# MACKENZIE.





City of St. Helens St. Helens Police Station City Council Update | 04.02.2025

IMPORTANCE FACTOR SCORING MATRIX - INDIVIDUAL SCORES																				
CRITERIA	MA	YOR	COMMIS	SSIONER	COUN	CILOR	COMMIS	SIONER	COUN	CILOR	COMMIS	SSIONER	COMMIS	SIONER	COUN	CILOR	COUN	CILOR	ADMINIS	STRATOR
RANK 1 (least suited) OR 2 (best suited)	Mas	ssey	David Ro	sengard	Brandon	Sundeen	Scott Ja	cobson	Mark Gu	ndersen	Brooke	e Sisco	Jennifer S	hoemaker	Jessica	Chilton	Russ H	ubbard	John \	Walsh
	1771	Gable	1771	Gable	1771	Gable	1771	Gable	1771	Gable	1771	Gable	1771	Gable	1771	Gable	1771	Gable	1771	Gable
1 Cost of Land/Site Developments	2	1	1	2	1	2	1	2	1	2	2	1	2	1	1	2	2	1	2	1
2 Size of Site	2	1	1	1	1	2	2	2	2	1	2	1	2	2	1	2	2	1	2	1
3 Shape of Site	2	1	1	1	2	1	2	1	2	1	1	1	2	1	1	2	2	1	1	1
4 Existing Design Reuse	2	1	1	1	2	1	1	1	2	1	2	1	2	1	1	2	2	1	1	1
5 Public Access to Site - Vehicle	2	1	2	1	1	1	2	1	2	1	2	2	2	1	2	1	2	1	2	1
6 Public Access to Site - Transit	2	1	2	1	1	1	2	1	2	1	2	2	2	1	2	1	2	1	2	1
7 Public Access to Site - Pedestrian/Bicycle	2	1	2	1	2	1	2	1	2	1	2	2	2	1	2	1	2	1	2	1
8 Visibility and Prominence	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1
9 Proximity to Government Functions	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	2	2	1	2	1
10 Neighborhood Context	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1	2	2	1	2	1
11 Positioning on Site	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12 Security	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1	2	2	1	2	1
13 Traffic Congestion	1	1	1	1	1	1	2	1	2	1	2	1	2	1	1	2	2	1	2	1
14 Flood Plain Impact	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15 Proximity to Geographic Center	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16 Current Ownership	1	2	2	1	1	2	1	1	2	1	1	2	2	1	1	2	2	1	1	1
17 Land Use	2	1	2	1	2	1	2	1	2	1	2	1	1	1	1	1	2	1	2	1
18 Response Time	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ASSESSMENT SCORE	30	19	27	19	26	21	29	20	31	19	30	22	31	19	23	27	32	18	29	18
CUMULATIVE RANK (BASED ON SCORE)	1	2	1	2	1	2	1	2	1	2	1	2	1	2	2	1	1	2	1	2

TOTAL SCORE: 1771 COLUMBIA 288 1st
TOTAL SCORE: GABLE RD 202 2nd

Not Present: Charles Castner and Reid Harman

# Appraisal Justification for 1771 Columbia Site

3/27/2025

# **Estimated Project Cost for various Sites**

ltem	Columbia Site	Gable Road Site	New Greenfield Site	<b>Existing Police Site</b>	Sheriff Site	Notes
	LICW 2.2 Fatimata	12 months land	Assumes correct	New Design	Flood Plain issue	New Design needed for Existing Police site. Others
	HSW 3.2 Estimate	use	zoning	needed	Flood Plain Issue	reuse existing Kaster Design
						Green field is HSW 3.2 Columbia Estimate with
						Escalation for 6 months minimum at 4%. Gable Site is
Hard Cost	\$ 11,440,000.00	\$ 12,355,200.00	\$ 11,897,600.00	\$ 11,897,600.00	\$ 11,897,600.00	HSW 3.2 for 1 year at 8% due to land use
Offsite			\$ 100,000.00		\$ -	potential half street
Onsite			\$ 100,000.00		\$ 200,000.00	potential rock ex or grade issues
Building Demo	Included	\$ 80,000.00	\$ -	\$ 80,000.00	\$ -	Existing Police Demo
						includes new Survey and Geotech but needs to be
Professional Services	\$ 1,913,000.00	\$ 1,913,000.00	\$ 1,913,000.00	\$ 1,913,000.00	\$ 1,913,000.00	done [added] on all sites
						new site evaluation/ assumes reuse of the existing
Additional Landuse Civil and Landscape work	\$ 50,000.00	\$ 50,000.00	\$ 50,000.00	\$ 50,000.00	\$ 50,000.00	plans
New Building design due to Site constraints				\$ 500,000.00		Needs new design due to site size and constraints
City Costs	\$ 2,445,000.00	\$ 2,445,000.00	\$ 2,445,000.00	\$ 2,445,000.00	\$ 2,445,000.00	
						Police Relocation Cost. 2 moves. Temp Com Does
				\$600,000.00		rental space exist? School modulars? Utility
Extensive issues with Police Operations relocation				\$ 400,000.00	-	Connections are needed Parking Site purchase
Grand Total marginal additional Cost	\$ 15,848,000.00	\$ 16,843,200.00	\$ 16,505,600.00	\$ <del>17,285,600.00</del>	\$ 16,505,600.00	
Difference between Columbia site build and other sites		\$ 995,200.00	\$ 657,600.00	\$ <del>1,437,600.00</del>	\$ 657,600.00	
	-	-	-	\$17,885,600	-	
Purchase Price Ask	\$ 1,250,000,00		•	. φ17,000,000		

Purchase Price Ask \$ 1,250,000.00 Appraised Price for Columbia Site 700,000.00 Differertial between Ask and Appraisal 550,000.00

\$2,037,600

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SITE 1: 1771 Columbia Boulevard

SITE 2: 1271 Columbia Boulevard (Existing Police Site)

SITE 3: Columbia County Sheriff's Office

SITE 4: 2675 Gable Road

# SCHEDULE CONSIDERATIONS

SANITARY SEWER LINE RELOCATION

# LAND USE APPROVAL PROCESS

- CITY PLANNING STAFF RECOMMEND A ZONE CHANGE (FOR THE SOUTHERN 3/4 CURRENTLY ZONED AS GC) TO HBD ZONE SINCE IT PERMITS PUBLIC SAFETY AND SUPPORT FACILITIES OUTRIGHT
- ASSUMING ZONE CHANGE IS APPROVED, PROJECT WOULD REQUIRE SITE DEVELOPMENT REVIEW APPROVAL BY PLANNING DIRECTOR PRIOR TO BUILDING PERMITSW



#### **LOCATION**

- 1771 Columbia Blvd. St. Helens. OR
- Tax Lots: 4104-CA-20900, 21000, 21100, 21200, 21300, 21400

#### SIZE

■ 1.04 Acres

#### ZONING

- Houlton Business District (HBD) for northern 1/4 lots abutting Columbia Blvd. Allows "Public safety and support facilities" and "Public facilities, major" outright
- General Commercial (GC) for the southern 3/4. Allows "Public facilities, major" as Conditional Use but does not list "Public safety and support facilities"

#### TRANSPORTATION ACCESS

- Pedestrian
- Bike

#### **DEVELOPMENT STANDARDS**

- Building Setbacks: Maximum front yard of zero in HBD zone (no setback standards elsewhere)
- Maximum Building Coverage: 90%
- Minimum Landscaping Area: 10%
- Max. Building Height: 45 feet
- Minimum Parking Ratio:
   1 space for every employee on largest shift using "Public Safety Services" category





#### SITE 2: 1271 COLUMBIA BLVD

#### LOCATION

- 1271 Columbia Blvd St. Helens, OR
- Tax Lot: 4N1W-4AC-1000, 902, 900 & 701

## SIZE

■ 1.5 Acres

#### ZONING

■ Houlton Business District (HBD)

#### TRANSPORTATION ACCESS

- Bus
- Bike

#### SITE INFORMATION

- Building Setbacks: Maximum front yard of zero
- Maximum Building Coverage: 90%
- Max. Building Height: 45 ft
- Minimum Parking Ratio: No maximum. Minimum is 1 space for every employee on largest shift using "Public Safety Services" category



SANITARY AND STORM EASEMENT (WIDTH UNKNOW

#### **PROGRAM**

- One story Police Facility
- Some covered secured parking
- Separate public and secured parking

#### **PROS**

- Property already owned by the
   Project must be phased due City
- Entire parking program can be accommodated on site
- Directly adjacent to Fire Station
- Adjacent on-street parking could count towards public parking

#### CONS

- to proximity of existing Police Facility
- Legal lot definition coordination with Fire Station
- New building design might have to be modified in order to accommodate a drive aisle to connect the two secure parking areas
- Will require relocation of police operations during construction





# PS ANNUAL CHANCE OF FLOOD HAZARD (100 PLOOD HAZARD (500 PLOOD HAZARD (500 PLOOD HAZARD DESIGN CURRENT POLICE STATION BUILDING DESIGN Legend Tax Lot 700 Year Flood Point line Soo Year Flood Point line



## SITE 3: COLUMBIA COUNTY SHERIFF'S OFFICE

#### LOCATION

- 901 Port Avenue St. Helens, OR
- Tax Lot: 4N1W-9B-200

#### SIZE

■ 10.67 Acres

#### ZONING

Heavy Industrial (HI)

#### TRANSPORTATION ACCESS

Bus

#### SITE INFORMATION

- Building Setbacks: No specific yard (setback) requirement in HI zone.
- Maximum Building Coverage: No basic standard for HI zone.
- Max. Building Height: 75'
- Minimum Parking Ratio: No maximum. Minimum is 1 space for every employee on largest shift using "Public Safety Services" category. Additional spaces should be considered for areas open to the public.
- Allowed Use: Conditional Use in the HI zone.
- No frontage improvements anticipated.

#### **PROGRAM**

- One story Police Facility
- Shared secured parking
- Shared separate public and secured parking

#### **PROS**

- Entire parking program can be accommodated on site provided sharing with Sheriff is allowed
- Minimal site work due to existing use
- Existing police building design can be utilized with minimal re-design

#### CONS

- Portion of building and parking in flood plain
- Limited access to site during flood events

- Potential need to expand secure parking to accommodate demand for both Sheriff and Police parking requirement
- Construction will need to be phased to enable continued operation of facility and access/egress to and from site
- May require raising grade above the flood plain elevation, which could affect public parking and entry access of existing Sheriff's building

# **GABLE RD** ENCLOSURE DEMOLISHED WALL/FENCE EXISTING BUILDINGS EXANDRA CARPORT ABOVE FUTURE SITE EXPANSION STORMWATE TRANSFORMER GENERATOR 3 TRAILER SPACES HAMMER HEAD TURN-AROUND ALDER ST. SECONDARY EMERGENCY ACCESS, GRAVEL RD

#### **LOCATION**

- 2675 Gable Road St. Helens, OR
- Tax Lots: 4108-BA-03800, 03900, and 4108-BB-01400

#### SIZE

■ 1.71 Acres

#### ZONING

- Eastern 2 parcels are zoned Apartment Residential (AR) by City. Allows "Public facilities, major" as Conditional Use but does not list "Public safety and support facilities"
- Western parcel is zoned Multiple Family Residential (MFR) by Columbia County. Does not permit police facilities

#### TRANSPORTATION ACCESS

- Pedestrian
- Bike

#### **DEVELOPMENT STANDARDS**

- Building Setbacks:
   Minimum front yard of 20 feet
   Minimum rear yard of 10 feet
   Minimum interior yard of 6 feet
- Maximum Building Coverage: 50%
- Minimum Landscaping Area: 25%
- Max. Building Height: 35 feet
- Minimum Parking Ratio:
   1 space for every employee on largest shift using "Public Safety Services" category

#### **EXHIBIT A**

# **SCHEDULE CONSIDERATIONS**

- UNKNOWN IMPACTS WITH NEIGHBORS
- WETLANDS IMPACTS WOULD REQUIRE PERMITS FROM OREGON DEPARTMENT OF STATE LANDS AND/OR US ARMY CORPS OF ENGINEERS

## LAND USE APPROVAL PROCESS

- CITY PLANNING STAFF RECOMMEND A ZONE CHANGE TO ONE THAT LISTS PUBLIC SAFETY AND SUPPORT FACILITIES (E.G. PUBLIC LANDS (PL) OR RESIDENTIAL-5 (R-5)
- ASSUMING ZONE CHANGE IS APPROVED, PROJECT WOULD REQUIRE CONDITIONAL USE PERMIT APPROVAL BY PLANNING COMMISSION PRIOR TO BUILDING PERMITS
- PARTITION OR LOT LINE ADJUSTMENT MAY ALSO BE REQUIRED
- ANY DEVELOPMENT ON THE COUNTY-ZONED PARCEL WOULD REQUIRE ANNEXATION AND CITY ZONING

# **Exhibit B**

Report of Geotechnical Engineering Services

**City of St. Helens Public Safety Building** 

St. Helens, Oregon

August 13, 2025













Vancouver, Washington • Phone: 360-823-2900 Portland, Oregon • Phone: 971-384-1666 www.columbia-west.com

August 13, 2025

Otak 808 SW Third Avenue, Suite 800 Portland, OR 97204

Attn: David Lintz

Re: Report of Geotechnical Engineering Services

**City of St. Helens Public Safety Building** 

1771 Columbia Boulevard

St. Helens, Oregon

**CWE Project: Otak-3-01-1** 

Columbia West Engineering, Inc. (Columbia West) is pleased to present this geotechnical report for the proposed City of St. Helens Public Safety Building in St. Helens, Oregon. Our services were conducted in accordance with the Subconsultant Agreement between Otak and Columbia West dated July 14, 2025.

We appreciate the opportunity to work on the project. Please contact us if you have any questions regarding this report.

Sincerely,

Nick Paveglio, PE Principal Engineer

NNP:kat

Attachments

Document ID: Otak-3-01-1-081325-geor.docx

RED PROFESSION BEGON OREGON OREGON OF AS N PAREN

**EXPIRES: 12/31/26** 

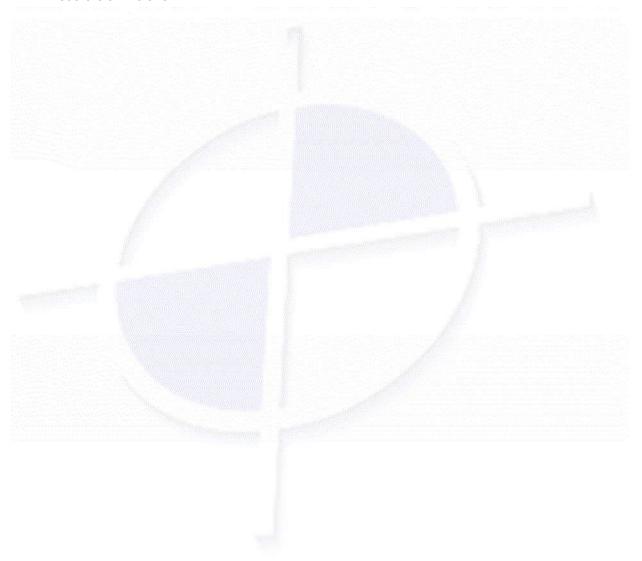
#### **EXECUTIVE SUMMARY**

This section provides a summary of the geotechnical considerations associated with the proposed City of St. Helens Public Safety Building in St. Helens, Oregon. Our conclusions and recommendations are based on the subsurface information presented in the report and proposed development information provided by the design team. A detailed discussion of the geotechnical considerations summarized herein is presented in respective sections of the report.

- USTs were previously located at the site. While documentation indicates the USTs were removed, the exact locations, depths, and type of backfill used are unknown. Based on available information, USTs were likely located in the northwest portion of the site, although they may also have been present in other areas.
- Competent basalt is likely present between depths of 2 and 6 feet BGS. Based on the
  depth to competent basalt, significant rock excavation could be required to develop the
  site if significant cuts are planned.
- The proposed building can be supported on conventional spread footings on firm, native soil. Undocumented fill is not suitable to support foundations for the building. All undocumented fill should be completely removed from beneath building footings (to native soil) and replaced with compacted crushed rock.
- There is a small risk for poor performance of floor slabs and pavement established directly
  over undocumented fill. To eliminate the risk of poor performance, undocumented fill
  should be removed and replaced after site stripping and cuts. Alternatively, the fill can
  remain in place if it is evaluated as described in this report, provided the owner is willing
  to accept a small risk of floor slab cracking and irregular pavement.
- Based on the soil and groundwater conditions at the site, seismic settlement and lateral spreading are not design considerations for the project.
- Static groundwater is more than 20 feet BGS at the site; however, there is a possibility that perched groundwater will be present at shallower depths across the site, particularly in the wet season and where permeable soil is underlain by less permeable soil. The contractor should be prepared for dewatering at the site.
- Irregular surfaces may be present in the bases of excavations for foundations, floor slabs, and pavement areas. If irregular surfaces are present, they should be removed and replaced with compacted crushed rock to create a generally level surface. Boulders and cobbles should not be left to protrude into footings.



- The near-surface soil at the site generally consists of granular material with variable proportions of silt. Trafficability on the near-surface soil will likely be possible during dry periods but difficult during extended wet periods. The subgrade should be protected from disturbance and damage by construction traffic.
- Based on testing and the soil and rock conditions, stormwater infiltration systems are not feasible at the site.





# **Exhibit B**

Report of Geotechnical Engineering Services City of St. Helens Public Safety Building

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# **Exhibit B**

Report of Geotechnical Engineering Services City of St. Helens Public Safety Building

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#### **ABBREVIATIONS AND ACRONYMS**

AASHTO American Association of State Highway and Transportation Officials

AC asphalt concrete

ACP asphalt concrete pavement

ASCE American Society of Civil Engineers

ASTM ASTM International
BGS below ground surface
CSZ Cascadia subduction zone

fps feet per second

g gravitational acceleration (32.2 feet/second<sup>2</sup>)

GPS global positioning system H:V horizontal to vertical

IBC International Building Code

km kilometer(s)

MCE maximum considered earthquake

MFA Maul Foster & Alongi, Inc.
mm/yr millimeter(s) per year
Mw moment magnitude
NA not applicable

ORS Oregon Revised Statute

OSSC 2024 Oregon Standard Specifications for Construction

PCC portland cement concrete
pcf pounds per cubic foot
pci pounds per cubic inch
PG performance grade
psf pounds per square foot
psi pounds per square inch
ReMi refraction microtremor

SOSSC State of Oregon Structural Specialty Code

USDA U.S. Department of Agriculture

USGS U.S. Geological Survey
UST underground storage tank

Vs<sub>100</sub> average shear wave velocity for the upper 100 feet of the soil profile



# REPORT OF GEOTECHNICAL ENGINEERING SERVICES CITY OF ST. HELENS PUBLIC SAFETY BUILDING ST. HELENS, OREGON

#### 1.0 INTRODUCTION

Columbia West is pleased to submit this geotechnical report for the proposed City of St. Helens Public Safety Building in St. Helens, Oregon. The approximately 50,000-squre-foot site is located at 1771 Columbia Boulevard. The site is shown relative to surrounding physical features on Figure 1. Figure 2 shows the existing conditions of the site. Abbreviations and acronyms used herein are defined immediately following the Table of Contents.

Based on correspondence with Otak, we understand an approximately 11,000- to 12,000-square-foot, single-story public safety building will be constructed at the site. The building will be constructed in the northwest portion of the site with the remaining portions consisting of associated infrastructure, including parking lots, driveways, and utilities.

Building loads were unknown at the time this report was prepared; however, we anticipate maximum column and wall loads for the building will be less than 200 kips and 8 kips per lineal foot, respectively, with floor slab loading of up to 200 psf. Based on the topography at the site, we anticipate cuts and fills will generally be less than 5 feet.

#### 2.0 BACKGROUND

Based on documentation provided by Maul Foster & Alongi, Inc. (MFA; Maul Foster & Alongi, Inc. 2024), the following environmental activities occurred at the site.

- In 1989, one 4,000-gallon gasoline UST and one, 4,000-gallon diesel UST were decommissioned at the site. The documentation does not indicate the activities associated with the decommissioning or if the USTs were removed.
- In 2004, four previously decommissioned 2,000-gallon USTs were removed and taken to a scrap yard. An additional 180 tons of petroleum-contaminated soil were removed from around the removed USTs and taken to a local landfill. This is no record of backfill type or compaction techniques.

MFA indicates there are no maps showing the locations of the decommissioned/removed USTs at the site. We obtained a log of a boring that was completed as part of an environmental testing program in 2003 from the Oregon Water Resources Department. While specific locations of USTs are not shown, it includes a site plan that indicates at least one UST was present near South 18<sup>th</sup> Street, west of the northern most building at the site. Figure 3 shows a plan associated with the borings in 2003.

#### 3.0 PURPOSE AND SCOPE

The purpose of our services was to provide geotechnical engineering recommendations for use in design and construction of the proposed project. Specifically, we completed the following tasks:



- Reviewed information available in Columbia West's files for the site vicinity.
- Coordinated and managed the field exploration program, which including locating utilities, coordinating site access, and scheduling subcontractors and Columbia West field staff.
- Drilled five borings to depths between 5.1 and 20.1 feet BGS.
- Collected soil samples from the explorations for laboratory testing and maintained a log of encountered soil and groundwater conditions in the explorations.
- Completed shear wave velocity testing (ReMi) in the upper 100 feet of soil at the site for use in the site-specific seismic hazard evaluation required for the project.
- Completed a laboratory testing program using select soil samples collected from the explorations, including the following:
  - Three moisture content determinations in general accordance with ASTM D2216
  - Three particle-size analyses in general accordance with ASTM D1140
- Prepared this geotechnical report that summarizes our explorations, laboratory testing, and analyses and provides geotechnical design criteria and construction recommendations for the development, including information relating to the following:
  - Summary of soil and groundwater conditions at the site
  - Exploration logs and laboratory testing results
  - Recommendations for shallow foundation support, including allowable bearing pressure, modulus of subgrade reaction, and total and differential settlement
  - Passive earth pressure and coefficient recommendations for foundations and walls
  - A site-specific seismic hazard evaluation that includes spectral response acceleration at short and 1-second periods ( $S_s$  and  $S_1$ )
  - Recommendations for managing groundwater for design of structures and pavement
  - Lateral earth pressure design for walls
  - Recommendations for AC and PCC design and construction based on loading information provided by the design and ownership team
  - Recommendations for temporary excavations
  - Discussion of slope stability
  - Recommendations for rock excavation, if necessary
  - Recommendations for cut and fill
  - Discussion of underslab and foundation drainage

#### 4.0 SITE CONDITIONS

#### 4.1 GEOLOGY

Geologic conditions at the site are mapped as the Sentinel Bluffs member of Columbia River basalt flows in the region. The basalt is mapped as much as 300 feet thick in the area (Evarts 2004).

The USDA Web Soil Survey indicates the near-surface soil at the site consists of rock outcrop comprised of 2 to 3 feet of variable soil underlain by unweathered bedrock (USDA 2025).

#### 4.2 SURFACE CONDITIONS

The approximately 50,000-square-foot site is located in downtown St. Helens, Oregon. The site is bounded by Columbia Boulevard to the north, South 17<sup>th</sup> Street to the east, Cowlitz Street, to the south, and South 18<sup>th</sup> Street to the west. The site is fully developed and occupied by two single-



story buildings in the northwest portion of the site. The remainder of the site is an AC-paved parking/storage lot that is fully fenced. Topography at the site grades gently downward from north to south between elevations of approximately 100 and 112 feet. Vegetation is limited to trees and grass in planter strips in the rights-of-way around the site.

#### 4.3 SUBSURFACE CONDITIONS

#### 4.3.1 General

Subsurface conditions at the site were explored by drilling five borings (B-1 through B-5) to depths between 5.1 and 20.1 feet BGS. The exploration locations are shown on Figure 2. A description of our field exploration program and the exploration logs are presented in Appendix A. A description of our laboratory testing program and the test results are presented in Appendix B.

In addition to the borings, one ReMi array (A-1) was completed to measure the shear wave velocity of the subsurface soil at the site to support the site-specific seismic hazard evaluation. ReMi array A-1 was completed at the location shown on Figure 2. The shear wave velocity test results are presented in Appendix C.

A summary of the subsurface conditions is presented below.

#### 4.3.2 Soil Conditions

#### 4.3.2.1 Pavement Section

Pavement sections consisting of approximately 2 to 4 inches of AC over 0 to 2 inches of aggregate base were observed in the all of the borings completed at the site.

#### 4.3.2.2 Fill

Fill was observed in boring B-1 directly below pavement section. The fill consists of loose, silty gravel with sand. Based on the location of boring B-1 and the discussion in Section 2.0 (Background), we anticipate the fill is associated with a former UST. The fill extends to a depth of approximately 5 feet BGS. It is possible that additional fill is present at the site and particularly in the northwest portion.

#### 4.3.2.3 Gravel (Fractured Basalt)

Very dense gravel is present below the pavement section or fill. The gravel is fractured basalt that is known to be shallow in the area. The gravel contains variable proportions of silt and sand, is fine to coarse, and is subangular.

It is difficult to determine the competency and rippability of the fracted basalt based on the drilled borings. The ReMi testing results indicate very high shear wave velocities at approximately 6 feet BGS that could indicate competent basalt.

#### 4.3.2.4 Competent Basalt

Competent basalt is present below the fractured basalt. The competent basalt contact is difficult to predict based on the explorations. Additional geophysical testing can be completed at the site to determine the depth to competent basalt if significant site cuts are anticipated.



#### 4.3.3 Groundwater

The well logs described in Section 2.0 (Background) and our recent explorations did not encounter groundwater to depths of 20 feet BGS. We anticipate static groundwater at the site is deep; however, perched groundwater could be present at shallower depths and particularly near the interface of soil and competent basalt.

#### 4.4 GEOLOGIC HAZARDS

#### 4.4.1 Seismic Settlement and Lateral Spreading

Liquefaction is caused by a rapid increase in pore water pressure that reduces the effective stress between soil particles. Granular soil, which relies on interparticle friction for strength, undergoes a loss of strength until the excess pore pressures dissipate. In general, loose, saturated sand soil with low silt and clay content is the most susceptible to liquefaction. Silty soil with low plasticity can be susceptible to strain softening under relatively higher levels of ground shaking. Strainsoftened soil has volumetric strains much smaller than liquefiable soil due to matrix effects.

Lateral spreading is a liquefaction-related seismic hazard and occurs on gently sloping or flat sites underlain by liquefiable sediment adjacent to an open face, such as a riverbank. Liquefied soil adjacent to an open face can flow toward the open face, resulting in lateral ground displacement.

Based on the soil and groundwater conditions and results of geophysical testing at the site, it is our opinion that liquefaction and lateral spreading are not design consideration for the project.

#### 4.4.2 Other Geologic Hazards

A discussion of other geologic hazards that could affect the site are discussed in the Site-Specific Seismic Hazard Evaluation presented in Appendix D.

#### 5.0 DESIGN

#### 5.1 FOUNDATION SUPPORT

#### 5.1.1 General

Building loads were unknown at the time this report was prepared; however, we anticipate maximum column and wall loads for the building will be less than 200 kips and 8 kips per lineal foot, respectively. Based on the subsurface conditions at the site, foundations for structures associated with development can be supported on conventional spread footings on firm, native soil.

Foundations should not be constructed on undocumented fill that is present in portions of the site. Based on explorations and documentation, we anticipate there is a high likelihood of fill in the north and particularly the northwest portions of the site. Undocumented fill should be completely removed to native soil if it is encountered below footings. Upon verification of native soil by a member of our field staff, the over-excavation should be backfilled with compacted crushed rock to the planned footing base. Over-excavation should extend 6 inches beyond the margins of the footings for every foot excavated below the base grade of the footing. Crushed rock should be compacted to not less than 95 percent of maximum dry density as determined by ASTM D1557 or until well keyed as determined by one of our geotechnical staff.



#### 5.1.2 Dimensions and Capacities,

Footings should be established on firm native soil evaluated by Columbia West. Footings should be proportioned for an allowable bearing pressure of 3,500 psf. This value is a net bearing pressure; the weight of the footing and overlying backfill can be ignored in calculating footing sizes. The recommended allowable bearing pressure applies to the total of dead plus long-term live loads and can be increased by one-third for short-term loads resulting from wind or seismic forces.

Continuous isolated spread footings or circular footings should be at least 24 inches wide or 24 inches in diameter, respectively. Continuous footings should be a minimum of 18 inches wide. The bottoms of exterior footings should be at least 18 inches below the lowest adjacent exterior grade. The bottoms of interior footings should be established at least 12 inches below the base of the slab. If footings are excavated in the wet season, we recommend they are covered with a minimum of 6 inches of crushed rock shortly after excavation to prevent softening of the subgrade soil.

Irregular surfaces may be present at the bases of excavations due to fractured basalt. If irregular surfaces are present, they should be removed and replaced with compacted crushed rock to create a generally level surface.

If footings are constructed after fill-induced settlement is complete, total post-construction consolidation settlement is expected to be less than 1.0 inch with differential settlement less than 0.5 inch over a 50-foot span.

#### 5.1.3 Resistance to Sliding

Lateral loads on footings can be resisted by passive earth pressure on the sides of structures and by friction on the bases of footings. Our analysis indicates that the available passive earth pressure for footings confined by native soil and structural fill is 300 pcf, modeled as an equivalent fluid pressure. Typically, the movement required to develop the available passive resistance may be relatively large; therefore, we recommend using a reduced passive equivalent fluid pressure of 250 pcf. Adjacent floor slabs, pavement, or the upper 12-inch depth of unpaved areas should not be considered when calculating passive resistance. In addition, in order to rely on passive resistance, a minimum of 5 feet of horizontal clearance must exist between the faces of the footings and any adjacent down slopes.

An allowable coefficient of friction equal to 0.35 can be used for footings supported on native soil. If a minimum of 6 inches of gravel is placed at the base of a footing, the coefficient of friction can be increased to 0.45.

#### **5.1.4** Subgrade Observation and Preparation

All footing subgrade should be evaluated by a representative of Columbia West to confirm suitable bearing conditions. Observations should also confirm that loose or soft material, organic material, unsuitable fill, prior topsoil zones, and softened subgrade (if present) have been removed. Localized deepening of footing excavations may be required to penetrate any deleterious or soft material, particularly during wet weather conditions.



#### 5.2 FLOOR SLABS

As previously discussed, fill from former USTs is present at the site. Due to the variable composition of the fill and the unknown methods of placement and compaction, reliable strength properties for undocumented fill are difficult to predict and there is a risk for poor performance of floor slabs established directly over undocumented fill and buried topsoil.

To eliminate all risk of poor floor performance, undocumented fill should be removed, moisture conditioned, and re-compacted or removed and replaced after site stripping and cuts. Buried topsoil should be completely removed. Alternatively, floor slabs can be constructed on undocumented fill and buried topsoil, provided a risk of distress is accepted and it is evaluated by Columbia West. Refer to Section 6.1.4 (Undocumented Fill) for additional discussion.

A minimum 6-inch-thick layer of imported granular material should be placed and compacted over the prepared subgrade to assist as a capillary break. The floor slab base rock should be crushed rock or crushed gravel and sand meeting the requirements outlined in Section 6.5.1 (Structural Fill). The imported granular material should be placed in one lift and compacted to not less than 95 percent of maximum dry density as determined by ASTM D1557. Floor slab base rock contaminated with excessive fines (greater than 5 percent by dry weight passing the U.S. Standard No. 200 sieve) should be replaced.

Satisfactory subgrade support for building floor slabs at existing grades supporting loads of up to 200 psf is possible, provided the subgrade is prepared as recommended in this report. A modulus of subgrade reaction (k) of 120 pci should be used for design of floor slabs.

Flooring manufacturers often require vapor barriers to protect flooring and flooring adhesives. Many flooring manufacturers will warrant their product only if a vapor barrier is installed according to their recommendations. Selection and design of an appropriate vapor barrier, if needed, should be based on discussions among members of the design team. We can provide additional information to assist you with your decision.

