REPORT ON
CULVERT 3727
HARPERS FERRY ROAD OVER BEAVER POND BROOK
I-84 RECONSTRUCTION, STATE PROJECT 151-273
WATERBURY, CONNECTICUT

by

Haley & Aldrich, Inc.
East Hartford, Connecticut

for

Berger, Lehman Associates
Wethersfield, Connecticut

File No. 91313-100
Revised February 2003

Haley & Aldrich, Inc.
100 Corporate Place
Suite 105
Rocky Hill, CT 06067-1803

Tel: 860.282.9400
Fax: 860.721.0612
HaleyAldrich.com

HALEY & ALDRICH

Revised 1 February 2003
12 February 2002
File No. 91313-100

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

Attention: Thomas J. Bulzak, P.E., L.S.

Subject: Geotechnical Engineering Recommendations
Culvert 3727, Harpers Ferry Road Over Beaver Pond Brook
I-84 Reconstruction, State Project 151-273
Waterbury, Connecticut

Ladies and Gentlemen:

This report presents our evaluation of subsurface conditions and geotechnical engineering recommendations for Culvert 3727, Harpers Ferry Road Over Beaver Pond Brook, part of the I-84 Reconstruction project in Waterbury, Connecticut. The work was conducted in accordance with our agreement dated 26 December 2000.

In summary, subsurface conditions consist of fill over glaciofluvial deposits. We recommend box culvert and wingwall foundations bear on a 0.15-m thick layer of crushed stone placed over glaciofluvial deposits. Design wingwall foundations as spread footings. Detailed recommendations follow.

PROPOSED CONSTRUCTION

Culvert 3727 is part of the I-84 Reconstruction project in Waterbury, Connecticut (refer to Figure 1, Project Locus). Culvert 3727 will be located on the north side of I-84, as shown on Figure 2, and will carry Beaver Pond Brook beneath Harpers Ferry Road. The culvert will replace an existing culvert, which will be removed.

Culvert 3727 will be 36.5-m long, and will consist of two side-by side box culverts, each 4000 mm high by 3500 mm wide. The invert will slope from El. 110.85 at the inlet to El. 110.4 at the outlet. A 900-mm thick layer of riprap will be placed along the bottom of culvert. Preliminary layout drawings prepared by Berger Lehman Associates are provided in Appendix D.

The inlet headwall will bear at El. 109.35, and the outlet headwall will bear at El. 108.9. The culvert is shown in profile on Figure 3.

Normal water depth in Culvert 3727 will be about 0.3 m. The design 100-yr. flood level is El. 114.9.

Elevations are in meters and refer to NGVD-29.

SITE CONDITIONS

The site is located on Harpers Ferry Road, approximately 20 m north of I-84. Culvert 3727 will be constructed at the location of an existing culvert, which will be removed. The existing culvert consists of twin box culverts, each 3000 mm high by 3000 mm wide, and the invert slopes from El. 111.74 to El. 111.47. The existing and new culvert locations are shown in plan on the preliminary layout drawings in Appendix D.

An underground water main, storm drain, and two sanitary sewers intersect the culvert and wingwall alignments. Utilities are shown in plan on Figure 2, and on the layout drawing included in Appendix D. We understand that utilities will be rerouted prior to construction.

Ground surface slopes from about El. 118 on the Harpers Ferry Road to about El. 112 adjacent to Beaver Pond Brook. The Harpers Ferry Road embankment slope is about 1 vertical to 2 horizontal (1:2).

SUBSURFACE CONDITIONS

Test Borings

General Borings, Inc., Prospect, Connecticut, drilled two test borings for the culvert (S3727-1 and S3727-2) on 20 March 2001. Borings were drilled to depths of 4.0 and 5.2 m below ground surface using hollow-stem augers, and were terminated in dense naturally deposited soils. Soil samples were taken at maximum 1.5-m intervals. Additional samples were taken at closer intervals within the fill and the upper part of the glaciofluvial deposits.

Haley & Aldrich monitored the drilling and prepared test boring logs. AI Engineers, Middletown, Connecticut, surveyed boring locations and ground surface elevations. Test boring locations are shown on Figure 2, and logs are presented in Appendix A.

Previous Test Borings

Two previous test borings, designated D and H, were drilled along the Culvert 3727 alignment in 1958 for design of I-84. Borings D and H were drilled to 10.7 and 5.5 m below

ground surface, respectively, and terminated in dense naturally deposited soils. Logs are presented in Appendix B.

Laboratory Testing

Two laboratory gradation analyses were performed on representative samples of the fill and glaciofluvial deposits to aid in classification. Tests were conducted in the Haley & Aldrich laboratory in general accordance with ASTM procedures. Laboratory test results are presented in Appendix C.

Subsurface Conditions

The borings encountered fill and glaciofluvial deposits. Generalized soil descriptions are given below in order of increasing depth below ground surface. A subsurface profile is shown on Figure 3.

Thickness, m	Generalized Description
1.2 to 2.4	**Fill** – Loose to medium dense, brown to black, coarse to fine SAND, trace to little gravel, trace silt, concrete, and brick.
More than 8.0	**Glaciofluvial Deposits** – Medium dense to very dense, brown, coarse to fine SAND, trace to some gravel, trace silt, with cobbles.

Boulders were not encountered in the fill or glaciofluvial deposits in borings drilled for Culvert 3727. However, boulders were commonly encountered in other borings for this project, and are likely to be present in both the fill and glaciofluvial deposits.

Bedrock – Bedrock was not encountered in borings drilled for Culvert 3727. However, bedrock encountered in other borings for this project typically consists of GRANITIC GNEISS, part of the Waterbury Gneiss formation.

Groundwater was measured at El. 111.5 and El. 111.7 in borings S3727-1 and S3727-2, respectively. However, these measurements were made during or shortly after drilling, and may not represent stabilized groundwater. Groundwater will vary with water levels in Beaver Pond Brook, season, precipitation, nearby construction activity, and other factors.

GEOTECHNICAL ENGINEERING RECOMMENDATIONS

Foundation Type

Glaciofluvial deposits are expected at design subgrade level for the culvert, headwalls, and wingwalls. We recommend structures be supported on spread footing foundations bearing on a 0.15-m thick layer of crushed stone placed over geotextile fabric. Crushed stone is recommended instead of granular fill because the glaciofluvial deposits are relatively pervious and groundwater is above invert grade.

Design Culvert 3727 according to the following criteria:

Foundation Design Criteria

- Place the culvert, headwalls, and wingwalls on a 150-mm thick layer of crushed stone (M.01.01 No. 6). Place geotextile fabric (Form 815 Section 7.55 Geotextile, Separation, Medium Survivability) beneath the crushed stone.

- Assume a Load and Resistance Factor Design (LRFD) ultimate bearing capacity of 925 kPa, and a resistance factor of 0.45. Foundations should bear at least 1.2 m below the lowest adjacent ground surface for frost protection. We estimate total settlement will be less than 25 mm, with differential settlement less than 12 mm. Settlement will occur as load is applied.

