **S4-7**
Sheet **1** of **2**

E. Del Priore	SM - 001 - M REV. 1/94 BORING REPORT	Hole No. **S4-7**
DRILLER	STATE OF CONNECTICUT	Line & Station
P. Carrera	DEPARTMENT OF TRANSPORTATION	Offset
INSPECTOR	TOWN: **Waterbury, Connecticut**	N. Coordinate **230950.46**
Haley & Aldrich, Inc.	PROJECT NAME: **Reconstruction of I-84**	E. Coordinate **282424.27**
SOILS ENGINEER	PROJECT NUMBER: **State: 151-273/H&A: 91313-100**	**Berger, Lehman Associates, P.C.**
	BORING CONTRACTOR: **General Borings, Inc.**	PRIME DESIGNER

Surface Elevation: **111.20**		Casing				Auger		Mud	Sampler		Core Barrel			
Date Started: **7 December 2000**	Utilized								X					X
Date Finished: **11 December 2000**	Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Groundwater Observations	Size I.D. (mm)	60	76	100	64				35	X	35	35	55	55
@ _____ m after _____ days	Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
@ m after days	Fall (m)	0.6	0.6	0.6	0.6				0.76		of bit		Carbide	

DEPTH	Casing blows per half meter	SAMPLE DEPTH IN METERS FROM - TO	NO.	PEN. m	REC m	Type	BLOWS PER 0.15 METERS ON SAMPLER 0-0.15	0.15-0.30	0.30-0.45	0.45-0.60	STRATA CHANGE ELEV./DEPTH (m)	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		15.24-15.24	11	0.00	0.00	D	50					No recovery
		16.76-17.37	12	0.61	0.30	D	19	23	21	20		Dense light brown coarse to fine SAND, trace fine gravel, silt
		18.29-18.90	13	0.61	0.20	D	28	31	33	100		Very dense light brown coarse to fine SAND, some medium to fine gravel
											92.30 18.90	-GLACIOFLUVIAL DEPOSITS-
20		19.51-21.03	1	1.52	1.52	C		[RQD = 59%]				Roller bit to 19.51 m. C1: Very hard, fresh, gray and white, coarse to fine grained GRANITIC GNEISS. Foliation is high angle, extremely close. Joints are moderately dipping to vertical, close to moderate, rough, undulating, discolored, open. Secondary mineral growth on joint surfaces, also slickensides noted on moderately dipping, joint at 20.16 m.
		21.03-22.55	2	1.52	1.47	C		[RQD = 88%]				
											88.64 22.56	C2: Very hard, fresh, gray and white, medium to fine grained BIOTITE GNEISS, with a layer of coarse to fine grained GRANITIC GNEISS. Foliation is moderately dipping, extremely close to wide, rough, undulating to planar, discolored, open to tight. -BEDROCK-
25												Bottom of Exploration at 22.56 m.
30												

Casing Size	From	To	Meters of Earth	Rock
NW	**0.0**	**18.9**	**19.51** m	**3.04** m
			No. of Samples	
			13D, 2C	

NOTES: **Bomb mounted Diedrich D-50 with wire winch to drive safety hammer. Borehole backfilled with drill cuttings upon completion.**

SAMPLE TYPE CODING: D=Driven C=Core A=Auger UP=Undisturbed Piston V=Vane Test SS=Split Spoon
PROPORTIONS USED: Trace=1-10% Little=10-20%, Some=20-35%, And=35-50%

Hole No. **S4-7**
Sheet **2** of **2**

E. Pelky	SM - 001 - M REV. 1/94 BORING REPORT	Hole No. **S4-8**
DRILLER	STATE OF CONNECTICUT	Line & Station
P. Carrera	DEPARTMENT OF TRANSPORTATION	Offset
INSPECTOR	TOWN: **Waterbury, Connecticut**	N. Coordinate **230949.84**
Haley & Aldrich, Inc.	PROJECT NAME: **Reconstruction of I-84**	E. Coordinate **282469.08**
SOILS ENGINEER	PROJECT NUMBER: **State: 151-273/H&A: 91313-100**	**Berger, Lehman Associates, P.C.**
	BORING CONTRACTOR: **General Borings, Inc.**	PRIME DESIGNER

Surface Elevation: **106.53**		Casing				Auger		Mud	Sampler		Core Barrel			
Date Started: **21 November 2000**	Utilized		X						X					X
Date Finished: **22 November 2000**	Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Groundwater Observations	Size I.D. (mm)	60	76	100	64				35	X	35	35	55	55
@ _____ m after _____ days	Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
@ m after days	Fall (m)	0.6	0.6	0.6	0.6				0.76		of bit		Carbide	

