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Tacoma, WA 98409-2319
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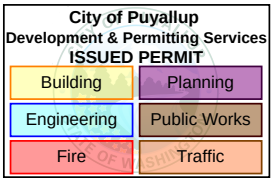
Brent K. Leslie, P.E., S.E.
Kathy A. Hargrave, P.E.
Larry G. Lindell, P.E., S.E.
Michael A. McEvilly, P.L.S.
Andrew J. Boileau, P.E., S.E.
David C. Boileau, A.I.A.



April 11th, 2022

THE CITY OF PUYALLUP
Development Engineering
Puyallup City Hall
333 South Meridian
Puyallup, WA 98371

SUBJECT: ***PUYALLUP SCHOOL DISTRICT***
2022 SOUTH HILL SUPPORT CAMPUS (SHSC) PORTABLE BUILDING RELOCATION PROJECT
ABBREVIATED STORMWATER SITE PLAN REPORT
PARCEL NO. 0419043117
SITTS & HILL PROJECT NO. 19,553.319

To The City of Puyallup Development Engineering Department:

The Puyallup School District is applying for a site development permit associated with the addition of one 887 square foot "dry" single portable (1.010 square feet including the roof overhang area) and the addition of 50 square feet of concrete walk surfacing at the South Hill Support Campus (SHSC) site. The site address is 1501 39th Avenue SW, Puyallup, Washington 98373 and the parcel number is 0419043117. The total new non-pollution generating impervious surfaces associated with the placement of the portable and walkway area is approximately 1,060 square feet.

Based on the City's adopted stormwater management manual and MS4 permit requirements, the 2019 Washington State Department of Ecology Stormwater Management Manual for Western Washington (hereinafter referred to as the Manual) flow charts identify Minimum Requirement #2 as applicable to this project. A copy of the flow chart logic is included herein and a descriptive summary of how each requirement has been met is outlined below.

<u>Minimum Requirement #2 - Construction Stormwater Pollution Prevention:</u>
A discussion of each of the thirteen elements is provided below in compliance with the Manual, Chapter 1, Section 2.5.2:

1. *Preserve Vegetation / Mark Clearing Limits* - Work limits will be identified in the field from the construction plans.
2. *Establish Construction Access* - Construction vehicles will access the site from a private asphalt road off of 39th Avenue SW, and then from an adjacent existing gravel access. The private roadway surfaces shall be swept clean to prevent tracking soils onto other paved areas.
3. *Control Flow Rates* - Flow control is not a requirement for this project. However, in the existing condition, stormwater runoff will occur over grass surfaces prior to discharge. In the proposed condition, runoff will similarly runoff over grass surfaces prior to discharge.
4. *Install Sediment Controls* - Catch basin inserts will be used by the Contractor to mitigate against the potential for sediment to enter the existing catch basins. If any catch basins or inserts become filled with sediment or debris, they must be cleaned in such a manner as to prevent material from entering the stormwater drainage system. Sweeping of paved surfaces will also help to prevent sediment from entering the existing system.

5. *Stabilize Soils* - Any exposed soils requiring stabilization due to poor weather conditions, or left unworked for more than 2 days from October 1 to April 30 (7 days from May 1 to September 30), will be covered at the end of each work shift. Covering material will be anchored to ensure adequate protection. Erosion control measures will remain in place until soil stabilization can be achieved by the installation of permanent surfacing. Dust control measures are not anticipated to be required, but will be implemented as necessary at the Contractor's discretion by keeping the work area in an adequately moistened condition.
6. *Protect Slopes* - The project will not negatively impact any slopes.
7. *Protect Drain Inlets* - All catch basins near the site are to be protected as necessary during construction. This will be accomplished through the use of catch basin inserts and pavement sweeping. The construction drawings detail the location and protection measures required for each existing catch basin to be protected. Inlet protection filters are required on all existing catch basins near the area of work. Filters will be inspected frequently during construction (especially after storm events) and pavement will be checked and swept as necessary. If inlet protection filters become one-third full, they will be cleaned in such a manner as to prevent sediment from entering the stormwater drainage system. Inlet protection material will also be kept on hand in case additional protection becomes necessary.
8. *Stabilize Channels and Outlets* - No channel or outlet stabilization will be required.
9. *Control Pollutants* - All material to be removed / demolished will be disposed of at an approved off-site location. Fueling and lubrication of construction vehicles and other motorized equipment will occur only at approved off-site facilities. Construction equipment will be inspected daily as part of regular maintenance activities. Any leaks or other sources of contamination will be repaired immediately. Spillage or other discharges of pollutants will be reported within 24 hours. Also, the Contractor will maintain any materials necessary for rapid cleanup of spills.
10. *Control Dewatering* - It is not anticipated that de-watering will be included as a part of this project.
11. *Maintain BMPs* - All erosion and sediment control BMPs will be maintained and repaired as needed during construction. Installed BMPs will be inspected weekly (unless otherwise specified) or after any large storm event for stability and functionality. Deficiencies will be corrected in such a way as to prevent sediment from entering the stormwater drainage system. Refer to the TESC Plans submitted with this letter.
12. *Manage the Project* - The Erosion Control Specialist will be identified prior to the start of construction and will be on-call at all times. Construction activity is expected to occur during summer 2022.
13. *Protect Low Impact Development BMPs* - No low impact development BMPs are proposed.

Minimum Requirements (MR) 3 Source Control, MR 4 Preservation of Natural Drainage Systems and Outfalls and MR 5 Onsite Stormwater Management discussions are not required. However, in regard to MR 4, the project proposes to provide portable building downspout splash blocks. The surface runoff from the building roof downspout splash blocks is still tributary to the same pre-developed locations. In regard to MR 5, from previous project work with the Summit Building permit, the recently completed 2020 GLAD and CTE Portable Building Relocation work (permit E-20-0549), and the Kessler Center site development work (permit E-19-0574), the site surface soils do not infiltrate very well. So, the proposed downspout splash block dispersion methodology fits with the location and the site conditions.

The project is located within a groundwater recharge area and is not located within the FEMA floodplain. The proposed project stormwater disposal approach is consistent with MR 4. Recent portable project approval included in City permit E-20-0549 may be consulted for additional information (a copy is attached herein).

This concludes our evaluation of the Minimum Requirements for this project.

Finally, the City Design Standard 205.4 requires projects to prepare an Operations and Maintenance (O&M) Manual for all project stormwater facilities. This is typically done in conjunction with a facility Stormwater Maintenance Agreement. Since the project proposes downspout splash block installations,

there are no formal stormwater facilities requiring either an O&M Manual or Stormwater Maintenance Agreement.

Please feel free to contact our office with any additional questions or comments regarding this project.

Sincerely,

SITTS & HILL ENGINEERS, INC.

