Washington State Department of Transportation

Memorandum

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STATE OF WASHINGTON
37891
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 7/22/08

Date: August 30, 2006

TO: David Edwards / Mohammad Hasan MS 117

FROM: Chris Johnson / Maher Shebl MS 29

SUBJECT: SR 520 XL-2028
Lake Sammamish Parkway to SR 202
Widening and Safety Project
Sign Structure Foundation Report

This memorandum provides geo-technical recommendations for the design and construction of the subject project. This project will construct a cantilever sign structure located on the north side of SR 202 as shown on the attached Cantilever Sign Structure and Boring Location Sheet. This location is at the approach for the SR 202 off ramp to SR 520-WB.

The conclusions, design and construction considerations contained in this memorandum are based on the project description, and site conditions, as they existed at the time of our field investigation. It is further assumed that the subsurface conditions as interpreted from the boring log are representative of the subsurface conditions. If during construction, subsurface conditions are different from those encountered in the exploratory boring, we should be advised so we can assist you and re-evaluate our recommendations.

Field Investigation

The field investigation consisted of a site reconnaissance and a subsurface exploration consisting of drilling and sampling one boring at the approximate location of the proposed sign structure. The drilling for the exploratory boring was performed using a CME 45 drill rig with automatic hammer. The boring was advanced to a maximum depth of 17 feet below the ground surface using mud rotary drilling method. Soil samples were obtained using a 2-inch OD, 1.4-inch ID split-spoon sampler. SPTs (Standard Penetration Tests) were performed in general accordance with ASTM Test Method D-1586. SPT values are obtained by driving the split-spoon sampler 18-inches into the soil with a 140-pound hammer using 30-inch drops. The number of blows required to achieve each 6 inches of penetration are recorded. The soil's SPT resistance, or N-value, is calculated as the number of blows required to achieve the final 12 inches of penetration. The drill rig is equipped with an automatic trip hammer to drive the split-spoon sampler. Disturbed soil samples were recovered and visually classified in the field using the Unified Soil Classification System (USCS) in general accordance with ASTM Test Method D-2488. The boring log is attached and should be included in the contract documents.

Subsurface Conditions

Soil conditions were interpreted from the exploratory boring performed at the approximate location of the proposed cantilever sign structure supplied by your office. The boring location is shown on the Boring Location sheet attached to this report. This boring indicates the site is underlain by medium dense to very dense silty sand with gravels and boulders in the area of the test hole. Detailed description of the soil conditions are described in more detail in the attached boring log.

Groundwater level in the test boring was determined after the test boring was bailed of water and the borehole was left for approximately one (1) hour for the ground water to recharge. Groundwater in the test boring appears to be approximately seventeen (17) feet below the existing grade at the proposed sign bridge location.

Design and Construction Considerations

Based on the soil and groundwater conditions encountered in the boring near the location of the proposed sign bridge, we recommend that the sign bridge structure be supported on Type 1 foundation, which assumes drilled shaft with a soil lateral bearing pressure of 3,500 psf for the design of the sign bridge foundation. The foundation depth should be determined based on the total sign area correlated to the allowable bearing pressure, as shown on the Standard Plan G-3a.

Construction Considerations

Localized water seepage may be encountered at depth 13.0 ft or shallower depending on the season, during shaft construction. Stabilization measures might be required during shaft excavation, if excessive water is encountered. Hard drilling should be expected due to presence of gravels and boulders as indicated in the attached log of test boring. These measures could include the use of temporary casing, and could involve the use of slurries and/or the placement of concrete using tremie method. The base of the shaft borings should be cleaned from any loose soil before concrete placement. Excessive loose material left in the bottom of the shaft borings will increase the amount of settlement that occurs, affecting the performance of the sign structures. After placement of the reinforcing steel and concrete, the temporary casing, if used, must be removed so that the shaft can develop its friction resistance from the concrete/soil interface.

Closure

We trust the information contained in this report is sufficient so you can complete the design of your project. If you have any questions or require additional information, contact Nabil Dbaibo at 206-768-5905 or Maher Shebl at 206-768-5915.