DEPTH	Casing blows per half meter	SAMPLE DEPTH IN METERS FROM - TO	NO.	PEN. m	REC m	Type	BLOWS PER 0.15 METERS ON SAMPLER 0-0.15	0.15-0.30	0.30-0.45	0.45-0.60	STRATA CHANGE ELEV./DEPTH (m)	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		0.00-0.61	1	0.61	0.46	D	4	12	12	10		Medium dense brown coarse to fine SAND, some medium to fine gravel, little silt
		1.52-2.13	2	0.61	0.61	D	2	3	6	8		Loose dark brown coarse to fine SAND, trace silt
											103.48	-FILL-
		3.05-3.66	3	0.61	0.30	D	20	20	32	40	3.05	Very dense brown coarse to fine SAND and fine gravel, trace silt with cobbles
5		4.57-4.57	4	0.00	0.00	D	100/0					Drilled boulder from 4.57 - 4.88 m
		6.10-6.71	5	0.61	0.30	D	12	13	15	23		Same as S3
		7.62-7.85	6	0.23	0.15	D	48	50/.08				Very dense gray brown medium to fine GRAVEL, trace coarse to fine sand, silt
10		9.14-9.24	7	0.10	0.05	D	50/1					Very dense gray medium to fine GRAVEL, trace coarse to fine sand, silt
		10.67-10.92	8	0.25	0.28	D	38	100/.1				Very dense brown medium to fine GRAVEL and coarse to fine SAND
		12.19-12.19	9	0.00	0.00	D	100/0					Boulder 12.19 m. to 12.5 m
											93.73 / 12.80	-GLACIOFLUVIAL DEPOSITS-
15		13.72-15.24	1	1.52	1.29	C		[RQD = 76%]				C1: Very hard, fresh, pink to white, coarse to fine grained GRANITIC GNEISS. Foliation is high angle extremely close to indistinct. Joints are low angle, close, rough, stepped to undulating, fresh to discolored, open.

Casing Size	From	To	Meters of Earth	Rock
NW	**0.0**	**12.2**	**13.72** m	**3.05** m
			No. of Samples	
			9D, 2C	

NOTES: **Truck mounted Mobile Drill B-53 with wire winch to drive safety hammer. Borehole backfilled with drill cuttings upon completion**

SAMPLE TYPE CODING: D=Driven C=Core A=Auger UP=Undisturbed Piston V=Vane Test SS=Split Spoon
PROPORTIONS USED: Trace=1-10% Little=10-20%, Some=20-35%, And=35-50%

Hole No. **S4-8**
Sheet **1** of **2**

E. Pelky	SM - 001 - M REV. 1/94 BORING REPORT	Hole No. **S4-8**
DRILLER	STATE OF CONNECTICUT	Line & Station
P. Carrera	DEPARTMENT OF TRANSPORTATION	Offset
INSPECTOR	TOWN: **Waterbury, Connecticut**	N. Coordinate **230949.84**
Haley & Aldrich, Inc.	PROJECT NAME: **Reconstruction of I-84**	E. Coordinate **282469.08**
SOILS ENGINEER	PROJECT NUMBER: **State: 151-273/H&A: 91313-100**	**Berger, Lehman Associates, P.C.**
	BORING CONTRACTOR: **General Borings, Inc.**	PRIME DESIGNER

Surface Elevation: **106.53**		Casing				Auger		Mud	Sampler		Core Barrel			
Date Started: **21 November 2000**	Utilized		X						X					X
Date Finished: **22 November 2000**	Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Groundwater Observations	Size I.D. (mm)	60	76	100	64				35	X	35	35	55	55
@ _____ m after _____ days	Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
@ m after days	Fall (m)	0.6	0.6	0.6	0.6				0.76		of bit		Carbide	

DEPTH	Casing blows per half meter	SAMPLE DEPTH IN METERS FROM - TO	NO.	PEN. m	REC m	Type	BLOWS PER 0.15 METERS ON SAMPLER 0-0.15	0.15-0.30	0.30-0.45	0.45-0.60	STRATA CHANGE ELEV./DEPTH (m)	FIELD IDENTIFICATION OF SOIL REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
		15.24-16.76	2	1.52	0.30	C		[RQD = 13%]			91.29 15.24	C2: Same as C1 except joints are very close to close.
											89.61 16.92	-BEDROCK-
												BOTTOM OF EXPLORATION 16.92 m
20												
25												
30												

Casing			Meters of	
Size	From	To	Earth	Rock
NW	**0.0**	**12.2**	**13.72** m	**3.05** m
			No. of Samples	
			9D, 2C	

NOTES: **Truck mounted Mobile Drill B-53 with wire winch to drive safety hammer. Borehole backfilled with drill cuttings upon completion**

