Geotechnical Data Report
Victor Road Reconstruction
Anchorage, Alaska

December 2009

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EXECUTIVE SUMMARY

This report presents the results of a data study performed for the proposed upgrade to Victor Road between Dimond Boulevard and 100th Avenue in Anchorage, Alaska. Data from two prior explorations was used for this report. The purpose of this work was to gather geotechnical data for use in formulating engineering recommendations for the proposed road improvements. Our geotechnical recommendations are presented under separate cover in our December 2009 *Geotechnical Engineering Report, Victor Road Reconstruction, Anchorage, Alaska.*

The proposed improvements to Victor Road will include adjusting the vertical alignment (cutting and filling the respective high and low points), widening, adding curb and gutter, and potentially installing a retaining wall along a portion of the alignment. The length of the project is approximately 2,600 feet between the centerlines of Dimond Boulevard and 100th Avenue. The existing pavement on Victor Road contains numerous longitudinal and transverse cracks and occasional frost heaves.

Nineteen boring logs were reviewed during our analysis, 16 from a 1994 Shannon & Wilson report, and 3 from a 1985 Harding Lawson Associates (HLA) report. In both investigations, the borings ranged in depth from 13 to 21.5 feet with a majority of them being advanced to 16.5 feet below the ground surface (bgs). Borings in the existing road prism largely encountered granular fills that, on average, were around 4 feet thick. According to reviewed data, native soils encountered beneath the fill were relatively uniform over the project site and consisted of mostly medium stiff to very stiff, sandy silt with isolated areas of clayey silt, and silty sand. Borings outside the road prism generally encountered medium stiff to stiff, native, sandy and clayey silts.

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GEOTECHNICAL DATA REPORT
VICTOR ROAD RECONSTRUCTION
ANCHORAGE, ALASKA

1.0 INTRODUCTION

This report presents the results of our geotechnical study for the proposed Victor Road Upgrade in Anchorage, Alaska. The purpose of this geotechnical study was to evaluate subsurface conditions for design of road improvements to Victor Road between West Dimond Boulevard and West 100th Avenue. We understand that the proposed improvements to Victor Road will include improving the vertical alignment (cutting and filling the respective high and low points), widening, and adding curb and gutter. In 1994, Shannon & Wilson, Inc. conducted field explorations and produced a geotechnical data report for the Municipality of Anchorage (MOA) along this section of Victor Road. Explorations in the project area were previously conducted in 1985 by Harding Lawson Associates (HLA) along 97th Avenue, including the intersection of 97th Avenue and Victor Road. Based on these exploration data, this report presents descriptions of the site and project, subsurface exploration and laboratory test procedures, and an interpretation of subsurface conditions.

This report is being submitted in Alaska Department of Transportation & Public Facilities (ADOT&PF) format due to the change in jurisdiction over the project from the Municipality of Anchorage (MOA) to ADOT&PF. The data contained within is consistent with Shannon & Wilson's original submittal of our April 2002 *Geotechnical Report, Victor Road Upgrade, Anchorage, Alaska*. Engineering recommendations based on the data included here are presented in the companion to this report: *Geotechnical Engineering Report, Victor Road Reconstruction, Anchorage, Alaska*.

We received authorization to proceed with reformatting our original reports to ADOT&PF standards in the form of a signed contract from Mr. James Sawhill of Lounsbury and Associates on December 27, 2006.

2.0 DATA REVIEW

As mentioned above, two previous studies were used in the development of engineering recommendations for the proposed improvements to Victor Road. The primary source of data was an investigation performed by Shannon & Wilson in 1994. The results of this investigation were presented in an April 2002 report to the MOA entitled *Geotechnical Report, Victor Road, Dimond Boulevard to West 100th*. A field exploration program (16 borings total) with complementary laboratory testing was conducted for the 1994 study along the current project area. The other data source included in this review is a 1985 report titled *Soil Investigation, 97th Avenue Storm Drain* prepared for CRW Engineering Group by HLA. Only a portion of the data included in the 1985 HLA report fell within the confines of this project; pertinent borings from the HLA report are included in the data presented herein.

3.0 PHYSICAL SETTING

As shown on the vicinity map included as Figure 1, the site is located in south Anchorage, extending south from Dimond Boulevard to West 100th Avenue. The length of the project is approximately 2,600 feet between the centerlines of the above mentioned end streets. The pavement conditions on this road in 2002 were fair with numerous longitudinal and transverse cracks and occasional frost heaves that suggest frost susceptible soils as a root cause of the pavement degradation.

3.1 Climate

The climate is predominantly cool maritime with mild winters and cool summers. Average annual precipitation is about 15 inches. Strong winds are common especially in winter and cloud cover is persistent. Average annual temperature is about 36 degrees Fahrenheit (°F) with a mean January temperature of about 15.8°F and a mean July temperature of 58.4°F for climatic data recorded between 1971 and 2000 at Anchorage International Airport.

3.2 Topography, Drainage, and Vegetation

Currently, this section of Victor Road is straight but undulates with nearly 37 vertical feet of relief between high and low points, which occur approximately 1,100 and 2,050 feet south of the Dimond Boulevard centerline, respectively. At the low point of Victor Road (near its intersection with Olympic Drive), the banks of Campbell Lake are approximately 250 feet west of the Victor Road Centerline. At present, Victor Road has relatively well defined ditches that should serve to carry surface water away from the road prism. Based on a review of aerial photographs, this section of Victor Road appears to be lined by a 20 to 30-foot corridor of maintained grasses and small brush. A dense stand of native spruce and birch forest remains at the southern end of Victor Road between Campbell Lake and 100th Avenue.

3.3 Significant Man-Made and Natural Features

The area surrounding the project location is chiefly developed with residential housing and related infrastructure. A large warehouse store exists at the northern end of Victor Road at Dimond Boulevard. Aerial photographs also show a powerline running parallel to the roadway approximately 40 feet west of centerline. The eastern edge of Campbell Lake parallels approximately the middle third of Victor Road about 500 feet west of centerline.

3.4 Regional Geology and Seismicity

Approximately two major glaciation events have occurred in the upper Cook Inlet within the last 75,000 years. During the Knik Glaciation (30,000 to 75,000 years ago), thick sequences of sediment, known as the Knik Ground Moraine, were deposited as glaciers retreated. These deposits extend from the Eagle River Valley to Point Woronzof and can be observed in the Eagle River channel and south of Fort Richardson in the Anchorage Bowl area. The Naptowne Glaciation (11,000 to 30,000 years ago) is responsible for the majority of glacial deposits currently encountered in the Anchorage area. At its maximum, the Naptowne Glaciation extended across the Anchorage Bowl area from the north and terminated at Point Woronzof and Point Campbell.

The project region is one of the most seismically active areas in the U.S. and historically subjected to large earthquakes. The driving force behind this high seismicity is the relatively nearby Aleutian-Alaska Megathrust, a small part of the Circum-Pacific Earthquake Belt, that marks the upper collision boundary between the North American and Pacific tectonic plates. The boundary extends from east of the Kenai Peninsula and west along the Aleutian Islands approximately 2,300 miles (3,701 km). Within the Anchorage region, two shallow crustal faults have been identified that may present significant ground motion. They are the Castle Mountain Fault and the Border Ranges Fault zone.

The Castle Mountain Fault has been mapped over a total length of approximately 295 miles (475 km). The fault trends east-northeast/west-southwest approximately parallel to the northwest shore of the Cook Inlet. At its closest approach, it is about 30 miles (48 km) northwest of the Anchorage. Evidence of Holocene (11,000 years before present [ybp]) displacement has been observed along a 50 mile (80 km) long portion of the fault in the Susitna lowland north of Anchorage.

Using Slemmons (1982) relationship between maximum earthquake magnitude and source parameters (maximum surface rupture length, total length, fault area, or displacement per event), Woodward-Clyde Consultants (1982) have estimated the maximum magnitude for the Castle Mountain Fault to be about 7.5. Assuming an average slip rate of approximately 5 millimeters per year (mm/yr), they also estimate the average recurrence interval for a maximum magnitude 7.5 seismic event to be approximately 235 years. Wesson, et al. (1999) in their probabilistic ground motion hazard study for the State of Alaska also determined that a likely maximum magnitude for this fault is about 7.5, but they used a slip rate of 0.5 mm/yr to estimate a recurrence rate of 1,300 years.

The Border Ranges Fault is mapped as a north-dipping reverse fault separating upper Paleozoic and lower Mesozoic rocks on the north from Upper Mesozoic and Tertiary rocks on the south. The fault can be traced approximately 620 miles (1,000 km) northeastward from Kodiak Island, across the Kenai Peninsula, and along the northern front of the Chugach Mountains. Investigations pertaining to the activity of the Border Ranges Fault zone are still in progress and there is no means to directly assess its earthquake potential. However, if the Border Ranges Fault is part of the same tectonic system as the Castle Mountain Fault, then a similar maximum magnitude (i.e., M_s 7.5) and recurrence interval (i.e., hundreds to a few thousand years) could be likely.

3.5 Site Geology

A localized geologic map of Anchorage and vicinity by the USGS shows the Bootlegger Cove Formation as the major geologic unit underlying the project area. The Bootlegger Cove Formation was formed during the Naptowne Glaciation in the ice-free areas of the basin starting around 18,000 years ago. The formation is generally considered an unconsolidated glacial lake deposit consisting mainly of clay and silt with localized gravel, cobbles, and boulders.

Interbedded, fine sands are also common within the unit as a result of the complex fluvial environment related to the glacial retreat. It ranges in thickness from 60 to 200 feet.

4.0 FIELD INVESTIGATION

A total of 19 borings were reviewed during our analysis, 16 from the 1994 Shannon & Wilson report, and 3 from the 1985 HLA report. Detailed logs of each boring are included in Appendix A and their approximate locations are plotted on the site map included as Figure 2.

4.1 Explorations

On Figure 2, Shannon & Wilson borings are designated SWB-1 through SWB-17, and Harding Lawson Associates borings are labeled HLAB-2 through HLAB-4. Note that SWB-4 was excluded from the 1994 explorations because of a utility conflict and SWB-12 and SWB-16 were designated 12A and 16A, respectively, after they were moved from planned locations to avoid buried utilities. Between both investigations, the borings ranged in depth from 13 to 21.5 feet with a majority of them being advanced to 16.5 feet below the ground surface (bgs). The boring locations marked on Figure 2 were approximated from site maps included in each of the two previous reports and should be considered approximate.

The soils encountered during each of the previous explorations were visually classified in the field using the Unified Soil Classification System that is presented on Figure 3. The soil classifications were then verified through selective laboratory analysis. Detailed logs of the borings from each report have been reproduced and are presented in Appendix A.

4.2 Drilling and Sampling

According to the previous reports, drilling services for each of the projects were provided by local drilling contractors using conventional drilling equipment. The borings were advanced with $3^{1}/_{4}$-inch inside diameter, continuous flight, hollow-stem augers. For the Shannon & Wilson and HLA borings, samples were typically recovered with a 2-inch outer diameter split spoon sampler using Standard Penetration Test Procedures. In this test, samples are recovered by driving the sampler into the bottom of the advancing hole with blows of a 140-lb hammer free falling 30 inches onto the drilling rod. The number of blows required to advance the sampler the final 12 inches of an 18-inch penetration is termed the Standard Penetration Resistance, which was recorded for each sample. According to the HLA 1985 report, several samples were taken using modified penetration resistance procedures. The modification in sampling procedures consisted of using a 2.5-inch inner diameter split spoon and a 300-lb hammer. Blow count values are shown graphically on the boring logs adjacent to the sample depth and give a measure of the relative density (compactness) or consistency (stiffness) of cohesionless or cohesive soils, respectively. HLA samples obtained using modified sampling procedures are marked with an asterisk.

4.3 Laboratory Testing

According to each of the previous reports, laboratory tests were performed on select samples recovered from the borings to calibrate field classifications and to determine the index properties of the typical materials encountered at the site. According to the Shannon & Wilson 1994 report, samples acquired during explorations were tested for moisture content and grain size distribution using ASTM D-2216 and ASTM D-422 testing procedures, respectively. Testing procedures and results for samples taken from the HLA borings were not evident in the 1985 report. Moisture content test results for Shannon & Wilson’s borings are presented on the logs in Appendix A. Grain size classification results from the Shannon & Wilson 1994 report are included in Appendix B. A Laboratory Results Summary Table is also included in Appendix B as Figure B-1.

5.0 SUBSURFACE CONDITIONS

The subsurface conditions at the site are depicted graphically on the boring logs in Appendix A. According to the Shannon & Wilson 1994 and HLA 1985 reports, the subsurface conditions over the project area were relatively uniform. Borings in the existing road prism encountered granular fills. Borings outside the road prism generally encountered medium stiff to stiff, native, sandy and clayey silts.

Previous explorations in 1994 reveal that the pavement thickness on Victor Road ranged from 3 to 6 inches. Most of the Shannon & Wilson borings advanced through the asphalt encountered a layer of medium dense to dense, granular fill that, on average, was around 4 feet thick. According to laboratory tests, the fill material consisted of sandy gravel and gravelly sand. Most of the road base fill material was relatively clean to slightly silty (based on field visual/manual classification methods). However, some areas were encountered where the fill soils contained significantly larger amounts of silt as in Borings SWB-7 and SWB-11. In addition, in several borings, scattered organics were encountered at the lower limits of the fill sections and Boring SWB-16A encountered significant amounts of peat and wood intermixed with soft silt from 5.5 to 10 feet bgs. It is our opinion that the scattered organic matter found in these borings is organic material that was not completely removed before the original construction of Victor Road, or originated with organics that were allowed to contaminate fills during construction. Fills that were relatively clean had relatively low moisture contents around 3 to 5 percent with slightly elevated moisture contents in the siltier fills.

Beneath the fill layer encountered by the Shannon & Wilson borings, native soils were encountered. These soils were relatively uniform over the project site and consisted of mostly medium stiff to very stiff, sandy silt with isolated areas of clayey silt, and silty sand. Because of the silt content of this material, it is classified as highly frost susceptible (F4) soil. According to laboratory tests, moisture content values of the native material averaged around 20 to 25 percent. The three HLA borings included in this study are in general accordance with the findings from the Shannon & Wilson field program.

Groundwater was encountered in Boring SWB-12A at 11 feet bgs and perched water was found at 5 feet bgs in Boring SWB-16A. Groundwater was also encountered in the three HLA borings at depths ranging from 1.5 to 7.5 feet bgs. Although little groundwater was encountered by the Shannon & Wilson field program, it is our opinion that the likelihood that water will be encountered during the construction of the proposed improvements is relatively high. We understand there are several springs on the residential properties between Victor Road and Campbell Lake. Both drilling programs were conducted in the month of June, a time when we would anticipate groundwater levels to be shallower than in other times of the year. Water levels may fluctuate a few feet from season to season and surface water that migrates into the subgrade will likely perch on top of the relatively impermeable native soils.

