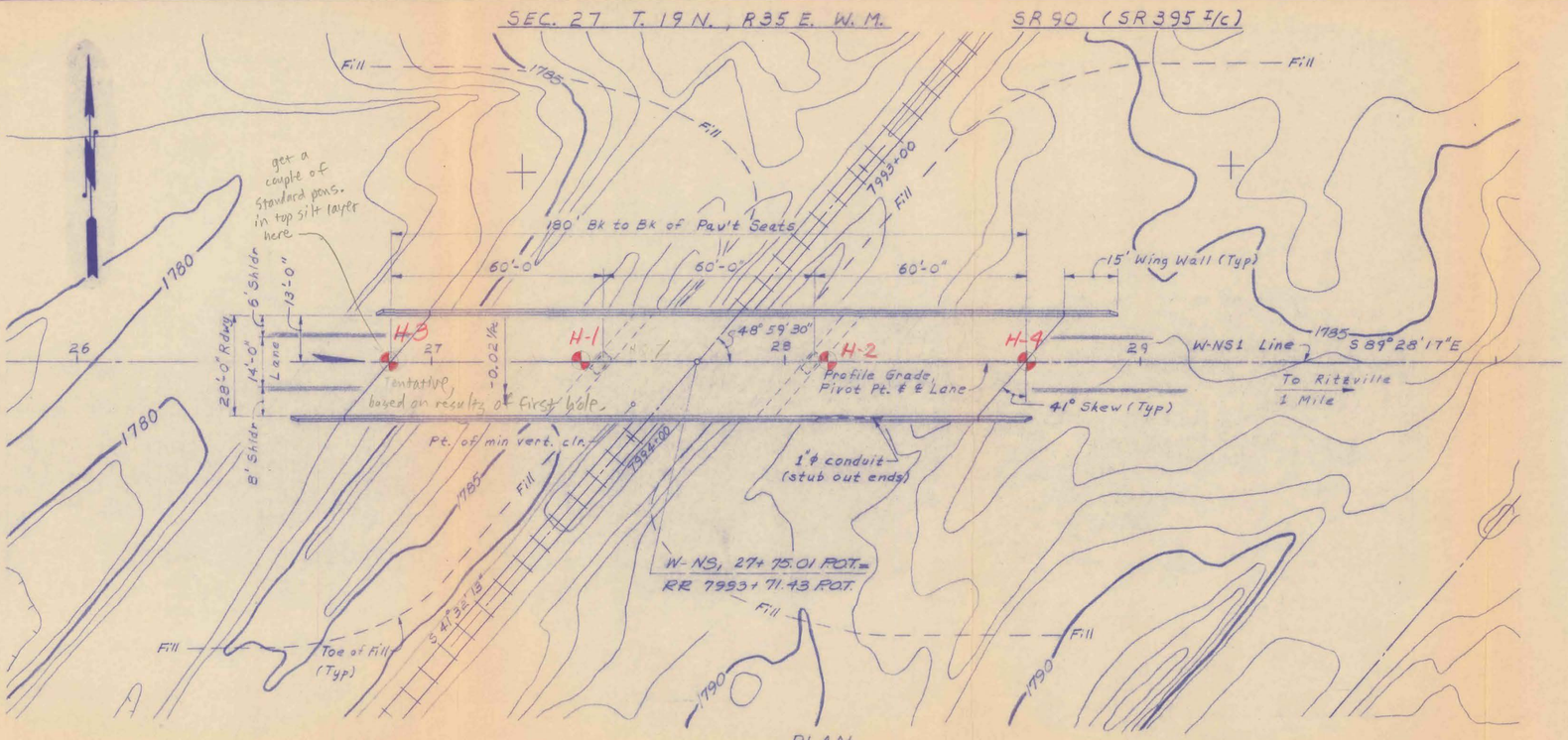
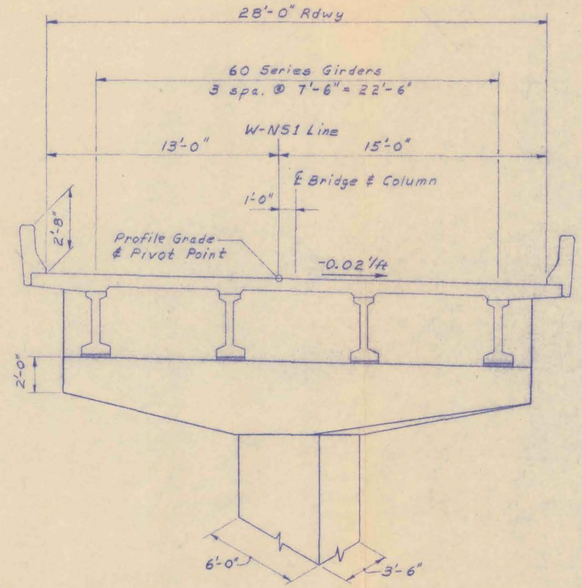
12/28/83

Min Vertical Clearance
B.N.R.R. Sta. 7993+92.88 - 6' Rt.
W-NS1 Sta. 27+56.41 - 12.25' Rt.



PLAN
Scale: 1" = 20'
Note: Bearing of all Piers is S 41° 32' 13" W



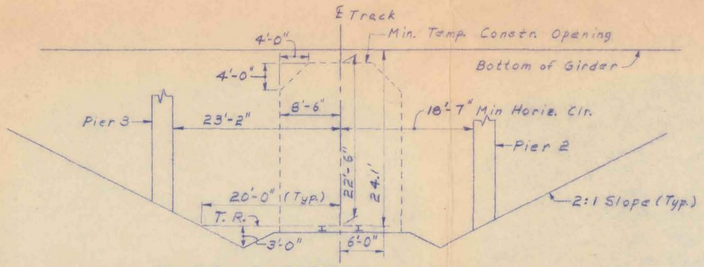
TYP. ROADWAY SECTION NEAR INT. PIER
Looking A'hd on W-NS1 Station
Scale: 1/4" = 1'-0"

Core 40' into bedrock
Expect to hit 5' to 15' of sandy silt above rock.
Call Tony Allen at 234-4660 after drilling first hole (HQ-1).