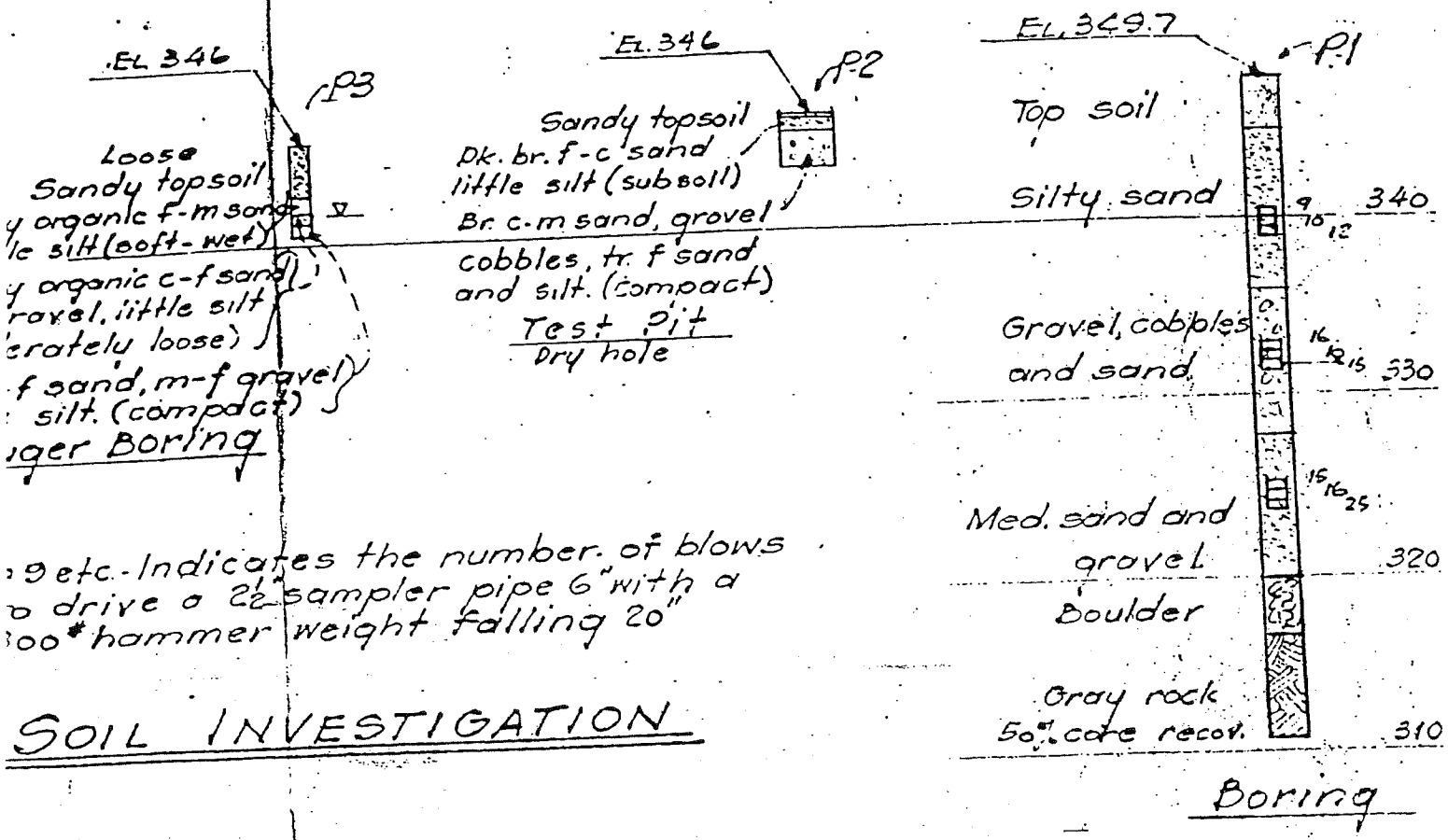
SAMPLE TYPE CODING: D=Driven C=Core A=Auger UP=Undisturbed Piston V=Vane Test SS=Split Spoon
PROPORTIONS USED: Trace=1-10% Little=10-20%, Some=20-35%, And=35-50%

Hole No. **S4-8**
Sheet **2** of **2**

APPENDIX B
Previous Explorations

STEEL DETAILS

$\frac{1}{2}$" = 1'-0"



9 etc. - Indicates the number of blows
o drive a 2½" sampler pipe 6" with a
300# hammer weight falling 20"

SOIL INVESTIGATION

ENERAL NOTES

Conn. State Highway Dept. - Form 808.
S and Special Provisions.

tions: A.A.S.H.O. - 1953, as supplemented by
icut State Highway Department "Standard
etails for Contracting Engineers, Dated Feb. 1955.
d 85 lbs. per sq. ft.

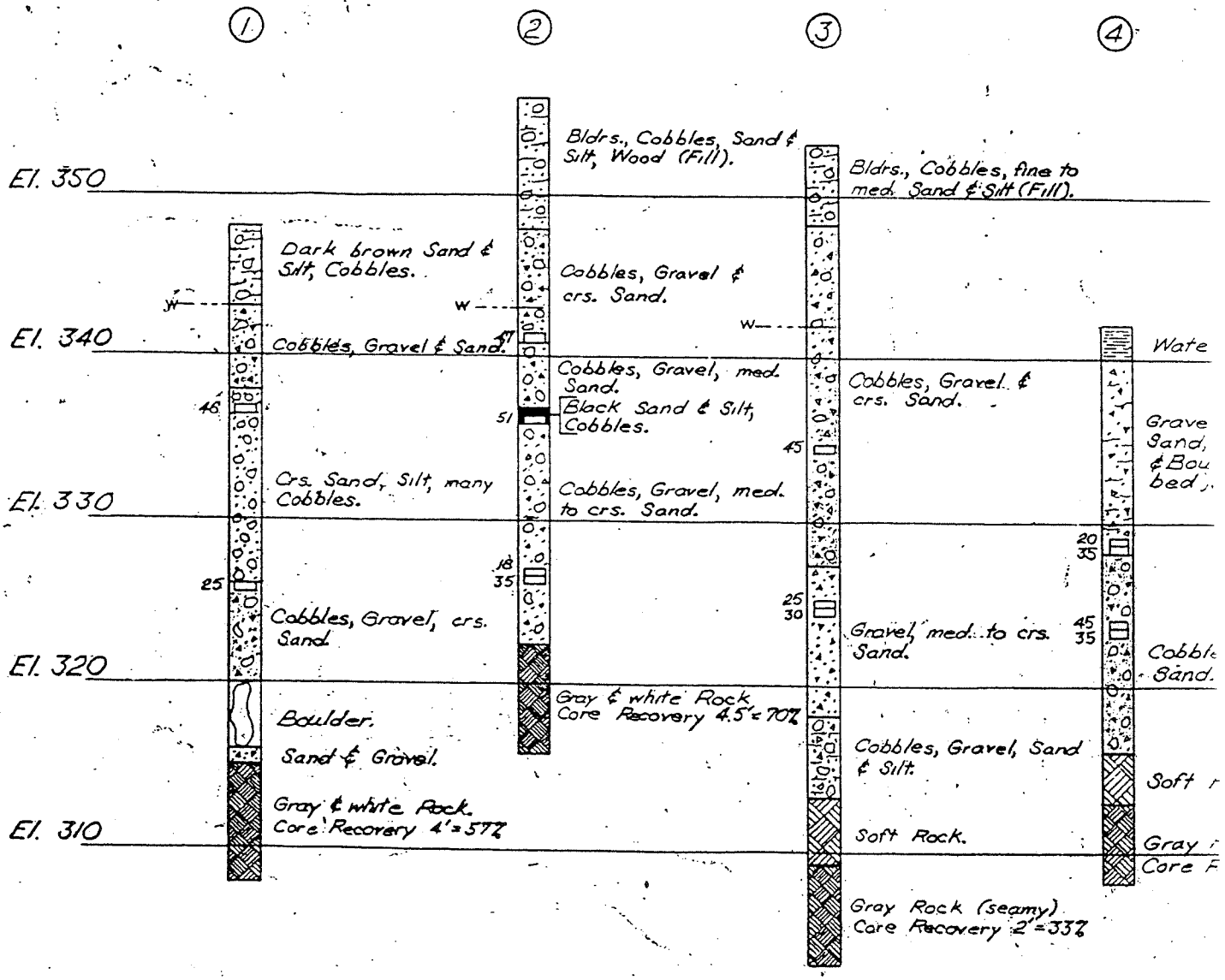
e shall be used throughout. See Special Provisions
Seal.

