associated earth sciences incorporated

October 20, 2022
Project No. 20220346E001

Community Health Care
1148 Broadway, Suite 100
Tacoma, Washington 98042

Attention: Ms. Debbie Jacobson

Subject: Limited Geotechnical Engineering Study
1906 Cannery Building Upgrades
201 West Main Street
Puyallup, Washington

Reference: Subsurface Exploration, Geologic Hazard, and Geotechnical Engineering Report CANNERY STATION GARAGE, Prepared by Associated Earth Sciences, Inc., dated November 30, 2004 (AESI Project Number 20040686KEA)

Dear Ms. Jacobson:

Associated Earth Sciences, Inc. (AESI) has prepared this letter summarizing our conclusions and recommendations for design of new interior foundations as part of the proposed upgrades to the existing 1906 Cannery Building in Puyallup, Washington. Our study is based on information provided during an October 7, 2022 TEAMS meeting with Miller Hayashi Architects and PCS Structural Solutions. AESI previously completed a subsurface exploration and geotechnical study for the adjacent parking garage located at 111 West Main Street, which was used as the basis for the recommendations presented in this limited study and is referenced below.

SITE AND PROJECT DESCRIPTION

The existing Cannery Building at 201 West Main Street was built in 1906. The site location is shown on the "Vicinity Map," Figure 1. The building is reportedly built on shallow foundations with timber post and beam framing. The building was updated in 2000 to replace some of the timber columns with steel elements. The proposed remodel building upgrades are to configure the building to become a Community Health Care dental and vision center. We understand that the remodel work will include a new set of stairs and several new interior foundation elements but will not include any significant structural modifications or building additions.

REVIEW OF PREVIOUS STUDY

Our referenced 2004 study is a comprehensive geotechnical engineering report supporting the construction of a multi-level parking garage located directly east of the subject Cannery Building.

The study included drilling one exploration boring, advancing one cone penetrometer test (CPT), laboratory testing, and performing geologic studies to assess the type, thickness, distribution, and physical properties of the subsurface sediments and groundwater conditions. The approximate locations of explorations completed for our 2004 study are shown on the "Site and Exploration Plan," Figure 2. Geologic hazard evaluations and engineering studies were also completed to determine suitable geologic hazard mitigation techniques, the type of suitable foundations, and anticipated settlements. The Interpretive exploration logs of subsurface explorations completed for our 2004 study are included in the Appendix of this limited study for reference.

Subsurface Conditions from 2004 Cannery Station Parking Garage Project

Fill

Fill soils (those not naturally placed) were observed in both explorations to depths of roughly 5 feet below ground surface elevation. The fill and the upper surface of the underlying alluvium were in a medium dense condition.

Alluvium

Sediments encountered beneath the asphalt and fill generally consisted of a fine to medium sand, silty sand, and soft to medium stiff clayey silt with varying amounts of gravel and organics. We interpreted these sediments to be representative of recent alluvium and volcanic mudflow sediments deposited in former channels of the Puyallup River. The alluvium extended beyond the depths of our explorations (90 feet). In CP-1, the alluvial sediments were found in a loose to medium dene condition from depths of about 6 to 45 feet and were in a soft/loose condition from 45 to 65 feet. In EB-1 the alluvium was medium dense to about 8 feet, loose to roughly 30 feet, medium dense to dense to 40 feet, and soft/loose to 65 feet. Below roughly 65 to 70 feet the sediments in both explorations were found in a medium dense to dense/stiff condition.

Geologic Hazards

For this part of the study, we reviewed potential geologic hazards pertaining to the construction of the new multi-level parking garage structure. The risk for landslides and surficial ground rupture was found to be relatively low due to the absence of steep slopes and documented ground ruptures near the site. Although, it was determined that the site is susceptible to liquefaction which is detailed below.

Liquefaction

Liquefaction is a process through which unconsolidated soil loses strength as a result of vibrations, such as those which occur during a seismic event. During normal conditions, the weight of the soil is supported by both grain-to-grain contacts and by the fluid pressure within the pore spaces of the soil below the water table. Extreme vibratory shaking can disrupt the grain-to-grain contact,

increase the pore pressure, and result in a temporary decrease in soil shear strength. The soil is said to be liquefied when nearly all of the weight of the soil is supported by pore pressure alone. Liquefaction can result in deformation of the sediment and settlement of overlying structures. Areas most susceptible to liquefaction include those underlain by non-cohesive silt and sand with low relative densities, accompanied by a shallow water table.

