AZURE | GREEN
CONSULTANTS
+feasibility +planning +engineering +surveying

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409 East Pioneer, Suite A
Puyallup, WA 98372

April 21, 2022

Re: Taco Time Preliminary Drainage Report
Parcel # 784510-003-2 & 042027-1-171

**Overview:**

The project site is located on the north side of E Main, east of SR 512. The site address is 1115 E Main. Tax parcel numbers are 784510-003-2 & 042027-1-171. Total parcel area is 3.21 acres. The site is currently developed with a Taco Time Restaurant, primarily on parcel -003-2. The project consists of the construction of a new Taco Time Restaurant building and expansion of the existing parking lot. The existing building will remain for use by other tenants.

Improvements for the project will include the new building, additional parking lot, storm drainage facilities, expansion of existing driveway approach, sanitary sewer service, water service, and other underground utilities.

The City adopted the 2019 Manual in July 2022. Update the storm design and references, information and tables in the report to align with the 2019 Manual. [Drainage Report, Page 1]

**Project Requirements:**

**Determination of Applicable Minimum Requirements**

Per PMC 21.10.040 the City of Puyallup has adopted the Washington State Department of Ecology Stormwater Management Manual for Western Washington (SMMWW), with the version in effect being "the most current version approved for city use by the council." The 2012 DOE Manual as amended in 2014 has been adopted by the City and is the controlling regulation and is referred to as "the Manual" or "SMMWW" hereinafter.

The project consists of over 18,000 sf of new plus replaced hard surfaces onsite. The existing hard surfaces are less than 35% of the project site and therefore, the project is considered new development. Since the total new plus replaced hard surfaces for the project are greater than 5,000 square feet, all minimum requirements apply to the new and replaced hard surfaces and converted vegetation areas.

Remove the word, "project". Be careful when using the term "Project Site." The 2019 Manual has two different meanings for "Project Site" and "Site." [Drainage Report, Page 1]

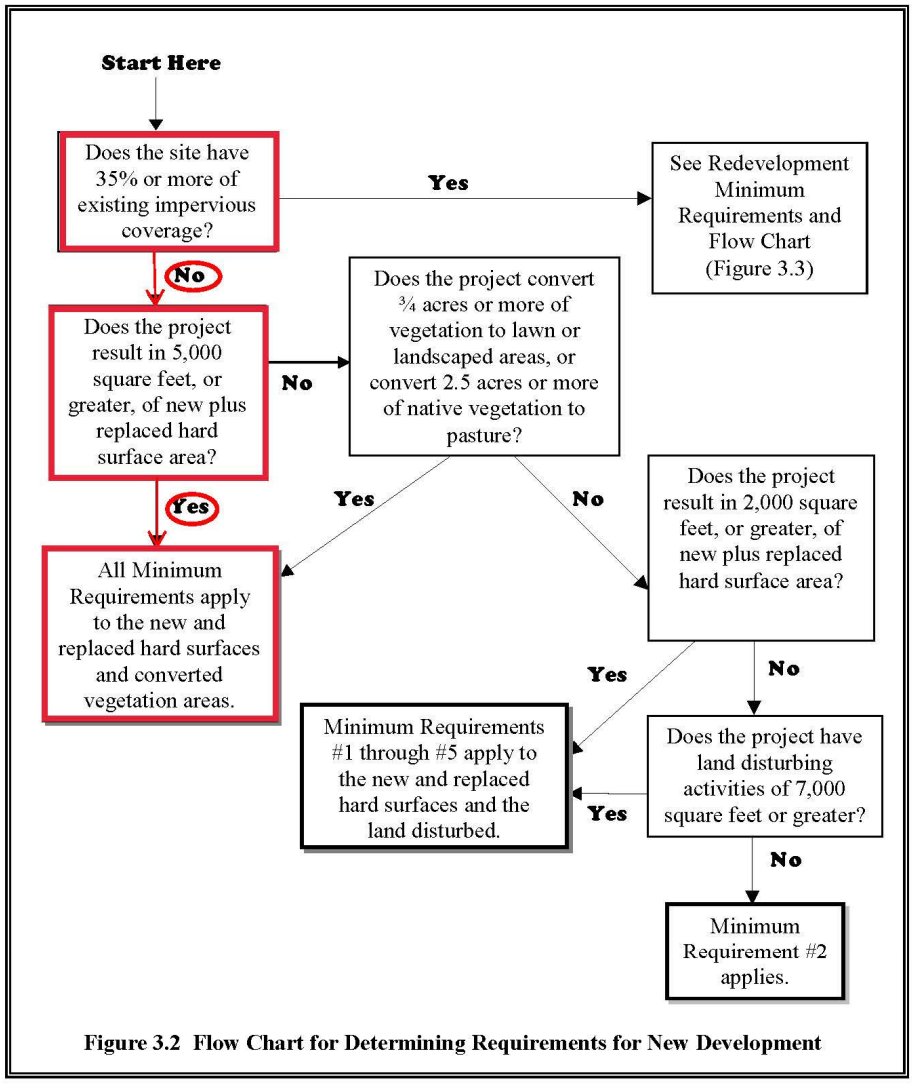



**Figure 3.2 Flow Chart for Determining Requirements for New Development**

## Discussion of Minimum Requirements

The Minimum Requirements per Section I-2.5 of the Manual:

**Minimum Requirement #1: Preparation of Stormwater Site Plans**

The Stormwater Site Plan consists of a report and construction plans. This report and the attached conceptual storm plan are preliminary versions of the Drainage Report and the site improvement plans that will be submitted for construction permits and will satisfy Minimum Requirement #1.

Submit SWPPP separately from the Drainage Report at time of civil permit

**Minimum Requirement #2: Construction Stormwater Pollution Prevention (SWPPP)**

The SWPPP consists of a narrative and drawings. The narrative will be addressed in Section V of the final version of the Drainage Report. The drawings will include a TESC plan, notes, and details as part of the site development construction plans. The narrative and drawings will be prepared and submitted at time of civil permit application.

**Minimum Requirement #3: Source Control of Pollution**

A Pollution Source Control Plan will be prepared in conformance with requirements of Section IV of the Manual and will be submitted as a separate document at time of civil permit application.

**Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls**

Currently, drainage from the original improvements to the site, generally the southwest portion of the site, are collected in a conveyance system that connects to the existing closed conveyance system in E Main. Drainage from improvements to the site made in 2003 are collected, routed through a bioswale for treatment, then infiltrated in an underground gallery, with an overflow connection into the original conveyance system. The improvements proposed under this permit will infiltrate runoff to the greatest extent feasible to preserve the natural drainage system and outfall.

**Minimum Requirement #5: On-site Stormwater Management**

Because the project triggers MR #1-9, and is inside the urban growth area, the project must either meet the Low Impact Development Performance Standard, or use List #2 to determine applicable On-Site Stormwater Management BMPs. This project will use List #2. For each surface the BMP's must be considered in the order listed for that type of surface and use the first BMP that is considered feasible.

Lawn and Landscaped Areas:

- All lawn and landscaped areas will meet the requirements of BMP T5.13, Post Construction Soil Quality and Depth with notes on the plans to this effect.

Roofs:

1. BMP T5.10: Downspout Full Infiltration – will be used for the new building.

Other Hard Surfaces:

1. BMP T5.30: Full Dispersion – infeasible due to inadequate vegetated area to meet the 65:10 ratio
2. BMP T5.15: Permeable pavement – infeasible due to fill required for grading of parking lot; as a technical equivalent, an infiltration facility per Volume III, Section 3.3 will be used

**Minimum Requirement #6: Runoff Treatment**

New plus replaced pollution generating hard surfaces (PGHS) is the parking lot paving. The total area is well over 5,000 square feet and therefore runoff treatment is required. As a commercial development, enhanced treatment is required. Filterra or Biopod systems will be used for to meet enhanced treatment requirements.

**Minimum Requirement #7: Flow Control**

The total new plus replaced hard surface for the project is well over 10,000 sf, however, through the use of infiltration, the effective impervious area will be essentially zero. The converted vegetation areas are below the thresholds, and the increase in runoff rates for the 100-year event is less than 0.15 cfs. Therefore, this minimum requirement does not apply.

**Minimum Requirement #8: Wetlands Protection**

There are no wetlands on or near the site.

**Minimum Requirement #9: Operation and Maintenance**

The stormwater facilities required for this project that require a maintenance plan are: conveyance system, infiltration gallery, and Filterra or Biopod. All onsite stormwater facilities will be owned, operated, and maintained by the property owner. An O&M plan will be submitted with civil plan application in the future.

## Soils:

The NRCS Soil Survey of Pierce County indicates the soils on the portion of the site to be developed are Puyallup fine sandy loam (31A). Puyallup soils are hydrologic group A. Based on the soils exploration performed by GeoResources, infiltration is feasible on the eastern portion of the development with a design infiltration rate of 2.5 inches per hour. Groundwater monitoring found peak groundwater at depths ranging from 5.7 to 8.8 feet or elevations 44.7 to 47.7 within the area in which infiltration is feasible.

## Floodplain

The project site is mapped with an AE floodplain at elevation 46.3. All proposed improvements are outside the mapped floodplain.

## Flow Control

Infiltration will be used so that there is no effective impervious area and so that runoff rates do not increase by more than 0.15 cfs. A downspout infiltration trench will be used for the roof, and an infiltration gallery with underground lattice structure such as StormTank will be used for the parking lot. WWHM is used to size each infiltration facility. For the WWHM analysis, the project site is in the 42-inch, east rainfall zone. The infiltration systems are modeled in WWHM as gravel trench beds. For the downspout trench the voids are 30%, standard for drainrock, and for the lattice grid system, 95% per manufacturer's specifications. The depth of each system is assumed to be 2 feet, so an overflow standpipe is set at that depth and trench re-sized until 100% infiltration is achieved. The following table shows the design parameters and trench sizing for full infiltration:

| | Area | | depth | infil. Rate | voids | Length | Width | Area |
|---|---|---|---|---|---|---|---|---|
| | sf | acre | ft | in/hr | % | ft | ft | sf |
| Roof | 2987 | 0.0686 | 2 | 2.5 | 30 | 100 | 3 | 300 |
| Parking | 22382 | 0.5138 | 2 | 2.5 | 95 | 100 | 13.1 | 1310 |

The proposed infiltration systems will be located near the groundwater monitoring well where groundwater peaked at 44.7. Therefore, the bottom of roof drain trench must be 45.7 or higher and the infiltration trench for parking lot must be 47.7 or higher. Finished grade is expected to be approximately 53.0.

## Runoff Treatment

Because the project is commercial, enhanced treatment of runoff is required. Filterra, Biopod, or other GULD enhanced treatment device will be used precedent to infiltration. The WWHM analysis shows that the treatment flow rate for all new improvements is 0.0911 cfs. The exact configuration of treatment facilties will be determined at time of civil plan submittal.

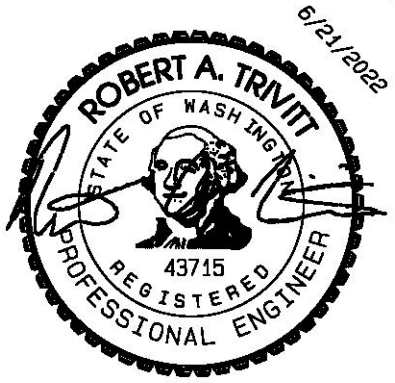
In existing conditions, a bioswale provides treatment of runoff for the 2003 improvements. The improvements for this project will eliminate this bioswale. It will be replaced by a StormFilter catch basin.

## Conclusions

The preliminary analysis shows that infiltration is feasible for runoff and the site plan shows there is adequate area for the required infiltration systems. Full design and analysis will be prepared and submitted with civil permit application.