#### 5.3 SEISMIC DESIGN CRITERIA

Seismic design is currently prescribed by the 2022 SOSSC. Based on shear wave velocity testing at the site, the seismic site class per ASCE 7-16 is B. Public safety buildings are considered "essential facilities" under ORS 455.447 and require a site-specific seismic hazard evaluation. Our Site-Specific Seismic Hazard Evaluation, which includes seismic design parameters, is presented in Appendix D.

#### 5.4 RETAINING STRUCTURES

#### 5.4.1 Assumptions

Our retaining wall design recommendations are based on the following assumptions: (1) the walls are cantilevered walls, (2) the walls are less than 10 feet in height, (3) drainage is provided behind the walls, (4) the retained soil has a slope flatter than 4H:1V, and (5) the ground surface at the toes of the walls has an inclination of flatter than 5H:1V. Re-evaluation of our recommendations will be required if the retaining wall design criteria for the project varies from these assumptions.



#### **5.4.2 Wall Design Parameters**

Permanent retaining structures free to rotate slightly around the base should be designed for active earth pressures using an equivalent fluid unit pressure of 35 pcf. If retaining walls are restrained against rotation during backfilling, they should be designed for an at-rest earth pressure of 55 pcf.

Seismic lateral forces can be calculated using a dynamic force equal to 7H<sup>2</sup> pounds per linear foot of wall, where H is the wall height. The seismic force should be applied as a distributed load with the centroid located at 0.4H from the wall base. Footings for retaining walls should be designed as recommended for shallow foundations.

The design equivalent fluid pressure should be increased for walls that retain sloping soil. We recommend the above lateral earth pressures be increased using the factors presented in Table 1 when designing walls that retain sloping soil.

Slop	oe of Retained Soil (degrees)	Lateral Earth Pressure Increase Factor		
	0	1.00		
據	5	1.06		
10.00	10	1.12		
	20	1.33		
	25	1.52		
	30	2.27		

**Table 1. Lateral Earth Pressure Increase Factors for Sloping Soil** 

A vertical live load of 250 psf should be applied where roadways are located within 1H of the back of the walls, where H is the exposed height of the wall. Figure 4 should be used if other surcharges are located near the back of the wall.

Foundations for walls can be designed in accordance with Section 5.1 (Foundation Support).

#### 5.4.3 Wall Drainage and Backfill

The above design parameters have been provided assuming drains will be installed behind walls to prevent hydrostatic pressure from developing. If a drainage system is not installed, our office should be contacted for revised design forces.

Backfill placed behind the walls and extending a horizontal distance of ½H, where H is the height of the retaining wall, should consist of retaining wall select backfill placed and compacted in conformance with the Section 6.5.1 (Structural Fill).

A minimum 6-inch-diameter, perforated collector pipe should be placed at the bases of the walls. The pipe should be embedded in a minimum 2-foot-wide zone of angular drain rock that is wrapped in a drainage geotextile fabric and extends up the back of the wall to within 1 foot of finished grade. The drain rock and drainage geotextile fabric should meet the specifications in Section 6.5 (Materials). The perforated collector pipes should discharge at an appropriate location



away from the base of the wall. The discharge pipes should not be tied directly into stormwater drain systems, unless measures are taken to prevent backflow into the wall's drainage system.

Settlement of up to 1 percent of the wall height commonly occurs immediately adjacent to the wall as the wall rotates and develops active lateral earth pressures. Consequently, we recommend construction of flatwork adjacent to retaining walls be postponed at least four weeks after backfilling of the wall, unless survey data indicates that settlement is complete prior to that time.

#### 5.5 PAVEMENT

#### 5.5.1 General

AC pavement will be needed for parking areas and drive aisles and we assume PCC may also be required on portions of the site. All pavement should be installed on subgrade prepared in conformance with Section 6.1 (Site Preparation) and Section 6.5 (Structural Fill). Our pavement design recommendations are based on the following assumptions:

- The top 12 inches of soil subgrade is compacted to at least 92 percent of maximum dry density as determined by ASTM D1557 or until proof rolling with heavy equipment indicates that is it firm and unyielding.
- Assumed resilient moduli of 5,500 psi for the subgrade soil and 20,000 psi for the aggregate base.
- The design manual provided for the project specifies pavement recommendations based on a design life of 20 years.
- Initial and terminal serviceability indices of 4.2 and 2.5, respectively.
- Reliability of 85 percent and standard deviation of 0.45.
- No growth
- Heavy vehicle traffic will consist of the occasional garbage truck, box truck, or other heavy vehicle.

If any of our assumptions or traffic volumes are incorrect, we should be contacted to provide alternative recommendations.

#### 5.5.2 AC Pavement

Our AC pavement design recommendations are presented in Table 2.

**Table 2. 20-Year Standard AC Pavement Sections** 

Traffic Levels	AC¹ (inches)	Aggregate Base <sup>1</sup> (inches)		
Car parking areas	2.5	6		
Car-only drive aisles	3	8		
Heavy vehicle areas	3.5	10		

1. All thicknesses are intended to be the minimum acceptable.



Our PCC pavement design recommendations are provided in Table 3.

**Table 3. 20-Year PCC Standard Pavement Sections** 

Traffic Levels	PCC¹ (inches)	Aggregate Base <sup>1</sup> (inches)	Maximum Joint Spacing (feet)	
Car and heavy vehicle areas	6.5	6	13	

<sup>1.</sup> All thicknesses are intended to be the minimum acceptable.

#### **5.5.3 Construction Considerations**

All thicknesses are intended to be the minimum acceptable. Design of the recommended pavement sections assumes that construction will be completed during an extended period of dry weather. Wet weather construction could require an increased thickness of aggregate base.

Construction traffic should be limited to non-building, unpaved portions of the site or haul roads. Construction traffic should not be allowed on new pavement. If construction traffic is to be allowed on newly constructed road sections, an allowance for this additional traffic will need to be made in the design pavement section.

The aggregate base thicknesses do not account for construction traffic, and haul roads and staging areas should be used as described in Section 6.0 (Construction).

#### 5.6 DRAINAGE

#### 5.6.1 Temporary

During work at the site, the contractor should be made responsible for temporary drainage of surface water as necessary to prevent standing water and/or erosion at the working surface. During rough and finished grading of the site, the contractor should keep all pads and subgrade free of ponding water.

#### 5.6.2 Surface

The ground surface at finished pads should be sloped away from their edges at a minimum 2 percent gradient for a distance of at least 5 feet. Roof drainage from buildings should be directed into solid, smooth-walled drainage pipes that carry the collected water to the storm drain system.

#### 5.6.3 Subsurface

Based on the soil and groundwater conditions at the site, perimeter footing drains are not required, unless specifically requested by the ownership and design team. If desired, perimeter foundation drains should consist of a filter fabric-wrapped, drain rock-filled trench that extends at least 12 inches below the lowest adjacent grade (i.e., slab subgrade elevation). A perforated pipe should be placed at the base to collect water that gathers in the drain rock. The drain rock and filter fabric should meet specifications outlined in Section 6.5 (Materials). Discharge for footing drains should not be tied directly into the stormwater drainage system, unless mechanisms are installed to prevent backflow.



Due to the depth of groundwater, underslab drains are not required for slabs onsite.

#### **5.6.4 Stormwater Infiltration Systems**

Based on the subsurface soil encountered in the explorations and the environmental history discussed in Section 2.0 (Background), on-site infiltration systems are not recommended.

#### 5.7 PERMANENT SLOPES

Permanent cut and fill slopes should not exceed 2H:1V. Slopes that will be maintained by mowing should not be constructed steeper than 3H:1V. Access roads and pavement should be located at least 5 feet from the top of cut and fill slopes. The horizontal setback should be increased to 10 feet for buildings. Note that the setback recommendations pertain to engineered cut and fill slopes only.

Concentrated drainage or water flow over the face of slopes should be prohibited as described in this report and adequate protection against erosion is required. Fill slopes should be overbuilt, compacted, and trimmed at least 2 feet horizontally to provide adequate compaction of the outer slope face.

#### 6.0 CONSTRUCTION

#### 6.1 SITE PREPARATION

#### 6.1.1 General

Site grading activities should be performed in accordance with the requirements specified in the 2021 IBC, Chapter 18 and Appendix J, with exceptions noted in this report. Site preparation should be observed and documented by Columbia West.

#### 6.1.2 Demolition

Demolition includes removal of existing structural features at the site. Abandoned foundations and utilities, if present, will need to be removed and the resulting excavations backfilled. Utility lines should be completely removed or, with prior approval, grouted full if left in place. Excavations remaining from demolition and removal of existing structures should be backfilled with compacted structural fill in accordance with the recommendations in Section 6.5 (Materials).

#### **6.1.3** Stripping and Grubbing

Stripping and grubbing is anticipated to be minimal and, where encountered, the existing root and topsoil zones should be stripped and removed from all areas to receive new structural improvements. The actual stripping depth should be based on field observations at the time of construction. Stripped material should be transported offsite for disposal or used in landscaped areas.

Trees and shrubs should be removed from fill areas. In addition, root balls should be grubbed out to the depth of the roots, which could exceed 3 feet BGS. Depending on the methods used to remove root balls, considerable disturbance and loosening of the subgrade could occur during site grubbing. We recommend that soil disturbed during grubbing operations be removed to expose firm, undisturbed subgrade. The resulting excavations should be backfilled with structural fill.



#### 6.1.4 Undocumented Fill

#### 6.1.4.1 General

Undocumented fill from UST removal is present onsite. In addition, other shallower areas of fill may be present at the site. Due to the variable composition of the fill and the unknown methods of placement and compaction, reliable strength properties for undocumented fill are difficult to predict.

#### 6.1.4.2 Foundation Areas

Undocumented fill should be completely removed from under new building foundations and footings should be supported on crushed rock as discussed in the Section 5.1 (Foundation Support) and Section 6.5 (Materials).

#### 6.1.4.3 Floor Slab and Pavement Areas

There is a small risk for poor performance of floor slabs and pavement established directly over undocumented fill and buried topsoil. If undocumented fill and buried topsoil are present after site grading, removal and replacement of undocumented fill and buried topsoil would eliminate all risk. Floor slabs and pavement can be constructed on fill, provided a small risk of distress is accepted (minor floor slab cracking and localized "bird baths" in pavement areas) and they are evaluated as described in Section 6.1.5 (Subgrade Evaluation).

#### 6.1.5 Subgrade Evaluation

Upon completion of stripping and prior to the placement of structural fill, foundations, floor slabs, or pavement improvements, exposed subgrade soil should be evaluated by proof rolling with a fully loaded dump truck or similar heavy, rubber-tired construction equipment. When the subgrade is too wet for proof rolling, a foundation probe may be used to identify areas of soft, loose, or unsuitable soil. Subgrade evaluation should be performed by Columbia West. If soft or yielding subgrade areas are identified during evaluation, we recommend the subgrade be overexcavated and backfilled with compacted imported granular fill.

#### 6.2 CONSTRUCTION TRAFFIC AND STAGING

The site is currently covered by AC. Where possible, the AC should be left in place as long as possible to support construction traffic. Beneath the AC is granular fill and native soil that contains silt and can be disturbed when wet.

If construction occurs in the dry season, we anticipate the granular material beneath the site can support most construction traffic; however, if construction occurs during or extends into the wet season or if the moisture content of the surficial soil is more than a couple percentage points above optimum, granular haul roads and staging areas will be necessary for support of construction traffic during the rainy season or when the moisture content of the surficial soil is more than a few percentage points above optimum.

The aggregate base thickness for pavement areas is intended to support post-construction design traffic loads and is not designed to support construction traffic. Moreover, if construction is planned for periods when the subgrade soil is wet, staging and haul roads with increased thicknesses of base rock will be required. The amount of staging and haul road areas, as well as the required thickness of granular material, will vary with the contractor's sequencing of a project



and type/frequency of construction equipment and should, therefore, be the responsibility of the contractor. Based on our experience, between 12 and 18 inches of imported granular material is generally required in staging areas and between 18 and 24 inches in haul road areas. The contractor should also be responsible for selecting the type of material for construction of haul roads and staging areas. A geotextile fabric can be placed as a barrier between the subgrade and imported granular material in areas of repeated construction traffic to help prevent silt migration into the base rock. Imported granular material, stabilization material, and geotextile fabric should meet the specifications in Section 6.5 (Materials).

As an alternative to thickened crushed rock sections, haul roads and utility work zones are commonly constructed using cement-amended subgrade overlain by a crushed rock wearing surface. Due to the presence gravel and fill, we anticipate that cement amendment is not viable for the project.

Project stakeholders should understand that wet weather construction is risky and costly. Proper construction methods and techniques are critical to overall project integrity and should be observed and documented by Columbia West.

#### 6.3 EXCAVATION

#### 6.3.1 General

Subsurface conditions at the site consist of a pavement section over loose fill or fractured to competent basalt. We anticipate the basalt will be present in the upper 2 to 6 feet and more competent basalt will be present below those depths.

#### 6.3.2 Soil and Gravel Excavation

Excavation into sand should be readily accomplished with conventional earthwork equipment. Excavation into fractured basalt is possible; however, the depth of the excavation will depend on the degree of weathering of the basalt. Excavation into the fractured basalt will likely encounter cobbles and boulders that will make excavation more difficult.

Because of the presence of sand and gravel, sloughing and caving should be expected at all depths and open excavations should be assumed for trenches that extend more than a few feet below ground surface. Excavations should be cut at a slope of 1H:1V if groundwater seepage is not present. Excavations should be flattened to 1.5H:1V or 2H:1V if excessive sloughing or raveling occurs. If groundwater is present, caving and raveling will likely occur and dewatering will be necessary. In lieu of large and open cuts, approved temporary shoring may be used for excavation support. A wide variety of shoring and dewatering systems are available. The contractor should be responsible for selecting the appropriate shoring and dewatering systems.

#### 6.3.3 Basalt Excavation

Competent basalt is likely present between 2 and 6 feet BGS. Our scope of services did not include geophysical or unconfined compressing testing of the basalt that can be used to assess the effort required to remove it; however, based on experience and mapping in the area, blasting, sawing, and hydraulic chipping will be required to excavate competent basalt at the site.



#### 6.4 CONSTRUCTION DEWATERING

#### 6.4.1 General

Based on the results of explorations, dewatering is likely to be minimal at the site. Groundwater will likely be perched on the basalt and volumes are expected to be minimal. Sump pumps will likely be suitable to remove water from the excavations; however, it is possible more robust systems could be required in isolated areas.

#### 6.4.2 Construction Dewatering

The contractor should be responsible for temporary drainage of surface water, perched water, and groundwater as necessary to prevent standing water and/or erosion at the working surface. Because of the instability of saturated, low plasticity silt, sloughing and "running" conditions can occur if excavations extend below groundwater seepage levels. Positive control of groundwater will be required to maintain stable trench sides and base. The proposed dewatering plan should be capable of maintaining groundwater levels at least 2 feet below the base of the trench excavation (including the depth required for trench bedding and stabilization material). In addition to safety considerations, running soil, caving, or other loss of ground will increase backfill volumes and can result in damage to adjacent structures or utilities.

Flow rates for dewatering are likely to vary depending on location, soil type, and the season in which excavation occurs. Dewatering systems should be capable of adapting to variable flows. Because of the tendency of saturated, low plasticity silt with sand to "run," we recommend dewatering wells or well points be considered if trench excavations extend below groundwater levels. Tight-joint driven sheets in conjunction with a scaled-down dewatering program can also be an effective way to control groundwater seepage, provided the sheets are driven deep enough to control heaving conditions at the base of the excavation.

Trench dewatering will be required to maintain dry working conditions if the invert elevations of the proposed utilities encounter groundwater. Pumping from sumps located within the trench may result in excessive sloughing, caving, or running conditions, and dewatering by well points may be required. If groundwater is present at the base of a utility excavation, we recommend placing 1.5 to 2 feet of stabilization material at the base of the excavation. The use of a subgrade geotextile fabric may reduce the amount of stabilization material required. The actual thickness should be based on field observations during construction. Trench stabilization material and subgrade geotextile fabric should meet the requirements described in Section 6.5 (Materials). Trench stabilization material should be placed in one lift and compacted until well keyed.

While we have described certain approaches to excavation dewatering, it is the contractor's responsibility to select the dewatering methods.

#### 6.5 MATERIALS

#### 6.5.1 Structural Fill

#### 6.5.1.1 General

Areas proposed for fill placement should be appropriately prepared as described in Section 6.1 (Site Preparation). Engineered fill placement should be observed by Columbia West. Compaction



of engineered structural fill should be verified by proof rolling or nuclear gauge field compaction testing performed in accordance with ASTM D6938. Field compaction testing should be performed for each vertical foot of engineered fill placed.

Various materials may be acceptable for use as structural fill. Structural fill should be free of organic material or other unsuitable material and meet the specifications provided in the following sections. Representative samples of proposed engineered structural fill should be submitted for laboratory testing and approval by Columbia West prior to placement. All structural fill should be free of organic material and have a particle size of less than 6 inches.

#### 6.5.1.2 On-Site Soil

The near-surface soil consists of fractured basalt, which is suitable for use as structural fill if it is adequately dried or moisture conditioned to achieve the recommended compaction specifications. We recommend the particle size criteria in Table 4 be followed for placement of onsite soil.

Depth Below Finished Grade (feet) (inches)

0 to 2 3
2 to 8 6
>8 12

**Table 4. On-Site Fill Particle Size Recommendations** 

All particles with a maximum particle size greater than 12 inches should be removed from fill and stockpiled in an area designated by the owner.

Typically, the compaction criterion for fill is a specified percentage (e.g., 95 percent) relative to a Proctor test (ASTM D1557). Where feasible, we will conduct density testing of fill using a nuclear densometer to determine relative compaction values. The material should be compacted to at least 95 percent of maximum dry density as determined by ASTM D1557. However, because of the variability of the material and presence of oversize materials, monitoring the compaction purely by comparison to a Proctor value may not be appropriate for fill at this site. Therefore, we recommend that the following performance-based evaluation procedure be used:

- Complete test strips to establish compaction standards using field-determined Proctor values. This will require establishing a test strip area of relatively consistent material and completing nuclear density gauge testing with each pass of the compactor. Typically, maximum densities tend to occur after four to five passes; however, several passes may be required to establish moisture/density curves for evaluating fill compaction.
- Testing with a nuclear density gauge will be completed to monitor moisture contents as well as for tracking fill densities.



- Qualified personnel will observe a proof roll with a fully loaded off-road truck (or similar rubber-tired equipment).
- To be considered structural fill, the material should be dense and unyielding with negligible deflection, pumping, or rutting and the moisture/density values within the range of field-established Proctor values.

#### 6.5.1.3 Processed Basalt

If fractured or competent basalt rock is processed for use as structural fill, we recommend the maximum particle sizes in Table 4. Processed basalt should be placed and compacted as described in Section 6.5.1.2 (On-Site Soil).

#### 6.5.1.4 Imported Granular Material

Imported granular material should consist of pit- or quarry-run rock, crushed rock, or crushed gravel and sand. Imported granular material should be placed in loose lifts not exceeding 12 inches in thickness and compacted to at least 95 percent of maximum dry density as determined by ASTM D1557. During wet weather conditions or where wet subgrade conditions are present, the initial loose lift of granular fill should be approximately 18 inches thick and should be compacted with a smooth-drum roller operating in static mode.

#### 6.5.1.5 Stabilization Material

Stabilization material should consist of durable, 4- or 6-inch-minus pit- or quarry-run rock, crushed rock, or crushed gravel and sand that is free of organic material and other deleterious material. The material should have a maximum particle size of 6 inches with less than 5 percent by dry weight passing the U.S. Standard No. 4 sieve. The material should have at least two mechanically fractured faces.

Stabilization material should be placed in loose lifts between 12 and 24 inches thick and compacted to a firm, unyielding condition. Equipment with vibratory action should not be used when compacting stabilization material over wet, fine-grained soil. If stabilization material is used to stabilize soft subgrade below pavement or construction haul roads, a subgrade geotextile should be placed as a separation barrier between the soil subgrade and the stabilization material.

#### 6.5.1.6 Trench Backfill

Trench backfill placed beneath, adjacent to, and for at least 12 inches above utility lines (i.e., the pipe zone) should consist of durable, well-graded granular material with a maximum particle size of 1½ inches, should have less than 7 percent fines by dry weight, and should have at least two mechanically fractured faces. The pipe zone backfill should be compacted to at least 90 percent of maximum dry density as determined by ASTM D1557 or as required by the pipe manufacturer or local building department.

Within roadway alignments, the remainder of the trench backfill up to the subgrade elevation should consist of durable, well-graded granular material with a maximum particle size of 2½ inches, should have less than 7 percent fines by dry weight, and should have at least two mechanically fractured faces. This material should be compacted to at least 92 percent of



maximum dry density as determined by ASTM D1557 or as required by the pipe manufacturer or local building department. The upper 3 feet of the trench backfill should be compacted to at least 95 percent of maximum dry density as determined by ASTM D1557.

Outside of structural areas, trench backfill placed above the pipe zone should be compacted to at least 90 percent of maximum dry density as determined by ASTM D1557 or as required by the local jurisdictional agency or pipe manufacturer.

#### 6.5.1.7 Retaining Wall Backfill

Backfill placed behind retaining walls and extending a horizontal distance of ½H, where H is the height of the retaining wall, should consist of imported granular material as described above and should have less than 7 percent fines by dry weight. We recommend the wall backfill be separated from general fill, native soil, and/or topsoil using a geotextile fabric that meets the specifications provided below for drainage geotextiles.

The wall backfill should be compacted to a minimum of 95 percent of maximum dry density as determined by ASTM D1557. However, backfill located within a horizontal distance of 3 feet from a retaining wall should only be compacted to approximately 90 percent of maximum dry density as determined by ASTM D1557. Backfill placed within 3 feet of the wall should be compacted in lifts less than 6 inches thick using hand-operated tamping equipment (such as a jumping jack or vibratory plate compactor). If flatwork (sidewalks or pavement) will be placed atop the wall backfill, we recommend that the upper 2 feet of material be compacted to 95 percent of maximum dry density as determined by ASTM D1557.

#### 6.5.1.8 Retaining Wall Leveling Pad

Crushed aggregate used as a leveling pad for retaining wall footings should consist of ¾- or 1¼-inch-minus crushed rock and should have less than 7 percent fines by dry weight. The leveling pad material should be compacted to at least 95 percent of maximum dry density as determined by ASTM D1557.

#### 6.5.1.9 Floor Slab and Pavement Aggregate Base

Imported granular material used as base rock for building floor slabs and pavement should consist of ¾- or 1½-inch-minus material (depending on the application). In addition, the aggregate should have less than 5 percent fines by dry weight and should have at least two mechanically fractured faces. The aggregate base should be compacted to not less than 95 percent of maximum dry density as determined by ASTM D1557.

#### 6.5.1.10 Drain Rock

Drain rock should consist of angular, granular material with a maximum particle size of 2 inches. The material should be free of roots, organic material, and other unsuitable material; should have less than 2 percent fines by dry weight; and should have at least two mechanically fractured faces. Drain rock should be compacted to a well-keyed, firm condition.



#### 6.5.2 Geotextile Fabric

#### 6.5.2.1 Subgrade Geotextile

Subgrade geotextile should conform to OSSC Table 02320-4 and OSSC 00350 (Geosynthetic Installation). A minimum initial aggregate base lift of 6 inches is required over geotextiles. All drainage aggregate and stabilization material should be underlain by a subgrade geotextile.

#### 6.5.2.2 Drainage Geotextile

Drainage geotextile should conform to Type 2 material of OSSC Table 02320-1 and OSSC 00350 (Geosynthetic Installation). A minimum initial aggregate base lift of 6 inches is required over geotextiles.

#### 6.5.3 Pavement

#### 6.5.3.1 AC

The AC should be Level 2, ½-inch, dense ACP in the parking areas and Level 3, ½-inch, dense ACP in the truck areas according to OSSC 00744 (Asphalt Concrete Pavement). The AC should be compacted to 92 percent of the theoretical maximum density of the mix as determined by AASHTO T 209. The minimum and maximum lift thicknesses are 2 inches and 3 inches, respectively, for ½-inch ACP. Asphalt binder should be performance graded and conform to PG 64-22. The binder grade should be adjusted depending on the aggregate gradation and amount of recycled asphalt pavement and/or recycled asphalt shingles in the contractor's mix design submittal.

#### 6.5.3.2 PCC

PCC should be Class 4000, 1½-inch paving concrete according to OSSC 02001 (Concrete) with a minimum 28-day flexural strength of 600 psi. The length to width ratio for any panel should be at least 0.80 and should not exceed 1.25. Joints in truck bays should have a maximum 14-foot joint spacing. Reinforcing and specifications should be provided by the site civil and structural engineering team. Concrete should be tested during installation in accordance with ASTM C171, ASTM C138, ASTM C231, ASTM C143, ASTM C1064, and ASTM C31. This includes casting of cylinder specimen at a frequency of four cylinders per 100 cubic yards of poured concrete. Recommended field concrete testing includes slump, air entrainment, temperature, and unit weight.

#### 6.5.3.3 Cold Weather Paving Considerations

In general, AC paving is not recommended during cold weather (temperatures less than 40 degrees Fahrenheit). Compacting under these conditions can result in low compaction and premature pavement distress.

Each AC mix design has a recommended compaction temperature range that is specific for the particular AC binder used. In colder temperatures, it is more difficult to maintain the temperature of the AC mix as it can lose heat while stored in the delivery truck, as it is placed, and in the time between placement and compaction. In Oregon, the AC surface temperature during paving should be at least 40 degrees Fahrenheit for lift thickness greater than 2.5 inches and at least 50 degrees Fahrenheit for lift thickness between 2 and 2.5 inches.



If AC paving must take place during cold weather construction as defined above, the contractor and design team should discuss options for minimizing risk of pavement serviceability.

#### 6.6 EROSION CONTROL

Soil at this site is susceptible to erosion by wind and water; therefore, erosion control measures should be carefully planned and installed before construction begins. Surface water runoff should be collected and directed away from sloped areas to prevent water from running down the slope face. Measures that can be employed to reduce erosion include the use of silt fences, hay bales, buffer zones of natural growth, sedimentation ponds, and granular haul roads. All erosion control methods should be in accordance with local jurisdiction standards.

#### 7.0 OBSERVATION OF CONSTRUCTION

Satisfactory pavement, earthwork, and foundation performance depends to a large degree on the quality of construction. Sufficient observation of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. Columbia West should be retained to observe subgrade preparation, fill placement, foundation excavations, drainage system installation, and pavement placement and to review laboratory compaction and field moisture-density information.

Subsurface conditions observed during construction should be compared with those encountered during the subsurface explorations. Recognition of changed conditions requires experience; therefore, qualified personnel should visit the site with sufficient frequency to detect whether subsurface conditions change significantly from those anticipated.

#### 8.0 LIMITATIONS

We have prepared this report for use by the addressee and members of the design and construction team for the proposed project. This report is subject to the limitations expressed in Appendix E.

. . .

We appreciate the opportunity to be of service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,

Nick Paveglio, PE Principal Engineer



#### **REFERENCES**

AASHTO 1993. AASHTO Guide for Design of Pavement Structures.

ASCE 2016. Minimum Design Loads and Associated Criteria for Buildings and Other Structures and supplements. ASCE Standard ASCE/SEI 7-16.

ASTM International 2022. *Annual Book of ASTM Standards*, Volume 04.08: Soil and Rock (I), D420-D5876/D5876m.

Evarts, R.C. 2004. Geologic Map of the Saint Helens Quadrangle, Columbia County, Oregon, and Cowlitz and Clark Counties, Washington, U.S. Geological Survey Scientific Investigations Map 2834.

Maul Foster & Alongi, Inc. 2024. Phase I Environmental Site Assessment; Former Portland General Electric Yard; 1771 Columbia Boulevard; St. Helens, Oregon 97051, dated September 6, 2024.

Oregon Building Codes Division 2022. 2022 Oregon Structural Specialty Code.

Oregon Department of Transportation 2024. Oregon Standard Specifications for Construction.

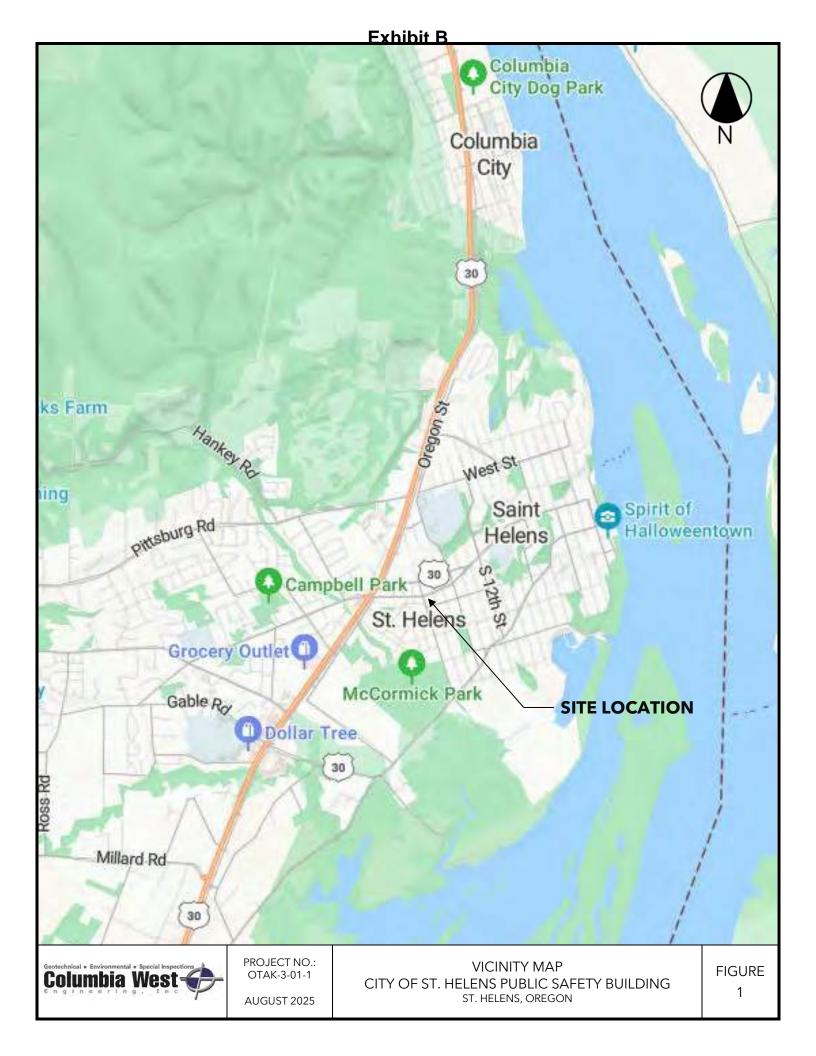
USDA 2025. Web Soil Survey. National Resources Conservation Services. <a href="https://websoilsurvey.nrcs.usda.gov/app/HomePage.htm">https://websoilsurvey.nrcs.usda.gov/app/HomePage.htm</a>. Accessed August 2025.