For our 2004 study, we performed a liquefaction hazard analysis for the site in accordance with guidelines published in Seed and Idriss, 1982; Seed et al., 1985; and Kramer, 1996. Our liquefaction analysis was completed with the aid of LiquefyPro computer software Version 4.3 by CivilTech Corporation.

Two models were completed for this study using assumed groundwater tables of 5 and 14 feet, respectively. Our analysis indicated that under both groundwater table conditions, the site soils have a high risk of liquefaction above a depth of 30 feet. Settlements ranging from roughly 7 to 10 inches were calculated for the site soil profile below the proposed Cannery Station Parking Garage project using the ground surface acceleration required by the code version in effect at the time our work was completed.

NEW FOOTING DESIGN RECOMMENDATIONS

It is assumed that the existing 1906 Cannery Building is underlain by soil and groundwater conditions like those encountered below the Cannery Station Parking Garage project as detailed in our 2004 study. The 1906 Cannery Building is therefore assumed to have a similar post-earthquake liquefaction settlement risk as identified for the adjacent parking garage project. It is not the intent of the proposed building upgrade program to mitigate the liquefaction settlement risk to the shallow foundation supported 1906 Cannery Building. The geotechnical recommendations presented in this limited study are for the use of conventional shallow foundations like the existing building foundations. It is assumed that the new and existing foundation elements will have similar post-earthquake settlement performance. The recommendations outlined below include design soil bearing pressures, passive resistance, base friction value, and general foundation subgrade preparation requirements.

Shallow footings may be founded directly on medium dense native alluvial soils or recompacted inorganic existing fills assuming a maximum allowable soil bearing pressure of 3,000 pounds per square foot (psf). An increase of one-third may be used for short-term wind or seismic loading if needed.

Perimeter footings should be buried at least 18 inches into the surrounding soil for frost protection. Interior footings should be buried at least 12 inches. However, all footings must penetrate to the prescribed bearing stratum, and no footing should be founded in or above organic or loose soils. If fill soils are encountered, we recommend recompacting the subgrade prior to placing footings.

Lateral loads can be resisted by friction between the foundation and the native soils or supporting structural fill soils, and by passive earth pressure acting on the buried portions of the foundations. The foundations must be backfilled with structural fill and compacted to at least 95 percent of the maximum dry density to achieve the passive resistance provided below. We recommend the following allowable design parameters which both include a factor of safety of at least 1.5:

- Passive equivalent fluid = 250 pounds per square foot (pcf)
- Coefficient of friction = 0.35

If retaining walls are required, we recommend they be designed assuming an active equivalent fluid pressure of 35 pcf for unrestrained walls that are free to yield. For restrained walls, an at-rest equivalent fluid pressure of 50 pcf should be assumed for design. For permanent walls, a seismic surcharge pressure should be added to these recommended equivalent fluid pressures. A seismic surcharge of 5H or 10H psf (H is the wall height in feet) is recommended for the active and at-rest loading conditions, respectively. The seismic surcharge should be modeled as a rectangular distribution with the resultant applied at the midpoint of the walls. These wall design recommendations assume the wall backfill is fully drained.

CLOSURE

We have enjoyed working with you on this study and are confident these recommendations will aid in the successful completion of your upgrade project. If you should have any questions or require further assistance, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