Please contact us if you require further information.

Sincerely,




Robert Trivitt, P.E.
Project Manager
rob@mailagc.com

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Submit Soils Report separately from the Drainage Report at time of civil permit.

December 10, 2021

Taco Time Northwest
3401 Lind Avenue SW
Renton, Washington 98057

Update references to the 2014 Ecology Manual with equivalent reference points in the 2019 Manual. Requirements for soils testing have subtly changed so confirm the testing criteria is still met. [Soils Report, Page 6]

Attn: Robby Tonkin
(206) 499-1360
rtonkin@tacotimenw.com

Preliminary Soils Report
Proposed Restaurant
1115 & 1129 East Main
Puyallup, Washington
PN: 7845100032 & 0420271171
Doc ID: TacoTimeNorthwest.EMainSt.SR.doc

## INTRODUCTION

This *Preliminary Soils Report* summarizes our site observations and geotechnical data review, and addresses the feasibility of stormwater infiltration for the proposed restaurant to be constructed at 1115 and 1129 East Main in Puyallup, Washington. The approximate site location is shown on Figure 1.

Our understanding of the project is based on our correspondence with you and Azure Green Consultants, our review of the provided site plan, our understanding of the City of Puyallup's development codes, and our experience in the site area. We understand that you propose to construct a new restaurant on the undeveloped portion of the site. Development will also include expanding parking and converting the existing restaurant into a separate retail space. We anticipate that the new structure will be a one- to two-story, wood-framed structure supported by conventional shallow foundations.

## SCOPE

The purpose of our services was to evaluate the surface and subsurface conditions across the site as a basis for providing geotechnical recommendations and design criteria for the proposed restaurant. Specifically, the scope of services for this project included the following:

1. Reviewing the available geologic, hydrogeologic, and geotechnical data for the site area;
2. Exploring surface and subsurface conditions by reconnoitering the site and monitoring the excavation of a series of three test pits at select locations across the site and installed shallow (less than 10 feet) groundwater monitoring stand pipes in each of the test pits;
3. Describing surface and subsurface conditions, including soil type, depth to groundwater, if encountered, and an estimate of seasonal high groundwater levels;

4. Providing our opinion about the feasibility of onsite infiltration in accordance with the 2014 SWMMWW, including a preliminary design infiltration rate based on grain size analysis, as applicable; and,
5. Prepared this *Preliminary Soils Report* that satisfies the 2014 SWMMWW requirements and summarizes our site observations and conclusions, and our geotechnical recommendations, along with the supporting data.

The above scope of work was summarized in our *Proposal for Geotechnical Engineering Services* dated September 21, 2021. We received written authorization to proceed from you on October 1, 2021.

## SITE CONDITIONS

### Surface Conditions

As mentioned above, the site is located at 1115 and 1129 East Main in Puyallup, Washington, within an area of existing commercial development. The site consists of two tax parcels, that when combined is generally trapezoidal in shape, measures approximately 480 to 570 feet long (north to south) by approximately 275 feet wide (east to west), and encompasses approximately 3.3 acres. The site is bounded by the Puyallup River to the north, E Main St to the south, an RV park to the west, and commercial and non-developed parcels to the east. The southern portion of the site is currently developed. An existing Taco Time building is located in the southwestern portion of the site. The remaining area of the southern portion of the site is developed with automobile parking. The northern portion of the site is undeveloped.

Based on topographic information obtained from Pierce County Public GIS and our site observations, the ground surface of the site generally slopes down to the north. In the southern portion of the site, in the area of the existing commercial development, the ground surface is relatively level. In the central portion of the site, the ground surface slopes down to the north at approximately 4 to 8 percent. These slopes continue at similar inclinations throughout the northern portion of the site. The total topographic relief of the site is on the order of approximately 15 feet. The existing site configuration and topography are shown on the Site & Exploration Map, Figure 2.

Vegetation in the southern portion of the site generally consists of commercial landscaping in the parking lot area with some scattered coniferous and deciduous trees with areas of maintained grass. In the central and northern portion of the site, vegetation generally consists of a moderate stand of coniferous and deciduous trees with a moderately dense understory of native and invasive plants and shrubs. No seeps, springs, or standing water was observed at the time of our site reconnaissance. No areas of surficial erosion or slope movement were observed at the time of our site visit.

### Site Soils

The Natural Resource Conservation Service (NRCS) Web Soil Survey maps the site as being underlain by Pilchuck fine sandy loam (29A) and Puyallup sandy loam (31A). The Pilchuck soils are mapped across the northern portion of the site, are derived from mixed alluvium under hardwoods and conifers, form on slopes of less than 3 percent, have a “none” erosion hazard when exposed, and are included in hydrologic soils group C. The Puyallup fine sandy loam soils are mapped across the southern portion of the site, are derived from alluvium, form on slopes of 0 to 3 percent, have a

"slight" erosion hazard when exposed, and are included in hydrologic soils group A. A copy of the NRCS soils map is included as Figure 3.

## Site Geology

According to the *draft Geologic map of the Puyallup 7.5-minute Quadrangle, Washington* by Troost, (in review) the site is mapped as being underlain by Quaternary Alluvium (Qal). Alluvial soils generally consist of normally consolidated, stratified deposits of sand, silt, clay, and occasional peat that were deposited along the Puyallup River channel. The existing topography, as well as the surficial and shallow soils in the area, are the result of fluvial action, including down-cutting by the river, channel meandering and migration, and flood deposits. An excerpt from the geologic map is included as Figure 4.

## Subsurface Explorations

On October 14, 2021, a field representative from GeoResources visited the site and monitored the excavation of three test pits to depths of about 9½ to 10½ feet below the existing ground surface, logged the subsurface conditions encountered in each test pit, and obtained representative soil samples. The test pits were excavated by a small track-mounted excavator operated by a licensed operated working under subcontract to GeoResources. The soil densities presented on the logs were based on the difficulty of excavation and our experience. The number and location of the test pits were selected in the field based on project information provided by Azure Green Consultants, consideration for underground utilities, existing site conditions, and current site usage. An open standpipe piezometer (OSP) was installed in each test pit and backfilled with the excavated soils and bucket tamped, but not otherwise compacted.

The subsurface explorations excavated as part of this evaluation indicate the subsurface conditions at specific locations only, as actual subsurface conditions can vary across the site. Furthermore, the nature and extent of such variation would not become evident until additional explorations are performed or until construction activities have begun. Based on our experience in the area and extent of prior explorations in the area, it is our opinion that the soils encountered in the explorations are generally representative of the soils at the site.

The soils encountered were visually classified in accordance with the Unified Soil Classification System (USCS) and ASTM D: 2488. The approximate locations of our test pits are indicated on the attached Site & Exploration Map, Figure 2. The USCS is included in Appendix A as Figure A-1, while the descriptive logs of our test pits are included as Figures A-2 through A-3.

## Subsurface Conditions

At the locations of our test pits we encountered relatively somewhat uniform subsurface conditions that in our opinion generally confirmed the mapped stratigraphy at the site. Our test pits generally encountered approximately ¾ to 1 foot of topsoil. Underlying the topsoil in test pit TP-1 we encountered approximately 4½ feet of brown silty sand with significant amounts of concrete, some metal, and trace organics. We interpret these soils to be undocumented fill. Underlying the topsoil in test pit TP-2 we encountered brown poorly graded sand with some silt and gravel in a loose to medium dense, moist condition. We interpret these soils be weathered alluvium. Underlying the topsoil in test pit TP-3 and the weathered alluvium in test pit TP-2, we encountered brown-grey to grey fine silty sand in a medium dense, moist condition. We interpret these soils to be alluvium and were encountered to the full depth explored in test pit TP-2. Underlying the undocumented fill in test pit TP-1 and the alluvium in test pit TP-3, we encountered brown grey sandy silt in a stiff, moist

condition. We interpret these soils to be consistent with alluvium deposits. These soils were encountered to the full depth explored.

### Laboratory Testing

Geotechnical laboratory tests were performed on two samples retrieved from the test pits to estimate index engineering properties of the soils encountered. Laboratory testing included visual soil classification per ASTM D: 2487 and ASTM D: 2488, moisture content determinations per ASTM D: 2216, and grain size analyses per ASTM D: 6913 standard procedures. The results of the laboratory tests are included in Appendix B.

### Groundwater Conditions

At the locations of our test pits we did not encounter groundwater seepage within the depths explored. However, we did observe iron-oxide staining/discoloration, otherwise known as mottling, at approximately 4 to 5¼ feet below existing ground surface. Mottling is generally indicative of a seasonal or fluctuating groundwater surface, often associated with perched groundwater. Perched groundwater table develops when the vertical infiltration of precipitation through a more permeable soil, is slowed at depth by a deeper, less permeable soil type. We anticipate fluctuations in the local groundwater levels will occur in response to precipitation patterns, off-site construction activities, and site utilization. Analysis or modeling of anticipated groundwater levels during construction is beyond the scope of this report. We will monitor groundwater levels bi-weekly throughout the wet season, prior to issuance of the *Final Soils Report*.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our data review, site reconnaissance, and subsurface explorations, it is our opinion that the infiltration of stormwater runoff generated onsite by the new impervious surfaces may be feasible for this project.

Submit an updated Soils report with the completed referenced observations conducted during the wet weather months. [Soils Report, Page 9]

### Infiltration Recommendations

Based on our site observations and subsurface explorations, it is our opinion that stormwater infiltration via a trench or basin type system may be feasible at the site. Per Volume 3.1.1 of the 2014 SWMMWW, downspout infiltration is considered feasible on lots or sites if 3 feet or more of permeable soil from the proposed final grade to the seasonal high ground water table exists and at least 1 foot of clearance from the expected bottom elevation of the infiltration facility to the seasonal high ground water table can be met. For the purposes of this infiltration feasibility evaluation, we have assumed that, at a minimum, the standard infiltration trench section (6 inches of topsoil over a 2 foot deep trench) and the standard permeable pavement section (6 inches of pavement over 6 inches of storage course) would be used. Deeper trenches and thicker storage courses may be designed by a civil engineer where the vertical separation requirements can be met. The silty sand to sandy silt alluvium soils encountered in test pits TP-2 and TP-3 encountered mottling at approximately 4 to 5 feet below existing ground surface. We interpret the mottling to be indicative of seasonal high groundwater. Test pit TP-1 encountered approximately 4½ feet of undocumented fill, therefore infiltration is not feasible near this location.

We completed a soil gradation analyses on three representative soil samples from the site per the 2014 SWMMWW, Volume III, Section 3.3.6, Method 3 and in accordance with ASTM D6913. Based on our gradation analyses, we recommend a design infiltration rate of 2.5 inches per hour in the silty

Grain Size Analysis may be used if soils are unconsolidated by glacial advance. Please confirm site soils have this characteristic. [Soils Report, Page 9]

Provide calculations that arrive to the design infiltration rate. [Soils Report, Page 9]

sand alluvium encountered in test pit TP-2. Appropriate correction factors have been applied to these values in accordance with the 2014 SWMMWW, Volume III, Section 3.3.6, Table 3.3.1, including correction factors for site variability ($F_{variability}$), testing method ($F_{testing}$) and maintenance for situation biofouling ($F_{maintenance}$).

All proposed infiltration facilities should be designed and constructed in accordance with the 2014 SWMMWW. All minimum separations, setback requirements, and infeasibility criteria per 2014 SWMMWW should be considered prior to the selection, design and location of any stormwater facility for the proposed development.