# Exhibit B









Golumbia West

CITY OF ST. HELENS PUBLIC SAFETY BUILDING ST. HELENS, OREGON

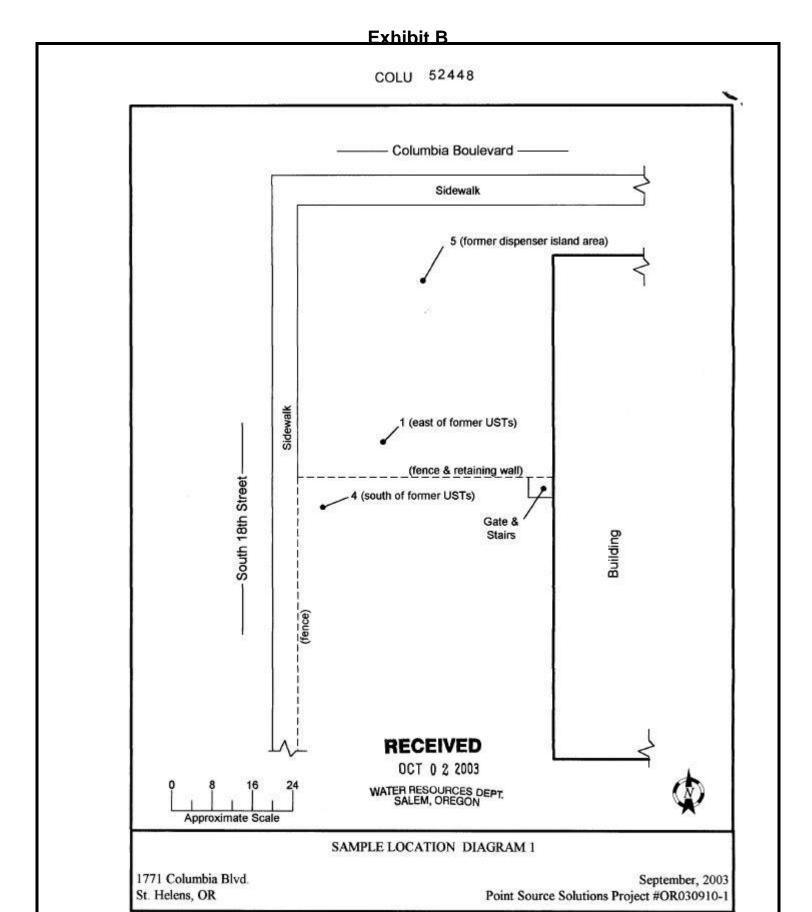
SITE PLAN

PROJECT NO: OTAK-3-01-1

AUGUST 2025

FIGURE

2

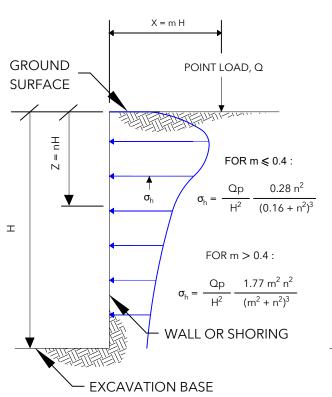


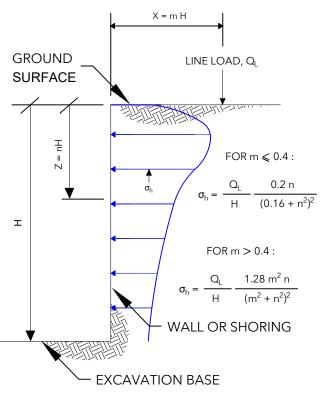


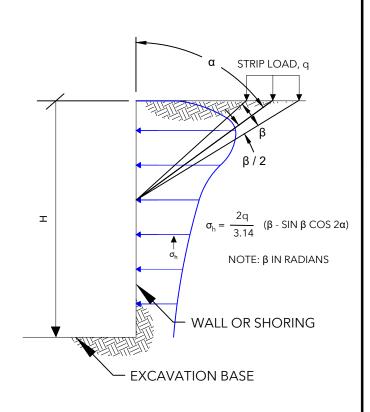
PROJECT NO.: OTAK-3-01-1

AUGUST 2025

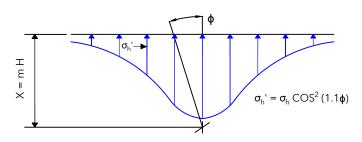
2003 BORING PLAN CITY OF ST. HELENS PUBLIC SAFETY BUILDING ST. HELENS, OREGON







# VERTICAL POINT LOAD HORIZONTAL PRESSURE DISTRIBUTION



#### NOTES:

- 1. FIGURE SHOULD BE USED JOINTLY WITH RECOMMENDATIONS PRESENTED IN THE REPORT TEXT.
- 2. LATERAL EARTH PRESSURES ASSUME RIGID WALLS WITH BACKFILL MATERIALS HAVING A POISSON'S RATIO OF 0.5.
- 3. TOTAL LATERAL EARTH PRESSURES RESULTING FROM COMBINED LOADS MAY BE CALCULATED USING SUPERPOSITION.
- 4. DRAWING IS NOT TO SCALE.

# **APPENDIX A**



# APPENDIX A FIELD EXPLORATIONS

#### **GENERAL**

Subsurface conditions at the site were explored by drilling five borings (B-1 through B-5) to depths between 5.1 and 20.1 feet BGS. Excavation services were completed by Western States Soil Conservation of Hubbard, Oregon, using mud rotary drilling methods. The exploration logs are presented in this appendix.

The exploration locations are shown on Figure 2. The exploration locations were determined in the field by pacing or measuring from existing site features. This information should be considered accurate only to the degree implied by the methods used.

#### **SOIL SAMPLING**

Soil samples were collected from the borings using split-barrel SPT samplers in general accordance with ASTM D1586 or modified California samplers in general accordance with ASTM D3550. The samplers were driven a total distance of 18 inches with a 140-pound, automatic-trip hammer free falling 30 inches. The number of blows required to drive the samplers the final 12 inches, or as otherwise indicated, into the soil is shown adjacent to the sample symbols on the boring logs. Disturbed samples were collected from the samplers for subsequent classification and index testing. The average efficiency of the automatic SPT hammer used by Western States Soil Conservation, Inc. was 88 percent. The calibration testing results are presented at the end of this appendix. Sampling methods and intervals are shown on the exploration logs.

## SOIL CLASSIFICATION

The soil samples were classified in the field in accordance with the "Exploration Legend" and "Soil Classification System," which are presented in this appendix. The exploration logs indicate the depths at which the soil characteristics change, although the change could be gradual. If the change occurred between sample locations, the depth was interpreted. Classifications are shown on the exploration logs.



# **EXPLORATION LEGEND**

SAMPLER TYPE	DESCR	IPTION
SPT	Sample collected from the indicated depth in Standard Test Method Standard Penetration Tusing an SPT sampler and 140-pound hamme	est (SPT) and Split-Barrel Sampling of Soils,
SH	Sample collected from the indicated depth in Standard Practice for Thin-Walled Tube Samp Purposes, using a thin-walled Shelby tube, or Standard Practice for Sampling of Soil Using t Sampler, using a thin-walled tube	ling of Fine-Grained Soils for Geotechnical in general accordance with ASTM D6519,
D&M	Sample collected from the indicated depth in Standard Practice for Thick Wall, Ring-Lined, Susing a Dames & Moore sampler and 140-po	Split Barrel, Drive Sampling of Soils,
CSS	Sample collected from the indicated depth in Standard Practice for Thick Wall, Ring-Lined, Sa-inch-outside diameter California split-spoo	Split Barrel, Drive Sampling of Soils, using a
DP	Sample collected from the indicated depth in Standard Guide for Direct Push Soil Sampling using a direct-push soil sampler	
GRAB	Grab sample collected from the indicated depth	Observed contact at the indicated depth
CORE	Pavement or rock core interval at the indicated depth	Inferred contact at the indicated depth

	GEOTECHNICAL	ABBREVIA	TIONS
ATT	Atterberg limits	PP	Pocket penetrometer
CBR	California bearing ratio	P200	Percent passing No. 200 sieve
CON	Consolidation test	RES	Resilient modulus
DD	Dry density	SIEV	Sieve analysis
DS	Direct shear	TS	Torvane shear
HYD	Hydrometer	tsf	Tons per square foot
MC	Moisture content	UC	Unconfined compressive strength
MD	Moisture-density relationship	UU	Unconsolidated undrained triaxial test
NP	Non-plastic	VS	Vane shear
OC	Organic content	WD	Wet density
	ENVIRONMENTAL	ABBREVIA	ATIONS
CA	Sample submitted for chemical	ND	Not detected
	analysis	NS	No sheen
PID	Photoionization detector headspace	SS	Slight sheen
	analysis	MS	Moderate sheen
ppm	Parts per million	HS	Heavy sheen

# Exhibit B SOIL CLASSIFICATION SYSTEM

## **PARTICLE-SIZE CLASSIFICATION**

COMPONENT	ASTM	/ USCS	AAS	нто
COMPONENT	Size Range	Sieve Size Range	Size Range	Sieve Size Range
Boulders	Greater than 300 mm	Greater than 12 inches		
Cobbles	75 mm to 300 mm	3 inches to 12 inches	Greater than 75 mm	Greater than 3 inches
Gravel	75 mm to 4.75 mm	3 inches to No. 4 sieve	75 mm to 2.00 mm	3 inches to No. 10 sieve
Coarse	75 mm to 19.0 mm	3 inches to 3/4-inch sieve		
Fine	19.0 mm to 4.75 mm	3/4-inch to No. 4 sieve		
Sand	4.75 mm to 0.075 mm	No. 4 to No. 200 sieve	2.00 mm to 0.075 mm	No. 10 to No. 200 sieve
Coarse	4.75 mm to 2.00 mm	No. 4 to No. 10 sieve	2.00 mm to 0.425 mm	No. 10 to No. 40 sieve
Medium	2.00 mm to 0.425 mm	No. 10 to No. 40 sieve		
Fine	0.425 mm to 0.075 mm	No. 40 to No. 200 sieve	0.425 mm to 0.075 mm	No. 40 to No. 200 sieve
Fines (Silt and Clay)	Less than 0.075 mm	Passing No. 200 sieve	Less than 0.075 mm	Passing No. 200 sieve

## **CONSISTENCY FOR FINE-GRAINED SOIL**

CONSISTENCY	SPT N-VALUE (blows per foot)	D&M N-VALUE (blows per foot)	POCKET PENETROMETER (unconfined compressive strength [tsf])
Very soft	0 to 2	0 to 3	Less than 0.25
Soft	2 to 4	3 to 6	0.25 to 0.5
Medium stiff	4 to 8	6 to 12	0.5 to 1.0
Stiff	8 to 15	12 to 25	1.0 to 2.0
Very stiff	15 to 30	25 to 65	2.0 to 4.0
Hard	Greater than 30	Greater than 30	Greater than 4.0

## **RELATIVE DENSITY FOR COARSE-GRAINED SOIL**

RELATIVE DENSITY	SPT N-VALUE (blows per foot)	D&M N-VALUE (blows per foot)
Very loose	0 to 4	0 to 11
Loose	4 to 10	11 to 26
Medium dense	10 to 30	26 to 74
Dense	30 to 50	74 to 120
Very dense	Greater than 50	Greater than 120

## **MOISTURE DESIGNATIONS**

TERM	FIELD IDENTIFICATION
Dry	Very low moisture, dry to touch
Moist	Damp, color appears darkened, without visible moisture, cohesive soil will clump, sand will bulk
Wet	Visible free water, usually saturated

## **ADDITIONAL CONSTITUENTS**

	SILT AND	CLAY IN		SAND AND	GRAVEL IN		SECONDARY MATERIAL
PERCENT	Fine- Grained Soil	Coarse- Grained Soil	PERCENT	Fine- Grained Soil	Coarse- Grained Soil	PERCENT	Organics and Man-Made Debris
< 5	trace	trace	< 5	trace	trace	< 4	trace
5 - 12	minor	with	5 - 15	minor	minor	4 - 12	some
> 12	some	silty/clayey	15 - 30	with	with		
			> 30	sandy/gravelly	with		



# **Boring Number: B-1**

Page 1 of 2

RO.IF	CT N	JMRFR	Otak-3-01-1	PP	O.IF	сто	ITY ST	TATE St. H	lelens	s. Oregon			
			CTOR Western States Soil Conservation, In						1010110	, 0.0go			
			Mud Rotary				ED 8:4						
			5, Rig 5					07/16/20	125				
			3.875 inches	_				11:00 AM	1				
AMN	1ER EF	FICIEN	CY 88%	_ LO	GGE	D BY	S. Cha	andra -					
DEPTH (ft)	nscs	GRAPHIC LOG	MATERIAL DESCRIPTION AND NOTES		SAMPLE TYPE	RECOVERY (in)	SAMPLE ID	BLOW COUNTS	CONTENT (%)	□ Percent	Fines	<b>▲</b> Ra	w N-Value
DEP	šn	GRAPH			SAMPI	RECOV	SAMI	BLOW (	MOISTURE (	+ Plastic		ture Conte	Liquid Lir
			Asphalt Concrete (4 inches).	0.3					Σ	1 	<u> </u>	1	
			Aggregate Base (2 inches).	0.5	1								
-			Loose, dark brown-gray silty GRAVEL with sand, moist, gravel is fine to coarse and subrounded (possible UST backfill) - <b>FILL</b> .										
-					SPT	6	B1.1	7-4-3 (7)	25	□ • 17-		·	
			Lost 50 gallons of mud at 4 feet.	5.0									1
5 <b>-</b>			Very dense, dark brown-gray GRAVEL with	5.0	SPT	5	B1.2	50/5"	26	□10 ●			
_			silt and sand, moist.									<del> </del>   -	
					SPT/	1 /	B1.3	50/1"	1			į	
_							<u> </u>	30/1	1			· <del> </del> -	
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													-
10 -	GP-GN				SPT	0	B1.4	50/1"	7				
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	Wa	ter Leve	ls		•		•	•	•		1	1	
7	No	t observe	ed										
<del>7</del> -	-												



PROJECT N DRILLING CO DRILLING M	UMBER (	y of St. Helens Public Safety Building  Otak-3-01-1  TOR Western States Soil Conservation, In	CLIE								
ORILLING CO	_		PRO.	15							
ORILLING M	ONTRAC	TOP Western States Soil Conservation In		JE	CT C	ITY, ST	TATE St. H	elens	s, Oregon		
		vesicin states son conservation, in	c. DATI	E S	TAR	<b>ΓΕD</b> 07	//16/2025				
	ETHOD !	Mud Rotary	TIME	SI	ART	<b>ED</b> 8:4	0 AM				
QUIPMENT	CME-75	5, Rig 5	DATI	E C	ОМР	LETEC	07/16/20	25			
		3.875 inches	TIME	ЕС	ОМР	LETED	11:00 AM				
HAMMER EF	FICIENC	<b>88</b> %	LOG	ЭEI	) BY	S. Cha	ndra				
DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION AND NOTES	דתייד די מאאי	SAMPLE I YPE	RECOVERY (in)	SAMPLE ID	BLOW COUNTS	MOISTURE CONTENT (%)	☐ Percent Fines /		/alue Blo
								MOIS	20 40 I I	60 I	80 I
		(continued from previous page)  Exploration completed at 20.1 feet.	20.1	<u>ss</u> /\	1	B1.5 B1.6	100/1" (100)				



# **Boring Number: B-2**

Page 1 of 1

			y of St. Helens Public Safety Building	CLIE									
PROJE	CT NU	MBER	Otak-3-01-1	PRO	JE	СТС	ITY, ST	TATE St. H	elens	, Oregon			
DRILLIN	NG CO	NTRAC	CTOR Western States Soil Conservation, In	c. DATI	E S	TAR	<b>TED</b> <u>07</u>	//16/2025					
DRILLIN	NG ME	THOD	Mud Rotary	TIME	S1	<b>TART</b>	ED 11:0	05 AM					
EQUIPN	MENT	CME-7	5, Rig 5	DATI	E C	OMF	PLETED	07/16/20	25				
BORING	G DIAN	<b>IETER</b>	3.875 inches	TIME	ЕС	OMP	LETED	12:20 PM					
HAMM	ER EF	ICIENC	CY <u>88%</u>	LOGO	3EI	D BY	S. Cha	ındra					
DЕРТН (ft)	nscs	GRAPHIC LOG	MATERIAL DESCRIPTION AND NOTES	10/7H T 10/14/14	_E	RECOVERY (in)	PLE ID	BLOW COUNTS	CONTENT (%)	□ Percent Fi	nes	<b>▲</b> Raw	N-Value Blov
DEP.	ñ	GRAPI		CN CO	SAIMPI	RECOV	SAMPLEI	BLOW (	MOISTURE (	+ Plastic Li		X L re Content	iquid Limit
5 - 0	€P-GM		Asphalt Concrete (2 inches). Aggregate Base (2 inches). Very dense, dark brown-gray GRAVEL with silt and sand, moist. Light oil odor at 2.5 feet.	SE	PT/	0	B2.1 B2.2 B2.3 B2.4 B2.4	50/1" 50/1" 100/1" (100)					
	Wat	er Level	Exploration completed at 10.1 feet.	<del>Q</del> -			02.4	30/1					
<u>▼</u>	Not -	observe	d										



<b>`</b> DO IEOT I											
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ROJECT	NUMBER	Otak-3-01-1	PRO.	ECT (	CITY, ST	TATE St. ⊢	lelens	s, Oregon			
RILLING (	CONTRAC	TOR Western States Soil Conservation, Inc.	DATE	STAR	<b>RTED</b> <u>07</u>	7/16/2025					
RILLING I	METHOD !	Mud Rotary	TIME	STAR	<b>TED</b> 12:	30 PM					
QUIPMEN	NT CME-75	5, Rig 5	DATE	СОМ	PLETE	07/16/20	)25				
30RING DI	IAMETER	3.875 inches	TIME	СОМ	PLETED	1:00 PM					
HAMMER I	EFFICIENC	<b>Y</b> 88%	LOGG	ED B\	S. Cha	andra					
DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION AND NOTES	AMDI F TYPE	RECOVERY (in)	SAMPLE ID	BLOW COUNTS	JRE CONTENT (%)	□ Percent  + Plastic	Limit	<b>X</b> Li	I-Value Bl
_	©	Asphalt Concrete (2 inches).  Very dense, dark brown-gray GRAVEL with	0.2			BL	MOISTURE	20	40	60 I	80
GP-0	€M	silt and sand, moist, gravel is fine to coarse and subangular.	cs	6 0	B3.1	100/5" (100)	- /				
			5.1								
		Exploration completed at 5.1 feet.	5.1 <u>SP</u>	<u>r/\ 1</u>	B3.2	50/1"	<b>-</b>	<u> </u>			
		Exploration completed at 5.1 feet.		<u>r/\ 1</u>	B3.2	50/1"	<del>)</del>				
		Exploration completed at 5.1 feet.		<u>r/\ 1</u>	B3.2	50/1"	}				
	<b>Vater Level</b> :	s		1	B3.2	50/1"	}				



PROJECT NUMBER Otak-3-01-1  PROJECT CITY, STATE St. Helens, Oregon  DATE STARTED 07/16/2025  DATE STARTED 1:05 PM  EQUIPMENT CME-75, Rig 5  DATE COMPLETED 07/16/2025  BORING DIAMETER 3.875 inches  HAMMER EFFICIENCY 88%  LOGGED BY S. Chandra    A SUMMAR STARTED 1:05 PM   DATE COMPLETED 1:45 PM	PROJECT NUMBER Otak-3-01-1  PROJECT CITY, STATE St. Helens, Oregon  DATE STARTED 07/16/2025  TIME STARTED 1:05 PM  DATE COMPLETED 07/16/2025  TIME COMPLETED 07/16/2025  TIME COMPLETED 07/16/2025  TIME COMPLETED 07/16/2025  TIME COMPLETED 1:45 PM  LOGGED BY S. Chandra   MATERIAL DESCRIPTION AND NOTES  Asphalt Concrete (4 inches).  OBJECT CITY, STATE St. Helens, Oregon  DATE STARTED 07/16/2025  TIME COMPLETED 07/16/2025  TIME COMP													
DRILLING CONTRACTOR Western States Soil Conservation, Inc.  DRILLING METHOD Mud Rotary  TIME STARTED 1:05 PM  DATE COMPLETED 07/16/2025  TIME COMPLETED 1:45 PM  HAMMER EFFICIENCY 88%  LOGGED BY S. Chandra  MATERIAL DESCRIPTION AND NOTES  MATERIAL DESCRIPTION AND NOTES  Asphalt Concrete (4 inches).  O.3  Asphalt Concrete (4 inches).  O.5  Very dense, dark brown-gray GRAVEL with sit and sand, moist, gravel is fine to coarse and subangular.	DRILLING CONTRACTOR Western States Soil Conservation, Inc.  DRILLING METHOD Mud Rotary  TIME STARTED 1:05 PM  DATE COMPLETED 07/16/2025  TIME COMPLETED 1:45 PM  LOGGED BY S. Chandra  TIME COMPLETED 1:45 PM	PROJE	CT NA	ME Cit	y of St. Helens Public Safety Building	CLIE	NT	Ota	k					
TIME STARTED 1:05 PM  DATE COMPLETED 07/16/2025  SORING DIAMETER 3.875 inches  TIME COMPLETED 1:45 PM  LOGGED BY S. Chandra  DATE COMPLETED 07/16/2025  TIME COMPLETED 07/16/2025  TIME COMPLETED 1:45 PM  LOGGED BY S. Chandra  DATE COMPLETED 07/16/2025  TIME COMPLET	TIME STARTED 1:05 PM  DATE COMPLETED 07/16/2025  TIME COMPLETED 1:45 PM  HAMMER EFFICIENCY 88%  DATE COMPLETED 07/16/2025  TIME COMPLETED 07/16/2025  TIME COMPLETED 07/16/2025  TIME COMPLETED 1:45 PM  LOGGED BY S. Chandra  DATE COMPLETED 07/16/2025  TIME COMPLETED	PROJE	CT NU	JMBER	Otak-3-01-1	PRO.	JEC	СТС	ITY, ST	TATE St. H	lelens	s, Oregon		
Asphalt Concrete (4 inches).  Asphalt Concrete (4 inches).  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  OP-GM  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  OF-GM  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  OF-GM  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  OF-GM  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  OF-GM  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  OF-GM  Asphalt Concrete (4 inches).  OF-GM  Aspha	Asphalt Concrete (4 inches).  Asphalt Concrete (4 inches).  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  OP-GM  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  OF-GM  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  OF-GM  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  OF-GM  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  OF-GM  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  OF-GM  Asphalt Concrete (4 inches).  OF-GM  Aspha	DRILLI	NG CO	NTRAC	TOR Western States Soil Conservation, Inc	. DATI	E S	TAR	<b>TED</b> 07	7/16/2025				
TIME COMPLETED 1:45 PM  LOGGED BY S. Chandra  MATERIAL DESCRIPTION AND NOTES  Asphalt Concrete (4 inches).  Asphalt Concrete (4 inches).  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  Very dense, dark brown-gray GRAVEL with silt and sand, moist, gravel is fine to coarse and subangular.  SOSI O B41 100/1"  (100)  TIME COMPLETED 1:45 PM  LOGGED BY S. Chandra  Percent Fines A Raw N-Value of the properties of the p	TIME COMPLETED 1:45 PM  LOGGED BY S. Chandra    Asphalt Concrete (4 inches).   Asphalt Concrete (4 inches).   Asphalt Concrete (4 inches).   Asphalt Concrete (4 inches).   O.5	DRILLI	NG ME	THOD	Mud Rotary	TIME	ST	ΓART	<b>ED</b> 1:0	5 PM				
HAMMER EFFICIENCY 88%  LOGGED BY S. Chandra    Asphalt Concrete (4 inches).   Asphalt Concrete (4 inches).   Asphalt Concrete (4 inches).   O.5   Very dense, dark brown-gray GRAVEL with silt and sand, moist, gravel is fine to coarse and subangular.   St.   O.5   O	HAMMER EFFICIENCY 88%  LOGGED BY S. Chandra    Agency   Control	EQUIP	MENT	CME-7	5, Rig 5	DATI	E C	Ю	PLETED	07/16/20	)25			
MATERIAL DESCRIPTION AND NOTES  Asphalt Concrete (4 inches).  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  Very dense, dark brown-gray GRAVEL with silt and sand, moist, gravel is fine to coarse and subangular.  CSSS 0 BA1 100/1" (100)	MATERIAL DESCRIPTION AND NOTES  Asphalt Concrete (4 inches).  Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  Very dense, dark brown-gray GRAVEL with silt and sand, moist, gravel is fine to coarse and subangular.  CSS/ 0	BORIN	G DIA	METER	3.875 inches	TIME	E C	ОМР	LETED	1:45 PM				
MATERIAL DESCRIPTION AND NOTES  Asphalt Concrete (4 inches).  Asphalt Concrete (4 inches).  O.3  Aggregate Base (2 inches).  Very dense, dark brown-gray GRAVEL with sit and sand, moist, gravel is fine to coarse and subangular.	MATERIAL DESCRIPTION AND NOTES  A Raw N-Value II  Percent Fines  A Raw N-Value II  Percent Fines  A Raw N-Value II  Plastic Limit  X Liquid Lim  Moisture Content  Aggregate Base (2 inches).  Very dense, dark brown-gray GRAVEL with silt and sand, moist, gravel is fine to coarse and subangular.	НАММ	IER EF	FICIENC	CY 88%	LOG	GEI	D BY	S. Cha	andra				
Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  Very dense, dark brown-gray GRAVEL with silt and sand, moist, gravel is fine to coarse and subangular.  GP-GM  CSS 0 B4.1 100/1" (100)	Asphalt Concrete (4 inches).  Aggregate Base (2 inches).  Very dense, dark brown-gray GRAVEL with silt and sand, moist, gravel is fine to coarse and subangular.  GP-GM  CSS 0 B4.1 100/1" (100)	DEРТН (ft)	nscs	GRAPHIC LOG	MATERIAL DESCRIPTION AND NOTES	FG// F	SAMPLE I YPE	RECOVERY (in)	SAMPLE ID	LOW COUNTS	CONTENT	+ Plastic Limit		<b>X</b> Liquid Lir
		- - -	GP-GM		Aggregate Base (2 inches).  Very dense, dark brown-gray GRAVEL with silt and sand, moist, gravel is fine to coarse	0.5	ss/\		<b>B4.1</b> ✓		MOIS	20 4	00 66	80
Water Levels		5.=	Was	ar Love			PT	1 /	B4.2	50/1"				
Water Levels  ☑ Not observed		5			s		PTA	1 /	B4.2	50/1"				
Not observed	Not observed	<u> </u>			s		PTA	1 /	B4.2 J	50/1"				



PROJE	CT NA	ME City	y of St. Helens Public Safety Building	с	LIEN	<b>r</b> Ota	k				
PROJE	CT NU	IMBER 9	Otak-3-01-1	P	ROJE	ст с	ITY, S	TATE St. H	Helens	s, Oregon	
DRILLING CONTRACTOR Western States Soil Conservation, Inc.			on, Inc. D	ATE S	STAR	<b>TED</b> 07	7/17/2025				
DRILLING METHOD Mud Rotary			TI	ME S	TART	ED 2:0	00 PM				
EQUIP	MENT	CME-7	5, Rig 5	D	ATE (	СОМЕ	PLETE	07/17/2	025		
BORIN	G DIAN	METER	3.875 inches	TI	ME C	OMP	LETEC	2:55 PM			
НАММ	ER EFI	FICIENC	<b>EY</b> <u>88%</u>	LC	GGE	D BY	S. Cha	andra			
DEPTH (ft)	nscs	GRAPHIC LOG	MATERIAL DESCRIPTION AND NO	DTES	SAMPLE TYPE	RECOVERY (in)	SAMPLE ID	BLOW COUNTS	MOISTURE CONTENT (%)	▲ Raw N-Value Blows  + Plastic Limit ● Moisture	□ Percent Fin  ★ Liquid Lim e Content
- -			Asphalt Concrete (3 inches).  Aggregate Base (2 inches).  Very dense, dark brown-gray GRAVEL was silt and sand, moist, gravel is fine to coan and subangular.	0.3 0.4 vith	css/	0 /	<b>B</b> 5.1	100/1"	MOIS	20 40	60 80
	GP-GM				000	ٽا		(100)	Λ		
_ 5				5.1	-\ <sub>SDT</sub> /	\ 1	R5.2		25	21	
5			Exploration completed at 5.1 feet.	5.1	SPT	1_/	B5.2	50/1"	25	21	
5-4			Exploration completed at 5.1 feet.	5.1	SPT	1	B5.2		25	21	
5_5			Exploration completed at 5.1 feet.	5.1	SPT	1	B5.2		25	21	
51	Wat	er Level		5.1	SPT	1	B5.2		25	21	
		er Level:	s	5.1	SPT	1	B5.2		25	21	

Shannon & Wilson SPT Analyzer Results

PDA-S Ver. 2022.35.2 - Printed: 1/13/2025

## **Summary of SPT Test Results**

Project: rig 5, Test Date: 12/30/2024
FMX: Maximum Force EFV: Maximum Energy

VMX: Maximum Velocity FTR: Energy Transfer Ratio - Rated

VIVIX: Maximum velocity	1					E	rk: Energy rransfer	Ratio - Rated
BPM: Blows/Minute Instr.	Blows	N	N60	Average	Average	Average	Average	Average
Length	Applied	Value	Value	FMX	VMX	BPM	EFV	ETF
ft	/6"			kips	ft/s	bpm	ft-lb	%
62.50	9-10-12	22	32	52	17.2	46.5	321	91.8
64.50	2-6-9	15	22	47	17.0	35.7	303	86.5
67.50	10-12-14	26	38	51	16.2	48.7	318	91.0
69.50	9-13-21	34	49	53	16.9	57.1	287	82.0
72.50	5-10-18	28	41	51	17.9	57.5	316	90.4
		Overall Ave	rage Values:	51	17.0	51.0	308	88.0
		Standa	rd Deviation:	2	0.8	7.3	17	4.8
		Overall Max	imum Value:	58	19.2	57.8	342	97.6
		Overall Min	imum Value:	44	15.6	35.6	268	76.5

# **APPENDIX B**



# APPENDIX B LABORATORY TESTING

#### **GENERAL**

Laboratory testing was conducted on select soil samples to confirm field classifications and determine the index engineering properties and strength characteristics. The laboratory classifications are shown on the exploration logs if those classifications differed from the field classifications. The locations of the tested samples are shown on the exploration logs. Descriptions of the tests are presented below and the test results are presented in this appendix.

## **PARTICLE-SIZE**

Particle-size analyses were completed on select soil samples in general accordance with ASTM D1140 (P200). This test is a quantitative determination of the percent passing the U.S. Standard No. 200 sieve expressed as a percentage of the dry weight of the soil.

### **MOISTURE CONTENT**

The natural moisture content of select soil samples was determined in general accordance with ASTM D2216. The natural moisture content is a ratio of the weight of the water to dry soil in a test sample and is expressed as a percentage.