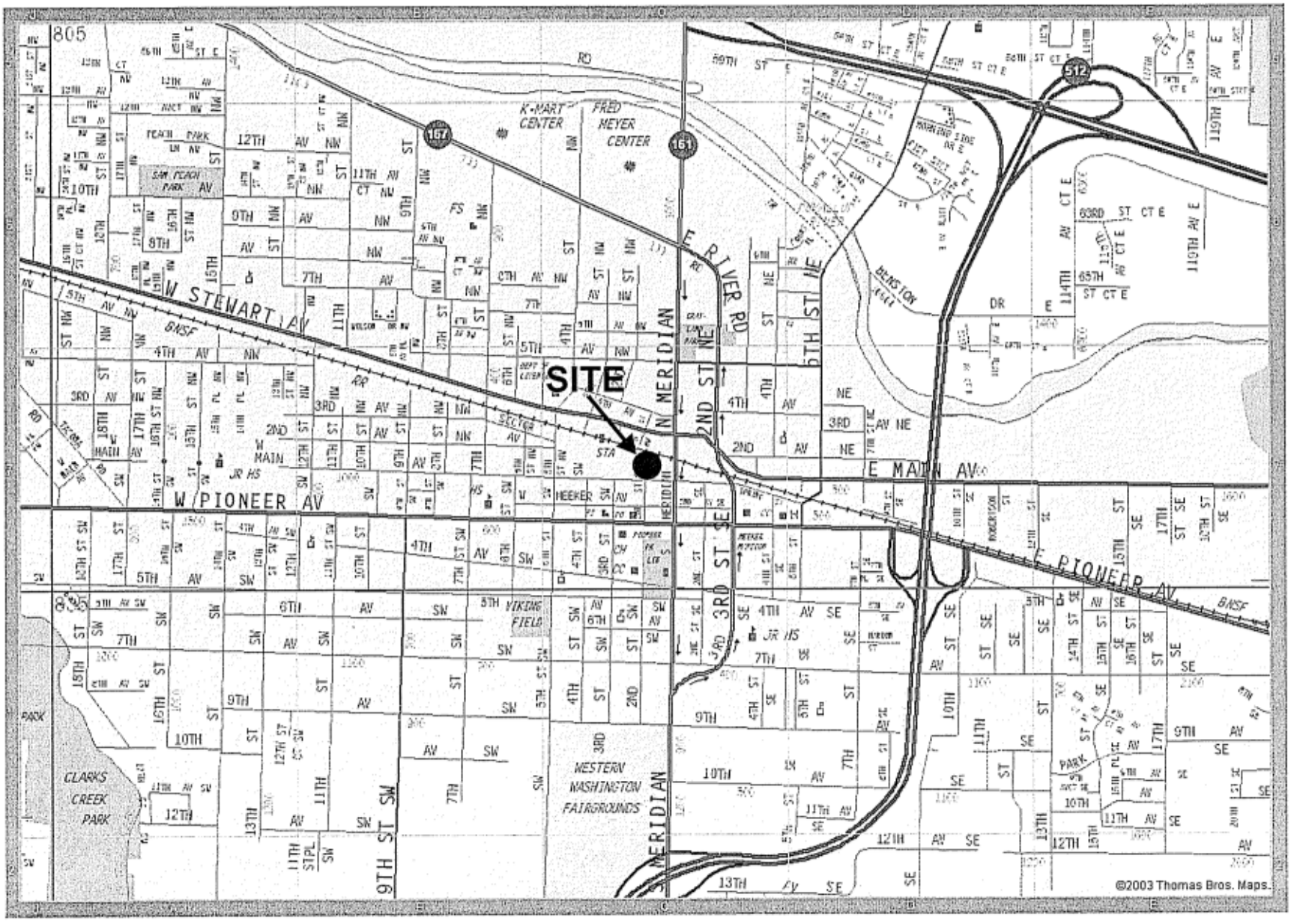
Kurt D. Merriman, P.E.
Digitally signed by Kurt D. Merriman, P.E.
Date: 2022.10.20 15:14:22 -07'00'

KURT D. MERRIMAN
STATE OF WASHINGTON
23580
REGISTERED
PROFESSIONAL ENGINEER

Aaron R. Turnley, G.I.T.
Senior Staff Geologist

Kurt D. Merriman, P.E.
Senior Principal Engineer

Attachments:
Figure 1. Vicinity Map from Referenced 2004 Study
Figure 2. Site and Exploration Plan from Referenced 2004 Study
Appendix. Exploration Logs and Laboratory Results from Referenced 2004 Study



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NOT TO SCALE

Associated Earth Sciences, Inc.