Richard C. Hand, P.E.
Senior Project Manager

11 APRIL 2022

Figure I-3.1: Flow Chart for Determining Requirements for New Development

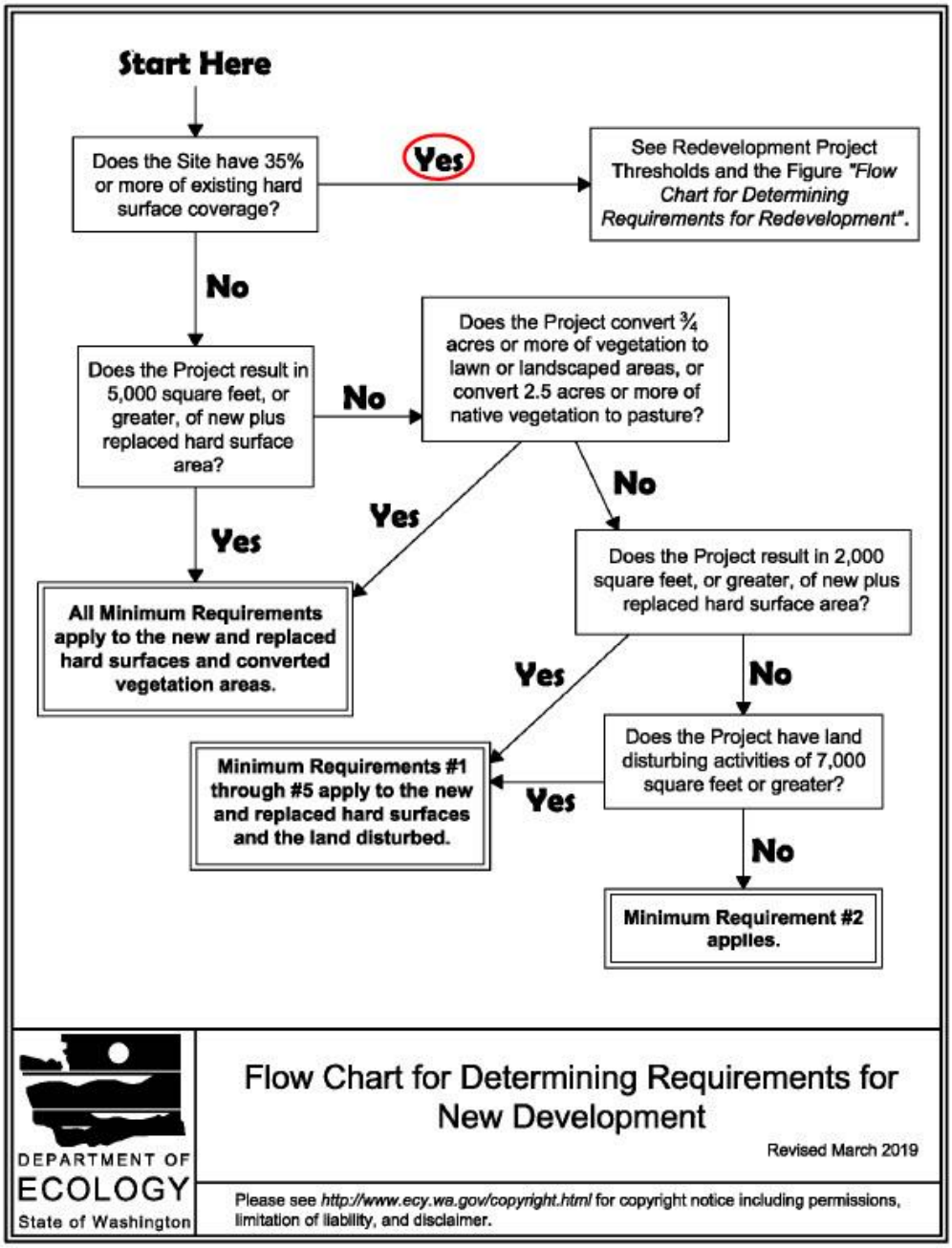
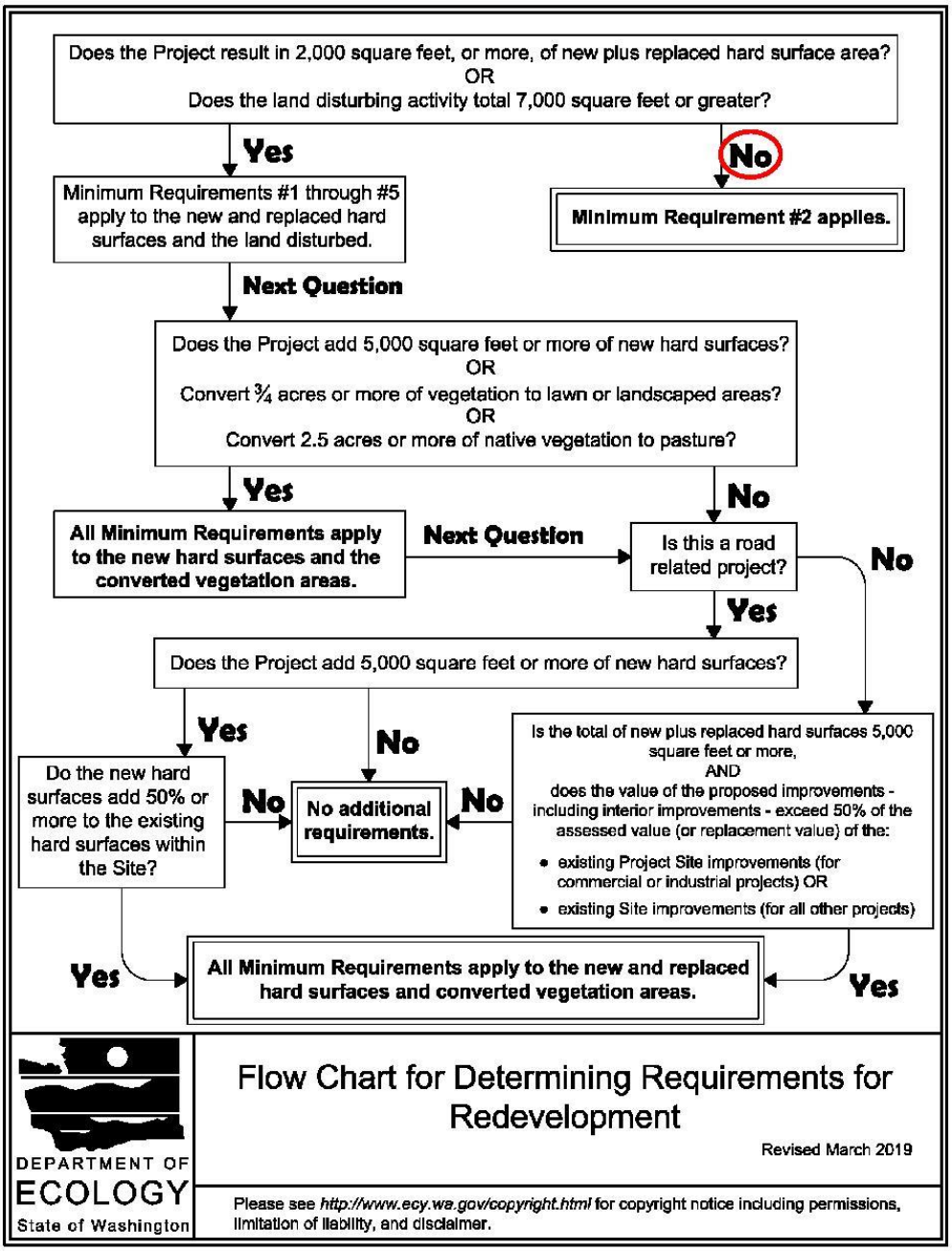
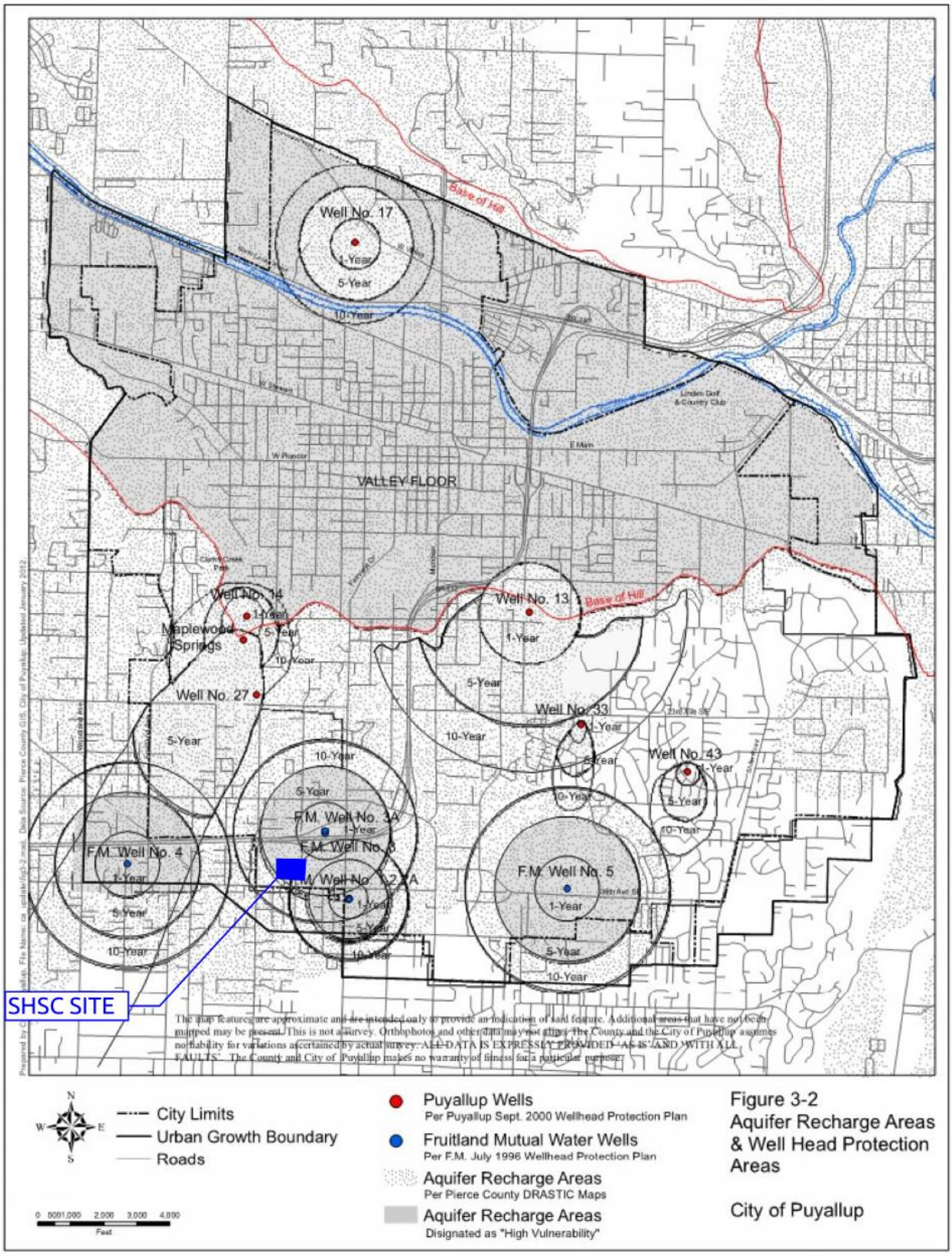
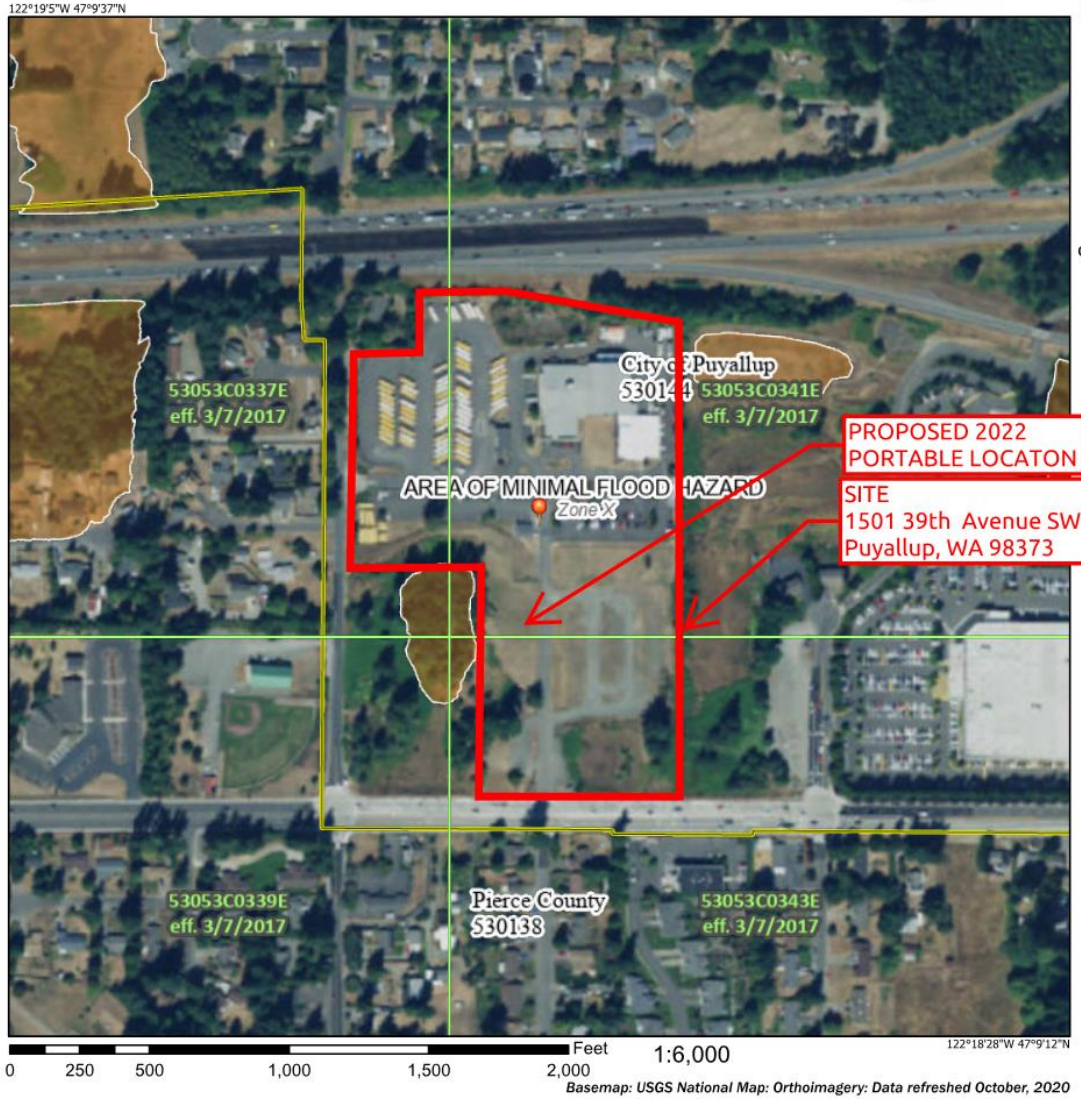