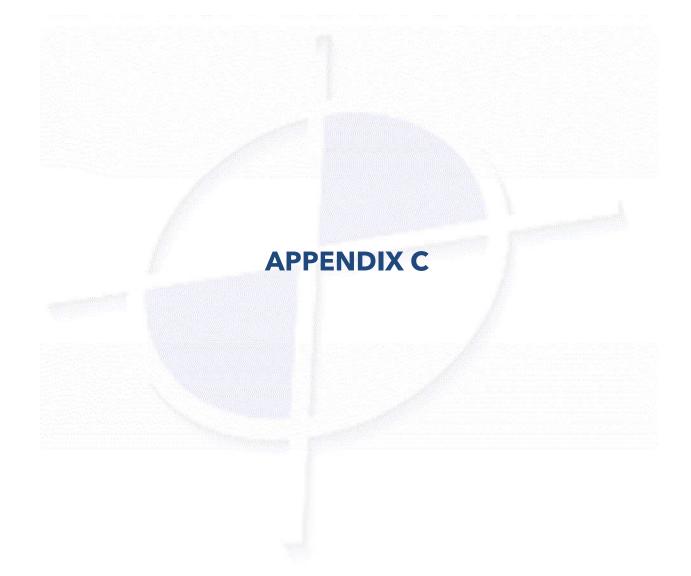
11917 NE 95<sup>th</sup> Street Vancouver, Washington 98682 ● Phone: 360-823-2900 8880 SW Nimbus Avenue, Suite A Portland, Oregon 97008 ● Phone: 971-384-1666

www.columbia-west.com



**MOISTURE CONTENT, PERCENT PASSING NO. 200 SIEVE BY WASHING** 

PROJECT			CLIENT			PROJECT NO.			
	lens Public Safe	ety Building	Otak	al A a a a C ita	000	Otak-3-01-1			
St. Helens, O	bia Boulevard Pregon		Portland, Of	d Avenue, Suite R 97204	800	ISSUE DATE PAGE 07/23/25		1 of 1	
						DATE SAMPLED SAMPLED 07/16/25 S		D BY S. Chandra	
LABORATOR	RY TEST DATA	\	<u> </u>						
TEST PROCEDURE									
ASTM D2216	CONTAINER	MOIST MASS	DRY MASS	AFTER WASH DRY			PERCENT	PERCENT	
LAB ID	MASS (g)	+ CONTAINER (g)	+ CONTAINER (g)	MASS + CONTAINER (g)	FIELD ID	SAMPLE DEPTH (ft)	MOISTURE CONTENT	PASSING NO. 200 SIEVE	
S25-1481	579.13	892.82	830.11	786.93	B1.1	2.5	25%	17%	
S25-1482	548.01	835.97	776.14	752.95	B1.2	5	26%	10%	
S25-1483	540.75	618.58	603.02	590.16	B5.2	5	25%	21%	
	t received for Lab entire sample use		d 1483 did not m	eet the minimum s	ize	DATE TESTED 07/22/2	TESTED  J. Coma	BY astro, L. Gunderson	
. "	,	,				8	J C	Z	





# APPENDIX C SEISMIC SURVEY

#### INTRODUCTION

This appendix summarizes the results of our seismic survey for the proposed City of St. Helens Public Safety Building in Saint Helens, Oregon. The objective of the survey was to determine the shear wave velocity profile of approximately 100 feet of the subsurface soil. Fieldwork for the survey was completed on August 8, 2025.

Detailed discussion of the surface and subsurface conditions at the site is presented in the main report.

## **SCOPE OF SERVICES**

Our scope of services included the following:

- Completed one ReMi array consisting of 12 geophones in a linear arrangement.
- Generated additional seismic noise as needed via hammer strikes or other active sources.
- Acquired sixty 30-second-long data records.
- Pre-processed and analyzed the data to extract a dispersion curve.
- Inverted the dispersion curve and iteratively adjusted the interpreted shear wave velocity profile to align theoretical and modeled dispersion curves.
- Prepared this appendix that includes an estimate of the  $Vs_{100}$  and a corresponding seismic site class in accordance with the 2021 IBC and ASCE 7-16.

### **METHODOLOGY**

The seismic survey technique known as ReMi was used to estimate the  $Vs_{100}$  for a linear array of geophones deployed at the site. ReMi is a non-invasive surface wave method used to estimate subsurface shear wave velocity profiles using ambient seismic noise to capture surface wave velocities through a linear array of geophones. The technique was developed in 2001 by Dr. John Louie as a method to accurately and efficiently capture the one-dimensional  $Vs_{100}$  in a codecompliant manner (Louie 2001). The technique is well suited for areas with pronounced background noise such as urban settings or high traffic areas. In areas lacking passive noise, active sources such as sledgehammer strikes or pedestrian foot traffic can be used to enhance the seismic signal.

Given the topography and locations of various features at the site (e.g., fences, structures, etc.), we were able to deploy an approximately 190-foot-long array. The array was set generally parallel to the South 17<sup>th</sup> Street, between Cowlitz Street and Columbia Boulevard. The linear array consisted of 12 HG-6, 4.5-hertz geophones, with an approximate center-to-center geophone spacing of 17.2 feet. Approximate GPS coordinates for the first and last geophones are provided in Table C-1, and the approximate array location is shown on Figure 2 and Figure C-1.



**Table C-1. ReMi Array Coordinates** 

Аннали	Orientation	<b>Approximate GPS Coordinates</b>			
Array	Orientation	Geophone 1	Geophone 12		
A-1	North-South	45.85852	45.85903		
A-1	North-South	-122.81460	-122.81481		

Each geophone was mounted on a tripod base and set on a generally level pavement surface. Small sandbags were placed on top of each geophone to increase stability and coupling to the ground. The surface wave data were acquired using a ReMiDAQ 4-12 channel seismograph for approximately 53 minutes. Noise sources included 10-pound sledgehammer blows to a plastic strike plate on both ends and at the midpoint of the array, along with ambient noise generated by traffic on nearby roads.

Pre- and post-processing was completed using Terēan's proprietary VsSurf ReMi 1dS software, which indicated that the data collected along the array were sufficient in quality to characterize shear wave velocity to a minimum depth of 100 feet BGS. A minimum of 10 individual records were "stacked" and inverted to facilitate dispersion curve selection along the lowest velocity envelope. The dispersion curve was then imported into the VsSurf ReMi 1dS Disper module, which was used to perform forward modeling of the interpreted shear wave velocity profile. The shear wave velocity profile was adjusted based on our understanding of the site geology and subsurface conditions until the theoretical dispersion curve fit the selected dispersion points within an acceptable margin.

### **RESULTS**

Table C-2 summarizes the interpreted one-dimensional  $Vs_{100}$  for the array. The interpreted value should be thought of as an average representation along the length of the array. Figure C-2 shows the interpreted shear wave velocity profile from the ground surface to a depth of 100 feet BGS. Note that the velocity structure shown in Table C-2 and on Figure C-2 represents a non-unique interpretation of the geophysical data and other interpretations are possible; however, the resulting  $Vs_{100}$  value is generally considered to be reliable for the purpose of seismic design in accordance with the 2021 IBC and ASCE 7-16.

Table C-2. Average Shear Wave Velocity in the Upper 100 Feet<sup>1</sup>

Array	Depth (feet BGS)	Shear Wave Velocity <sup>1</sup> (fps)	Vs <sub>100</sub> (fps)	2021 IBC/ ASCE 7-16 Site Class
	0 to 6	973		
A-1	6 to 43	5,494	3,925	В
	43 to 100	4,474		

1. Depth and shear wave velocity rounded to nearest whole number for the purposes of reporting.



### **REFERENCES**

ASCE 2016. Minimum Design Loads and Associated Criteria for Buildings and Other Structures and supplements. ASCE Standard ASCE/SEI 7-16.

International Code Council 2021. 2021 International Building Code.

Louie, John N. 2001. "Faster, Better: Shear-Wave Velocity to 100 Meters Depth from Refraction Microtremor Arrays." *Bulletin of the Seismological Society of America*, vol. 91, no. 2, 1 April, pp. 347–364, https://doi.org/10.1785/0120000098.

VsSurf ReMi 1dS. Version 2.1.7. Terēan. <a href="https://www.terean.com/applications">https://www.terean.com/applications</a>.







# **REMI ARRAY LOCATION (LOOKING NORTH)**



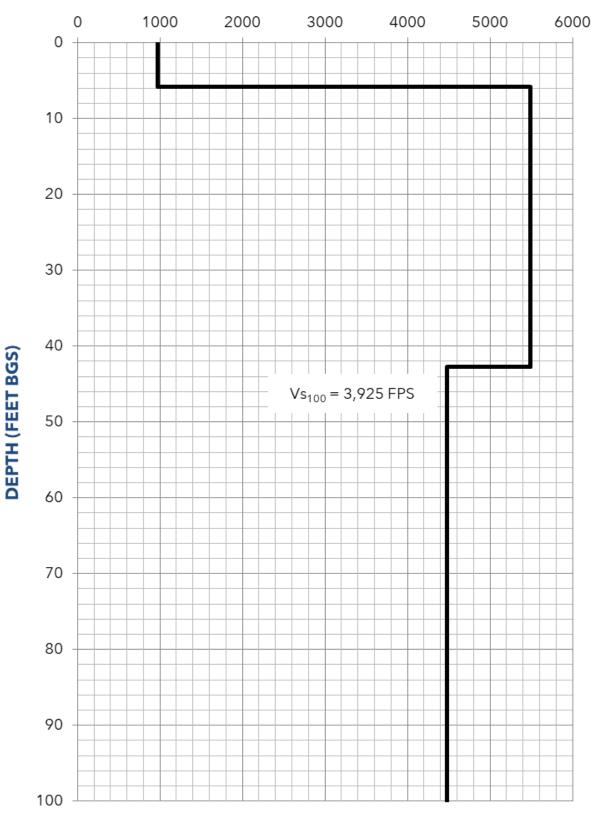
PROJECT NO.: OTAK-3-01-1

AUGUST 2025

ARRAY PHOTOGRAPH
CITY OF ST. HELENS PUBLIC SAFETY BUILDING
ST. HELENS, OREGON

FIGURE C-1







PROJECT NO.: OTAK-3-01-1

AUGUST 2025

SHEAR WAVE VELOCITY PROFILE
CITY OF ST. HELENS PUBLIC SAFETY BUILDING
ST. HELENS, OREGON

# **APPENDIX D**



# APPENDIX D SITE-SPECIFIC SEISMIC HAZARD EVALUATION

#### INTRODUCTION

This appendix summarizes the results of a site-specific seismic hazard evaluation for the proposed City of St. Helens Public Safety Building in St. Helens, Oregon. This seismic hazard evaluation was performed in accordance with the requirements of the 2022 SOSSC and ASCE 7-16.

## **SITE CONDITIONS**

### **REGIONAL GEOLOGY AND SUBSURFACE CONDITIONS**

The regional geology and subsurface conditions in the area are presented in the main report.

## **SEISMIC SETTING**

### **Earthquake Source Zones**

Three scenario earthquakes were considered for this study consistent with the local seismic setting. Two of the possible earthquake sources are associated with the CSZ, and the third event is a shallow, local crustal earthquake that could occur in the North American Plate. The three earthquake scenarios are discussed below.

## **Regional Events**

The CSZ is the region where the Juan de Fuca Plate is being subducted beneath the North American Plate. This subduction is occurring in the coastal region between Vancouver Island and northern California. Evidence has accumulated suggesting that this subduction zone has generated eight great earthquakes in the last 4,000 years, with the most recent event occurring approximately 300 years ago (Weaver and Shedlock 1991). The fault trace is mapped approximately 50 to 120 km off the Oregon Coast.

Two types of subduction zone earthquakes are possible and considered in this study:

- 1. An interface event earthquake on the seismogenic part of the interface between the Juan de Fuca Plate and the North American Plate on the CSZ. This source is capable of generating earthquakes with a  $M_W$  of 9.0+.
- 2. A deep intraplate earthquake on the seismogenic part of the subducting Juan de Fuca Plate. These events typically occur at depths of between 30 and 60 km. This source is capable of generating an event with a  $M_W$  of up to 8.0.

## **Local Events**

An earthquake could possibly occur on local crustal faults. Figure D-1 shows the locations of faults with potential Quaternary movement within a 40-km radius of the site. Figure D-2 shows the interpreted locations of recent seismic events (USGS 2025a). Table D-1 provides information on local faults close to the site.



**Table D-1. Nearest Mapped Crustal Faults** 

Source	Closest Mapped Distance <sup>1</sup> (km)	Mapped Length <sup>1</sup> (km)	Slip Rate (mm/yr)
Portland Hills fault	1.2	49	<0.2
East Bank fault	25.0	29	<0.2

### **DESIGN EARTHQUAKE**

Based on deaggregation using the USGS Unified Hazard Tool (USGS 2025b) and a fundamental building period of 0.2 second, the hazard at the site is dominated by the CSZ interface event (more than 60 percent). The CSZ intraplate and local crustal event each contribute approximately 20 percent to the hazard, respectively.

# SEISMIC DESIGN PARAMETERS SEISMIC SITE CLASS

Based on the shear wave velocity testing presented in Appendix C, the seismic site class at the site in accordance with Table 20.3-1 of ASCE 7-16 is B. Calculations for the seismic site class are provided in Table D-2.

**Table D-2. Site Class Determination** 

Depth (feet BGS)	Interval (feet BGS)	Shear Wave Velocity (fps)	Interval/Shear Wave Velocity (second)
0 to 6	6	973	0.005951
6 to 43	37	5,494	0.006719
43 to 100	57	4,474	0.012804
Sum	100	NA	0.025474
Average Shear Wave Velocity in the Upper 100 Feet BGS, V <sub>S100</sub> (fps)	NA	3,925	
Site Class per ASCE 7-16	NA	В	

Based on the subsurface conditions encountered at the site, it is our opinion that amplification factors prescribed by ASCE 7-16 for a seismic site class of B are appropriate for design and a site-response analysis is not required. The parameters in Table D-3 can be used design of the project.



**Table D-3. Seismic Design Parameters in Accordance with ASCE 7-16** 

Parameter	Short Period (T <sub>s</sub> )	1-Second Period (T <sub>1</sub> )
MCE spectral response acceleration, S	$S_s = 0.834 g$	$S_1 = 0.402 g$
Site class		3
Site coefficient, F	$F_a = 0.9$	$F_{\rm v} = 0.8$
Adjusted spectral response acceleration, $S_M$	$S_{MS} = 0.751 g$	$S_{M1} = 0.321 g$
Design spectral response acceleration, $S_D$	$S_{DS} = 0.500 g$	$S_{D1} = 0.214 g$

#### LIQUEFACTION

Liquefaction is caused by a rapid increase in pore water pressure that reduces the effective stress between soil particles. Granular soil, which relies on interparticle friction for strength, undergoes a loss of strength until the excess pore pressures dissipate. In general, loose, saturated sand soil with low silt and clay content is the most susceptible to liquefaction. Silty soil with low plasticity can be susceptible to strain softening under relatively higher levels of ground shaking. Strain-softened soil has volumetric strains much smaller than liquefiable soil due to matrix effects.

Based on the soil and groundwater conditions and the results of geophysical testing at the site, it is our opinion that seismic settlement is not a design consideration for the project.

### LATERAL SPREADING

Lateral spreading is a liquefaction-related seismic hazard and occurs on gently sloping or flat sites underlain by liquefiable sediment adjacent to an open face, such as a riverbank. Liquefied soil adjacent to an open face can flow toward the open face, resulting in lateral ground displacement. Because liquefaction is not a design consideration, lateral spreading is not a design consideration.

### **FAULT SURFACE RUPTURE**

Active faults are not mapped directly beneath the site. Therefore, it is our opinion that the risk of fault rupture at the site is low.

### **GROUND MOTION AMPLIFICATION**

Soil capable of significantly amplifying ground motions beyond the levels determined by our site-specific seismic response analysis was not encountered during the subsurface explorations. The main report provides a detailed description of the subsurface conditions encountered. We conclude that the level of amplification determined by our response analysis is appropriate for the project.

#### **LANDSLIDE**

Earthquake-induced landsliding generally occurs in steeper slopes comprised of relatively weak soil deposits. The site and surrounding area are relatively flat, and landslides are unlikely during postulated seismic scenarios.



#### **SETTLEMENT**

Settlement due to earthquakes is most prevalent in relatively deep deposits of dry, clean sand. We do not anticipate that significant settlement in addition to liquefaction-induced settlement will occur during design levels of ground shaking.

### SUBSIDENCE/UPLIFT

Subduction zone earthquakes can cause vertical tectonic movements. The movements reflect coseismic strain release accumulation associated with interplate coupling in the subduction zone. Based on our review of the literature, the locked zone of the CSZ is located in excess of 90 miles from the site. Consequently, we do not anticipate that subsidence or uplift is a significant design concern.

## **REFERENCES**

ASCE 2016. Minimum Design Loads and Associated Criteria for Buildings and Other Structures and supplements. ASCE Standard ASCE/SEI 7-16.

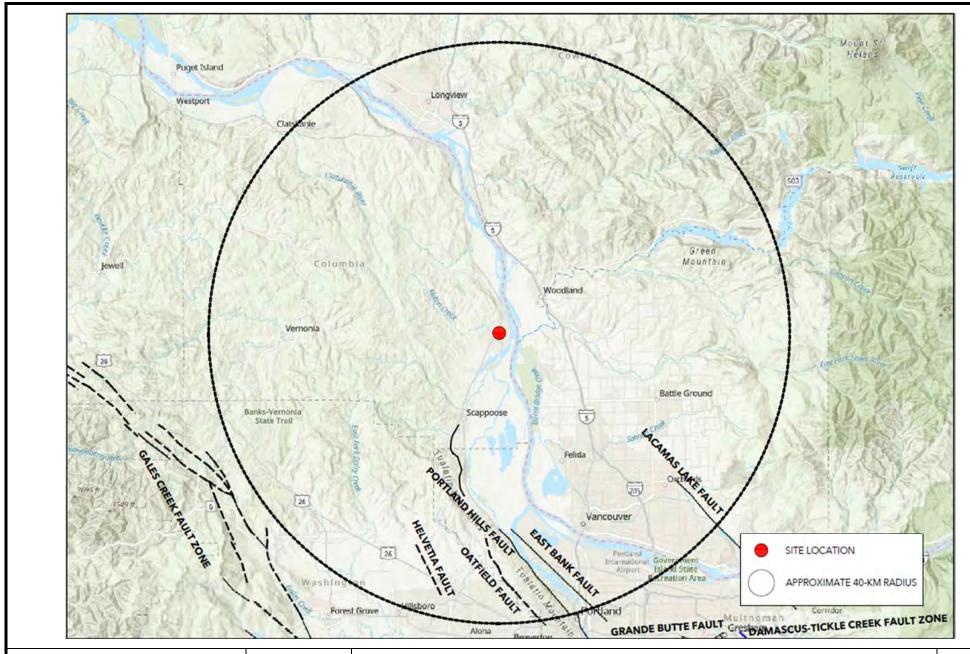
Oregon Building Codes Division 2022. 2022 Oregon Structural Specialty Code.

Weaver, C.S., and K.M. Shedlock 1991. Program for earthquake hazards assessment in the Pacific Northwest: U.S. Geological Survey Circular 1067, 29 pgs.

USGS 2025a. Earthquake Hazards Program, Unified Hazard Tool. <a href="https://earthquake.usgs.gov/hazards/interactive/">https://earthquake.usgs.gov/hazards/interactive/</a>. Accessed August 2025.

USGS 2025b. Quaternary Fault and Fold Database for the United States. <a href="https://www.usgs.gov/natural-hazards/earthquake-hazards/faults">https://www.usgs.gov/natural-hazards/earthquake-hazards/faults</a>. Accessed August 2025.





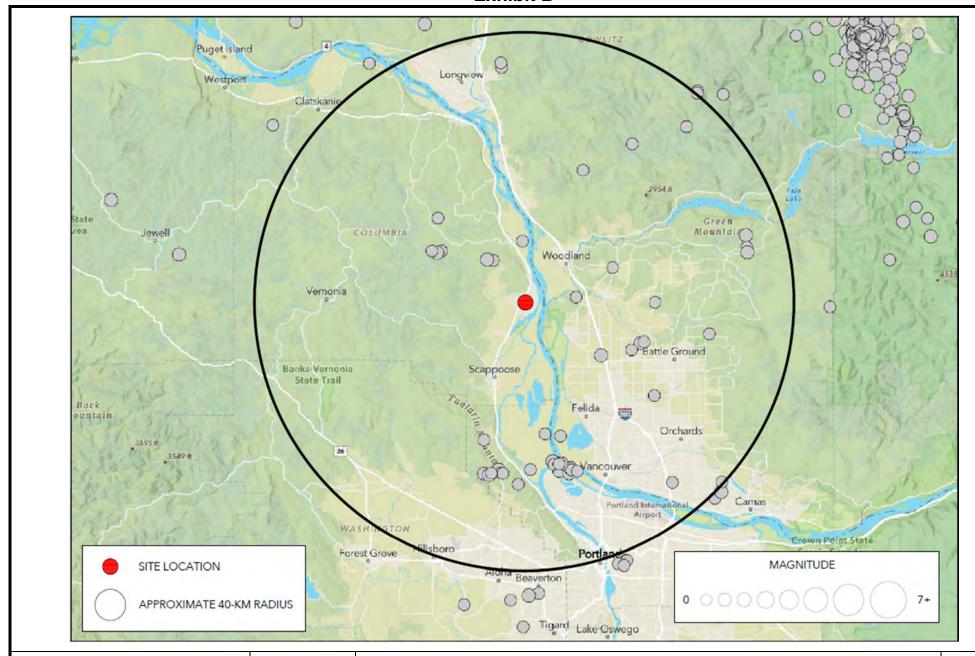


PROJECT NO.: OTAK-3-01-1

AUGUST 2025

QUATERNARY FAULT MAP
CITY OF ST. HELENS PUBLIC SAFETY BUILDING
ST. HELENS, OREGON

FIGURE D-1





PROJECT NO.: OTAK-3-01-1 AUGUST 2025

HISTORICAL SEISMICITY MAP
CITY OF ST. HELENS PUBLIC SAFETY BUILDING
ST. HELENS, OREGON

FIGURE D-2

# **APPENDIX E**



# APPENDIX E REPORT LIMITATIONS AND IMPORTANT INFORMATION

## Report Purpose, Use, and Standard of Care

This report has been prepared in accordance with standard fundamental principles and practices of geotechnical engineering and/or environmental consulting, and in a manner consistent with the level of care and skill typical of currently practicing local engineers and consultants. This report has been prepared to meet the specific needs of specific individuals for the indicated site. It may not be adequate for use by other consultants, contractors, or engineers, or if change in project ownership has occurred. It should not be used for any other reason than its stated purpose without prior consultation with Columbia West Engineering, Inc. (Columbia West). It is a unique report and not applicable for any other site or project. If site conditions are altered, or if modifications to the project description or proposed plans are made after the date of this report, it may not be valid. Columbia West cannot accept responsibility for use of this report by other individuals for unauthorized purposes, or if problems occur resulting from changes in site conditions for which Columbia West was not aware or informed.

## **Report Conclusions and Preliminary Nature**

This geotechnical or environmental report should be considered preliminary and summary in nature. The recommendations contained herein have been established by engineering interpretations of subsurface soils based upon conditions observed during site exploration. The exploration and associated laboratory analysis of collected representative samples identifies soil conditions at specific discreet locations. It is assumed that these conditions are indicative of actual conditions throughout the subject property. However, soil conditions may differ between tested locations at different seasonal times of the year, either by natural causes or human activity. Distinction between soil types may be more abrupt or gradual than indicated on the soil logs. This report is not intended to stand alone without understanding of concomitant instructions, correspondence, communication, or potential supplemental reports that may have been provided to the client.

Because this report is based upon observations obtained at the time of exploration, its adequacy may be compromised with time. This is particularly relevant in the case of natural disasters, earthquakes, floods, or other significant events. Report conclusions or interpretations may also be subject to revision if significant development or other manmade impacts occur within or in proximity to the subject property. Groundwater conditions, if presented in this report, reflect observed conditions at the time of investigation. These conditions may change annually, seasonally or as a result of adjacent development.

## **Additional Investigation and Construction Observation**

Columbia West should be consulted prior to construction to assess whether additional investigation above and beyond that presented in this report is necessary. Even slight variations in soil or site conditions may produce impacts to the performance of structural facilities if not adequately addressed. This underscores the importance of diligent construction observation and testing to verify soil conditions do not differ materially or significantly from the interpreted conditions utilized for preparation of this report.



Therefore, this report contains several recommendations for field observation and testing by Columbia West personnel during construction activities. Actual subsurface conditions are more readily observed and discerned during the earthwork phase of construction when soils are exposed. Columbia West cannot accept responsibility for deviations from recommendations described in this report or future performance of structural facilities if another consultant is retained during the construction phase or Columbia West is not engaged to provide construction observation to the full extent recommended.

## **Collected Samples**

Uncontaminated samples of soil or rock collected in connection with this report will be retained for thirty days. Retention of such samples beyond thirty days will occur only at client's request and in return for payment of storage charges incurred. All contaminated or environmentally impacted materials or samples are the sole property of the client. Client maintains responsibility for proper disposal.

## **Report Contents**

This geotechnical or environmental report should not be copied or duplicated unless in full, and even then only under prior written consent by Columbia West, as indicated in further detail in the following text section entitled Report Ownership. The recommendations, interpretations, and suggestions presented in this report are only understandable in context of reference to the whole report. Under no circumstances should the soil boring or test pit excavation logs, monitor well logs, or laboratory analytical reports be separated from the remainder of the report. The logs or reports should not be redrawn or summarized by other entities for inclusion in architectural or civil drawings, or other relevant applications.

### **Report Limitations for Contractors**

Geotechnical or environmental reports, unless otherwise specifically noted, are not prepared for the purpose of developing cost estimates or bids by contractors. The extent of exploration or investigation conducted as part of this report is usually less than that necessary for contractor's needs. Contractors should be advised of these report limitations, particularly as they relate to development of cost estimates. Contractors may gain valuable information from this report, but should rely upon their own interpretations as to how subsurface conditions may affect cost, feasibility, accessibility and other components of the project work. If believed necessary or relevant, contractors should conduct additional exploratory investigation to obtain satisfactory data for the purposes of developing adequate cost estimates. Clients or developers cannot insulate themselves from attendant liability by disclaiming accuracy for subsurface ground conditions without advising contractors appropriately and providing the best information possible to limit potential for cost overruns, construction problems, or misunderstandings.

### **Report Ownership**

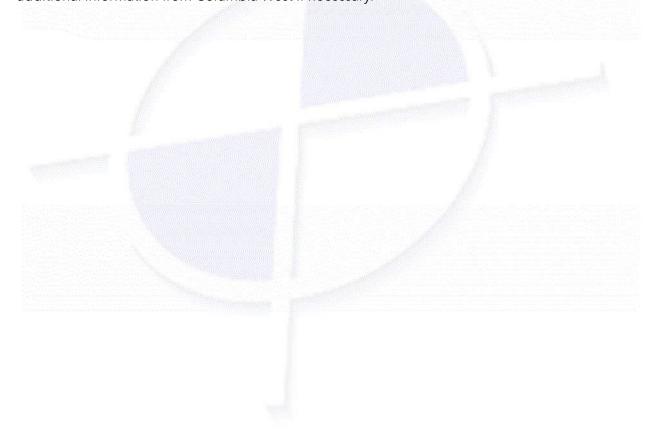
Columbia West retains the ownership and copyright property rights to this entire report and its contents, which may include, but may not be limited to, figures, text, logs, electronic media, drawings, laboratory reports, and appendices. This report was prepared solely for the client, and other relevant approved users or parties, and its distribution must be contingent upon prior express written consent by Columbia West. Furthermore, client or approved users may not use, lend, sell, copy, or distribute this document without express written consent by Columbia West.



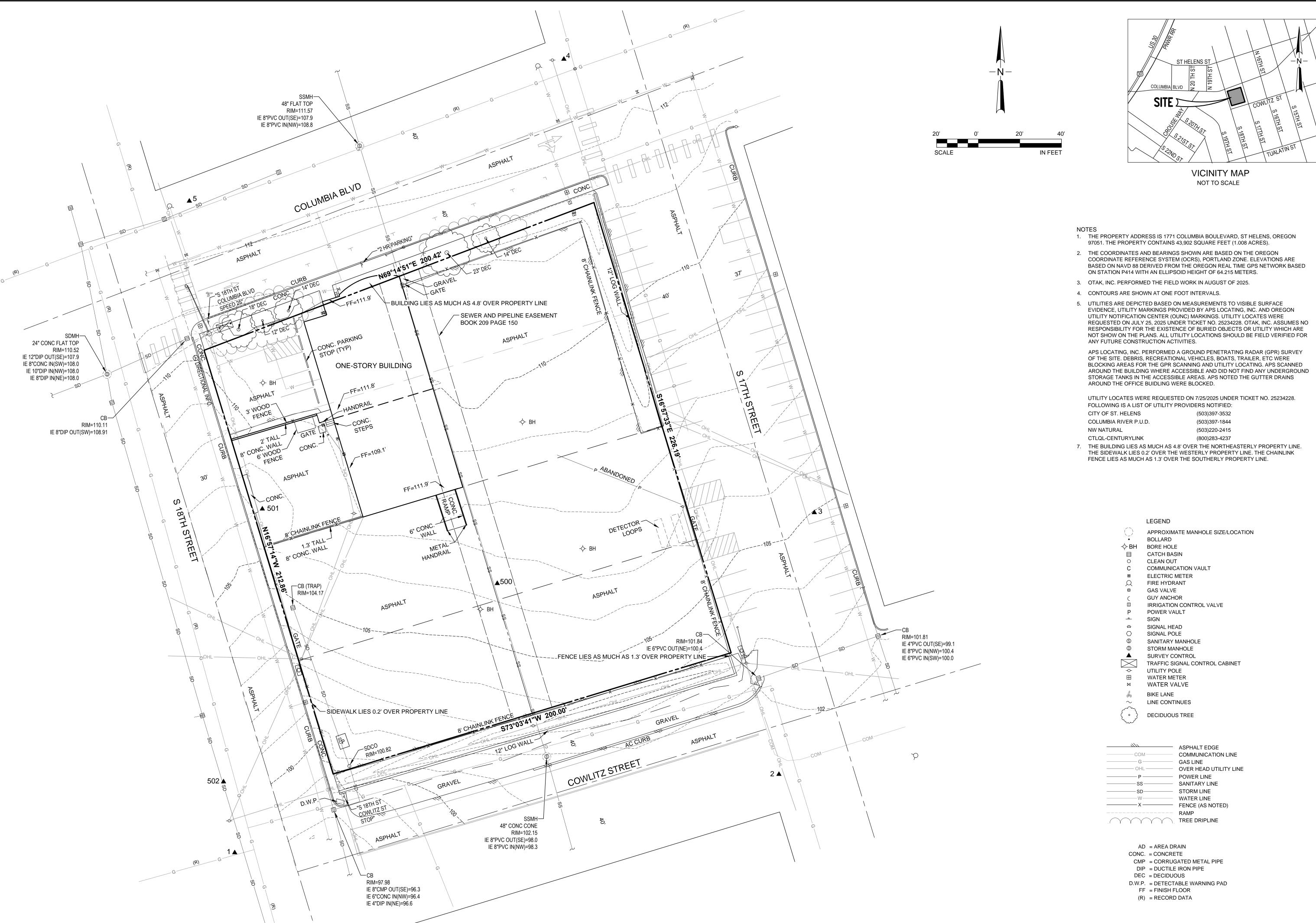
Client does not own nor have rights to electronic media files that constitute this report, and under no circumstances should said electronic files be distributed or copied. Electronic media is susceptible to unauthorized manipulation or modification, and may not be reliable.

## **Consultant Responsibility**

Geotechnical and environmental engineering and consulting is much less exact than other scientific or engineering disciplines, and relies heavily upon experience, judgment, interpretation, and opinion often based upon media (soils) that are variable, anisotropic, and non-homogenous. This often results in unrealistic expectations, unwarranted claims, and uninformed disputes against a geotechnical or environmental consultant. To reduce potential for these problems and assist relevant parties in better understanding of risk, liability, and responsibility, geotechnical and environmental reports often provide definitive statements or clauses defining and outlining consultant responsibility. The client is encouraged to read these statements carefully and request additional information from Columbia West if necessary.







Calculated MDR 9-02-2025 9-03-2025

NST Checked

**REVISIONS** 

4 Ч ПО , TOWNSHIP CITY O

Otak Inc., 808 SW 3rd Avenue, Suite 800 Portland, Oregon 97204 Phone: (503) 287-6825 www.otak.com

1 OF 1

Sheet No.

Project No.