It is our opinion that the mottling observed in the test pits represents seasonal high groundwater levels at the site. However, we will continue to monitor groundwater levels until the end of the prescriptive wet season as required by the City of Puyallup. Additionally, the City will require that an in-situ small-scale Pilot Infiltration Test (PIT) be completed to verify these rates prior to permit issuance. We will issue a *Final Soils Report* after the wet season ends that summarizes our observations and refines seasonal high groundwater levels as appropriate.

### Construction Considerations

Appropriate design, construction and maintenance measures will be required to ensure the infiltration rate can be effectively maintained over time. Stormwater Best Management Practices (BMPs) in accordance with the 2014 SWMMWW should be included in the project plans and specifications to minimize the potential for fines contamination of Low Impact Development BMPs utilized at the site.

Suspended solids could clog the underlying soil and reduce the infiltration rate. To reduce potential clogging of the infiltration systems, the infiltration system should not be connected to the stormwater runoff system until after construction is complete and the site area is landscaped, paved or otherwise protected. Additional measures may also be taken during construction to minimize the potential of fines contamination of the proposed infiltration system, such as utilizing an alternative storm water management location during construction or leaving the bottom of the permanent systems 1 to 2 feet high, and subsequently excavating to the finished grade once the site soils have been stabilized. All contractors working on the site (builders and subcontractors) should divert sediment laden stormwater away from proposed infiltration facilities during construction and landscaping activities. No concrete trucks should be washed or cleaned, and washout areas should not be within the vicinity of the proposed infiltration facilities. After construction activities have been completed, periodic sweeping of the paved areas will help extend the life of the infiltration system.

## LIMITATIONS

We have prepared this report for use by Taco Time NW and other members of the design team, for use in the permitting and design of a portion of this project. The data used in preparing this report and this report should be provided to prospective contractors for their bidding or estimating purposes only. Our report, conclusions and interpretations are based on subsurface explorations and data from others and limited site reconnaissance, and should not be construed as a warranty of the subsurface conditions.

Variations in subsurface conditions are possible between the explorations and may also occur with time. A contingency for unanticipated conditions should be included in the budget and schedule. Sufficient monitoring, testing and consultation should be provided by our firm during construction to

confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork and foundation installation activities comply with contract plans and specifications.

The scope of our services does not include services related to environmental remediation and construction safety precautions. Our recommendations are not intended to direct the contractor's methods, techniques, sequences or procedures, except as specifically described in our report for consideration in design.

If there are any changes in the loads, grades, locations, configurations or type of facilities to be constructed, the conclusions and recommendations presented in this report may not be fully applicable. If such changes are made, we should be given the opportunity to review our recommendations and provide written modifications or verifications, as appropriate.

◆ ◆ ◆

We have appreciated the opportunity to be of service to you on this project. If you have any questions or comments, please do not hesitate to call at your earliest convenience.

Respectfully submitted,
GeoResources, LLC

Davis Carlsen, GIT
Staff Geologist

KYLE EUGENE BILLINGSLEY
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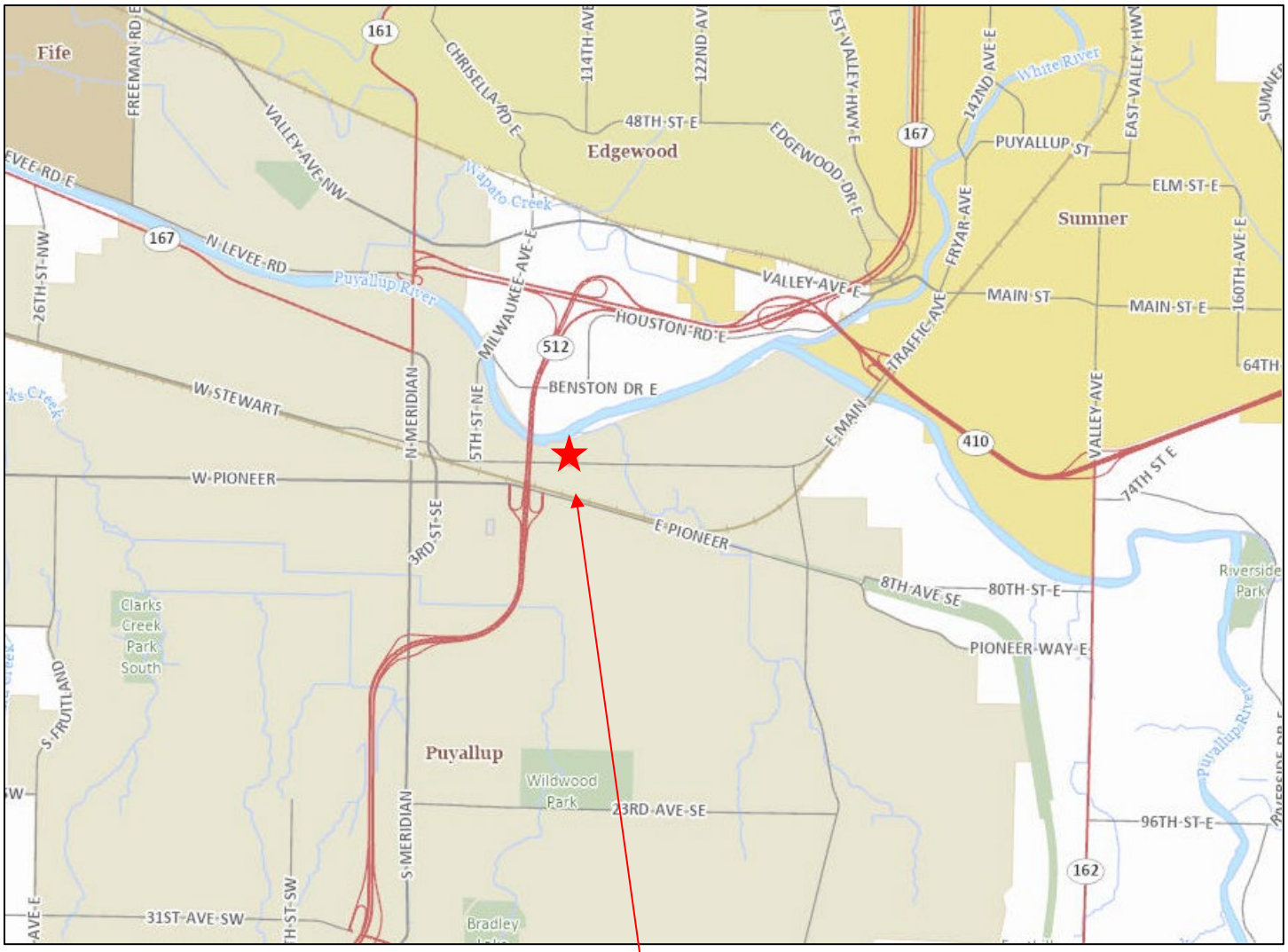
Eric W. Heller, PE, LG
Senior Geotechnical Engineer

DC:KEB:EWH/dc
DocID: TacoTimeNorthwest.EMainSt.SR
Attachments: Figure 1: Site Vicinity Map
Figure 2: Site & Exploration Map
Figure 3: NRCS Soils Map
Figure 4: Geologic Map
Appendix A – Subsurface Explorations
Appendix B – Laboratory Test Results




**Approximate Site Location**

Map created from Peirce County Public GIS (https://matterhornwab.co.pierce.wa.us/publicgis/)


**Not to Scale**

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# Site Location Map

Proposed Taco Time
1115 & 1129 East Main
Puyallup, Washington
PN: 7845100032 & 0420271171

| DocID: TacoTimeNorthwest.EMainSt.F.docx | December 2021 | Figure 1 |
|---|---|---|


Map created from Peirce County Public GIS (https://matterhornwab.co.pierce.wa.us/publicgis/)

Number and approximate location of test pit exploration and open standpipe piezometer (OSP) (GeoResources 2021)

N
W
E
S

**Not to Scale**

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# Site & Exploration Map

Proposed Taco Time
1115 & 1129 East Main
Puyallup, Washington
PN: 7845100032 & 0420271171

| DocID: TacoTimeNorthwest.EMainSt.F.docx | December 2021 | Figure 2 |
|---|---|---|


**Approximate Site Location**

Map created from Web Soil Survey (http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)

| Soil Type | Soil Name | Parent Material | Slopes | Erosion Hazard | Hydrologic Soils Group |
|---|---|---|---|---|---|
| W | Water | - | - | - | - |
| 29A | Pilchuck fine sandy loam | Mixed alluvium under hardwoods and conifers | <3 | None | C |
| 31A | Puyallup fine sandy loam | Alluvium | 0 to 3 | Slight | A |

N W E S

**Not to Scale**

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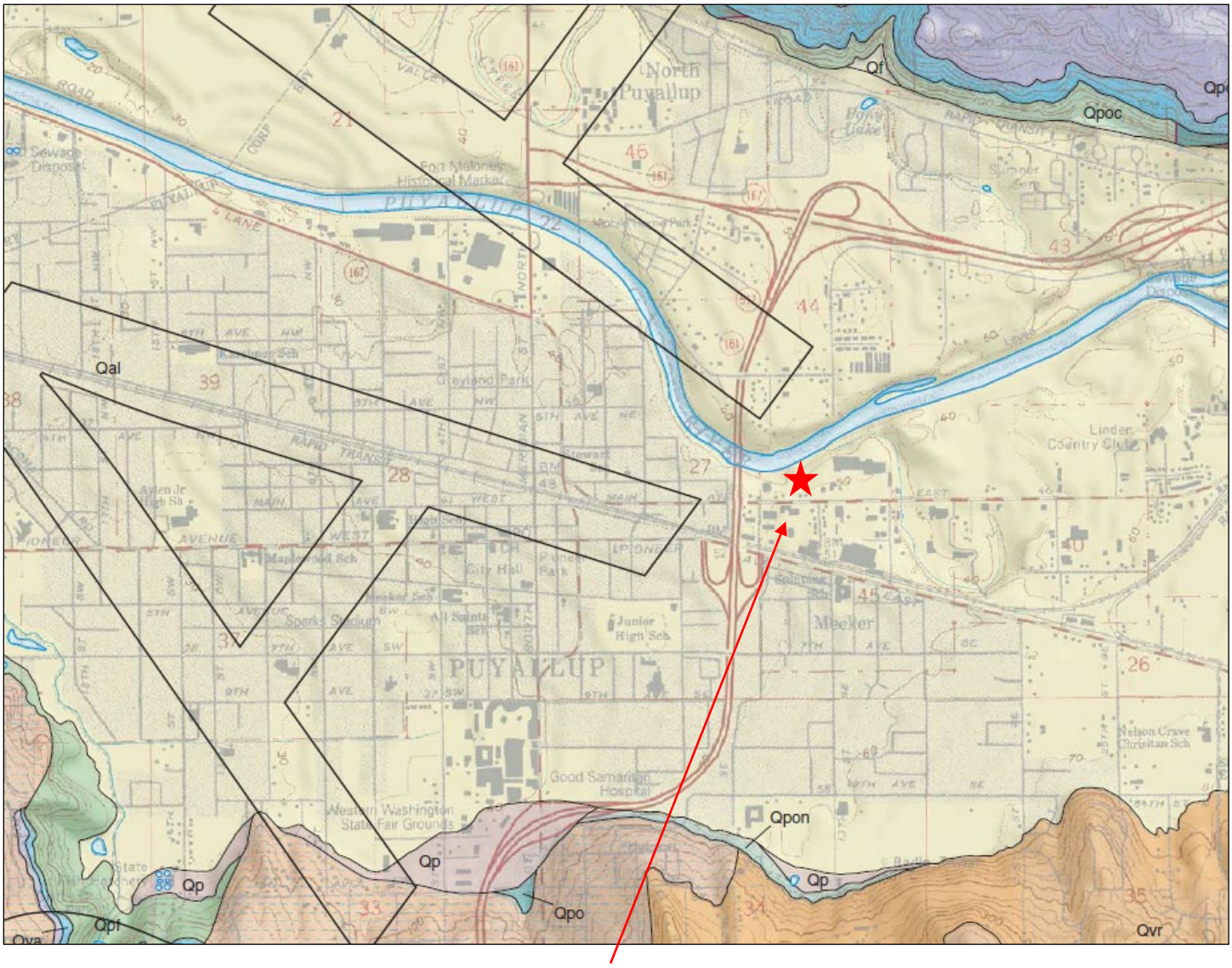
# NRCS Soils Map