Figure I-3.2: Flow Chart for Determining Requirements for Redevelopment




Well No. 17
1-Year
5-Year
10-Year
Base of Hill
VALLEY FLOOR
Well No. 14
Maplewood Springs
Well No. 27
Well No. 13
Well No. 33
Well No. 43
F.M. Well No. 3A
F.M. Well No. 4
F.M. Well No. 5
SHSC SITE
The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. Orthophotos and other data may not align. The County and the City of Puyallup assumes no liability for variations ascertained by actual survey. ALL DATA IS EXPRESSLY PROVIDED "AS IS" AND WITH ALL FAULTS." The County and City of Puyallup makes no warranty of fitness for a particular purpose.
City Limits
Urban Growth Boundary
Roads
Puyallup Wells
Per Puyallup Sept. 2000 Wellhead Protection Plan
Fruitland Mutual Water Wells
Per F.M. July 1996 Wellhead Protection Plan
Aquifer Recharge Areas
Per Pierce County DRASTIC Maps
Aquifer Recharge Areas
Disignated as "High Vulnerability"
Figure 3-2
Aquifer Recharge Areas & Well Head Protection Areas
City of Puyallup

National Flood Hazard Layer FIRMette



FEMA

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/11/2022 at 10:01 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

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Brent K. Leslie, P.E., S.E.
Kathy A. Hargrave, P.E.
Larry G. Lindell, P.E., S.E.
Michael A. McEvilly, P.L.S.
Wesley J. Jones, P.E.

Revised March 15, 2021
Revised January 14, 2021
November 2, 2020

THE CITY OF PUYALLUP
Development Engineering
Puyallup City Hall
333 South Meridian
Puyallup, Washington 98371

TO: Anthony Hulse, EIT

SUBJECT: ***REVISED ABBREVIATED STORMWATER DRAINAGE LETTER FOR PSD 2021 CTE AND GLAD PORTABLES***
PUYALLUP SCHOOL DISTRICT NO. 3
PARCEL NO. 0419043117
SITTS & HILL PROJECT NO. 18,980

Dear Mr. Hulse:

The Puyallup School District is applying for a site development permit for the placement of two dry portable buildings and the addition of associated concrete sidewalk and asphalt pavement at the Puyallup School District Support Operations Campus (1501 39th Avenue SW, Puyallup, Washington 98373). The total of new hard surfaces associated with the placement of the portable is approximately 4,113 square feet. No replaced hard surfaces are proposed. Minimum Requirements #1 through #5 are applied to this project (see attached flowcharts). Runoff from the new roof area will be managed by a proposed dispersion trench.

In the existing condition, runoff from the project area sheet flows either to the east into the street or to the west into the wetland. Minimum Requirement #8 Wetlands Protection is not triggered by the proposed project. Runoff that enters the street continues to surface flow north into the existing stormwater system. Soil conditions in the project area were previously investigated as a part of the Kessler Center Project (permit no. E-19-0574), which is currently under construction. Excerpts from the Subsurface Exploration, Infiltration Testing, and Design Infiltration Rate Determination letter for this project (dated December 18, 2019 by Associated Earth Sciences Inc.) are included with this letter. The upper layer of soil is described as Vashon Recessional Lacustrine Deposits, which provides a poor infiltration rate.

<u>Minimum Requirement #1 – Preparation of Stormwater Site Plans:</u>
This letter and the accompanying project drawings satisfy this requirement.

<u>Minimum Requirement #2 - Construction Stormwater Pollution Prevention:</u>
A discussion of each of the thirteen elements is provided below:

1. *Mark Clearing Limits* – Work limits will be identified in the field from the construction plans. *Applicable BMPs*: C101 Preserving Natural Vegetation

2. *Establish Construction Access* - Construction vehicles will access the site from 17th Street SW. Access is via existing pavement. Any debris generated as a result of construction activity will be swept clean to prevent tracking onto paved areas.

3. *Control Flow Rates* - Flow control is not a requirement for this project.

4. *Install Sediment Controls* – Silt fence will be installed per the project plans. Catch basin inserts will be used by the contractor to minimize sediment entering the existing catch basins. If any catch basins or inserts become filled with sediment or debris, it must be cleaned in such a manner as to prevent material from entering the stormwater drainage system. Sweeping of paved surfaces will also help to prevent sediment from entering the existing system.
   Applicable BMPs: C220 Inlet Protection; C233 Silt Fence

5. *Stabilize Soils* - Any exposed soils requiring stabilization due to poor weather conditions, or left unworked for more than 2 days from October 1 to April 30 (7 days from May 1 to September 30), will be covered at the end of each work shift. Covering material will be anchored to ensure adequate protection. Erosion control measures will remain in place until soil stabilization can be achieved by the installation of permanent surfacing. Dust control is not anticipated to be required, but will be utilized as necessary at the Contractor's discretion by keeping the work area in an adequately moistened condition.
   Applicable BMPs: C120 Temporary and Permanent Seeding; C121 Mulching; C123 Plastic Covering; C125 Topsoiling/Composting; C140 Dust Control

6. *Protect Slopes* - The project will not include any destabilized slopes.

