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PRELIMINARY STORMWATER NARRATIVE FOR

GENESEE ENERGY
PROPONE BULK PLANT

412 23rd St SE
Puyallup, WA 98372

Owner
Genesee Energy
3616 S Genesee St
Seattle, WA 98118

Engineer/Contact
Ryan Moore
Vector Engineering, Inc
2724 Black Lake Blvd SW
Suite 202
(360) 352-2477

VEI Job # 2021 – Genesee (Propone Bulk Plant)

Section 1 – Proposed Project Description

Genesee Propane Bulk Plant is the proposed new development of a 1.13-Acre parcel in Puyallup, WA. The proposed site is located at 412 23rd St SE, Puyallup, WA and consists of Parcel No. 2105200303. The site is bordered by private businesses to the north, east, and west. Burlington Northern Railroad to the south.

The proposed development includes construction of a 3200-sf office/shop on a commercial site. Development also includes a 30,000 gallon propane tank at the south end of the site, as shown on the plans.

The City of Puyallup is the permitting jurisdiction for the site; therefore, the proposal will meet the requirements of the 2012 Edition of the *Stormwater Management Manual for Western Washington* as amended in December, 2014 (hereinafter referred to as the "Manual"). The proposed site is zoned as ML and the existing site has no previous development.

The United States Department of Agriculture National Resources Conservation Site (USDA NRCS) maps most onsite soils as Briscot Loam, 0 to 2 percent slopes. Briscot Loam soils are of hydrologic soil group [B] per the USDA Natural Resources Conservation Service. USDA Soil map is attached. There is also a full geotechnical report completed by Earth Solutions NW LLC attached.

Pending the necessary permit approvals, the applicant anticipates a Summer construction start date.

Section 2 – Temporary Erosion Control Plan

There will be a temporary erosion control plan in place for the life the project construction. The temporary erosion control plan includes BMPs such as BMP C105: Stabilized Construction Entrance, BMP C103: High Visibility Fence, BMP C123: Plastic Covering, BMP C220: Storm Drain Inlet Protection, BMP C233: Silt Fence. Placement of all BMPs mentioned is shown on the attached plan sheet.

Section 3 – Drainage Plan

The proposed permanent stormwater management plan consists of storing and infiltrating runoff from the site in underground storage tanks. The existing stormwater system that runs along Inter Ave will need to be extended south along the length of 23rd St to capture runoff from the proposed vehicles access points as well as emergency overflow from the proposed storage facility. There are a proposed number of 4 catch basins in the street (23rd st) and 4 catch basins on the actual site totaling 8 proposed catch basins. Runoff from the proposed office building will be tightlined to the storm system in the street as it does not require treatment. All remaining runoff from parking areas and storage areas will be captured in catch basins and then stored in the proposed storage tanks (as shown on plans). WWHM stormwater calculations report is attached to this narrative.

Certification:

"I hereby state that this Drainage and Erosion Control Plan/Construction SWPPP for the Genesee project has been prepared by me, or under my supervision, and meets the requirements of the King County Municipal Code and the standard of care and expertise which is usual and customary in this community for professional engineers. I understand that Thurston County does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me."

Signature

4-1-21
Date

Ryan Moore, P.E.
Project Manager

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

4/1/22

List of Appendices:

A. NRCS Soils Map and Legend
B. Geotechnical Report
C. Temporary Erosion Control Plan
D. WWHM Calculations Report

Appendix A

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.

Appendix B

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

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Cont'd

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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.

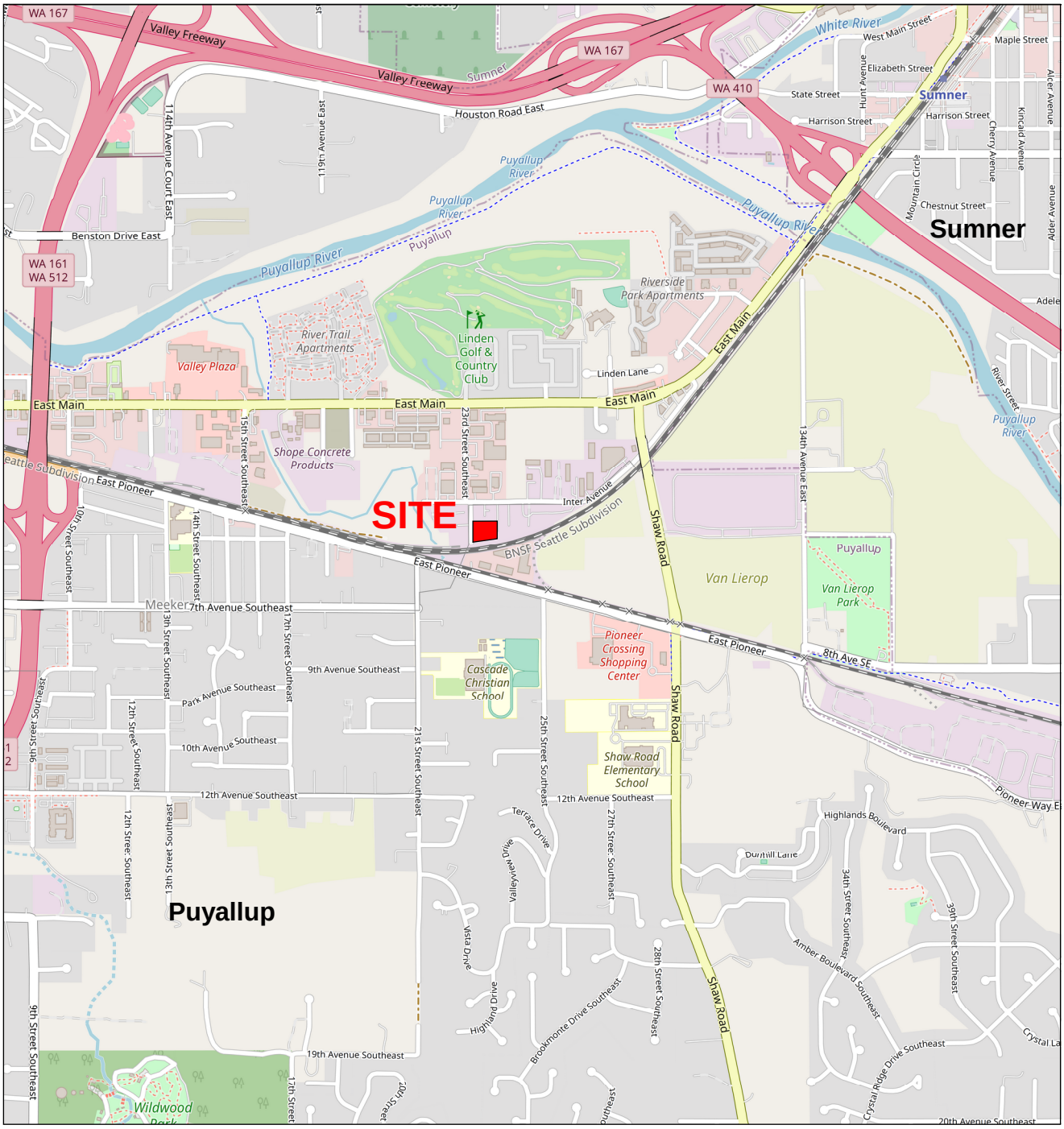
The HMA, CRB and ATB materials should conform to WSDOT specifications. The City of Puyallup minimum pavement requirements may supersede our recommendations and may require thicker pavement sections.