20996



# **Applied Professional Services, Inc.**

43530 SE North Bend Way North Bend, WA 98045

"Solutions that exceed expectations"

Date	Project Address/Job Number:	Services Performed For:
7/25/2025	1771 Columbia Blvd Saint Helens, OR Utility research – GPR request The scope is to perform utility	OTAK
	1	Sue Tsoi
	GPR success is based off of site- specific conditions and access ****NO Guarantees*	Sue.Tsoi@otak.com
		425-420-5464

# **Scope of Work**

- A. APS, Inc. will employ all industry and best practices to designate and mark the known conductible and/or non-conductible utilities within the project boundaries.
- B. APS, Inc. will sweep the area, after the known utilities have been marked, to attempt to identify any unknown or abandoned utilities.
- C. The project boundaries are defined by civil drawings or maps provided by the Client.
- D. Conductible Utility Locating refers to conductible (metallic) utilities only.
- E. **Non-Conductible Utility Locating** refers to non-conductible *(non-metal)* utilities only. This is generally for sewer & storm facilities only, or sewer & storm video inspection.
- F. **GPR Utility Locating** refers to Ground Penetrating Radar, used to find non-metallic utilities such as concrete, PVC, or polyethylene water mains, USTs, and other anomalies.

# **Cost Estimate**

Conductible Budget	0	\$135.00	
Mobilization and GPR	4	\$210.00	\$840.00
Sonde budget*	0	\$195.00	
	4		
		Labor Est. Total	\$840.00



#### Invoicing

Net 30 days on all billing unless specified otherwise under a separate contract or negotiation.

#### **Disclaimer**

APS, Inc, and or its employees cannot guarantee that all conductible and/or non-conductible utilities within the project boundaries can or will be found.

#### **Project Estimate**

#### NOT TO EXCEED WITHOUT WRITTEN CLIENT APPROVAL:

This hourly / not to exceed project estimate is based on the estimated number of hours it will take to perform the Scope of Work. If the project requires additional time or costs to complete the Scope of work, then written approval to exceed the original cost estimate is required.

#### **OTAK**

Ву		
Name		
Title		



## ACKNOWLEDGEMENT AND ACCEPTANCE OF TERMS AND CONDITIONS FOR SERVICES

"Client" acknowledges that the Proposal prepared by Applied Professional Services, Inc. ("APS"), along with the Terms and Conditions ("Terms") below comprise the entire agreement between the Client and APS (collectively "Agreement"), and supersedes all prior or contemporaneous written and oral understandings, agreements, negotiations, representations, warranties, and communications.

#### **GENERAL TERMS AND CONDITIONS**

**RELATIONSHIP OF THE PARTIES:** The relationship between the parties is that of independent contractors. Nothing contained in this Agreement shall be construed as creating any agency, partnership, joint venture or other form of joint enterprise, employment or fiduciary relationship between the parties, and neither party shall have authority to contract for or bind the other party in any manner whatsoever.

**SERVICES**: APS shall provide services to the Client for the project ("Project"), as defined in the Proposal and the Agreement, or as requested by the Client by an agreed Order (the "Services") in accordance with these Terms.

**PROJECT SCHEDULE:** APS shall use reasonable efforts to meet the Project schedule dates specified in the Proposal. These dates shall be estimates only.

CLIENT'S RESPONSIBILITIES: Client shall provide/perform the following in a timely manner so as not to delay the Services:

- Provide accurate information about the location and survey of the site where services are to be provided.
- Cooperate with APS in all matters relating to the Services.
- Secure legal rights to and provide access to the Project site property and authorize APS staff to access the site for activities necessary for the performance of the Services.
- Respond promptly to any APS request to provide direction, information, approvals, authorizations or decisions that are reasonably necessary for APS to perform Services in accordance with the requirements of this Agreement
- Provide materials, data, or information that APS may request that is reasonably necessary to carry out the Services in a timely manner and ensure that such materials, data, or information provided are complete and accurate in all material respects.
- Comply with all applicable laws in relation to the Services before the date on which the Services are to start, including required licenses, permits, and consents to allow APS to perform Services.
- Give prompt consideration and action to all communications, reports and other documents relating to the Services furnished by APS and inform APS in writing of decisions in reasonable time so as not to delay the Services.

**CLIENT'S ACTS OR OMISSIONS:** If APS's performance of its obligations under this Agreement is prevented or delayed by any act or omission of Client or its agents, subcontractors, consultants or employees, APS shall not be deemed in breach of its obligations under this Agreement or otherwise liable for any costs, charges or losses sustained or incurred by Client, in each case, to the extent arising directly or indirectly from such prevention or delay.

**COMPENSATION AND PAYMENT:** In consideration of the provision of the Services by APS under this Agreement, Compensation will be made as follows:

— Payment: Invoices for APS's Services shall be submitted on a monthly basis and are payable within thirty (30) days after the invoice date. In the event that the Client disputes any portion of an invoice, client shall notify APS - of such disputed items within ten (10) days of invoice date. Retainers/deposits shall be credited on the final invoice. Interest will accrue on accounts overdue by 30 days at the lesser of 1.5 percent per month (18 percent per annum) or the maximum legal rate of interest allowable.

- Failure to make any payment when due is a material breach of this Agreement. In the event any invoice has not been paid in full within ninety (90) days of the invoice date, APS shall have the right to immediately suspend all or any portion of the Services hereunder indefinitely, pending payment in full of such invoice(s).
- Taxes: Client shall be responsible for all sales, use and excise taxes, and any other similar taxes, duties and charges of any kind imposed by any federal, state or local governmental entity on any amounts payable by Client hereunder.
- Compensation: Client shall pay the agreed upon rates or amounts set forth in the Proposal. If the agreement extends across multiple years, the compensation paid to APS may be adjusted due to market conditions, underlying labor costs, overhead and pricing influences.

**CHANGE ORDERS:** If either party wishes to change the scope or performance of the Services, it shall submit details in writing of the requested change in a timely manner to the other party. APS shall, within a reasonable time after such request, provide a written estimate to Client of:

- the likely time required to implement the change
- any necessary variations to the compensation and other charges for the Services arising from the change
- the likely effect of the change on the Services
- any other impact the change might have on the performance of this Agreement

Promptly after receipt of the written estimate, the parties shall negotiate in good faith and agree in writing on the terms of such change (a "Change Order"). Neither party shall be bound by any Change Order unless mutually agreed upon in writing.

APS may charge for the time it spends assessing and documenting a request for a Change Order on a time and materials basis in accordance with the Proposal.

**DOCUMENTS:** Unless otherwise agreed to by the parties in writing, all of the documents prepared by or on behalf of APS in connection with the Services (herein called the "Documents") will be considered Instruments of Service and will become the property of Client upon full and final payment of the Compensation. Any copyright of the Documents shall be retained by APS. APS grants to Client a non-exclusive right and license to use, disclose and reproduce the Documents solely for the purpose of the Project.

**DATA AND DOCUMENT RETENTION:** APS will retain all data and Documents in accordance with its Data Retention Policy, unless otherwise agreed upon in writing.

**LIMITATION OF USE:** Client shall not amend, alter or revise, reuse, permit the use of, disclose or reproduce any of the Documents for the completion of another project or work, without first obtaining the written consent of APS, and all reproductions shall include notice of this restriction.

APS shall have no responsibility for any loss or damage suffered by Client or others resulting from any unauthorized use or modification of the Documents, errors in transmission of the Documents, changes to the Documents by others. The Documents may be relied upon by Client for design and construction work undertaken by other parties with respect to the Project provided such parties



verify the accuracy and completeness of the Documents to their satisfaction. The Client agrees to defend, indemnify and hold APS harmless from and against all claims, demands, losses, damages, liability and costs associated therewith

In the event any of APS's work product documents are modified in any respect, without involvement and oversight of APS, Client agrees that any modification is at the Client's sole risk

In the event that Client is in default of its obligations under this Agreement, APS may terminate Client's right and license to use, disclose and reproduce the Documents upon providing written notice to Client. Client shall return to APS all Documents and that no residual copies of any part of any Documents are to be retained by the Client or other parties.

STANDARD OF CARE: The standard of care for all Services performed under this Agreement will be the care and skill ordinarily used by members of the subject profession practicing under similar circumstances at the same time and in the same locality. APS makes no warranties or guarantees under this Agreement in connection with the Services. APS makes no warranty whatsoever with respect to the services, including any warranty of merchantability, warranty of fitness for a particular purpose, warranty of title, or warranty against infringement of intellectual property rights of a third party; whether express or implied by law, course of dealing, course of performance, usage of trade, or otherwise.

**CONFIDENTIALITY:** Both parties shall use reasonable efforts to keep confidential all data and information which is marked confidential and furnished by the respective parties under this Agreement. Confidentiality obligations shall not apply if such data or information is within the public domain, was known to the Client or APS at the time of disclosure, or was rightfully obtained by Client or APS on a non-confidential basis from a third party.

**PERSONAL INFORMATION:** Unless otherwise agreed to by the parties in writing, Client shall only collect and use individually identifiable information from or about APS employees if such collection and use is required. Client shall collect and use all Personal Information in accordance with applicable federal, state or personal information protection legislation.

NON-SOLICITATION OF EMPLOYEES: Neither party shall knowingly solicit, recruit, hire or otherwise employ or retain the employees of the other party during the Term of this Agreement and for one (1) year following the termination or expiration of this Agreement without the prior written consent of the other party. However, neither party shall be restricted from soliciting or recruiting generally in the media, or from hiring, without prior written consent, the other party's employees who answer any advertisement or otherwise voluntarily applies for hire without having been personally solicited.

For a breach of Non-Solicitation, an amount equal to twice the base annual salary of the recruited employee at the time of their departure shall be paid by the hiring party to the other party.

INDEMNIFICATION: To the fullest extent permitted by law, APS shall indemnify and hold harmless Client from and against any and all damages, liabilities, costs and expenses, including but not limited to reimbursement of reasonable attorney's fees arising out of damages or injuries to persons or property to the proportionate extent caused by the negligence, gross negligence or willful misconduct of APS or anyone acting under its direction or control or on its behalf in the course of its performance under this Agreement; provided that APS's aforesaid indemnity and hold harmless obligation shall not be applicable to any liability based upon the willful misconduct or negligence of Client or upon use of or reliance on information supplied by Client or on behalf of Client to APS in preparation of any report, study or other written document.

Client shall indemnify and hold harmless APS from and against any and all damages, liabilities, costs and expenses, including but not limited to reimbursement of reasonable attorney fees arising out of (i) damages or injuries to persons or property caused by the negligence, gross negligence or willful misconduct by Client or anyone acting under its direction or control or on its behalf in connection with this Agreement and (ii) claims, actions or demands for environmental liability arising from, or in relation to, any condition, not caused by the negligence of APS or anyone acting under its authority; provided

that Client's aforesaid indemnity and hold harmless obligation shall not be applicable to any liability based upon the willful misconduct or negligence of APS.

The duty to indemnify does not include the duty to pay for or to provide an upfront defense against unproven claims or allegations.

Where any claim results from the joint negligence, gross negligence, or willful misconduct, by Client and APS, the amount of such damage for which Client or APS is liable shall equal the proportionate part that the amount of such claim attributable to indemnitor's negligence, gross negligence, willful misconduct, bears to the amount of the total claim attributable to the joint negligence, gross negligence, or willful misconduct, at issue.

LIMITATION OF LIABILITIES: Notwithstanding any other provision in the Agreement, the Client agrees to limit APS's liability under the Agreement or arising from the performance or non-performance of the Services under any theory of law, including but not limited to claims for negligence, negligent misrepresentation and breach of contract, to the lesser of: (a) the fees paid to APS for Services or (b) the maximum of remaining available insurance provided. No claim may be brought against APS in contract or tort more than two (2) years after the cause of action arose. Any claim, suit, demand or action brought under the Agreement shall be directed and/or asserted only against APS and not against any of APS's employees, shareholders, officers or directors. APS's liability with respect to any claims arising out of this Agreement shall be limited as provided herein to direct damages arising out of the performance of the Services and APS shall not be held responsible or liable whatsoever for any consequential damages, injury or damage incurred by the actions or inactions of the Client, including but not limited to claims for loss of use, loss of profits and loss of markets.

**FORCE MAJEURE:** If performance of the Services is affected by causes beyond APS's reasonable control, the Project schedule and the Compensation shall be equitably adjusted by mutual agreement of the parties. APS shall not be liable or responsible to Client, nor be deemed to have defaulted or breached this Agreement, for any failure or delay in fulfilling or performing any term of this Agreement when and to the extent such failure or delay is caused by or results from acts or circumstances beyond the reasonable control of APS.

These causes include, without limitation, inclement weather conditions, acts of God, flood, fire, earthquake, explosion, governmental actions, war, invasion or hostilities (whether war is declared or not), terrorist threats or acts, riot, or other civil unrest, national emergency, revolution, insurrection, pandemic/epidemic, lock-outs, strikes or other labor disputes (whether or not relating to either party's workforce), or restraints or delays affecting carriers or inability or delay in obtaining supplies of adequate or suitable materials, materials or telecommunication breakdown or power outage, or similar causes and without the fault or negligence of the delayed party. If the event in question continues for a period in excess of thirty (30) days, Client shall be entitled to give notice in writing to APS to terminate this Agreement.

**INSURANCE:** APS shall maintain Insurance which it deems to be reasonable throughout the term of this Agreement. APS shall provide Client with certificates of insurance upon written request.

Client assumes sole responsibility and waives all rights and claims against APS for all loss of or damage to property owned by or in the custody of Client and any items at the site or in transit thereto however such loss or damage shall occur, unless caused by the sole negligence of APS.

Client agrees to maintain appropriate Property Insurance and shall require its insurers to waive all rights of subrogation against APS for claims covered under any Property Insurance that Client may carry. Such waivers shall survive termination or discharge of this Agreement.

**TERM AND TERMINATION:** This Agreement will continue in effect unless terminated by either party with thirty (30) days written notice to the other party. In the event of any termination, APS shall be paid for all Services rendered and reimbursable costs incurred through the date of notice of termination. In the event of termination, the Client shall pay all additional compensation related to termination of the project.



In addition to any remedies that are provided under this Agreement, APS may also terminate this Agreement with immediate effect upon written notice if the Client becomes insolvent, files a petition for bankruptcy or commences or has commenced against it proceedings relating to bankruptcy, receivership, reorganization, or assignment for the benefit of creditors.

In the event of termination, APS shall be paid for all Services rendered and costs incurred by APS through the date of notice of termination. In the event of termination due to the termination of the Project, the Client shall pay all additional costs incurred by APS related to termination of the Project.

**DISPUTE RESOLUTION:** If requested in writing by either the Client or APS, the Parties shall attempt to resolve any dispute between them arising out of or in connection with this Agreement by entering into a management/principal level meeting(s). The first such meeting shall occur within thirty (30) days from the first date of the written request for such meeting.

- If a dispute cannot be settled informally between the Parties within a
  period of sixty (60) calendar days from the first date of the written
  request, the Parties shall enter structured non-binding negotiations with
  the assistance of a mediator. The mediator shall be appointed by
  agreement of the Parties.
- If the Parties are unable to reach an acceptable resolution of the dispute, controversy, or claim through the mediation process, the Parties shall have any and all rights and remedies available to it under this Agreement and any and all rights and remedies at law or in equity.
- Attorney Fee Provision: With respect to any dispute relating to this Agreement, or in the event that a lien, suit, action, arbitration, mediation, or other proceeding of any nature whatsoever is instituted to interpret or enforce the provisions of this Agreement, including, without limitation, any proceeding under the U.S. Bankruptcy Code and involving issues peculiar to federal bankruptcy law or any action, suit, arbitration, or proceeding seeking a declaration of rights or rescission, the prevailing party shall be entitled to recover from the losing party its reasonable attorney fees, paralegal fees, expert fees, and all other fees, costs, title reports, title guarantee reports, and expenses actually incurred and reasonably necessary in connection therewith, as determined by the judge or arbitrator at trial, arbitration, mediation, or other proceeding, or on any appeal or review, and all proceedings in U.S. Bankruptcy Court. APS shall also be entitled to reasonable attorney's fees and costs incurred in enforcing any award and/or judgment, in addition to all other amounts provided by law.

**ASSIGNMENT:** Neither party to this Agreement shall, without the prior written consent of the other party, which shall not be unreasonably withheld, assign the benefit or in any way transfer any claim or obligation under this Agreement or any part hereof. This Agreement shall inure to the benefit of and be binding upon the parties hereto, and except as otherwise provided herein, upon their executors, administrators, successors, and assigns.

**NO THIRD-PARTY BENEFICIARY:** This Agreement is for the sole benefit of the parties hereto and their respective successors and permitted assigns and nothing herein, express or implied, is intended to or shall confer upon any other person or entity any legal or equitable right, benefit or remedy of any nature whatsoever under or by reason of this Agreement.

**LEGAL CONSTRUCTION:** In case any one or more of the provisions contained in this Agreement shall for any reason be held to be invalid or unenforceable in any respect, such invalidity or unenforceability shall not affect any other provision hereof. This Agreement shall be construed as if such invalid or unenforceable provision had never been contained herein.

**ENTIRE AGREEMENT:** This Agreement supersedes any and all other agreements, either oral or in writing, between the parties relating to the subject matter of this Agreement and is the entire understanding and agreement related thereto. This Agreement may be amended by mutual consent of the parties in writing to be attached hereto and incorporated herein, executed by APS's and the Client's authorized representatives.

**WAIVER:** Failure by one party to notify the other party of a breach of any provision of this Agreement shall not constitute a waiver of any continuing breach. Failure by one party to enforce any of its rights under this Agreement shall not constitute a waiver of those rights. The waiver by either party of a breach or violation of any provision of this Agreement shall not operate as, or be construed to be, a waiver of any subsequent breach of the same or any other provision hereof.

**SEVERABILITY:** If any term or provision of this Agreement is invalid, illegal or unenforceable in any jurisdiction, such invalidity, illegality or unenforceability shall not affect any other term or provision of this Agreement or invalidate or render unenforceable such term or provision in any other jurisdiction.

**SURVIVAL OF PROVISIONS:** The expiration or termination of this Agreement, or any Task Order shall not affect the provisions, and the rights and obligations set forth in which either by their terms state or evidence the intent of the Parties that the provisions survive the expiration or termination, or must survive to give effect to the provisions.

**GOVERNING LAW:** The validity of the Agreement and any of its terms or provisions, as well as the rights and duties of the parties hereunder, shall be interpreted and governed by the laws of the state in which the Project is located.

Specific state statutes and regulations will be adhered to under this contractual agreement through the use of Addendums, as appropriate.

Statement of Work for OTAK -

# Phase I Environmental Site Assessment

Former Portland General Electric Yard 1771 Columbia Boulevard, St. Helens, Oregon 97051

Prepared for:

#### City of St. Helens

September 6, 2024 Project No. M0830.10.001

Prepared by:

Maul Foster & Alongi, Inc. 3140 NE Broadway, Portland, OR 97232

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Appendix I

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### **Abbreviations**

3 Kings Environmental, Inc.
AAI all appropriate inquiries

ACM asbestos-containing materials
AST aboveground storage tank

ASTM E1527-21 ASTM International Standard Practice for Environmental Site Assessments:

Phase I Environmental Site Assessment Process

CERCLA Comprehensive Environmental Response, Compensation, and Liability Act

CFR Code of Federal Regulations

Client City of St. Helens

CREC controlled recognized environmental condition
DEQ Oregon Department of Environmental Quality
ECSI Environmental Cleanup Site Information
EDR Environmental Data Resources, Inc.
EPA U.S. Environmental Protection Agency

ESA environmental site assessment

HREC historical recognized environmental condition

LUST landowner liability protections
LUST leaking underground storage tank

MFA Maul Foster & Alongi, Inc.

MRL method reporting limit

NFA No Further Action

PAHs polycyclic aromatic hydrocarbons

PCBs polychlorinated biphenyls
PCS petroleum-contaminated soil
PGE Portland General Electric

the Property 1771 Columbia Boulevard, St. Helens, Oregon 97051

RBC risk-based concentration

REC recognized environmental condition

RV recreational vehicle

SFIM Sanborn Fire Insurance Map

Shields Shields Installation and Commercial Flooring, Inc.

TPH total petroleum hydrocarbons
UST underground storage tank
VOCs volatile organic compounds

## **Summary**

This summary is not intended as a stand-alone document and must be evaluated in context with the entire document.

At the request of City of St. Helens, Maul Foster & Alongi, Inc. (MFA), conducted a Phase I environmental site assessment (ESA) of the site at 1771 Columbia Boulevard, St. Helens, Oregon 97051 (the Property).

MFA conducted the Phase I ESA in accordance with the requirements of the ASTM International Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM E1527-21). In addition, the Phase I ESA report was prepared to support the Bona Fide Prospective Purchaser defense (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] § 101(4), as amended by the Superfund Amendments and Reauthorization Act of 1986 and the Small Business Liability Relief and Brownfields Revitalization Act of 2002, 42 U.S. Code §9601 et seq.) and the innocent purchaser defense (CERCLA § 101(35)(A)(i)), if applicable. The Phase I ESA generally complies with 40 Code of Federal Regulations Part 312, adopted by the U.S. Environmental Protection Agency on November 5, 2005, and effective November 1, 2006. These rules identify the standards and practices for all appropriate inquiries under CERCLA § 101(35)(B). The purpose of the Phase I ESA is to identify, to the extent reasonably feasible, recognized environmental conditions (RECs).

#### **Property Summary**

The approximately 1.04-acre Property is located at 1771 Columbia Boulevard in St. Helens, Oregon. According to the Columbia County Assessor, the northern portion of the Property is currently zoned Houlton Business District ("HBD") while the rest of the Property is currently zoned General Commercial ("GC").

Dating back to at least the early 1920s, the Property included a public hall and residences. By the late 1940s and 1950s, the Property included facilities and structures associated with automobile repair, including an apparent gas station and automobile repair facility on the northwest portion of the Property. It is unclear based on reviewed documents when these operations ceased at the Property. Between 1971 and 2006, the Property was owned and operated by Portland General Electric (PGE) as a yard and office space. According to a 2006 Phase I ESA,¹ some transformers were historically stored on the Property and at least one spill of transformer oil containing polychlorinated biphenyls (PCBs) occurred.

The Property is currently used by multiple tenants and includes office space, a kitchen, warehouse, indoor and outdoor storage areas, a recreational vehicle and boat storage yard, and an automotive conversion shop that builds and modifies food trucks.

<sup>&</sup>lt;sup>1</sup> 3 Kings Environmental, Inc. *Phase I Environmental Site Assessment, Former PGE Property, 1771 Columbia Blvd, St. Helens, Oregon 97051.* Prepared by 3 Kings Environmental, Inc.: Battle Ground, Washington. February 17.

#### **Recognized Environmental Conditions**

ASTM E1527-21 defines RECs as (1) the presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment; (2) the likely presence of hazardous substances or petroleum products in, on, or at the subject property due to a release or likely release to the environment; or (3) the presence of hazardous substances or petroleum products in, on, or at the subject property under conditions that pose a material threat of a future release to the environment.

MFA did not identify any RECs for the Property.

#### **Historical Recognized Environmental Conditions**

ASTM E1527-21 defines historical RECs (HRECs) as a previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority without subjecting the subject property to any controls (for example, activity and use limitations or other property use limitations).

MFA did not identify any HRECs for the Property.

#### **Controlled Recognized Environmental Conditions**

ASTM E1527-21 defines controlled RECs (CRECs) as a REC affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities with hazardous substances or petroleum products allowed to remain in place subject to implementation of required controls.

MFA identified the following CREC for the Property:

Groundwater Contamination. During underground storage tank (UST) decommissioning at the
Property, groundwater contamination was identified. Concentrations of ethylbenzene,
naphthalene, and diesel-range total petroleum hydrocarbons (TPH) exceed current (as of this
report) Oregon Department of Environmental Quality (DEQ) risk-based concentrations (RBCs) for
occupational ingestion and inhalation from tap water. Groundwater is not currently used as a
drinking water source and cannot be used for any consumptive or non-consumptive reason
based on a conditional No Further Action (NFA) with DEQ.

Concentrations of ethylbenzene and diesel-range TPH also exceed current (as of this report) DEQ residential RBCs for vapor intrusion from groundwater. Presently, the Property is used for commercial and light industrial purposes, and contaminant concentrations in groundwater were reported to be below DEQ RBCs for vapor intrusion for occupational receptors. Currently, groundwater contamination is considered a CREC for the Property because groundwater cannot be used for any consumptive or non-consumptive purpose, and because residential receptors will not be exposed to concentrations of ethylbenzene and diesel-range TPH above DEQ RBCs for groundwater vapor intrusion under current use conditions.

Changes to these use conditions (e.g., redeveloping the Property for mixed-use residential and commercial spaces and/or contamination identified during redevelopment activities) may impact whether groundwater contamination remains controlled and therefore protective of receptors. In

those instances, additional investigation may be warranted (see Data Gaps and Recommendations below).

#### **De minimis Conditions**

A de minimis condition, as defined by ASTM E1527-21, generally does not present a threat to human health or the environment and generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. An identified de minimis condition is neither a REC nor a CREC.

MFA identified the following de minimis condition for the Property:

- PCB-Containing Equipment Storage. Based on reviewed documents, the Property was previously operated as an office and yard space by PGE from at least the mid-1990s to early 2000s. According to a 2006 Phase I ESA, PGE historically stored transformers on the Property. At least one spill of PCB-containing transformer oil occurred on the Property, impacted storm drains, and was reported to have been cleaned up. In May 2004, PGE collected 28 surface soil samples on the southern portion of the Property, where transformer storage and the prior spill occurred. PCBs were analyzed for and were non-detect in all samples. In 1979, EPA banned PCBs from non-enclosed applications,<sup>2</sup> though transformers and capacitors manufactured before that time may contain PCBs.
- Chemical and Waste Handling and Storage. Several chemicals used or generated during onsite operations are present at the Property. On the northern and western portions of the on-Property building, various glues, grouts, flooring tiles, and other unidentified or unlabeled chemicals are present in support of flooring manufacturing operations. On the southern portion of the Property, hazardous substances and petroleum products associated with auto conversion operations are present in quantities ranging from less than 1-gallon up to 55-gallon drums. Air gas tanks, drums, car batteries, paints and primers, and chemicals in support of welding operations are present in the auto shop. Poor housekeeping (e.g., accumulated refuse debris, chemicals without adequate secondary containment) is noted throughout the on-Property building. In uncovered outdoor areas, 55-gallon drums with evidence of corrosion are visible. Significant trash and refuse debris, scrap metal, wood, and car parts associated with auto conversion operations are present in outdoor areas. The full extent of chemical use and storage could not be fully documented during MFA's July 11, 2024, site reconnaissance visit.

#### **Data Gaps**

MFA identified the following data gaps for the Property:

• Potential Residual Subsurface Features. A review of historical information, including Sanborn Fire Insurance Maps, indicated that residential dwellings and a structure labeled "HALL" were historically present on the Property. Infrastructure associated with these uses (for example, septic systems or underground heating oil tanks and associated piping) may still be present beneath the Property. Further, six USTs were decommissioned at the Property, and it is unclear through reviewed records whether all associated piping and/or impacted material, such as stained soil, were fully removed. In the absence of relevant removal records, this is considered a

<sup>&</sup>lt;sup>2</sup> https://www.epa.gov/pcbs/learn-about-polychlorinated-biphenyls. Accessed June 28, 2024.

- significant data gap for potential future observation and investigation during demolition and redevelopment (see Recommendations below).
- Potential Soil Vapor Impacts. Following UST decommissioning, residual contaminant concentrations were noted to be present in soil at the Property below current DEQ RBCs for occupational soil ingestion, dermal contact, and inhalation. However, current RBCs are unavailable for vapor intrusion from soil contamination to indoor air, and, in the absence of soil vapor analytical data, MFA is unable to screen data of volatile substances remaining in soil (such as naphthalene and xylenes) to vapor intrusion screening criteria. Based on the low concentrations reported to remain in soil and the length of time that has passed since sampling was conducted (allowing for natural attenuation), the remaining residual concentrations in soil that were reported to DEQ related to this UST decommissioning, have a low potential to cause soil vapor levels above current vapor intrusion RBCs. Therefore, this data gap is not considered to be significant, but any observations beyond those as described in the DEQ NFA letter may be of concern (see Recommendations below)

#### Recommendations

MFA identified the following recommendation for the Property:

- Focused Soil Vapor Investigation. As described above, residual contaminant concentrations were
  reported to remain in soil and groundwater beneath the Property in relation to UST
  decommissioning activities in 2004. Further, residual subsurface features associated with prior
  uses of the Property may still be present.
  - While soil concentrations are below DEQ RBCs for occupational ingestion, dermal contact, and inhalation, if impacts remain beyond those conditions report in the DEQ NFA letter then the potential exists for vapor intrusion to impact indoor air quality and pose unacceptable risks to occupational users of the current building or future buildings. Though groundwater concentrations are reported to be below DEQ occupational RBCs for vapor intrusion from groundwater, ethylbenzene and diesel-range TPH concentrations were reported to be above DEQ residential RBCs for vapor intrusion, providing a further line of evidence that subsurface conditions have the potential to adversely impact indoor air quality. Further investigation is then warranted if the Property is proposed for residential use and/or if environmental impacts are identified during redevelopment of the Property (e.g., stained soil).

#### **Activity Use Limitations Compliance**

MFA identified the following activity use limitation for the Property:

Groundwater Use. On March 7, 2005, the Property received an NFA determination from DEQ following UST decommissioning, excavation, and confirmation sampling activities. However, the NFA prohibits groundwater use (for both consumptive and non-consumptive purposes) without performing and submitting a risk assessment to DEQ for review and approval. Therefore, groundwater use is considered an activity use limitation at the Property.

#### **Conclusions**

MFA has conducted a Phase I ESA of 1771 Columbia Boulevard, St. Helens, Oregon 97051, in conformance with the scope and limitations of ASTM E1527-21.

#### Phase I Environmental Site Assessment

Former Portland General Electric Yard

The Phase I ESA revealed the following CREC and data gaps in connection with the Property:

- CREC: Groundwater contamination with concentrations above current DEQ RBCs.
- Data gaps: Potential remaining subsurface features and/or impacted soil associated with historical uses of the Property.

## 1 Introduction

#### 1.1 Purpose

On behalf of City of St. Helens, Maul Foster & Alongi, Inc., conducted a Phase I environmental site assessment (ESA) of the property located at 1771 Columbia Boulevard, St. Helens, Oregon 97051 (the Property) (see Figure 1-1). MFA conducted the Phase I ESA in accordance with the requirements of the ASTM International Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM E1527-21). In addition, this Phase I ESA report was prepared to support the Bona Fide Prospective Purchaser defense (Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] § 101(4)), as amended by the Superfund Amendments and Reauthorization Act of 1986 and the Small Business Liability Relief and Brownfields Revitalization Act of 2002, 42 US Code §9601 et seq. and the innocent purchaser defense (CERCLA § 101(35)(A)(i)), if applicable. The Phase I ESA generally complies with 40 Code of Federal Regulations (CFR) Part 312, adopted by the U.S. Environmental Protection Agency (EPA) on November 5, 2005, and effective November 1, 2006. These rules identify the standards and practices for all appropriate inquiries (AAI) under CERCLA § 101(35)(B). The purpose of the Phase I ESA is to identify, to the extent reasonably feasible, recognized environmental conditions (RECs). ASTM E1527-21 defines RECs as the following:

(1) the presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment; (2) the likely presence of hazardous substances or petroleum products in, on, or at the subject property due to a release or likely release to the environment; or (3) the presence of hazardous substances or petroleum products in, on, or at the subject property under conditions that pose a material threat of a future release to the environment.

RECs include the presence of hazardous substances or petroleum products even under conditions that comply with applicable environmental laws. The term is not intended to include de minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

#### 1.2 Scope of Work

The scope of work, as outlined in ASTM E1527-21, included four components—site reconnaissance, records review, interviews, and preparation of a report—each of which is briefly described below.

#### 1.2.1 Site Reconnaissance

On July 11, 2024, Gina Baragona of MFA conducted reconnaissance of the Property to look for evidence of RECs. Section 2 documents the results of this site visit.