7. *Protect Drain Inlets* - All catch basins near the site are to be protected as necessary during construction. This will be accomplished through the use of catch basin inserts and pavement sweeping. The construction drawings detail the location and protection measures required for each existing catch basin to be protected. Inlet protection filters are required on all existing catch basins near the area of work. Filters will be inspected frequently during construction (especially after storm events) and pavement will be checked and swept as necessary. If inlet protection filters become one-third full, they will be cleaned in such a manner as to prevent sediment from entering the stormwater drainage system. Inlet protection material will also be kept on hand in case additional protection becomes necessary.
   Applicable BMPs: C220 Inlet Protection

8. *Stabilize Channels and Outlets* - No channel or outlet stabilization will be required.

9. *Control Pollutants* - All material to be removed / demolished will be disposed of at an approved off-site location. Fueling and lubrication of construction vehicles and other motorized equipment will occur only at approved off-site facilities. Construction equipment will be inspected daily as part of regular maintenance activities. Any leaks or other sources of contamination will be repaired immediately. Spillage or other discharges of pollutants will be reported within 24 hours. Also, the contractor will maintain any materials necessary for rapid cleanup of spills.
   Applicable BMPs: C151 Concrete Handling; C152 Sawcutting and Surfacing Pollution Prevention; C153 Material Delivery, Storage, and Containment; C154 Concrete Washout Area

10. *Control Dewatering* - It is not anticipated that de-watering will be included as a part of this project.

11. *Maintain BMPs* - All erosion and sediment control BMPs will be maintained and repaired as needed during construction. Installed BMPs will be inspected weekly (unless otherwise

specified) or after any large storm event for stability and functionality. Deficiencies will be corrected in such a way as to prevent sediment from entering the stormwater drainage system. Refer to the project TESC Plans.
Applicable BMPs: C150 Materials on Hand; C160 Certified Erosion and Sediment Control Lead

12. *Manage the Project* - The Erosion Control Specialist will be identified prior to the start of construction and will be on-call at all times.
Applicable BMPs: C150 Materials on Hand; C160 Certified Erosion and Sediment Control Lead; C162 Scheduling

13. *Protect Low Impact Development BMPs* - No low impact development BMPs are proposed.

Minimum Requirement #3 – Source Control of Pollution:
The proposed project is located on the Puyallup School District Support campus. The current source control measures for the existing stormwater system will continue to be implemented. No new source control measures are applicable to the proposed portable buildings.

During construction, the project shall comply with the following Department of Ecology BMP's:
BMP C101 Preserving Natural Vegetation
BMP C120 Temporary and Permanent Seeding
BMP C121 Mulching
BMP C123 Plastic Covering
BMP C125 Topsoiling/Composting
BMP C140 Dust Control
BMP C150 Materials on Hand
BMP C151 Concrete Handling
BMP C152 Sawcutting and Surfacing Pollution Prevention
BMP C153 Material Delivery, Storage, and Containment
BMP C154 Concrete Washout Area
BMP C160 Certified Erosion and Sediment Control Lead
BMP C162 Scheduling
BMP C220 Inlet Protection
BMP C233 Silt Fence

Minimum Requirement #4 – Preservation of Natural Drainage Systems and Outfalls:
Runoff from the project area will continue to discharge to the wetland and into the adjacent street. Roof area will be dispersed toward the wetland.

Minimum Requirement #5 – On-site Stormwater Management:
Since the project triggers only Minimum Requirements #1 through #5, on-site stormwater management BMPs from List #1 are selected to satisfy Minimum Requirement #5.

For lawn and landscaped areas, BMP T5.13 Post-Construction Soil Quality and Depth applies. This BMP will be implemented for all disturbed soil areas.

For hard surfaces, infiltration BMPs such as rain gardens, perforated sub-out connections, and permeable pavement are not feasible due to the lack of infiltrative soils on the project site (see attached email from Jennifer Saltonstall of Associated Earth Sciences, Inc). Roof area will be managed using the proposed dispersion trench. Dispersion of the proposed pavement is not feasible due to the lack of available flowpath.

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Development Engineering
Puyallup City Hall
Revised March 15, 2021
Revised January 14, 2021
November 2, 2020
Page 4 of 33

The dispersion trench is sized to provide 10 feet of trench per 700 square feet of roof area in accordance with BMP T5.10B of the Manual. 1,976 square feet of roof area is proposed, resulting in a trench length of 28 feet (1,976 x 10 / 700 = 28 feet).

The following is an excerpt from the Manual of List #1. It is marked to indicate application to this project.

Lawn and landscaped areas:

- **Post-Construction Soil Quality and Depth in accordance with BMP T5.13: Post-Construction Soil Quality and Depth (p.911).**

Roofs:

- **Full Dispersion in accordance with BMP T5.30: Full Dispersion (p.939), or Downspout Full Infiltration Systems in accordance with BMP T5.10A: Downspout Full Infiltration (p.905)**
- **Rain Gardens in accordance with BMP T5.14A: Rain Gardens (p.915), or Bioretention in accordance with BMP T7.30: Bioretention Cells, Swales, and Planter Boxes (p.959). The rain garden or bioretention facility must have a minimum horizontal projected surface area below the overflow which is at least 5% of the area draining to it.**
- 3. **Downspout Dispersion Systems in accordance with BMP T5.10B: Downspout Dispersion Systems (p.905)**
- **Perforated Stub-out Connections in accordance with BMP T5.10C: Perforated Stub-out Connections (p.905)**

Other Hard Surfaces:

- **Full Dispersion in accordance with BMP T5.30: Full Dispersion (p.939)**
- **Permeable pavement[1] in accordance with BMP T5.15: Permeable Pavements (p.917), or Rain Gardens in accordance with BMP T5.14A: Rain Gardens (p.915), or Bioretention in accordance with BMP T7.30: Bioretention Cells, Swales, and Planter Boxes (p.959). The rain garden or bioretention facility must have a minimum horizontal projected surface area below the overflow which is at least 5% of the area draining to it.**
- **Sheet Flow Dispersion in accordance with BMP T5.12: Sheet Flow Dispersion (p.908), or Concentrated Flow Dispersion in accordance with BMP T5.11: Concentrated Flow Dispersion (p.905).**

Other Requirements:
An Operation and Maintenance Manual is not required for the project building downspout and dispersion trench systems. The School District is responsible for potential maintenance and is covered by an existing recorded maintenance agreement.

Please feel free to contact our office with any additional questions or comments regarding this project.

Sincerely,

Richard C. Hand, PE
Senior Project Manager

RICHARD C. HAND
STATE OF WASHINGTON
26780
REGISTERED
PROFESSIONAL ENGINEER
03/15/21

Attachments:
- Flow Charts from the Manual
- Email from Jennifer Saltonstall, AESI