- Design the culvert for loading in accordance with AASHTO LRFD Specifications for Highway Bridges, Sections 3 and 12. Design box culverts for lateral earth pressures based on an equivalent fluid unit weight of soil equal to 8.7 kN/m^3 (55 pcf), which assumes an at-rest coefficient of earth pressure of 0.45. Include the lateral component of the vertical surcharge pressure due to traffic or vehicle loading. Multiply the vertical surcharge pressure at the top of the box culvert by 0.45 and apply as a uniform lateral pressure distribution.

- Site grading behind the wingwalls has not yet been finalized. The following table provides equivalent fluid unit soil weights for various backfill slopes:

Equivalent Fluid Unit Weight of Soil (kN/m^3)	Slope Behind the Wall
5.2 kN/m^3 (33 pcf)	Level Backfill
6.0 kN/m^3 (38 pcf)	1V:4H
6.3 kN/m^3 (40 pcf)	1V:3H
7.4 kN/m^3 (47 pcf)	1V:2H

- Assume a 0.8 resistance factor against sliding, and a coefficient of friction on the base of the wall of 0.6. Neglect passive pressure in front of the wall.

- Design headwalls and wingwalls as drained retaining walls, with provisions for water to drain through the face. Provide 100-mm dia. weep holes in accordance with CONNDOT specifications for drainage. Maximum spacing between weep holes should be 3 m.

- Backfill the walls with pervious structure backfill (ConnDOT M.02.05). Place pervious structure backfill behind abutments and wingwalls above a line defined by a 1V:1.5H slope extending up from the heel of the footing.

Seismic Design

The seismic soil coefficient, S, is equal to 1.0, and soils are not susceptible to liquefaction. Based on the Bridge Design Manual, Culvert 3727 does not require seismic design.

Reuse of Excavated Materials

Based on the results of gradation analyses, excavated soils will not be suitable for reuse as pervious structure backfill or granular fill. Excavated soils will generally be suitable for reuse as 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 equipment, construction methods and procedures.

Excavation and Temporary Lateral Support

Culvert 3727 will be constructed in stages to avoid disruption of traffic on Harpers Ferry Road. Excavations will extend up to about 7.5-m below Harpers Ferry Road. Temporary lateral support of the excavation will be required to protect the adjacent roadway and nearby underground utilities during construction staging, and to limit the size of the excavation within Harpers Ferry Road.

Steel sheet piling may require pre-excavation, due to the potential for cobbles and boulders to obstruct installation. We anticipate soldier piles and lagging will be feasible, however, pre-drilling may be necessary to install soldier piles.

Excavations will be in fill and glaciofluvial deposits. Conventional heavy construction equipment appears practical for excavation of overburden soils. However, chiseling or mechanical splitting maybe necessary for removal of boulders.

Cofferdam and Dewatering

Excavation will extend up to 3 m below water levels measured in the borings, and excavation dewatering will be required. We anticipate that a series of deep wells around the perimeter of the excavation will be required to permit construction in the dry. Cofferdam and dewatering should be specified in the contract documents.

Subgrade Preparation

Due to the wet conditions anticipated, geotextile fabric and crushed stone should be placed immediately after excavation to avoid subgrade disturbance due to seepage.

CLOSURE

This report has been prepared for specific application to Culvert 3727 of the I-84 Reconstruction project, as understood at this time, in accordance with generally accepted geotechnical engineering practice. 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.

Nathan L. Whetten, P.E., C.G.
Senior Engineer

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

Enclosures:

- Figure 1 – Project Locus
- Figure 2 – Subsurface Exploration Plan, Culvert 3727 Harpers Ferry Road Over Beaver Pond Brook
- Figure 3 – Subsurface Profile Along Culvert 3727, Harpers Ferry Road Over Beaver Pond Brook
- Appendix A – Recent Test Boring Logs
- Appendix B – Previous Test Boring Logs
- Appendix C – Results of Laboratory Testing
- Appendix D – Preliminary Culvert Layout Drawings

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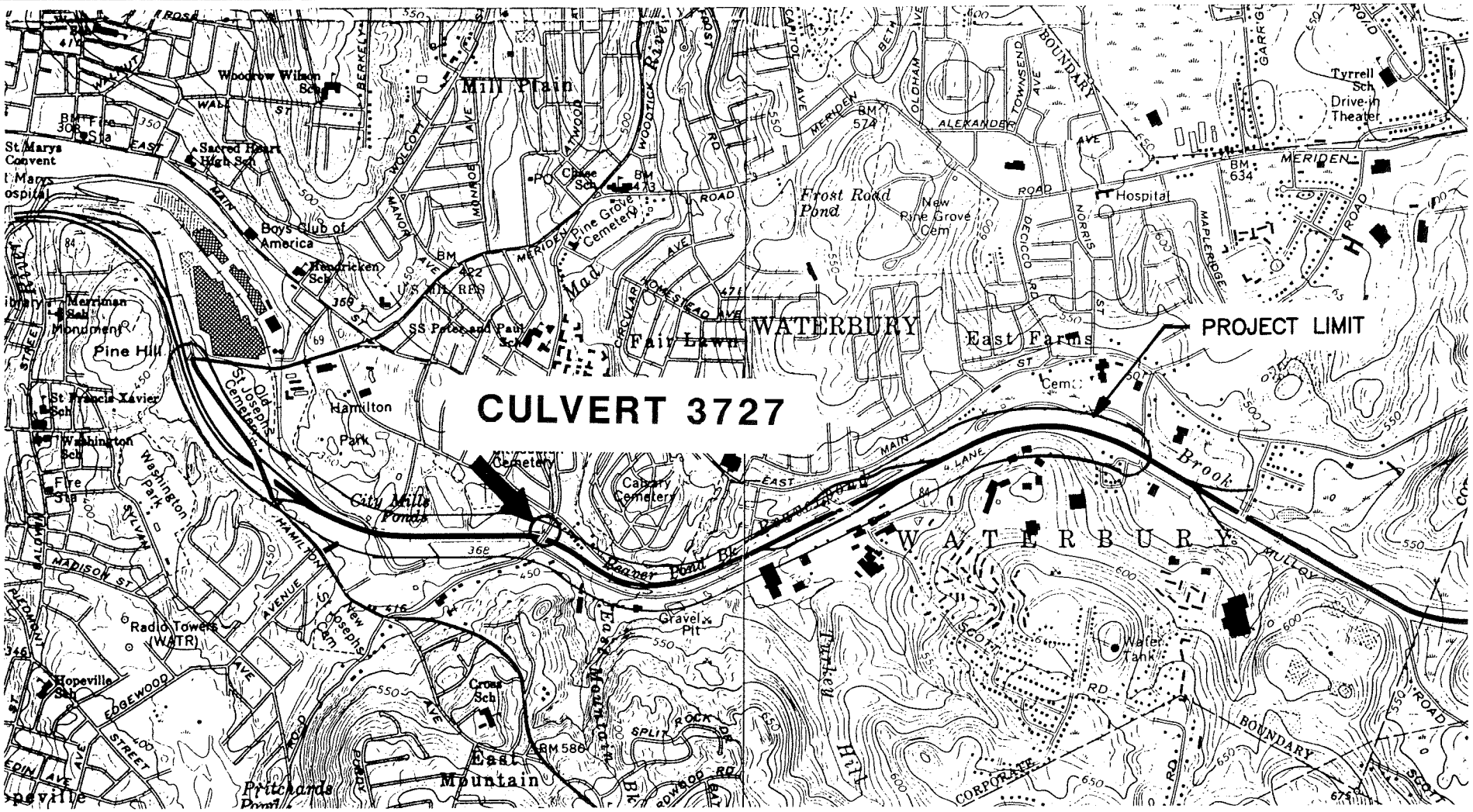
91313-100 CULVERTS/A02