6.0 LIMITATIONS

This report was prepared for the exclusive use of our client and their representatives for evaluating the site as it relates to the geotechnical aspects discussed herein. The conclusions contained in this report are based on information provided from the observed site conditions and other conditions described herein. The analyses, conclusions and recommendations contained in this report are based on site conditions as they existed at the time of the explorations. It is assumed that the exploratory borings are representative of the subsurface conditions throughout the site, i.e., the subsurface conditions everywhere are not significantly different from those disclosed by the explorations.

If, during construction, subsurface conditions different from those encountered in these and prior explorations are observed or appear to be present, Shannon & Wilson, Inc. should be advised at once so that these conditions can be reviewed and recommendations can be reconsidered where necessary. If there is a substantial lapse of time between the submittal of this report and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or adjacent to the site, it is recommended that this report be reviewed to determine the applicability of the conclusions and recommendations considering the changed conditions and time lapse.

We recommend that we be retained to review those portions of the plans and specifications pertaining to earthwork and foundations to determine if they are consistent with our recommendations. In addition, we should be retained to observe construction, particularly the installation of shoring and site excavations, preparation of subgrade for footing foundations and compaction of structural fill, and also to make field measurements of ground displacements and such other field observations as may be necessary.

Unanticipated soil conditions are commonly encountered and cannot fully be determined by merely taking soil samples or advancing borings. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs. Shannon & Wilson has prepared the attachment in Appendix C *Important Information About Your Geotechnical/Environmental Report* to assist you and others in understanding the use and limitations of the reports.

Copies of documents that may be relied upon by our client are limited to the printed copies (also known as hard copies) that are signed or sealed by Shannon & Wilson with a wet, blue ink signature. Files provided in electronic media format are furnished solely for the convenience of the client. Any conclusion or information obtained or derived from such electronic files shall be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, or you question the authenticity of the report please contact the undersigned.

We appreciate this opportunity to be of service. Please contact the undersigned at (907) 561-2120 with questions or comments concerning the contents of this report.

Sincerely,

SHANNON & WILSON, INC.

Prepared by:

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Reviewed by:

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Vice President

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Kyle Brennan
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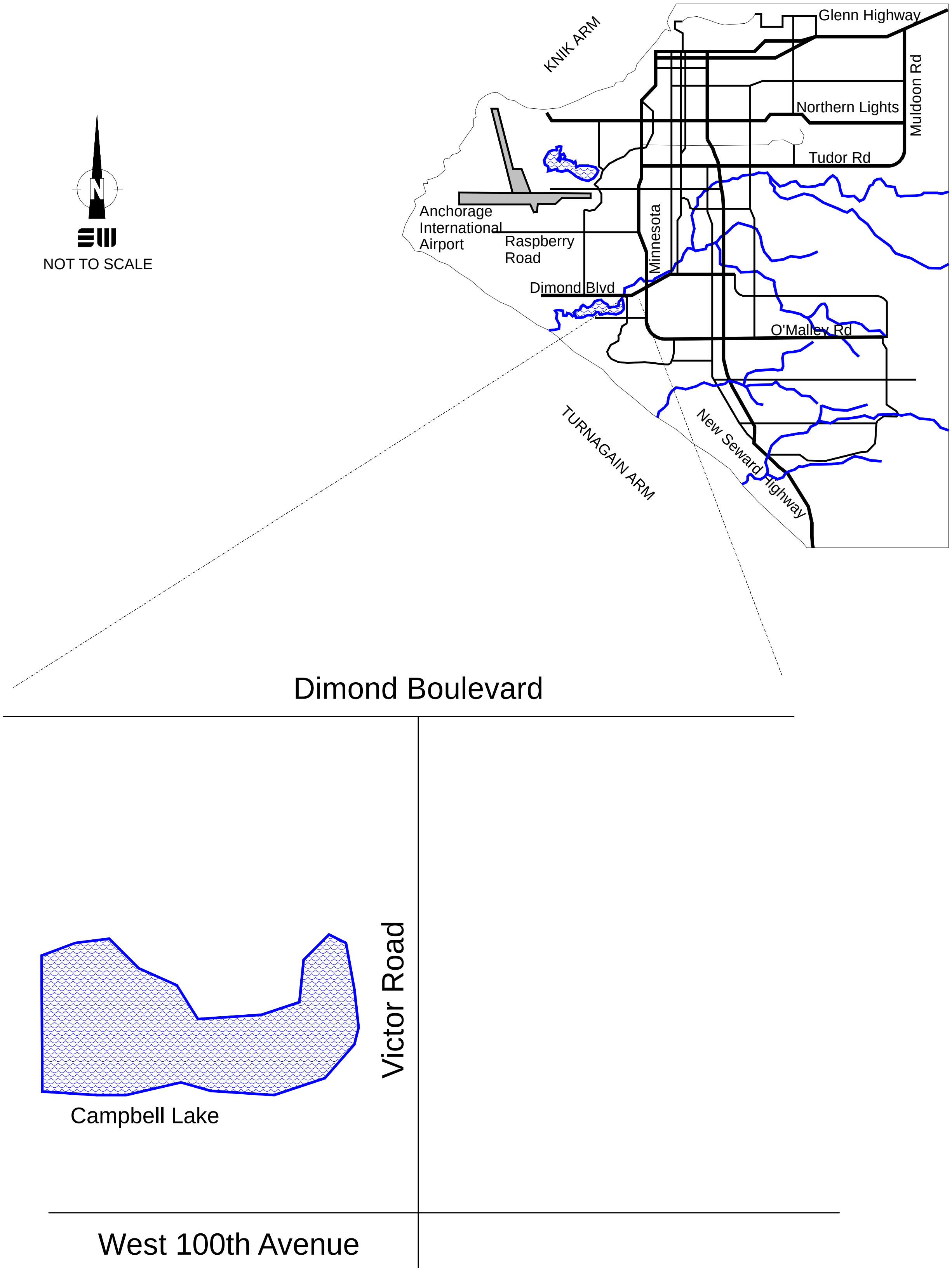
REGISTERED PROFESSIONAL ENGINEER



Victor Road Reconstruction
Anchorage, Alaska

VICINITY MAP

December 2007
32-1-01870

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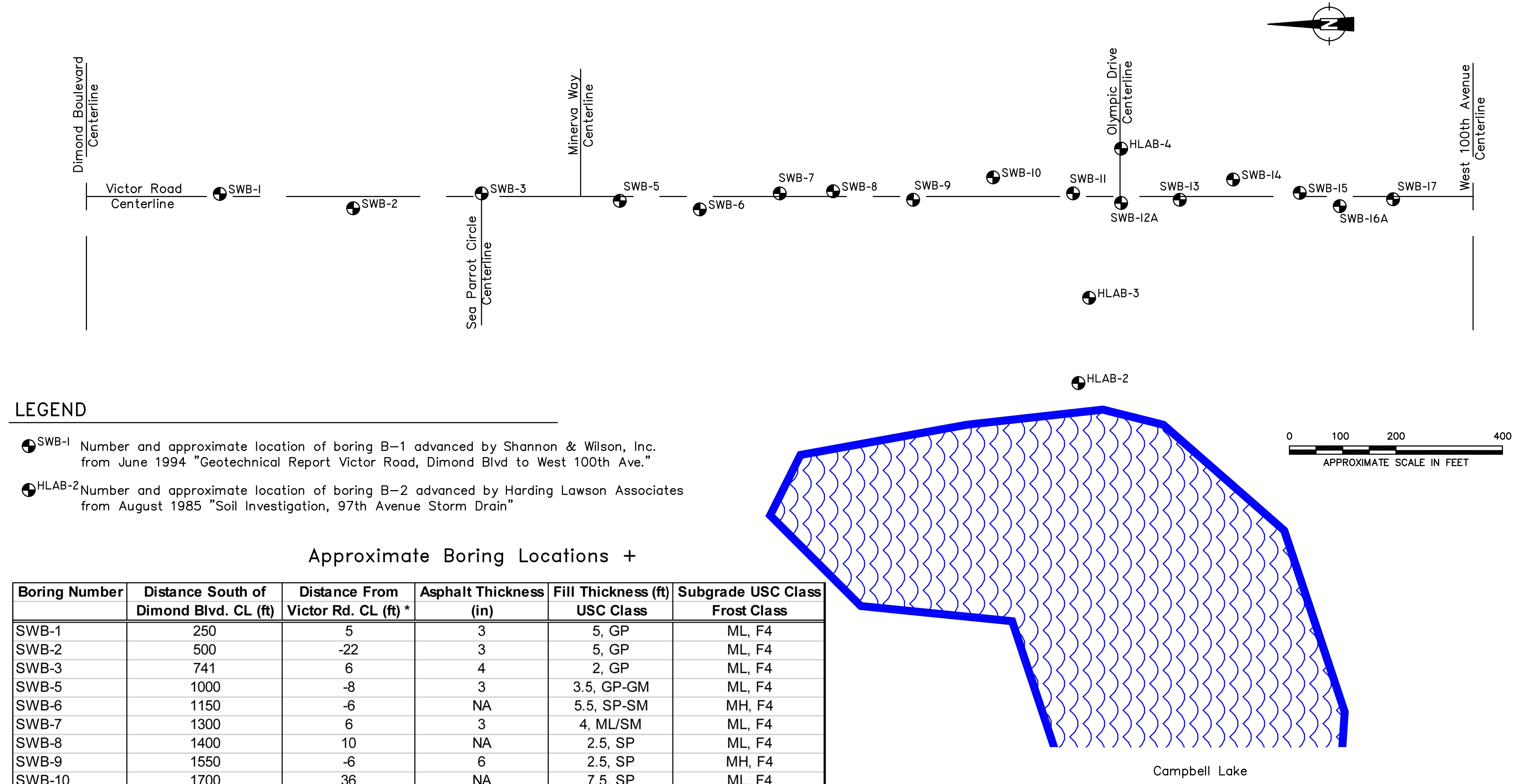
Fig. 1



LEGEND

⊕ SWB-1 Number and approximate location of boring B-1 advanced by Shannon & Wilson, Inc. from June 1994 "Geotechnical Report Victor Road, Dimond Blvd to West 100th Ave."

⊕ HLAB-2 Number and approximate location of boring B-2 advanced by Harding Lawson Associates from August 1985 "Soil Investigation, 97th Avenue Storm Drain"

Approximate Boring Locations +

Boring Number	Distance South of Dimond Blvd. CL (ft)	Distance From Victor Rd. CL (ft) *	Asphalt Thickness (in)	Fill Thickness (ft) USC Class	Subgrade USC Class Frost Class
SWB-1	250	5	3	5, GP	ML, F4
SWB-2	500	-22	3	5, GP	ML, F4
SWB-3	741	6	4	2, GP	ML, F4
SWB-5	1000	-8	3	3.5, GP-GM	ML, F4
SWB-6	1150	-6	NA	5.5, SP-SM	MH, F4
SWB-7	1300	6	3	4, ML/SM	ML, F4
SWB-8	1400	10	NA	2.5, SP	ML, F4
SWB-9	1550	-6	6	2.5, SP	MH, F4
SWB-10	1700	36	NA	7.5, SP	ML, F4
SWB-11	1850	6	3	5, ML/SM	MH, F4
SWB-12A	1940	-12	NA	2.5, ML/SM	GP, F2
SWB-13	2050	-6	5	5.5, ML	ML, F4
SWB-14	2150	32	NA	5.5, GP	ML, F4
SWB-15	2275	7	4	2.5, SP	ML, F4
SWB-16A	2350	-18	NA	5.5, SP	MH/PEAT, F4
SWB-17	2450	-5	4	5, GP	MH, F4
HLAB-2	1860	-350	NA	4, SM	SP, F1
HLAB-3	1880	-190	NA	1, SM	ML/PEAT, F4
HLAB-4	1940	90	NA	NA	ML/PEAT, F4

* Negative distance denotes Westerly offset

\+ Locations measured relative to existing roadway centerlines in the field with a surveyor's wheel.

Victor Road Reconstruction
Anchorage, Alaska

SITE PLAN

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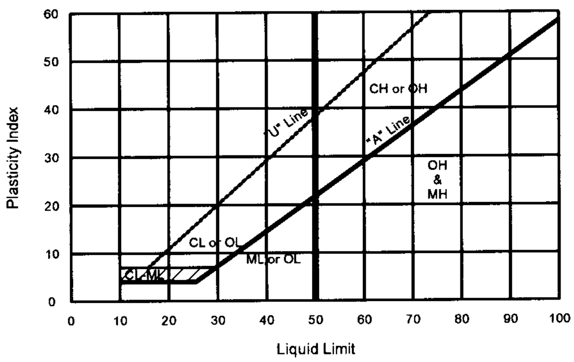
FIG. 2

Unified Soil Classification System

GROUP NAME **Criteria for Assigning Group Names and Group Symbols**			**Soil Classification Group Symbol with Generalized Group Descriptions**	
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	Clean GRAVELS Less than 5% fines	GW	Well-graded Gravels
			GP	Poorly-graded Gravels
		GRAVELS with fines More than 12% fines	GM	Gravel & Silt Mixtures
			GC	Gravel & Clay Mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	Clean SANDS Less than 5% fines	SW	Well-graded Sands
			SP	Poorly-graded Sands
		SANDS with fines More than 12% fines	SM	Sand & Silt Mixtures
			SC	Sand & Clay Mixtures
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve	SILTS AND CLAYS Liquid limit 50% or less	INORGANIC	ML	Non-plastic & Low-plasticity Silts
			CL	Low-plasticity Clays
		ORGANIC	OL	Non-plastic and Low-plasticity Organic Clays Non-plastic and Low-plasticity Organic Silts
	SILTS AND CLAYS Liquid limit greater than 50%	INORGANIC	CH	High-plasticity Clays
			MH	High-plasticity Silts
		ORGANIC	OH	High-plasticity Organic Clays High-plasticity Organic Silts
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT	Peat

PLASTICITY CHART



Descriptive Terminology Denoting Component Proportions

Description	Range of Proportion
Add the adjective "slightly"	5 - 12%
Add soil adjective[(a)]	12 - 50%
Major proportion in upper case, (e.g., SAND)	>50%

(a) Use gravelly, sandy, or silty as appropriate

NOTE: The soil descriptions used in the boring logs lists constituents from smallest percentage to largest percentage.