Figure I-2.4.1 Flow Chart for Determining Requirements for New Development

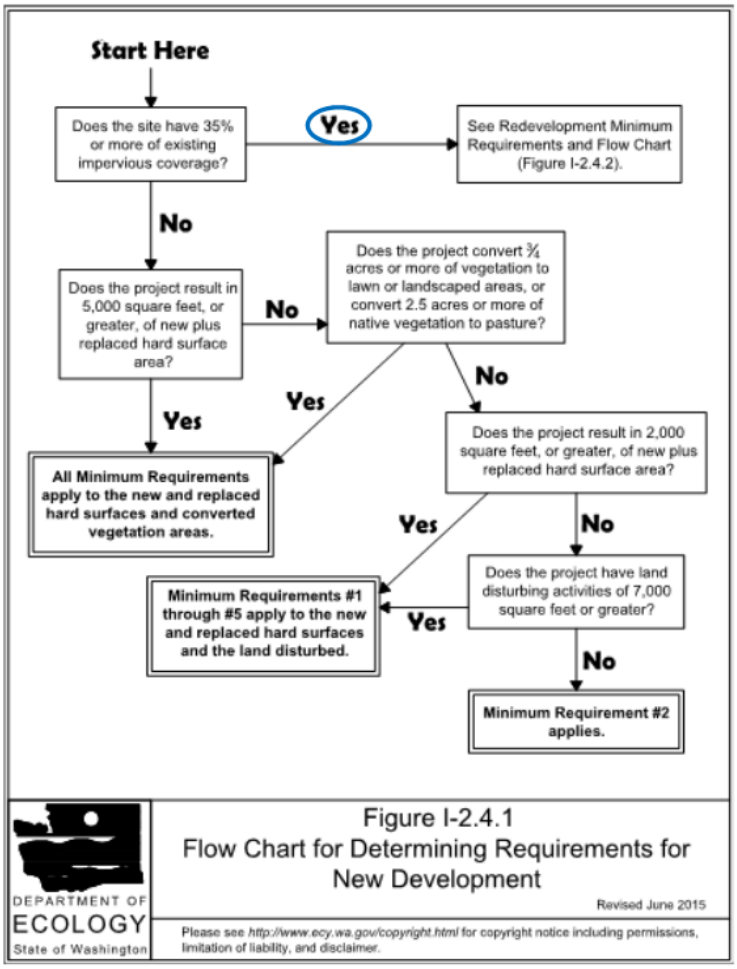

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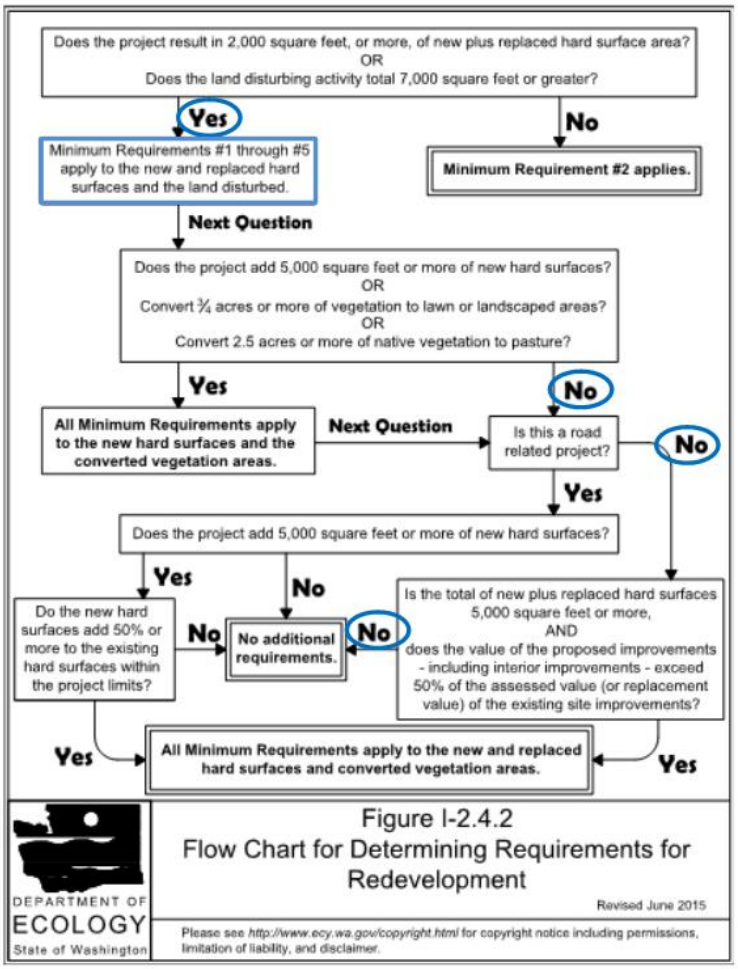
Figure I-2.4.2 Flow Chart for Determining Requirements for Redevelopment



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Development Engineering
Puyallup City Hall
Revised March 15, 2021
Revised January 14, 2021
November 2, 2020
Page 7 of 33

Victor Schlonga

From:	Jennifer Saltonstall <Jsaltonstall@aesgeo.com>
Sent:	Friday, January 8, 2021 9:08 AM
To:	Victor Schlonga
Cc:	Rick Hand; Vandeberg, Larry; Bradford Drew
Subject:	RE: PSD ITC Site Infiltration
Attachments:	Report.InfiltrationTesting.AESI.2005-12-06.pdf

Hi Victor,

We found the 2005 report containing infiltration test results for IP-1 - attached. The test was performed 5 feet below existing grade at elev. 352 and the field rate was 0.2 in/hr, so infeasible for infiltration. The nearby test pits show variable recessional consisting of sandy silt and silty sand to a depth of about 8 feet and then transitions to interbeds of cleaner sand at depth. These sandier zones contained nuisance seepage during excavation of the Warehouse and Kessler trenches, and we do not recommend targeting the sandier interbeds, if they happened to be present, for infiltration.

Shallow infiltration would be considered infeasible based on the 0.3-inches/hour criteria.

I'll give you a call to discuss, and make sure you've got what you need for a response.

Thanks, Jenny

Jennifer H. Saltonstall, L.G., L.Hg. | Principal Geologist/Hydrogeologist
Jsaltonstall@aesgeo.com | www.aesgeo.com
Associated Earth Sciences, Inc.
O|425-827-7701 C| 425-766-7303

From: Victor Schlonga <victors@sittshill.com>
Sent: Tuesday, January 5, 2021 1:22 PM
To: Jennifer Saltonstall <Jsaltonstall@aesgeo.com>
Cc: Rick Hand <rickh@sittshill.com>
Subject: PSD ITC Site Infiltration

Hi Jenny,

I just left you a voice mail on this topic, and I want to send you the plans and review comments we received from the City of Puyallup, so that you know exactly where we are talking about. The second bullet under "Page 3" is the one in question. Specifically, the reviewer thinks that infiltration near EP-8 is feasible. What are your thoughts? I have tried to find infiltration analysis for nearby IP-1, but couldn't find any. The District is eager to resubmit this, so would you have time to look at this before the end of the week?

Thanks!

THE CITY OF PUYALLUP
Development Engineering
Puyallup City Hall
Revised March 15, 2021
Revised January 14, 2021
November 2, 2020
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Victor Schlonga, P.E.
Project Engineer

SITTS & HILL ENGINEERS, INC.
CIVIL | STRUCTURAL | SURVEY
4815 CENTER STREET, TACOMA, WA 98409
PHONE: (253) 474-9449 ext.307
EMAIL: victors@sittshill.com
http://www.sittshill.com/

Associated Earth Sciences, Inc.

Celebrating 25 Years of Service

December 6, 2005
Project No. KE05522B

Puyallup School District
Facilities Management
323 12th Street NW
Puyallup, Washington 98371

Attention: Mr. Tom Shields

Subject: Soil Infiltration Testing Results
Proposed Central Kitchen Complex
1504 39th Avenue SW
Puyallup, Washington

Reference: Subsurface Exploration, Geologic Hazards,
and Geotechnical Engineering Report
Proposed Central Kitchen Complex
Puyallup School District
1504 39th Avenue SE
Puyallup, Washington
Report Date: September 13, 2005

Dear Mr. Shields:

As requested, this report presents the results of our evaluation of soil infiltration capability and provides recommendations for use in design of the storm water infiltration system for the proposed Central Kitchen Complex located at 1504 39th Avenue SE in Puyallup, Washington. The general site location is shown on the Vicinity Map, Figure 1. The existing site layout and the approximate locations of the subsurface explorations advanced at the site for this and our referenced study are presented on the Site and Exploration Plan (Figure 2).

Project and Site Description

As indicated, exploration for this study was conducted to evaluate soil infiltration capacity at two locations within the site. The information in this report supplements our referenced report, which presents the results of our subsurface exploration, geologic hazards, and preliminary geotechnical engineering study for the project. Some of the information from the referenced report is re-presented herein for clarity.

The Central Kitchen Complex site is located on the north side of 39th Avenue SW, west of 14th Street Place SW in Puyallup, Washington. School district buildings and associated parking/drive areas and a water management pond are present within the northern portion of the site. A

converted residential structure and adjacent parking/drive area are present within the southwestern portion of the site. The remainder of the site is vacant and covered with a moderate growth of weeds and brush. It is our understanding that a wetland is located along the southern portion of the western property line.

Based on information provided to us, Phase I includes approximately 60 percent of proposed site development and will consist of an addition to the existing Central Kitchen Complex with some additional parking and development of the southern portion of the site for use as a parking lot for school buses. Completion of site development will occur as Phase II and will consist of construction of a new transportation facility and parking/drive areas for both buses and passenger cars within the central portion of the site. We anticipate that minimal mass grading will be included in the project and that final grades will be close to existing grades. No site development plans were available to us as of the date of this report.

Storm water runoff is to be infiltrated on-site utilizing infiltration ponds. Based on information provided to us, the existing infiltration pond within the northwest portion of the site is to be expanded along the western edge and utilized to infiltrate storm water runoff from Phase I development. A new pond to infiltrate storm water runoff from Phase II development is to be constructed within the western-central portion of the site southwest of the existing gated, bus parking area west of the existing access road. As requested, infiltration testing was conducted in each of the two areas to be used for on-site infiltration.

Subsurface Exploration

Our preliminary field study was conducted on August 15, 2005 and included excavating a total of 16 exploration pits with a rubber-tire backhoe to gain general subsurface information about the site. Our current field study was conducted on October 10, 2005 and included conducting two Pilot Infiltration Tests (PIT's) followed by excavation of the infiltration pits to a depth of 10 feet using a rubber-tire backhoe to obtain samples for sieve analyses and to gain additional information about the shallow soil and ground water conditions at the site. We are attaching to this report copies of the exploration pit logs generated during our August 15, 2005 field study and copies of the infiltration pit logs generated during our October 10, 2005 subsurface exploration. Our explorations were approximately located in the field by estimation based on known site features shown on the "Master Plan South Hill Site – Concept A, Phase II" dated October 18, 2004 by BCRA.

Subsurface Conditions

The encountered soils were consistent with the geology mapped in the site area as shown on the State of Washington Department of Conservation Division of Water Resources, Water Supply Bulletin No. 22: *Geology and Ground-Water Resources of Central Pierce County, Washington,* (1968). This map shows the site area is mantled by recessional outwash soil.

Subsurface conditions at the project site were inferred from the field explorations accomplished for this and our preliminary study, visual reconnaissance of the site, and review of applicable geologic literature. Because of the nature of exploratory work below ground, extrapolation of subsurface conditions between field explorations is necessary. It should be noted that differing subsurface

conditions may sometimes be present due to the random nature of deposition and the alteration of topography by past grading and/or filling. The nature and extent of any variations between the field explorations may not become fully evident until construction. If variations are observed at that time, it may be necessary to re-evaluate specific recommendations and make appropriate changes. The following section presents more detailed subsurface information.