SITE COORDINATES: 041°32'26.86"N 073°01'10.77"W

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

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

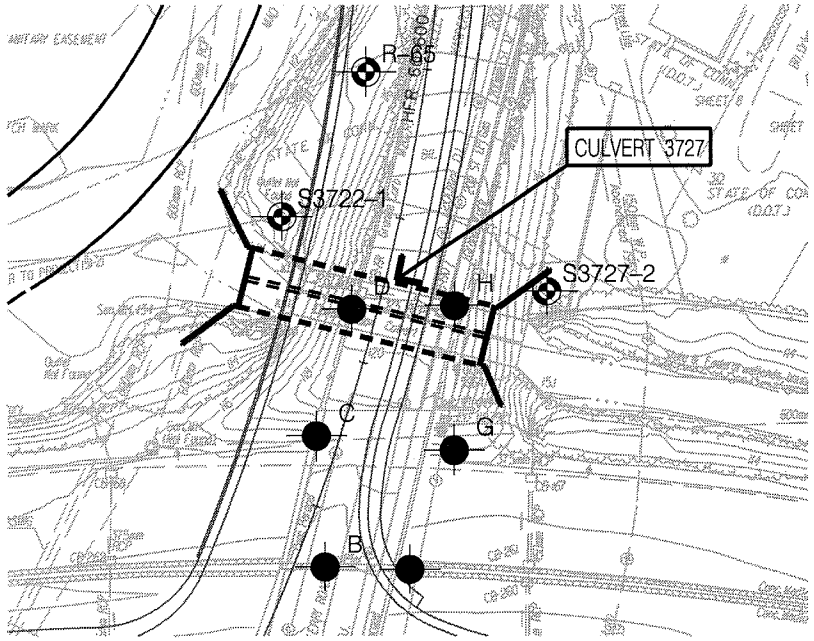
U.S. INTERSTATE 84 RECONSTRUCTION
STATE PROJECT NO. 151-0273
WATERBURY, CONNECTICUT

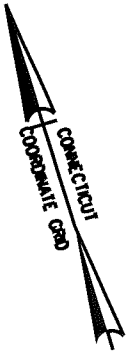
PROJECT LOCUS

SCALE: 1:24,000

FEBRUARY 2002

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, MIDDLETOWN CONNECTICUT.
2. ELEVATIONS ARE IN METERS, REFER TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929.

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

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

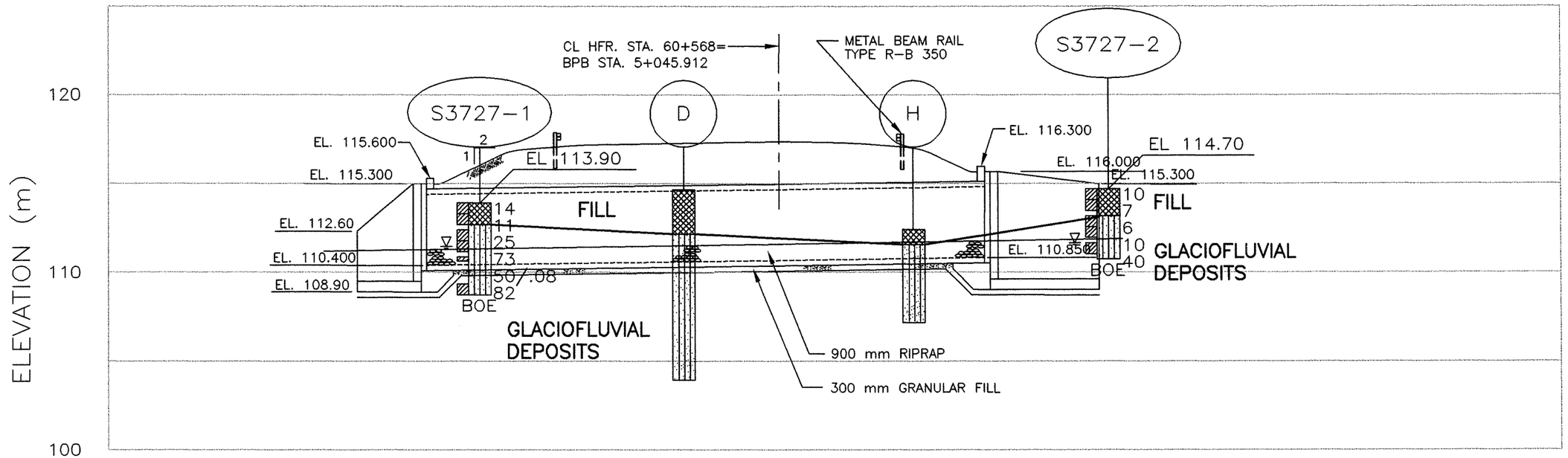
SUBSURFACE EXPLORATION PLAN
STRUCTURE 3727 HARPERS FERRY ROAD OVER BEAVER POND BROOK

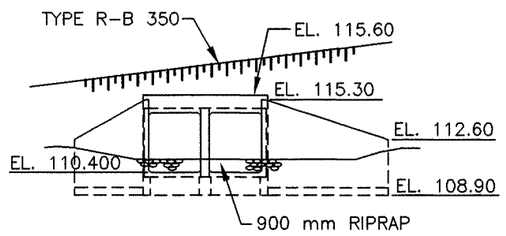
SCALE: 1:1000

FEBRUARY 2002

91313-100

FIGURE 2





WEST ELEVATION (OUTLET)

SUBSURFACE PROFILE (LOOKING NORTH)

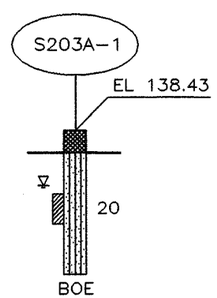
LEGEND

LITHOLOGY GRAPHICS

- Fill
- Glaciofluvial Deposits
- Glacial Till

SAMPLER GRAPHICS

- SAMPLE OBTAINED BY A 51 mm O.D. SPLIT SPOON SAMPLER WITH A 63.5 kg WEIGHT FALLING 0.76 m – NUMBER INDICATES STANDARD PENETRATION RESISTANCE N-VALUE OF SAMPLE INTERVAL, IN BLOWS PER 0.3 m
- CORE SAMPLE 55 mm DIA.



EXPLORATION DESIGNATION.

APPROXIMATE GROUND SURFACE ELEVATION (METERS) AT EXPLORATION

MAJOR STRATUM BOUNDARY BETWEEN DIFFERENT SOIL TYPES

WATER LEVEL NOTED DURING OR SHORTLY AFTER DRILLING

SAMPLE LOCATION AND INTERVAL. SEE SAMPLER GRAPHIC LEGEND FOR SAMPLE TYPE

BOTTOM OF EXPLORATION

NOTES

1. REFER TO FIGURE 2 FOR LOCATIONS OF TEST BORINGS.
2. INFORMATION ON PROPOSED CULVERT, WINGWALLS, AND FINAL GROUND SURFACE CONFIGURATION WAS PROVIDED BY BERGER LEHMAN ASSOCIATES.
3. STRATA BOUNDARIES ARE INTERPOLATED FROM TEST BORINGS AND MAY VARY BETWEEN BORING LOCATIONS.
4. ELEVATIONS ARE IN METERS AND REFER TO NGVD-29.