Victor Road Reconstruction
Anchorage, Alaska

SOIL CLASSIFICATION LEGEND

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Fig. 3

APPENDIX A

BORING LOGS BY SHANNON & WILSON, INC. AND OTHERS

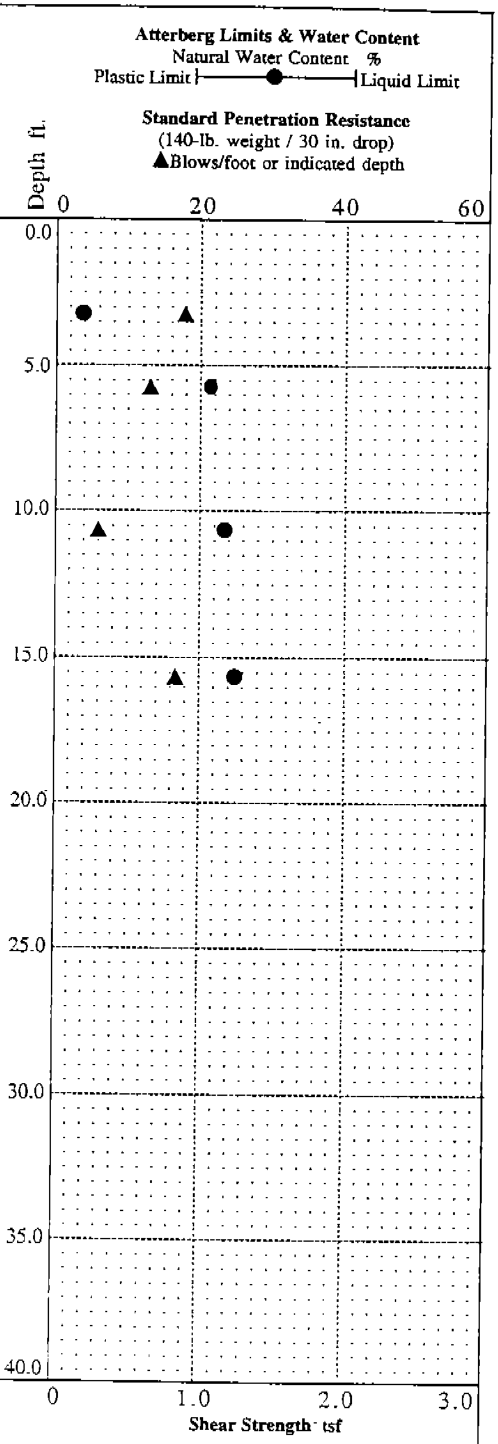
Figures 2 through 17	Shannon & Wilson, Inc. Log of Borings B-1 through B-17
Plates 2 and 3	Harding Lawson Associates Log of Borings 1 through 4

Surface Elevation: Top of Asphalt

Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
3" asphalt. Medium dense, brown, sandy GRAVEL, moist.	5.0		1	
Medium dense, brown, slightly gravelly, sandy SILT, moist.	7.0		2	
Loose, brown, sandy SILT, moist.	10.5			
Loose, gray, clayey SILT, moist.	16.5		3 4	

Bottom of Boring
Boring Completed 6/7/94

No Groundwater Encountered.



Legend

- Ⅱ 3" O.D. thin-wall sample
- I 2" O.D. split-spoon sample
- ▨ continuous sample
- REC% RQD% ☒ Rock core sample
- ■ Grab sample
- Impervious seal
- ▽ 0hr Water level at indicated number of hours after drilling
- Piezometer tip

Method of Measurement
- ○ Unconfined Compression
- △ Unconsolidated - Undrained triaxial compression
- ◇ Torvane
- ☐ Pocket Penetrometer

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-1

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VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

A-587

Fig. 2

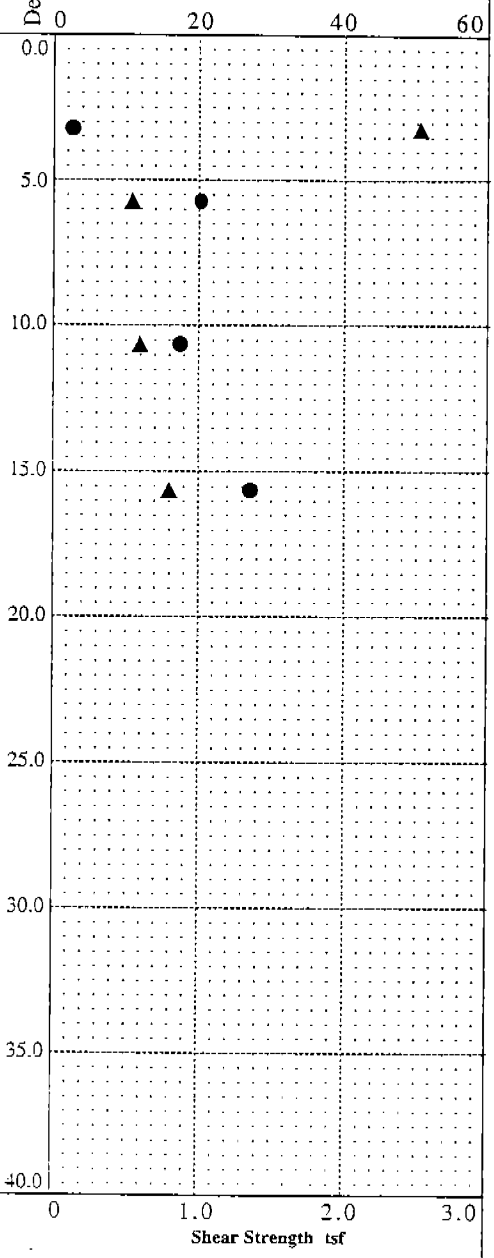
Soil Description

Surface Elevation: Top of Asphalt

Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
3" asphalt. Dense, brown, sandy GRAVEL, moist to dry; frequent 3"+ cobbles.			1	
Loose, gray, sandy SILT, moist; numerous wood and peat.	5.0		2	
Loose, brown sandy, gravelly SILT, moist.	10.0		3	
Loose, gray, clayey SILT, moist.	12.0		4	
Bottom of Boring Boring Completed 6/7/94 No Groundwater Encountered.	16.5			

Atterberg Limits & Water Content
Natural Water Content %
Plastic Limit ├──●──┤ Liquid Limit

Standard Penetration Resistance
(140-lb. weight / 30 in. drop)
▲ Blows/foot or indicated depth



Legend

- 3" O.D. thin-wall sample
- 2" O.D. split-spoon sample
- continuous sample
- REC% RQD% ☒ Rock core sample
- ■ Grab sample
- Impervious seal
- ▽ 0hr Water level at indicated number of hours after drilling
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Method of Measurement

- ○ Unconfined Compression
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- ◇ Torvane
- ☐ Pocket Penetrometer

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-2

SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

A-587

Fig. 3

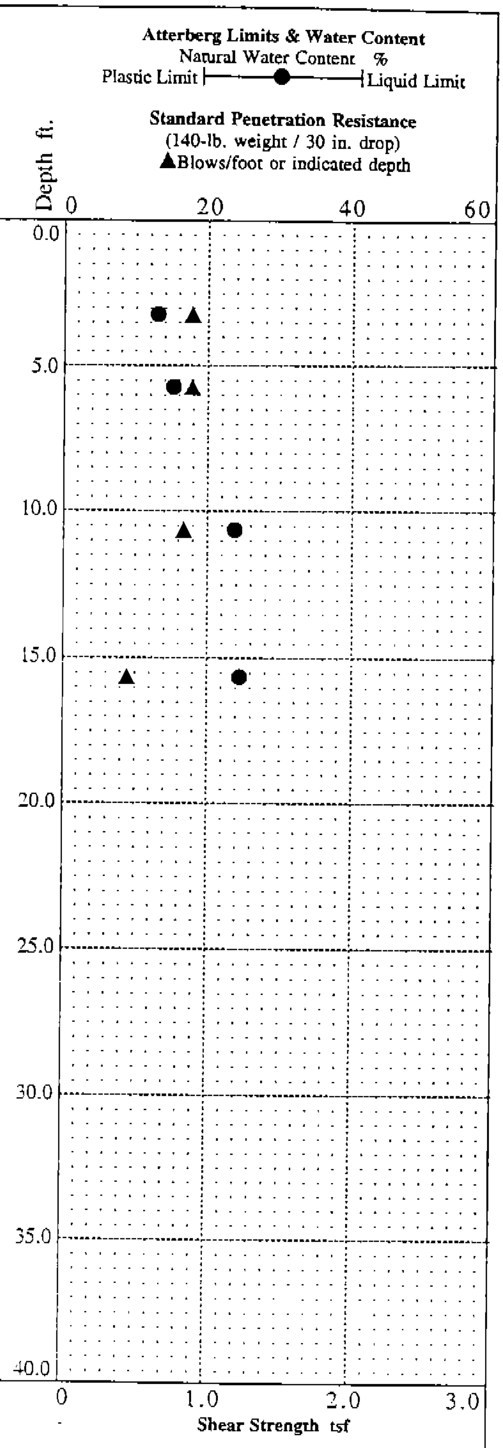
Soil Description

Surface Elevation: Top of Asphalt

Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
4" asphalt. Medium dense, brown, sandy GRAVEL, moist.	2.0			
Medium dense, gray/brown sandy SILT, moist.	5.0		1	
Loose, gray, slightly sand SILT, moist.	7.0		2	
Medium dense to loose, gray clayey SILT, moist.	16.5		3 4	

Bottom of Boring
Boring Completed 6/7/94

No Groundwater Encountered.



Legend

- 3" O.D. thin-wall sample
- 2" O.D. split-spoon sample
- continuous sample
- REC% RQD% Rock core sample
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- Water level at indicated 0hr number of hours after drilling
- Piezometer tip

Method of Measurement
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Log of Boring B-3

SHANNON & WILSON, INC.
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VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

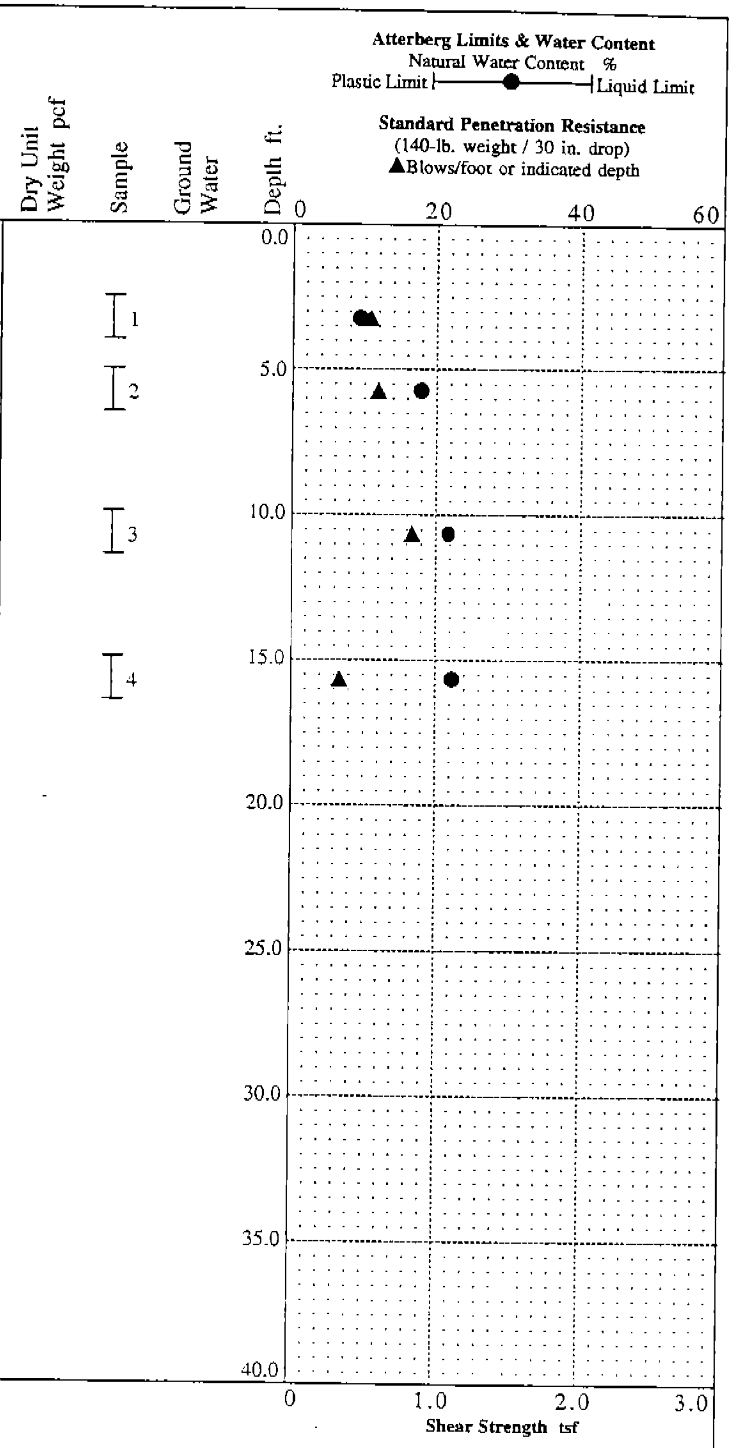
A-587

Fig. 4

Soil Description Surface Elevation: Top of Asphalt	Depth ft.
3" asphalt. Loose to medium dense, brown, slightly silty, sandy GRAVEL, moist; occassional root fibers.	3.5
Medium dense, gray, slightly sandy SILT, moist.	6.0
Medium dense to loose, gray clayey SILT, moist to wet.	16.5

Bottom of Boring
Boring Completed 6/7/94

No Groundwater Encountered.