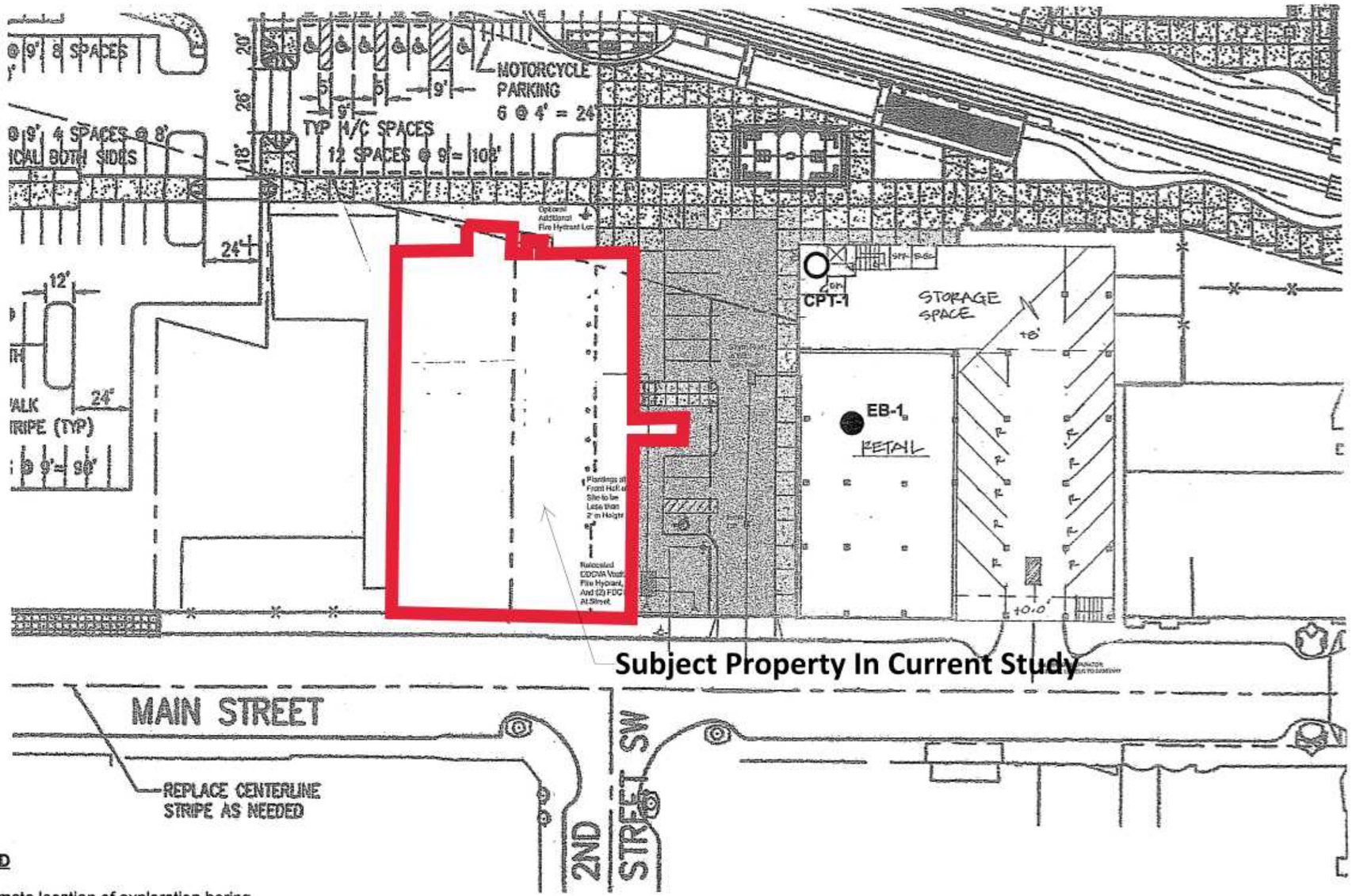
VICINITY MAP
CANNERY STATION GARAGE
PUYALLUP, WASHINGTON

FIGURE 1

DATE 11/04

PROJ. NO. KE04686A

04686 cannery station garage\04686-vicinity.cdr page1



LEGEND

EB-1 ● Approximate location of exploration boring

CPT-1 ○ Approximate location of cone penetrometer exploration

Reference: BCRA

N

0 100

SCALE IN FEET

04686 cannery station garage\04686 site.cdr

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SITE AND EXPLORATION PLAN
CANNERY STATION GARAGE
PUYALLUP, WASHINGTON