#### 1.2.2 Records Review

MFA reviewed the following records:

- State and federal agency database records as described in Section 4.1.
- Aerial photographs of the Property as described in Section 4.3.1.
- Historical topographic maps related to the Property. See Section 4.3.2.
- Sanborn Fire Insurance Maps (SFIMs) for the Property. See Section 4.3.3.
- Historical city directories for the Property. See Section 4.3.4.
- Prior site assessment reports for the Property, if available. See Section 4.4.

MFA used the U.S. Geological Survey (USGS) 7.5-minute quadrangle map (2020) for St. Helens as the physical setting source (see Figure 1-1).

#### 1.2.3 Interviews

To obtain site-specific information regarding the Property, MFA interviewed the current owner of the Property. MFA also interviewed state and/or local government officials for information about the Property. Section 5 of this report discusses the interviews MFA completed.

#### 1.2.4 Report Preparation

MFA prepared this report in accordance with ASTM E1527-21. The recommended format was adjusted to improve usability and comprehension. Consistent with this ASTM guidance document, the following issues were not evaluated during the Phase I ESA: asbestos-containing materials (ACM) unrelated to releases into the environment; biological agents; cultural and historic resources; ecological resources; endangered species; health and safety; indoor air quality unrelated to releases of hazardous substances or petroleum products into the environment; industrial hygiene; lead-based paint unrelated to releases into the environment; lead in drinking water; mold or microbial growth conditions; building materials containing polychlorinated biphenyls (PCBs) (for example, interior fluorescent light ballasts, paint, and caulk); naturally occurring radon; regulatory compliance; substances not defined as hazardous substances (including some substances sometimes generally referred to as emerging contaminants) unless or until such substances are classified as a CERCLA hazardous substance; and wetlands. Fluorescent light ballasts, caulk, paint, and other materials that may contain PCBs and that are located inside and/or are part of the building or structure are outside the scope of this ESA.

#### 1.3 Presumed Viability

To qualify for one of the threshold criteria for satisfying the landowner liability protections (LLPs) to CERCLA liability, the AAI components listed below must be conducted or updated within 180 days of and prior to the date of acquisition of the Property, and all other components of AAI must be conducted within one year prior to the date of acquisition of the Property. The date of the report generally does not represent the date the individual components of AAI were completed and should not be used when evaluating compliance with the 180-day or one-year AAI requirements. Based on

the earliest conducted AAI component noted below, this assessment is presumed to be viable until December 17, 2024.

- Interviews with owners, operators, and occupants—July 11, 2024.
- Searches for recorded environmental cleanup liens (a user responsibility)—July 16, 2024.
- Reviews of federal, tribal, state, and local government records—June 20, 2024.
- Visual inspections of the Property and of adjoining properties—July 11, 2024.
- The declaration by the environmental professional responsible for the assessment—September 6, 2024.

#### 1.4 Significant Assumptions

Significant assumptions include any assumptions made during the Phase I ESA process that have the potential to impact the opinions put forth in this report. MFA made no significant assumptions when preparing this report.

## 1.5 Limitations and Exceptions

Any opinions and recommendations presented in this Phase I ESA report apply to conditions that existed at the Property when MFA performed the services. No environmental assessment can wholly eliminate uncertainty regarding the potential for RECs in connection with a property. Performance of a Phase I ESA is intended to reduce, but not eliminate, uncertainty regarding the existence of RECs in connection with a property.

MFA conducted AAI regarding the potential for RECs at the Property. ASTM E1527-21 defines AAI as:

inquiry constituting "all appropriate inquiries into the previous ownership and uses of the subject property consistent with good commercial or customary practice" as defined in CERCLA, 42 U.S.C. § 9601(35)(B) and 40 C.F.R. Part 312, that will qualify a party to a commercial real estate transaction for one of the threshold criteria for satisfying the LLPs to CERCLA liability (42 U.S.C §§ 9601(35)(A) & (B), § 9607(b)(3), § 9607(q), and § 9607(r)), assuming compliance with other elements of the defense.

MFA is not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services and does not warrant the accuracy of information supplied by others or the use of segregated portions of this report.

Identification of activity and use limitations or findings based on implementation of required controls does not imply evaluation or confirmation of the adequacy, implementation, or continued effectiveness of the controls.

#### 1.6 Special Terms and Conditions

No special terms or conditions apply to this Phase I ESA other than those set forth in ASTM E1527-21, CERCLA 101(35)B(iii), and 40 CFR Part 312.

#### 1.7 Deviations

There were no deviations from ASTM E1527-21, CERCLA 101(35)B(iii), and 40 CFR Part 312.

#### 1.8 Additional Services

MFA performed no services outside the scope of ASTM E1527-21 for Phase I ESAs.

# **1.9 Qualifications of Responsible Environmental Professionals**

Environmental professionals experienced in performing ESAs and familiar with ASTM E1527-21 conducted the Phase I ESA of the Property. Résumés of the environmental professionals involved in performing the Phase I ESA are provided in Appendix A.

#### 1.10 Reliance

For the purposes of the contractual relationship, the term Client refers to the City of St. Helens, which has sole permission to rely on this report. ASTM E1527-21 defines the user as the party seeking to use Practice E1527 to complete an ESA of the Property. The Client is the user of this Phase I ESA.

## 2 Site Description and Reconnaissance

#### 2.1 Objective and Methodology

Gina Baragona conducted a site reconnaissance visit on July 11, 2024, to obtain information indicating the presence of RECs in connection with the Property. During the site visit, Gina Baragona visually and physically observed the Property for evidence of the presence of RECs, including evidence of underground storage tanks (USTs) and aboveground storage tanks (ASTs), petroleum products, transformers containing PCBs, and the use and storage of hazardous material. MFA observed the interiors and exteriors of all structures. Gina Baragona also observed the Property and adjacent properties from public thoroughfares. Photographs taken during the site reconnaissance are provided in Appendix B.

#### 2.1.1 Exterior

Gina Baragona visually and physically observed the periphery of the Property and the periphery of all structures on the Property. MFA identified the Property's roads and paths with no apparent outlet in an effort to determine whether these roads were likely to have been used as avenues for disposal of hazardous substances or petroleum products.

#### 2.1.2 Interior

Gina Baragona visually and physically observed accessible common areas that occupants or the public are expected to use (e.g., lobbies, hallways, utility rooms, recreation areas); maintenance and repair areas, including boiler rooms; and a representative sample of occupant spaces. They did not look under floors, above ceilings, or behind walls.

#### 2.1.3 Limiting Conditions

Though Property access was initially granted, the current Property owner, Wayne Weigandt, would not allow Gina Baragona to revisit any portions of the Property at the conclusion of the site reconnaissance visit.

#### 2.2 General Site Setting

#### 2.2.1 Property Location and Legal Description

The approximately 1.04-acre Property is located at 1771 Columbia Boulevard, St. Helens, Oregon 97051, in township 4 north, range 1 west, section 4 of the Willamette Meridian, on six tax lots (41W04CA2-0900, -1000, -1100, -1200, -1300, and -1400) (see Figures 1-1 and 2-1).

#### 2.2.2 Site and Vicinity Characteristics

According to the Columbia County Assessor, the northern portion of the Property is currently zoned Houlton Business District ("HBD") while the rest of the Property is currently zoned General Commercial ("GC"). The Property is currently occupied by two tenants: Shields Installation and Commercial Flooring, Inc. (Shields), and Global Food Trucks. In general, the Property slopes to the south.

#### 2.2.3 Current Uses of Property

As described above, the Property is currently occupied by two tenants. Shields, a flooring manufacturing and sales business, operates the northern portion of the building as an office with a kitchen, warehouse, and storage space. Global Food Trucks, an automotive conversion shop that builds and modifies food trucks, operates the southern portion of the building as well as the outdoor recreational vehicle (RV) and boat storage yard. Generally poor housekeeping occurs throughout the Property, including improper chemical labeling and storage and copious amounts of scrap metal, wood, and trash.

#### 2.2.4 Past Uses of Property

Dating back to at least the early 1920s, the Property included a public hall and residences. By the late 1940s and 1950s, the Property included facilities and structures associated with automobile repair, including an apparent gas station and automobile repair facility on the northwest portion of the Property. It is unclear based on reviewed documents when these operations ceased at the Property. Between 1971 and 2006, the Property owned and operated by Portland General Electric (PGE) as a yard and office space. According to a 2006 Phase I ESA by 3 Kings Environmental, Inc. (3 Kings) (see Appendix C), PGE stored PCB-containing transformers on the Property with at least one documented release and cleanup. The 2006 Phase I ESA is discussed further in Section 4.4.

#### 2.2.5 Current Uses of Adjoining Properties

Adjoining properties are currently operated as mixed use residential or commercial spaces, with some light industrial operations (e.g., Eaton's Tire & Auto Repair to the north).

The following border the Property:

- North—Columbia Boulevard and an auto repair facility (Eaton's Tire & Auto Repair).
- South—Cowlitz Street and residential properties.
- East—South 17th Street and mixed use residential and commercial spaces, including a restaurant (Zhen's Chinese)
- West—South 18th Street and mixed use residential and commercial properties, including a
  newspaper publisher (The Columbia County Chronicle & Chief), restaurant (Miyako), cannabis
  store (Sweet Relief St. Helens), clothing store (Harrington's Clothing), and real estate office (John
  L. Scott).

#### 2.2.6 Past Uses of Adjoining Properties

Prior uses of the adjoining properties historically include mixed use residential and commercial, with some light industrial operations (e.g., Eaton's Tire and Auto Repair to the north and an unnamed automobile repair facility to the west).

#### 2.2.7 Current or Past Uses in Surrounding Area

Generally, the surrounding area is and has historically been used for residential, commercial, and light industrial purposes. Multiple automotive service, automotive repair, and dry cleaner businesses have operated in the area historically (see Section 4.1 for additional discussion).

#### 2.2.8 Geologic, Hydrogeologic, Hydrologic, and Topographic Conditions

In general, the Property and surrounding area slope to the south. According to the Environmental Data Resources, Inc. (EDR), report (see Appendix D), the dominant soil type in the vicinity of the Property is "rock outcrop", which is clayey with a high water table or shallow to an impervious layer and very slow infiltration rates.

According to Oregon Water Resources Department well logs,¹ groundwater has been encountered between approximately 4.5 and 5.6 feet below ground surface near the Property. The nearest waterbody is Milton Creek, located approximately 1,500 feet southwest of the Property. Milton Creek flows southeast towards the Columbia River, which is located approximately 1 mile east of the Property. Though unconfirmed, groundwater is anticipated to flow southwest towards Milton Creek.

<sup>&</sup>lt;sup>1</sup> https://apps.wrd.state.or.us/apps/gw/well\_log/Default.aspx. Accessed June 24, 2024.

#### 2.3 Interior and Exterior Observations

Feature	Observed on the Property		Notes	
Structures	X	No	There is one building on the Property that has been remodeled twice. The Shields office and storage space occupies the northern and central portions of the building, while Global Food Trucks occupies the large southern shop space.  Shields' portion of the building contains the business office, kitchen, and warehouse and storage space. Global Food Trucks' portion of the building contains an automotive shop with storage areas and a break room.  According to the current Property owner, Wayne Weigandt, a Metal Skin Pole Building on the northeast side of the Property was demolished in 2006 (see Figure 1 in the 2006 Phase I ESA in Appendix C).	
Roads	Х		The Property parking lot is accessed from the west, on the corner of South 18th Street and Columbia Boulevard. The Shields office is on the north side of the Property, off Columbia Boulevard, while Global Food Trucks is accessed from South 18th Street. The Property is bordered to the east by South 17th Street, and to the south by Cowlitz Street.	
Potable water supply	Х		The City of St. Helens provides the potable water to the Property.	
Sewage-disposal system	Х		The Property is served by a municipal sewer system.	

Feature	Observed on the Property		Notes
	Yes	No	
Hazardous substances and petroleum products in connection with identified uses	X		Both tenants on the Property use and store potentially hazardous substances. In support of flooring manufacturing operations, Shields stores and uses various glues, grout, and floor tiles, among other unidentified or unlabeled chemicals.
			Global Food Trucks uses and stores several hazardous substances and petroleum products associated with auto conversion operations (i.e., converting trailers into food trucks). Several chemicals ranging from containers less than 1-gallon up to 55-gallon drums are present on the southern portion of the Property (see Appendix B, photographs 19-24). Multiple air gas tanks, drums, car batteries, paint and primer pails, and chemicals in support of welding operations, are present in the auto shop, the storage and break room. Several chemicals are present in unlabeled containers and poor general housekeeping is noted throughout the Property, particularly in the southern areas.
Storage tanks		Х	
Odors	Х		The Global Food Trucks shop area contains odors consistent with automotive activity, welding, and petroleum product use and storage.
Pools of liquid		Х	
Drums, totes, and intermediate bulk containers	X		On the southern portion of the Property, Global Food Trucks stores drums and various smaller containers throughout the auto shop. Global Food Trucks stores drums, totes, bulk materials, scrap metal, wood debris, and refuse in outdoor areas. 55-gallon drums stored outside showed signs of degradation, including rust and visible damage (for example, see Appendix B, photographs 25, 28, and 35).
Hazardous-substance and petroleum-product containers not connected with identified uses	X		Hazardous substances and petroleum products in connection with operations at the Property are evident. However, given the haphazard nature of chemical storage, often lacking proper labels and/or secondary containment, and generally poor housekeeping observed throughout the Property, it is possible that hazardous substances or petroleum products not connected with identified uses by Shields or Global Food Trucks are present.

Feature		d on the perty	Notes
- Sature	Yes	No	
Unidentified-substance containers	Х		Multiple storage containers were observed throughout the Property, many without proper labeling and identification.
Items potentially containing polychlorinated biphenyls	X		No transformers were observed on or adjacent to the Property. Given the age of the building, it is possible that PCB-containing light ballasts are present, though this was not confirmed during the July 11, 2024, site reconnaissance visit. Further, given the historical operations by PGE and known storage of PCB-containing transformers, the potential exists for residual PCB-containing materials to be present.
Stains or corrosion	X		Minor staining was observed inside the Global Food Truck automotive shop. Corrosion is noted on 55-gallon drums (with unknown contents) stored in outdoor areas on the southern portion of the Property.
			Given the poor housekeeping documented previously, including the degree of chemical storage and refuse present throughout the Property, it is possible additional areas of staining or corrosion exist.
Drains or sumps	X		The current Property owner, Wayne Weigandt, identified a catch basin in the Global Food Trucks automotive shop, near the roll-up door. According to Wayne Weigandt, the catch basin is 1-foot-deep, has been plugged up for many years, is non-salvageable, and is currently covered.
Pits, ponds, or lagoons		Х	None observed or noted by the current Property owner, Wayne Weigandt.
Stained soil or pavement	X		Stains of various size and discoloration were observed primarily on the southern portion of the Property, in the RV and boat storage yard.
Stressed vegetation	X		The vegetation on and around the property is somewhat stressed and very dry. It is assumed that has been caused by the recent, and consistent, hot weather.
Solid waste	Х		Solid waste is found in the building and throughout the RV and boat storage yard. Wastes observed include rusty drums, totes, various building materials, refuse and trash debris, scrap metal, wood, and car parts.
Wastewater	Χ		The Property is served by the City of St. Helens municipal wastewater system.

Feature	Observed on the Property		Notes	
	Yes	No		
Stormwater	X		The Property owner, Wayne Weigandt, identified a City of St. Helens storm drain covered by a metal plate on the southwest corner of the Property.	
Wells		Х		
Septic systems		X		

## 3 User-Provided Information

MFA provided a Client/User Questionnaire to the Client. Appendix E includes a copy of the completed form. The Client is the user of this Phase I ESA.

#### 3.1 Land Title Records

Title records were not provided for review.

#### 3.2 Environmental Liens or Activity and Use Limitations

Based on reviewed records, groundwater use for consumptive or non-consumptive purposes is prohibited at the Property. A risk assessment must be prepared and submitted to the Oregon Department of Environmental Quality (DEQ) for review and approval prior to any groundwater use (see additional discussion in Section 4.2).

#### 3.3 Specialized Knowledge

The Client provided no specialized knowledge regarding the Property.

## 3.4 Commonly Known or Reasonably Ascertainable Information

The Client did not provide any information, commonly known in or reasonably ascertainable from the local community, that is relevant to RECs in connection with the Property.

#### 3.5 Valuation Reduction for Environmental Issues

The Client has determined that the purchase price has not been affected by the presence of contamination.

#### 3.6 Owner, Property Manager, and Occupant Information

According to Wayne Weigandt, the current Property owner, Shields occupies the northern and western portions of the Property, while Global Food Trucks occupies the southern portion of the Property.

#### 3.7 Reason for Performing Phase I ESA

The Client reported that the purpose of this Phase I ESA is to perform due diligence in preparation for purchasing the Property for development.

## 4 Records Review

#### 4.1 Standard Environmental Record Sources

MFA contracted EDR to search state and federal agency record sources for information regarding the Property and sites near the Property. MFA searched all databases using the standard approximate minimum search distances specified in ASTM E1527-21 or the search distances used by EDR, if those are greater. The following table shows the sites identified by this database search. MFA also researched a list of orphan sites with inadequate address information for mapping; orphan sites found to be within the appropriate search radii are also included in this table. The EDR-generated report is provided in Appendix D.

	Sites I	isted
Databases Searched	EDR GeoCheck	Orphan
Approximate Minimum Search Distance: 1 Mile from Property Boundary		
EPA National Priorities List (NPL) Sites	0	0
Federal Resource Conservation and Recovery Act (RCRA) Facilities Undergoing Corrective Action	1	0
DEQ Environmental Cleanup Site Information (ECSI)	21	3
State and/or Tribal Equivalent NPL	5	0
Approximate Minimum Search Distance: 0.5 Miles from Property Boundary		
Superfund Enterprise Management System (SEMS) or EPA's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)	0	1
SEMS Archive or CERCLA No Further Remedial Action Planned	0	1
Federal Delisted NPL	0	0
RCRA Information System Non-CORRACTS Treatment, Storage, and Disposal	0	0
Federal CERCLA Removals and CERCLA Orders	0	0
State and/or Tribal Hazardous Waste Facilities	26	0
State and/or Tribal Leaking UST (LUST)	25	2
State and/or Tribal SEMS Equivalent, Voluntary Cleanup Sites, and Brownfield Sites	4	0

	Sites Listed		
Databases Searched	EDR GeoCheck	Orphan	
State and/or Tribal Landfill and Solid Waste Disposal Sites	0	0	
Federal Engineering or Institutional Control Sites	0	0	
State and/or Tribal Engineering or Institutional Control Sites	1	0	
Approximate Minimum Search Distance: 0.25 Miles from Property Boundary			
EPA RCRA Large-Quantity Generator	0	0	
EPA RCRA Small-Quantity Generator	0	0	
State and/or Tribal UST Database	8	0	
State and/or Tribal AST Database	3	0	
Approximate Minimum Search Distance: Target Property			
Federal Emergency Response Notification System	0	0	
Underground Injection Control Program	0	0	

Based on the review of EDR's report, MFA identified the following sites for further review of their potential to impact the Property (discussed further in Section 4.2):

- PGE St. Helens (the Property) (located at 1771 Columbia Boulevard) is listed in the DEQ's UST and LUST. databases. The Property was historically operated by PGE. According to DEQ's LUST database,<sup>2</sup> a LUST containing unleaded gasoline was discovered during site assessment activities on October 23, 2003. Environmental records for the Property were obtained through regulatory online databases. The Property is discussed further in Section 4.2.
- Eaton's Tire & Used Car Center/Marvin's Union Service (located at 1780 Columbia Boulevard, approximately 70 feet northwest and inferred upgradient of the Property) is listed in DEQ's UST, LUST, ECSI (Site ID 5033), and Voluntary Cleanup Program databases, and EDR's Hist Auto database. This site is operated as a used car sales and repair business. According to the EDR report, the site operated as a gasoline service station between at least 1969 and 1971. Environmental records for this site were obtained through regulatory online databases. This site is discussed further in Section 4.2.
- Valpiani, Terry LLC (located at 114 N 17th Street, approximately 100 feet northeast and inferred upgradient of the Property) is listed in DEQ's LUST database. According to DEQ's LUST database,<sup>3</sup> a LUST containing heating oil was discovered during decommissioning on June 4, 2012. The cause of the release was identified as tank corrosion and impacted environmental media was limited to soil. The size of the tank and volume of heating oil released were not identified in reviewed documents. Unspecified soil cleanup activities were completed on July 26, 2012, and DEQ lists the project status as closed. Given the release was limited to soil which was remediated, this site appears unlikely to have impacted the Property.
- McDonald, I HOT (located at 234 South 17th Street, approximately 260 feet southeast and inferred downgradient of the Property) is listed in DEQ's LUST database. According to DEQ's LUST database, 4 a LUST containing heating oil was discovered during site assessment activities on June 11, 1996. The cause of the release, size of the tank, and volume of heating oil released were not identified in reviewed documents. Impacted environmental media was noted to be soil, and a risk-based evaluation was completed on August 23, 2004. DEQ lists the project status as

<sup>&</sup>lt;sup>2</sup> https://www.deq.state.or.us/lg/tanks/lust/LustPublicList.asp. Accessed June 21, 2024.

<sup>&</sup>lt;sup>3</sup> Ibid. Accessed June 21, 2024.

<sup>&</sup>lt;sup>4</sup> Ibid. Accessed June 21, 2024.

closed. Given the release was limited to soil and the inferred downgradient position of this site, this site appears unlikely to have impacted the Property.

- Cascade Cleaner/Johnstun's Drycleaners/Royal Quick Clean Laundromat (located at 1805 Saint Helens Street, approximately 330 feet northwest and inferred cross-gradient of the Property) is listed in DEQ's ECSI (Site IDs 5833 and 5893) and EDR's DRYCLEANERS databases. This site was historically operated as a dry cleaner (since at least 1993) and more recently as a laundromat and commercial business space. Environmental records for this site were obtained through regulatory online databases. This site is discussed further in Section 4.2.
- Ackerman, Steve/Heating Oil Tank (located at 145 South 19th Street, approximately 400 feet southwest and inferred downgradient of the Property) is listed in DEQ's LUST database. According to DEQ's LUST database,<sup>5</sup> a LUST containing heating oil was discovered during decommissioning activities on May 1, 2000. The cause of the release, size of the tank, and volume of heating oil released were not identified in reviewed documents. Impacted environmental media was noted to be soil, and an unspecified soil cleanup was completed on November 28, 2000. DEQ lists the project status as closed. The site is approximately 400 feet away southwest (and inferred downgradient) of the Property, impacted environmental media was limited to soil, and soil cleanup activities were completed, resulting in a closed status noted by DEQ. Taken together, this site appears unlikely to have impacted the Property.
- Hi-School Pharmacy (located at 135 South Columbia River Highway, approximately 1,050 feet
  west and inferred cross-gradient of the Property) is listed in DEQ's LUST and ECSI (Site ID 1769)
  databases. According to DEQ's LUST database,<sup>6</sup> a LUST containing diesel was discovered during
  decommissioning activities on April 5, 1996. DEQ noted that impacted environmental media
  included groundwater. Environmental records for this site were obtained through regulatory
  online databases. This site is discussed further in Section 4.2.

The remaining sites have no reported releases, have reported that cleanup is complete, have received No Further Action (NFA) determinations from DEQ, or have little potential to impact the Property, based on their proximity or elevation in relation to the Property.

#### 4.2 Regulatory File Review

MFA accessed regulatory documents and environmental reports for other nearby sites through DEQ and EPA's online databases. Selected documents obtained from the regulatory file review are provided in Appendix F and are summarized below.

• PGE St. Helens (the Property). The Property was historically operated by PGE as a yard and office space that included onsite storage of PCB-containing transformers. On October 23, 2003, a petroleum release was identified during site assessment activities and reported to DEQ. Sometime prior to discovery, four 2,000-gallon abandoned USTs containing gasoline were decommissioned in place with sand and water. On May 3, 2004, the four USTs were removed and recycled at an off-Property location. Approximately 180 tons of petroleum-contaminated soil (PCS) were removed from within or around the USTs and disposed at Hillsboro Landfill. Approximately 3,747 gallons of oily water were removed from the USTs and approximately 9,648 gallons of oily water were removed from the excavation area. All oily water was transported off-Property for treatment and disposal.

<sup>&</sup>lt;sup>5</sup> Ibid. Accessed June 21, 2024.

<sup>&</sup>lt;sup>6</sup> Ibid. Accessed June 21, 2024.

<sup>&</sup>lt;sup>7</sup> The date of in-place decommissioning was not identified in reviewed documents.

Confirmation soil samples were collected and analyzed for total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and total lead. Confirmation soil sample results generally indicated low-level contamination, with most constituents below laboratory method reporting limits (MRLs). Groundwater was encountered in the excavation and groundwater samples revealed low level detections of ethylbenzene, total xylenes, and naphthalene. All other VOC, PAH, and dissolved lead concentrations were below laboratory MRLs. On a separate portion of the Property, a 4,000-gallon gasoline UST and 4,000-gallon diesel UST were decommissioned in November 1989. Confirmation soil samples indicated low-level contamination, with most constituents below laboratory MRLs. Groundwater was encountered in the tank excavation and low-level contamination was identified in reconnaissance groundwater samples, with most contaminants detected below laboratory MRLs.

A risk-based evaluation was performed and DEQ concluded that surface soil direct contact, soil vapor to outdoor air, and soil vapor to indoor air are complete pathways at the Property. However, for residential and occupational exposure scenarios, soil concentrations were below risk-based concentrations (RBCs) (published in 2003). Based on a limited review of available data, soil concentrations remain below DEQ's current (updated in 2023) RBCs for occupational soil ingestion, dermal contact, and inhalation. However, in the absence of soil vapor data, the potential exists for vapor intrusion into the building which may pose unacceptable risks to building occupants. Further, though contaminant concentrations in groundwater are below DEQ occupational RBCs for groundwater vapor intrusion, ethylbenzene and diesel-range TPH exceed DEQ residential RBCs for groundwater vapor intrusion, further highlighting the potential for vapor intrusion by subsurface contamination beneath the Property. Concentrations of ethylbenzene, naphthalene, and diesel-range TPH in groundwater exceed DEQ's current RBCs for occupational ingestion and inhalation from tap water.

On March 7, 2005, DEQ issued an NFA determination for the Property subject to the following condition:

NO USE SHALL BE MADE OF THE GROUNDWATER AT THE PROPERTY, BY EXTRACTION THROUGH WELLS OR BY OTHER MEANS THAT INVOLVES CONSUMPTION OR NON-CONSUMPTIVE USE OF THE GROUNDWATER. THIS PROHIBITION SHALL NOT APPLY TO EXTRACTION OF GROUNDWATER ASSOCIATED WITH TEMPORARY DEWATERING ACTIVITIES RELATED TO THE INSTALLATION OF SEWERS OR UTILITIES AT THE PROPERTY. SHOULD GROUNDWATER USE BE PROPOSED, A RISK ASSESSMENT MUST BE CONDUCTED AND SUBMITTED TO DEQ FOR REVIEW AND APPROVAL PRIOR TO THE EXTRACTION OF ANY GROUNDWATER.

• Eaton's Tire & Used Car Center/Marvin's Union Service. This site was historically operated as an automotive service and repair facility. Between 2008 and 2010, environmental investigations were completed at the site, which identified contamination in a gravel parking lot where vehicles and other materials were stored. Shallow soil sampling identified TPH, PAH, and lead contamination. Between 2008 and 2009, two soil removal actions were performed, whereupon approximately 100 cubic yards of contaminated soil were excavated and transported to the Hillsboro Landfill. Post-removal sampling indicated residual petroleum and metal concentrations below occupational RBCs at the time of the evaluation. A risk-based evaluation noted that lead concentrations in soil exceed residential direct-contact RBCs but were below occupational direct-contact RBCs.

On August 13, 2010, DEQ issued a conditional NFA for the site, contingent on the site use remaining commercial or industrial. DEQ noted that site soils contain low-level contamination not

- suitable for residential exposure and that redevelopment would require a DEQ-approved contaminated media management plan to guide soil-disrupting activities. Given that contamination is limited to soil, no groundwater impacts were noted, and that DEQ issued a conditional NFA for the site, this site appears unlikely to have impacted the Property.
- Cascade Cleaner/Johnstun's Drycleaners/Royal Quick Clean Laundromat. This site includes an approximately 2,500-square-foot building built sometime between 1983 and 1996 and divided into retail space, a former dry cleaner location, and office spaces. In 2011, a sub-slab vapor investigation identified tetrachloroethene concentrations up to 52,000 micrograms per cubic meter. In October 2013, additional site investigation activities included sub-slab vapor and indoor air sample collection. Chlorinated VOCs, including tetrachloroethene, were detected at concentrations generally near or slightly above for likely exposure pathways in each of the subslab vapor and indoor air samples. Between December 2013 and March 2014, interim remedial actions including installation of two sub-slab vapor collection pits, concrete sealing, and installation of vent fans were performed at the site. These actions reduced chlorinated VOC concentrations below occupational RBCs at the site. On May 22, 2014, DEO issued an NFA for the site, noting that remedial actions lowered chlorinated VOC concentrations below DEQ RBCs for occupational and urban residential exposure. Given that this site is approximately 330 feet northwest, that groundwater impacts were not noted, and that soil vapor impacts were mitigated through interim remedial actions resulting in an NFA from DEQ, this site appears unlikely to have impacted the Property.
- Hi-School Pharmacy. According to DEQ, three USTs were encountered during Highway 30 right-of-way construction activities. On April 9, 1996, the tanks were decommissioned by removal and recycled offsite. Approximately 1,415 cubic yards of PCS was excavated and disposed offsite. Approximately 1,040 gallons of oily- and rinse water were removed from the USTs and disposed offsite, while approximately 21,000 gallons of pit water was pumped from the excavation, aerated onsite in temporary holding tanks, and discharged to the City sanitary sewer. Confirmation sampling identified diesel concentrations beneath Highway 30 below DEQ RBCs for construction workers. Further, diesel contamination was identified in soils beneath the Hi-School Pharmacy parking lot, but contamination was below DEQ RBCs at that time. A groundwater monitoring well was installed in the parking lot and four quarters of monitoring were performed. DEQ noted that all measured contaminant concentrations in groundwater were below the most stringent RBCs for all exposure pathways. Based on these results, DEQ issued an NFA for the site on August 8, 2005. Given this site is over 1,000 feet west and inferred cross-gradient of the Property, and that groundwater monitoring revealed contaminant concentrations below the most stringent RBCs at the time, this site appears unlikely to have impacted the Property.

# 4.3 Historical Use Information about Property and Adjoining Properties

MFA used the following information sources to obtain historical use(s) information.

#### 4.3.1 Historical Aerial Photographs Review

MFA obtained aerial photographs of the Property from EDR and reviewed the photographs to identify historical changes to the Property and its historical uses, if any (see Appendix G).