Legend

Ⅱ 3" O.D. thin-wall sample
I 2" O.D. split-spoon sample
▨ continuous sample
REC% RQD% ☒ Rock core sample
■ Grab sample

Impervious seal
∇ 0hr Water level at indicated number of hours after drilling
Piezometer tip

Method of Measurement
○ Unconfined Compression
△ Unconsolidated - Undrained triaxial compression
◇ Torvane
☐ Pocket Penetrometer

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-5

SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

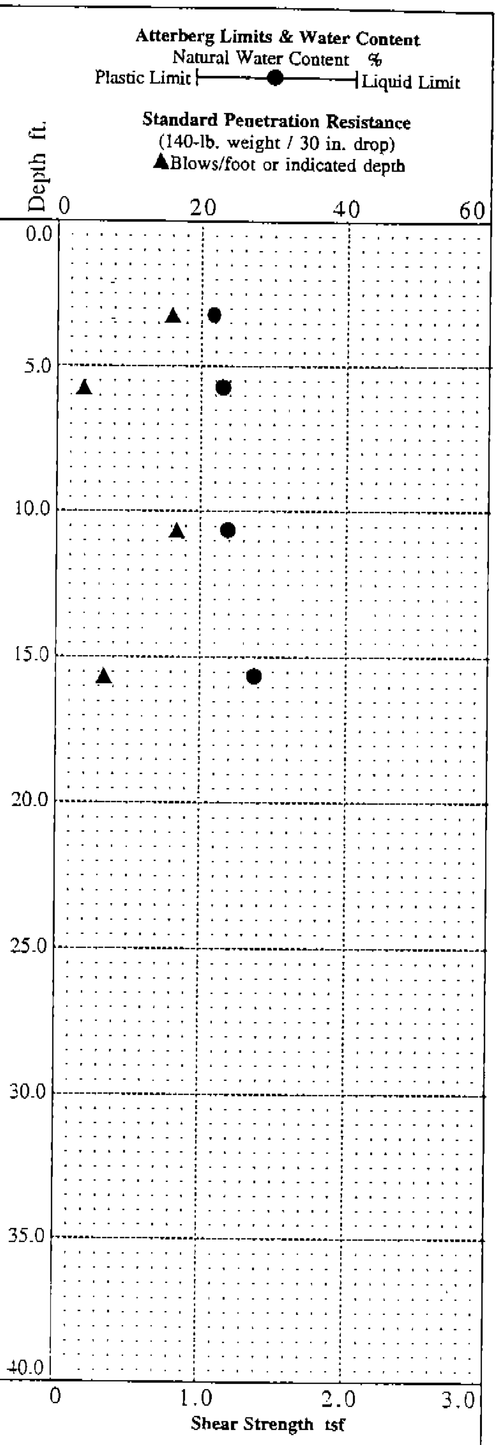
A-587

Fig. 5

Soil Description

Surface Elevation: Grade

Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
Grass and topsoil. Medium dense, brown, slightly silty, SAND, moist.			1	
Very loose to medium dense, gray, slightly sandy, clayey SILT, moist; with layers of sandy silt.	5.5		2 3 4	
Bottom of Boring Boring Completed 6/7/94 No Groundwater Encountered.	16.5			



Legend

- 3" O.D. thin-wall sample
- 2" O.D. split-spoon sample
- continuous sample
- REC% RQD% ☒ Rock core sample
- ■ Grab sample
- Impervious seal
- ▽ 0hr Water level at indicated number of hours after drilling
- Piezometer tip

Method of Measurement

- ○ Unconfined Compression
- △ Unconsolidated - Undrained triaxial compression
- ◇ Torvane
- ☐ Pocket Penetrometer

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-6

SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

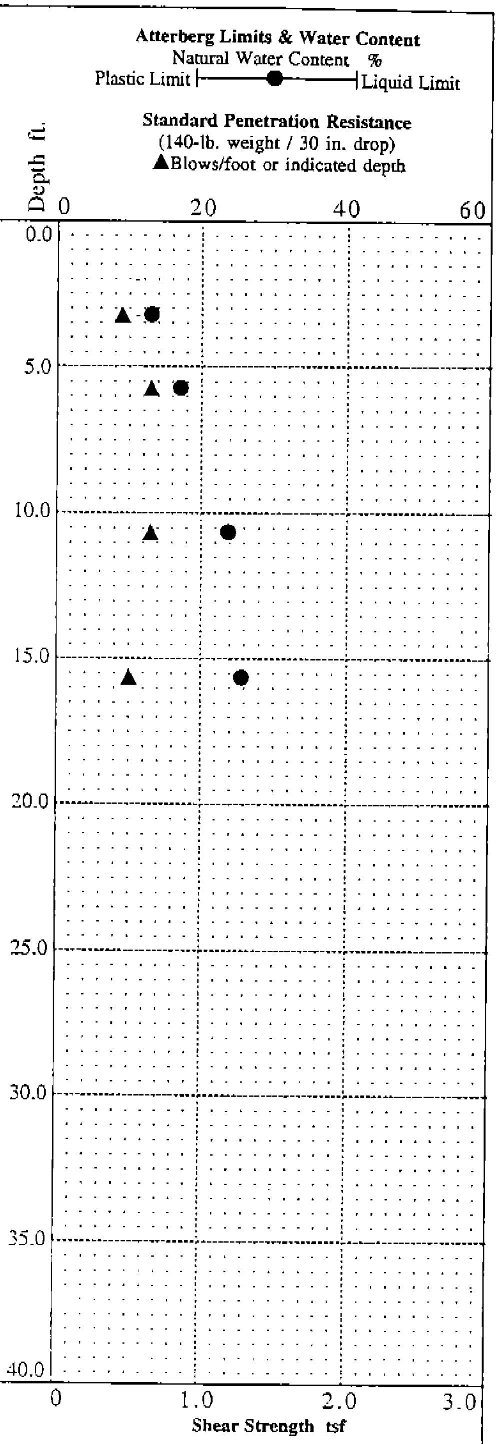
A-587

Fig. 6

Soil Description

Surface Elevation: Top of Asphalt

Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
3" Asphalt. Medium dense to loose, gray/brown, SILT and SAND, moist; trace organics.			1	
Medium dense, brown/trace gray, clayey SILT, moist.	4.0		2	
Medium dense to loose, gray clayey SILT, moist.	10.7		3 4	
Bottom of Boring Boring Completed 6/7/94 No Groundwater Encountered.	16.5			



Legend

- 3" O.D. thin-wall sample
- 2" O.D. split-spoon sample
- continuous sample
- REC% RQD% Rock core sample
- Grab sample
- Impervious seal
- ▽ 0hr Water level at indicated number of hours after drilling
- Piezometer tip

Method of Measurement

- ○ Unconfined Compression
- △ Unconsolidated - Undrained triaxial compression
- ◇ Torvane
- ☐ Pocket Penetrometer

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-7

SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

A-587

Fig. 7

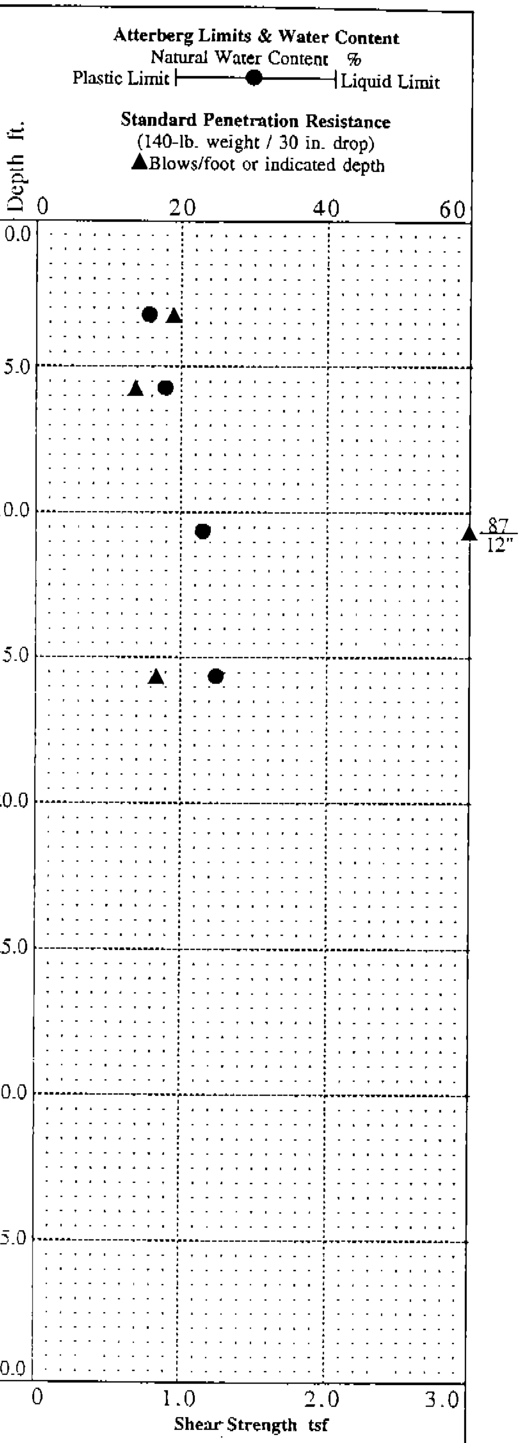
Soil Description

Surface Elevation: Shoulder of Roadway.

Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
Off the edge asphalt. Medium dense, brown, gravelly SAND.	2.5			
Medium dense, brown/gray, gravelly, sandy SILT, moist.	5.0		1	
Medium dense, gray and brown sandy SILT, moist; scattered wood chips.	10.0		2	
Drove Rock, brown SILT, moist.	12.0		3	
Medium dense, gray clayey SILT, moist.	16.5		4	

Bottom of Boring
Boring Completed 6/7/94

No Groundwater Encountered.



Legend

- 3" O.D. thin-wall sample
- 2" O.D. split-spoon sample
- continuous sample
- REC% RQD% ☒ Rock core sample
- ■ Grab sample
- Impervious seal
- ▽ 0hr Water level at indicated number of hours after drilling
- Piezometer tip

Method of Measurement

- ○ Unconfined Compression
- △ Unconsolidated - Undrained triaxial compression
- ◇ Torvane
- ☐ Pocket Penetrometer

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-8

SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

A-587

Fig. 8

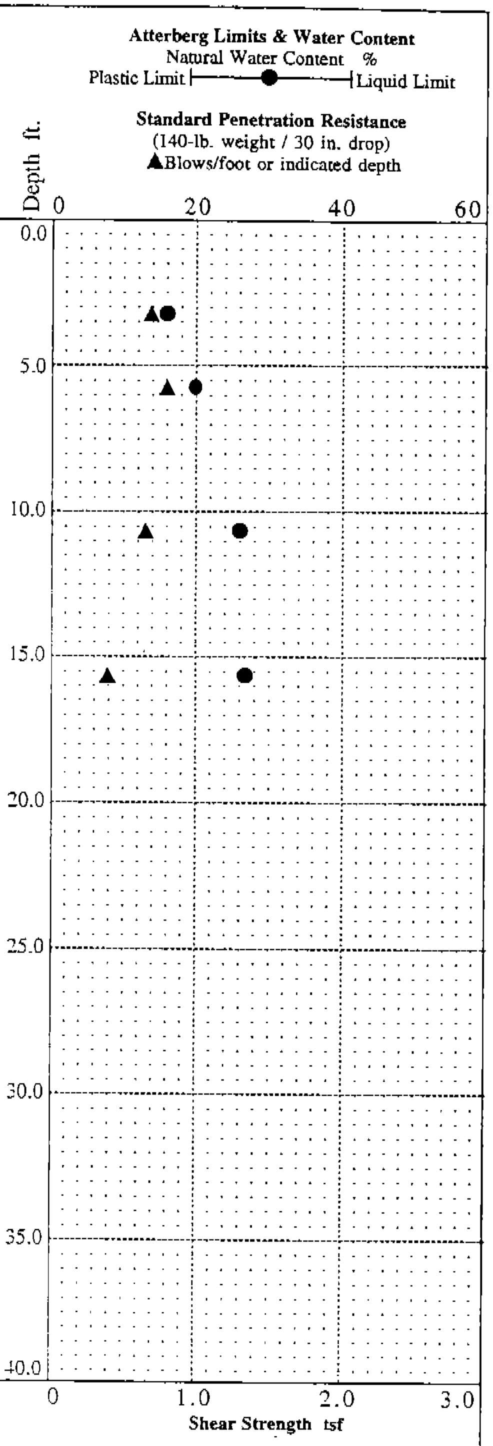
Soil Description

Surface Elevation: Top of Asphalt

Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
6" asphalt. Medium dense, brown, gravelly SAND.	2.5		1	
Medium dense, mixed brown/gray SILT, moist to dry.	5.0		2	
Medium dense, gray and brown sandy SILT, moist.	7.0			
Medium dense to loose, gray clayey SILT, moist.	16.5		3 4	

Bottom of Boring
Boring Completed 6/7/94

No Groundwater Encountered.



Legend

- 3" O.D. thin-wall sample
- 2" O.D. split-spoon sample
- continuous sample
- REC% RQD% Rock core sample
- Grab sample
- Impervious seal
- ▽ 0hr Water level at indicated number of hours after drilling
- Piezometer tip

Method of Measurement
- ○ Unconfined Compression
- △ Unconsolidated - Undrained triaxial compression
- ◇ Torvane
- ☐ Pocket Penetrometer

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-9

SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

A-587

Fig. 9

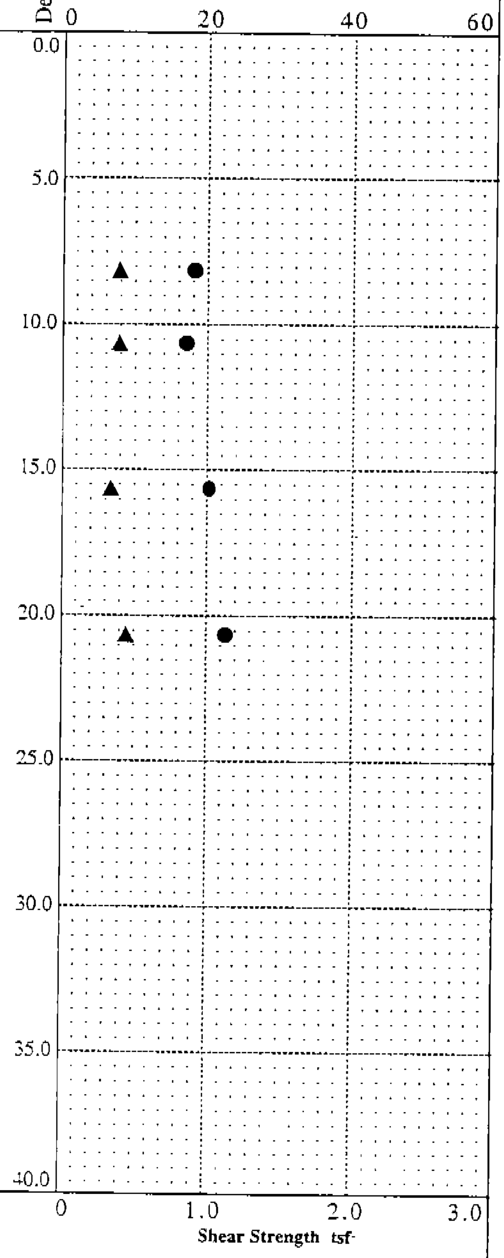
Soil Description

Surface Elevation: Bike path above road grade.

Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
Grass and Topsoil. Medium dense, brown, gravelly SAND.				
Loose, brown layered Sand and sandy SILT, moist.	7.5		1	
Loose, gray and brown sandy SILT, moist.	10.0		2	
Loose, gray clayey SILT, moist.	15.0		3 4	
Bottom of Boring Boring Completed 6/8/94 No Groundwater Encountered.	21.5			

Atterberg Limits & Water Content
Natural Water Content %
Plastic Limit ├───●───┤ Liquid Limit

Standard Penetration Resistance
(140-lb. weight / 30 in. drop)
▲Blows/foot or indicated depth



Method of Measurement
○ Unconfined Compression
△ Unconsolidated - Undrained triaxial compression
◇ Torvane
☐ Pocket Penetrometer

Legend

- 3" O.D. thin-wall sample
- 2" O.D. split-spoon sample
- continuous sample
- REC% RQD% ☒ Rock core sample
- ■ Grab sample
- Impervious seal
- ▽ 0hr Water level at indicated number of hours after drilling
- Piezometer tip

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-10

SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

A-587

Fig. 10

Soil Description

Surface Elevation: Top of Asphalt

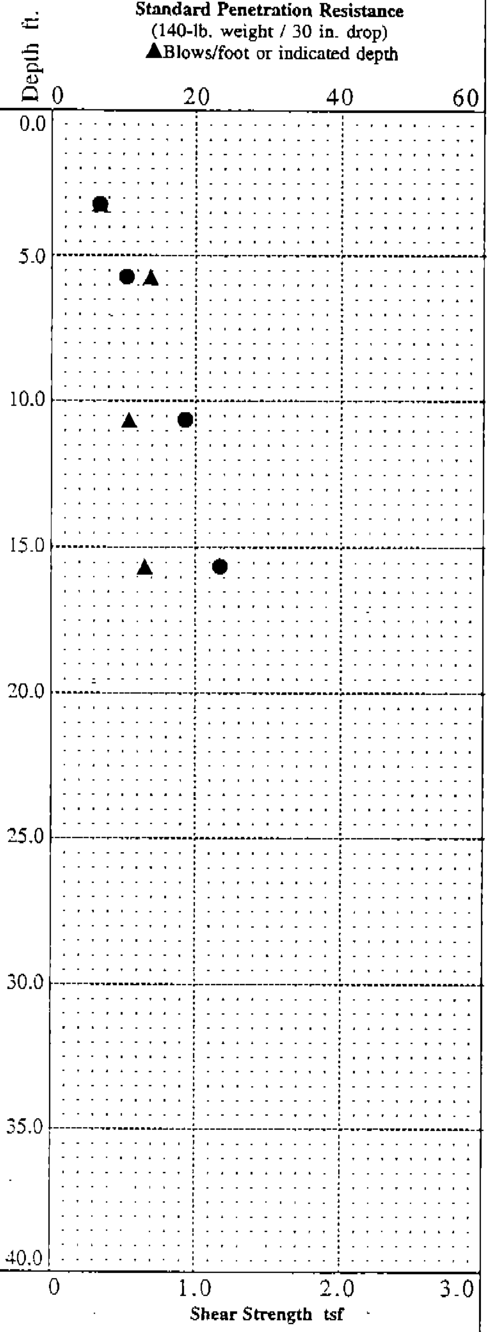
Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
3" asphalt. Medium dense to loose, brown, gravelly SAND and SILT, moist.	5.0		1	
Medium dense, gray and brown sandy SILT, moist.	5.8		2	
Medium dense, gray/tan clayey SILT, moist.	10.0			
Medium dense, gray clayey SILT, moist to wet.	16.5		3 4	

Bottom of Boring
Boring Completed 6/8/94

No Groundwater Encountered.

Atterberg Limits & Water Content
Natural Water Content %
Plastic Limit ├──●──┤ Liquid Limit

Standard Penetration Resistance
(140-lb. weight / 30 in. drop)
▲ Blows/foot or indicated depth



Method of Measurement
○ Unconfined Compression
△ Unconsolidated - Undrained triaxial compression
◇ Torvane
☐ Pocket Penetrometer

Legend

Ⅱ 3" O.D. thin-wall sample
Ⅰ 2" O.D. split-spoon sample
▨ continuous sample
REC% RQD% ☒ Rock core sample
█ Grab sample

Impervious seal
▽ 0hr Water level at indicated number of hours after drilling
Piezometer tip

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-11

SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

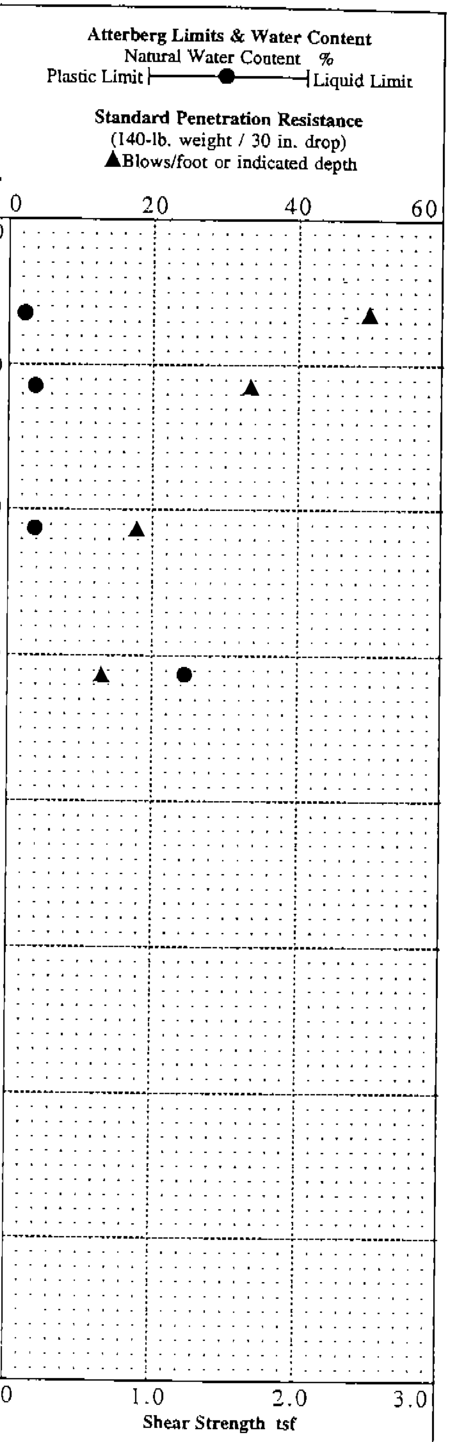
A-587

Fig. 11

Soil Description

Surface Elevation: Grade of Roadway

Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water	Depth ft.
Brown, gravelly SAND and SILT, moist.					0.0
Very dense to dense, gray silty, sandy GRAVEL, moist; frequent 3 to 4 inch cobbles.	2.5		1		
			2		5.0
			3	∇ During Drilling.	10.0
Medium dense, gray clayey SILT, moist to wet.	15.0		4		15.0
Bottom of Boring Boring Completed 6/17/94 Groundwater Encountered at 11 feet.	16.5				
					20.0
					25.0
					30.0
					35.0
					40.0



Method of Measurement
○ Unconfined Compression
△ Unconsolidated - Undrained triaxial compression
◇ Torvane
☐ Pocket Penetrometer

Legend

3" O.D. thin-wall sample
2" O.D. split-spoon sample
continuous sample
REC% / RQD% ☒ Rock core sample
■ Grab sample

Impervious seal
∇ 0hr Water level at indicated number of hours after drilling
Piezometer tip

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-12A

SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

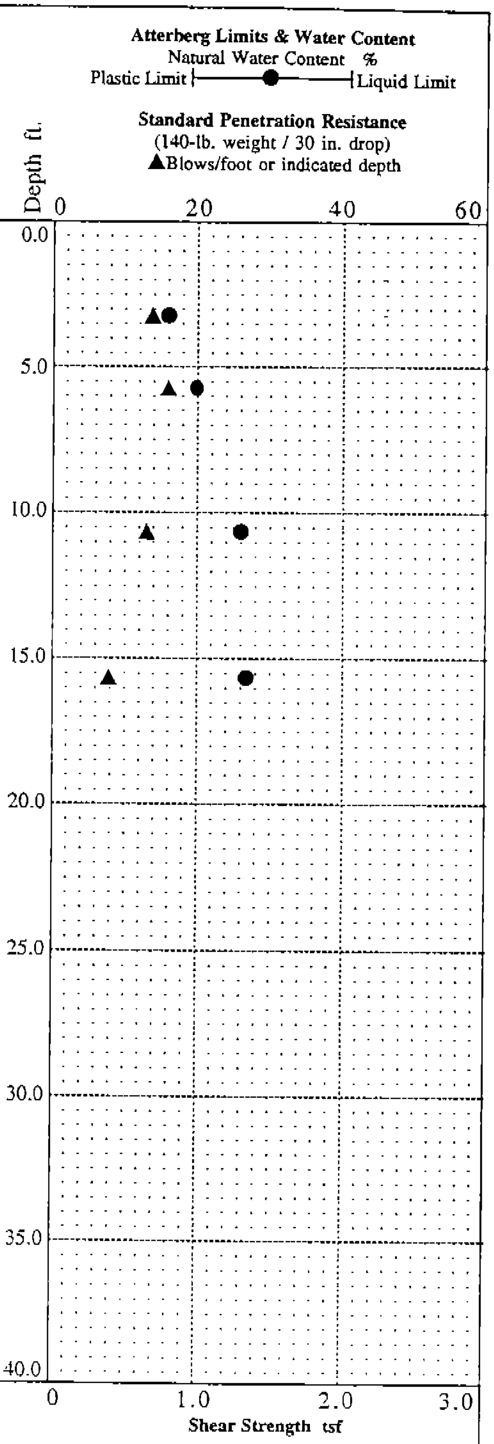
A-587

Fig. 12

Soil Description

Surface Elevation: Top of Asphalt

Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
5" asphalt. Medium dense, brown, sandy GRAVEL.			1	
Medium dense, gray/brown sandy SILT, moist; scattered wood chip.	5.5		2	
Medium dense to loose, gray sandy GRAVEL, moist. (Occluding rock, 2.4 inches, at 10.2 feet)	10.0		3	
Medium dense, gray fine sand, clayey SILT, moist.	12.0		4	
Bottom of Boring Boring Completed 6/8/94 No Groundwater Encountered.	16.5			



Legend

- 3" O.D. thin-wall sample
- 2" O.D. split-spoon sample
- continuous sample
- REC% RQD% ☒ Rock core sample
- ■ Grab sample
- Impervious seal
- ▽ 0hr Water level at indicated number of hours after drilling
- Piezometer tip

Method of Measurement

- ○ Unconfined Compression
- △ Unconsolidated - Undrained triaxial compression
- ◇ Torvane
- ☐ Pocket Penetrometer

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-13

SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

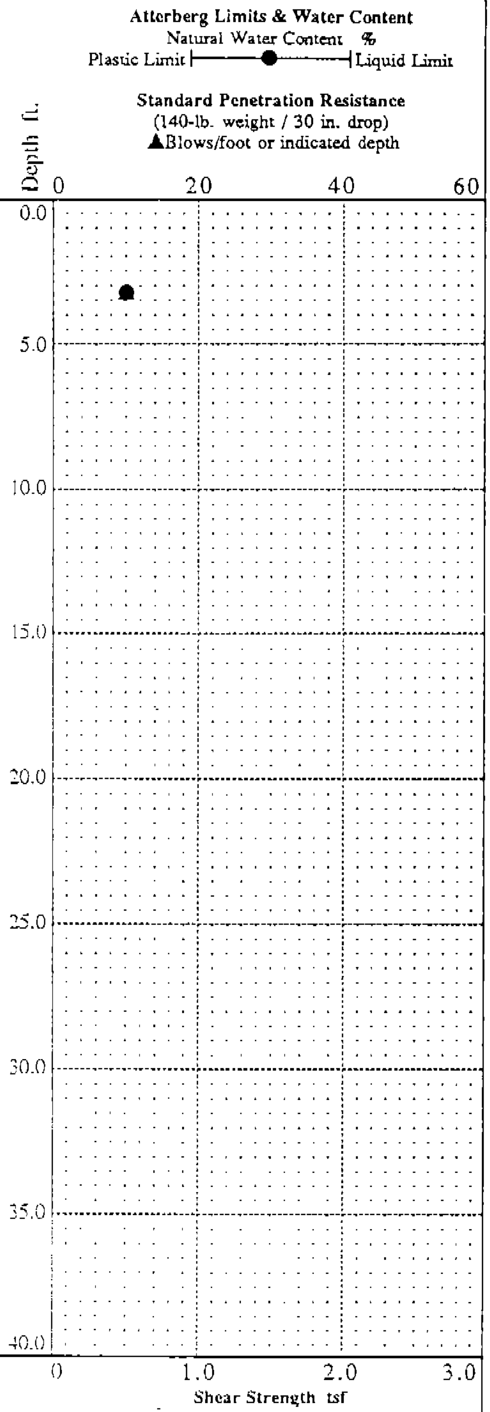
A-587

Fig. 13

Soil Description

Surface Elevation: Off edge of bike path.

Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
Grass and Topsoil. Medium dense, brown, sandy GRAVEL, moist.			I 1	
9" O.D., 6" I.D. ENSTAR Gas line. Gray sandy SILT, moist; Observed backhoe trench excavation. Material continues to bottom of trench with rope, tin can, moose leg bones and tree stump removed. (Fill)	5.5			
Bottom of Boring Boring Completed 6/8/94 No Groundwater Encountered.	13.0			



Method of Measurement
- ○ Unconfined Compression
- △ Unconsolidated - Undrained triaxial compression
- ◇ Torvane
- ☐ Pocket Penetrometer

Legend

- 3" O.D. thin-wall sample
- 2" O.D. split-spoon sample
- continuous sample
- REC% RQD% ☒ Rock core sample
- ■ Grab sample
- Impervious seal
- ∇ Water level at indicated 0hr number of hours after drilling
- Piezometer tip

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-14

SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

A-587

Fig. 14

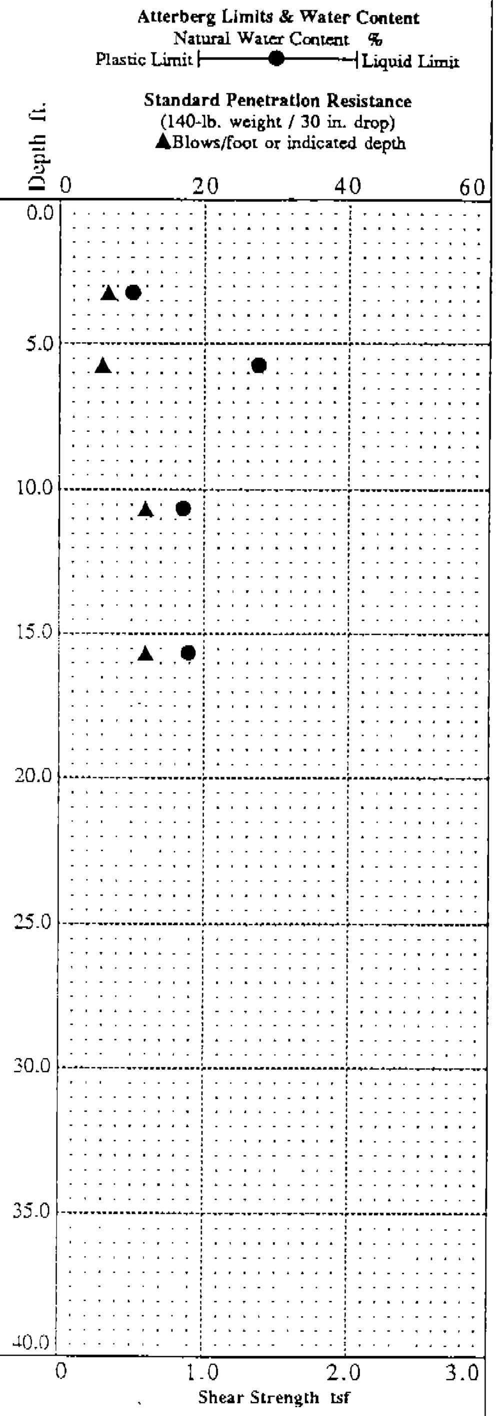
Soil Description

Surface Elevation: Top of Asphalt

Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
4" asphalt. Medium dense, brown, gravelly SAND.	2.5			
Medium dense, gray sandy SILT, moist; scatttered organics.	5.0		1	
Medium dense, gray and brown sandy SILT, moist; scattered organics.	10.0		2	
Medium dense, gray clayey SILT, moist; occassional cobbles.	12.0		3	
Medium dense, gray and brown slightly sandy, clayey SILT, moist.	16.5		4	

Bottom of Boring
Boring Completed 6/7/94

No Groundwater Encountered.