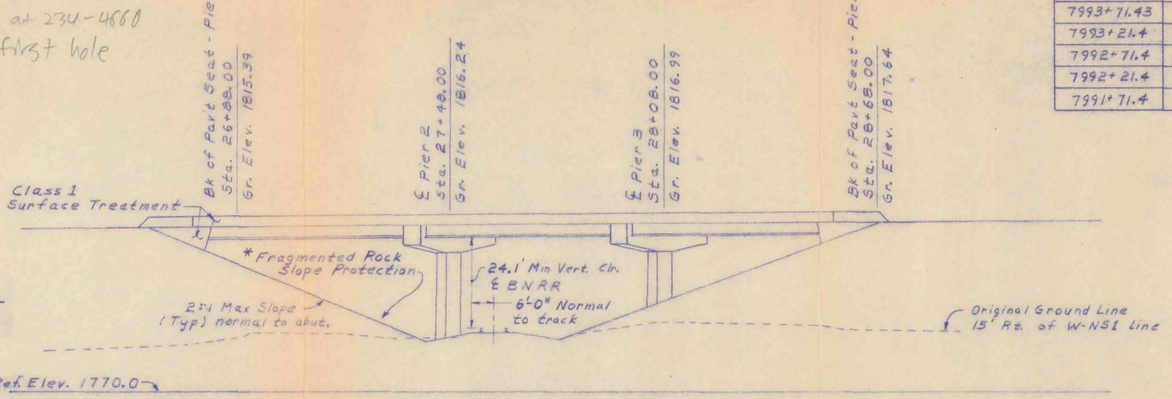
W-NS1 Line Profile

BNRR Top of Rail Elevations

Station	Elevation
7995+71.4	1787.09
7995+21.4	1787.23
7994+71.4	1787.38
7994+21.4	1787.51
7993+71.43	1787.62
7993+21.4	1787.82
7992+71.4	1787.96
7992+21.4	1788.14
7991+71.4	1788.36



BNRR CLEARANCE DIAGRAM
Looking A'hd on BNRR Station



ELEVATION
Grade elevations shown are finished grades on W-NS1 Line and are equal to profile grade
* Not included in Bridge Quantities

DATUM
Nat'l. Geod. Vert. Datum of 1929

NOTES TO DISTRICT:
1. We can accommodate Guard Rail Terminal Design "F", if desired. Please indicate locations on "PLAN".
2. Please verify BNRR top of rail elevations.
3. Please verify size of new conduit
4. Show location of existing utilities

PRESTRESSED GIRDER SERIES 60
CONTINUOUS FOR LL
LOADING: HS-20 OR TWO 24K AXLES @ 4' CTRS.

Prestressed Girder - Series 60 Cont. for L.L.
'A' Dimension = 10 3/4" Not for Design.
Epoxy coated top mat reinf. Deck Protective System
Bridge const. with approach fill

LAYOUT APPROVED BY:
C. B. Gloyd
Bridge and Structures Engineer
District Administrator

Bridge Design Engineer	J. Manbeck	12-83
Supervisor	Charles C. Ruth	12/83
Reviewed By	L.D. Okearty	12/83
Designed By		
Checked By		
Detailed By	D.L. Patrick	11-83
Architect	R. Mills	12-83
Preliminary Plan By	D.L. Patrick	11-83

DATE	REVISION	BY	APP'D

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
10	WASH			

JOB NUMBER
CONTRACT NO.

BRIDGES AND STRUCTURES
APPROVED

Washington State Department of Transportation

LAYOUT

BRIDGE SHEET NO.
SHEET OF SHEETS

DOT FORM 221-013 Revised 6/82

JOB NO. 1661 SHEET 1 SR 90

CS 0101 PROJECT No. L 6763A DIST. 6 SR 395 I.C. MODIFICATION SR 90 W-NS1 RAMP OVER BN

Foundations

JOHN SPELLMAN
Governor

DUANE BERENTSON
Secretary

STATE OF WASHINGTON
DEPARTMENT OF TRANSPORTATION
Transportation Building • Olympia, Washington 98504 • (206) 753-6005

March 29, 1984

Mr. C. S. Gloyd
Bridge Engineer
Transportation Building
Olympia, WA 98504

Re: L-6763, SR-90, C.S. 0101
SR-395 I/C, W-NS 1 Ramp over BN
Vicinity Station 28+00
Foundation Recommendations

Dear Mr. Gloyd:

This letter presents the foundation recommendations for the SR-395 interchange W-NS1 Ramp Overcrossing Structure. This bridge will carry SR-90 traffic over the Burlington Northern Railroad tracks approximately one mile west of Ritzville. The new bridge structure is proposed to be a three-span, pre-stressed concrete-girder structure providing one 14-ft lane with one 8-ft and one 6-ft shoulder. The approach embankments will require fills which will vary up to 33 ft in height.

The analyses, conclusions, and recommendations contained in this report are based on the project description, and site conditions which existed at the time of the field explorations, and further assume that the exploratory borings are representative of the subsurface conditions through the project area. If, during construction, subsurface conditions different from those found by the explorations are encountered, or appear to be present beneath or beyond the excavations, we should be advised so that we can assist you and re-evaluate our recommendations.

Site Geology

During Miocene time and continuing into Pliocene time, vast quantities of basaltic lavas were extruded across the Columbia Plateau. These lavas, known as the Columbia River Basalt, covered thousands of square miles of eastern Washington. Some of the flows are believed to have travelled over 200 miles from their source vents.

The bridge site is located at the head of Lind Coulee, near Ritzville. There is one feature of the landscape called the Channeled Scablands. Washington's "Scabland" topography is unique in the entire world in that the conditions

necessary to form such a landscape have never existed elsewhere. Several times, enormous volumes of water were released by the failure of glacial dams to flood the area with extreme high velocity water. These floods excavated the basalt, creating the many extinct cataracts, and now dry coulees that characterize the Scabland.

At the bridge site, almost no cover exists over the basalt, which will form foundation support for the structure, because of the above processes.