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

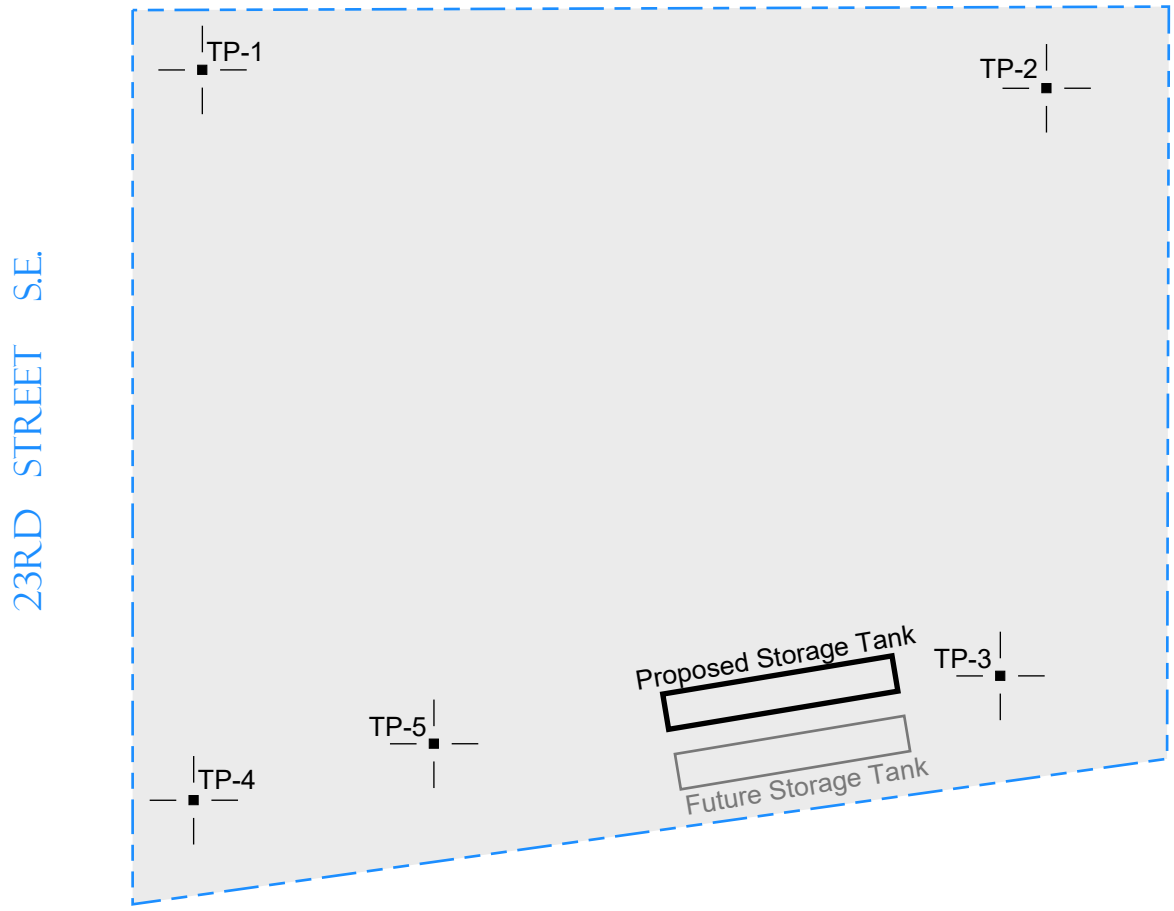
Earth Solutions NW LLC

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

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.



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.

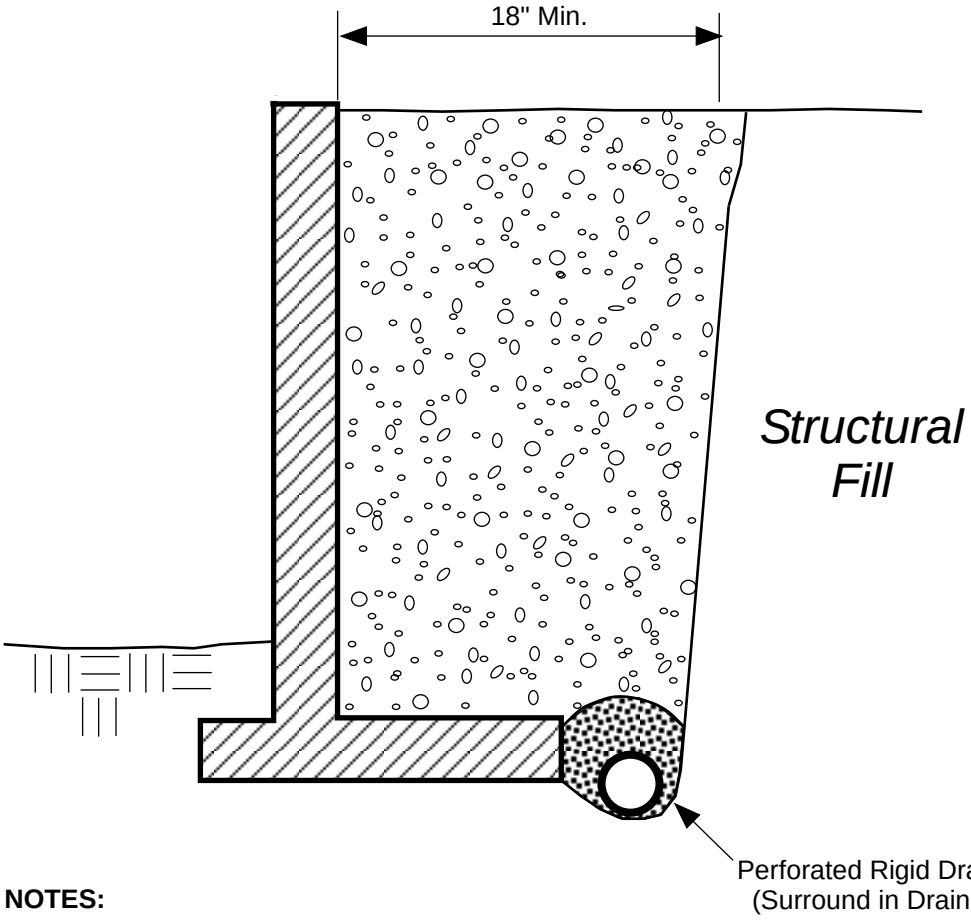
NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

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:

