FOUNDATIONS

Geotechnical Report

SR 167
MAIN ST. TO 84TH AVE. SO.

Washington State Department of Transportation
Operations Division
Materials Laboratory

Washington State
Department of Transportation

Memorandum

January 18, 1994

FROM: R. G. Finkle/D. G. Chadbourne
Headquarters Materials Laboratory, 7365
Geotechnical Branch
Phone: 586-7838 SCAN 321-7838

TO: R. Q. Anderson/A. E. Stiles
District 1
NB-82, D-1, MS-29

RE: SR-167, C.S. 1766, L-1511
Main Street to 84th Avenue South
MP 14.77 to MP 21.40
Retaining Walls 1, 2, 3, 5 and 10
Noise Walls 1 and 2

As requested we are providing the design recommendations for the five proposed retaining walls and two noise walls along SR-167 from Main Street to 84th Avenue South. The retaining walls will retain fills for ramps at the intersections of SR-167 with South 277th Street, SR-516, and 84th Avenue South. The noise walls will be constructed along the existing SR-167 embankment north of the SR-167/SR-516 Interchange.

The analysis, conclusions, and recommendations contained in this report are based on the project description and site conditions that existed at the time of the field explorations. The exploratory borings are assumed to represent the subsurface conditions throughout the project area. If subsurface conditions different from those found by the explorations are encountered during construction, or appear to be present beneath or beyond the excavations, we should be advised so that we can aid you and reevaluate our recommendations.

Field Investigation

Nine test borings and five hand holes were advanced to provide subsurface information for foundation analysis and design of the retaining walls. Ten hand holes were made along the alignments for the noise walls. A plan view of the project showing wall locations and the test borings associated with each wall is in Appendix A.

Standard penetrometer tests (SPT) were taken, in general, at five foot intervals in each test hole. Disturbed soil samples from the standard penetrometer were visually identified in the field and then submitted to the Materials Laboratory for more detailed classification. Undisturbed samples consisting of

Washington DOT samplers were obtained in the fine grained soils. Portable penetrometer tests were taken in the hand holes. The portable penetrometer readings were converted to SPT values for correlation of density and consistency of the soils. The logs of the test holes are included in Appendix B.

In general the embankment soils on the project consist of very dense sandy gravels. The embankments are underlain by flood plain deposits of soft to stiff silts and loose to medium dense sands with silt lenses. These soils are underlain by medium dense to dense, slightly silty to silty, fine to medium sand. More detailed descriptions of the soils at each wall site are given with the wall recommendations.

Laboratory Testing

The laboratory testing program for this project consisted of the identification and classification of selected disturbed samples from the test borings. The Unified Soil Classification System was used to classify the selected samples. Visual Classification included density or consistency, color, water content, major soil type, and modifying fractions of the samples.

Grain size analyses and water content tests were conducted according to the procedures detailed in AASHTO T-88 and ASTM D-2216 respectively. Determination of Atterberg limits for fine grained samples was done according to AASHTO T-88 and T-90.

Two unconsolidated undrained triaxial tests were conducted to evaluate total strength parameters for the fine grained soils. The tests were conducted according to the procedures detailed in ASTM D-2850. The laboratory test data is included in Appendix C.

Wall Selection Recommendations

General wall selection and implementation criteria for the various types of walls available are provided in Appendix D. Standard concrete retaining walls are feasible for Walls 3 and 10, however due to stability and settlement considerations standard walls do not appear feasible for Walls 1, 2, and 5 unless they are pile supported. Therefore we recommend that mechanically stabilized earth wall options (MSE wall) be considered as a more economical alternative.

Of the six preapproved retaining walls listed in Appendix D, all are feasible except Stresswall, because of the amount of settlement expected at Walls 1, 2, and 5. We recommend providing at least three wall options in the contract provisions

to promote competitive bidding if proprietary walls are pursued.

Recommendations for Wall Stability and Foundation Design

Our geotechnical design of the retaining walls includes evaluation of overall external stability, wall foundation bearing capacity and embedment depth required, wall settlement, and soil properties to be used for design. The proprietary wall manufacturer will evaluate the wall for overturning stability, sliding stability, and internal stability of the wall and will provide the size, length, and spacing of the soil backfill reinforcement, minimum wall width required, all facing design and connection details, and any special design and construction requirements if a proprietary wall is selected.

Regardless of which wall system is selected, the following criteria should be used to insure overall stability of the wall:

1. The wall should be placed on a level foundation in the direction perpendicular to the wall face.

2. Where the retaining walls are located on slopes, the wall base/footing should be located using the minimum embedment criteria in the Bridge Design Manual for footings on slopes. In no case should the wall base/footing embedment be less than 10 percent of the wall height.

3. The proprietary walls should have a wall face batter no steeper than 48V:1H.

4. Soil parameters to be used for design are provided in the Retaining Wall Data Sheet attached with this memorandum.

Retaining Wall No. 1

Wall 1 will retain new fill along the DR1 Ramp at the SR-167/South 277th Street Interchange. Wall 1 will be 302 meters (990 ft) long and have a maximum exposed height of approximately 2.4 meters (8 ft). The wall will be founded on native soils at the base of the existing embankment. The soils beneath the embankment consist of 3.5 to 6 meters (12 to 20 ft) of loose to medium dense, silty sands and soft to medium stiff silts underlain by medium dense to dense, slightly silty to silty sands.

Wall 1 can be designed for a maximum allowable bearing stress of 95 kiloPascals (kPa) (1 tsf), provided the embedment of the wall base is no less than 0.45 meters (1.5 ft). The base width of the wall should be no less than 50 percent of wall height to

insure overall stability. Maximum total settlement of the wall will be approximately 28 centimeters (cm) (11 inches) and differential settlement will be approximately 8 cm per 30 meters (3 inches per 100 ft).

The largest settlement will occur from Wall 1 Station 12+50 to Station 15+50 (LM Stations 722+20 to 725+20). The maximum estimated settlement and the estimated differential settlement can be reduced if the soft silt beneath the wall is partially overexcavated 0.9 meters (3 ft) and backfilled with good quality granular material compacted to 95 percent of maximum density. Total settlement will be reduced to 20 cm (8 inches). Differential settlement will be reduced to 4 cm per 30 meters (1.5 inches per 100 ft). Deeper overexcavation is feasible, however we feel it is not desirable because of the shallow water table at the site.

Primary settlement of the wall will occur over a period of approximately 2 months. We recommend paving and construction of the traffic barrier be delayed during a 2 month period to allow the primary settlement to occur. After the delay period, long term settlement of the wall is expected to be less than 3 cm (1 inch). Placement of the survey monuments for monitoring settlement is included in this memorandum under Construction Considerations on page 8.

At Wall Station 13+45 (LM 723+15) the wall will be constructed over a 24 inch diameter concrete pipe. The Hydraulics Section should be contacted to confirm that the culvert pipe can tolerate the added load and settlement from the wall. We estimate that the peak bearing stress at the base of the wall will be approximately 95 kPa (2000 psf). We have discussed possible rerouting of the pipe with the District.

Retaining Wall No. 2

At the SR-167/SR-516 Interchange, Wall 2 will retain fill along the AL2 Ramp. The wall will be 91.5 meters (300 ft) long with a maximum exposed height of approximately 2.1 meters (7 ft). Wall 2 will be founded on approximately 1.2 meters (4 ft) of loose to medium dense sands and stiff silts underlain by 0.9 to 3 meters (3 to 10 ft) of soft silt.

Wall 2 can be designed for a maximum allowable bearing capacity of 140 kPa (1.5 tsf) with a minimum embedment of 0.45 meters (1.5 ft). The base width of the wall should be no less than 50 percent of the wall height to insure overall stability.

We estimate up to 15 cm (6 inches) of settlement will occur

beneath the wall. Primary settlement of the wall will occur over a period of approximately 2 months. We recommend paving and construction of the traffic barrier be delayed during a 2 month period to allow the primary settlement to occur. After the delay period, settlement of the wall is expected to be less than 3 cm (1 inch). Placement of survey monuments for monitoring the settlement is included in this memorandum under Construction Considerations on page 8.

Retaining Wall No. 3

Wall 3 will be 91.4 meters (307 ft) long with a maximum exposed height of approximately 4 meters (13 ft) and will retain fill along the DR2 Ramp of the SR-167/SR-516 Interchange. The wall will be founded in the existing embankment. The embankment material consists of dense to very dense sandy gravels. The soils beneath the embankment consist of from 0.9 to 3.5 meters (3 to 12 ft) of medium stiff to stiff silt underlain by medium dense to dense, silty sands.

Wall 3 can be designed for a maximum allowable bearing pressure of 240 kPa (2.5 tsf). Embedment should be based on the minimum embedment criteria for footings on slopes for an MSE wall or 30 percent of wall height for standard walls. To insure overall stability the base width of the wall should be 60 percent of the total wall height for an MSE wall. Settlement of the wall will be approximately 5 cm (2 inches). Approximately 3 cm (1 inch) of settlement will occur during construction with long term settlement of less than 2 cm (1 inch).

Retaining Wall No. 5

Wall 5 with a length of 155.4 meters (510 ft) and a maximum exposed height of 4.9 meters (16 ft) will retain new fill along the AL3 Ramp at the SR-167/84th Avenue S. E. Interchange. At Wall 5 the soils beneath the embankment consist of up to 4.9 meters (16 ft) of very loose to loose silty fine sand and soft of medium stiff sandy silt underlain by medium dense silty sand with silt lenses. A cross section showing the soil profile at Wall 5 is included in Appendix A.

Wall 5 can be designed for a maximum allowable bearing pressure of 290 kPa (3.0 tsf). Maximum settlement of Wall 5 will be approximately 15 cm (6 inches) and differential settlement will be approximately 5 cm per 30 meters (2 inches per 100 ft) of length. Settlement of the wall is expected to occur during construction. Post construction settlement should be negligible.

To insure overall stability the wall base width should be no less than 65 percent of the total wall height. The wall base should be located using the minimum embedment criteria in the WSDOT Bridge Design Manual for footings on slopes, however, embedment should be no less than 25 percent of the wall height.

At Station L 885+00, Wall 5 will be constructed over the Mill Creek crossing consisting of twin 48 inch CMP. The Hydraulics Section should be contacted to confirm that the culvert pipe can support the added load from the wall. We estimate the peak bearing stress on the pipes will be 48 kPa (1000 psf). Settlement of the pipe due to the construction of the wall will be approximately 2 cm (1 inch) and will occur as the wall is being constructed.

Retaining Wall No. 10

Wall 10 with a length of 176.8 meters (580 ft) and a maximum exposed height of 3 meters (10 ft) will retain new fill along the AR3 Ramp at the SR-167/84th Avenue S. E. Interchange. The soil conditions at Wall 10 are similar to Wall 5. Wall 10 will be founded in the embankment with approximately 4.6 meters (15 ft) to native soil.

Wall 10 can be designed for a maximum allowable bearing capacity of 240 kPa (2.5 tsf). Embedment should be based on the minimum embedment criteria in the WSDOT Bridge Design Manual for footings on slopes for MSE walls or 30 percent of total wall height for standard walls. To insure adequate overall stability the minimum wall base width should be 65 percent of total wall height for MSE walls. Settlement of the wall will be approximately 3 cm (1 inch) and will occur during construction. Long term settlement of the wall will be negligible.

Noise Walls 1 and 2

Two noise walls will be constructed along SR-167 on this project. Noise Wall No. 1 extends from Station L 810+00 to Station L 830+00 and will have a maximum exposed height of approximately 3 meters (10 ft). Noise Wall No. 2 which begins at Station L 834+70 and ends at Station L 855+00 will also have a maximum exposed height of approximately 3 meters (10 ft). Both walls will be founded in existing embankments or sliver fills. Where the wall can be located on level ground a minimum of 0.9 meters (3 ft) from the edge of the shoulder slope, standard foundation designs can be used. Where the 0.9 meter (3 ft) minimum distance can not be maintained special foundation designs will be required. Our recommendations for the special designs are included below.

Our analysis indicates that either spread footings or small diameter reinforced concrete shafts are feasible for foundation support of the proposed noise walls. Spread footings should be designed for allowable bearing capacity of 95 kPa (1 tsf) with a minimum footing width of 0.9 meters (3 ft). Footing embedment should be determined based on the criteria in the Bridge Design Manual for footings on slopes, but should not be less than 0.6 meters (2 ft). The total footing settlement will be approximately 1 cm (0.5 inches) and will occur during construction.

From approximately Station 810+50 to 813+50, Noise Wall No. 1 will be placed on sliver fills. Settlement at the shoulder of the sliver fill will be approximately 3 cm (1 inch) and will occur over a period of approximately 1 month, resulting in a total settlement for the noise wall of approximately 4 cm (1.5 inches). It should be noted that settlement at the toe of the fill will be approximately 10 cm (4 inches). The existing embankment slopes should be terraced prior to fill placement according to Section 2-03.3(14). Foundation recommendations and design soil properties for the noise walls are summarized on the attached Retaining Wall Data Sheet.

Lateral capacity will control reinforced concrete shaft design. Figure 1 presents design criteria for determining the ultimate passive earth pressure of the foundation soil. A factor of safety of 1.5 must be applied to the ultimate passive earth pressure shown in Figure 1 to obtain allowable values. The earth pressure coefficients have already been reduced to account for the sloping ground in front of the wall.

Construction Considerations

Shoring may be needed to construct the walls while preserving the existing adjacent roadway. A wall base width of 70 percent of the wall height can be used for excavation estimating purposes for the MSE wall systems and a base width of 50 percent of the wall height can be used for estimating for the Criblock wall systems. Temporary slopes at the back of the wall excavation of 1:1 can also be used for excavation and shoring estimating purposes. Please note that the determination of the actual slope used for the excavation is the responsibility of the contractor, as the contractor will have control over factors which affect the stability of the excavation slope, such as length of exposed slope, length of time the excavation is left open, the amount and type of dewatering utilized, and response to inclement weather.

Settlement Monitoring

To verify that primary settlement is completed, we recommend settlements be monitored at survey hubs installed along Walls 1 and 2. The hubs should be placed and surveyed immediately after construction of the wall. Elevations of monuments should then be surveyed twice weekly for two weeks, then weekly for approximately two months. The Engineer will approve final grading and construction of the traffic barrier based on interpretation of the settlement data. The location for the settlement hubs is provided below.

Wall 1	Station	W1 11+30	(LM 721+00)
		W1 14+30	(LM 724+00)
		W1 15+30	(LM 725+00)
		W1 18+30	(LM 728+00)
Wall 2	Station	W2 11+30	(L 793+00)
		W2 12+30	(L 794+00)

Conclusion

The soil profiles, logs of test borings, laboratory test data, and Retaining Wall Data Sheets for the retaining walls and noise walls included in the project are attached to this memorandum. Please note that Section 1-02.4 of the Standard Specifications allows potential bidders to inspect all factual data, which includes the boring logs and laboratory test data.

If you have any questions regarding the recommendations made in this memorandum, please call Todd Harrison at SCAN 321-7659 or Don Chadbourne at SCAN 321-7838.

RGF:dgc

DGC

Attachments

cc: M. M. Lwin, Bridge & Structures, 7340
R. R. Mays, Architecture, 7328
Project Engineer, Dist. 1

Washington State Department of Transportation

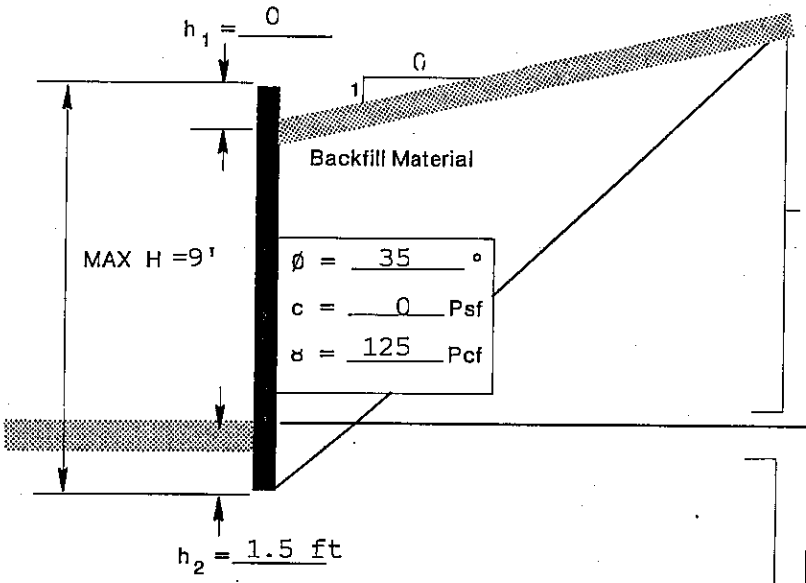
RETAINING WALL DATA SHEET

WALL 1

Dist. No. 1 Control Section 1766 SR No. 167 Job No. L-1511 Date 1/4/94

Project Main St to 84th Ave South Prepared By DGC

Wall Type Planned MSE



Show Location of Water Table: Elev-35 ft

Fill Material or Native Soil = Fill - gravel borrow

ø = 35 °
c = 0 Psf
ɣ = 125 Pcf

ø = 28 °
c = 0 Psf
ɣ = 120 Pcf

Foundation Soil Soft silt and loose to medium dense silty SAND. See Remark 2.

Allowable Bearing Value: 1.0 Tsf

Recommended Footing Elev. See Remark 1

Pile Support: Yes ____ No X

Pile Type: ____

ADDITIONAL SKETCHES REQUIRED:

1. Profile of Complete Retaining Wall
2. Sketch showing location of sewer lines, water mains, etc,
3. Sketch showing type and location of all surcharges (buildings, bridge footings, streets, etc.) located above the proposed footing elevation of the wall within a horizontal distance equal to three times the wall height.
4. Sketch showing all planned drainage (applies to drainage behind wall) and how seepage and runoff are to be handled. Mention if areas of heavy seepage are anticipated.

REMARKS—

1. Minimum embedment = 1.5 ft.
2. The soft silts beneath the wall from W1 Station 12+50 to 15+50 may be overexcavated 3 ft below the base of the wall and backfilled with good quality granular material compacted to 95% maximum density to reduce settlement.
3. 24 inch diameter concret pipe at Wall Station 13+45.

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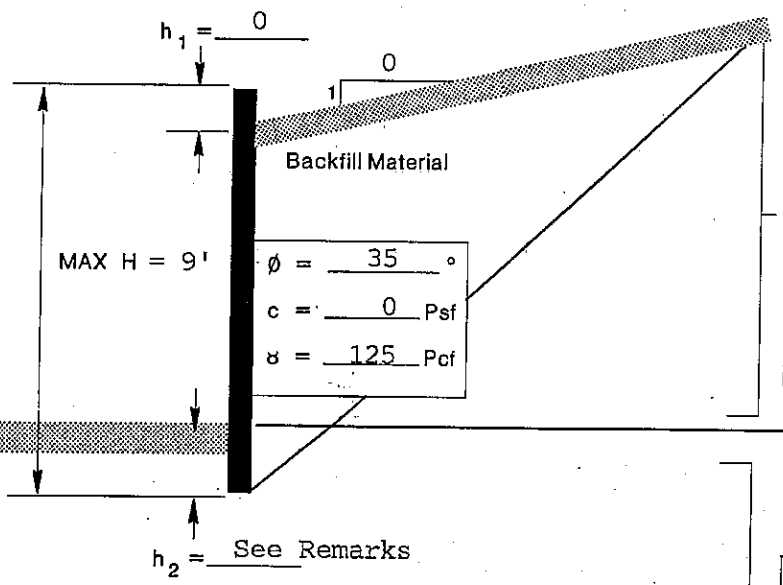
RETAINING WALL DATA SHEET

WALL 2

Dist. No. 1 Control Section 1766 SR No. 167 Job No. L-1511 Date 1/4/93

Project Main St to 84th Ave South Prepared By DGC

Wall Type Planned MSE



Show Location of Water Table: Elev = 34 ft

Fill Material or Native Soil = Fill gravel borrow

ø =	35	°
c =	0	Psf
ɤ =	125	Pcf

ø =	35	°
c =	0	Psf
ɤ =	125	Pcf

ø =	28	°
c =	0	Psf
ɤ =	120	Pcf

Foundation Soil Medium dense silty SAND and stiff sandy SILT.

Allowable Bearing Value: 1.5 Tsf

Recommended Footing Elev. See Remark No. 1

Pile Support: Yes ____ No X

Pile Type: ____

ADDITIONAL SKETCHES REQUIRED:

1. Profile of Complete Retaining Wall
2. Sketch showing location of sewer lines, water mains, etc,
3. Sketch showing type and location of all surcharges (buildings, bridge footings, streets, etc.) located above the proposed footing elevation of the wall within a horizontal distance equal to three times the wall height.
4. Sketch showing all planned drainage (applies to drainage behind wall) and how seepage and runoff are to be handled. Mention if areas of heavy seepage are anticipated.

REMARKS—

1. Minimum embedment = 1.5 ft.

Washington State
Department of Transportation

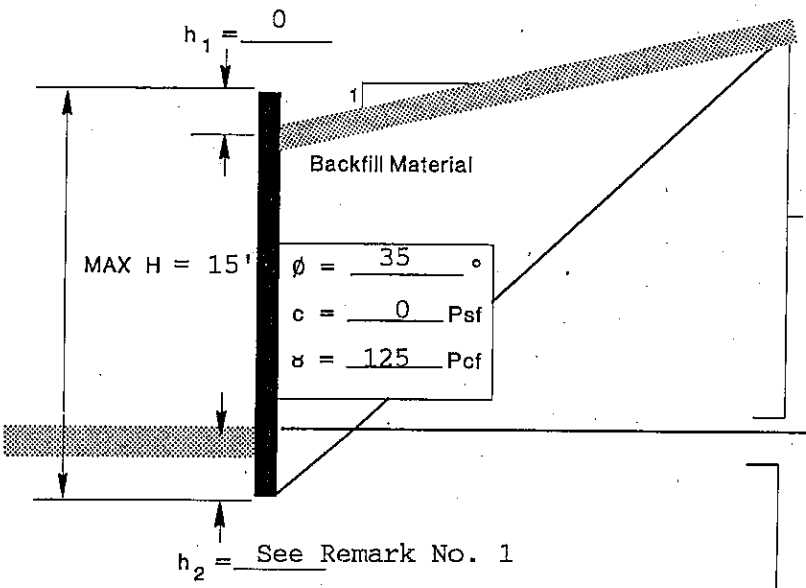
RETAINING WALL DATA SHEET

WALL 3

Dist. No. 1 Control Section 1766 SR No. 167 Job No. L-1551 Date 1/4/94

Project Main St to 84th Ave South Prepared By DGC

Wall Type Planned MSE



Show Location of Water Table: ▽ Elev = 31 ft

Fill Material or Native Soil = Fill - Gravel Borrow

ø =	35 °
c =	0 Psf
ɤ =	125 Pcf

ø =	35 °
c =	0 Psf
ɤ =	125 Pcf

ø =	36 °
c =	0 Psf
ɤ =	130 Pcf

Foundation Soil Embedment material - very dense sandy GRAVEL.

Allowable Bearing Value: 2.5 Tsf

Recommended Footing Elev. See Remark No. 1

Pile Support: Yes ____ No X

Pile Type: ____

ADDITIONAL SKETCHES REQUIRED:

1. Profile of Complete Retaining Wall
2. Sketch showing location of sewer lines, water mains, etc,
3. Sketch showing type and location of all surcharges (buildings, bridge footings, streets, etc.) located above the proposed footing elevation of the wall within a horizontal distance equal to three times the wall height.
4. Sketch showing all planned drainage (applies to drainage behind wall) and how seepage and runoff are to be handled. Mention if areas of heavy seepage are anticipated.

REMARKS—

1. Use minimum embedment criteria in the WSDOT Bridge Design Manual for footings on slopes for MSE wall or 0.3H for standard wall.
2. The minimum wall base width should be 0.6H.

Washington State Department of Transportation

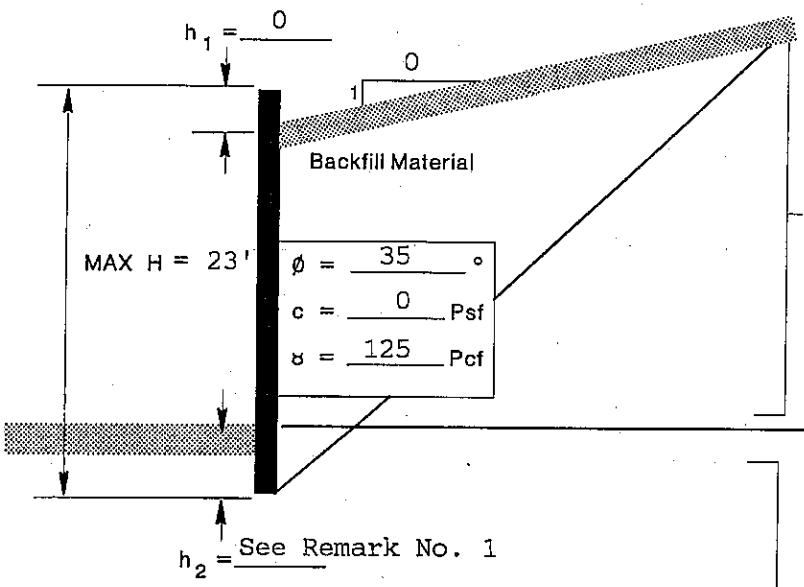
RETAINING WALL DATA SHEET

WALL 5

Dist. No. 1 Control Section 1766 SR No. 167 Job No. L-1551 Date 1/4/94

Project Main St to 84th Ave South Prepared By DGC

Wall Type Planned MSE



Show Location of Water Table: Elev = 28 ft

Fill Material or Native Soil = Gravel Borrow

ø =	35	°
c =	0	Psf
ɤ =	125	Pcf

ø =	35	°
c =	0	Psf
ɤ =	125	Pcf

Foundation Soil Embankment Material

Very dense sandy GRAVEL

ø =	36	°
c =	0	Psf
ɤ =	130	Pcf

Allowable Bearing Value: 3.0 Tsf

Recommended Footing Elev. See Remark No. 1

Pile Support: Yes _____ No X

Pile Type: _____

ADDITIONAL SKETCHES REQUIRED:

1. Profile of Complete Retaining Wall
2. Sketch showing location of sewer lines, water mains, etc,
3. Sketch showing type and location of all surcharges (buildings, bridge footings, streets, etc.) located above the proposed footing elevation of the wall within a horizontal distance equal to three times the wall height.
4. Sketch showing all planned drainage (applies to drainage behind wall) and how seepage and runoff are to be handled. Mention if areas of heavy seepage are anticipated.

REMARKS—

1. Minimum embedment according to WSDOT Bridge Design Manual but not less than 0.25H.
2. The minimum wall base width should be 0.65H.
3. The wall will be constructed over two 48" CMP in the vicinity of Station 885+00.

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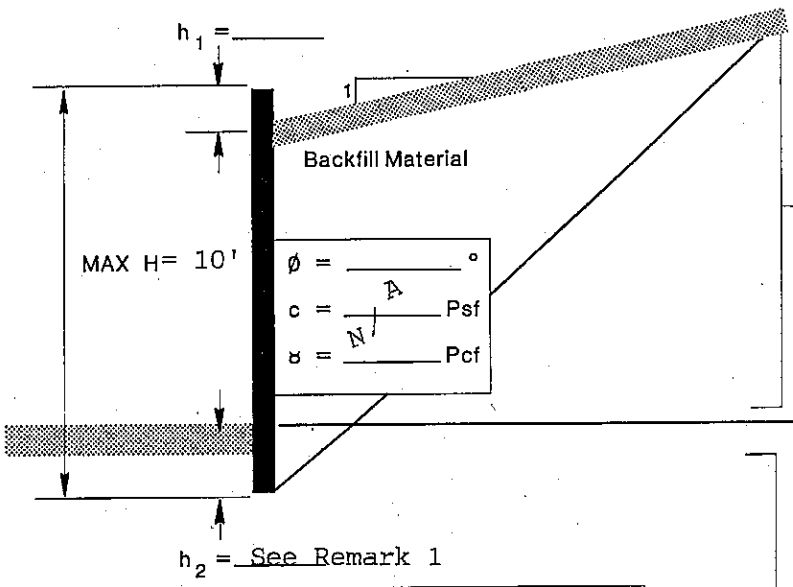
RETAINING WALL DATA SHEET

NOISE WALL 1 & 2

Dist. No. 1 Control Section 1766 SR No. 167 Job No. OL-1511 Date 1/6/94

Project Main St to 84th Ave South Prepared By DGC

Wall Type Planned Noise Wall



Show Location of Water Table:

Fill Material or Native Soil = N/A

ø = °
c = Psf
ɤ = Pcf

ø = 35 °
c = 0 Psf
ɤ = 125 Pcf

Foundation Soil Embankment Material - Very dense sandy GRAVEL

Allowable Bearing Value: 1.0 Tsf

Recommended Footing Elev. See Remark 1 & 2

Pile Support: Yes ____ No ____

Pile Type: ____

ADDITIONAL SKETCHES REQUIRED:

1. Profile of Complete Retaining Wall
2. Sketch showing location of sewer lines, water mains, etc,
3. Sketch showing type and location of all surcharges (buildings, bridge footings, streets, etc.) located above the proposed footing elevation of the wall within a horizontal distance equal to three times the wall height.
4. Sketch showing all planned drainage (applies to drainage behind wall) and how seepage and runoff are to be handled. Mention if areas of heavy seepage are anticipated.

REMARKS—

1. Embedment based on the criteria in WSDOT Bridge Design Manual for footings on slopes.
2. Drilled shaft option is feasible. See Figure 1.

Washington State Department of Transportation

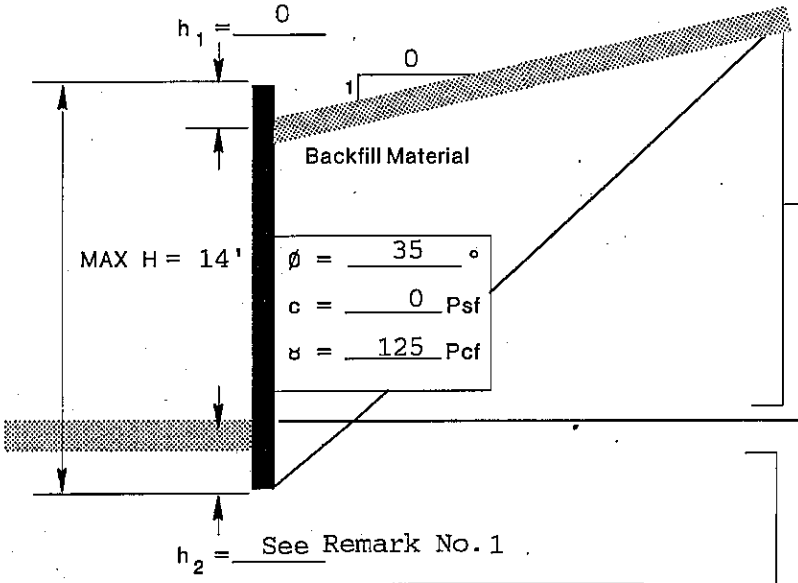
RETAINING WALL DATA SHEET

WALL 10

Dist. No. 1 Control Section 1766 SR No. 167 Job No. L-1511 Date 1/4/94

Project Main St to 84th Ave South Prepared By DGC

Wall Type Planned MSE



Show Location of Water Table: ▽ Elev = 35ft

Fill Material or Native Soil = Fill - Gravel

ø = 35 °
c = 0 Psf
ɣ = 125 Pcf

Foundation Soil Embankment material - Very dense sandy GRAVEL.

Allowable Bearing Value: 2.5 Tsf

Recommended Footing Elev. See Remark No. 1

Pile Support: Yes ____ No X

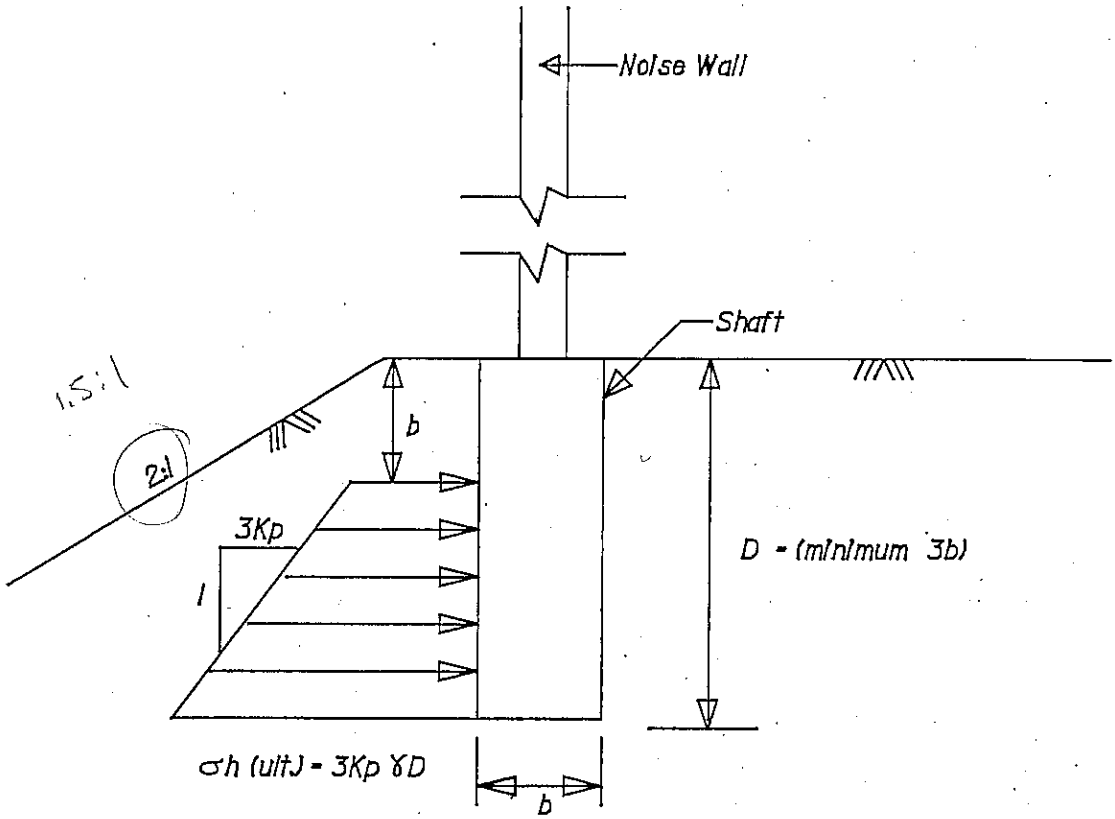
Pile Type: ____

ADDITIONAL SKETCHES REQUIRED:

1. Profile of Complete Retaining Wall
2. Sketch showing location of sewer lines, water mains, etc,
3. Sketch showing type and location of all surcharges (buildings, bridge footings, streets, etc.) located above the proposed footing elevation of the wall within a horizontal distance equal to three times the wall height.
4. Sketch showing all planned drainage (applies to drainage behind wall) and how seepage and runoff are to be handled. Mention if areas of heavy seepage are anticipated.

REMARKS—

1. Minimum embedment according to WSDOT Bridge Design Manual but not less than 0.2 H for MSE walls or 0.3 H for standard wall.
2. The minimum wall base width should be 0.65 H for MSE walls.



NOTE: (1) $\sigma h\ (allowable) = \dfrac{\sigma h\ (ult)}{1.5}$

(2) The passive pressure diagram should only be applied over the width of the foundation, "b".

(3) Kp = 1.5 for shoulder slopes of 2:1 1.5:1
γ = 125 pcf

FIGURE 1: ULTIMATE PASSIVE EARTH PRESSURE FOR SHAFT DESIGN OF NOISE WALLS 1 and 2.