FIGURE 2

DATE 11/04

PROJ. NO. KE04686A

APPENDIX

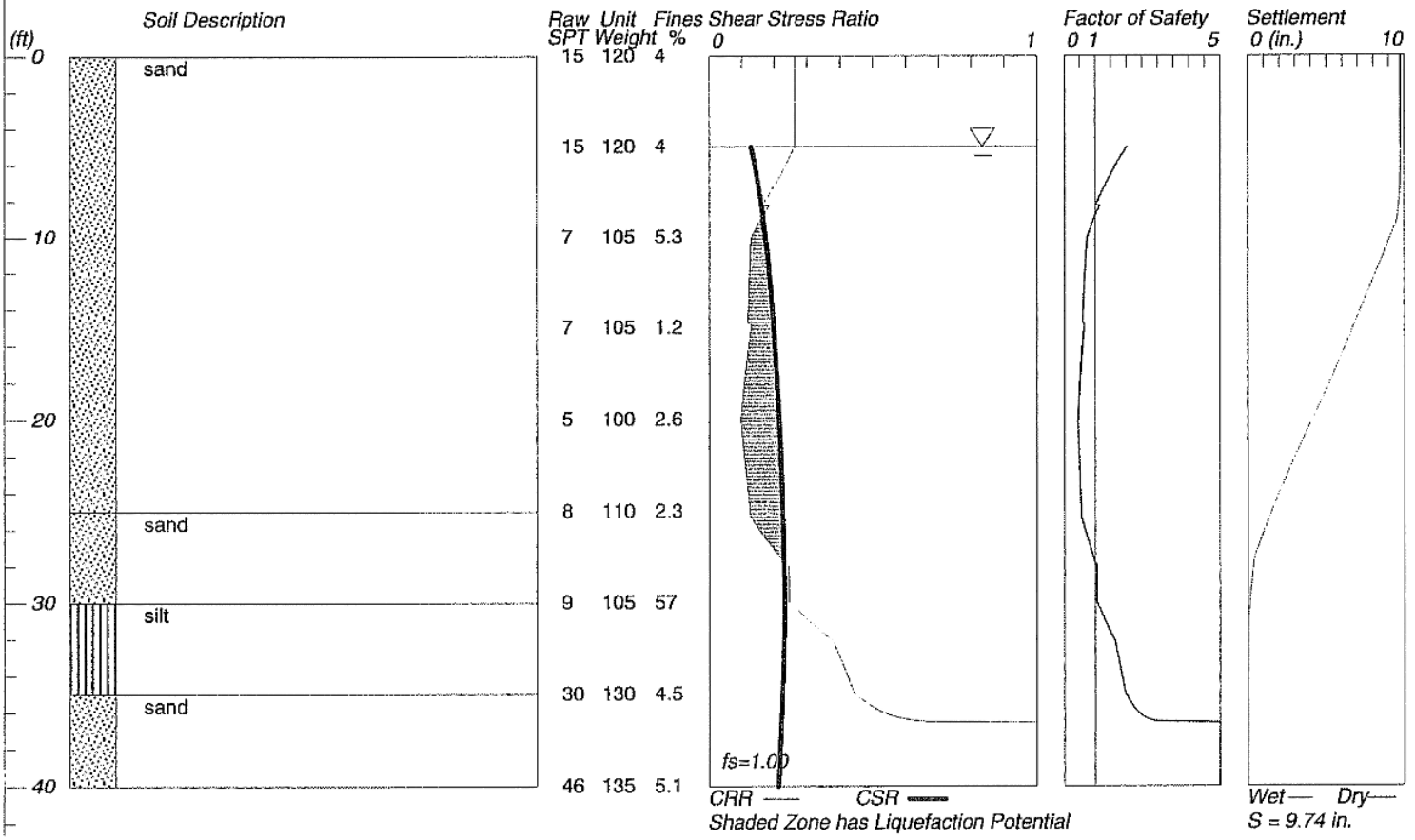
Exploration Logs and Laboratory Results from Referenced 2004 Study

