Vector ENGINEERING INC
2724 BLACK LAKE BLVD, ST 202 • TUMWATER WA 98512 • TEL: 360 352-2477 • FAX: 360 352-0179
www.vectorengineeringinc.com

05.24.2023

PRELIMINARY STORMWATER DRAINAGE REPORT

For

GENESEE ENERGY
PROPANE BULK PLANT

Offsite improvements exceed 2,000 square feet and will need to be mitigated per the 2019 Manual using separate off site BMPs and facilities. [Storm Report page 1]

Site Location:
412 23rd Street SE
Puyallup, WA 98372

SECTION 1- PROPOSED PROJECT OVERVIEW:

The project consists of a commercial / light industrial bulk propane storage and distribution plant on a currently vacant 1.13 acre lot within the City of Puyallup. The site location is 412 23rd Street SE which is at the end of a dead-end local street that butts up to the BNSF Railroad Right of Way and is bordered by private businesses to the north, east and west and BNSF Railroad to the south. The project development includes new site surfacing improvements, the installation of a 30,000 gallon propane distribution tank at the south end of the site, stormwater site utility installation and utility stub-outs (water, sewer, power, telecom) for a planned future building, as well as 23rd Street half-street frontage improvements.

Project Boundaries & Zoning

Parcel No: 2105200303 Area: 49,311 s.f. (1.13 Ac)

Legal Description: Lot 2, Short Plat No. 201807035004, records of Pierce County; Situate in the County of Pierce, State of Washington.

Zoning: ML – Limited Manufacturing

Site Areas

The Existing and Proposed project development areas are as follows:

Existing Site		Proposed Site	
Asphalt Paving Hardscape:	0.00 Ac / 237 SF	Asphalt Paving & Sidewalk:	0.45 Ac / 19,715 SF
Gravel Surface Hardscape:	1.10 Ac / 47,841 SF	Gravel Surface Hardscape:	0.38 Ac / 16,620 SF
Roofs:	0.00 Ac / 0 SF	Propane Tank Pad (Concrete):	0.02 Ac / 750 SF
		Roofs:	0.09 Ac / 4,000 SF
Misc Pervious:	0.03 Ac / 1,233 SF	Lawn / Landscape:	0.19 Ac / 8,226 SF
ROW Asphalt Paving:	0.10 Ac / 4,350 SF	ROW Asphalt Paving:	0.17 Ac / 7,485 SF
ROW Gravel Surfacing:	0.15 Ac / 6,636 SF	ROW Conc. Curb & Sidewalk:	0.04 Ac / 1,691 SF
		ROW Conc. Driveways:	0.01 Ac / 562 SF
ROW Pervious:	0.00 Ac / 0 SF	ROW Landscape:	0.03 Ac / 1,248 SF

Stormwater Management Plan Summary

A review of site vicinity shows Deer Creek drainage to the west of the site and generally flowing northwest to the Puyallup River, which flows east to west (see vicinity map below). A review of the project site topographical survey data did not identify a discernable stormwater drainage path. Further, there is currently no right of way stormwater drainage improvements along 23rd Street that the site could connect to. Therefore, it is assumed that the existing stormwater flow routing for the site is mainly surface flow to the south and/or southwest to the rail-side ditch, making its way to the Deer Creek drainage basin.

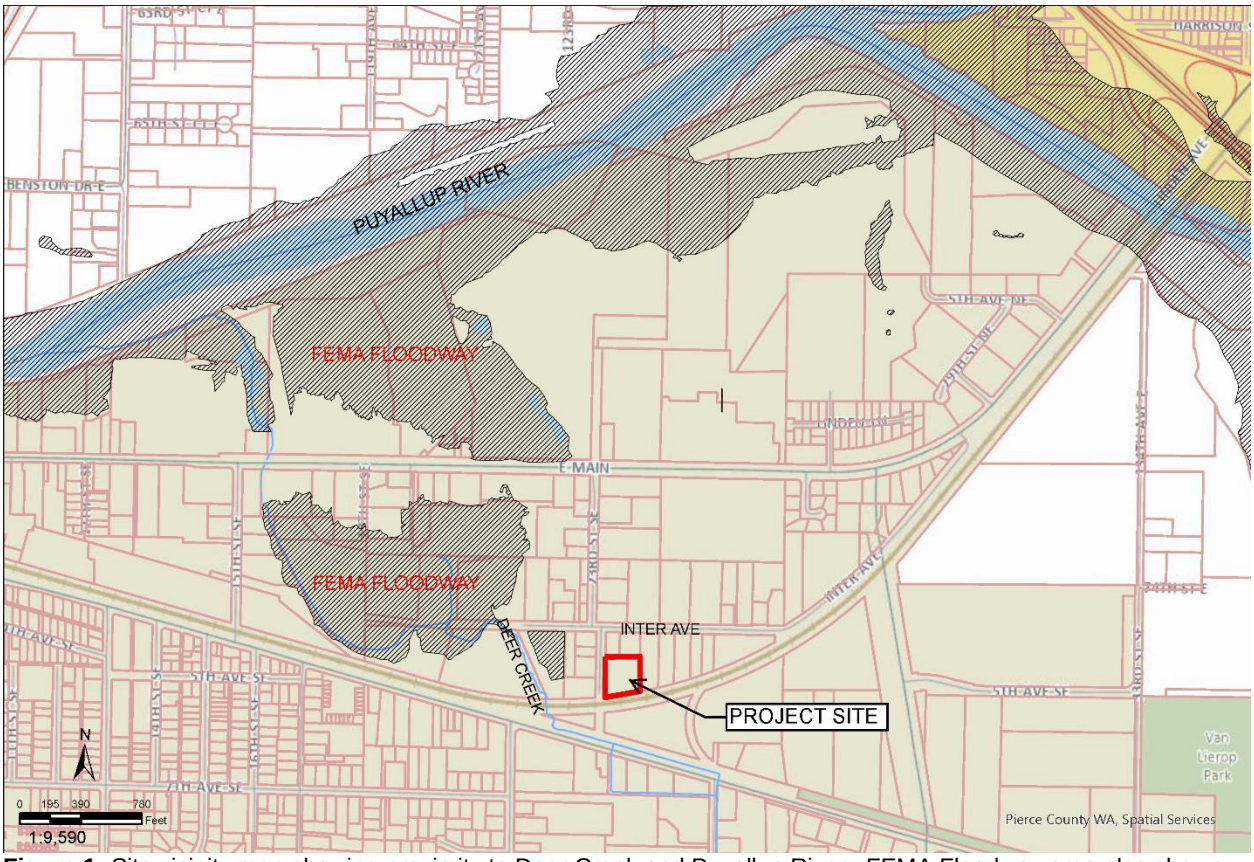


Figure 1: Site vicinity map showing proximity to Deer Creek and Puyallup River. FEMA Floodway area also shown.

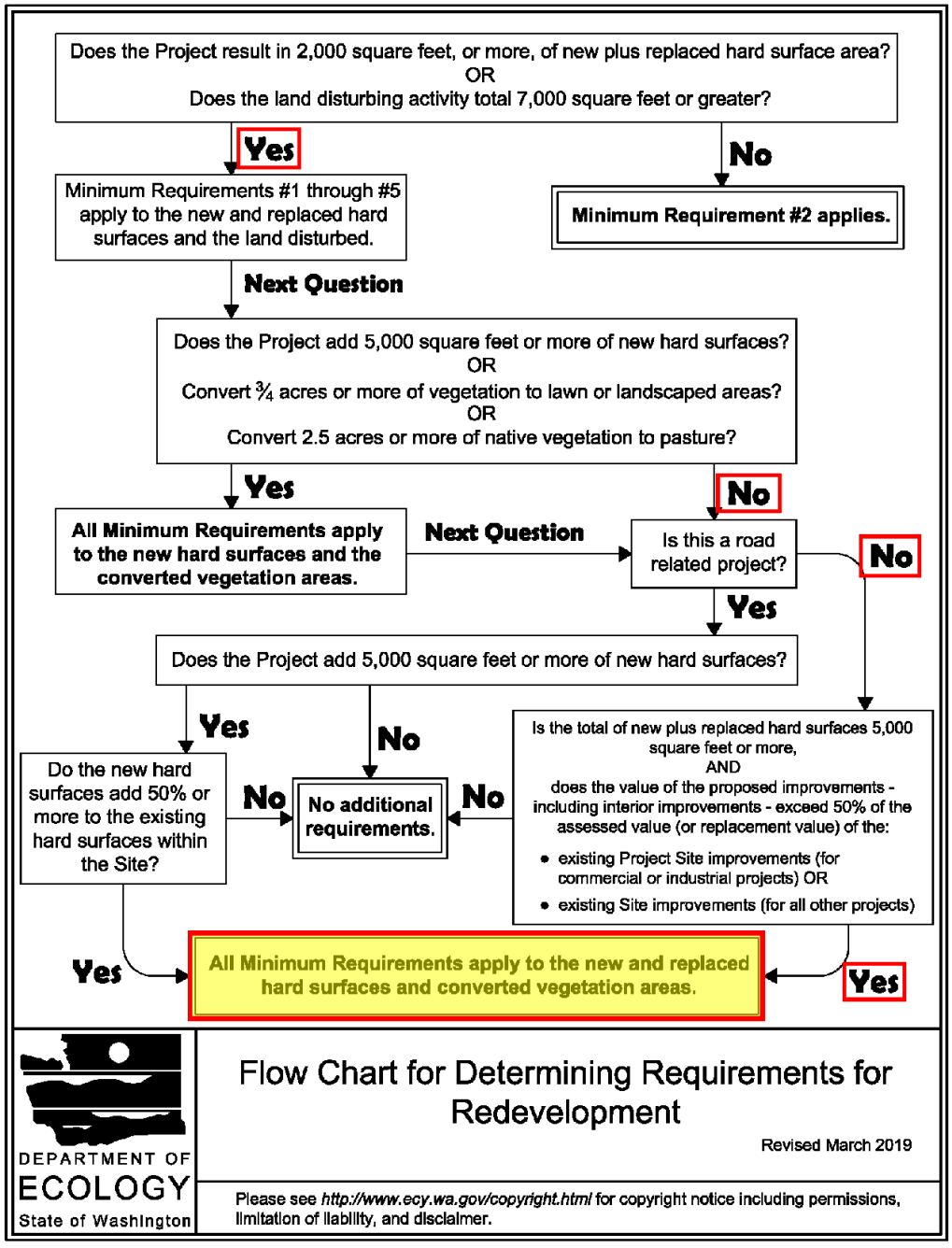
The existing soils are listed by the NRCS Soil Survey as Briscot Loam. A geotechnical investigation was conducted which confirmed interbedded silts and sands underlain by more coarsely grained silty sand. A winter water study found a seasonally fluctuating water table from 6-7 feet bgs (below ground surface) in the summer that moves up to 0 feet bgs in the winter.

Based on the extremely high water table, a small-scale Pilot Infiltration Test (PIT) was conducted and it was determined that infiltration of stormwater is not feasible at this site. Based on these results, the site stormwater runoff is designed to be contained in underground holding tanks for detention, prior to release. Stormwater treatment is preliminarily designed using a Manufactured Treatment Devise (per SWMMWW, V-10);

SECTION 2- MINIMUM REQUIREMENTS:

The City of Puyallup has adopted the most current version of the WA State Dept. of Ecology Stormwater Management Manual for Western WA (version 2019) including all minimum requirements, supplemental guidelines and optional guidance. Based on Section I-3.3 from the Manual, this project is considered redevelopment requiring all Minimum Requirements.

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



Minimum Requirement #1 – Stormwater Site Planning:

- A geotechnical site investigation has been conducted and a report prepared by Earth Solutions NW, LLC.
- A follow-up Infiltration Evaluation and Winter Groundwater Level Study has been conducted and a report prepared by Earth Solutions NW, LLC.
- Infiltration has been determined to be infeasible and therefore, the stormwater design is based on collection, treatment, detention in underground vaults and controlled release to the City stormwater system.
- City stormwater releases to Deer Creek and then the Puyallup River. Deer Creek is listed as a Category 4A waterbody for Parameter; Bacteria (fecal coliform). Deer Creek is included as part of the Puyallup River Watershed Bacteria TMDL approved by EPA 9/20/2011.
- A Construction Stormwater Pollution Prevention Plan will be provided during future project phases for inclusion in the Final Stormwater Management Plan submittal.

Minimum Requirement #2 – Construction Stormwater Pollution Prevention Plan (C-SWPPP):

A Construction Stormwater Pollution Prevention Plan will be provided at a later project phase once the final layout and complete construction conditions have been determined.

Minimum Requirement #3 – Source Control of Pollution:

Source control BMPs prevent contaminants from entering stormwater runoff by controlling them at the source. The project connects to the City utility systems including the City storm sewer system, following on-site treatment and detention. This project type does not fall under a specific permit type for source control, but general measures for commercial development sites apply.

The City stormwater utility system in the vicinity of the project discharges to Deer Creek at a point northwest of the site on Inter Avenue. Deer Creek is part of the Puyallup River Watershed TMDL for control of Bacteria, specifically Fecal Coliform. The project design includes on-site treatment and detention of the site stormwater as well as proper connection of sanitary sewer to the City sewer main system, therefore the project will not impact the discharge waterway.

General Source Control BMPs applicable to the site will be attached in **Appendix F** of this report for inclusion in the overall stormwater management plan as the Permanent Pollution Source Control Program for the project, as well as for owner reference and use.

Minimum Requirement #4 – Preservation of Natural Drainage Systems/Outfalls:

The project plans to connect to the City storm sewer system. Additionally, the site stormwater will be treated and detained on-site prior to being released at pre-development rates, so therefore the outfall will not be affected and the natural drainage system/outfall is preserved.

Minimum Requirement #5 – On-Site Stormwater Management:

The existing site conditions include a previously developed vacant parking lot with mostly gravel surfacing. The site is located within a light manufacturing zoning with surrounding commercial and light industrial uses surrounding and a railroad right of way to the south. Very little vegetation currently exists at the perimeter of the site as well as in the immediate vicinity. Further, exploratory test pits on the site provided evidence of an extremely high seasonal water

table that was confirmed by a follow-up winter water study that identified a seasonal high water table at 0 ft below the existing ground surface.

List Approach Compliance Method: From Table I-3.2, List #2 (for MR #1-9 projects that are not flow control exempt) is to be used for this project. The BMPs for each surface type are evaluated for implementation as follows:

Lawn & Landscape Areas:

1. BMP T5.13: Post-Construction Soil Quality and Depth
   This BMP shall be applied for all proposed landscape areas and planter areas.

Roofs:

1. BMP T5.30: Full Dispersion or BMP T5.10A: Downspout Full Infiltration
   BMP T5.30 allows for "fully dispersing" runoff from impervious surfaces and cleared areas of the Project Site into areas preserved as forest, native vegetation, or cleared area. However, there are no areas of forest, native vegetation, or cleared vegetation area on or adjacent to the site, nor is there room to construct one. Further, there isn't sufficient separation from the water table. Therefore, this BMP has been determined to be infeasible for this project.

   BMP T5.10 requires 3 feet or more of permeable soil from the proposed final grade to the seasonal high ground water table or at least 1 foot of clearance from the expected bottom elevation of the infiltration trench or dry well to the seasonal high ground water table. Due to the extremely high seasonal water table, this is not feasible and therefore, this BMP has been determined to be infeasible for this project.
2. BMP T7.30: Bioretention
   This BMP has been determined to be infeasible as a minimum vertical separation of 1 foot to the seasonal high water table cannot be obtained and the potential bioretention sites have a measured native soil hydraulic conductivity less than 0.30 inches per hour.
3. BMP T5.10B: Downspout Dispersion Systems
   The vegetated flow path lengths for this BMP cannot be obtained. Therefore, this BMP has been determined to be infeasible for this project.
4. BMP T5.10C: Perforated Stub-out Connections
   Infiltration of any size is not feasible for this site, therefore this BMP is not feasible for this project.

Other Hard Surfaces:

1. BMP T5.30: Full Dispersion or BMP T5.10A: Downspout Full Infiltration
   BMP T5.30 allows for "fully dispersing" runoff from impervious surfaces and cleared areas of the Project Site into areas preserved as forest, native vegetation, or cleared area. However, there are no areas of forest, native vegetation, or cleared vegetation area on or adjacent to the site, nor is there room to construct one. Further, there isn't sufficient separation from the water table. Therefore, this BMP has been determined to be infeasible for this project.

   BMP T5.10 requires 3 feet or more of permeable soil from the proposed final grade to the seasonal high ground water table or at least 1 foot of clearance from the expected bottom elevation of the infiltration trench or dry well to the seasonal high ground water table. Due to the extremely high seasonal water table, this is not feasible and therefore, this BMP has been determined to be infeasible for this project.
2. BMP T5.15: Permeable Pavements

Seasonal high ground water would create saturated conditions within one foot of the bottom of the permeable pavement BMP. Therefore, this BMP has been determined to be infeasible for this project.

3. BMP T7.30: Bioretention
   This BMP has been determined to be infeasible as a minimum vertical separation of 1 foot to the seasonal high water table cannot be obtained and the potential bioretention sites have a measured native soil hydraulic conductivity less than 0.30 inches per hour.
4. BMP T5.12: Sheet Flow Dispersion or BMP T5.11: Concentrated Flow Dispersion
   The vegetated flow path lengths for these BMPs cannot be obtained. Therefore, these BMPs have been determined to be infeasible for this project.

Based on the existing site conditions including the level of previous development on the site and in the immediate vicinity, as well as the extremely high water table, BMPs from List #2 have been determined to be infeasible for this project. Therefore, a manufactured treatment product and more traditional detention method will need to be implemented for the project.

Minimum Requirement #6 - Runoff Treatment:

This project proposes to construct more than 5,000 SF of pollution-generating hard surfaces (PGHS). Therefore, MR#6 – Runoff Treatment is required for this project.

Determining Runoff Treatment requirements:

- Based on the offsite analysis, the Watershed Plan for the Deer Creek & Puyallup River receiving waters pollutant of concern is Bacteria – Fecal Coliform.
- An oil control BMP is not required as the ADT is less than 400 trips per day, parking of heavy equipment/trucks is less than 25 and there's no storage or transfer of petroleum products in excess of 1,500 gallons per year.
- Runoff Treatment by Infiltration is not feasible due to the high seasonal water table
- Phosphorus is not identified as a pollutant of concern within the watershed. Therefore phosphorus treatment is not required.
- The site area designated for storage of products (i.e. possible erodible or leachable material, wastes or chemicals) is less than the runoff area associated with parking and/or light vehicle traffic areas and roofs and therefore, the area subject to the Enhanced Treatment Performance Goal comprises less than 50% of the total runoff from the TDA. Additionally, the site discharges to the city municipal storm sewer system which discharges through tributary to the Puyallup River south of the Carbon River only requiring basic treatment.

Based on the treatment selection evaluation, the stormwater treatment system shall include BMPs that meet the Basic Treatment Performance Goal. Due to site and high water table constraints, conventional BMPs are not feasible and a manufactured treatment device will be implemented. Preliminary design has incorporated a Contech Engineered Solutions Jellyfish® Filter, which has a DOE General Use Level Designation (GULD) for Basic (TSS) and Phosphorus Treatment.

All disturbed areas that will be lawn or landscape areas will have minimum soil quality and depth re-established (BMP T5.13) to provide improved on-site management of stormwater flow and water quality of the pervious surfaces.

Minimum Requirement #7 - Flow Control:

Flow control for the site is planned to be accomplished through implementation of underground detention tanks (BMP D.2) with an outlet control structure prior to discharge to the city municipal storm sewer system. WWHM was used to determine the size of the detention facility required.

All disturbed areas that will be lawn or landscape areas will have minimum soil quality and depth re-established (BMP T5.13) to provide improved on-site management of stormwater flow and water quality of the pervious surfaces.

All flow control calculations can be found in **Appendix C**.