JOB QL-1511 S.P. 167 C.S. 1766

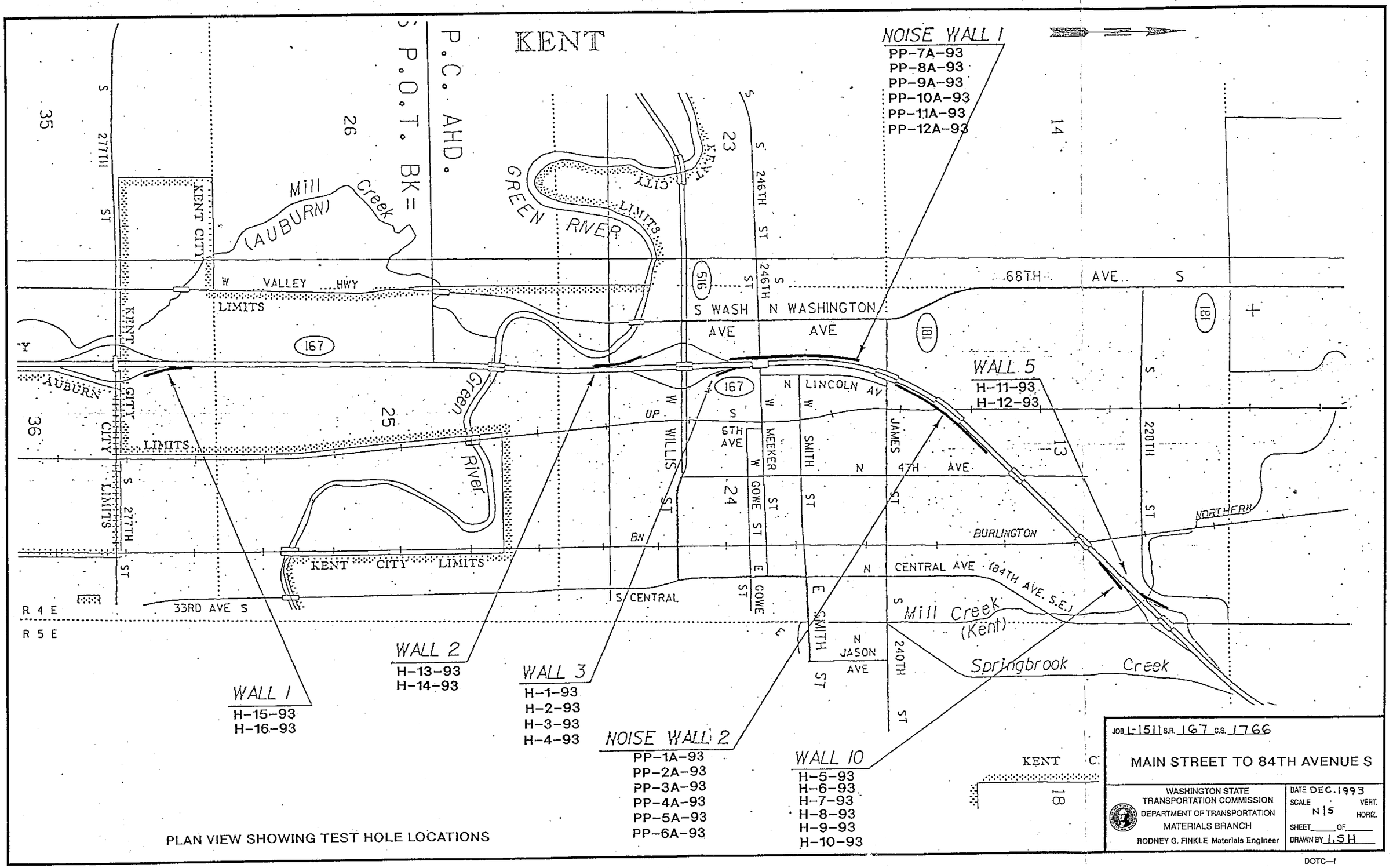
MAIN STREET TO
84TH AVENUE SOUTH

WASHINGTON STATE
TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
R. H. FINCK MATERIALS ENGINEER

DATE JAN. 1994
SCALE NS VERT.
NS HORIZ.
SHEET ___ OF ___
DRAWN BY LSH

APPENDIX A

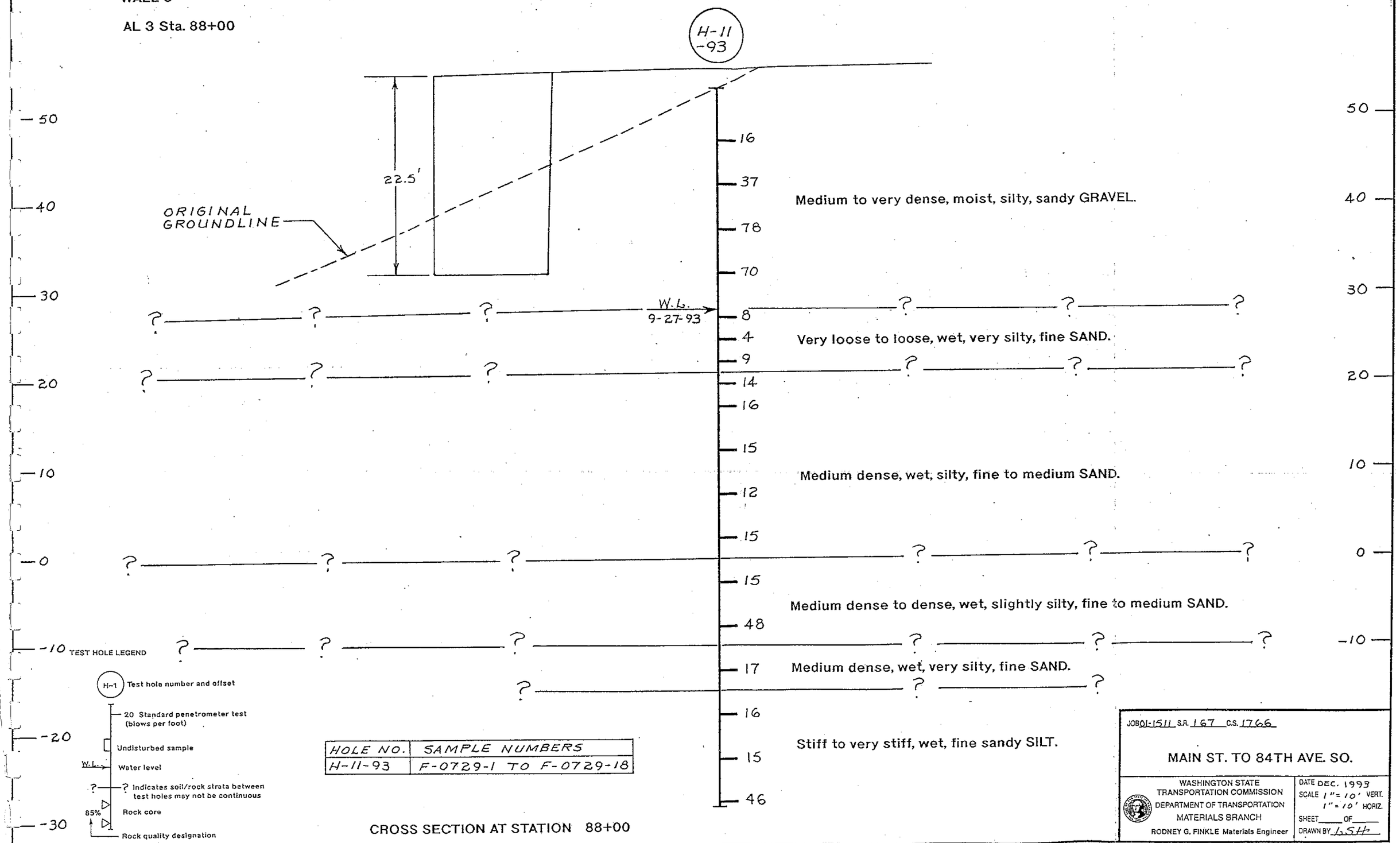
SOIL PROFILE AND PLAN SHEET



PLAN VIEW SHOWING TEST HOLE LOCATIONS

WALL 5

AL 3 Sta. 88+00



HOLE NO.	SAMPLE NUMBERS
H-11-93	F-0729-1 TO F-0729-18

CROSS SECTION AT STATION 88+00

JOB 01-1511 S.R. 167 C.S. 1766

MAIN ST. TO 84TH AVE. SO.

WASHINGTON STATE TRANSPORTATION COMMISSION
DEPARTMENT OF TRANSPORTATION
MATERIALS BRANCH
RODNEY G. FINKLE Materials Engineer

DATE DEC. 1993
SCALE 1" = 10' VERT.
1" = 10' HORIZ.
SHEET ____ OF ____
DRAWN BY L.S.H.

DOTC—1

APPENDIX B

LOGS OF TEST BORINGS

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-1-93 Sub Section Wall #3 Cont. Sec. 1766

Station W-3 10+50 Offset 25.0' Lt. of Wall CL Ground El. 58.0'

Type of Boring Skid Rig Casing W.T. El. 31.0'

Inspector Date August 24, 1993 Sheet 1 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
						ACP
	30		STD PEN 1	15 15 15		Dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.2 ft.
5	37		STD PEN 2	7 17 20		Dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.7 ft.
10	89/11"		STD PEN 3	39 39 50/5"		Very dense, brown, moist, sandy, silty **GRAVEL** with occasional cobbles. Retained 1.0 ft.
15	50/4"		STD PEN 4	45 50/4"		***SW-SM, M.C.=3.9%** Very dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.0 ft.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-1-93 Sub Section Wall #3 Cont. Sec. 1766

Station W-3 10+50 Offset 25.0' Lt. of Wall CL Ground El. 58.0'

Type of Boring Skid Rig Casing W.T. El. 31.0'

Inspector Date August 24, 1993 Sheet 2 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	79/10"		STD PEN 5 — 12 29 50/4"	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.0 ft.
25	87/11"		STD PEN 6 — 13 37 50/5"	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.0 ft.
30	7		STD PEN 7 — 2 3 4	**ML, M.C.=38.2%** Medium stiff, mottled gray and yellowish red, wet **SILT.** Retained 1.5 ft.
35	15		STD PEN 8 — 6 7 8	Medium dense, black, wet, very silty, fine **SAND.** Retained 0.8 ft.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-1-93 Sub Section Wall #3 Cont. Sec. 1766

Station W-3 10+50 Offset 25.0' Lt. of Wall CL Ground El. 58.0'

Type of Boring Skid Rig Casing W.T. El. 31.0'

Inspector Date August 24, 1993 Sheet 3 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	20		STD PEN 9 — 7 9 11	Medium dense, black, wet, very silty, fine **SAND.** Retained 0.3 ft.
				End of test hole boring at 41.5 ft. below ground elevation.
				*Laboratory test results reflect the finer fraction of soil observed in the field.
45				This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-2-93 Sub Section Wall #3 Cont. Sec. 1766

Station W3 12+00 Offset 20.0' Lt. of Wall CL Ground El. 57.2'

Type of Boring Skid Rig Casing W.T. El. 28.2'

Inspector Date August 26, 1993 Sheet 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
						ACP
5	41		STD PEN 1	15 20 21		Dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.7 ft.
10	77		STD PEN 2	30 27 50		Very dense, gray, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.9 ft.
15	50/4"		STD PEN 3	50/4"		Very dense, gray, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.8 ft.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-2-93 Sub Section Wall #3 Cont. Sec. 1766

Station W3 12+00 Offset 20.0' Lt. of Wall CL Ground El. 57.2'

Type of Boring Skid Rig Casing W.T. El. 28.2'

Inspector Date August 26, 1993 Sheet 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	50/5"		STD PEN 4 — 27, 50/5"	Very dense, gray, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.7 ft.
25	99/11"		STD PEN 5 — 47, 49, 50/5"	***SW-SM, M.C.=7.0%** Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.2 ft.
30	9		STD PEN 6 — 4, 3, 6, 9	Stiff, mottled, wet **SILT**. Retained 2.0 ft.
35	14		STD PEN 7 — 5, 7, 7	**SM, M.C.=25.8%** Medium dense, black, wet, very silty, fine **SAND** with slight trace of organics. Retained 1.0 ft.
40				End of test hole boring at 36.5 ft. below ground elevation.

*Laboratory test results reflect the finer fraction of soil observed in the field.

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

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-3-93 Sub Section Wall #3 Cont. Sec. 1766

Station W3 10+50 Offset 37.0' Rt. of Wall CL Ground El. 34.0

Type of Boring Port. Penetrometer Casing W.T. El. 29.0'

Inspector Date September 14, 1993 Sheet 1 of 1

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
	*11		PORT PEN 1		11 14 18	Stiff, gray, wet **SILT**.
	*13		PORT PEN 2		11 17 21	Stiff, mottled gray, moist **SILT**.
5	*6		PORT PEN 3		8 11 8	▽ **M.C.=34.3%** Medium stiff, mottled grayish brown, wet **SILT** with some sand lenses.
			S-1			Loose, black, wet, silty, fine to medium **SAND**.
10						End of test hole boring at 9.0 ft. below ground elevation.
						*Blows per foot are equivalent to Standard Penetrometer test values.
						This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-4-93 Sub Section Wall #3 Cont. Sec. 1766

Station W3 12+00 Offset 45.0' Rt. of Wall CL Ground El. 35.0'

Type of Boring Port. Penetrometer Casing W.T. El. No Free Water

Inspector Date September 14, 1993 Sheet 1 of 1

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
	*25/6"		PORT PEN 1		50/6"	Dense, brown, dry, sandy, silty **GRAVEL** with occasional cobbles.
	*26		PORT PEN 2		23 25 27	Dense, brown, moist, sandy, silty **GRAVEL** with occasional cobbles.
5						End of test hole boring at 4.5 ft. below ground elevation.
						*Blows per foot are equivalent to Standard Penetrometer test values.
						This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-5-93 Sub Section Wall #10 Cont. Sec. 1766

Station W10 11+00 Offset 15.0' Lt. of Wall CL Ground El. 63.0'

Type of Boring Skid Rig Casing W.T. El. 36.0'

Inspector Date September 1, 1993 Sheet 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
	59		STD PEN 1	15 23 36		**SP-SM, M.C.=4.4%** Very dense, brown, moist, slightly silty, gravelly, fine to coarse **SAND** with occasional cobbles. Retained 1.0 ft.
5	95/10"		STD PEN 2	27 45 50/4"		Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.2 ft.
10	96		STD PEN 3	35 47 49		***SP-SM, M.C.=7.4%** Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.3 ft.
15	80		STD PEN 4	23 41 39		***SP-SM, M.C.=6.0%** Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.3 ft.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-5-93 Sub Section Wall #10 Cont. Sec. 1766

Station W10 11+00 Offset 15.0' Lt. of Wall CL Ground El. 63.0'

Type of Boring Skid Rig Casing W.T. El. 36.0'

Inspector Date September 1, 1993 Sheet 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
	50/5"		STD PEN 5		21 50/5"	**GW-GM, M.C.=1.8%** Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.3 ft.
25	50/3"		STD PEN 6		50/3"	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles and some wood fragments. Retained 0.3 ft.
30	40		STD PEN 7		15 19 21	***SP-SM, M.C.=7.3%** Dense, gray, wet, silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
35						End of test hole boring at 31.5 ft. below ground elevation. *Laboratory test results reflect the finer fraction of soil observed in the field. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-6-93 Sub Section Wall #10 Cont. Sec. 1766

Station W10 11+00 Offset 40.0' Rt. of Wall CL Ground El. 37.0'

Type of Boring Port. Penetrometer Casing W.T. El. 33.0'

Inspector Date September 16, 1993 Sheet 1 of 1

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
	*12		PORT PEN 1		8 10 13	Medium dense, brown, moist, very silty, fine **SAND.**
	*10		PORT PEN 2		9 11 9	Loose, black, wet, very silty, fine **SAND.** ▽
5	*5		PORT PEN 3		7 8 8	**ML, M.C.=35.1%** Loose, black, wet, fine sandy **SILT** with fibrous organic material.
						End of test hole boring at 6.5 ft. below ground elevation.
						*Blows per foot are equivalent to Standard Penetrometer test values.
						This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-7-93 Sub Section Wall #10 Cont. Sec. 1766

Station W10 13+00 Offset 25.0' Lt. of Wall CL Ground El. 61.0'

Type of Boring Skid Rig Casing W.T. El. No Free Water

Inspector Date September 9, 1993 Sheet 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.		DESCRIPTION OF MATERIAL
					ACP
5	50/6"		STD PEN 1	50/6"	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.4 ft.
10	25		STD PEN 2	17 14 11	Dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.5 ft.
15	46		STD PEN 3	38 28 18	*SP-SM, M.C.=5.6% Dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.5 ft.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-7-93 Sub Section Wall #10 Cont. Sec. 1766

Station W10 13+00 Offset 25.0' Lt. of Wall CL Ground El. 61.0'

Type of Boring Skid Rig Casing W.T. El. No Free Water

Inspector Date September 9, 1993 Sheet 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	63		STD PEN 4: 17, 25, 38	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.0 ft.
25	33		STD PEN 5: 14, 15, 18	Dense, brown, moist, silty, fine to coarse sandy **GRAVEL** Retained 1.0 ft.
30	14		STD PEN 6: 8, 7, 7	**SM, M.C.=28.4%** Medium dense, black, moist, gravelly, very silty, fine to medium **SAND** with root hairs. Retained 0.5 ft.
35	14		STD PEN 7: 5, 7, 7	**SM, M.C.=26.6%** Medium dense, black, moist, gravelly, silty fine **SAND.**
40				End of test hole boring at 36.5 ft. below ground elevation.

*Laboratory test results reflect the finer fraction of soil observed in the field.

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

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-8-93 Sub Section Wall #10 Cont. Sec. 1766

Station W10 13+00 Offset 40.0' Rt. of Wall CL Ground El. 31.0'

Type of Boring Port. Penetrometer Casing W.T. El. 27.0'

Inspector Date September 16, 1993 Sheet 1 of 1

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
	*14		PORT PEN 1		8 13 15	Medium dense, brown, moist, very silty, fine **SAND.**
	*18		PORT PEN 2		8 15 21	**SM, M.C.=31.5%** Medium dense, gray, moist to wet, very silty, fine **SAND.**
5	*22		PORT PEN 3		16 23 21	Medium dense, gray, wet, very silty, fine **SAND.**
						End of test hole boring at 6.5 ft. below ground elevation.
						*Blows per foot are equivalent to Standard Penetrometer test values.
10						This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-9-93 Sub Section Wall #10 Cont. Sec. 1766

Station W10 15+00 Offset 15.0' Lt. of Wall CL Ground El. 56.0'

Type of Boring Skid Rig Casing W.T. El. 29.1'

Inspector Date September 15, 1993 Sheet 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
				ACP
5	73		STD PEN 1 28 41 32	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.0 ft.
10	50/5"		STD PEN 2 50/5"	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.4 ft.
15	93/11"		STD PEN 3 30 43 50/5"	Very dense, gray, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.2 ft.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-9-93 Sub Section Wall #10 Cont. Sec. 1766

Station W10 15+00 Offset 15.0' Lt. of Wall CL Ground El. 56.0'

Type of Boring Skid Rig Casing W.T. El. 29.1'

Inspector Date September 15, 1993 Sheet 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	75/9"		STD PEN 4: 23, 25, 50/3"	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.0 ft.
25	26		STD PEN 5: 11, 12, 14	***SM, M.C.=11.3%** Dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.8 ft.
30	12		STD PEN 6: 9, 5, 7	Medium dense, black, wet, gravelly, silty, fine to medium **SAND**. Retained 1.5 ft.
35				End of test hole boring at 31.5 ft. below ground elevation.
40				*Laboratory test results reflects the finer fraction of soil observed in the field.
				This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.

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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-10-93 Sub Section Wall #10 Cont. Sec. 1766

Station W10 15+00 Offset 45.0' Rt. of Wall CL Ground El. 29.0'

Type of Boring Port. Penetrometer Casing W.T. El. 25.0'

Inspector Date September 16, 1993 Sheet 1 of 1

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
	*15		PORT PEN 1		7 22 8	Medium dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL**
	*12		PORT PEN 2		20 16 20	Stiff, gray, moist, fine to medium sandy **SILT** with organics.
5	*12		PORT PEN 3		15 21 16	**ML, M.C.=35.0%** Stiff, black, wet, fine to medium sandy **SILT** with organics.
						End of test hole boring at 6.5 ft. below ground elevation.
						*Blows per foot are equivalent to Standard Penetrometer test values.
						This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-11-93 Sub Section Wall #5 Cont. Sec. 1766

Station W5 13+20 Offset 30.0' Rt. of Wall CL Ground El. 53.0'

Type of Boring Skid Rig Casing W.T. El. 28.0'

Inspector Date September 27, 1993 Sheet 1 of 5

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
						ACP
5	16		STD PEN 1		6 7 9	Medium dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.3 ft.
10	37		STD PEN 2		22 18 19	Dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.0 ft.
15	78		STD PEN 3		14 31 47	Very dense, gray, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles and some wood fragments. Retained 1.0 ft.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-11-93 Sub Section Wall #5 Cont. Sec. 1766

Station W5 13+20 Offset 30.0' Rt. of Wall CL Ground El. 53.0'

Type of Boring Skid Rig Casing W.T. El. 28.0'

Inspector Date September 27, 1993 Sheet 2 of 5

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	70		STD 31 PEN 31 4 39	Very dense, gray, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.2 ft.
25	8		STD 4 PEN 4 5 4	Loose, black wet, very silty, fine **SAND**.
	4		STD 2 PEN 2 6 2	**SM, M.C.=32.5%** Very loose, black, wet, very silty, fine **SAND**. Retained 1.0 ft.
30	9		STD 2 PEN 3 7 6	Loose, black, wet, very silty, fine **SAND**. Retained 0.9 ft.
	14		STD 5 PEN 6 8 8	Medium dense, black, wet, very silty, fine **SAND**. Retained 0.3 ft.
35	16		STD 7 PEN 7 9 9	**SM, M.C.=26.9%** Medium dense, black, wet, silty, fine to medium **SAND**. Retained 0.5 ft.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-11-93 Sub Section Wall #5 Cont. Sec. 1766

Station W5 13+20 Offset 30.0' Rt. of Wall CL Ground El. 53.0'

Type of Boring Skid Rig Casing W.T. El. 28.0'

Inspector Date September 27, 1993 Sheet 3 of 5

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	15		STD PEN 10 — 5 7 8	Medium dense, black, wet, silty, fine to medium **SAND.** Retained 0.2 ft.
45	12		STD PEN 11 — 5 5 7	Medium dense, black, wet, silty, fine to medium **SAND.** No recovery.
50	15		STD PEN 12 — 7 7 8	Medium dense, black, wet, silty, fine to medium **SAND.** Retained 1.0 ft.
55	15		STD PEN 13 — 6 7 8	**SW, M.C.=24.4%** Medium dense, black, wet, slightly silty, fine to medium **SAND.** Retained 1.0 ft.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-11-93 Sub Section Wall #5 Cont. Sec. 1766

Station W5 13+20 Offset 30.0' Rt. of Wall CL Ground El. 53.0'

Type of Boring Skid Rig Casing W.T. El. 28.0'

Inspector Date September 27, 1993 Sheet 4 of 5

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	48		STD 15 PEN 26 14 22	Dense, black, wet, very silty, fine **SAND.** Retained 1.2 ft.
65	17		STD 6 PEN 6 15 11	**SM, M.C.=29.8%** Medium dense, black wet, very silty, fine **SAND.** Retained 1.2 ft.
70	16		STD 7 PEN 7 16 9	Very stiff, black, wet, fine sandy **SILT.** Retained 1.1 ft.
75	15		STD 6 PEN 6 17 9	**ML, M.C.=35.5%** Stiff, gray, wet, fine sandy **SILT.** Retained 1.0 ft.
80				

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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-11-93 Sub Section Wall #5 Cont. Sec. 1766

Station W5 13+20 Offset 30.0' Rt. of Wall CL Ground El. 53.0'

Type of Boring Skid Rig Casing W.T. El. 28.0'

Inspector Date September 27, 1993 Sheet 5 of 5

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	46		STD 13 PEN 15 18 31	Hard, gray, wet, gravelly, fine sandy **SILT**. Retained 1.3 ft.
				End of test hole boring at 81.5 ft. below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-12-93 Sub Section Wall #5 Cont. Sec. 1766

Station W5 11+00 Offset 25.0' Rt. of Wall CL Ground El. 53.9'

Type of Boring Skid Rig Casing W.T. El. 26.9'

Inspector Date October 8, 1993 Sheet 1 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
						ACP
5	54		STD PEN 1	25 26 28		Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.9 ft.
10	57		STD PEN 2	15 17 40		Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.2 ft.
15	50/2"		STD PEN 3	50/2"		Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.0 ft.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-12-93 Sub Section Wall #5 Cont. Sec. 1766

Station W5 11+00 Offset 25.0' Rt. of Wall CL Ground El. 53.9'

Type of Boring Skid Rig Casing W.T. El. 26.9'

Inspector Date October 8, 1993 Sheet 2 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	85		STD 20 PEN 45 4 40	***SM, M.C.=9.1%** Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with cobbles. Retained 1.0 ft.
25	44		STD 15 PEN 15 5 29	Dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.3 ft.
30	20		STD 6 PEN 9 6 11	**SM, M.C.=30.5%** Medium dense, black, wet, gravelly, silty, fine **SAND** with some wood fragments. Retained 1.0 ft.
35	20		STD 7 PEN 9 7 11	**SP, M.C.=22.5%** Medium dense, black, wet, slightly silty, fine to coarse **SAND** with wood fragments. Retained 0.6 ft.
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Continued Next Page

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-12-93 Sub Section Wall #5 Cont. Sec. 1766

Station W5 11+00 Offset 25.0' Rt. of Wall CL Ground El. 53.9'

Type of Boring Skid Rig Casing W.T. El. 26.9'

Inspector Date October 8, 1993 Sheet 3 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	18		STD 7 PEN 8 8 10	Medium dense, black wet, slightly silty, fine to coarse **SAND.** Retained 0.7 ft.
45	24		STD 12 PEN 13 9 11	Medium dense, black, wet, slightly silty, fine to coarse **SAND.** Retained 1.0 ft.
50	19		STD 7 PEN 8 10 11	Medium dense, black, wet, slightly silty, fine to coarse **SAND.** Retained 0.1 ft.
55	30		STD 15 PEN 12 11 18	Dense, black, wet, slightly silty, fine to coarse **SAND.** Retained 0.6 ft.
				End of test hole boring at 56.5 ft. below ground elevation.
				*Laboratory test results reflect the finer fraction of soil observed in the field.
60				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

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-13-93 Sub Section Wall #2 Cont. Sec. 1766

Station W2 12+50 Offset 8.0' Rt. of Wall CL Ground El. 47.0'

Type of Boring Skid Rig Casing W.T. El. 34.0'

Inspector Date September 16, 1993 Sheet 1 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.		DESCRIPTION OF MATERIAL
	81/11"		STD PEN 1	23 31 50/5"	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.0 ft.
5	68		STD PEN 2	20 18 50	***SP-SM, M.C.=5.0%** Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 0.5 ft.
10	10		STD PEN 3	4 5 5	**ML, M.C.=27.5%** Stiff, mottled dark brown, moist, fine sandy **SILT** with trace of organics. Retained 1.0 ft.
15	3		STD PEN 4	1 2 1	Soft, mottled, wet, very sandy **SILT** with trace of organics. Retained 1.5 ft.
20			U-1	A B C D	**ML, M.C.=57.4%** Gray, wet, fine sandy **SILT** with fine lenses of fibrous organic material.

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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-13-93 Sub Section Wall #2 Cont. Sec. 1766

Station W2 12+50 Offset 8.0' Rt. of Wall CL Ground El. 47.0'

Type of Boring Skid Rig Casing W.T. El. 34.0'

Inspector Date September 16, 1993 Sheet 2 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
	4		STD PEN 5	1 1 3		**ML, M.C.=39.0%** Soft, wet, fine sandy **SILT** with fibrous organic material. Retained 1.5 ft.
			U-2			No recovery.
25	37		STD PEN 6	6 11 26		Dense, black, wet, silty, fine to medium **SAND**. Retained 1.0 ft.
30	3		STD PEN 7	2 1 2		**ML, M.C.=41.4%** Soft, gray, wet **SILT**. Retained 1.2 ft.
			U-3			No recovery.
35	26		STD PEN 8	10 12 14		Very stiff, gray, wet, fine sandy **SILT**. Retained 0.2 ft.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-13-93 Sub Section Wall #2 Cont. Sec. 1766

Station W2 12+50 Offset 8.0' Rt. of Wall CL Ground El. 47.0'

Type of Boring Skid Rig Casing W.T. El. 34.0'

Inspector Date September 16, 1993 Sheet 3 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	15		STD 1 PEN 3 9 12	**ML, M.C.=31.7%** Stiff, gray, wet, fine sandy **SILT** with fibrous organic material. Retained 1.5 ft.
				End of test hole boring at 41.5 ft. below ground elevation.
				*Laboratory test results reflect the finer fraction of soil observed in the field.
				This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-14-93 Sub Section Wall #2 Cont. Sec. 1766

Station W2 10+50 Offset 6.0' Rt. of Wall CL Ground El. 45.0'

Type of Boring Skid Rig Casing W.T. El. 33.0'

Inspector Date September 21, 1993 Sheet 1 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.		DESCRIPTION OF MATERIAL
					ACP
	56		STD PEN 1	13 26 30	Very dense, brown, moist, silty, gravelly, fine to coarse **SAND**. Retained 1.0 ft.
5	8		STD PEN 2	10 4 4	**SP-SM, M.C.18.2%** Loose, gray, moist, silty, gravelly, fine to coarse **SAND**. Retained 1.5 ft.
10	13		STD PEN 3	7 6 7	**SP, M.C.=4.9%** Medium dense, brown, moist, slightly silty, fine to coarse **SAND** with root hairs. Retained 1.5 ft.
15	3		STD PEN 4	1 1 2	**ML, M.C.=41.7%** Soft, gray, wet, fine sandy **SILT** with fibrous organic material.
20			U-1	A B	Loose, gray, wet, silty, fine **SAND**. Retained 1.5 ft.

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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-14-93 Sub Section Wall #2 Cont. Sec. 1766

Station W2 10+50 Offset 6.0' Rt. of Wall CL Ground El. 45.0'

Type of Boring Skid Rig Casing W.T. El. 33.0'

Inspector Date September 21, 1993 Sheet 2 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	14		STD PEN 5: 4, 6, 8	**ML, M.C.=24.2%** Stiff, gray, wet, fine sandy **SILT.** Retained 1.5 ft.
				Tried to push U.D. at 22.5 ft., met with resistance.
25	17		STD PEN 6: 8, 9, 8	**SP-SM, M.C.=26.5%** Medium dense, dark gray, wet, silty, fine to medium **SAND.** Retained 1.5 ft.
30	11		STD PEN 7: 1, 5, 6	Medium dense, dark gray, water bearing, silty, fine to medium **SAND.**
			U-2: B, C	Medium stiff, dark gray, wet, fine sandy **SILT.** Retained 1.0 ft.
35	28		STD PEN 8: 10, 15, 13	**ML, M.C.=24.4%** Very stiff, dark gray, wet, fine sandy **SILT.** Retained 1.5 ft.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-14-93 Sub Section Wall #2 Cont. Sec. 1766

Station W2 10+50 Offset 6.0' Rt. of Wall CL Ground El. 45.0'

Type of Boring Skid Rig Casing W.T. El. 33.0'

Inspector Date September 21, 1993 Sheet 3 of 3

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	34		STD 18 PEN 20 9 14	Hard, dark gray, wet, fine sandy SILT. Retained 1.5 ft.
				End of test hole boring at 41.5 ft. below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-15-93 Sub Section Wall #1 Cont. Sec. 1766

Station D1 21+00 Offset 20.0' Lt. of Wall CL Ground El. 45.0

Type of Boring Skid Rig Casing W.T. El. 35.0'

Inspector Date September 22, 1993 Sheet 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
						ACP
	34		STD PEN 1		13 17 17	Dense, brown, moist, silty, fine to coarse sandy **GRAVEL** Retained 0.8 ft.
5	88		STD PEN 2		20 43 45	Very dense, brown, moist, dense, silty, fine to coarse sandy **GRAVEL** Retained 0.8 ft.
10	15		STD PEN 3		15 7 8	∇ Medium dense, gray, wet, silty, fine to coarse sandy **GRAVEL**
15	7		STD PEN 4		3 4 3	Medium stiff, gray, wet, very sandy **SILT.**
			U-1		A THRU F	Medium stiff, gray, wet, sandy **SILT.**
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-15-93 Sub Section Wall #1 Cont. Sec. 1766

Station D1 21+00 Offset 20.0' Lt. of Wall CL Ground El. 45.0

Type of Boring Skid Rig Casing W.T. El. 35.0'

Inspector Date September 22, 1993 Sheet 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	15		STD PEN 5: 5, 7, 8	**ML, M.C.=29.5%** Stiff, black, wet, fine sandy **SILT.** Retained 0.9 ft.
25	5		STD PEN 6: 3, 2, 3	Medium stiff, black, wet, fine sandy **SILT.**
	25		STD PEN 7: 7, 8, 17	**SP, M.C.=19.7%** Dense, black, wet, fine to coarse **SAND.** Retained 1.5 ft.
30	26		STD PEN 8: 8, 9, 17	Dense, black, wet, fine to coarse **SAND.** Retained 1.5 ft.
				End of test hole boring at 31.5 ft. below ground elevation.
				This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-16-93 Sub Section Wall #1 Cont. Sec. 1766

Station LM 724+20 Offset 20.0' Lt. of Wall CL Ground El. 45.0'

Type of Boring Skid Rig Casing W.T. El. 35.0'

Inspector Date September 23, 1993 Sheet 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
						ACP
	68		STD PEN 1		21 29 39	*SP-SM, M.C.=5.3% Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.2 ft.
5	69		STD PEN 2		20 27 42	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles. Retained 1.0 ft.
10	4		STD PEN 3		1 2 2	ML, M.C.=46.0% Soft, gray, wet, gravelly **SILT**. Retained 1.2 ft.
			U-1		A B	Soft, gray, wet, sandy **SILT** (sample A) Very loose, black, wet, silty, fine **SAND** (sample B)
15	3		STD PEN 4		3 1 2	ML, M.C.=43.5% Soft, gray, wet, fine sandy **SILT**. Retained 1.0 ft.
20			U-2		A B C D E	ML, M.C.=37.3% Gray, wet, fine sandy **SILT**.

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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-16-93 Sub Section Wall #1 Cont. Sec. 1766

Station LM 724+20 Offset 20.0' Lt. of Wall CL Ground El. 45.0'

Type of Boring Skid Rig Casing W.T. El. 35.0'

Inspector Date September 23, 1993 Sheet 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	14		STD PEN 5 — 2, 6, 8	Stiff, black, wet, fine sandy **SILT**. Retained 1.3 ft.
25	22		STD PEN 6 — 7, 8, 14	**SM, M.C.=24.9%** Medium dense, black, wet, very silty, fine **SAND**. Retained 1.5 ft.
30	20		STD PEN 7 — 6, 8, 12	Medium dense, black, wet, fine to coarse **SAND**. Retained 0.2 ft.
35				End of test hole boring at 31.5 ft. below ground elevation. *Laboratory test results reflect the finer fraction of soil observed in the field. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-17-93 Sub Section Wall #1 Cont. Sec. 1766

Station LM 726+70 Offset CL Wall Ground El. 40.0'

Type of Boring Skid Rig Casing W.T. El. 35.0'

Inspector Date September 24, 1993 Sheet 1 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
	12		STD PEN 1	3 5 7		Medium dense, mottled, moist, very silty, fine **SAND.** Retained 1.0 ft.
5	5		STD PEN 2	2 3 2		▽ **SM, M.C.=21.8%** Loose, black, wet, very silty, fine **SAND.** Retained 1.0 ft.
	5		STD PEN 3	4 3 2		Loose, black, wet, very silty, fine **SAND.** Retained 1.5 ft.
10	14		STD PEN 4	3 7 7		Medium dense, black, wet, very silty, fine **SAND.** Retained 1.5 ft.
15	12		STD PEN 5	5 5 7		Stiff, black, wet, fine sandy **SILT.** Retained 1.5 ft.
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LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. H-17-93 Sub Section Wall #1 Cont. Sec. 1766

Station LM 726+70 Offset CL Wall Ground El. 40.0'

Type of Boring Skid Rig Casing W.T. El. 35.0'

Inspector Date September 24, 1993 Sheet 2 of 2

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.	DESCRIPTION OF MATERIAL
	6		STD 4 PEN 2 6 4	Loose, black, wet, fine to coarse **SAND** with some wood fragments. Retained 1.0 ft.
	24		STD 11 PEN 12 7 12	**SP-SM, M.C.=21.7%** Medium dense, black, wet, slightly silty, fine to medium **SAND**. Retained 1.2 ft.
25	15		STD 5 PEN 7 8 8	Medium dense, black, wet, fine to coarse **SAND**. Retained 0.9 ft.
30	30		STD 8 PEN 14 9 16	Dense, black, wet, fine to coarse **SAND**. Retained 1.0 ft.
				End of test hole boring at 31.5 ft. below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. PP-7A-93 Sub Section Noise Wall #1 Cont. Sec. 1766

Station NW 11+00 Offset CL Ground El. 53.5'

Type of Boring Port. Penetrometer Casing W.T. El. No Free Water

Inspector Date December 3, 1993 Sheet 1 of 1

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
	*26		PORT PEN 1		9 20 32	Dense, brown, moist slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
	*25/4"		PORT PEN 2		41 50/4"	Very dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
5	*25/4"		PORT PEN 3		50/4"	Very dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL** with cobbles.
						End of test hole boring at 6.0 ft. below ground elevation.
						*Note: Blows per foot are equivalent to standard penetrometer values.
						This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. PP-8A-93 Sub Section Noise Wall #1 Cont. Sec. 1766

Station NW 14+00 Offset CL Ground El. 53.5'

Type of Boring Casing W.T. El. No Free Water

Inspector Date December 3, 1993 Sheet 1 of 1

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
	*38/10"		PORT PEN 1	X	18 26 50/4"	Dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
	*25/4"		PORT PEN 2	X	48 50/4"	Very dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
5	*25/3"		PORT PEN 3	X	50/3"	Very dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
						End of test hole boring at 5.3 ft. below ground elevation.
						*Note: Blows per foot are equivalent to standard penetrometer values.
						This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. PP-9A-93 Sub Section Noise Wall #1 Cont. Sec. 1766

Station NW 17+00 Offset CL Ground El. 56.0'

Type of Boring Port. Penetrometer Casing W.T. El. No Free Water

Inspector Date December 3, 1993 Sheet 1 of 1

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
	*39		PORT PEN 1		20 28 50	Dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
	*25/4		PORT PEN 2		38 50/4"	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
5	*25/3"		PORT PEN 3		50/3"	Dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
						End of test hole boring at 5.3 ft. below ground elevation.
						*Note: Blows per foot are equivalent to standard penetrometer values.
						This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. PP-10A Sub Section Noise Wall #1 Cont. Sec. 1766

Station NW 20+00 Offset CL Ground El. 56.0'

Type of Boring Port. Penetrometer Casing W.T. El. No Free Water

Inspector Date December 3, 1993 Sheet 1 of 1

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.			DESCRIPTION OF MATERIAL
	*39		PORT PEN 1		28 28 50	Dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
	*25/3"		PORT PEN 2		50/3"	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
5	25/2"		PORT PEN 3		50/2"	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
						End of test hole boring at 5.2 ft. below ground elevation.
						*Note: Blows per foot are equivalent to standard penetrometer values.
						This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. PP-11A Sub Section Noise Wall #1 Cont. Sec. 1766

Station NW 23+00 Offset CL Ground El. 54.0'

Type of Boring Port. Penetrometer Casing W.T. El. No Free Water

Inspector Date December 3, 1993 Sheet 1 of 1

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.		DESCRIPTION OF MATERIAL
	*38/10"		PORT PEN 1	18 26 50/4"	Dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
	*25/3"		PORT PEN 2	50/3"	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
5	*25/2"		PORT PEN 3	50/2"	Very dense, brown, moist, silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
					End of test hole boring at 5.2 ft. below ground elevation.
					*Note: Blows per foot are equivalent to standard penetrometer values.
					This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

Washington State Department of Transportation

S.R. 167 SECTION Main Street to 84th Avenue South Job No. L-1511

Hole No. PP-12A Sub Section Noise Wall #1 Cont. Sec. 1766

Station NW 27+00 Offset CL Ground El. 55.5'

Type of Boring Port. Penetrometer Casing W.T. El. No Free Water

Inspector Date December 3, 1993 Sheet 1 of 1

DEPTH	BLOWS PER FT.	PROFILE	SAMPLE TUBE NOS.		DESCRIPTION OF MATERIAL
	*46		PORT PEN 1	25 41 50	Dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
	*25/5"		PORT PEN 2	50/5"	Very dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
5	*25/3"		PORT PEN 3	50/3"	Very dense, brown, moist, slightly silty, fine to coarse sandy **GRAVEL** with occasional cobbles.
					End of test hole boring at 5.3 ft. below ground elevation.
					*Note: Blows per foot are equivalent to standard penetrometer values.
					This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications.
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DOT FORM 351-003 REVISED 12/79

LOG OF TEST BORING

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

S.H. _____ S.R. 167 SECTION Main St. to 84 th Ave So. Job No. OL-1511

Hole No. PP-1A Sub Section HOV & SC&DI Noise Wall #2 Cont. Sec. _____

Station Noise Wall 11+00 Offset Wall#2 Centerline Ground El. 59'

Type Of Boring Portable Penetrometer Casing _____ W.T. El. No Free Water

Inspector H.C. Date 12/6/93 Sheet 1 1

DEPTH	BLOWS / FT.	PROFILE	SAMPLE #'s	DESCRIPTION OF MATERIAL
0	P-1		5/12/18	moist brown dense sandy silty fineto coarse GRAVEL
	15			w/ occasional cobbles
	P-2		11/18/28	moist brown dense sandy silty fineto coarse GRAVEL
	22			w/ occasional cobbles
5	P-3		18-25-28	moist brown dense sandy silty fineto coarse GRAVEL
	27			w/ occasional cobbles
				Note : blows per foot are equivalent to standard
10				penetrometer values
				End of boring at elevation 53.5'
15				
20				

FORM 351-003
REVISED 12/79

DOT

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. 167 SECTION Main St. to 84 th Ave So. Job No. OL-1511

Hole No. PP-2A Sub Section HOV & SC&DI Noise Wall #2 Cont. Sec. _____

Station Noise Wall 14+00 Offset Wall#2 Centerline Ground El. 63.2'

Type Of Boring Portable Penetrometer Casing _____ W.T. El. No Free Water

Inspector H.C. Date 12/6/93 Sheet 1 1

DEPTH	BLOWS / FT.	PROFILE	SAMPLE #'s	DESCRIPTION OF MATERIAL
0	P-1		8/9/17	moist brown dense sandy silty fineto coarse GRAVEL
	13			w/ occasional cobbles
	P-2		18-25-25	moist brown dense sandy silty fineto coarse GRAVEL
	25			w/ occasional cobbles
5	P-3		22-28-31	moist brown dense sandy silty fineto coarse GRAVEL
	30			w/ occasional cobbles
				Note : blows per foot are equivalent to standard
10				penetrometer values
				End of boring at elevation 57.7'
15				
20				

FORM 351-003
REVISED 12/79

DOT

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. 167 SECTION Main St. to 84 th Ave So. Job No. OL-1511

Hole No. PP-3A Sub Section HOV & SC&DI Noise Wall #2 Cont. Sec. ____

Station Noise Wall 16+50 Offset Wall#2 Centerline Ground El. 66.3'

Type Of Boring Portable Penetrometer Casing ____ W.T. El. No Free Water

Inspector H.C. Date 12/6/93 Sheet 1 1

DEPTH	BLOWS / FT.	PROFILE	SAMPLE #'s	DESCRIPTION OF MATERIAL
0	P-1		12/16/16	moist brown dense sandy silty fineto coarse GRAVEL
	16			w/ occasional cobbles
	P-2		18-18-28	moist brown dense sandy silty fineto coarse GRAVEL
	23			w/ occasional cobbles
5	P-3		25-32-39	moist brown dense sandy silty fineto coarse GRAVEL
	35			w/ occasional cobbles
				Note : blows per foot are equivalent to standard
10				penetrometer values
				End of boring at elevation 60.8'
15				
20				

FORM 351-003
REVISED 12/79

DOT

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. 167 SECTION Main St. to 84 th Ave So. Job No. OL-1511

Hole No. PP-4A Sub Section HOV & SC&DI Noise Wall #2 Cont. Sec. _____

Station Noise Wall 21+00 Offset Wall#2 Centerline Ground El. 68.5'

Type Of Boring Portable Penetrometer Casing _____ W.T. El. No Free Water

Inspector H.C. Date 12/6/93 Sheet 1 1

DEPTH	BLOWS / FT.	PROFILE	SAMPLE #'s	DESCRIPTION OF MATERIAL
0	P-1		9/18/18	moist brown dense sandy silty fineto coarse GRAVEL
	18			w/ occasional cobbles
	P-2		22-22-31	moist brown dense sandy silty fineto coarse GRAVEL
	26			w/ occasional cobbles
5	P-3		22-31-34	moist brown dense sandy silty fineto coarse GRAVEL
	33			w/ occasional cobbles
				Note : blows per foot are equivalent to standard
10				penetrometer values
				End of boring at elevation 63'
15				
20				

FORM 351-003
REVISED 12/79

DOT

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. 167 SECTION Main St. to 84 th Ave So. Job No. OL-1511

Hole No. PP-5A Sub Section HOV & SC&DI Noise Wall #2 Cont. Sec. _____

Station Noise Wall 24+00 Offset Wall#2 Centerline Ground El. 68'

Type Of Boring Portable Penetrometer Casing _____ W.T. El. No Free Water

Inspector H.C. Date 12/6/93 Sheet 1 1

DEPTH	BLOWS / FT.	PROFILE	SAMPLE #'s	DESCRIPTION OF MATERIAL
0	P-1		7/10/13	moist brown dense sandy silty fineto coarse GRAVEL
	12			w/ occasional cobbles
	P-2		25-29-37	moist brown dense sandy silty fineto coarse GRAVEL
	33			w/ occasional cobbles
5	P-3		30-40-38	moist brown dense sandy silty fineto coarse GRAVEL
	39			w/ occasional cobbles
				Note : blows per foot are equivalent to standard
10				penetrometer values
				End of boring at elevation 62.5'
15				
20				

FORM 351-003
REVISED 12/78

DOT

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. 167 SECTION Main St. to 84 th Ave So. Job No. OL-1511

Hole No. PP-6A Sub Section HOV & SC&DI Noise Wall #2 Cont. Sec. _____

Station Noise Wall 27+00 Offset Wall#2 Centerline Ground El. 64.8'

Type Of Boring Portable Penetrometer Casing _____ W.T. El. No Free Water

Inspector H.C. Date 12/6/93 Sheet 1 1

DEPTH	BLOWS / FT.	PROFILE	SAMPLE #'s	DESCRIPTION OF MATERIAL
0	P-1		16-19-20	moist brown dense sandy silty fineto coarse GRAVEL
	20			w/ occasional cobbles
	P-2		21-231	moist brown dense sandy silty fineto coarse GRAVEL
	29			w/ occasional cobbles
5	P-3		19-26-48	moist brown dense sandy silty fineto coarse GRAVEL
	37			w/ occasional cobbles
				Note : blows per foot are equivalent to standard
10				penetrometer values
				End of boring at elevation 57'
15				
20				

FORM 351-003
REVISED 12/79

DOT

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

APPENDIX C

LABORATORY TEST DATA

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St to 84th Ave. S. SR No. 167 Sub-Section WALL #3

Station & Offset W-3 10+50 Hole # W3 1-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0719 -1	P-1	2.0' TO 3.5'			LK 19-3
-2	P-2	5.0' TO 6.5'			LK 19-3
—	P-3	10.0' TO 11'5"	No Rec		
-3	P-4	15.0' TO 15'10"	MC = 3.9%	SW-SM	
-4	P-5	20.0' TO 21'4"			LK 20-5
-5	P-6	25.0' TO 26'5"			LK 20-5
-6	P-7	30.0' TO 31.5'	MC = 38.2%	ML	PI Non-Plastic
-7	P-8	35.0' TO 36.5'			LK F-0720-7 inc f-m sand
-8	P-9	40.0' TO 41.5'			LK 20-7

Yours Very Truly,

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Inspector.

1 copy with samples
1 copy to addressee

FORM 351-002

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0719-3

HOLE NO.: W3-1-93

DATE: 11-24-93

LAB. TECH.: D.G.

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.: 112.2 g

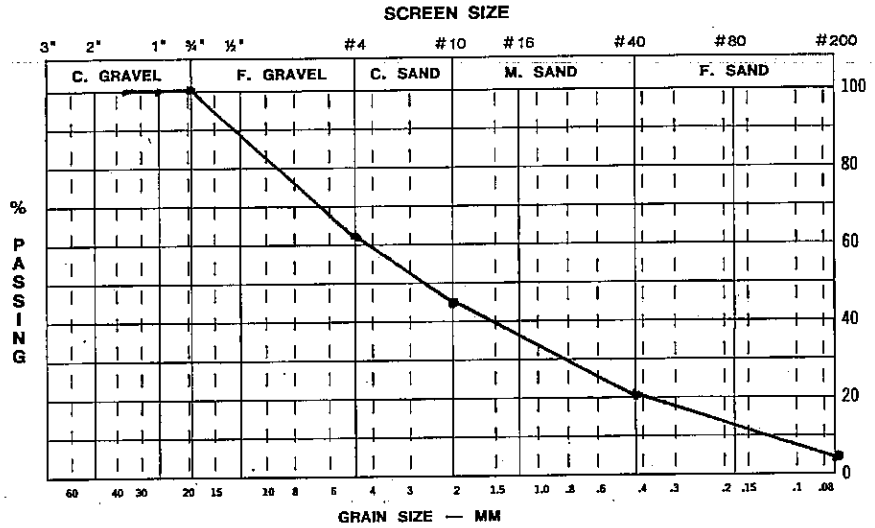
WET WT.: 116.6 g

% H_2O: 3.9%

WT. OF SAMPLE: 354.0 g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	133.3 g	100.0
-#4	54.8 g	62.3
-#10	93.7 g	46.9
-#40	53.9 g	20.4
-#200	18.3 g	5.2

GRAIN SIZE CURVE



SAMPLE DESCRIPTION

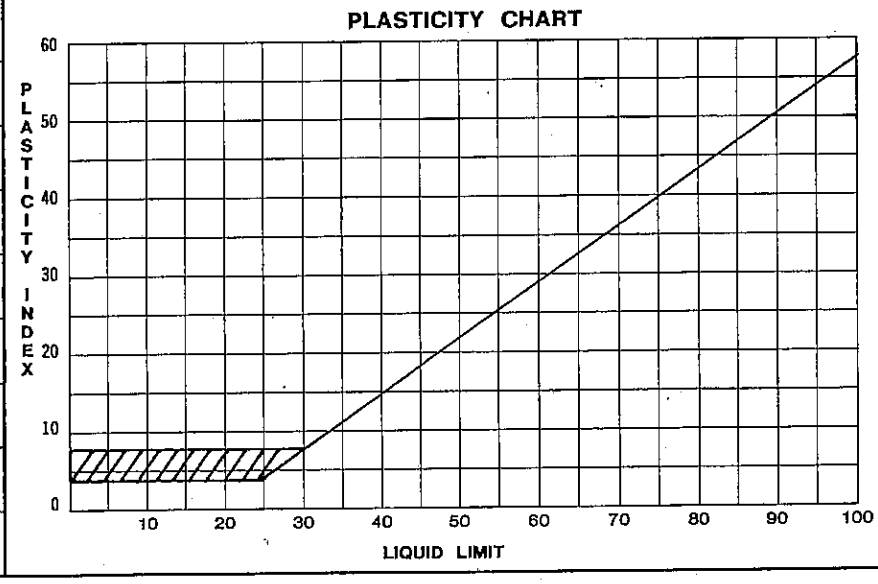
CLASS. SW-SM

Dark Grayish Brown, Dry, Slightly Silty, Gravelly Fine TO Coarse Sand

LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0719-6
HOLE NO.:	W3-1-93
DATE:	12-2-93
LAB. TECH.:	LHB

SIEVE ANALYSIS

DRY WT.:	65.0g
WET WT.:	89.8g
% H_2O:	38.2%
WT. OF SAMPLE:	358.8g

	WT.	% PASS
-1½"	∅	100.0
-1"	∅	100.0
-¾"	∅	100.0
-#4	∅	100.0
-#10	0.3g	100.0
-#40	2.6g	99.9
-#200	355.9g	99.2

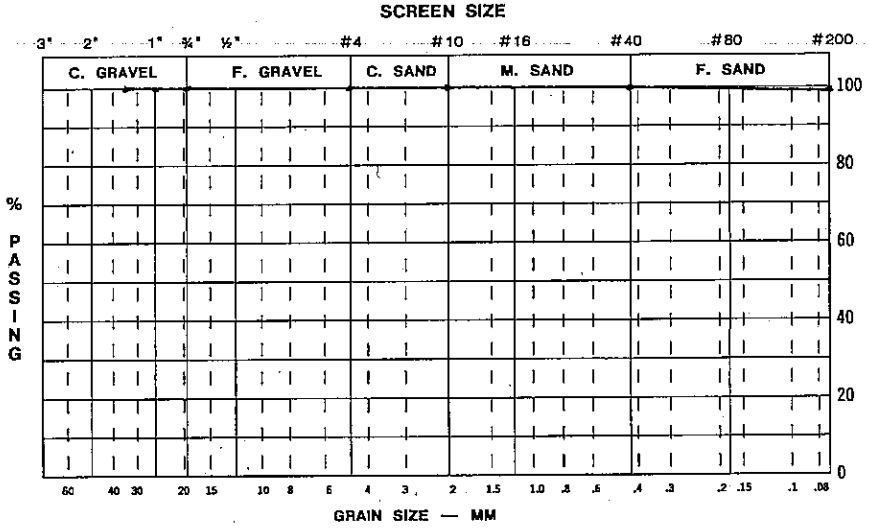
SAMPLE DESCRIPTION

CLASS. ML Mottled Gray & Yellowish Red, Wet, Silt

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL			✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

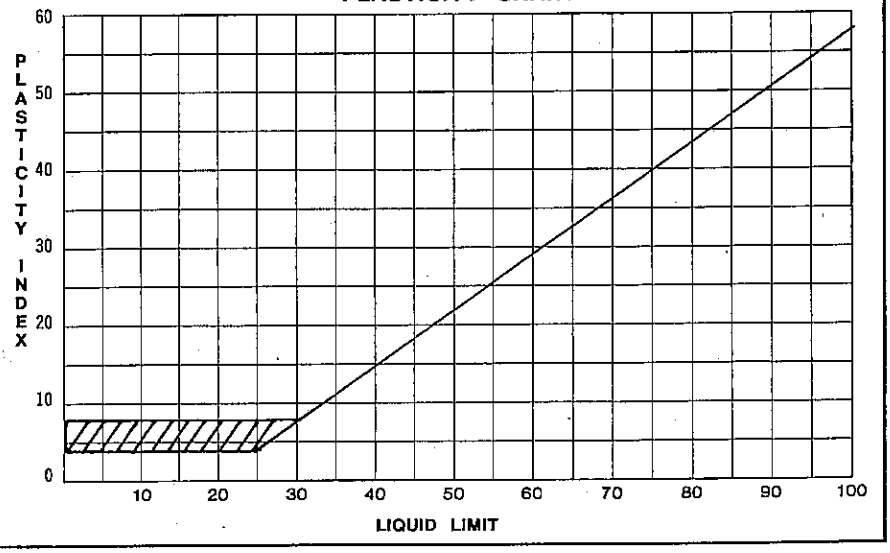
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S.
SR No. 167 Sub-Section WALL # 3

Station & Offset DR2 12+00 20.0' Lt. Hole # W3 2-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0720 -1	P-1	5.0' TO 6.5'			LK 19-3
-2	P-2	10.0' TO 11.5'			LK 19-3
-3	P-3	15.0' TO 15'4"			LK 19-3
-4	P-4	20.0' TO 20'11"			LK 20-5
-5	P-5	25.0' TO 26'5"	MC = 7.0%	SW-SM	
-6	P-6	30.0' TO 32.0'			LK 19-6
-7	P-7	35.0' TO 36.5'	MC = 25.8%	SM	

1 copy with samples
1 copy to addressee

Yours very truly,

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT District 1 Mats Lab
[illegible]rson Avenue South
M[illegible] Stop: NB-82/MS-29
Seattle, WA 98108-3445

Inspector.

FORM 351-002

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0720-5

HOLE NO.: W3-2-93

DATE: 11-30-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 105.2 g

WET WT.: 112.6 g

% H_2O: 7.0 %

WT. OF SAMPLE: 358.8 g

	WT.	% PASS
-1½"	Ø	100.0
-1"	28.2 g	100.0
-¾"	108.3 g	92.1
-#4	49.4 g	62.0
-#10	85.0 g	48.2
-#40	52.5 g	24.5
-#200	35.4 g	9.9

SAMPLE DESCRIPTION

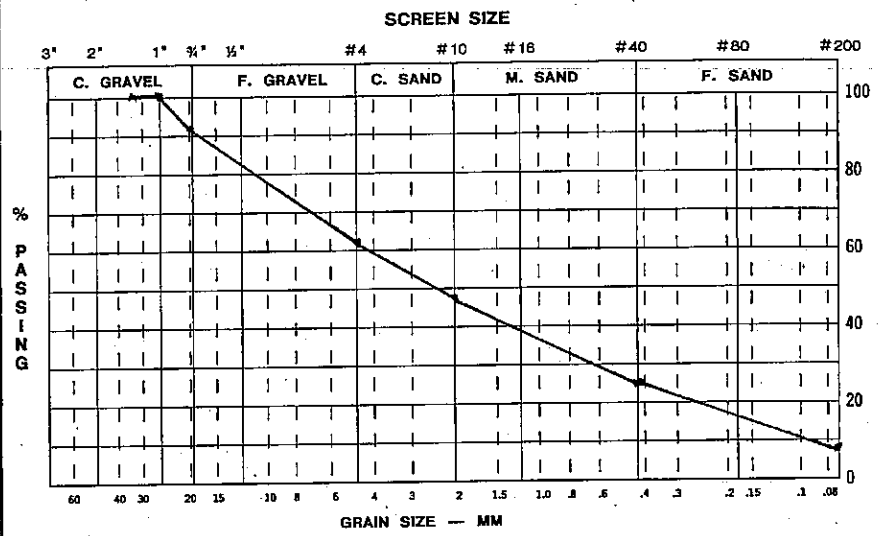
CLASS. SW-SM

Olive Brown, Dry, Silty, Gravelly, Fine to Coarse Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

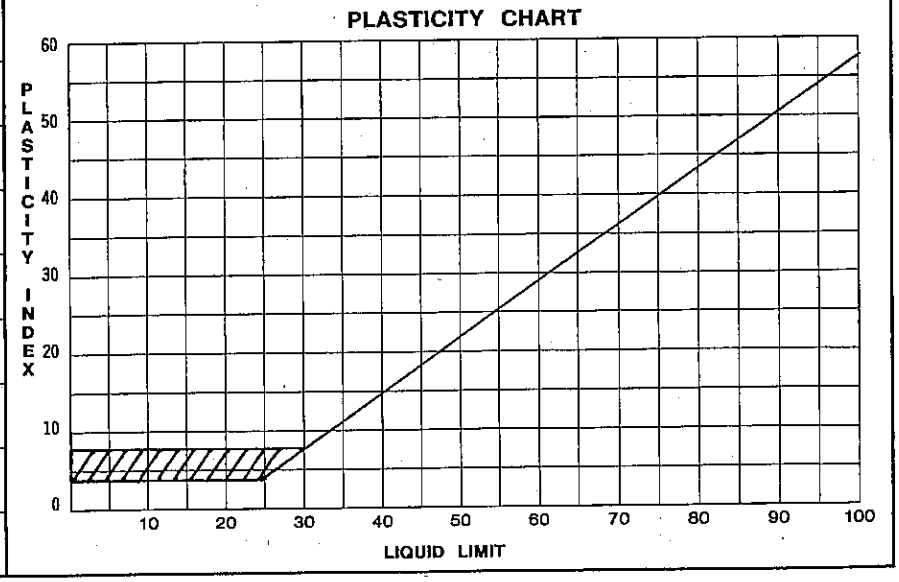
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0720-7

HOLE NO.: W3-2-93

DATE: 11-30-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 52.7g

WET WT.: 66.3g

% H_2O: 25.8%

WT. OF SAMPLE: 279.8g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	Ø	100.0
-#40	155.7	100.0
-#200	124.1	44.4

SAMPLE DESCRIPTION

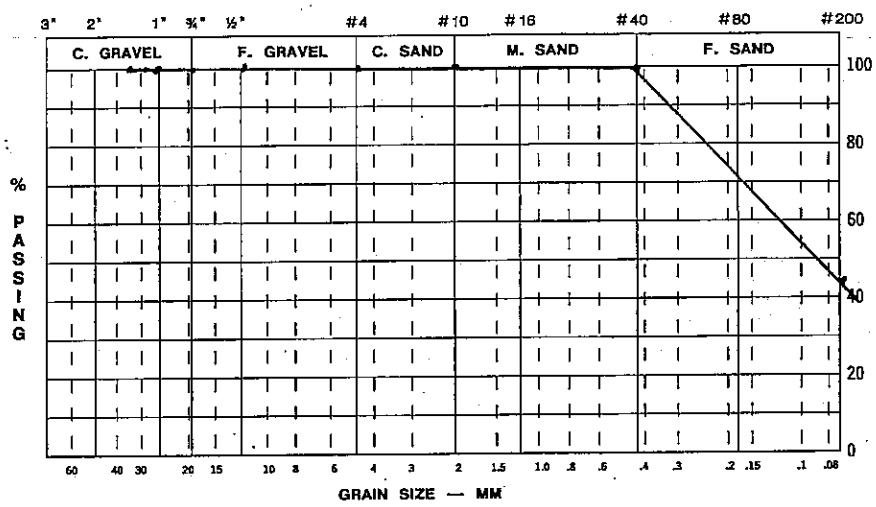
CLASS. SM Dark Olive Brown

Moist, Very silty, fine Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

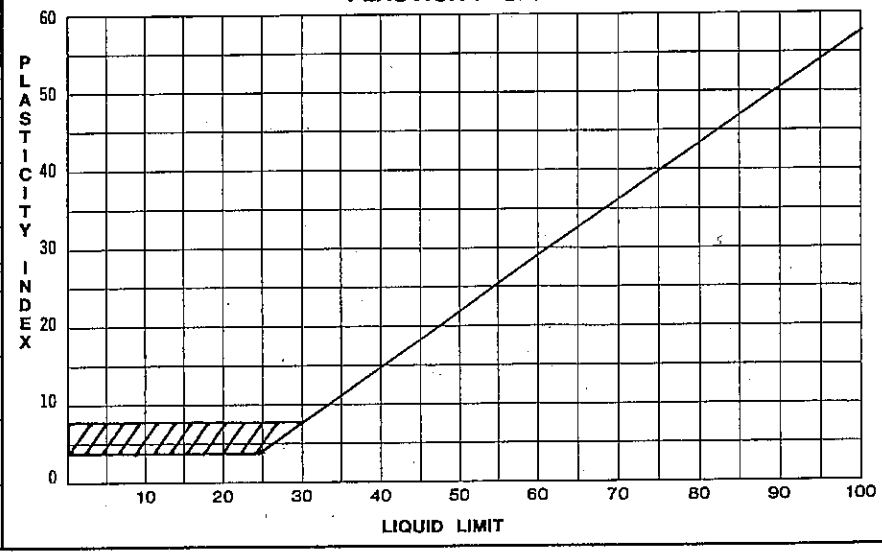
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



DOT FORM 351-019 REVISED 4/87 -1272-

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
aterials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
5 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S.

SR No. 167 Sub-Section

Station & Offset W3 10+50 37.0' Rt. Hole # W3 3-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0721 -1	P-1	1.0' TO 3.0'			LK F-0719-6
-2	P-2	3.0' TO 5.0'			LK 19-6
-3	P-3	5.0' TO 7.0'	MC = 34.3%		MC 19-6

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Your Very Truly,

Inspector.

1 copy with samples
1 copy to addressee

FORM 251-002

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

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

Place Seattle

Date 10-14-93

Undisturbed

Dear Sir:

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

Contract or Job No. L151 Section Main St. to 84th Ave. S.
SR No. 167 Sub-Section

Station & Offset W3 10+00 37.0' Rt. Hole # W3 3-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0721-4	S-1	7.0' to 9.0'			

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT District 1 Mats Lab
Yours Very truly,
Larson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

1 copy with samples
1 copy to addressee

Inspector.

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0721-3

HOLE NO.: W3-3-93

DATE: 11-30-93

LAB. TECH.: D. G.

SIEVE ANALYSIS

DRY WT.: 89

WET WT.: 119.5

% H_2O: 34.3%

WT. OF SAMPLE: ——

	WT.	% PASS
-1½"		
-1"		
-¾"	MC	
-#4	Only	
-#10		
-#40		
-#200		

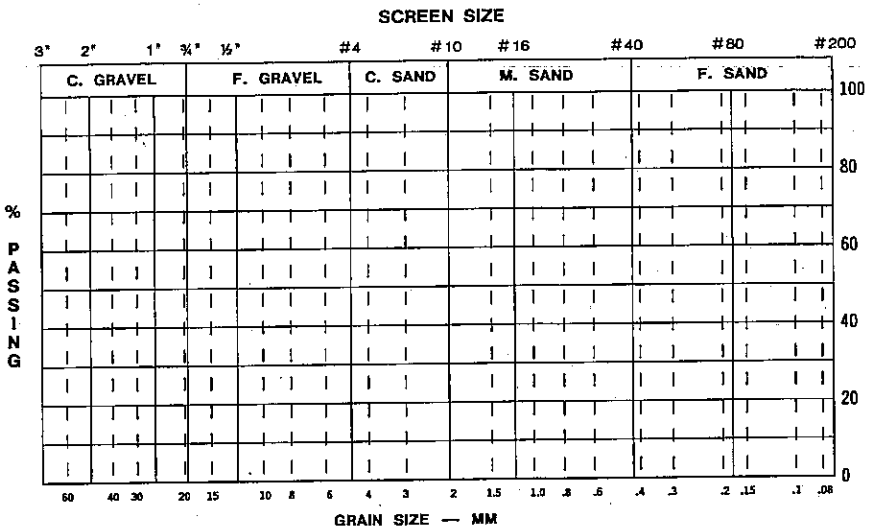
SAMPLE DESCRIPTION

CLASS. Grayish Brown

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL				
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

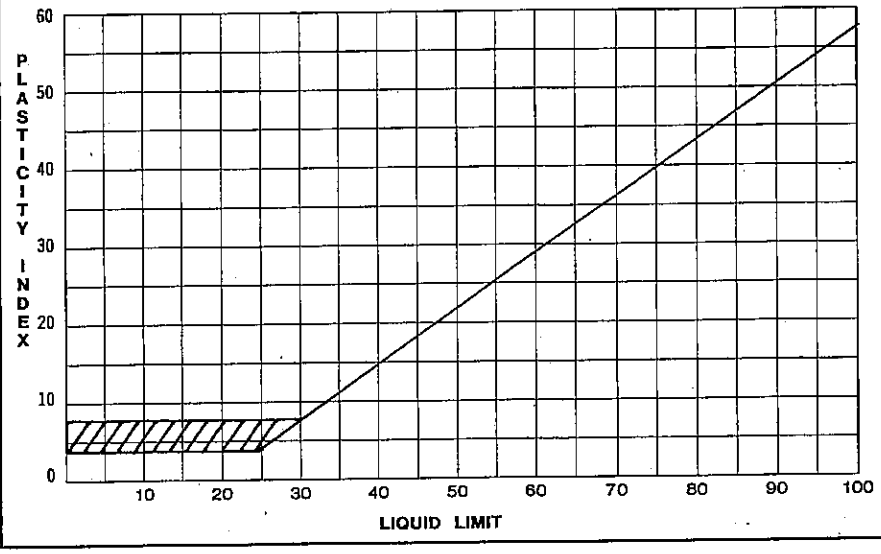
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
aterials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place South Hill

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S.
SR No. 167 Sub-Section

Station & Offset W3 12+00 45.0' Rt. Hole # W3 4-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0722-1	P-1	1.0' to 3.0'			Sandy silty Gravel
-2	P-2	3.0' to 4.5'			Sandy silty Gravel

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT District 1 Mats Lab
643 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Yours very truly,

Inspector.

1 copy with samples
1 copy to addressee

FORM 351-002

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

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

Place Seattle

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S. SR No. 167 Sub-Section WALL # 10

Station & Offset W10 11+00 15.0' Lt. Hole # W10 5293

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0723 -1	P-1	1.0' TO 2.5'	MC = 4.4%	SP-SM	
-2	P-2	5.0' TO 6'4"			LK 23-3
-3	P-3	10.0' TO 11.5'	MC = 7.4%	SP-SM	
-4	P-4	15.0' TO 16.5'	MC = 6.0%	SP-SM	LK 23-3
-5	P-5	20.0' TO 20'11"	MC = 11.8%	GW-GM	PI Non-Plastic
-6	P-6	25.0' TO 25'3"			LK 23-7 incr grav
-7	P-7	30.0' TO 31.5'	MC = 1.3%	SP-SM	

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mats Lab
Y643 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

1 copy with samples
1 copy to addressee

Inspector.

FORM 351-002

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0723-1
HOLE NO.:	W10-5-93
DATE:	11-24-93
LAB. TECH.:	DG

SOIL FIELD IDENTIFICATION

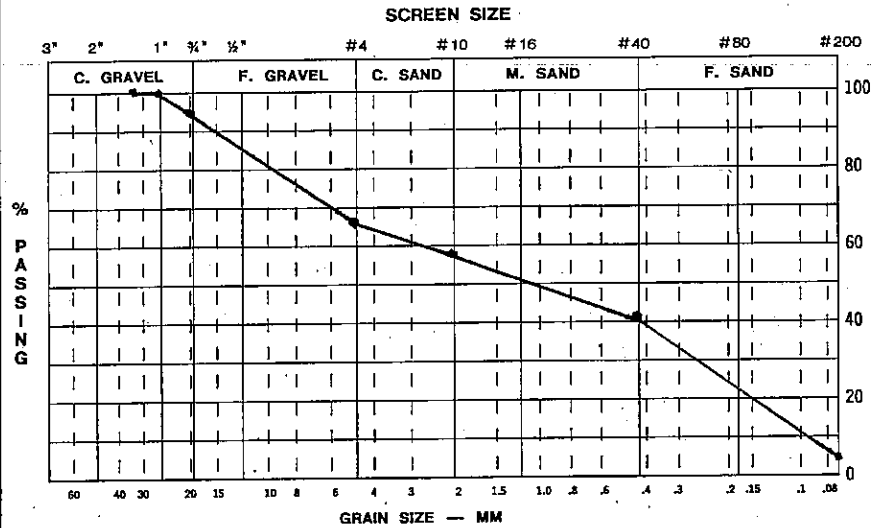
TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.:	83.9g
WET WT.:	87.6g
% H_2O:	4.4%
WT. OF SAMPLE:	419.0g

	WT.	% PASS
-1½"	Ø	100.0
-1"	20.8g	100.0
-¾"	115.1g	95.0
-#4	35.5g	67.6
-#10	71.9g	59.1
-#40	153.8g	41.9
-#200	21.9	5.2

GRAIN SIZE CURVE



SAMPLE DESCRIPTION

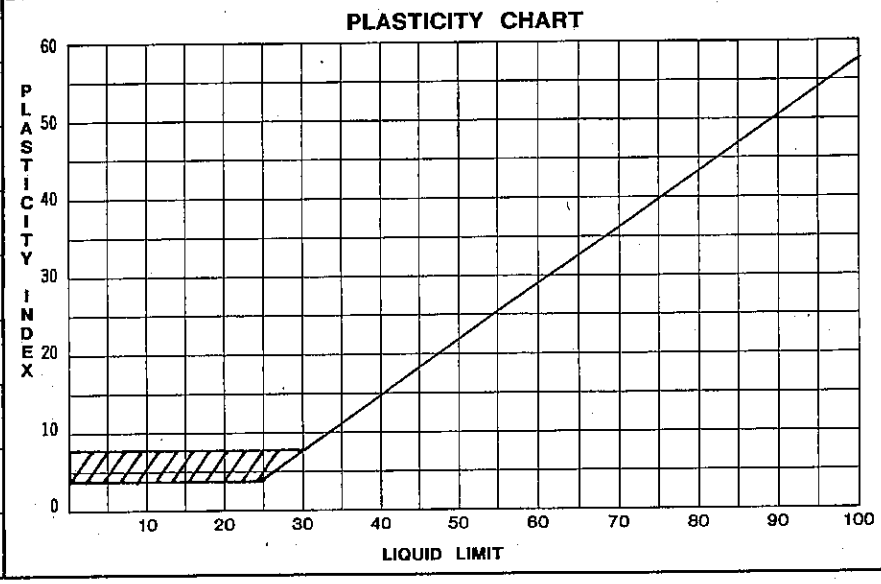
CLASS. SP-SM

Light Yellowish Brown, Dry, Slightly silty, Gravelly, fine to coarse Sand

LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0723-3
HOLE NO.:	W10-5-93
DATE:	11-24-93
LAB. TECH.:	D.G.

SOIL FIELD IDENTIFICATION

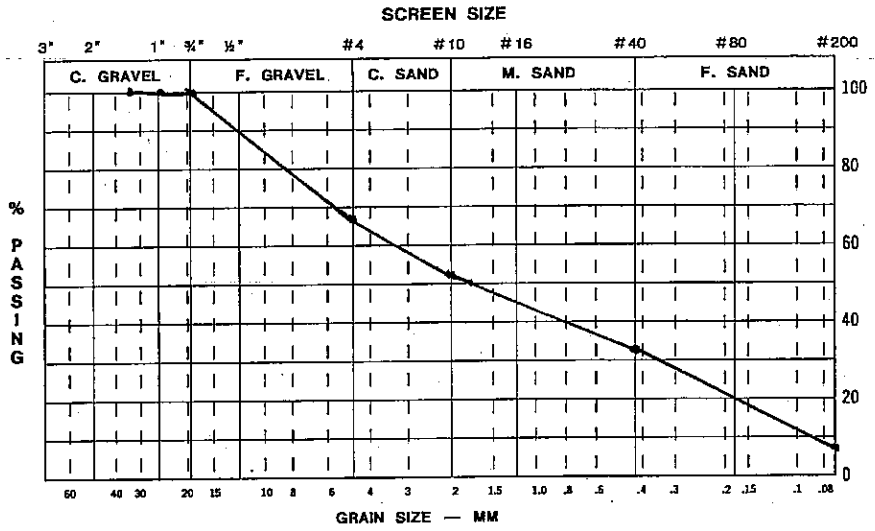
TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.:	63.2 g
WET WT.:	67.9 g
% H_2O:	7.4%
WT. OF SAMPLE:	514.9 g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	165.6 g	100.0
-#4	73.1 g	67.8
-#10	111.5 g	53.6
-#40	119.3 g	32.0
-#200	45.4 g	8.8

GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

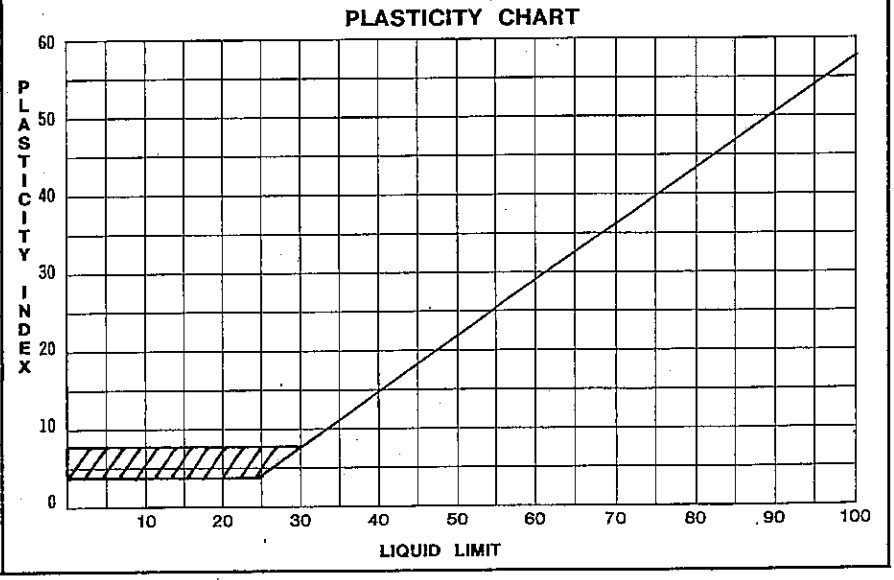
	LIQUID LIMIT				PLASTIC LIMIT
Can No.					
Wet Wt.					
Dry Wt.					
% H_2O					PL=
Blows					PI=

SAMPLE DESCRIPTION

CLASS. SP-SM

Olive Brown, Dry Silty, Gravelly, fine to Coarse Sand

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0723-4
HOLE NO.:	W10-5-93
DATE:	12-2-93
LAB. TECH.:	LHB

SIEVE ANALYSIS

DRY WT.:	88.2g
WET WT.:	93.5g
% H_2O:	6.0%
WT. OF SAMPLE:	721.9g

	WT.	% PASS
-1½"	∅	100.0
-1"	∅	100.0
-¾"	246.8g	100.0
-#4	98.9g	65.8
-#10	146.1g	52.1
-#40	155.4g	31.9
-#200	74.7g	10.3

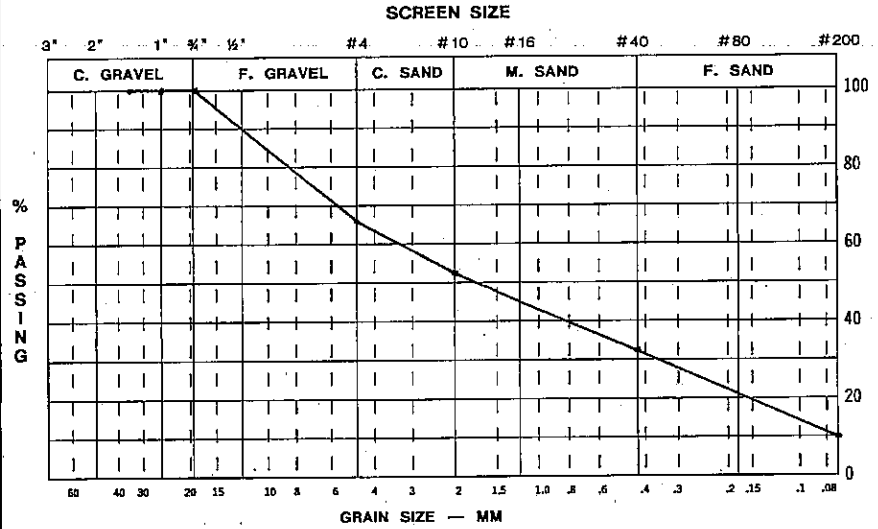
SAMPLE DESCRIPTION

CLASS. SP-SM Dark Olive Brown, Dry, Silty, Gravelly, Fine To Coarse Sand.

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

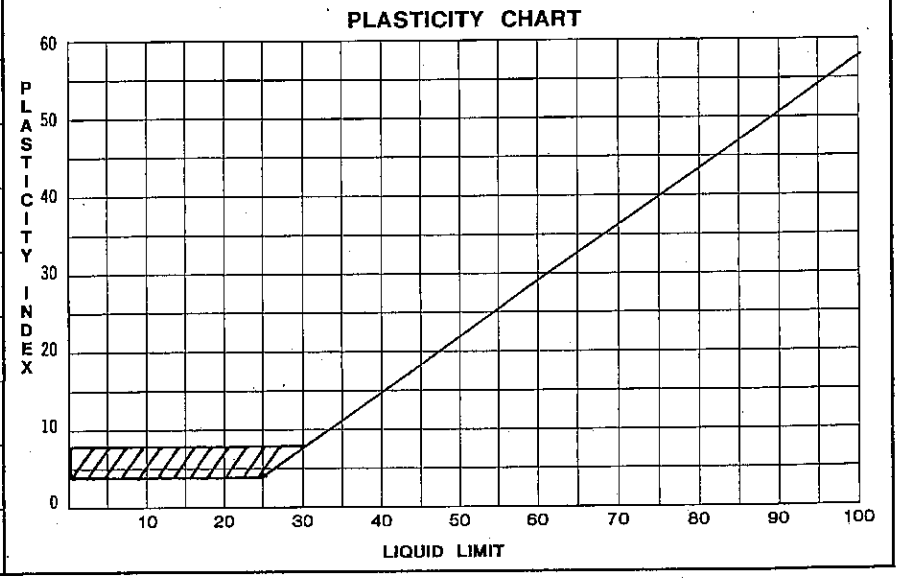
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0723-5
HOLE NO.:	W10-5-93
DATE:	12-7-93
LAB. TECH.:	LHB

SOIL FIELD IDENTIFICATION

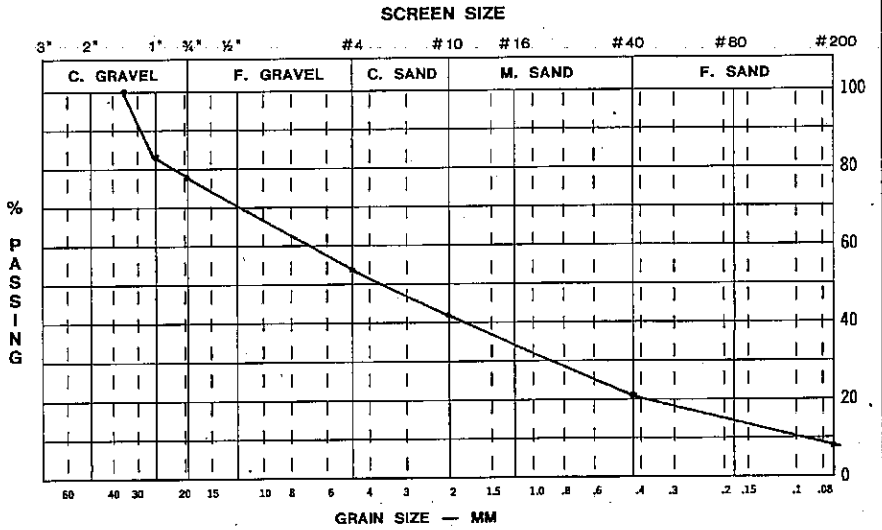
TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.:	95.4g
WET WT.:	97.1g
% H_2O:	1.8%
WT. OF SAMPLE:	281.1g

	WT.	% PASS
-1½"	47.3g	100.0
-1"	13.6g	83.2
-¾"	70.5g	78.3
-#4	32.6g	53.3
-#10	58.4g	41.7
-#40	37.1g	20.9
-#200	21.6g	7.7

GRAIN SIZE CURVE



SAMPLE DESCRIPTION

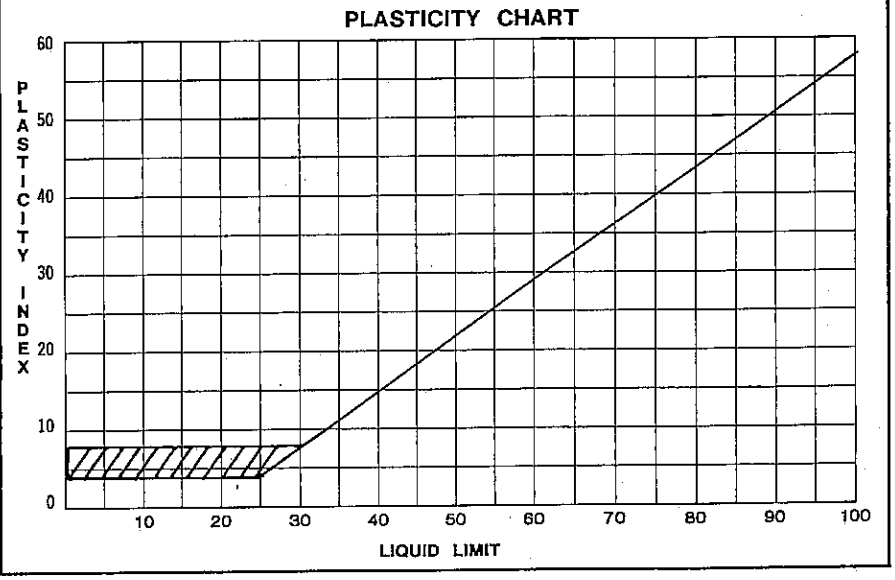
CLASS. GW-GM

Light Olive Brown, Dry, Silty, Fine To Coarse Sandy Gravel.

LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0723-7

HOLE NO.: W10-5-93

DATE: 11-24-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 88.2 g

WET WT.: 94.6 g

% H_2O: 7.3%

WT. OF SAMPLE: 411.7

	WT.	% PASS
-1½"	Ø	100.0
-1"	34.0 g	100.0
-¾"	128.0 g	91.7
-#4	37.3 g	60.7
-#10	79.4 g	51.6
-#40	101.4 g	32.3
-#200	31.6 g	7.7

SAMPLE DESCRIPTION

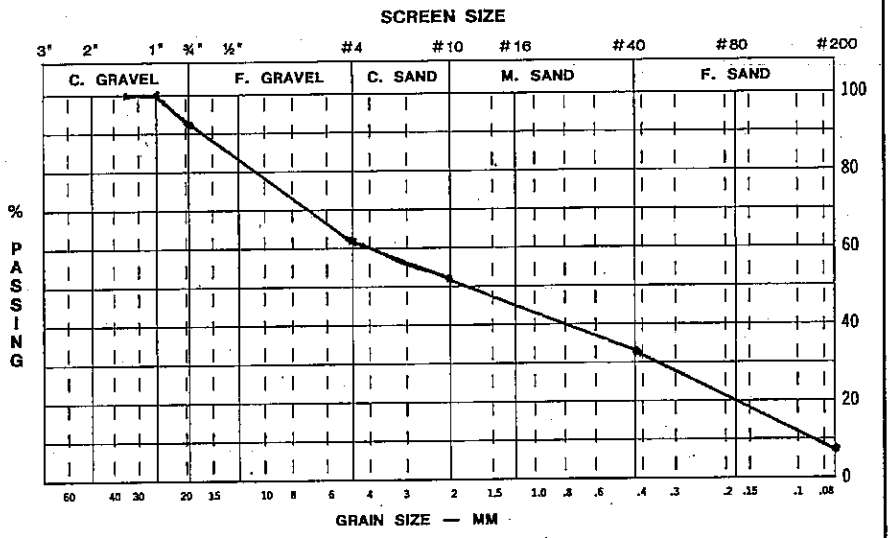
CLASS. SP-SM

Olive Gray, Dry, silty, Gravelly, fine to coarse Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

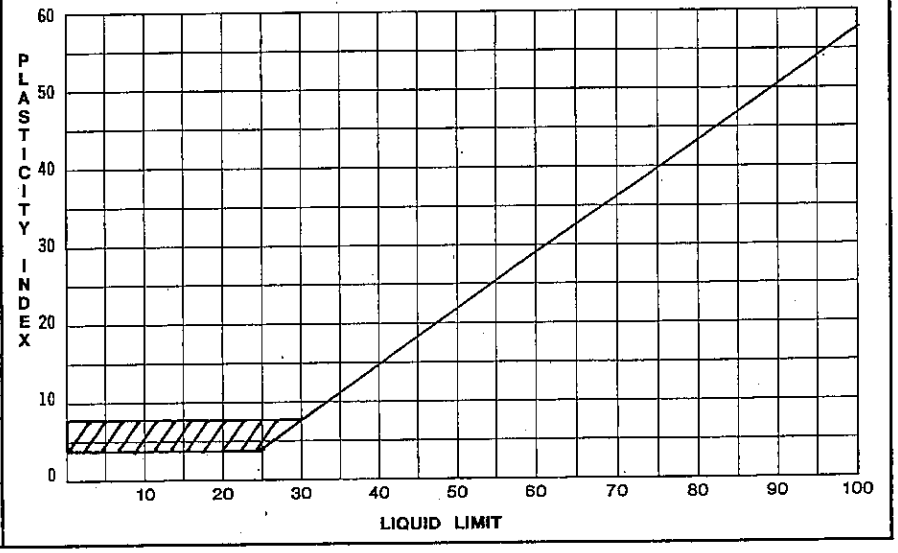
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S. SR No. 167 Sub-Section

Station & Offset W10 11+00 40.0'RT Hole # W10 6-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0724 -1	P-1	1.0' to 3.0'			LK 26-2 ~~[illegible]~~
-2	P-2	3.0' to 5.0'			LK 26-2 ~~[illegible]~~
-3	P-3	5.0' to 6.5'	MC= 35.1%	ML	

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

1 copy with samples
1 copy to addressee

Inspector.

FORM 351-002

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0724-3

HOLE NO.: W10-6-93

DATE: 11-30-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 79.5g

WET WT.: 107.4g

% H_2O: 35.1

WT. OF SAMPLE: 360.9g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	0.5g	100.0
-#4	0.2g	99.9
-#10	0.1g	99.8
-#40	157.6g	99.8
-#200	202.5g	56.1

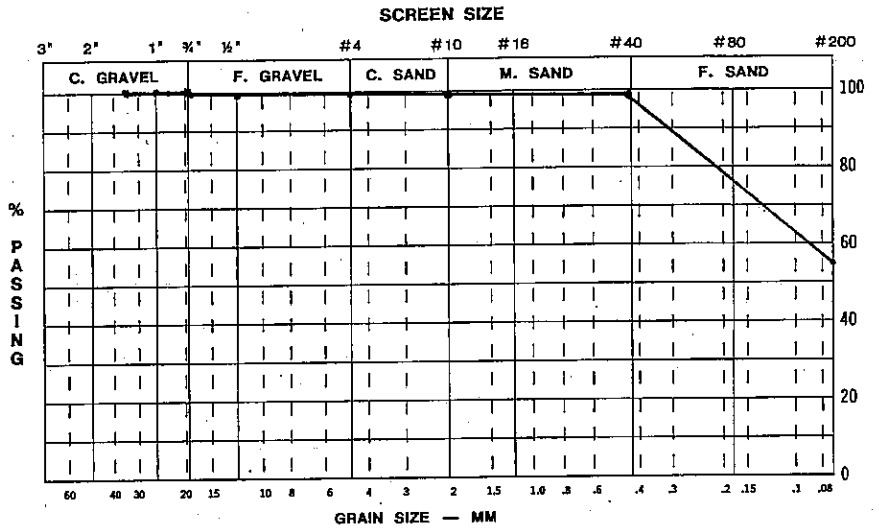
SAMPLE DESCRIPTION

CLASS. ML Gray, wet, Fine sandy, silt with Fibrous Organic Material

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

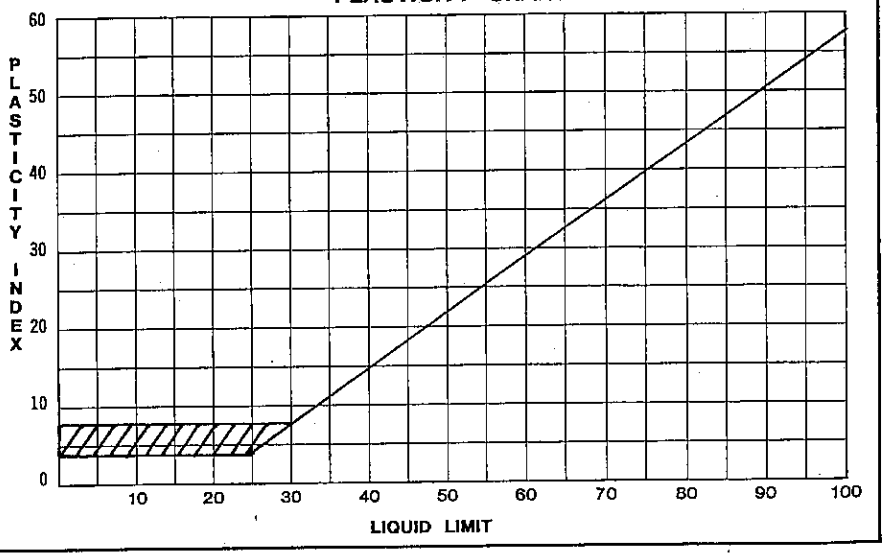
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

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

Place SEATTLE

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L1511 Section MAIN ST. to 84th St. S. SR No. 167 Sub-Section

Station & Offset W10 13+00 25.0' LT.

Hole # W10 7-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0725 -1	P-1	5.0' TO 5'6"			LK F-0725-3
-2	P-2	10.0' TO 11.5'			LK F0725-3
-3	P-3	15.0' TO 16.5'	MC = 5.6%	SP-SM	
-4	P-4	20.0' TO 21.5'			LK F-27-5
-5	P-5	25.0' TO 26.5'			LK F-27-5
-6	P-6	30.0' TO 31.5'	MC = 28.4%	SM	
-7	P-7	35.0' TO 36.5'	MC = 26.6%	SM	

Copy with samples
copy to addressee

Yours very truly,

Allen B. Stiles, P.E.
Assist Materials Engineer
WSDOT District 1 Mats Lab
Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Inspector.

WSDOT FORM 351-002 REVISED 2/89

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0725-3

HOLE NO.: W10-7-93

DATE: 11-30-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 86.9 g

WET WT.: 91.8 g

% H_2O: 5.6%

WT. OF SAMPLE: 401.8

	WT.	% PASS
-1½"	Ø	100.0
-1"	20.2g	100.0
-¾"	118.4g	95.0
-#4	55.4g	65.5
-#10	94.9g	51.7
-#40	72.9g	28.1
-#200	40.0g	10.0

SAMPLE DESCRIPTION

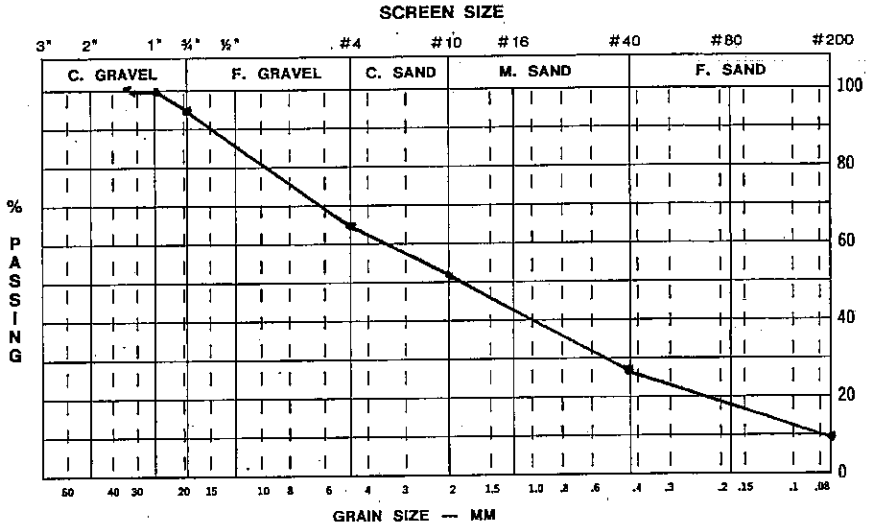
CLASS. SP-SM

Dark yellowish Brown Silty, Gravelly, fine TO Coarse Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

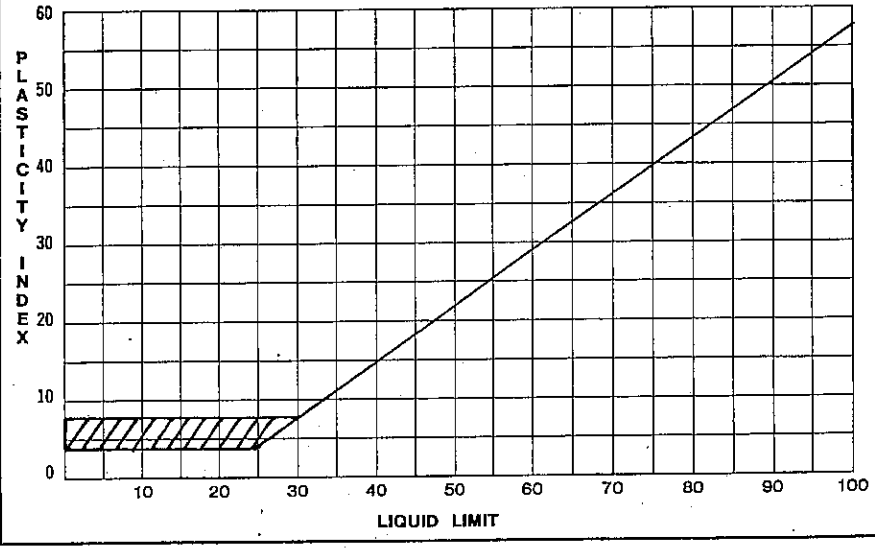
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0725-6

HOLE NO.: W10-7-93

DATE: 11-30-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 39.5g

WET WT.: 50.7g

% H_2O: 28.4%

WT. OF SAMPLE: 108.8

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	2.4g	100.0
-#4	1.5g	97.8
-#10	6.1g	96.4
-#40	62.1g	90.8
-#200	36.7g	33.7

SAMPLE DESCRIPTION

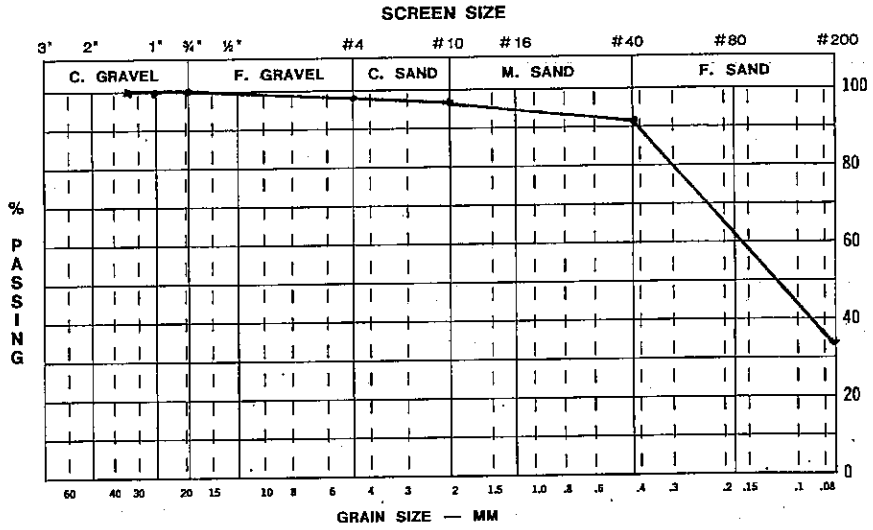
CLASS. SM

Dark Brown, Moist, Gravelly, very silty, Fine to Medium Sand with root hairs

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

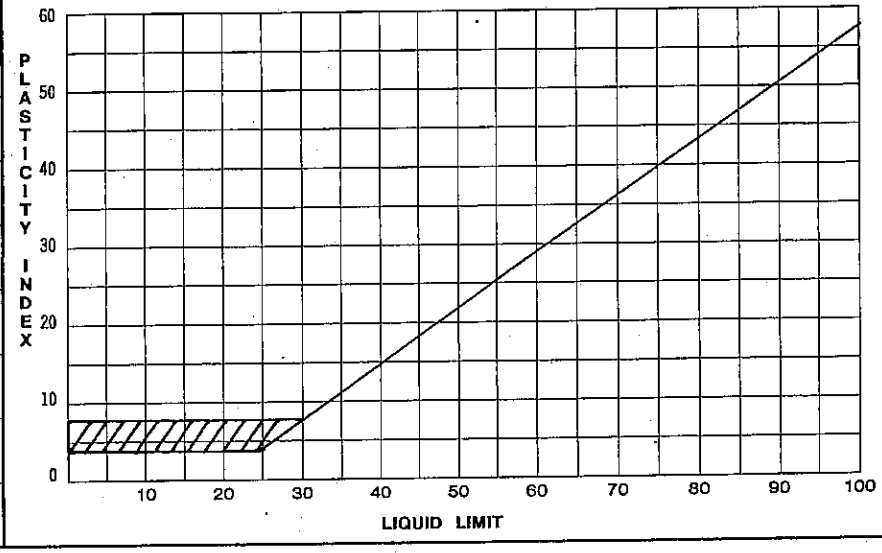
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0725-7

HOLE NO.: W10-7-93

DATE: 11-24-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 70.0g

WET WT.: 88.6g

% H_2O: 26.6%

WT. OF SAMPLE: 191.8g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	4.2g	100.0
-#4	Ø	97.8
-#10	0.3g	97.8
-#40	161.1g	97.7
-#200	26.2g	13.7

SAMPLE DESCRIPTION

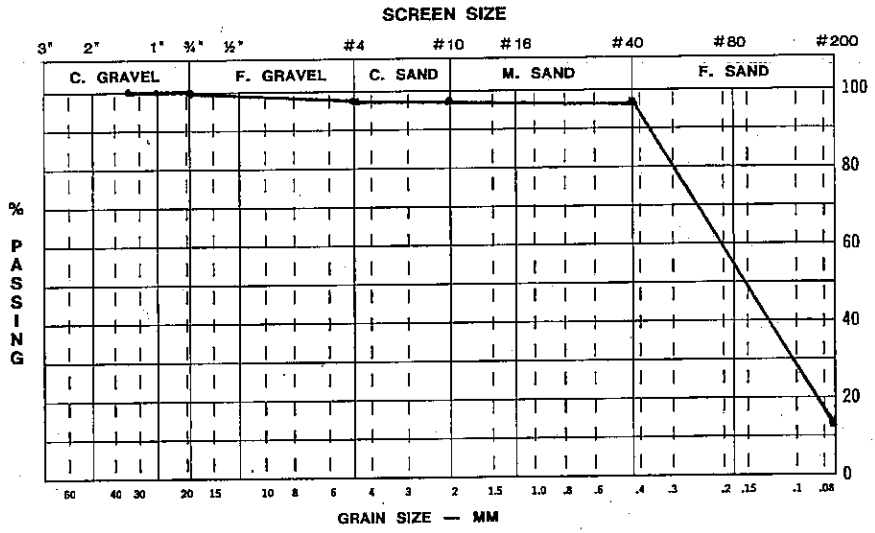
CLASS. SM

Dark olive Gray, Moist, Gravelly, Silty fine Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

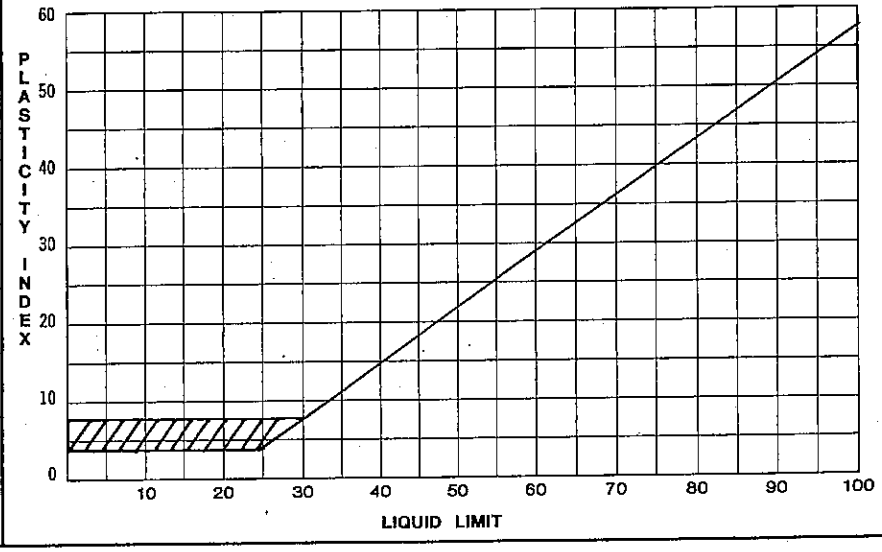
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
umwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S. SR No. 167 Sub-Section

Station & Offset W10 83+00 40.0' RT, Hole # W10 8-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0726 -1	P-1	1.0' to 3.0'			LK 26-2
-2	P-2	3.0' to 5.0'	MC = 31.5%	SM	
-3	P-3	5.0' to 6.5'			LK 26-2

copy with samples
copy to addressee

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT · District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Yours very truly,

Inspector.

FORM 351-002

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0726-2

HOLE NO.: W10-8-93

DATE: 11-30-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 59.0g

WET WT.: 77.6g

% H_2O: 31.5%

WT. OF SAMPLE: 210.6

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	0.2g	100.0
-#40	124.1g	99.9
-#200	86.3g	41.0

SAMPLE DESCRIPTION

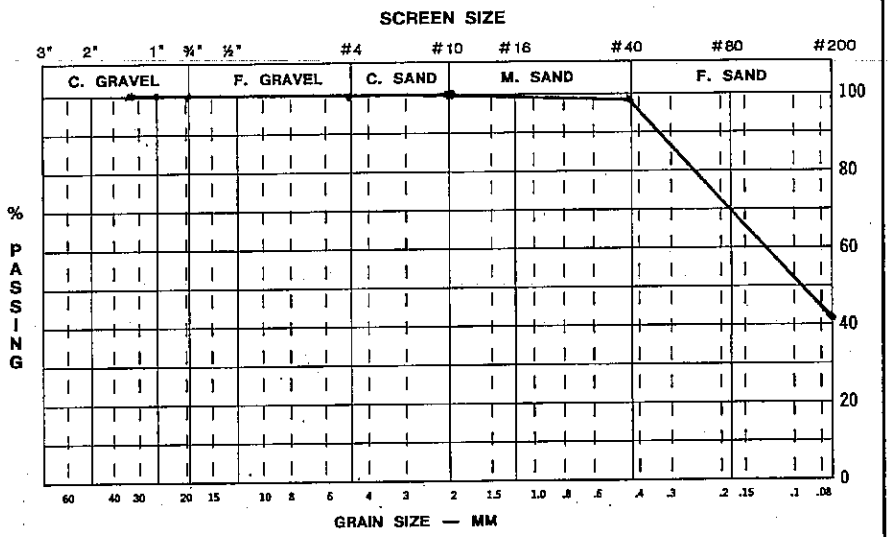
CLASS. SM

Dark Olive Brown, wet, very silty, fine Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

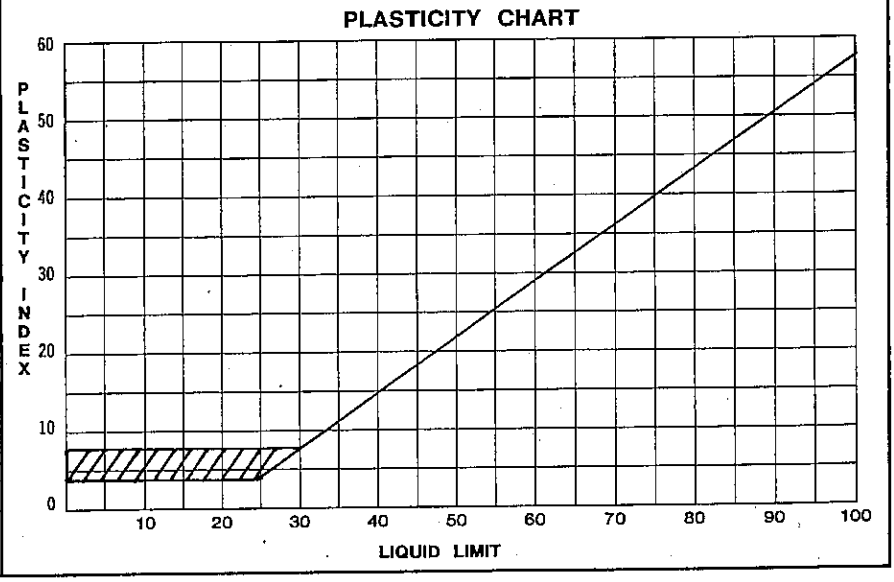
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
Materials Laboratory
O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
umwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Dear Sir:

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

Contract or Job No. L1511 Section main st. to 84th ave. S. SR No. 167 Sub-Section wall # 10

Station & Offset W10 15+00 15.0' LT Hole # TH# W10 9-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0727 -1	P-1	5.0' TO 6.5'			LK F-0725-3 inc gray
-2	P-2	10.0' TO 10'5"			LK 25-3 inc gray
-3	P-3	15.0' TO 16'5"			LK 25-3 inc gray
-4	P-4	20.0' TO 21'3"			LK F-27-5 inc gravel
-5	P-5	25.0' TO 26.5'	MC= 11.3%	SM	
-6	P-6	30.0' TO 31.5'			LK 25-7

1 copy with samples
1 copy to addressee

Yours very truly

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Inspector.

FORM 351-002

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0727-5
HOLE NO.:	W10-9-93
DATE:	11-30-93
LAB. TECH.:	D.G.

SOIL FIELD IDENTIFICATION

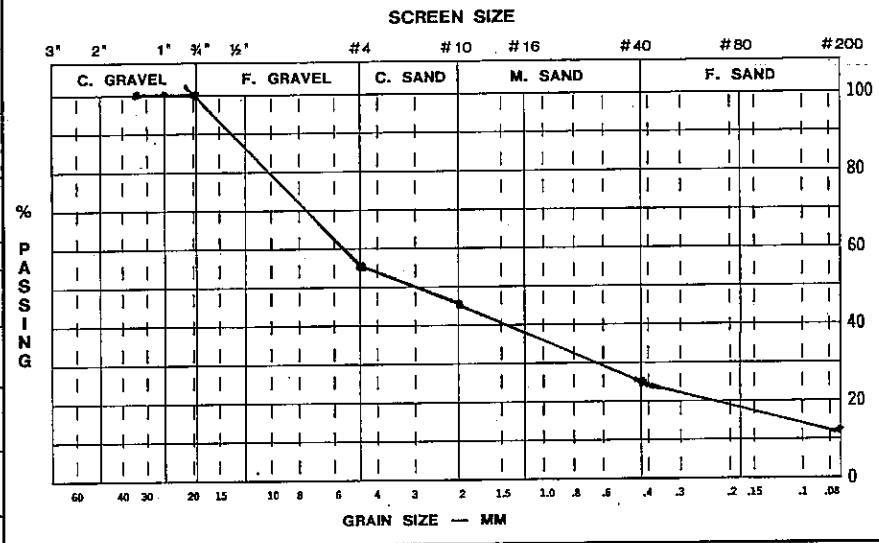
TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.:	80.4 g
WET WT.:	89.5 g
% H_2O:	11.3 %
WT. OF SAMPLE:	328.8 g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	143.7 g	100.0
-#4	35.4 g	56.3
-#10	64.8 g	45.5
-#40	44.5 g	25.8
-#200	40.4 g	12.3

GRAIN SIZE CURVE



SAMPLE DESCRIPTION

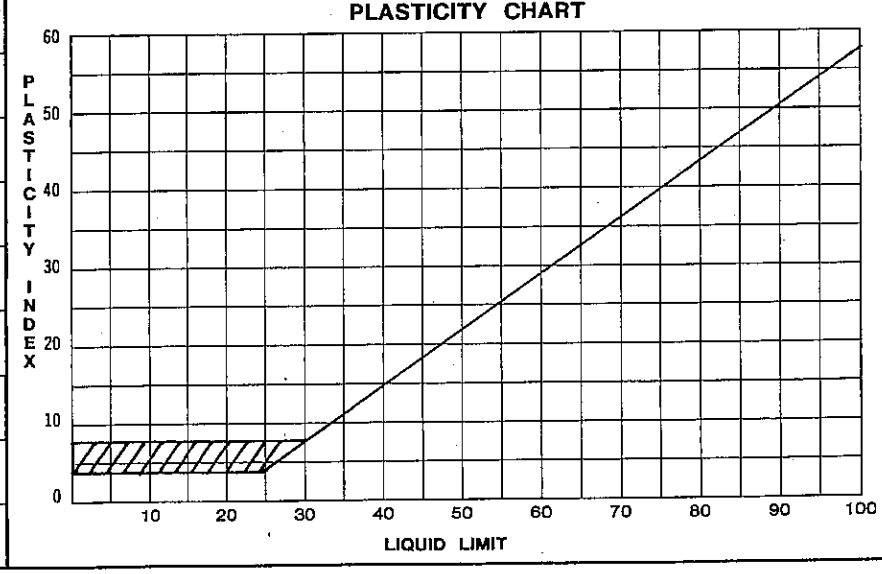
CLASS.	
SM	Dark Yellowish Brown

Moist, Silty, Gravelly, fine To Coarse Sand

LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S. SR No. 167 Sub-Section

Station & Offset W1D 15+00 45.0' RT Hole # W1D 1093

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0728 -1	P-1	1.0' to 3.0'			LK 23-1
-2	P-2	3.0' to 5.0'			LK F-0728-3
-3	P-3	5.0' to 6.5'	MC = 35.0%	ML	

1 copy with samples
1 copy to addressee

Yours very truly,

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Inspector.

FORM 351-002

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0728-3

HOLE NO.: W10-10-93

DATE: 11-30-93

LAB. TECH.: D.G.

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.: 46.9g

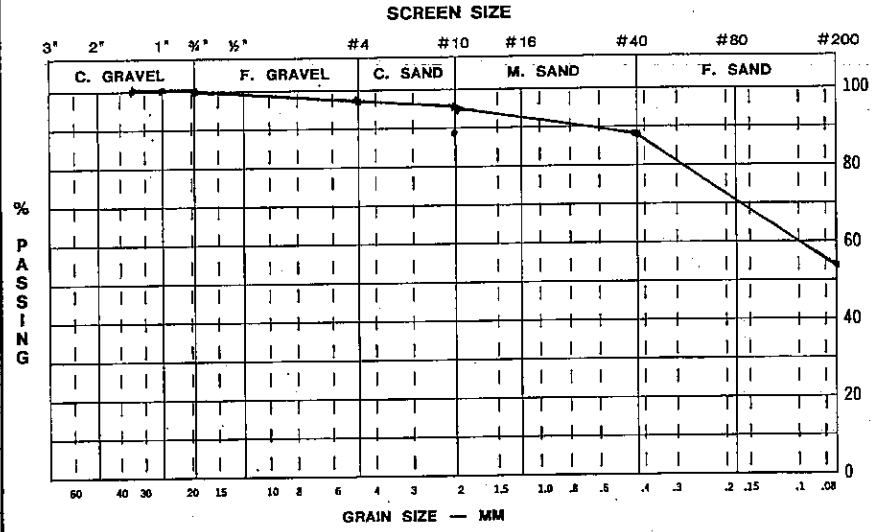
WET WT.: 63.3g

% H_2O: 35.0%

WT. OF SAMPLE: 134.1

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	3.8g	100.0
-#4	0.3g	97.2
-#10	9.9g	96.9
-#40	45.9g	89.6
-#200	74.2g	55.3

GRAIN SIZE CURVE



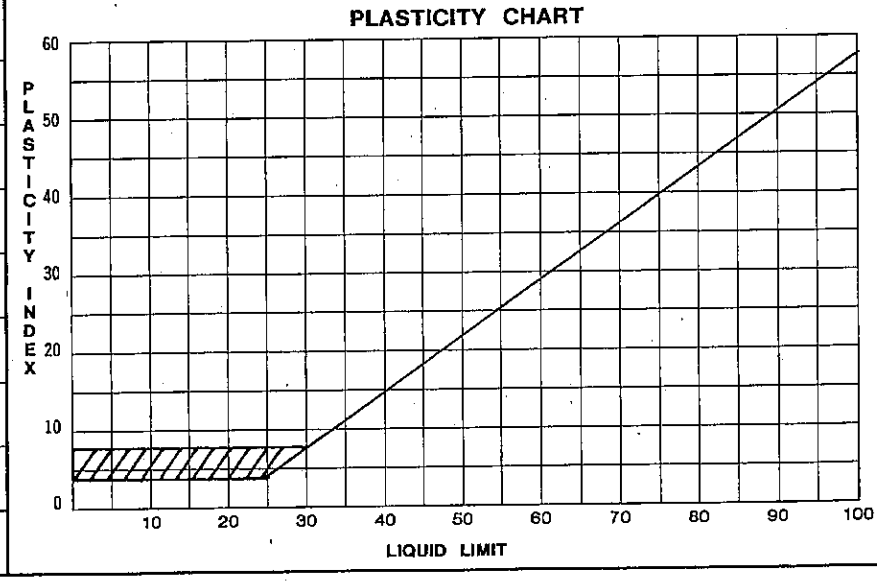
LIQUID LIMIT DETERMINATION

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

SAMPLE DESCRIPTION

CLASS. ML Dark Yellowish Brown Wet, Gravelly, fine to Medium Sandy, silt with root hairs and decayed wood Fragments

PLASTICITY CHART



WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Disturbed

Page 1 of 2

Dear Sir:

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

Contract or Job No. 41511 Section Main St. to 84th Ave. S.
SR No. 167 Sub-Section

Station & Offset W5 13+20 30.0' RT. Hole # W5 11-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0729 -1	P-1	5.0' TO 6.5'			LK 30-4 incr c-SD f grav
-2	P-2	10.0' TO 11.5'			30-4 c-SD f grav
-3	P-3	15.0 TO 16.5			30-4 incr C SD f grav
-4	P-4	20.0' TO 21.5			30-4
-5	P-5	25.0' TO 26.5			LK F-29-6
-6	P-6	27.5' TO 29.0	MC = 32.5%	SM	
-7	P-7	30.0' TO 31.5			LK F-29-6
-8	P-8	32.5' TO 34.0			LK 29-6
-9	P-9	35.0' TO 36.5	MC = 26.9%	SM	

Yours very truly,

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

1 copy with samples
1 copy to addressee

Inspector.

FORM 351-002

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-19-93

Disturbed

Page 2 of 2

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S. SR No. 167 Sub-Section

Station & Offset W5 13+20 30.0' RT. Hole # W5 11-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
-10	P-10	40.0' TO 41.5'			LK 29-9
-11	P-11	45.0' TO 46.5'	Sample Missing		
-12	P-12	50.0' TO 51.5'			LK 29-9
-13	P-13	55.0' TO 56.5'	MC= 24.4%	SW	~~LK~~
-14	P-14	60.0' TO 61.5'			LK 29-15
-15	P-15	65.0' TO 66.5'	MC= 29.8%	SM	
-16	P-16	70.0' TO 71.5'			LK 29-17 incr m-c sand
-17	P-17	75.0' TO 76.5'	MC= 35.5%	ML	
-18	P-18	80.0' TO 81.5'			LK 29-17 incr m-c sand

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Yours very truly,

Inspector.

I copy with samples
I copy to addressee

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0729-6
HOLE NO.:	W5-11-93
DATE:	11-30-93
LAB. TECH.:	D.G.

SOIL FIELD IDENTIFICATION

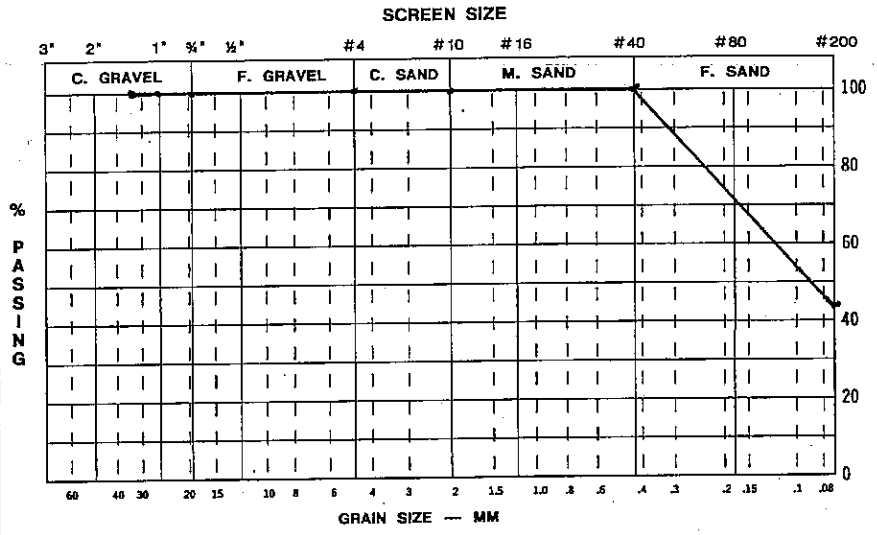
TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.:	60.6 g
WET WT.:	80.3 g
% H_2O:	32.5%
WT. OF SAMPLE:	332.2 g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	Ø	100.0
-#40	179.1 g	100.0
-#200	153.1 g	46.1

GRAIN SIZE CURVE



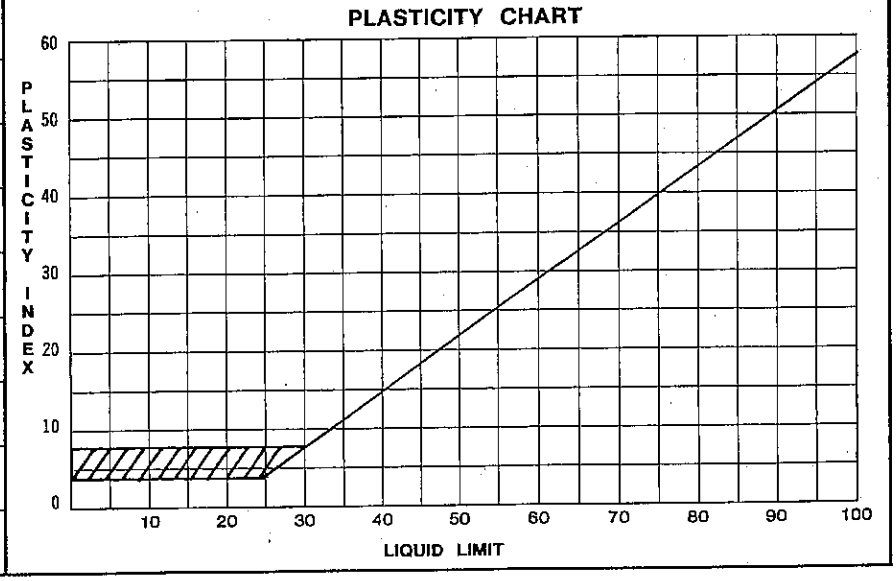
LIQUID LIMIT DETERMINATION

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

SAMPLE DESCRIPTION

CLASS.	
SM	Gray, wet, very silty, fine Sand

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0729-9
HOLE NO.:	W5-11-93
DATE:	11-24-93
LAB. TECH.:	D.G.

SIEVE ANALYSIS

DRY WT.:	59.5 g
WET WT.:	75.5 g
% H_2O:	26.9%
WT. OF SAMPLE:	182.7 g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	19.9 g	100.0
-#40	137.7 g	89.1
-#200	25.1 g	13.7

SAMPLE DESCRIPTION

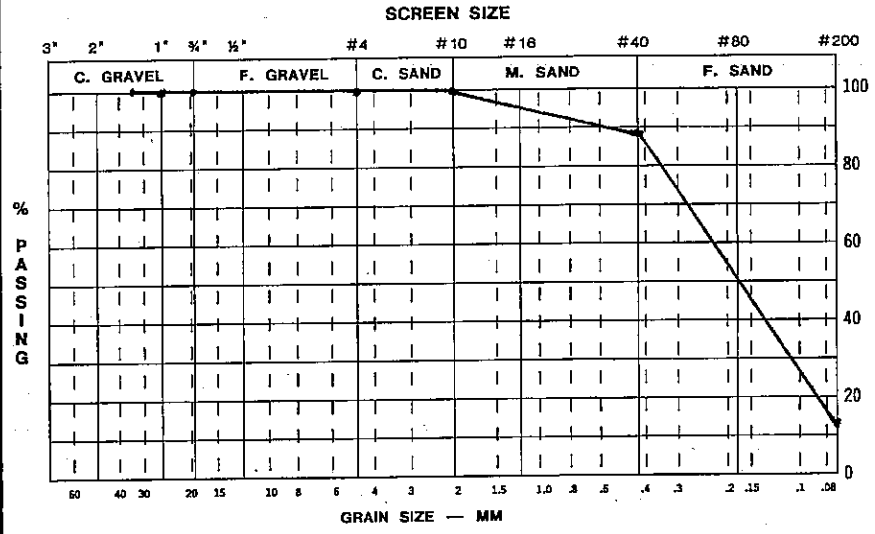
CLASS. SM

very Dark Grayish Brown, Moist, silty, fine to Medium Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

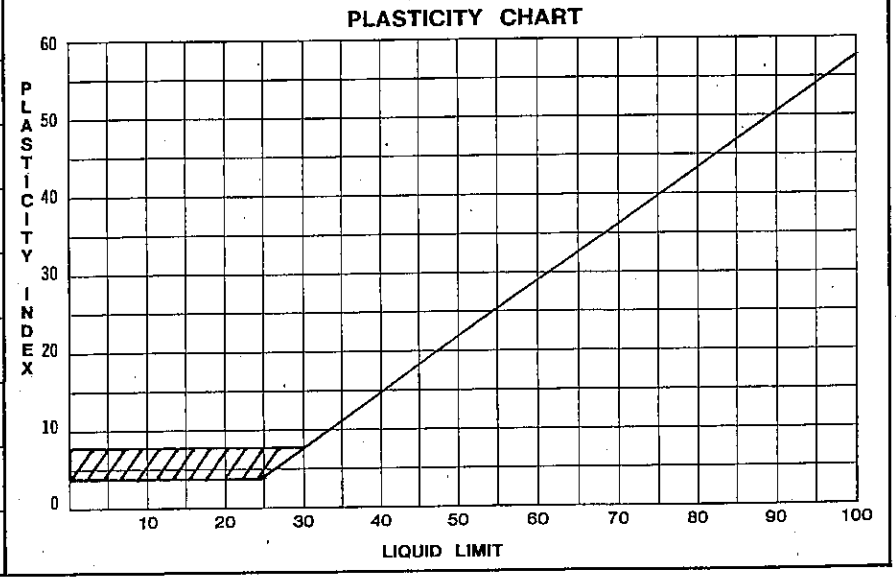
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-072913

HOLE NO.: W5-11-93

DATE: 11-24-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 62.4g

WET WT.: 77.6g

% H_2O: 24.4%

WT. OF SAMPLE: 240.6g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	0.9g	100.0
-#10	175.4g	99.6
-#40	59.4g	26.7
-#200	4.9g	2.0

SAMPLE DESCRIPTION

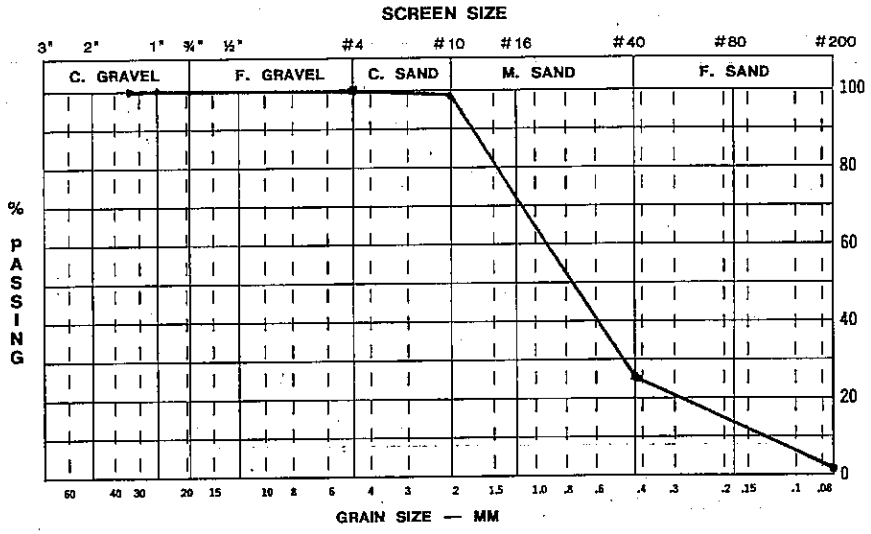
CLASS. SW

Very Dark Gray, Moist, slightly silty, fine to Medium Sandy

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

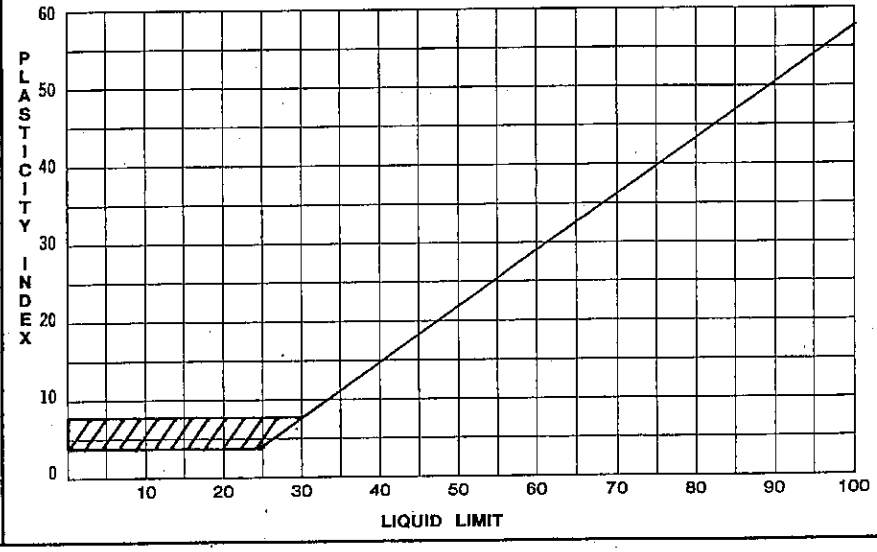
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0729-15

HOLE NO.: W5-11-93

DATE: 11-24-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 56.1g

WET WT.: 72.8g

% H_2O: 29.8%

WT. OF SAMPLE: 288.9g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	0.7 g	100.0
-#40	226.3 g	99.8
-#200	61.9 g	21.4

SAMPLE DESCRIPTION

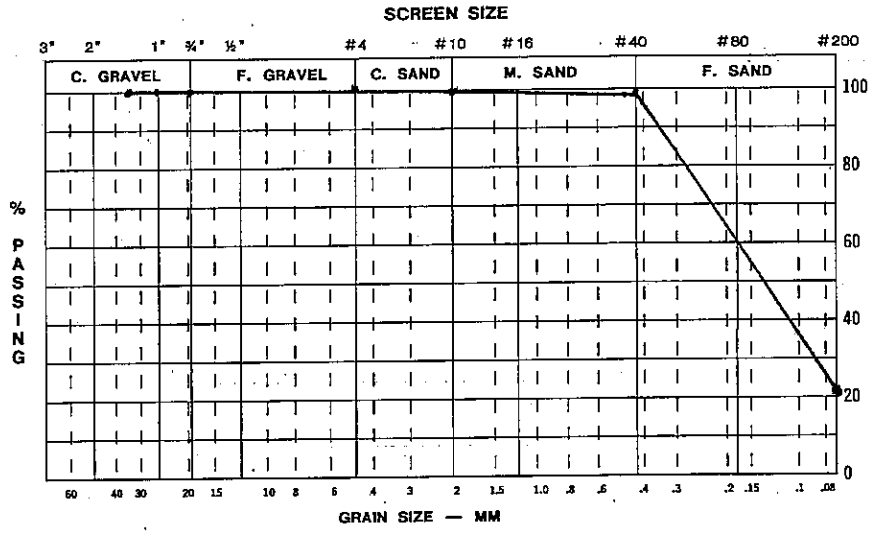
CLASS. SM

very Dark Grayish Brown, Moist, Very Silty, fine Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

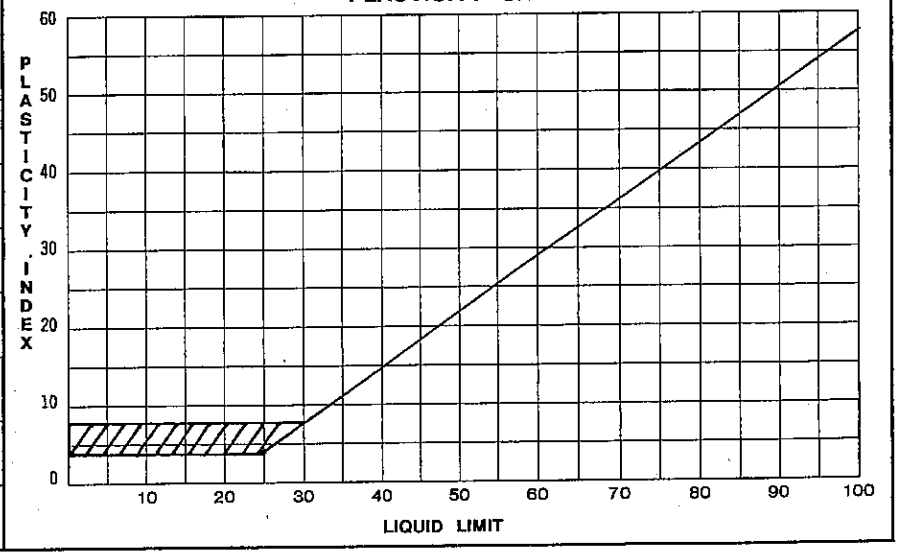
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0729-17

HOLE NO.: W5-11-93

DATE: 12-2-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 62.3

WET WT.: 84.8g

% H_2O: 35.5

WT. OF SAMPLE: 279.1g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	Ø	100.0
-#40	114.9g	100.0
-#200	164.2g	58.8

SAMPLE DESCRIPTION

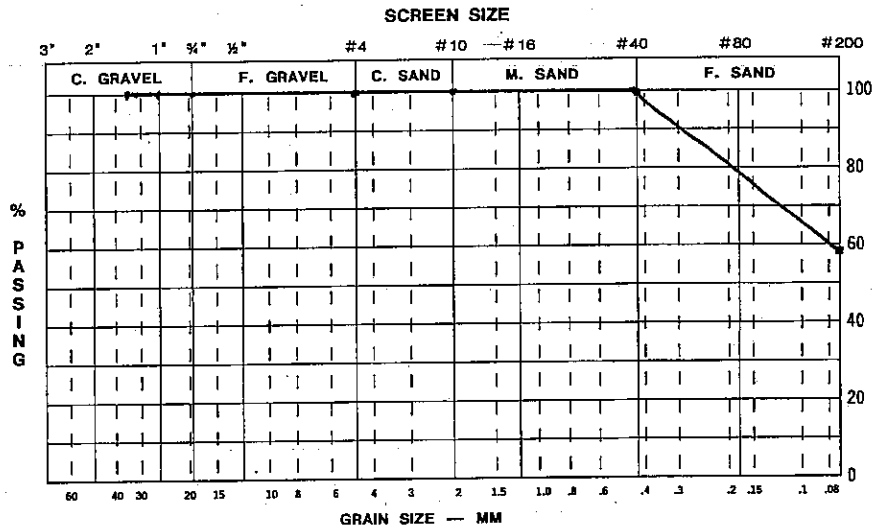
CLASS. ML

Dark Gray, wet, fine Sandy Silt

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

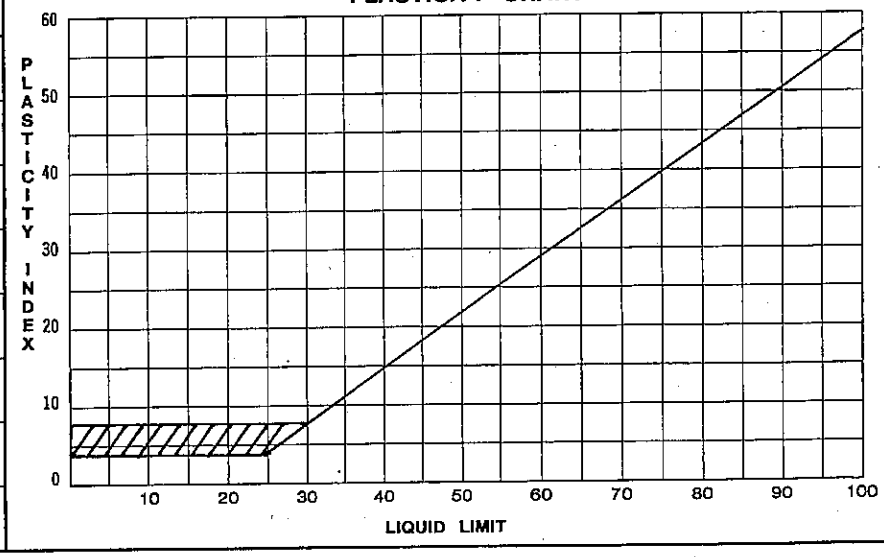
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
..aterials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S.
SR No. 167 Sub-Section

Station & Offset WS 11+00 25.0' Rt. Hole # WS 12-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0730 -1	P-1	5.0' TO 6.5'			LK - F-0730-4 incr gravel
-2	P-2	10.0' TO 11.5'			LK F-0730-4 incr Sand & gravel
-3	P-3	15.0' TO 15.2'			LK F-0730-4 incr sand Poor Sample
-4	P-4	20.0' TO 21.5'	MC = 9.1%	SM	
-5	P-5	25.0' TO 26.5'			LK F-0730-4 mostly gravel
-6	P-6	30.0' TO 31.5'	MC = 30.5%	SM	wood fragments
-7	P-7	35.0' TO 36.5'	MC = 22.5%	SP	
-8	P-8	40.0' TO 41.5'			LK -30-7
-9	P-9	45.0' TO 46.5'			LK - 30-7

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Yours very truly,

Inspector.

copy with samples
1 copy to addressee

DOT FORM 351-002

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
aterials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S SR No. 167 Sub-Section

Station & Offset W5 11+00 25.0' RT Hole # W5 12-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
-10	P-10	50.0' TO 51.5'			LK 30-7
-11	P-11	55.0' TO 56.5'			LK 30-7

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Yours very truly,

Inspector.

1 copy with samples
1 copy to addressee

FORM 351-002

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0730-4

HOLE NO.: W5-12-93

DATE: 11-30-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 109.3

WET WT.: 119.3

% H_2O: 9.1

WT. OF SAMPLE: 489.6

	WT.	% PASS
-1½"	Ø	100.0
-1"	21.9g	100.0
-¾"	170.8g	95.5
-#4	53.8g	60.6
-#10	98.4g	49.7
-#40	84.8g	29.6
-#200	59.9g	12.2

SAMPLE DESCRIPTION

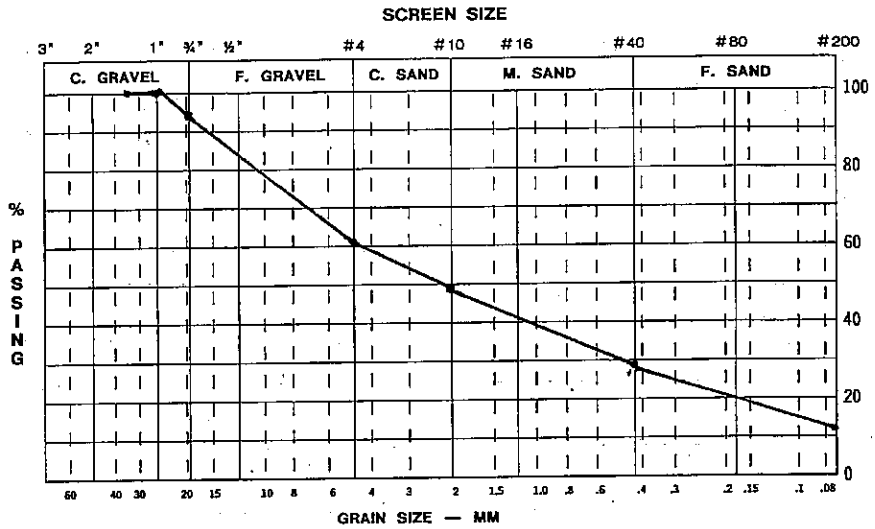
CLASS. SM

Dark Gray, Dry, Silty, Gravelly, fine to coarse Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

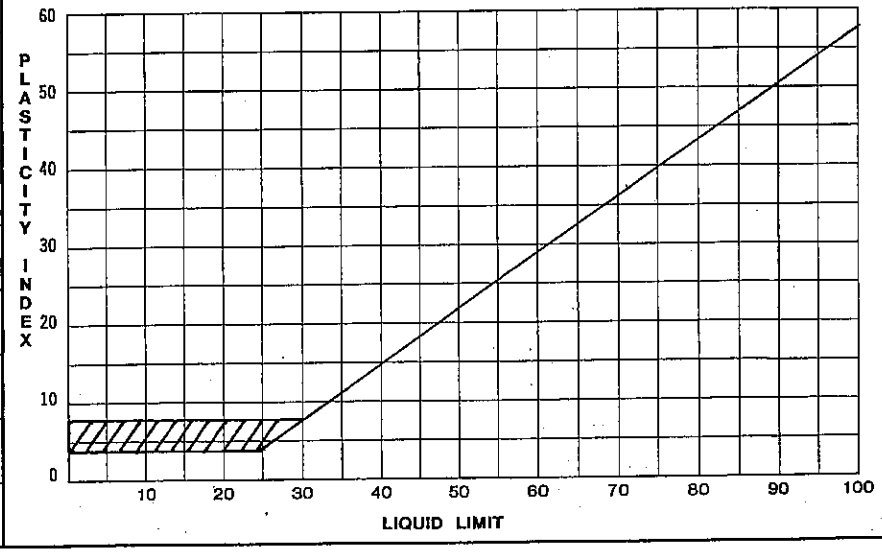
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0730-6

HOLE NO.: W5-12-93

DATE: 11-24-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 85.5 g

WET WT.: 111.6 g

% H_2O: 30.5 %

WT. OF SAMPLE: 273.1

	WT.	% PASS
-1½"	Ø	100.0
-1"	12.0 g	100.0
-¾"	2.5 g wood Fragments only	95.6
-#4	0.7 g	94.7
-#10	0.6 g	94.4
-#40	209.4 g	94.2
-#200	47.9 g	17.5

SAMPLE DESCRIPTION

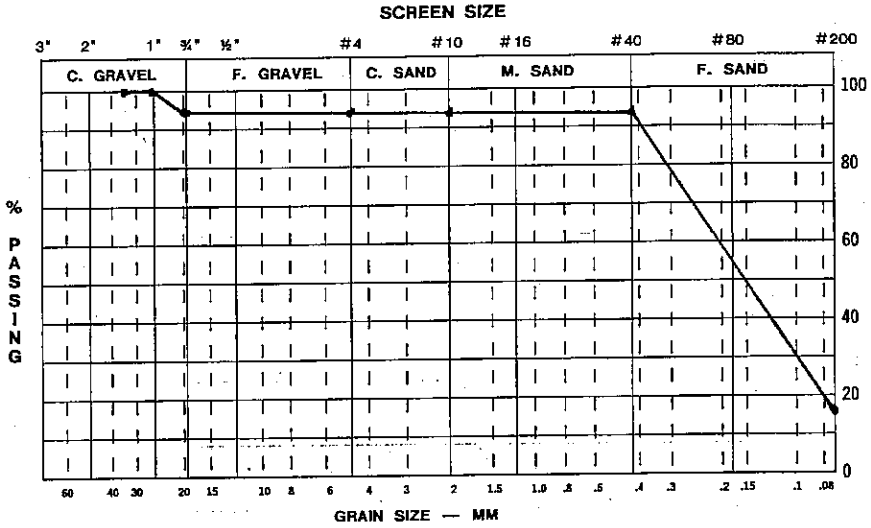
CLASS. SM

Dark Gray, wet, Gravelly, Silty, fine Sand with Fibrous Organic Material

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

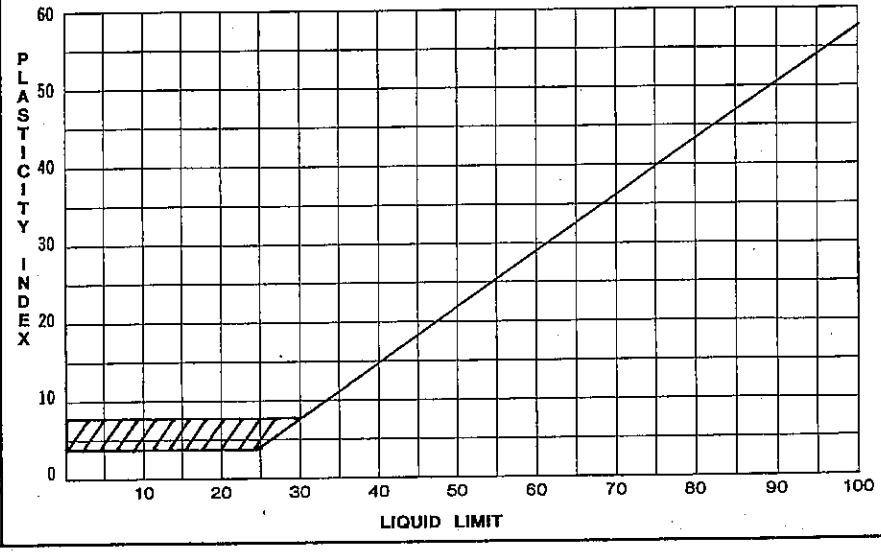
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0730-7

HOLE NO.: W5-12-93

DATE: 11-24-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 59.2 g

WET WT.: 72.5

% H_2O: 22.5 %

WT. OF SAMPLE: 223.8 g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Wood Fragments only 2.6 g	100.0
-#4	7.5 g	98.8
-#10	125.9 g	95.5
-#40	80.2 g	39.2
-#200	7.6 g	3.4

SAMPLE DESCRIPTION

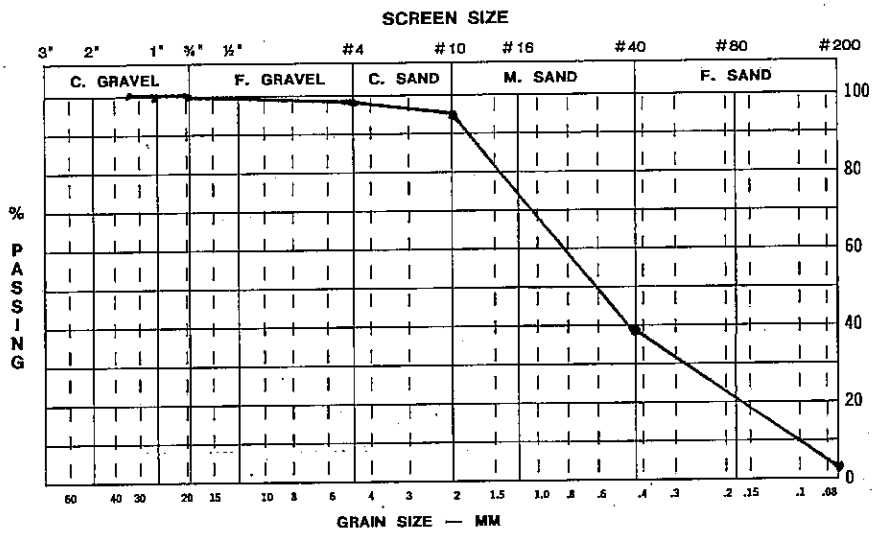
CLASS. SP

Very Dark Gray, Moist, slightly silty, fine to Coarse Sand with wood Fragments

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

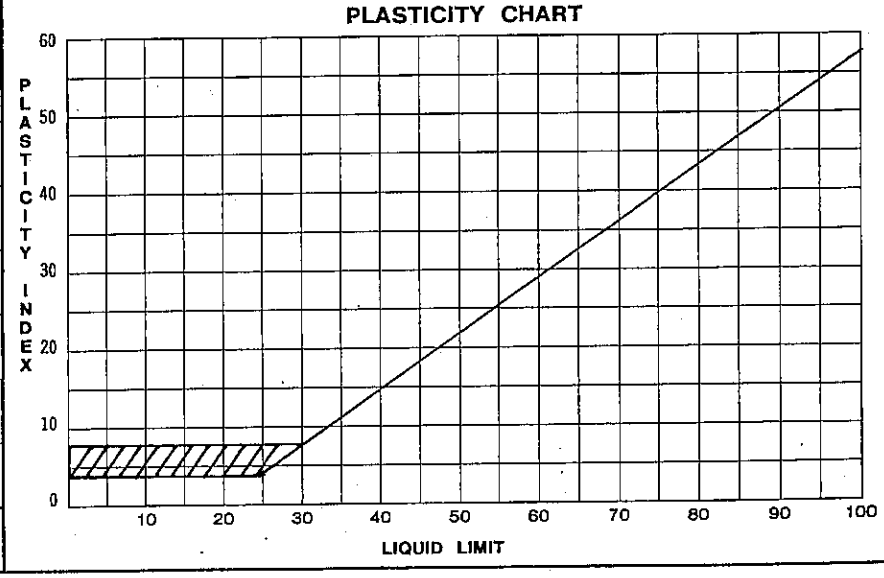
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
umwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L1511 Section main St. to 84th Ave. S. SR No. 167 Sub-Section

Station & Offset WZ 12+50 8.0' RT. Hole # TH#WZ 13-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0731 -1	P-1	1.0' TO 2.5'			LK 31-2
-2	P-2	5.0' TO 6.5'	MC = 5.0%	SP-SM	
-3	P-3	10.0' TO 11.5'	MC = 27.5%	ML	
-4	P-4	15.0' TO 16.5'			LK 35 very sandy, wet
-5	P-5	20.0' TO 21.5'	MC = 39.0%	ML	PI
-6	P-6	25.0' TO 26.5'			LK 32-6
-7	P-7	30.0' TO 31.5'	MC = 41.4%	ML	PI
-8	P-8	35.0' TO 36.5'			LK 32-5
-9	P-9	40.0' TO 41.5'	MC = 31.7%	ML	PI Before & After Oven dry

Yours very truly,

Albert E. Stiles, P.E.
District Materials Engineer
District 1 Materials Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

1 copy with samples
1 copy to addressee

Inspector.

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Undisturbed

Dear Sir:

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

Contract or Job No. 61511 Section main St. to 84th Ave. S. SR No. 167 Sub-Section wall #2

Station & Offset W2 12+50 8.0' Rt Hole # W2 13-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0731 -10	U-1 A	17'6" to 17'10"			
-11	U-1 B	17'10" to 18'2"	MC = 57.4%	ML	Non-Plastic
-12	U-1 C	18'2" to 18'6"			
-13	U-1 D	18'6" to 18'10"			

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Materials Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Yours very truly,

Inspector.

1 copy with samples
1 copy to addressee

FORM 351-002

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0731-2

HOLE NO.: W2-13-93

DATE: 11-24-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 72.3g

WET WT.: 75.9g

% H_2O: 5.0%

WT. OF SAMPLE: 489.0g

	WT.	% PASS
-1½"	Ø	100.0
-1"	66.5g	100.0
-¾"	136.0g	86.4
-#4	52.1g	58.6
-#10	79.2g	47.9
-#40	101.4g	31.7
-#200	53.8g	11.0

SAMPLE DESCRIPTION

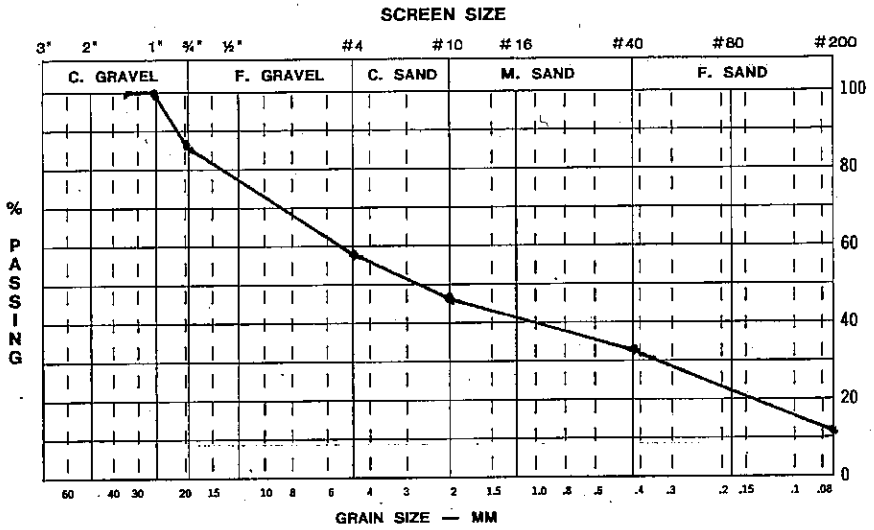
CLASS. SP-SM

Yellowish Brown silty, Gravelly, fine to Coarse Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

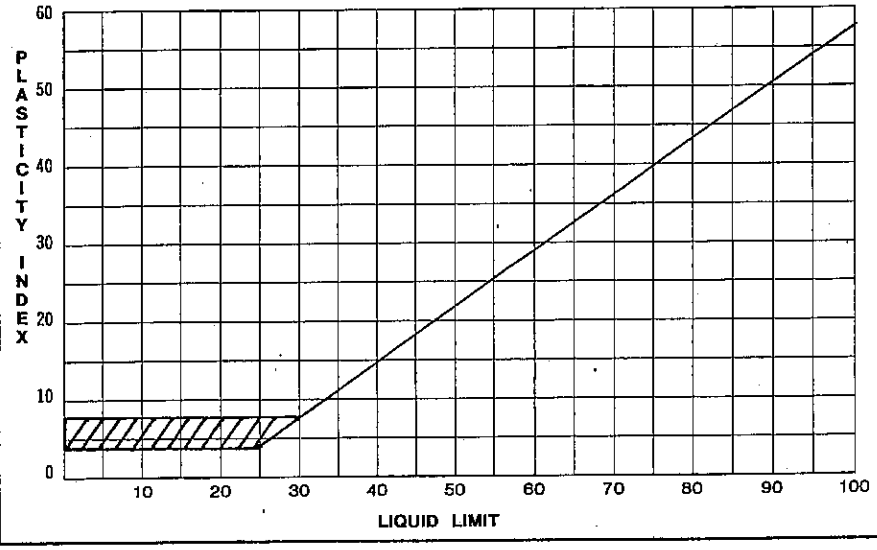
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0731-3

HOLE NO.: W2-13-93

DATE: 11-30-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 40.7g

WET WT.: 51.9g

% H_2O: 27.5%

WT. OF SAMPLE: 243.5g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	1.2g	100.0
-#40	68.5g	99.5
-#200	173.8g	71.4

SAMPLE DESCRIPTION

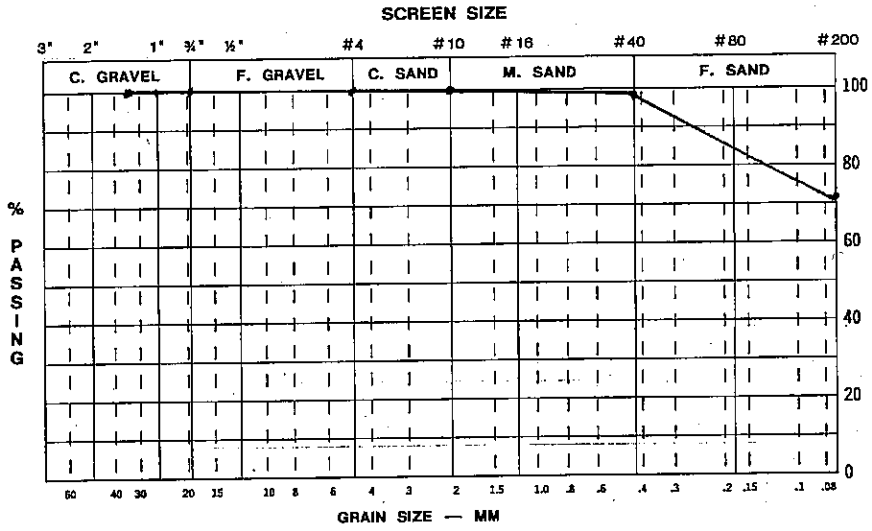
CLASS. ML

Dark Brown, Moist fine Sandy, Silt

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

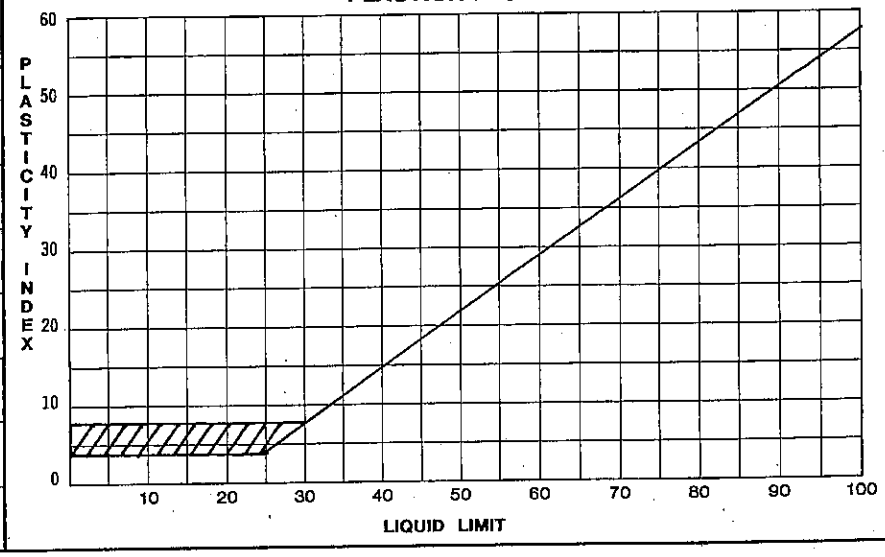
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0731-5
HOLE NO.:	W2-13-93
DATE:	12-2-93
LAB. TECH.:	LHB

SIEVE ANALYSIS

DRY WT.:	54.6g
WET WT.:	75.9g
% H_2O:	39.0%
WT. OF SAMPLE:	264.4g

	WT.	% PASS
-1½"	∅	100.0
-1"	∅	100.0
-¾"	∅	100.0
-#4	0.6g	100.0
-#10	0.1g	99.8
-#40	5.4g	99.7
-#200	258.3g	97.7

SAMPLE DESCRIPTION

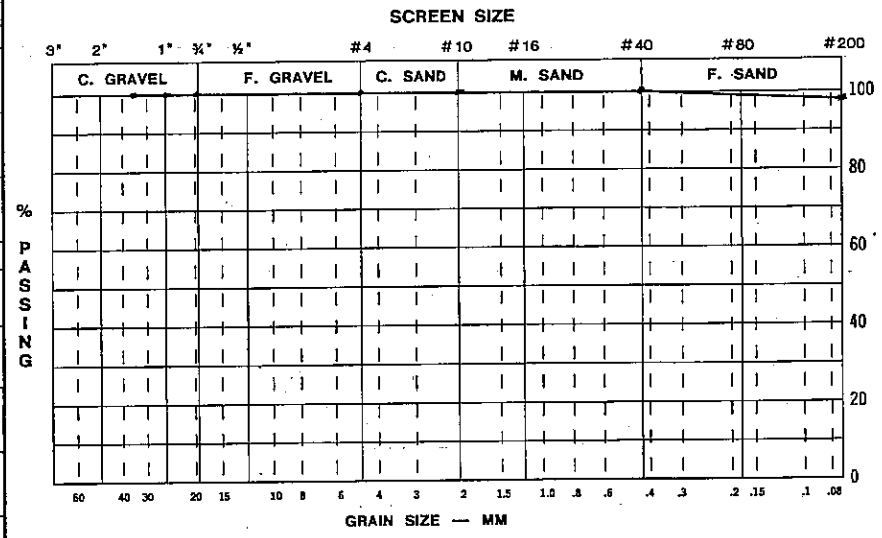
CLASS. ML

Gray, Wet, Fine Sandy Silt w/ Fibrous Organic Material.

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

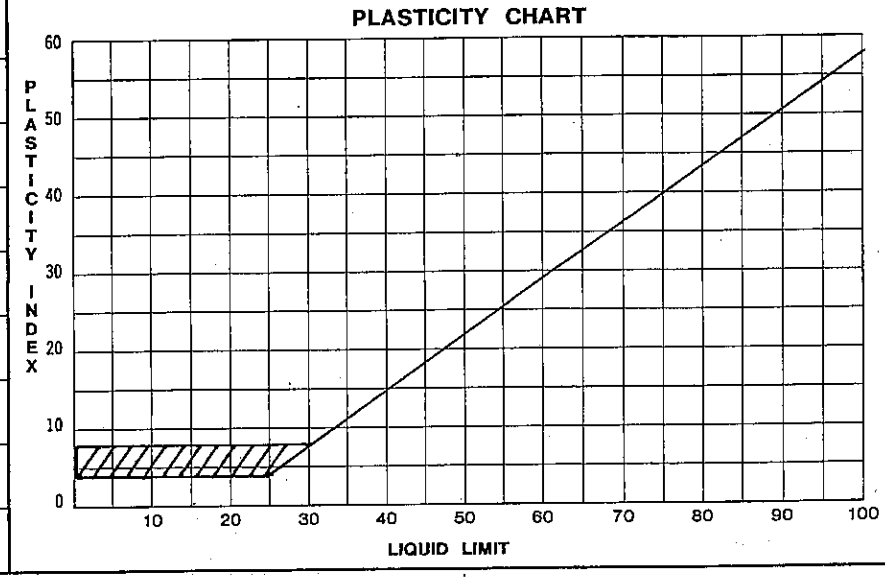
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0731-7
HOLE NO.:	W2-13-93
DATE:	12-2-93
LAB. TECH.:	LHB

SIEVE ANALYSIS

DRY WT.:	53.1g
WET WT.:	75.1g
% H_2O:	41.4%
WT. OF SAMPLE:	205.1g

	WT.	% PASS
-1½"	ϕ	100.0
-1"	ϕ	100.0
-¾"	ϕ	100.0
-#4	ϕ	100.0
-#10	0.3g	100.0
-#40	3.0g	99.9
-#200	201.8g	98.4

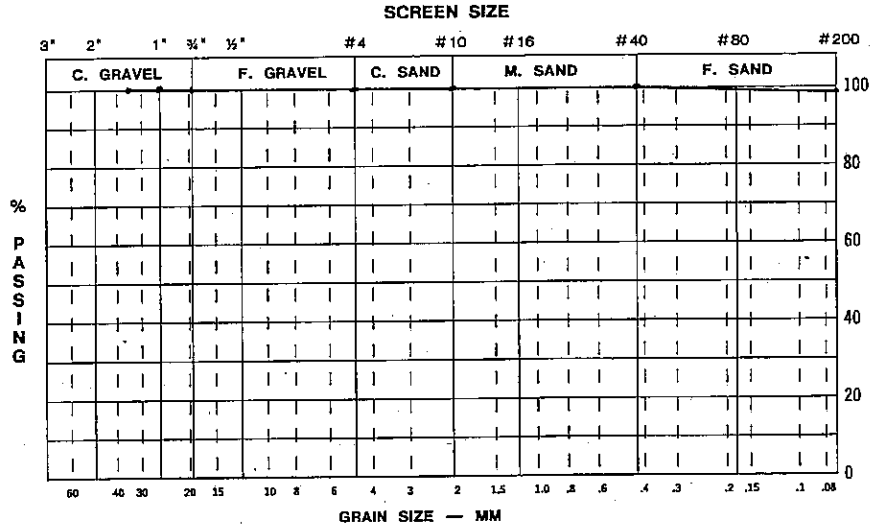
SAMPLE DESCRIPTION

CLASS.	
ML	Gray, Wet, Silt

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL			✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

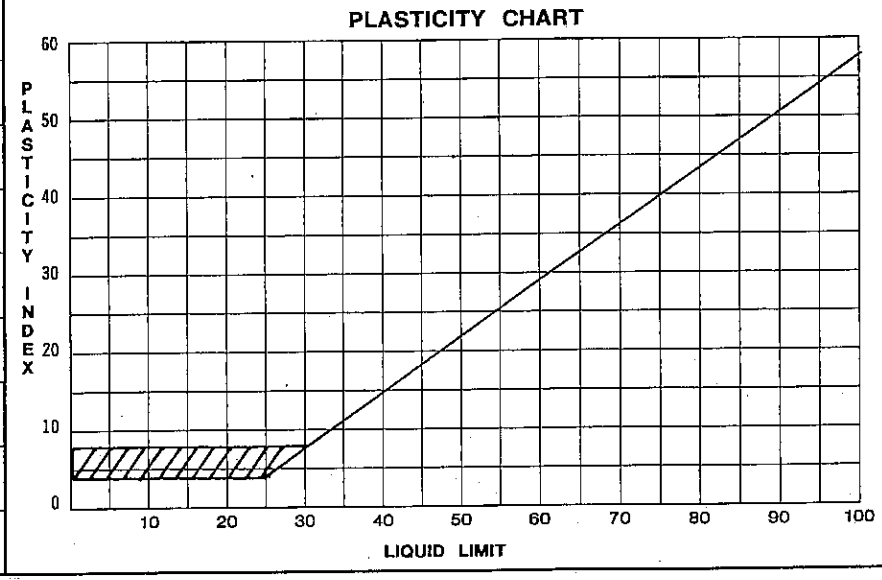
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0731-9
HOLE NO.:	W2-13-93
DATE:	12-2-93
LAB. TECH.:	LHR

SOIL FIELD IDENTIFICATION

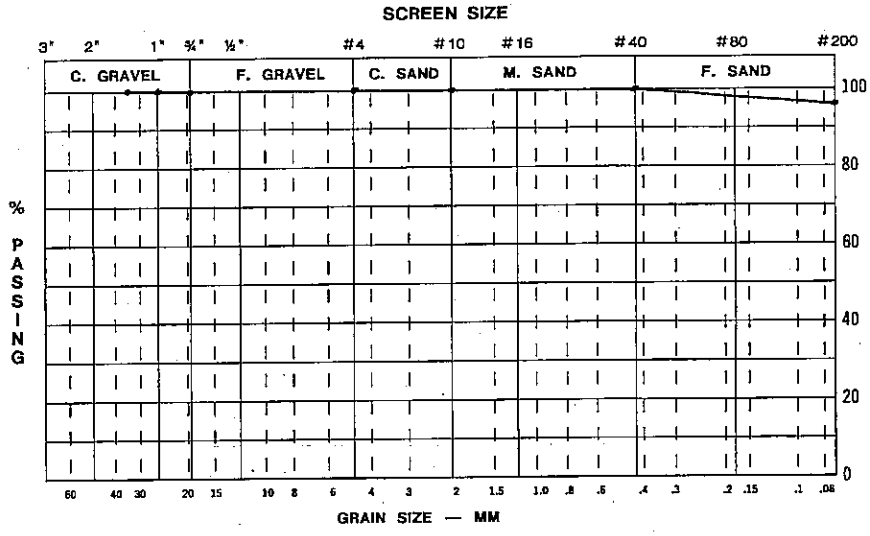
TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.:	55.5g
WET WT.:	73.1g
% H_2O:	31.7%
WT. OF SAMPLE:	188.3g

	WT.	% PASS
-1½"	∅	100.0
-1"	∅	100.0
-¾"	∅	100.0
-#4	∅	100.0
-#10	0.1g	100.0
-#40	6.5g	99.9
-#200	181.7g	96.5

GRAIN SIZE CURVE



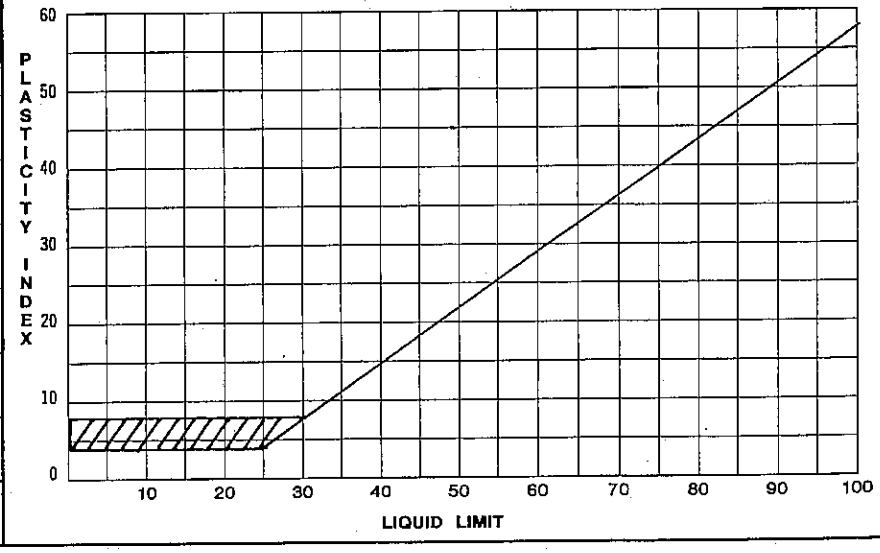
SAMPLE DESCRIPTION

CLASS. ML Dark Gray, Wet, Fine Sandy Silt w/Fibrous Organic Material.

LIQUID LIMIT DETERMINATION

	LIQUID LIMIT				PLASTIC LIMIT
Can No.					
Wet Wt.					
Dry Wt.	Non-Plastic Both Before & After Oven Drying				
% H_2O					PL=
Blows					PI=

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0731-11
HOLE NO.:	H-13-93
DATE:	12-29-93
LAB. TECH.:	LHB

SOIL FIELD IDENTIFICATION

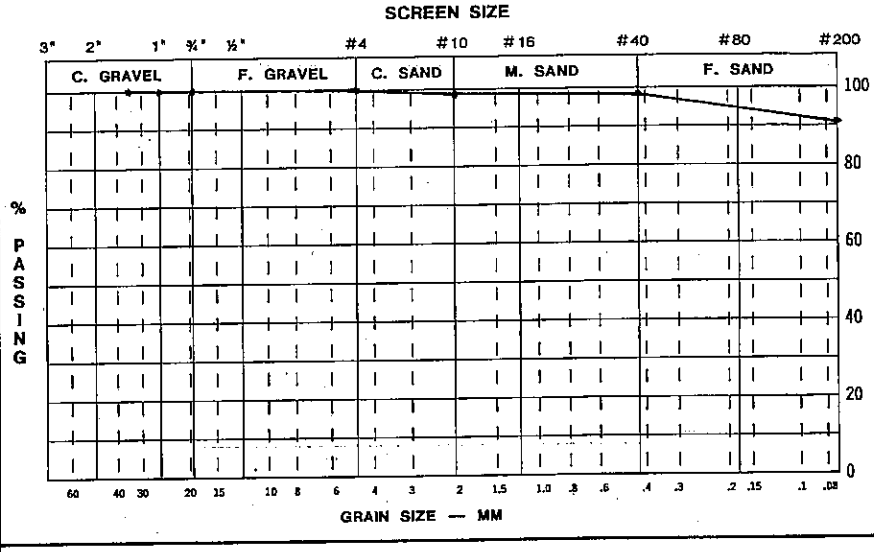
TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.:	187.2g
WET WT.:	294.6g
% H_2O:	57.4%
WT. OF SAMPLE:	184.8g

	WT.	%PASS
-1½"	∅	100.0
-1"	∅	100.0
-¾"	∅	100.0
-#4	F.O.M. 1.8g	100.0
-#10	F.O.M. 1.0g	99.0
-#40	w/F.O.M. 13.9g	98.5
-#200	168.1g	91.0

GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

SAMPLE DESCRIPTION

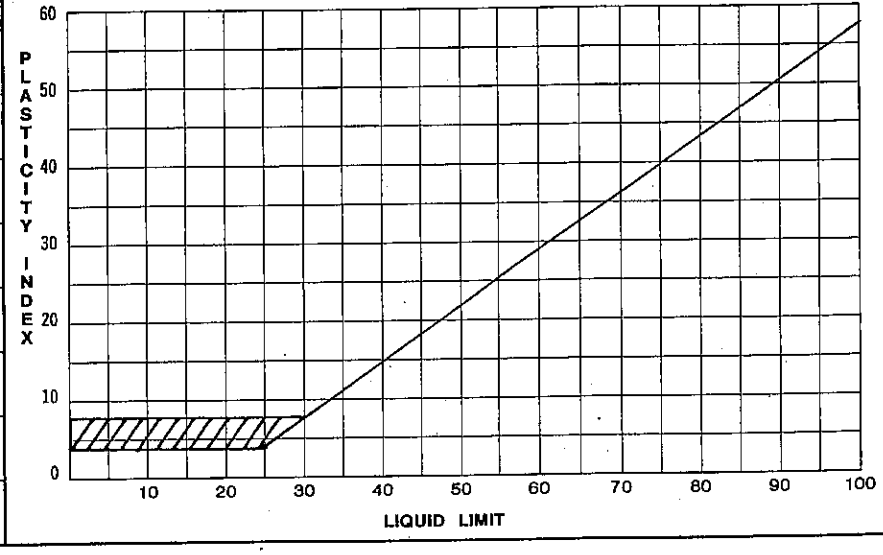
CLASS. ML Dark Olive Gray, Wet, Fine Sandy Silt w/Fibrous Organic Material.

UU Test # F0731-11

γ Wet = 91.2 pcf

γ Dry = 57.9 pcf

PLASTICITY CHART



UNCONSOLIDATED UNDRAINED TEST

PROJECT: MAIN STREET TO
PROJECT NO: L-1511
TEST NO: F0731-11
SOIL DESCRIPTION: D OLIVE GRAY F SANDY SILT W/F.O.M.
DATE: 12-21-93
TESTER: LHB
CHECKER: DC
BORING NO: H-13-93
SAMPLE NO: U-1/B
DEPTH: 17'-10
INITIAL LENGTH: 4.000 in.
INITIAL AREA: 2.865 sq. in.
INITIAL VOLUME: 11.459 cu. in.
PISTON FRICTION: 0.000 lbs.
PISTON DIAMETER: 0.000 in.
LOAD CORRECTION: 0.000 lbs.
CELL PRESSURE: 15.00 psf
WET UNIT WEIGHT: 98.18 pcf
QUALITY OF SAMPLE: GOOD

WATER CONTENT

	BEFORE TEST	AFTER TEST	TRIMMINGS
CONTAINER NUMBER			
WT CONTAINER+WET SOIL in gm	376.500	376.500	376.500
WT CONTAINER+DRY SOIL in gm	269.100	269.100	269.100
WT WATER in gm	107.400	107.400	107.400
WT CONTAINER in gm	81.900	81.900	81.900
WT DRY SOIL in gm	187.200	187.200	187.200
WATER CONTENT in %	57.372	57.372	57.372

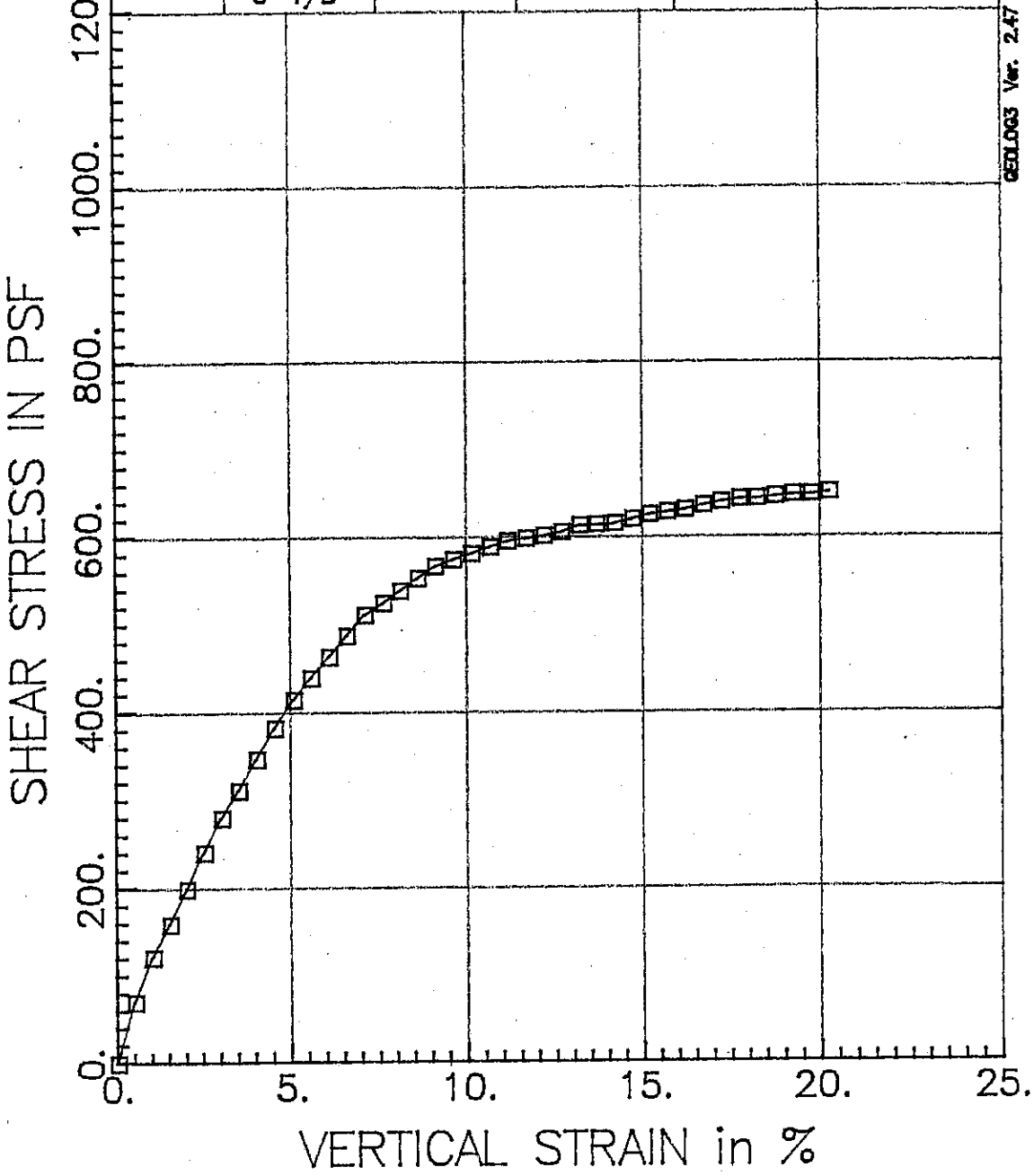
SAMPLE SKETCH

AXIAL COMPRESSION in inches	AXIAL STRAIN in %	PROVING RING DIAL .0001 in.	PROVING RING LOAD in lbs.	CORR. LOAD ON SAMPLE in lbs.	SHEAR STRESS in psf
0.0000	0.00	- 0.0351	- 0.10	- 0.10	0.0
0.0201	0.50	- 0.0624	2.80	2.80	70.0
0.0406	1.01	- 0.0820	4.87	4.87	121.1
0.0602	1.51	- 0.0966	6.42	6.42	158.8
0.0807	2.02	- 0.1122	8.07	8.07	198.7
0.1012	2.53	- 0.1288	9.82	9.82	240.7
0.1209	3.02	- 0.1444	11.48	11.48	279.7
0.1405	3.51	- 0.1571	12.82	12.82	310.9
0.1610	4.03	- 0.1717	14.37	14.37	346.6
0.1815	4.54	- 0.1863	15.92	15.92	381.9
0.2028	5.07	- 0.2000	17.37	17.37	414.3
0.2225	5.56	- 0.2107	18.50	18.50	439.2
0.2430	6.07	- 0.2215	19.64	19.64	463.6
0.2635	6.59	- 0.2322	20.78	20.78	487.7
0.2840	7.10	- 0.2429	21.91	21.91	511.6
0.3047	7.62	- 0.2495	22.61	22.61	524.9
0.3243	8.11	- 0.2563	23.33	23.33	538.8
0.3446	8.61	- 0.2634	24.08	24.08	553.1
0.3643	9.11	- 0.2702	24.80	24.80	566.6
0.3849	9.62	- 0.2749	25.29	25.29	574.5
0.4052	10.13	- 0.2790	25.73	25.73	581.2
0.4258	10.65	- 0.2836	26.22	26.22	588.9
0.4454	11.13	- 0.2878	26.66	26.66	595.5
0.4659	11.65	- 0.2904	26.94	26.94	598.3
0.4864	12.16	- 0.2934	27.25	27.25	601.7
0.5069	12.67	- 0.2966	27.59	27.59	605.6
0.5273	13.18	- 0.3015	28.11	28.11	613.3
0.5470	13.68	- 0.3034	28.32	28.32	614.4
0.5675	14.19	- 0.3054	28.52	28.52	615.2
0.5880	14.70	- 0.3093	28.94	28.94	620.3
0.6077	15.19	- 0.3132	29.35	29.35	625.6

AXIAL COMPRESSION in inches	AXIAL STRAIN in %	PROVING RING DIAL .0001 in.	PROVING RING LOAD in lbs.	CORR. LOAD ON SAMPLE in lbs.	SHEAR STRESS in psf
0.6281	15.70	- 0.3161	29.66	29.66	628.4
0.6478	16.20	- 0.3190	29.97	29.97	631.2
0.6683	16.71	- 0.3229	30.38	30.38	636.0
0.6886	17.22	- 0.3265	30.76	30.76	640.0
0.7093	17.73	- 0.3298	31.11	31.11	643.2
0.7289	18.22	- 0.3317	31.31	31.31	643.6
0.7494	18.74	- 0.3346	31.62	31.62	645.9
0.7691	19.23	- 0.3376	31.93	31.93	648.2
0.7896	19.74	- 0.3395	32.14	32.14	648.3
0.8092	20.23	- 0.3424	32.45	32.45	650.5

UNCONFINED COMPRESSION TEST

TEST NO.	SAMPLE	DEPTH ft.	WATER CONTENT %	UNIT WEIGHT pcf	CELL PRESSURE psi
F0731-11	H-13-93 U-1/B	17'-10	57.37	98.18	1



WASHINGTON STATE DOT
TEST NAME: F0731-11

STRAIN RATE = 1 %/min

PROJECT: MAIN STREET TO 84TH SOUTH
DATE:12-21-93
FILE NO.: L-1511

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
aterials Laboratory
. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

1 Disturbed

Dear Sir:

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

Contract or Job No. L1511

Section Main St. to 84th Ave. S.

SR No. 167 Sub-Section

Station & Offset WZ 10+50 6.0' Rt.

Hole # WZ 14-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0732 -1	P-1	1.0' TO 2.5'			LK 31-2
-2	P-2	5.0' TO 6.5'	MC = 18.2%	SP-SM	
-3	P-3	10.0' TO 11.5'	MC = 4.9%	SP	
-4	P-4	15.0' TO 16.5'	MC = 41.7%	ML	
-5	P-5	20.0' TO 21.5'	MC = 24.2%	ML	
-6	P-6	25.0' TO 26.5'	MC = 26.5%	SP-SM	
-7	P-7	30.0' TO 31.5'			LK 32-6
-8	P-8	35.0' TO 36.5'	MC = 24.4%	ML	
-9	P-9	40.0' TO 41.5'			LK 32-8 incr m-c sd

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT District 1 Materials Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-2
Seattle, WA 98108-3445

Yours very truly,

Inspector.

copy with samples
1 copy to addressee

DOT FORM 351-002
REVISED 8/93

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
5 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Undisturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S.
SR No. 167 Sub-Section

Station & Offset W2 10+50 6.0' Rt. Hole # W2 14-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0732-10	U-1 A	17'6" TO 17'10"			
-11	U-1 B	17'10" TO 18'2"			
-12	U-2 B	32'6" TO 32'10"			
-13	U-2 C	32'10" TO 33'2"			

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mat.
6431 Corson Avenue So.
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

1 copy with samples
1 copy to addressee

Yours very truly,

Inspector.

DOT FORM 351-002

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0732-2

HOLE NO.: W2-14-93

DATE: 11-24-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 65.3g

WET WT.: 77.2g

% H_2O: 18.2%

WT. OF SAMPLE: 337.8g

	WT.	% PASS
-1½"	40.1g	100.0
-1"	Ø	88.1
-¾"	68.6g	88.1
-#4	94.8g	67.8
-#10	65.7g	57.5
-#40	89.0g	38.1
-#200	39.6g	11.7

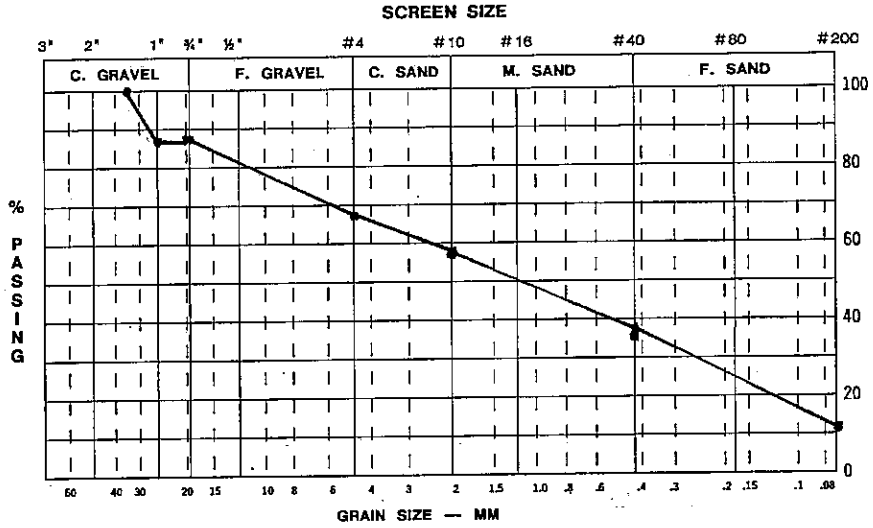
SAMPLE DESCRIPTION

CLASS. SP-SM Dark Gray, Moist, Silty, Gravelly, fine to Coarse Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

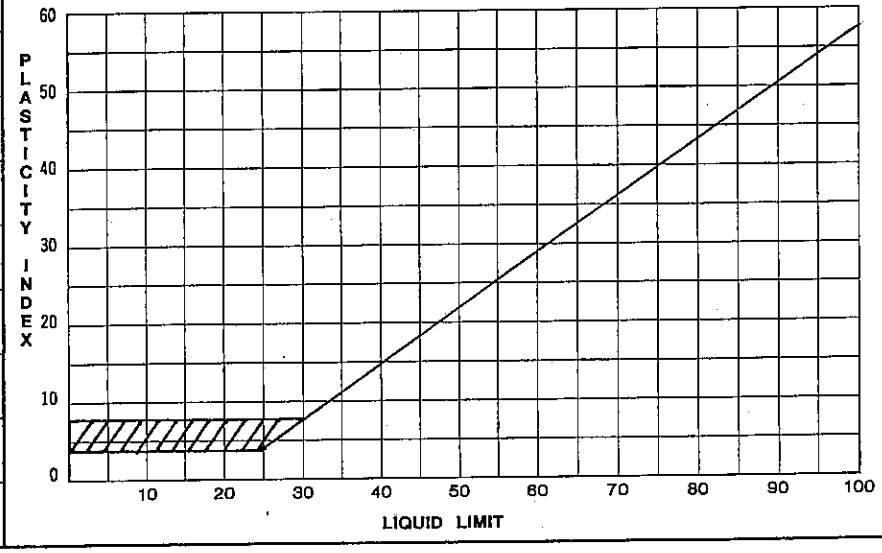
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-07 ~~32~~-3

HOLE NO.: W2-14-93

DATE: 11-24-93

LAB. TECH.: D. G.

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.: 59.4 g

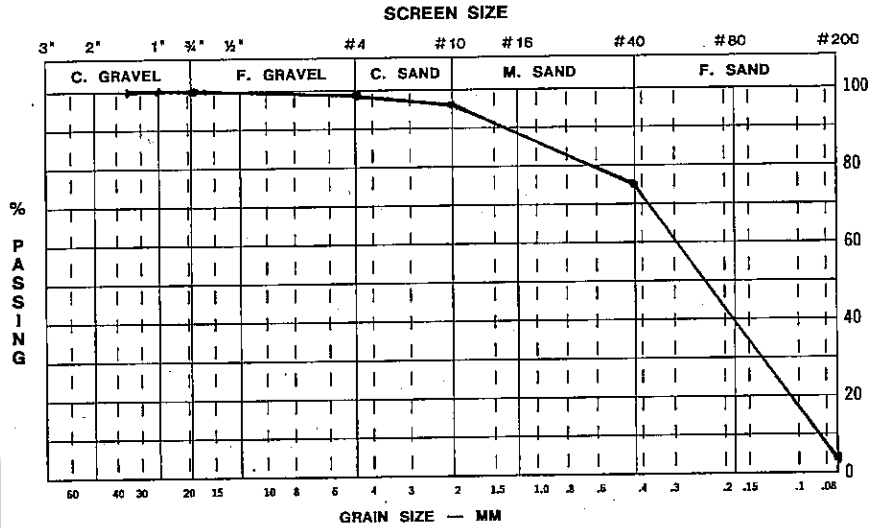
WET WT.: 62.3 g

% H_2O: 4.9 %

WT. OF SAMPLE: 289.6 g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	2.0 g	100.0
-#4	6.3 g	99.3
-#10	64.8 g	97.1
-#40	203.0 g	74.8
-#200	13.5 g	4.7

GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

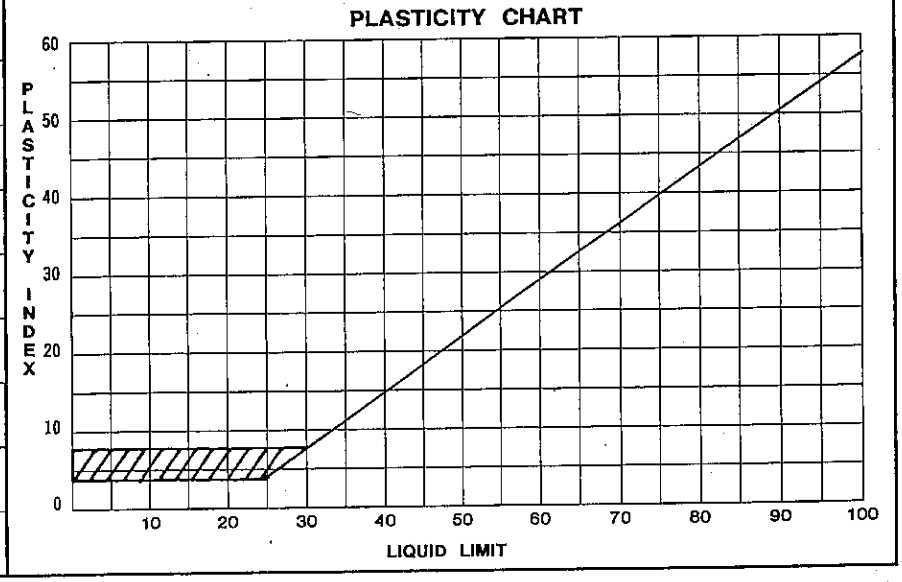
	LIQUID LIMIT				PLASTIC LIMIT
Can No.					
Wet Wt.					
Dry Wt.					
% H_2O					PL=
Blows					PI=

SAMPLE DESCRIPTION

CLASS. SP

Dark Yellowish Brown, Dry, Slightly Silty, fine to Coarse Sand with root hairs

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0732-4
HOLE NO.:	W2-14-93
DATE:	12-2-93
LAB. TECH.:	LHB

SIEVE ANALYSIS

DRY WT.:	42.4g
WET WT.:	60.1g
% H_2O:	41.7%
WT. OF SAMPLE:	235.6g

	WT.	% PASS
-1½"	ϕ	100.0
-1"	ϕ	100.0
-¾"	ϕ	100.0
-#4	ϕ	100.0
-#10	0.2g	100.0
-#40	23.6g	99.9
-#200	211.8g	89.9

SAMPLE DESCRIPTION

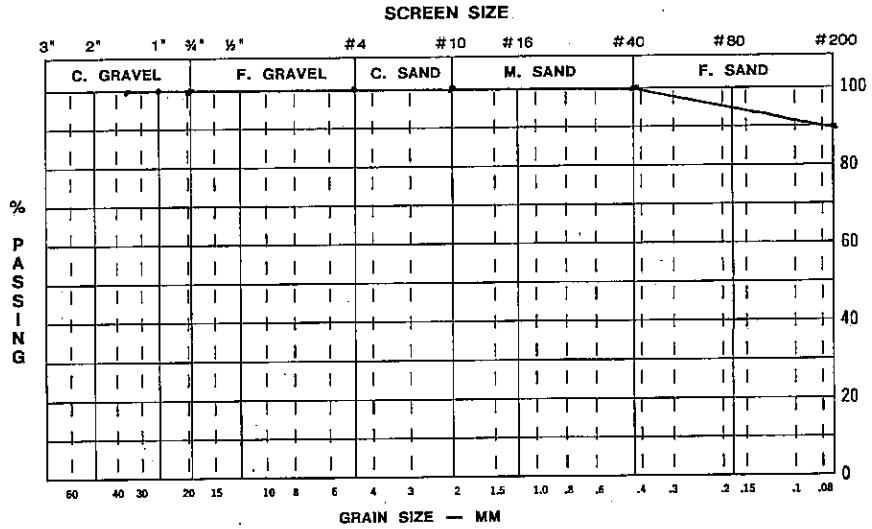
CLASS. ML Gray, Wet, Fine Sandy Silt W/Fibrous Organic Material.

FOM

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

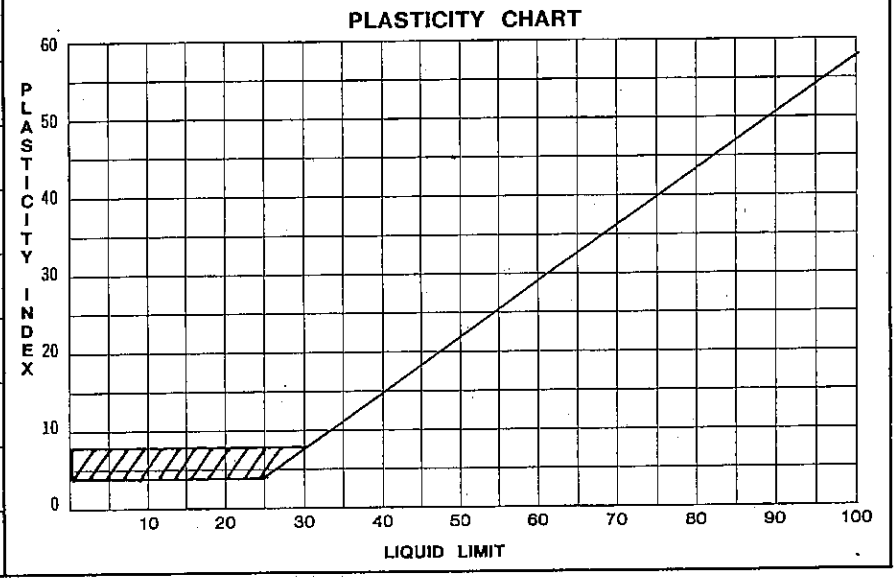
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0732-5

HOLE NO.: W2-14-93

DATE: 11-30-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 66.6 g

WET WT.: 82.7 g

% H_2O: 24.2%

WT. OF SAMPLE: 273.6 g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	Ø	100.0
-#40	109.8 g	100.0
-#200	163.8 g	59.9

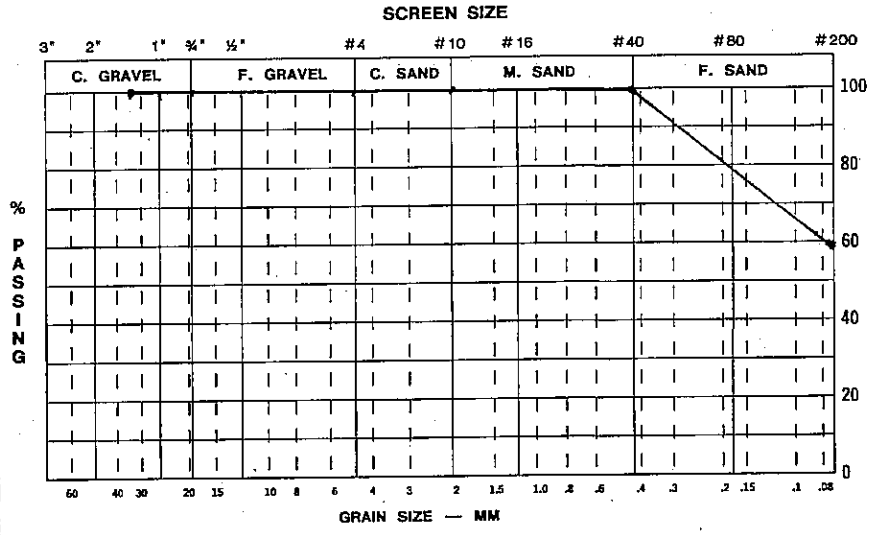
SAMPLE DESCRIPTION

CLASS. ML Dark Gray, Moist, fine Sandy, Silt

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

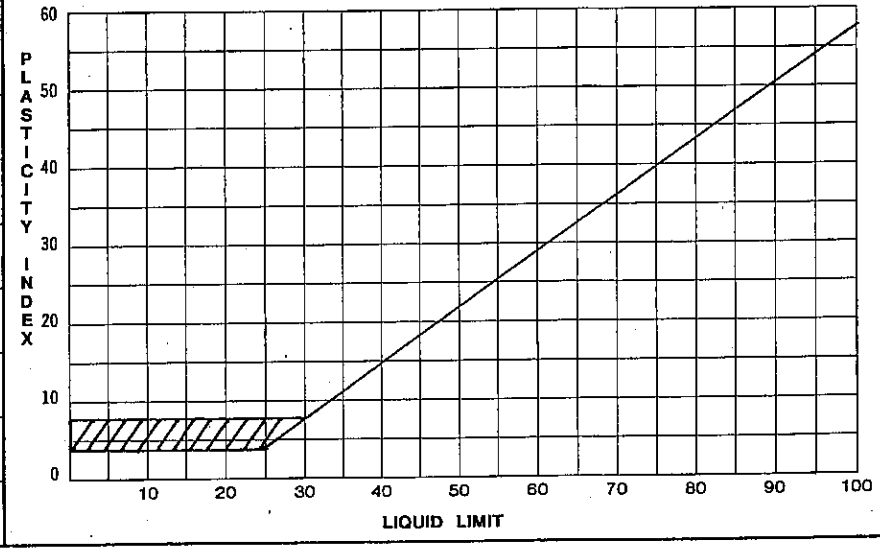
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0732-6
HOLE NO.:	W2-14-93
DATE:	11-24-93
LAB. TECH.:	D.G.

SOIL FIELD IDENTIFICATION

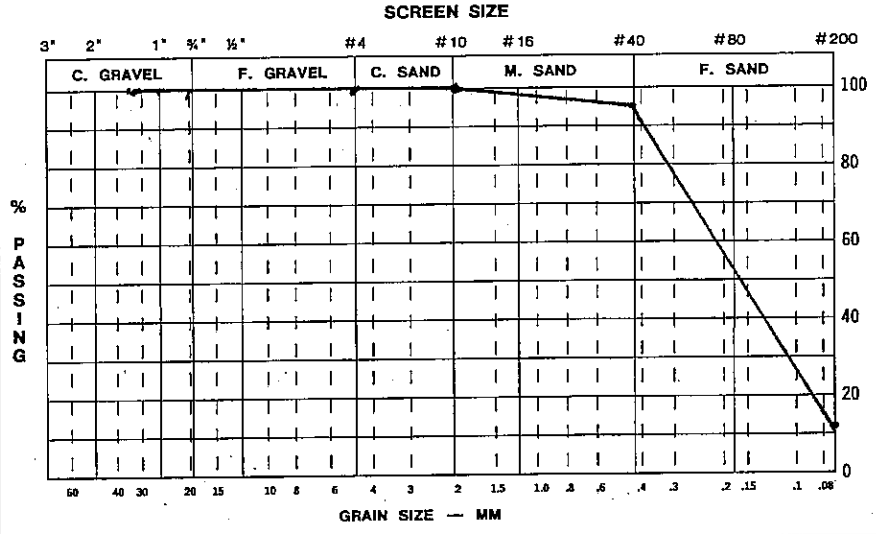
TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.:	64.1g
WET WT.:	81.1g
% H_2O:	26.5%
WT. OF SAMPLE:	391.0g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	15.6g	100.0
-#40	331.6g	96.0
-#200	43.8g	11.2

GRAIN SIZE CURVE



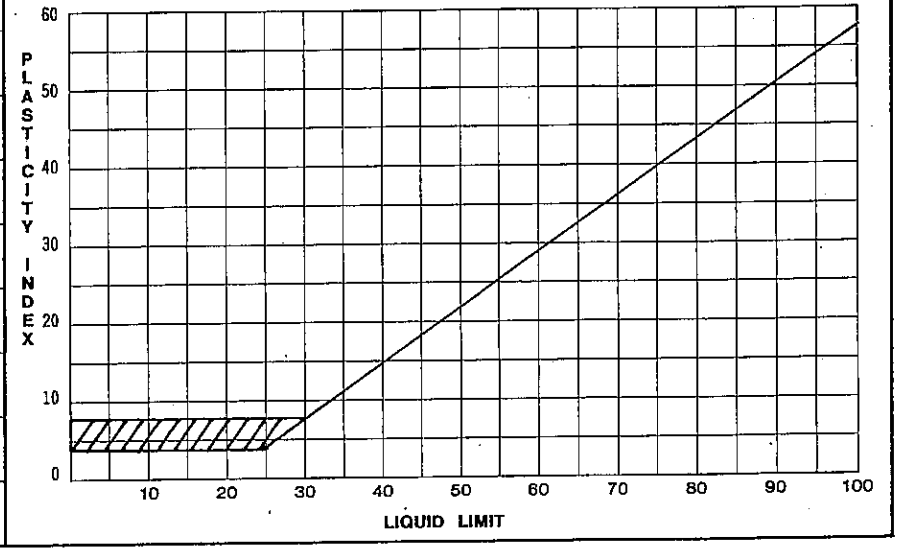
LIQUID LIMIT DETERMINATION

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

SAMPLE DESCRIPTION

CLASS.	
SP-SM	Dark Gray, Moist, Silty, fine to Medium Sand

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0732-8

HOLE NO.: W2-14-93

DATE: 11-24-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 58.3 g

WET WT.: 72.5 g

% H_2O: 24.4%

WT. OF SAMPLE: 270.3 g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	0.5 g	100.0
-#40	117.1 g	99.8
-#200	152.7 g	56.5

SAMPLE DESCRIPTION

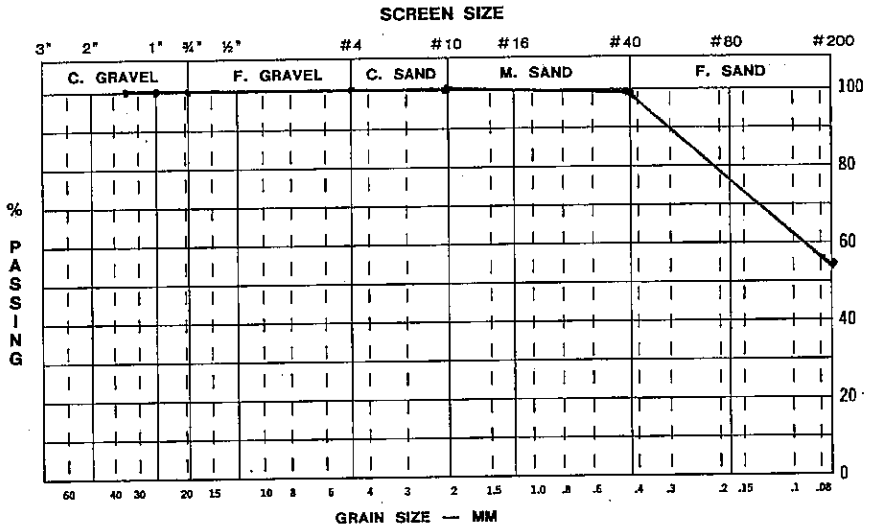
CLASS. ML

Very Dark Grayish Brown, Moist, fine Sandy, Silt

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

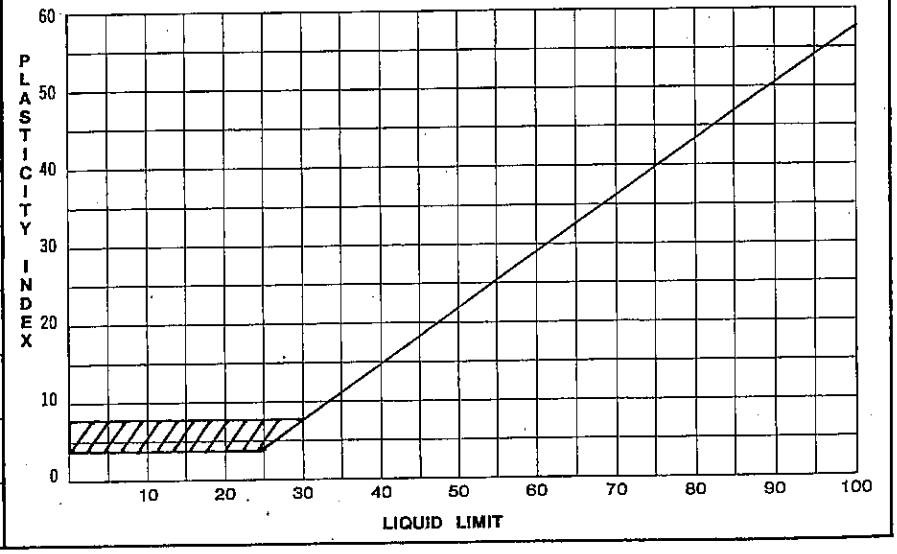
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

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

Place Seattle

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S. SR No. 167 Sub-Section

Station & Offset D P1 21+00 20.0' LT. Hole # TH # W1 15-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0733 -1	P-1	1.0' TO 2.5'			LK F-0734-1
-2	P-2	5.0' TO 6.5'			LK F-0734-1
-3	P-3	10.0' TO 11.5'			LK F-0734-1
-4	P-4	15.0' TO 16.5'			LK F-0734-4
-5	P-5	20.0' TO 21.5'	MC = 29.5%	ML	
-6	P-6	25.0' TO 26.5'			LK-0733-5
-7	P-7	27.5' TO 29.0'	MC = 19.7%	SP	
-8	P-8	30.0' TO 31.5'			LK 33-7

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Yours very truly

Inspector.

1 copy with samples
1 copy to addressee

FORM 351-002

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
aterials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
mwater, Washington 98504 (Shipping Address)

Place Seattle

Date

Undisturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S.
SR No. 167 Sub-Section

Station & Offset

Hole # W1 15-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0733 -9	U-1 A	17'6" TO 17'10"			
-10	U-1 B	17'10" TO 18'2"			
-11	U-1 C	18'2" TO 18'6"			
-12	U-1 D	18'6" TO 18'10"			
-13	U-1 E	18'10" TO 19'2"			
-14	U-1 F	19'2" TO 19'6"			

copy with samples
1 copy to addressee

Yours very truly,

Inspector.

FORM 351-002

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0733-5

HOLE NO.: W1-15-93

DATE: 11-30-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 104.4 g

WET WT.: 135.2 g

% H_2O: 29.5 %

WT. OF SAMPLE: 263.3 g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	Ø	100.0
-#40	121.8	100.0
-#200	141.5	53.7

SAMPLE DESCRIPTION

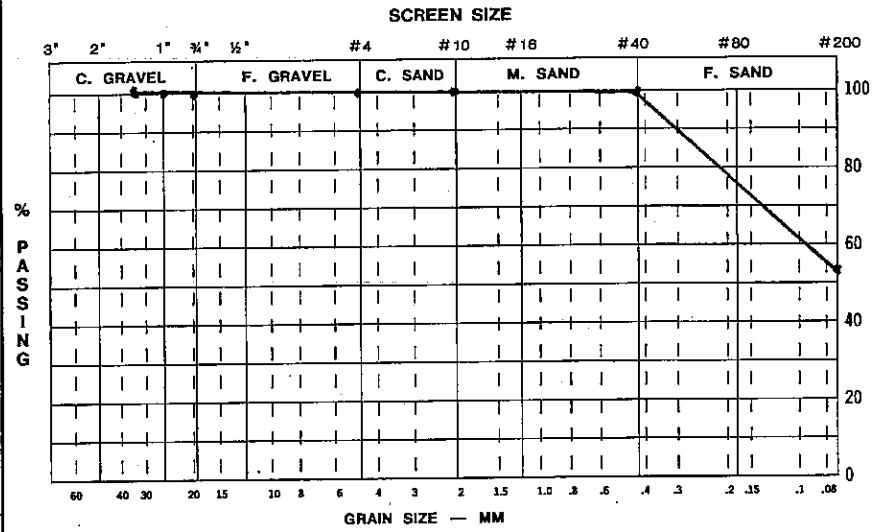
CLASS. ML

Dark Gray, Moist, Fine Sandy, Silt

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

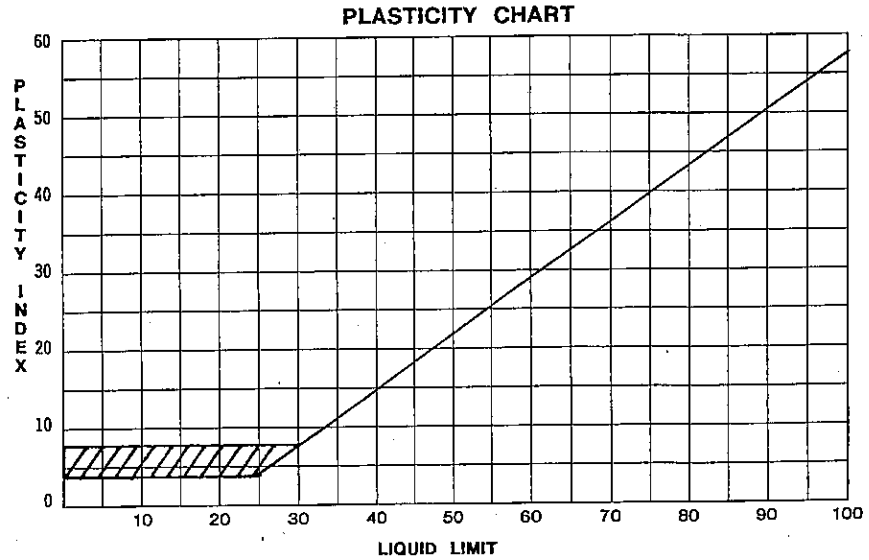
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0733-7

HOLE NO.: W1-15-93

DATE: 11-30-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 124.6

WET WT.: 149.1g

% H_2O: 19.7%

WT. OF SAMPLE: 374.0g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	7.1g	100.0
-#4	7.3g	98.1
-#10	182.6g	96.1
-#40	173.5g	47.3
-#200	3.5g	.9

SAMPLE DESCRIPTION

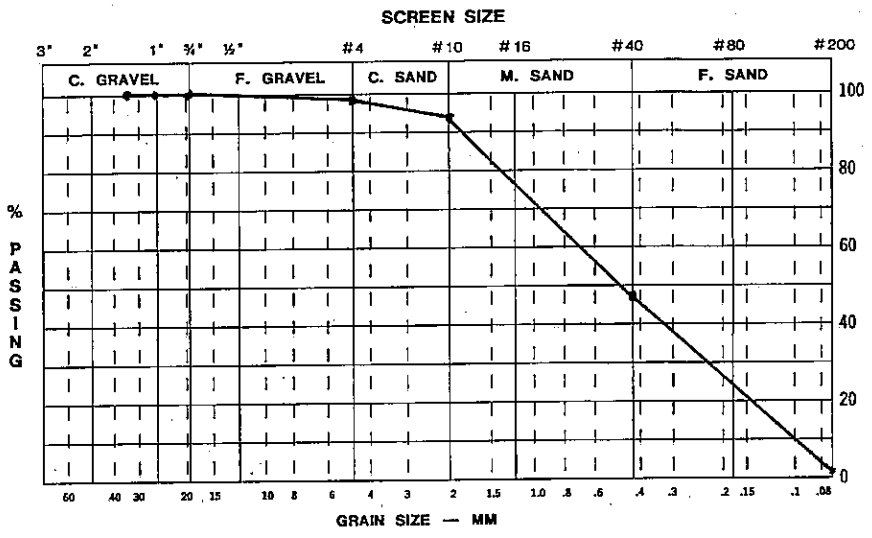
CLASS. SP

Very Dark Gray, Moist, fine to Coarse Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

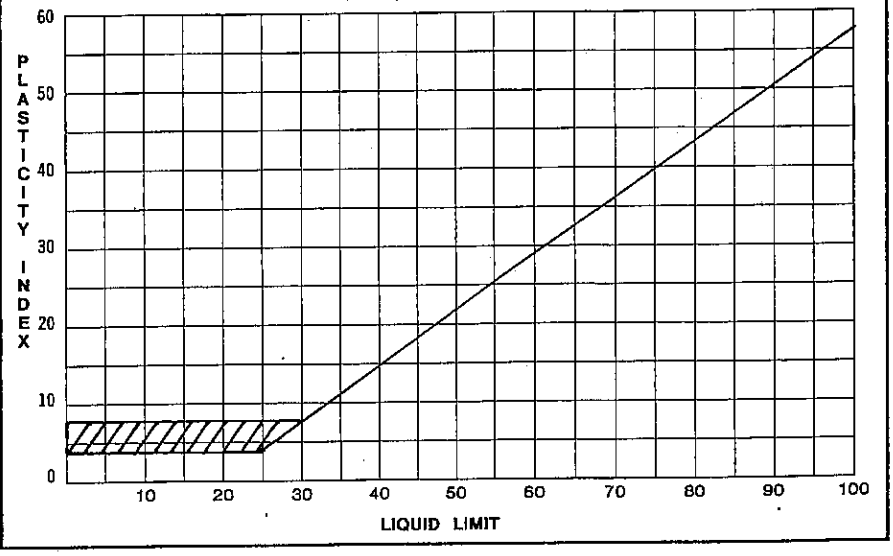
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

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

Place SEATTLE

Date 10-14-93

Disturbed

Dear Sir:

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

Contract or Job No. L 1511 Section Main St. to 84th Ave. S. SR No. 167 Sub-Section

Station & Offset IM 723+70 20.0' LT. WALL ℄ Hole # TH # W1 16-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0734 -1	P-1	1.0' TO 2.5'	MC = 5.3%	SP ~~SM~~	
-2	P-2	5.0' TO 6.5'			LK F-0734-1
-3	P-3	10.0' TO 11.5'	MC = 46.0%	ML	PI LK F-0734-4
-4	P-4	15.0' TO 16.5'	MC = 43.5%	ML ~~PI~~	Dried in Wrong Oven
-5	P-5	20.0' TO 21.5'			LK F-0733-5
-6	P-6	25.0' TO 26.5'	MC = 24.9%	SM	
-7	P-7	30.0' TO 31.5'			LK 33-7

1 copy with samples
1 copy to addressee

Yours very truly,

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Inspector.

FORM 351-002

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

ATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
55 So. 2nd Ave.
umwater, Washington 98504 (Shipping Address)

Place Seattle

Date 10-14-93

Undisturbed

Dear Sir:

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

Contract or Job No. L1511 Section Main St. to 84th Ave. S. SR No. 167 Sub-Section

Station & Offset 20.0' LT of wall ℄ LM 723+20 Hole # TH # W1 16-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0734 -8	U-1 A	12'6" to 12'10"			
-9	U-1 B	12'10" to 13'2"			
-10	U-2 A	17'6" to 17'10"			
-11	U-2 B	17'10" to 18'2"			γ Wet = 110.2 pcf
-12	U-2 C	18'2" to 18'6"	MC = 37.3%	ML	Non-Plastic
-13	U-2 D	18'6" to 18'10"			
-14	U-2 E	18'10" to 19'2"			

1 copy with samples
1 copy to addressee

Yours very truly,

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Inspector.

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0734-1

HOLE NO.: W1-16-93

DATE: 11-30-93

LAB. TECH.: D. G.

SIEVE ANALYSIS

DRY WT.: 181.2

WET WT.: 190.8 g

% H_2O: 5.3 %

WT. OF SAMPLE: 534.5

	WT.	% PASS
-1½"	48.9 g	100.0
-1"	43.8 g	90.9
-¾"	122.6 g	82.7
-#4	44.8 g	59.7
-#10	97.6 g	51.3
-#40	143.2 g	33.1
-#200	33.6 g	6.3

SAMPLE DESCRIPTION

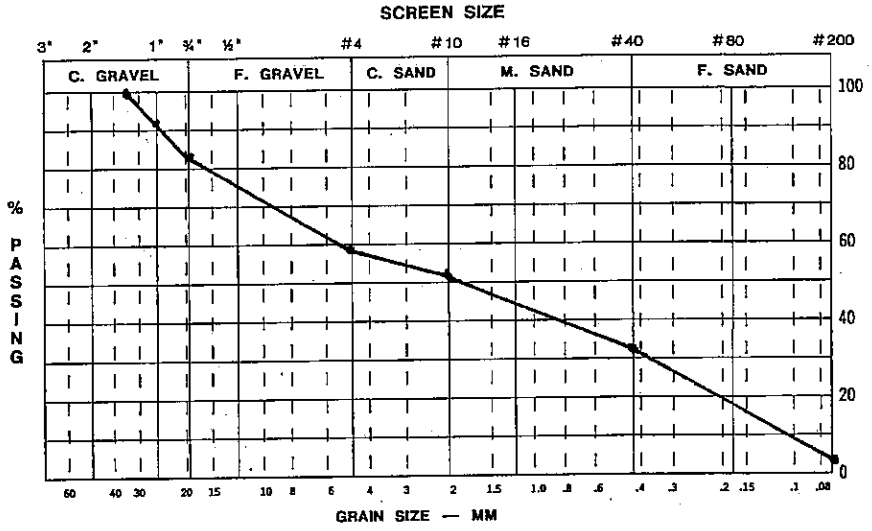
CLASS. SP-SM

Dark Grayish Brown Dry, Silty, Gravelly, fine To Coarse Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓	✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

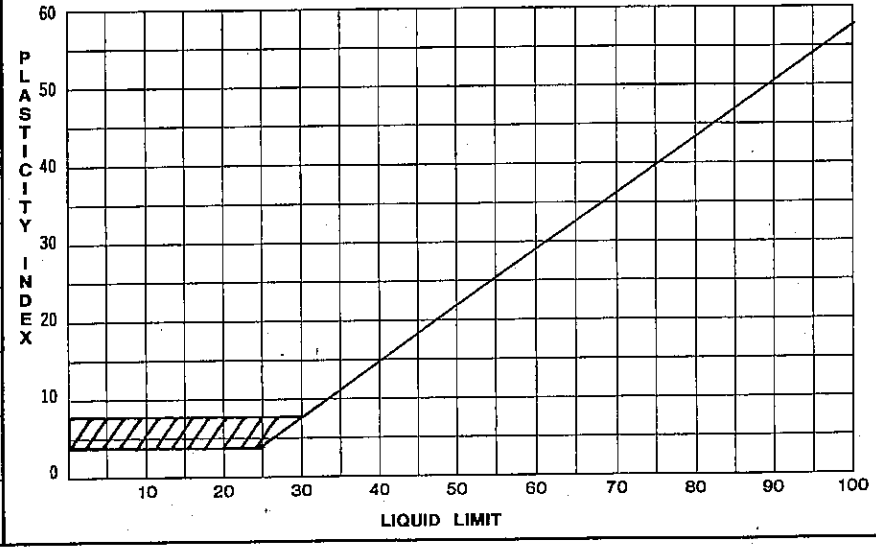
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0734-3
HOLE NO.:	W1-16-93
DATE:	12-2-93
LAB. TECH.:	LHB

SIEVE ANALYSIS

DRY WT.:	46.5g
WET WT.:	67.9g
% H_2O:	46.0%
WT. OF SAMPLE:	196.6g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	15.7g	100.0
-#4	0.1g	92.0
-#10	0.5g	92.0
-#40	1.5g	91.7
-#200	178.8g	90.9

SAMPLE DESCRIPTION

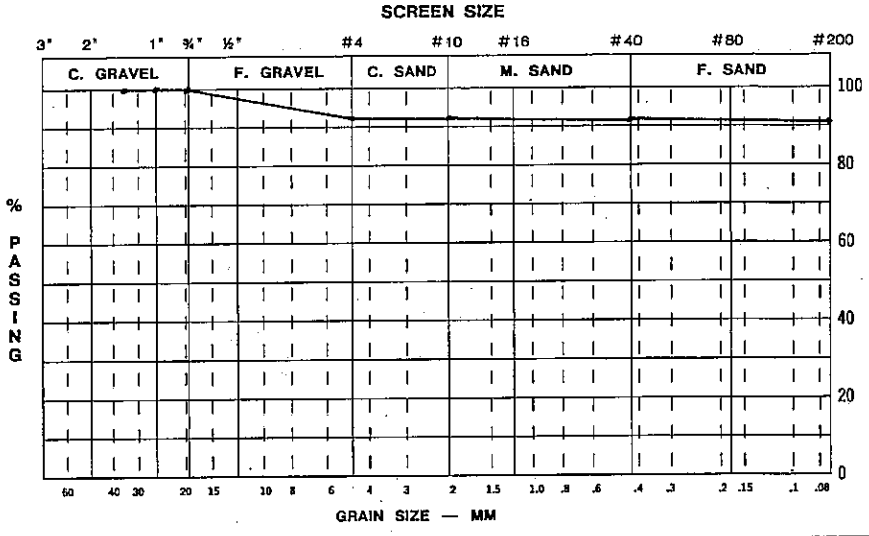
CLASS. ML

Gray, Wet, Gravelly Silt.

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL	✓		✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

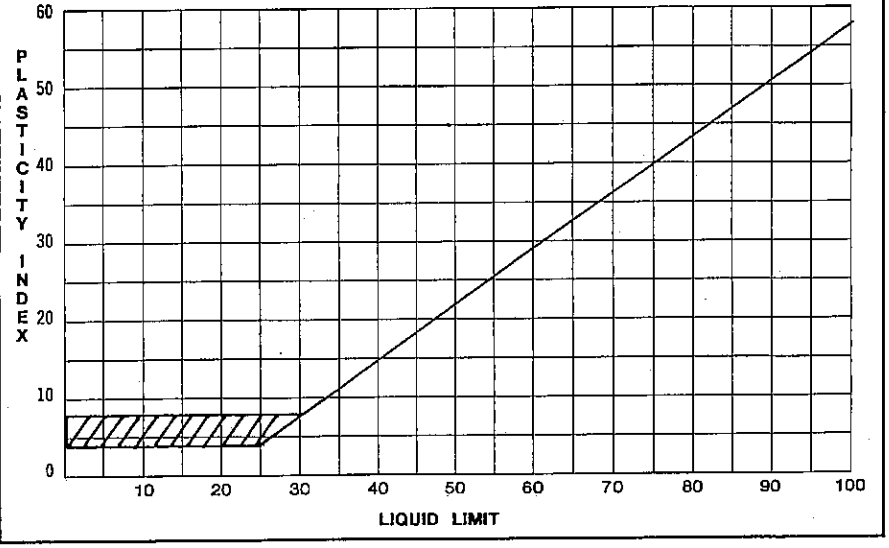
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0734-4
HOLE NO.:	W1-16-93
DATE:	11-24-93
LAB. TECH.:	D.G.

SOIL FIELD IDENTIFICATION

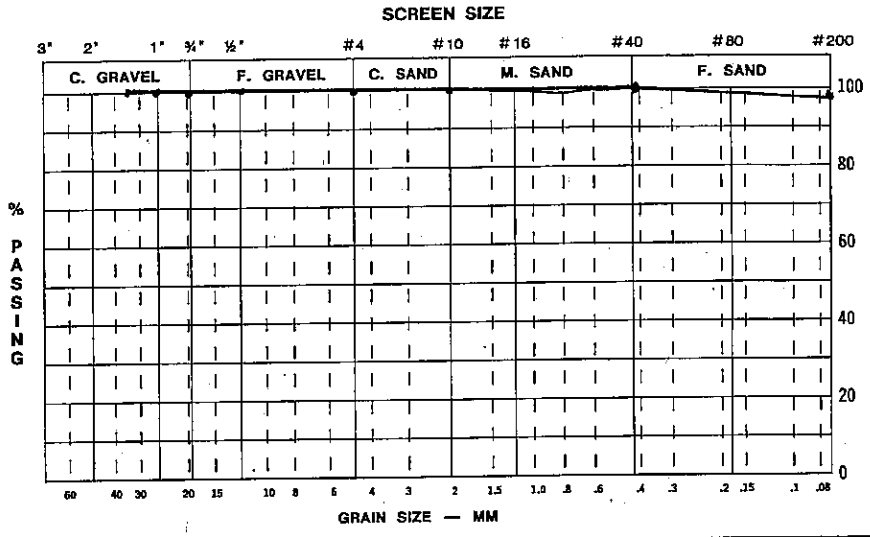
TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.:	100.3
WET WT.:	143.9g
% H_2O:	43.5%
WT. OF SAMPLE:	292.1g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	Ø	100.0
-#40	6.5g	100.0
-#200	285.6 g	97.8

GRAIN SIZE CURVE



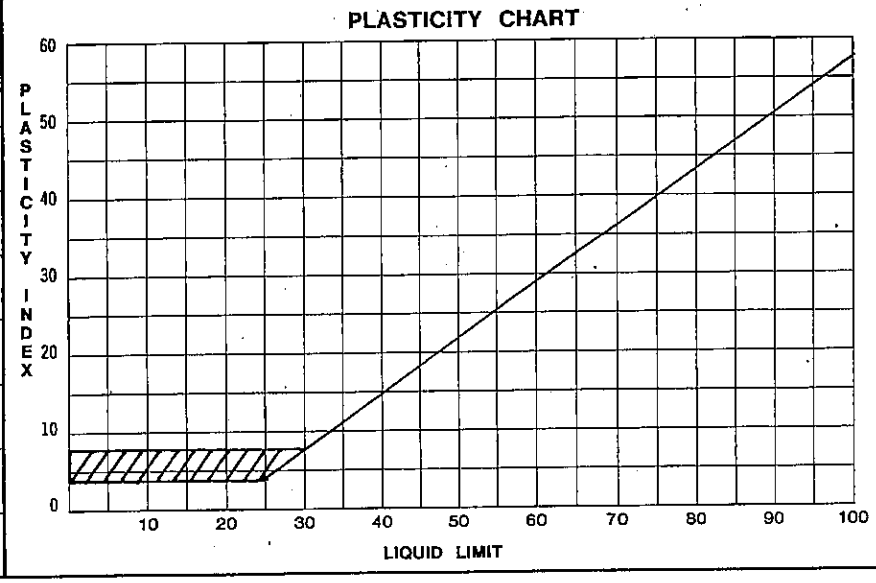
LIQUID LIMIT DETERMINATION

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

SAMPLE DESCRIPTION

CLASS.	
ML	Gray, wet, fine Sandy Silt

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0734-6

HOLE NO.: W1-16-93

DATE: 11-30-93

LAB. TECH.: D. G.

SIEVE ANALYSIS

DRY WT.: 133.9 g

WET WT.: 167.2 g

% H_2O: 24.9%

WT. OF SAMPLE: 375.2 g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	3.1 g	100.0
-#40	224.3 g	99.2
-#200	147.8 g	39.4

SAMPLE DESCRIPTION

CLASS. SM

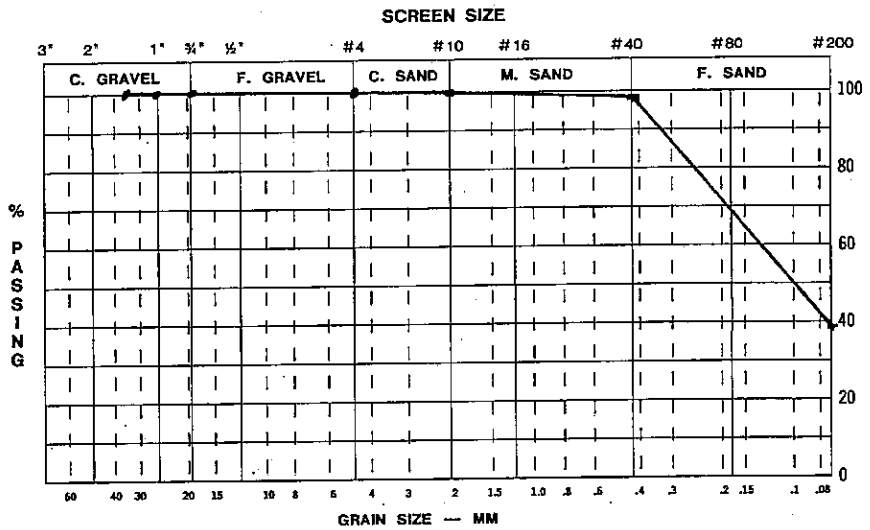
Dark Brown, Moist

Very silty, fine Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

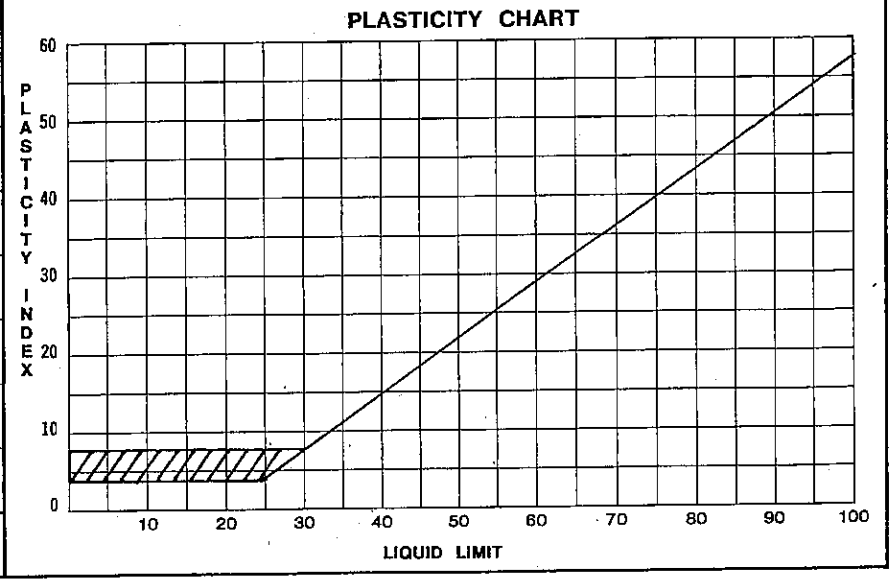
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0734-11
HOLE NO.:	H-16-93
DATE:	12-28-93
LAB. TECH.:	LHB

SIEVE ANALYSIS

DRY WT.:	N/A
WET WT.:	N/A
% H_2O:	N/A
WT. OF SAMPLE:	N/A

	WT.	% PASS
-1½"		
-1"		
-¾"		
-#4		
-#10		
-#40		
-#200		

Wet weight only

SAMPLE DESCRIPTION

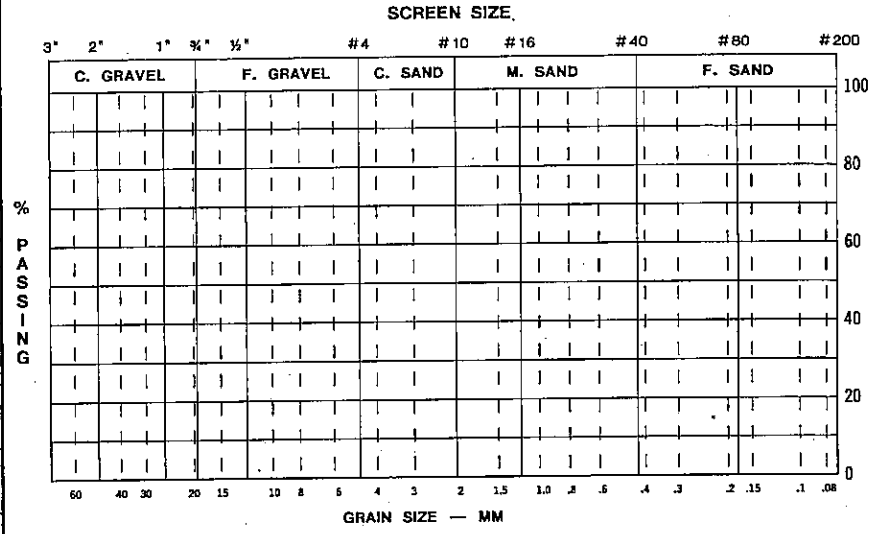
CLASS.	

γ Wet = 110.2 pcf

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL				
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

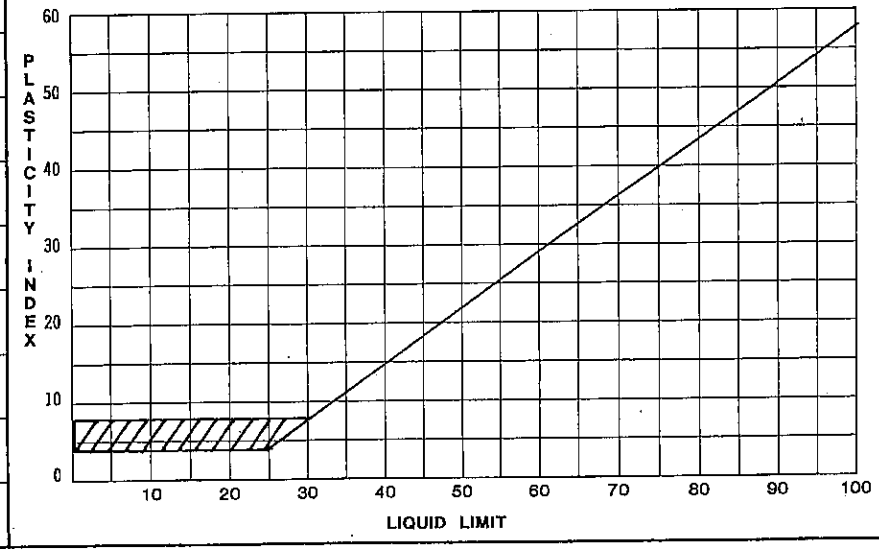
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0734-12
HOLE NO.:	H-16-93
DATE:	12-29-93
LAB. TECH.:	LHB

SOIL FIELD IDENTIFICATION

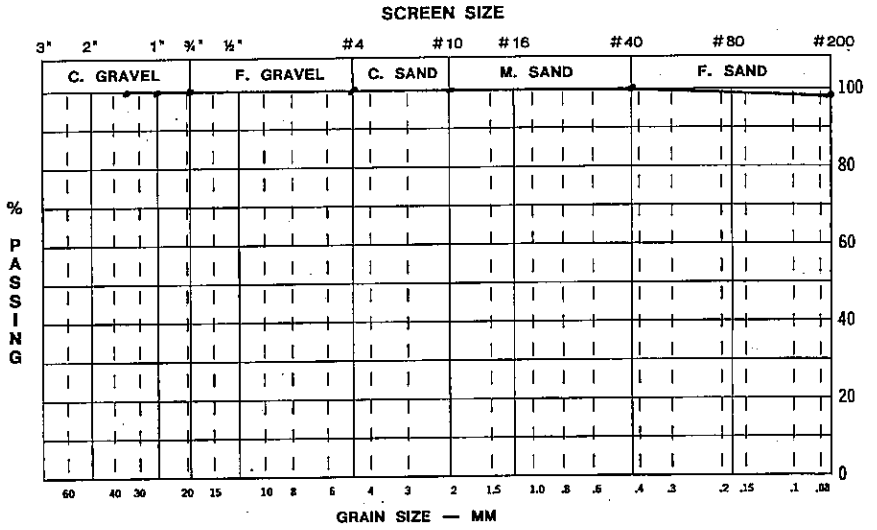
TEST	GRAVEL	SAND	SILT	CLAY
VISUAL			✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.:	229.2g
WET WT.:	314.7g
% H_2O:	37.3%
WT. OF SAMPLE:	228.8g

	WT.	% PASS
-1½"	ϕ	100.0
-1"	ϕ	100.0
-¾"	ϕ	100.0
-#4	ϕ	100.0
-#10	ϕ	100.0
-#40	3.8g	100.0
-#200	225.0g	98.3

GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

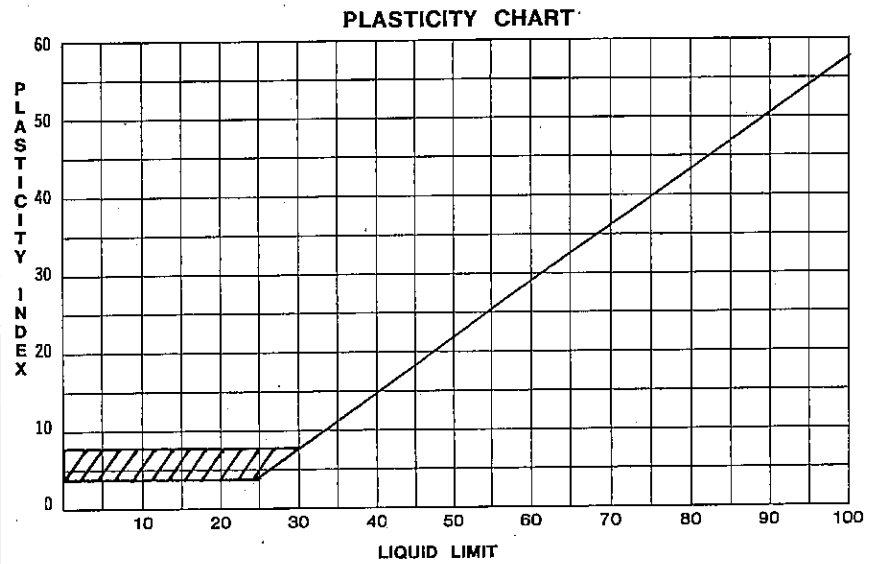
	LIQUID LIMIT				PLASTIC LIMIT
Can No.					
Wet Wt.					
Dry Wt.	Non-Plastic				
% H_2O					PL=
Blows					PI=

SAMPLE DESCRIPTION

CLASS.	
ML	Gray, Wet, Silt

UU Test # F0734-12
γ_{wet} = 116.4 pcf
γ_{Dry} = 84.8 pcf

PLASTICITY CHART



UNCONSOLIDATED UNDRAINED TEST

PROJECT: MAIN STREET TD
SOIL DESCRIPTION: GRAY WET SILT
DATE: 12-21-93
BORING NO: H-16-93
INITIAL LENGTH: 3.750 in.
PISTON FRICTION: 0.000 lbs.
CELL PRESSURE: 15.00 psf

PROJECT NO: L-1511
TESTER: LHB
SAMPLE NO: U-2/C
INITIAL AREA: 2.865 sq. in.
PISTON DIAMETER: 0.000 in.
WET UNIT WEIGHT: 116.57 pcf

TEST NO: F0734-12
CHECKER: DC
DEPTH: 18'-2
INITIAL VOLUME: 10.743 cu. in.
LOAD CORRECTION: 0.000 lbs.
QUALITY OF SAMPLE: GOOD

WATER CONTENT

	BEFORE TEST	AFTER TEST	TRIMMINGS
CONTAINER NUMBER			
WT CONTAINER+WET SOIL in gm	396.200	396.200	396.200
WT CONTAINER+DRY SOIL in gm	310.700	310.700	310.700
WT WATER in gm	85.500	85.500	85.500
WT CONTAINER in gm	81.500	81.500	81.500
WT DRY SOIL in gm	229.200	229.200	229.200
WATER CONTENT in %	37.304	37.304	37.304

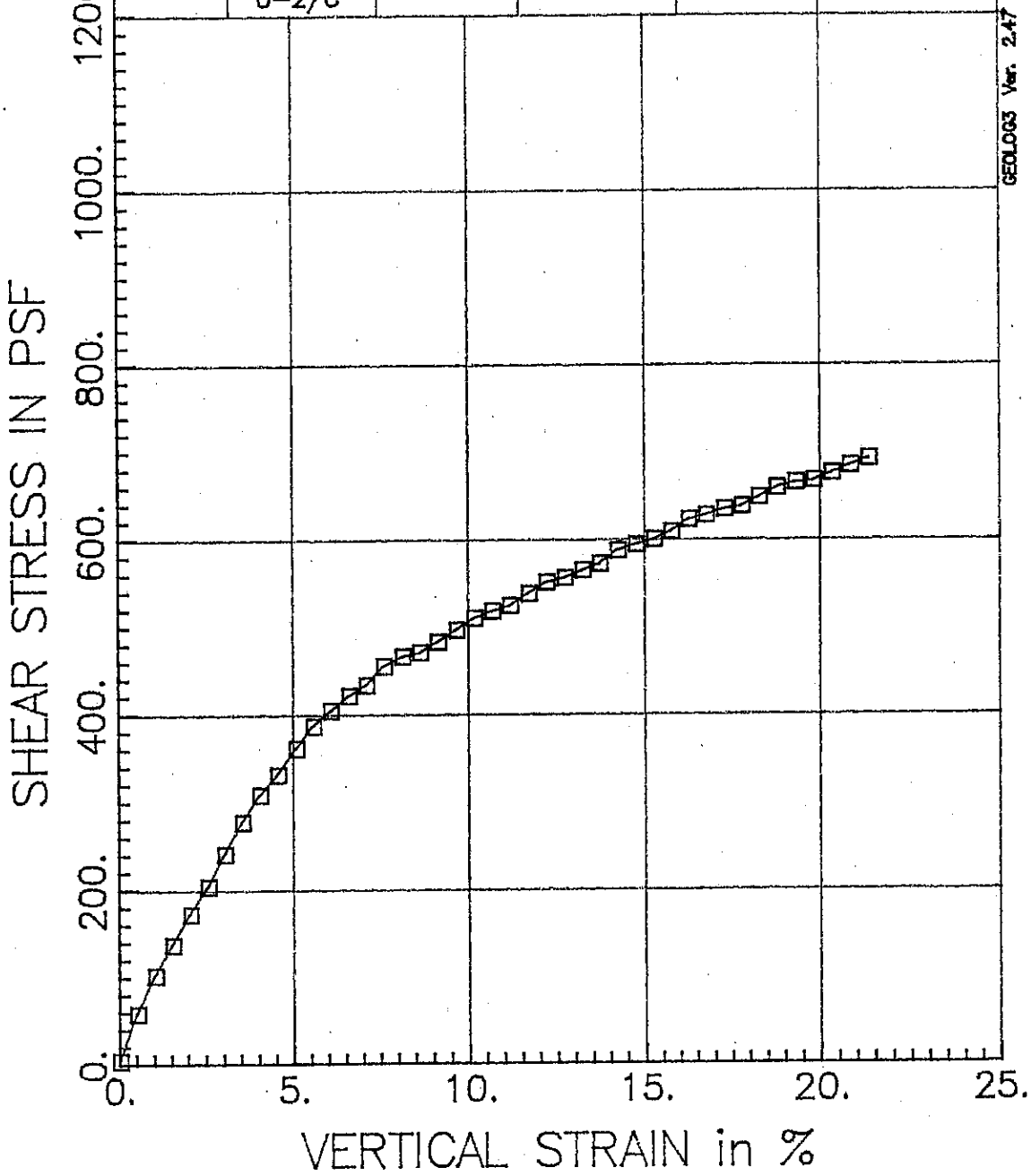
SAMPLE SKETCH

AXIAL COMPRESSION in inches	AXIAL STRAIN in %	PROVING RING DIAL .0001 in.	PROVING RING LOAD in lbs.	CORR. LOAD ON SAMPLE in lbs.	SHEAR STRESS in psf
- 0.0004	0.00	- 0.0488	0.19	0.19	4.7
0.0190	0.51	- 0.0692	2.35	2.35	58.8
0.0381	1.02	- 0.0859	4.11	4.11	102.3
0.0570	1.52	- 0.0995	5.56	5.56	137.6
0.0767	2.04	- 0.1132	7.01	7.01	172.5
0.0959	2.56	- 0.1257	8.34	8.34	204.2
0.1135	3.03	- 0.1405	9.90	9.90	241.3
0.1324	3.53	- 0.1551	11.45	11.45	277.6
0.1512	4.03	- 0.1678	12.79	12.79	308.5
0.1701	4.54	- 0.1776	13.83	13.83	331.7
0.1901	5.07	- 0.1901	15.15	15.15	361.4
0.2086	5.56	- 0.2010	16.30	16.30	387.0
0.2274	6.07	- 0.2088	17.13	17.13	404.4
0.2471	6.59	- 0.2166	17.96	17.96	421.6
0.2660	7.09	- 0.2224	18.58	18.58	433.8
0.2848	7.60	- 0.2322	19.61	19.61	455.4
0.3047	8.13	- 0.2378	20.21	20.21	466.6
0.3235	8.63	- 0.2407	20.52	20.52	471.1
0.3422	9.12	- 0.2468	21.16	21.16	483.3
0.3618	9.65	- 0.2537	21.88	21.88	496.9
0.3807	10.15	- 0.2605	22.61	22.61	510.5
0.3997	10.66	- 0.2651	23.10	23.10	518.6
0.4185	11.16	- 0.2690	23.51	23.51	524.9
0.4381	11.68	- 0.2761	24.26	24.26	538.5
0.4569	12.18	- 0.2829	24.98	24.98	551.4
0.4766	12.71	- 0.2865	25.37	25.37	556.5
0.4954	13.21	- 0.2917	25.91	25.91	565.2
0.5143	13.71	- 0.2963	26.40	26.40	572.5
0.5331	14.22	- 0.3044	27.26	27.26	587.6
0.5528	14.74	- 0.3090	27.74	27.74	594.4
0.5716	15.24	- 0.3132	28.18	28.18	600.4

AXIAL COMPRESSION in inches	AXIAL STRAIN in %	PROVING RING DIAL .0001 in.	PROVING RING LOAD in lbs.	CORR. LOAD ON SAMPLE in lbs.	SHEAR STRESS in psf
0.5904	15.74	- 0.3187	28.77	28.77	609.3
0.6092	16.25	- 0.3265	29.60	29.60	623.0
0.6281	16.75	- 0.3304	30.01	30.01	627.9
0.6477	17.27	- 0.3353	30.53	30.53	634.7
0.6667	17.78	- 0.3385	30.87	30.87	637.9
0.6854	18.28	- 0.3450	31.56	31.56	648.2
0.7042	18.78	- 0.3519	32.28	32.28	659.0
0.7239	19.30	- 0.3567	32.80	32.80	665.2
0.7427	19.81	- 0.3596	33.11	33.11	667.3
0.7615	20.31	- 0.3655	33.73	33.73	675.5
0.7806	20.82	- 0.3717	34.38	34.38	684.3
0.7995	21.32	- 0.3776	35.00	35.00	692.2

UNCONFINED COMPRESSION TEST

TEST NO.	SAMPLE	DEPTH ft.	WATER CONTENT %	UNIT WEIGHT pcf	CELL PRESSURE psi
F0734-12	H-16-93 U-2/C	18'-2	37.30	116.57	1



WASHINGTON STATE DOT
TEST NAME: F0734-12

STRAIN RATE = 1.0 %/min

PROJECT: MAIN STREET TO 84TH SOUTH
DATE:12-21-93
FILE NO.: L-1511

WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION

[ATERIALS ENGINEER
Materials Laboratory
P. O. Box 167, Olympia, WA 98504 (Mailing Address)
555 So. 2nd Ave.
umwater, Washington 98504 (Shipping Address)

Place Seattle
Date 10-14-93
Disturbed

Dear Sir:

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

Contract or Job No. Lisil
Section Main St. to 84th Ave. S.
SR No. 167 Sub-Section WALL #1

Station & Offset EM72B+70 ℄ wall
Hole # W1 17-93

Lab No.	Drive #	Depth	Tube Position in Sampler	Clas.	Description
F-0735 -1	P-1	1.0' TO 2.5'			Top soil silt w/ root hair
-2	P-2	5.0' TO 6.5'	MC = 21.8%	SM	~~LK F~~
-3	P-3	7.5' T 9.0'			LK F-0735-2
-4	P-4	10.0' TO 11.5'			LK F-0735-2
-5	P-5	15.0' TO 16.5			LK-F-0733-5
-6	P-6	20.0' TO 21.5'			LK-F-0733-7
-7	P-7	22.5' TO 24.0'	MC = 21.7%	SP-SM	
-8	P-8	25.0' TO 26.5'			LK F-0733-7
-9	P-9	30.0' TO 31.5'			LKF-0733-7

1 copy with samples
1 copy to addressee

Yours very truly,

Allen E. Stiles, P.E.
District Materials Engineer
WSDOT - District 1 Mats Lab
6431 Corson Avenue South
Mail Stop: NB-82/MS-29
Seattle, WA 98108-3445

Inspector.

FORM 351-002

SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.:	L-1511
SAMPLE NO.:	F-0735-2
HOLE NO.:	W1-17-93
DATE:	11-30-93
LAB. TECH.:	D.G.

SOIL FIELD IDENTIFICATION

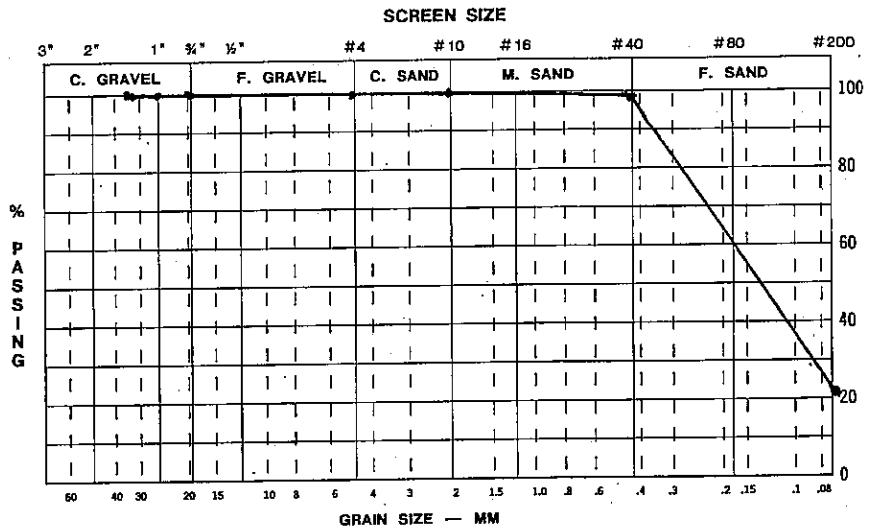
TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

SIEVE ANALYSIS

DRY WT.:	117.4g
WET WT.:	143.0g
% H_2O:	21.8%
WT. OF SAMPLE:	249.0g

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	Ø	100.0
-#4	Ø	100.0
-#10	0.6g	100.0
-#40	192.4g	99.8
-#200	56.0g	22.5

GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

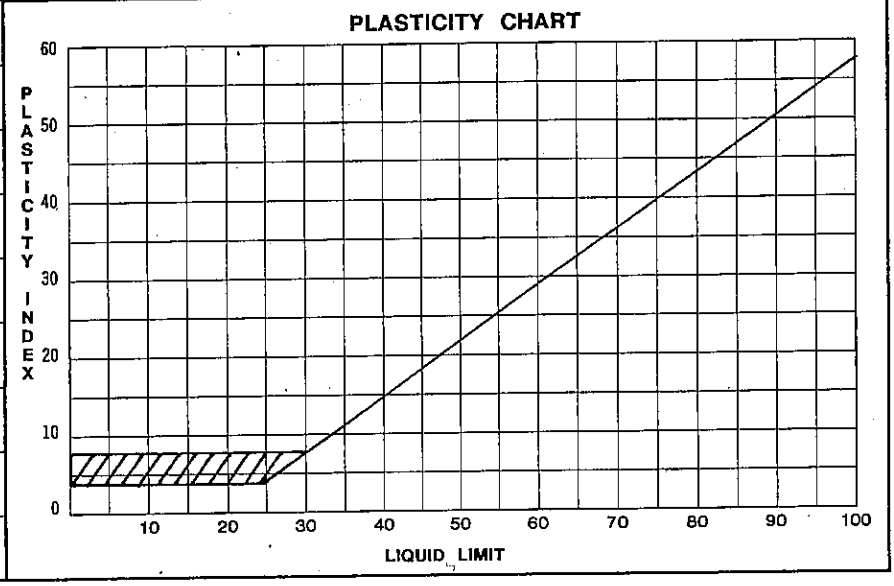
	LIQUID LIMIT				PLASTIC LIMIT
Can No.					
Wet Wt.					
Dry Wt.					
% H_2O					PL=
Blows					PI=

SAMPLE DESCRIPTION

CLASS. SM

Dark Gray, Moist, Very Silty Fine Sand.

PLASTICITY CHART



SOIL CLASSIFICATION AND IDENTIFICATION WORKSHEET

JOB NO.: L-1511

SAMPLE NO.: F-0735-7

HOLE NO.: W1-17-93

DATE: 11-30-93

LAB. TECH.: D.G.

SIEVE ANALYSIS

DRY WT.: 120.1g

WET WT.: 146.2g

% H_2O: 21.7 %

WT. OF SAMPLE: 378.7

	WT.	% PASS
-1½"	Ø	100.0
-1"	Ø	100.0
-¾"	3.0g	100.0
-#4	Ø	99.2
-#10	13.2g	99.2
-#40	34.9g	95.7
-#200	20.6g	5.4

SAMPLE DESCRIPTION

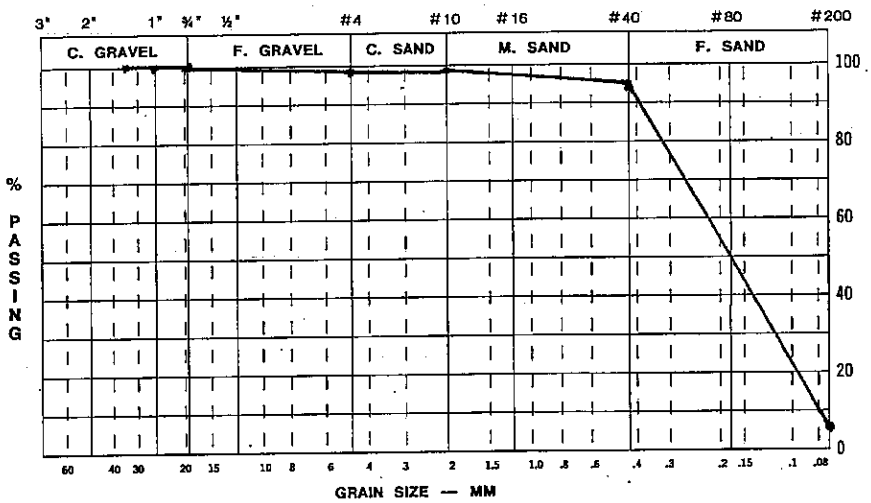
CLASS. SP-SM

Very Dark Gray, Moist, Slightly Silty, fine to Medium Sand

SOIL FIELD IDENTIFICATION

TEST	GRAVEL	SAND	SILT	CLAY
VISUAL		✓	✓	
DRIED CAST				
DILITANCY				
BITE				
TOUGHNESS				

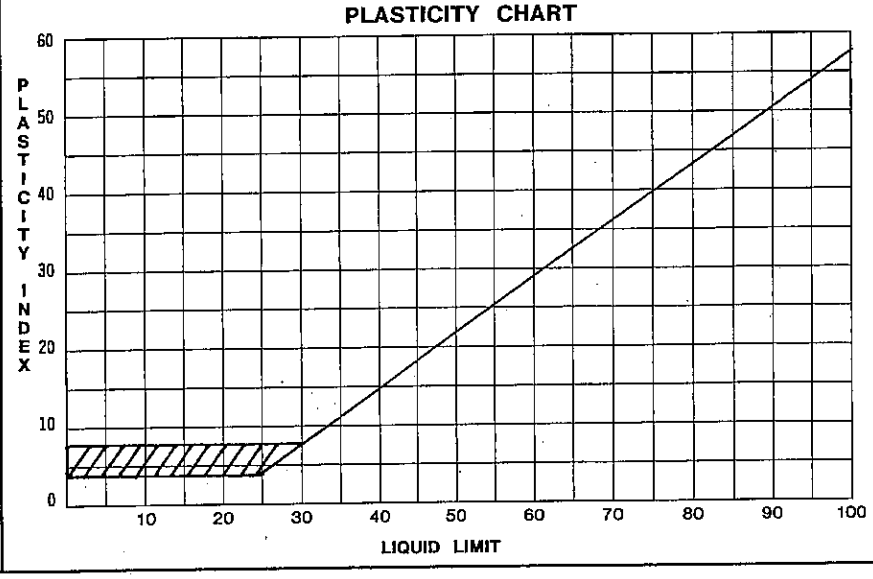
GRAIN SIZE CURVE



LIQUID LIMIT DETERMINATION

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

PLASTICITY CHART



APPENDIX D

RETAINING WALL GUIDELINES

WALL SELECTION AND IMPLEMENTATION CRITERIA

Both standard retaining walls and nonstandard walls are usually feasible for a given wall. Standard walls are those walls for which full standard designs are provided in the WSDOT Standard Plans. Standard walls include reinforced concrete cantilever retaining walls Types 1 through 4 and metal bin gravity walls. Nonstandard walls may be either proprietary or nonproprietary.

Proprietary walls are provided by wall manufacturers which include VSL Corporation, Reinforced Earth, Hilfiker Retaining Walls, Criblock Retaining Walls Northwest, Stresswall International, Doublewal Retaining Walls, Earth Retention Inc., and Keystone Pacific Northwest. VSL, Reinforced Earth, Hilfiker, Earth Retention Inc., and Keystone provide mechanically stabilized earth (MSE) wall systems. Criblock, Stresswall, Doublewal, and Earth Retention Inc. provide structural gravity wall systems. Nonstandard, nonproprietary walls may utilize some proprietary wall elements, but are designed by WSDOT or its representative and allow more than one proprietary company to supply a given element of the wall such as the backfill reinforcement. Alternatively, some or all of the elements of the nonstandard nonproprietary wall system may be fabricated by the contractor at the job site.

Nonstandard, nonproprietary walls include geosynthetic walls, ground nail walls, soldier pile walls with or without tieback anchors, as well as many others. Please note that although standard details for gabion baskets are provided in the Standard Plans, gabion walls are a nonstandard wall which must be designed for overturning, sliding, and bearing capacity. A full design for gabion walls is not provided in the Standard Plans.

Preapproved Proprietary Walls

Some of the proprietary wall manufacturers previously listed have preapproved wall systems available. These wall manufacturers do provide multiple wall systems, and not all systems provided by a given manufacturer are preapproved. Preapproved proprietary retaining walls are determined by the Bridge and Structures Office. Particular wall systems which are preapproved are periodically communicated to the District by the Bridge and Structures Office. Currently, the proprietary wall systems which are preapproved are as follows:

Wall Manufacturer	Wall System Preapproved	Maximum Wall Height Preapproved
VSL Corporation	Retained Earth Wall with modular precast concrete panels	30 ft
Reinforced Earth Company	Reinforced Earth Wall with modular precast concrete panels	30 ft
Hilfiker Retaining Walls	Welded Wire Wall with modular precast concrete panels	30 ft
Hilfiker Retaining Walls	Welded Wire Wall with welded wire face	20 ft
Criblock Retaining Walls Northwest	Concrete Criblock Wall	30 ft
Stresswall International	Stresswall	30 ft

Walls with maximum heights equal to or less than the heights listed in the above table can be considered to be preapproved provided that the soil surcharge slope above the wall is 2H:1V or flatter. Walls with soil surcharge slopes steeper than 2H:1V are not preapproved.

Project specific geotechnical and aesthetic design criteria for a proposed wall in which preapproved wall systems can be used are approved, and in most cases developed, by the Geotechnical Branch and Headquarters Architecture. It is possible, if the District has hired a consultant, that some of the geotechnical design criteria for the wall could be provided by the District, subject to Headquarters approval. Preapproved wall systems can be included in the PS&E by the District simply by providing a wall plan, profile, typical cross-sections, any desired wall appurtenances, right-of-way limits, special design requirements, and quantities for the proposed wall and by contacting the wall manufacturers to determine which ones are interested in pursuing the project. The design criteria should be transmitted to the interested wall manufacturers at that time. Special provisions for the preapproved wall systems are provided by the Bridge and Structures Office. These special provisions should include the geotechnical and aesthetic design criteria. Detailed wall designs and plan details for the proprietary wall system selected by the contractor are provided as shop drawings after the contract is awarded.

Proprietary Wall Systems Which are Not Preapproved

Other facing systems, such as full height precast concrete panels or cast-in-place concrete facings, and the use of polymeric soil reinforcement for the wall manufacturers which have preapproved systems are not preapproved. Of course, wall systems provided by all other wall manufacturers are also not preapproved. Possible proprietary wall systems which are not preapproved from manufacturers who do not have any preapproved wall systems include Keystone (Genesis) walls, Earth Retention Inc. Gravity Stone walls, and Doublewal.

Proprietary wall systems which are not preapproved require that design calculations and detailed plans developed by the proprietary wall manufacturer be submitted to the Bridge and Structures Office for review and approval. Detailed wall plans and special provisions for each proprietary wall alternate approved in this manner are then included in the PS&E.

The Bridge Office will take the lead in developing the wall PS&E unless a project specific agreement between the Bridge Office and the District is made to have the District take the lead. This could occur, for example, if the District has hired a consultant to perform this task. The office taking the lead to develop the wall PS&E, normally the Bridge Office, should contact the wall manufacturers to determine which ones are interested in pursuing the project. Project specific design criteria for the wall to be provided to the wall manufacturers are approved, and in most cases developed, by the Bridge Office, the Geotechnical Branch, and Headquarters Architecture. The District provides wall site data and the PS&E for District items of work such as drainage and traffic control. This information is then sent to the interested wall manufacturers for their use in designing the wall and for developing plan sheets. The proprietary wall designs and plans are then sent to the Bridge office for review and final approval before inclusion in the PS&E.

Nonstandard, Nonproprietary Wall Systems

Nonstandard, nonproprietary wall systems are usually included in the PS&E by the Bridge and Structures Office, but can be included in the PS&E by the District. Please note that the Design Manual does give the District the freedom to develop the design and PS&E for nonstandard, nonproprietary walls, as is true for proprietary wall systems which are not preapproved. However, the design of these walls, with the exception of geosynthetic walls, must be reviewed and approved by the Bridge and Structures Office and Architecture. Geosynthetic wall designs and PS&E's must be reviewed and approved by the Geotechnical Branch and Architecture.

Normally, the District will opt to have nonstandard, nonproprietary

walls be designed by Headquarters, unless the District has hired a consultant to perform that task. The Bridge and Structures Office will provide the wall PS&E if they have performed the structural wall design. The District would only provide wall site data and the PS&E for District items of work such as drainage, traffic control, etc. in this case. Geosynthetic walls are an exception to this procedure, in that the Geotechnical Branch provides the wall design details and Special Provisions to the District. The District uses those design details to develop PS&E wall plans, and includes the wall plans and wall Special Provisions in the District PS&E.

Wall Selection

Selection of retaining wall alternates to be placed in the contract PS&E may be governed by both wall cost, which is affected by the cost of the specific system and excavation requirements, and wall face aesthetics. MSE wall systems are most cost effective in fill wall situations where excavation requirements can be minimized. Structural gravity wall systems can be cost effective in either cut or fill wall situations due to their relatively narrow base width requirements. The Headquarters Geotechnical Branch should be contacted to determine which wall types are technically feasible for the wall in question. The Headquarters Architectural Branch should be contacted to determine the aesthetic requirements for the wall in question. In general, proprietary wall systems are more economical than a standard concrete cantilever retaining wall and therefore should be given serious consideration for inclusion in the contract PS&E.

The following table summarizes typical costs for wall heights between 20 and 40 ft for various wall types. These costs are 1990 costs and do include backfill. They do not include excavation/shoring or mobilization.

Wall Type	Facing	Cost per ft^2 of Wall Face
Std. Concrete Cantilever	C.I.P. Concrete	37 - 60
Std. Metal Bin	Metal	35 - 45
RE/VSL/WW	C.I.P. Concrete	30 - 38
RE/VSL/WW (preapproved)	Modular Conc. Panels	25 - 32
WW	Welded Wire	18 - 26
Criblock (preapproved)	Conc. Headers	25 - 32
Stresswall (preapproved)	Concrete Panels	?
Doublewal	Concrete Panels	23 - 33
Keystone	Masonry Blocks	20 - 28
Gravity Stone	Masonry Blocks	20 - 30
Geotextile or Geogrid	C.I.P. Concrete	17 - 27
Geotextile or Geogrid	Shotcrete	11 - 21
Soldier Pile w/ or w/o tiebacks	C.I.P. Concrete	50 - 100
Ground Nail	C.I.P. Concrete or shotcrete	25 - 45
Gabion	Rock-filled Wire Basket	32 - 50

If the proprietary walls are the preferred wall option, plans and special provisions for alternate wall systems should be included in the contract documents to encourage competitive bidding. As a minimum, a standard wall option should be bid competitively with a proprietary wall system. It is recommended, however, that at least three proprietary systems be included in the contract documents to maximize the competition to insure that WSDOT receives the lowest possible price.