Lorenzini Lake House

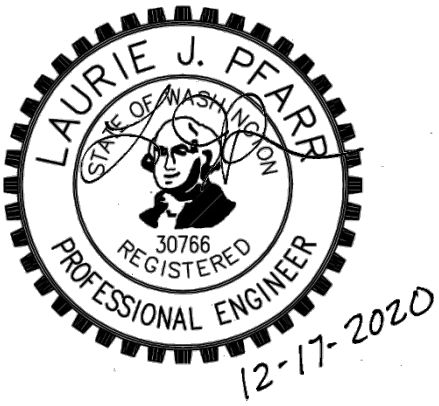
3310 97TH AVENUE SE

Mercer Island, WA

Stormwater Drainage Report

December 17, 2020

The information contained in this report was prepared by and under the direct supervision of the undersigned.



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LORENZINI STAIR HOUSE
STORMWATER DRAINAGE REPORT

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FIGURES AND APPENDICES

LPD engineering pllc

LORENZINI LAKE HOUSE
3310 97TH AVENUE SE
STORMWATER DRAINAGE REPORT
DECEMBER 17, 2020

Project Overview

The following Stormwater Drainage Report is for parcel #4139300333 located at 3310 97th Avenue SE, in the City of Mercer Island. See **Figure 1 – Vicinity Map**. The existing parcel totals approximately 0.63 acres and consists of a single-family residence with detached garage, concrete driveway, concrete walkways, and brick patios. The project proposes both interior renovations and exterior on-site improvements.

North of the renovated house facing the Lake Washington waterfront, site improvements will consist of the removal and replacement of the majority of existing decking and concrete pathways with a new elevated pool area surrounded by granite paver patio and walkways with integrated landscape features for outdoor entertaining and access to the waterfront. South of the renovated house, the existing driveway will be removed and repaved to improve the layout, surfacing, and pedestrian pathway connections. The south side of the house will also have a stone paver patio with drainage features. A portion of the detached garage will be removed to reduce the building footprint and this building will be renovated and roof replaced. The driveway will be extended to the new building edge.

Based upon the City of Mercer Island Municipal Code (MIMC) Section 15.09.050, the drainage analysis will be assessed using the Department of Ecology (DOE) 2014 Stormwater Manual of Western Washington (SWMWW). Additionally, projects that replace, modify, or construct a new driveway prior to discharge from the site shall provide passive spill control. Water quality treatment of the proposed pollution-generating surface (PGIS) is not required since the project proposes less than 5,000 SF of PGIS. The project is exempt from flow control requirements as the site has a direct discharge to Lake Washington which is considered a receiving water.

Existing Conditions

The site is bounded by single family residences to the east, west, and south, and Lake Washington to the north. According to the City of Mercer Island Zoning Map, the project site is within the R-9.6 zone. Based upon the Geologic Map of Mercer Island, the site soils are comprised primarily of nonglacial lake deposits in the north portion, and Vashon recessional lacustrine deposits in the south.

According to the City of Mercer Island, the property is not within an Erosion Hazard or Landslide Hazard area.

The existing site features include a single-family residence with concrete walkways and stairs, a concrete driveway, and an accessory building in the southern portion of the property. The total existing impervious surface is approximately 13,804 SF within the project site. The site topography slopes from south to north, with a grade difference of approximately 28 feet and an average slope of 10 percent. See **Figure 2 – Existing Conditions**.

Downstream Analysis

The project site was mapped by topographical field survey provided by Terrane. This field survey was provided to LPD Engineering and was supplemented by record information and aerial mapping data obtained from the City of Mercer Island. Additionally, a storm and sewer video investigation conducted by the project contractor on July 30th, 2020.

Per existing site plans, there are two primary pipe outlets that discharge to Lake Washington, a 6-inch PVC line on the east side of the property and a 4-inch PVC line on the west side of the property. The stormwater runoff from the driveways is collected in area drains and conveyed north along the east side of the property via the 6-inch PVC to a Type 1 Catch Basin structure. Runoff from the existing roofs is collected using downspouts, and also conveyed north via the 6-inch PVC which outlets at the northwest corner of the property through the rockery bulk head into Lake Washington. A smaller portion of the roof runoff, on the west side of the house, is convey via a 4-inch PVC line which discharges stormwater through an outlet at the northwest corner of the property through a rockery bulk head into Lake Washington.

Proposed Conditions

The total new plus replaced hard surface (as defined by the 2014 DOE manual) is approximately 5,264 square feet. See **Figure 3 – Proposed Conditions**. The concrete driveway and paver pathways have been included in both the existing and proposed hard surface area calculations for this drainage analysis. Please note that the "hard surface" calculations used in the drainage analysis are not necessarily the same as the impervious surface calculations used for the lot coverage analysis. Table 1 below shows an area summary of proposed improvements.