During Civil permit, provide design and calculations that enables the tank design to overcome buoyancy forces from high groundwater. [Storm Report page 7]

Minimum Requirement #8 - Wetlands Protection:

The proposed project will discharge to the city municipal storm sewer system which discharges to Deer Creek at the west end of Inter Avenue. City maps indicate potential of a depressional wetland area associated with the Deer Creek riparian corridor. This project will comply with all minimum requirements that provide general protection of wetlands, protection from pollutants and hydroperiod protection based on providing construction BMPs, Source Control BMPs, Runoff Treatment BMPS, and Flow Control BMPs that maintain pre-development level discharge rates. Therefore, there will be no adverse impacts to any offsite wetlands.

Minimum Requirement #9 – Operation and Maintenance:

An Operations & Maintenance Plan will be developed as part of the final project design and incorporated into the final stormwater plan. Additionally, a project-specific agreement to maintain the stormwater facilities (City of Puyallup standard form) has also been included for reference and/or future use.

Additional Protective Measure #1 – Financial Guarantee:

In accordance with City of Puyallup Municipal Code Title 21.10.160, the project proponent/owner shall provide a performance bond (financial warranty) for not less than 125 percent of the total estimated construction cost, as reviewed and approved by the city, to implement the approved storm water site plan.

In accordance with City of Puyallup Municipal Code Title 21.10.165, the project proponent/owner shall provide a 12-month maintenance bond for any public storm water facilities required for the project. The amount of this security shall be not less than 10 percent of the total estimated construction cost, as reviewed and approved by the city, to fully implement the approved stormwater site plan.

In accordance with City of Puyallup Municipal Code Title 21.10.170, the contractor performing work within the street right-of-way, public easement or other city property shall have a valid permit covering the work, shall be licensed and bonded in Washington State and the City during the course of the work. The contractor shall maintain insurance with the limits of liability and coverage as specified within the Title Section.

Additional Protective Measure #2 – Offsite Analysis and Mitigation:

Qualitative Analysis

Site Discharge Basin

The project is located within the Puyallup River basin, within Water Resource Inventory Area (WRIA) 10. The basin drains an area of approx. 1,065 square miles. The Puyallup River is the major river of the basin.

Downstream Discharge

A review of site vicinity shows Deer Creek drainage to the west of the site and generally flowing northwest to the Puyallup River, which flows east to west (see vicinity map below). A review of the project site topographical survey data did not identify a discernable stormwater drainage path. Further, there is currently no right of way stormwater drainage improvements along 23rd Street that the site could connect to. Therefore, it is assumed that the existing stormwater flow routing for the site is mainly surface flow to the south and/or southwest to the rail-side ditch, making its way to the Deer Creek drainage basin.

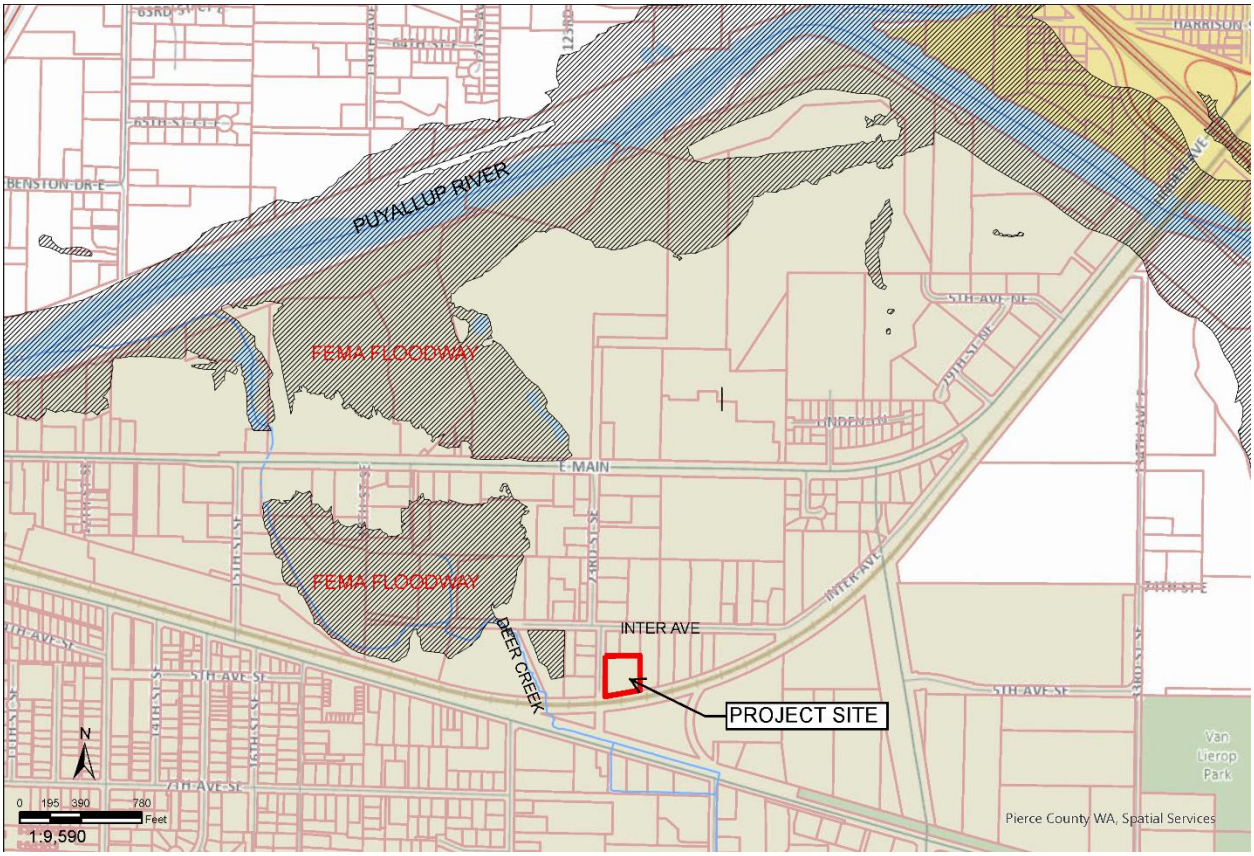


Figure 1: Site vicinity map showing proximity to Deer Creek and Puyallup River. FEMA Floodway area also shown.

The existing soils are listed by the NRCS Soil Survey as Briscot Loam. A geotechnical investigation was conducted which confirmed interbedded silts and sands underlain by more coarsely grained silty sand. A winter water study found a seasonally fluctuating water table from 6-7 feet bgs (below ground surface) in the summer that moves up to 0 feet bgs in the winter.

Based on the extremely high water table, a small-scale Pilot Infiltration Test (PIT) was conducted (See **Appendix E**) and it was determined that infiltration of stormwater is not feasible at this site. Based on these results, the site stormwater runoff will need to be designed to be contained in underground holding tanks for detention, prior to release. Stormwater treatment is preliminarily designed using a Manufactured Treatment Device (per SWMMWW, Section V-10).

SECTION 3 - CERTIFICATION:

"I hereby state that this Drainage and Erosion Control Plan/Construction SWPPP for the Genesee Bulk Propane Plant project has been prepared by me, or under my supervision, and meets the requirements of the Department of Ecology 2019 Stormwater Management Manual for Western Washington (2019 SWMMWW) and the standard of care and expertise which is usual and customary in this community for professional engineers. I understand that the City of Puyallup does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me."

Signature

05/24/2023
Date

Kyle Freeman, P.E.
Vector Engineering, Inc.
2724 Black Lake Blvd, Ste 202
Tumwater, WA 98512
(360) 352-2477

Seal:

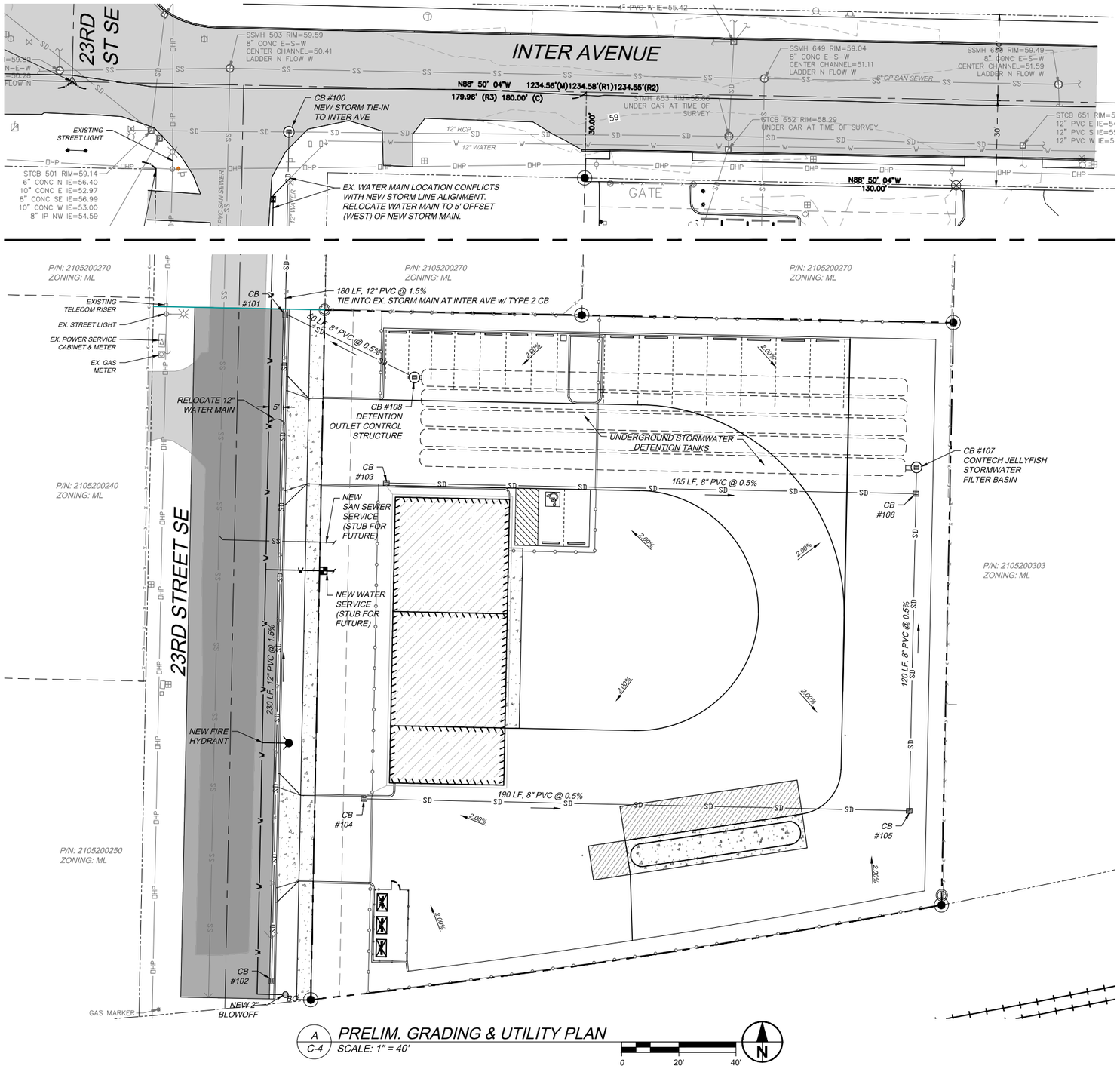
05/24/23

List of Appendices:

- **A. Stormwater Management Plans**
- **B. Construction Stormwater Pollution Prevention Plan (CSWPPP)**
- **C. Resource Maps**
- **D. Calculations**
- **E. Geotechnical Reports**
- **F. O & M Manuals**
  - **a. O & M Maintenance Plan**
  - **b. Project-Specific Agreement to Maintain Facilities**

Appendix A

Stormwater Management Plans



CATCH BASIN SCHEDULE

CB ID	RIM	STRUCTURE	IE
100	59.00	TYPE 2 CB	53.20 10" E (REPL.) 53.10 12" W (REPL.) 54.61 12" S
101	60.5	TYPE 1 CB W/ RECTANGULAR HERRINGBONE GRATE	55.39 12" N 55.49 12" S 55.49 8" E
103	61.34	TYPE 1 CB W/ RECTANGULAR HERRINGBONE GRATE	57.34 12" N
104	62.00	TYPE 1 CB W/ RECTANGULAR HERRINGBONE GRATE	60.33 8" E
105	61.09	TYPE 1 CB W/ RECTANGULAR HERRINGBONE GRATE	59.59 8" E
106	62.65	TYPE 1 CB W/ RECTANGULAR HERRINGBONE GRATE	58.45 8" W 57.93 8" S 57.93 8" N
107	60.5	TYPE 1 CB W/ RECTANGULAR HERRINGBONE GRATE	58.48 8" W 58.48 8" N
108	62.66	TYPE 1 CB W/ RECTANGULAR HERRINGBONE GRATE	57.89 8" S 57.89 8" W
109	63.16	TYPE 2 CB W/ FLOW RESTRICTOR	55.76 8" W 55.86 8" E

LEGEND

LINES

EXIST	PROP	
		EDGE PAVING
x x x		FENCE
***	***	CONTOUR
		PROPERTY LINE
W	W	WATER
SS	SS	SANITARY SEWER
SD	SD	STORM DRAIN
OHP	OHP	OVERHEAD PWR

SYMBOLS

EXIST	PROP	
		CATCH BASIN

STORMWATER GENERAL NOTES

1. ALL WORK IN CITY RIGHT-OF-WAY REQUIRES A PERMIT FROM THE CITY OF PUYALLUP. PRIOR TO ANY WORK COMMENCING, THE GENERAL CONTRACTOR SHALL ARRANGE FOR A PRECONSTRUCTION MEETING AT THE DEVELOPMENT SERVICES CENTER TO BE ATTENDED BY ALL CONTRACTORS THAT WILL PERFORM WORK SHOWN ON THE ENGINEERING PLANS, REPRESENTATIVES FROM ALL APPLICABLE UTILITY COMPANIES, THE PROJECT OWNER AND APPROPRIATE CITY STAFF. CONTACT ENGINEERING SERVICES TO SCHEDULE THE MEETING (253) 841-5568. THE CONTRACTOR IS RESPONSIBLE TO HAVE THEIR OWN APPROVED SET OF PLANS AT THE MEETING.
2. AFTER COMPLETION OF ALL ITEMS SHOWN ON THESE PLANS AND BEFORE ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL OBTAIN A "PUNCH LIST" PREPARED BY THE CITY'S INSPECTOR DETAILING REMAINING ITEMS OF WORK TO BE COMPLETED. ALL ITEMS OF WORK SHOWN ON THESE PLANS SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY PRIOR TO ACCEPTANCE OF THE WATER SYSTEM AND PROVISION OF SANITARY SEWER SERVICE.
3. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION (HEREINAFTER REFERRED TO AS THE "STANDARD SPECIFICATIONS"), WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND AMERICAN PUBLIC WORKS ASSOCIATION, WASHINGTON STATE CHAPTER, LATEST EDITION, UNLESS SUPERSEDED OR AMENDED BY THE CITY OF PUYALLUP CITY STANDARDS FOR PUBLIC WORKS ENGINEERING AND CONSTRUCTION (HEREINAFTER REFERRED TO AS THE "CITY STANDARDS").
4. A COPY OF THESE APPROVED PLANS AND APPLICABLE CITY DEVELOPER SPECIFICATIONS AND DETAILS SHALL BE ON SITE DURING CONSTRUCTION.
5. ANY REVISIONS MADE TO THESE PLANS MUST BE REVIEWED AND APPROVED BY THE DEVELOPER'S ENGINEER AND THE ENGINEERING SERVICES STAFF PRIOR TO ANY IMPLEMENTATION IN THE FIELD. THE CITY SHALL NOT BE RESPONSIBLE FOR ANY ERRORS AND/OR OMISSIONS ON THESE PLANS.
6. THE CONTRACTOR SHALL HAVE ALL UTILITIES VERIFIED ON THE GROUND PRIOR TO ANY CONSTRUCTION. CALL(811) AT LEAST TWO WORKING DAYS IN ADVANCE. THE OWNER AND HIS/HER ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.
7. ANY STRUCTURE AND/OR OBSTRUCTION WHICH REQUIRE REMOVAL OR RELOCATION RELATING TO THIS PROJECT, SHALL BE DONE SO AT THE DEVELOPER'S EXPENSE.
8. DURING CONSTRUCTION, ALL EXISTING AND NEWLY INSTALLED DRAINAGE STRUCTURES SHALL BE PROTECTED FROM SEDIMENTS.
9. ALL STORM MANHOLES SHALL CONFORM TO CITY STANDARD DETAIL NO. 02.01.01. FLOW CONTROL MANHOLE/OIL WATER SEPARATOR SHALL CONFORM TO CITY STANDARD DETAIL NO. 02.01.06 AND 02.01.07.
10. MANHOLE RING AND COVER SHALL CONFORM TO CITY STANDARD DETAIL 06.01.02.
11. CATCH BASINS TYPE I SHALL CONFORM TO CITY STANDARD DETAIL NO.02.01.02 AND 02.01.03 AND SHALL BE USED ONLY FOR DEPTHS LESS THAN 5 FEET FROM TOP OF THE GRATE TO THE INVERT OF THE STORM PIPE.
12. CATCH BASINS TYPE II SHALL CONFORM TO CITY STANDARD DETAIL NO.02.01.04 AND SHALL BE USED FOR DEPTHS GREATER THAN 5 FEET FROM TOP OF THE GRATE TO THE INVERT OF THE STORM PIPE.
13. CAST IRON OR DUCTILE IRON FRAME AND GRATE SHALL CONFORM TO CITY STANDARD DETAIL NO.02.01.05. GRATE SHALL BE MARKED WITH "DRAINS TO STREAM". SOLID CATCH BASIN LIDS (SQUARE UNLESS NOTED AS ROUND) SHALL CONFORM TO WSDOT STANDARD PLAN B-30.20-04 (OLYMPIC FOUNDRY NO. SM60 OR EQUAL). VANED GRATES SHALL CONFORM TO WSDOT STANDARD PLAN B-30.30-03 (OLYMPIC FOUNDRY NO. SM60V OR EQUAL).
14. STORMWATER PIPE SHALL BE ONLY PVC, CONCRETE, DUCTILE IRON, OR DUAL WALLED POLYPROPYLENE PIPE.

a. THE USE OF ANY OTHER TYPE SHALL BE REVIEWED AND APPROVED BY THE ENGINEERING SERVICES STAFF PRIOR TO INSTALLATION.

b. PVC PIPE SHALL BE PER ASTM D3034, SDR 35 FOR PIPE SIZE 15-INCH AND SMALLER AND F679 FOR PIPE SIZES 18 TO 27 INCH. MINIMUM COVER ON PVC PIPE SHALL BE 3.0 FEET.

c. CONCRETE PIPE SHALL CONFORM TO THE WSDOT STANDARD SPECIFICATIONS FOR CONCRETE UNDERDRAIN PIPE. MINIMUM COVER ON CONCRETE PIPE SHALL NOT LESS THAN 3.0 FEET.

d. DUCTILE IRON PIPE SHALL BE CLASS 50, CONFORMING TO AWWA C151. MINIMUM COVER ON DUCTILE IRON PIPE SHALL BE 1.0 FOOT.

e. POLYPROPYLENE PIPE (PP) SHALL BE DUAL WALLED, HAVE A SMOOTH INTERIOR AND EXTERIOR CORRUGATIONS AND MEET WSDOT 9-05.24(1). 12-INCH THROUGH 30-INCH PIPE SHALL MEET OR EXCEED ASTM F2736 AND AASHTO M330, TYPE S, OR TYPE D. 36-INCH THROUGH 60-INCH PIPE SHALL MEET OR EXCEED ASTM F2881 AND AASHTO M330, TYPE S, OR TYPE D. TESTING SHALL BE PER ASTM F1417. MINIMUM COVER OVER POLYPROPYLENE PIPE SHALL BE 3-FEET.

15. TRENCHING, BEDDING, AND BACKFILL FOR PIPE SHALL CONFORM TO CITY STANDARD DETAIL NO. 06.01.01.
16. STORM PIPE SHALL BE A MINIMUM OF 10 FEET AWAY FROM BUILDING FOUNDATIONS AND/OR ROOF LINES.
17. ALL STORM DRAIN MAINS SHALL BE TESTED AND INSPECTED FOR ACCEPTANCE AS OUTLINED IN SECTION 406 OF THE CITY OF PUYALLUP SANITARY SEWER SYSTEM STANDARDS.
18. ALL TEMPORARY SEDIMENTATION AND EROSION CONTROL MEASURES, AND PROTECTIVE MEASURES FOR CRITICAL AREAS AND SIGNIFICANT TREES SHALL BE INSTALLED PRIOR TO INITIATING ANY CONSTRUCTION ACTIVITIES.

FILE: PLAN SET 5.11.23.dwg		5		
PROJECT: 21-GEN		4		
		3		
CHECKED BY: RLM		2		
DETAILED BY: KML		1		
DESIGNED BY: KML	DATE	NO.	REVISION	BY

FOR PRELIMINARY SITE PLAN APPROVAL

BRADLEY MOORE — STATE OF WASHINGTON — 42604 — REGISTERED PROFESSIONAL ENGINEER — 5/15/23

Vector ENGINEERING INC.
2724 Black Lake Boulevard SW Suite 202
Tumwater, WA 98512
ph: (360) 352-2477 fax: (360) 352-0179 E-mail: admin@vectorengineeringinc.com

GENESEE PROPANE BULK PLANT
412 23RD ST SE
PUYALLUP, WA 98372

GENESEE ENERGY
3616 S GENESEE ST
SEATTLE, WA 98118

C-4
PRELIMINARY GRADING & UTILITY PLAN
SHT 4 OF 7

X:\2021 Jobs\Genesee (Propane Bulk Plant)\Engineering\Drawing File\Preliminary Drawings\PLAN SET 5.11.23.dwg - May 24, 2023 - 2:32pm

Appendix B

Construction Stormwater Pollution Prevention Plan (CSWPPP)

Appendix C

Resource Maps

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Pierce County Area, Washington

January 12, 2022

Custom Soil Resource Report
Soil Map

Map Scale: 1:535 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 5 10 20 30

Feet: 0 25 50 100 150

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 17, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 18, 2020—Aug 2, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6A	Briscot loam	1.1	100.0%
Totals for Area of Interest		**1.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Pierce County Area, Washington

6A—Briscot loam

Map Unit Setting

National map unit symbol: 2hrc
Elevation: 20 to 250 feet
Mean annual precipitation: 30 to 55 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 160 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Briscot, drained, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Briscot, Drained

Setting

Landform: Flood plains
Parent material: Alluvium

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 38 inches: stratified fine sand to silt loam
H3 - 38 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 12 to 35 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Ecological site: F002XA007WA - Puget Lowlands Wet Forest
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Other vegetative classification: Seasonally Wet Soils (G002XN202WA)
Hydric soil rating: Yes

Minor Components

Briscot, undrained

Percent of map unit: 5 percent
Landform: Flood plains
Other vegetative classification: Seasonally Wet Soils (G002XN202WA)
Hydric soil rating: Yes

Main Listing Information

Listing ID: 45616
Waterbody Name: DEER CREEK
Medium: Water
Parameter: Bacteria - Fecal coliform
WQI Project: Puyallup River Bacteria TMDL
Designated Use: Recreation - Primary Contact

Year	Category
2018	4A
2012	4A
2010	4A
2008	5
2004	3
1998	N
1996	N

Assessment Unit

Assessment Unit ID: 17110014001364_001_001
Size: 5.082 Kilometers
Associated Components(s): Reach: 17110014001364 0% - 100%, Type: Rivers/Streams
County: Pierce
WRIA: Puyallup-White

Basis Table

Assessment Year
2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value	Criterion 2	Aggregate 2	Calculated Value 2
2007	14	23	200 #col/100ml	Highest daily average	2800	100 #col/100ml	Three-month geometric mean	1199

Basis Statement

Remarks

Item
Assessment Cycle 2018 - A historic Category 4A determination was carried forward from a previous assessment or administrative decision. See Historic Basis Statement for previous assessment information.
Impairment was determined by exceedance of the geometric mean criterion in water year(s) 2007, and the percent criterion in water year(s) 2007 and calendar year(s) 2006.
Part of the Puyallup River Watershed Bacteria TMDL approved by EPA 9/20/11.

Data Sources

Study Id	Location Id	Source Database
LSUL0001	10-DEE-2.0	EIM
LSUL0001	10-DEE-1.0	EIM
LSUL0001	10-DEE-0.1	EIM

Map Link

Map Link (https://apps.ecology.wa.gov/waterqualityatlas/wqa/map?lstid=45616)

Appendix D

Calculations

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	GENESEE POND
Site Name:	GENESEE
Site Address:	412 23RD ST SE
City:	PUYALLUP
Report Date:	2/1/2022
Gage:	38 IN CENTRAL
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	15 Minute
Precip Scale:	0.000 (adjusted)
Version Date:	2019/09/13
Version:	4.2.17

POC Thresholds

Low Flow Threshold for POC1:	0 Percent of the 2 Year
High Flow Threshold for POC1:	2 Year

Landuse Basin Data

Predeveloped Land Use

Basin 2

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	1.125
Pervious Total	1.125
Impervious Land Use	acre
Impervious Total	0
Basin Total	1.125

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	0.205
Pervious Total	0.205

Impervious Land Use	acre
ROADS FLAT	0.085
PARKING FLAT	0.835
Impervious Total	0.92
Basin Total	1.125

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

If Storage tanks are proposed, use the storage tank BMP element from WWHM. [WWHM]

Routing Elements
Predeveloped Routing

Mitigated Routing

Trapezoidal Pond 1

Bottom Length: 150.00 ft.
Bottom Width: 2.00 ft.
Depth: 4 ft.
Volume at riser head: 0.0879 acre-feet.
Infiltration On
Infiltration rate: 0.5
Infiltration safety factor: 1
Wetted surface area On
Total Volume Infiltrated (ac-ft.): 0
Total Volume Through Riser (ac-ft.): 0
Total Volume Through Facility (ac-ft.): 0
Percent Infiltrated: 0
Total Precip Applied to Facility: 0
Total Evap From Facility: 0
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 2 To 1
Side slope 4: 2 To 1
Discharge Structure
Riser Height: 3 ft.
Riser Diameter: 36 in.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

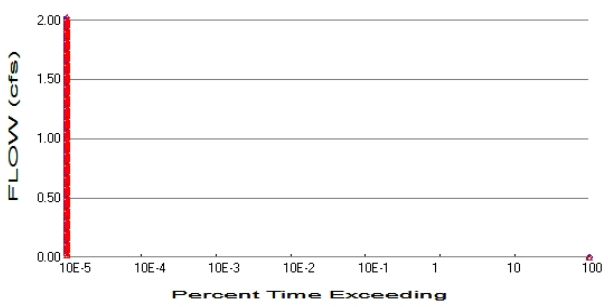
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.006	0.000	0.000	0.000
0.0444	0.007	0.000	0.000	0.003
0.0889	0.008	0.000	0.000	0.004
0.1333	0.008	0.001	0.000	0.004
0.1778	0.009	0.001	0.000	0.004
0.2222	0.010	0.001	0.000	0.005
0.2667	0.010	0.002	0.000	0.005
0.3111	0.011	0.002	0.000	0.005
0.3556	0.011	0.003	0.000	0.006
0.4000	0.012	0.003	0.000	0.006
0.4444	0.013	0.004	0.000	0.006
0.4889	0.013	0.005	0.000	0.007
0.5333	0.014	0.005	0.000	0.007
0.5778	0.015	0.006	0.000	0.007
0.6222	0.015	0.007	0.000	0.007
0.6667	0.016	0.007	0.000	0.008
0.7111	0.017	0.008	0.000	0.008
0.7556	0.017	0.009	0.000	0.008
0.8000	0.018	0.010	0.000	0.009
0.8444	0.018	0.010	0.000	0.009
0.8889	0.019	0.011	0.000	0.009
0.9333	0.020	0.012	0.000	0.010
0.9778	0.020	0.013	0.000	0.010
1.0222	0.021	0.014	0.000	0.010
1.0667	0.022	0.015	0.000	0.011
1.1111	0.022	0.016	0.000	0.011

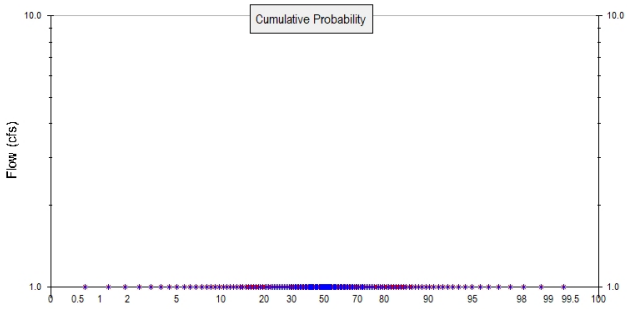
1.1556	0.023	0.017	0.000	0.011
1.2000	0.024	0.018	0.000	0.012
1.2444	0.024	0.019	0.000	0.012
1.2889	0.025	0.020	0.000	0.012
1.3333	0.026	0.021	0.000	0.013
1.3778	0.026	0.023	0.000	0.013
1.4222	0.027	0.024	0.000	0.013
1.4667	0.028	0.025	0.000	0.014
1.5111	0.028	0.026	0.000	0.014
1.5556	0.029	0.028	0.000	0.014
1.6000	0.030	0.029	0.000	0.015
1.6444	0.030	0.030	0.000	0.015
1.6889	0.031	0.032	0.000	0.015
1.7333	0.032	0.033	0.000	0.016
1.7778	0.032	0.035	0.000	0.016
1.8222	0.033	0.036	0.000	0.016
1.8667	0.034	0.038	0.000	0.017
1.9111	0.034	0.039	0.000	0.017
1.9556	0.035	0.041	0.000	0.017
2.0000	0.036	0.042	0.000	0.018
2.0444	0.037	0.044	0.000	0.018
2.0889	0.037	0.046	0.000	0.019
2.1333	0.038	0.047	0.000	0.019
2.1778	0.039	0.049	0.000	0.019
2.2222	0.039	0.051	0.000	0.020
2.2667	0.040	0.052	0.000	0.020
2.3111	0.041	0.054	0.000	0.020
2.3556	0.041	0.056	0.000	0.021
2.4000	0.042	0.058	0.000	0.021
2.4444	0.043	0.060	0.000	0.021
2.4889	0.043	0.062	0.000	0.022
2.5333	0.044	0.064	0.000	0.022
2.5778	0.045	0.066	0.000	0.022
2.6222	0.046	0.068	0.000	0.023
2.6667	0.046	0.070	0.000	0.023
2.7111	0.047	0.072	0.000	0.023
2.7556	0.048	0.074	0.000	0.024
2.8000	0.048	0.076	0.000	0.024
2.8444	0.049	0.078	0.000	0.025
2.8889	0.050	0.081	0.000	0.025
2.9333	0.051	0.083	0.000	0.025
2.9778	0.051	0.085	0.000	0.026
3.0222	0.052	0.087	0.105	0.026
3.0667	0.053	0.090	0.547	0.026
3.1111	0.053	0.092	1.178	0.027
3.1556	0.054	0.095	1.950	0.027
3.2000	0.055	0.097	2.840	0.027
3.2444	0.056	0.100	3.833	0.028
3.2889	0.056	0.102	4.915	0.028
3.3333	0.057	0.105	6.077	0.029
3.3778	0.058	0.107	7.307	0.029
3.4222	0.059	0.110	8.596	0.029
3.4667	0.059	0.112	9.934	0.030
3.5111	0.060	0.115	11.31	0.030
3.5556	0.061	0.118	12.72	0.030
3.6000	0.061	0.121	14.14	0.031
3.6444	0.062	0.123	15.58	0.031
3.6889	0.063	0.126	17.02	0.032

3.7333	0.064	0.129	18.45	0.032
3.7778	0.064	0.132	19.85	0.032
3.8222	0.065	0.135	21.23	0.033
3.8667	0.066	0.138	22.56	0.033
3.9111	0.067	0.141	23.85	0.033
3.9556	0.067	0.144	25.07	0.034
4.0000	0.068	0.147	26.24	0.034
4.0444	0.069	0.150	27.33	0.035

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.125
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.205
Total Impervious Area: 0.92

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1902	0.000	0.000
1903	0.000	0.000
1904	0.000	0.000
1905	0.000	0.000
1906	0.000	0.000
1907	0.000	0.000
1908	0.000	0.000
1909	0.000	0.000
1910	0.000	0.000
1911	0.000	0.000

1912	0.000	0.000
1913	0.000	0.000
1914	0.000	0.000
1915	0.000	0.000
1916	0.000	0.000
1917	0.000	0.000
1918	0.000	0.000
1919	0.000	0.000
1920	0.000	0.000
1921	0.000	0.000
1922	0.000	0.000
1923	0.000	0.000
1924	0.000	0.000
1925	0.000	0.000
1926	0.000	0.000
1927	0.000	0.000
1928	0.000	0.000
1929	0.000	0.000
1930	0.000	0.000
1931	0.000	0.000
1932	0.000	0.000
1933	0.000	0.000
1934	0.000	0.000
1935	0.000	0.000
1936	0.000	0.000
1937	0.000	0.000
1938	0.000	0.000
1939	0.000	0.000
1940	0.000	0.000
1941	0.000	0.000
1942	0.000	0.000
1943	0.000	0.000
1944	0.000	0.000
1945	0.000	0.000
1946	0.000	0.000
1947	0.000	0.000
1948	0.000	0.000
1949	0.000	0.000
1950	0.000	0.000
1951	0.000	0.000
1952	0.000	0.000
1953	0.000	0.000
1954	0.000	0.000
1955	0.000	0.000
1956	0.000	0.000
1957	0.000	0.000
1958	0.000	0.000
1959	0.000	0.000
1960	0.000	0.000
1961	0.000	0.000
1962	0.000	0.000
1963	0.000	0.000
1964	0.000	0.000
1965	0.000	0.000
1966	0.000	0.000
1967	0.000	0.000
1968	0.000	0.000
1969	0.000	0.000

1970	0.000	0.000
1971	0.000	0.000
1972	0.000	0.000
1973	0.000	0.000
1974	0.000	0.000
1975	0.000	0.000
1976	0.000	0.000
1977	0.000	0.000
1978	0.000	0.000
1979	0.000	0.000
1980	0.000	0.000
1981	0.000	0.000
1982	0.000	0.000
1983	0.000	0.000
1984	0.000	0.000
1985	0.000	0.000
1986	0.000	0.000
1987	0.000	0.000
1988	0.000	0.000
1989	0.000	0.000
1990	0.000	0.000
1991	0.000	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.000	0.000
1996	0.000	0.000
1997	0.000	0.000
1998	0.000	0.000
1999	0.000	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.000	0.000
2003	0.000	0.000
2004	0.000	0.000
2005	0.000	0.000
2006	0.000	0.000
2007	0.000	0.000
2008	0.000	0.000
2009	0.000	0.000
2010	0.000	0.000
2011	0.000	0.000
2012	0.000	0.000
2013	0.000	0.000
2014	0.000	0.000
2015	0.000	0.000
2016	0.000	0.000
2017	0.000	0.000
2018	0.000	0.000
2019	0.000	0.000
2020	0.000	0.000
2021	0.000	0.000
2022	0.000	0.000
2023	0.000	0.000
2024	0.000	0.000
2025	0.000	0.000
2026	0.000	0.000
2027	0.000	0.000

2028	0.000	0.000
2029	0.000	0.000
2030	0.000	0.000
2031	0.000	0.000
2032	0.000	0.000
2033	0.000	0.000
2034	0.000	0.000
2035	0.000	0.000
2036	0.000	0.000
2037	0.000	0.000
2038	0.000	0.000
2039	0.000	0.000
2040	0.000	0.000
2041	0.000	0.000
2042	0.000	0.000
2043	0.000	0.000
2044	0.000	0.000
2045	0.000	0.000
2046	0.000	0.000
2047	0.000	0.000
2048	0.000	0.000
2049	0.000	0.000
2050	0.000	0.000
2051	0.000	0.000
2052	0.000	0.000
2053	0.000	0.000
2054	0.000	0.000
2055	0.000	0.000
2056	0.000	0.000
2057	0.000	0.000
2058	0.000	0.000
2059	0.000	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0000	0.0000
2	0.0000	0.0000
3	0.0000	0.0000
4	0.0000	0.0000
5	0.0000	0.0000
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	0.0000	0.0000
11	0.0000	0.0000
12	0.0000	0.0000
13	0.0000	0.0000
14	0.0000	0.0000
15	0.0000	0.0000
16	0.0000	0.0000
17	0.0000	0.0000
18	0.0000	0.0000
19	0.0000	0.0000
20	0.0000	0.0000
21	0.0000	0.0000
22	0.0000	0.0000

23	0.0000	0.0000
24	0.0000	0.0000
25	0.0000	0.0000
26	0.0000	0.0000
27	0.0000	0.0000
28	0.0000	0.0000
29	0.0000	0.0000
30	0.0000	0.0000
31	0.0000	0.0000
32	0.0000	0.0000
33	0.0000	0.0000
34	0.0000	0.0000
35	0.0000	0.0000
36	0.0000	0.0000
37	0.0000	0.0000
38	0.0000	0.0000
39	0.0000	0.0000
40	0.0000	0.0000
41	0.0000	0.0000
42	0.0000	0.0000
43	0.0000	0.0000
44	0.0000	0.0000
45	0.0000	0.0000
46	0.0000	0.0000
47	0.0000	0.0000
48	0.0000	0.0000
49	0.0000	0.0000
50	0.0000	0.0000
51	0.0000	0.0000
52	0.0000	0.0000
53	0.0000	0.0000
54	0.0000	0.0000
55	0.0000	0.0000
56	0.0000	0.0000
57	0.0000	0.0000
58	0.0000	0.0000
59	0.0000	0.0000
60	0.0000	0.0000
61	0.0000	0.0000
62	0.0000	0.0000
63	0.0000	0.0000
64	0.0000	0.0000
65	0.0000	0.0000
66	0.0000	0.0000
67	0.0000	0.0000
68	0.0000	0.0000
69	0.0000	0.0000
70	0.0000	0.0000
71	0.0000	0.0000
72	0.0000	0.0000
73	0.0000	0.0000
74	0.0000	0.0000
75	0.0000	0.0000
76	0.0000	0.0000
77	0.0000	0.0000
78	0.0000	0.0000
79	0.0000	0.0000
80	0.0000	0.0000

81	0.0000	0.0000
82	0.0000	0.0000
83	0.0000	0.0000
84	0.0000	0.0000
85	0.0000	0.0000
86	0.0000	0.0000
87	0.0000	0.0000
88	0.0000	0.0000
89	0.0000	0.0000
90	0.0000	0.0000
91	0.0000	0.0000
92	0.0000	0.0000
93	0.0000	0.0000
94	0.0000	0.0000
95	0.0000	0.0000
96	0.0000	0.0000
97	0.0000	0.0000
98	0.0000	0.0000
99	0.0000	0.0000
100	0.0000	0.0000
101	0.0000	0.0000
102	0.0000	0.0000
103	0.0000	0.0000
104	0.0000	0.0000
105	0.0000	0.0000
106	0.0000	0.0000
107	0.0000	0.0000
108	0.0000	0.0000
109	0.0000	0.0000
110	0.0000	0.0000
111	0.0000	0.0000
112	0.0000	0.0000
113	0.0000	0.0000
114	0.0000	0.0000
115	0.0000	0.0000
116	0.0000	0.0000
117	0.0000	0.0000
118	0.0000	0.0000
119	0.0000	0.0000
120	0.0000	0.0000
121	0.0000	0.0000
122	0.0000	0.0000
123	0.0000	0.0000
124	0.0000	0.0000
125	0.0000	0.0000
126	0.0000	0.0000
127	0.0000	0.0000
128	0.0000	0.0000
129	0.0000	0.0000
130	0.0000	0.0000
131	0.0000	0.0000
132	0.0000	0.0000
133	0.0000	0.0000
134	0.0000	0.0000
135	0.0000	0.0000
136	0.0000	0.0000
137	0.0000	0.0000
138	0.0000	0.0000

139	0.0000	0.0000
140	0.0000	0.0000
141	0.0000	0.0000
142	0.0000	0.0000
143	0.0000	0.0000
144	0.0000	0.0000
145	0.0000	0.0000
146	0.0000	0.0000
147	0.0000	0.0000
148	0.0000	0.0000
149	0.0000	0.0000
150	0.0000	0.0000
151	0.0000	0.0000
152	0.0000	0.0000
153	0.0000	0.0000
154	0.0000	0.0000
155	0.0000	0.0000
156	0.0000	0.0000
157	0.0000	0.0000
158	0.0000	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0000	5540064	5540064	100	Pass
0.0000	0	0	100	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass

0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass
0.0000	0	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Trapezoidal Pond 1 POC	☐	0.00			☐	0.00			
Total Volume Infiltrated		0.00	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

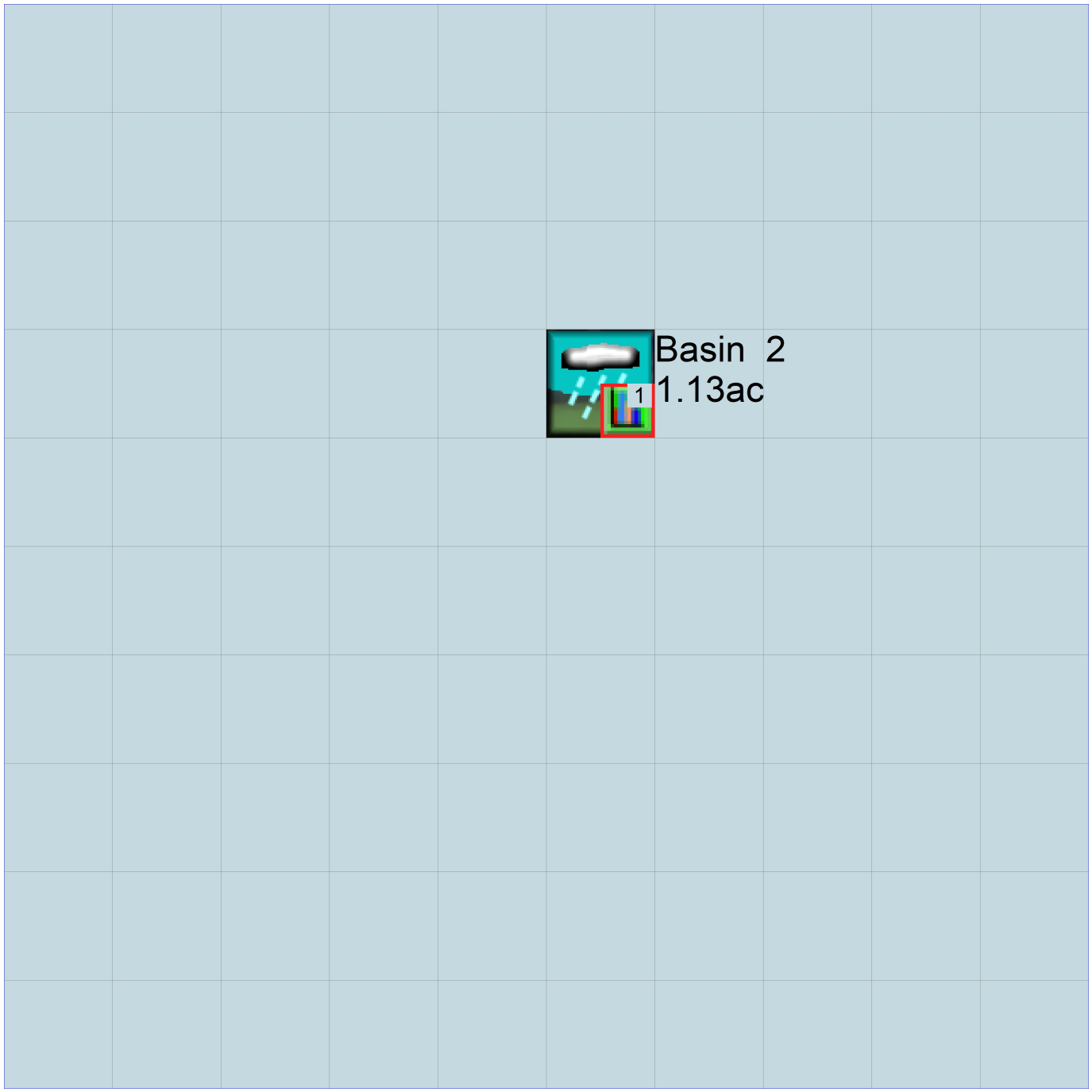
PERLND Changes

No PERLND changes have been made.

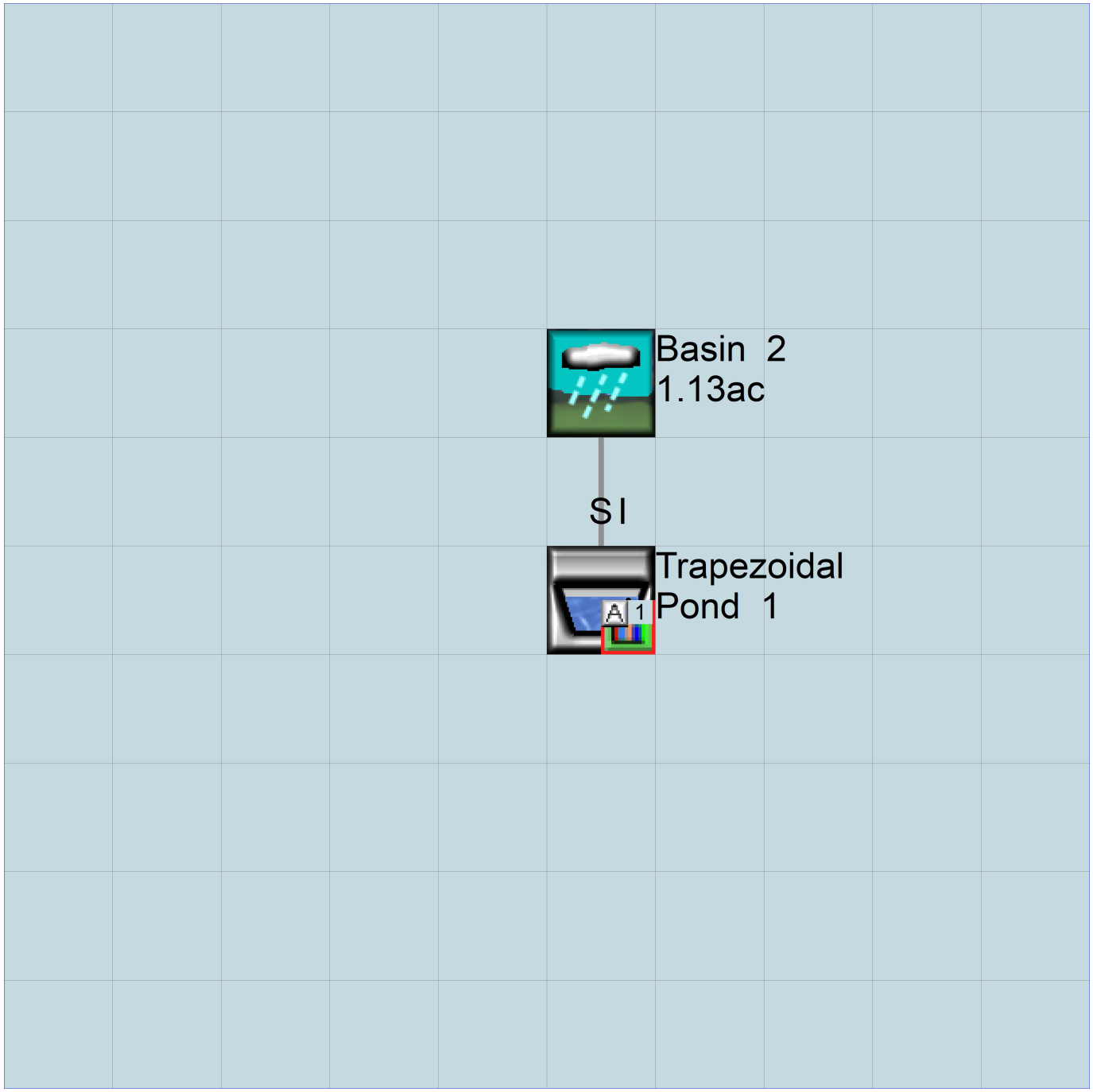
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   GENESEE POND.wdm
MESSU       25   PreGENESEE POND.MES
            27   PreGENESEE POND.L61
            28   PreGENESEE POND.L62
            30   POCGENESEE POND1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      10
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  2                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                      in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10             0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10           0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10             0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  2***
PERLND  10                       1.125     COPY   501     12
PERLND  10                       1.125     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                          in  out                            ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                      ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit       for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    0              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    0              IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   GENESEE POND.wdm
MESSU       25   MitGENESEE POND.MES
            27   MitGENESEE POND.L61
            28   MitGENESEE POND.L62
            30   POCGENESEE POND1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      16
      IMPLND       1
      IMPLND      11
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Trapezoidal Pond  1         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   16     C, Lawn, Flat           1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   16         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
```

```
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   16         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   16         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   16             0       4.5      0.03       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   16             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   16           0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS       AGWS      GWVS
   16             0         0         0         0       2.5          1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
   11      PARKING/FLAT           1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
   11         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
   11         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         0    0    0    0    0
   11         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
```

```
    1            400      0.01       0.1       0.1
   11            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
   11              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
   11              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  2***
PERLND  16                       0.205     RCHRES   1      2
PERLND  16                       0.205     RCHRES   1      3
IMPLND   1                       0.085     RCHRES   1      5
IMPLND  11                       0.835     RCHRES   1      5

******Routing******
PERLND  16                       0.205     COPY     1     12
IMPLND   1                       0.085     COPY     1     15
IMPLND  11                       0.835     COPY     1     15
PERLND  16                       0.205     COPY     1     13
RCHRES   1                           1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
    1     Trapezoidal Pond-007    2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
```

```
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *      *  *  *  *  *         ***
    1       0  1  0  0    4  5  0  0  0       0  0  0  0  0         2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.03       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
         *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1           0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)     (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.006887  0.000000  0.000000  0.000000
  0.044444  0.007508  0.000320  0.000000  0.003785
  0.088889  0.008131  0.000667  0.000000  0.004099
  0.133333  0.008755  0.001043  0.000000  0.004414
  0.177778  0.009380  0.001446  0.000000  0.004729
  0.222222  0.010007  0.001876  0.000000  0.005045
  0.266667  0.010635  0.002335  0.000000  0.005362
  0.311111  0.011265  0.002822  0.000000  0.005679
  0.355556  0.011896  0.003337  0.000000  0.005998
  0.400000  0.012529  0.003879  0.000000  0.006317
  0.444444  0.013163  0.004450  0.000000  0.006636
  0.488889  0.013799  0.005049  0.000000  0.006957
  0.533333  0.014436  0.005677  0.000000  0.007278
  0.577778  0.015074  0.006333  0.000000  0.007600
  0.622222  0.015714  0.007017  0.000000  0.007923
  0.666667  0.016355  0.007729  0.000000  0.008246
  0.711111  0.016998  0.008471  0.000000  0.008570
  0.755556  0.017643  0.009240  0.000000  0.008895
  0.800000  0.018288  0.010039  0.000000  0.009220
  0.844444  0.018936  0.010866  0.000000  0.009547
  0.888889  0.019584  0.011722  0.000000  0.009874
  0.933333  0.020234  0.012607  0.000000  0.010201
  0.977778  0.020886  0.013521  0.000000  0.010530
  1.022222  0.021539  0.014464  0.000000  0.010859
  1.066667  0.022193  0.015435  0.000000  0.011189
  1.111111  0.022849  0.016436  0.000000  0.011520
  1.155556  0.023506  0.017466  0.000000  0.011851
  1.200000  0.024165  0.018526  0.000000  0.012183
  1.244444  0.024826  0.019614  0.000000  0.012516
  1.288889  0.025487  0.020733  0.000000  0.012850
  1.333333  0.026150  0.021880  0.000000  0.013184
  1.377778  0.026815  0.023057  0.000000  0.013519
  1.422222  0.027481  0.024264  0.000000  0.013855
  1.466667  0.028149  0.025500  0.000000  0.014192
  1.511111  0.028818  0.026766  0.000000  0.014529
  1.555556  0.029488  0.028061  0.000000  0.014867
  1.600000  0.030160  0.029387  0.000000  0.015206
  1.644444  0.030833  0.030742  0.000000  0.015545
  1.688889  0.031508  0.032128  0.000000  0.015885
  1.733333  0.032184  0.033543  0.000000  0.016226
  1.777778  0.032862  0.034988  0.000000  0.016568
  1.822222  0.033541  0.036464  0.000000  0.016910
```

```
  1.866667  0.034221  0.037970  0.000000  0.017253
  1.911111  0.034903  0.039506  0.000000  0.017597
  1.955556  0.035587  0.041072  0.000000  0.017942
  2.000000  0.036272  0.042669  0.000000  0.018287
  2.044444  0.036958  0.044297  0.000000  0.018633
  2.088889  0.037646  0.045955  0.000000  0.018980
  2.133333  0.038335  0.047643  0.000000  0.019327
  2.177778  0.039026  0.049362  0.000000  0.019676
  2.222222  0.039718  0.051112  0.000000  0.020025
  2.266667  0.040412  0.052893  0.000000  0.020374
  2.311111  0.041107  0.054704  0.000000  0.020725
  2.355556  0.041803  0.056547  0.000000  0.021076
  2.400000  0.042501  0.058420  0.000000  0.021428
  2.444444  0.043201  0.060325  0.000000  0.021780
  2.488889  0.043902  0.062260  0.000000  0.022134
  2.533333  0.044604  0.064227  0.000000  0.022488
  2.577778  0.045308  0.066225  0.000000  0.022843
  2.622222  0.046013  0.068254  0.000000  0.023198
  2.666667  0.046720  0.070315  0.000000  0.023555
  2.711111  0.047428  0.072407  0.000000  0.023912
  2.755556  0.048137  0.074531  0.000000  0.024269
  2.800000  0.048848  0.076686  0.000000  0.024628
  2.844444  0.049561  0.078873  0.000000  0.024987
  2.888889  0.050275  0.081092  0.000000  0.025347
  2.933333  0.050990  0.083342  0.000000  0.025708
  2.977778  0.051707  0.085624  0.000000  0.026069
  3.022222  0.052425  0.087938  0.105514  0.026431
  3.066667  0.053145  0.090284  0.547881  0.026794
  3.111111  0.053866  0.092662  1.178161  0.027158
  3.155556  0.054589  0.095072  1.950342  0.027522
  3.200000  0.055313  0.097515  2.840748  0.027887
  3.244444  0.056039  0.099989  3.833395  0.028253
  3.288889  0.056766  0.102496  4.915755  0.028619
  3.333333  0.057494  0.105035  6.076986  0.028987
  3.377778  0.058224  0.107607  7.307048  0.029355
  3.422222  0.058955  0.110211  8.596222  0.029723
  3.466667  0.059688  0.112847  9.934849  0.030093
  3.511111  0.060422  0.115516  11.31319  0.030463
  3.555556  0.061158  0.118218  12.72134  0.030834
  3.600000  0.061895  0.120953  14.14927  0.031206
  3.644444  0.062634  0.123720  15.58681  0.031578
  3.688889  0.063374  0.126520  17.02374  0.031951
  3.733333  0.064115  0.129353  18.44986  0.032325
  3.777778  0.064858  0.132219  19.85511  0.032699
  3.822222  0.065603  0.135118  21.22969  0.033075
  3.866667  0.066349  0.138051  22.56421  0.033451
  3.911111  0.067096  0.141016  23.84981  0.033828
  3.955556  0.067845  0.144015  25.07838  0.034205
  4.000000  0.068595  0.147047  26.24267  0.034583
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    0             PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    0             IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1001 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
```

```
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

Legal Notice

This program and accompanying documentation are provided 'as-is' without warranty of any kind. The entire risk regarding the performance and results of this program is assumed by End User. Clear Creek Solutions Inc. and the governmental licensee or sublicensees disclaim all warranties, either expressed or implied, including but not limited to implied warranties of program and accompanying documentation. In no event shall Clear Creek Solutions Inc. be liable for any damages whatsoever (including without limitation to damages for loss of business profits, loss of business information, business interruption, and the like) arising out of the use of, or inability to use this program even if Clear Creek Solutions Inc. or their authorized representatives have been advised of the possibility of such damages.

Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

Appendix E

Geotechnical Report

Earth Solutions NW LLC

Geotechnical Engineering
Construction Observation/Testing
Environmental Services

GEOTECHNICAL ENGINEERING STUDY
GENESEE ENERGY
PROPOSED FUEL TANK PAD
412 – 23RD STREET SOUTHEAST
PUYALLUP, WASHINGTON

ES-6614.01

15365 N.E. 90th Street, Suite 100 Redmond, WA 98052
(425) 449-4704 Fax (425) 449-4711
www.earthsolutionsnw.com

PREPARED FOR

GENESEE ENERGY

August 5, 2021

Samuel E. Suruda, G.I.T.
Staff Geologist

HENRY T. WRIGHT
STATE OF WASHINGTON
53803
REGISTERED
PROFESSIONAL ENGINEER

08/05/2021

Henry T. Wright, P.E.
Senior Project Manager

Kyle R. Campbell, P.E.
Principal Engineer

GEOTECHNICAL ENGINEERING STUDY
GENESEE ENERGY
PROPOSED FUEL TANK PAD
412 – 23RD STREET SOUTHEAST
PUYALLUP, WASHINGTON

ES-6614.01

Earth Solutions NW, LLC
15365 Northeast 90th Street, Suite 100
Redmond, Washington 98052
Phone: 425-449-4704 | Fax: 425-449-4711
www.earthsolutionsnw.com

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

August 5, 2021
ES-6614.01

Genesee Energy
3616 South Genesee Street
Seattle, Washington 98118

Attention: Mr. Steven Clark

Dear Mr. Clark:

Earth Solutions NW, LLC (ESNW) is pleased to present this report titled "Geotechnical Engineering Study, Genesee Energy, Proposed Fuel Pad, 412 – 23rd Street Southeast, Puyallup, Washington". In general, the site is underlain by loose to medium dense silt and sand alluvium deposits.

Groundwater was encountered at depths of six and one-half feet to seven feet below the existing ground surface during our exploration. We anticipate groundwater seepage and related caving may be encountered during deeper site excavations, such as utility installations.

The proposed propane storage tank can be constructed on conventional continuous and spread footing foundations bearing on at least 12 inches of crushed rock placed on compacted in-situ soil. Additional thickness of crushed rock and/or the use of a geotextile fabric below the crushed rock may be recommended depending on soil conditions exposed during construction. ESNW should evaluate subgrade conditions during construction. Where loose or unsuitable soil conditions are exposed at foundation subgrade elevations, compaction of soils to the specifications of structural fill, or overexcavation and replacement with a suitable structural fill material, will be necessary.

When building plans are being developed for the potential future buildings to be constructed on site, ESNW can update this report with recommendations for the proposed buildings.

Recommendations for foundation design, seismic considerations, site preparation, drainage, and other pertinent recommendations are provided in this study. We appreciate the opportunity to be of service to you on this project. If you have questions regarding the content of this geotechnical engineering study, please call.

Sincerely,

EARTH SOLUTIONS NW, LLC

Samuel E. Suruda, G.I.T.
Staff Geologist

Table of Contents

ES-6614.01

Table of Contents

Cont'd

ES-6614.01

GEOTECHNICAL ENGINEERING STUDY
GENESEE ENERGY
PROPOSED FUEL TANK PAD
412 – 23RD STREET SOUTHEAST
PUYALLUP, WASHINGTON

ES-6614.01

INTRODUCTION

General

This geotechnical engineering study was prepared for the proposed fuel tank pads and parking area located at 412 – 23rd Street Southeast, in Puyallup, Washington. The purpose of this study was to explore subsurface conditions across the site and develop geotechnical recommendations for the proposed development. Our scope of services for completing this geotechnical engineering study included the following:

- Subsurface exploration in the form of test pits.
- Engineering analyses of data gathered during site exploration.
- Preparation of this report.

The following documents/maps were reviewed as part of our report preparation:

- Geologic Map of the Tacoma 1:100,000-Scale Quadrangle, Washington, compiled by J.E. Schuster et al., 2015.
- Genesee Propane Bulk Plant, prepared by Vector Engineering, Inc., dated June 30, 2021.
- Online Web Soil Survey (WSS) resource, maintained by the Natural Resources Conservation Service under the United States Department of Agriculture (USDA).
- Puyallup Municipal Code Chapter 21.06, Article XII – Geologically Hazardous Areas, updated June 15, 2021.
- Potential Seismic Hazard Areas, endorsed by the Department of Planning & Land Services, Pierce County, dated February 24, 2005.

Project Description

We understand the site will be developed with a 30,000-gallon propane storage tank. Based on the referenced site plan, we understand that a second propane storage tank and two commercial structures are proposed for the subject site at a later date. Given the existing topography across the site, we estimate that minimal cuts and fills of less than five feet will occur across the subject site.

We understand the fuel tank will be supported on a steel frame placed on a concrete strip footing foundation. Foundation loading for the fuel tank is expected to be approximately one to two kips per linear foot.

If the above design assumptions are incorrect or change, ESNW should be contacted to review the recommendations in this report. ESNW should review the final design to confirm that the geotechnical recommendations included in this report have been incorporated into the project plans.

SITE CONDITIONS

Surface

The project area consists of one parcel located on the east side of the 23rd Street Southeast, approximately 300 feet south of the intersection between 23rd Street Southeast and Inter Avenue, in Puyallup, Washington. The site consists of one Pierce County tax parcel (Parcel Number 210520-0303), and totals approximately 1.13 acres of land area. The approximate location of the property is illustrated on Plate 1 (Vicinity Map).

The site is bordered to the south by a railway easement, to the west by 23rd Street southeast, and to the north and east by commercial properties. Site topography is relatively level. The railway embankment is roughly four feet higher than the subject site. At the time of our exploration, the subject site was covered in a gravel base.

Subsurface

An ESNW representative observed, logged, and sampled five test pits on May 21, 2021. The test pits were excavated within accessible site areas, using a trackhoe and operator retained by us for the purposes of subsurface investigation. The test pits were completed to evaluate and classify site soils, and to characterize groundwater conditions within accessible site areas.

The approximate locations of the test pits are depicted on Plate 2 (Test Pit Location Plan). Please refer to the attached test pit logs for a more detailed description of subsurface conditions. Representative soil samples collected at the test pit locations were analyzed in general accordance with both Unified Soil Classification System (USCS) and USDA methods and procedures.

Topsoil and Fill

Topsoil was not encountered during our explorations at the subject site. Minimal amounts of topsoil were observed within the corners of the subject site, but we do not anticipate topsoil to be encountered in significant amounts within the project area.

Fill was encountered at all five test pit locations to depths of about one-half feet to one and one-half feet below the existing ground surface (bgs). The fill was characterized as a poorly graded gravel and was likely placed to facilitate parking on the subject site.

Native Soil

Underlying the fill at the test locations, native soil consisting of interbedded silts and sands were encountered. In general, the finer-grained sandy silts (USCS: ML) were observed to be underlain by more coarsely grained silty sand (USCS: SM). Soils were observed extending to the maximum exploration depth of about nine feet below the existing ground surface (bgs). The native soil density was observed to be loose to medium dense across the site, and minor to moderate caving was observed related to the groundwater table at test pit locations TP-1, TP-2, and TP-3.

Geologic Setting

The referenced geologic map identifies alluvium (Qa) across the site. Alluvium deposits are mostly gravel and sand, with areas overlain by thin silt, clay, and peat. The referenced WSS resource identifies Briscot loam (Map unit symbol: 6A) across the site and surrounding area. Briscot series soils are formed in alluvial settings and areas often found in river floodplains.

Based on our field observations, the native soil generally correlates with the geologic setting of alluvium, as locally mapped.

Groundwater

Groundwater was encountered at all test pit locations at depths ranging from six and one-half feet to seven feet bgs. The groundwater table was allowed approximately thirty minutes to stabilize in TP-1 and was observed beginning at a depth of about seven feet bgs. Groundwater should be expected within site excavations. Groundwater elevations fluctuate depending on many factors, including precipitation duration and intensity, the time of year, and soil conditions. In general, groundwater levels and flow rates are higher during the winter, spring, and early summer months.

GEOLOGICALLY HAZARDOUS AREAS ASSESSMENT

To evaluate the presence of geologically hazardous areas on site, ESNW reviewed the referenced Puyallup Municipal code sections and a publicly available hazards map provided by the City of Puyallup. Article XII of the Puyallup Municipal Code recognizes erosion hazard, landslide hazard, seismic hazard, and volcanic hazard areas as geologically hazardous areas.

Based on our review and understanding of site conditions, it is our opinion the subject parcel meets the definition of a seismic hazard area. Further discussion of the possible impacts to the proposed project from an earthquake or another intense ground shaking are provided in the *Seismic Design* section of this report. No further Geologically Hazardous Areas were observed within the subject area or adjacent areas.

DISCUSSION AND RECOMMENDATIONS

General

Based on the results of our investigation, construction of the proposed fuel tank pad is feasible from a geotechnical standpoint. The primary geotechnical considerations associated with the proposed project include foundation subgrade support, foundation design parameters, the suitability of using native soils as structural fill, and preliminary infiltration feasibility.

The proposed propane storage tank can be constructed on conventional continuous and spread footing foundations bearing on at least 12 inches of crushed rock placed on compacted in-situ soil. Additional thickness of crushed rock and/or the use of a geotextile fabric below the crushed rock may be recommended depending on soil conditions exposed during construction. ESNW should evaluate subgrade conditions during construction. Where loose or unsuitable soil conditions are exposed at foundation subgrade elevations, compaction of soils to the specifications of structural fill, or overexcavation and replacement with a suitable structural fill material, will be necessary.

When building plans are being developed for the potential future buildings to be constructed on site, ESNW can update this report with final recommendations for the proposed buildings.

This study has been prepared for the exclusive use of Genesee Energy and their representatives. The study has been prepared specifically for the subject project. No warranty, expressed or implied, is made. This study has been prepared in a manner consistent with the level of care and skill ordinarily exercised by other members of the profession currently practicing under similar conditions in this area.

Site Preparation and Earthwork

Initial site preparation activities will consist of installing temporary erosion control measures and establishing grading limits. Subsequent earthwork activities will involve grading and related infrastructure improvements.

Temporary Erosion Control

The following temporary erosion control measures should be considered:

- Temporary construction entrances and drive lanes, consisting of at least six inches of quarry spalls, should be considered to both minimize off-site soil tracking and provide stable surfaces at site entrances. Placing geotextile fabric underneath the quarry spalls will provide greater stability if needed.

- Silt fencing should be placed around the appropriate portions of the site perimeter.

- When not in use, soil stockpiles should be covered or otherwise protected to reduce the potential for soil erosion, especially during periods of wet weather.

- Temporary measures for controlling surface water runoff, such as interceptor trenches, sumps, or interceptor swales, should be installed prior to beginning earthwork activities.

- Dry soils disturbed during construction should be wetted to minimize dust and airborne soil erosion.

- When appropriate, permanent planting or hydroseeding will help to stabilize site soils.

Additional Best Management Practices, as specified by the project civil engineer and indicated on the plans, should be incorporated into construction activities. Temporary erosion control measures may be modified during construction as site conditions require, as approved by the site erosion control lead.

Temporary Excavations and Slopes

Based on the soil conditions observed at the test pit locations, the following allowable temporary slope inclinations, as a function of horizontal to vertical (H:V) inclination, may be considered for preliminary planning purposes. The applicable Federal Occupation Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA) soil classifications are also provided:

- Loose soil 1.5H:1V (Type C)

- Areas containing groundwater seepage 1.5H:1V (Type C)

- Medium dense to dense native soil 1H:1V (Type B)

The presence of groundwater may cause localized sloughing of temporary slopes. An ESNW representative should observe temporary and permanent slopes to confirm the slope inclinations are suitable for the exposed soil conditions and to provide additional final excavation and slope recommendations, as necessary. If the recommended temporary slope inclinations cannot be achieved, temporary shoring may be necessary to support excavations.

In-situ and Imported Soils

From a geotechnical standpoint, it is our opinion in-situ soils may not be suitable for use in structural fill applications unless the moisture content of the soil is at (or slightly above) the optimum moisture content at the time of placement and compaction. Successful use of native soils as structural fill will largely be dictated by in-situ moisture contents during construction.

Where necessary, imported soil intended for use as structural fill should consist of a well-graded, granular soil with a moisture content that is at (or slightly above) the optimum level. Imported soil intended for use as structural fill should consist of a well-graded, granular soil with a fines content of 5 percent or less (where the fines content is defined as the percent passing the Number 200 sieve, based on the minus three-quarter-inch fraction).

Structural Fill

Structural fill is defined as compacted soil placed in foundation, slab-on-grade, and roadway areas. Fill placed to construct permanent slopes and throughout retaining wall and utility trench backfill areas is considered structural fill as well. Soils placed in structural areas, including slab-on-grade, utility trench, and pavement areas, should be placed in loose lifts of 12 inches or less and compacted to a relative compaction of 95 percent, based on the laboratory maximum dry density as determined by the Modified Proctor Method (ASTM D1557). More stringent compaction specifications may be required for utility trench backfill zones depending on the responsible utility district or jurisdiction.

Foundations

The proposed propane storage tank can be constructed on conventional continuous and spread footing foundations bearing on at least 12 inches of crushed rock placed on compacted in-situ soil. Additional thickness of crushed rock and/or the use of a geotextile fabric below the crushed rock may be recommended depending on soil conditions exposed during construction. ESNW should evaluate subgrade conditions during construction. Where loose or unsuitable soil conditions are exposed at foundation subgrade elevations, compaction of soils to the specifications of structural fill, or overexcavation and replacement with a suitable structural fill material, will be necessary. Provided the foundation will be supported as prescribed above, the following parameters may be used for design:

- Allowable soil bearing capacity 2,500 psf
- Passive earth pressure 300 pcf (equivalent fluid)
- Coefficient of friction 0.40

A one-third increase in the allowable soil bearing capacity may be assumed for short-term wind and seismic loading conditions. The above passive pressure and friction values include a factor-of-safety of 1.5. With structural loading as expected, total settlement in the range of one and one-half inches and differential settlement of about one inch is anticipated. The majority of the settlements should occur during construction, as dead loads are applied.

The above foundation design recommendations can be used for preliminary design purposes of future buildings at the subject site; however, ESNW should review proposed building plans and loading conditions, when they become available, to provide final design recommendations. A preload or surcharge program may be necessary depending on building loads and potential grading.

Seismic Design Considerations

The 2018 International Building Code (2018 IBC) recognizes the most recent edition of the Minimum Design Loads for Buildings and Other Structures manual (ASCE 7-16) for seismic design, specifically with respect to earthquake loads. Based on the soil conditions encountered at the test pit locations, Site Class E should be used for design.

Further discussion between the project structural engineer, the project owner, and ESNW may be necessary to determine the possible impacts to the structural design due to increased earthquake load requirements under the 2018 IBC. ESNW can provide additional consulting services to aid with design efforts, including supplementary geotechnical and geophysical investigation, upon request.

Liquefaction

The referenced Seismic Hazard Areas map indicates the site is within a seismic hazard area. Liquefaction is a phenomenon where saturated or loose soils suddenly lose internal strength and behave as a fluid. This behavior is in response to increased pore water pressures resulting from an earthquake or another intense ground shaking. As previously summarized in the *Subsurface* section of this letter, groundwater was encountered at a depth of roughly six and one-half feet to seven feet bgs.

In our opinion, site susceptibility to liquefaction can be characterized as moderate. In our opinion and based on our experience, liquefaction-induced settlement of the native soil may be roughly two to three inches and would likely not occur uniformly. Greater liquefaction-induced settlement could occur during very large earthquake events; ESNW can provide further evaluation of potential impacts of liquefaction, upon request, which would require deeper subsurface data.

Utility Support and Trench Backfill

In our opinion, the soils anticipated to be exposed in utility excavations should generally be suitable for support of utilities except where groundwater degrades the soil present at the bottom-of-trench. Where these conditions are encountered, utility trench bottoms will need to be overexcavated and stabilized with geotextile under rock and a subsequent layer of the fabric placed under pipe bedding. Organic or highly compressible soils encountered in the trench excavations should not be used for supporting utilities. The on-site soil may not be suitable for use as trench backfill if the soil moisture content is too high at the time of placement and compaction. The on-site soils are not suitable for use as pipe bedding. Utility trench backfill should be placed and compacted to the specifications of structural fill provided in this report, or to the applicable Pierce County specifications. Groundwater seepage will likely be encountered in utility trench excavations. Caving of the trench sidewalls should be anticipated by the contractor where seepage is encountered. The contractor installing the utilities must be prepared to manage groundwater entering utility trenches.

Pavement Sections

The performance of site pavements is largely related to the condition of the underlying subgrade. To ensure adequate pavement performance, the subgrade should be in a firm and unyielding condition when subjected to proofrolling with a loaded dump truck. Structural fill in pavement areas should be compacted to the specifications detailed in the *Site Preparation and Earthwork* section of this report. It is possible that soft, wet, or otherwise unsuitable subgrade areas may still exist after base grading activities. Areas of unsuitable or yielding subgrade conditions may require remedial measures such as overexcavation and replacement with structural fill or thicker crushed rock sections prior to pavement.

For relatively lightly loaded pavements subjected to automobiles and occasional truck traffic, the following sections can be considered for preliminary design:

- Two inches of hot mix asphalt (HMA) placed over four inches of CRB, or;
- Two inches of HMA placed over three inches of asphalt treated base (ATB).

Heavier traffic areas generally require thicker pavement sections depending on site usage, pavement life expectancy, and site traffic. For preliminary design purposes, the following pavement sections can be considered for areas subject to occasional truck traffic:

- Three inches of HMA placed over six inches of crushed rock base (CRB), or;
- Three inches of HMA placed over four-and-one-half inches of ATB.

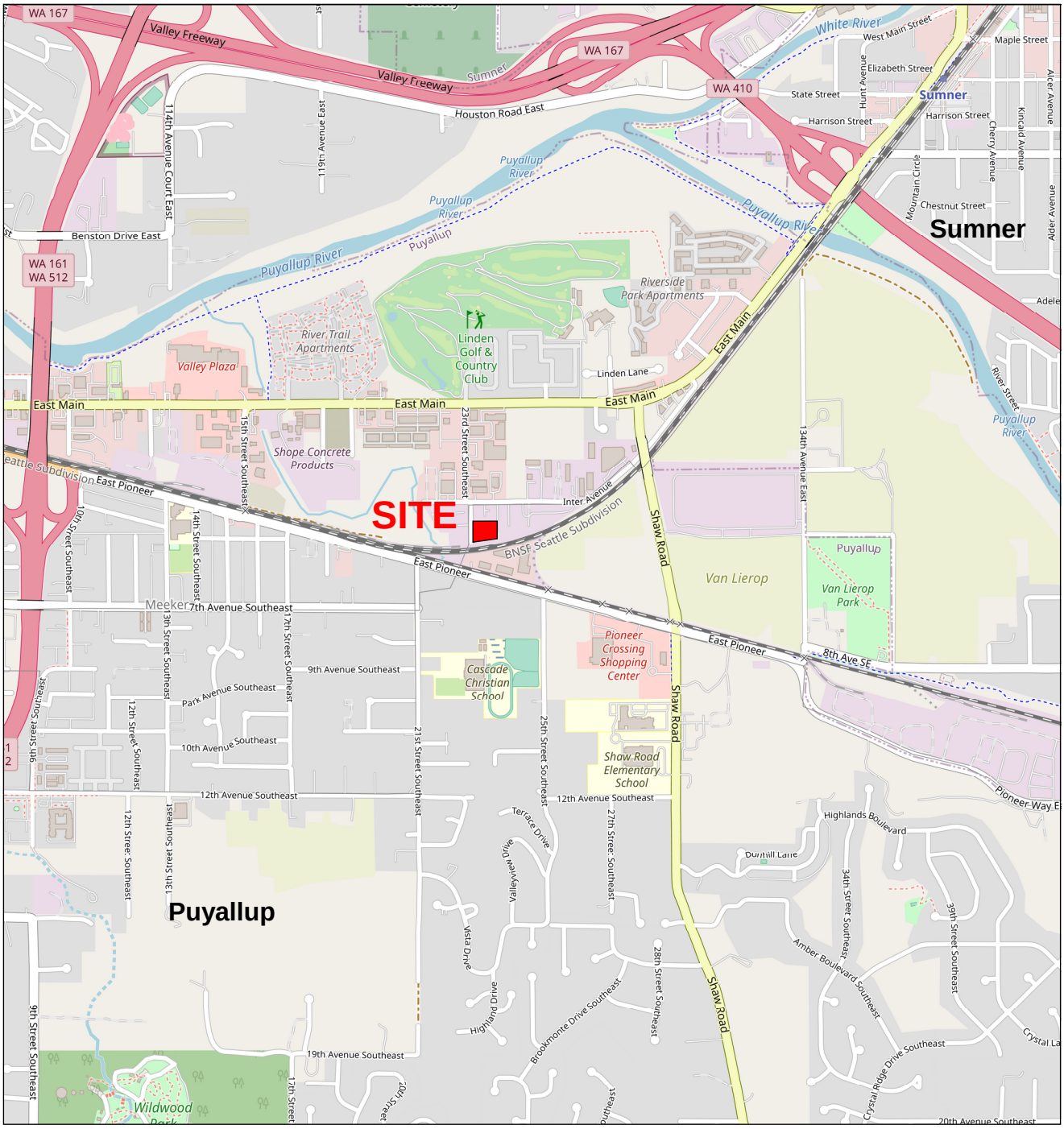
The HMA, CRB and ATB materials should conform to WSDOT specifications. The City of Puyallup minimum pavement requirements may supersede our recommendations and may require thicker pavement sections.

LIMITATIONS

This study has been prepared for the exclusive use of Genesee Energy and their representatives. The recommendations and conclusions provided in this study are professional opinions consistent with the level of care and skill that is typical of other members in the profession currently practicing under similar conditions in this area. No warranty, express or implied, is made. Variations in the subsurface conditions observed at the test pit locations may exist and may not become evident until construction. ESNW should reevaluate the conclusions provided in this study if variations are encountered.

Additional Services

ESNW should have an opportunity to review the final design with respect to the geotechnical recommendations provided in this report. ESNW should also be retained to provide testing and consultation services during construction.



Reference:
Pierce County, Washington
OpenStreetMap.org

NORTH

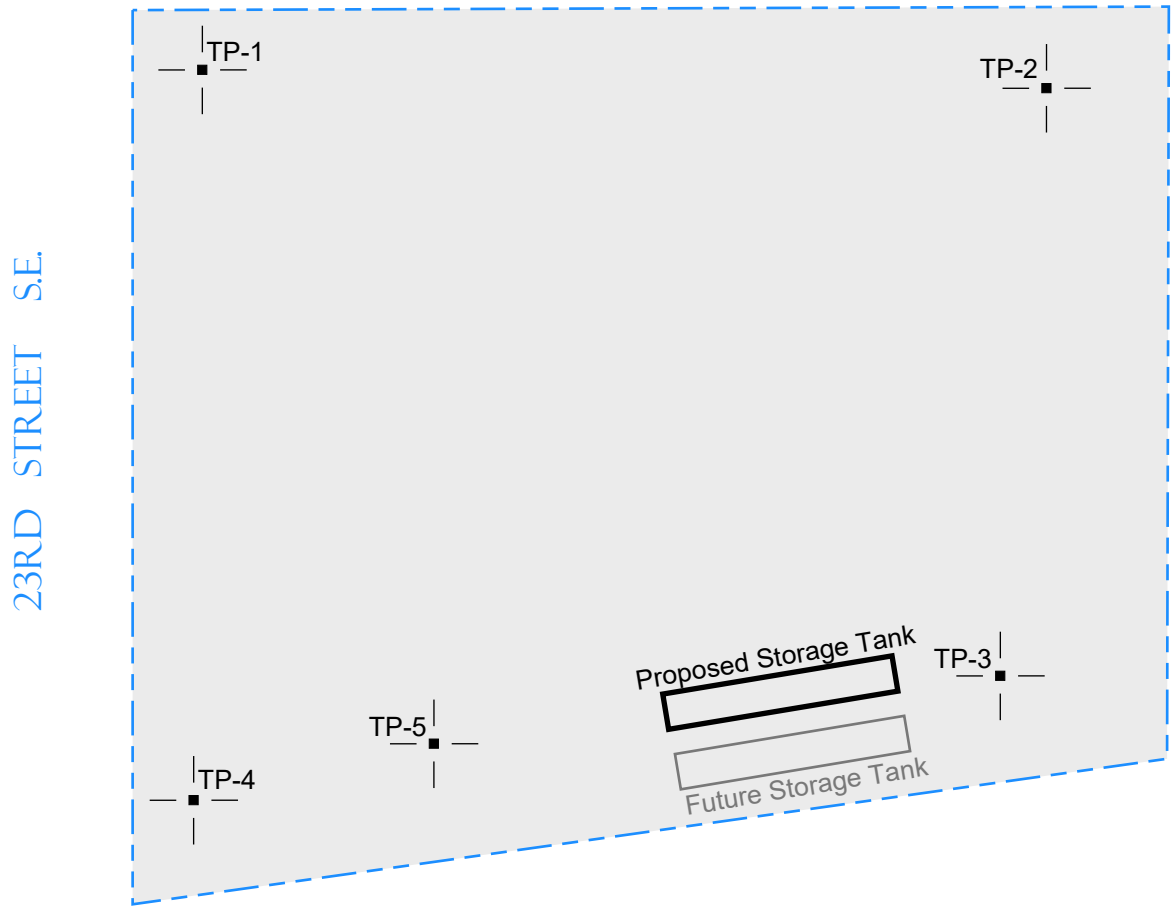
NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Vicinity Map
Genesee Energy
Puyallup, Washington

Drwn. MRS	Date 07/08/2021	Proj. No. 6614.01
Checked SES	Date July 2021	Plate 1



NORTH

1"=40'

0 20 40 80

Scale in Feet

LEGEND

TP-1 — Approximate Location of ESNW Test Pit, Proj. No. ES-6614.01, May 2021

Subject Site

NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

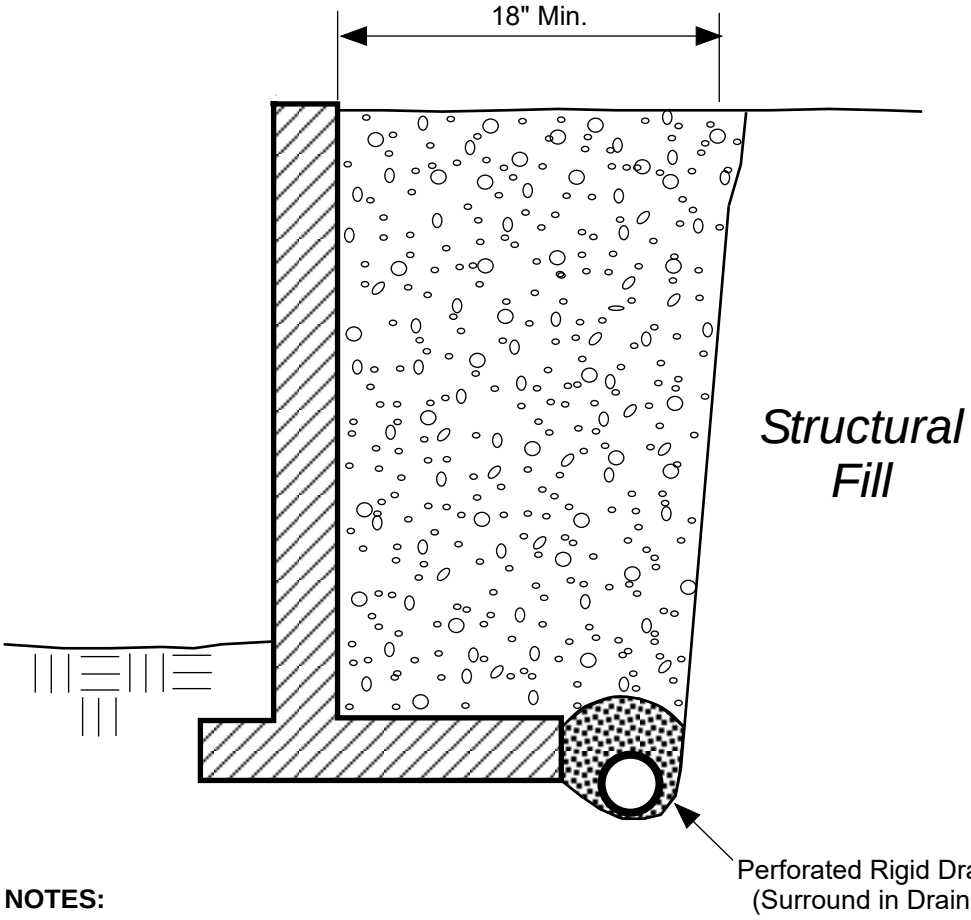
NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Test Pit Location Plan
Genesee Energy
Puyallup, Washington

Drwn. MRS	Date 07/08/2021	Proj. No. 6614.01
Checked SES	Date July 2021	Plate 2



NOTES:

- Free-draining Backfill should consist of soil having less than 5 percent fines. Percent passing No. 4 sieve should be 25 to 75 percent.
- Sheet Drain may be feasible in lieu of Free-draining Backfill, per ESNW recommendations.
- Drain Pipe should consist of perforated, rigid PVC Pipe surrounded with 1-inch Drain Rock.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

LEGEND:

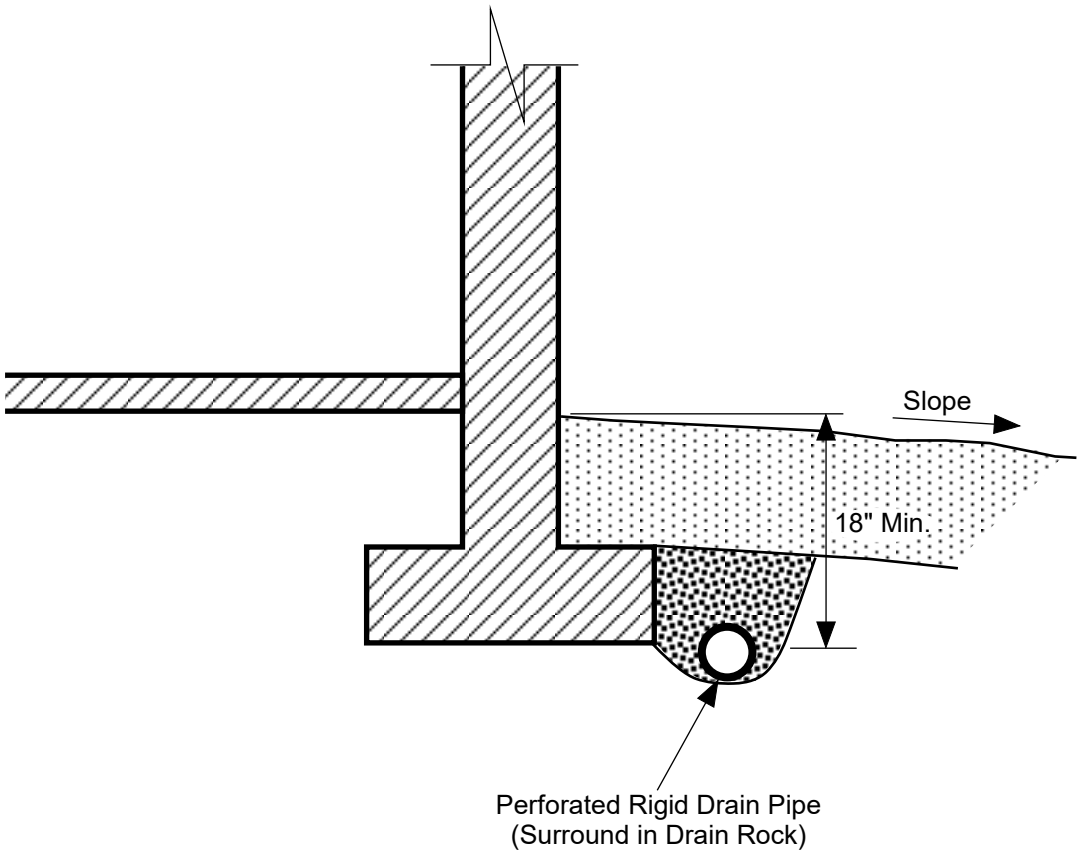
Free-draining Structural Backfill

1-inch Drain Rock

Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Retaining Wall Drainage Detail
Genesee Energy
Puyallup, Washington

Drwn. MRS	Date 07/08/2021	Proj. No. 6614.01
Checked SES	Date July 2021	Plate 3



NOTES:

- Do NOT tie roof downspouts to Footing Drain.
- Surface Seal to consist of 12" of less permeable, suitable soil. Slope away from building.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

LEGEND:

Surface Seal: native soil or other low-permeability material.

1-inch Drain Rock

Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Footing Drain Detail
Genesee Energy
Puyallup, Washington

Drwn. MRS	Date 07/08/2021	Proj. No. 6614.01
Checked SES	Date July 2021	Plate 4

Appendix A

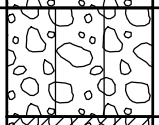
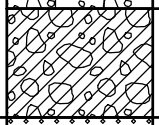
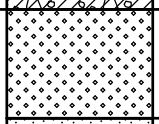
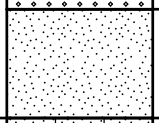
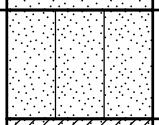
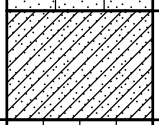
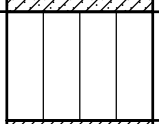
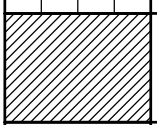
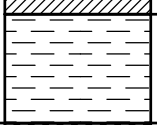
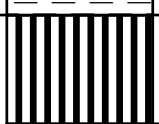
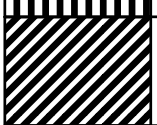
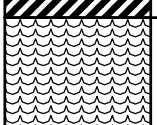
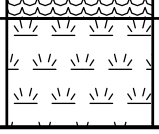
Subsurface Exploration
Test Pit Logs

ES-6614.01

The subsurface conditions at the site were previously explored by excavating a total of five test pits across accessible portions of the property. The subsurface explorations were completed on May 21, 2021. The approximate test locations are illustrated on Plate 2 of this report. Logs of the test pits are provided in this Appendix. The maximum depth of exploration was nine feet bgs.

Earth Solutions NW LLC

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

DUAL SYMBOLS are used to indicate borderline soil classifications.

The discussion in the text of this report is necessary for a proper understanding of the nature of the material presented in the attached logs.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-1

PROJECT NUMBER ES-6614.01 **PROJECT NAME** Genesee Energy

DATE STARTED 5/21/21 **COMPLETED** 5/21/21 **GROUND ELEVATION** 60+- **TEST PIT SIZE**

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18846 **LONGITUDE** -122.264439

EXCAVATION METHOD **GROUND WATER LEVELS:**

LOGGED BY SES **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION** 7ft

NOTES Surface Conditions: gravel pad

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			GP		Gray poorly graded GRAVEL, medium dense, damp (Fill)
				1.0	
			ML		Gray sandy SILT, loose to medium dense, wet
		MC = 40.3%			
		MC = 58.4%			-iron oxide staining
				4.0	
			SM		Black silty SAND, loose to medium dense, wet
5		MC = 20.5% Fines = 13.6%			[USDA Classification: slightly gravelly SAND]
					-moderate caving to BOH
					-groundwater table
		MC = 30.6%		9.0	

Test pit terminated at 9.0 feet below existing grade. Groundwater table encountered at 7.0 feet during excavation. Caving observed from 7.0 feet to BOH.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-2

PROJECT NUMBER ES-6614.01 **PROJECT NAME** Genesee Energy

DATE STARTED 5/21/21 **COMPLETED** 5/21/21 **GROUND ELEVATION** 60+- **TEST PIT SIZE**

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18839 **LONGITUDE** -122.26383

EXCAVATION METHOD **GROUND WATER LEVELS:**

LOGGED BY SES **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION** 6.5ft

NOTES Surface Conditions: grass

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
		MC = 7.6%	SM		Brown silty SAND with gravel, medium dense, damp (Fill)
				1.5	-isolated concrete debris
					Gray sandy SILT, loose to medium dense, wet
		MC = 35.4% Fines = 78.1%	ML		[USDA Classification: slightly gravelly LOAM]
5				5.0	
					Black silty SAND, loose to medium dense, wet
			SM		-groundwater table, minor caving to BOH
		MC = 28.6%		7.0	

Test pit terminated at 7.0 feet below existing grade. Groundwater table encountered at 6.5 feet during excavation. Caving observed from 6.5 feet to BOH.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-3

PROJECT NUMBER ES-6614.01 **PROJECT NAME** Genesee Energy

DATE STARTED 5/21/21 **COMPLETED** 5/21/21 **GROUND ELEVATION** 60+- **TEST PIT SIZE**

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18803 **LONGITUDE** -122.26386

EXCAVATION METHOD **GROUND WATER LEVELS:**

LOGGED BY SES **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION** 7ft

NOTES Surface Conditions: gravel pad

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			GP		Gray poorly graded GRAVEL, medium dense, damp (Fill)
				0.5	-isolated asphalt pieces
			GM		Brown silty GRAVEL with sand, loose to medium dense, damp
				2.5	
		MC = 38.9%			Gray sandy SILT, loose to medium dense, wet
5			ML		
					-groundwater table, minor caving to BOH
				8.0	

Test pit terminated at 8.0 feet below existing grade. Groundwater table encountered at 7.0 feet during excavation. Caving observed from 7.0 feet to BOH.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-4

PROJECT NUMBER ES-6614.01 **PROJECT NAME** Genesee Energy

DATE STARTED 5/21/21 **COMPLETED** 5/21/21 **GROUND ELEVATION** 60+- **TEST PIT SIZE**

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18204 **LONGITUDE** -122.26445

EXCAVATION METHOD **GROUND WATER LEVELS:**

LOGGED BY SES **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION** 6.5ft

NOTES Surface Conditions: gravel pad

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
		MC = 54.9%	GP		Gray poorly graded GRAVEL with sand, medium dense, damp (Fill)
				1.0	
			SP-SM		Gray poorly graded SAND with silt, loose to medium dense, wet
				2.0	
		MC = 41.2%	ML		Gray sandy SILT, loose to medium dense, wet
		MC = 40.4%		4.5	
5			SM		Black silty SAND, loose to medium dense, wet
				6.0	
			ML		Gray sandy SILT, loose to medium dense, wet
		MC = 65.8%			-groundwater table
				7.5	
			SM		Black silty SAND, loose to medium dense, wet
		MC = 29.9% Fines = 13.9%		9.0	[USDA Classification: black SAND]

Test pit terminated at 9.0 feet below existing grade. Groundwater table encountered at 6.5 feet during excavation. No caving observed.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-5

PROJECT NUMBER ES-6614.01 **PROJECT NAME** Genesee Energy

DATE STARTED 5/21/21 **COMPLETED** 5/21/21 **GROUND ELEVATION** 60+- **TEST PIT SIZE**

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18802 **LONGITUDE** -122.26418

EXCAVATION METHOD **GROUND WATER LEVELS:**

LOGGED BY SES **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION** 6.5ft

NOTES Surface Conditions: gravel pad

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			GP		Gray poorly graded GRAVEL, medium dense, damp (Fill)
		MC = 61.5%		1.0	
			ML		Dark gray sandy SILT, loose to medium dense, wet
					-becomes gray
		MC = 21.9%		3.0	
			SM		Black silty SAND, loose to medium dense, wet
				4.5	
5			ML		Gray sandy SILT, loose to medium dense, wet
					-2" layer of MH at 5.5'
				5.5	
			SM		Black silty SAND, loose to medium dense, wet
					-groundwater table
		MC = 39.3%		7.0	

Test pit terminated at 7.0 feet below existing grade. Groundwater table encountered at 6.5 feet during excavation. No caving observed.

Appendix B

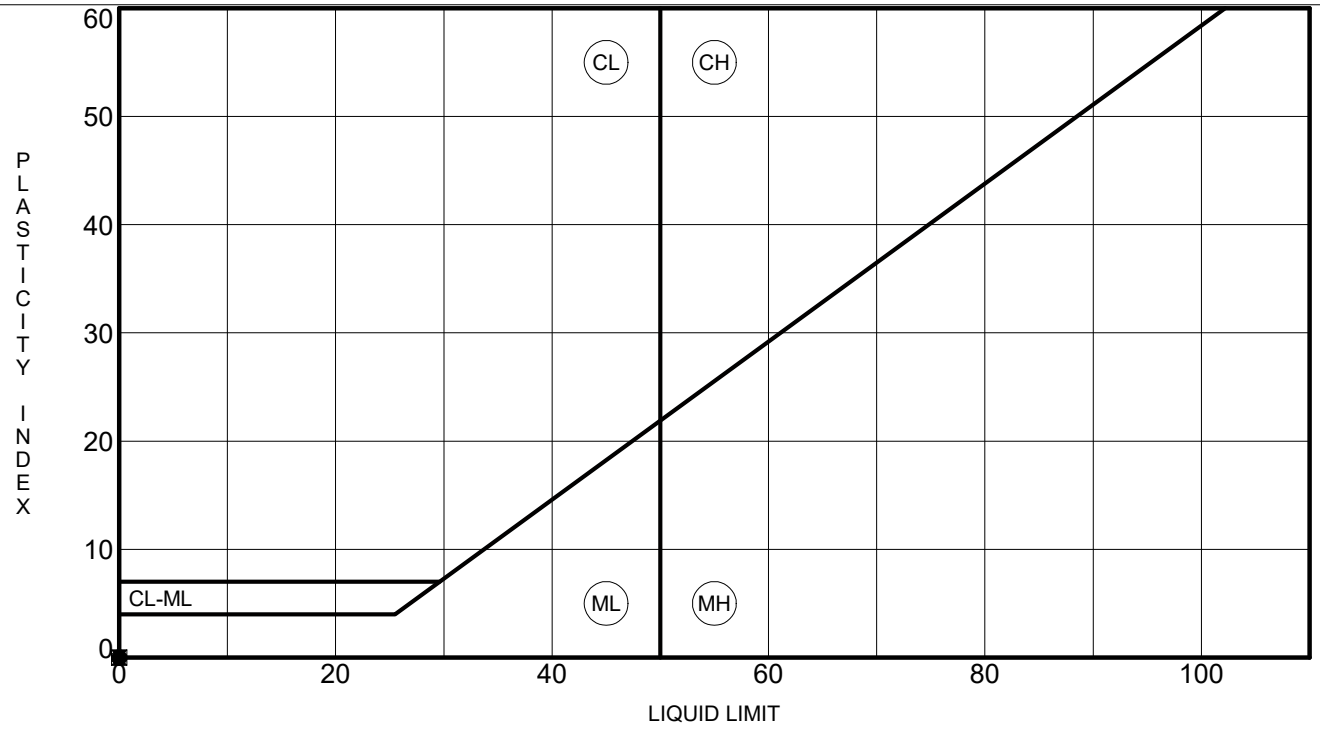
Laboratory Test Results

ES-6614.01

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

ATTERBERG LIMITS' RESULTS

PROJECT NUMBER ES-6614.01 **PROJECT NAME** Genesee Energy

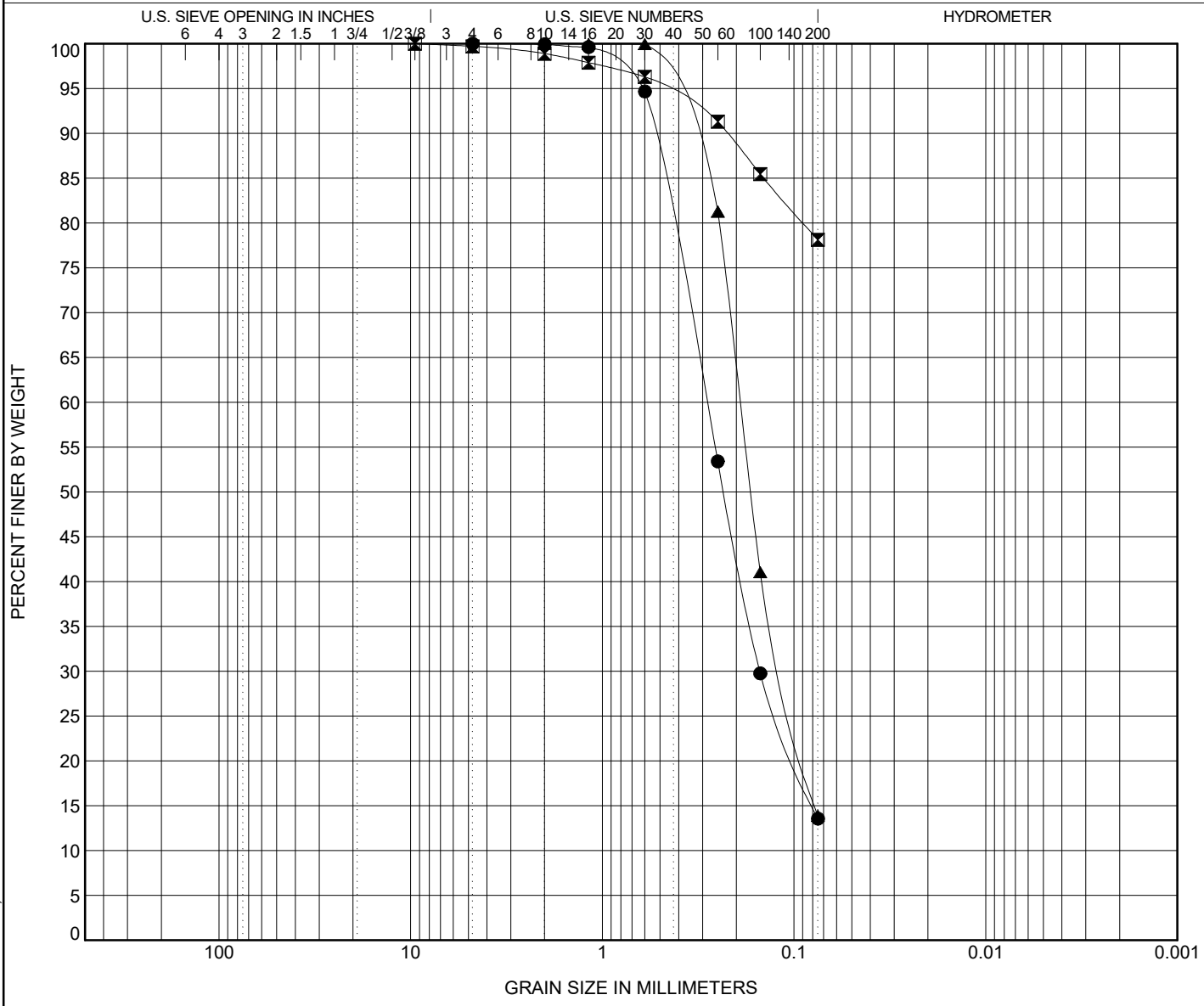


	Specimen Identification		LL	PL	PI	Fines	Classification
●	**TP-01**	**2.0**	**NP**	**NP**	**NP**	**30.6**	**-**
⧓	**TP-04**	**7.0**	**NP**	**NP**	**NP**	**65.7**	**-**

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

GRAIN SIZE DISTRIBUTION

PROJECT NUMBER ES-6614.01 **PROJECT NAME** Genesee Energy



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	Cc	Cu
●	**TP-01**	**5.00ft.**	**USDA: Black Slightly Gravelly Sand. USCS: SM.**		
⊠	**TP-02**	**3.00ft.**	**USDA: Gray Slightly Gravelly Loam. USCS: ML with Sand.**		
▲	**TP-04**	**9.00ft.**	**USDA: Black Sand. USCS: SM.**		

Specimen Identification			D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
●	**TP-01**	**5.0ft.**	**4.75**	**0.287**	**0.151**					**13.6**	
⊠	**TP-02**	**3.0ft.**	**9.5**							**78.1**	
▲	**TP-04**	**9.0ft.**	**2**	**0.191**	**0.113**					**13.9**	

Report Distribution

ES-6614.01

EMAIL ONLY

Genesee Energy
3616 South Genesee Street
Seattle, Washington 98118

Attention: Mr. Steven Clark

Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

June 2, 2022
ES-6614.02

Mr. Steven Clark
c/o Genesee Energy
3616 South Genesee Street
Seattle, Washington 98118

Subject: **Infiltration Evaluation and Groundwater Level Summary**
Proposed Commercial Development
412 – 23rd Street Southeast
Puyallup, Washington

Reference: Earth Solutions NW, LLC
Geotechnical Engineering Study
Project No. ES-6614.01, dated August 5, 2021

Washington State Department of Ecology
2014 Stormwater Management Manual for Western Washington

Dear Mr. Clark:

As requested, Earth Solutions NW, LLC (ESNW) has prepared this letter summarizing the results of our infiltration testing and seasonal groundwater level monitoring on site.

Infiltration Feasibility

In-situ infiltration testing was completed in general accordance with the requirements of the referenced stormwater manual. One small-scale Pilot Infiltration Test (PIT) was completed at test location TP-104 at a depth of approximately two and one-half feet bgs. No measurable infiltration was recorded following the pre-soak period of the PIT. Based on the results of our testing, infiltration should be considered infeasible from a geotechnical standpoint.

Groundwater Level Monitoring

The seasonal groundwater level monitoring consisted of installing piezometers at test pit locations TP-101, TP-102, and TP-103; the approximate locations are depicted on Plate 2 (Test Pit Location Plan). Groundwater levels have been recorded daily using dataloggers from December 22, 2021 through May 5, 2022. ESNW personnel visited the site biweekly to download the collected data and perform manual measurements at each piezometer using a depth-to-water meter. The following table summarizes the groundwater level data collected during our monitoring program.

Location	Depth of Test Pit (ft)	Ground Elevation* (ft)	Peak GWT Depth† (ft bgs)	Peak GWT Elevation* (ft)	Peak Date
TP-101	10.0	60.0	0.0	60.0	01/14/2022
TP-102	9.0	60.0	0.0	60.0	01/14/2022
TP-103	9.0	60.0	0.0	60.0	01/14/2022

* *Elevations are approximate, based on readily available topographic survey data; piezometer locations have not been surveyed.*
† *Depth measured from existing ground surface.*

A groundwater level monitoring chart with the compilation of the data is attached to this letter, along with test pit logs and laboratory analyses from the December 2021 fieldwork.

We trust this letter meets your current needs. Should you have any questions regarding the content herein, or require additional information, please call.

Sincerely,

EARTH SOLUTIONS NW, LLC

06/02/2022

Samuel E. Suruda, L.G.
Senior Staff Geologist

Henry T. Wright, P.E.
Associate Principal Engineer

Attachments: Plate 1 – Vicinity Map
Plate 2 – Test Pit Location Plan
Test Pit Logs
Grain Size Distribution
Seasonal Groundwater Level Monitoring Chart

cc: Vector Engineering, Inc.
Attention: Mr. Ryan Moore, P.E. (Email only)

Modern Construction and Design, LLC
Attention: Mr. Robert Bruner (Email only)

Mr. Jack Richlen (Email only)

Reference:
Pierce County, Washington
OpenStreetMap.org

NORTH

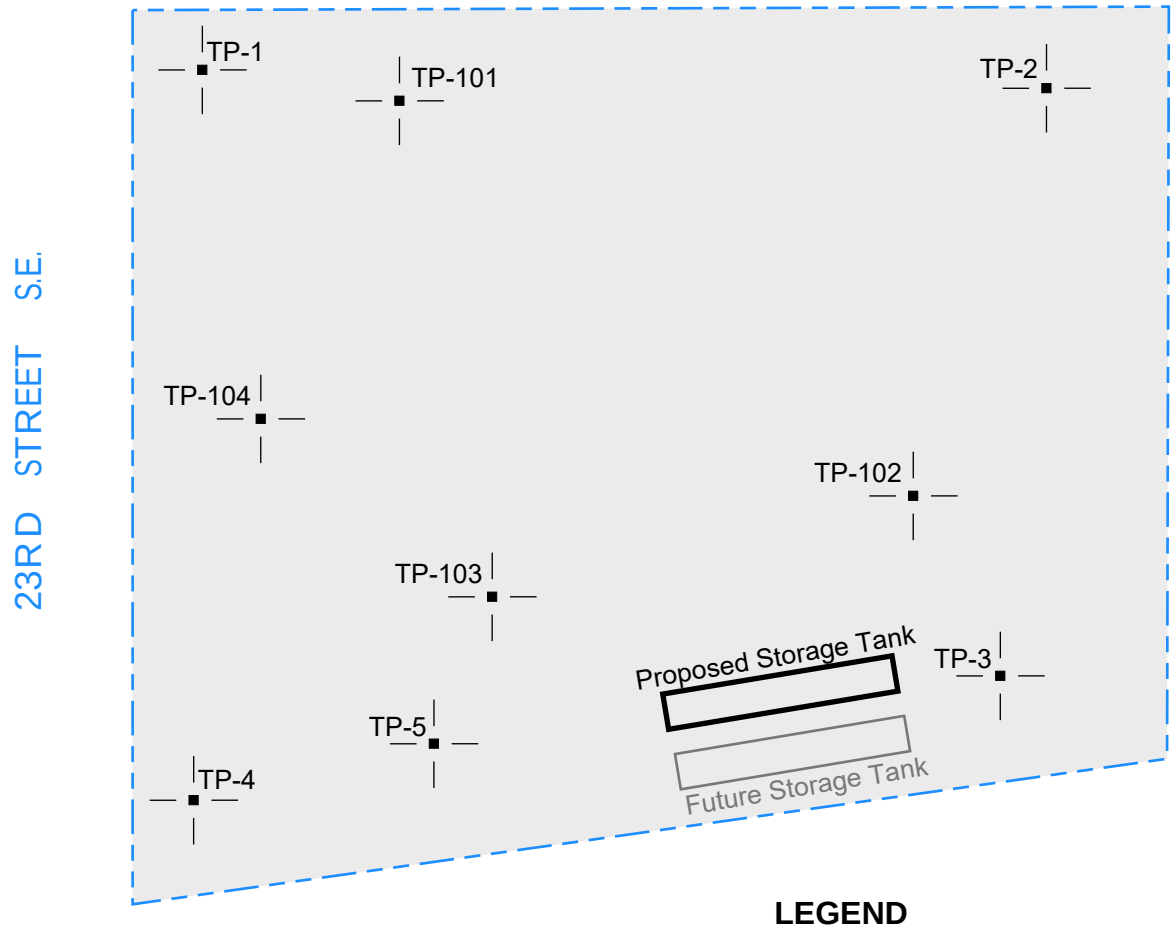
NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Vicinity Map
Genesee Energy
Puyallup, Washington

Drwn. CAM	Date 06/01/2022	Proj. No. 6614.02
Checked SES	Date June 2022	Plate 1



LEGEND

TP-101 — Approximate Location of ESNW Test Pit, Proj. No. ES-6614.02, Dec. 2021

TP-1 — Approximate Location of ESNW Test Pit, Proj. No. ES-6614.01, May 2021

Subject Site

NORTH

1"=40'

0 20 40 80

Scale in Feet

NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

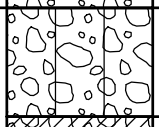
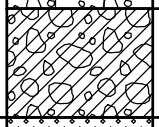
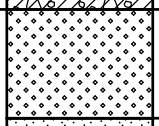
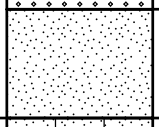
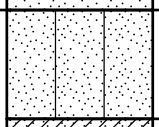
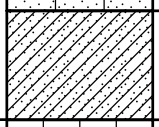
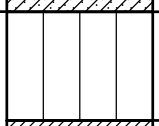
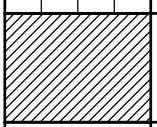
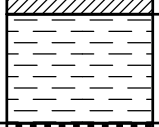
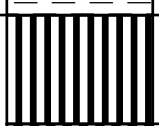
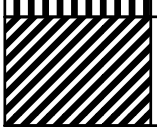
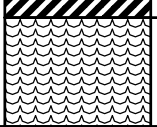
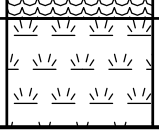
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Test Pit Location Plan
Genesee Energy
Puyallup, Washington

Drwn. CAM	Date 06/01/2022	Proj. No. 6614.02
Checked SES	Date June 2022	Plate 2

Earth Solutions NW LLC

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

DUAL SYMBOLS are used to indicate borderline soil classifications.

The discussion in the text of this report is necessary for a proper understanding of the nature of the material presented in the attached logs.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-101

PROJECT NUMBER ES-6614.02 **PROJECT NAME** Genesee Energy

DATE STARTED 12/21/21 **COMPLETED** 12/21/21 **GROUND ELEVATION** 60 ft

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18841 **LONGITUDE** -122.26433

EXCAVATION METHOD **GROUND WATER LEVEL:**

LOGGED BY SES **CHECKED BY** HTW ▽ **AT TIME OF EXCAVATION**

NOTES Surface Conditions: bare gravels

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0			GP		Gray poorly graded GRAVEL, dense, damp	
					0.5	59.5
			ML		Gray sandy SILT, loose to medium dense, moist	
2.5					-light groundwater seepage to BOH	
					-minor caving to BOH	
					4.0	56.0
			GM		Gray silty GRAVEL, loose to medium dense, wet	
5.0						
					-moderate caving	
7.5						
10.0		MC = 27.4%			10.0	50.0
					Test pit terminated at 10.0 feet below existing grade. Groundwater seepage encountered at 3.0 feet during excavation. Caving observed from 3.5 feet to BOH.	

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-102

PROJECT NUMBER ES-6614.02 **PROJECT NAME** Genesee Energy

DATE STARTED 12/21/21 **COMPLETED** 12/21/21 **GROUND ELEVATION** 60 ft

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18817 **LONGITUDE** -122.26403

EXCAVATION METHOD **GROUND WATER LEVEL:**

LOGGED BY SES **CHECKED BY** HTW ▽ **AT TIME OF EXCAVATION**

NOTES Surface Conditions: bare gravels

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			GP		Gray poorly graded GRAVEL, medium dense, damp
					0.5 59.5
			ML		Gray sandy SILT, loose to medium dense, moist
					-mottled texture
					-light groundwater seepage to BOH
2.5					
5.0					
					-moderate caving to BOH
					7.0 53.0
7.5			GM		Dark gray silty GRAVEL, loose to medium dense, wet
		MC = 27.1%			9.0 51.0
					Test pit terminated at 9.0 feet below existing grade. Groundwater seepage encountered at 2.0 feet during excavation. Caving observed from 6.5 feet to BOH.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-103

PROJECT NUMBER ES-6614.02 **PROJECT NAME** Genesee Energy

DATE STARTED 12/21/21 **COMPLETED** 12/21/21 **GROUND ELEVATION** 60 ft

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18815 **LONGITUDE** -122.26428

EXCAVATION METHOD **GROUND WATER LEVEL:**

LOGGED BY SES **CHECKED BY** HTW ▽ **AT TIME OF EXCAVATION**

NOTES Surface Conditions: bare gravels

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			GP		Gray poorly graded GRAVEL, medium dense, damp
				0.5	59.5
			ML		Gray sandy SILT, loose to medium dense, moist
2.5				3.0	57.0
			GM		Dark gray silty GRAVEL, loose to medium dense, wet -light groundwater seepage at 3' -moderate caving to BOH
5.0					
7.5		MC = 23.4%		9.0	51.0

Test pit terminated at 9.0 feet below existing grade. Groundwater seepage encountered at 3.0 feet during excavation. Caving observed from 4.5 feet to BOH.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-104

PROJECT NUMBER ES-6614.02 **PROJECT NAME** Genesee Energy

DATE STARTED 12/21/21 **COMPLETED** 12/21/21 **GROUND ELEVATION** 60 ft

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18823 **LONGITUDE** -122.26445

EXCAVATION METHOD **GROUND WATER LEVEL:**

LOGGED BY SES **CHECKED BY** HTW ▽ **AT TIME OF EXCAVATION**

NOTES Surface Conditions: bare gravels

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			GP		Gray poorly graded GRAVEL, dense, wet
0.5					59.5
			ML		Gray sandy SILT, loose to medium dense, wet, mottled texture
2.0					58.0
2.5		MC = 27.0% Fines = 22.5%	GM		Dark gray silty GRAVEL, loose to medium dense, wet -infiltration test at 2.5' [USDA Classification: extremely gravelly LOAM] -light groundwater seepage to BOH -moderate caving to BOH
5.0					
7.5					
10.0		MC = 26.2%			10.0 50.0 Test pit terminated at 10.0 feet below existing grade. Groundwater seepage encountered at 3.5 feet during excavation. Caving observed from 4.0 feet to BOH.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-1

PROJECT NUMBER ES-6614.01 **PROJECT NAME** Genesee Energy

DATE STARTED 5/21/21 **COMPLETED** 5/21/21 **GROUND ELEVATION** 60+-

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18846 **LONGITUDE** -122.264439

EXCAVATION METHOD **GROUND WATER LEVEL:**

LOGGED BY SES **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION** 7.0 ft

NOTES Surface Conditions: gravel pad

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			GP		Gray poorly graded GRAVEL, medium dense, damp (Fill)
				1.0	
			ML		Gray sandy SILT, loose to medium dense, wet
		MC = 40.3%			
		MC = 58.4%			-iron oxide staining
				4.0	
			SM		Black silty SAND, loose to medium dense, wet
5		MC = 20.5% Fines = 13.6%			[USDA Classification: slightly gravelly SAND]
					▽ -moderate caving to BOH
					-groundwater table
		MC = 30.6%		9.0	
					Test pit terminated at 9.0 feet below existing grade. Groundwater table encountered at 7.0 feet during excavation. Caving observed from 7.0 feet to BOH.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-2

PROJECT NUMBER ES-6614.01 **PROJECT NAME** Genesee Energy

DATE STARTED 5/21/21 **COMPLETED** 5/21/21 **GROUND ELEVATION** 60+-

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18839 **LONGITUDE** -122.26383

EXCAVATION METHOD **GROUND WATER LEVEL:**

LOGGED BY SES **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION** 6.5 ft

NOTES Surface Conditions: grass

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
		MC = 7.6%	SM		Brown silty SAND with gravel, medium dense, damp (Fill)
				1.5	-isolated concrete debris
					Gray sandy SILT, loose to medium dense, wet
		MC = 35.4% Fines = 78.1%	ML		[USDA Classification: slightly gravelly LOAM]
5				5.0	
			SM		Black silty SAND, loose to medium dense, wet
				▽	-groundwater table, minor caving to BOH
		MC = 28.6%		7.0	

Test pit terminated at 7.0 feet below existing grade. Groundwater table encountered at 6.5 feet during excavation. Caving observed from 6.5 feet to BOH.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-3

PROJECT NUMBER ES-6614.01 **PROJECT NAME** Genesee Energy

DATE STARTED 5/21/21 **COMPLETED** 5/21/21 **GROUND ELEVATION** 60+-

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18803 **LONGITUDE** -122.26386

EXCAVATION METHOD **GROUND WATER LEVEL:**

LOGGED BY SES **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION** 7.0 ft

NOTES Surface Conditions: gravel pad

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			GP		Gray poorly graded GRAVEL, medium dense, damp (Fill)
					-isolated asphalt pieces
				0.5	
			GM		Brown silty GRAVEL with sand, loose to medium dense, damp
				2.5	
		MC = 38.9%			Gray sandy SILT, loose to medium dense, wet
5			ML		
					▽ -groundwater table, minor caving to BOH
				8.0	

Test pit terminated at 8.0 feet below existing grade. Groundwater table encountered at 7.0 feet during excavation. Caving observed from 7.0 feet to BOH.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-4

PROJECT NUMBER ES-6614.01 **PROJECT NAME** Genesee Energy

DATE STARTED 5/21/21 **COMPLETED** 5/21/21 **GROUND ELEVATION** 60+-

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18204 **LONGITUDE** -122.26445

EXCAVATION METHOD **GROUND WATER LEVEL:**

LOGGED BY SES **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION** 6.5 ft

NOTES Surface Conditions: gravel pad

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
		MC = 54.9%	GP		Gray poorly graded GRAVEL with sand, medium dense, damp (Fill)
				1.0	
			SP-SM		Gray poorly graded SAND with silt, loose to medium dense, wet
				2.0	
		MC = 41.2%	ML		Gray sandy SILT, loose to medium dense, wet
		MC = 40.4%		4.5	
5			SM		Black silty SAND, loose to medium dense, wet
				6.0	
		MC = 65.8%	ML		▽ Gray sandy SILT, loose to medium dense, wet -groundwater table
				7.5	
		MC = 29.9% Fines = 13.9%	SM		Black silty SAND, loose to medium dense, wet [USDA Classification: black SAND]
				9.0	

Test pit terminated at 9.0 feet below existing grade. Groundwater table encountered at 6.5 feet during excavation. No caving observed.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-5

PROJECT NUMBER ES-6614.01 **PROJECT NAME** Genesee Energy

DATE STARTED 5/21/21 **COMPLETED** 5/21/21 **GROUND ELEVATION** 60+-

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.18802 **LONGITUDE** -122.26418

EXCAVATION METHOD **GROUND WATER LEVEL:**

LOGGED BY SES **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION** 6.5 ft

NOTES Surface Conditions: gravel pad

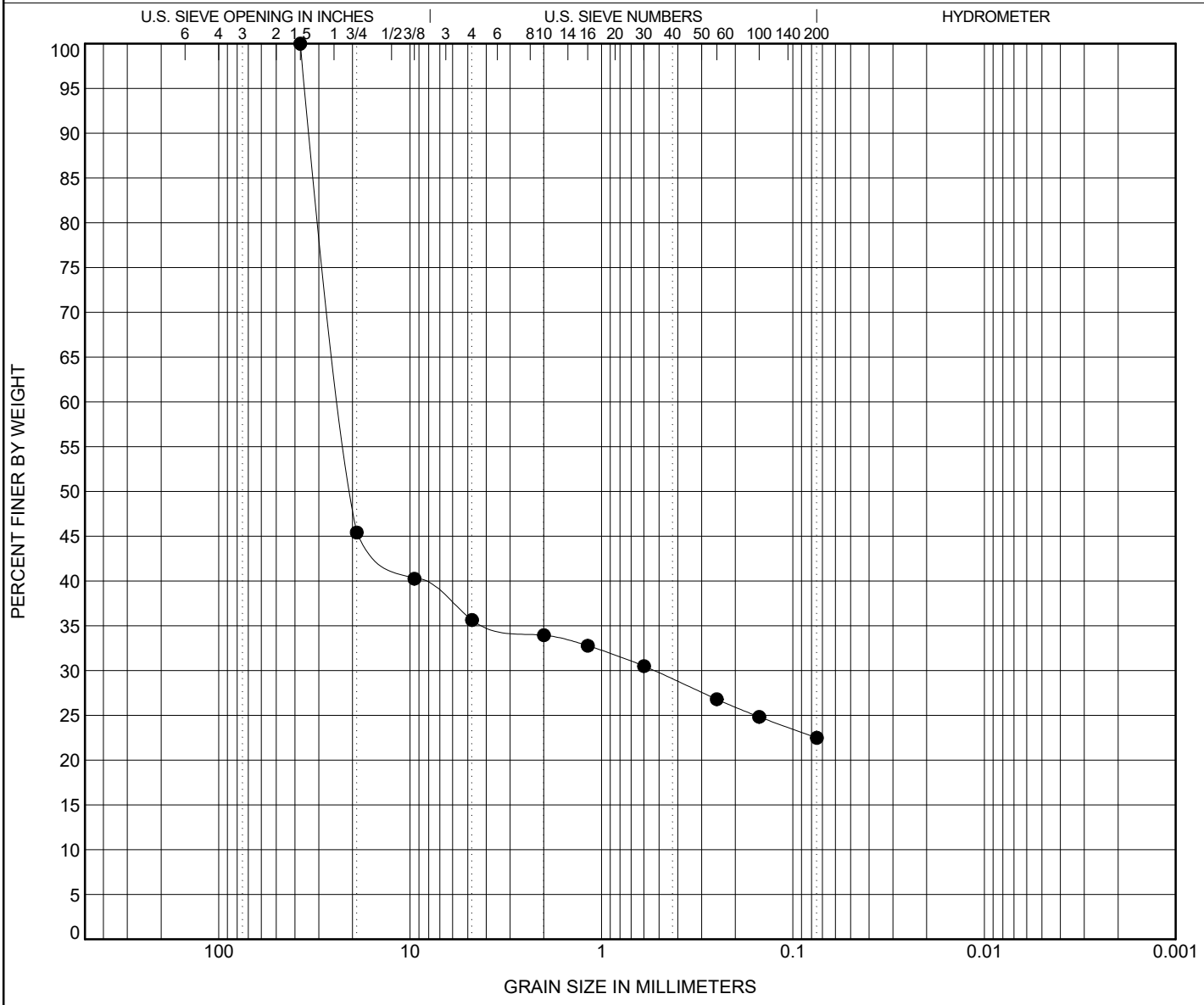
DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					
		MC = 61.5%	GP		Gray poorly graded GRAVEL, medium dense, damp (Fill)
				1.0	
			ML		Dark gray sandy SILT, loose to medium dense, wet
					-becomes gray
		MC = 21.9%		3.0	
			SM		Black silty SAND, loose to medium dense, wet
				4.5	
5			ML		Gray sandy SILT, loose to medium dense, wet
					-2" layer of MH at 5.5'
				5.5	
			SM		Black silty SAND, loose to medium dense, wet
				▽	-groundwater table
		MC = 39.3%		7.0	

Test pit terminated at 7.0 feet below existing grade. Groundwater table encountered at 6.5 feet during excavation. No caving observed.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

GRAIN SIZE DISTRIBUTION

PROJECT NUMBER ES-6614.02 **PROJECT NAME** Genesee Energy



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	Cc	Cu
● **TP-104**	**2.50ft.**	**USDA: Dk Gray Extremely Gravelly Loam. USCS: GM.**		

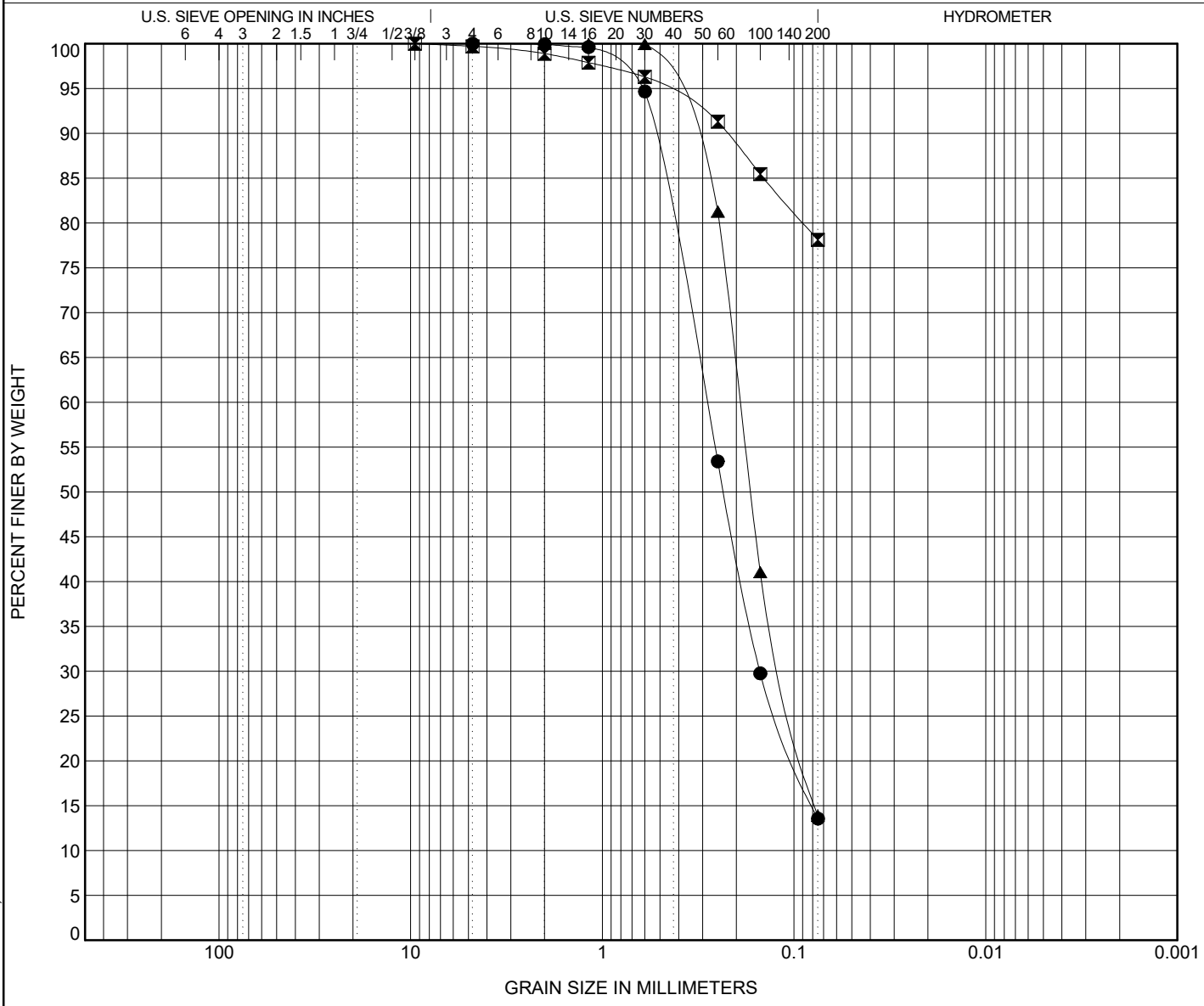
Specimen Identification		D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
● **TP-104**	**2.5ft.**	**37.5**	**22.785**	**0.534**					**22.5**	

GRAIN SIZE USDA ES-6614.02 GENESEE ENERGY.GPJ GINT US LAB.GDT 3/3/22

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

GRAIN SIZE DISTRIBUTION

PROJECT NUMBER ES-6614.01 **PROJECT NAME** Genesee Energy (fka. Ascendent Truck Storage)

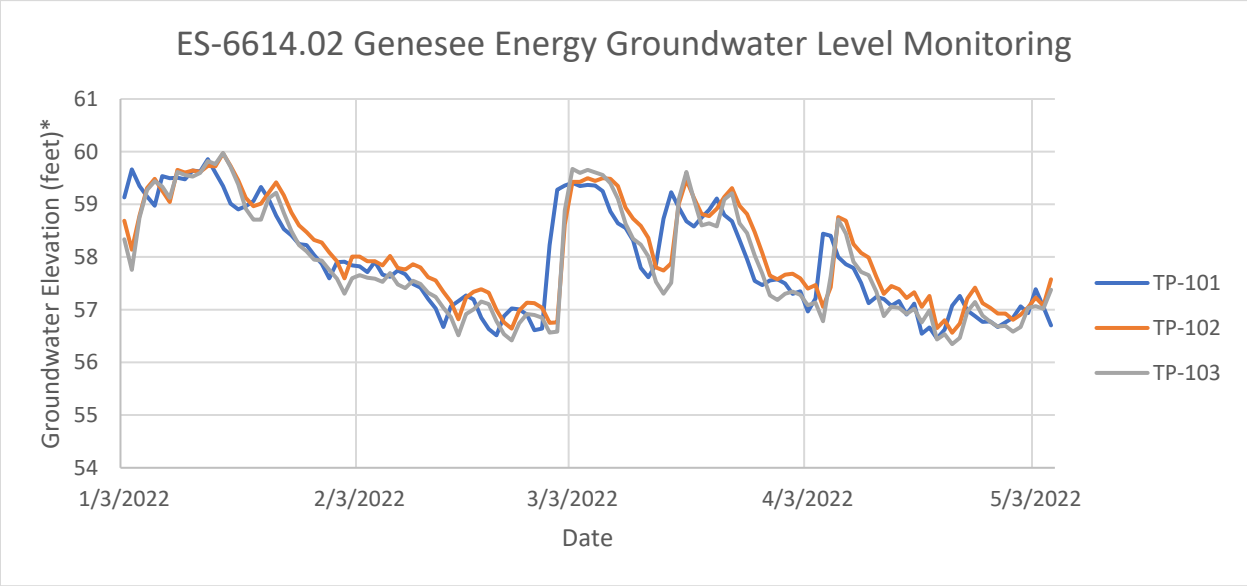


COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	Cc	Cu
●	TP-01	5.00ft.	USDA: Black Slightly Gravelly Sand. USCS: SM.		
⊠	TP-02	3.00ft.	USDA: Gray Slightly Gravelly Loam. USCS: ML with Sand.		
▲	TP-04	9.00ft.	USDA: Black Sand. USCS: SM.		

Specimen Identification			D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
●	TP-01	5.0ft.	4.75	0.287	0.151					13.6	
⊠	TP-02	3.0ft.	9.5							78.1	
▲	TP-04	9.0ft.	2	0.191	0.113					13.9	

Seasonal Groundwater Level Monitoring Chart



* The elevation is approximated, the surface grades at the piezometers have not been surveyed.

Appendix F

Operations & Maintenance Manuals

After recording return to:

City Clerk
City of Puyallup
333 South Meridian
Puyallup, WA 98371

info@puyallupwa.gov

Document Title: Stormwater Outfall Management & BMP Facilities Agreement
Grantee: City of Puyallup
Grantor: _____
Legal Description: _____
Complete Legal Description on ____ Page of this Document
Assessor's Tax Parcel or Account Numbers: _____
Reference Number of Related Document(s): _____

Stormwater Management & BMP Facilities Agreement

A. Parties. The parties to this agreement are Grantee City of Puyallup, a Washington State municipal corporation (City), and Grantor landowner _____ (Landowner).

B. Property. Landowner is the owner of certain real property (Property), which is legally described in this document and is located at the following address: _____.

C. Development Plan & Stormwater Facilities. The site, subdivision or other development plan (Plan) for the Property, specifically known, entitled or described as _____, provides for detention, retention, treatment or management of stormwater that is associated with the Property through the use of identified stormwater facilities or best management practices (collectively, Stormwater Facilities). Upon approval of the Plan by the City, the Plan shall be incorporated herein by this reference. In accordance with the Plan, Landowner shall adequately construct, operate, use, maintain and repair the Stormwater Facilities.

D. Agreement. On the terms and conditions set forth herein, the City and Landowner agree as follows:

1. The Stormwater Facilities shall be constructed, operated, used, maintained and repaired by Landowner in accordance with the requirements of the Plan, and any other applicable law or regulation.
2. Landowner (which expressly includes its agents, successors and assigns, including any homeowners association) shall adequately and properly operate, use, maintain and repair the Stormwater Facilities as described in the maintenance and operations manual, which is on file with the City, and may be attached and recorded herewith as Exhibit ____. This duty extends to all associated pipes and channels, as well as all structures, improvements, and vegetation that are provided to control the quantity and quality of the stormwater. Adequate maintenance shall mean maintenance that is sufficient to keep the Stormwater Facilities in good working order and operating so as to satisfy the design and performance standards of the Plan.
3. Landowner shall regularly inspect the Stormwater Facilities and shall submit an inspection report to the City at least once a year on a date prescribed by the City. The purpose of the inspection(s) is to ensure that the Stormwater Facilities are safe and functioning properly. The scope of the inspection shall include the entire Stormwater Facilities, including but not limited to, berms, outlet structures, pond areas, access roads, and so forth. Deficiencies and any performance or other related issues shall be noted by Landowner in the inspection report. The annual report shall be in a form and include content as prescribed from time to time by the City. An example copy of the report form may be attached hereto as Exhibit _____.
4. Landowner hereby grants permission to the City to enter upon the Property to inspect the Stormwater Facilities. Except in case of emergency, the City shall provide Landowner with at least forty-eight (48) hours written notice prior to entering on to the Property. Landowner shall be entitled to have a representative accompany the City during such inspection. The City shall provide Landowner with copies of written inspection reports.
5. If Landowner fails to adequately and properly operate, use, maintain or repair the Stormwater Facilities, the City shall notify Landowner in writing and provide Landowner with a reasonable opportunity to cure. If Landowner fails to timely cure, then the City may enter upon the Property and remedy the issue(s) identified in the notice and those reasonably related thereto; Furthermore, if the City performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like while remedying the identified issues, the City may charge the cost of the remedy to Landowner, and Landowner shall promptly pay the costs to the City. Notwithstanding the foregoing, the City shall be under no obligation to inspect, maintain or repair the Stormwater Facilities.
6. Landowner shall defend, indemnify and hold the City, its officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with activities or operations, performed by Landowner, or on Landowner's behalf, that relate to the Stormwater Facilities and the subject matter of this agreement, except for injuries and damages caused by the negligence of the City.

E. Covenant. The terms and provisions of this agreement constitute a covenant, which is subject to the following: This covenant is an equitable covenant. It touches and concerns the land that is described as the Property herein. The parties intend that this covenant shall bind the parties' successor and assigns. This covenant shall run with the land that is described as the Property herein, and shall bind whoever has possession of the land, in whole or in part, without regard to whether the possessor has title, or has succeeded to the same estate that granting parties have or had. Possessors shall include, but are not limited to, leasehold tenants, contract purchasers, subtenants, and adverse possessors. This covenant shall run with the land even in the absence of the transfer of some interest in land, other than the covenant itself, between Landowner and the City. This covenant shall not be governed by the mutuality rule. The burden of the covenant can run independently from the benefit of the covenant, and the benefit need not run. The benefit may be in gross or personal to Landowner or the City. Landowner waives its right to assert any defenses to the enforcement of this covenant, including, but not limited to, the change of neighborhood doctrine, laches, estoppel, balancing of hardships, and abandonment. If Landowner breaches any term of this covenant and agreement, then all remedies in equity and at law, including, but not limited to, injunctions, mandamus, declaratory judgments, and damages, shall be available to the City.

F. Governing Law & Venue. This agreement shall be governed by and construed in accordance with the laws of the State of Washington. The venue for any action that arises from or out of this instrument shall be the Pierce County Superior Court.

<signature page to follow>

This page intentionally left blank.

Exhibit A

Exhibit B

Annual Inspection Report

City of Puyallup - Stormwater BMP Facilities Inspection and Maintenance Log

Facility Name .....

Address .....

Begin Date ..... End Date .....

Date	BMP ID#	BMP Facility Description	Inspected by:	Cause for Inspection	Exceptions Noted	Comments and Actions Taken

Instructions:

Record all inspections and maintenance for all treatment BMPs on this form. Use additional log sheets and/or attach extended comments or documentation as necessary. Submit a copy of the completed log with the Annual Independent Inspectors' Report to the City, and start a new log at that time.

BMP ID# — Always use ID# from the Operation and Maintenance Manual.
Inspected by — Note all inspections and maintenance on this form, including the required independent annual inspection.
Cause for inspection — Note if the inspection is routine, pre-rainy-season, post-storm, annual, or in response to a noted problem or complaint.
Exceptions noted — Note any condition that requires correction or indicates a need for maintenance.
Comments and actions taken — Describe any maintenance done and need for follow-up.

Return Form to: Stormwater Engineer/City of Puyallup
333 South Meridian
Puyallup, WA 98371

Annual Inspection Report

City of Puyallup - Stormwater BMP Facilities Inspection and Maintenance Log

Facility Name _____

Date	BMP ID#	BMP Facility Description	Inspected by:	Cause for Inspection	Exceptions Noted	Comments and Actions Taken