CITY OF MERCER ISLAND

DEVELOPMENT SERVICES GROUP

9611 SE 36TH STREET | MERCER ISLAND, WA 98040
PHONE: 206.275.7605 | www.mercergov.org
Inspection Requests: Online: www.MyBuildingPermits.com VM: 206.275.7730

SECTION A: SMALL PROJECT STORMWATER SITE PLAN/REPORT

Narrative and Plan Submittal

Instructions: This is a template for a simplified Stormwater Report. This form or an equivalent must accompany your Building Permit Application if the answer is "Yes" to each statement below. If "No" is the answer to one or more of the statements below, a full Drainage Report is required and the project does not qualify for use of the Small Project Stormwater Site Plan/Report template.

Select "yes" or "no" for each statement below. Answer "yes" if the statement accurately describes your project.

Yes	No	Statement
✓		This project disturbs less than 1 acre and is not part of a larger common plan of development.
✓		This project converts less than 3/4 acre to lawn or landscape areas.
✓		This project will create, add, or replace (in any combination) 2,000 square feet or greater, but less than 5,000 square feet, of new plus replaced hard surface **OR** will have a land disturbing activity of 7,000 square feet or greater **OR** will result in a net increase of impervious surface of 500 square feet or greater.
✓		This project will not adversely impact a wetland, stream, water of the state, or change a natural drainage course.

Basic Project Information

Project Name: GIOLA//ALDEHAYYAT

Site Address: 2969 74TH AVE SE

Total Lot Size: 14,009 sf

Total Proposed Area to be Disturbed (including stockpile area): 8,195 sq ft

Total Volume of Proposed Cut and Fill: 345 cy sq ft

Total Proposed New Hard Surface Area: 0 sq ft

Total Proposed Replaced Hard Surface Area: 4,156 sq ft

Total Proposed Converted Pervious Surface Area (Native vegetation to lawn or landscape): 0 sq ft

Net Increase in Impervious Surface: -925 sq ft

CITY OF MERCER ISLAND

SECTION A: SMALL PROJECT STORMWATER SITE PLAN/REPORT

Minimum Requirement #1 : Preparation of Stormwater Site Plan

Written Project Description:

Construction of a new single-family residence, driveway, patio and walkway on a developed lot. All existing improvements will be removed including house and extensive patios. The proposed residence will have two levels.
Stormwater runoff will be infiltrated into the soil through a drywell in the rear yard. The driveway, walkway, and patio will be surfaced with permeable pavers.

Calculate new or replaced areas by surface type:

Lawn or Landscape Areas: 9,853 sq ft

Roof Area: 3,004 sq ft

Other Hard Surface Areas:

Driveway: 605 sq ft

Patio: 421 sq ft

Sidewalk: 126 sq ft

Parking Lot: ______ sq ft

Other: ______ sq ft

☑ Attach Drainage Plan

Drainage Plan shall include the following:

- Scaled drawing with slopes, lot lines, any public-right-of-way and any easements, location of each on-site stormwater management BMP selected above and the areas served by them, buildings, roads, parking lots, driveways, landscape features, and areas of disturbed soils to be amended.
- The scaled drawing must be suitable to serve as a recordable document that will be attached to the property deed for each lot that includes on-site BMPs. Document submittal must follow the “Standard Formatting Requirements for Recording Documents” per King County: www.kingcounty.gov/depts/records-licensing/recorders-office/recording-documents.aspx
- Identify design details and maintenance instructions for each on-site BMP, and attach them to this Small Project Stormwater Site Plan/Report.

Minimum Requirement #2 : Construction Stormwater Pollution Prevention

☑ Complete Section B of this submittal package: Construction Stormwater Pollution Prevention Plan Narrative (SWPPP)

☐ Attach construction SWPPP

Minimum Requirement #3 : Source Control of Pollution

This section contains practices and procedures to reduce the release of pollutants. Provide a description of all known, available and reasonable source control BMPs that will be, or are anticipated to be, used at this location to prevent stormwater from coming into contact with pollutants. Additional BMPs are found in Volume IV of the 2014 Stormwater Management Manual for Western Washington (SWMMWW).

Check the BMPs you will use:

☐ BMP S411 for Landscaping and Lawn/ Vegetation Management
Operational practices for sites with landscaping

☐ BMP S421 for Parking and Storage of Vehicles.
Public and commercial parking lots can be sources of suspended solids, metals, or toxic hydrocarbons such oils and greases.

☐ BMP S433 for Pools, Spas, Hot Tubs, Fountains
Discharge from pools, hot tubs, and fountains can degrade ambient water quality. Routine maintenance activities generate a variety of wastes. Direct disposal of these waters to drainage system and waters of the state are not permitted without prior treatment and approval.

☐ Other BMPs found in Volume IV of SWMMWW applicable to project:

☑ No source control BMPs are applicable for this project.

Minimum Requirement #4 : Preservation of Natural Drainage Systems

Natural drainage patterns shall be maintained and discharges from the project site shall occur at the natural location, to the maximum extent practicable. All outfalls require energy dissipation.

Choose the option below that best describes your project:

☐ This site has existing drainage systems or outfalls. These items are shown on the Drainage Plan. Include the following items on the Drainage Plan:

- Pipe invert elevations, slopes, cover, and material
- Locations, grades, and direction of flow in ditches and swales, culverts, and pipes

Describe how these systems will be preserved:

☑ This site does not have any existing drainage systems or outfalls.

Additional Comments:

The natural direction of runoff is overland north into an adjacent private property. However, very little runoff would be expected given the high permeability of the soil. The proposed site drainage system will infiltrate stormwater preserving the natural system.

Minimum Requirement #5 : On-site Stormwater Management

All projects meeting the thresholds for this Small Project Stormwater Report shall employ on-site stormwater management BMPs (See Small Project Stormwater Requirements Tip Sheet) to infiltrate, disperse, and retain stormwater runoff on-site to the extent feasible without causing flooding or erosion impacts.

List #1

For each category select the *first* feasible item on the list below. Document your justification for each infeasible BMP in Section C of this submittal package.

Check one option for each category below:

Lawn and Landscape Areas

☐ My project does not have *Lawn or Landscape* areas

☑ Post-construction soil quality and depth

☐ Post-construction soil quality and depth is infeasible (see Section C of this submittal package)

Roofs

☐ My project does not have *Roof* areas

☑ 1. Full dispersion or downspout full infiltration

☐ 2. Rain garden or bioretention

☐ 3. Downspout dispersion system

Measured Infiltration Rate: 6.0 in/ hr

☐ 4. Perforated stub-out connections

☐ 5. On-site detention system or fee-in-lieu of on-site detention authorized by the City Engineer (applicable if options #1-4 are infeasible and drainage from the site will be discharged to a storm or surface water system that includes a watercourse or there is a capacity constraint in the system)

☐ 6. No Roof BMP (applicable if options #1-4 are infeasible and on-site detention is not required)

If #5 or #6 is selected, briefly describe why no Roof BMP is feasible (include detailed information in Section C of this submittal package):

Minimum Requirement #5 : On-site Stormwater Management (cont.)

Other Hard Surfaces (such as driveway, sidewalk, parking lot, patio, etc.)

☐ My project does not have *Other Hard Surface* areas

☐ 1. Full dispersion

Measured Infiltration Rate: 6.0 in/ hr

☑ 2. Permeable pavement, rain gardens, or bioretention

☐ 3. Sheet flow dispersion or concentrated flow dispersion

☐ 4. On-site detention system or fee-in-lieu of on-site detention authorized by the City Engineer (applicable if options #1-3 are infeasible and drainage from the site will be discharged to a storm or surface water system that includes a watercourse or there is a capacity constraint in the system)

☐ 5. No Other Hard Surface BMP (applicable if options #1-3 are infeasible and on-site detention is not required)

If #4 or #5 is selected, briefly describe why no Other Hard Surface BMP is feasible (include detailed information in Section C of this submittal package):

The existing site is too small to accommodate the required 100-foot full dispersion flowpath.

Flow Control Exempt List

Proceed with this list if your project discharges directly to Lake Washington or if findings from a downstream analysis confirm that the downstream system is free of capacity constraints for a minimum of ¼ mile and a maximum of 1 mile.

For flow control exempt discharges, the BMPs listed below for Roofs and Other Hard Surfaces do not need to be evaluated in priority order. You can select any BMP from the lists provided below and do not need to document infeasibility in Section C of this submittal package.

Check one option for each category below:

Lawn and Landscape Areas

☐ My project does not have *Lawn or Landscape* areas

☐ Post-construction soil quality and depth

Minimum Requirement #5 : On-site Stormwater Management (cont.)

Roofs

☐ My project does not have *Roof* areas

☐ Downspout full infiltration

☐ Downspout dispersion system

☐ Perforated stub-out connections

☐ Each item above is infeasible

If "Each item above is infeasible" is selected, briefly describe why no Roof BMP is feasible:

Other Hard Surfaces (such as driveway, sidewalk, parking lot, patio, etc.)

☐ My project does not have *Other Hard Surface* areas

☐ Sheet flow dispersion

☐ Concentrated flow dispersion

☐ Each item above is infeasible

If "Each item above is infeasible" is selected, briefly describe why no Other Hard Surface BMP is feasible:

CITY OF MERCER ISLAND

SECTION B: SMALL PROJECT CONSTRUCTION SWPPP NARRATIVE

Instructions

This is a template for a simplified Construction Stormwater Pollution Prevention Plan ("Construction SWPPP"). If "No" is the answer to one or more of the statements on the first page of Section A of this submittal package, then a full Construction SWPPP is required and the project does not quality for the use of the Small Project Construction SWPPP Narrative template. If the project is less than the thresholds on the first page of Section A of this submittal package, then Minimum Requirement #2 still applies, but this section (Section B) or a full construction SWPPP is not required. You should include your Construction SWPPP in your contract with your builder. A copy of the Construction SWPPP must be located at the construction site or within reasonable access to the site for construction and inspection personnel at all times.

General Information on the Existing Site and Project

Describe the following in the Project Narrative box below (attach additional pages if necessary):

- Nature and purpose of the construction project
- Existing topography, vegetation, and drainage, and building structures
- Adjacent areas, including streams, lakes, wetlands, residential areas, and roads that might be affected by the construction project
- How upstream drainage areas may affect the site
- Downstream drainage leading from the site to the receiving body of water
- Areas on or adjacent to the site that are classified as critical areas
- Critical areas that receive runoff from the site up to one-quarter mile away
- Special requirements and provisions for working near or within critical areas
- Areas on the site that have potential erosion problems

Project Narrative:

The project is a new single family residence. A new driveway, patio and walkway will also be constructed.

The existing terrain slope is mild and averages less than 2% down towards the north. Existing vegetation consists of lawn, landscaping, and trees. There is no existing drainage system in the fronting street. Given the high infiltration capacity of the soil it is likely most runoff is absorbed in landscaped areas,

Drainage from the roof will be collected by roof gutters and conveyed by downspouts and buried pipes to a drywell in the rear yard. On-grade impervious surfaces will be mitigated with permeable pavement.

Offsite drainage may enter the site along its south boundary as the area southward is upslope. The amount of drainage is expected to be insignificant.

Disturbance to the site is is limited to that necessary to construct the improvements and infiltration system. 11 of the 13 trees will be retained. Disturbance and exposure of soils during construction of the improvements has a potential for erosion. The impacts will be mitigated by construction BMPs and phasing.

CITY OF MERCER ISLAND

SECTION B: SMALL PROJECT CONSTRUCTION SWPPP NARRATIVE

Construction SWPPP Drawings

Refer to the general Drawing Requirements in Stormwater Management Manual for Western Washington (SWMMWW) Volume I, Chapter 3.

Vicinity Map

Provide a map with enough detail to identify the location of the construction site, adjacent roads, and receiving waters.

Site Map

Include the following (where applicable):

- ☑ Legal description of the property boundaries or an illustration of property lines (including distances) on the drawings.
- ☑ North arrow.
- ☑ Existing structures and roads.
- ☐ Boundaries and identification of different soil types.
- ☐ Areas of potential erosion problems.
- ☐ Any on-site and adjacent surface waters, critical areas, buffers, flood plain boundaries, and Shoreline Management boundaries.
- ☑ Existing contours and drainage basins and the direction of flow for the different drainage areas.
- ☑ Where feasible, contours extend a minimum of 25 feet beyond property lines and extend sufficiently to depict existing conditions.
- ☑ Final and interim grade contours as appropriate, drainage basins, and the direction of stormwater flow during and upon completion of construction.
- ☑ Areas of soil disturbance, including all areas affected by clearing, grading, and excavation.
- ☐ Locations where stormwater will discharge to surface waters during and upon completion of construction.
- ☑ Existing unique or valuable vegetation and vegetation to be preserved.
- ☐ Cut-and-fill slopes indicating top and bottom of slope catch lines.
- ☐ Total cut-and-fill quantities and the method of disposal for excess material.
- ☑ Stockpile; waste storage; and vehicle storage, maintenance, and washdown areas.

Temporary and Permanent BMPs

Include the following on site map (where applicable):

- ☐ Locations for temporary and permanent swales, interceptor trenches, or ditches.
- ☐ Drainage pipes, ditches, or cut-off trenches associated with erosion and sediment control and stormwater management.
- ☐ Temporary and permanent pipe inverts and minimum slopes and cover.
- ☐ Grades, dimensions, and direction of flow in all ditches and swales, culverts, and pipes.
- ☐ Locations and outlets of any dewatering systems.
- ☐ Details for bypassing off-site runoff around disturbed areas.
- ☑ Locations of temporary and permanent stormwater treatment and/or flow control best management practices (BMPs).
- ☑ Details for all structural and nonstructural erosion and sediment control (ESC) BMPs (including, but not limited to, silt fences, construction entrances, sedimentation facilities, etc.)
- ☐ Details for any construction-phase BMPs or techniques used for Low Impact Development (LID) BMP protection.

Element 1: Preserve Vegetation / Mark Clearing Limits

The goal of this element is to preserve native vegetation and to clearly show the limits of disturbance.

*This element **does not** apply to my project because:*

☐ The site was cleared as part of clearing activity that is subject to an enforcement action and is re-vegetated. Restoration may be necessary to comply with Critical Area Regulations or NPDES requirements. Buffer Zones-BMP C102 may apply if Critical Areas exist on-site and buffer zones shall be protected.

☐ Other Reason / Additional Comments:

*If it **does** apply, describe the steps you will take and select the best management practices (BMPs) you will use:*

☑ The perimeter of the area to be cleared shall be marked prior to clearing operation with visible flagging, orange plastic barrier fencing and/or orange silt fencing as shown on the SWPPP site map. The total disturbed area shall be less than 7,000 square feet. Vehicles will only be allowed in the areas to be graded, so no compaction of the undeveloped areas will occur.

Additional Comments:

Limits of disturbance will be delineated with tree protection fence, orange barrier fence and silt fence.

Check the BMPs you will use:

☑ C101 Preserving Natural Vegetation

☐ C102 Buffer Zones

☑ C103 High Visibility Fence

Element 2: Construction Access

The goal of this element is to provide a stabilized construction entrance/exit to prevent or reduce or sediment track out.

*This element **does not** apply to my project because:*

☐ The driveway to the construction area already exists and will be used for construction access. All equipment and vehicles will be restricted to staying on that existing impervious surface.

☐ Other Reason / Additional Comments:

*If it **does** apply, describe the steps you will take and select the BMPs you will use:*

☑ A stabilized construction entrance will be installed prior to any vehicles entering the site, at the location shown on the SWPPP site map.

Additional Comments:

A temporary rock construction entrance will be installed. The existing driveway can be used prior to that.

Check the BMPs you will use:

☑ C105 Stabilized Construction Entrance / Exit

☐ C106 Wheel Wash

☐ C107 Construction Road / Parking Area Stabilization

Element 3: Control Flow Rates

The goal of this element is to construct retention or detention facilities when necessary to protect properties and waterways downstream of development sites from erosion and turbid discharges.

This element ***does not*** *apply to my project because:*

☑ Other Reason / Additional Comments:

The disturbed area is too small to warrant a flow control facility.

If it ***does*** *apply, describe the steps you will take and select the BMPs you will use:*

☐ Flow rates will be controlled by using SWPPP Element 4 sediment controls and BMP T5.13 Post-Construction Soil Quality and Depth if necessary.

Additional Comments:

Element 4: Sediment Control

The goal of this element is to construct sediment control BMPs that minimize sediment discharges from the site.

*This element **does not** apply to my project because:*

☐ The site has already been stabilized and re-vegetated.

☐ Other Reason / Additional Comments:

*If it **does** apply, describe the steps you will take and select the BMPs you will use:*

☑ Sediment control BMPs shall be placed at the locations shown on the SWPPP site map

Additional Comments:

Sediment control facilities will consist of silt fence at the downslope perimeter.

Check the BMPs you will use:

☐ C231 Brush Barrier

☐ C232 Gravel Filter Berm

☑ C233 Silt Fence

☐ C234 Vegetated Strip

☐ C235 Wattles

Element 5: Stabilize Soils

The goal of this element is to stabilize exposed and unworked soils by implementing erosion control BMPs.

*This element **does not** apply to my project because:*

☐ Other Reason / Additional Comments:

*If it **does** apply, describe the steps you will take and select the BMPs you will use:*

☐ Exposed soils shall be worked during the week until they have been stabilized. Soil stockpiles will be located within the disturbed area shown on the SWPPP site map. Soil excavated for the foundation will be backfilled against the foundation and graded to drain away from the building. No soils shall remain exposed and unworked for more than 7 days from May 1 to September 30 or more than 2 days from October 1 to April 30. Once the disturbed landscape areas are graded, the grass areas will be amended using BMP T5.13 Post-Construction Soil Quality and Depth. All stockpiles will be covered with plastic or burlap if left unworked.

Additional Comments:

Mulch disturbed soils that will not be immediately covered by permanent improvements or landscaping.

Check the BMPs you will use:

- ☐ C120 Temporary & Permanent Seeding
- ☑ C121 Mulching
- ☐ C122 Nets & Blankets
- ☐ C123 Plastic Covering
- ☐ C124 Sodding
- ☐ C125 Topsoil / Composting
- ☐ C131 Gradient Terraces
- ☐ C140 Dust Control
- ☐ C235 Wattles

Element 6: Protect Slopes

The goal of this element is to design and construct cut-and-fill slopes in a manner to minimize erosion.

This element ***does not*** *apply to my project because:*

☐ No cut slopes over 4 feet high or slopes steeper than 2 feet horizontal to 1 foot vertical, and no fill slopes over 4 feet high will exceed 3 feet horizontal to 1 foot vertical. Therefore, there is no requirement for additional engineered slope protection.

☐ Other Reason / Additional Comments:

If it ***does*** *apply, describe the steps you will take and select the BMPs you will use:*

Additional Comments:

The only slopes will be those associated with the excavation for the crawl space. Plastic sheeting is proposed as a mitigation.

Check the BMPs you will use:

☐ C120 Temporary & Permanent Seeding
☐ C204 Pipe Slope Drains
☐ C205 Subsurface Drains
☐ C206 Level Spreader
☐ C207 Check Dams
☐ C208 Triangular Silt Dike (Geotextile-Encased Check Dam)

Element 7: Protect Permanent Drain Inlets

The goal of this element is to protect storm drain inlets during construction to prevent stormwater runoff from entering the conveyance system without being filtered or treated.

*This element **does not** apply to my project because:*

☐ The site has open ditches in the right-of-way or private road right-of-way.

☑ There are no catch basins on or near the site.

☐ Other Reason / Additional Comments:

*If it **does** apply, describe the steps you will take and select the BMPs you will use:*

☐ Catch basins on the site or immediately off site in the right-of-way are shown on the SWPPP site map. Storm drain inlet protection shall be installed.

Additional Comments:

Check the BMPs you will use:

☐ C220 Storm Drain Inlet Protection

Element 8: Stabilize Channels and Outlets

The goal of this element is to design, construct, and stabilize on-site conveyance channels to prevent erosion from entering existing stormwater outfalls and conveyance systems.

This element ***does not*** *apply to my project because:*

☑ Construction will occur during the dry weather. No storm drainage channels or ditches shall be constructed either temporary or permanent. A small swale shall be graded to convey yard drainage around the structure using a shallow slope; it shall be seeded after grading and stabilized.

☐ Other Reason / Additional Comments:

If it ***does*** *apply, describe the steps you will take and select the BMPs you will use:*

☐ A wattle shall be placed at the end of the swale to prevent erosion at the outlet of the swale.

Additional Comments:

Check the BMPs you will use:

☐ C202 Channel Lining ☐ C207 Check Dams ☐ C209 Outlet Protection ☐ C235 Wattles

Element 9: Control Pollutants

The goal of this element is to design, install, implement and maintain BMPs to minimize the discharge of pollutants from material storage areas, fuel handling, equipment cleaning, management of waste materials, etc.

*This element **does not** apply to my project because:*

☐ Other Reason / Additional Comments:

*If it **does** apply, describe the steps you will take and select the BMPs you will use:*

☑ Any and all pollutants, chemicals, liquid products and other materials that have the potential to pose a threat to human health or the environment will be covered, contained, and protected from vandalism. All such products shall be kept under cover in a secure location on-site. Concrete handling shall follow BMP C151.

Additional Comments:

See also pollution control notes on the plans.

Check the BMPs you will use:

☑ C151 Concrete Handling

☑ C153 Material Delivery, Storage, and Containment

☑ C152 Sawcutting and Surfacing Pollution Prevention

☑ C154 Concrete Washout Area

Element 10: Control De-watering

The goal of this element is to handle turbid or contaminated dewatering water separately from stormwater.

This element ***does not*** *apply to my project because:*

☑ No dewatering of the site is anticipated.

☐ Other Reason / Additional Comments:

The soils report suggests there will be no dewatering. The soils are permeable with no groundwater issues.

If it ***does*** *apply, describe the steps you will take and select the BMPs you will use:*

Additional Comments:

Check the BMPs you will use:

☐ C203 Water Bars ☐ C236 Vegetated Filtration ☐ C206 Level Spreader

Element 11: Maintain Best Management Practices

The goal of this element is to maintain and repair all temporary and permanent erosion and sediment control BMPs to assure continued performance.

Describe the steps you will take:

☑ Best Management Practices or BMPs shall be inspected and maintained during construction and removed within 30 days after the City Inspector or Engineer determines that the site is stabilized, provided that they may be removed when they are no longer needed.

Element 12: Manage the Project

The goal of this element is to ensure that the construction SWPPP is properly coordinated and that all BMPs are deployed at the proper time to achieve full compliance with City regulations throughout the project.

If it ***does*** *apply, describe the steps you will take and select the BMPs you will use:*

The Construction SWPPP will be implemented at all times. The applicable erosion control BMPs will be implemented in the following sequence:

☑ 1. Mark clearing limits

☑ 2. Install stabilized construction entrance

☐ 3. Install protection for existing drainage systems and permanent drain inlets

☑ 4. Establish staging areas for storage and handling polluted material and BMPs

☑ 5. Install sediment control BMPs

☑ 6. Grade and install stabilization measures for disturbed areas

☑ 7. Maintain BMPs until site stabilization, at which time they may be removed

Additional Comments:

Element 13: Protect Low Impact Development BMPs

The goal of this element is to protect on-site stormwater management BMPs (also known as “Low Impact Development BMPs”) from siltation and compaction during construction. On-site stormwater management BMPs used for runoff from roofs and other hard surfaces include: full dispersion, roof downspout full infiltration or dispersion systems, perforated stubout connections, rain gardens, bioretention systems, permeable pavement, sheetflow dispersion, and concentrated flow dispersion. Methods for protecting on-site stormwater management BMPs include sequencing the construction to install these BMPs at the latter part of the construction grading operations, excluding equipment from the BMPs and the associated areas, and using the erosion and sedimentation control BMPs listed below.

Describe the construction sequencing you will use:

Additional Comments:

A fence will be paced around the drywell areas to prevent wheel loading by machinery.

Select the BMPs you will use:

☐ C102 Buffer Zone
☐ C233 Silt Fence
☑ C103 High Visibility Fence
☐ C234 Vegetated Strip
☐ C231 Brush Barrier

Minimum Requirement #5 (On-Site Stormwater Management)

The following tables summarize infeasibility criteria that can be used to justify not using various on-site stormwater management best management practices (BMPs) for consideration for Minimum Requirement #5. This information is also included under the detailed descriptions of each BMP in the 2014 Stormwater Management Manual for Western Washington (Stormwater Manual), but is provided here in this worksheet for additional clarity and efficiency. Where any inconsistencies or lack of clarity exists, the requirements in the main text of the Stormwater Manual shall be applied. If a project is limited by one or more of the infeasibility criteria specified below, but an applicant is interested in implementing a specific BMP, a functionally equivalent design may be submitted to the City for review and approval. Evaluate the feasibility of the BMPs in priority order based on List #1 or #2 (Small Project Stormwater Requirements Tip Sheet and Stormwater Manual). Select the first BMP that is considered feasible for each surface type. Document the infeasibility (narrative description and rationale) for each BMP that was not selected. Only one infeasibility criterion needs to be selected for a BMP before evaluating the next BMP on the list. Attach additional pages for supporting information if necessary.

Note: If your project discharges directly to Lake Washington (flow control exempt) or a downstream analysis confirms that the downstream system is free of capacity constraints for a minimum of ¼ mile and a maximum of 1 mile, then you do not need to complete this worksheet, but should still refer to the infeasibility criteria when selecting BMPs.

Lawn and Landscaped Areas

BMP and Applicable Lists	Infeasibility Criteria	Infeasibility Description and Rationale for Each BMP Not Selected
Post-construction Soil Quality and Depth List #1 and #2	☐ Siting and design criteria provided in BMP T5.13 (**Stormwater Manual** Volume V, Section 5.3) cannot be achieved.	
	☐ Lawn and landscape area is on till slopes greater than 33 percent.	

Roofs

BMP and Applicable Lists	Infeasibility Criteria	Infeasibility Description and Rationale for Each BMP Not Selected
Full Dispersion List #1 and #2	☑ Site setbacks and design criteria provided in BMP T5.30 (**Stormwater Manual** Volume V, Section 5.3) cannot be achieved.	
	☑ A 65 to 10 ratio of forested or native vegetation area to impervious area cannot be achieved.	
	☑ A minimum forested or native vegetation flowpath length of 100 feet (25 feet for sheet flow from a non-native pervious surface) cannot be achieved.	
Downspout Full Infiltration List #1 and #2	☐ Evaluation of infiltration is not required per the Infiltration Infeasibility Map due to steep slopes, erosion hazards, or landslide hazards.	
	☐ Site setbacks and design criteria provided in BMP T5.10A (**Stormwater Manual** Volume III, Section 3.1.1) cannot be achieved.	
	☐ The lot(s) or site does not have out-wash or loam soils.	
	☐ There is not at least 3 feet or more of permeable soil from the proposed final grade to the seasonal high groundwater table or other impermeable layer.	
	☐ There is not at least 1 foot or more of permeable soil from the proposed bottom of the infiltration system to the seasonal high groundwater table or other impermeable layer.	

Roofs (cont.)		
BMP and Applicable Lists	**Infeasibility Criteria**	**Infeasibility Description and Rationale for Each BMP Not Selected**
Bioretention or Rain Gardens List #1 (both) and List #2 (bioretention only)	*Note: Criteria with setback distances are as measured from the bottom edge of the bioretention soil mix.* Citation of any of the following infeasibility criteria must be based on an evaluation of site-specific conditions and a written recommendation from an appropriate licensed professional (e.g., engineer, geologist, hydrogeologist): ☐ Where professional geotechnical evaluation recommends infiltration not be used due to reasonable concerns about erosion, slope failure, or down-gradient flooding. ☐ Within an area whose ground water drains into an erosion hazard, or landslide hazard area. ☐ Where the only area available for siting would threaten the safety or reliability of pre-existing underground utilities, pre-existing underground storage tanks, pre-existing structures, or pre-existing road or parking lot surfaces. ☐ Where the only area available for siting does not allow for a safe overflow pathway to stormwater drainage system or private storm sewer system. ☐ Where there is a lack of usable space for bioretention areas at re-development sites, or where there is insufficient space within the existing public right-of-way on public road projects. ☐ Where infiltrating water would threaten existing below grade basements. ☐ Where infiltrating water would threaten shoreline structures such as bulkheads. The following criteria can be cited as reasons for infeasibility without further justification (though some require professional services to make the observation): ☐ Evaluation of infiltration is not required per the Infiltration Infeasibility Map due to steep slopes, erosion hazards, or landslide hazards ☐ Within setback provided for BMP T7.30 (**Stormwater Manual** Volume V, Section 7.4) ☐ Where they are not compatible with surrounding drainage system as determined by the city (e.g., project drains to an existing stormwater collection system whose elevation or location precludes connection to a properly functioning bioretention area).	

Roofs (cont.)		
BMP and Applicable Lists	**Infeasibility Criteria**	**Infeasibility Description and Rationale for Each BMP Not Selected**
Bioretention or Rain Gardens (cont.)	The following criteria can be cited as reasons for infeasibility without further justification (though some require professional services to make the observation): ☐ Where land for bioretention is within an erosion hazard, or landslide hazard area (as defined by MICC 19.07.060). ☐ Where the site cannot be reasonably designed to locate bioretention areas on slopes less than 8 percent. ☐ Within 50 feet from the top of slopes that are greater than 20 percent and over 10 feet of vertical relief. ☐ For properties with known soil or groundwater contamination (typically federal Superfund sites or state cleanup sites under the Model Toxics Control Act [MTCA]): • Within 100 feet of an area known to have deep soil contamination. • Where groundwater modeling indicates infiltration will likely increase or change the direction of the migration of pollutants in the groundwater. • Wherever surface soils have been found to be contaminated unless those soils are removed within 10 horizontal feet from the infiltration area. • Any area where these facilities are prohibited by an approved cleanup plan under the state MTCA or Federal Superfund Law, or an environmental covenant under Chapter 64.70 RCW. ☐ Within 100 feet of a closed or active landfill. ☐ Within 10 feet of an underground storage tank and connecting underground pipes when the capacity of the tank and pipe system is 1,100 gallons or less. As used in these criteria, an underground storage tank means any tank used to store petroleum products, chemicals, or liquid hazardous wastes of which 10 percent or more of the storage volume (including volume in the connecting piping system) is beneath the ground surface. ☐ Within 100 feet of an underground storage tank and connecting underground pipes when the capacity of the tank and pipe system is greater than 1,100 gallons.	

Roofs (cont.)		
BMP and Applicable Lists	**Infeasibility Criteria**	**Infeasibility Description and Rationale for Each BMP Not Selected**
Bioretention or Rain Gardens (cont.)	The following criteria can be cited as reasons for infeasibility without further justification (though some require professional services to make the observation): ☐ Where field testing indicates potential bioretention/rain garden sites have a measured (a.k.a., initial) native soil saturated hydraulic conductivity less than 0.30 inches per hour. A small-scale or large-scale PIT in accordance with **Stormwater Manual** Volume III, Section 3.3.6 (or an alternative small scale test specified by the City) shall be used to demonstrate infeasibility of bioretention areas. If the measured native soil infiltration rate is less than 0.30 in/hour, bioretention/rain garden BMPs are not required to be evaluated as an option in List #1 or List #2. In these slow draining soils, a bioretention area with an underdrain may be used to treat pollution-generating surfaces to help meet Minimum Requirement #6, Runoff Treatment. If the underdrain is elevated within a base course of gravel, it will also provide some modest flow reduction benefit that will help achieve Minimum Requirement #7. ☐ Where the minimum vertical separation of 3 feet to the seasonal high groundwater elevation or other impermeable layer would not be achieved below bioretention that would serve a drainage area that exceeds the following thresholds (and cannot reasonably be broken down into amounts smaller than indicated): o 5,000 square feet of pollution-generating impervious surface (PGIS) o 10,000 square feet of impervious area o 0.75 acres of lawn and landscape. ☐ Where the minimum vertical separation of 1 foot to the seasonal high groundwater or other impermeable layer would not be achieved below bioretention that would serve a drainage area less than the above thresholds. ☐ Within 100 feet of a drinking water well, or a spring used for drinking water supply. ☐ Within 10 feet of small on-site sewage disposal drainfield, including reserve areas, and grey water reuse systems. For setbacks from a "large on-site sewage disposal system," see Chapter 246-272B WAC.	

Roofs (cont.)		
BMP and Applicable Lists	**Infeasibility Criteria**	**Infeasibility Description and Rationale for Each BMP Not Selected**
Downspout Dispersion Systems List #1 and #2	☐ Site setbacks and design criteria provided in BMP T5.10B (**Stormwater Manual** Volume III, Section 3.1.2) cannot be achieved. ☐ For splash blocks, a vegetated flowpath at least 50 feet in length from the downspout to the downstream property line, structure, stream, wetland, slope over 15 percent, or other impervious surface is not feasible. ☐ For trenches, a vegetated flowpath of at least 25 feet in between the outlet of the trench and any property line, structure, stream, wetland, or impervious surface is not feasible. A vegetated flowpath of at least 50 feet between the outlet of the trench and any slope steeper than 15 percent is not feasible.	
Perforated Stub-Out Connections List #1 and #2	☐ Evaluation of infiltration is not required per the Infiltration Infeasibility Map due to steep slopes, erosion hazards, or landslide hazards ☐ For sites with septic systems, the only location available for the perforated portion of the pipe is located up-gradient of the drainfield primary and reserve areas. This requirement can be waived if site topography will clearly prohibit flows from intersecting the drainfield or where site conditions (soil permeability, distance between systems, etc.) indicate that this is unnecessary. ☐ Site setbacks and design criteria provided in BMP T5.10C (**Stormwater Manual** Volume III, Section 3.1.3) cannot be achieved. ☐ There is not at least 1 foot of permeable soil from the proposed bottom (final grade) of the perforated stub-out connection trench to the highest estimated groundwater table or other impermeable layer. ☐ The only location available for the perforated stub-out connection is under impervious or heavily compacted soils.	
On-site Detention List #1 and #2	☐ Project discharges directly to Lake Washington. ☐ Findings from a 1/4 mile downstream analysis confirm that the downstream system is free of capacity constraints. ☐ Site setbacks and design criteria provided in the **Stormwater Manual** (Volume III, Section 3.2.2) cannot be achieved.	

SECTION C: INFEASIBILITY CRITERIA

Other Hard Surfaces		
BMP and Applicable Lists	**Infeasibility Criteria**	**Infeasibility Description and Rationale for Each BMP Not Selected**
Full Dispersion List #1 and #2	☑ Site setbacks and design criteria provided in BMP T5.30 (**Stormwater Manual** Volume V, Section 5.3) cannot be achieved. ☑ A 65 to 10 ratio of forested or native vegetation area to impervious area cannot be achieved. ☑ A minimum forested or native vegetation flowpath length of 100 feet (25 feet for sheet flow from a non-native pervious surface) cannot be achieved.	
Permeable Pavement List #1 and #2	Citation of any of the following infeasibility criteria must be based on an evaluation of site-specific conditions and a written recommendation from an appropriate licensed professional (e.g., engineer, geologist, hydrogeologist): ☐ Where professional geotechnical evaluation recommends infiltration not be used due to reasonable concerns about erosion, slope failure, or downgradient flooding. ☐ Within an area whose ground water drains into an erosion hazard, or landslide hazard area. ☐ Where infiltrating and ponded water below the new permeable pavement area would compromise adjacent impervious pavements. ☐ Where infiltrating water below a new permeable pavement area would threaten existing below grade basements. ☐ Where infiltrating water would threaten shoreline structures such as bulkheads. ☐ Down slope of steep, erosion prone areas that are likely to deliver sediment. ☐ Where fill soils are used that can become unstable when saturated. ☐ Excessively steep slopes where water within the aggregate base layer or at the subgrade surface cannot be controlled by detention structures and may cause erosion and structural failure, or where surface runoff velocities may preclude adequate infiltration at the pavement surface. ☐ Where permeable pavements cannot provide sufficient strength to support heavy loads at industrial facilities such as ports. ☐ Where installation of permeable pavement would threaten the safety or reliability of pre-existing underground utilities, pre-existing underground storage tanks, or pre-existing road subgrades.	

Other Hard Surfaces (cont.)		
BMP and Applicable Lists	**Infeasibility Criteria**	**Infeasibility Description and Rationale for Each BMP Not Selected**
Permeable Pavement (cont.)	The following criteria can be cited as reasons for infeasibility without further justification (though some require professional services to make the observation): ☐ Evaluation of infiltration is not required per the Infiltration Infeasibility Map due to steep slopes, erosion hazards, or landslide hazards ☐ Within an area designated as an erosion hazard, or landslide hazard. ☐ Within 50 feet from the top of slopes that are greater than 20 percent. ☐ For properties with known soil or groundwater contamination (typically federal Superfund sites or state cleanup sites under MTCA): • Within 100 feet of an area known to have deep soil contamination. • Where groundwater modeling indicates infiltration will likely increase or change the direction of the migration of pollutants in the groundwater. • Wherever surface soils have been found to be contaminated unless those soils are removed within 10 horizontal feet from the infiltration area. • Any area where these facilities are prohibited by an approved cleanup plan under the state MTCA or Federal Superfund Law, or an environmental covenant under Chapter 64.70 RCW. ☐ Within 100 feet of a closed or active landfill. ☐ Within 100 feet of a drinking water well, or a spring used for drinking water supply, if the pavement is a pollution-generating surface. ☐ Within 10 feet of a small on-site sewage disposal drainfield, including reserve areas, and grey water reuse systems. For setbacks from a “large on-site sewage disposal system,” see Chapter 246-272B WAC. ☐ Within 10 feet of any underground storage tank and connecting underground pipes, regardless of tank size. As used in these criteria, an underground storage tank means any tank used to store petroleum products, chemicals, or liquid hazardous wastes of which 10 percent or more of the storage volume (including volume in the connecting piping system) is beneath the ground surface. ☐ At multi-level parking garages, and over culverts and bridges. ☐ Where the site design cannot avoid putting pavement in areas likely to have long-term excessive sediment deposition after construction (e.g., construction and landscaping material yards).	

Other Hard Surfaces (cont.)		
BMP and Applicable Lists	**Infeasibility Criteria**	**Infeasibility Description and Rationale for Each BMP Not Selected**
Permeable Pavement (cont.)	The following criteria can be cited as reasons for infeasibility without further justification (though some require professional services to make the observation): ☐ Where the site cannot reasonably be designed to have: • Porous asphalt surface < 5% slope • Pervious concrete surface < 10% slope • Permeable interlocking concrete pavement surface < 12% slope • Grid systems < 6-12% slope (check with manufacturer and local supplier to confirm maximum slope) ☐ Where the subgrade soils below a pollution-generating permeable pavement (e.g., road or parking lot) do not meet the soil suitability criteria for providing treatment. See soil suitability criteria for treatment in the **Stormwater Manual** Volume III, Section 3.3.7. Note: In these instances, the city may approve installation of a 6 inch sand filter layer meeting city specifications for treatment as a condition of construction. ☐ Where underlying soils are unsuitable for supporting traffic loads when saturated. Soils meeting a California Bearing Ratio of 5 percent are considered suitable for residential access roads. ☐ Where replacing existing impervious surfaces unless the existing surface is a non-pollution generating surface over an outwash soil with a saturated hydraulic conductivity of 4 inches per hour or greater. ☐ Where appropriate field testing indicates soils have a measured (a.k.a., initial) subgrade soil saturated hydraulic conductivity less than 0.3 inches per hour. Only small-scale PIT or large-scale PIT methods in accordance with **Stormwater Manual** Volume III, Section 3.3.6 (or an alternative small scale test specified by the City) shall be used to evaluate infeasibility of permeable pavement areas. (Note: In these instances, unless other infeasibility restrictions apply, roads and parking lots may be built with an underdrain, preferably elevated within the base course, if flow control benefits are desired.) ☐ Roads that receive more than very low traffic volumes, and areas having more than very low truck traffic. Roads with a projected average daily traffic volume of 400 vehicles or less are very low volume roads (AASHTO 2001) (U.S. Department of Transportation, 2013). Areas with very low truck traffic volumes are roads and other areas not subject to through truck traffic but may receive up to weekly use by utility trucks (e.g., garbage, recycling), daily school bus use, and multiple daily use by pick-up trucks, mail/parcel delivery trucks, and maintenance vehicles. (Note: This infeasibility criterion does not extend to sidewalks and other non-traffic bearing surfaces associated with the collector or arterial).	

Other Hard Surfaces (cont.)		
BMP and Applicable Lists	**Infeasibility Criteria**	**Infeasibility Description and Rationale for Each BMP Not Selected**
Permeable Pavement (cont.)	The following criteria can be cited as reasons for infeasibility without further justification (though some require professional services to make the observation): ☐ At sites defined as "high-use sites" (refer to the Glossary in the **Stormwater Manual** Volume I). ☐ In areas with "industrial activity" as identified in 40 CFR 122.26(b)(14). ☐ Where the risk of concentrated pollutant spills is more likely such as gas stations, truck stops, and industrial chemical storage sites. ☐ Where routine, heavy applications of sand occur in frequent snow zones to maintain traction during weeks of snow and ice accumulation. ☐ Where the seasonal high groundwater or an underlying impermeable/ low permeable layer would create saturated conditions within 1 foot of the bottom of the lowest gravel base course.	
Bioretention or Rain Gardens List #1 (both) and List #2 (bioretention only)	*Note: Criteria with setback distances are as measured from the bottom edge of the bioretention soil mix.* Citation of any of the following infeasibility criteria must be based on an evaluation of site-specific conditions and a written recommendation from an appropriate licensed professional (e.g., engineer, geologist, hydrogeologist): ☐ Where professional geotechnical evaluation recommends infiltration not be used due to reasonable concerns about erosion, slope failure, or down-gradient flooding. ☐ Within an area whose ground water drains into an erosion hazard, or landslide hazard area. ☐ Where the only area available for siting would threaten the safety or reliability of pre-existing underground utilities, pre-existing underground storage tanks, pre-existing structures, or pre-existing road or parking lot surfaces. ☐ Where the only area available for siting does not allow for a safe overflow pathway to stormwater drainage system or private storm sewer system. ☐ Where there is a lack of usable space for bioretention areas at re-development sites, or where there is insufficient space within the existing public right-of-way on public road projects. ☐ Where infiltrating water would threaten existing below grade basements. ☐ Where infiltrating water would threaten shoreline structures such as bulkheads.	

Other Hard Surfaces (cont.)		
BMP and Applicable Lists	**Infeasibility Criteria**	**Infeasibility Description and Rationale for Each BMP Not Selected**
Bioretention or Rain Gardens (cont.)	The following criteria can be cited as reasons for infeasibility without further justification (though some require professional services to make the observation): ☐ Where evaluation of infiltration is not required per the Infiltration Infeasibility Map due to steep slopes, erosion hazards, or landslide hazards. ☐ Within setback provided for BMP T7.30 (**Stormwater Manual** Volume V, Section 7.4) ☐ Where they are not compatible with surrounding drainage system as determined by the city (e.g., project drains to an existing stormwater collection system whose elevation or location precludes connection to a properly functioning bioretention area). ☐ Where land for bioretention is within an erosion hazard, or landslide hazard area (as defined by MICC 19.07.060). ☐ Where the site cannot be reasonably designed to locate bioretention areas on slopes less than 8 percent. ☐ Within 50 feet from the top of slopes that are greater than 20 percent and over 10 feet of vertical relief. ☐ For properties with known soil or groundwater contamination (typically federal Superfund sites or state cleanup sites under the Model Toxics Control Act [MTCA]): • Within 100 feet of an area known to have deep soil contamination. • Where groundwater modeling indicates infiltration will likely increase or change the direction of the migration of pollutants in the groundwater. • Wherever surface soils have been found to be contaminated unless those soils are removed within 10 horizontal feet from the infiltration area. • Any area where these facilities are prohibited by an approved cleanup plan under the state MTCA or Federal Superfund Law, or an environmental covenant under Chapter 64.70 RCW. ☐ Within 100 feet of a closed or active landfill. ☐ Within 10 feet of an underground storage tank and connecting underground pipes when the capacity of the tank and pipe system is 1,100 gallons or less. As used in these criteria, an underground storage tank means any tank used to store petroleum products, chemicals, or liquid hazardous wastes of which 10 percent or more of the storage volume (including volume in the connecting piping system) is beneath the ground surface.	

Other Hard Surfaces (cont.)		
BMP and Applicable Lists	**Infeasibility Criteria**	**Infeasibility Description and Rationale for Each BMP Not Selected**
Bioretention or Rain Gardens (cont.)	The following criteria can be cited as reasons for infeasibility without further justification (though some require professional services to make the observation): ☐ Within 100 feet of an underground storage tank and connecting underground pipes when the capacity of the tank and pipe system is greater than 1,100 gallons. ☐ Where field testing indicates potential bioretention/rain garden sites have a measured (a.k.a., initial) native soil saturated hydraulic conductivity less than 0.30 inches per hour. A small-scale or large-scale PIT in accordance with **Stormwater Manual** Volume III, Section 3.3.6 (or an alternative small scale test specified by the City) shall be used to demonstrate infeasibility of bioretention areas. If the measured native soil infiltration rate is less than 0.30 in/hour, bioretention/rain garden BMPs are not required to be evaluated as an option in List #1 or List #2. In these slow draining soils, a bioretention area with an underdrain may be used to treat pollution-generating surfaces to help meet Minimum Requirement #6, Runoff Treatment. If the underdrain is elevated within a base course of gravel, it will also provide some modest flow reduction benefit that will help achieve Minimum Requirement #7. ☐ Where the minimum vertical separation of 3 feet to the seasonal high groundwater elevation or other impermeable layer would not be achieved below bioretention that would serve a drainage area that exceeds the following thresholds (and cannot reasonably be broken down into amounts smaller than indicated): o 5,000 square feet of pollution-generating impervious surface (PGIS) o 10,000 square feet of impervious area o 0.75 acres of lawn and landscape. ☐ Where the minimum vertical separation of 1 foot to the seasonal high groundwater or other impermeable layer would not be achieved below bioretention that would serve a drainage area less than the above thresholds ☐ Within 100 feet of a drinking water well, or a spring used for drinking water supply. ☐ Within 10 feet of small on-site sewage disposal drainfield, including reserve areas, and grey water reuse systems. For setbacks from a "large on-site sewage disposal system," see Chapter 246-272B WAC.	

Other Hard Surfaces (cont.)

BMP and Applicable Lists	Infeasibility Criteria	Infeasibility Description and Rationale for Each BMP Not Selected
Sheet Flow Dispersion List #1 and #2	☐ Site setbacks and design criteria provided in BMP T5.12 (**Stormwater Manual** Volume V, Section 5.3) cannot be achieved. ☐ Positive drainage for sheet flow runoff cannot be achieved. ☐ Area to be dispersed (e.g., driveway, patio) cannot be graded to have less than a 15 percent slope. ☐ For flat to moderately sloped areas, at least a 10 foot-wide vegetation buffer for dispersion of the adjacent 20 feet of contributing surface cannot be achieved. For variably sloped areas, at least a 25 foot vegetated flowpath between berms cannot be achieved.	
Concentrated Flow Dispersion List #1 and #2	☐ Site setbacks and design criteria provided in BMP T5.11 (**Stormwater Manual** Volume V, Section 5.3) cannot be achieved. ☐ A minimum 3 foot length of rock pad and 50 foot flowpath OR a dispersion trench and 25 foot flowpath for every 700 square feet of drainage area followed with applicable setbacks cannot be achieved. ☐ More than 700 square feet drainage area drains to any dispersion device.	
On-site Detention List #1 and #2	☐ Project discharges directly to Lake Washington. ☐ Findings from a 1/4 mile downstream analysis confirm that the downstream system is free of capacity constraints. ☐ Site setbacks and design criteria provided in the **Stormwater Manual** (Volume III, Section 3.2.2) cannot be achieved.	

CITY OF MERCER ISLAND

SECTION D: POST-CONSTRUCTION SOIL MANAGEMENT

Attachments Required *(Check off required items that are attached)*

☐ Site Plan showing, to scale:

- ☐ Areas of undisturbed native vegetation (no amendment required)
- ☐ New planting beds (amendment required)
- ☐ New turf areas (amendment required)
- ☐ Type of soil improvement proposed for each area

☐ Soil test results (required if proposing custom amendment rates)

☐ Product test results for proposed amendments

Total Amendment / Topsoil / Mulch for All Areas

Calculate the quantities needed for the entire site based on all of the areas identified on the Site Plan and the calculations on the following page(s):

Product	Total Quantity (CY)	Test Results
Product #1: ______________________	______________ CY	_________ % organic matter _________ C:N ratio "Stable"? yes ☐ no ☐
Product #2: ______________________	______________ CY	_________ % organic matter _________ C:N ratio "Stable"? yes ☐ no ☐
Product #3: ______________________	______________ CY	_________ % organic matter _________ C:N ratio "Stable"? yes ☐ no ☐

CY = cubic yards, C:N = Carbon:Nitrogen

CITY OF MERCER ISLAND

SECTION D: POST-CONSTRUCTION SOIL MANAGEMENT

Amendment / Topsoil / Mulch by Area

For each identified area on your Site Plan, provide the following information: (Use additional sheets if necessary)

Area # ______________ (should match identified Area # on Site Plan)

Planting type: ☐ Turf ☐ Undisturbed native vegetation
☐ Planting Beds ☐ Other: ______________________________

Pre-Approved Amendment Method

☐ Amend with compost	Turf:________ SF x 5.4 CY ÷ 1,000 SF = _________CY Planting beds:______ SF x 9.3 CY ÷ 1,000 SF= ______CY Total Quantity = _______CY Scarification depth: 8 inches	Product: ________________
☐ Stockpile and amend	Turf:_________ SF x 5.4 CY ÷ 1,000 SF = _________CY Planting beds:______ SF x 9.3 CY ÷ 1,000 SF= _______CY Total Quantity = _______CY Scarification depth: 8 inches	Product: ________________
☐ Topsoil import	Turf:_________ SF x 18.6 CY÷1,000 SF = _________CY Planting beds:______ SF x 18.6 CY ÷ 1,000 SF= ______CY Total Quantity = _______CY Scarification depth: 6 inches	Product: ________________

Custom Amendment

☐ Amend with compost	Attach information on bulk density, percent organic matter, moisture content, C:N ratio, and heavy metals analysis to support custom amendment rate and scarification depth. Total Quantity = ___________CY Scarification depth: ________inches	Product: ________________
☐ Stockpile and amend	Attach information on bulk density, percent organic matter, moisture content, C:N ratio, and heavy metals analysis to support custom amendment rate and scarification depth. Total Quantity = ___________CY Scarification depth: ________inches	Product: ________________

Mulch

☐ Amend with compost	Planting beds: ______ SF x 12.4 CY ÷ 1,000 SF= ___________CY Total Quantity = _____________CY	Product: ________________
☐ Stockpile and amend	Planting beds: ______ SF x 12.4 CY ÷ 1,000 SF= ___________CY Total Quantity = _____________CY	Product: ________________
☐ Topsoil import	Planting beds: ______ SF x 12.4 CY ÷ 1,000 SF= ___________CY Total Quantity = _____________CY	Product: ________________

CY = cubic yards, C:N = Carbon:Nitrogen

CITY OF MERCER ISLAND

SECTION E: SIGNATURE PAGE

Project Engineer's Certification for Section B

For Stormwater Site Plans with engineered elements, the Construction SWPPP is stamped by a professional engineer licensed in the State of Washington in civil engineering.

If required, attach a page with the project engineer's seal with the following statement:

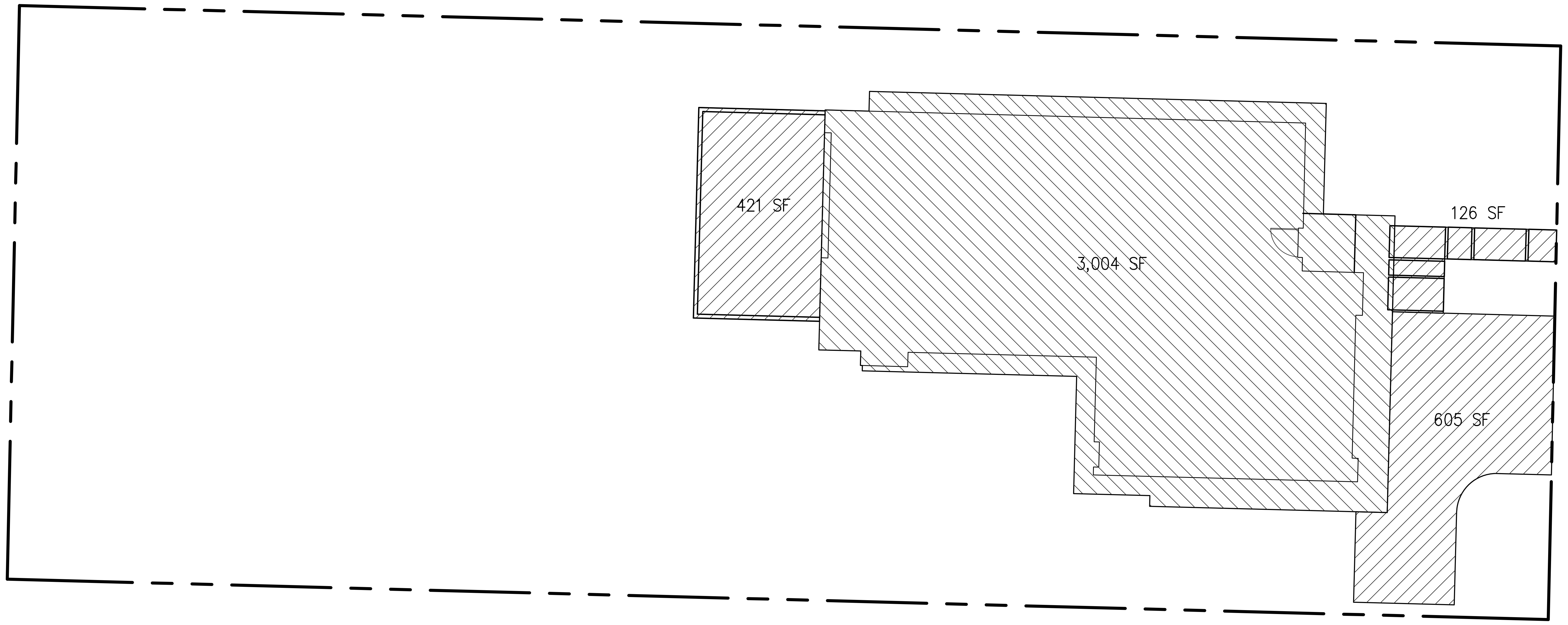
"I hereby state that this Construction Stormwater Pollution Prevention Plan for GIOLA//ALDEHAYYAT *(name of project)* *has been prepared by me or under my supervision and meets the standard of care and expertise which is usual and customary in this community for professional engineers. I understand that the City of Mercer Island does not and will not assume liability for the sufficiency, suitability, or performance of Construction SWPPP BMPs prepared by me."*

Applicant Signature for Full Stormwater Package (Sections A through D)

I have read and completed the Stormwater Submittal Package and know the information provided to be true and correct.

Print Applicant Name: Nick Bossoff

Applicant Signature: Date 1/13/2025



AREAS

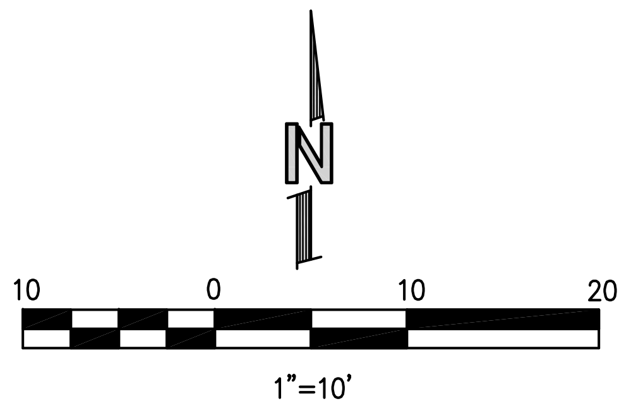
▧ ROOF TO DRYWELL: 3,004 SF

▨ PERMEABLE PAVERS: 1,152 SF

TOTAL IMPERVIOUS: 4,156 SF

☐ LANDSCAPING: 9,853 SF

TOTAL: 14,009 SF



DRYWELL CALCULATION
(PER DOE 2019 SWMMWW)

EXISTING SOIL: SP (POORLY GRADED SAND, <5% FINES)
MEASURED RATE 6 INCHES/HOUR
DOE CLASSIFICATION MEDIUM SAND

REQUIRED VOLUME = 90 CF/1000 SF
= 90 X 3,004/1000
= 270 CF

REQUIRED AREA AT 4' DEEP = 65.6 SF (72.0 SF PROVIDED)

POST DEVELOPMENT IMPERVIOUS AREAS

DRYWELL FEASIBILTY ANALYSIS AND DESIGN

Procedure for Evaluating Feasibility

1. Have one of the following prepare a soils report to determine if soils suitable for infiltration are present on the site: The report was prepared a by a geotechnical engineer.
   - A professional soil scientist certified by the Soil Science Society of America (or an equivalent national program)
   - A locally licensed on-site sewage designer
   - A suitably trained person working under the supervision of a professional engineer, geologist, hydrogeologist, or engineering geologist registered in the State of Washington.

   The report shall reference a sufficient number of soils logs to establish the type and limits of soils on the project site. The report should at a minimum identify the limits of any outwash type soils (i.e., those meeting USDA soil texture classes ranging from coarse sand and cobbles to medium sand) versus other soil types and include an inventory of topsoil depth.

   Two bores to 25 feet and a PIT site indicate consistent medium sand soil.

2. Complete additional site-specific testing on lots or sites containing outwash (coarse sand and cobbles to medium sand) and loam type soils.

   A PIT was performed at the proposed infiltration site.

   Individual lot or site tests must consist of at least one soils log at the location of the infiltration system, a minimum of 4 feet in depth from the proposed grade and at least 1 foot below the expected bottom elevation of the infiltration trench or dry well.

   A boring soil log extended to a depth of 25 feet at the infiltration site, 18 feet below the drywell.

   Identify the NRCS series of the soil and the USDA textural class of the soil horizon through the depth of the log, and note any evidence of high ground water level, such as mottling. The soil is identified as medium sand. No groundwater was present below the drywell site, and at 13 feet at the second bore.

3. Downspout full infiltration is considered feasible on lots or sites that meet all of the following:
   - 3 feet or more of permeable soil from the proposed final grade to the seasonal high ground water table. The highest groundwater level observed is 13 feet below grade.
   - At least 1-foot of clearance from the expected bottom elevation of the infiltration trench or dry well to the seasonal high ground water table. The separation is about 6 feet.
   - The downspout full infiltration system can be designed to meet the minimum design criteria specified below.

Setbacks

Local governments may require specific setbacks in sites with slopes over 40%, land slide areas, open water features, springs, wells, and septic tank drain fields. Adequate room for maintenance access and equipment should also be considered. Examples of setbacks commonly used include the following:

1. All infiltration systems should be at least 10 feet from any structure, property line, or sensitive area (except slopes over 40%). The proposed drywell is over 20 feet from the nearest property line, over 40 feet from the structure. Thre are no slopes over 40%.
2. All infiltration systems must be at least 50 feet from the top of any slope over 40%. This setback may be reduced to 15 feet based on a geotechnical evaluation, but in no instances may it

be less than the buffer width. There are no steep slopes over 40%.

3. For sites with septic systems, infiltration systems must be downgradient of the drainfield unless the site topography clearly prohibits subsurface flows from intersecting the drainfield.

There are no septic systems.

Design Criteria

Infiltration Trenches

Figure V-4.1: Typical Downspout Infiltration Trench shows a typical downspout infiltration trench system, and Figure V-4.2: Alternative Downspout Infiltration Trench System for Coarse Sand and Gravel presents an alternative infiltration trench system for sites with coarse sand and cobble soils. These systems are designed as specified below.

1. The following minimum lengths (linear feet) per 1,000 square feet of roof area based on soil type may be used for sizing downspout infiltration trenches:
    - Coarse sands and cobbles: 20 LF
    - Medium sand: 30 LF
    - Fine sand, loamy sand: 75 LF
    - Sandy loam: 125 LF
    - Loam: 190 LF
2. Silt and clay type soils have a saturated hydraulic conductivity that is too small for adequate infiltration and are infeasible for downspout infiltration trenches.
3. The maximum length of the trench shall not exceed 100 feet from the inlet sump.
4. The minimum spacing between trench centerlines shall be 6 feet.
5. Filter fabric shall be placed over the drain rock as shown on Figure V-4.1: Typical Downspout Infiltration Trench prior to backfilling.
6. Infiltration trenches may be placed in fill material if:
    - the fill is placed and compacted under the direct supervision of a geotechnical engineer or professional civil engineer with geotechnical expertise, and
    - the measured infiltration rate is at least 8 inches per hour.

    Trench length in fill must be 60 linear feet per 1,000 square feet of roof area. Infiltration rates can be tested using the methods described in V-5.4 Determining the Design Infiltration Rate of the Native Soils.
7. Infiltration trenches should not be built on slopes steeper than 25% (4:1). A geotechnical analysis and report may be required on slopes over 15%, or if the proposed trench is located within 200 feet of the top of a slope steeper than 40%, or in a landslide hazard area.
8. Infiltration trenches may be located under pavement if a small yard drain or catch basin with grate cover is placed at the end of the trench pipe such that overflow would occur out of the

Infiltration Drywells

Figure V-4.3: Typical Downspout Infiltration Drywell shows a typical downspout infiltration drywell system. These systems are designed as specified below.

1. Drywell bottoms must be a minimum of 1 foot above the seasonal high ground water level or impermeable soil layers. The separation to observed groundwater is 6 feet.
2. When located in course sands and cobbles, drywells must contain a volume of gravel equal to or greater than 60 cubic feet per 1000 square feet of impervious surface served. When located in medium sands, drywells must contain at least 90 cubic feet of gravel per 1,000 square feet of impervious surface served. 90 cubic feet for medium sands was used for the design.
3. Drywells must be at least 48 inches in diameter (minimum) and deep enough to contain the gravel amounts specified above for the soil type and impervious surface served. Area calculation is included in this report.
4. Filter fabric (geotextile) must be placed on top of the drain rock and on drywell sides prior to backfilling. This is specified on the detail.
5. Spacing between drywells must be a minimum of 10 feet. There are no other infiltration facilities.
6. Downspout infiltration drywells must not be built on slopes greater than 25% (4:1). Drywells may not be placed on or above a landslide hazard area or on slopes greater than 15% without evaluation by a licensed engineer in the state of Washington with geotechnical expertise or a licensed geologist, hydrogeologist, or engineering geologist, and with jurisdiction approval.

   There are no slopes over 15% or landslide hazard areas.

Applications and Limitations

Permeable pavements are an important integrated management practice within the LID approach and can be designed to accommodate pedestrian, bicycle and auto traffic while allowing Runoff Treatment and Flow Control of stormwater.

Permeable pavements are appropriate in many applications where traditionally impermeable pavements have been used. Typical applications for permeable pavements include parking lots, sidewalks, pedestrian and bike trails, driveways, residential access roads, and emergency and facility maintenance roads.

Limitations to permeable pavements include:

- No run-on from pervious surfaces is preferred. If runoff comes from minor or incidental pervious areas, those areas must be fully stabilized.
- Unless the pavement, base course, and subgrade have been designed to accept runoff from adjacent impervious surfaces, slope impervious runoff away from the permeable pavement to the maximum extent practicable. Sheet flow from up-gradient impervious areas is not recommended, but permissible if the permeable pavement area is > the impervious pavement area.
- Soils must not be tracked onto the wear layer or the base course during construction.

Infeasibility Criteria

The following infeasibility criteria describe conditions that make permeable pavement infeasible when applying The List Approach within I-3.4.5 MR5: On-Site Stormwater Management. If a project proponent wishes to use a permeable pavement BMP even though one of the infeasibility criteria within this section are met, they may propose a functional design to the local government.

These criteria also apply to impervious pavements that would employ stormwater collection from the surface of impervious pavement with redistribution below the pavement.

Any of the following circumstances allow the designer to determine permeable pavement as "infeasible" when applying the The List Approach within I-3.4.5 MR5: On-Site Stormwater Management:

- Citation of any of the following infeasibility criteria must be based on an evaluation of site-specific conditions and a written recommendation from an appropriate licensed professional (e.g, engineer, geologist, hydrogeologist)
  - Where professional geotechnical evaluation recommends infiltration not be used due to reasonable concerns about erosion, slope failure, or down gradient flooding.
    Plans have been provided to the geotechnical consultant for review.
  - Within an area whose ground water drains into an erosion hazard, or landslide hazard area. The site groundwater does not drain to an immediate hazard area.
  - Where infiltrating and ponded water below new permeable pavement area would compromise adjacent impervious pavements. The permable pavement is not adjacent impermeable pavement.
  - Where infiltrating water below a new permeable pavement area would threaten existing below grade basements. The permeable pavement is not near to existing basements.

  - Where infiltrating water would threaten shoreline structures such as bulkheads.
    The project is not near a shoreline.
  - Down slope of steep, erosion prone areas that are likely to deliver sediment.
    There are no steep or erosion prone slopes in the vicinity.
  - Where fill soils are used that can become unstable when saturated.
    There are no fill soils below the permeable pavement.
  - On excessively steep slopes where water within the aggregate base layer or at the sub-grade surface cannot be controlled by detention structures and may cause erosion and structural failure, or where surface runoff velocities may preclude adequate infiltration at the pavement surface.
    No applicable.
  - Where permeable pavements can not provide sufficient strength to support heavy loads at industrial facilities such as ports.
    Not applicable.
  - Where installation of permeable pavement would threaten the safety or reliability of pre-existing underground utilities, pre-existing underground storage tanks, or pre-existing road sub-grades.
    Not applicable.
- The following infeasibility criteria are based on conditions such as topography and distances to predetermined boundaries. Citation of the following criteria do not need site-specific written recommendations from a licensed professional, although some may require professional services to determine:
  - Within an area designated as an erosion hazard, or landslide hazard.
    The site is not inside those areas.
  - Within 50 feet from the top of slopes that are greater than 20%.
    There are no nearby slopes.
  - For properties with known soil or ground water contamination (typically federal Superfund sites or state cleanup sites under the Model Toxics Control Act (MTCA)):
    There is no known contamination.
    - Within 100 feet of an area known to have deep soil contamination;
    - Where ground water modeling indicates infiltration will likely increase or change the direction of the migration of pollutants in the ground water;
    - Wherever surface soils have been found to be contaminated unless those soils are removed within 10 horizontal feet from the infiltration area;
    - Any area where these facilities are prohibited by an approved cleanup plan under the state Model Toxics Control Act or Federal Superfund Law, or an environmental covenant under Chapter 64.70 RCW.
  - Within 100 feet of a closed or active landfill.
    There is no active landfill nearby.
  - Within 100 feet of a drinking water well, or a spring used for drinking water supply, if the permeable pavement is (or has run-on from) a pollution-generating hard surface.
    There are no nearby wells.
  - Within 10 feet of a small on-site sewage disposal drainfield, including reserve areas, and grey water reuse systems. For setbacks from a “large on-site sewage disposal system”, see Chapter 246-272B WAC. There are no nearby septic systems.
  - Within 10 feet of any underground storage tank and connecting underground pipes, regardless of tank size. As used in these criteria, an underground storage tank means any tank used to store petroleum products, chemicals, or liquid hazardous wastes of

which 10% or more of the storage volume (including volume in the connecting piping system) is beneath the ground surface. There are no nearby underground storage tanks.

- At multi-level parking garages, and over culverts and bridges.
  Not applicable.
- Where the site design cannot avoid putting pavement in areas likely to have long-term excessive sediment deposition after construction (e.g., construction and landscaping material yards).
  Excessive sediment is not expected.
- Where the subgrade slope exceeds 6 percent after reasonable efforts to grade. Where the permeable pavement wearing course slope exceeds 6 percent after reasonable efforts to design grade.
  Subgrade slope will be kept to 2% maximum.
- Where the native soils below a pollution-generating permeable pavement (e.g., road or parking lot) do not meet the criteria for Runoff Treatment in V-5.6 Site Suitability Criteria (SSC), or do not have adequate separation to ground water (or other impermeable surface). If the local jurisdiction wishes to allow permeable pavement in areas where the native soils do not meet the site suitability criteria, installation of a 6" layer of sand that meets the size gradation (by weight) given in Table V-6.1: Sand Medium Specification can be used to provide treatment.
  A sand medium layer will be added per the plans.
- Where seasonal high ground water or an underlying impermeable/low permeable layer would create saturated conditions within one foot of the bottom of the permeable pavement BMP. The bottom of the permable pavement BMP is the bottom of the lowest layer that has been designed to be part of the BMP, such as the lowest gravel base course or a sand layer used for treatment below the permeable pavement.
  The observed groundwater depth is 13 feet.
- Where underlying soils are unsuitable for supporting traffic loads when saturated. Soils meeting a California Bearing Ratio of 5% are considered suitable for residential access roads. The pavement is not a road.
- Where appropriate field testing indicates soils have a measured (a.k.a., initial) native soil saturated hydraulic conductivity (K_{sat}) less than 0.3 inches per hour. See V-5.4 Determining the Design Infiltration Rate of the Native Soils. (Note: In these instances, unless other infeasibility restrictions apply, roads and parking lots may be built with an underdrain, preferably elevated within the base course, if Flow Control benefits are desired.) Soil testing nearby measured 6 inches per hour.
- Roads that receive more than very low traffic volumes. Roads with a projected average daily traffic volume of 400 vehicles or less are very low volume roads (AASHTO, 2001), (USDOT, 2013). Note: This infeasibility criterion does not extend to sidewalks and other non-traffic bearing surfaces. The pavement is not a road.
- Areas having more than very low truck traffic. Areas with very low truck traffic volumes are roads and other areas not subject to through truck traffic but may receive up to weekly use by utility trucks (e.g., garbage, recycling), daily school bus use, and multiple daily use by pick-up trucks, mail/parcel delivery trucks, and maintenance vehicles. Note: This infeasibility criterion does not extend to sidewalks and other non-traffic bearing surfaces. The pavement has very low truck traffic.
- Where replacing existing impervious surfaces, unless the existing surface is a non-

pollution generating surface over an outwash soil with a measured (initial) saturated hydraulic conductivity (K_{sat}) of four inches per hour or greater.

The pavement is not repacing PGIA.

- At sites that whose land use requires oil control BMPs per III-1.2 Choosing Your Runoff Treatment BMPs. Oil control is not required.

- In areas with “industrial activity” as identified in 40 CFR 122.26(b)(14).

  Not applicable.

- Where the risk of concentrated pollutant spills is more likely such as gas stations, truck stops, and industrial chemical storage sites.

  Not applicable.

- Where routine, heavy applications of sand occur in frequent snow zones to maintain traction during weeks of snow and ice accumulation.

  Not applicable.

- A local government may designate geographic areas within which permeable pavement, or certain types of permeable pavement, may be designated as infeasible due to year-round, seasonal or periodic high groundwater conditions, or due to inadequate infiltration rates. Designations must be based upon a preponderance of field data, collected within the area of concern, that indicate a high likelihood of failure to achieve the minimum groundwater clearance or infiltration rates identified in the above infeasibility criteria. The local government must develop a technical report, and make it available upon request to Ecology. The technical report must be authored by (a) professional(s) with appropriate expertise (e.g., registered engineer, geologist, hydrogeologist, or certified soil scientist), and document the location and pertinent values/observations of data that were used to recommend the designation and boundaries for the geographic area. The types of pertinent data include, but are not limited to:
  - Standing water heights or evidence of recent saturated conditions in observation wells, test pits, test holes, and well logs.
  - Observations of areal extent and time of surface ponding, including local government or professional observations of high water tables, frequent or long durations of standing water, springs, wetlands, and/or frequent flooding.
  - Results of infiltration tests The site is not in an area designated as infeasible on the City map.
- In addition, a local government can map areas that meet a specific infeasibility criterion listed above provided they have an adequate data basis. Criteria that are most amenable to mapping are:
  - Where land for permeable pavement is within an area designated by the local government as an erosion hazard, or landslide hazard
  - Within 50 feet from the top of slopes that are greater than 20% and over 10 feet vertical relief
  - Within 100 feet of a closed or active landfill

The site is not in an area designated as infeasible on the City map.

Design Criteria

General Design Criteria

- Ecology has listed below the critical design criteria you must consider when designing permeable pavement. Local governments can adopt alternative design criteria, as long as it does not conflict with the criteria listed below.
- You can find additional guidance for permeable pavement design in the *Low Impact Development Technical Guidance Manual for Puget Sound* (Hinman and Wulkan, 2012).

  Note that the *Low Impact Development Technical Guidance Manual for Puget Sound* (Hinman and Wulkan, 2012) is for additional informational purposes only. You must follow the guidance within this manual if there are any discrepancies between this manual and the *Low Impact Development Technical Guidance Manual for Puget Sound* (Hinman and Wulkan, 2012).
- Project submission requirements: Submit results of infiltration (K_{sat}) testing, ground water elevation testing (or other documentation and justification for the rates and hydraulic restriction layer clearances) with the Stormwater Site Plan as justification for the feasibility decision regarding permeable pavement, and as justification for assumptions made in the runoff modeling. If necessary, also submit documentation of meeting the criteria for Runoff Treatment in V-5.6 Site Suitability Criteria (SSC).
- Legal documentation to track permeable pavement obligations: Where drainage plan submittals include assumptions in regard to size and location of permeable pavement, approval of the plat or short-plat should identify the permeable pavement obligation of each lot; and the appropriate lots should have deed requirements for construction and maintenance of those BMPs.

Permeable Pavement as Runoff Treatment

Ecology recognizes the permeable pavement BMP as a basic treatment BMP (as further described in III-1.2 Choosing Your Runoff Treatment BMPs) if it meets either of the following criteria:

- The native soils below the permeable pavement meet the criteria for Runoff Treatment per V-5.6 Site Suitability Criteria (SSC).

  OR
- The permeable pavement design includes a 6" layer of sand that meets the size gradation (by weight) given in Table V-6.1: Sand Medium Specification.

6" sand medium layer added to section under driveway

Subgrade

- Compact the subgrade to the minimum compaction necessary for structural stability. Two guidelines currently used to specify subgrade compaction are “firm and unyielding” (qualitative), and 90- 92% Standard Proctor (quantitative). Subgrade should not be subject to compaction beyond the qualitative and quantitative levels identified herein. Do not allow

Compaction requirements included in section.

construction traffic and equipment onto the subgrade except when construction access on subgrade is required for the pavement section installation. Follow back dumping approach as noted below.

- To prevent compaction when installing the aggregate base, the following steps (back-dumping) should be followed: 1) the aggregate base is dumped onto the subgrade from the edge of the installation and aggregate is then pushed out onto the subgrade; 2) trucks then dump subsequent loads from on top of the aggregate base as the installation progresses.
- Use on soil types A through C.

Separation or Bottom Filter Layer (recommended but optional)

- A layer of sand or crushed stone (0.5 inch or smaller) graded flat is recommended to promote infiltration across the surface, stabilize the base layer, protect underlying soil from compaction, and serve as a transition between the base course and the underlying geotextile material.

Base Material

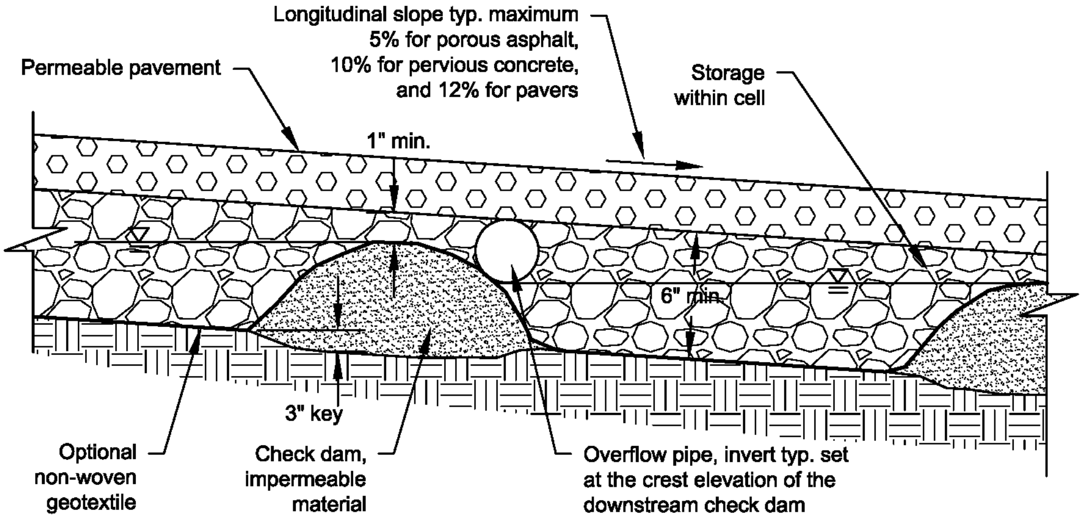
- Local governments should adopt their own minimum base material requirements as they see necessary for support of flexible pavements. Many design combinations are possible. The material must be free draining. The municipality should determine and publish estimates of the void space for each standard base material allowed in their jurisdiction.

Type 22 aggregate specified.

- To increase infiltration, improve flow attenuation and reduce structural problems associated with subgrade erosion on slopes, impermeable check dams may be placed on the subgrade and below the permeable pavement surface (See Figure V-5.3: Example of a Check Dam Along a Sloped Section of Permeable Pavement). Check dams should have an overflow drain invert placed at the maximum ponding depth. The distance between berms will vary depending on slope, Flow Control goals and cost.

Subgrade to be kept below 2%.

Figure V-5.3: Example of a Check Dam Along a Sloped Section of Permeable Pavement



NOT TO SCALE

DEPARTMENT OF
ECOLOGY
State of Washington

Example of a Check Dam Along a Sloped
Section of Permeable Pavement

Revised May 2019

Wearing Layer

- For all surface types, a minimum initial infiltration rate of 20 inches per hour is necessary. To improve the probability of long-term performance, significantly higher initial infiltration rates are desirable.
- ***Porous Asphalt:*** Products must have adequate void spaces through which water can infiltrate. A void space within the range of 16 – 25% is typical.
- ***Pervious Concrete:*** Products must have adequate void spaces through which water can infiltrate. A void space within the range of 15 – 35% is typical..
- ***Grid/lattice systems filled with gravel, sand, or a soil of finer particles with or without grass:*** The fill material must be at least a minimum of 2 inches of sand, gravel, or soil.
- ***Permeable Interlocking Concrete Pavement and Aggregate Pavers:*** Pavement joints should be filled with No. 8, 89 or 9 stone. Consult with paver manufacturer specifications to determine the appropriate material type and size.

ECO -PRIORA selected. This is a permeable pavement system.

Drainage Conveyance

Roads should still be designed with adequate drainage conveyance facilities as if the road surface was impermeable. Roads with base courses that extend below the surrounding grade should have a designed drainage flow path to safely move water away from the road prism and into the roadside drainage facilities. Use of perforated storm drains to collect and transport infiltrated water from under the road surface will result in less effective designs and less Flow Control benefit.

Not applicable.

Underdrains

Note that if an underdrain is placed at or near the bottom of the aggregate base in a permeable pavement BMP, the permeable pavement is no longer considered an LID BMP and cannot be used to satisfy The List Approach within I-3.4.5 MR5: On-Site Stormwater Management. However, designs utilizing an underdrain that is elevated within the aggregate base course to protect the pavement wearing course from saturation is considered an LID BMP and can be used to satisfy The List Approach within I-3.4.5 MR5: On-Site Stormwater Management.

Underdrain is not proposed due to adequate permeability of the native soil.

Infiltration Test for Permeable Pavement Surface

- Permeable pavement driveways can be tested by simply throwing a bucket of water on the surface. If anything other than a scant amount puddles or runs off the surface, additional testing is necessary prior to accepting the construction.
- Permeable pavement roads may be initially tested with the bucket test described above. In addition, test the initial infiltration with a 6-inch ring, sealed at the base to the road surface, or with a sprinkler infiltrometer. Wet the road surface continuously for 10 minutes. Begin test to determine compliance with 20 inches per hour minimum rate. Use of ASTM C1701 or ASTM C1781, as appropriate, is also recommended.

Determining the Native Soil Infiltration Rates

Determining infiltration rates of the site soils is necessary to determine feasibility of designs that intend to infiltrate stormwater on-site. It is also necessary to estimate flow reduction benefits of such designs when using a continuous runoff model

The certified soils professional or engineer can exercise discretion concerning the need for and extent of infiltration rate (saturated hydraulic conductivity, K_{sat}) testing. The professional can consider a reduction in the extent of infiltration (K_{sat}) testing if, in their judgment, information exists confirming that the site is unconsolidated outwash material with high infiltration rates, and there is adequate separation from ground water.

Refer to V-5.4 Determining the Design Infiltration Rate of the Native Soils for further guidance on the methods to determine the infiltration rate of the native soils.

Field Testing Requirements Based Upon Project Size

- Projects subject to Minimum Requirements #1 - #5:
    - A small-scale Pilot Infiltration Test (PIT) – or other small-scale tests as allowed by the local jurisdiction - should be performed for every 5,000 sq. ft. of permeable pavement, but not less than 1 test per site. Submit results as part of the Stormwater Site Plan to establish a basis for a feasibility decision.

A small PIT was conducted by a licensed geotechnical engineer. Measured rate was 6 inches/hour.

- Projects subject to Minimum Requirements #1 - #9:
    - A small-scale Pilot Infiltration Tests (PIT) - or other small-scale tests as allowed by the local jurisdiction - should be performed for every 5,000 sq. ft. of permeable pavement, but not less than 1 test per site.

On residential developments, small-scale infiltration tests should be performed at every proposed lot, at least every 200 feet of roadway and within each length of road with significant differences in subsurface characteristics. However, if the site subsurface characterization - including soil borings across the development site - indicate consistent soil characteristics and depths to seasonal high ground water conditions, the number of test locations may be reduced to a frequency recommended by a geotechnical professional.

Unless seasonal high ground water elevations across the site have already been determined, upon conclusion of the infiltration testing, infiltration sites should be over-excavated 1 foot to see any restrictive layers or ground water. Observations through a wet season can identify a seasonal ground water restriction.

Perform infiltration testing in the soil profile at the estimated bottom elevation of base materials for the permeable pavement. If no base materials, (e.g., a pervious concrete sidewalk), perform the testing at the estimated bottom elevation of the pavement.

Assignment of Appropriate Correction Factors

If the design requires determination of a long-term (design) infiltration rate of the native soils (for example, to demonstrate compliance with the LID Performance Standard and/or the Flow Control

Performance Standard), refer to V-5.4 Determining the Design Infiltration Rate of the Native Soils and the following additional guidance specific to permeable pavement BMPs:

- The overlying permeable pavement provides excellent protection for the underlying native soil from sedimentation. Accordingly, when using The Simplified Approach to Calculating the Design Infiltration Rate of the Native Soils as described in V-5.4 Determining the Design Infiltration Rate of the Native Soils, the correction factor for the sub-grade soil does not have to take into consideration the extent of influent control and clogging over time. The correction factor to be applied to in-situ, small-scale infiltration test results for permeable pavement sites is determined by the site variability and number of locations tested, the quality of the aggregate base material, and the method used to determine the initial K_{sat}. Using Table V-5.1: Correction Factors to be Used With In-Situ Saturated Hydraulic Conductivity Measurements to Estimate Design Rates, the correction factor for permeable pavement design is revised based on this guidance as:

  $$\text{Total Correction Factor, } CF_T = CF_v \times CF_t \times CF_a$$

  =0.75 x 0.50 x 0.90 = 0.33
  I = 6 x 0.33 =2.0 inches/hour

  where CF_a is the partial correction factor determined by the quality of the pavement aggregate base material. CF_a ranges from 0.9 to 1.0.

- Tests should be located and be at adequate frequency capable of producing a soil profile characterization that fully represents the infiltration capability where the permeable pavement is located. The partial correction factor CF_V depends on the level of uncertainty that variable subsurface conditions justify. If enough pilot infiltration tests are conducted across the permeable pavement subgrade to provide an accurate characterization, or the range of uncertainty is low (for example, conditions are known to be uniform through previous exploration and site geological factors), then a partial correction factor CF_V of one for site variability may be justified. Additionally, a partial correction factor CF_a of 1 for the quality of pavement aggregate base material may be necessary if the aggregate base is clean washed material with 1% or less fines passing the 200 sieve.

- If the level of uncertainty is high, a partial correction factor CF_V near the low end of the range may be appropriate. Two example scenarios where a low CF_V may be appropriate include:
  - Site conditions are highly variable due to a deposit of ancient landslide debris, or buried stream channels. In these cases, even with many explorations and several pilot infiltration tests, the level of uncertainty may still be high.
  - Conditions are variable, but few explorations and only one pilot infiltration test is conducted. That is, the number of explorations and tests conducted do not match the degree of site variability anticipated.

Runoff Model Representation

Note that if the project is using permeable pavement to only meet The List Approach within I-3.4.5 MR5: On-Site Stormwater Management, there is no need to model the permeable pavement in a continuous runoff model.

The permeable pavement was modeled using WWHM. Printout included in report. All precipation over period of record is infiltated.

The guidance below is to show compliance with the LID Performance Standard in I-3.4.5 MR5: On-Site Stormwater Management, or the standards in I-3.4.6 MR6: Runoff Treatment, I-3.4.7 MR7: Flow Control, and/or I-3.4.8 MR8: Wetlands Protection.

Continuous runoff modeling software include specific modeling elements to use to model the stormwater for permeable pavement.

Within these elements, the model user specifies pavement thickness and porosity, aggregate base material thickness and porosity, maximum allowed ponding depth, and the infiltration rate into the native soil.

- For grades less than 2%, no adjustment to the below ground volumes are necessary.
- For grades greater than 2% without internal dams within the base materials, the below ground storage volume must be adjusted as follows:
    - Permeable pavement surfaces that are below the surrounding grade and that are on a slope can be modeled as permeable pavement with an infiltration rate and a nominal depth.
    - The dimensions of the permeable pavement are: the length (parallel to and beneath the road) of the base materials that are below grade; the width of the below grade base materials; and an Effective Total Depth of 1 inch. If the continuous runoff model requires the permeable pavement to have an overflow riser to model overflows that occur should the available storage get exceeded, enter 0.04 ft (1/2 inch) for the “Riser Height” and a large Riser Diameter (say 1000 inches) to ensure that there is no head build up.
    - If a drainage pipe is embedded and elevated in the below grade base materials, the pipe should only have perforations on the lower half (below the spring line) or near the invert. Pipe volume and trench volume above the pipe invert cannot be assumed as available storage space. If a drainage pipe is placed at the bottom of the base material, the pavement is modeled as an impervious surface without any gravel trench.
- For roads on a slope with internal dams within the base materials that are below grade, the below ground storage volume must be adjusted as follows:
    - Each stretch of permeable pavement (cell) that is separated by barriers can be modeled separately. For each cell, determine the average depth of water within the cell at which the barrier at the lower end will be overtopped.
    - Specify the dimensions of each cell of the below-grade base materials using the permeable pavement dimension fields for: the “Pavement Length” (length of the cell parallel to the road); the “Pavement Bottom Width”(width of the bottom of the base material); and the Effective Total Depth. In WWHM2012, the field entiltled “Effective Volume Factor” is used by the program to calculate the effective storage volume within the below-grade base materials for roads on a slope. The Effective Volume Factor is the ratio of the average maximum water depth behind a check dam (typically at the middle of the pavement length) to the below-grade base materials depth.

  - Each cell should have its own tributary drainage area within the permeable pavement element that includes the road above it, any project site areas whose runoff drains onto and through the road (lateral flow soil or impervious basin), and any off-site areas. Represent each drainage area with a permeable pavement icon and a lateral flow basin icon (if runon occurs).

In the runoff modeling, similar designs throughout a development can be summed and represented as one large facility. For instance, walkways can be summed into one facility. Driveways with similar designs (and enforced through deed restrictions) can be summed into one facility. In these instances, a weighted average of the design infiltration rates (where within a factor of two) for each location may be used. The averages are weighted by the size of their drainage area. The design infiltration rate for each site is the measured K_{sat} multiplied by the appropriate correction factors.

On the Permeable Pavement screen under “Infiltration”, there is a field that asks the following “Use Wetted Surface Area?” By default, it is set to “NO”. It should stay “NO” if the below-grade base material trench has sidewalls steeper than 2 horizontal to 1 vertical.

Maintenance

Please see Table V-A.22: Maintenance Standards - Permeable Pavement.

Maintenance recommendations for all permeable pavement BMPs:

- Erosion and introduction of sediment from surrounding land uses should be strictly controlled after construction by amending exposed soil with compost and mulch, planting exposed areas as soon as possible, and armoring outfall areas.
- Surrounding landscaped areas should be inspected regularly and possible sediment sources controlled immediately.
- Installations can be monitored for adequate or designed minimum infiltration rates by observing drainage immediately after heavier rainstorms for standing water or infiltration tests using ASTM C1701.
- Clean permeable pavement surfaces to maintain infiltration capacity at least once or twice annually following recommendations below.
- Utility cuts should be backfilled with the same aggregate base used under the permeable paving to allow continued conveyance of stormwater through the base, and to prevent migration of fines from the standard base aggregate to the more open graded permeable base material (Diniz, 1980).
- Ice build up on permeable pavement is reduced and the surface becomes free and clear more rapidly compared to conventional pavement. For western Washington, deicing and sand application may be reduced or eliminated and the permeable pavement installation should be assessed during winter months and the winter traction program developed from those observations. Vacuum and sweeping frequency will likely be required more often if sand is applied.

Porous asphalt and pervious concrete maintenance recommendations:

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	GIAL-2301_2025-01-16
Site Name:	Giola//Aldehayyat
Site Address:	2969 74th Ave SE
City:	Mercer Island
Report Date:	1/16/2025
Gage:	Seatac
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	1.00
Version Date:	2016/02/25
Version:	4.2.12

POC Thresholds

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

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
A B, Forest, Flat	0.0265
Pervious Total	0.0265
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.0265

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Routing Elements

Predeveloped Routing

Mitigated Routing

Permeable Pavement 1

Pavement Area:0.0265 acre.Pavement Length:34.00 ft.
Pavement Width: 34.00 ft.
Pavement slope 1:0.02 To 1
Pavement thickness: 0.29
Pour Space of Pavement: 0.1
Material thickness of second layer: 0.5
Pour Space of material for second layer: 0.33
Material thickness of third layer: 0
Pour Space of material for third layer: 0
Infiltration On
Infiltration rate: 6
Infiltration safety factor: 0.33
Total Volume Infiltrated (ac-ft.): 3.708
Total Volume Through Riser (ac-ft.): 0
Total Volume Through Facility (ac-ft.): 3.708
Percent Infiltrated: 100
Total Precip Applied to Facility: 0
Total Evap From Facility: 0.255
Element Flows To:
Outlet 1 Outlet 2

Permeable Pavement Hydraulic Table

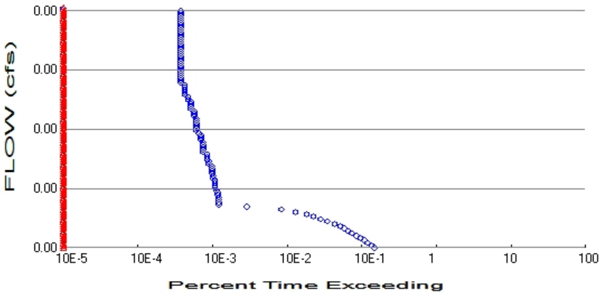
Stage(feet)	**Area(ac.)**	**Volume(ac-ft.)**	**Discharge(cfs)**	**Infilt(cfs)**
0.0000	0.026	0.000	0.000	0.000
0.0088	0.026	0.000	0.000	0.053
0.0176	0.026	0.000	0.000	0.053
0.0263	0.026	0.000	0.000	0.053
0.0351	0.026	0.000	0.000	0.053
0.0439	0.026	0.000	0.000	0.053
0.0527	0.026	0.000	0.000	0.053
0.0614	0.026	0.000	0.000	0.053
0.0702	0.026	0.000	0.000	0.053
0.0790	0.026	0.000	0.000	0.053
0.0878	0.026	0.000	0.000	0.053
0.0966	0.026	0.000	0.000	0.053
0.1053	0.026	0.000	0.000	0.053
0.1141	0.026	0.001	0.000	0.053
0.1229	0.026	0.001	0.000	0.053
0.1317	0.026	0.001	0.000	0.053
0.1404	0.026	0.001	0.000	0.053
0.1492	0.026	0.001	0.000	0.053
0.1580	0.026	0.001	0.000	0.053
0.1668	0.026	0.001	0.000	0.053
0.1756	0.026	0.001	0.000	0.053
0.1843	0.026	0.001	0.000	0.053
0.1931	0.026	0.001	0.000	0.053
0.2019	0.026	0.001	0.000	0.053
0.2107	0.026	0.001	0.000	0.053
0.2194	0.026	0.001	0.000	0.053
0.2282	0.026	0.002	0.000	0.053
0.2370	0.026	0.002	0.000	0.053
0.2458	0.026	0.002	0.000	0.053

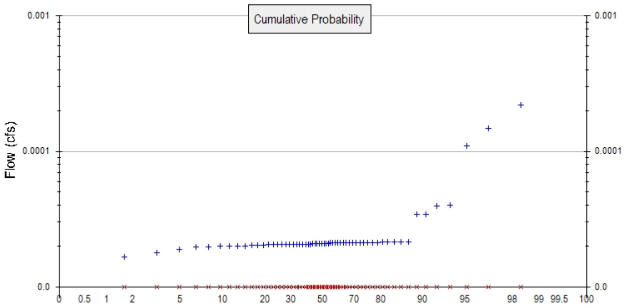
0.2546	0.026	0.002	0.000	0.053
0.2633	0.026	0.002	0.000	0.053
0.2721	0.026	0.002	0.000	0.053
0.2809	0.026	0.002	0.000	0.053
0.2897	0.026	0.002	0.000	0.053
0.2984	0.026	0.002	0.000	0.053
0.3072	0.026	0.002	0.000	0.053
0.3160	0.026	0.002	0.000	0.053
0.3248	0.026	0.002	0.000	0.053
0.3336	0.026	0.002	0.000	0.053
0.3423	0.026	0.003	0.000	0.053
0.3511	0.026	0.003	0.000	0.053
0.3599	0.026	0.003	0.000	0.053
0.3687	0.026	0.003	0.000	0.053
0.3774	0.026	0.003	0.000	0.053
0.3862	0.026	0.003	0.000	0.053
0.3950	0.026	0.003	0.000	0.053
0.4038	0.026	0.003	0.000	0.053
0.4126	0.026	0.003	0.000	0.053
0.4213	0.026	0.003	0.000	0.053
0.4301	0.026	0.003	0.000	0.053
0.4389	0.026	0.003	0.000	0.053
0.4477	0.026	0.003	0.000	0.053
0.4564	0.026	0.004	0.000	0.053
0.4652	0.026	0.004	0.000	0.053
0.4740	0.026	0.004	0.000	0.053
0.4828	0.026	0.004	0.000	0.053
0.4916	0.026	0.004	0.000	0.053
0.5003	0.026	0.004	0.000	0.053
0.5091	0.027	0.004	0.000	0.053
0.5179	0.027	0.004	0.000	0.053
0.5267	0.027	0.004	0.000	0.053
0.5354	0.027	0.004	0.000	0.053
0.5442	0.027	0.004	0.000	0.053
0.5530	0.027	0.004	0.000	0.053
0.5618	0.027	0.004	0.000	0.053
0.5706	0.027	0.004	0.000	0.053
0.5793	0.027	0.004	0.000	0.053
0.5881	0.027	0.004	0.000	0.053
0.5969	0.027	0.004	0.000	0.053
0.6057	0.027	0.004	0.000	0.053
0.6144	0.027	0.004	0.000	0.053
0.6232	0.027	0.004	0.000	0.053
0.6320	0.027	0.004	0.000	0.053
0.6408	0.027	0.004	0.000	0.053
0.6496	0.027	0.004	0.000	0.053
0.6583	0.027	0.004	0.000	0.053
0.6671	0.027	0.004	0.000	0.053
0.6759	0.027	0.004	0.000	0.053
0.6847	0.027	0.004	0.000	0.053
0.6934	0.027	0.004	0.000	0.053
0.7022	0.027	0.004	0.000	0.053
0.7110	0.027	0.004	0.000	0.053
0.7198	0.027	0.005	0.000	0.053
0.7286	0.027	0.005	0.000	0.053
0.7373	0.027	0.005	0.000	0.053
0.7461	0.027	0.005	0.000	0.053
0.7549	0.027	0.005	0.000	0.053

0.7637	0.027	0.005	0.000	0.053
0.7724	0.027	0.005	0.000	0.053
0.7812	0.027	0.005	0.000	0.053
0.7900	0.027	0.005	0.000	0.053

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.0265
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0
Total Impervious Area: 0.026538

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.000022
5 year	0.000034
10 year	0.000043
25 year	0.000058
50 year	0.00007
100 year	0.000084

Flow Frequency Return Periods for Mitigated. POC #1

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

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	0.000	0.000
1950	0.000	0.000
1951	0.000	0.000
1952	0.000	0.000
1953	0.000	0.000
1954	0.000	0.000
1955	0.000	0.000
1956	0.000	0.000
1957	0.000	0.000
1958	0.000	0.000

1959	0.000	0.000
1960	0.000	0.000
1961	0.000	0.000
1962	0.000	0.000
1963	0.000	0.000
1964	0.000	0.000
1965	0.000	0.000
1966	0.000	0.000
1967	0.000	0.000
1968	0.000	0.000
1969	0.000	0.000
1970	0.000	0.000
1971	0.000	0.000
1972	0.000	0.000
1973	0.000	0.000
1974	0.000	0.000
1975	0.000	0.000
1976	0.000	0.000
1977	0.000	0.000
1978	0.000	0.000
1979	0.000	0.000
1980	0.000	0.000
1981	0.000	0.000
1982	0.000	0.000
1983	0.000	0.000
1984	0.000	0.000
1985	0.000	0.000
1986	0.000	0.000
1987	0.000	0.000
1988	0.000	0.000
1989	0.000	0.000
1990	0.000	0.000
1991	0.000	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.000	0.000
1996	0.000	0.000
1997	0.000	0.000
1998	0.000	0.000
1999	0.000	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.000	0.000
2003	0.000	0.000
2004	0.000	0.000
2005	0.000	0.000
2006	0.000	0.000
2007	0.000	0.000
2008	0.000	0.000
2009	0.000	0.000

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	**Predeveloped**	**Mitigated**
1	0.0002	0.0000
2	0.0001	0.0000
3	0.0001	0.0000

4	0.0000	0.0000
5	0.0000	0.0000
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	0.0000	0.0000
11	0.0000	0.0000
12	0.0000	0.0000
13	0.0000	0.0000
14	0.0000	0.0000
15	0.0000	0.0000
16	0.0000	0.0000
17	0.0000	0.0000
18	0.0000	0.0000
19	0.0000	0.0000
20	0.0000	0.0000
21	0.0000	0.0000
22	0.0000	0.0000
23	0.0000	0.0000
24	0.0000	0.0000
25	0.0000	0.0000
26	0.0000	0.0000
27	0.0000	0.0000
28	0.0000	0.0000
29	0.0000	0.0000
30	0.0000	0.0000
31	0.0000	0.0000
32	0.0000	0.0000
33	0.0000	0.0000
34	0.0000	0.0000
35	0.0000	0.0000
36	0.0000	0.0000
37	0.0000	0.0000
38	0.0000	0.0000
39	0.0000	0.0000
40	0.0000	0.0000
41	0.0000	0.0000
42	0.0000	0.0000
43	0.0000	0.0000
44	0.0000	0.0000
45	0.0000	0.0000
46	0.0000	0.0000
47	0.0000	0.0000
48	0.0000	0.0000
49	0.0000	0.0000
50	0.0000	0.0000
51	0.0000	0.0000
52	0.0000	0.0000
53	0.0000	0.0000
54	0.0000	0.0000
55	0.0000	0.0000
56	0.0000	0.0000
57	0.0000	0.0000
58	0.0000	0.0000
59	0.0000	0.0000
60	0.0000	0.0000
61	0.0000	0.0000

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0000	3140	0	0	Pass
0.0000	2881	0	0	Pass
0.0000	2567	0	0	Pass
0.0000	2280	0	0	Pass
0.0000	2031	0	0	Pass
0.0000	1793	0	0	Pass
0.0000	1578	0	0	Pass
0.0000	1394	0	0	Pass
0.0000	1246	0	0	Pass
0.0000	1092	0	0	Pass
0.0000	920	0	0	Pass
0.0000	745	0	0	Pass
0.0000	595	0	0	Pass
0.0000	481	0	0	Pass
0.0000	388	0	0	Pass
0.0000	276	0	0	Pass
0.0000	181	0	0	Pass
0.0000	62	0	0	Pass
0.0000	26	0	0	Pass
0.0000	26	0	0	Pass
0.0000	26	0	0	Pass
0.0000	26	0	0	Pass
0.0000	25	0	0	Pass
0.0000	25	0	0	Pass
0.0000	24	0	0	Pass
0.0000	23	0	0	Pass
0.0000	23	0	0	Pass
0.0000	23	0	0	Pass
0.0000	23	0	0	Pass
0.0000	22	0	0	Pass
0.0000	22	0	0	Pass
0.0000	21	0	0	Pass
0.0000	21	0	0	Pass
0.0000	21	0	0	Pass
0.0000	21	0	0	Pass
0.0000	19	0	0	Pass
0.0000	19	0	0	Pass
0.0000	18	0	0	Pass
0.0000	18	0	0	Pass
0.0000	18	0	0	Pass
0.0000	16	0	0	Pass
0.0000	16	0	0	Pass
0.0000	16	0	0	Pass
0.0000	16	0	0	Pass
0.0000	16	0	0	Pass
0.0000	15	0	0	Pass
0.0000	15	0	0	Pass
0.0000	15	0	0	Pass
0.0000	14	0	0	Pass
0.0000	13	0	0	Pass
0.0000	13	0	0	Pass
0.0000	13	0	0	Pass
0.0000	13	0	0	Pass

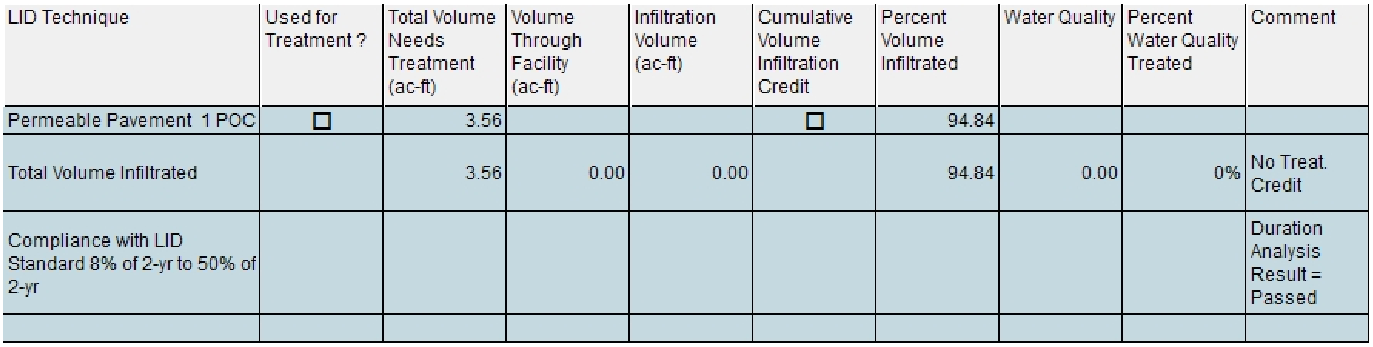
0.0000	13	0	0	Pass
0.0000	13	0	0	Pass
0.0000	12	0	0	Pass
0.0000	12	0	0	Pass
0.0000	12	0	0	Pass
0.0000	11	0	0	Pass
0.0000	11	0	0	Pass
0.0000	11	0	0	Pass
0.0000	11	0	0	Pass
0.0000	10	0	0	Pass
0.0000	10	0	0	Pass
0.0000	9	0	0	Pass
0.0000	9	0	0	Pass
0.0001	9	0	0	Pass
0.0001	9	0	0	Pass
0.0001	9	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass
0.0001	8	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

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

LID Report



LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Permeable Pavement 1 POC	☐	3.56			☐	94.84			
Total Volume Infiltrated		3.56	0.00	0.00		94.84	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

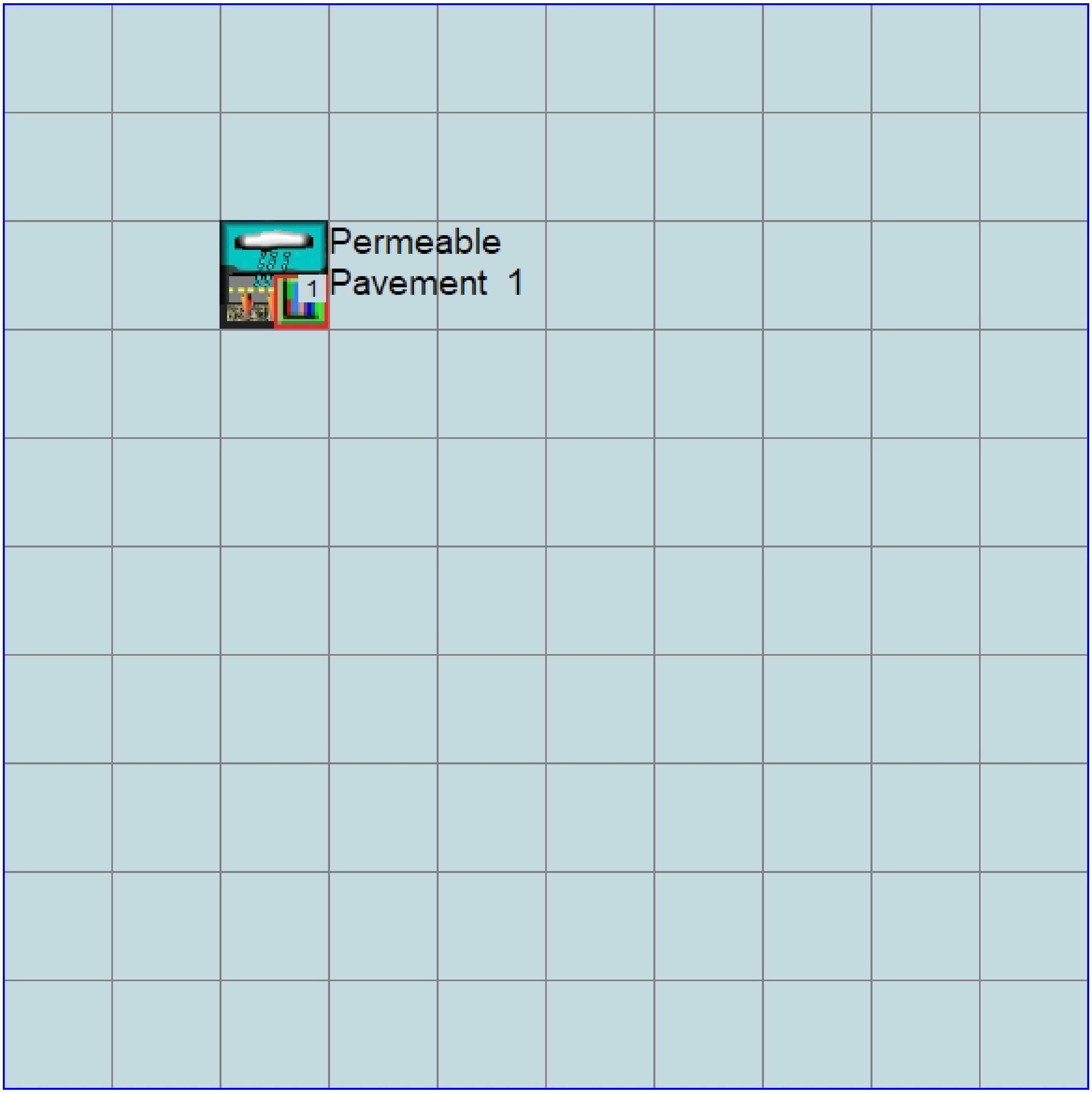
IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic

Mitigated Schematic



Predeveloped UCI File

Mitigated UCI File

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

Legal Notice

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

www.clearcreeksolutions.com

GEOTECH
CONSULTANTS, INC.

2401 10th Ave E
Seattle, Washington 98102
(425) 747-5618

June 6, 2023

JN 23105

Yazan Aldehayyat and Stephanie Giola
2969 – 74th Avenue Southeast
Mercer Island, Washington 98040
via email: yazanaldhiat@gmail.com and Giola.stephanie@gmail.com

Subject: **Foundation Design Criteria and Evaluation of Infiltration Feasibility**
Proposed Residence
2969 – 74th Avenue Southeast
Mercer Island, Washington

Greetings:

This report presents the findings and recommendations of our geotechnical engineering study for the site of the proposed new residence to be located in Mercer Island. The scope of our services consisted of exploring site surface and subsurface conditions, and then developing this report to provide recommendations for foundations and subsurface drainage, as well as an evaluation of infiltration feasibility. This work was authorized by your acceptance of our proposal, P-11342, dated March 6, 2023.

We were provided with an architectural site plan for preparation of this report. This plan was developed by Lane Williams Architects and was not dated. Based on this plan, we understand that a new, two-story residence will be constructed on the eastern approximate half of the site. The existing house will be demolished as part of the site work. The new residence will extend westward from the footprint of the existing house and will be slightly inset from the existing footprint on its north, east, and south sides. A basement is not being proposed beneath the residence, and we understand that the residence will potentially be underlain by a crawlspace. An attached garage will be located in the northeastern corner of the residence and will be accessed via a new driveway. Walkways, and planting/landscaping beds are shown to flank the residence, and a concrete patio will be located on the west side of the residence. The remainder of the western approximate half of the property will remain undeveloped. The new residence will be situated approximately 9.1 feet from the north property line, 22.7 feet from the east, and 16.8 feet from the south. Finish floor elevations were not shown on the provided site plan, but we anticipate that the residence's main floor will be set at, or slightly above the existing site grades.

If the scope of the project changes from what we have described above, we should be provided with revised plans in order to determine if modifications to the recommendations and conclusions of this report are warranted.

SITE CONDITIONS

SURFACE

The Vicinity Map, Plate 1, illustrates the general location of the site in Mercer Island. The rectangular-shaped site comprises a total site area of 0.32-acres. The site is bordered to the north, south, and west by residential parcels, and to the east by 74th Avenue Southeast.

The grade across the property is essentially flat, with only small, localized undulations noted across the property. The general vicinity surrounding this property is also generally flat to gently sloped. The property contains a two-story house located on the eastern portion of the site. A driveway, walkways, and patios flank the perimeter of the house. The remainder of the site is undeveloped, and is covered with grass, landscaping, and a moderate stand of mature trees.

Our review of the Mercer Island GIS shows that no geologic hazard areas are mapped on the site. The closest mapped geologic hazard areas are located approximately 200 feet east of the site, near the eastern perimeter of the parcels located on the eastern side of 74th Avenue Southeast. There are no steep slopes on, or near, the site.

The adjacent parcels are all developed with residences and outbuildings. North of the site, a two-story residence underlain by a crawlspace is situated approximately 5.5 to 7.5 feet from the property line near the eastern perimeter of the lot. A detached shed is located approximately 2 feet from the northern property line in this adjacent property's western yard. The southeastern parcel also contains a residence that is set well away from the property lines. A detached, on-grade garage and shed are situated to the south of the site, approximately 5 feet from the common property line. The southwestern parcel contains a newer two-story residence located approximately 30 feet from the property line. This residence does not appear to contain a basement. A one-story residence and detached structure are located on the adjacent western parcel. Both buildings appear to be underlain by a crawlspace, and the residence and detached structure are situated 7.5 and 5.5 feet from the property line, respectively.

SUBSURFACE

The subsurface conditions were explored by drilling two test borings and excavating one test pit at the approximate locations shown on the Site Exploration Plan, Plate 2. Our exploration program was based on the proposed construction, anticipated subsurface conditions and those encountered during exploration, and the scope of work outlined in our proposal.

The test borings were drilled on May 3, 2023 using a track-mounted, hollow-stem auger drill in order to explore the deeper subsurface conditions at the site. Samples were taken at approximate 2.5- to 5-foot intervals with a standard penetration sampler. This split-spoon sampler, which has a 2-inch outside diameter, is driven into the soil with a 140-pound hammer falling 30 inches. The number of blows required to advance the sampler a given distance is an indication of the soil density or consistency. A geotechnical engineer from our staff observed the drilling process, logged the test borings, and obtained representative samples of the soil encountered. The Test Boring Logs are attached as Plates 3 and 4.

The test pit was excavated on May 31, 2023 with a small, tracked excavator in order to perform a Pilot Infiltration Test (PIT). A geotechnical engineer from our staff observed the excavation process, logged the test pits, and obtained representative samples of the soil encountered. "Grab" samples of selected subsurface soil were collected from the backhoe bucket. The Test Pit Log is attached to this report as Plate 5.

Soil Conditions

Test Borings 1 and 2 were drilled near the eastern and western extents of the new residence, and the test pit was excavated southwest of Test Boring 1. Beneath the ground surface and a layer of topsoil, native, loose, root-laden, we observed a layer of silty, fine-grained sand. This silty sand continued to depths of 2 to 3 feet and was underlain by sand that contained small amounts of fines (silt) that continued to the base of the explorations. The silt content in this sand was 5 percent, or less.

The sandy layer was initially loose and contained varying roots and gravel, becoming medium-dense beneath depths of 3 to 4 feet in the explorations. The sands continued with depth in the borings, becoming dense beneath depths of 7.5 feet. The sand became very dense beneath depths of 10 to 12.5 feet, with this density continuing to the base of the borings at depths of 21.5 to 26.5 feet. The test pit was terminated at a shallower depth of 4 feet to conduct additional testing.

The Washington State Department of Natural Resources Subsurface Viewer maps the site and surrounding area as being underlain by Continental Glacial Drift. The site soils, as well as results from several other test pits excavated in the nearby vicinity found in The City of Mercer Island GIS, would generally confirm the subsurface profile encountered in our explorations.

No obstructions were revealed by our explorations. However, debris, buried utilities, and old foundation and slab elements are commonly encountered on sites that have had previous development.

Although our explorations did not encounter cobbles or boulders, they are often found in soils that have been deposited by glaciers or fast-moving water.

Groundwater Conditions

Some standing water was revealed at a depth of 13 feet in the open borehole after drilling Test Boring 2. Elevated moisture contents were observed in some of the deeper soil samples in this boring, and the accumulated water in the borehole could have resulted from a very slow seepage/moisture accumulation that was blocked by the drill augers, prohibiting the observance of this water during drilling. No groundwater was encountered in Test Boring 1 or the shallow test pit.

The test pit and test borings were left open for only a short time period. Therefore, the seepage levels on the logs represent the location of transient water seepage and may not indicate the static groundwater level. As noted above, groundwater levels encountered during drilling can be deceptive, because seepage into the boring can be blocked or slowed by the auger itself.

It should be noted that groundwater levels vary seasonally with rainfall and other factors.

The stratification lines on the logs represent the approximate boundaries between soil types at the exploration locations. The actual transition between soil types may be gradual, and subsurface conditions can vary between exploration locations. The logs provide specific subsurface information only at the locations tested. If a transition in soil type occurred between samples in the borings, the depth of the transition was interpreted. The relative densities and moisture descriptions indicated on the test pit and test boring logs are interpretive descriptions based on the conditions observed during excavation and drilling.

The compaction of test pit backfill was not in the scope of our services. The test pits were backfilled with excavated soil that was lightly tamped into place. Loose soil will therefore be found in the area of the test pits. If this presents a problem, the backfill will need to be removed and replaced with structural fill during construction.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

THIS SECTION CONTAINS A SUMMARY OF OUR STUDY AND FINDINGS FOR THE PURPOSES OF A GENERAL OVERVIEW ONLY. MORE SPECIFIC RECOMMENDATIONS AND CONCLUSIONS ARE CONTAINED IN THE REMAINDER OF THIS REPORT. ANY PARTY RELYING ON THIS REPORT SHOULD READ THE ENTIRE DOCUMENT.

The explorations for this study encountered native, medium-dense sand beneath a mantle of loose silty sand and sand ranging in thickness from approximately 3 to 4 feet. This native sand will provide suitable support for the proposed residence, and it is our professional opinion that a conventional foundation system can be used for the proposed residence. All new footings will need to be excavated through the looser surficial, root-laden soils to expose the underlying medium-dense sands. To help prevent subgrade disturbance during excavation, we recommend that the foundation excavations occur using a smooth bucket, grade bar, or a flat blade shovel to allow for the foundation subgrades to be scraped clean. In order to densify the granular subgrade soils, we recommend that the foundation areas be recompacted in place with a jumping jack compactor prior to placing any structural fill or placing foundation rebar. Some additional excavations may need to occur within the existing residence footprint, or in any other areas of previous disturbance due to the existing development. Where this may need to occur, either the foundations could be lowered to bear on the recompacted medium-dense sands, or the grades could be restored using compacted, granular fill or quarry spalls. In addition, we recommend that any settlement sensitive elements surrounding the new residence such as the deck be supported on the underlying recompacted, medium-dense sands, or upon compacted structural fill placed over the competent native soils.

Excavations for this project are not anticipated to extend more than a few feet beneath the ground surface at this time. All foundation excavations should be planned to extend deep enough to expose the underlying medium-dense sands. Based on the soils encountered in our borings and test pit, excavations for this project should not be excavated at an inclination steeper than a 1:1 (Horizontal:Vertical) extending continuously between the top and bottom of a cut. Vertical excavations should not be conducted on, or near the shared property lines, near any adjacent settlement sensitive structure, or at the base of a sloped cut for this project. Based on the property line setbacks, and anticipated depth of excavation, it would appear that the residence excavation will be able to be maintained within the property boundaries using open, laid-back sloped cuts.

A discussion of infiltration testing procedures and feasibility is included later in this report.

The erosion control measures needed during the site development will depend heavily on the weather conditions that are encountered. We anticipate that a silt fence will be needed around the downslope sides of any cleared areas. Existing pavements, ground cover, and landscaping should be left in place wherever possible to minimize the amount of exposed soil. Rocked staging areas and construction access roads should be provided to reduce the amount of soil or mud carried off the property by trucks and equipment. Trucks should not be allowed to drive off of the rock-covered areas. Cut slopes and soil stockpiles should be covered with plastic during wet weather. Following clearing or rough grading, it may be necessary to mulch or hydroseed bare areas that will not be immediately covered with landscaping or an impervious surface. On most construction projects, it is necessary to periodically maintain or modify temporary erosion control measures to address specific site and weather conditions.

The drainage and/or waterproofing recommendations presented in this report are intended only to prevent active seepage from flowing through concrete walls or slabs. Even in the absence of active seepage into and beneath structures, water vapor can migrate through walls, slabs, and floors from the surrounding soil, and can even be transmitted from slabs and foundation walls due to the concrete curing process. Water vapor also results from occupant uses, such as cooking, cleaning, and bathing. Excessive water vapor trapped within structures can result in a variety of undesirable conditions, including, but not limited to, moisture problems with flooring systems, excessively moist air within occupied areas, and the growth of molds, fungi, and other biological organisms that may be harmful to the health of the occupants. The designer or architect must consider the potential vapor sources and likely occupant uses, and provide sufficient ventilation, either passive or mechanical, to prevent a build up of excessive water vapor within the planned structure.

Geotech Consultants, Inc. should be allowed to review the final development plans to verify that the recommendations presented in this report are adequately addressed in the design. Such a plan review would be additional work beyond the current scope of work for this study, and it may include revisions to our recommendations to accommodate site, development, and geotechnical constraints that become more evident during the review process.

We recommend including this report, in its entirety, in the project contract documents. This report should also be provided to any future property owners so they will be aware of our findings and recommendations.

SEISMIC CONSIDERATIONS

In accordance with the International Building Code (IBC), the site class within 100 feet of the ground surface is best represented by Site Class Type D (Stiff Soil). As noted in the USGS website, the mapped spectral acceleration value for a 0.2 second (S_s) and 1.0 second period (S_1) equals 1.40g and 0.48g, respectively.

The IBC and ASCE 7 require that the potential for liquefaction (soil strength loss) during an earthquake be evaluated for the peak ground acceleration of the Maximum Considered Earthquake (MCE), which has a probability of occurring once in 2,475 years (2 percent probability of occurring in a 50-year period). The MCE peak ground acceleration adjusted for site class effects (F_{PGA}) equals 0.66g. The soil beneath the site is not susceptible to seismic liquefaction under the ground motions of the MCE because of their dense nature and the absence of near-surface groundwater.

Sections 1803.5 of the IBC and 11.8 of ASCE 7 require that other seismic-related geotechnical design parameters (seismic surcharge for retaining wall design and slope stability) include the potential effects of the Design Earthquake. The peak ground acceleration for the Design Earthquake is defined in Section 11.2 of ASCE 7 as two-thirds (2/3) of the MCE peak ground acceleration, or 0.44g.

CONVENTIONAL FOUNDATIONS

We recommend that continuous and individual spread footings have minimum widths of 16 and 24 inches, respectively. Exterior footings should also be bottomed at least 18 inches below the lowest adjacent finish ground surface for protection against frost and erosion. The local building codes should be reviewed to determine if different footing widths or embedment depths are required. Footing subgrades must be cleaned of loose or disturbed soil prior to pouring concrete. Depending upon site and equipment constraints, this may require removing the disturbed soil by hand.

Depending on the final site grades, overexcavation may be required below the footings to expose competent native soil. Unless lean concrete is used to fill an overexcavated hole, the overexcavation must be at least as wide at the bottom as the sum of the depth of the overexcavation and the footing width. For example, an overexcavation extending 2 feet below the bottom of a 2-foot-wide footing must be at least 4 feet wide at the base of the excavation. If lean concrete is used, the overexcavation need only extend 6 inches beyond the edges of the footing.

An allowable bearing pressure of 2,000 pounds per square foot (psf) is appropriate for footings supported on competent native soil. A one-third increase in this design bearing pressure may be used when considering short-term wind or seismic loads. For the above design criteria, it is anticipated that the total post-construction settlement of footings founded on competent native soil, or on structural fill up to 5 feet in thickness, will be about one-inch, with differential settlements on the order of one-inch in a distance of 30 feet along a continuous footing with a uniform load.

Lateral loads due to wind or seismic forces may be resisted by friction between the foundation and the bearing soil, or by passive earth pressure acting on the vertical, embedded portions of the foundation. For the latter condition, the foundation must be either poured directly against relatively level, undisturbed soil or be surrounded by level, well-compacted fill. We recommend using the following ultimate values for the foundation's resistance to lateral loading:

PARAMETER	ULTIMATE VALUE
Coefficient of Friction	0.40
Passive Earth Pressure	300 pcf

Where: pcf is Pounds per Cubic Foot, and Passive Earth Pressure is computed using the Equivalent Fluid Density.

If the ground in front of a foundation is loose or sloping, the passive earth pressure given above will not be appropriate. The above ultimate values for passive earth pressure and coefficient of friction do not include a safety factor.

BUILDING FLOORS

We understand that the majority of the residence may be underlain by a crawlspace. The garage floor can be constructed as a slab-on-grade atop competent, native soils, or on structural fill placed atop this competent soil. The subgrade soil must be in a firm, non-yielding condition at the time of slab construction or underslab fill placement. Any soft areas encountered should be excavated and replaced with select, imported structural fill.

Even where the exposed soils appear dry, water vapor will tend to naturally migrate upward through the soil to the newly constructed space above it. This can affect moisture-sensitive flooring, cause imperfections or damage to the slab, or simply allow excessive water vapor into the space above the slab. All interior slabs-on-grade should be underlain by a capillary break drainage layer consisting of a minimum 4-inch thickness of clean gravel or crushed rock that has a fines content (percent passing the No. 200 sieve) of less than 3 percent and a sand content (percent passing the No. 4 sieve) of no more than 10 percent. Pea gravel or crushed rock are typically used for this layer.

As noted by the American Concrete Institute (ACI) in the *Guides for Concrete Floor and Slab Structures*, proper moisture protection is desirable immediately below any on-grade slab that will be covered by tile, wood, carpet, impermeable floor coverings, or any moisture-sensitive equipment or products. ACI recommends a minimum 10-mil thickness vapor retarder for better durability and long-term performance than is provided by 6-mil plastic sheeting that has historically been used. A vapor retarder is defined as a material with a permeance of less than 0.3 perms, as determined by ASTM E 96. It is possible that concrete admixtures may meet this specification, although the manufacturers of the admixtures should be consulted. Where vapor retarders are used under slabs, their edges should overlap by at least 6 inches and be sealed with adhesive tape. The sheeting should extend to the foundation walls for maximum vapor protection.

If no potential for vapor passage through the slab is desired, a vapor *barrier* should be used. A vapor barrier, as defined by ACI, is a product with a water transmission rate of 0.01 perms when tested in accordance with ASTM E 96. Reinforced membranes having sealed overlaps can meet this requirement.

We recommend that the contractor, the project materials engineer, and the owner discuss these issues and review recent ACI literature and ASTM E-1643 for installation guidelines and guidance on the use of the protection/blotter material.

SUBSURFACE INFILTRATION TESTING

To assess the infiltrative capacity of the native sands, a Pilot Infiltration Test (PIT) was conducted in the area of Test Pit 1, located near Test Boring 1 and near the approximate location of the proposed infiltration system. The soil encountered in this test pit is described in the ***Subsurface*** section of this report. The soil encountered at the base of the test pit would be classified as sand under the *USDA Textural Triangle.*

A small PIT test was conducted per the general procedure listed in the 2021 King County Stormwater Design Manual for Western Washington (KCSWDM). The PIT was conducted at a depth of 4 feet below the ground surface.

The native, medium-dense sand encountered at the testing depth was observed to be moderately permeable. The results of the steady state and falling head portions of the PIT yielded a **measured infiltration rate of 6 inches per hour**. Similar infiltration test results have been obtained in similar outwash sand deposits in other projects. This measured rate does not include any safety factors. This rate should only be used for facilities founded into the underlying sand, and should not be used for shallower facilities, such as permeable pavement, which would likely be constructed atop the siltier soils located at a shallower depth.

Applicable property line and structure setbacks should be followed in the final siting of the facilities. It would be most practical to place the systems as far from the property lines as possible, as this is where the potential for adverse drainage impacts exists in the case of a sustained storm event, particularly where adjacent residences are located in close proximity to the shared property lines. It would be practical to utilize more than one facility in order to spread out the tributary runoffs from the proposed development. In addition, the applicable stormwater design manuals and City of Mercer Island/King County codes should be followed with regards to a minimum maintenance plan for these systems. Continued maintenance throughout the life of the systems will help to slow the degradation of these systems over time. Poor maintenance schedules, or no maintenance at all will lead to an early failure of these systems. The property owners will need to implement their own maintenance program to ensure that these systems continue to function as intended. The performance of any infiltration system will degrade over time as the surrounding soil is clogged by fines and debris carried in with the stormwater. Over time, this can require repair or replacement of an infiltration system. Frequent cleaning of gutters, pavements, and collection basins/filter basins can help to prolong the life of the infiltration system.

DRAINAGE CONSIDERATIONS

Footing drains should be used where: (1) crawl spaces or basements will be below a structure; (2) a slab is below the outside grade; or (3) the outside grade does not slope downward from a building. Footing drains would not be needed for the residence if no below-grade space is included beneath the footprint, the floor slabs are set above the surrounding grades, and the grade slopes away from the residence on all sides.

Drains or weep holes should also be placed at the base of all earth-retaining walls.

Footing drains should be surrounded by at least 6 inches of 1-inch-minus, washed rock that is encircled with non-woven, geotextile filter fabric (Mirafi 140N, Supac 4NP, or similar material). At its highest point, a perforated pipe invert should be at least 6 inches below the bottom of a slab floor or the level of a crawl space. The discharge pipe for subsurface drains should be sloped to flow to the outlet point. Roof and surface water drains must not discharge into the foundation drain system. A typical footing drain detail is attached to this report as Plate 6. For the best long-term performance, perforated PVC pipe is recommended for all subsurface drains. Clean-outs should be provided for potential future flushing or cleaning of footing drains.

As a minimum, a vapor retarder, as defined in the ***Slabs-On-Grade*** section, should be provided in any crawl space area to limit the transmission of water vapor from the underlying soils. Crawl space grades are sometimes left near the elevation of the bottom of the footings. As a result, an outlet drain is recommended for all crawl spaces to prevent an accumulation of any water that may bypass the footing drains. Providing a few inches of free draining gravel underneath the vapor retarder is also prudent to limit the potential for seepage to build up on top of the vapor retarder.

Some potential groundwater was observed during our field work, but was encountered well below the expected excavation levels or the infiltration system. If seepage is encountered in an excavation, it should be drained from the site by directing it through drainage ditches, perforated pipe, or French drains, or by pumping it from sumps interconnected by shallow connector trenches at the bottom of the excavation.

Water should not be allowed to stand in any area where foundations, slabs, or pavements are to be constructed. Final site grading in areas adjacent to the residence should slope away at least one to 2 percent, except where the area is paved. Surface drains should be provided where necessary to prevent ponding of water behind foundation or retaining walls.

LIMITATIONS

The conclusions and recommendations contained in this report are based on site conditions as they existed at the time of our exploration and assume that the soil and groundwater conditions encountered in the test pits and test borings are representative of subsurface conditions on the site. If the subsurface conditions encountered during construction are significantly different from those observed in our explorations, we should be advised at once so that we can review these conditions and reconsider our recommendations where necessary. Unanticipated conditions are commonly encountered on construction sites and cannot be fully anticipated by merely taking samples in test pits and borings. Subsurface conditions can also vary between exploration locations. Such unexpected conditions frequently require making additional expenditures to attain a properly constructed project. It is recommended that the owner consider providing a contingency fund to accommodate such potential extra costs and risks. This is a standard recommendation for all projects.

This report has been prepared for the exclusive use of Yazan Aldehayyat and Stephanie Giola, and their representatives, for specific application to this project and site. Our conclusions and recommendations are professional opinions derived in accordance with our understanding of current local standards of practice, and within the scope of our services. No warranty is expressed or implied. The scope of our services does not include services related to construction safety precautions, and 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. Our services also do not include assessing or minimizing the potential for biological hazards, such as mold, bacteria, mildew, and fungi in either the existing or proposed site development.

ADDITIONAL SERVICES

In addition to reviewing the final plans, Geotech Consultants, Inc. should be retained to provide geotechnical consultation, testing, and observation services during construction. This is to confirm that subsurface conditions are consistent with those indicated by our exploration, to evaluate whether earthwork and foundation construction activities comply with the general intent of the recommendations presented in this report, and to provide suggestions for design changes in the event subsurface conditions differ from those anticipated prior to the start of construction. However, our work would not include the supervision or direction of the actual work of the contractor and its employees or agents. Also, job and site safety, and dimensional measurements, will be the responsibility of the contractor.

During the construction phase, we will provide geotechnical observation and testing services when requested by you or your representatives. Please be aware that we can only document sitework we actually observe. It is still the responsibility of your contractor or on-site construction team to verify that our recommendations are being followed, whether we are present at the site or not.

The following plates are attached to complete this report:

Plate 1	Vicinity Map
Plate 2	Site Exploration Plan
Plates 3 - 5	Test Boring and Test Pit Logs
Plate 6	Typical Footing Drain Detail

We appreciate the opportunity to be of service on this project. Please contact us if you have any questions, or if we can be of further assistance.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.

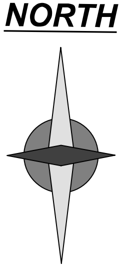
27845

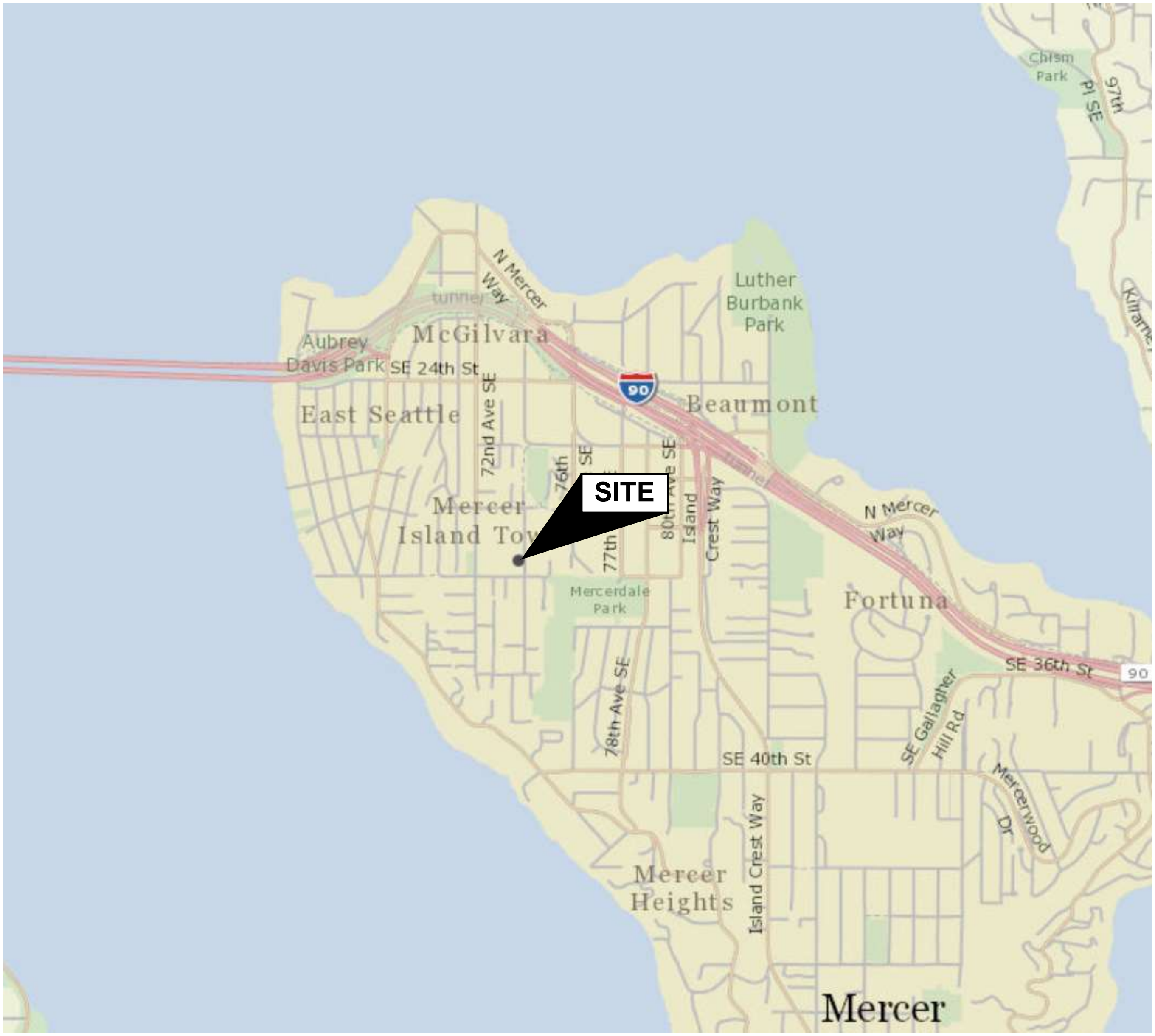
6/6/2023

Matthew K. McGinnis
Geotechnical Engineer

Marc R. McGinnis, P.E.
Principal

MKM/MRM:kg





(Source: King County iMap)

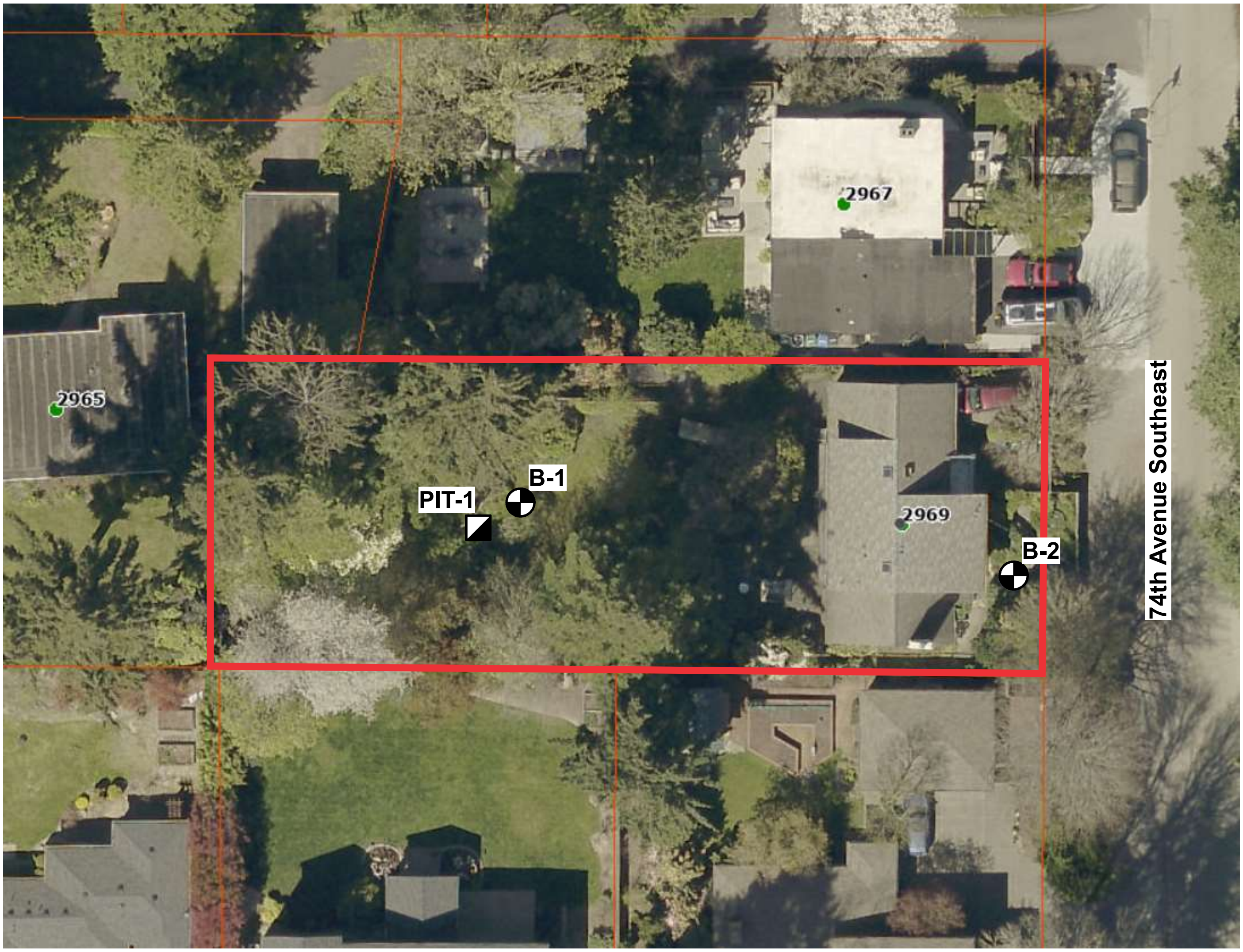
GEOTECH
CONSULTANTS, INC.

VICINITY MAP

2969 - 74th Avenue Southeast
Mercer Island, Washington

Job No:	**Date:**		**Plate:**
23105	May. 2023		1

NORTH



Legend:

- ⊕ Test Boring Location
- ◩ PIT Location

GEOTECH
CONSULTANTS, INC.

SITE EXPLORATION PLAN

2969 - 74th Avenue Southeast
Mercer Island, Washington

Job No: 23105	**Date:** May. 2023	No Scale	**Plate:** 2

BORING 1

Depth (ft.)	Moisture	Water Table	Blows per Foot	Sample	USCS	Description
					SM	Topsoil Brown gravelly, silty SAND with roots, fine-grained, moist, loose
						Brown, very gravelly SAND with silt and roots, fine to medium-grained, moist, loose
			26	1		-becomes medium-dense
5						
			22	2		
			32	3		-becomes grayish-brown, intact, dense
10						-with trace fine gravels
			32	4		
			71	4	SP	-becomes fine to coarse-grained, gravelly, moist to very moist, very dense -with a thin silty seam at tip of sampler
15						
			58	5		
20			75	6		-becomes fine to medium-grained, very moist to wet
25						
			69	7		

*** Test boring was terminated at 26.5 feet on May 3, 2023.**

*** No groundwater seepage was observed during drilling.**

GEOTECH
CONSULTANTS, INC.

TEST BORING LOG

2969 - 74th Avenue Southeast
Mercer Island, Washington

Job	Date:	Logged by:	Plate:
23105	May 2023	MKM	3

BORING 2

Depth (ft.)	Moisture	Water Table	Blows per Foot	Sample	USCS	Description
					SM	Topsoil Brown silty SAND with roots, fine-grained, moist, loose
						Brown with rusting, very gravelly SAND with silt and roots, fine to coarse-grained, moist, loose
			20	1		-becomes medium-dense
5			25	2		
			29	3		-becomes gray-brown, medium-dense to dense
10			54	4		-becomes moist to very moist, fine to medium-grained with thin, slightly silty to silty seams, very dense
					SP	
		▼				
15			65	5		-becomes very moist
20			50 6"	6		-becomes gray, very moist to wet
25						

- **Test boring was terminated at 21.5 feet on May 3, 2023.**
- **Potential groundwater seepage was measured at approximately 13 feet after augers pulled from borehole.**

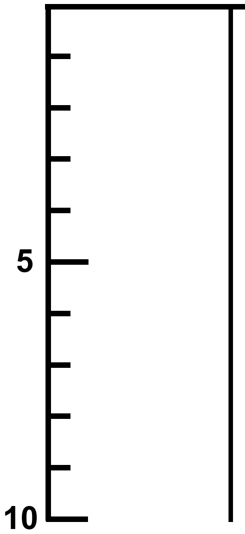
GEOTECH
CONSULTANTS, INC.

TEST BORING LOG

2969 - 74th Avenue Southeast
Mercer Island, Washington

Job	*Date:*	*Logged by:*	*Plate:*
23105	May 2023	MKM	4

PIT 1



Depth (ft.)	Moisture Content (%)	Water Table	USCS	Description
			SM	Topsoil over; Brown silty SAND with gravel and abundant roots, fine-grained, moist, loose
			SP	Brown SAND with gravel and trace silt, fine to meidum-grained, moist, loose -becomes medium-dense

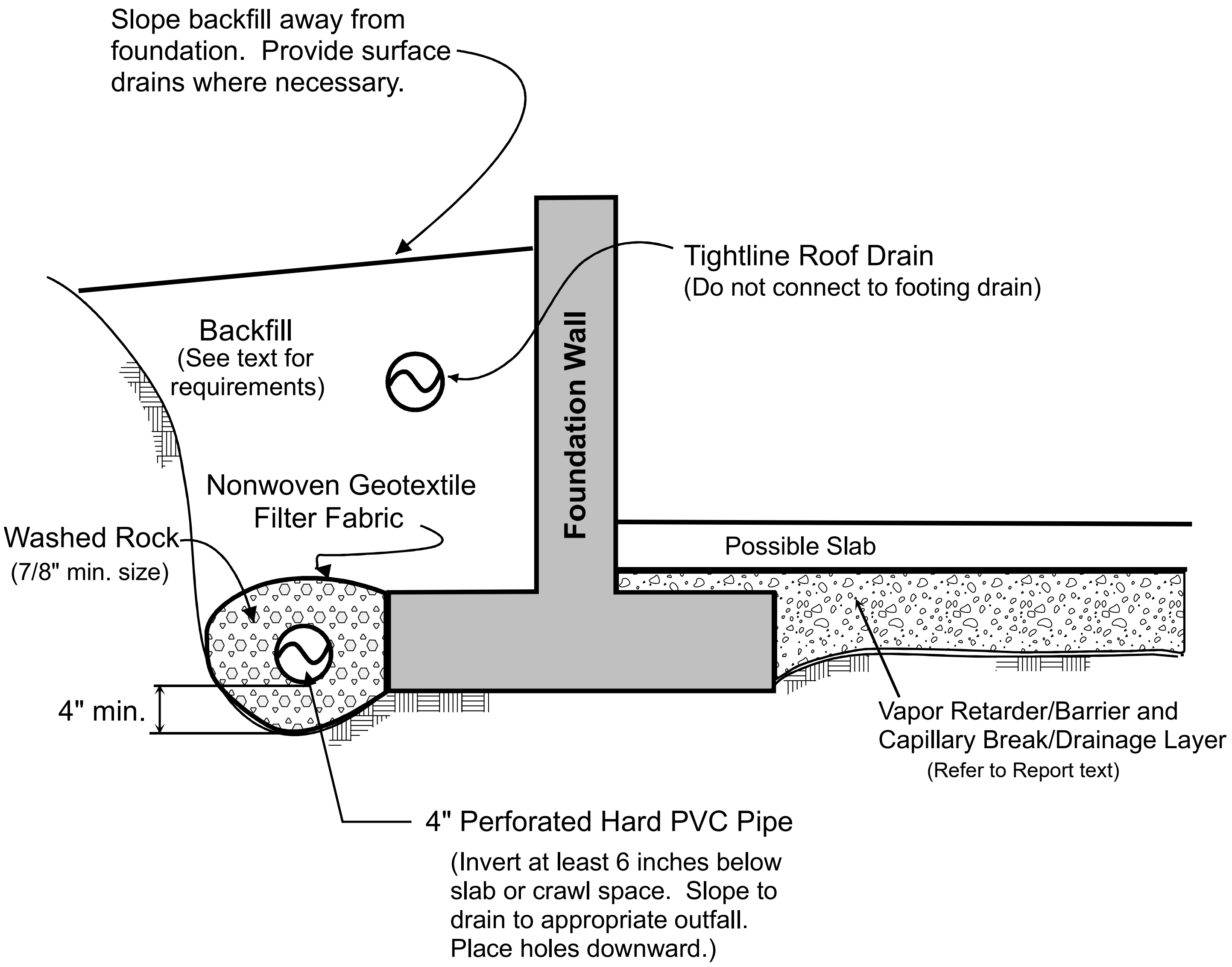
*** Test Pit terminated at 4 feet on May 31, 2023.**
*** No groundwater seepage was observed during excavation.**
*** Slight caving was observed from 1 to 3 feet during excavation.**

GEOTECH
CONSULTANTS, INC.

TEST PIT LOG

2969 - 74th Avenue Southeast
Mercer Island, Washington

Job No:	Date:		Plate:
23105	May. 2023		5



NOTES:

(1) In crawl spaces, provide an outlet drain to prevent buildup of water that bypasses the perimeter footing drains.

(2) Refer to report text for additional drainage, waterproofing, and slab considerations.

GEOTECH
CONSULTANTS, INC.

FOOTING DRAIN DETAIL

2969 - 74th Avenue Southeast
Mercer Island, Washington

Job No:	Date:		Plate:
23105	May. 2023		6