Proposed Taco Time
1115 & 1129 East Main
Puyallup, Washington
PN: 7845100032 & 0420271171




**Approximate Site Location**

Excerpt from the draft *Geologic Map of the Puyallup 7.5-Minute Quadrangle, Washington*
By Troost, K.G. (in review)

| | |
|---|---|
| Qal | Alluvium |

**Not to Scale**

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# Geologic Map

Proposed Taco Time
1115 & 1129 East Main
Puyallup, Washington
PN: 7845100032 & 0420271171

| DocID: TacoTimeNorthwest.EMainSt.F.docx | December 2021 | Figure 4 |
|---|---|---|

# Appendix A

Subsurface Explorations

# SOIL CLASSIFICATION SYSTEM

| MAJOR DIVISIONS | | | GROUP SYMBOL | GROUP NAME |
|---|---|---|---|---|
| COARSE GRAINED SOILS<br><br>More than 50% Retained on No. 200 Sieve | GRAVEL<br><br>More than 50% Of Coarse Fraction Retained on No. 4 Sieve | CLEAN GRAVEL | GW | WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL |
| | | | GP | POORLY-GRADED GRAVEL |
| | | GRAVEL WITH FINES | GM | SILTY GRAVEL |
| | | | GC | CLAYEY GRAVEL |
| | SAND<br><br>More than 50% Of Coarse Fraction Passes No. 4 Sieve | CLEAN SAND | SW | WELL-GRADED SAND, FINE TO COARSE SAND |
| | | | SP | POORLY-GRADED SAND |
| | | SAND WITH FINES | SM | SILTY SAND |
| | | | SC | CLAYEY SAND |
| FINE GRAINED SOILS<br><br>More than 50% Passes No. 200 Sieve | SILT AND CLAY<br><br>Liquid Limit Less than 50 | INORGANIC | ML | SILT |
| | | | CL | CLAY |
| | | ORGANIC | OL | ORGANIC SILT, ORGANIC CLAY |
| | SILT AND CLAY<br><br>Liquid Limit 50 or more | INORGANIC | MH | SILT OF HIGH PLASTICITY, ELASTIC SILT |
| | | | CH | CLAY OF HIGH PLASTICITY, FAT CLAY |
| | | ORGANIC | OH | ORGANIC CLAY, ORGANIC SILT |
| HIGHLY ORGANIC SOILS | | | PT | PEAT |

NOTES:

1. Field classification is based on visual examination of soil in general accordance with ASTM D2488-90.
2. Soil classification using laboratory tests is based on ASTM D2487-90.
3. Description of soil density or consistency are based on interpretation of blow count data, visual appearance of soils, and or test data.

SOIL MOISTURE MODIFIERS:

Dry- Absence of moisture, dry to the touch

Moist- Damp, but no visible water

Wet- Visible free water or saturated, usually soil is obtained from below water table

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4809 Pacific Hwy. E. | Fife, WA 98424 | 253.896.1011 | www. georesources.rocks

**Unified Soils Classification System**

Proposed Taco Time
1115 & 1129 East Main
Puyallup, Washington
PN: 7845100032 & 0420271171

## Test Pit/ Open Standpipe Piezometer TP/OSP-1

Location: North of existing structure
Approximate Elevation: 50'

| Depth (ft) | | | Soil Type | Soil Description |
|---|---|---|---|---|
| 0 | - | ¾ | - | Topsoil/rootzone |
| ¾ | - | 5¼ | SM | Brown silty sand with significant amounts of cement fragments, some metal, and trace organics (Undocumented fill) (medium dense, moist) |
| 5¼ | - | 10½ | ML | Brown-grey sandy silt (alluvium deposits) (stiff, moist) |

Terminated at 10½ feet below ground surface.
Mottling observed at approximately 5¼ feet below existing ground surface
No significant caving observed at the time of excavation.
No seepage observed at the time of excavation.

## Test Pit/ Open Standpipe Piezometer TP/OSP-2

Location: East-central portion of site
Approximate Elevation: 52'

| Depth (ft) | | | Soil Type | Soil Description |
|---|---|---|---|---|
| 0 | - | ¾ | - | Topsoil/rootzone |
| ¾ | - | 1¾ | SP-SM | Brown poorly graded sand with some silt and gravel (Weathered Alluvium) (loose to medium dense, moist) |
| 1¾ | - | 10 | SM | Grey silty fine sand (Alluvium) (medium dense, moist) |

Terminated at 10 feet below ground surface.
Mottling observed at approximately 5 feet below existing ground surface
No significant caving observed at the time of excavation.
No seepage observed at the time of excavation.

**Logged by: DC** **Excavated on: October 14, 2021**

## Test Pit/Open Standpipe Piezometer TP/OSP-3

Location: Southeast portion of site
Approximate Elevation: 54'

| Depth (ft) | | | Soil Type | Soil Description |
|---|---|---|---|---|
| 0 | - | 1 | - | Topsoil/rootzone |
| 1 | - | 7 | SM | Brown-grey silty fine sand (medium dense, moist) (alluvium) |
| 7 | - | 9½ | ML | Brown-grey sandy silt (Stiff, moist) (alluvium deposits) |

Terminated at 9½ feet below ground surface.
Mottling observed at approximately 4 feet below existing ground surface
No significant caving observed at the time of excavation.
No seepage observed at the time of excavation.

**Logged by: DC** **Excavated on: October 14, 2021**

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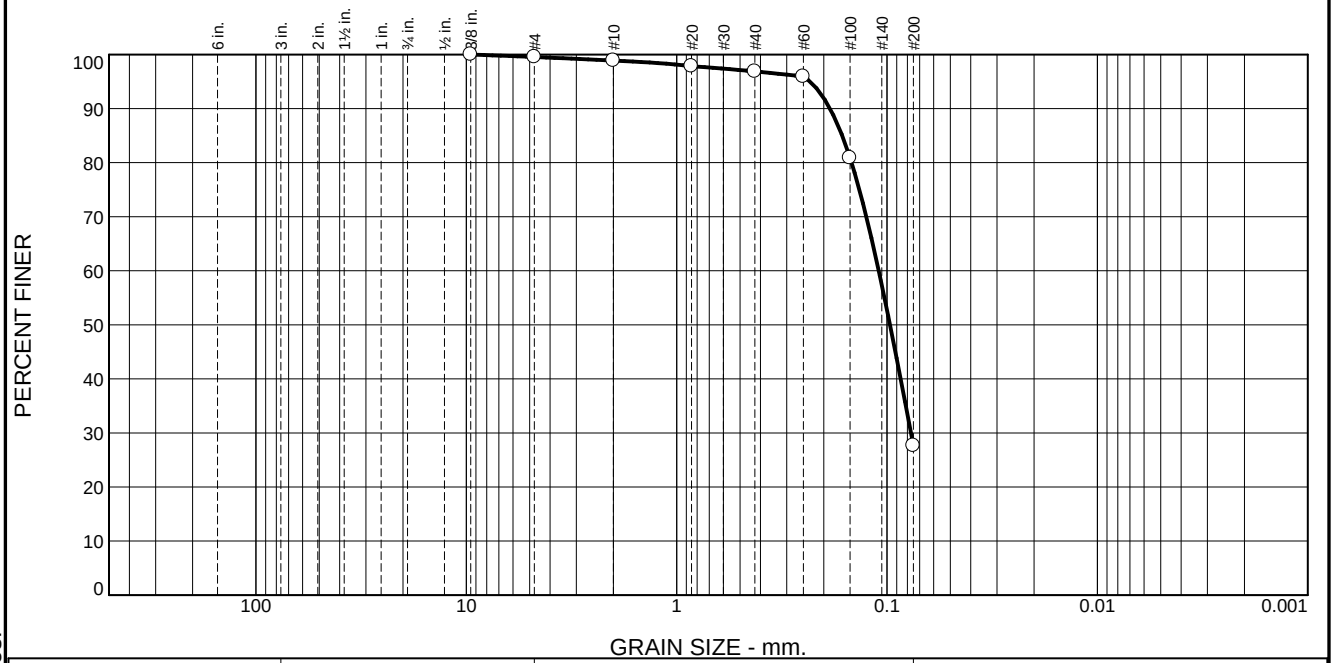
**Test Pit Logs**
Proposed Taco Time
1115 & 1129 East Main
Puyallup, Washington
PN: 7845100032 & 0420271171

# Appendix B

Laboratory results

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.5 | 0.6 | 2.0 | 69.2 | 27.7 | |

**Test Results (ASTM D 6913 & ASTM D 1140)**

| Opening Size | Percent Finer | Spec.* (Percent) | Pass? (X=Fail) |
|---|---|---|---|
| 0.375 | 100.0 | | |
| #4 | 99.5 | | |
| #10 | 98.9 | | |
| #20 | 97.8 | | |
| #40 | 96.9 | | |
| #60 | 95.9 | | |
| #100 | 80.9 | | |
| #200 | 27.7 | | |

* (no specification provided)

**Material Description**

Silty SAND (SM)

**Atterberg Limits (ASTM D 4318)**

**PL=** NP **LL=** NV **PI=** NP

**Classification**

**USCS (D 2487)=** SM **AASHTO (M 145)=** A-2-4(0)

**Coefficients**

$D_{90}$= 0.1868 $D_{85}$= 0.1634 $D_{60}$= 0.1095
$D_{50}$= 0.0969 $D_{30}$= 0.0770 $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Remarks**