0 10 20

SCALE IN METERS

1:250

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

U.S. INTERSTATE ROUTE 84 RECONSTRUCTION
STATE PROJECT NO. 151-0273
WATERBURY, CONNECTICUT

SUBSURFACE PROFILE ALONG CULVERT 3727, HARPER'S FERRY RD. OVER BEAVER POND BROOK

SCALE: AS SHOWN

FEBRUARY 2002

FIGURE 3

100/CULVERTS/91313-972 B01

APPENDIX A

Recent Test Boring Logs

J. Ouellette DRILLER	SM - 001 - M REV. 1/94 BORING REPORT STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	Hole No. **S3727-1**
P. Carrera INSPECTOR	TOWN: **Waterbury, CT**	Line & Station Offset
Haley & Aldrich, Inc. SOILS ENGINEER	PROJECT NAME: **Reconstruction of I-84**	N. Coordinate **230933.70**
	PROJECT NUMBER: **State: 151-273/H&A: 91313-102**	E. Coordinate **283165.10**
	BORING CONTRACTOR: **General Borings, Inc.**	**Berger, Lehman Associates, P.C.** PRIME DESIGNER

Surface Elevation: **113.90**
Date Started: **20 March 2001**
Date Finished: **20 March 2001**

Groundwater Observations
@ **2.44** m after **0** hours
@ m after hours

	Casing				Auger		Mud	Sampler		Core Barrel			
Utilized						X		X					
Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Size I.D. (mm)	60	76	100	64		83		35	X	35	35	55	55
Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
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	0.36	D	4	7	7	5		Medium dense brown coarse to fine SAND, trace fine gravel, silt
		0.61-1.22	2	0.61	0.30	D	6	5	6	9		Medium dense brown coarse to fine SAND, trace coarse gravel, silt
											112.68 1.22	-FILL-
		1.52-2.13	3	0.61	0.41	D	5	5	20	22	111.77 2.13	Medium dense brown coarse to fine SAND, little coarse to fine gravel
		2.13-2.74	4	0.61	0.36	D	25	32	41	50		Very dense brown coarse to fine SAND and medium to fine GRAVEL, trace silt with cobbles
		3.05-3.28	5	0.23	0.15	D	22	50/.08				Very dense brown coarse to fine GRAVEL and coarse to fine SAND, trace silt with cobbles
5		4.57-5.18	6	0.61	0.41	D	25	38	44	50		Same as D5
											108.72 5.18	-GLACIOFLUVIAL DEPOSITS- Bottom of Exploration at 5.18 m.
10												
15												

Casing Size	From	To	Meters of Earth	Rock
HSA	0.0	4.57	5.18 m	- m
			No. of Samples	
			6D	

NOTES: **Track mounted CME-45C with automatic 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. **S3727-1**
Sheet **1** of **1**

J. Ouellette DRILLER	SM - 001 - M REV. 1/94 BORING REPORT STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	Hole No. **S3727-2**
P. Carrera INSPECTOR	TOWN: **Waterbury, CT**	Line & Station Offset N. Coordinate **230913.90**
Haley & Aldrich, Inc. SOILS ENGINEER	PROJECT NAME: **Reconstruction of I-84** PROJECT NUMBER: **State: 151-273/H&A: 91313-102** BORING CONTRACTOR: **General Borings, Inc.**	E. Coordinate **283195.60** **Berger, Lehman Associates, P.C.** PRIME DESIGNER

		Casing				Auger		Mud	Sampler		Core Barrel			
Surface Elevation: **114.70**	Utilized						X		X					
Date Started: **20 March 2001**	Type	BW	NW	HW	Pipe	Solid	Hollow		SS		B(st)	B(dt)	NX(st)	NX(dt)
Date Finished: **20 March 2001**	Size I.D. (mm)	60	76	100	64		83		35	X	35	35	55	55
Groundwater Observations	Hammer (kg)	136	136	136	136			Bit	63.5		Type		Diamond	
@ **3.05** m after **0** hours	Fall (m)	0.6	0.6	0.6	0.6				0.76		of bit		Carbide	
@ m after hours														

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	0.13	D	3	7	3	3		Medium dense gray to black coarse to fine SAND and coarse to fine GRAVEL, with concrete, brick
		0.61-1.22	2	0.61	0.05	D	7	3	4	7		D2 same as D1 except loose
		1.52-2.13	3	0.61	0.43	D	5	3	3	5		-FILL-
		2.13-2.74	4	0.61	0.51	D	5	3	7	7	112.27	Loose brown coarse to fine SAND
											2.43 111.65	Medium dense brown coarse to fine SAND, trace fine gravel, silt
		3.05-3.66	5	0.61	0.46	D	14	17	23	38	3.05 110.74	Dense olive brown coarse to fine SAND, little silt, trace fine gravel, wood with cobbles
											3.96	-GLACIOFLUVIAL DEPOSITS-
5												Bottom of Exploration at 3.96 m.
10												
15												

Casing Size	From	To	Meters of Earth	Rock
HSA	0.0	3.96	3.96 m	- m
			No. of Samples	
			5D	

NOTES: **Track mounted CME C-45 with automatic hammer. Borehole backfilled with drill cuttings upon completion**