Field Investigation

Part of the field investigation consisted of drilling two test holes to determine the type of foundation support required. A standard penetrometer test was taken in test hole H-1. The disturbed soil sample from the standard penetrometer was visually identified in the field and then submitted to the Materials Laboratory for a more detailed classification, as bedrock was very near the surface of the ground at this site. A total of thirteen rock cores were obtained at the site from these two test holes.

Portable penetrometer tests were performed at two locations at the site as well. Readings were taken continuously until bedrock was reached. Copies of the two test hole logs, as well as copies of the two portable penetrometer logs are presented in Appendix B, detailing specific site conditions.

In general, the foundation material at the proposed bridge site consists of 3 to 5 feet of organic silty sand with rock fragments underlain by moderately to highly fractured basalt bedrock. A static water table was not encountered in any of the test holes.

A soil profile is provided in Appendix A depicting generalized soil conditions at this site.

Laboratory Testing

The laboratory program of this project consisted of the identification and classification of three disturbed samples obtained from the standard penetrometer tests conducted in the field. The Unified Soil Classification System was used as the basis to describe all soil samples. Visual classification included modifying fractions of the samples. Grain-sized analyses and moisture content determinations were performed on the disturbed samples. Grain-size analyses were performed in accordance with procedures detailed in ASTM D-2216, and water content tests were performed in accordance with the procedures detailed in AASHTO T88. The thirteen rock cores submitted to the laboratory were identified according to rock type and rock quality. The results of all laboratory tests are presented in Appendix C.

Embankment Design

Both approaches will require new fills which will vary up to 33 feet in height. The end and side slopes of these fills will be stable with 2:1 or flatter slopes. Up to two inches of fill settlement is expected to occur at this site. The settlement is expected to occur rapidly with post-construction settlement being negligible. Considering that little settlement is expected, pavement approach slabs are not recommended for this structure.

Pier Foundation Support

Spread footings are recommended for support of all piers. At Piers 1 and 4, we have determined that spread footings are designed for allowable loads of 3 tsf will be stable, provided the footings are located on the basis of the criteria in the Bridge Design Manual for foundations on slopes. At Piers 2 and 3, the spread footings may be designed for allowable loads up to 10 tsf, provided that the base of the footings are placed on sound rock. At Pier 2, to insure this condition, the base of the footing should be located at or below elevation 1777. At Pier 3, the footing should be located at or below elevation 1781 feet. At all four piers, footing settlement is expected to be one inch or less. Differential settlement between the end piers and the interior piers may be as great as 3/4 inch.

Construction Considerations

At Piers 2 and 3, care should be exercised when constructing the footing. The footing should be uniformly on sound rock, with no soft seams or soil infilling. If sound rock is present the footing can be poured directly on the rock surface.

Foundation recommendations have been summarized on the attached Foundation Design Recommendations sheet. The soil profile, Logs of Test Borings and laboratory test data are attached with this letter and can be found in Appendices A, B, And C, respectively.

Very truly yours,

A. J. PETERS, P. E.
Materials Engineer

AJP:dt
TMA
Attach.

cc: W. R. Horning
G. Putas
A. H. Walley
C. L. Slemmer

WASHINGTON STATE TRANSPORTATION COMMISSION
Department of Transportation
MATERIALS LABORATORY

FOUNDATION DESIGN RECOMMENDATIONS

S.R. NO. 90 PROJECT SR-395 I/C W-NS 1 Ramp over BN

JOB NO. L-6763 CONTROL SECTION 0101 DATE March 28, 1984

		PILE SUPPORT			SPREAD FOOTINGS		
PIER NO.	STATION	ESTIMATED TIP ELEVATION	MINIMUM TIP ELEVATION	ALLOWABLE LOAD	FOOTING ELEV. AS SHOWN ON LAYOUT	RECOMMENDED FOOTING ELEVATION	ALLOWABLE BEARING VALUE
1	26+88				----------	(1)	3.0 tsf
2	27+48				-------- (2)	1777 ft	10.0 tsf
3	28+08				--------(2)	1781 ft	10.0 tsf
4	28+68				---------	(1)	3.0 tsf

REMARKS: (1) Located on the basis of the criteria in the Bridge Design Manual for foundations on slopes. (2) Base of footing should be fully on sound rock to insure that there are no point loads on footing bases.