LIQUEFACTION ANALYSIS

Cannery Station Garage

Hole No.=B-1 Water Depth=5 ft

Magnitude=6.5
Acceleration=.2g

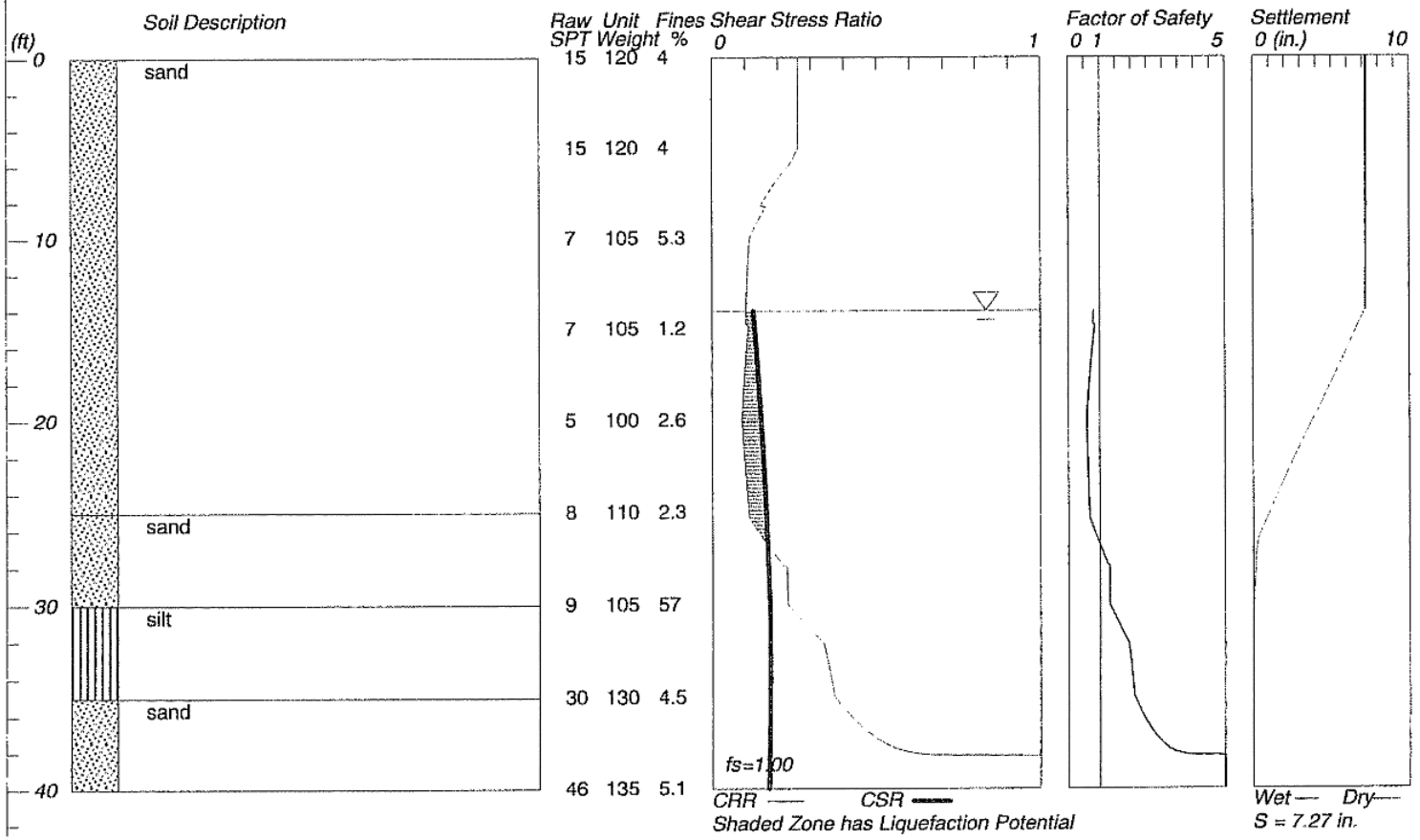


LIQUEFACTION ANALYSIS

Cannery Station Garage

Hole No.=B-1 Water Depth=14 ft

Magnitude=6.5
Acceleration=.2g



50
60
70

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Exploration Log

Project Number	Exploration Number	Sheet
KE04686A	EB-1	1 of 3

Project Name	Cannery Station Garage	Ground Surface Elevation (ft)	
Location	Puyallup, WA	Datum	N/A
Driller/Equipment	Geologic Drill / XC	Date Start/Finish	November, 2004
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Fill Dry, brown, silty fine SAND with gravel.					
5		S-1		**Alluvium** Slightly moist, brown, medium SAND.			7 7 8	▲15	
10		S-2		Wet, dark brown, silty very fine SAND.			5 4 3	▲7	
15		S-3		Wet, dark brown, fine to medium SAND, few organics and wood.		▼	1 3 4	▲7	
20		S-4		Few silt and gravel.			1 2 3	▲5	
25		S-5		Wet, gray, medium SAND with coarse sand and gravel.			3 3 5	▲8	
30		S-6		Wet, gray, SILT with fine sand interbedded with fine sand with silt.			1 1 8	▲9	
35		S-7		Wet, gray, medium SAND, trace silt and gravel.			11 12 18	▲30	
		S-8					21 24 22	▲46	