Natural Moisture: 5.7%

**Date Received:** 10/19/21 **Date Tested:** 10/19/21

**Tested By:** MAW

**Checked By:** KEB

**Title:** PM

**Location:** TP-2, S-1 **Date Sampled:** 10/19/21
**Sample Number:** 102580 **Depth:** 4'

**GeoResources, LLC**

**Fife, WA**

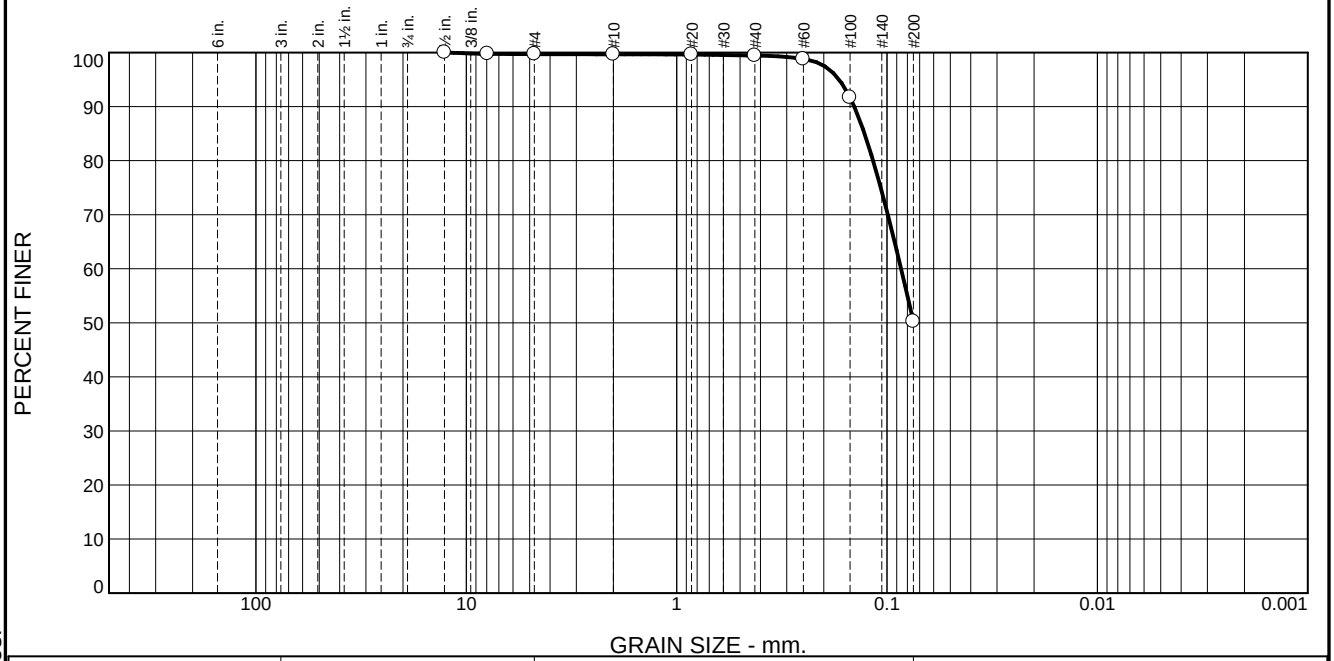
**Client:** Taco Time Northwest
**Project:** Proposed Taco Time

**Project No:** TacoTimeNorthwest.EMainSt **Figure** B-1



**Tested By:** _____ **Checked By:** _____

# Particle Size Distribution Report




| % +3" | % Gravel | | % Sand | | | % Fines | |
|---|---|---|---|---|---|---|---|
| | Coarse | Fine | Coarse | Medium | Fine | Silt | Clay |
| 0.0 | 0.0 | 0.3 | 0.0 | 0.3 | 49.1 | 50.3 | |

**Test Results (ASTM D 6913 & ASTM D 1140)**

| Opening Size | Percent Finer | Spec.* (Percent) | Pass? (X=Fail) |
|---|---|---|---|
| .5 | 100.0 | | |
| .3125 | 99.8 | | |
| #4 | 99.7 | | |
| #10 | 99.7 | | |
| #20 | 99.6 | | |
| #40 | 99.4 | | |
| #60 | 98.8 | | |
| #100 | 91.7 | | |
| #200 | 50.3 | | |

* (no specification provided)

**Material Description**

Sandy SILT (ML)

**Atterberg Limits (ASTM D 4318)**

**PL=** NP **LL=** NV **PI=** NP

**Classification**

**USCS (D 2487)=** ML **AASHTO (M 145)=** A-4(0)

**Coefficients**

$D_{90}$= 0.1432 $D_{85}$= 0.1279 $D_{60}$= 0.0858
$D_{50}$= $D_{30}$= $D_{15}$=
$D_{10}$= $C_u$= $C_c$=

**Remarks**

Natural Moisture: 15.3%

**Date Received:** 10/19/21 **Date Tested:** 10/19/21

**Tested By:** MAW

**Checked By:** KEB

**Title:** PM

**Location:** TP-3 S-1
**Sample Number:** 102581 **Depth:** 3'

**Date Sampled:** 10/19/21

**GeoResources, LLC**

**Fife, WA**

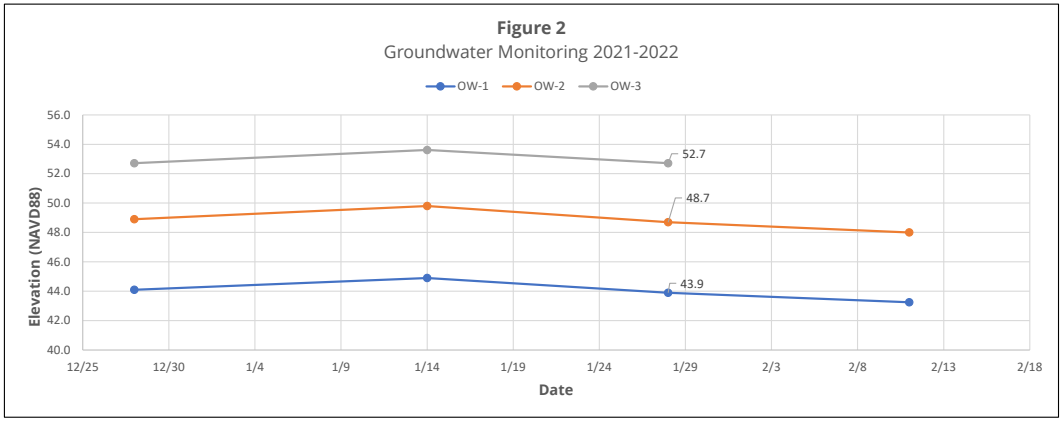
**Client:** Taco Time Northwest
**Project:** Proposed Taco Time

**Project No:** TacoTimeNorthwest.EMainSt **Figure** B-2



**Tested By:** _____ **Checked By:** _____

## TacoTimeNW.EMainSt




| | ***Well name: Location*** | | ***Well name: Location*** | | ***Well name: Location*** | |
|---|---|---|---|---|---|---|
| Date | Measured Depth to Water | Water Elevation | Measured Depth to Water | Water Elevation | Measured Depth to Water | Water Elevation |
| 12/28/2021 | 6.9 | 44.1 | 6.6 | 48.9 | 9.7 | 52.7 |
| 1/14/2022 | 6.1 | 44.9 | 5.7 | 49.8 | 8.8 | 53.6 |
| 1/28/2022 | 7.1 | 43.9 | 6.8 | 48.7 | 9.7 | 52.7 |
| 2/11/2022 | 7.8 | 43.3 | 7.5 | 48.0 | | |
| | | 51.0 | | 55.5 | | 62.4 |
| | | 51.0 | | 55.5 | | 62.4 |
| | | 51.0 | | 55.5 | | 62.4 |

| ***Well ID*** | ***Ground surface elevation at well location (Feet)*** | ***Correction for riser stickup to GS (feet)*** | ***Well Elevation*** |
|---|---|---|---|
| **Well** | 50 | 1 | 51 |
| **Well** | 55 | 0.5 | 55.5 |
| **Well** | 60 | 2.416666667 | 62.41666667 |

**Note: Use column "K" only if needed. Do not use for flush-mount well monuments with known/ surveyed elevations**

# WWHM2012

# PROJECT REPORT

# General Model Information

| | |
|---|---|
| Project Name: | Taco Time |
| Site Name: | Taco Time |
| Site Address: | 1115 E Main |
| City: | Puyallup |
| Report Date: | 6/21/2022 |
| Gage: | 42 IN EAST |
| 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

## *Mitigated Land Use*

### Basin 1

| | |
|---|---|
| Bypass: | No |
| GroundWater: | No |
| Pervious Land Use | acre |
| Pervious Total | 0 |
| Impervious Land Use | acre |
| ROOF TOPS FLAT | 0.0686 |
| Impervious Total | 0.0686 |
| Basin Total | 0.0686 |

Element Flows To:

| Surface | Interflow | Groundwater |
|---|---|---|
| Gravel Trench Bed 1 | | |

## Basin 2

| | |
|---|---|
| Bypass: | No |
| GroundWater: | No |
| Pervious Land Use | acre |
| Pervious Total | 0 |
| Impervious Land Use | acre |
| PARKING FLAT | 0.5138 |
| Impervious Total | 0.5138 |
| Basin Total | 0.5138 |

Element Flows To:

| Surface | Interflow | Groundwater |
|---|---|---|
| Gravel Trench Bed 1 | Gravel Trench Bed 1 | |

# Routing Elements
## Predeveloped Routing

## *Mitigated Routing*

### Gravel Trench Bed 1

| | |
|---|---|
| Bottom Length: | 100.00 ft. |
| Bottom Width: | 3.00 ft. |
| Trench bottom slope 1: | 0 To 1 |
| Trench Left side slope 0: | 0 To 1 |
| Trench right side slope 2: | 0 To 1 |
| Material thickness of first layer: | 5 |
| Pour Space of material for first layer: | 0.3 |
| Material thickness of second layer: | 0 |
| Pour Space of material for second layer: | 0 |
| Material thickness of third layer: | 0 |
| Pour Space of material for third layer: | 0 |
| Infiltration On | |
| Infiltration rate: | 2.5 |
| Infiltration safety factor: | 1 |
| Total Volume Infiltrated (ac-ft.): | 30.747 |
| Total Volume Through Riser (ac-ft.): | 0 |
| Total Volume Through Facility (ac-ft.): | 30.747 |
| Percent Infiltrated: | 100 |
| Total Precip Applied to Facility: | 0 |
| Total Evap From Facility: | 0 |
| Discharge Structure | |
| Riser Height: | 2 ft. |
| Riser Diameter: | 8 in. |
| Element Flows To: | |
| Outlet 1 | Outlet 2 |

Gravel Trench Bed Hydraulic Table

| Stage(feet) | Area(ac.) | Volume(ac-ft.) | Discharge(cfs) | Infilt(cfs) |
|---|---|---|---|---|
| 0.0000 | 0.006 | 0.000 | 0.000 | 0.000 |
| 0.0333 | 0.006 | 0.000 | 0.000 | 0.017 |
| 0.0667 | 0.006 | 0.000 | 0.000 | 0.017 |
| 0.1000 | 0.006 | 0.000 | 0.000 | 0.017 |
| 0.1333 | 0.006 | 0.000 | 0.000 | 0.017 |
| 0.1667 | 0.006 | 0.000 | 0.000 | 0.017 |
| 0.2000 | 0.006 | 0.000 | 0.000 | 0.017 |
| 0.2333 | 0.006 | 0.000 | 0.000 | 0.017 |
| 0.2667 | 0.006 | 0.000 | 0.000 | 0.017 |
| 0.3000 | 0.006 | 0.000 | 0.000 | 0.017 |
| 0.3333 | 0.006 | 0.000 | 0.000 | 0.017 |
| 0.3667 | 0.006 | 0.000 | 0.000 | 0.017 |
| 0.4000 | 0.006 | 0.000 | 0.000 | 0.017 |
| 0.4333 | 0.006 | 0.000 | 0.000 | 0.017 |
| 0.4667 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.5000 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.5333 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.5667 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.6000 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.6333 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.6667 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.7000 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.7333 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.7667 | 0.006 | 0.001 | 0.000 | 0.017 |