Topsoil

A surficial layer of organic topsoil ranging in depth from approximately 0.5 feet to 1.5 feet was encountered across the surface of much of the site. Topsoil consisted generally of a moist, brown, silty fine sand to sandy silt.

Existing Fill

Fill ranging in depth from 2 to 4 feet was encountered within exploration pits EP-4, EP-10, EP-11, and EP-14. The fill consisted of a mixture of silt, sand, and gravel in a loose to medium dense condition. No fill was encountered within either of the two infiltration pits excavated as a part of our current study.

Recessional Outwash

Each of our exploration and infiltration pits encountered a medium dense mixture of silt, fine to coarse sand, and few gravel interpreted as recessional outwash. The percent of silt and sand varied within and between exploration/infiltration pits. The recessional outwash observed in our explorations graded from brown to brown-gray in the weathered zone near the surface to gray at depth where there was less weathering. The recessional outwash was deposited by meltwater streams that emanated from the retreating glacial ice during the latter portion of the Vashon Stade of the Fraser Glaciation approximately 13,000 years ago.

Hydrology

No ground water seepage was encountered during our explorations as described herein. It should be noted that the presence and depth of seepage at the site may vary in response to such factors as changes in season, precipitation, and site use. The presence of silty interbeds may result in perched ground water during wetter periods of the year. Perched ground water commonly occurs in areas where layers of relatively low permeable soil exist within sandier, more permeable soil, and originates as surface water that percolates down through the near-surface, relatively permeable soil and becomes trapped or "perched" atop the underlying, relatively impermeable silt interbeds. Perched ground water is often a seasonal phenomenon. Ground water levels are expected to be higher, and the amount of ground water is expected to be greater during and following the wetter winter and spring seasons. Ground water conditions should also be expected to vary in response to changes in precipitation, on- and off-site land usage, and other factors.

Laboratory Testing

In order to provide an infiltration rate estimate based on published correlation to soil grain size, samples were submitted for mechanical grain size analysis testing in accordance with American

Society for Testing and Materials (ASTM):D 1140. Table 1 presents a summary of grain size analyses performed on samples obtained from the infiltration pits in the vicinity of the proposed infiltration facilities.

Table 1
Summary of Grain Size Analysis Results
ASTM:D 1140

Infiltration Pit (IP) No.	Sample Depth Below Existing Ground Surface (feet)	Soil Type	Percent Silt (% passing No. 200 sieve)
IP-1	5 - 7	Sandy silt, trace gravel	53.3
IP-2	1 - 4	Sand, trace silt, few gravel	4.0
IP-2	1 - 4	Sandy silt, trace gravel	59.1

Site Infiltration Evaluation

As discussed in our referenced report, the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) publication *Soil Survey of Pierce County, Washington* (1979) maps the site as being mantled by the Indianola soil group with a USDA texture classification of loamy sand. Based on Table 2.1 presented in the Washington State Department of Ecology publication *Stormwater Management Manual for Western Washington* (2005) (Ecology Manual), Indianola group soil is classified as Hydrologic Group "A" with a water transmission rate greater than 0.3 inches per hour (iph). Actual infiltration rates can be significantly higher than 0.3 iph in Group A soils. Site-specific information is required to determine rates appropriate for the site.

Infiltration Based on USDA Soil Textural Classification

The grain size analyses performed on soil samples from the infiltration pits excavated during our current exploration support the USDA texture classification of silt loam and sand. Table 3.7 presented in the Ecology Manual (2005) indicates an estimated short-term infiltration rate of 8 iph for sand. The estimated long-term infiltration rate can be determined by applying a correction factor ranging from 2 to 4 depending on soil textural classification. Recommended correction factors can be reduced depending on soil variability, facility maintenance, and pretreatment. No infiltration rate was presented for silty loam.

Infiltration Rate Based on In-situ Infiltration Measurements

Infiltration testing was conducted within both areas currently under consideration for infiltration ponds. Infiltration rates were measured using a large-scale, constant head infiltration rate test and water from nearby fire hydrants. Permission to use water from the fire hydrants was granted by the Fruitland Mutual Water District. The large-scale test is a constant head test completed using a 6-foot-diameter, single-ring infiltrometer. This method generally corresponds to the procedure

described as a PIT in the Ecology Manual (2005). Water was discharged at a known rate into a test pit of known dimensions, and the saturated infiltration rate (vertical hydraulic conductivity) was calculated using a constant head analysis. It should be noted that the infiltration rate indicated is specific to the location and depth tested. Where infiltration structures are proposed in locations or at depths or within soils not represented by exploration/testing presented herein, additional exploration/infiltration testing may be required.

Two infiltration tests were performed. As requested, the infiltration test within infiltration pit IP-1 was conducted at a depth of approximately 5 feet below existing ground surface; the infiltration test within infiltration pit IP-2 was conducted at a depth of approximately 1 foot below the bottom of the existing infiltration pond.

For each test, water was introduced into the infiltration pit through a fabric diffuser to minimize turbulence. An electronic flow meter/totalizer was used to monitor the water discharge rate and total flow. A staff gauge with 0.01-foot divisions was used to measure the water level. The measured infiltration rates at each test location are reported in Table 2.

Table 2
Infiltration Test Results

Test No.	Existing Surface Elevation (feet)	Proposed Surface Elevation (feet)	Test Elevation (feet)	Elevation at Bottom of Pit After Test (feet)	Field-Calculated Infiltration Rate (inches/hour)
IP-1	357	352	352	347	0.2
IP-2	347	347	346	337	7.6

Infiltration test locations are shown on Figure 2. After conclusion of the infiltration test at each location, the infiltration pit was extended to a depth of 10 feet below existing ground surface to observe the degree of stratification of the receptor horizon and evaluate the potential for barriers to flow. No ground water seepage was encountered.

Discussion/Recommendations

Observation of soil conditions across the site in our exploration and infiltration pits indicate that soils in the vicinity of infiltration pit IP-1 are relatively silty compared to the soils encountered in the vicinity of infiltration pit IP-2 where relatively sandy soils were encountered. The results of the infiltration testing reflect the existence of the finer, less permeable soils in the vicinity of infiltration pit IP-1 and the coarser, relatively more permeable soils in the vicinity of infiltration pit IP-2.

Information provided by school district employees on-site during our current exploration indicates that no appreciable amount of water accumulates in the existing pond within the northwest portion of the site, even after periods of heavy rainfall. This information, in combination with the

comparatively sandy soil encountered within pits excavated within the bottom of the existing pond, is consistent with the field infiltration rate observed during infiltration testing in infiltration pit IP-2 within the existing pond bottom.

Due to the variable and silty nature of the recessional outwash deposits encountered over portions of the site, concentrated storm water infiltration should be directed to sand-rich areas, as encountered in infiltration pit IP-2. This concentrated storm water runoff should not be directed to silty areas, as was encountered in infiltration pit IP-1. Based on exploration, infiltration testing, and reported performance of the existing infiltration pond, we recommend a design infiltration rate of 3.8 iph in the vicinity of infiltration pit IP-2. The recommended infiltration rate includes a correction factor of 2.

It is our understanding, based on telephone conversations with Mr. Bob Dahmon/Sitts & Hill Engineers, Inc., that by utilizing the recommended design infiltration rate of 3.8 iph for design, the proposed enlargement of the existing pond within the northwest portion of the site will be suitable for infiltration of Phase I storm water. We recommend that actual pond performance monitoring be conducted during the winter of 2005/2006 and for one winter/spring once Phase I development is complete. The results of monitoring should be reviewed and evaluated to determine if storm water from the future Phase II can be routed to and infiltrated within the northerly pond.

Proposed monitoring would include installation of an observation well adjacent to the existing pond and installation of a staff gauge located in the pond bottom. Data loggers would be installed in the observation well and staff gauge, and downloaded on a monthly basis.

Given the range of potential infiltration rates and relatively silty and finer-grained layers within the stratigraphic columns observed in our explorations, we recommend a series of vertical drains strategically located across the bottom of the infiltration ponds designed to improve performance. The purpose of the vertical drains is to avoid potential buildup of water within the facility by penetrating through lower permeability horizontal layers and exposing more granular receptor soils contained in the recessional outwash deposits. The vertical drains also serve to expose a greater surface area of the native recessional outwash soil for infiltration. This process would be accomplished by excavating vertical drains through the variable recessional soils and backfilling with an engineered, permeable fill material.

We recommend that vertical drains consisting of 10-foot-long, 12-inch-wide, and 10-foot-deep pits filled with permeable fill (4x8 sand or equivalent) be incorporated into infiltration pond design. The entire facility bottom would then be capped with a minimum 12-inch-thick, fine-grained engineered fill (C33 sand or equivalent), which would serve as a filter and thus minimize plugging of the permeable fill material in the pits. The C33 sand cap would be considered a sacrificial sand layer. Maintenance of this sand layer can be performed when the sands become silted up, or biological growth causes a decrease in infiltration performance, and could be accomplished by removing the affected sand with a shovel and replacing it with new filter sand. The vertical drain system should consist of several pits excavated from the pond subgrade into the underlying receptor horizons. The actual number of pits will depend on subsurface conditions encountered during construction and on the ultimate infiltration capacity required by system design.