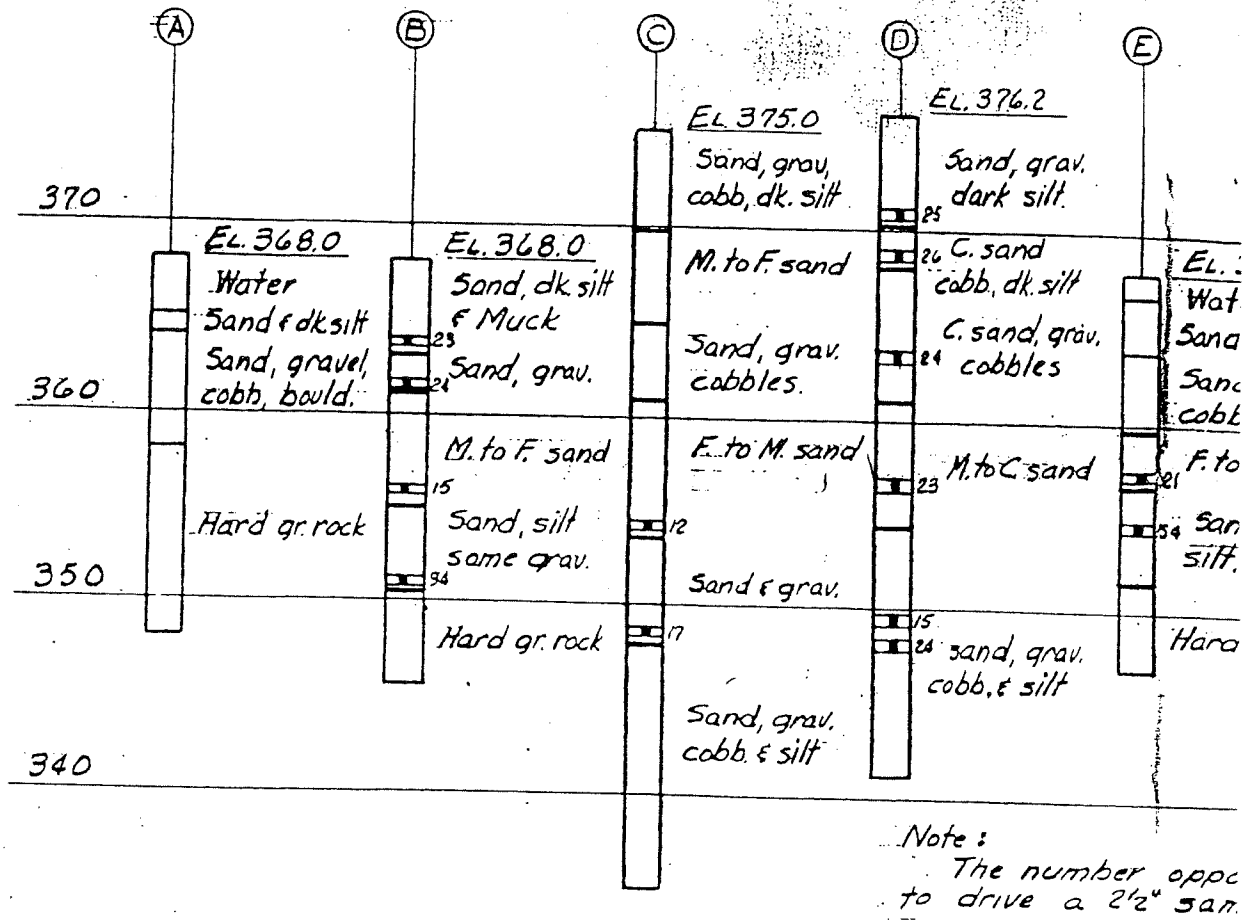
SAMPLE TYPE CODING: D=Driven C=Core A=Auger UP=Undisturbed Piston V=Vane Test SS=Split Spoon
PROPORTIONS USED: Trace=1-10% Little=10-20%, Some=20-35%, And=35-50%