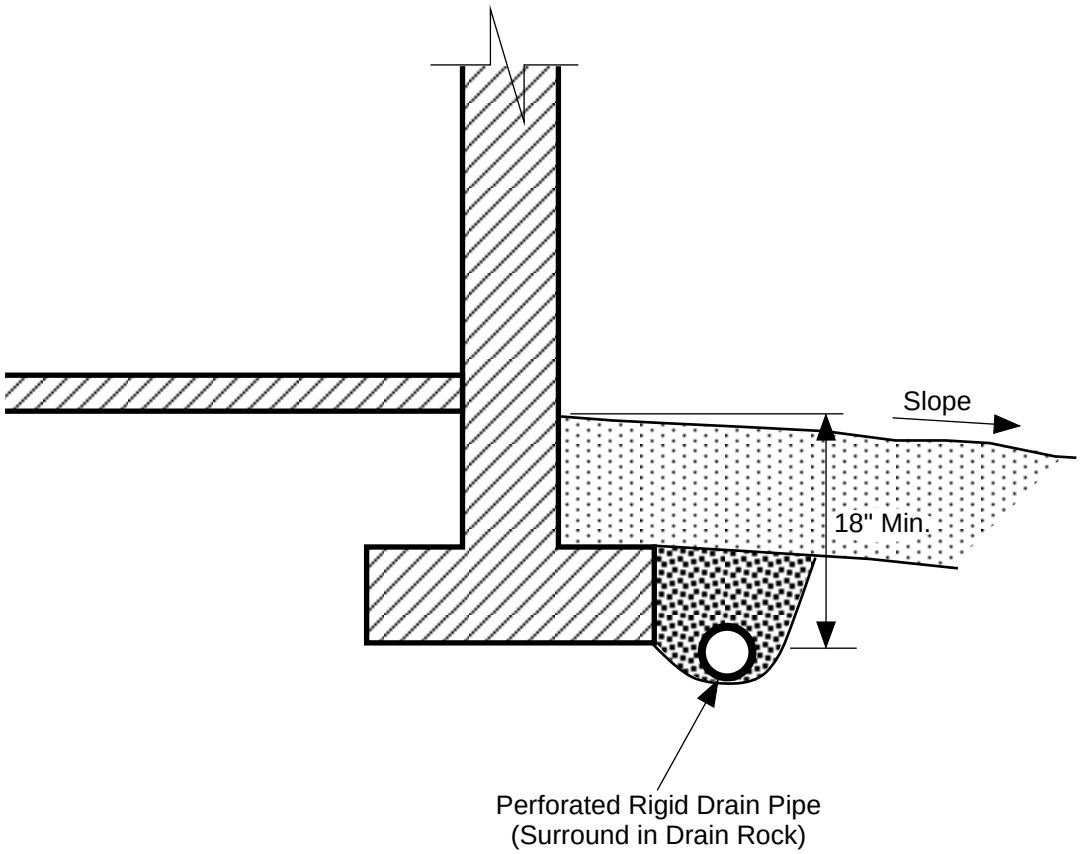
Free-draining Structural Backfill

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

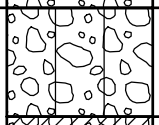
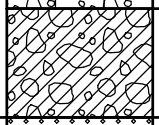
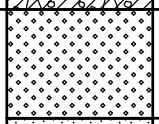
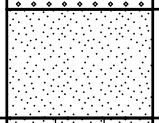
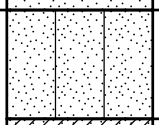
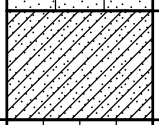
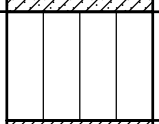
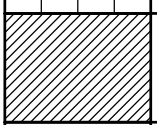
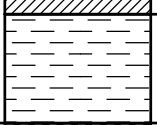
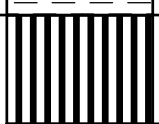
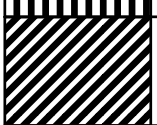
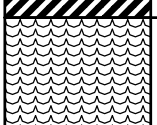
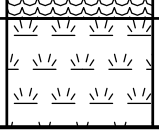
Subsurface Exploration
Test Pit Logs