| | | | | |
|---|---|---|---|---|
| 0.8000 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.8333 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.8667 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.9000 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.9333 | 0.006 | 0.001 | 0.000 | 0.017 |
| 0.9667 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.0000 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.0333 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.0667 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.1000 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.1333 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.1667 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.2000 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.2333 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.2667 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.3000 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.3333 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.3667 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.4000 | 0.006 | 0.002 | 0.000 | 0.017 |
| 1.4333 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.4667 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.5000 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.5333 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.5667 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.6000 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.6333 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.6667 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.7000 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.7333 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.7667 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.8000 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.8333 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.8667 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.9000 | 0.006 | 0.003 | 0.000 | 0.017 |
| 1.9333 | 0.006 | 0.004 | 0.000 | 0.017 |
| 1.9667 | 0.006 | 0.004 | 0.000 | 0.017 |
| 2.0000 | 0.006 | 0.004 | 0.000 | 0.017 |
| 2.0333 | 0.006 | 0.004 | 0.043 | 0.017 |
| 2.0667 | 0.006 | 0.004 | 0.121 | 0.017 |
| 2.1000 | 0.006 | 0.004 | 0.219 | 0.017 |
| 2.1333 | 0.006 | 0.004 | 0.329 | 0.017 |
| 2.1667 | 0.006 | 0.004 | 0.441 | 0.017 |
| 2.2000 | 0.006 | 0.004 | 0.547 | 0.017 |
| 2.2333 | 0.006 | 0.004 | 0.639 | 0.017 |
| 2.2667 | 0.006 | 0.004 | 0.711 | 0.017 |
| 2.3000 | 0.006 | 0.004 | 0.762 | 0.017 |
| 2.3333 | 0.006 | 0.004 | 0.808 | 0.017 |
| 2.3667 | 0.006 | 0.004 | 0.847 | 0.017 |
| 2.4000 | 0.006 | 0.005 | 0.885 | 0.017 |
| 2.4333 | 0.006 | 0.005 | 0.921 | 0.017 |
| 2.4667 | 0.006 | 0.005 | 0.956 | 0.017 |
| 2.5000 | 0.006 | 0.005 | 0.989 | 0.017 |
| 2.5333 | 0.006 | 0.005 | 1.022 | 0.017 |
| 2.5667 | 0.006 | 0.005 | 1.053 | 0.017 |
| 2.6000 | 0.006 | 0.005 | 1.084 | 0.017 |
| 2.6333 | 0.006 | 0.005 | 1.114 | 0.017 |
| 2.6667 | 0.006 | 0.005 | 1.143 | 0.017 |
| 2.7000 | 0.006 | 0.005 | 1.171 | 0.017 |

| | | | | |
|---|---|---|---|---|
| 2.7333 | 0.006 | 0.005 | 1.198 | 0.017 |
| 2.7667 | 0.006 | 0.005 | 1.225 | 0.017 |
| 2.8000 | 0.006 | 0.005 | 1.252 | 0.017 |
| 2.8333 | 0.006 | 0.005 | 1.277 | 0.017 |
| 2.8667 | 0.006 | 0.005 | 1.303 | 0.017 |
| 2.9000 | 0.006 | 0.006 | 1.328 | 0.017 |
| 2.9333 | 0.006 | 0.006 | 1.352 | 0.017 |
| 2.9667 | 0.006 | 0.006 | 1.376 | 0.017 |
| 3.0000 | 0.006 | 0.006 | 1.399 | 0.017 |

## Gravel Trench Bed 1

| | |
|---|---|
| Bottom Length: | 100.00 ft. |
| Bottom Width: | 13.10 ft. |
| Trench bottom slope 1: | 0 To 1 |
| Trench Left side slope 0: | 0 To 1 |
| Trench right side slope 2: | 0 To 1 |
| Material thickness of first layer: | 3 |
| Pour Space of material for first layer: | 0.95 |
| Material thickness of second layer: | 0 |
| Pour Space of material for second layer: | 0 |
| Material thickness of third layer: | 0 |
| Pour Space of material for third layer: | 0 |
| Infiltration On | |
| Infiltration rate: | 2.5 |
| Infiltration safety factor: | 1 |
| Total Volume Infiltrated (ac-ft.): | 232.57 |
| Total Volume Through Riser (ac-ft.): | 0 |
| Total Volume Through Facility (ac-ft.): | 232.57 |
| Percent Infiltrated: | 100 |
| Total Precip Applied to Facility: | 0 |
| Total Evap From Facility: | 0 |
| Discharge Structure | |
| Riser Height: | 2 ft. |
| Riser Diameter: | 8 in. |
| Element Flows To: | |
| Outlet 1 | Outlet 2 |

Gravel Trench Bed Hydraulic Table

| Stage(feet) | Area(ac.) | Volume(ac-ft.) | Discharge(cfs) | Infilt(cfs) |
|---|---|---|---|---|
| 0.0000 | 0.030 | 0.000 | 0.000 | 0.000 |
| 0.0333 | 0.030 | 0.001 | 0.000 | 0.075 |
| 0.0667 | 0.030 | 0.001 | 0.000 | 0.075 |
| 0.1000 | 0.030 | 0.002 | 0.000 | 0.075 |
| 0.1333 | 0.030 | 0.003 | 0.000 | 0.075 |
| 0.1667 | 0.030 | 0.004 | 0.000 | 0.075 |
| 0.2000 | 0.030 | 0.005 | 0.000 | 0.075 |
| 0.2333 | 0.030 | 0.006 | 0.000 | 0.075 |
| 0.2667 | 0.030 | 0.007 | 0.000 | 0.075 |
| 0.3000 | 0.030 | 0.008 | 0.000 | 0.075 |
| 0.3333 | 0.030 | 0.009 | 0.000 | 0.075 |
| 0.3667 | 0.030 | 0.010 | 0.000 | 0.075 |
| 0.4000 | 0.030 | 0.011 | 0.000 | 0.075 |
| 0.4333 | 0.030 | 0.012 | 0.000 | 0.075 |
| 0.4667 | 0.030 | 0.013 | 0.000 | 0.075 |
| 0.5000 | 0.030 | 0.014 | 0.000 | 0.075 |
| 0.5333 | 0.030 | 0.015 | 0.000 | 0.075 |
| 0.5667 | 0.030 | 0.016 | 0.000 | 0.075 |
| 0.6000 | 0.030 | 0.017 | 0.000 | 0.075 |
| 0.6333 | 0.030 | 0.018 | 0.000 | 0.075 |
| 0.6667 | 0.030 | 0.019 | 0.000 | 0.075 |
| 0.7000 | 0.030 | 0.020 | 0.000 | 0.075 |
| 0.7333 | 0.030 | 0.021 | 0.000 | 0.075 |
| 0.7667 | 0.030 | 0.021 | 0.000 | 0.075 |
| 0.8000 | 0.030 | 0.022 | 0.000 | 0.075 |
| 0.8333 | 0.030 | 0.023 | 0.000 | 0.075 |

| | | | | |
|---|---|---|---|---|
| 0.8667 | 0.030 | 0.024 | 0.000 | 0.075 |
| 0.9000 | 0.030 | 0.025 | 0.000 | 0.075 |
| 0.9333 | 0.030 | 0.026 | 0.000 | 0.075 |
| 0.9667 | 0.030 | 0.027 | 0.000 | 0.075 |
| 1.0000 | 0.030 | 0.028 | 0.000 | 0.075 |
| 1.0333 | 0.030 | 0.029 | 0.000 | 0.075 |
| 1.0667 | 0.030 | 0.030 | 0.000 | 0.075 |
| 1.1000 | 0.030 | 0.031 | 0.000 | 0.075 |
| 1.1333 | 0.030 | 0.032 | 0.000 | 0.075 |
| 1.1667 | 0.030 | 0.033 | 0.000 | 0.075 |
| 1.2000 | 0.030 | 0.034 | 0.000 | 0.075 |
| 1.2333 | 0.030 | 0.035 | 0.000 | 0.075 |
| 1.2667 | 0.030 | 0.036 | 0.000 | 0.075 |
| 1.3000 | 0.030 | 0.037 | 0.000 | 0.075 |
| 1.3333 | 0.030 | 0.038 | 0.000 | 0.075 |
| 1.3667 | 0.030 | 0.039 | 0.000 | 0.075 |
| 1.4000 | 0.030 | 0.040 | 0.000 | 0.075 |
| 1.4333 | 0.030 | 0.041 | 0.000 | 0.075 |
| 1.4667 | 0.030 | 0.041 | 0.000 | 0.075 |
| 1.5000 | 0.030 | 0.042 | 0.000 | 0.075 |
| 1.5333 | 0.030 | 0.043 | 0.000 | 0.075 |
| 1.5667 | 0.030 | 0.044 | 0.000 | 0.075 |
| 1.6000 | 0.030 | 0.045 | 0.000 | 0.075 |
| 1.6333 | 0.030 | 0.046 | 0.000 | 0.075 |
| 1.6667 | 0.030 | 0.047 | 0.000 | 0.075 |
| 1.7000 | 0.030 | 0.048 | 0.000 | 0.075 |
| 1.7333 | 0.030 | 0.049 | 0.000 | 0.075 |
| 1.7667 | 0.030 | 0.050 | 0.000 | 0.075 |
| 1.8000 | 0.030 | 0.051 | 0.000 | 0.075 |
| 1.8333 | 0.030 | 0.052 | 0.000 | 0.075 |
| 1.8667 | 0.030 | 0.053 | 0.000 | 0.075 |
| 1.9000 | 0.030 | 0.054 | 0.000 | 0.075 |
| 1.9333 | 0.030 | 0.055 | 0.000 | 0.075 |
| 1.9667 | 0.030 | 0.056 | 0.000 | 0.075 |
| 2.0000 | 0.030 | 0.057 | 0.000 | 0.075 |
| 2.0333 | 0.030 | 0.058 | 0.043 | 0.075 |
| 2.0667 | 0.030 | 0.059 | 0.121 | 0.075 |
| 2.1000 | 0.030 | 0.060 | 0.219 | 0.075 |
| 2.1333 | 0.030 | 0.060 | 0.329 | 0.075 |
| 2.1667 | 0.030 | 0.061 | 0.441 | 0.075 |
| 2.2000 | 0.030 | 0.062 | 0.547 | 0.075 |
| 2.2333 | 0.030 | 0.063 | 0.639 | 0.075 |
| 2.2667 | 0.030 | 0.064 | 0.711 | 0.075 |
| 2.3000 | 0.030 | 0.065 | 0.762 | 0.075 |
| 2.3333 | 0.030 | 0.066 | 0.808 | 0.075 |
| 2.3667 | 0.030 | 0.067 | 0.847 | 0.075 |
| 2.4000 | 0.030 | 0.068 | 0.885 | 0.075 |
| 2.4333 | 0.030 | 0.069 | 0.921 | 0.075 |
| 2.4667 | 0.030 | 0.070 | 0.956 | 0.075 |
| 2.5000 | 0.030 | 0.071 | 0.989 | 0.075 |
| 2.5333 | 0.030 | 0.072 | 1.022 | 0.075 |
| 2.5667 | 0.030 | 0.073 | 1.053 | 0.075 |
| 2.6000 | 0.030 | 0.074 | 1.084 | 0.075 |
| 2.6333 | 0.030 | 0.075 | 1.114 | 0.075 |
| 2.6667 | 0.030 | 0.076 | 1.143 | 0.075 |
| 2.7000 | 0.030 | 0.077 | 1.171 | 0.075 |
| 2.7333 | 0.030 | 0.078 | 1.198 | 0.075 |
| 2.7667 | 0.030 | 0.079 | 1.225 | 0.075 |

| | | | | |
|---|---|---|---|---|
| 2.8000 | 0.030 | 0.080 | 1.252 | 0.075 |
| 2.8333 | 0.030 | 0.080 | 1.277 | 0.075 |
| 2.8667 | 0.030 | 0.081 | 1.303 | 0.075 |
| 2.9000 | 0.030 | 0.082 | 1.328 | 0.075 |
| 2.9333 | 0.030 | 0.083 | 1.352 | 0.075 |
| 2.9667 | 0.030 | 0.084 | 1.376 | 0.075 |
| 3.0000 | 0.030 | 0.085 | 1.399 | 0.075 |

# Analysis Results

## POC 1

POC #1 was not reported because POC must exist in both scenarios and both scenarios must have been run.

# Model Default Modifications

Total of 0 changes have been made.