Hole No. **S3727-2**
Sheet **1** of **1**

APPENDIX B

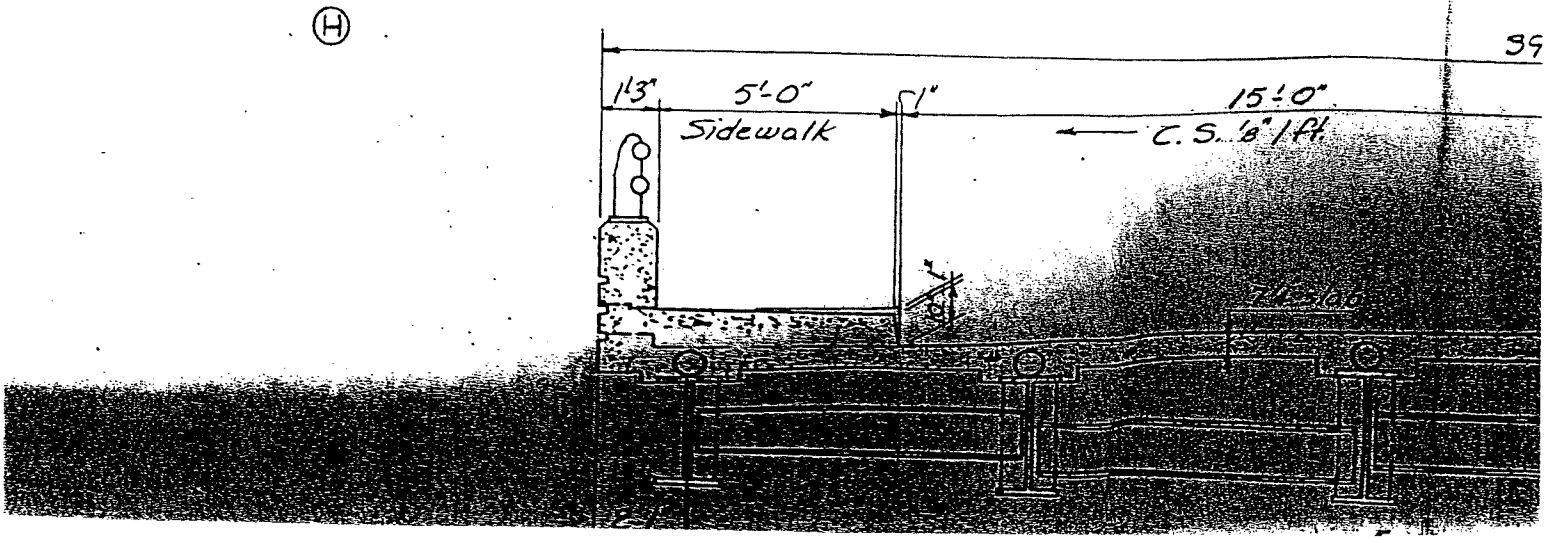
Previous Test Boring Logs

PUB. RC
DIV. N
1

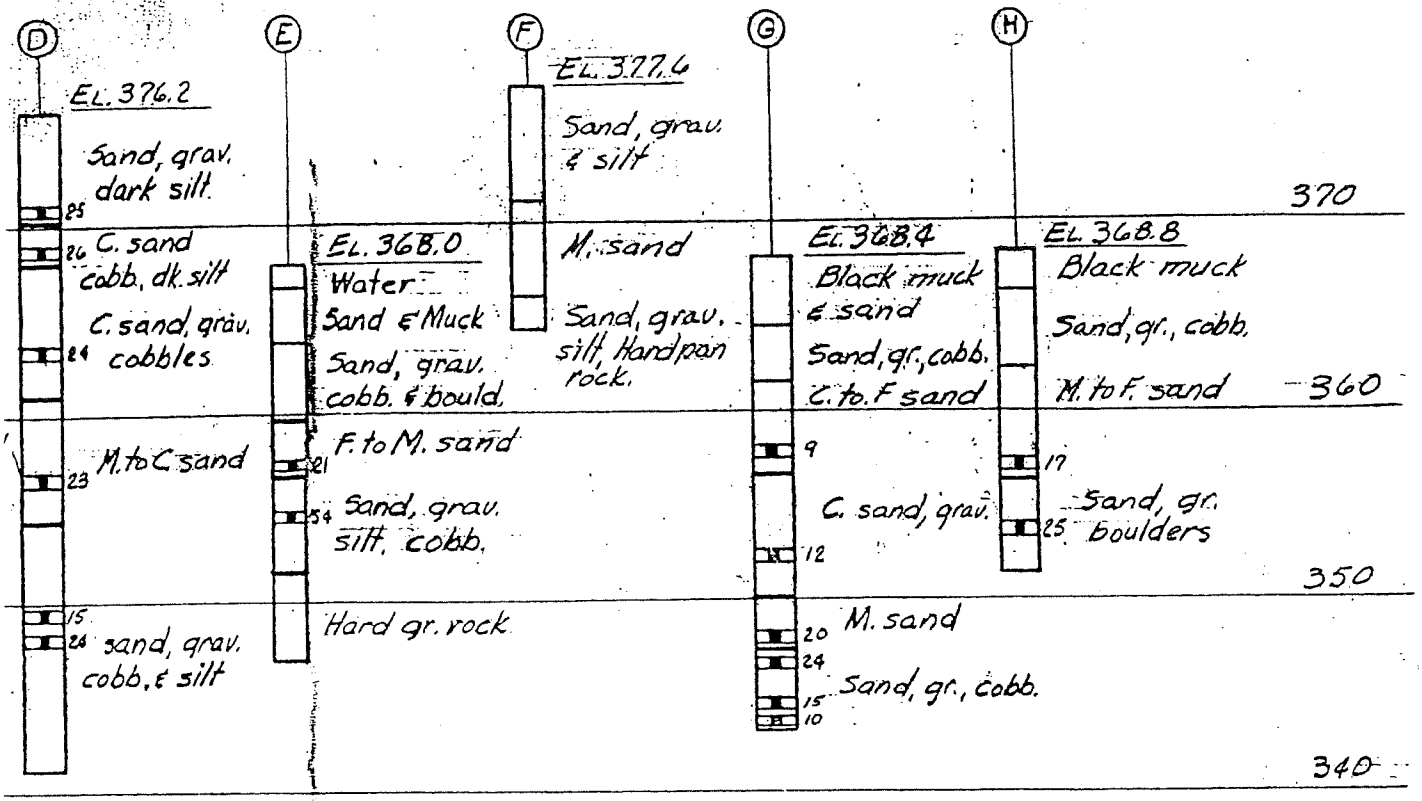


Gutter
393.47

BORINGS

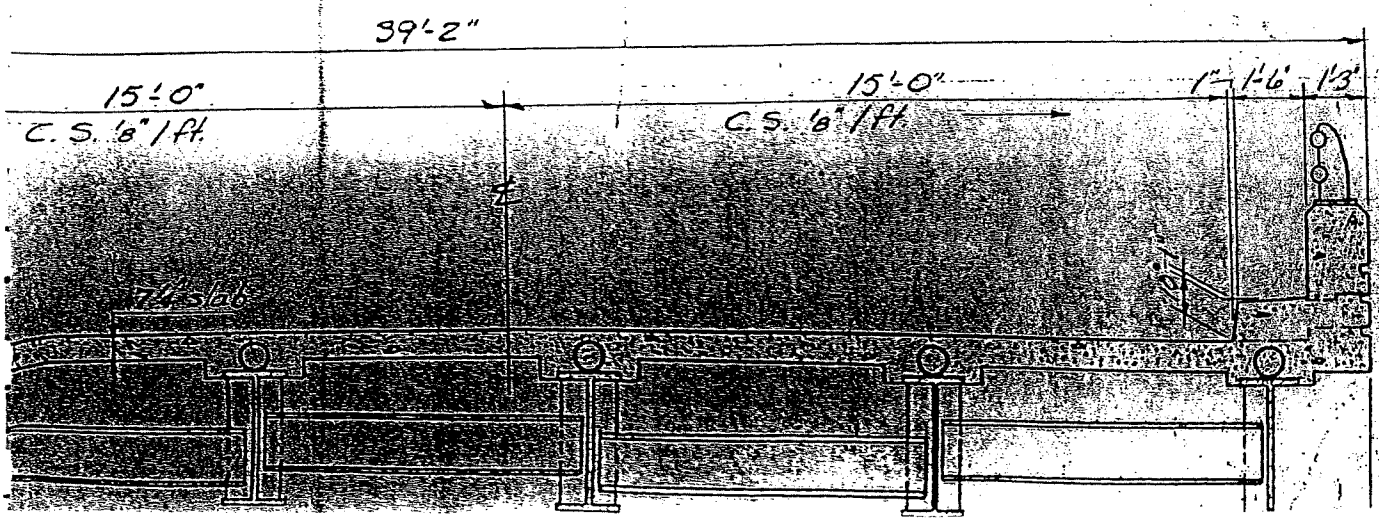


PUB. ROAD DIV. NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TO SH
1	CONN.	Waterbury	I-138(9)	182-20	1958		46	9



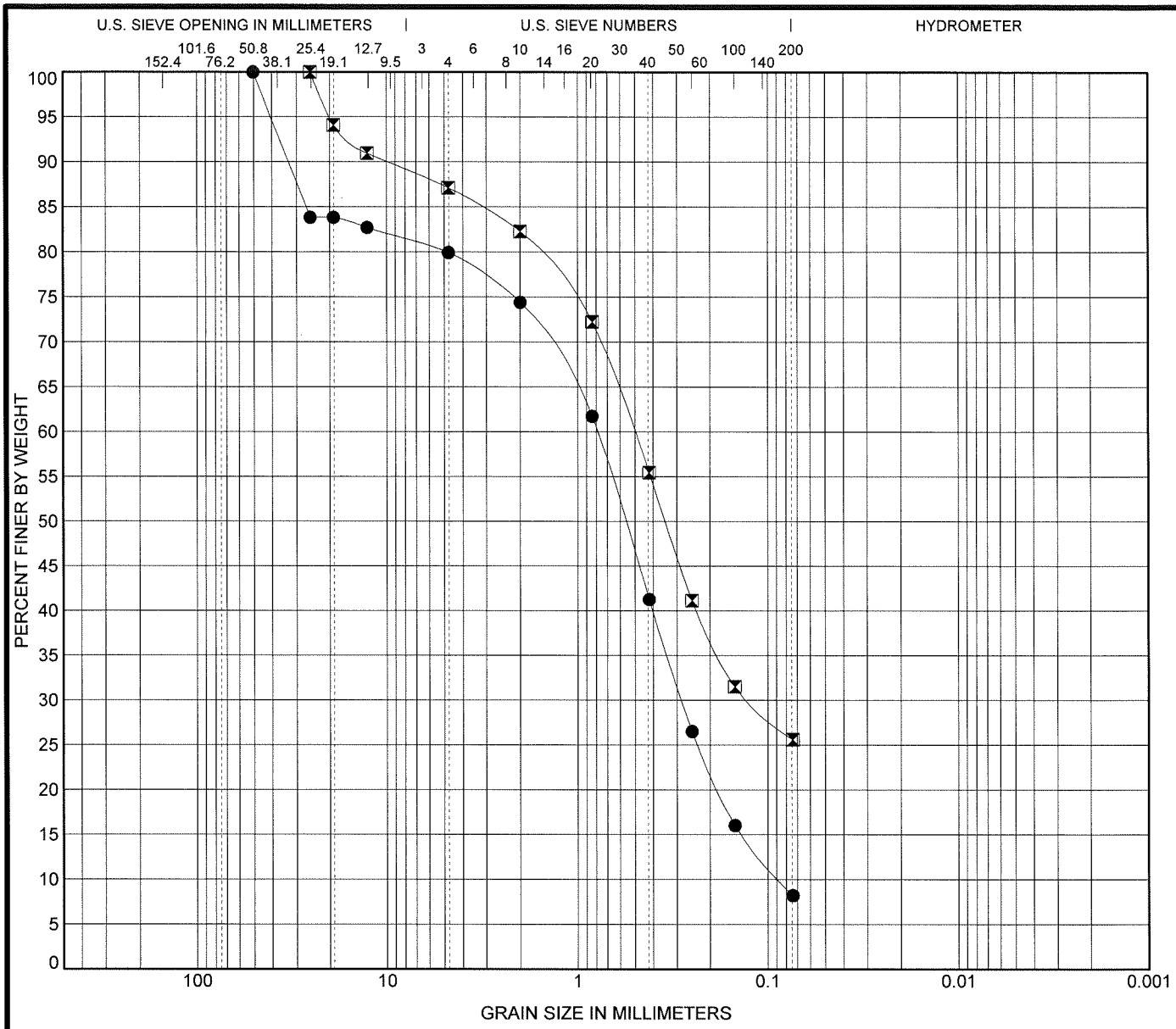
Note:
The number opposite the strata indicates the number of blows needed to drive a 2½" sampler pipe 1'-0" with a 300 lb. hammer falling 2'-0".