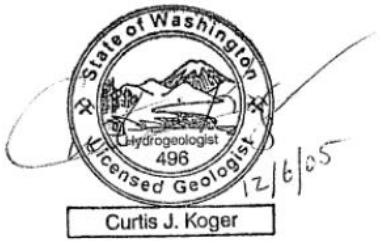
The recommended design infiltration rates are based on the soil characteristics at the infiltration test locations. Soil conditions beyond the test locations may vary. Soil characteristics for infiltration facilities should be observed by a representative of AESI during construction to verify applicability of the design infiltration rate and to aid in determination of the required number of vertical infiltration pits.

We appreciate the continued opportunity to have been of service to you on this project. If you should have any questions or require further assistance, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

Maire Thornton

Maire Thornton, P.E.
Senior Project Engineer



Curtis J. Koger, P.G., P.E.G., P.Hg.
Principal Geologist/Hydrogeologist

Kurt D. Merriman, P.E.
Principal Engineer

Attachments: Figure 1: Vicinity Map
Figure 2: Site and Exploration Plan
Exploration Logs

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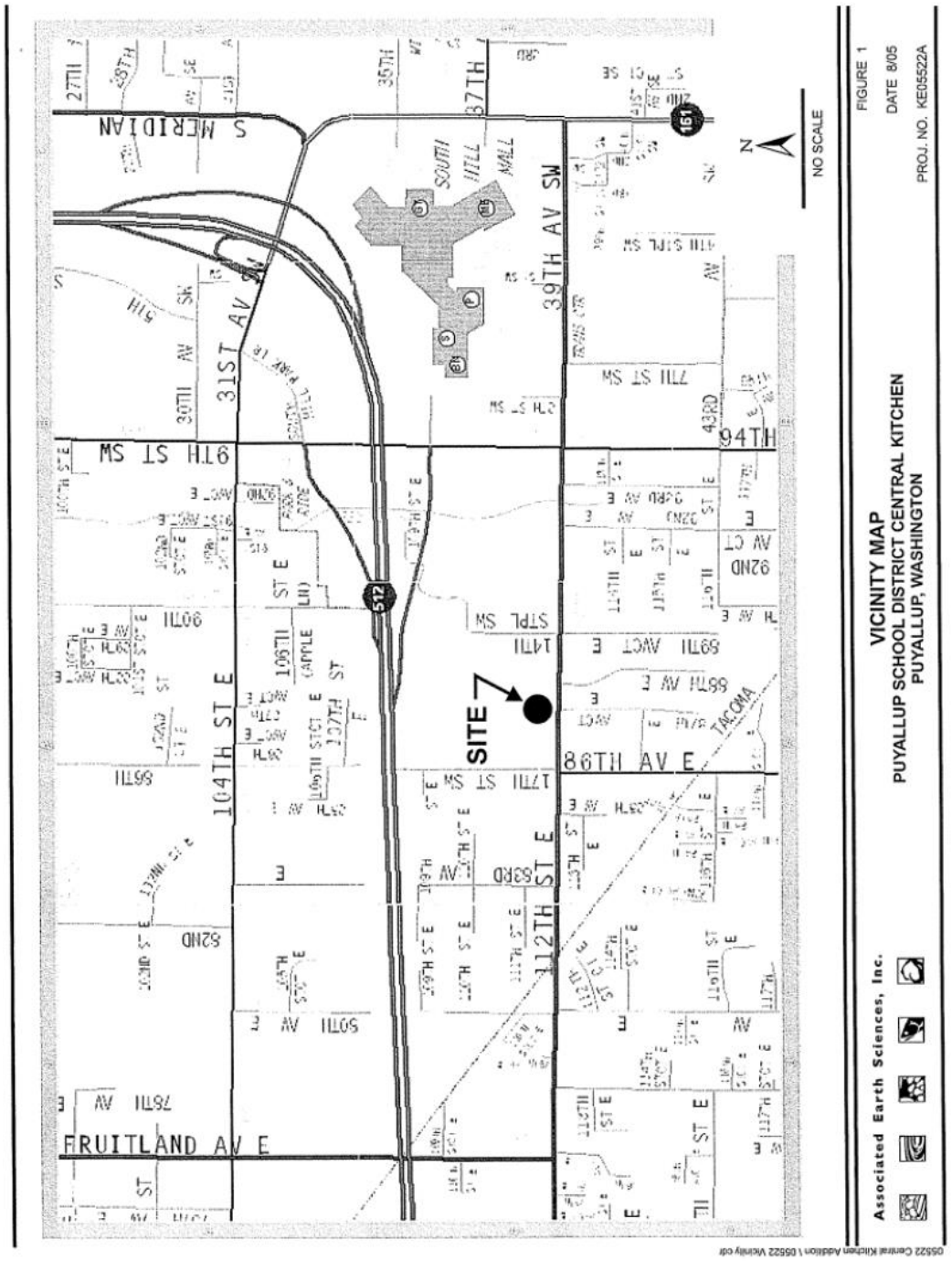
VICINITY MAP
PUYALLUP SCHOOL DISTRICT CENTRAL KITCHEN
PUYALLUP, WASHINGTON
FIGURE 1
DATE 8/05
PROJ. NO. KE05522A
Associated Earth Sciences, Inc.
NO SCALE
N
SITE
S MERIDIAN
31ST AV SW
39TH AV SW
37TH
35TH
SOUTH HILL MALL
94TH
91ST ST SW
86TH AV E
104TH ST E
112TH ST E
FRUITLAND AV E
TACOMA
512
05522 Central Kitchen Addition \ 05522 Vicinity.cdr

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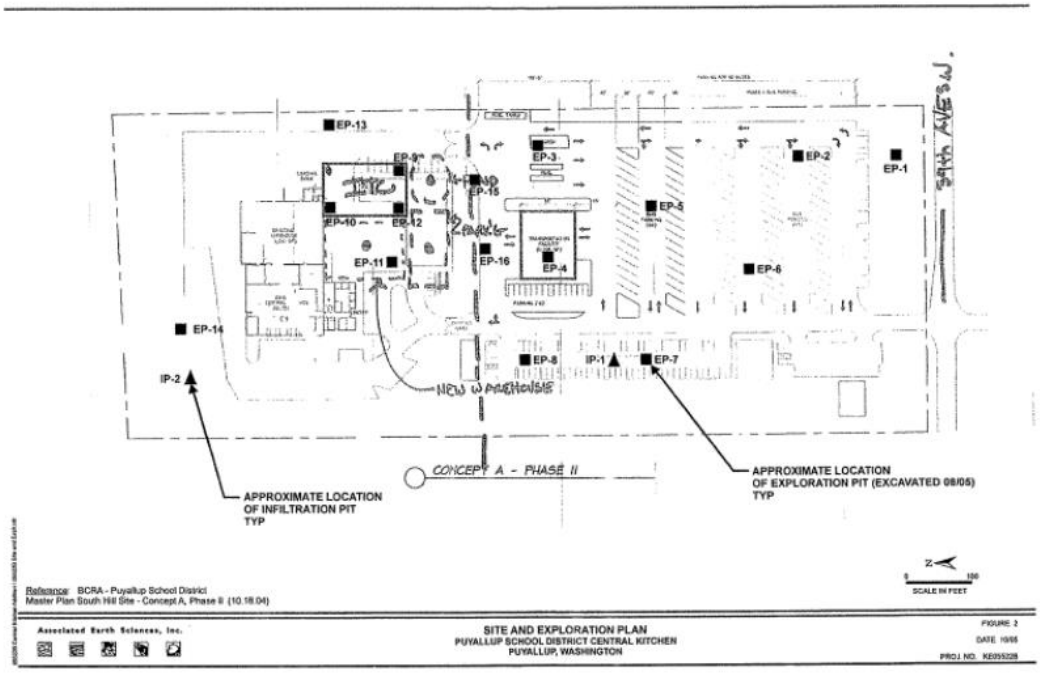

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LOG OF EXPLORATION PIT NO. EP-1

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION**
1	**Topsoil** Loose, dry to damp, brown, silty fine SAND, roots.
2	**Recessional Outwash** Loose to 18" becoming medium dense below, damp to moist, light brown to light gray, silty fine SAND/fine sandy SILT.
3	
4	Coarser with depth.
5	
6	
7	Medium dense, moist, gray, fine to coarse SAND, few gravel.
8	
9	Medium dense, moist, light gray, very moist, silty fine SAND.
10	
11	Medium dense, moist, light gray, very moist, fine SAND, trace silt.
12	
13	Bottom of exploration pit at depth 12 feet No ground water/seepage. Caving between surface and 2'.
14	
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17	
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19	
20	

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Central Kitchen Project
Puyallup, WA

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Associated Earth Sciences, Inc.