NTD/MAS:mas
Attachment: Sign Bridge Structure and Boring Location.
Serial File: 06-157
cc: Jim Cuthbertson/HQ Mats Lab/MS-47365, Gary Bedi/HQ Bridge/MS-47340

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE01347

HOLE No. TH-1-06

Sheet 1 of 1

Job No. XL-2028 | SR 520 | Elevation ft (m)

Project SR-520 WLSP to SR 202 - Geotech

Driller Jody Dickson | Lic# 2637

Site Address

Inspector Donny Henderson

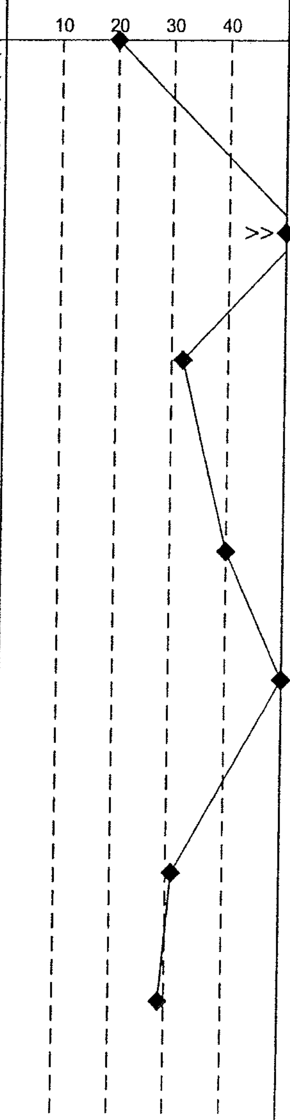
Start April 24, 2006 | Completion April 24, 2006 | Well ID#

Equipment CME 45 w/ autohammer

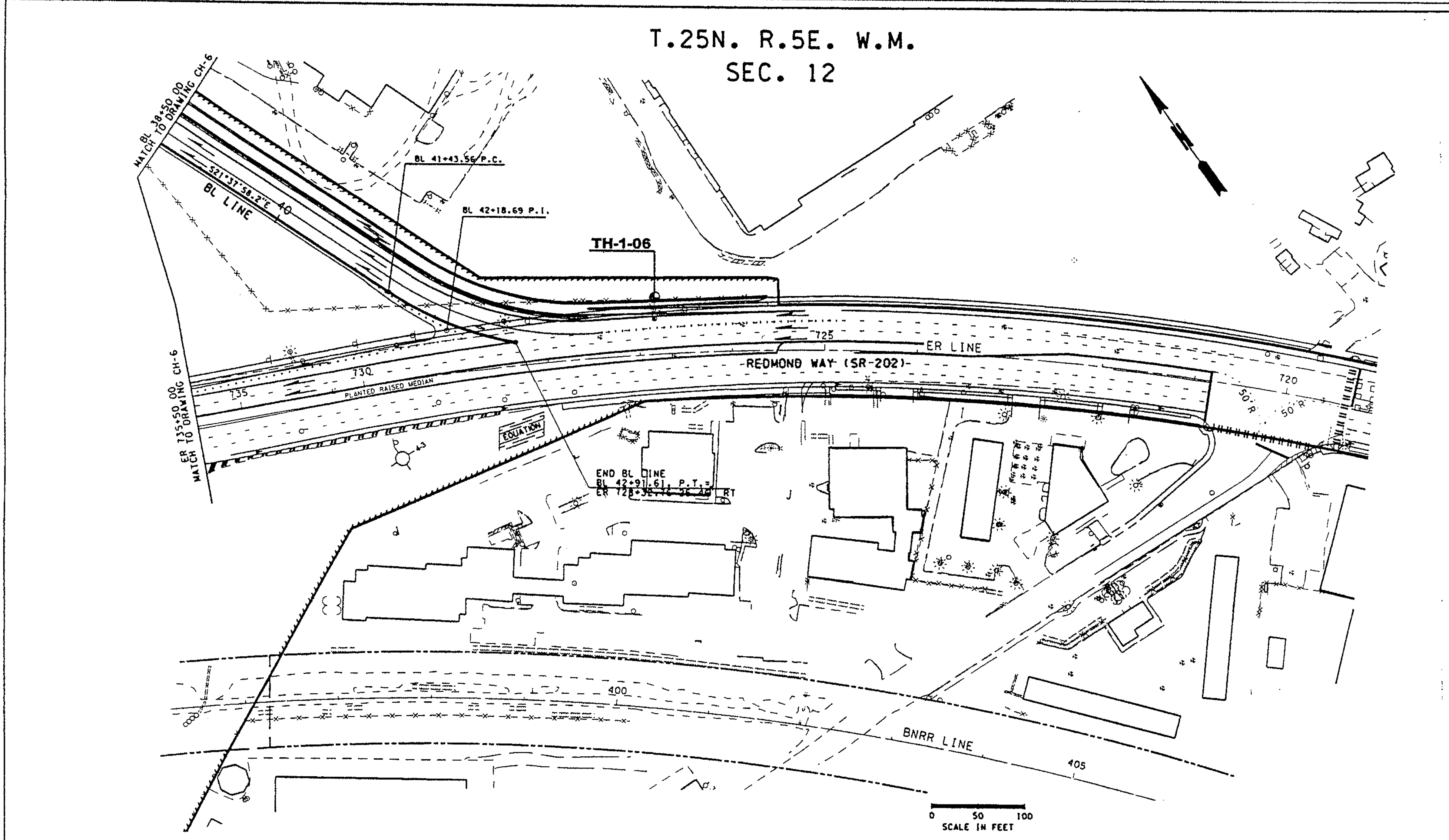
Station | Offset | Casing HQ 3.5 | Method Wet Rotary