BORINGS



APPENDIX C

Results of Laboratory Testing



	COBBLES	% GRAVEL			% SAND		% FINES	
		COARSE	MEDIUM	FINE	COARSE	FINE	% SILT	% CLAY
●	0.0	16.2	1.9	7.5	33.2	33.0	8.2	
⊠	0.0	0.0	10.2	7.5	26.8	29.9	25.6	

	Expl. No.	Sample No.	Depth (m)	LL	PL	PI	Water Content (%)	Cc	Cu
●	S3727-1	S2	0.61-1.22				8.73	1.17	9.14
⊠	S3727-2	S4	2.13-2.74				9.95		

Sample Description

●	**Brown coarse to fine SAND and coarse to fine GRAVEL, trace silt (FILL)**
⊠	**Brown coarse to fine SAND, some silt, little gravel. (GLACIOFLUVIAL DEPOSIT)**

Remarks:

HALEY & ALDRICH
Glastonbury, Connecticut

I-84 Reconstruction
Waterbury, Connecticut
State Project No.: 151-273

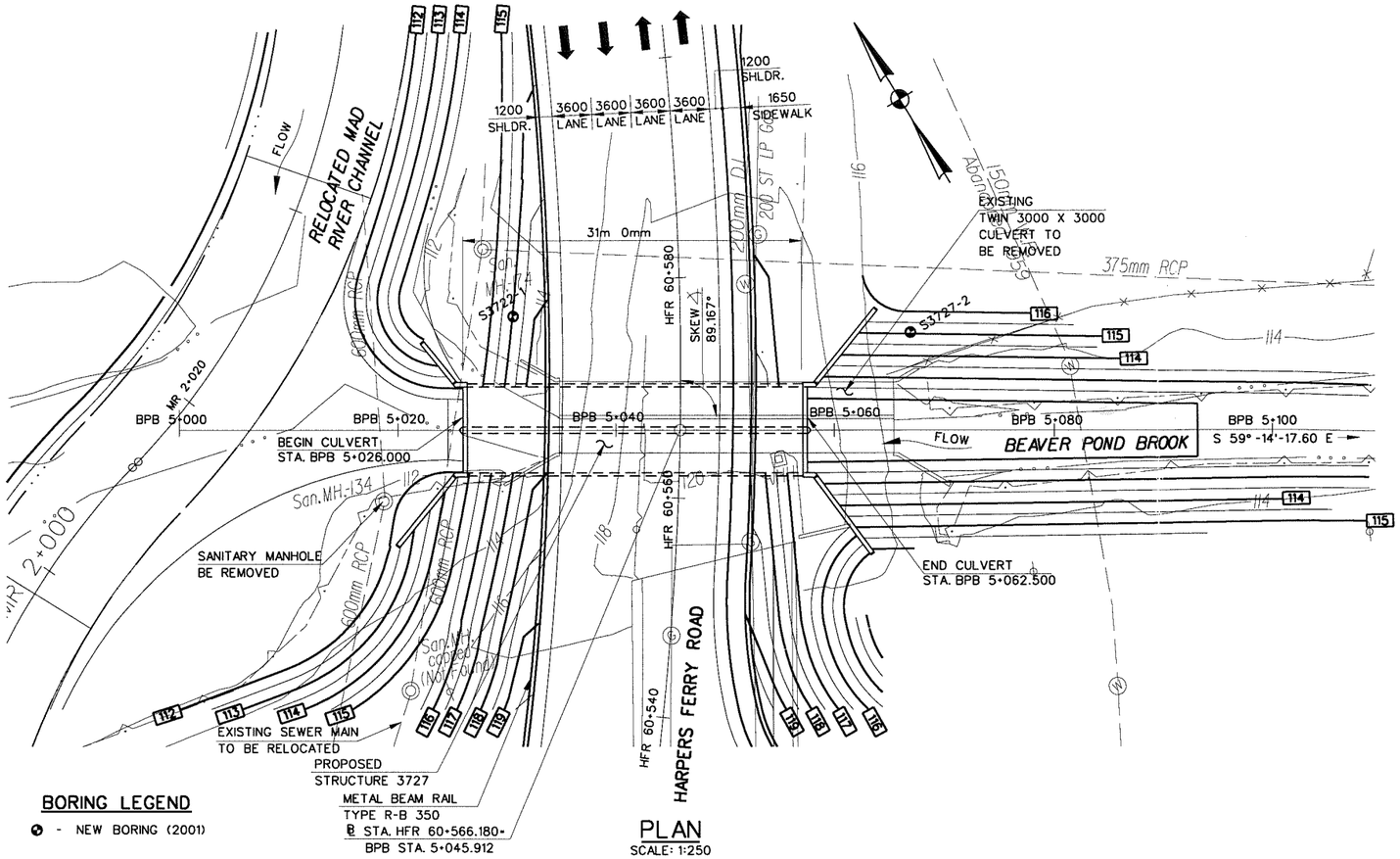
GRAIN SIZE DISTRIBUTION

Date: 2/11/2002 File No.: 91313-100

CONN DOT SIEVE 91313S.GPJ US LAB.GDT 2/11/02

APPENDIX D

Preliminary Culvert Layout Drawings



PLAN
SCALE: 1:250

BORING LEGEND
- NEW BORING (2001)