Year of Image	Observations
1938	Aerial photograph resolution is low. The Property is developed with residential dwellings and commercial buildings visible in this arial photograph. The immediate surrounding properties in all directions are similarly developed, with historical dry cleaning and auto service use, while some properties remain undeveloped.
1951	The Property has been developed, with residential dwellings and commercial buildings visible in this aerial photograph. The immediate surrounding properties in all directions are similarly developed, with primarily commercial properties to the north of the Property, and residential properties to the south. Surrounding roads have been widened and paved to the north of the Property.
1956	Aerial photograph resolution is very low. Features of the Property, adjacent properties, and surrounding area are not discernible based on the photograph quality.
1960	Aerial photograph resolution is low, though the Property, adjacent properties, and surrounding area appear relatively unchanged compared to the 1951 photograph.
1964	The Property and adjacent properties to the west, north, and east are relatively unchanged compared to the 1951 photograph. The Property has at least two large commercial buildings, and a few residential dwellings to the south. New residential and commercial buildings have been constructed in the surrounding area, particularly areas north and south of the Property.
1970	The Property and adjacent properties to the west, north, and east are relatively unchanged compared to the 1964 photograph. The two commercial buildings are no longer visible in the photograph. Further residential construction (i.e., new structures) are visible on the adjacent properties to the south.
1977	The resolution of this photograph is low. The Property and adjacent properties to the west, north, and east appear unchanged compared to the 1970 photograph.
1981	The resolution of this photograph is very low and features on the Property cannot be readily discerned The adjacent properties appear relatively unchanged compared to the 1977 photograph.
1990	The resolution of this photograph is very low and features on the Property cannot be readily discerned. The Property has one large commercial building, and the residential dwellings appear to have been demolished. The adjacent properties appear relatively unchanged compared to the 1981 photograph.
1994	The resolution of this photograph is low. The Property and adjacent properties to the west, north, and east appear unchanged compared to the 1990 photograph.
1995	The Property is developed with a large commercial building visible in this aerial photograph. The immediately adjacent properties to the west, north, and east are similarly developed with mixed use commercial properties. Multiple small structures or dwellings on the southern portion of the Property are no longer visible. The adjacent properties to the south are developed with residential dwellings or small structures.
2000	The Property, adjacent properties, and surrounding area appear unchanged compared to the 1995 photograph.
2006	The Property is developed with a large commercial building visible in this aerial photograph. The immediately adjacent properties to the west, north, and east are similarly developed with mixed use commercial properties.
2009	The Property, and the commercial building on the Property appears to be unchanged from the 2006 photograph, however, the commercial building is now square, with a portion possibly demolished. The south end of the Property is being used for automotive storage.
2012	The resolution of this photograph is low. The Property and adjacent properties to the west, north, and east appear unchanged compared to the 2009 photograph.

Year of Image	Observations
2016	The Property, and the commercial building on the Property appears to be unchanged from the 2006 photograph. The south end of the Property is being used for automotive storage.
2020	The Property, and the commercial building on the Property appears to be unchanged from the 2006 photograph. Much of the Property appears to be used for automotive storage.

#### 4.3.2 Historical Topographic Maps

EDR provided historical topographic maps for the area for 1943, 1954, 1970, 1975, 1995, 2014, 2017, and 2020 (see Appendix H). The oldest topographic maps show the Property within the developed downtown portion of St. Helens adjacent to the Columbia River. Gradual development of the surrounding area, particularly to the west, is apparently in later topographic maps. The available topographic maps do not provide additional details beyond what is ascertained through review of other documents for the Property.

#### 4.3.3 Sanborn Map Review

MFA requested SFIMs from EDR. MFA reviewed SFIMs to identify historical changes to the Property and the Property's historical uses, if any (see Appendix I).

Year of Map	Observations
1921	A public hall and dwelling are identified on the Property. Churches are present on properties to the north and west, and several dwellings are visible on adjacent properties to the north and south.
1939	Overall, the area is more developed compared to the 1921 SFIM. A structure labeled "HALL" is visible on the northeast portion of the Property, and several dwellings are visible on and adjacent to the Property. Churches are still visible on the properties to the north and west. On the adjacent property to the north, an automobile service station with a building labeled "GAS & OIL" is present.
1948	An apparent automobile repair facility, with buildings labeled "AUTO REPG" and "GAS & OILS" is present on the northwest portion of the Property, as is the "HALL" and multiple dwellings. Another apparent automobile repair facility is visible to the east. The "GAS & OIL" automobile service station and church are visible to the north. Dwellings are visible to the south of the Property. To the west, an automobile tire service station and dry cleaning facility are visible.
1957	The Property appears largely unchanged compared to the 1948 SFIM. The automobile repair facility is still present to the east. Dwellings are visible to the northeast, southeast, south, and southwest. The auto service station and church are still present to the north, while the automobile tire service station and dry cleaning facility are present to the west.

#### 4.3.4 City Directories

EDR provided city directories for 1992, 1995, 2000, 2005, 2010, 2014, 2017, and 2020 (see Appendix J). Based on the 1995 and 2000 city directories, PGE is the listed occupant of the Property. In 2014, the Property is occupied by Thrifters Marketplace. In 2020, the Property is occupied by All

Fab Engineering.8 The surrounding properties are occupied by individuals (i.e., residences) or commercial or light industrial businesses, as described previously.

# **4.4 Prior Environmental Reports or Other Helpful Documents for Property**

MFA requested prior environmental reports and other helpful documents from the Property owner, key site manager, and user (see Sections 3 and 5 for further information about the people MFA contacted). Appendix K outlines the types of documents requested. The Property owner provided a previous Phase I ESA (see Appendix C), the details of which are summarized below.

In February 2006, 3 Kings performed a Phase I ESA for the Property. As described in Section 4.2, 3 Kings noted that six USTs were previously decommissioned at the Property with associated PCS and oil water off-Property disposal. 3 Kings further noted that during PGE's operations, transformers were stored on the Property. 3 Kings noted that at least one spill of a relatively small amount of PCB-containing transformer oil occurred, impacting on-Property storm drains. 3 Kings noted that the spill was cleaned up, but specific details were not provided. In May 2004, PGE collected 28 surface soil samples on the southern portion of the Property, where transformer storage and the prior spill had occurred. The samples were analyzed for PCBs, but PCBs were not detected in any samples. Based on these results, 3 Kings concluded that the potential for adverse environmental conditions due to transformer storage on the Property is relatively low.

## 5 Interviews

#### 5.1 Interview with Property Owner and Key Site Manager

Gina Baragona contacted Wayne Weigandt, the current Property owner, for general and site-specific information regarding the Property. For the purposes of this report, Wayne Weigandt is also considered the key site manager for the Property. On July 11th, 2024, Wayne Weigandt indicated that, to their knowledge, there were no pending, threatened, or past litigation or administrative proceedings relevant to hazardous substances or petroleum products on the Property. They were aware of no notices from any government agency regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products relative to the Property. According to Wayne Weigandt, there are no environmental liens on the Property.

#### 5.2 Interview with Current Occupant

At the request of the current Property owner, Wayne Weigandt, MFA was prohibited from interviewing the current occupants of the Property.

<sup>&</sup>lt;sup>8</sup> The Property is not listed in the 2005, 2010, and 2017 city directories.

# **5.3 Interviews with Previous Operators, Owners, and Occupants**

Contact information for previous operators, owners, and occupants was not provided.

#### 5.4 Interview with State and/or Local Government Officials

On June 28, 2024, Justin Hansen interviewed Mark Pugh with DEQ for information regarding the Property and surrounding area. Mark Pugh is the DEQ site manager for the Former Cascade Cleaners Site (ECSI IDs 5833 and 5893) located approximately 330 feet northwest of the Property. Mark Pugh did not provide any information significant to this report regarding the Property or surrounding area.

# 5.5 Interviews with Owners or Occupants of Adjoining or Nearby Properties

ASTM E1527-21 requires interviews with owners or occupants of nearby properties for abandoned properties and properties that have evidence of potential unauthorized uses or evidence of uncontrolled access. Adjoining properties do not fit this description; therefore, MFA did not conduct interviews of these neighbors.

## 6 Findings and Opinions

#### 6.1 Recognized Environmental Conditions

ASTM E1527-21 defines RECs as (1) the presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment; (2) the likely presence of hazardous substances or petroleum products in, on, or at the subject property due to a release or likely release to the environment; or (3) the presence of hazardous substances or petroleum products in, on, or at the subject property under conditions that pose a material threat of a future release to the environment.

MFA did not identify any RECs for the Property.

#### 6.2 Historical Recognized Environmental Conditions

ASTM E1527-21 defines historical RECs (HRECs) as a previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority without subjecting the subject property to any controls (for example, activity and use limitations or other property use limitations).

MFA did not identify any HRECs for the Property.

#### 6.3 Controlled Recognized Environmental Conditions

ASTM E1527-21 defines controlled RECs (CRECs) as a REC affecting the subject property addressed to the satisfaction of the applicable regulatory authority or authorities, with hazardous substances or petroleum products allowed to remain in place subject to implementation of required controls.

MFA identified the following CREC for the Property:

Groundwater Contamination. During UST decommissioning at the Property, groundwater
contamination was identified. Concentrations of ethylbenzene, naphthalene, and diesel-range
TPH exceed current (as of this report) DEQ RBCs for occupational ingestion and inhalation from
tap water. Groundwater is not currently used as a drinking water source and cannot be used for
any consumptive or non-consumptive reason based on a conditional NFA with DEQ.

Concentrations of ethylbenzene and diesel-range TPH also exceed current (as of this report) DEQ residential RBCs for vapor intrusion from groundwater. Presently, the Property is used for commercial and light industrial purposes, and contaminant concentrations in groundwater were reported to be below DEQ RBCs for vapor intrusion for occupational receptors. Currently, groundwater contamination is considered a CREC for the Property because groundwater cannot be used for any consumptive or non-consumptive purpose, and because residential receptors will not be exposed to concentrations of ethylbenzene and diesel-range TPH above DEQ RBCs for groundwater vapor intrusion under current use conditions.

Changes to these use conditions (e.g., redeveloping the Property for mixed-use residential and commercial spaces and/or contamination identified during redevelopment activities) may impact whether groundwater contamination remains controlled and therefore protective of receptors. In those instances, additional investigation may be warranted (see Data Gaps and Recommendations below).

#### 6.4 De Minimis Conditions

A de minimis condition, as defined by ASTM E1527-21, generally does not present a threat to human health or the environment and generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. An identified de minimis condition is neither a REC nor a CREC.

MFA identified the following de minimis conditions for the Property:

- PCB-Containing Equipment Storage. Based on reviewed documents, the Property was previously operated as an office and yard space by PGE from at least the mid-1990s to early 2000s. According to a 2006 Phase I ESA, PGE historically stored transformers on the Property. At least one spill of PCB-containing transformer oil occurred on the Property, impacted storm drains, and was reported to have been cleaned up. In May 2004, PGE collected 28 surface soil samples on the southern portion of the Property, where transformer storage and the prior spill occurred. PCBs were analyzed for and were non-detect in all samples. In 1979, EPA banned PCBs from non-enclosed applications,<sup>9</sup> though transformers and capacitors manufactured before that time may contain PCBs.
- Chemical and Waste Handling and Storage. Several chemicals used or generated during onsite
  operations are present at the Property. On the northern and western portions of the on-Property

<sup>9</sup> https://www.epa.gov/pcbs/learn-about-polychlorinated-biphenyls. Accessed June 28, 2024.

building, various glues, grouts, flooring tiles, and other unidentified or unlabeled chemicals are present in support of flooring manufacturing operations. On the southern portion of the Property, hazardous substances and petroleum products associated with auto conversion operations are present in quantities ranging from less than 1-gallon up to 55-gallon drums. Air gas tanks, drums, car batteries, paints and primers, and chemicals in support of welding operations are present in the auto shop. Poor housekeeping (e.g., accumulated refuse debris, chemicals without adequate secondary containment) is noted throughout the on-Property building. In uncovered outdoor areas, 55-gallon drums with evidence of corrosion are visible. Significant trash and refuse debris, scrap metal, wood, and car parts associated with auto conversion operations are present in outdoor areas. The full extent of chemical use and storage could not be fully documented during MFA's July 11, 2024, site reconnaissance visit.

#### 6.5 Data Gaps

MFA identified the following data gaps for the Property:

- Potential Subsurface Features. A review of historical information, including Sanborn Fire Insurance Maps, indicated that residential dwellings and a structure labeled "HALL" were historically present on the Property. Infrastructure associated with these uses (for example, septic systems or underground heating oil tanks and associated piping) may still be present beneath the Property. Further, six USTs were decommissioned at the Property, and it is unclear through reviewed records whether all associated piping and/or impacted material, such as stained soil, were fully removed. In the absence of relevant removal records, this is considered a significant data gap for potential future observation and investigation during demolition and redevelopment (see Recommendations below).
- Potential Soil Vapor Impacts. Following UST decommissioning, residual contaminant concentrations were noted to be present in soil at the Property below current DEQ RBCs for occupational soil ingestion, dermal contact, and inhalation. However, current RBCs are unavailable for vapor intrusion from soil contamination to indoor air, and, in the absence of soil vapor analytical data, MFA is unable to screen data of volatile substances remaining in soil (such as naphthalene and xylenes) to vapor intrusion screening criteria. Based on the low concentrations reported to remain in soil and the length of time that has passed since sampling was conducted (allowing for natural attenuation), the remaining residual concentrations in soil that were reported to DEQ related to this UST decommissioning, have a low potential to cause soil vapor levels above current vapor intrusion RBCs. Therefore, this data gap is not considered to be significant, but any observations beyond those as described in the DEQ NFA letter may be of concern (see Recommendations below)

#### 6.6 Recommendations

MFA identified the following recommendation for the Property:

- Focused Soil Vapor Investigation. As described above, residual contaminant concentrations were
  reported to remain in soil and groundwater beneath the Property in relation to UST
  decommissioning activities in 2004. Further, residual subsurface features associated with prior
  uses of the Property may still be present.
  - While soil concentrations are below DEQ RBCs for occupational ingestion, dermal contact, and inhalation, if impacts remain beyond those conditions report in the DEQ NFA letter then the potential exists for vapor intrusion to impact indoor air quality and pose unacceptable risks to

occupational users of the current building or future buildings. Though groundwater concentrations are reported to be below DEQ occupational RBCs for vapor intrusion from groundwater, ethylbenzene and diesel-range TPH concentrations were reported to be above DEQ residential RBCs for vapor intrusion, providing a further line of evidence that subsurface conditions have the potential to adversely impact indoor air quality. Further investigation is then warranted if the Property is proposed for residential use and/or if environmental impacts are identified during redevelopment of the Property (e.g., stained soil).

#### 6.7 Activity Use Limitations Compliance

MFA identified the following activity use limitation for the Property:

Groundwater Use. On March 7, 2005, the Property received an NFA determination from DEQ following UST decommissioning, excavation, and confirmation sampling activities. However, the NFA prohibits groundwater use (for both consumptive and non-consumptive purposes) without performing and submitting a risk assessment to DEQ for review and approval. Therefore, groundwater use is considered an activity use limitation at the Property.

# 6.8 Statement of Environmental Professionals Conducting Phase I Environmental Site Assessment

Former Portland General Electric Yard

1771 Columbia Boulevard, St. Helens, Oregon 97051

The material and data in this report were prepared under the supervision and direction of the undersigned.

Maul Foster & Alongi, Inc.

J**y**stin **y**lansen

Project Environmental Scientist

Caitlin Bryan

Principal Environmental Scientist

We declare that, to the best of our professional knowledge and belief, we meet the definition of environmental professional as defined in §312.10 of 40 CFR 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature,

#### Phase I Environmental Site Assessment

history, and setting of the subject property. We have developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

### 7 Conclusions

MFA has conducted a Phase I ESA, in conformance with the scope and limitations of ASTM E1527-21 of 1771 Columbia Boulevard, St. Helens, Oregon 97051, the Property. MFA describes any exceptions to, or deviations from, this practice in Section 1 of this report.

The Phase I ESA revealed the following CREC and data gaps in connection with the Property:

- CREC: Groundwater contamination with concentrations above current DEQ RBCs.
- Data gaps: Potential remaining subsurface features and/or impacted soil associated with historical uses of the Property.

### Limitations

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our Client. This report is solely for the use and information of our Client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the Client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

The purpose of an environmental assessment is to reasonably evaluate the potential for or actual impact of past practices on a given site area. In performing an environmental assessment, it is understood that a balance must be struck between a reasonable inquiry into the environmental issues and an exhaustive analysis of each conceivable issue of potential concern. The following paragraphs discuss the assumptions and parameters under which such an opinion is rendered.

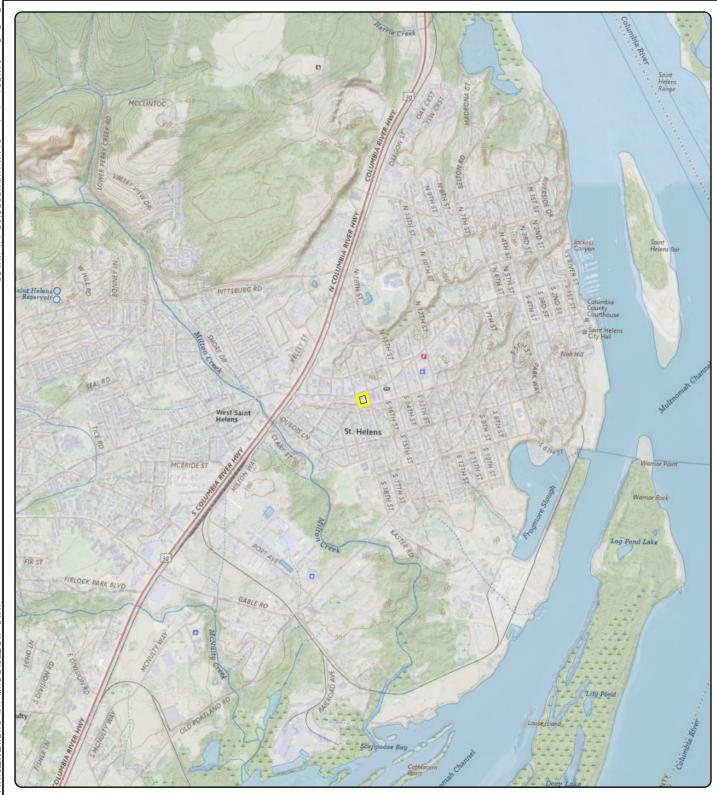
No investigation is thorough enough to exclude the presence of hazardous materials at a given site. If hazardous conditions have not been identified during the assessment, such a finding should not, therefore, be construed as a guarantee of the absence of such materials on the site, but rather as the result of the services performed within the constraints of the agreed-upon scope, limitations, and costs.

Environmental conditions that cannot be identified by visual observation may exist at the site. Where subsurface work was performed, our professional opinions are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions at unsampled locations.

Except where there is express concern by our Client, or where specific environmental contaminants have been previously reported by others, the presence of naturally occurring toxic substances, potential environmental contaminants inside buildings, or contaminant concentrations that are not of current environmental concern may not be reflected in this document.

## **Figures**





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www.columbia-west.com

March 12, 2025

Otak, Inc. 808 SW Third Avenue, Suite 800 Portland, OR 97204

Attn: David Lintz

Re: Proposal for Hazardous Building Materials Survey

St. Helens Police Station 1771 Columbia Boulevard St. Helens, Oregon

CWE Project: Otak-3-02-3

#### **INTRODUCTION**

Columbia West Engineering, Inc. (Columbia West) is pleased to provide this proposal to conduct a hazardous building materials survey (HBMS) of the St. Helens Police Station site located at 1771 Columbia Boulevard in St. Helens, Oregon (subject property). It is our understanding that the subject property is approximately 50,000 square feet and consists of Columbia County tax lots 4N1W-4CA-20900, 21000, 21100, 21200, 21300, and 21400. The subject property is current developed with a single-story commercial building that encompasses approximately 5,100 square feet.

We understand the proposed development will likely consist of construction of an 11,500-square-foot police station with associated asphalt concrete-paved parking areas and utilities. The existing structure located on the subject property will be demolished as part of the planned development.

#### **SCOPE OF SERVICES**

The HBMS will include surveys for asbestos-containing materials (ACM) and lead-based paint (LBP) and a universal waste evaluation. The specific scope of services for the HBMS is presented below.

#### PRE-CONSTRUCTION ACM SURVEY

The purpose of the pre-construction ACM survey is to provide an evaluation of the interior and exterior portions of the existing structure for the potential presence of asbestos in suspect materials. The pre-construction ACM survey will be conducted in general accordance with ASTM E2356-18, Standard Practice for Comprehensive Building Asbestos Surveys. For this project, the proposed scope of services is consistent with the requirements of a pre-construction survey in anticipation of future demolition of the existing structure where a baseline survey has not been conducted and there is no or insufficient information as to the existence of ACM within the planned limits of construction. The pre-construction survey requires destructive testing if concealed spaces are to be breached during construction.

The survey will be conducted by personnel certified under the U.S. Environmental Protection Agency's (EPA's) Asbestos Hazard Emergency Response Act program and will include the following:

- Review available permits and online property information to verify building conditions and construction details.
- Review any previously completed HBMS reports for the existing structure, as available and provided by Otak.
- Conduct an initial reconnaissance of the existing structure to verify building construction and layout, verify building mechanical components, measure building dimensions, and gather additional information to develop an appropriate sampling plan.
- Develop an ACM sampling plan based on the initial building reconnaissance and review of the floor plans and/or previous HBMS reports.
- Collect up to 30 samples of homogenous suspect ACM, including appropriate sample population, taking into account material quantities and location.
- Collect photographic documentation of each representative homogenous suspect building material from each structure.
- Document quantities and locations of each suspect homogenous building material from each structure.
- Submit the samples to EMC Labs, Inc. of Phoenix, Arizona, for analysis of asbestos content by PLM/EPA Method 600/R-93-116. Columbia West assumes that up to five samples for which preliminary results identified as containing less than 1 percent asbestos will be further analyzed using point count methodology.
- Summarize the results of the pre-construction ACM survey in an HBMS report, including site plans showing sample locations, summary data tables, analytical laboratory reports, and photographs of ACM sample locations.

#### **LBP SURVEY**

The purpose of the LBP survey is to evaluate paint and finishes throughout the existing structure for the presence of lead at a concentration greater than 1.0 milligrams per square centimeter that will need to be accounted for by contractors during the structure's demolition activities. The LBP survey will be performed by Columbia West personnel and will include the following:

- Collect up to 10 paint chip samples from representative painted surfaces throughout the existing structure.
- Submit the samples to EMC Labs, Inc. of Phoenix, Arizona, for analysis of environmental lead by flame atomic absorption.
- Summarize the results and findings of the LBP survey in the HBMS report, including site
  plans showing sample locations, summary data tables, analytical laboratory reports, and
  photographs of LBP sample locations.

#### **UNIVERSAL WASTE EVALUATION**

The purpose of the universal waste evaluation is to evaluate the subject property for the presence of universal waste that may require special handling and/or disposal. The universal waste evaluation will include the following:



- Evaluate the subject property for the presence of universal waste, including pesticides, batteries, potential mercury-containing equipment (including thermostats, thermometers, barometers, and mercury-containing switches), potential polychlorinated biphenyl (PCB)
   -containing equipment, and mercury-containing lamps.
- Summarize the results and findings of the universal waste evaluation in the HBMS report.

#### **SCHEDULE**

We anticipate conducting field activities within three weeks of your authorization to proceed. Suspect ACM and LBP sample results will be available within two weeks of the completion of field activities. The HBMS report will be provided to you within two weeks of receipt of the final analytical laboratory report.

#### **PAYMENT**

We will conduct the HBMS on a time-and-materials basis for an estimated fee not to exceed **\$7,800**. Services will be conducted in accordance with the attached Standard Contract Terms and Provisions and the Schedule of Fees. Columbia West will invoice upon project completion and be compensated in full within 30 days of receipt of the invoice.

#### **ASSUMPTIONS**

- Field activities for the HBMS can be conducted in two 10-hour days during normal working hours (i.e., between 7 a.m. and 6 p.m., Monday through Friday).
- Suspect ACM and LBP samples will be analyzed on a standard (10 business days) laboratory turnaround time.
- A maximum of 10 paint chip samples and 30 suspect ACM samples will be collected during this investigation. If necessary, additional samples will be collected at a rate of \$35 per sample.
- Samples of suspect roofing materials will be collected during this ACM survey. Columbia
  West personnel will temporarily patch roof sample locations. However, if demolition of the
  existing structure will not be completed within three months of field activities, it may be
  prudent to contract with a roofing contractor to repair roof sample locations. Columbia
  West will not be responsible for damage to the roof from sampling activities.

\* \* \*



#### Proposal for Hazardous Building Materials Survey St. Helens Police Station

We appreciate the opportunity to submit this agreement and look forward to working with you on this project. Please do not hesitate to contact us if you have questions or require additional information. To formally authorize our services, return a signed copy of this agreement.

information. To formally authorize our ser	vices, return	a signed copy of this agreement.	
Sincerely,			
JAM J			
Colby R. Hunt, CHMM			
Principal			
CBS:CRH:kat			
Attachment: Standard Contract Terms and Provisions,	Schedule of Fee	s	
Document ID: Otak-3-02-3-031225-envp.docx			
The scope of services outlined in this agreauthorized to proceed. This agreement columbia West and supersedes all prior	onstitutes the	e entire agreement between the Clie	
	by -		
Organization	-,	Signature*	
D :	_	D: . IN	
Date		Printed Name	
	-	Title	
		riue	

\*Individual with contracting authority and responsible for payment of Columbia West's fees.

- 1. **General.** Columbia West Engineering, Inc. ("Columbia West") shall perform for Client the professional engineering services as outlined in the body of the Letter Agreement/Contract to which this applies. No additional services shall be performed nor required of Columbia West absent written agreement of the parties.
- 2. Client's Responsibilities. Client shall provide all reasonable information as to Client's requirements for the Project, and will designate a person to act with authority on Client's behalf for all aspects of the Project. Said person will examine and promptly respond to Columbia West's submissions and requests for information, and shall give prompt written notice to Columbia West should Client observe or otherwise become aware of any defect in the work performed under this Agreement. Columbia West shall be entitled to reasonably rely on all information provided to it by Client.
- 3. Payment. Fees and other charges will be billed in accordance with the terms and conditions outlined in the letter agreement. Additionally, the amount of each billing shall be due and payable 30 days after the date of such billing. Any portion of a billing not paid within thirty days of the billing date shall be delinquent and shall bear a service charge of one and one-half percent per month on the unpaid balance. If any billing is not paid within thirty days after the billing date, then in addition to any other remedies as may be available to Columbia West, it may cease performing work upon delivery of written notice to Client of its intention to do so. Columbia West shall additionally have the right but not the obligation to cease performing work under any other contract as may then be outstanding between Client and Columbia West.
- Limitation of Remedy. To the fullest extent permitted by law, and not withstanding any other provision of this contract, the total liability, in the aggregate, of Columbia West and its officers, directors, partners, employees, agents and subconsultants, and any of them, to the Client and anyone claiming by or through the Client, and all other contractors, subcontractor, consultants or others providing services for the project for any and all claims, losses, costs of damages, including attorneys' fees and costs and expert-witness fees and costs of any nature whatsoever or claims expenses resulting from or in any way related to the project from any cause or causes arising out of Columbia West's services on the project (whether described in this agreement or any subsequent agreement between the parties, except as expressly agreed otherwise), including any indemnity obligation owed hereunder or otherwise, shall not exceed \$50,000 or the compensation received under this contract, whichever is greater. It is intended that this limitation apply to any and all liability or cause of action however alleged or arising, including negligence, strict liability, statutory liability, breach of contract, breach of warranty, negligent misrepresentation, or other acts giving rise to liability based on contract, tort, or statute, unless otherwise prohibited by law.
- 5. Standard of Care. Columbia West will provide its services under this agreement in a manner consistent with that level of care and skill ordinarily exercised by members of its profession currently practicing under similar conditions and time period in the locality of the project. Columbia West makes no other representation regarding its services, and no guarantee or warranty, express or implied, is included or intended as to any findings, recommendations, specifications, reports, opinions, documents or other instruments of service prepared by Columbia West. No agent or representative of Columbia West has any authority to modify this disclaimer of warranty. Except when authorized by both parties, Columbia West and the Client will keep obtained and created information confidential. Client recognizes that subsurface conditions may vary from those encountered at the location where borings, surveys or explorations are to be made by Columbia West. Client acknowledges that the interpretations and recommendations made by Columbia West are based solely on the information available to Columbia West. Client agrees that Columbia West has been engaged to provide technical professional services only, and that Columbia West does not owe any fiduciary responsibility to the Client, or the project Owner, if different from Client.
- **6. Client's Termination of Work.** Client may, by written notice, terminate Columbia West's work prior to completion. Columbia West shall nevertheless be entitled to payment of all fees and expenses incurred up to termination, and may additionally complete such work as may be necessary to place its files in order and to complete a report on work performed to date of termination. A termination charge to cover the costs thereof may be imposed at the discretion of Columbia West, said termination charge not to exceed ten percent of all charges incurred up to the date of notice of termination.
- 7. Utilities. In the prosecution of its work, Columbia West will take reasonable precautions to avoid any injury or damage to underground structures or utilities. Client agrees to defend, indemnify and hold Columbia West harmless for any damages or claims of damage to any such underground structures or utilities not called to Columbia West's attention or incorrectly shown on surveys or plans furnished to Columbia West.
- 8. Samples. Columbia West will retain uncontaminated samples of soil or rock taken in connection with this work. [Columbia West will retain such samples for thirty days. Retention of such samples beyond thirty days will occur only at Client's request and in return for payment of storage charges incurred.] All contaminated or environmentally impacted material or samples are the sole property of the client. Client maintains responsibility for proper disposal.
- 9. Right of Entry. Client will provide for the right of entry to Columbia West, its employees, agents or consultants, and for all equipment reasonably necessary to complete the work. Columbia West will take reasonable precautions in accordance with the Standard of Care to minimize any damage to property. It is understood by Client, however, that in the normal course of work, some damage may occur, in

- which event Columbia West is not obliged to restore the property to its state prior to the performance of such work.
- 10. Re-use of Documents. Any reuse or modification of documents by Client or anyone obtaining it through Client will be at Client's sole risk and without liability to Columbia West. Client will defend, indemnify and hold Columbia West harmless from all third party claims, demands, actions, and expenses (including reasonable attorney's fees, expert fees, and other costs of defense) arising out of or in any way related to the reuse or modification of the Work by Client or anyone obtaining it through Client.
- 11. Cost and Other Estimates. Client recognizes that Columbia West has no control over the cost of labor, materials, equipment or services provided by others, or over the contractor's methods of determining prices, or of market conditions. Any cost estimates as may be provided are made only on the basis of Columbia West's experience and judgment. No warranty is given, express or implied, that proposals or bids or actual project construction costs will not vary from cost estimates provided by Columbia West. Additionally, Columbia West makes no representations concerning estimates of area or volumes. Such estimates are estimates only. No warranty is made that estimates of areas or volumes will not be different from actual quantities.
- 12. Construction Monitoring. If Columbia West is retained by Client to provide services to monitor or observe portions of construction work, foundation excavations, or other field activities, Columbia West will report its observations and opinions to Client's designated agent. Columbia West will report any observed geotechnically-related work that, in Columbia West's opinion, does not conform to plans or specifications. Client acknowledges that Columbia West has no right to reject or stop work of any contractor, subcontractor or agent of the Client. Columbia West's construction monitoring or foundation observation does not include nor consist of exploratory investigation, subsurface evaluation, seismic evaluation, groundwater analysis or any other activities associated with site investigation. Construction monitoring is limited to materials tested and observed during the construction phase of the project and is not a warranty or evaluation of subsurface conditions. Columbia West claims no past or prior knowledge of site conditions other than those documented in our reports. Should Columbia West not be retained by Client for the purpose of monitoring construction work or field activities, Columbia West shall not be held liable or responsible for any such activities, or for the geotechnical performance of the completed Project. Monitoring of construction work or field activities and the performance of the complete Project will then be the sole responsibility of Client or of any other parties designated by Client. Client in such event agrees to defend, indemnify and hold harmless Columbia West from any loss or judgment incurred by Columbia West as a result of a claim or lawsuit resulting from Client's failure to monitor construction work or field activities for which Columbia West has not been retained.
- 13. Means, Methods and Techniques; Safety. Columbia West is not responsible for and will not have control of means, methods, techniques, sequences or procedures of construction or other field activities of any contractor, subcontractor, agent or representative of Client. It is agreed that Columbia West has no control over any person or parties not employees or consultants of Columbia West. Columbia West has not been engaged and is not responsible for any safety precautions or programs related to construction for non-employees or non-consultants of Columbia West.
- **14. Assignments.** During the term of this Agreement and following its expiration or termination for any reason, neither Client nor Columbia West shall transfer, assign, convey or sublet any right, claims, duty or obligation under it, nor any other interest therein without the prior written consent of the other party.
- **15. Disputes.** In the event of a disagreement, Client and Columbia West agree that they will use their best efforts to resolve same in good faith negotiations or discussions with one another. If unsuccessful in resolving the dispute, the parties shall mediate any dispute prior to and as a precondition to commencement of a lawsuit by either.
- 16. Certifications: Client agrees not to require that Columbia West execute any certification with regard to services performed or work tested and/or observed under this agreement unless: (1) Columbia West believes that it has performed sufficient services to provide a sufficient basis to issue the certification, (2) Columbia West believes that the services performed or work tested and/or observed meet the criteria of the proposed certification, and (3) Columbia West has reviewed and approved in writing the exact form of such certification prior to execution of this agreement. Any certification by Columbia West is limited to an expression of professional opinion based upon the services performed by it, and does not constitute or imply a warranty or guarantee of any kind.
- **17. No Personal Liability.** Client expressly waives any right to sue, or otherwise make any claim against, any of Columbia West's officers or employees, past or present, as individuals, for any cause.
- **18. Consequential Damages.** Neither Client nor Columbia West will be liable to the other for any special, consequential, incidental or penal losses or damages including but not limited to losses, damages or claims related to the unavailability of property or facilities, shutdowns or service interruptions, loss of use, profits, revenue, or inventory, or for use charges, cost of capital, or claims of the other party and/or its customers.
- **19. No Third Party Beneficiaries.** Nothing in this Agreement shall be construed to give any rights or benefits to anyone other than Client and Columbia West. No third party beneficiaries are created or intended by this Agreement.