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

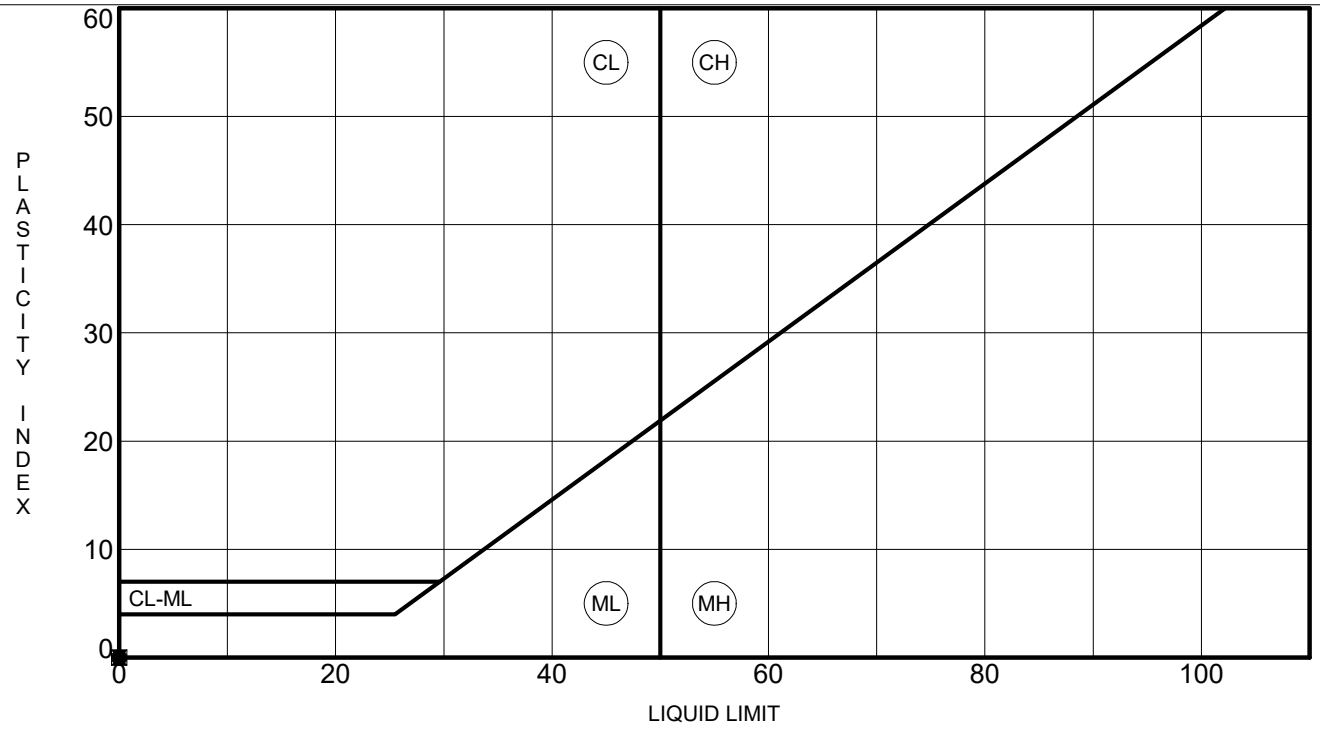
Laboratory Test Results

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

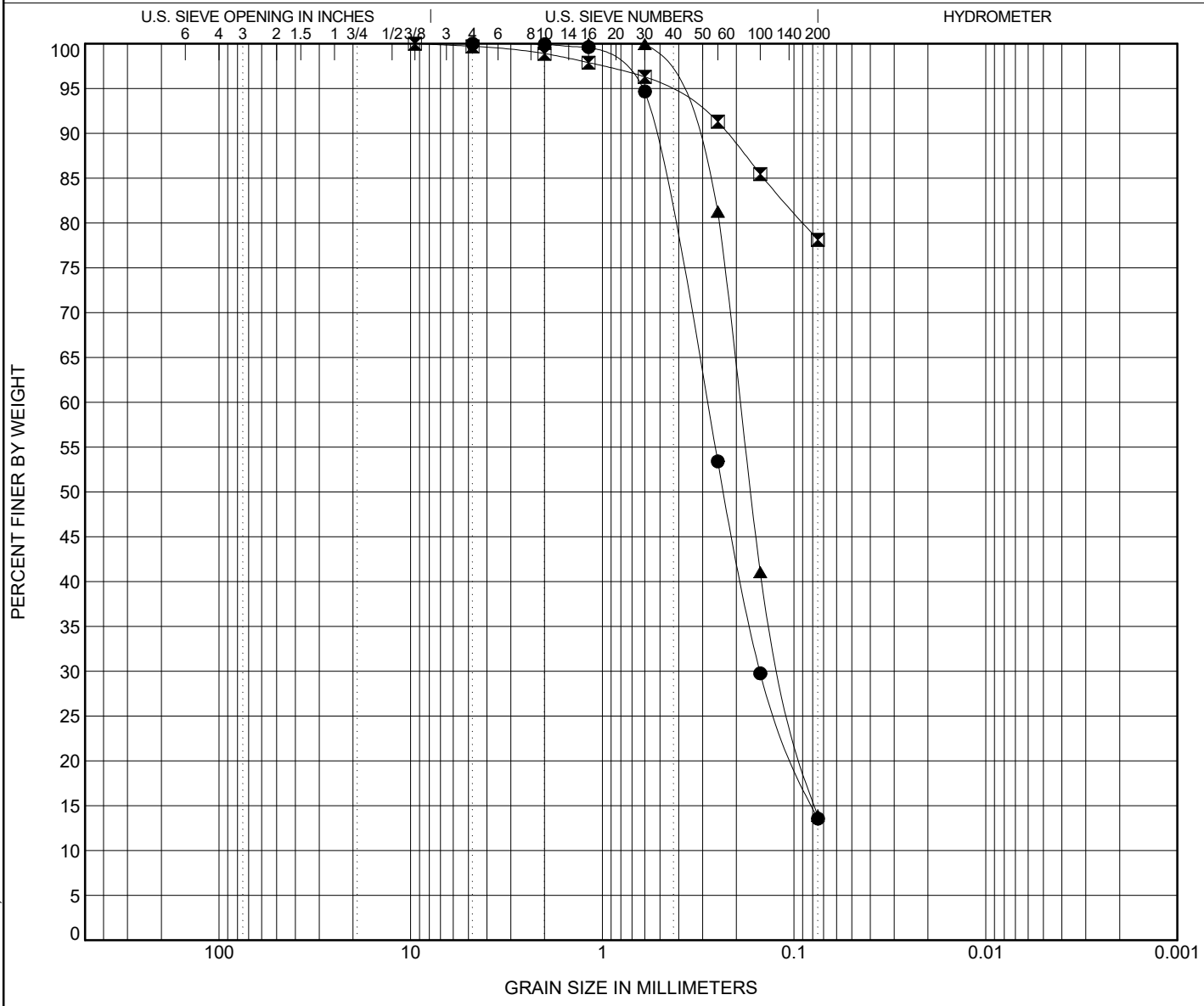


	Specimen Identification		LL	PL	PI	Fines	Classification
●	**TP-01**	**2.0**	**NP**	**NP**	**NP**	**30.6**	**-**
⧓	**TP-04**	**7.0**	**NP**	**NP**	**NP**	**65.7**	**-**

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

Appendix C

GENESEE PROPANE BULK PLANT
TESC PLAN
SN 26, T20N, R04E

CONSTRUCTION NOTES

1. BMP C105: STABILIZED CONSTRUCTION ENTRANCE
2. BMP C103: HIGH VISIBILITY PLASTIC FENCE
3. BMP C233: SILT FENCE
4. BMP C220: STORM DRAIN INLET PROTECTION
5. BMP C123: PLASTIC COVERING

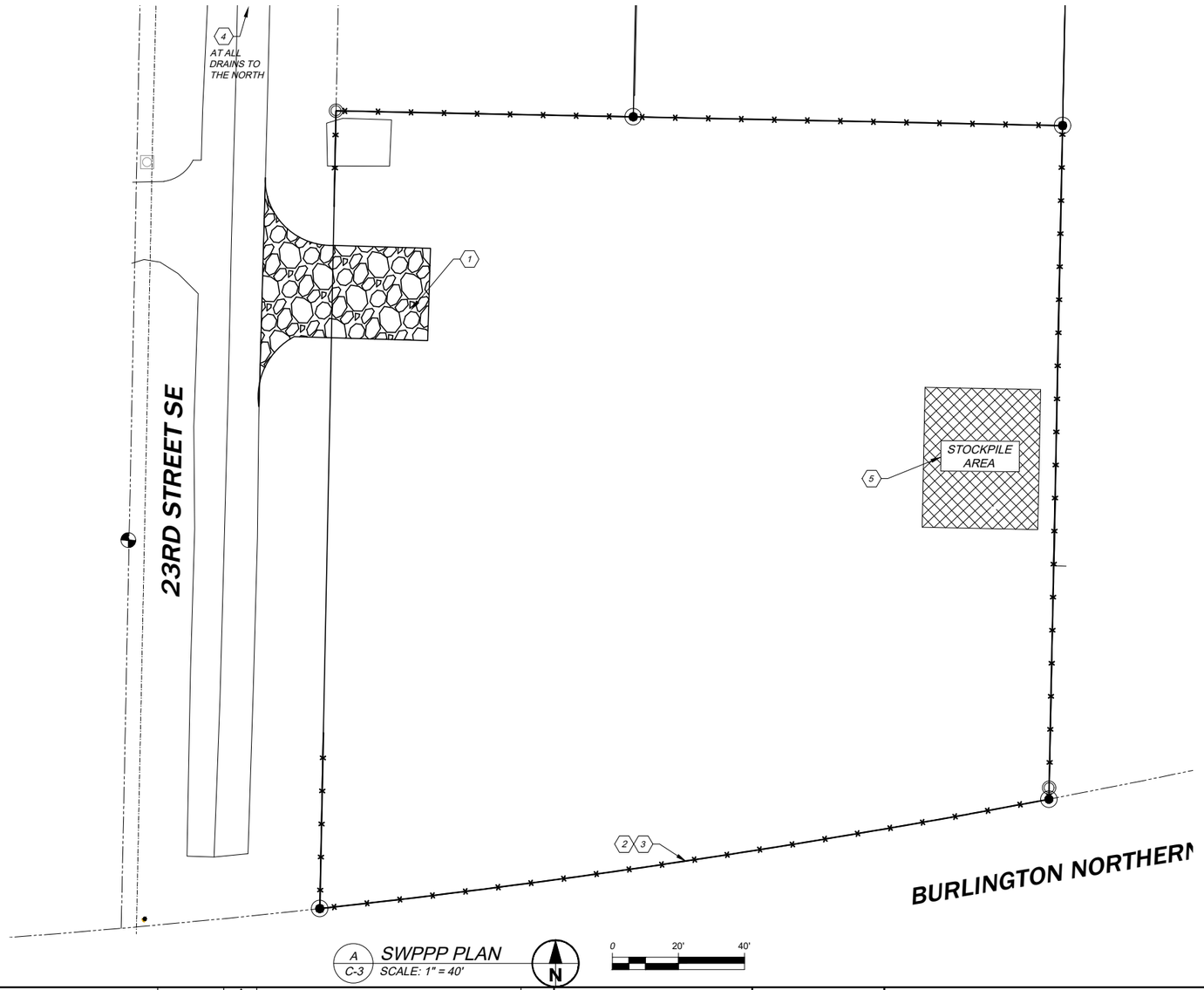
LEGEND

HATCH

STABILIZED ENTRANCE

LINES

HIGH VISIBILITY / SILT FENCE



A / C-3 SWPPP PLAN
SCALE: 1" = 40'