GENERAL NOTES

1. SPECIFICATIONS: CONNECTICUT DEPARTMENT OF TRANSPORTATION FORM 815 (1995) WITH SUPPLEMENTS THERETO DATED (-/ -/ -) AND SPECIAL PROVISIONS.
2. DESIGN SPECIFICATIONS: AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECOND EDITION 1998 WITH THE INTERIM SPECIFICATIONS UP TO AND INCLUDING 2001, AS SUPPLEMENTED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION BRIDGE MANUAL (1997 METRIC EDITION).
3. ALLOWABLE DESIGN STRESSES:
   CLASS "A" CONCRETE BASED ON f'c = 21 MPa
   REINFORCEMENT (ASTM A515M GRADE 420) fY = 414 Mpa
4. LIVE LOAD: HL - 93.
5. CLASS "A" CONCRETE: CLASS "A" CONCRETE SHALL BE USED FOR THE ENTIRE STRUCTURE AND THE PARAPETS.
6. JOINT SEAL: SEE SPECIAL PROVISIONS.
7. EXPOSED EDGES: EXPOSED EDGES OF CONCRETE SHALL BE BEVELED 25 mm x 25 mm UNLESS DIMENSIONED OTHERWISE.
8. CONCRETE COVER: ALL REINFORCEMENT SHALL HAVE 50 mm COVER UNLESS DIMENSIONED OTHERWISE.
9. REINFORCEMENT: ALL REINFORCEMENT SHALL BE ASTM A615M GRADE 420.
10. PREFORMED EXPANSION JOINT FILLER: THE COST OF FURNISHING AND INSTALLING PREFORMED EXPANSION JOINT FILLER SHALL BE INCLUDED IN THE COST OF THE ITEM "CLASS 'A' CONCRETE.
11. CONSTRUCTION JOINTS: CONSTRUCTION JOINTS, OTHER THAN THOSE SHOWN ON THE PLANS, WILL NOT BE PERMITTED WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.
12. ELEVATIONS: ALL ELEVATIONS ARE GIVEN IN METERS (m).
13. DIMENSIONS: ALL DIMENSIONS ARE GIVEN IN MILLIMETERS (mm).
14. STATIONING: STATIONS ARE GIVEN IN METERS (m).
15. DECIMAL DIMENSIONS: WHEN DIMENSIONS ARE GIVEN TO LESS THAN THREE DECIMAL PLACES, THE OMITTED DIGITS SHALL BE ASSUMED TO BE ZEROS.

EXISTING DIMENSIONS AND ELEVATIONS DIMENSIONS AND ELEVATIONS OF THE EXISTING STRUCTURE SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY. THEY HAVE BEEN TAKEN FROM THE ORIGINAL DESIGN DRAWINGS AND A LIMITED FIELD SURVEY AND ARE NOT GUARANTEED. THE EXISTING DIMENSIONS AND ELEVATIONS HAVE BEEN CONVERTED FROM ENGLISH UNITS TO THEIR METRIC EQUIVALENT AND ROUNDED TO NEAREST MILLIMETER. THE CONTRACTOR SHALL TAKE ALL FIELD MEASUREMENTS TO ASSURE PROPER FIT OF THE FINISHED WORK AND SHALL ASSUME FULL RESPONSABILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENTS ARE SUBMITTED FOR APPROVAL THE FIELD MEASUREMENTS SHALL ALSO BE SUBMITTED FOR REFERENCE BY THE REVIWER.

EXISTING PLANS CULVERT NO. ORIGINALLY CONSTRUCTED UNDER CONTRACT NO.

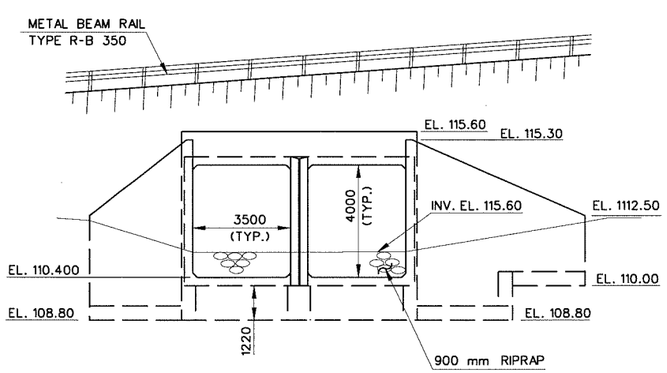
HARPERS FERRY ROAD	
P.C.	STA. HFR 60+353.733
	N 230789.282
	E 283008.738
C.C.	N 231075.237
	E 282918.021
P.C.C.	STA. HFR 60+684.068
	N 231026.708
	E 283214.070
Δ	63° 05'21.60" Left
T (m)	184.162
L (m)	330.335
R (m)	300.000

CURVE DATA

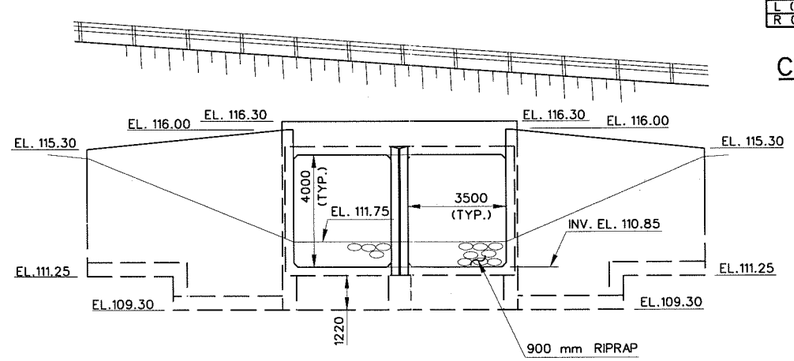
WATERSHED AREA	DESIGN FLOW FREQ.	DESIGN FLOW
15.1 km²	100-YEAR	55.5 m³/s

INSPECTION OF FIELD WELDS		
METHOD	UNIT	QUAN.
ULTRASONIC	mm	-
MAGNETIC PARTICLE	mm	-

	CULVERT INLET
DESIGN FLOW ELEVATION	114.9
AVERAGE FREEBOARD (m)	N/A



WEST ELEVATION (OUTLET)
SCALE: 1:100



EAST ELEVATION (INLET)
SCALE: 1:100

NOTICE TO BRIDGE INSPECTORS

THE DEPARTMENT'S BRIDGE SAFETY PROCEDURES REQUIRE THIS BRIDGE TO BE INSPECTED FOR, BUT NOT LIMITED TO, ALL APPROPRIATE COMPONENTS INDICATED IN THE GOVERNING MANUALS FOR BRIDGE INSPECTION. ATTENTION MUST BE GIVEN TO INSPECTING THE FOLLOWING SPECIAL COMPONENTS AND DETAILS. (THE LISTING OF COMPONENTS FOR SPECIFIC ATTENTION SHALL NOT BE CONSTRUED TO REDUCE THE IMPORTANCE OF INSPECTION OF ANY OTHER COMPONENT OF THE STRUCTURE.) THE FREQUENCY OF INSPECTION OF THIS STRUCTURE SHALL BE IN ACCORDANCE WITH THE GOVERNING MANUALS FOR BRIDGE INSPECTION, UNLESS OTHERWISE DIRECTED BY THE ENGINEER OF BRIDGES AND STRUCTURES.

COMPONENT OR DETAIL	BRIDGE SHEET REFERENCE

REV.	DATE	DESCRIPTION	SHEET NO
		REVISIONS	

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR THE ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED

CADD ..\0273f372701.brg
PLOTTED 22 FEB 2002
SCALE AS NOTED

DESIGNER: H. DIERKS
DRAFTER: M. OFFENBERG
CHECKED BY: N. VYAS
DATE CHECKED:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
ENGINEER BERGER LEHMAN ASSOCIATES, P.C.
APPROVED BY: DATE:

PROJECT TITLE: RECONSTRUCTION OF I-84 WATERBURY HARPERS FERRY RD. OVER BEAVER POND BROOK STRUCTURE NO. 151-273-3727

TOWN: WATERBURY

DRAWING TITLE: STRUCTURE LAYOUT FOR DESIGN PLAN AND ELEVATION

PROJECT NO.: 151-273
DRAWING NO.: 1
SHEET NO.:

...\str3727\fd\0273f372701.brg Feb. 22, 2002 15:31:58