\$660

\$160

\$345

each

each

each



#### **SCHEDULE OF FEES**

	SCHEDU	LE OF FEES		
GEOTECHNICAL AND ENVIRONMEN	ITAL SERVICES	-		
Personnel	Rate	Personnel		Rate
Principal Engineer	\$250	Senior Engineering Techn	ician	\$110
Associate Engineer	\$225	Engineering Technician		\$100
Senior Project Engineer/Geologist	\$215	Laboratory Manager		\$145
Project Engineer/Geologist II	\$190	Laboratory Technician		\$80
Project Engineer/Geologist I	\$170	Senior Technical Editor		\$100
Senior Staff Engineer/Geologist	\$150	Technical Editor		\$90
Staff Engineer/Geologist II	\$140	Administrative Assistant		\$80
Staff Engineer/Geologist I	\$135	/ tallimistrative / tosistant		Ψ00
SPECIAL INSPECTION SERVICES				
> Services			Unit	Rate
Special Inspection (masonry, reinforce	d concrete, shot	crete)	hourly	\$95
Special Inspection (proprietary anchors			hourly	\$95
Special Inspection (fireproofing, firesto		22.2 .333 3.331)	hourly	\$95
Special Inspection (meplooning, meste Special Inspection (post-tensioned cor		ness)	hourly	\$105
Special Inspection (post tensioned cor Special Inspection (structural steel, bol		·/	hourly	\$105
Non-Destructive Testing Inspector	g, wording)		hourly	\$100
Project Manager			hourly	\$145
				Ψ1 10
MATERIALS TESTING SERVICES				_
Soils and Aggregate			Unit	Rate
Atterberg Limits			each	\$195
California Bearing Ratio			each	\$500
Clay Lumps and Friable Particles			each	\$135
Direct Shear, One-Point			each	\$315
Direct Shear, Three-Point			each	\$605
Flat and Elongated Particles			each	\$155
Fractured Face Determination			each	\$80
Hydrometer Analysis			each	\$165
os Angeles Abrasion			each	\$370
Moisture Content			each	\$40
One-Dimensional Consolidation			each	\$575
Organic Content			each	\$110
Percent Passing No. 200 Sieve by Wasl	hing		each	\$110
Permeability (constant head)	9		each	\$430
Permeability (falling head)			each	\$380
oH (soil)			each	\$90
Proctor Moisture-Density			each	\$300
Sand Equivalent			each	\$145
Sieve Analysis, < ¾-Inch Maximum Par	ticle Size		each	\$155
Sieve Analysis, ¾- to 3-Inch Maximum I			each	\$205
Sieve Analysis, > 3-Inch Maximum Part			each	\$395
Soil Classification			each	\$40
Soil Resistivity			each	\$255
Soundness of Aggregate			each	\$525
Specific Gravity of Coarse Aggregate			each	\$110
Specific Gravity of Coarse Aggregate			each	\$160
Uncompacted Void Content			each	\$175
Unconfined Compression			each	\$173
Unit Weight of Aggregate			each	\$160
Unit Weight of Aggregate  Unit Weight of Soil			each	\$143 \$55
-			each <b>Unit</b>	Rate
Treated Soils			J	

California Bearing Ratio (7-day cure)

Compressive Strength Test

Proctor Moisture-Density

#### **EXHIBIT F**

Schedule of Fees Page 2

Portland Cement Concrete/Masonry/Rock/PPC/SFRM	Unit	Rate
Compressive Strength Test - CMU Prism	each	\$160
Compressive Strength Test - Grout Prism	each	\$65
Concrete Core Absorption	each	\$125
Concrete Cylinder/Masonry Cylinder/2-Inch Cube Compressive Strength	each	\$40
Core Compressive Strength (peak strength only)	each	\$80
Core Unconfined Compressive Strength (stress-strain relationship)	each	\$240
		\$65
Field-Prepared CDF/CDSM/CLSM Cylinder Compressive Strength	each	
Flexural Strength (concrete beam)	each	\$125
Masonry Unit Absorption, Density, Net Area	each	\$145
Masonry Unit Compressive Strength Test	each	\$115
Modulus of Elasticity	each	\$105
Spray-Applied Fire-Resistive Materials Density Test	each	\$110
Wall/Paver Unit Absorption and Density (coupon)	each	\$65
Wall/Paver Unit Compressive Strength Test (coupon)	each	\$65
> Asphalt Concrete	Unit	Rate
Core Density and Thickness	each	\$80
Moisture Content of Bituminous Mixtures	each	\$40
Oil Content and Gradation - Ignition	each	\$260
Oil Content Furnace Calibration - Ignition	each	\$430
Rice Density	each	\$160
- · · · · · · · · · · · · · · · · · · ·	22.2	<b>V</b> 100
RESOURCES AND EQUIPMENT	Unit	Rate
Anchor Proof Loading Hydraulic Ram and Deflection Gauges	daily	\$315
Bond Tester	daily	\$160
Calcium Chloride/RH Moisture Probe	each	\$90
Cement Amendment Kit	daily	\$40
Concrete Slump and Air Entrainment Meter	daily	\$75
Concrete Strength-Maturity Electronic Meter	daily	\$105
Core Bit Wear	per core	\$35 \$315
Core Drill Equipment	daily	\$315
Dames & Moore Sampler	daily	\$25 \$10
Data Logger	daily	
Data Logger	weekly	\$50 ¢105
Data Logger Data Recorder	monthly daily	\$105 \$10
Dynamic Cone Penetrometer	daily	\$125
Field Torvane/Penetrometer	daily	\$70
Floor Flatness Meter	daily	\$265
Hand Auger	daily	\$55
Magnetic Particle Equipment	each	\$80
Nuclear Densometer	daily	\$75
Per Diem	daily	\$315
Refraction Microtremor (ReMi) Equipment and Software	half day	\$800
Refraction Microtremor (ReMi) Equipment and Software	daily	\$1,200
Shelby Tube	each	\$40
Skidmore Wilhelm - Bolt Calibrator	daily	\$95
Strength-Maturity/Ambient Environment Sensors	each	\$315
Sub-Meter Accuracy GPS	Daily	\$75
Ultra-Sonic Meter	daily	\$75
Vibrating Wire Piezometer	each	\$625
Water Level Meter	daily	\$50
Zip Level	daily	\$50
Outside Services	each	cost + 20%
Vehicle Fee	daily	\$50
Mileage (outside of service area)	mile	\$0.85
mileage (catalide of service died)	mile	Ψ0.05

Personnel rates are portal to portal. All requested geotechnical observations, inspections, and testing require 24-hours' notice and have a 3-hour minimum charge. Hours in excess of eight per day, work on weekends, night work between the hours of 8PM and 5AM, and same-day service requests will be invoiced at 1.5 times the quoted rate. Work on holidays will be invoiced at two times the quoted rate. Laboratory testing requests with turnaround less than two days will be invoiced at 1.5 times the indicated rate. Laboratory rates do not include pick up or delivery to Columbia West's laboratory. (3-12-010125)



1994 STORMWATER IMPROVEMENTS PROJECT

PROJECT

CITY OF ST. HELENS, OREGON JANUARY, 1994

PREPARED BY:

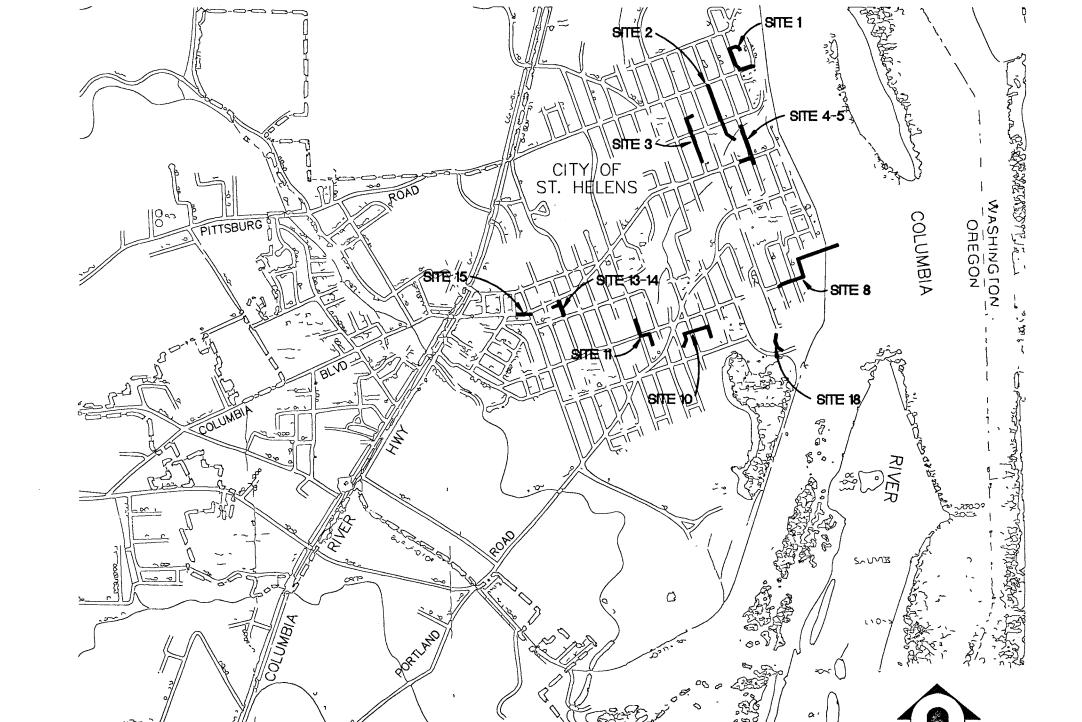


DAVID EVANS AND ASSOCIATES, INC 2828 S.W. CORBETT AVENUE PORTLAND, OR 97201 (503)223-6663

THESE RECORD DRAWING HAVE BEEN COMPILED FROM DATA OBTAINED FROM THE CONSTRUCTION DESIGN DRAWINGS SUBSEQUENT ADDENDA AND CHANGE ORDERS, SURVEY RECORDS, CONTRACTOR RECORD DRAWING SUBMITTALS, AND OTHER RECORD DRAWINGS. TO THE BEST OF OUR KNOWLEDGE AND BELIEF, THESE DRAWINGS ARE REPRESENTATIVE OF THE PROJECT AS CONSTRUCTED.

## GENERAL NOTES:

- 1. STORM SEWER EASEMENTS ARE TO BE 20' IN WIDTH AND CENTERED ON THE SEWER LINE AS SHOWN. UNLESS OTHERWISE INDICATED CONSTRUCTION EASEMENTS ARE AS SHOWN.
- 2. THE LOCATIONS OF EXISTING UTILITIES ARE BASED ON RECORD DRAWINGS, AERIAL MAPPING, AND SURVEYED UTILITIES LOCATED BY THE RESPECTIVE COMPANIES.
- 3. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. ALL EXCAVATORS PERFORMING WORK ON THIS PROJECT MUST COMPLY WITH ALL PROVISIONS OF O.R.S. 757.541 TO 757.571, INCLUDING NOTIFICATION OF ALL OWNERS OF UNDERGROUND FACILITIES AT LEAST 48 BUSINESS DAY HOURS, BUT NOT MORE THAN TEN (10) BUSINESS DAYS BEFORE COMMENCING AN EXCAVATION.
- 4. THE LOCATIONS OF OVERHEAD UTILITIES ARE NOT SHOWN.
- 5. PROPERTY LINES SHOWN HEREON ARE FROM A COMBINATION OF VARIOUS MAPS AND DOCUMENTS OF RECORD. THEY ARE APPROXIMATE ONLY AND DO NOT CONSTITUTE DEEDED BOUNDARY LINES.
- 6. THE CONTRACTOR IS TO INSTALL AND MAINTAIN ALL EROSION CONTROL IN CONFORMANCE WITH STATE OF OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY GUIDELINES.
- 7. ELEVATIONS ARE BASED ON U.S.C. & G.S. BENCH MARK Z 116; A 3 1/2" BRASS CAP IN CURB AT THE N.E. CORNER OF 6TH STREET AND COLUMBIA BLVD. ELEVATION = 73.264 1929 N.G.V.D.
- 8. BEDDING, BACKFILL AND TRENCH REPAIR SHALL CORRESPOND TO DETAILS FOR STREET AND NON-STREET AREAS, AS DELINEATED IN PLAN VIEW OF EACH SITE.



VICINITY MAP

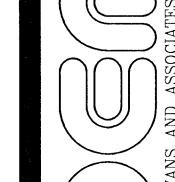
SCALE: 1"=1650'

LEGEND:

EXI8	TING	PROP	OSED .
	BUILDING		STORM SEWER
—x——x—	FENCE		STORM MANHOLE
	UTILITY POLE	-	CATCH BASIN
$\cup$	GUY	~	OUTLET
þ	SIGN	Articularity Principles (Indiana)	PERMANENT EASEMENT
Ø	MAILBOX		TEMPORARY CONSTRUCTION EASEMENT
$\bigcirc$	SANITARY MANHOLE		LIFT STATION P.S. #10
	SANITARY SEWER		STORM SEWER FORCE MAIN
	STORM SEWER	•	STORM SEWER FORCE MAIN
	STORM MANHOLE		
	CATCH BASIN		
w	WATER LINE		
	GAS LINE		
$\otimes$	VALVE		
⊞	WATER METER BOX		
X	FIRE HYDRANT		
$\bigcirc$	TELEPHONE MANHOLE		
mula man	CONIFEROUS TREE		
	DECIDUOUS TREE		
	CURB		
	EDGE OF PAVEMENT		
	EDGE OF GRAVEL		
	DITOLI		

— DITCH

AS BUILT



SITE 13-14 SITE 11 SEWAGE 77 LAGOON 17 SITE 10 SVMM3

INDEX MAP

SHEET INDEX

TITLE

INDEX SHEET

PLAN AND PROFILE - SITE 1

PLAN AND PROFILE - SITE 2

PLAN AND PROFILE - SITE 3

PLAN AND PROFILE - SITE 8

PLAN AND PROFILE - SITE 10

PLAN AND PROFILE - SITE 4-5

PLAN AND PROFILE - SITE 11

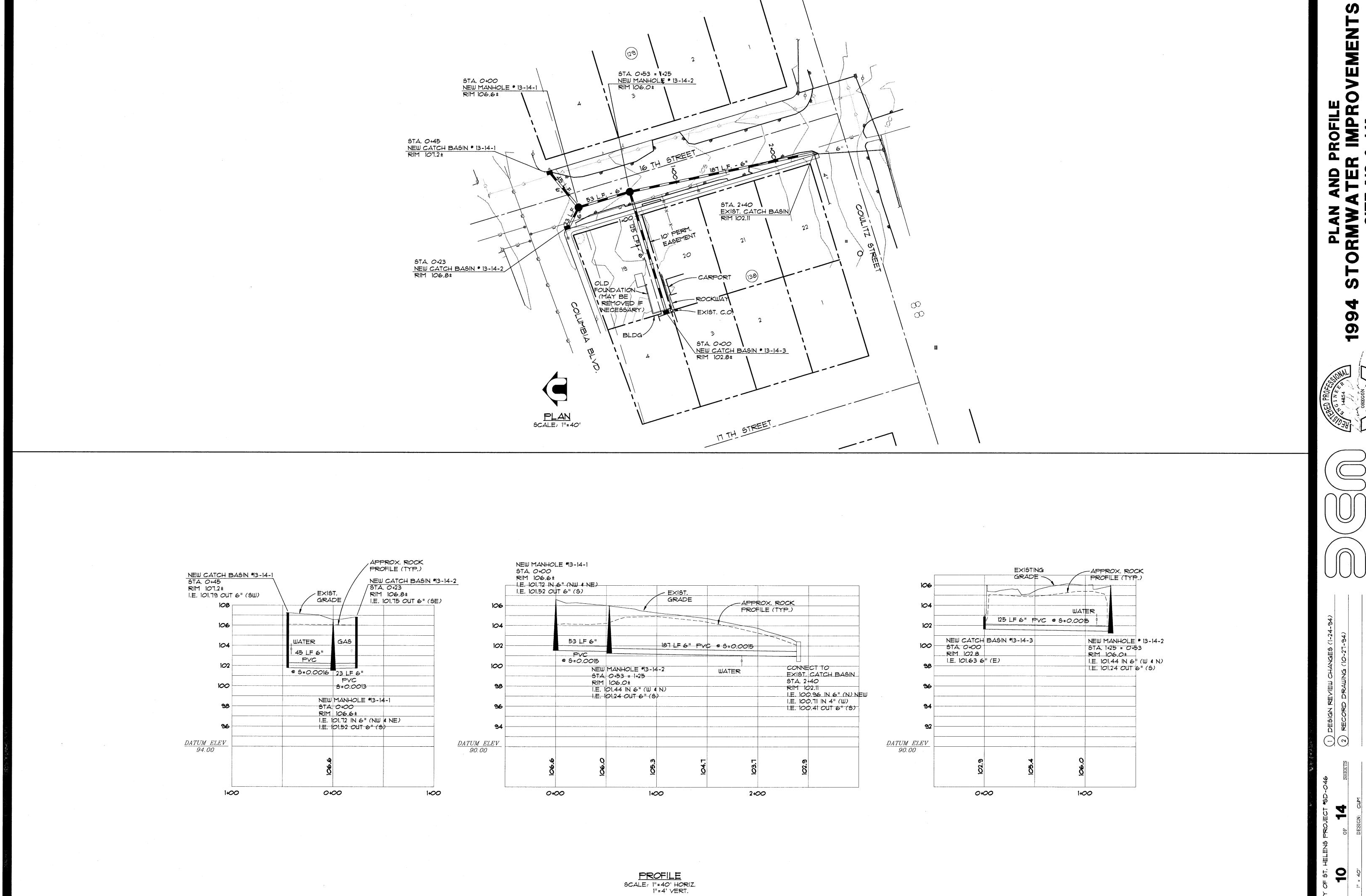
PLAN AND PROFILE - SITE 13-14

PLAN AND PROFILE - SITE 15

PLAN AND PROFILE - SITE 18

DETAIL SHEET

PUMP STATION - SITE 1



**EXHIBIT C** 

0

-STANDARD M.H. RUNGS 12" O.C. LOCATED ON VERT. SIDE OF MANHOLE, WITHIN 24" OF COVER AND FLOOR. CAST IRON FINISH GRADE FRAME & COVER SET FRAME -IN NON-SHRINK " CONCRETE EXTENSION RING. INSTALL AS REQUIRED TO BRING MANHOLE COVER AND FRAME TO DESIGN GRADE - MAX. 3 RINGS OR 12" MAX. - ECCENTRIC MANHOLE TOP STANDARD PREFORMED PLASTIC GASKET 48" MANHOLE RISERS -- UNDISTURBED EARTH RAM-NEK JOINT MATERIAL OR EQUAL - ALT. COMPACTED 3/4/"-0 CRUSHED ROCK

AND GROUT

MATERIAL (3/4"-0)

" LAYER COMPACTED BASE

### NOTES:

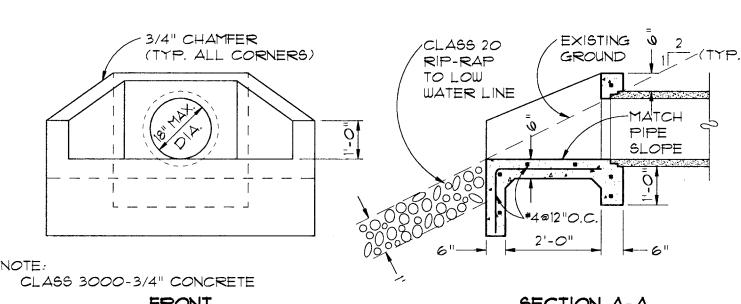
GROUT

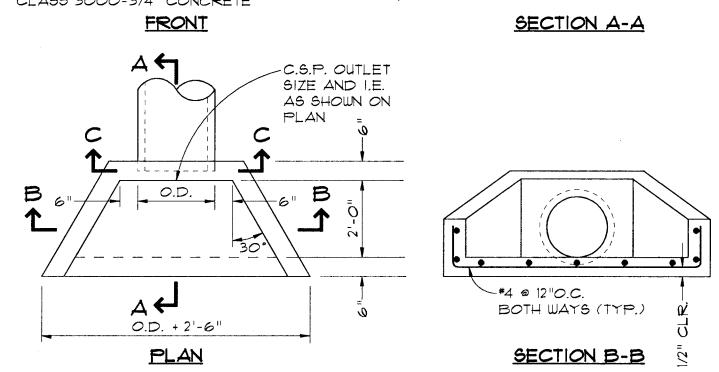
GROUT .

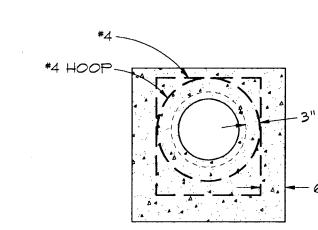
- 1. POURED CONCRETE BASE 5 SACK MIX, 2500 P.S.I. AT 28 DAYS.
- 2. FORM GROOVED INVERT AND MAKE SURFACE SMOOTH TO DIRECT FLOW.

## STANDARD MANHOLE

CONTRACTOR SHALL CONFORM TO U.S.A. DWG. NO. 010



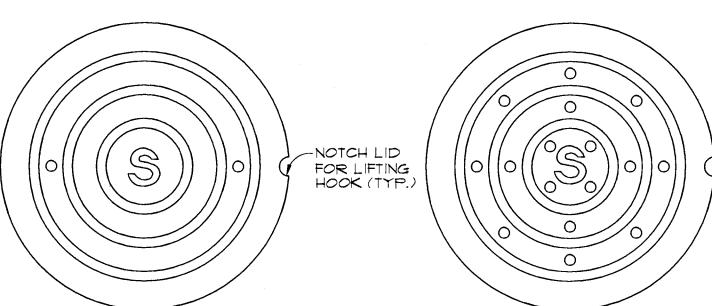




SECTION C-C

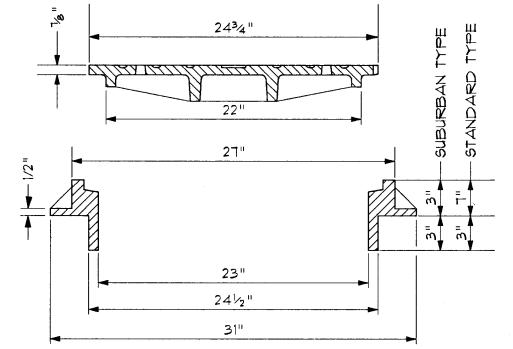
# OUTLET STRUCTURE DETAIL

NOT TO SCALE



SANITARY SEWER COVER





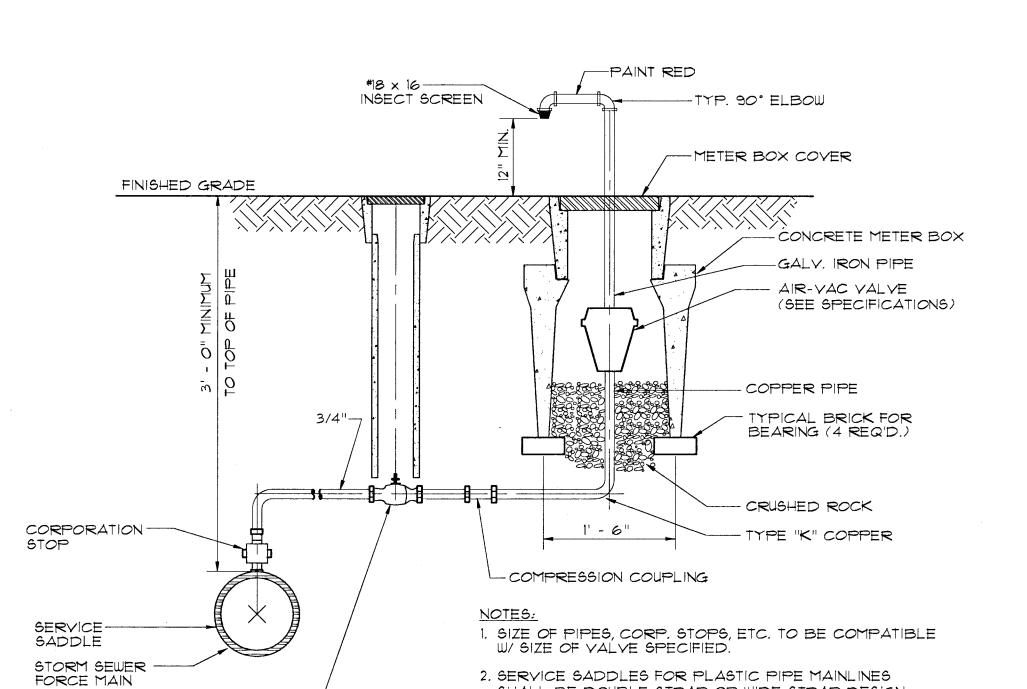
- 1. HEAVY DUTY MANHOLE FRAMES AND COVERS ARE TO BE USED ON ALL MANHOLES UNLESS OTHERWISE APPROVED BY U.S.A.
- 2. SOLID LIDS MAY BE REQUIRED IN CERTAIN CASES. 3. COVER AND FRAME TO BE MACHINED TO A TRUE BEARING ALL AROUND
- 4. USE 16 HOLE LID FOR STORM SEWER 5. USE SUBURBAN TYPE IN NON-TRAFFIC AREAS ONLY

CURB VALVE -

W/ CURB BOX 4 STATIONARY WRENCH

## STANDARD MANHOLE FRAME & COVER

CONTRACTOR SHALL CONFORM TO U.S.A. DWG. NO. 120





SHALL BE DOUBLE STRAP OR WIDE STRAP DESIGN.

(SEE DETAIL) -CLASS A BACKFILL CLASS B

34" - O
GRANULAR
BACKFILL -BACKFILL IN STREET AREAS I. IF SIDEWALK IS AGAINST CURB, FILI ROCK TO BACK OF SIDEWALK

STREET AREAS

RESURFACING

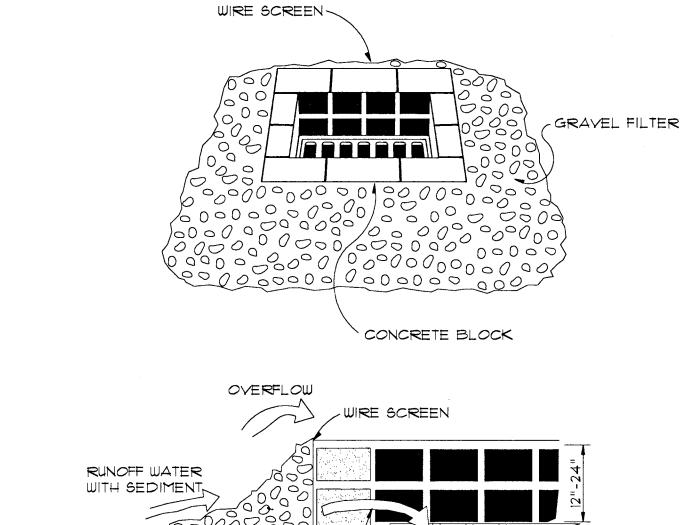
EXISTING

OUT OF STREET AREAS

2. IF SIDEWALK IS NOT AGAINST CURB

FILL ROCK 2' BACK FROM CURB

PIPE BEDDING BACKFILL DETAILS NOT TO SCALE

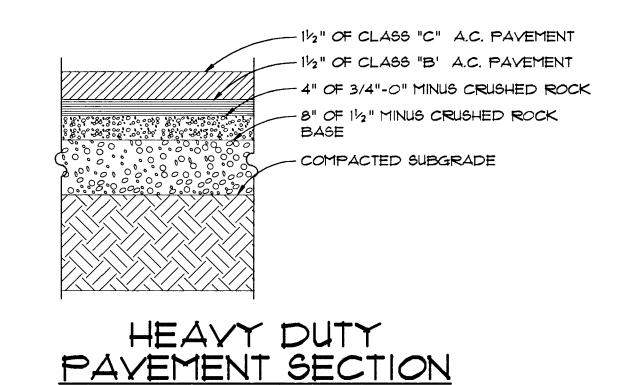


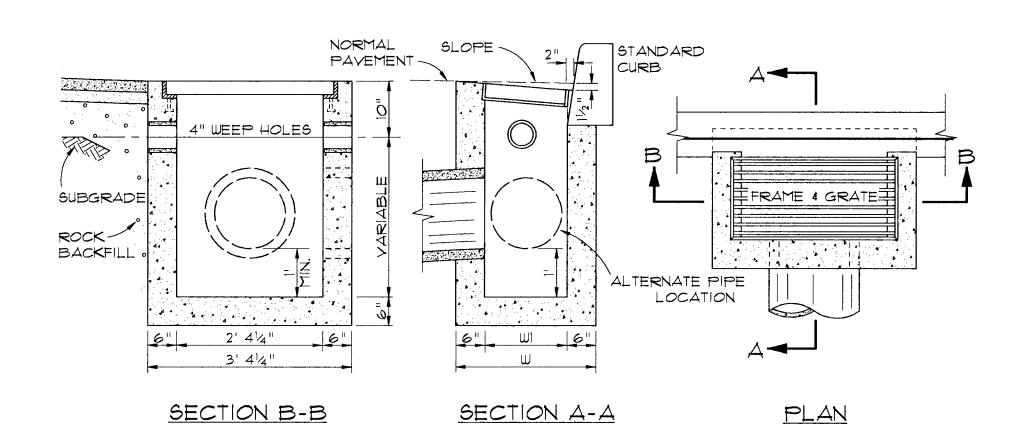
BLOCK & GRAVEL INLET BARRIER

FILTERED WATER

DROP INLET

WITH GRATE





NOTE	<u>=</u> ;
	SPECIFICATIONS FOR CONCRETE AND MISC. MATERIALS USED IN CONSTRUCTION SHALL CONFORM TO THE CURREN O.S.H.D. "STANDARD SPECIFICATIONS FOR HIGHWAY
	CONSTRUCTION".

A MAXIMUM DEVIATION FROM PLAN DIMENSIONS OF ONE INCH, AT THE INLET FLOOR, SHALL BE ALLOWED FOR TAPERING OF FORMS USED IN CONSTRUCTION OF CONCRETE INLETS.

INLET TYPE	W	WΙ
GB	2' 178"	1' 178"
GB-1	2' 81/8"	1' 87/8"
GB-2	3' 33 <sub>8</sub> "	2' 33/8"

STANDARD CONCRETE INLET DETAILS