shall be beveled 1" x 1" unless otherwise dimensioned.

e cost of furnishing and placing 2 layers of 3 ply tar
at backwalls shall be included in item for Class "A" Concrete.

hop and field painting of Structural Steel and
Bridge Rail see Special Provisions.

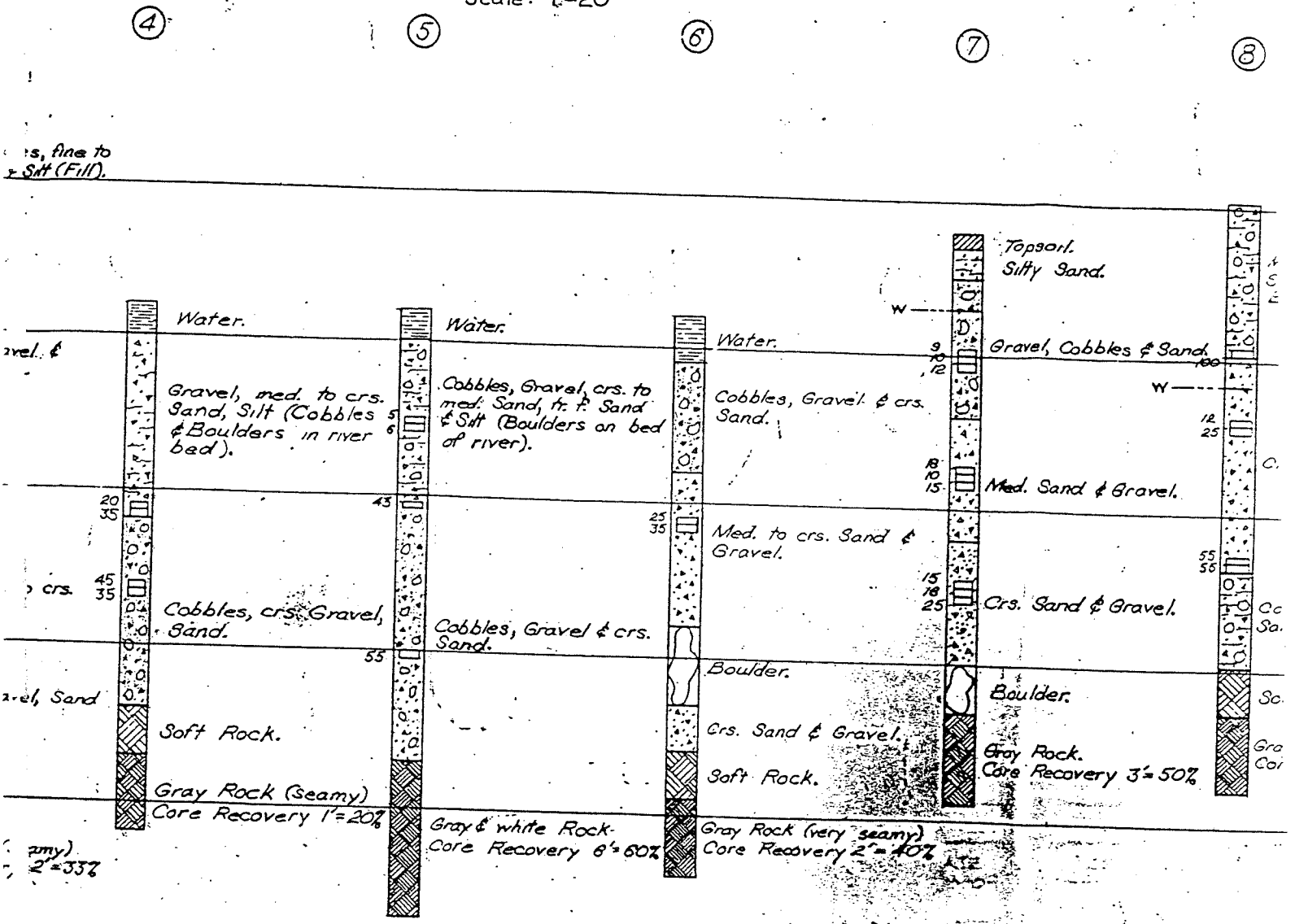
approximate only and do not relieve the Contractor
sibility of checking them in preparing his bid.