Table 1 –Proposed Improvements Area Summary

Surface Area	Pervious Surface [SF]	Hard Surface [SF]
PGIS Concrete Driveway		2,272
NPGIS Pool Area/ Concrete Walk		727
NPGIS Additional Roofing		1332
NPGIS Permeable Pavement (Not considered an Impervious Surface)		720
PGIS Permeable Pavement (Not considered an Impervious Surface)		521
Landscape	15,202	

Total New Plus Replaced Hard Surface		5,572 (0.128 AC)
Total Pervious	15,202 (0.349 AC)	
Total Replaced Roof Surface (Existing foundation and floor slab to remain)		6,699 (0.154 AC)
Total Existing Impervious Surface to Remain		70 (0.002 AC)
Total Lot Size	27,543 (0.632 AC)	

Drainage from the proposed driveway will be collected by a combination of trench drains, area drains, and Type 1 catch basins, including one with an existing oil water separator. Roof runoff will be collected in gutters and downspouts connected to a below-grade tight lined drainage system. The onsite drainage system will be routed to the existing 6-inch PVC and 4-inch PVC respectively and continue to outlet to Lake Washington. The proposed site drainage system and outfall locations are shown on the Grading and Drainage plan included in the Project Documents.

Minimum Requirements

Per Volume I of the DOE Manual, if the existing lot coverage is 35% impervious or more, the project is classified as a redevelopment. If less than 35% existing lot coverage, the project is a new development. The site is currently developed, with approximately 50.1% impervious coverage and is therefore classified as a redevelopment. See **Figure 2 – Existing Conditions**. Per Figure 2.4.2 as shown below, Minimum Requirements #1-5 will be required for all new and replaced hard surfaces, as well as disturbed land.

This project's minimum requirements were determined based on the redevelopment flow chart (Figure I-2.4.2) referred to in Volume I of the 2014 SWMMWW. The project proposes more than 2,000 SF of new plus replaced hard surface and therefore, will require Minimum Requirements (MR) #1 - #5 for all *new and replaced hard surfaces and converted vegetation areas.*

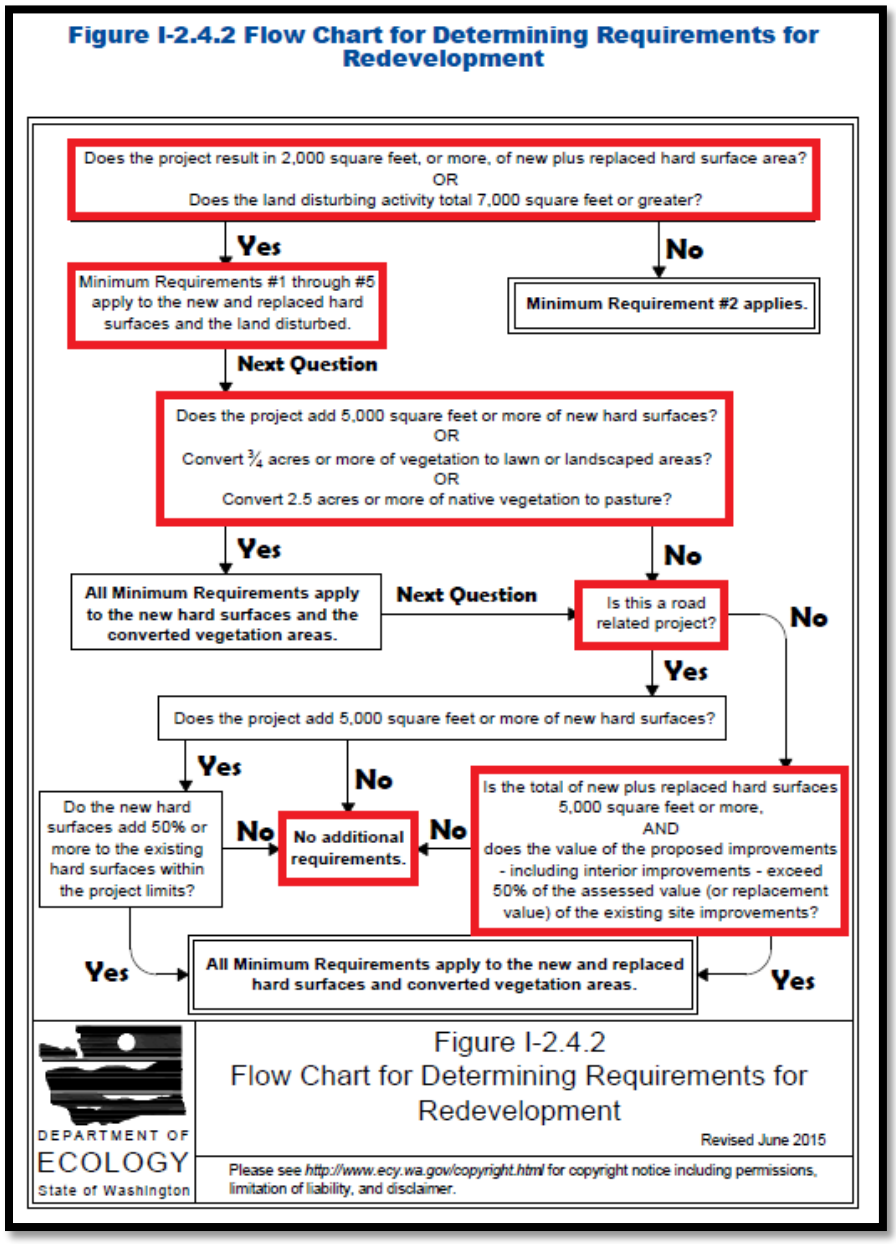
The project does not create greater than 5,000 SF of "new" hard surface. Comparing the total hard surface area in the pre-developed and post-developed conditions, the amount of hard surface area tributary to the downstream storm system is reduced. Therefore, the project does not create any additional hard surface areas; see Table 2 for a net calculation of existing and proposed surfaces:

Table 2 – Net Area Summary

Pre-Developed Hard/Impervious Surfaces [SF]	Post-Developed Hard Surfaces [SF]	Delta
13,805	12,341	-1,464

Therefore, no additional requirements are applied to this project. No flow control or water quality treatment is required. See the following redevelopment flow chart (Figure I-2.4.2) per the DOE manual.

Figure I-2.4.2 Flow Chart for Determining Requirements for Redevelopment



As indicated in the flow chart above, the minimum requirements (MR1-MR5) will apply to the new plus replaced hard surfaces. The project does not propose any converted vegetation areas since the site's existing pervious areas are landscape and lawn areas. Below is description of each of the minimum requirements for the project and how this project addresses them:

Minimum Requirement #1 – Preparation of Stormwater Site Plans (MR1): This document is the Stormwater Site Plan. It outlines the existing and proposed site and drainage conditions, describes the flow control systems, and presents the stormwater analysis.

Minimum Requirement #2 – Construction Stormwater Pollution Prevention Plan (SWPPP) (MR2): The construction SWPPP is included in this report. Refer to the Sediment and Erosion Control section of this report.

Minimum Requirement #3 – Source Control of Pollution (MR3): In the proposed conditions, applicable activities matching those listed within Volume IV of the 2014 DOE Manual that will require the use of source control measures. Refer to the Sediment and Erosion Control section of this report.

Minimum Requirement #4 – Preservation of Natural Drainage Systems and Outfalls (MR4): The proposed conditions will not alter the general drainage path. Refer to the Existing and Proposed Conditions of this report for further details.

Minimum Requirement #5 – On-Site Stormwater Management (MR5): On this project, the proposed on-site stormwater management BMPs include preservation and retention of native vegetation, permeable pavement, and amended soils. The project also proposes a non-standard BMP green wall on the main house which will help mitigate some of the roof surfaces. Refer to the Stormwater Management section below for a detailed description of the onsite stormwater management.

Stormwater Management

Flow Control

As mentioned, the proposed project will result in less than 5,000 SF of new plus replaced hard surface, and therefore is not required to provide flow control. Additionally, per MIMC Section 15.09.050.A.2, hard surfaces that are infeasible to mitigate with On-Site Stormwater Management BMPS (MR5) are also exempt from flow control requirements as the site has a direct discharge to Lake Washington and the proposed downstream system will have adequate conveyance capacity. Refer to the On-Site Stormwater Management and Conveyance sections of this report for further details.

Water Quality Treatment

The proposed project will have a total of 2,793 SF PGIS, which is less than 5,000 SF, thus the project is not required to provide water quality treatment. The project will include passive spill control for the proposed driveway and car court area as required by the City of Mercer Island, using a new oil water separator in the proposed Type 1 catch basin structure.

On-Site Stormwater Management

Based upon the City of Mercer Island Municipal Code (MIMC) Section 15.09.050.A, the new plus replaced hard surface area will require mitigation by on-site stormwater management BMPs to the maximum extent feasible. However, per 2014 DOE Manual Section 2.5.5, projects that are required to meet on-site stormwater management (MR5), but do not trigger flow control (MR7) do not have to achieve LID performance standards nor consider bioretention, rain gardens, permeable pavement, and full dispersion if using List #1 or List #2. A number of other BMPS, as required by Section 2.5.5, were evaluated for the project and are discussed below. BMP T5.13, post-construction soil quality and depth, will be implemented for existing lawn areas requiring replacement.

- **BMP T5.13 Post-Construction Soil Quality and Depth:** Post-Construction Soil Quality and Depth will be applied to existing lawn areas requiring replacement due to being disturbed by construction.

- **BMP T5.10A Downspout Full Infiltration Systems, BMP T5.10B Downspout Dispersion Systems or BMP T5.10C Perforated stub-out Connections:** Downspout infiltration systems were determined to be infeasible for this site. The geotechnical report for the site, prepared by Terra Associates, Inc., observed that the native soils contain a high percentage of soil fines. Mottling was also observed, indicating shallow groundwater. According to the report, "even low impact development (LID) techniques would likely fill up and overtop during rain events and cause minor local flooding." Refer to the geotechnical report which is supplemental to this report.

  Downspout dispersion systems were also found to be infeasible for this site. Per Section 3.1.2 of Volume III. a vegetative flowpath of 25-feet or more was not feasible downstream of the target surfaces.

- **BMPT5.11 Concentrated Flow Dispersion or BMP T5.12 Sheet Flow Dispersion:** Concentrated flow or sheet flow dispersion for the proposed driveway and walkways was not feasible due to limited site and vegetative flow path downstream of the proposed surfaces.

- **BMPT5.15 Permeable Pavements:** Although not required to be evaluated, the proposed improvements include 1,241 SF of permeable grid system of concrete pavers surrounding the existing building.

- **Non-Standard Vegetated Green Wall BMP:** Although not a standard DOE BMP, the project proposes a vertical, vegetated green wall to collect a portion of the roof runoff. The roof runoff will disperse into the planted green wall and discharge into a french drain which will eventually flow into the proposed storm system. The replaced roof area tributary to this vegetated green wall is approximately 709 SF.

Conveyance

A conveyance analysis was performed for two pipe runs on the project. The pipes were sized to accommodate the 25-year storm event from the tributary areas. For conservative pipe sizing the 100-year storm event was also included in the conveyance analysis. Refer to Appendix A for the Conveyance Analysis Spreadsheet and MGS Flood output reports. Please see below for the following results of the pipe run analysis:

Pipe Run #1: The first pipe run includes all surfaces tributary to the 6-inch pipe outlet. Using Manning's Equation, the 6-inch discharge pipe (n=0.011) with a slope of 0.5% was determined to have full flow capacities of 0.47 cubic feet per second (cfs). Using MGS Flood with the 15-minute time series, the runoff rate was determined to be 0.25cfs for the 25-year peak flow and 0.38cfs for 100-year peak flow. Therefore, the 6-inch pipe will have adequate capacity to convey the flows.

Pipe Run #2: The second pipe run includes all surfaces tributary to the 4-inch pipe outlet. Using Manning's Equation, the 4-inch discharge pipe (n=0.011) with a slope of 0.5% was determined to have full flow capacities of 0.16 cubic feet per second (cfs). Using MGS Flood with the 15-minute time series, the runoff rate was determined to be 0.02cfs for the 25-year peak flow and 0.04cfs for 100-year peak flow. Therefore, the 4-inch pipe will have adequate capacity to convey the flows.

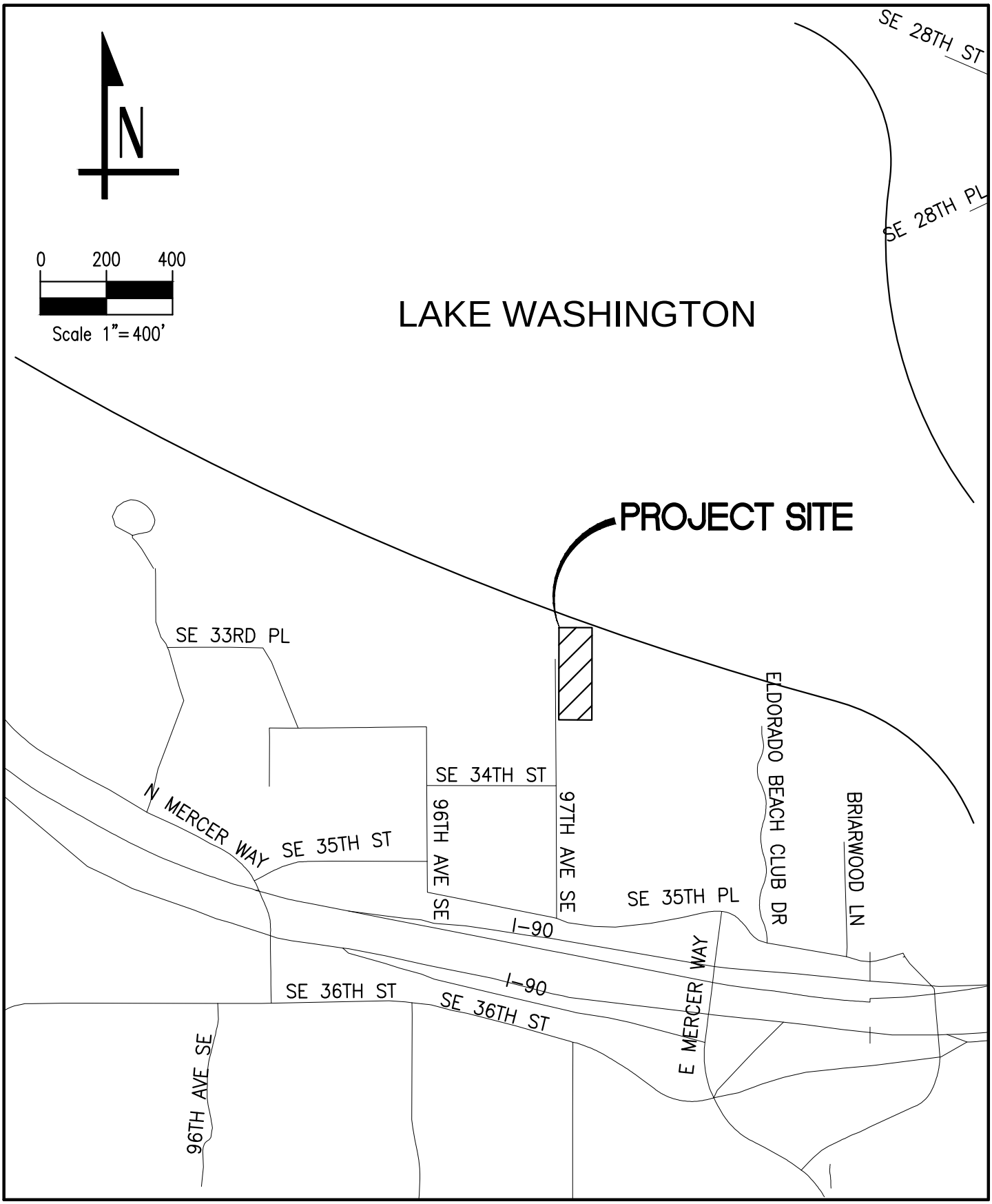
Sediment and Erosion Control Plan

The implementation of the temporary erosion and sediment control (TESC) plan as well as replacement and upgrading of the TESC facilities will be the responsibility of the contractor. The TESC plan is included in the project Documents. The TESC facilities will be constructed prior to and in conjunction with all clearing and grading activities and in a manner in which sediment or sediment laden water does not leave the project site, enter the drainage system, or violate applicable water quality standards. During construction the contractor is responsible for upgrading these facilities as necessary. Anticipated minimum TESC and stormwater pollution prevention measures are as follows:

- Mark Clearing Limits – Clearing limits will be defined by erosion control components and construction fencing as necessary.
- Establish Construction Access – Existing drive access will be used for construction access. A temporary asphalt drive and staging area will be added to allow for site stabilization and maneuverability. Quarry spalls along the edges of the drive will be supplemented as necessary to prevent erosion.
- Install Sediment Controls – Sediment will be controlled using perimeter siltation control include silt fence and silt sumps and pumps to direct runoff to a sediment tank on the north side of the site that will mitigate turbidity to allowable levels prior to discharging the stormwater into Lake Washington.
- Stabilize Soils –It is possible that some of the earthwork and grading may occur in wet weather conditions. The site must be stabilized and no soils will be allowed to remain unstabilized for more than two days between October 1 and April 30. From May 1 through September 30, cover measures must be installed to protect disturbed areas that will remain unworked for seven days or more. By October 8, seed all areas that will remain unworked from October 1 through April 30. Mulch all seeded areas. Exposed slopes will be protected by DOE-approved coverage methods. BMPs including, but not limited to: C101, Preserving Natural Vegetation; C121, Mulching; C123, Plastic Covering; C130, Surface Roughening; C140, Dust Control; and T5.13 Post Construction Soil Amendment will be used to stabilize onsite soils during construction. See Erosion and Sedimentation Control Notes on the plans in Project Documents.
- Control Pollutants – Temporary protection of the disturbed soils provides the first level of protection for pollution control and perimeter measures downstream will mitigate the remaining pollutants.
- Control De-watering –It is proposed that the majority of the earthwork on the project will be constructed during the dry season; therefore, it is not expected that groundwater will be encountered in the excavations for this project. In the event that perched groundwater is encountered during any wet season construction, the Contractor shall pump it out of the excavations, route it to the sediment tank for sediment settling prior to discharge to Lake Washington.
- Maintain BMPs – The BMP's will be maintained regularly in accordance with the Erosion and Sedimentation Control Plan and Notes.
- Manage the Project – The Contractor will maintain a daily presence on the site and will assign a contact person for erosion and sedimentation control issues.

Stormwater runoff during construction will be collected in temporary sump and pump and directed to a sediment tank. Sediment control sizing in accordance with the Stormwater Manual for Western Washington, for the 2-year storm event, requires a sediment facility yields approximately 1,750 gallons. Sediment control sizing calculations are provided in Appendix A.

FIGURES



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DESCRIPTION

VICINITY MAP

JULY 10, 2020

FIGURE

1

N

0 30 60

Scale 1"= 60'

EXISTING IMPERVIOUS AREA	
Existing Impervious	0.317 AC
Total Site Area	0.632 AC
Percentage of Site Impervious	50.1%

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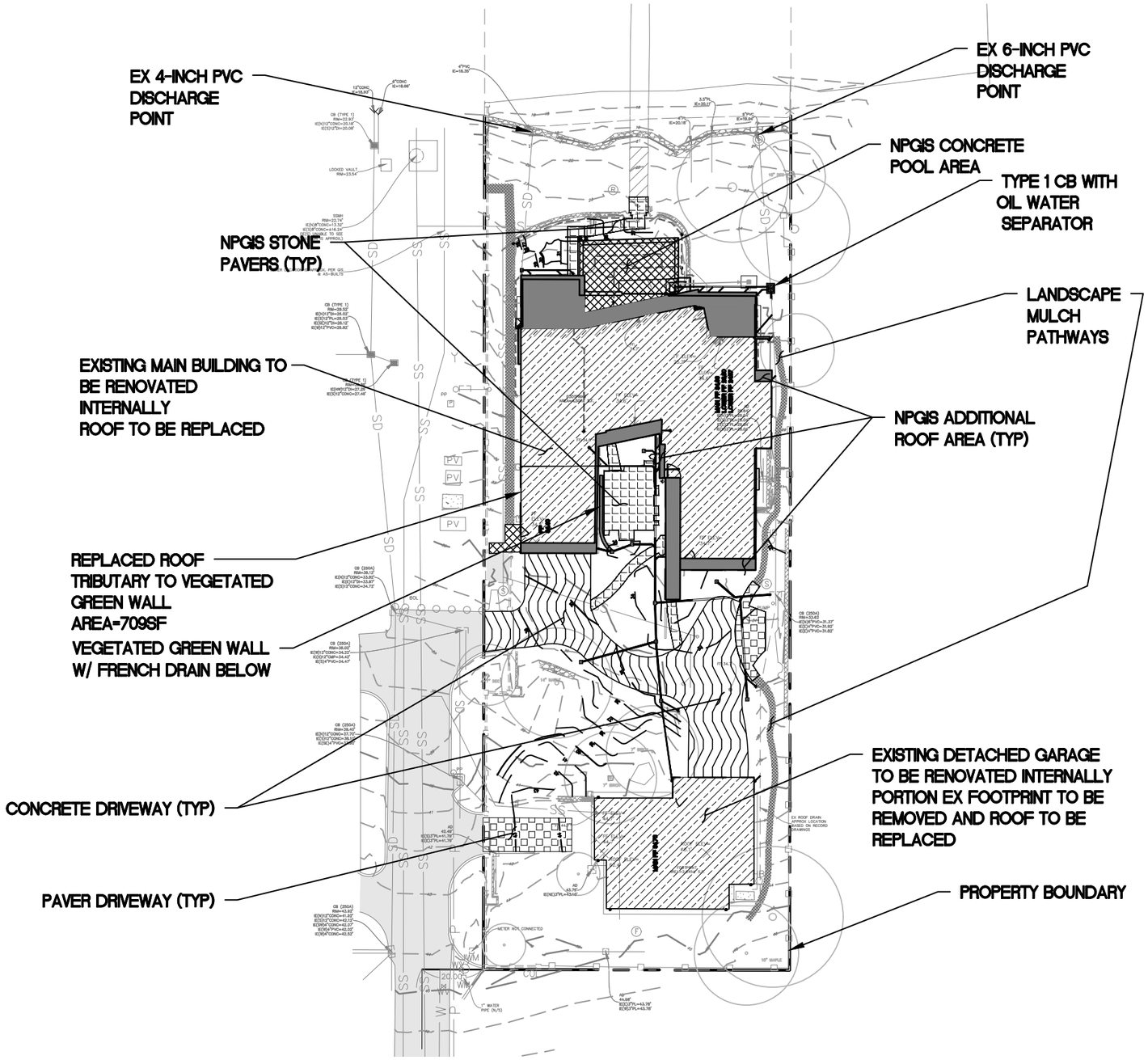
DESCRIPTION

EXISTING CONDITIONS

FIGURE

2



N

0 20 40

Scale 1"=40'

POST-DEVELOPED AREA SUMMARY

PGIS CONCRETE DRIVEWAY	2,272 SF (0.052 AC)
NPGIS CONCRETE POOL AREA AND WALK	727 SF (0.017 AC)
NPGIS ADDITIONAL ROOF AREA	1,332 SF (0.031 AC)
NPGIS PERMEABLE PAVEMENT	720 SF (0.016 AC)
PGIS PERMEABLE PAVEMENT	521 SF (0.012 AC)
TOTAL NEW PLUS REPLACE HARD SURFACES	5,572 SF (0.128 AC)
TOTAL PERVIOUS AREA	15,202 SF (0.349 AC)
TOTAL EXISTING IMPERVIOUS SURFACE TO REMAIN (INCLUDING REPLACED ROOF)	6,769 SF (0.155 AC)
TOTAL LOT SIZE	27,543 SF (0.632 AC)

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DESCRIPTION

PROPOSED CONDITIONS

FIGURE

3

LPD engineering pllc

APPENDIX A

Drainage Calculations

Lorenzini Residence

Conveyance Analysis Spreadsheet

Gravity Discharge

Pipe Run	Size (inches)	Mannings N	Plan Slope (ft/ft)	Qfull (cfs)	Tributary Basins	Tributary Area (acres)	Impervious (acres)	Grass (acres)	Qtrib (25yr-15min) (cfs)	% Full (25yr)	Qtrib (25yr-15min) (cfs)	% Full (25yr)
Pipe Run #1: 6-inch Outlet at NE Corner of Site	6	0.011	0.005	0.470	Area Tributary to 6-inch pipe outlet. Majority of Roof, Driveway, Paver Areas, and East Walkways	0.50	0.25	0.25	0.250	53%	0.388	78%
Pipe Run #2: 4-inch Outlet at NW Corner of Site	4	0.011	0.005	0.159	Area Tributary to 4-inch pipe outlet. Portion of Roof and West Walkways	0.05	0.02	0.03	0.023	14%	0.036	72%

Sediment Tank Sizing Calculations
Per the 2019 DOE Manual

Project Name: Lorenzini Residence

Required Sediment Trap Surface Area (SA):

SA =2*Q/Vsed

Where: Q = 2-year developed flow rate from M
Vsed = Settling Velocity (0.00096 ft/sec)

Calculation:

multiplier =	2		
Q =	0.169	cfs	Note: Used
Vsed =	0.00096	fps	
Required SA =	352.1	square feet	

Equivalent Sediment Trap Volume:

To determine the minimum sediment trap volume, an equivalent sediment trap was sized ba

Length of Top Surface Area =	10	feet
Width of Top Surface Area =	35.3	feet
Surface Area Provided =	353	square feet
Side Slope =	3	(H:1V)
Total Depth of Sediment Trap =	1	feet
Bottom Length of Sediment Trap =	4	feet
Bottom Width of Sediment Trap =	29.3	feet
Total pond Volume =	235.1	cubic feet
	1758.5	gallons

MGS Flood

a 5-min timestep instead of a 10-min.

ased upon the required surface area.

MGS FLOOD
PROJECT REPORT - TESC ANALYSIS

Program Version: MGSFlood 4.50
Program License Number: 201410003
Project Simulation Performed on: 12/11/2020 12:19 PM
Report Generation Date: 12/11/2020 12:19 PM

Input File Name: TESC and Conveyance
Project Name: Lake House
Analysis Title: Conveyance and TESC
Comments:

PRECIPITATION INPUT

Computational Time Step (Minutes): 5

Extended Precipitation Time Series Selected
Climatic Region Number: 15

Full Period of Record Available used for Routing
Precipitation Station : 96004005 Puget East 40 in_5min 10/01/1939-10/01/2097
Evaporation Station : 961040 Puget East 40 in MAP
Evaporation Scale Factor : 0.750

HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

********** Default HSPF Parameters Used (Not Modified by User) **********

********** WATERSHED DEFINITION **********

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.632	0.632
Area of Links that Include Precip/Evap (acres)	0.000	0.000
Total (acres)	0.632	0.632

----------SCENARIO: PREDEVELOPED
Number of Subbasins: 1

---------- Subbasin : Subbasin 1 ----------

	-------Area (Acres) --------
Till Grass	0.347
Impervious	0.285
Subbasin Total	0.632

----------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1

---------- Subbasin : Subbasin 1 ----------

	-------Area (Acres) --------
Till Grass	0.347
Impervious	0.285
Subbasin Total	0.632

********** LINK DATA **********

----------SCENARIO: PREDEVELOPED
Number of Links: 0

********** LINK DATA **********

----------SCENARIO: POSTDEVELOPED
Number of Links: 0

**********FLOOD FREQUENCY AND DURATION STATISTICS**********

----------SCENARIO: PREDEVELOPED
Number of Subbasins: 1
Number of Links: 0

----------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1
Number of Links: 0

************Groundwater Recharge Summary **************
Recharge is computed as input to Perlnd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation

Model Element	Recharge Amount (ac-ft)
Subbasin: Subbasin 1	42.378
Total:	42.378

Total Post Developed Recharge During Simulation

Model Element	Recharge Amount (ac-ft)
Subbasin: Subbasin 1	42.378
Total:	42.378

Total Predevelopment Recharge Equals Post Developed

Average Recharge Per Year, (Number of Years= 158)
Predeveloped: 0.268 ac-ft/year, Post Developed: 0.268 ac-ft/year

*************Water Quality Facility Data **************

----------SCENARIO: PREDEVELOPED

Number of Links: 0

----------SCENARIO: POSTDEVELOPED

Number of Links: 0

*************Compliance Point Results **************

Scenario Predeveloped Compliance Subbasin: Subbasin 1

Scenario Postdeveloped Compliance Subbasin: Subbasin 1

***** Point of Compliance Flow Frequency Data *****
Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	0.169	2-Year	0.169
5-Year	0.237	5-Year	0.237
10-Year	0.298	10-Year	0.298
25-Year	0.375	25-Year	0.375
50-Year	0.569	50-Year	0.569
100-Year	0.684	100-Year	0.684
200-Year	0.704	200-Year	0.704
500-Year	0.726	500-Year	0.726

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

MGS FLOOD
PROJECT REPORT – Pipe Run #1 Conveyance Analysis

Program Version: MGSFlood 4.50
Program License Number: 201410003
Project Simulation Performed on: 12/11/2020 5:27 PM
Report Generation Date: 12/11/2020 5:27 PM

Input File Name: Pipe Run #1.fld
Project Name: Lake House
Analysis Title: Conveyance Pipe Run #1
Comments:

PRECIPITATION INPUT

Computational Time Step (Minutes): 15

Extended Precipitation Time Series Selected
Climatic Region Number: 15

Full Period of Record Available used for Routing
Precipitation Station : 96004005 Puget East 40 in_5min 10/01/1939-10/01/2097
Evaporation Station : 961040 Puget East 40 in MAP
Evaporation Scale Factor : 0.750

HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

********** Default HSPF Parameters Used (Not Modified by User) **********

********** WATERSHED DEFINITION **********

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.500	0.500
Area of Links that Include Precip/Evap (acres)	0.000	0.000
Total (acres)	0.500	0.500

----------SCENARIO: PREDEVELOPED
Number of Subbasins: 1

---------- Subbasin : Subbasin 1 ----------

	-------Area (Acres) --------
Till Grass	0.250
Impervious	0.250
Subbasin Total	0.500

----------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1

---------- Subbasin : Subbasin 1 ----------

	-------Area (Acres) --------
Till Grass	0.250
Impervious	0.250
Subbasin Total	0.500

********** **LINK DATA** **********

----------SCENARIO: PREDEVELOPED
Number of Links: 0

********** **LINK DATA** **********

----------SCENARIO: POSTDEVELOPED
Number of Links: 0

**********FLOOD FREQUENCY AND DURATION STATISTICS**********

----------SCENARIO: PREDEVELOPED
Number of Subbasins: 1
Number of Links: 0

----------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1
Number of Links: 0

*************Groundwater Recharge Summary **************
Recharge is computed as input to Perlnd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation

Model Element	Recharge Amount (ac-ft)
Subbasin: Subbasin 1	30.553
Total:	30.553

Total Post Developed Recharge During Simulation

Model Element	Recharge Amount (ac-ft)
Subbasin: Subbasin 1	30.553
Total:	30.553

Total Predevelopment Recharge Equals Post Developed

Average Recharge Per Year, (Number of Years= 158)
Predeveloped: 0.193 ac-ft/year, Post Developed: 0.193 ac-ft/year

*************Water Quality Facility Data ***************

----------SCENARIO: PREDEVELOPED

Number of Links: 0

----------SCENARIO: POSTDEVELOPED

Number of Links: 0

*************Compliance Point Results ***************

Scenario Predeveloped Compliance Subbasin: Subbasin 1

Scenario Postdeveloped Compliance Subbasin: Subbasin 1

***** Point of Compliance Flow Frequency Data *****
Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	0.115	2-Year	0.115
5-Year	0.151	5-Year	0.151
10-Year	0.185	10-Year	0.185
25-Year	0.250	25-Year	0.250
50-Year	0.319	50-Year	0.319
100-Year	0.388	100-Year	0.388
200-Year	0.396	200-Year	0.396
500-Year	0.404	500-Year	0.404

** Record too Short to Compute Peak Discharge for These Recurrence Intervals

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MGS FLOOD
PROJECT REPORT – Pipe Run #2 Conveyance Analysis

Program Version: MGSFlood 4.50
Program License Number: 201410003
Project Simulation Performed on: 12/11/2020 5:28 PM
Report Generation Date: 12/11/2020 5:28 PM

Input File Name: Pipe Run #2.fld
Project Name: Lake House
Analysis Title: Conveyance Pipe Run #1
Comments:

PRECIPITATION INPUT

Computational Time Step (Minutes): 15

Extended Precipitation Time Series Selected
Climatic Region Number: 15

Full Period of Record Available used for Routing
Precipitation Station : 96004005 Puget East 40 in_5min 10/01/1939-10/01/2097
Evaporation Station : 961040 Puget East 40 in MAP
Evaporation Scale Factor : 0.750

HSPF Parameter Region Number: 1
HSPF Parameter Region Name : USGS Default

********** Default HSPF Parameters Used (Not Modified by User) **********

********** WATERSHED DEFINITION **********

Predevelopment/Post Development Tributary Area Summary

	Predeveloped	Post Developed
Total Subbasin Area (acres)	0.050	0.050
Area of Links that Include Precip/Evap (acres)	0.000	0.000
Total (acres)	0.050	0.050

----------SCENARIO: PREDEVELOPED
Number of Subbasins: 1

---------- Subbasin : Subbasin 1 ----------

	-------Area (Acres) --------
Till Grass	0.030
Impervious	0.020
Subbasin Total	0.050

----------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1

---------- Subbasin : Subbasin 1 ----------

	-------Area (Acres) --------
Till Grass	0.030
Impervious	0.020
Subbasin Total	0.050

********** **LINK DATA** **********

----------SCENARIO: PREDEVELOPED
Number of Links: 0

********** **LINK DATA** **********

----------SCENARIO: POSTDEVELOPED
Number of Links: 0

**********FLOOD FREQUENCY AND DURATION STATISTICS**********

----------SCENARIO: PREDEVELOPED
Number of Subbasins: 1
Number of Links: 0

----------SCENARIO: POSTDEVELOPED
Number of Subbasins: 1
Number of Links: 0

************Groundwater Recharge Summary **************
Recharge is computed as input to Perlnd Groundwater Plus Infiltration in Structures

Total Predeveloped Recharge During Simulation

Model Element	Recharge Amount (ac-ft)
Subbasin: Subbasin 1	3.666
Total:	3.666

Total Post Developed Recharge During Simulation

Model Element	Recharge Amount (ac-ft)
Subbasin: Subbasin 1	3.666
Total:	3.666

Total Predevelopment Recharge Equals Post Developed

Average Recharge Per Year, (Number of Years= 158)
Predeveloped: 0.023 ac-ft/year, Post Developed: 0.023 ac-ft/year

*************Water Quality Facility Data **************

----------SCENARIO: PREDEVELOPED

Number of Links: 0

----------SCENARIO: POSTDEVELOPED

Number of Links: 0

*************Compliance Point Results ***************

Scenario Predeveloped Compliance Subbasin: Subbasin 1

Scenario Postdeveloped Compliance Subbasin: Subbasin 1

***** Point of Compliance Flow Frequency Data *****
Recurrence Interval Computed Using Gringorten Plotting Position

Predevelopment Runoff		Postdevelopment Runoff	
Tr (Years)	Discharge (cfs)	Tr (Years)	Discharge (cfs)
2-Year	1.010E-02	2-Year	1.010E-02
5-Year	1.338E-02	5-Year	1.338E-02
10-Year	1.717E-02	10-Year	1.717E-02
25-Year	2.285E-02	25-Year	2.285E-02
50-Year	3.019E-02	50-Year	3.019E-02
100-Year	3.593E-02	100-Year	3.593E-02
200-Year	3.719E-02	200-Year	3.719E-02
500-Year	3.872E-02	500-Year	3.872E-02

** Record too Short to Compute Peak Discharge for These Recurrence Intervals