STANDARD EROSION CONTROL 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 (HERINAFTER 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 CITY ENGINEER 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 HOURS IN ADVANCE. THE OWNER AND HIS/HER ENGINEER SHALL BE CONTACTED IMMEDIATELY IF A CONFLICT EXISTS.
7. ALL LIMITS OF CLEARING AND AREAS OF VEGETATION PRESERVATION AS PRESCRIBED ON THE PLANS SHALL BE CLEARLY FLAGGED IN THE FIELD AND OBSERVED DURING CONSTRUCTION.
8. ALL REQUIRED SEDIMENTATION AND EROSION CONTROL FACILITIES MUST BE CONSTRUCTED AND IN OPERATION PRIOR TO ANY LAND CLEARING AND/OR OTHER CONSTRUCTION TO ENSURE THAT SEDIMENT LADEN WATER DOES NOT ENTER THE NATURAL DRAINAGE SYSTEM. THE CONTRACTOR SHALL SCHEDULE AN INSPECTION OF THE EROSION CONTROL FACILITIES PRIOR TO ANY LAND CLEARING AND/OR OTHER CONSTRUCTION. ALL EROSION AND SEDIMENT FACILITIES SHALL BE MAINTAINED IN A SATISFACTORY CONDITION AS DETERMINED BY THE CITY, UNTIL SUCH TIME THAT CLEARING AND/OR CONSTRUCTION IS COMPLETED AND THE POTENTIAL FOR ON-SITE EROSION HAS PASSED. THE IMPLEMENTATION, MAINTENANCE, REPLACEMENT, AND ADDITIONS TO THE EROSION AND SEDIMENTATION CONTROL SYSTEMS SHALL BE THE RESPONSIBILITY OF THE PERMITTEE.
9. THE EROSION AND SEDIMENTATION CONTROL SYSTEM FACILITIES DEPICTED ON THESE PLANS ARE INTENDED TO BE MINIMUM REQUIREMENTS TO MEET ANTICIPATED SITE CONDITIONS. AS CONSTRUCTION PROGRESSES AND UNEXPECTED OR SEASONAL CONDITIONS DICTATE, FACILITIES WILL BE NECESSARY TO ENSURE COMPLETE SILTATION CONTROL ON THE SITE. DURING THE COURSE OF CONSTRUCTION, IT SHALL BE THE OBLIGATION AND RESPONSIBILITY OF THE PERMITTEE TO ADDRESS ANY NEW CONDITIONS THAT MAY BE CREATED BY HIS ACTIVITIES AND TO PROVIDE ADDITIONAL FACILITIES, OVER AND ABOVE THE MINIMUM REQUIREMENTS, AS MAY BE NEEDED TO PROTECT ADJACENT PROPERTIES, SENSITIVE AREAS, NATURAL WATER COURSES, AND/OR STORM DRAINAGE SYSTEMS.
10. APPROVAL OF THESE PLANS IS FOR GRADING, TEMPORARY DRAINAGE, EROSION AND SEDIMENTATION CONTROL ONLY. IT DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT STORM DRAINAGE DESIGN, SIZE OR LOCATION OF PIPES, RESTRICTORS, CHANNELS, OR RETENTION FACILITIES.
11. ANY DISTURBED AREA WHICH HAS BEEN STRIPPED OF VEGETATION AND WHERE NO FURTHER WORK IS ANTICIPATED FOR A PERIOD OF 30 DAYS OR MORE, MUST BE IMMEDIATELY STABILIZED WITH MULCHING, GRASS PLANTING, OR OTHER APPROVED EROSION CONTROL TREATMENT APPLICABLE TO THE TIME OF YEAR IN QUESTION. GRASS SEEDING ALONE WILL BE ACCEPTABLE ONLY DURING THE MONTHS OF APRIL THROUGH SEPTEMBER INCLUSIVE. SEEDING MAY PROCEED OUTSIDE THE SPECIFIED TIME PERIOD WHENEVER IT IS IN THE INTEREST OF THE PERMITTEE BUT MUST BE AUGMENTED WITH MULCHING, NETTING, OR OTHER TREATMENT APPROVED BY THE CITY.
12. IN CASE EROSION OR SEDIMENTATION OCCURS TO ADJACENT PROPERTIES, ALL CONSTRUCTION WORK WITHIN THE DEVELOPMENT THAT WILL FURTHER AGGRAVATE THE SITUATION MUST CEASE, AND THE OWNER/CONTRACTOR WILL IMMEDIATELY COMMENCE RESTORATION METHODS. RESTORATION ACTIVITY WILL CONTINUE UNTIL SUCH TIME AS THE AFFECTED PROPERTY OWNER IS SATISFIED.
13. NO TEMPORARY OR PERMANENT STOCKPILING OF MATERIALS OR EQUIPMENT SHALL OCCUR WITHIN CRITICAL AREAS OR ASSOCIATED BUFFERS, OR THE CRITICAL ROOT ZONE FOR VEGETATION PROPOSED FOR RETENTION.

MAINTENANCE OF STORM DRAIN INLET PROTECTION

1. SILTATION BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. CLOSE ATTENTION SHALL BE PAID TO THE REPAIR OF DAMAGED EROSION CONTROL ELEMENTS, ESPECIALLY END-RUNS AND SEDIMENT BUILD-UP. NECESSARY REPAIRS TO BARRIERS SHALL BE ACCOMPLISHED THE SAME DAY.
2. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH RAINFALL. SEDIMENT DEPOSITS MUST BE REMOVED WHEN THE SEDIMENT LEVEL REACHES APPROXIMATELY ONE-HALF THE SILTATION BARRIER HEIGHT.
3. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE CHECK DAM IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.

FILE: PLAN SET 1.22.22.dwg		5		
PROJECT: 21-GEN		4		
		3		
CHECKED BY: RLM		2		
DETAILED BY: KML		1		
DESIGNED BY: KML	DATE	NO.	REVISION	BY

PERMIT SET

BRADLEY L. MOORE — STATE OF WASHINGTON — 42804 — REGISTERED PROFESSIONAL ENGINEER
4/1/22

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-3
SWPPP PLAN
SHT 3 OF 7

X:\2021 Jobs\Genesee (Propane Bulk Plant)\Engineering\Drawing File\Preliminary Drawings\PLAN SET 1.22.22.dwg - Apr 01, 2022 - 2:28pm

Appendix D

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	default[4]
Site Name:	Genesee Bulk Plant
Site Address:	412 23rd St SE
City:	Puyallup
Report Date:	3/28/2022
Gage:	
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2019/09/13
Version:	4.2.17

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	1.131
Pervious Total	1.131
Impervious Land Use	acre
Impervious Total	0
Basin Total	1.131

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	0.152
Pervious Total	0.152

Impervious Land Use	acre
ROOF TOPS FLAT	0.125
DRIVEWAYS FLAT	0.854
Impervious Total	0.979
Basin Total	1.131

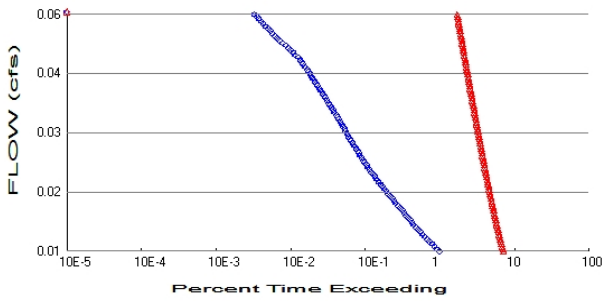
Element Flows To:

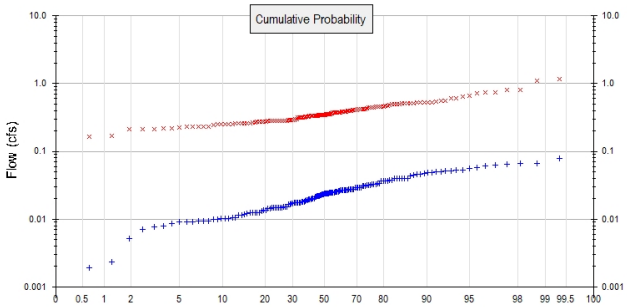
Surface	Interflow	Groundwater

Mitigated Routing

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.131
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.152
Total Impervious Area: 0.979

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.023833
5 year	0.037078
10 year	0.044274
25 year	0.051599
50 year	0.055952
100 year	0.059532

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.349164
5 year	0.470901
10 year	0.559702
25 year	0.681593
50 year	0.779672
100 year	0.884193

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1902	0.017	0.406
1903	0.015	0.450
1904	0.024	0.535
1905	0.011	0.231
1906	0.005	0.256
1907	0.037	0.355
1908	0.027	0.286
1909	0.027	0.346
1910	0.037	0.336
1911	0.024	0.381

1912	0.079	0.663
1913	0.038	0.269
1914	0.009	1.162
1915	0.015	0.235
1916	0.024	0.433
1917	0.008	0.163
1918	0.025	0.346
1919	0.019	0.216
1920	0.024	0.291
1921	0.027	0.248
1922	0.027	0.396
1923	0.022	0.271
1924	0.010	0.501
1925	0.012	0.212
1926	0.023	0.407
1927	0.015	0.332
1928	0.018	0.251
1929	0.038	0.503
1930	0.024	0.515
1931	0.023	0.252
1932	0.018	0.272
1933	0.017	0.268
1934	0.050	0.452
1935	0.023	0.228
1936	0.020	0.325
1937	0.032	0.475
1938	0.020	0.234
1939	0.001	0.293
1940	0.022	0.516
1941	0.010	0.509
1942	0.033	0.397
1943	0.017	0.386
1944	0.031	0.563
1945	0.027	0.417
1946	0.015	0.331
1947	0.009	0.252
1948	0.051	0.349
1949	0.044	0.532
1950	0.012	0.301
1951	0.015	0.455
1952	0.067	0.549
1953	0.060	0.503
1954	0.022	0.284
1955	0.018	0.260
1956	0.009	0.256
1957	0.031	0.280
1958	0.065	0.358
1959	0.040	0.361
1960	0.011	0.275
1961	0.040	0.800
1962	0.022	0.339
1963	0.010	0.249
1964	0.011	0.749
1965	0.045	0.333
1966	0.013	0.275
1967	0.019	0.395
1968	0.020	0.325
1969	0.020	0.294

1970	0.031	0.340
1971	0.048	0.332
1972	0.031	1.095
1973	0.040	0.611
1974	0.022	0.450
1975	0.051	0.489
1976	0.027	0.509
1977	0.009	0.211
1978	0.045	0.373
1979	0.012	0.377
1980	0.026	0.374
1981	0.025	0.347
1982	0.010	0.283
1983	0.040	0.390
1984	0.016	0.388
1985	0.027	0.450
1986	0.024	0.223
1987	0.045	0.383
1988	0.029	0.232
1989	0.026	0.211
1990	0.029	0.283
1991	0.023	0.424
1992	0.033	0.392
1993	0.032	0.448
1994	0.048	0.317
1995	0.009	0.242
1996	0.052	0.330
1997	0.020	0.291
1998	0.024	0.352
1999	0.002	0.370
2000	0.018	0.331
2001	0.009	0.261
2002	0.033	0.504
2003	0.029	0.281
2004	0.027	0.418
2005	0.049	0.798
2006	0.015	0.372
2007	0.015	0.423
2008	0.025	0.346
2009	0.017	0.261
2010	0.015	0.339
2011	0.012	0.353
2012	0.017	0.333
2013	0.014	0.318
2014	0.010	0.299
2015	0.019	0.533
2016	0.008	0.314
2017	0.037	0.508
2018	0.067	0.319
2019	0.062	0.474
2020	0.020	0.378
2021	0.033	0.316
2022	0.014	0.529
2023	0.028	0.648
2024	0.052	0.731
2025	0.025	0.337
2026	0.040	0.371
2027	0.014	0.413

2028	0.012	0.162
2029	0.027	0.272
2030	0.050	0.532
2031	0.017	0.169
2032	0.009	0.283
2033	0.015	0.355
2034	0.014	0.278
2035	0.057	0.359
2036	0.030	0.278
2037	0.007	0.374
2038	0.024	0.370
2039	0.002	0.714
2040	0.013	0.283
2041	0.018	0.360
2042	0.055	0.409
2043	0.027	0.452
2044	0.036	0.315
2045	0.025	0.256
2046	0.029	0.283
2047	0.021	0.344
2048	0.027	0.284
2049	0.024	0.421
2050	0.018	0.321
2051	0.026	0.461
2052	0.015	0.337
2053	0.026	0.287
2054	0.033	0.604
2055	0.010	0.348
2056	0.012	0.451
2057	0.018	0.221
2058	0.023	0.423
2059	0.040	0.528

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0793	1.1622
2	0.0669	1.0945
3	0.0668	0.7999
4	0.0645	0.7979
5	0.0623	0.7494
6	0.0603	0.7308
7	0.0569	0.7136
8	0.0553	0.6630
9	0.0524	0.6475
10	0.0523	0.6107
11	0.0513	0.6036
12	0.0508	0.5627
13	0.0504	0.5495
14	0.0499	0.5353
15	0.0490	0.5325
16	0.0484	0.5322
17	0.0478	0.5320
18	0.0455	0.5293
19	0.0452	0.5276
20	0.0449	0.5161
21	0.0439	0.5154
22	0.0403	0.5094

23	0.0401	0.5086
24	0.0401	0.5080
25	0.0401	0.5041
26	0.0400	0.5028
27	0.0399	0.5028
28	0.0380	0.5006
29	0.0379	0.4888
30	0.0369	0.4749
31	0.0367	0.4740
32	0.0366	0.4608
33	0.0360	0.4547
34	0.0334	0.4521
35	0.0332	0.4521
36	0.0331	0.4507
37	0.0329	0.4503
38	0.0327	0.4502
39	0.0321	0.4498
40	0.0319	0.4484
41	0.0314	0.4326
42	0.0309	0.4236
43	0.0308	0.4234
44	0.0307	0.4230
45	0.0295	0.4212
46	0.0294	0.4182
47	0.0289	0.4167
48	0.0288	0.4131
49	0.0287	0.4087
50	0.0278	0.4070
51	0.0274	0.4060
52	0.0272	0.3968
53	0.0272	0.3960
54	0.0272	0.3949
55	0.0271	0.3920
56	0.0271	0.3905
57	0.0269	0.3884
58	0.0268	0.3856
59	0.0267	0.3829
60	0.0266	0.3808
61	0.0266	0.3780
62	0.0263	0.3773
63	0.0259	0.3743
64	0.0256	0.3738
65	0.0255	0.3726
66	0.0255	0.3721
67	0.0253	0.3711
68	0.0246	0.3702
69	0.0245	0.3697
70	0.0245	0.3606
71	0.0245	0.3596
72	0.0243	0.3585
73	0.0242	0.3580
74	0.0241	0.3554
75	0.0239	0.3546
76	0.0239	0.3527
77	0.0238	0.3518
78	0.0238	0.3486
79	0.0235	0.3483
80	0.0232	0.3469