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

▽ Water Level ()

▼ Water Level at time of drilling (ATD)

Logged by: SGB

Approved by:

AESIBOR 046866A.GPJ November 19, 2004

Associated Earth Sciences, Inc.

Exploration Log

Project Number	Exploration Number	Sheet
KE04686A	EB-1	2 of 3

Project Name	Cannery Station Garage	Ground Surface Elevation (ft)	
Location	Puyallup, WA	Datum	N/A
Driller/Equipment	Geologic Drill / XC	Date Start/Finish	November, 2004
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
45		S-9		Wet, gray, SILT with fine sand, trace gravel and organics.			3 4 4	▲8	
50		S-10		Wet, gray clayey SILT with fine to medium sand, trace gravel.			1 0 1	▲1	
55		S-11		Wet, gray clayey SILT with sand and gravel.			2 3 2	▲5	
60		S-12		Few gravel.			5 1 3	▲4	
65		S-13					2 4 3	▲7	
70		S-14		Gray, fine SAND with silt			10 11 13	▲24	
75		S-15		Moist, gray, SILT with few organice, trace sand.			3 4 6	▲10	
		S-16		Moist, gray, very fine SAND with silt.			8 17 22	▲39	

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: SGB

Approved by:

AESIBOR 04686A.GPJ November 19, 2004

Associated Earth Sciences, Inc.

Exploration Log

Project Number	Exploration Number	Sheet
KE04686A	EB-1	3 of 3

Project Name: Cannery Station Garage
Location: Puyallup, WA
Driller/Equipment: Geologic Drill / XC
Hammer Weight/Drop: 140# / 30"

Ground Surface Elevation (ft):
Datum: N/A
Date Start/Finish: November, 2004
Hole Diameter (in):

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
85		S-17		As above.			5 11 12	▲23	
				Bottom of exploration boring at 85 feet					
90									
95									
100									
105									
110									
115									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ()
- Water Level at time of drilling (ATD)