Legend

- I 3" O.D. thin-wall sample
- I 2" O.D. split-spoon sample
- ▨ continuous sample
- REC% RQD% ☒ Rock core sample
- ■ Grab sample
- Impervious seal
- ▽ 0hr Water level at indicated number of hours after drilling
- Piezometer tip

Method of Measurement

- ○ Unconfined Compression
- △ Unconsolidated - Undrained triaxial compression
- ◇ Torvane
- ☐ Pocket Penetrometer

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-15

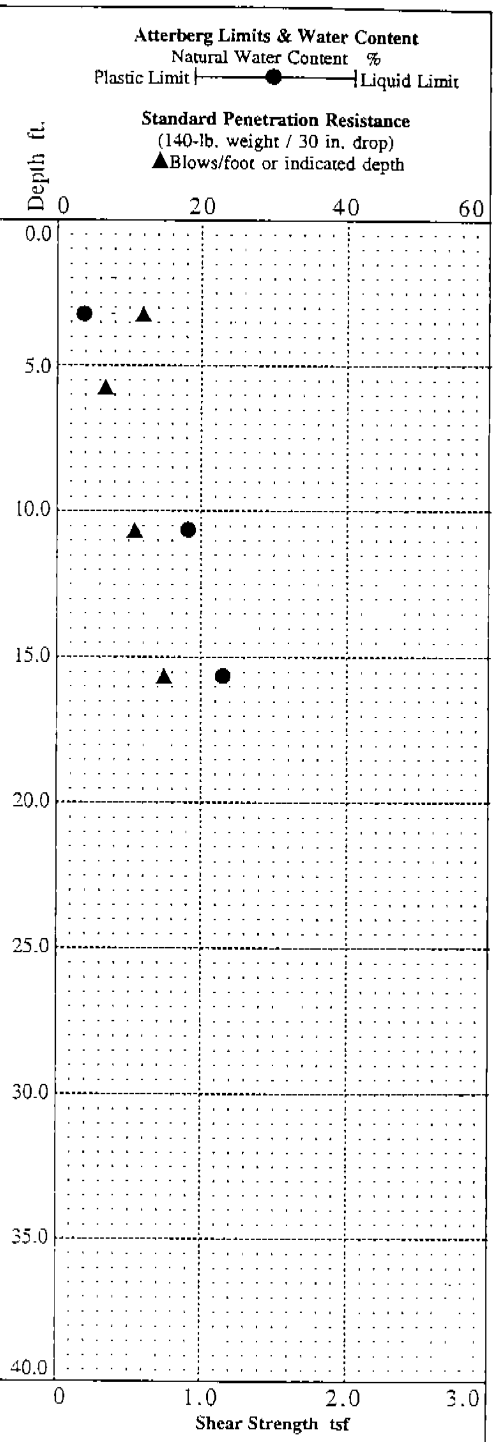
SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

A-587

Fig. 15

Soil Description Surface Elevation: Shoulder off Asphalt.	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
Medium dense, brown, gravelly SAND, wet.			1	
Loose, gray SILT layers in brown PEAT with wood fragments, wet.	5.5		2	
Medium dense, gray and brown clayey SILT, moist: occassional gravels.	10.0		3	
Medium dense, gray clayey SILT, wet.	13.0		4	
Bottom of Boring Boring Completed 6/17/94 No Groundwater Encountered.	16.5			



Legend

- 3" O.D. thin-wall sample
- 2" O.D. split-spoon sample
- continuous sample
- REC% RQD% Rock core sample
- Grab sample
- Impervious seal
- ▽ 0hr Water level at indicated number of hours after drilling
- Piezometer tip

Method of Measurement

- ○ Unconfined Compression
- △ Unconsolidated - Undrained triaxial compression
- ◇ Torvane
- ☐ Pocket Penetrometer

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-16A

SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

A-587

Fig. 16

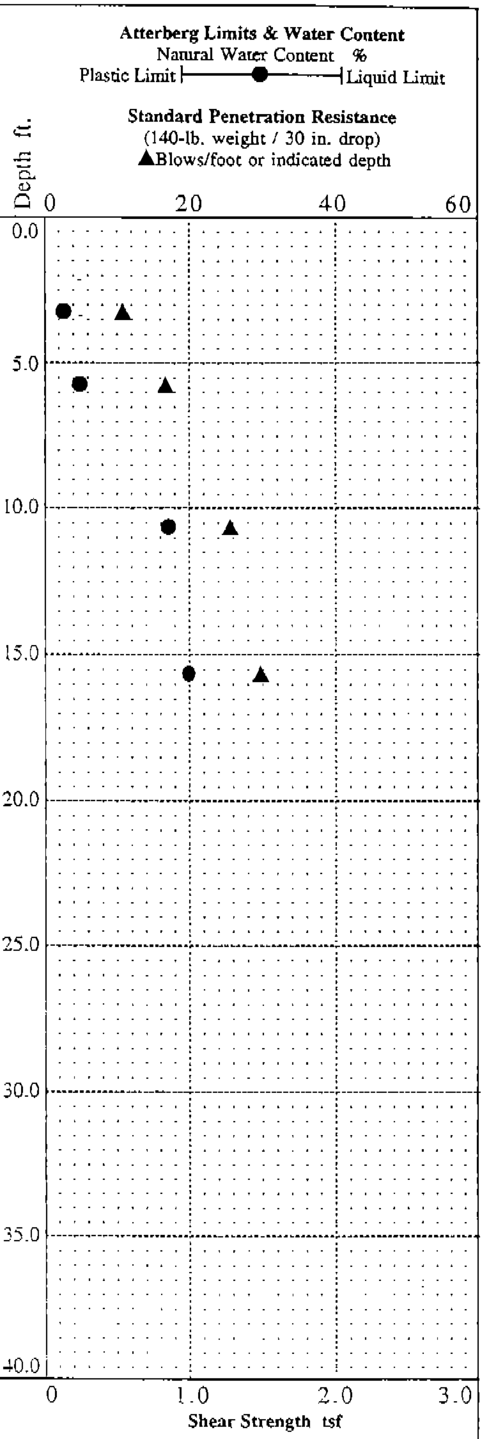
Soil Description

Surface Elevation: Top of Asphalt

Soil Description	Depth ft.	Dry Unit Weight pcf	Sample	Ground Water
4" asphalt. Medium dense, brown, sandy GRAVEL. (3 to 4 inch cobbles. Fill around storm drain.	5.0		1	
Medium dense, gray and brown sandy SILT, moist.	10.0		2	
Medium dense, gray clayey SILT, moist to dry.	13.0		3	
Medium dense, gray clayey SILT with stratified layers of gravelly SILT, wet.	16.5		4	

Bottom of Boring
Boring Completed 6/9/94

Perched groundwater 4 to 7 feet.



Legend

- 3" O.D. thin-wall sample
- 2" O.D. split-spoon sample
- continuous sample
- REC% RQD% ☒ Rock core sample
- ■ Grab sample
- Impervious seal
- ▽ 0hr Water level at indicated number of hours after drilling
- Piezometer tip

Method of Measurement
- ○ Unconfined Compression
- △ Unconsolidated - Undrained triaxial compression
- ◇ Torvane
- ☐ Pocket Penetrometer

1. Groundwater levels may vary with time, precipitation, infiltration, and other factors
2. The stratification lines represent approximate soil boundaries. Actual boundary may be transitional.

Log of Boring B-17

SHANNON & WILSON, INC.
Geotechnical Consultants

VICTOR ROAD
DIMOND BLVD TO W. 100th
ANCHORAGE, ALASKA

A-587

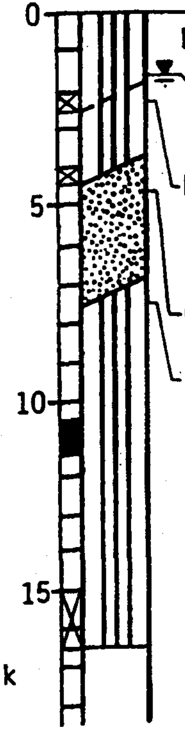
Fig. 17

LOG OF BORING 1

Equipment Nodwell B-61

** Elevation 21 Date Drilled 6/6/85

Laboratory Tests	% Passing No. 200	Blows/ Foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Samples
		7				
		11*				
		17				



BROWN-GRAY GRAVELLY SANDY SILT (ML)
loose, moist
water level during drilling at 1.5'

BROWN SANDY SILT (ML)
saturated, loose
encountered heaving sands at 4.5', no recovery at 5.0'

GRAY SAND (SP)
loose to medium dense, saturated

GRAY CLAYEY SILT (ML)
medium stiff, saturated

*Blow counts noted by a single asterisk (*) are for a 2.5-inch I.D. split-spoon driven with a 300-pound hammer free falling 30 inches. All other blow counts were determined by the Standard Penetration Test.

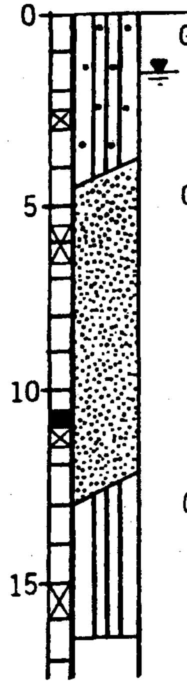
**Elevations interpreted from preliminary plan and profile drawings by CRW dated May, 1985.

LOG OF BORING 2

Equipment Nodwell B-61

Elevation 21 Date Drilled 6/6/85

Laboratory Tests	% Passing No. 200	Blows/ Foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Samples
		22				
		24*				
		67/10"				



GRAY SILTY SAND (SM)
loose, saturated
water level during drilling at 1.5'

GRAY SAND (SP)
medium dense, saturated

GRAY CLAYEY SILT (ML)
very stiff, saturated

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Log of Borings 1&2
97th Avenue Storm Drain
Anchorage, Alaska

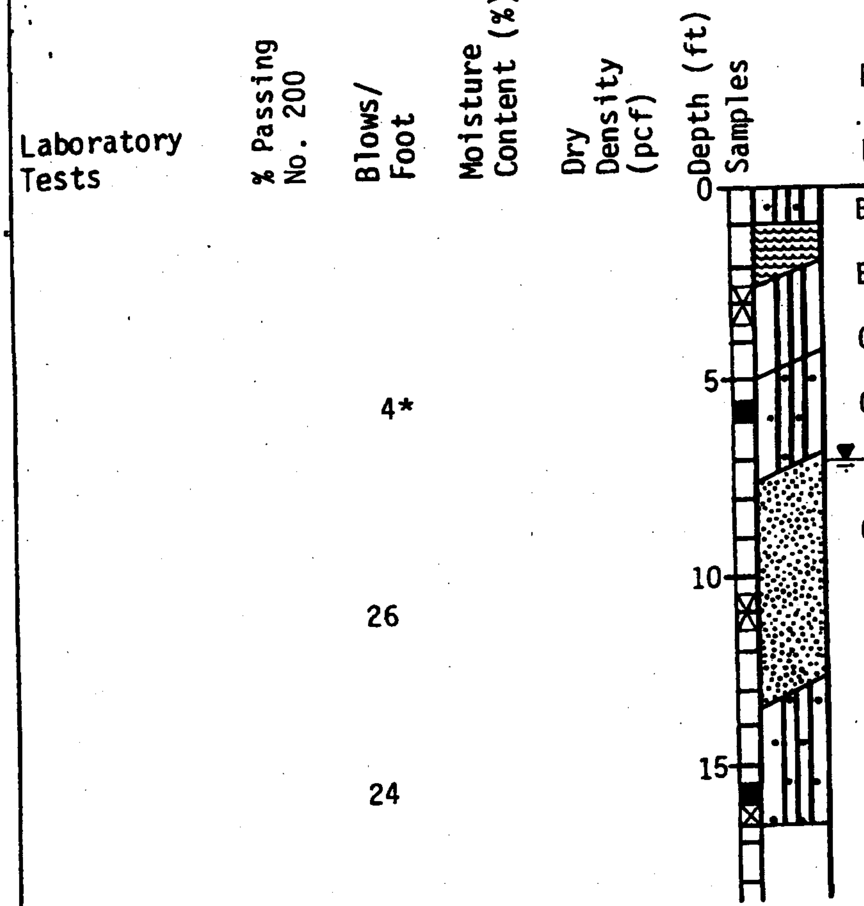
PLATE
2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9681,003.08	BW	7/85		

LOG OF BORING 3

Equipment Nodwell B-61

Elevation 24 Date Drilled 6/6/85



BROWN GRAVELLY SILTY SAND (SM)
loose, very moist

BROWN PEAT (Pt)
soft, very moist

GRAY SILT (ML)
medium stiff, very moist

GRAY SILTY SAND (SM)
loose, moist
water level druing drilling at 7.0'

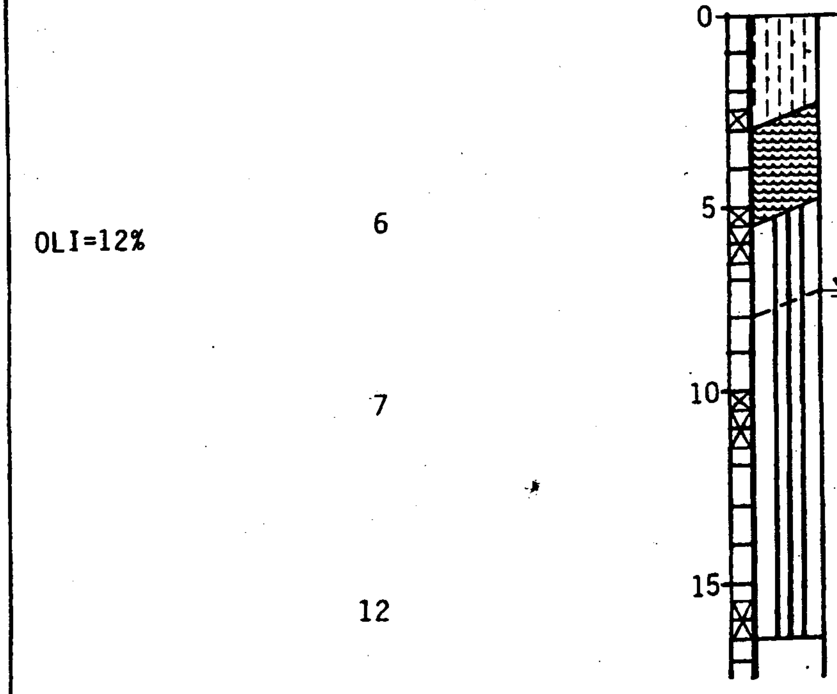
GRAY SAND (SP)
saturated, medium dense

GRAY SILTY SAND (SM)
medium dense, saturated

LOG OF BORING 4

Equipment Nodwell B-61

Elevation 30 Date Drilled 6/6/85



BROWN SANDY ORGANIC SILT (OL)
soft, moist

BROWN PEAT (Pt)
soft, moist

GRAY SANDY SILT (ML)
medium stiff, saturated, trace of organics
water level measured on 6/26/85 and 7/2/85