APPROACH FILLS

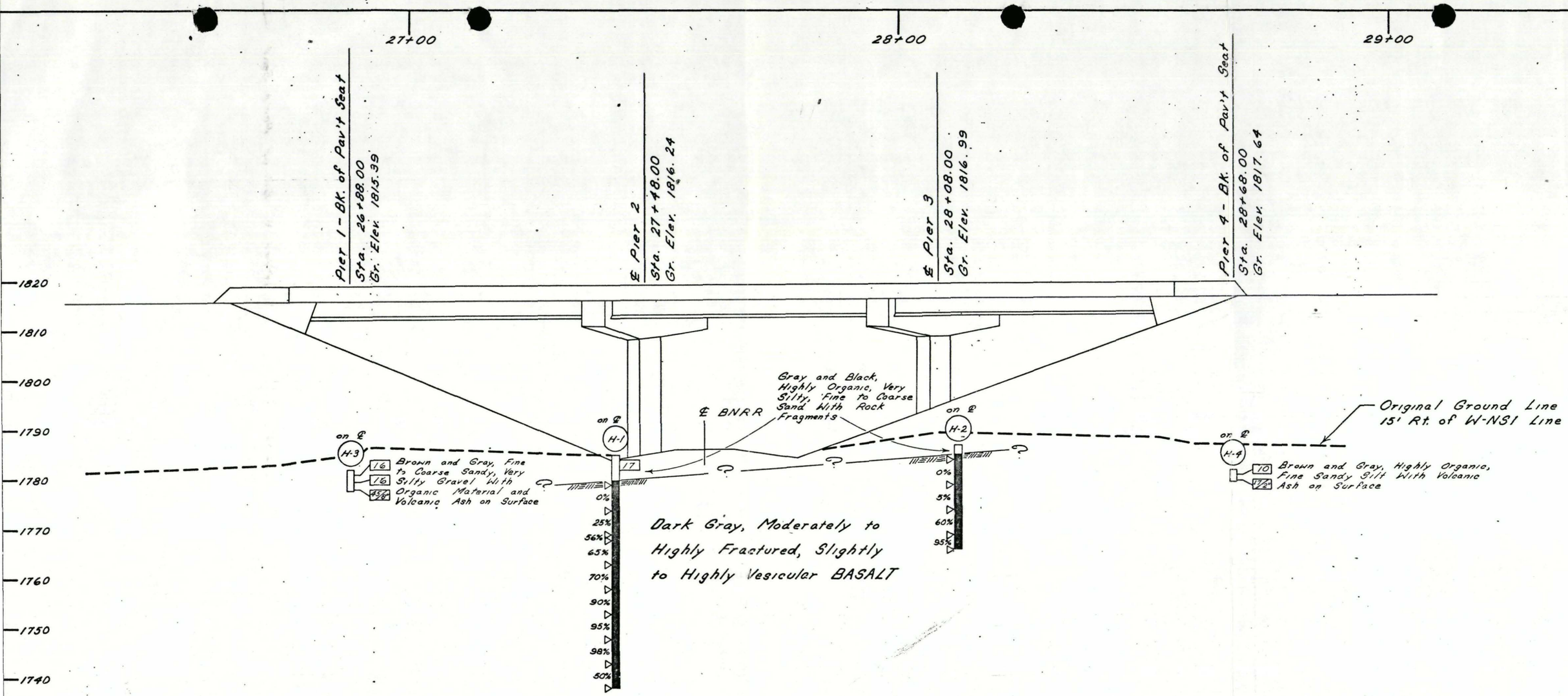
STABILITY: Stable with 2:1 slopes.

SETTLEMENT: Post-construction settlement should be negligible.

DOT FORM 350-079 REVISED 2/80

APPENDIX A

Soil Profile



HOLE NO.	SAMPLE NUMBERS
H-1	E-5294-1 to E-5294-5
H-2	E-5295-1 to E-5295-2
H-3	E-5308-1
H-4	E-5308-2

DATUM

N.G.V.D. of 1929

TEST HOLE LEGEND

- H-1 — TEST HOLE NUMBER
- 17 — STANDARD PENETROMETER TEST (BLOWS PER FOOT)
- 10 — PORTABLE PENETROMETER TEST (BLOWS PER FOOT ARE EQUIVALENT TO STANDARD PENETROMETER VALUES)
- ? — INDICATES SOIL STRATA BETWEEN TEST HOLES MAY NOT BE CONTINUOUS
- INDICATES INTACT ROCK
- 95% — ROCK QUALITY DESIGNATION

THIS PRINT REDUCED 50%

JOB L-6763 S.R. 90 C.S. 0101 Layout 1661

SR 395 1/c MODIFICATION

W-NS1 RAMP OVER BN

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH

A.J. PETERS Materials Engineer

DATE Mar. 1984
SCALE 1" = 10' VERT 1" = 10' HOR
SHEET 1 OF 1
DRAWN BY CLC

APPENDIX B

Logs of Test Borings

LOG OF TEST BORING WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

S.H. ____ S.R. 90 SECTION SR-395 I/C Modification Job No. L-6763

Hole No. H-1 Sub Section W-NS1 Ramp Over B.N. Cont. Sec. 0101

Station L-27+42 Offset ℄ Ground El. 1785 (Contour)

Type of Boring Tricone and Coring Casing 4" x 5' W.T. El. Not encountered

Inspector ____ Date February 16, 1984 Sheet 1 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	17		6 7 10 12 STD PEN 1	Medium dense, brown and black, wet, highly organic, gravelly, very silty, fine to coarse SAND - with rock fragments.
5				
			C-2 80% REC.	Dark gray, highly fractured BASALT. RQD = 0%
10				
				Little to no water loss 10' - 47'
			C-3 100% REC.	Dark gray, highly fractured, slightly vesicular BASALT. RQD = 25%
15				
			100% REC. C-4	Dark gray, moderately fractured BASALT. RQD = 56%
			C-5 100% REC.	Dark gray, dense, moderately fractured, slightly porphyritic BASALT. RQD = 65%
20				

DOT FORM 351-003 REVISED 12/79

Original to Materials Engineer
Copy to Bridge Engineer
Copy to District Administrator

Copy to ____

HWY Form 351-003-a (H. F. 26.66-A).
Revised 5-67.

Hole No. H-1 Sub Section W-NS1 Ramp Over B.N. Sheet 2 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
			C-6	Dark gray, dense, moderately fractured, slightly porphyritic BASALT. RQD = 70%
25			100% REC.	
			C-7	Dark gray, dense, moderately fractured, slightly porphyritic BASALT. RQD = 90%
30			100% REC.	
			C-8	Dark gray, dense, moderately fractured, slightly porphyritic BASALT. RQD = 95%
35			100% REC.	
			C-9	Dark gray, dense, moderately fractured, slightly porphyritic BASALT. RQD = 98%
40			100% REC.	
			C-10	Dark gray, dense, moderately to highly fractured with vertical fractures, slightly porphyritic BASALT. Low RQD due to vertical fractures. RQD = 50%
45			100% REC.	

HWY Form 351-003-a (H. F. 26.66-A).
Revised 5-67.

Hole No. H-1 Sub Section W-NS1 Ramp Over B.N. Sheet 3 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				Test boring stopped 47' below ground elevation.
50				
				NOTE: This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.