## PERLND Changes

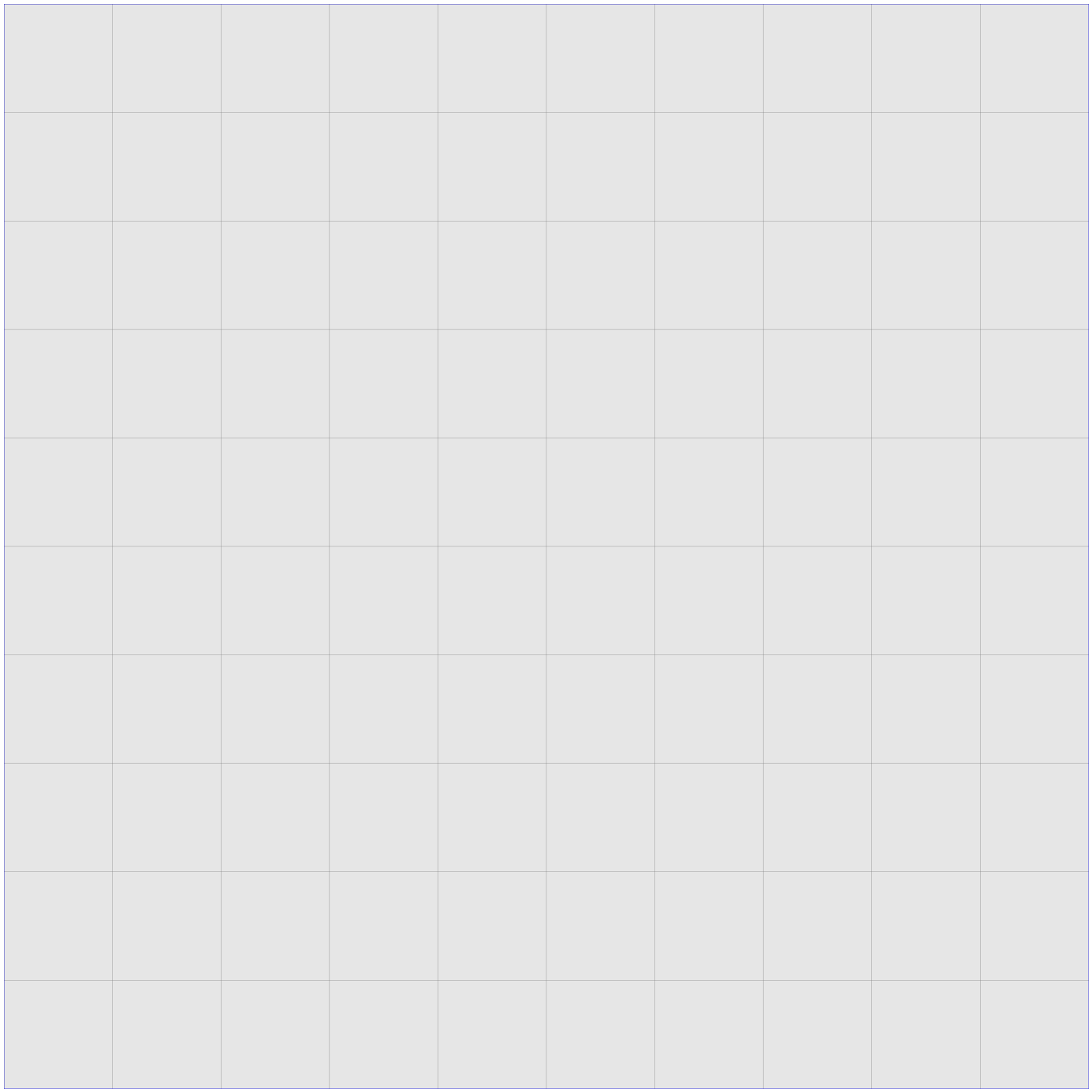
No PERLND changes have been made.

## IMPLND Changes

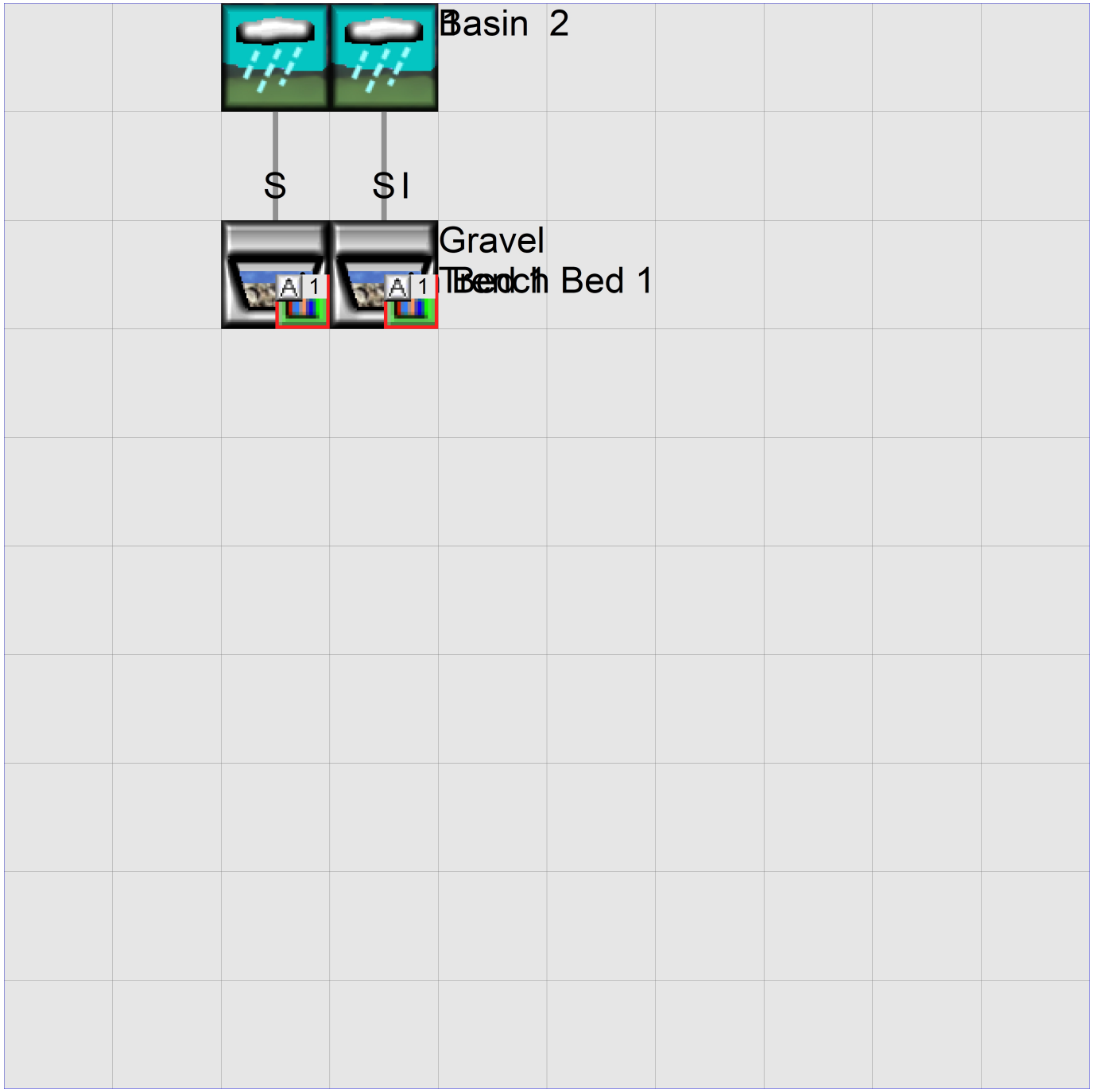
No IMPLND changes have been made.

# *Appendix*

## *Predeveloped Schematic*



## *Mitigated Schematic*



## *Predeveloped UCI File*

## *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   Taco Time.wdm
MESSU       25   MitTaco Time.MES
            27   MitTaco Time.L61
            28   MitTaco Time.L62
            30   POCTaco Time1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      IMPLND       4
      IMPLND      11
      RCHRES       1
      RCHRES       2
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Gravel Trench Bed 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           ***
  END GEN-INFO
  *** Section PWATER***

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

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

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

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
  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
  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
   11      PARKING/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
   11         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
   11         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    4         0    0    0    0    0
   11         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    4            400      0.01       0.1       0.1
   11            400      0.01       0.1       0.1
  END IWAT-PARM2

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

```
   11              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    4              0         0
   11              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
IMPLND   4                      0.0686     RCHRES   1      5
Basin  2***
IMPLND  11                      0.5138     RCHRES   2      5

******Routing******
IMPLND   4                      0.0686     COPY     1     15
IMPLND  11                      0.5138     COPY     1     15
RCHRES   1                           1     COPY   501     17
RCHRES   2                           1     COPY   501     17
END SCHEMATIC

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



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

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<----------------><---> User T-series  Engl Metr LKFG             ***
                                       in  out                              ***
    1     Gravel Trench Be-004    2    1    1    1   28    0    1
    2     Gravel Trench Be-006    2    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

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

```
  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.02       0.0       0.0       0.5       0.0
    2              2      0.02       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                          ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
           *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   92    5
      Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
       (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.006887  0.000000  0.000000  0.000000
  0.033333  0.006887  0.000069  0.000000  0.017361
  0.066667  0.006887  0.000138  0.000000  0.017361
  0.100000  0.006887  0.000207  0.000000  0.017361
  0.133333  0.006887  0.000275  0.000000  0.017361
  0.166667  0.006887  0.000344  0.000000  0.017361
  0.200000  0.006887  0.000413  0.000000  0.017361
  0.233333  0.006887  0.000482  0.000000  0.017361
  0.266667  0.006887  0.000551  0.000000  0.017361
  0.300000  0.006887  0.000620  0.000000  0.017361
  0.333333  0.006887  0.000689  0.000000  0.017361
  0.366667  0.006887  0.000758  0.000000  0.017361
  0.400000  0.006887  0.000826  0.000000  0.017361
  0.433333  0.006887  0.000895  0.000000  0.017361
  0.466667  0.006887  0.000964  0.000000  0.017361
  0.500000  0.006887  0.001033  0.000000  0.017361
  0.533333  0.006887  0.001102  0.000000  0.017361
  0.566667  0.006887  0.001171  0.000000  0.017361
  0.600000  0.006887  0.001240  0.000000  0.017361
  0.633333  0.006887  0.001309  0.000000  0.017361
  0.666667  0.006887  0.001377  0.000000  0.017361
  0.700000  0.006887  0.001446  0.000000  0.017361
  0.733333  0.006887  0.001515  0.000000  0.017361
  0.766667  0.006887  0.001584  0.000000  0.017361
  0.800000  0.006887  0.001653  0.000000  0.017361
  0.833333  0.006887  0.001722  0.000000  0.017361
  0.866667  0.006887  0.001791  0.000000  0.017361
  0.900000  0.006887  0.001860  0.000000  0.017361
  0.933333  0.006887  0.001928  0.000000  0.017361
  0.966667  0.006887  0.001997  0.000000  0.017361
  1.000000  0.006887  0.002066  0.000000  0.017361
  1.033333  0.006887  0.002135  0.000000  0.017361
  1.066667  0.006887  0.002204  0.000000  0.017361
  1.100000  0.006887  0.002273  0.000000  0.017361
  1.133333  0.006887  0.002342  0.000000  0.017361
  1.166667  0.006887  0.002410  0.000000  0.017361
  1.200000  0.006887  0.002479  0.000000  0.017361
  1.233333  0.006887  0.002548  0.000000  0.017361
  1.266667  0.006887  0.002617  0.000000  0.017361
  1.300000  0.006887  0.002686  0.000000  0.017361
  1.333333  0.006887  0.002755  0.000000  0.017361
  1.366667  0.006887  0.002824  0.000000  0.017361
  1.400000  0.006887  0.002893  0.000000  0.017361
  1.433333  0.006887  0.002961  0.000000  0.017361
  1.466667  0.006887  0.003030  0.000000  0.017361
  1.500000  0.006887  0.003099  0.000000  0.017361
```

```
1.533333  0.006887  0.003168  0.000000  0.017361
1.566667  0.006887  0.003237  0.000000  0.017361
1.600000  0.006887  0.003306  0.000000  0.017361
1.633333  0.006887  0.003375  0.000000  0.017361
1.666667  0.006887  0.003444  0.000000  0.017361
1.700000  0.006887  0.003512  0.000000  0.017361
1.733333  0.006887  0.003581  0.000000  0.017361
1.766667  0.006887  0.003650  0.000000  0.017361
1.800000  0.006887  0.003719  0.000000  0.017361
1.833333  0.006887  0.003788  0.000000  0.017361
1.866667  0.006887  0.003857  0.000000  0.017361
1.900000  0.006887  0.003926  0.000000  0.017361
1.933333  0.006887  0.003994  0.000000  0.017361
1.966667  0.006887  0.004063  0.000000  0.017361
2.000000  0.006887  0.004132  0.000000  0.017361
2.033333  0.006887  0.004201  0.042996  0.017361
2.066667  0.006887  0.004270  0.121030  0.017361
2.100000  0.006887  0.004339  0.219469  0.017361
2.133333  0.006887  0.004408  0.329384  0.017361
2.166667  0.006887  0.004477  0.441835  0.017361
2.200000  0.006887  0.004545  0.547841  0.017361
2.233333  0.006887  0.004614  0.639435  0.017361
2.266667  0.006887  0.004683  0.711272  0.017361
2.300000  0.006887  0.004752  0.762603  0.017361
2.333333  0.006887  0.004821  0.808195  0.017361
2.366667  0.006887  0.004890  0.847643  0.017361
2.400000  0.006887  0.004959  0.885334  0.017361
2.433333  0.006887  0.005028  0.921485  0.017361
2.466667  0.006887  0.005096  0.956270  0.017361
2.500000  0.006887  0.005165  0.989833  0.017361
2.533333  0.006887  0.005234  1.022295  0.017361
2.566667  0.006887  0.005303  1.053758  0.017361
2.600000  0.006887  0.005372  1.084308  0.017361
2.633333  0.006887  0.005441  1.114021  0.017361
2.666667  0.006887  0.005510  1.142961  0.017361
2.700000  0.006887  0.005579  1.171186  0.017361
2.733333  0.006887  0.005647  1.198748  0.017361
2.766667  0.006887  0.005716  1.225689  0.017361
2.800000  0.006887  0.005785  1.252051  0.017361
2.833333  0.006887  0.005854  1.277869  0.017361
2.866667  0.006887  0.005923  1.303176  0.017361
2.900000  0.006887  0.005992  1.328001  0.017361
2.933333  0.006887  0.006061  1.352370  0.017361
2.966667  0.006887  0.006129  1.376307  0.017361
3.000000  0.006887  0.006198  1.399836  0.017361
3.033333  0.006887  0.006267  1.422975  0.017361
END FTABLE  1
FTABLE      2
 92    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.030073  0.000000  0.000000  0.000000
0.033333  0.030073  0.000952  0.000000  0.075810
0.066667  0.030073  0.001905  0.000000  0.075810
0.100000  0.030073  0.002857  0.000000  0.075810
0.133333  0.030073  0.003809  0.000000  0.075810
0.166667  0.030073  0.004762  0.000000  0.075810
0.200000  0.030073  0.005714  0.000000  0.075810
0.233333  0.030073  0.006666  0.000000  0.075810
0.266667  0.030073  0.007619  0.000000  0.075810
0.300000  0.030073  0.008571  0.000000  0.075810
0.333333  0.030073  0.009523  0.000000  0.075810
0.366667  0.030073  0.010476  0.000000  0.075810
0.400000  0.030073  0.011428  0.000000  0.075810
0.433333  0.030073  0.012380  0.000000  0.075810
0.466667  0.030073  0.013333  0.000000  0.075810
0.500000  0.030073  0.014285  0.000000  0.075810
0.533333  0.030073  0.015237  0.000000  0.075810
0.566667  0.030073  0.016190  0.000000  0.075810
0.600000  0.030073  0.017142  0.000000  0.075810
```

| | | | | |
|---|---|---|---|---|
| 0.633333 | 0.030073 | 0.018094 | 0.000000 | 0.075810 |
| 0.666667 | 0.030073 | 0.019047 | 0.000000 | 0.075810 |
| 0.700000 | 0.030073 | 0.019999 | 0.000000 | 0.075810 |
| 0.733333 | 0.030073 | 0.020951 | 0.000000 | 0.075810 |
| 0.766667 | 0.030073 | 0.021904 | 0.000000 | 0.075810 |
| 0.800000 | 0.030073 | 0.022856 | 0.000000 | 0.075810 |
| 0.833333 | 0.030073 | 0.023808 | 0.000000 | 0.075810 |
| 0.866667 | 0.030073 | 0.024760 | 0.000000 | 0.075810 |
| 0.900000 | 0.030073 | 0.025713 | 0.000000 | 0.075810 |
| 0.933333 | 0.030073 | 0.026665 | 0.000000 | 0.075810 |
| 0.966667 | 0.030073 | 0.027617 | 0.000000 | 0.075810 |
| 1.000000 | 0.030073 | 0.028570 | 0.000000 | 0.075810 |
| 1.033333 | 0.030073 | 0.029522 | 0.000000 | 0.075810 |
| 1.066667 | 0.030073 | 0.030474 | 0.000000 | 0.075810 |
| 1.100000 | 0.030073 | 0.031427 | 0.000000 | 0.075810 |
| 1.133333 | 0.030073 | 0.032379 | 0.000000 | 0.075810 |
| 1.166667 | 0.030073 | 0.033331 | 0.000000 | 0.075810 |
| 1.200000 | 0.030073 | 0.034284 | 0.000000 | 0.075810 |
| 1.233333 | 0.030073 | 0.035236 | 0.000000 | 0.075810 |
| 1.266667 | 0.030073 | 0.036188 | 0.000000 | 0.075810 |
| 1.300000 | 0.030073 | 0.037141 | 0.000000 | 0.075810 |
| 1.333333 | 0.030073 | 0.038093 | 0.000000 | 0.075810 |
| 1.366667 | 0.030073 | 0.039045 | 0.000000 | 0.075810 |
| 1.400000 | 0.030073 | 0.039998 | 0.000000 | 0.075810 |
| 1.433333 | 0.030073 | 0.040950 | 0.000000 | 0.075810 |
| 1.466667 | 0.030073 | 0.041902 | 0.000000 | 0.075810 |
| 1.500000 | 0.030073 | 0.042855 | 0.000000 | 0.075810 |
| 1.533333 | 0.030073 | 0.043807 | 0.000000 | 0.075810 |
| 1.566667 | 0.030073 | 0.044759 | 0.000000 | 0.075810 |
| 1.600000 | 0.030073 | 0.045712 | 0.000000 | 0.075810 |
| 1.633333 | 0.030073 | 0.046664 | 0.000000 | 0.075810 |
| 1.666667 | 0.030073 | 0.047616 | 0.000000 | 0.075810 |
| 1.700000 | 0.030073 | 0.048569 | 0.000000 | 0.075810 |
| 1.733333 | 0.030073 | 0.049521 | 0.000000 | 0.075810 |
| 1.766667 | 0.030073 | 0.050473 | 0.000000 | 0.075810 |
| 1.800000 | 0.030073 | 0.051426 | 0.000000 | 0.075810 |
| 1.833333 | 0.030073 | 0.052378 | 0.000000 | 0.075810 |
| 1.866667 | 0.030073 | 0.053330 | 0.000000 | 0.075810 |
| 1.900000 | 0.030073 | 0.054283 | 0.000000 | 0.075810 |
| 1.933333 | 0.030073 | 0.055235 | 0.000000 | 0.075810 |
| 1.966667 | 0.030073 | 0.056187 | 0.000000 | 0.075810 |
| 2.000000 | 0.030073 | 0.057140 | 0.000000 | 0.075810 |
| 2.033333 | 0.030073 | 0.058092 | 0.042996 | 0.075810 |
| 2.066667 | 0.030073 | 0.059044 | 0.121030 | 0.075810 |
| 2.100000 | 0.030073 | 0.059997 | 0.219469 | 0.075810 |
| 2.133333 | 0.030073 | 0.060949 | 0.329384 | 0.075810 |
| 2.166667 | 0.030073 | 0.061901 | 0.441835 | 0.075810 |
| 2.200000 | 0.030073 | 0.062854 | 0.547841 | 0.075810 |
| 2.233333 | 0.030073 | 0.063806 | 0.639435 | 0.075810 |
| 2.266667 | 0.030073 | 0.064758 | 0.711272 | 0.075810 |
| 2.300000 | 0.030073 | 0.065711 | 0.762603 | 0.075810 |
| 2.333333 | 0.030073 | 0.066663 | 0.808195 | 0.075810 |
| 2.366667 | 0.030073 | 0.067615 | 0.847643 | 0.075810 |
| 2.400000 | 0.030073 | 0.068567 | 0.885334 | 0.075810 |
| 2.433333 | 0.030073 | 0.069520 | 0.921485 | 0.075810 |
| 2.466667 | 0.030073 | 0.070472 | 0.956270 | 0.075810 |
| 2.500000 | 0.030073 | 0.071424 | 0.989833 | 0.075810 |
| 2.533333 | 0.030073 | 0.072377 | 1.022295 | 0.075810 |
| 2.566667 | 0.030073 | 0.073329 | 1.053758 | 0.075810 |
| 2.600000 | 0.030073 | 0.074281 | 1.084308 | 0.075810 |
| 2.633333 | 0.030073 | 0.075234 | 1.114021 | 0.075810 |
| 2.666667 | 0.030073 | 0.076186 | 1.142961 | 0.075810 |
| 2.700000 | 0.030073 | 0.077138 | 1.171186 | 0.075810 |
| 2.733333 | 0.030073 | 0.078091 | 1.198748 | 0.075810 |
| 2.766667 | 0.030073 | 0.079043 | 1.225689 | 0.075810 |
| 2.800000 | 0.030073 | 0.079995 | 1.252051 | 0.075810 |
| 2.833333 | 0.030073 | 0.080948 | 1.277869 | 0.075810 |
| 2.866667 | 0.030073 | 0.081900 | 1.303176 | 0.075810 |
| 2.900000 | 0.030073 | 0.082852 | 1.328001 | 0.075810 |
| 2.933333 | 0.030073 | 0.083805 | 1.352370 | 0.075810 |

```
  2.966667  0.030073  0.084757  1.376307  0.075810
  3.000000  0.030073  0.085709  1.399836  0.075810
  3.033333  0.030073  0.086712  1.422975  0.075810
  END FTABLE  2
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***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1001 FLOW     ENGL      REPL
RCHRES   1 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
RCHRES   2 HYDR   RO     1 1        1      WDM   1004 FLOW     ENGL      REPL
RCHRES   2 HYDR   O      1 1        1      WDM   1005 FLOW     ENGL      REPL
RCHRES   2 HYDR   O      2 1        1      WDM   1006 FLOW     ENGL      REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1007 STAG     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

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

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


END MASS-LINK

END RUN
```

## *Predeveloped HSPF Message File*

## *Mitigated HSPF Message File*

# Disclaimer

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