81	0.0231	0.3465
82	0.0230	0.3460
83	0.0228	0.3457
84	0.0225	0.3439
85	0.0219	0.3400
86	0.0218	0.3393
87	0.0217	0.3391
88	0.0217	0.3372
89	0.0215	0.3369
90	0.0212	0.3357
91	0.0203	0.3328
92	0.0201	0.3328
93	0.0201	0.3320
94	0.0197	0.3316
95	0.0196	0.3314
96	0.0196	0.3310
97	0.0193	0.3296
98	0.0193	0.3251
99	0.0188	0.3249
100	0.0185	0.3208
101	0.0182	0.3194
102	0.0180	0.3183
103	0.0178	0.3167
104	0.0176	0.3158
105	0.0176	0.3149
106	0.0176	0.3137
107	0.0175	0.3005
108	0.0174	0.2987
109	0.0173	0.2942
110	0.0170	0.2933
111	0.0168	0.2912
112	0.0167	0.2908
113	0.0163	0.2870
114	0.0153	0.2859
115	0.0153	0.2843
116	0.0150	0.2837
117	0.0149	0.2832
118	0.0148	0.2831
119	0.0148	0.2830
120	0.0147	0.2829
121	0.0147	0.2826
122	0.0146	0.2813
123	0.0145	0.2802
124	0.0144	0.2783
125	0.0143	0.2781
126	0.0137	0.2749
127	0.0135	0.2747
128	0.0131	0.2722
129	0.0126	0.2717
130	0.0125	0.2715
131	0.0124	0.2688
132	0.0124	0.2681
133	0.0124	0.2612
134	0.0119	0.2606
135	0.0116	0.2598
136	0.0114	0.2561
137	0.0114	0.2558
138	0.0106	0.2556

139	0.0103	0.2517
140	0.0103	0.2516
141	0.0103	0.2507
142	0.0101	0.2490
143	0.0100	0.2484
144	0.0100	0.2417
145	0.0093	0.2346
146	0.0093	0.2338
147	0.0093	0.2317
148	0.0092	0.2309
149	0.0091	0.2282
150	0.0091	0.2233
151	0.0087	0.2210
152	0.0079	0.2157
153	0.0077	0.2119
154	0.0071	0.2113
155	0.0051	0.2107
156	0.0024	0.1689
157	0.0019	0.1632
158	0.0012	0.1616

Duration Flows

Flow(cfs)	Predev	Mit	Percentage
0.0119	54359	393954	724
0.0124	50165	385976	769
0.0128	46614	378386	811
0.0133	43312	371073	856
0.0137	40293	363927	903
0.0141	37456	357113	953
0.0146	34941	350686	1003
0.0150	32553	344260	1057
0.0155	30343	338276	1114
0.0159	28304	332459	1174
0.0164	26437	326531	1235
0.0168	24808	320991	1293
0.0173	23296	315451	1354
0.0177	21944	310244	1413
0.0181	20642	305091	1478
0.0186	19440	300050	1543
0.0190	18288	295230	1614
0.0195	17235	290632	1686
0.0199	16160	285978	1769
0.0204	15152	281491	1857
0.0208	14271	277059	1941
0.0213	13457	272959	2028
0.0217	12665	268582	2120
0.0221	11944	264593	2215
0.0226	11241	260605	2318
0.0230	10570	256616	2427
0.0235	9972	252849	2535
0.0239	9379	249137	2656
0.0244	8847	245425	2774
0.0248	8332	241824	2902
0.0253	7856	238334	3033
0.0257	7462	234899	3147
0.0262	7025	231464	3294
0.0266	6615	228084	3447
0.0270	6277	224927	3583
0.0275	5978	221769	3709
0.0279	5706	218611	3831
0.0284	5438	215398	3960
0.0288	5199	212461	4086
0.0293	4943	209470	4237
0.0297	4706	206589	4389
0.0302	4513	203708	4513
0.0306	4339	200827	4628
0.0310	4157	198168	4767
0.0315	3958	195453	4938
0.0319	3764	192739	5120
0.0324	3582	190080	5306
0.0328	3412	187531	5496
0.0333	3265	184983	5665
0.0337	3134	182434	5821
0.0342	3027	179997	5946
0.0346	2926	177559	6068
0.0350	2814	175232	6227
0.0355	2682	172850	6444

0.0359	2556	170579	6673
0.0364	2451	168307	6866
0.0368	2359	166091	7040
0.0373	2255	163764	7262
0.0377	2142	161604	7544
0.0382	2040	159498	7818
0.0386	1952	157393	8063
0.0390	1861	155399	8350
0.0395	1778	153294	8621
0.0399	1691	151244	8944
0.0404	1619	149194	9215
0.0408	1561	147255	9433
0.0413	1482	145316	9805
0.0417	1407	143432	10194
0.0422	1338	141493	10574
0.0426	1270	139610	10992
0.0431	1217	137781	11321
0.0435	1163	136009	11694
0.0439	1103	134236	12170
0.0444	1055	132463	12555
0.0448	1006	130746	12996
0.0453	964	129083	13390
0.0457	919	127421	13865
0.0462	872	125704	14415
0.0466	814	123987	15231
0.0471	774	122435	15818
0.0475	737	120773	16387
0.0479	694	119222	17178
0.0484	636	117671	18501
0.0488	601	116175	19330
0.0493	555	114679	20662
0.0497	517	113184	21892
0.0502	478	111798	23388
0.0506	434	110358	25428
0.0511	394	108973	27658
0.0515	363	107533	29623
0.0519	339	106203	31328
0.0524	310	104929	33848
0.0528	296	103544	34981
0.0533	273	102214	37441
0.0537	252	100940	40055
0.0542	237	99555	42006
0.0546	223	98281	44072
0.0551	206	97007	47090
0.0555	194	95788	49375
0.0560	180	94569	52538

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.1098 acre-feet
On-line facility target flow:	0.1439 cfs.
Adjusted for 15 min:	0.1439 cfs.
Off-line facility target flow:	0.0828 cfs.
Adjusted for 15 min:	0.0828 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
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 = Failed

Model Default Modifications

Total of 0 changes have been made.