1
2
3
4
El. 350
El. 340
El. 330
El. 320
El. 310
Bldrs., Cobbles, Sand & Silt, Wood (Fill).
Bldrs., Cobbles, fine to med. Sand & Silt (Fill).
Dark brown Sand & Silt, Cobbles.
Cobbles, Gravel & crs. Sand.
W
Cobbles, Gravel & Sand.
Cobbles, Gravel, med. Sand.
Black Sand & Silt, Cobbles.
Cobbles, Gravel & crs. Sand.
Wate
Grave Sand, & Bou bed
46
51
45
Crs. Sand, Silt, many Cobbles.
Cobbles, Gravel, med. to crs. Sand.
25
18
35
20
35
25
30
45
35
Cobbles, Gravel, crs. Sand.
Gravel, med. to crs. Sand.
Cobble Sand.
Boulder.
Sand & Gravel.
Gray & white Rock. Core Recovery 4.5' = 70%
Cobbles, Gravel, Sand & Silt.
Soft r
Gray & white Rock. Core Recovery 4' = 57%
Soft Rock.
Gray r
Core F
Gray Rock (seamy). Core Recovery 2' = 33%

Sco

ELEVATION

Scale: 1"=20'



BORINGS

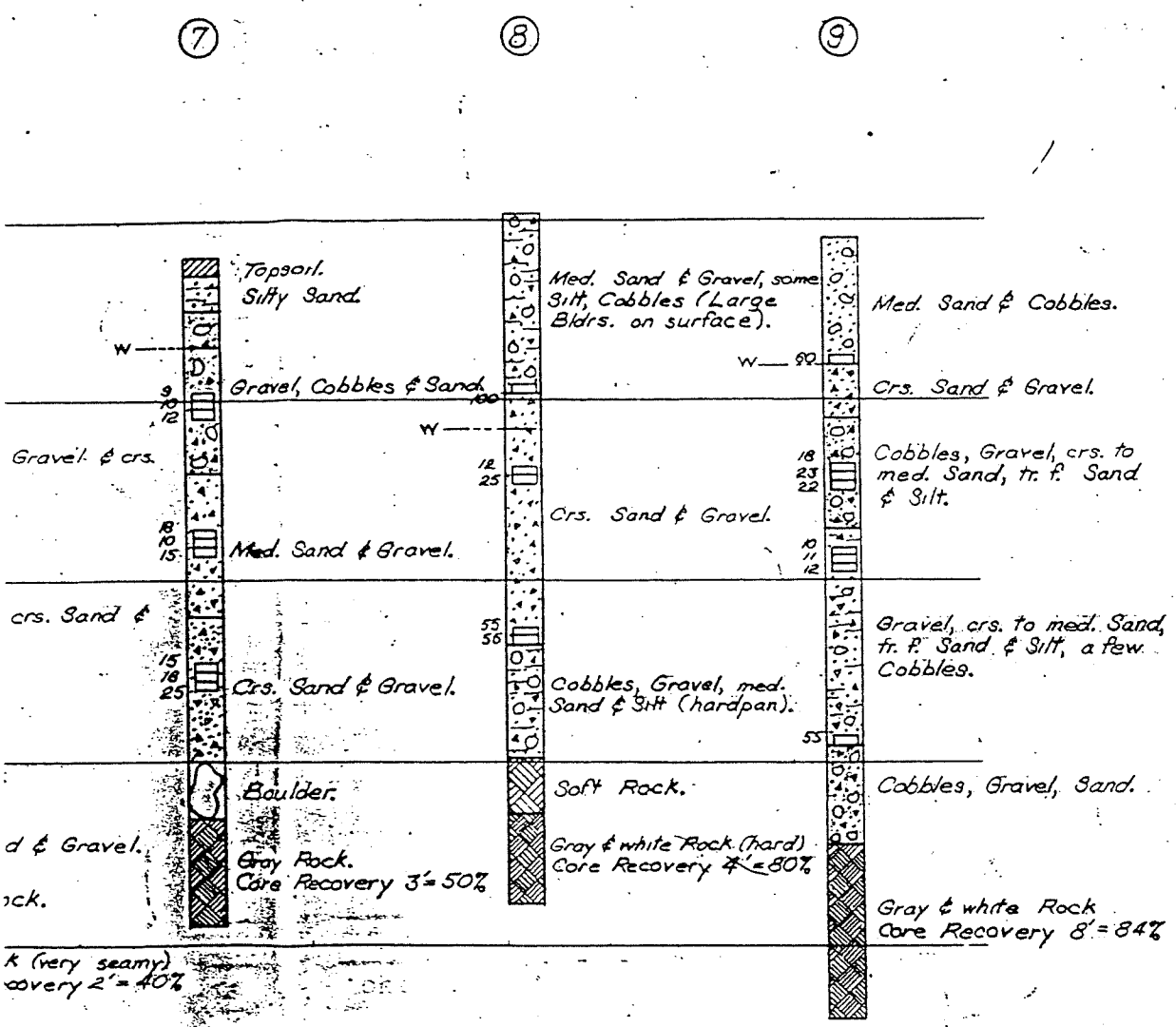
Scale 1"=10'-0" Vert.

Note: The numbers opposite the strata in the number of blows required to dr 2½" sampler pipe 6" with a 300lb. h falling 2'-0".

W ——— Indicates ground water level.