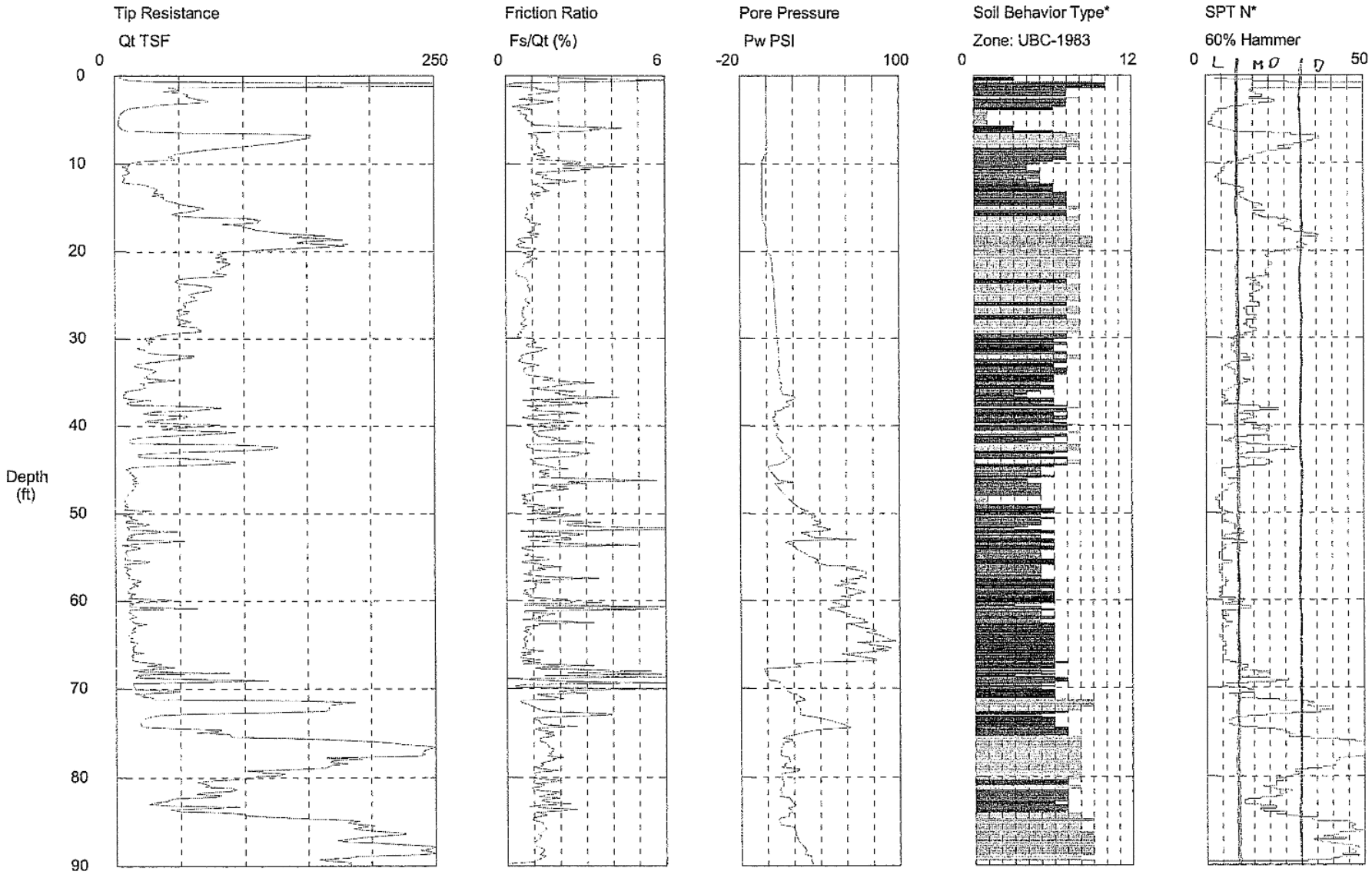
Logged by: SGB
Approved by:

AESIBOR 04686A.GPJ November 19, 2004

Associated Earth Sciences

Operator: Brown
Sounding: CPT-01
Cone Used: DSG0880

CPT Date/Time: 11/13/2004 4:11:48 PM
Location: Cannery Station Garage
Job Number: KE04686A



Maximum Depth = 89.90 feet

Depth Increment = 0.164 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

Pre-drilled top 6 feet though ACP and compacted select gravel fill

Near Kiosk in driveway
Northwest Cone Exploration

*Soil behavior type and SPT based on data from UBC-1983

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Percent Passing #200
ASTM D 1140

Date Sampled	Project	Project No.		Soil Description
11/12/2004	Cannery Station Garage	KE04686A		
Tested By	**Location**	**EB/EP No.**	**Depth**	
RDT				

Sample I.D.	EB-1 @ 3.5'	EB-1 @ 8.5'	EB-1 @ 13.5'
Wet Weight	939.0	610.0	1444.0
Dry Weight	898.0	537.0	1188.0
Water Weight	41.0	73.0	256.0
Pan	221.0	217.0	222.0
Actual Dry Weight	677.0	320.0	966.0
Percent of Water Weight	6.1	22.8	26.5
After Wash Weight	650.0	303.0	954.0
Percent Passing #200	4.0	5.3	1.2

Sample I.D.	EB-1 @ 18.5'	EB-1 @ 23.5'	EB-1 @ 27.5'
Wet Weight	849.0	495.0	895.0
Dry Weight	730.0	449.0	718.0
Water Weight	119.0	46.0	177.0
Pan	228.0	230.0	220.0
Actual Dry Weight	502.0	219.0	498.0
Percent of Water Weight	23.7	21.0	35.5
After Wash Weight	489.0	214.0	214.0
Percent Passing #200	2.6	2.3	57.0

Sample I.D.	EB-1 @ 32.5'	EB-1 @ 37.5'
Wet Weight	985.0	927.0
Dry Weight	828.0	813.0
Water Weight	157.0	114.0
Pan	225.0	220.0
Actual Dry Weight	603.0	593.0
Percent of Water Weight	26.0	19.2
After Wash Weight	576.0	563.0
Percent Passing #200	4.5	5.1