GRAY CLAYEY SILT (ML)
medium stiff, saturated

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Log of Borings 3&4
97th Avenue Storm Drain
Anchorage, Alaska

PLATE
3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	9681,003.08	CSW	7/85		

APPENDIX B

LABORATORY TEST RESULTS

Figure B-1	Laboratory Results Summary Table
Figures 18 through 21	Shannon & Wilson, Inc. Grain Size Classifications

SOILS TESTING REPORT

Project Name: Victor Road Reconstruction
Date: Dec-09
Project No.: 32-1-01870 Sampled By: RJV

Depth			2.5	5	10	15	2.5	5
Test Hole No.			SW B-1	SW B-1	SW B-1	SW B-1	SW B-2	SW B-2
Field Sample No.			S1	S2	S3	S4	S1	S2
Date Sampled			June 7, 1994	June 7, 1994	June 7, 1994	June 7, 1994	June 7, 1994	June 7, 1994
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm		100.0%				
	0.5"	12.5mm		90.9%				
	0.375"	9.5mm		89.5%				100.0%
	0.25"	6.3mm		87.8%				99.7%
	#4	4.75mm		86.8%				99.6%
	#8	2.36mm						
	#10	2mm		83.3%				98.3%
	#16	1.18mm						
	#20	0.64mm		79.4%				96.7%
	#40	0.425mm		75.1%				94.0%
	#60	0..25mm		72.3%				90.1%
	#100	0.15mm		71.0%				86.6%
	#200	0.075mm		70.0%				82.5%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			3.9%	21.6%	23.9%	25.4%	2.6%	20.6%
Organic Content %								
% Gravel				13%				0%
% Sand				17%				17%
% Silt & Clay				70%				83%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Figure B-1
Page 2 of 11

Project Name: Victor Road Reconstruction
Date: Dec-09
Project No.: 32-1-01870 Sampled By: RJV

Depth			10	15	2.5	5	10	15
Test Hole No.			SW B-2	SW B-2	SW B-3	SW B-3	SW B-3	SW B-3
Field Sample No.			S3	S4	S1	S2	S3	S4
Date Sampled			June 7, 1994	June 7, 1994	June 7, 1994	June 7, 1994	June 7, 1994	June 7, 1994
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm					100.0%	
	#8	2.36mm						
	#10	2mm					99.9%	
	#16	1.18mm						
	#20	0.64mm					99.9%	
	#40	0.425mm					99.8%	
	#60	0..25mm					99.6%	
	#100	0.15mm					99.4%	
	#200	0.075mm					99.1%	
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			17.7%	27.7%	13.2%	15.5%	24.4%	25.1%
Organic Content %								
% Gravel							0%	
% Sand							1%	
% Silt & Clay							99%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Victor Road Reconstruction
Date: Dec-09
Project No.: 32-1-01870
Sampled By: RJV

Depth			2.5	5	10	15	2.5	5
Test Hole No.			SW B-5	SW B-5	SW B-5	SW B-5	SW B-6	SW B-6
Field Sample No.			S1	S2	S3	S4	S1	S2
Date Sampled			June 7, 1994	June 7, 1994	June 7, 1994	June 7, 1994	June 7, 1994	June 7, 1994
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm	100.0%					
	1"	25mm	90.1%					
	0.75"	19mm	90.1%					
	0.5"	12.5mm	86.1%		100.0%			
	0.375"	9.5mm	82.6%		99.3%			
	0.25"	6.3mm	78.4%		99.2%			100.0%
	#4	4.75mm	76.6%		99.0%			99.9%
	#8	2.36mm						
	#10	2mm	71.6%		97.7%			99.7%
	#16	1.18mm						
	#20	0.64mm	66.4%		95.2%			99.0%
	#40	0.425mm	57.4%		86.9%			98.5%
	#60	0..25mm	44.1%		76.8%			97.0%
	#100	0.15mm	35.7%		71.9%			93.3%
	#200	0.075mm	28.0%		69.7%			86.2%
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			9.5%	17.9%	22.1%	22.8%	22.0%	23.6%
Organic Content %								
% Gravel			23%		1%			0%
% Sand			49%		29%			14%
% Silt & Clay			28%		70%			86%
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Figure B-1
Page 4 of 11

Project Name: Victor Road Reconstruction
Date: Dec-09
Project No.: 32-1-01870 Sampled By: RJV

Depth			10	15	2.5	5	10	15
Test Hole No.			**SW B-6**	**SW B-6**	**SW B-7**	**SW B-7**	**SW B-7**	**SW B-7**
Field Sample No.			S3	S4	S1	S2	S3	S4
Date Sampled			**June 7, 1994**	**June 7, 1994**	**June 7, 1994**	**June 7, 1994**	**June 7, 1994**	**June 7, 1994**
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#20	0.64mm						
	#40	0.425mm						
	#60	0..25mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			**24.3%**	**27.9%**	**13.2%**	**17.3%**	**24.2%**	**26.0%**
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay								
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Victor Road Reconstruction
Date: Dec-09
Project No.: 32-1-01870

Sampled By: RJV

Depth			2.5	5	10	15	2.5	5
Test Hole No.			SW B-8	SW B-8	SW B-8	SW B-8	SW B-9	SW B-9
Field Sample No.			S1	S2	S3	S4	S1	S2
Date Sampled			June 7, 1994	June 7, 1994	June 7, 1994	June 7, 1994	June 7, 1994	June 7, 1994
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm		100.0%				
	0.375"	9.5mm		99.0%				
	0.25"	6.3mm		98.1%				
	#4	4.75mm		97.3%				
	#8	2.36mm						
	#10	2mm		95.0%				
	#16	1.18mm						
	#20	0.64mm		92.8%				
	#40	0.425mm		89.5%				
	#60	0..25mm		84.6%				
	#100	0.15mm		81.7%				
	#200	0.075mm		78.9%				
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			15.8%	18.1%	23.7%	25.3%	16.0%	20.1%
Organic Content %								
% Gravel				3%				
% Sand				18%				
% Silt & Clay				79%				
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Figure B-1

Project Name: Victor Road Reconstruction
Date: Dec-09
Project No.: 32-1-01870

Sampled By: RJV (B-10 by Jim\Chris)

Depth			10	15	2.5	10	15	20
Test Hole No.			SW B-9	SW B-9	SW B-10	SW B-10	SW B-10	SW B-10
Field Sample No.			S3	S4	S1	S2	S3	S4
Date Sampled			June 7, 1994	June 7, 1994	June 8, 1994	June 8, 1994	June 8, 1994	June 8, 1994
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm	100.0%					
	#16	1.18mm						
	#20	0.64mm	99.9%					
	#40	0.425mm	99.9%					
	#60	0..25mm	99.4%					
	#100	0.15mm	98.7%					
	#200	0.075mm	98.2%					
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			26.4%	27.3%	18.2%	17.2%	20.4%	23.1%
Organic Content %								
% Gravel			0%					
% Sand			2%					
% Silt & Clay			98%					
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Figure B-1

Project Name: Victor Road Reconstruction
Date: Dec-09
Project No.: 32-1-01870
Sampled By: RJV

Depth			2.5	5	10	15	2.5	5
Test Hole No.			SW B-11	SW B-11	SW B-11	SW B-11	SW B-12A	SW B-12A
Field Sample No.			S1	S2	S3	S4	S1	S2
Date Sampled			June 7, 1994	June 7, 1994	June 8, 1994	June 8, 1994	June 17, 1994	June 17, 1994
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#20	0.64mm						
	#40	0.425mm						
	#60	0..25mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			6.7%	10.7%	18.8%	23.8%	2.5%	3.9%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay								
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Figure B-1

Project Name: Victor Road Reconstruction
Date: Dec-09
Project No.: 32-1-01870 Sampled By: RJV

Depth			10	15	2.5	10	15	20
Test Hole No.			SW B-12A	SW B-12A	SW B-13	SW B-13	SW B-13	SW B-13
Field Sample No.			S3	S4	S1	S2	S3	S4
Date Sampled			June 17, 1994	June 17, 1994	June 9, 1994	June 9, 1994	June 9, 1994	June 9, 1994
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#20	0.64mm						
	#40	0.425mm						
	#60	0..25mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			3.9%	25.1%	5.9%	17.6%	9.9%	17.7%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay								
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Figure B-1
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Project Name: Victor Road Reconstruction
Date: Dec-09
Project No.: 32-1-01870 Sampled By: RJV (B-14 by Jim\Chris)

Depth			2.5	2.5	5	10	15	2.5
Test Hole No.			SW B-14	SW B-15	SW B-15	SW B-15	SW B-15	SW B-16A
Field Sample No.			S1	S1	S2	S3	S4	S1
Date Sampled			June 8, 1994	June 9, 1994	June 9, 1994	June 9, 1994	June 9, 1994	June 17, 1994
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm					100.0%	
	0.5"	12.5mm					99.3%	
	0.375"	9.5mm			100.0%		98.9%	
	0.25"	6.3mm			98.9%		97.6%	
	#4	4.75mm			98.7%		97.4%	
	#8	2.36mm						
	#10	2mm			96.7%		96.0%	
	#16	1.18mm						
	#20	0.64mm			94.9%		94.4%	
	#40	0.425mm			92.1%		92.4%	
	#60	0..25mm			87.1%		87.2%	
	#100	0.15mm			81.7%		81.7%	
	#200	0.075mm			75.4%		77.4%	
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			10.1%	10.3%	27.9%	17.1%	18.0%	4.0%
Organic Content %								
% Gravel					1%		3%	
% Sand					24%		20%	
% Silt & Clay					75%		77%	
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

SOILS TESTING REPORT

Project Name: Victor Road Reconstruction
Date: Dec-09
Project No.: 32-1-01870
Sampled By: RJV

Depth			5	10	15	2.5	5	10
Test Hole No.			SW B-16A	SW B-16A	SW B-16A	SW B-17	SW B-17	SW B-17
Field Sample No.			S2	S3	S4	S1	S2	S3
Date Sampled			June 17, 1994	June 17, 1994	June 17, 1994	June 9, 1994	June 9, 1994	June 9, 1994
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#20	0.64mm						
	#40	0.425mm						
	#60	0..25mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			98.9%	18.4%	23.4%	2.8%	5.1%	17.3%
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay								
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								

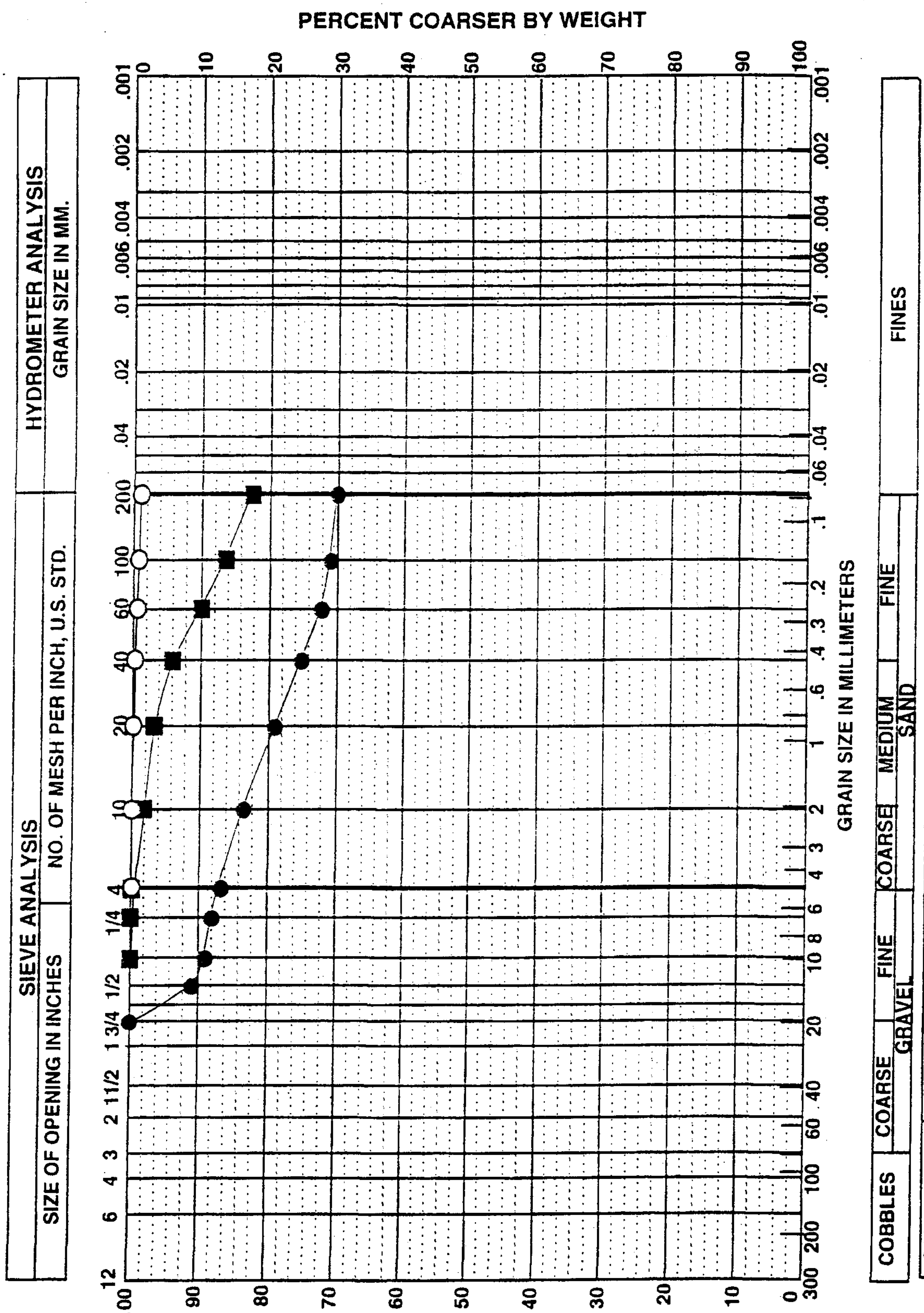
SOILS TESTING REPORT

Figure B-1

Project Name: Victor Road Reconstruction
Date: Dec-09
Project No.: 32-1-01870

Sampled By: RJV

Depth Test Hole No. Field Sample No. Date Sampled			15 **B-17** S4 **June 9, 1994**					
Percent Passing Sieve Size	3"	75mm						
	2"	50mm						
	1.5"	37.5mm						
	1"	25mm						
	0.75"	19mm						
	0.5"	12.5mm						
	0.375"	9.5mm						
	0.25"	6.3mm						
	#4	4.75mm						
	#8	2.36mm						
	#10	2mm						
	#16	1.18mm						
	#20	0.64mm						
	#40	0.425mm						
	#60	0..25mm						
	#100	0.15mm						
	#200	0.075mm						
DOTTSD								
Liquid Limit								
Plastic Index								
Moisture Content %			**20.3%**					
Organic Content %								
% Gravel								
% Sand								
% Silt & Clay								
Max. Dry Density								
Opt. Moisture %								
Unconsol. Unconfined Triaxial U_u								
Coeff. Of Consolidation C_v								
Unc. Comp. Strength Q_u								
Pocket Pen Value								