Class "A
½" Prem
Deform
Structu
Dampp
Remove
Metal
Pervio
Riprap
Alterna
Spiral S
Alterna
Welded
Welded

Supers
Substr
Footing

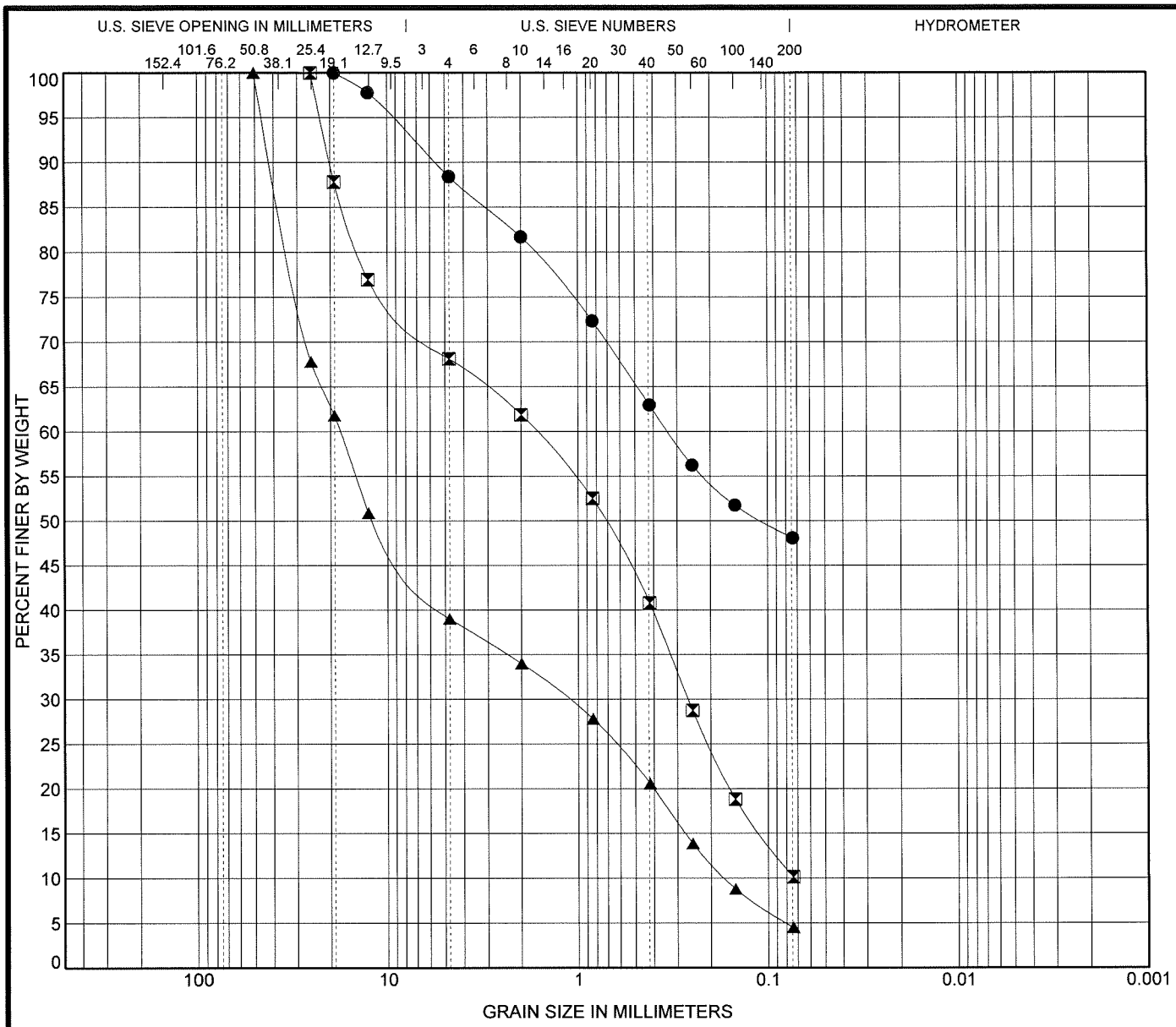


umbers opposite the strata indicate
imber of blows required to drive a
impler pipe 6" with a 300lb. hammer
2'-0".
tes ground water level.

original ground or fill

El. 348.0 which, in the opinion of the Engineer, interfere with pile driving shall be removed where ordered by the Engineer. Excavation required to remove such large rocks and boulders will be paid for as "Unclassified Excavation."

APPENDIX C
Laboratory Results



	COBBLES	% GRAVEL			% SAND		% FINES	
		COARSE	MEDIUM	FINE	COARSE	FINE	% SILT	% CLAY
●	0.0	0.0	5.0	13.3	18.7	14.9	48.1	
⊠	0.0	0.0	25.7	12.4	21.1	30.6	10.2	
▲	0.0	32.2	20.4	13.4	13.4	16.0	4.5	

	Expl. No.	Sample No.	Depth (m)	LL	PL	PI	Water Content (%)	Cc	Cu
●	S4-2	D1	0.0-0.61				6.2		
⊠	S4-3	D1	0.0-0.61				6.3		
▲	S4-7	D2	1.52-2.13				4.9	0.44	106.24

	Sample Description
●	**Coarse to fine SAND, some gravel, little silt - FILL**
⊠	**Coarse to fine SAND, little gravel, trace silt - FILL**
▲	**Coarse to fine GRAVEL, some sand, trace silt - FILL**

Remarks:

HALEY & ALDRICH
Glastonbury, Connecticut

U.S. Interstate Route 84 Reconstruction
Waterbury, Connecticut
State Project No.: 151-273

GRAIN SIZE DISTRIBUTION

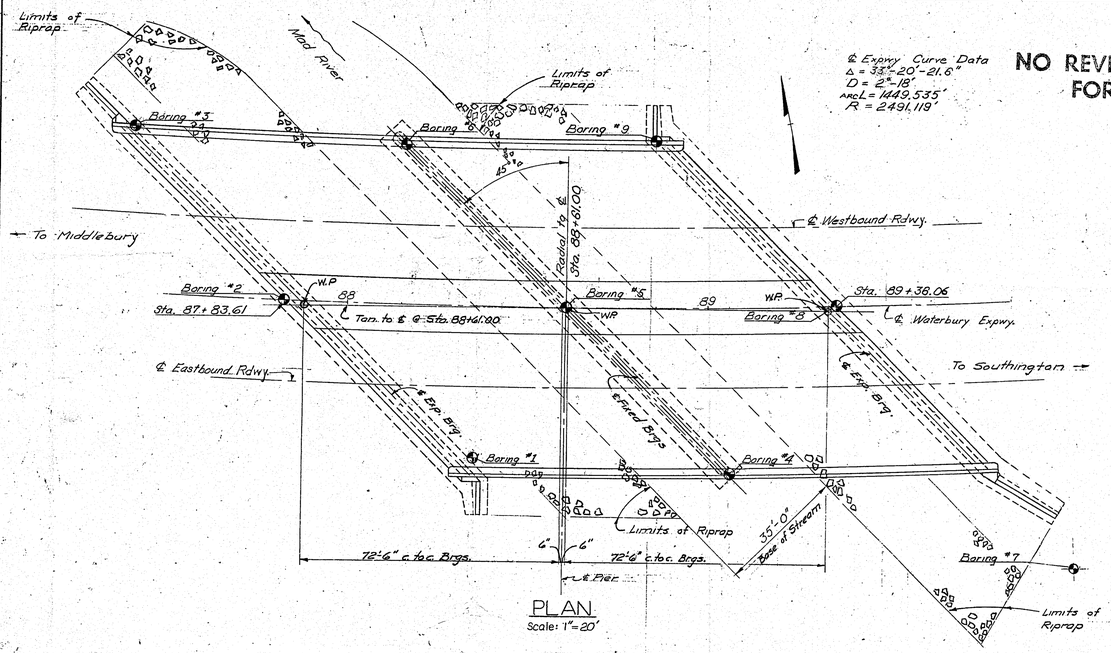
Date: 1/4/2001 File No.: 91313-100

CONN DOT SIEVE 91313SA.GPJ US_LAB.GDT 1/26/01

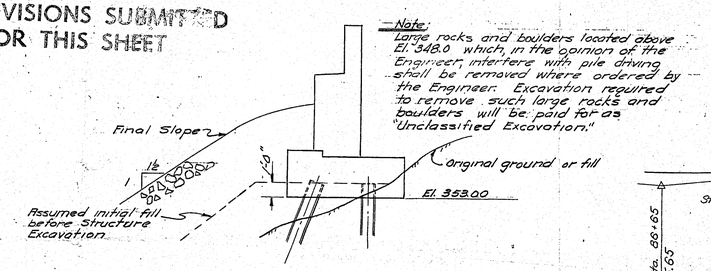
APPENDIX D
Existing Bridge Information

PUB. ROAD DIV. NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	Waterbury	T-138(9)	182-20	1958		33	9

NO REVISIONS SUBMITTED FOR THIS SHEET

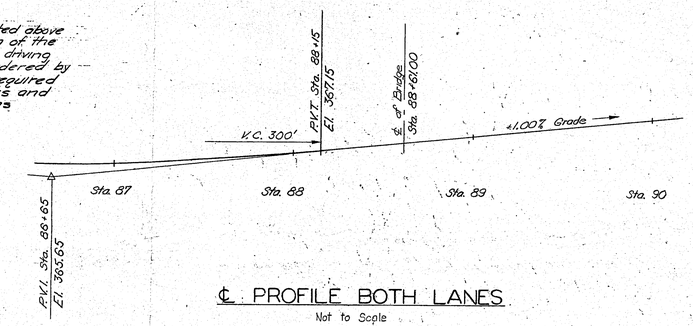


PLAN
Scale: 1"=20'

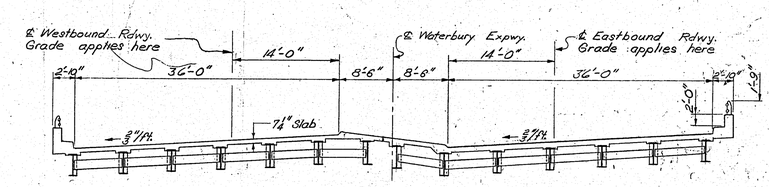


Note:
Large rocks and boulders located above El. 348.0 which, in the opinion of the Engineer, interfere with pile driving shall be removed where ordered by the Engineer. Excavation required to remove such large rocks and boulders will be paid for as "Unclassified Excavation."

DETAIL FOR STRUCTURE EXCAVATION

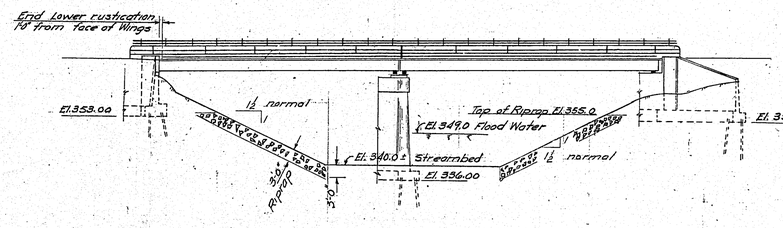


℄ PROFILE BOTH LANES
Not to Scale

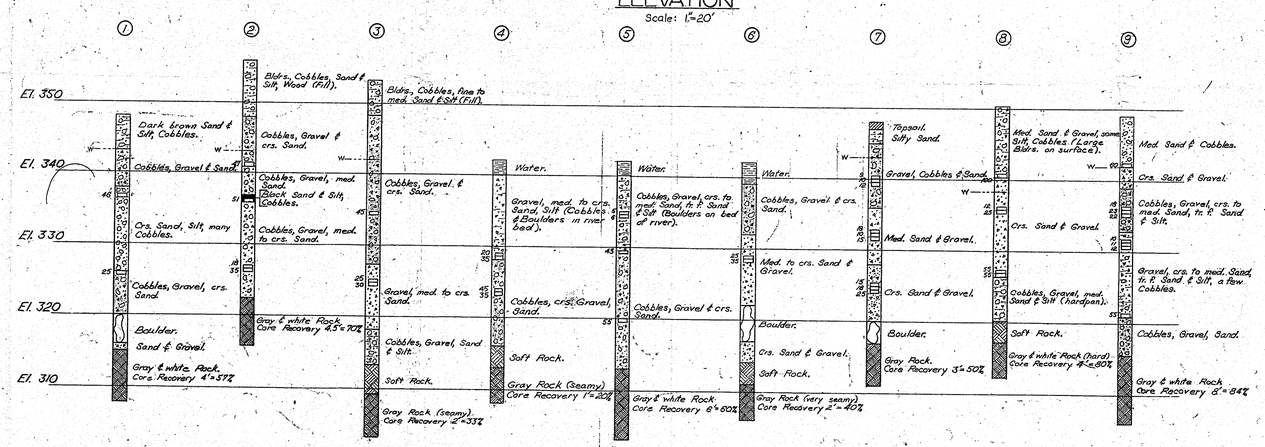


(88+75 Rt.)

TYPICAL CROSS SECTION
Scale: 1"=10'



ELEVATION
Scale: 1"=20'



BORINGS
Scale 1"=10'-0" Vert.

Note: The numbers opposite the strata indicate the number of blows required to drive a 2½" sampler pipe 6" with a 300 lb. hammer falling 2'-0".

W —— Indicates ground water level.

QUANTITIES

Unclassified Excavation	c.y.	50
Structure Excavation (Complete)	c.y.	606
Test Pile (12" H 53# 45'-0" lg.)	ea.	2
Test Pile (12" H 53# 35'-0" lg.)	ea.	1
Furnishing Steel Piles	lb.	273,480
Driving Steel Piles	l.f.	5,160
Splicing Steel Piles	ea.	5
Class "A" Concrete	c.y.	1,696
½" Prem. Bit. Joint Filler for Bridges	s.f.	480
Deformed Steel Bars	lb.	146,000
Structural Steel	lb.	561,000
Dampproofing	s.y.	364
Removal of Superstructure (Sta. 88+75 Rt.)	l.s.	
Metal Bridge Rail	l.f.	308
Pervious Structure Backfill	c.y.	1,560
Riprap	ton	860
Alternate "A" Spiral Shear Connector Bars	lb.	8,235
Alternate "B" Welded Stud Shear Connector (8 in.)	ea.	2,656
Welded Stud Shear Connector (6 in.)	ea.	4,248

CONCRETE DISTRIBUTION

Superstructure	c.y.	455
Substructure	c.y.	779
Footings	c.y.	462

GENERAL NOTES

Specifications: Connecticut State Highway Department Form 808 - January 1955, and Special provisions.

Design Specifications: A.A.S.H.O. - 1953 as supplemented by Connecticut State Highway Dept. "Standard Bridge Details for Contractin Engineers," Dated February 1956.

Live Load: H20-S16-44

Composite Construction: No temporary intermediate supports shall b used during construction. Superimposed loads on slab shal be placed when directed by the Engineer, but not less than 7 days after slab has been poured.

Class "A" Concrete: Class "A" Concrete shall be used throughout. See Special Provisions.

Exposed Edges: Exposed Edges shall be beveled "1"x1" unless otherwi dimensioned.

Joint Seal: Joint Seal shall be included in item for Class "A" Concre See Special Provisions for Class "A" Concrete.

Tar Paper: The cost of furnishing and placing 2 layers of 3-ply tar paper at backwalls shall be included in item for Class "A" Concrete.

Painting: For shop and field painting of Structural Steel and Me Bridge Rail see Special Provisions.

Quantities: Quantities are approximate only and do not relieve the Contractor of the responsibility of checking them in prepa his bid.

Piles: Piles to be driven to at least elevation 325.0, at Abutmen

Structural Steel: Plated Rolled Beams under the item "Structural Stee shall be steel conforming to A.S.T.M. A-373 Structural Steel for welding. See Special Provisions.

Shear Connectors: Shear Connectors to be either Spiral Shear Connector Bars (Alternate "A") or Welded Stud Shear Connectors (Alterna "B"). See Special Provisions.

CONNECTICUT
STATE HIGHWAY DEPARTMENT

TOWN OF WATERBURY
WATERBURY EXPRESSWAY
OVER MAD RIVER
STA. 88+61
GENERAL PLAN

REVISIONS		
NO.	DATE	DESCRIPTION

DESIGNED BY J.F.C.
SCALES As Noted
MADE BY B.F.D. DATE 8-21-57
CHECKED BY MGJ DATE 9-5-57
APPROVED [signature] DATE 9-5-57

PROJECT NO. 182-07-0
BRIDGE SHEET 1 OF 1