LOG OF TEST BORING WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

S.H. _____ S.R. 90 SECTION SR-395 I/C Modification Job No. L-6763

Hole No. H-2 Sub Section W-NS1 Ramp Over B.N. Cont. Sec. 0101

Station W-NS1 28+12 Offset ℄ Ground El. 1787 (Contour)

Type of Boring Tricone & Coring Casing 4" x W.T. El. Not determined

Inspector _____ Date February 16, 1984 Sheet 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				Brown, silty SAND - with rock fragments.
5			C-1	Dark gray, highly fractured, slightly vesicular BASALT. Fractures are random.
			96% REC.	RQD = 0%
				Slight water loss 3'-12'.
10			C-2	Dark gray, moderately to highly fractured, highly vesicular BASALT. Vesicles to 1".
			96% REC.	RQD = 5%
15			C-3	Dark gray, dense, moderately to highly fractured, slightly prophyritic BASALT. Vesicular to 15'.
			100% REC.	RQD = 60%
			C-4	Dark gray to black, dense, moderately fractured, slightly porphyritic BASALT.
20				RQD = 95%

DOT FORM 351-003 REVISED 12/79

Original to Materials Engineer
Copy to Bridge Engineer
Copy to District Administrator

Copy to _____

HWY Form 351-003-a (H. F. 26.66-A).
Revised 5-67.

Hole No. H-2 Sub Section W-NS1 Ramp Over B.N. Sheet 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				Test boring stopped 21' below ground elevation.
25				
				NOTE: This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
30				

LOG OF TEST BORING WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

S.H. ____ S.R. 90 SECTION SR-395 I/C Modification Job No. L-6763

Hole No. H-3 Sub Section W-NS1 Ramp Over B.N. Cont. Sec. 0101

Station 26+88 Offset ℄ Ground El. 1782 (Contour)

Type of Boring Portable Penetrometer Casing ____ W.T. El. Not determined

Inspector ____ Date February 23, 1984 Sheet 1 of 1

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	16		9 15	Medium dense to very dense, brown and gray, moist, fine to
			18 20	coarse sandy, very silty GRAVEL - with organic material and
	16		22 10	volcanic ash on surface.
			12 41	
	45/8"		50/ 2"	
5				
				Test boring stopped 4'-2" below ground elevation.
				NOTE: "Blows per foot" are equivalent to standard penetrometer values.
				NOTE: This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.

DOT FORM 351-003 REVISED 12/79

Original to Materials Engineer
Copy to Bridge Engineer
Copy to District Administrator

Copy to ____

LOG OF TEST BORING WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

S.H. ____ S.R. 90 SECTION SR-395 I/C Modification Job No. L-6763

Hole No. H-4 Sub Section W-NS1 Ramp over B.N. Cont. Sec. 0101

Station 28+68 Offset ℄ Ground El. 1782 (Contour)

Type of Boring Portable Penetrometer Casing ____ W.T. El. Not determined

Inspector ____ Date February 23, 1984 Sheet 1 of 1

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	10		12 22 8 30	Loose to dense, brown and gray, wet, highly organic, fine sandy SILT - with volcanic ash on surface.
	17/2"		50/ 2"	
5				
				Test boring stopped 2'-2" below ground surface.
				NOTE: "Blows per foot" are equivalent to standard penetrometer values.
				NOTE: This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.

DOT FORM 351-003 REVISED 12/79

Original to Materials Engineer
Copy to Bridge Engineer
Copy to District Administrator

Copy to ____

APPENDIX C

Laboratory Test Data

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

MATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
1655 So. 2nd Ave.
Tumwater, Washington 98504 (Shipping Address)

Place Olympia
Date 2/17/84

Dear Sir:

I have forwarded by today's Delivered the following Foundation Samples.

Contract or Job No. L-6763 Section SR-395 I/C mod. SR No. Sub-Section SR-90 WNS-1 Ramp over B.H.

Station & Offset L-27+42 Rt Hole # H-1

E Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
5294-1	D-1 x	1'-3'	H20 46.1%	Sm	
-2	Box 1	6'-17' Core 2	Core 2 6'-11'		Dark Gray, highly fractured BASALT. RQD = 0%.
			Core 3 11'-16'		Dark Gray, highly fractured, slightly vesicular BASALT. RQD = 25%.
-3	Box 2	17'-27' Core 3	Core 4 16'-17'		Dark Gray, moderately fractured BASALT. RQD = 56%.
			Core 5 17'-22'		Dark Gray, dense, moderately fractured, slightly porphyritic BASALT. RQD = 65%
-4	Box 3	27'-37' Core 4	Core 6 22'-27'		Same. RQD = 70%
			Core 7 27'-32'		Same. RQD = 90%
-5	Box 4	37'-47' Core 5	Core 8 32'-37'		Same. RQD = 95%
			Core 9 37'-42'		Same. RQD = 98%
			Core 10 42'-47'		Same, moderately to highly fractured, with vertical fractures. Low RQD due to vertical fractures.
					RQD = 50%

1 copy with samples
1 copy to addressee

Yours very truly,

C. H. Lovell
Inspector.

DOT FORM 351-002 REVISED 2/80

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

SR-395 Jc

SAMPLE NO. 5294-1 JOB NO. L-6763 HOLE NO.

DATE 3-6-84 OPERATOR gm

SOIL FIELD IDENTIFICATION

TEST	SAND	SILT	CLAY
VISUAL	✓	✓	
DRIED CAST			
DILATANCY			
BITE			
TOUGHNESS			

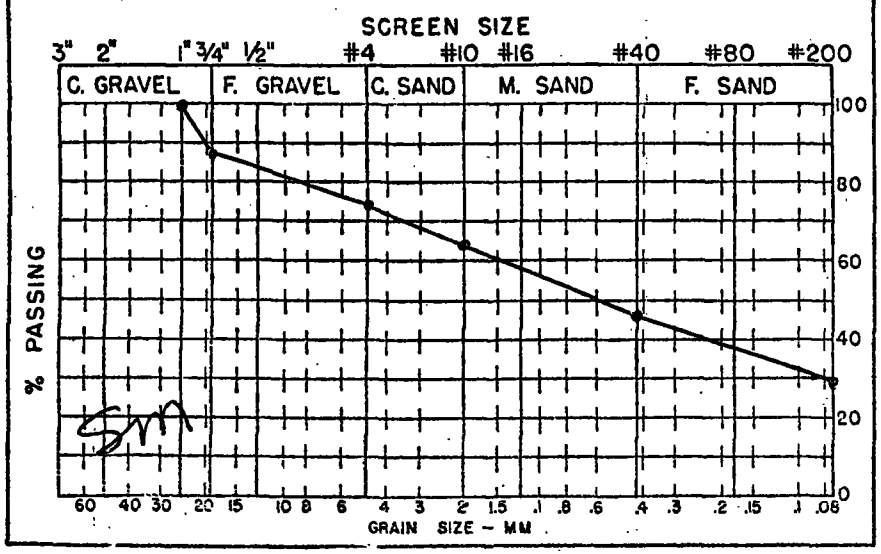
DESCRIPTION: BRN., WET, V. SILTY, F. GRAVELY F-C SAND, W/TRACE C. GRAV. HIGHLY ORGANIC