Project No. KE05522A
8/15/05

LOG OF EXPLORATION PIT NO. EP-2

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION**
	Topsoil
1	Loose, dry to damp, brown, silty fine SAND, roots.
	Recessional Outwash
2	Loose to 18" becoming medium dense below, damp to moist, light brown to light gray, silty fine SAND/fine sandy SILT.
3	
4	
5	Color change to light gray.
6	
7	
8	Orange oxidation staining, moist to very moist.
9	
10	Siltier with depth.
11	
12	
13	Bottom of exploration pit at depth 12 feet No ground water/seepage. No caving.
14	
15	
16	
17	
18	
19	
20	

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LOG OF EXPLORATION PIT NO. EP-3

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION**
1	**Topsoil** Loose, dry to damp, brown, silty fine SAND, roots.
2	**Recessional Outwash**
3	Loose to 18" becoming medium dense below, damp to moist, light brown to light gray, silty fine SAND/fine sandy SILT, horizontal stratification, orange oxidation staining on some horizontal surfaces.
4	
5	
6	
7	
8	Becomes very moist with depth.
9	
10	
11	Bottom of exploration pit at depth 10 feet No ground water/seepage. No caving.
12	
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LOG OF EXPLORATION PIT NO. EP-4

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION**
1	**Fill** Loose, dry to moist, light brown/brown, SILT/fine to medium SAND, trace gravel.
2	
3	
4	**Topsoil** Loose to medium dense, moist, brown, silty fine SAND, roothairs.
5	**Recessional Outwash**
6	Medium dense, moist to very moist, light gray, silty fine SAND, orange oxidation staining, trace gravel and coarse sand.
7	
8	
9	
10	
11	Bottom of exploration pit at depth 10 feet No ground water/seepage. No caving.
12	
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19	
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LOG OF EXPLORATION PIT NO. EP-5

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION**
1	**Topsoil** Loose, dry to damp, brown, silty fine SAND, roots.
2	**Recessional Outwash**
3	Medium dense, damp to moist, light brown to light gray, silty fine SAND/fine sandy SILT, orange oxidation.
4	
5	
6	
7	
8	Very moist with depth.
9	
10	
11	Bottom of exploration pit at depth 10 feet No ground water/seepage. No caving.
12	
13	
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LOG OF EXPLORATION PIT NO. EP-6

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
1	**Topsoil** Loose, dry to damp, brown, silty fine SAND, roots.
2	**Recessional Outwash** Loose to 18" becoming medium dense below, damp to moist, light brown to light gray, fine to medium SAND with silt, orange oxidation.
6	Medium dense, moist to very moist, gray, fine SAND, trace silt, horizontally stratified.
8	Medium dense, wet, light gray, fine SAND, trace silt, sandier with depth.
12	Bottom of exploration pit at depth 12 feet No ground water/seepage. No caving.

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LOG OF EXPLORATION PIT NO. EP-7

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplfication of actual conditions encountered.
	DESCRIPTION
1	**Topsoil** Loose, dry to damp, brown, silty fine SAND, roots.
2	**Recessional Outwash**
3	Medium dense, damp to moist, light gray, silty fine SAND/fine sandy SILT, few gravel.
4	Very moist at 4'.
5	
6	
7	
8	
9	Medium dense, very moist, gray, fine to medium SAND.
10	
11	
12	Bottom of exploration pit at depth 11 feet No ground water/seepage. No caving.
13	
14	
15	
16	
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LOG OF EXPLORATION PIT NO. EP-8

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered

Depth (ft)	DESCRIPTION
	3" crushed/washed gravel on surface.
	Fill
1	Loose, moist, light brown-gray, brown, SILT/fine SAND, few gravel.
2	
3	Small boulder at 3'.
	Recessional Outwash
4	Medium dense, moist, light gray, silty fine SAND/fine sandy SILT.
5	
6	
7	
8	
9	
10	Medium dense, moist, gray, SAND.
11	Medium dense, very moist, light gray, silty fine SAND/fine sandy SILT.
12	
13	Bottom of exploration pit at depth 12 feet No ground water/seepage. No caving.
14	
15	
16	
17	
18	
19	
20	

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LOG OF EXPLORATION PIT NO. EP-9

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
	Gravel on surface.
	Topsoil
1	Loose, dry to damp, brown, silty fine SAND, roots.
	Recessional Outwash
2	
3	Loose to 18" becoming medium dense below, damp to moist, light brown to light gray, silty fine SAND/fine sandy SILT, orange oxidation.
4	
5	Medium dense, moist to wet, light gray, fine SAND with silt, orange oxidation.
6	
7	
8	
9	
10	
11	Bottom of exploration pit at depth 10 feet No ground water/seepage. No caving
12	
13	
14	
15	
16	
17	
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19	
20	

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LOG OF EXPLORATION PIT NO. EP-10

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
	4" gravel on surface.
	Fill
1	Loose, dry to damp, red-brown, silty fine to medium SAND.
	Medium dense, damp, dark brown, gravelly SAND.
2	Medium dense, moist, red-brown, fine to medium SAND with silt and wood fragments.
	Recessional Outwash
3	Medium dense, damp to moist, light brown to light gray, silty fine SAND/fine sandy SILT, orange oxidation.
4	
5	
6	Medium dense, moist, gray, gravelly SAND.
7	Medium dense, moist, light gray, silty fine SAND, orange oxidation staining.
8	
9	
10	Bottom of exploration pit at depth 9 feet No ground water/seepage. No caving.
11	
12	
13	
14	
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17	
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20	

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LOG OF EXPLORATION PIT NO. EP-11

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered **DESCRIPTION**
	4" crushed/washed, 1" minus on surface.
	Fill
1	Loose, dry to damp, brown, silty fine SAND.
	Medium dense below 12", damp to moist, light gray, fine SAND.
2	
	Recessional Outwash
3	Few gravel at 2 1/2'.
4	Medium dense, damp to moist, light gray, fine sandy SILT, orange oxidation.
5	
6	
7	
8	
9	Bottom of exploration pit at depth 8 feet No ground water/seepage. No caving.
10	
11	
12	
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LOG OF EXPLORATION PIT NO. EP-12

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION
	Gravel on surface.
	Recessional Outwash
1	Loose, dry to damp, light brown, silty fine SAND, roots.
2	Medium dense, moist, light gray, fine SAND with silt.
3	Medium dense, moist, dark gray, gravelly SAND.
4	
5	
6	
7	Medium dense, moist, light gray, fine SAND with silt, orange oxidation.
8	
9	
10	
11	Bottom of exploration pit at depth 10 feet No ground water/seepage. No caving.
12	
13	
14	
15	
16	
17	
18	
19	
20	

KCTP3 05522A.GPJ November 29, 2005

Central Kitchen Project
Puyallup, WA

Logged by: MT
Approved by:

Associated Earth Sciences, Inc.

Project No. KE05522A
8/15/05

LOG OF EXPLORATION PIT NO. EP-13

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION**
1	**Topsoil** Loose, dry to damp, brown, silty fine SAND, roots.
2	**Recessional Outwash** Loose to 18" becoming medium dense below, damp to moist, light brown to light gray, silty fine SAND/fine sandy SILT.
3	Medium dense, moist, gray, coarse SAND, trace gravel.
4	Medium dense, moist, light gray, SILT, orange oxidation.
5	
6	
7	
8	
9	
10	
11	Bottom of exploration pit at depth 10 feet No ground water/seepage. No caving.
12	
13	
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15	
16	
17	
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19	
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Puyallup, WA

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LOG OF EXPLORATION PIT NO. EP-14

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplfication of actual conditions encountered. **DESCRIPTION**
1	Loose, dry, brown, silty fine SAND, fine to medium gravel.
2	Medium dense, moist, dark gray, medium to coarse SAND.
3	Medium dense, moist, gray, silty fine SAND to medium dense, moist to very moist, dark gray, medium to coarse SAND, orange oxidation mottling.
4	
5	
6	Medium dense, moist, gray, fine SAND, medium to coarse sand interbeds (1/2").
7	
8	
9	
10	
11	Bottom of exploration pit at depth 10 feet No ground water/seepage. Caving 2' to 6'
12	
13	
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LOG OF EXPLORATION PIT NO. EP-15

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered. **DESCRIPTION**
1	**Topsoil** Loose, dry to damp, brown, silty fine SAND, roots. **Recessional Outwash**
2	
3	Loose to 18" becoming medium dense below, damp to moist, light brown to light gray, silty fine SAND/fine sandy SILT, orange oxidation, small boulder at 3', trace gravel.
4	
5	
6	
7	
8	
9	
10	
11	Bottom of exploration pit at depth 10 feet No ground water/seepage. No caving.
12	
13	
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LOG OF EXPLORATION PIT NO. EP-16

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.

Depth (ft)	DESCRIPTION
1	**Topsoil/Fill** Loose, dry to damp, brown, silty fine SAND, roots.
2	**Recessional Outwash** Medium dense, damp to moist, light brown to light gray, silty fine SAND/fine sandy SILT.
3	
4	Medium dense, moist, gray, medium to coarse SAND, trace gravel.
5	Medium dense, moist, light gray, SILT/fine SAND, orange oxidation.
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	Bottom of exploration pit at depth 18 feet No ground water/seepage. No caving.
20	

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