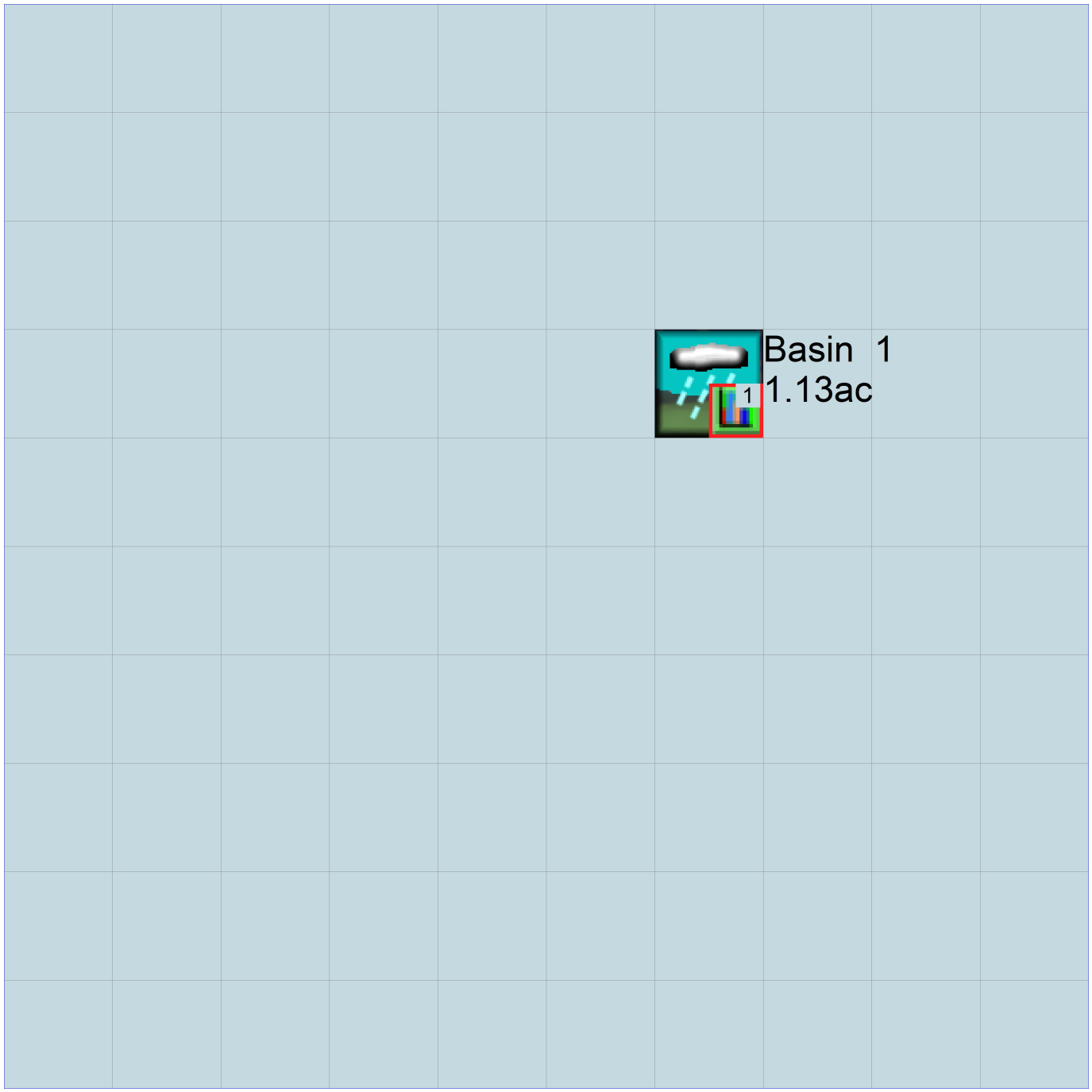
PERLND Changes

No PERLND changes have been made.

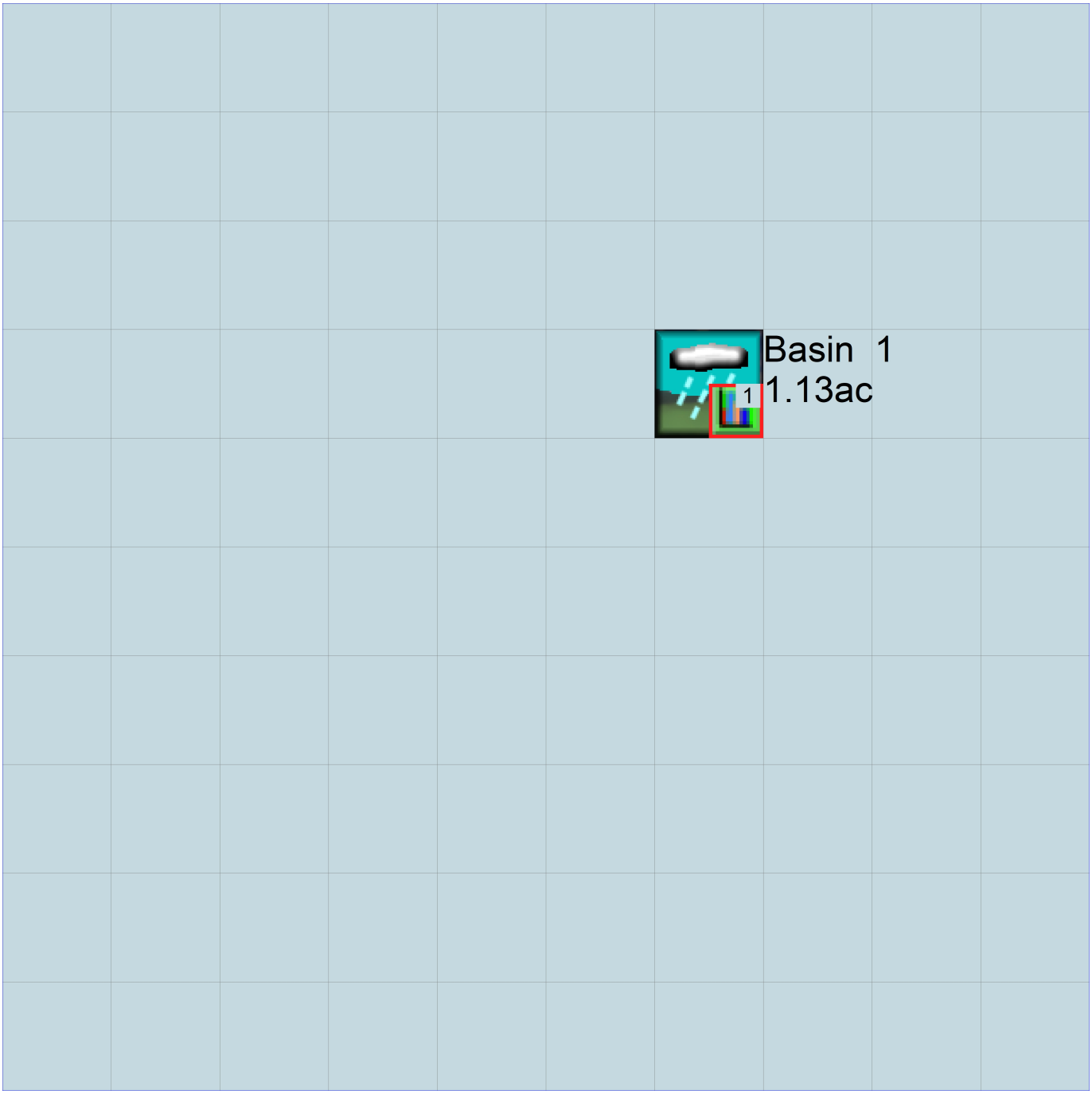
IMPLND Changes

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   default[4].wdm
MESSU       25   Predefault[4].MES
            27   Predefault[4].L61
            28   Predefault[4].L62
            30   POCdefault[4]1.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  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           ***
   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  1***
PERLND  10                       1.131     COPY   501     12
PERLND  10                       1.131     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    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              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   default[4].wdm
MESSU       25   Mitdefault[4].MES
            27   Mitdefault[4].L61
            28   Mitdefault[4].L62
            30   POCdefault[4]1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      16
      IMPLND       4
      IMPLND       5
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  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           ***
    4      ROOF TOPS/FLAT         1    1    1   27    0
    5      DRIVEWAYS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    4         0    0    1    0    0    0
    5         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    4         0    0    4    0    0    0    1    9
    5         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     ***
    4         0    0    0    0    0
    5         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    4            400      0.01       0.1       0.1
    5            400      0.01       0.1       0.1
```

```
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    4              0         0
    5              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    4              0         0
    5              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  16                      0.152     COPY   501     12
PERLND  16                      0.152     COPY   501     13
IMPLND   4                      0.125     COPY   501     15
IMPLND   5                      0.854     COPY   501     15

******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    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              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     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       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


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

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