47.3 69.1 H_2O = 46.1%

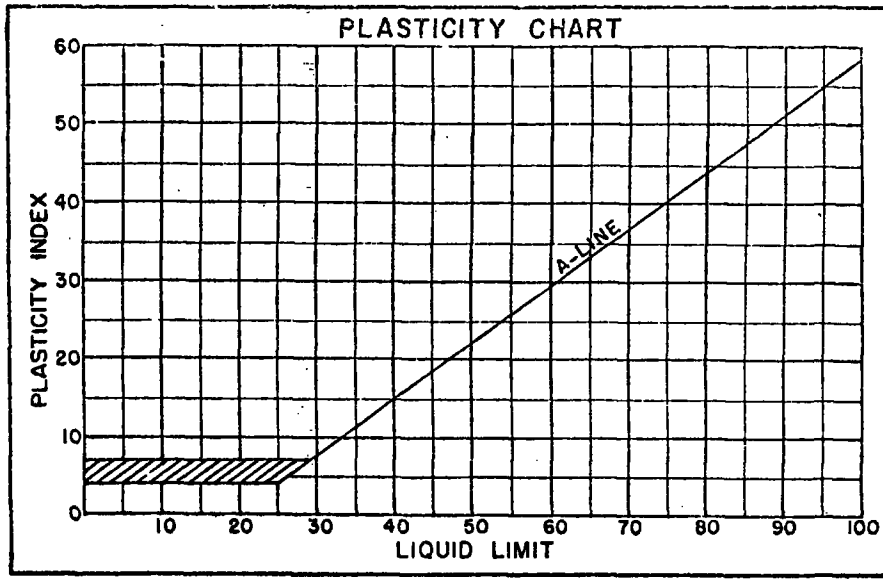
SIEVE ANALYSIS % Passing 83.8

-1"	10.8	100	-40	13.5	45.8
-3/4	10.5	87.1	-80		
-4	8.9	74.6	-140		
-10	15.2	64.0	-200	24.9	29.7

GRAIN SIZE CURVE

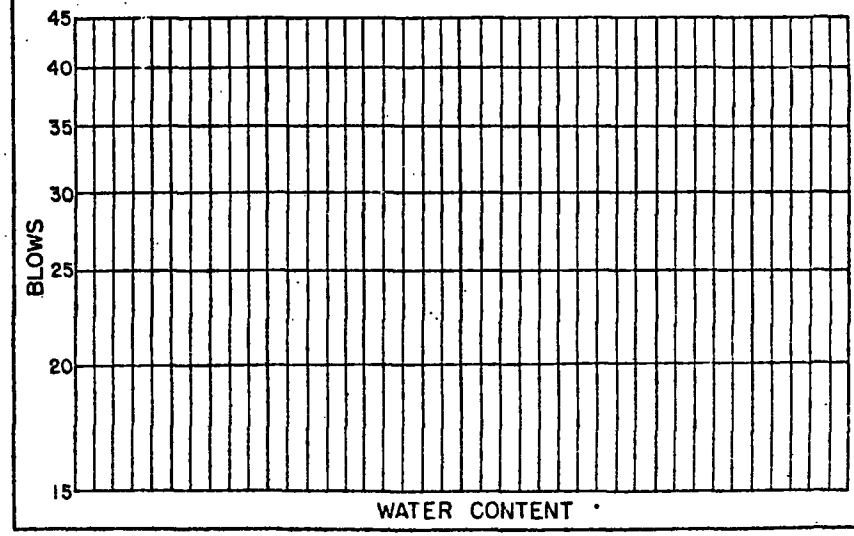


PLASTICITY CHART



LIQUID LIMIT DETERMINATION

	LIQUID LIMIT				PLASTIC LIMIT
Can No.					
Wet Wt.					
Dry Wt.					
% H_2O					PL=
Blows					PI=



DOT FORM 351-019

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

MATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
1655 So. 2nd Ave.
Tumwater, Washington 98504 (Shipping Address)

Place Olympia

Date 2/17/84

Dear Sir:

I have forwarded by today's Delivered the following Foundation Samples.

Contract or Job No. L-6763 Section SR-395 I/C modification SR No. 90 Sub-Section SR-90 WHS-1 Ramp over B.N.

Station & Offset L-28+12 Hole # H-2

E Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
5295-1	Box 1	3'-13'	Core 1 3'-8'		Dark Gray, highly fractured, slightly vesicular BASALT. Fractures are random. RQD = 0%
			Core 2 8'-13'		Dark Gray, moderately to highly fractured, highly vesicular BASALT. Vesicles to 1". RQD = 5%
-2	Box 2	13'-21'	Core 3 13'-18'		Dark Gray, moderately to highly fractured BASALT. Vesicular to 15', dense to bottom. Slightly porphyritic. RQD = 60%.
			Core 4 18'-21'		Dark Gray to Black, moderately fractured, slightly porphyritic, dense BASALT. RQD = 95%

1 copy with samples
1 copy to addressee

Yours very truly,

C. H. Lovell

Inspector.

DOT FORM 351-002 REVISED 2/80

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

MATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
1655 So. 2nd Ave.
Tumwater, Washington 98504 (Shipping Address)

Place Olympia
Date 2/23/84

Dear Sir:

I have forwarded by today's Delivered the following Foundation Samples.

Contract or Job No. L-6763 Section SR-395 I/C modification SR No. Sub-Section SR-90 WNS-1 Ramp over BH

Station & Offset

Hole # H-3 & H-4

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
5308-1	26+88 H-3 D-1	0'-0" 4'-2"	H20 12.2%	GM	
-2					
-2	28+68 H-4 D-1	0'-0" 2'-2"	H20 34.7%	ML	

1 copy with samples
1 copy to addressee

Yours very truly,

C. H. Savill

Inspector.

DOT FORM 351-002 REVISED 2/80

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

SR-395 I/C

SAMPLE NO. 5308-1 JOB NO. L6763 HOLE NO.

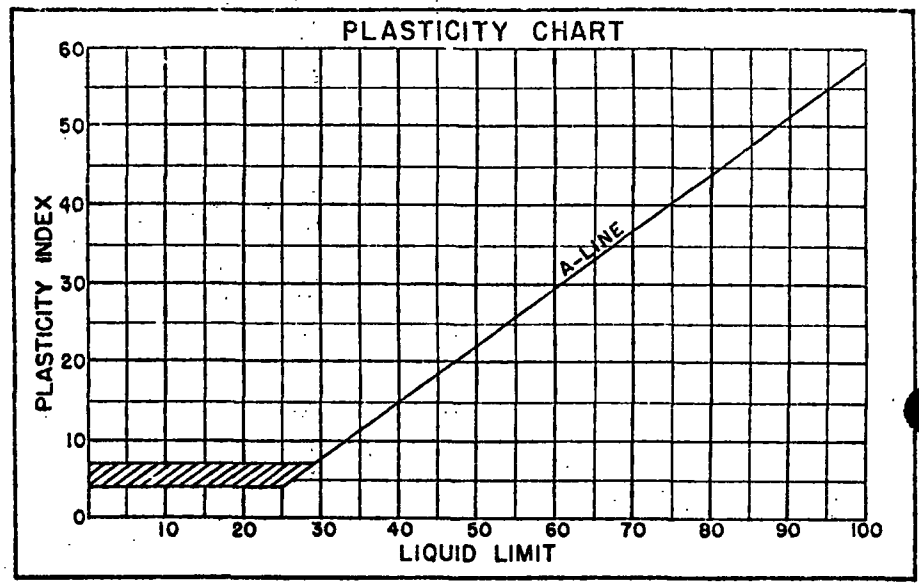
DATE 3-6-84 OPERATOR GM

SOIL FIELD IDENTIFICATION

TEST	SAND	SILT	CLAY
VISUAL	✓	✓	
DRIED CAST			
DILATANCY			
BITE			
TOUGHNESS			

DESCRIPTION: BRN, MOIST, V. SILTY, F-C SANDY GRAVEL, W/ ORGANIC MATL.

PLASTICITY CHART

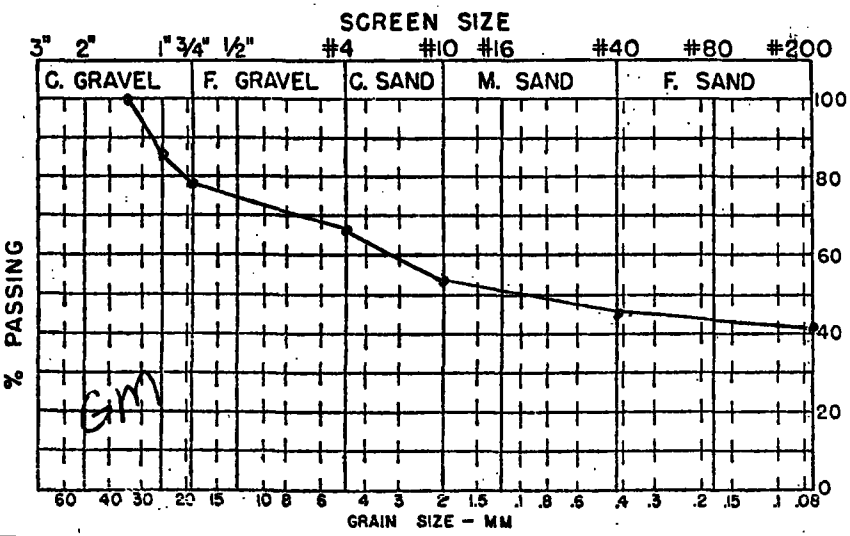


77.2 86.6 H_2O=12.2 %

100

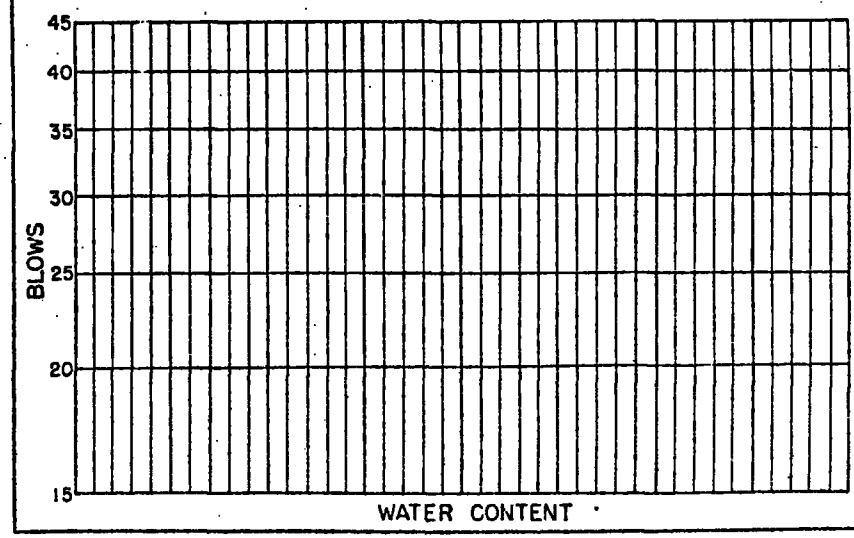
-1½"-39.7 SIEVE ANALYSIS		% Passing 277.3		
-1"	20.8	85.7	-40 8.8	44.7
-¾	30.9	78.2	-80	
-4	36.9	67.0	-140	
-10	25.0	53.7	-200 115.2	41.5

GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

	LIQUID LIMIT				PLASTIC LIMIT
Can No.					
Wet Wt.					
Dry Wt.					
% H_2O					PL=
Blows					PI=



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

SR-395 I/C

SAMPLE NO. 5308-2 JOB NO. L-6763 HOLE NO.

DATE 3-6-84 OPERATOR JM

SOIL FIELD IDENTIFICATION

TEST	SAND	SILT	CLAY
VISUAL	✓	✓	
DRIED CAST			
DILATANCY			
BITE			
TOUGHNESS			

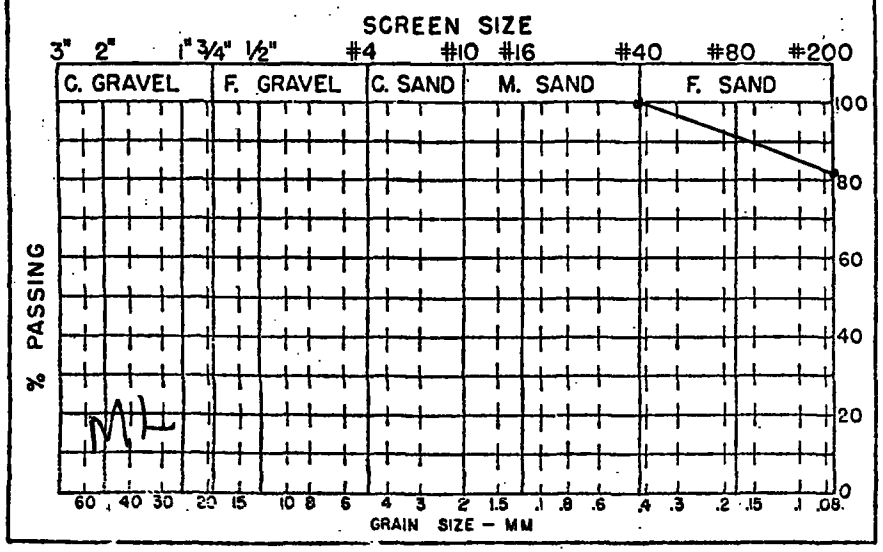
DESCRIPTION: BRN., WET, F. SANDY SILT
HIGHLY ORGANIC

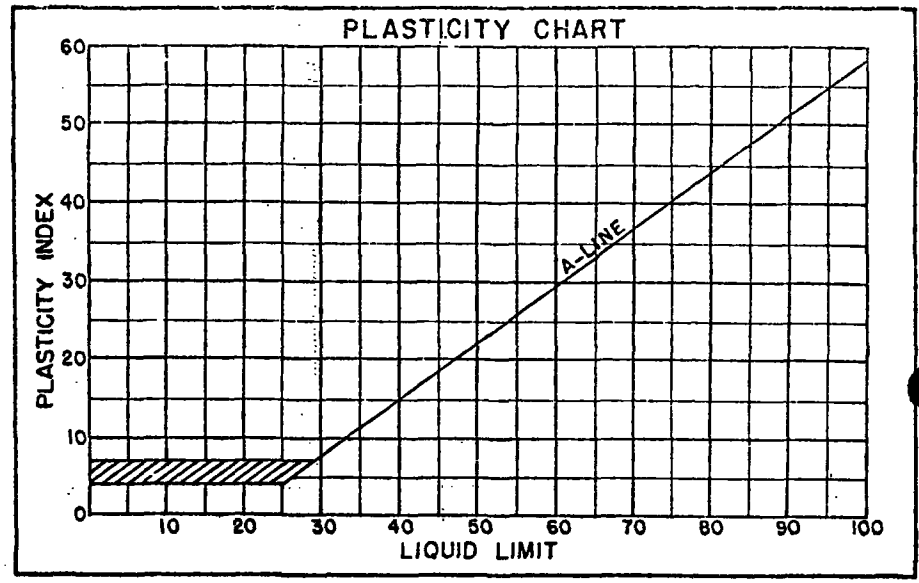
35.72 48.1 H_2O=34.7 %

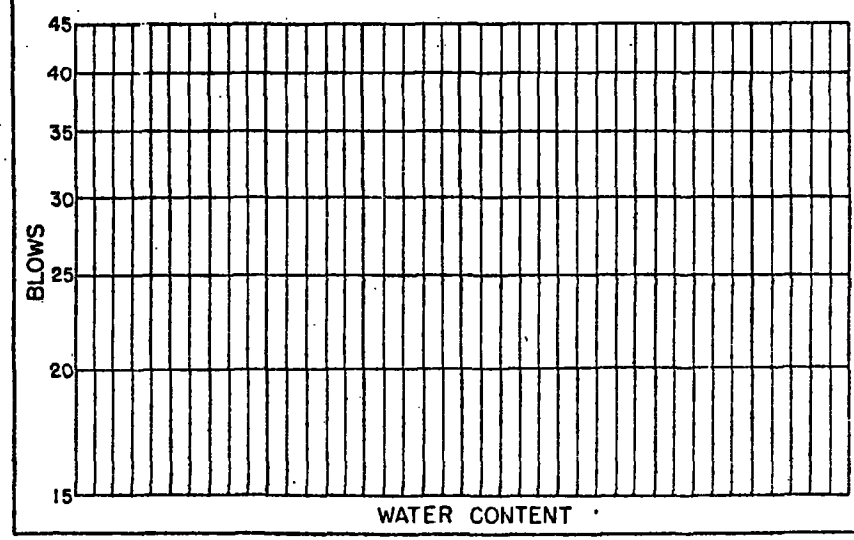
SIEVE ANALYSIS % Passing 134.8

	-40	24.1	100
-¾ 0	-80		
-4 0	-140		
-10 0	-200	110.70	82.1

GRAIN SIZE CURVE





LIQUID LIMIT DETERMINATION

	LIQUID LIMIT				PLASTIC LIMIT
Can No.					
Wet Wt.					
Dry Wt.					
% H_2O					PL=
Blows					PI=