Northing | Easting | Latitude | Longitude

County King | Subsection SE 1/4 of the SW 1/4 | Section 12 | Range 5E | Township 25



Depth (ft)	Meters (m)	Profile	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
0			4 8 12 18 (20)		D-1		Silty SAND with gravel, medium dense, gray, moist, Homogeneous, HCl reaction not tested, with gravels and boulders as indicated by drilling. Length Recovered 0.8 ft, Length Retained 0.8 ft		
	1		21 25 28 30 (53)		D-2		Silty SAND with gravel, very dense, brown, moist, Homogeneous, HCl reaction not tested, with gravels and boulders as indicated by drilling. Length Recovered 2.0 ft, Length Retained 2.0 ft		
5	2		32 18 14 15 (32)		D-3		Silty SAND with gravel, dense, brown, moist, Homogeneous, HCl reaction not tested, with gravels and boulders as indicated by drilling. Length Recovered 1.5 ft, Length Retained 1.5 ft		
			20 20 20 35 (40)		D-4		Silty SAND with gravel, dense, brown, moist, Homogeneous, HCl reaction not tested, with gravels and boulders as indicated by drilling. Length Recovered 1.3 ft, Length Retained 1.3 ft		
10	3		26 50/3 (50)		D-5		Silty SAND with gravel, dense, brown, moist, Homogeneous, HCl reaction not tested, with gravels and boulders as indicated by drilling. Length Recovered 0.7 ft, Length Retained 0.7 ft		
	4		13 16 15 12 (31)		D-6		Silty SAND with gravel, dense, brown, wet, Homogeneous, HCl reaction not tested, with gravels and boulders as indicated by drilling Length Recovered 1.3 ft, Length Retained 1.3 ft 04/24/2006 04/24/2006	▼	
15	5		13 14 15 15 (29)		D-7		Silty SAND with gravel, dense, brown, wet, Homogeneous, HCl reaction not tested, with gravels and boulders as indicated by drilling. Length Recovered 1.5 ft, Length Retained 1.5 ft		
20	6						End of test hole boring at 17 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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TIME	$TIME$			
DATE	$$$$DATE$$$			
DESIGNED BY				
ENTERED BY				
CHECKED BY				
PROJ. ENGR.				
REGIONAL ADM.	L. Eng	REVISION	DATE	BY

REGION NO.	STATE	FED. AID PROJ. NO.
10	WASH	
JOB NUMBER		
CONTRACT NO.		LOCATION NO.

EXPIRES 02/07/ DATE P.E. STAMP BOX

DATE P.E. STAMP BOX

Washington State Department of Transportation

SR 520/SR 202 MP 11.39 TO 13.18

SR 520 WEST LAKE SAMMAMISH PARKWAY TO SR 202

KING COUNTY FEBRUARY 2006

CANTILEVER SIGN STRUCTURE & BORING LOCATION

SHEET 1 OF 1 SHEETS

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