SAMPLE NO.	DEPTH, FT.	U.S.C.	CLASSIFICATION	W.C.%	LL	PL	PI
B-1, S-2	5.0	ML	● Gravelly, sandy SILT	21.6			
B-2, S-2	5.0	ML	■ Sandy SILT	20.6			
B-3, S-3	10.0	ML	○ SILT	24.4			

Victor Road / Dimond Blvd. to W. 100th
Anchorage, Alaska

GRAIN SIZE CLASSIFICATION

June, 1994

A-587

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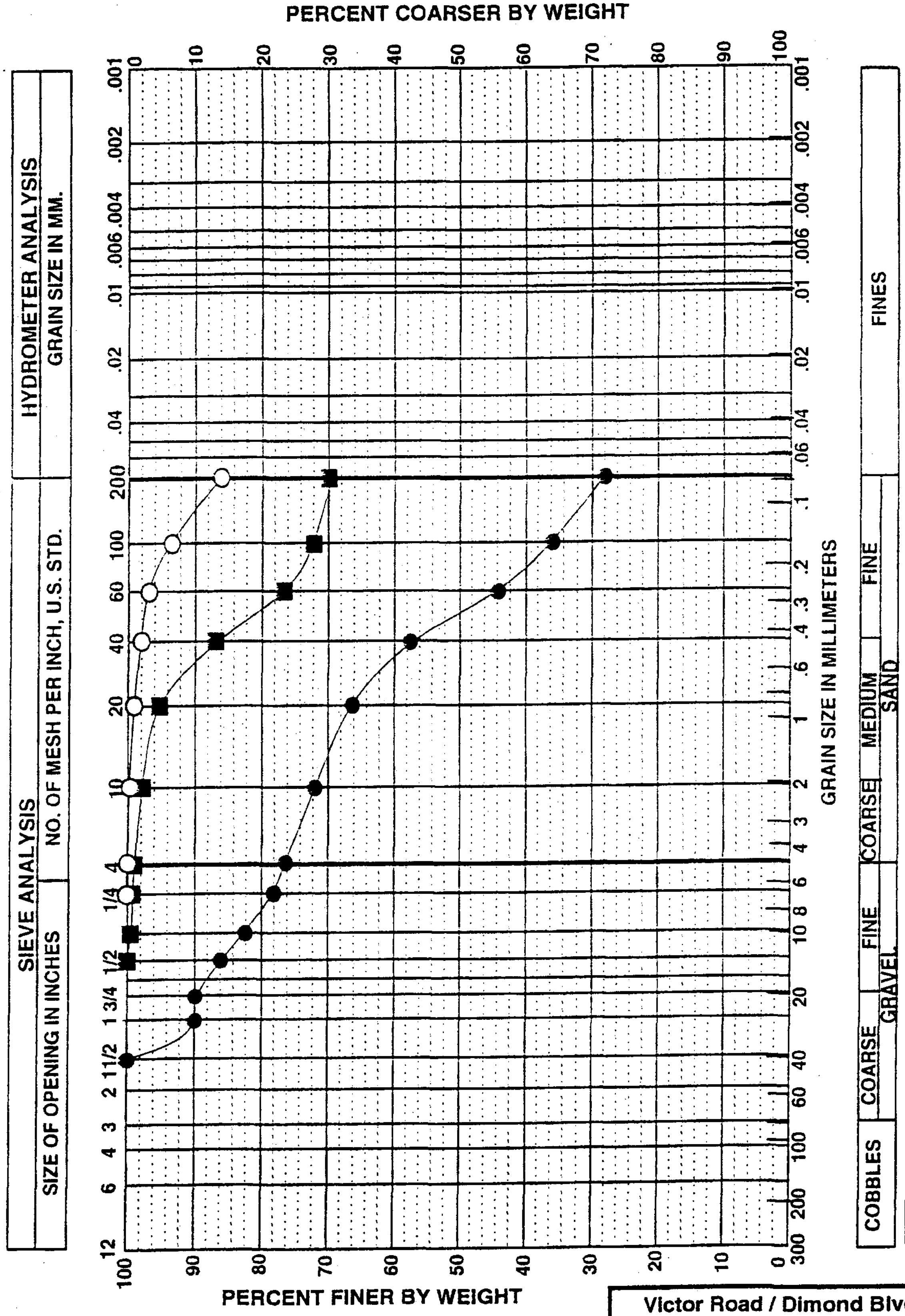
Fig. 18



SAMPLE NO.	DEPTH, FT.	U.S.C.	CLASSIFICATION	W.C.%	LL	PL	PI
B-5, S-1	2.5	SM	● Gravelly, silty SAND	9.5			
B-5, S--3	10.0	ML	■ Sandy SILT	22.1			
B-6, S-2	5.0	ML	○ Sandy SILT	23.6			

Victor Road / Dimond Blvd. to W. 100th
Anchorage, Alaska

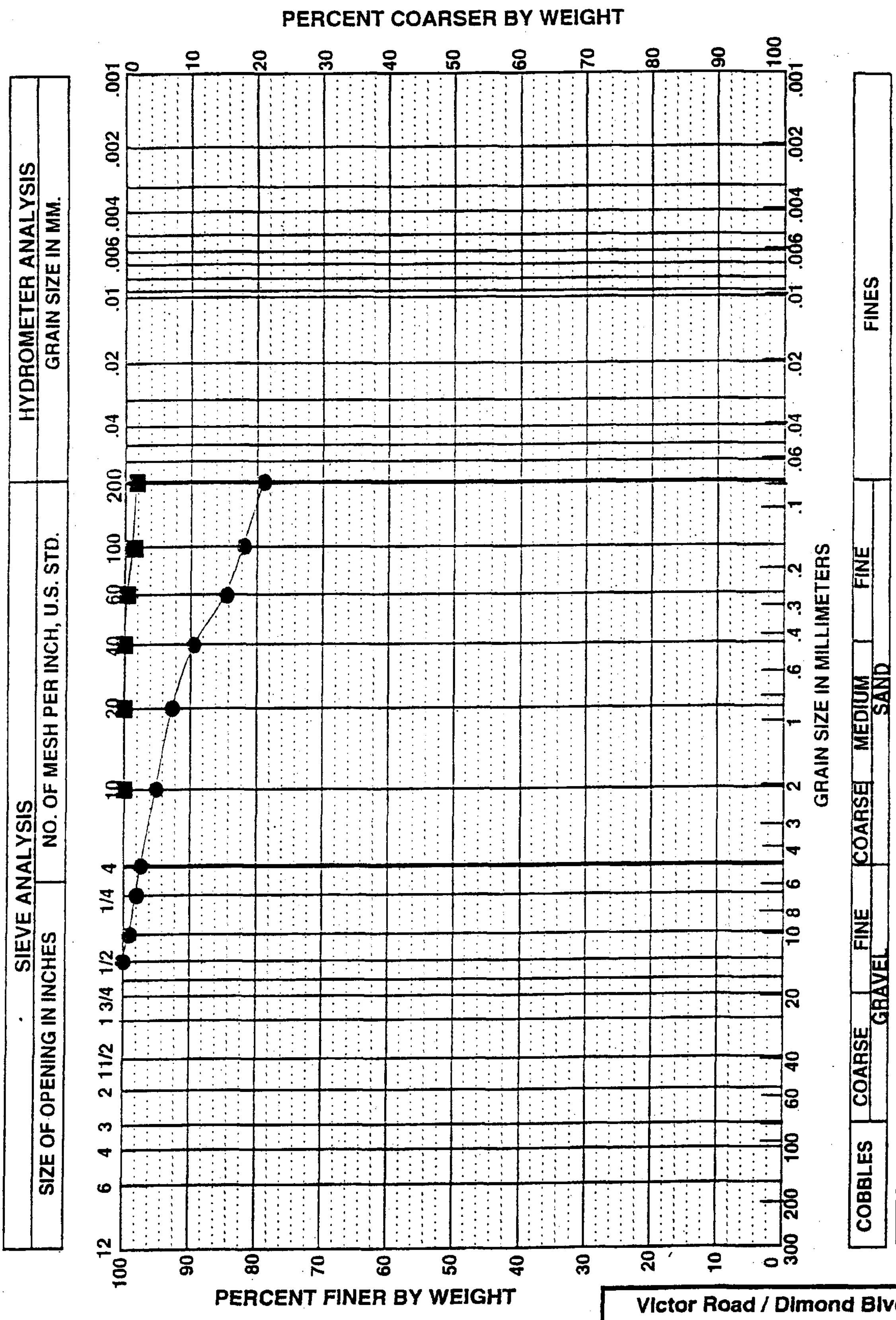
GRAIN SIZE CLASSIFICATION

June, 1994

A-587

SHANNON & WILSON, INC.
Geotechnical & Environmental Consultants

Fig. 19



SAMPLE NO.	DEPTH, FT.	U.S.C.	CLASSIFICATION	W.C.%	LL	PL	PI
B-8, S-2	5.0	ML	● Sandy SILT	18.1			
B-9, S-3	10.0	ML	■ SILT	26.4			

Victor Road / Dimond Blvd. to W. 100th
Anchorage, Alaska

GRAIN SIZE CLASSIFICATION

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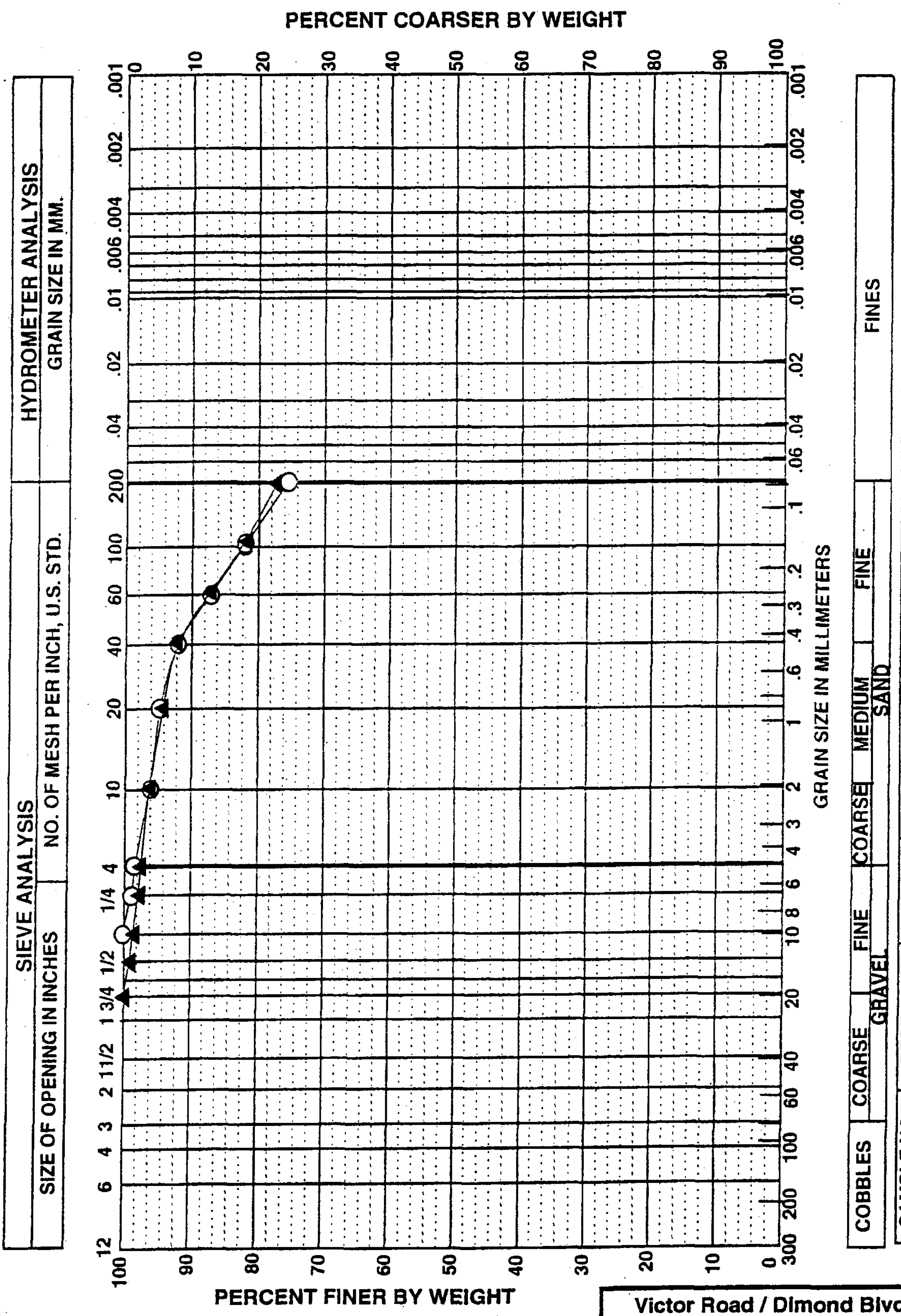
Fig. 20



SAMPLE NO.	DEPTH, FT.	U.S.C.	CLASSIFICATION	W.C.%	LL	PL	PI
B-15, S-2	5.0	ML	○ Sandy SILT	27.9			
B-15, S-4	15.0	ML	▲ Sandy SILT	18.0			

Victor Road / Dimond Blvd. to W. 100th
Anchorage, Alaska

GRAIN SIZE CLASSIFICATION

June, 1994

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Geotechnical & Environmental Consultants

Fig. 21

APPENDIX C

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to 32-1-01870

Date: December 2009
To: Lounsbury & Associates
Re: Victor Road Reconstruction
Anchorage, Alaska

Important Information About Your Geotechnical/Environmental Report

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include: the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used: (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors, which were considered in the development of the report, have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events, and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland