

Storm Drainage Report

For

Residence

Located at

3804 East Mercer Way

Mercer Island, WA 98040

Parcel # 2107000100



March, 2024

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1.0 Project Overview

This proposed single-family resident development is a 0.33 acres parcel project located in City of Mercer Island, King County, Washington. See Figure 1 for project Vicinity Map.

The subject property address is at 3804 East Mercer Way in Mercer Island, Washington. The development includes demolishing an existing house and an addition to the existing residence structure as well as driveway and walkway, accessible from East Mercer Way.

A primary component of the redevelopment project plans is the satisfaction of current stormwater management requirements commensurate with Department of Ecology 2019 Stormwater Management manual for Western Washington (SWWMM) and/or City of Mercer Island Storm Management Standards. This stormwater report describes the existing drainage characteristics in the project area and presents the proposed On-Site stormwater management within the project to mitigate for the project impacts.

Figure 1: Vicinity Map



2.0 Site Conditions

2.1 Existing Site Conditions

The existing parcel is located at 3804 East Mercer Way Mercer Island, WA. The property is bounded by East Mercer Way/single family residence to west, single-family residences to the north, south, and east. The site consists of a rectangular shaped property covering 0.33 acres in square footage. It is currently occupied by a single-family residence in the central portion and a paved driveway and detachable garage in western of the lot. Topographically, the site consists of a relatively level and gentle slope towards the lake.

There is currently no stormwater management facilities located on the property. The existing stormwater runoff for the site disposal by infiltration and/ or surface sheet flow to the backyard. The existing land cover is outlined in the Table 1.0.

Table 1.0: Existing Land Cover

Summary of Existing Site Conditions			
Surface Type	Area	Units	Notes
Total Lot	14,342	SF	
House	2,157	SF	
Carport	1,143	SF	
Walkway	1,235	SF	
Driveway	2,357	SF	
Impervious Subtotal	6,892	SF	

2.2 Existing Hydraulic Features

At this time, there is no stormwater drainage system on the site to collect stormwater runoff. The site stormwater disperses across the site from west to east direction. No wetlands or stream has been identified on or adjacent to the site.

2.3 Soils Information

The project area is located in the Northern Puget lowlands. This area was invaded by glacial ice at least three times during the Pleistocene Epoch, about 1.6 million to 10,000 years ago. The site is mapped as Pleistocene continental glacial till according to the 1:250,000 Washington Interactive Geological Map. The soils are described as Qgt - Pleistocene till, which is unsorted, unstratified, highly compacted mixture of clay, silt, sand, gravel, and boulders deposited by glacial ice; may contain interbedded stratified sand, silt, and gravel.

No groundwater seepage was observed in test pits excavated at 11/26/2022. No surface water was observed during our site visit.

Soil conditions were investigated by conducting two (2) test pits. For detailed soil observations, please refer to Figures 4 and 5 in Appendix; a USCS soil classification chart is provided in Figure 3 in Appendix. Native soils were generally consistent with findings of all test pit locations. Subsurface soil conditions are summarized as follows, from top to bottom: a. 0' - 2' b. 2' - 5'
Topsoil (OL)/Fill Clayey Sands with Gravel (Till)

a. Topsoil (OL)/Fill Dark brown, sandy silt topsoil with grass roots was encountered at the surface in TP#1. The black silty sand and some bricks was found in TP#2. This soil ranged from 0" to 2' thick, damp, and moderately loose.

b. Clayey Sands with Gravel (Till) The clayey sands underlying topsoil extends to excavation depth of ~5'. The soil is light brown to gray, stiff to hard, damp.

See Appendix F for Geotechnical Engineering Evaluation Report.

3.0 Developed Conditions

3.1 Design References

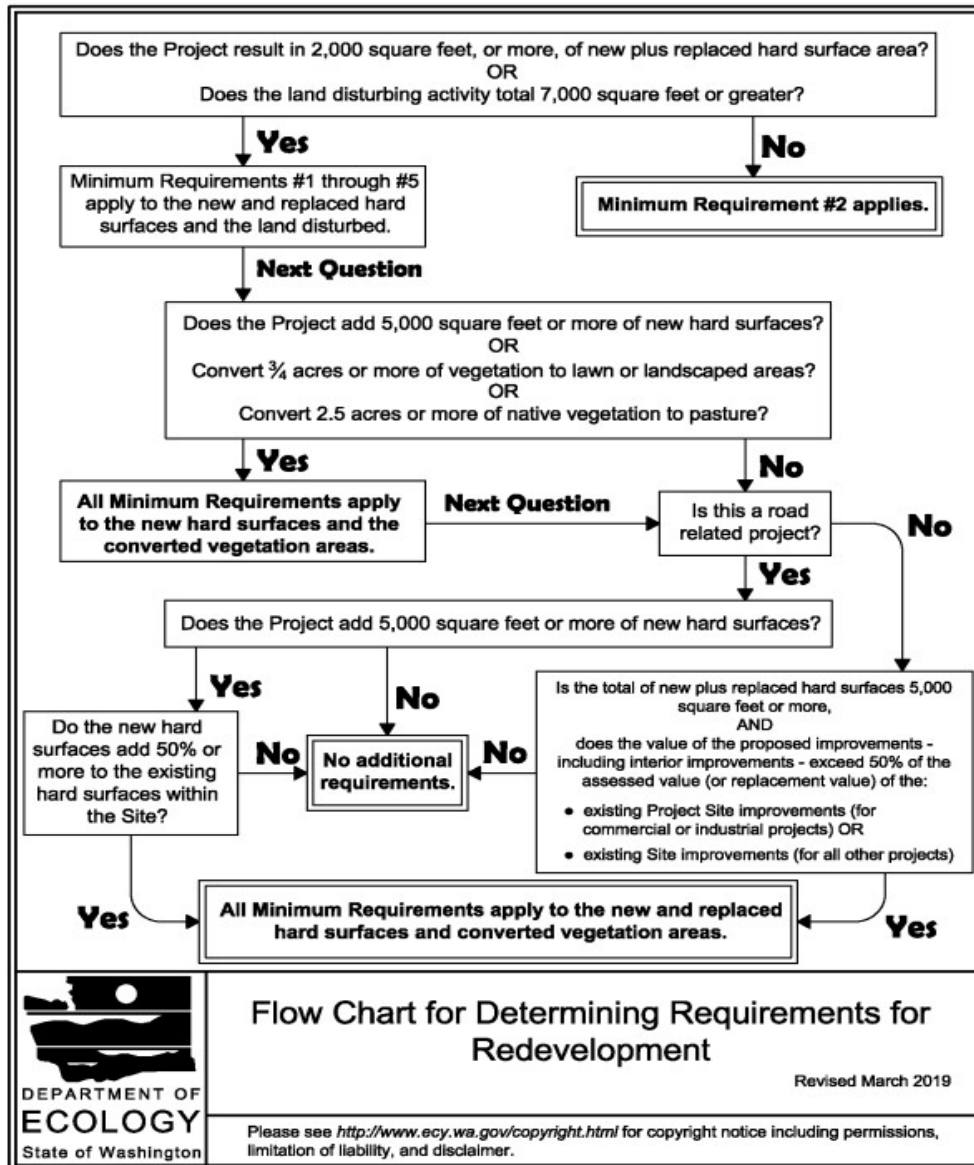
The following design references were utilized in development of the stormwater design:

- * Department of Ecology Stormwater Management Manual for Western Washington (SWWMM) 2019

3.2 Minimum Requirements

Summary of project information for determining minimum stormwater requirements			
Key	Component	Value	Notes
A	Project Site Area	14,342 SF	
B	Existing Impervious Area	6,892 SF	
C	Existing Impervious Area Coverage	48.05 %	Calculated as B/A100%
D	New Impervious Area	922 SF	Attached Garage
E	Replaced Impervious Area	2,452 SF	
F	New Plus Replaced Impervious Area	3,374 SF	Calculated as D+E
G	Proposed Impervious Area	3,374 SF	Existing + Replaced Areas
H	Converted Impervious: Concrete to lawn/ landscape	518 SF	N/A
I	Converted Pervious: Native vegetation converted to pasture	0.00 SF	N/A
J	Total Area of Land Disturbing Activity	4,398 SF	

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



According to the above Flow Chart for determining requirements for ReDevelopment project, Minimum Requirements #1 - #5 of SWWMM 2019 apply to the new and replaced impervious surfaces and the land disturbed.

3.3 Proposed Development and On-Site Stormwater Management

The Redevelopment proposed plans include a second addition to the existing residence structure, as well as the driveway and walkway.

See Appendix B for the proposed site conditions. The proposed land cover is outlined in Table 2.0.

Table 2.0: Developed Land Cover

Summary of Proposed Site Conditions	
Surface Type	Area
Total Lot	14,342 SF
New House Roof	2,452 SF
Driveway	(2,357 SF, Ex.) + (744 SF, Addition)
Ex. Carport	1,143 SF to be remain
New Walkway	(717 SF, Ex.) + (178 SF, Addition)
Total Impervious Subtotal	7,591 SF
Existing Lawn/Landscape	6,751 SF
Pervious Total	6,751 SF

3.4 Design Satisfaction of SMMWW Minimum Requirements

The following sections outline how the new single-family residential redevelopment project design satisfies the #1 – # 5 minimum SMMWW requirements.

MR #1 – Stormwater Site Plans

Stormwater Site Plans will be prepared for the single- family residential redevelopment. This report and other supporting studies and drawings will comprise the component Stormwater Site Plan.

MR #2 – Construction Stormwater Pollution Prevention

The single-family residential redevelopment project will include in the contract plans, the TESC plan sheets to address erosion. The SPCC will be a stand-alone document prepared by the contractor to address potential mechanical or construction related spills that could potentially contaminate stormwater or soils.

MR #3 – Source Control of Pollutants

Pollutants will be prevented from coming in contact and mixing with stormwater by using silt fence along the property line to keep stormwater within construction site. Construction entrance will be implemented prior to construction to prevent wheel tracking pollutant from construction site into the roadway.

MR #4 – Maintaining the Natural drainage system

Drainage patterns will be maintained as a result of the Single-family residential redevelopment project.

MR #5 – On-Site Stormwater Management

This redeveloped project does not require to provide flow control due the total new plus replaced surfaces are below the threshold 5,000 SF. Also, water quality is not required due to the added PGIS is less 2,000 SF. This redevelopment project requires to implement On-Site BMPs to the added/ replaced impervious surfaces.

The new roof surface is 2,452 SF. From List #3 BMPs,

Downspout Full Infiltration – Infeasible due infiltration is not feasible for the site.

Downspout Dispersion Systems – Infeasible due to the site is mapped as landside hazard areas.

Therefore, this project proposed detention pipe for the new roof surface stormwater runoff mitigation. Using the On-Site Detention Pipe Table 1, for 2,452 SF of impervious surface area, the required detention pipe diameter is 4 ft, pipe length is 36 ft, lowest orifice is 0.5 (in), distance from outlet invert to second orifice is 2.8, and second orifice diameter is 1.5 (in).

The added driveway and the walkway continue to disperse to the lawn as existing conditions.

See Appendix B for drainage system location and details.

See Appendix D for catch basin standard maintenance, detention pipe table 1, and List Approach Table.

4.0 Operations and Maintenance

The owner will need to perform appropriate preventive maintenance steps to ensure that on-site stormwater management facilities are adequately maintained and allow for continued operations according to the maintenance section of the SMMWW 2019.

Appendix A

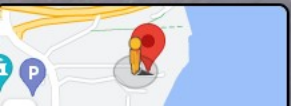
Existing Site Conditions and Photos

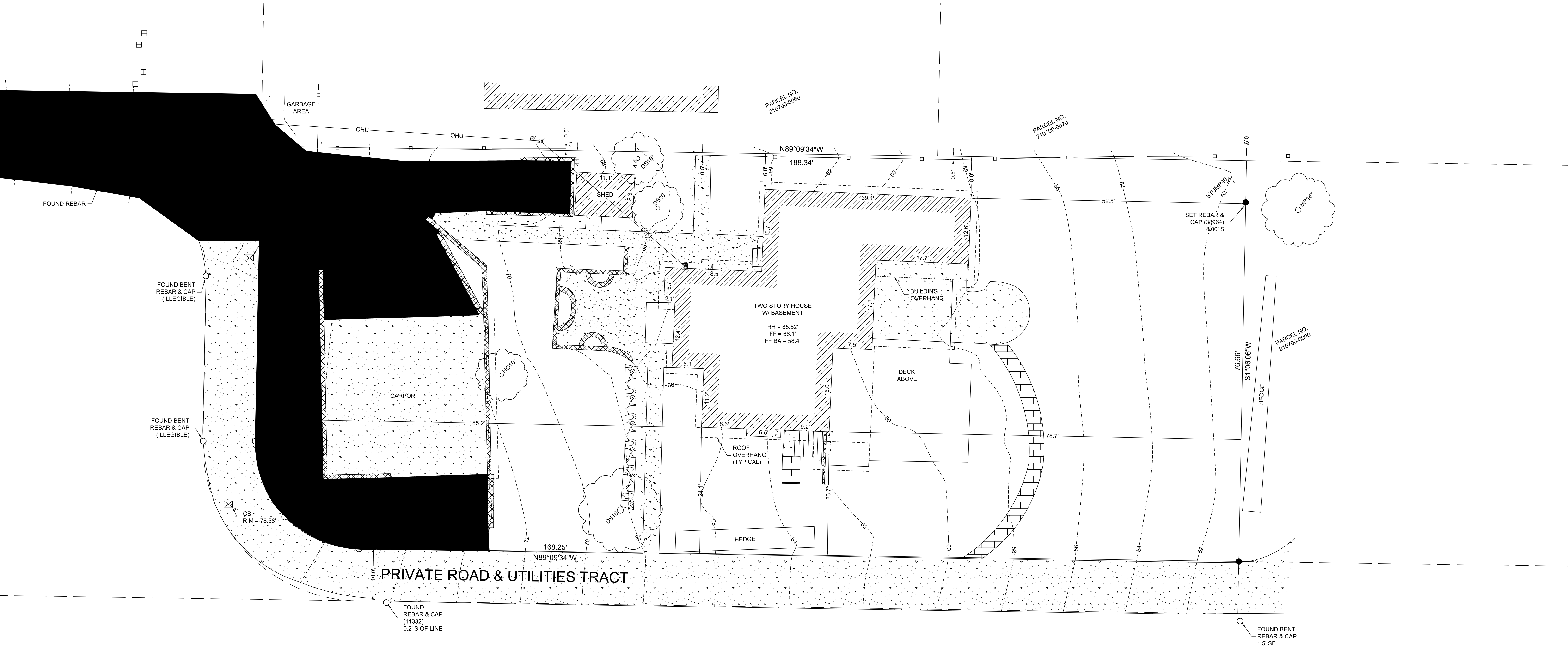


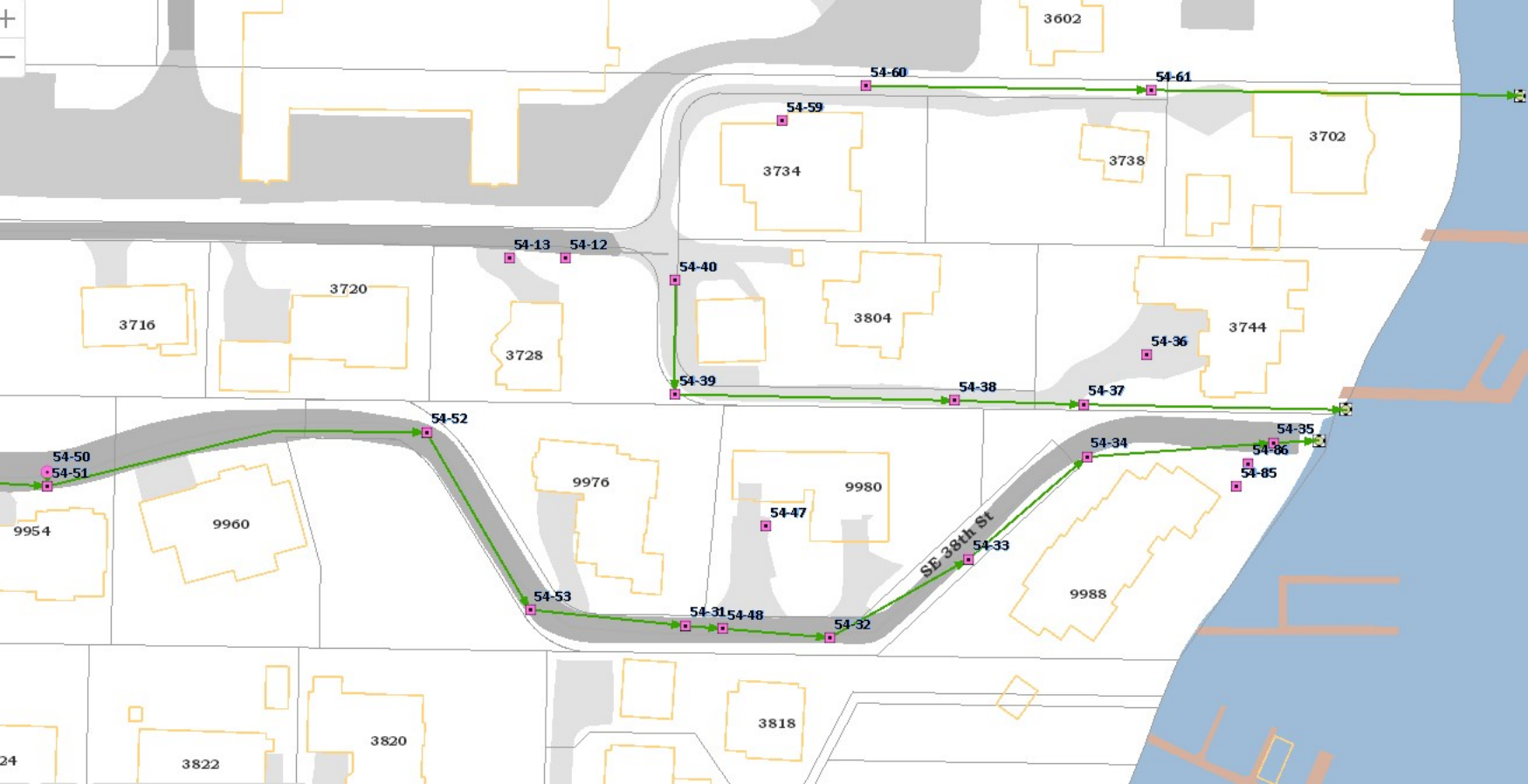
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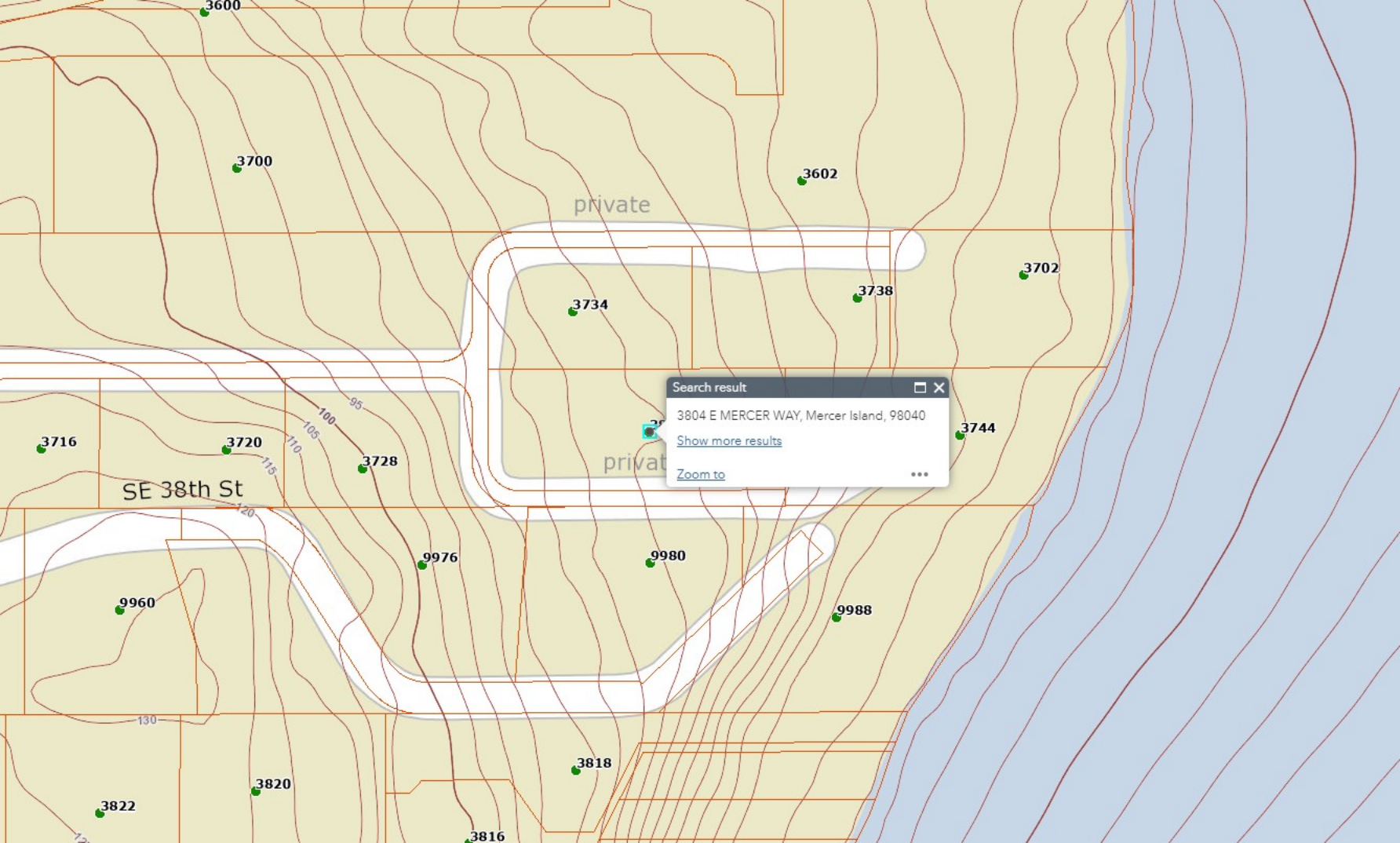


5804









3600

3700

3602

private

3702

3734

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Search result □ ✕
3804 E MERCER WAY, Mercer Island, 98040
[Show more results](#)
[Zoom to](#) ⋮

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SE 38th St

private

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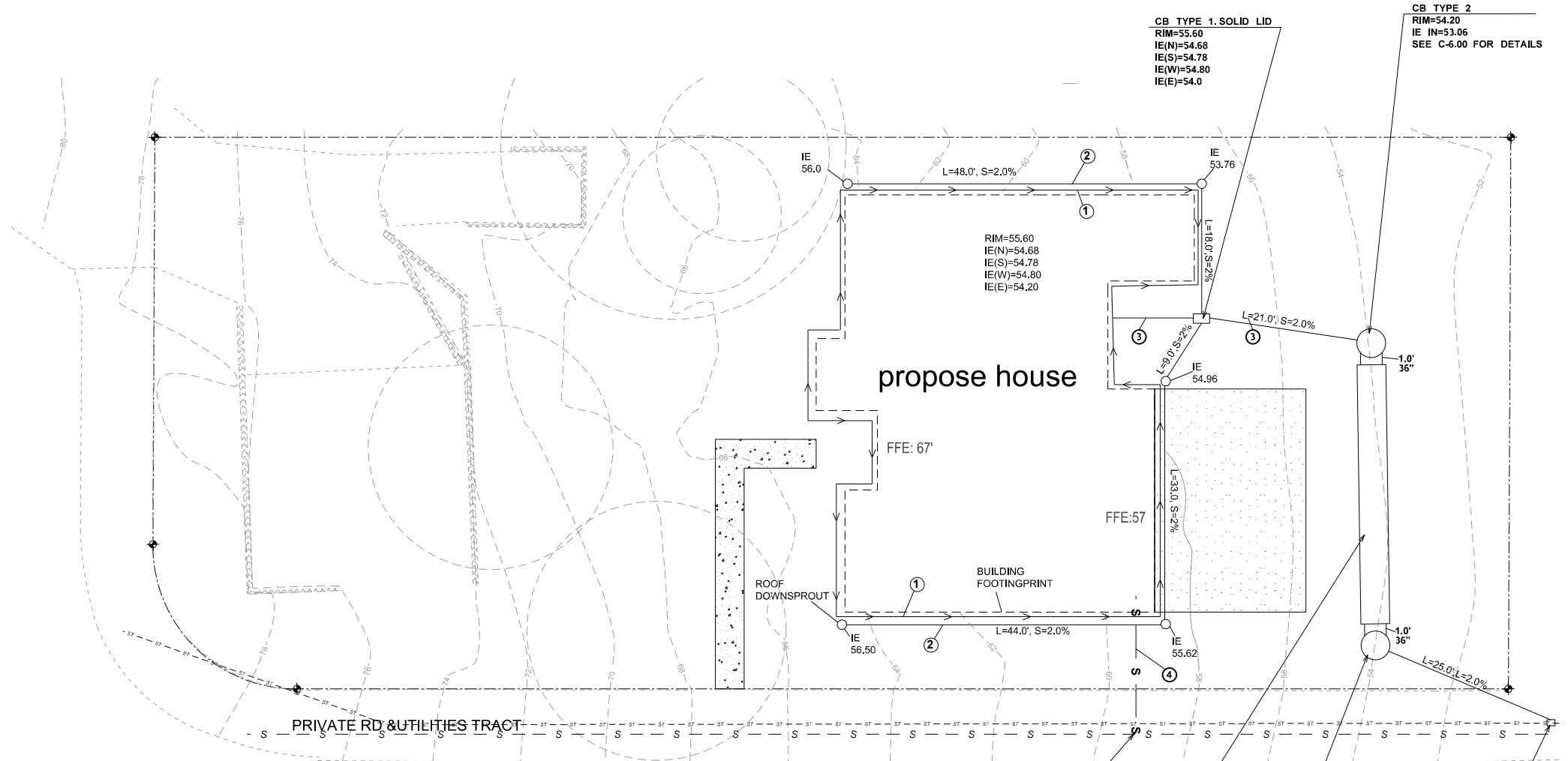
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Appendix B

Developed Site
Conditions and Drainage
plan & Detail

LEGEND

- EXISTING EDGE OF PAVEMENT - - - - -
- EXISTING SEWER MAIN - s - s - s -
- PROPOSED SIDE SEWER - s - s - s -
- PROPOSED FOOTING DRAIN ← ← ← ← ←
- EXISTING LOT LINE - - - - -
- TREE DRIP LINES ○



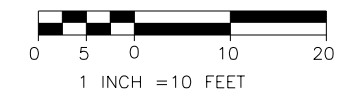
STORM DRAIN NOTES

- ① 4" FOOTING DRAIN, MIN 1% GRADE (ASTM D-3034 PVC)
- ② 4" ROOF DRAIN, MIN 2% GRADE (ASTM D-3034 PVC)
- ③ 4" STORM DRAIN, MIN 2% GRADE (ASTM D-3034 PVC)
- ④ 6" SIDE SEWER, MIN 2% GRADE (ASTM D-3034 PVC)

CONNECT WITH EXISTING 8" SEWER MAIN
CONTRACTOR SHALL FIELD VERIFY THE PIPE LOCATION AND IE PRIOR FOR CONSTRUCTION.

NOTE

NO EXCAVATION ENCROACHMENT INTO TREE DRIP LINE



4" DIAM. X36' DETENTION PIPE
TOP ELE.=54.0
BOTT. ELE.=50.0

CB TYPE 2
RIM=54.20
IE OUT=50.50
SEE C-6.00 FOR DETAILS

PROPOSED CB TYPE 1 (SOLID LID)
RIM=50.0
IE (N)=48.80
EXISTING 10", PVC, IE (W)=48.20
EXISTING 10", PVC, IE (E)=47.90
CONTRACTOR SHALL FIELD VERIFY THE EXISTING PIPE LOCATION, IE PRIOR TO CONSTRUCTION

Post Construction Soil Quality

- All areas subject to clearing and grading that have not been covered by impervious surface, incorporated into a drainage facility or engineered as structure fill or slope shall, at project completion, demonstrate the following:
1. A topsoil layer with a minimum organic matter content of 10% dry weight in planting beds, and 5% organic matter content in turf areas, and a pH from 6.0 to 8.0 or matching the pH of the undisturbed soil. The topsoil layer shall have a minimum depth of eight inches except where tree roots limit the depth of incorporation of amendments needed to meet the criteria. Subsoils below the topsoil layer should be scarified at least 4 inches with some incorporation of the upper material to avoid stratified layers, where feasible.
 2. Mulch planting beds with 2 inches of organic material
 3. Use compost and other materials that meet these organic content requirements:
 - a. The organic content for "pre-approved" amendment rates can be met only using compost meeting the compost specification for BMP T7.30: Bioretention Cells, Swales, and Planter Boxes (p.959), with the exception- that the compost may have up to 35% biosolids or manure. The compost must also have an organic matter content of 40% to 65%, and a carbon to nitrogen ratio below 25:1. The carbon to nitrogen ratio may be as high as 35:1 for plantings composed entirely of plants native to the Puget Sound Lowlands region.
 - b. Calculated amendment rates may be met through use of composted material meeting (a.) above; or other organic materials amended to meet the carbon to nitrogen ratio requirements, and not exceeding the contaminant limits identified in Table 220-B, Testing Parameters, in WAC 173-350-220.

Maintenance

1. Establish soil quality and depth toward the end of construction and once established, protect from compaction, such as from large machinery use, and from erosion.
2. Plant vegetation and mulch the amended soil area after installation.
3. Leave plant debris or its equivalent on the soil surface to replenish organic matter.
4. Reduce and adjust, where possible, the use of irrigation, fertilizers, herbicides and pesticides, rather than continuing to implement formerly established practices.

EXISTING UTILITIES ARE FOR REFERENCE ONLY.
CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES TO AVOID CONFLICTS.



Know what's below.
Call before you dig.

FIELD BOOK:	
SURVEYED:	
SURVEY BASE MAP:	
DESIGN ENTERED:	J.W
DESIGNED:	S.W
CHECKED:	S.W



TANDEM ENGINEERING CONSULTANT LLC
8822 NE 178TH ST
BOTHELL, WA 98011
(206) 795-5674

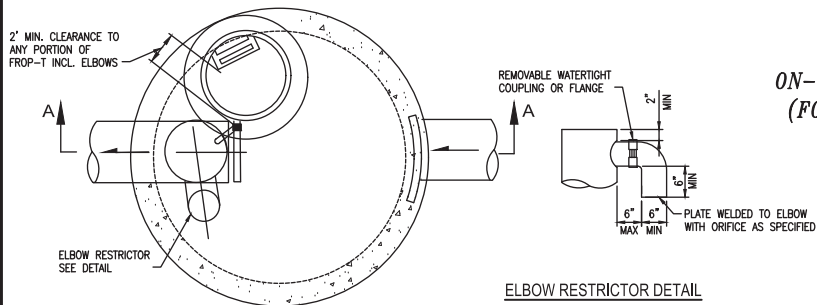
DRAINAGE & GRADATION PLAN

3804 RESIDENCE
3804 E MERCER WAY
MERCER ISLAND WA 98040

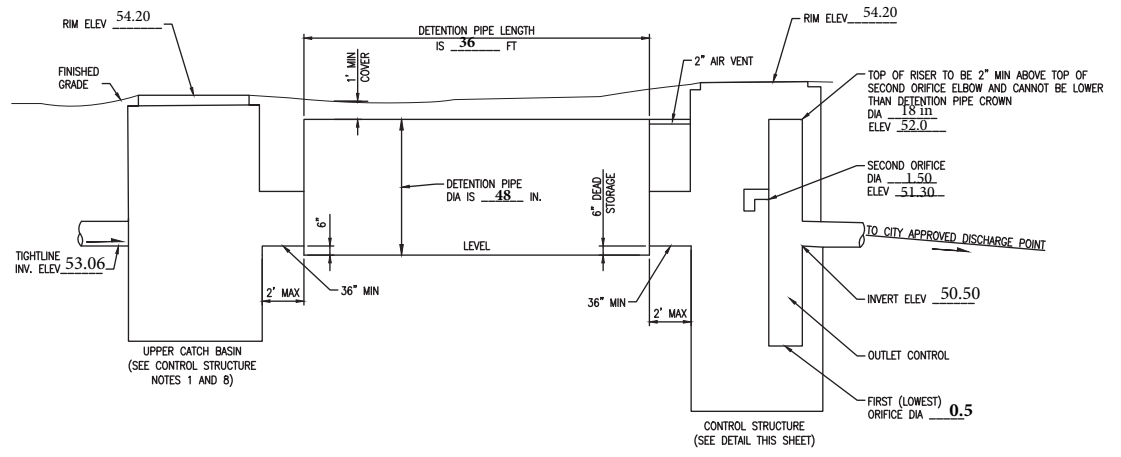
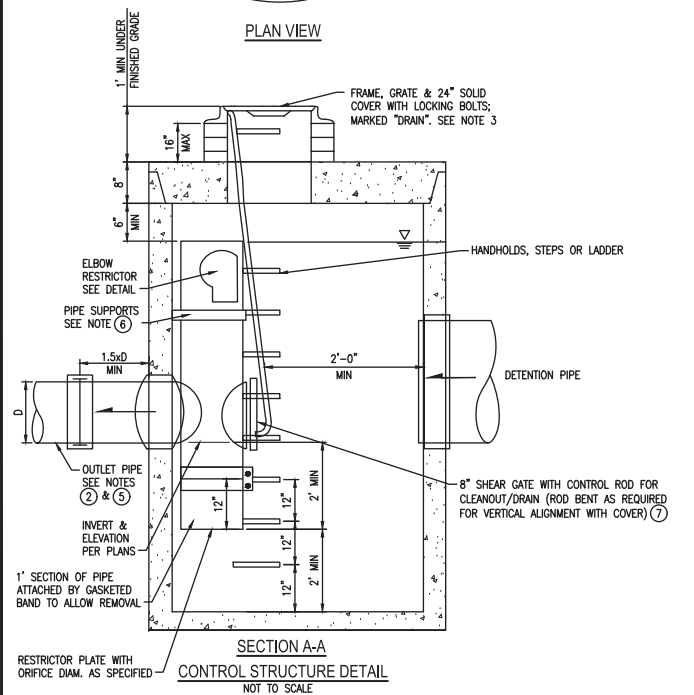
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**ATTACHMENT 1
CITY OF MERCER ISLAND
ON-SITE DETENTION SYSTEM WORKSHEET
(FOR NEW PLUS REPLACED IMPERVIOUS
AREA OF 9,500 SF OR LESS)**



OWNER: _____	ADDRESS: 3804 E Mercer Way	PREPARED BY: _____
PERMIT #: _____	PHONE: _____	DATE: _____
NEW PLUS REPLACED IMPERVIOUS SURFACE AREA (SF): <u>2,432</u>	DETENTION PIPE DIA (INCH): <u>48</u>	DETENTION PIPE LENGTH (FT): <u>36</u>
SOIL TYPE: <u>c</u>	PIPE MATERIAL: <u>Reinforced Conc pipe</u>	ORIFICE #1 DIA <u>0.5</u> INCH, ELEV <u>48.5</u>
		ORIFICE #2 DIA <u>1.5</u> INCH, ELEV <u>51.30</u>



**ON-SITE DETENTION SYSTEM
NOT TO SCALE (ENGINEER TO FILL IN BLANKS)**

CONTROL STRUCTURE NOTES

- ① USE A MINIMUM OF A 54 IN. DIAM. TYPE 2 CATCH BASIN. THE ACTUAL SIZE IS DEPENDENT ON CONNECTING PIPE MATERIAL AND DIAMETER.
- ② OUTLET PIPE: MIN. 6 INCH.
- ③ METAL PARTS: CORROSION RESISTANT. NON-GALVANIZED PARTS PREFERRED. GALVANIZED PIPE PARTS TO HAVE ASPHALT TREATMENT 1.
- ④ FRAME AND LADDER OR STEPS OFFSET SO:
 - A. CLEANOUT GATE IS VISIBLE FROM TOP;
 - B. CLIMB-DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE;
 - C. FRAME IS CLEAR OF CURB.
- ⑤ IF METAL OUTLET PIPE CONNECTS TO CEMENT CONCRETE PIPE, OUTLET PIPE TO HAVE SMOOTH O.D. EQUAL TO CONCRETE PIPE I.D. LESS 1/4 IN.
- ⑥ PROVIDE AT LEAST ONE 3 X 0.090 GAUGE SUPPORT BRACKET ANCHORED TO CONCRETE WALL WITH 5/8 IN. STAINLESS STEEL EXPANSION BOLTS OR EMBEDDED SUPPORTS 2 IN. INTO CATCH BASIN WALL (MAXIMUM 3'-0" VERTICAL SPACING).
- ⑦ THE SHEAR GATE SHALL BE MADE OF ALUMINUM ALLOY IN ACCORDANCE WITH ASTM B 26M AND ASTM B 275, DESIGNATION ZG32A; OR CAST IRON IN ACCORDANCE WITH ASTM A 48, CLASS 30B. THE LIFT HANDLE SHALL BE MADE OF A SIMILAR METAL TO THE GATE (TO PREVENT GALVANIC CORROSION), IT MAY BE OF SOLID ROD OR HOLLOW TUBING, WITH ADJUSTABLE HOOK AS REQUIRED. A NEOPRENE RUBBER GASKET IS REQUIRED BETWEEN THE RISER MOUNTING FLANGE AND THE GATE FLANGE. INSTALL THE GATE SO THAT THE LEVEL-LINE MARK IS LEVEL WHEN THE GATE IS CLOSED. THE MATING SURFACES OF THE LID AND THE BODY SHALL BE MACHINED FOR PROPER FIT. ALL SHEAR GATE BOLTS SHALL BE STAINLESS STEEL.
- ⑧ THE UPPER CATCH BASIN IS REQUIRED IF THE LENGTH OF THE DETENTION PIPE IS GREATER THAN 50 FT.

ON-SITE DETENTION SYSTEM NOTES:

1. CALL DEVELOPMENT SERVICES (206-275-7605) 24 HOURS IN ADVANCE FOR A DETENTION SYSTEM INSPECTION BEFORE BACKFILLING AND FOR FINAL INSPECTIONS.
2. RESPONSIBILITY FOR OPERATION AND MAINTENANCE OF DRAINAGE SYSTEMS ON PRIVATE PROPERTY IS RESPONSIBILITY OF THE PROPERTY OWNER. MATERIAL ACCUMULATED IN THE STORAGE PIPE MUST BE REMOVED FROM CATCH BASINS TO ALLOW PROPER OPERATION. THE OUTLET CONTROL ORIFICE MUST BE KEPT OPEN AT ALL TIMES.
3. PIPE MATERIAL, JOINT, AND PROTECTIVE TREATMENT SHALL BE IN ACCORDANCE WITH SECTION 7.04 AND 9.05 OF THE WSDOT STANDARD SPECIFICATION FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, LATEST VERSION. SUCH MATERIALS INCLUDE THE FOLLOWING: LINED CORRUGATED POLYETHYLENE PIPE (LCP), ALUMINIZED TYPE 2 CORRUGATED STEEL PIPE AND PIPE ARCH (MEETS AASHTO DESIGNATIONS M274 AND M36), CORRUGATED OR SPIRAL RIB ALUMINUM PIPE, OR REINFORCED CONCRETE PIPE. CORRUGATED STEEL PIPE IS NOT ALLOWED.
4. FOOTING DRAINS SHALL NOT BE CONNECTED TO THE DETENTION SYSTEM.

Appendix C

TESC Plan and Details

Appendix D

BMPs Design Criteria and Maintenance Standards

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



ON-SITE DETENTION DESIGN REQUIREMENTS

General Requirements

This guidance applies only to projects that meet the thresholds specified below in “Is On-site Detention Required for My Project?” if all of the on-site stormwater BMPs included on List #1 and List #2 are determined to be infeasible for roofs and/or other hard surfaces.

Is On-site Detention Required For My Project?

YES, if my project:

- 1) Results in 2,000 square feet, or greater, of new plus replaced hard surface area, or
- 2) Has a land disturbing activity or 7,000 square feet or greater, or
- 3) Results in a **net increase** of impervious surface of 500 square feet or greater.

AND

- 1) All of the on-site stormwater BMPs included on List #1 and List #2 are determined to be infeasible for roofs and/or other hard surfaces, and
- 2) Drainage from the site will be discharged to a storm and surface water system that includes a watercourse or there is a capacity constraint in the system.

NO, if my project:

- 1) Results in less than 2,000 square feet of new plus replaced hard surface area, and
- 2) Has a land disturbing activity less than 7,000 square feet, and
- 3) Results in a **net increase of less than 500 square feet** of impervious surface area.
- 4) The project discharges **directly** to Lake Washington, or findings from a ¼-mile downstream analysis confirm that the downstream system is free of capacity constraints.

Designing Your On-Site Detention System

All on-site detention system designs must be prepared by a professional engineer registered in the State of Washington. The Standard On-site Detention System worksheet (Attachment 1) must be submitted on 18" x 24" (minimum) size sheets.

Construction that results in 500 to 9,500 square feet of new plus replaced impervious surfaces:

Size system according to Table 1. The configuration of the on-site detention system shall be as shown on Attachment 1 (Standard On-Site Detention Systems Worksheet) or as specifically designed by the engineer for the site.

Note:

- The applicant may pay a fee-in-lieu-of constructing an on-site detention system when allowed by the City Engineer. The fee will not be an option when in the opinion of the City Engineer, undetained runoff from the development may adversely exacerbate an existing problem (MICC 15.11) or if flow control is required by Minimum Requirement #7.
- **Construction that results in more than 9,500 square feet of new plus replaced impervious surfaces and/or exceeds a 100-year flow frequency of 0.15 cubic feet per second (for moderate and steep sloped sites greater than a 5% slope):** Size system according to Minimum Requirement #7 (Flow Control) in the Stormwater Management Manual for Western Washington (Ecology 2014).

Table 1

ON-SITE DETENTION DESIGN FOR PROJECTS BETWEEN 500 SF AND 9,500 SF NEW PLUS REPLACED IMPERVIOUS SURFACE AREA

New and Replaced Impervious Surface Area (sf)	Detention Pipe Diameter (in)	Detention Pipe Length (ft)		Lowest Orifice Diameter (in) ⁽³⁾		Distance from Outlet Invert to Second Orifice (ft)		Second Orifice Diameter (in)	
		B soils	C soils	B soils	C soils	B soils	C soils	B soils	C soils
500 to 1,000 sf	36"	30	22	0.5	0.5	2.2	2.0	0.5	0.8
	48"	18	11	0.5	0.5	3.3	3.2	0.9	0.8
	60"	11	7	0.5	0.5	4.2	3.4	0.5	0.6
1,001 to 2,000 sf	36"	66	43	0.5	0.5	2.2	2.3	0.9	1.4
	48"	34	23	0.5	0.5	3.2	3.3	0.9	1.2
	60"	22	14	0.5	0.5	4.3	3.6	0.9	0.9
2,001 to 3,000 sf	36"	90	66	0.5	0.5	2.2	2.4	0.9	1.9
	48"	48	36	0.5	0.5	3.1	2.8	0.9	1.5
	60"	30	20	0.5	0.5	4.2	3.7	0.9	1.1
3,001 to 4,000 sf	36"	120	78	0.5	0.5	2.4	2.2	1.4	1.6
	48"	62	42	0.5	0.5	2.8	2.9	0.8	1.3
	60"	42	26	0.5	0.5	3.8	3.9	0.9	1.3
4,001 to 5,000 sf	36"	134	91	0.5	0.5	2.8	2.2	1.7	1.5
	48"	73	49	0.5	0.5	3.6	2.9	1.6	1.5
	60"	46	31	0.5	0.5	4.6	3.5	1.6	1.3
5,001 to 6,000 sf	36"	162	109	0.5	0.5	2.7	2.2	1.8	1.6
	48"	90	59	0.5	0.5	3.5	2.9	1.7	1.5
	60"	54	37	0.5	0.5	4.6	3.6	1.6	1.4
6,001 to 7,000 sf	36"	192	128	0.5	0.5	2.7	2.2	1.9	1.8
	48"	102	68	0.5	0.5	3.7	2.9	1.9	1.6
	60"	64	43	0.5	0.5	4.6	3.6	1.8	1.5
7,001 to 8,000 sf	36"	216	146	0.5	0.5	2.8	2.2	2.0	1.9
	48"	119	79	0.5	0.5	3.8	2.9	2.2	1.7
	60"	73	49	0.5	0.5	4.5	3.6	2.0	1.6
8,001 to 8,500 sf ⁽¹⁾	36"	228	155	0.5	0.5	2.8	2.2	2.1	1.9
	48"	124	84	0.5	0.5	3.7	2.9	1.9	1.8
	60"	77	53	0.5	0.5	4.6	3.6	2.0	1.6
8,501 to 9,000 sf	36"	NA ⁽¹⁾	164	0.5	0.5	NA ⁽¹⁾	2.2	NA ⁽¹⁾	1.9
	48"	NA ⁽¹⁾	89	0.5	0.5	NA ⁽¹⁾	2.9	NA ⁽¹⁾	1.9
	60"	NA ⁽¹⁾	55	0.5	0.5	NA ⁽¹⁾	3.6	NA ⁽¹⁾	1.7
9,001 to 9,500 sf ⁽²⁾	36"	NA ⁽¹⁾	174	0.5	0.5	NA ⁽¹⁾	2.2	NA ⁽¹⁾	2.1
	48"	NA ⁽¹⁾	94	0.5	0.5	NA ⁽¹⁾	2.9	NA ⁽¹⁾	2.0
	60"	NA ⁽¹⁾	58	0.5	0.5	NA ⁽¹⁾	3.7	NA ⁽¹⁾	1.7

Notes:

▪ Minimum Requirement #7 (Flow Control) is required when the 100-year flow frequency causes a 0.15 cubic feet per second increase (when modeled in WWHM with a 15-minute timestep). Breakpoints shown in this table are based on a flat slope (0-5%). The 100-year flow frequency will need to be evaluated on a site-specific basis for projects on moderate (5-15%) or steep (> 15%) slopes.

- Soil type to be determined by geotechnical analysis or soil map.
- Sizing includes a Volume Correction Factor of 120%.
- Upper bound contributing area used for sizing.

⁽¹⁾ On Type B soils, new plus replaced impervious surface areas exceeding 8,500 sf trigger Minimum Requirement #7 (Flow Control)

⁽²⁾ On Type C soils, new plus replaced impervious surface areas exceeding 9,500 sf trigger Minimum Requirement #7 (Flow Control)

⁽³⁾ Minimum orifice diameter = 0.5 inches

in = inch

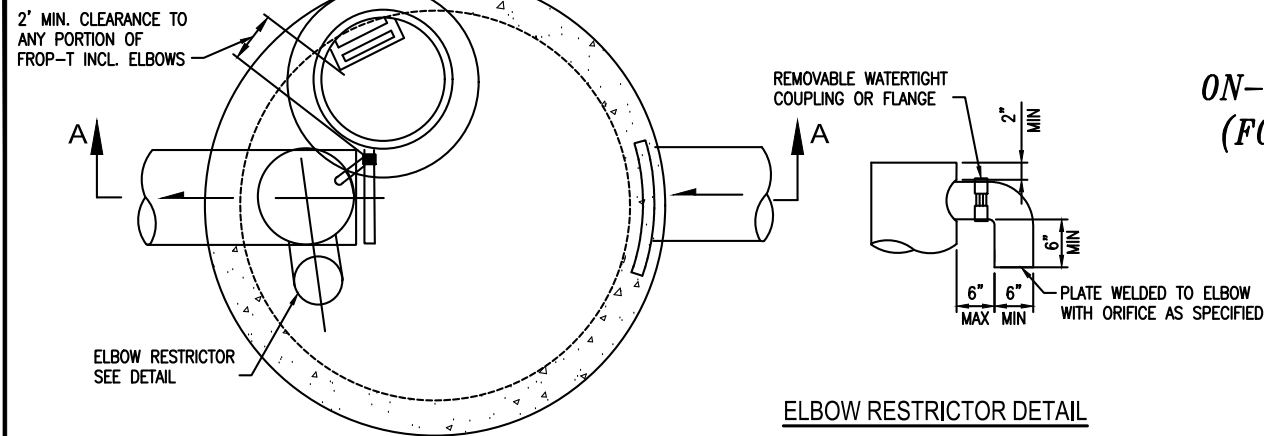
ft = feet

sf = square feet

Basis of Sizing Assumptions:

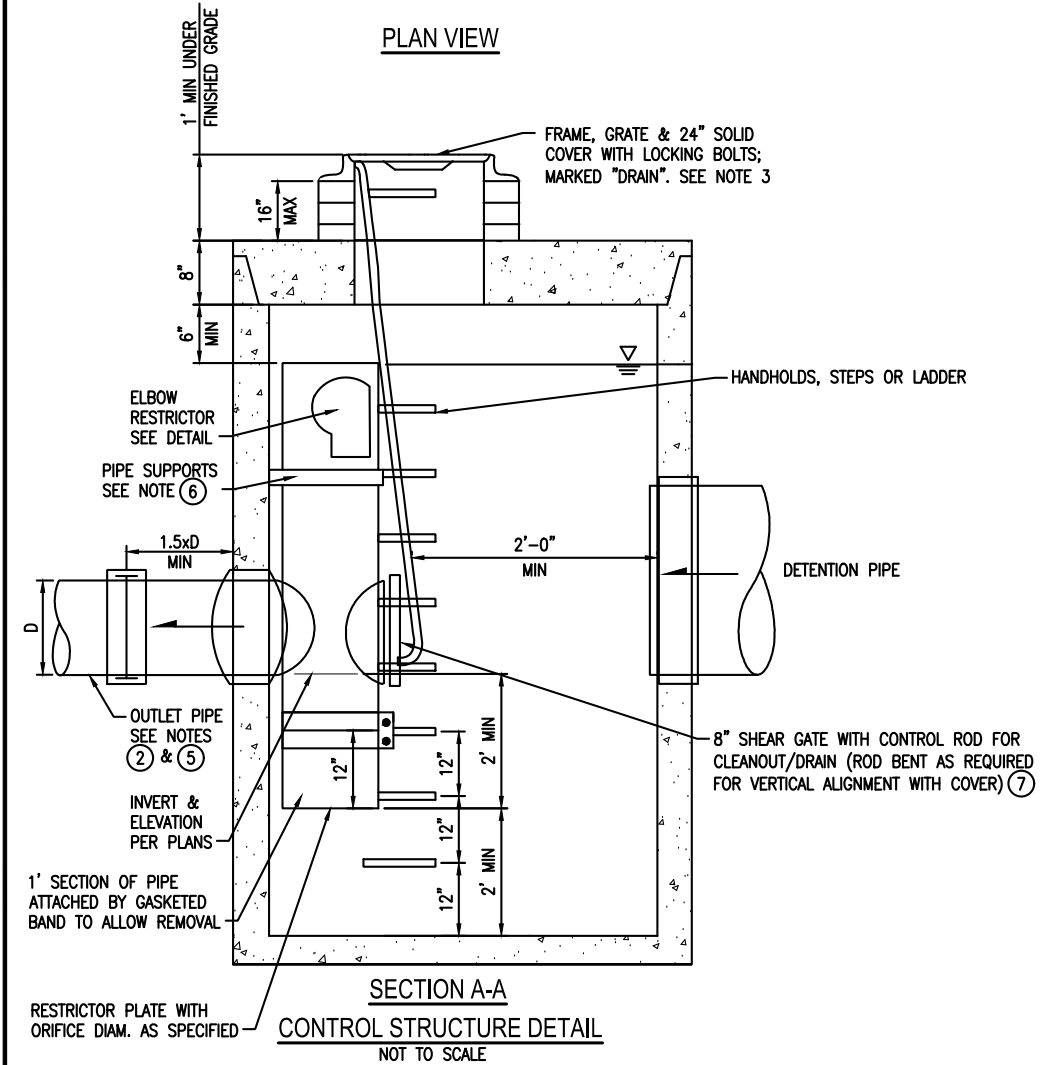
Sized per MR#5 in the Stormwater Management Manual for Puget Sound Basin (1992 Ecology Manual)
 SBUH, Type 1A, 24-hour hydrograph
 2-year, 24-hour storm = 2 in; 10-year, 24-hour storm = 3 in; 100-year, 24-hour storm = 4 in
 Predeveloped = second growth forest (CN = 72 for Type B soils, CN = 81 for Type C soils)
 Developed = impervious (CN = 98)
 0.5 foot of sediment storage in detention pipe
 Overland slope = 5%

ATTACHMENT 1
CITY OF MERCER ISLAND
ON-SITE DETENTION SYSTEM WORKSHEET
(FOR NEW PLUS REPLACED IMPERVIOUS
AREA OF 9,500 SF OR LESS)

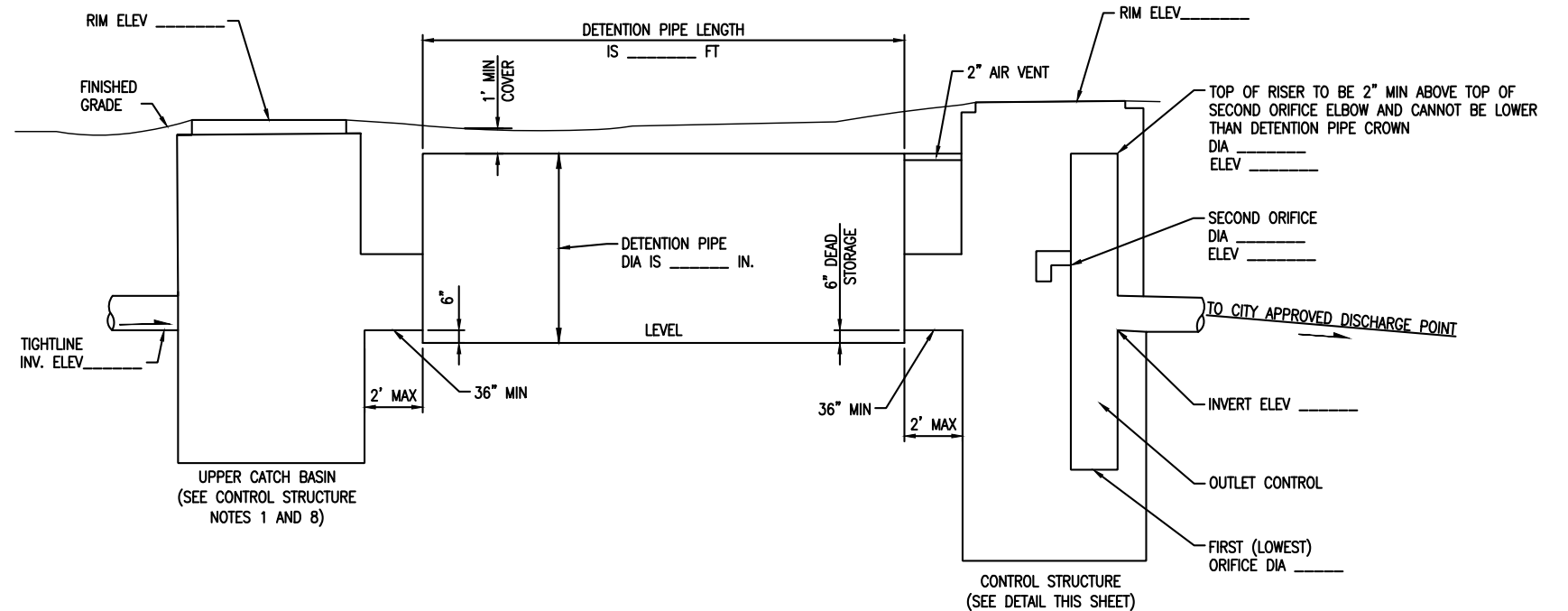


ELBOW RESTRICTOR DETAIL

OWNER: _____	ADDRESS: _____	PREPARED BY: _____
PERMIT #: _____	PHONE: _____	DATE: _____
NEW PLUS REPLACED IMPERVIOUS SURFACE AREA (SF): _____	DETENTION PIPE DIA (INCH): _____	DETENTION PIPE LENGTH (FT): _____
SOIL TYPE: _____	PIPE MATERIAL: _____	ORIFICE #1 DIA ____ INCH, ELEV _____
		ORIFICE #2 DIA ____ INCH, ELEV _____



SECTION A-A
CONTROL STRUCTURE DETAIL
 NOT TO SCALE



ON-SITE DETENTION SYSTEM
 NOT TO SCALE (ENGINEER TO FILL IN BLANKS)

CONTROL STRUCTURE NOTES:

- ① USE A MINIMUM OF A 54 IN. DIAM. TYPE 2 CATCH BASIN. THE ACTUAL SIZE IS DEPENDENT ON CONNECTING PIPE MATERIAL AND DIAMETER.
- ② OUTLET PIPE: MIN. 6 INCH.
- ③ METAL PARTS: CORROSION RESISTANT. NON-GALVANIZED PARTS PREFERRED. GALVANIZED PIPE PARTS TO HAVE ASPHALT TREATMENT 1.
- ④ FRAME AND LADDER OR STEPS OFFSET SO:
 - A. CLEANOUT GATE IS VISIBLE FROM TOP;
 - B. CLIMB-DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE;
 - C. FRAME IS CLEAR OF CURB.
- ⑤ IF METAL OUTLET PIPE CONNECTS TO CEMENT CONCRETE PIPE, OUTLET PIPE TO HAVE SMOOTH O.D. EQUAL TO CONCRETE PIPE I.D. LESS 1/4 IN.

- ⑥ PROVIDE AT LEAST ONE 3 X 0.090 GAUGE SUPPORT BRACKET ANCHORED TO CONCRETE WALL WITH 5/8 IN. STAINLESS STEEL EXPANSION BOLTS OR EMBEDDED SUPPORTS 2 IN. INTO CATCH BASIN WALL (MAXIMUM 3'-0" VERTICAL SPACING).
- ⑦ THE SHEAR GATE SHALL BE MADE OF ALUMINUM ALLOY IN ACCORDANCE WITH ASTM B 26M AND ASTM B 275, DESIGNATION ZG32A; OR CAST IRON IN ACCORDANCE WITH ASTM A 48, CLASS 30B. THE LIFT HANDLE SHALL BE MADE OF A SIMILAR METAL TO THE GATE (TO PREVENT GALVANIC CORROSION), IT MAY BE OF SOLID ROD OR HOLLOW TUBING, WITH ADJUSTABLE HOOK AS REQUIRED. A NEOPRENE RUBBER GASKET IS REQUIRED BETWEEN THE RISER MOUNTING FLANGE AND THE GATE FLANGE. INSTALL THE GATE SO THAT THE LEVEL-LINE MARK IS LEVEL WHEN THE GATE IS CLOSED. THE MATING SURFACES OF THE LID AND THE BODY SHALL BE MACHINED FOR PROPER FIT. ALL SHEAR GATE BOLTS SHALL BE STAINLESS STEEL.
- ⑧ THE UPPER CATCH BASIN IS REQUIRED IF THE LENGTH OF THE DETENTION PIPE IS GREATER THAN 50 FT.

ON-SITE DETENTION SYSTEM NOTES:

1. CALL DEVELOPMENT SERVICES (206-275-7605) 24 HOURS IN ADVANCE FOR A DETENTION SYSTEM INSPECTION BEFORE BACKFILLING AND FOR FINAL INSPECTIONS.
2. RESPONSIBILITY FOR OPERATION AND MAINTANANCE OF DRAINAGE SYSTEMS ON PRIVATE PROPERTY IS RESPONSIBILITY OF THE PROPERTY OWNER. MATERIAL ACCUMULATED IN THE STORAGE PIPE MUST BE REMOVED FROM CATCH BASINS TO ALLOW PROPER OPERATION. THE OUTLET CONTROL ORIFICE MUST BE KEPT OPEN AT ALL TIMES.
3. PIPE MATERIAL, JOINT, AND PROTECTIVE TREATMENT SHALL BE IN ACCORDANCE WITH SECTION 7.04 AND 9.05 OF THE WSDOT STANDARD SPECIFICATION FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, LATEST VERSION. SUCH MATERIALS INCLUDE THE FOLLOWING, LINED CORRUGATED POLYETHYLENE PIPE (LCPE), ALUMINIZED TYPE 2 CORRUGATED STEEL PIPE AND PIPE ARCH (MEETS AASHTO DESIGNATIONS M274 AND M36), CORRUGATED OR SPIRAL RIB ALUMINUM PIPE, OR REINFORCED CONCRETE PIPE. CORRUGATED STEEL PIPE IS NOT ALLOWED.
4. FOOTING DRAINS SHALL NOT BE CONNECTED TO THE DETENTION SYSTEM.

Compliance Methods

LID Performance Standard

The LID Performance Standard compliance method for Minimum Requirement #5 requires modeling the proposed Flow Control BMPs to demonstrate the flow reduction as described below. Note that in order to meet the LID Performance Standard, the chosen Flow Control BMPs will most likely need to include infiltration.

Stormwater discharges shall match developed discharge durations to pre-developed durations for the range of pre-developed discharge rates from 8% of the 2-year peak flow to 50% of the 2-year peak flow. Refer to the [Flow Control Performance Standard](#) section in [I-3.4.7 MR7: Flow Control](#) for information about the assignment of the pre-developed condition. Project sites that must also meet [I-3.4.7 MR7: Flow Control](#) must match flow durations between 8% of the 2-year flow through the full 50-year flow.

Designers selecting this option cannot use [BMP T5.14: Rain Gardens](#) to achieve the LID Performance Standard. They may choose to use [BMP T7.30: Bioretention](#) to achieve the LID Performance Standard.



The text in this box originates from one or more of the following Permits:
Appendix 1 of the Phase I / Phase II Municipal Stormwater Permits
Construction Stormwater General Permit

The List Approach

The List Approach compliance method for Minimum Requirement #5 requires evaluating the BMPs in [Table I-3.2: The List Approach for MR5 Compliance](#).

For each surface, evaluate the feasibility of the BMPs in the order listed, and use the first BMP that is considered feasible. The designer must document the site conditions and infeasibility criteria used to deem BMPs infeasible. Once a BMP is deemed feasible and used for a surface, no other BMP from the list is necessary for that surface.

If all BMPs in the list are infeasible, then the designer must document the site conditions and infeasibility criteria used to deem each BMP infeasible. This documentation will demonstrate compliance with Minimum Requirement #5.

Feasibility shall be determined by evaluation against:

- Design criteria, limitations, and infeasibility criteria identified for each BMP in this manual; and
- Competing Needs Criteria as listed below.



The text in this box originates from one or more of the following Permits:
Appendix 1 of the Phase I / Phase II Municipal Stormwater Permits
Construction Stormwater General Permit

Table I-3.2: The List Approach for MR5 Compliance

List #1 (For MR #1 - #5 Projects That Are Not Flow Control Exempt)	List #2 (For MR #1 - #9 Projects That Are Not Flow Control Exempt)	List #3 (For Flow Control Exempt Projects)
Surface Type: Lawn and Landscaped Areas		
BMP T5.13: Post-Construction Soil Quality and Depth	BMP T5.13: Post-Construction Soil Quality and Depth	BMP T5.13: Post-Construction Soil Quality and Depth
Surface Type: Roofs		
1. BMP T5.30: Full Dispersion or BMP T5.10A: Downspout Full Infiltration	1. BMP T5.30: Full Dispersion or BMP T5.10A: Downspout Full Infiltration	1. BMP T5.10A: Downspout Full Infiltration
2. BMP T5.14: Rain Gardens or BMP T7.30: Bioretention	2. BMP T7.30: Bioretention	2. BMP T5.10B: Downspout Dispersion Systems
3. BMP T5.10B: Downspout Dispersion Systems	3. BMP T5.10B: Downspout Dispersion Systems	3. BMP T5.10C: Perforated Stub-out Connections
4. BMP T5.10C: Perforated Stub-out Connections	4. BMP T5.10C: Perforated Stub-out Connections	
Surface Type: Other Hard Surfaces		
1. BMP T5.30: Full Dispersion	1. BMP T5.30: Full Dispersion	BMP T5.12: Sheet Flow Dispersion or BMP T5.11: Concentrated Flow Dispersion
2. BMP T5.15: Permeable Pavements or BMP T5.14: Rain Gardens or BMP T7.30: Bioretention	2. BMP T5.15: Permeable Pavements	
3. BMP T5.12: Sheet Flow Dispersion or BMP T5.11: Concentrated Flow Dispersion	3. BMP T7.30: Bioretention 4. BMP T5.12: Sheet Flow Dispersion or BMP T5.11: Concentrated Flow Dispersion	
Notes for using the List Approach: 1. Size BMP T5.14: Rain Gardens and BMP T7.30: Bioretention used in the List Approach to have a minimum horizontal projected surface area below the overflow which is at least 5% of the area drain-		

Table I-3.2: The List Approach for MR5 Compliance (continued)

List #1 (For MR #1 - #5 Projects That Are Not Flow Control Exempt)	List #2 (For MR #1 - #9 Projects That Are Not Flow Control Exempt)	List #3 (For Flow Control Exempt Pro- jects)
<p>ing to it.</p> <p>2. When the designer encounters BMP T5.15: Permeable Pavements in the List Approach, it is not a requirement to pave these surfaces. Where pavement is proposed, it must be permeable to the extent feasible unless BMP T5.30: Full Dispersion is employed.</p>		

Objective

The objective of On-Site Stormwater Management is to use practices distributed across a development that reduce the amount of disruption of the natural hydrologic characteristics of the site.

Competing Needs Criteria

LID BMPs can be superseded or restricted where they are in conflict with:

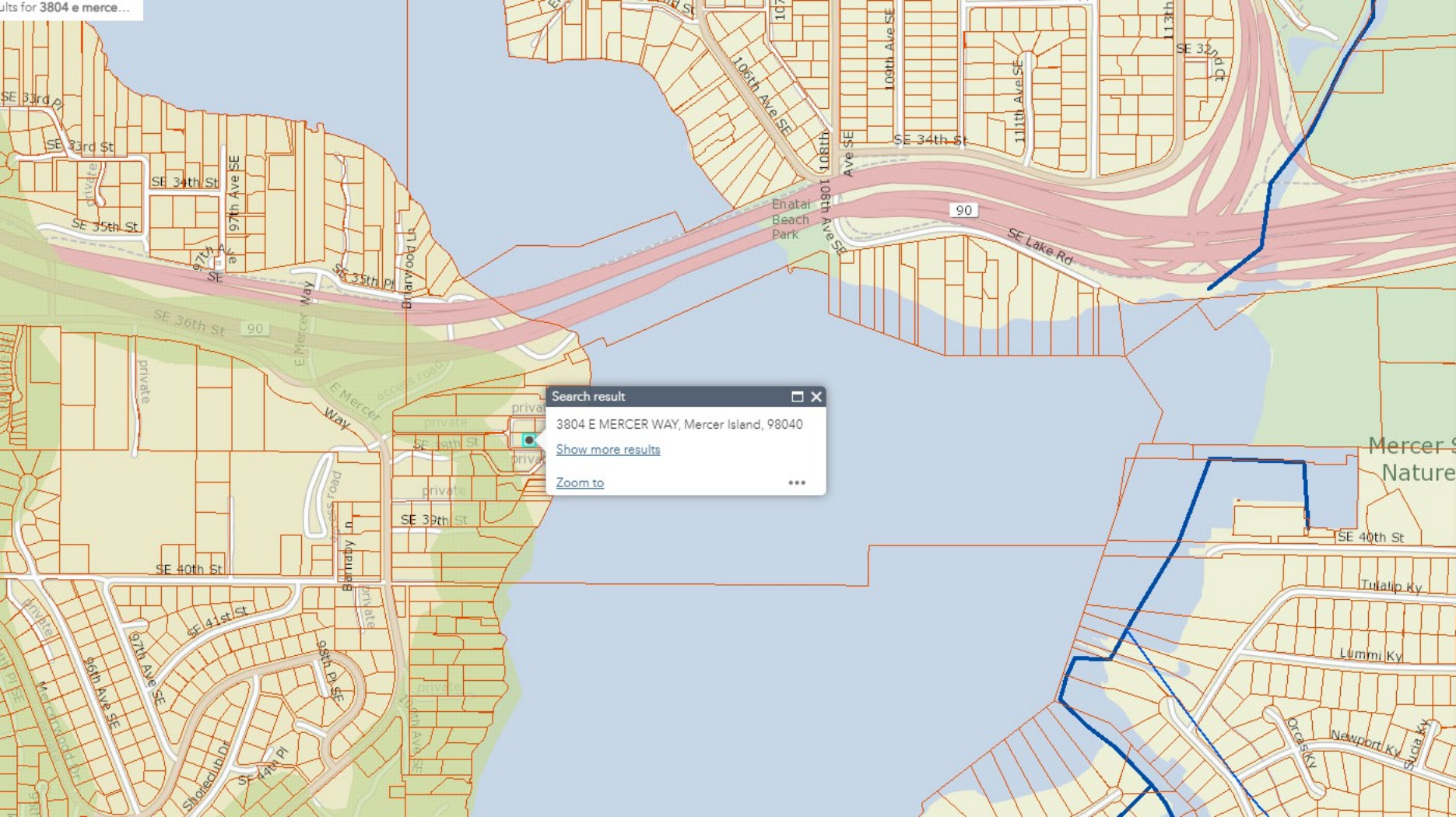
- Requirements of the following federal or state laws, rules, and standards:
 - Historic Preservation Laws and Archaeology Laws as listed at <https://dahp.wa.gov/project-review/preservation-laws>,
 - Federal Superfund or Washington State Model Toxics Control Act,
 - Federal Aviation Administration requirements for airports,
 - Americans with Disabilities Act.
- When an LID requirement has been found to be in conflict with special zoning district design criteria adopted and being implemented pursuant to a community planning process. The existing local codes may supersede or reduce the LID requirement.
- Public health and safety standards (e.g. active zone of a skate park, bike park, or sport court where permeable pavement violates safety standards).
- Transportation regulations to maintain the option for future expansion or multi-modal use of public rights-of-way.
- A local Critical Area Ordinance that provides protection of tree species.
- A local code or rule adopted as part of a Wellhead Protection Program established under the Federal Safe Drinking Water Act; or adopted to protect a Critical Aquifer Recharge Area established under the State Growth Management Act.

Supplemental Guidelines

In order to meet the LID Performance Standard, designers may use any Flow Control BMP in the SWMMWW. There are no specific Flow Control BMPs that must be used to meet the LID Performance Standard.

Appendix E

Sensitive Areas Map



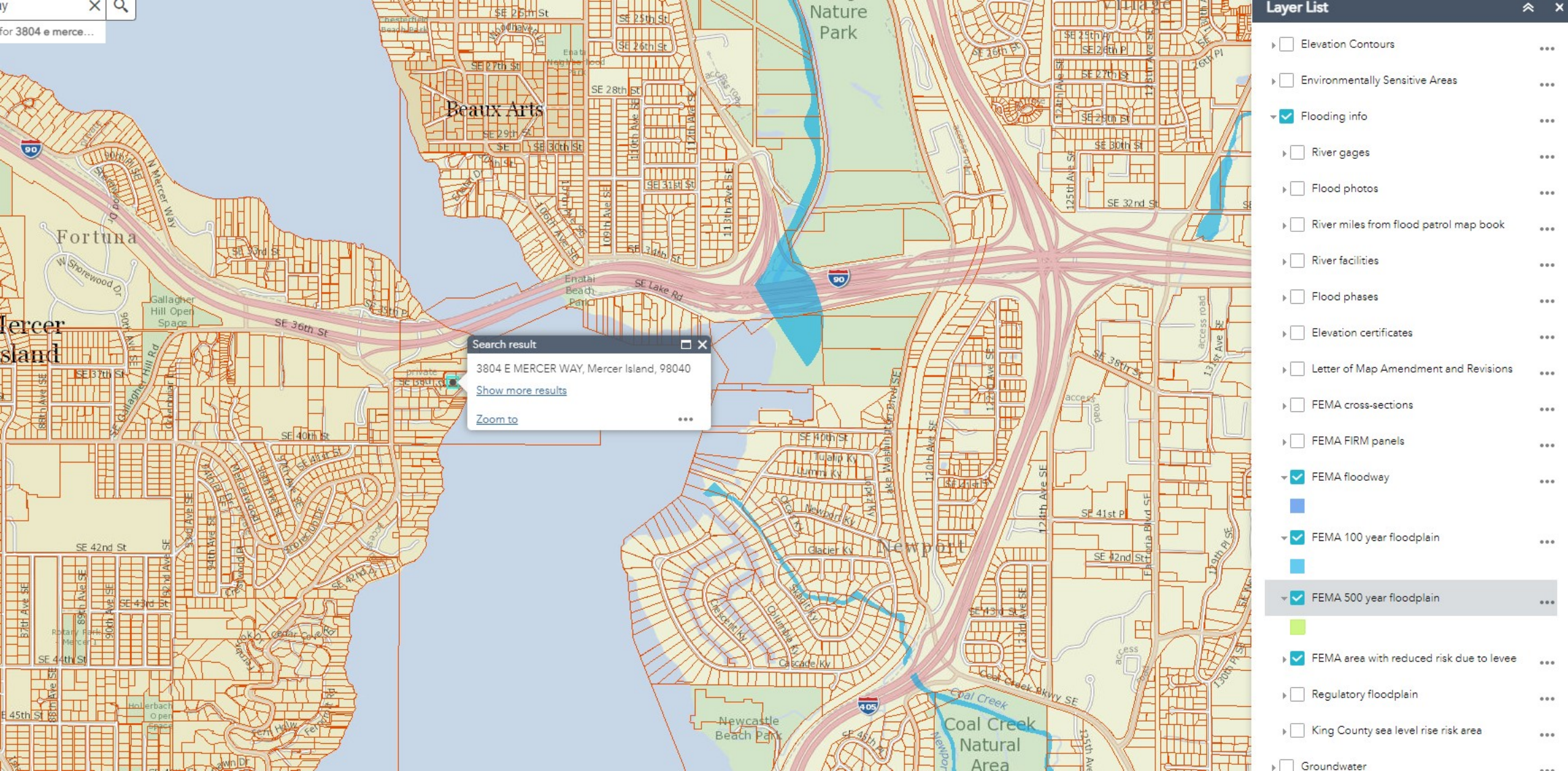
Search result

3804 E MERCER WAY, Mercer Island, 98040

[Show more results](#)

[Zoom to](#)

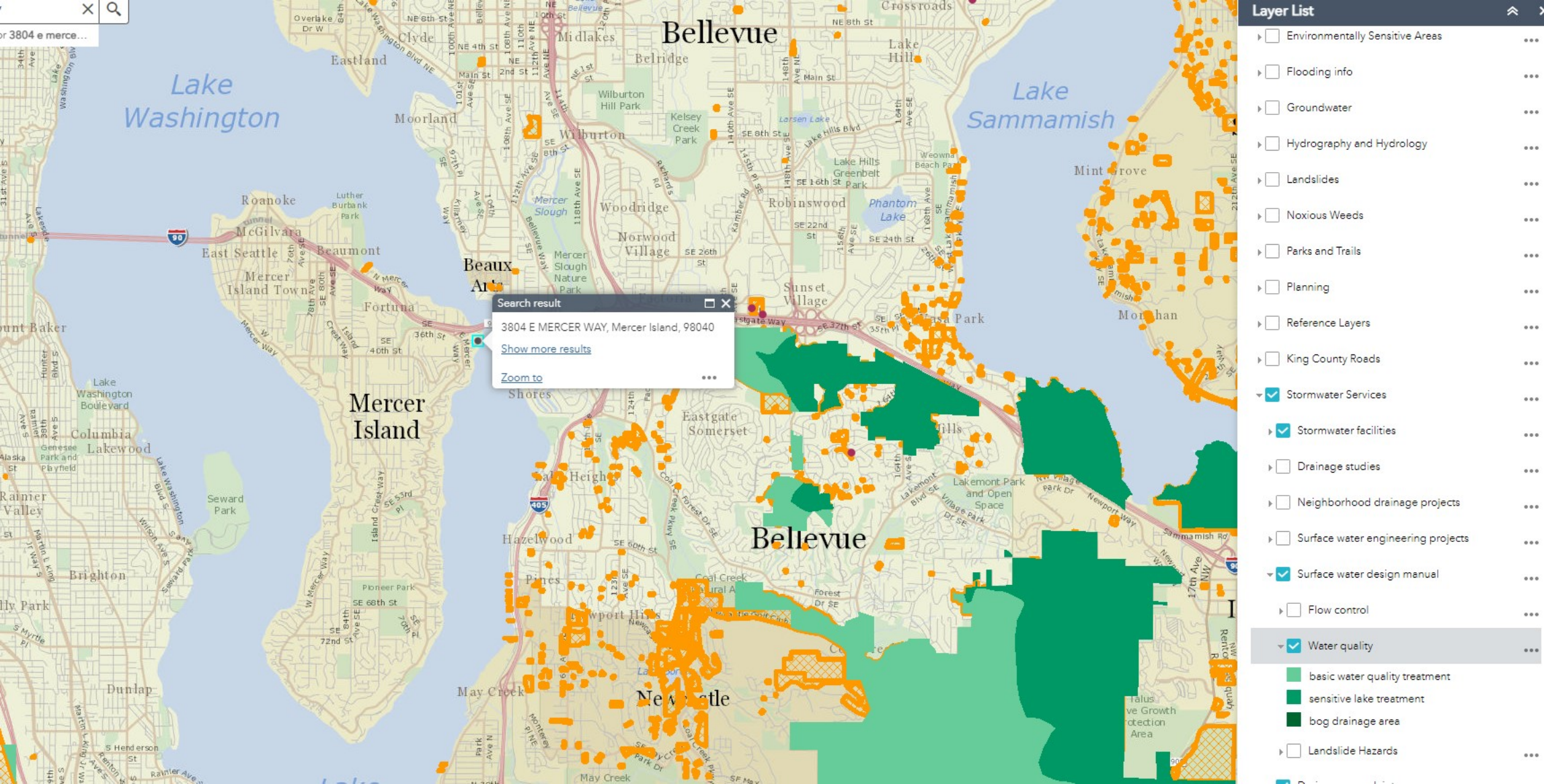
- Elevation Contours
- Environmentally Sensitive Areas
- Tributary basins (2005 CAO)
- Potential landslide hazard areas (2016, see explanation-->)
- Potential landslide hazard areas 50-foot buffer (2016)
- Landslide hazards, incorporated KC (1990)
- Potential steep slope hazard areas (2016, see explanation-->)
- Basin condition (2005 CAO)
- Shoreline condition (2005 CAO)
- Erosion hazard (1990 SAO)
- Seismic hazard (1990 SAO)
- Coal mine hazard (1990 SAO)
- Stream (1990 SAO)
 - class 1
 - class 2 perennial
 - class 2 salmonid
 - class 3
 - unclassified
- Wetland (1990 SAO)



for 3804 e merce...

Search result
3804 E MERCER WAY, Mercer Island, 98040
[Show more results](#)
[Zoom to](#)

- Elevation Contours ...
- Environmentally Sensitive Areas ...
- Flooding info ...
- River gages ...
- Flood photos ...
- River miles from flood patrol map book ...
- River facilities ...
- Flood phases ...
- Elevation certificates ...
- Letter of Map Amendment and Revisions ...
- FEMA cross-sections ...
- FEMA FIRM panels ...
- FEMA floodway ...
- FEMA 100 year floodplain ...
- FEMA 500 year floodplain ...
- FEMA area with reduced risk due to levee ...
- Regulatory floodplain ...
- King County sea level rise risk area ...
- Groundwater ...



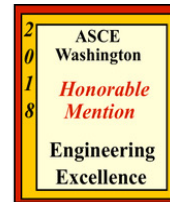
Search result
3804 E MERCER WAY, Mercer Island, 98040
[Show more results](#)
[Zoom to](#)

- Environmentally Sensitive Areas
- Flooding info
- Groundwater
- Hydrography and Hydrology
- Landslides
- Noxious Weeds
- Parks and Trails
- Planning
- Reference Layers
- King County Roads
- Stormwater Services
 - Stormwater facilities
 - Drainage studies
 - Neighborhood drainage projects
 - Surface water engineering projects
- Surface water design manual
 - Flow control
- Water quality
 - basic water quality treatment
 - sensitive lake treatment
 - bog drainage area
- Landslide Hazards

Appendix F

Geotechnical Report

November 26, 2022
Project No. 2DK0233995



Chunling Ou
chunling.office@gmail.com

Re: Geotechnical Infiltration Study
Proposed Single Family House
3804 E Mercer Way
Mercer Island, WA 98040

Dear Chunling:

At your request, we have conducted a subsurface investigation at the above referenced site. We understand that a residential building is proposed for construction on the site. The purpose of this study was to perform field tests in a specified area at the site to evaluate soil and groundwater conditions, conducted a small-scale Pilot Infiltration Test (PIT) and prepare a summary letter evaluating whether the site soils are suitable for civil engineering design of stormwater infiltration.

The scope of this study to date has included:

1. Observing two (2) test holes to maximum depth of 5.0'.
2. Logging, and interpreting soil, ground water, and subsurface conditions;
3. Preparing a report with recommendations for feasibility of soil infiltration.

SITE CONDITIONS: The subject property is located at 3804 E Mercer Way, Mercer Island, Washington, to east of E Mercer Way. The site has existing house with a detached garage. The backyard is a grass lawn with gentle slope towards to the lake.

Adjacent lots around the site are developed residential neighborhoods. The project location and vicinity is shown in Figure 1 and the site plan in Figure 2 in Appendix.

GEOLOGIC BACKGROUND: The project area is located in the Northern Puget lowlands. This area was invaded by glacial ice at least three times during the Pleistocene Epoch, about 1.6 million to 10,000 years ago. The site is mapped as Pleistocene continental glacial till according to the 1:250,000 Washington Interactive Geological Map. The soils are described as Qgt - Pleistocene till, which is unsorted, unstratified, highly compacted mixture of clay, silt, sand, gravel, and boulders deposited by glacial ice; may contain interbedded stratified sand, silt, and gravel.

SURFACE AND GROUNDWATER CONDITIONS: No groundwater seepage was observed in test pits excavated at 11/26/2022. No surface water was observed during our site visit.

SOIL CONDITIONS: Soil conditions were investigated by conducting two (2) test pits. For detailed soil observations, please refer to Figures 4 and 5 in Appendix; a USCS soil classification chart is provided in Figure 3 in Appendix. Native soils were generally consistent with findings of all test pit locations. Subsurface soil conditions are summarized as follows, from top to bottom:

- a. 0' - 2' Topsoil (OL)/Fill
- b. 2' - 5' Clayey Sands with Gravel (Till)

a. Topsoil (OL)/Fill

Dark brown, sandy silt topsoil with grass roots was encountered at the surface in TP#1. The black silty sand and some bricks was found in TP#2. This soil ranged from 0" to 2' thick, damp, and moderately loose.

b. Clayey Sands with Gravel (Till)

The clayey sands underlying topsoil extends to excavation depth of ~5'. The soil is light brown to gray, stiff to hard, damp.

CONCLUSIONS: Based on the findings of our study, it is our opinion and conclusion that site soil and subsurface conditions observed are not suitable for on site stormwater infiltration. This is due primarily to hard TILL soil from depth ~2' to ~5'. And the onsite TILL soil layer is within 3 feet of the base of infiltration basins or trench systems according to the 2014 Stormwater Management Manual for Western Washington, Volume III, Section 3.3.7 - Site Suitability Criteria, SSC-5 *Depth to Bedrock, Water Table, or Impermeable Layer*. Therefore, project stormwater runoff will need to be directed to a controlled detention/release stormwater facility.

Thank you for this opportunity to work with you on this project. Please contact us at (425) 454-2133 if you have any questions.

Sincerely,



November 26, 2022

Austin X. Huang, Ph.D., P.E., L.G., D.GE., F.ASCE
Principal
F.ASCE: Fellow - American Society of Civil Engineering
D.GE - Diplomate - Academy of GeoProfessionals

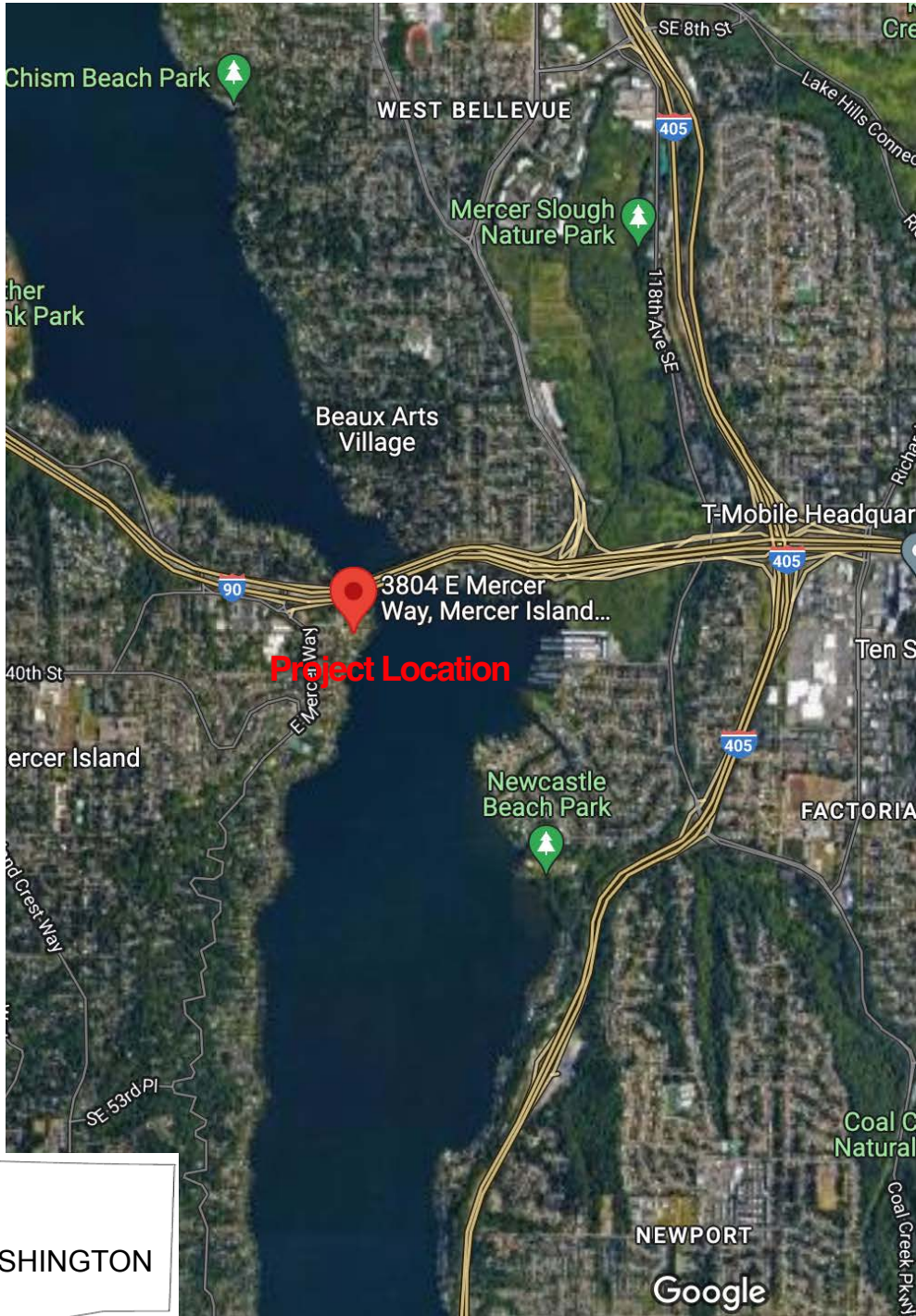
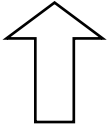
D.GEs provide successful projects that benefit their clients.

The D.GE certification recognizes geotechnical engineers who possess specialty education, extensive experience, integrity, and good judgment.

Appendix

Figure 1 Project Location and Vicinity
Figure 2 Site Plan
Figure 3 USCS Soils Classification Chart
Figures 4 and 5 Test Pit Logs

MERCER ISLAND, WASHINGTON



Project No. 2DK0233995

PROJECT LOCATION & VICINITY MAP

Date: 11/26/2022

Figure 1

Proposed Single Family House
3804 R Mercer Way
Mercer Island, Washington 98040



MERIT ENGINEERING INC.

10129 Main Street, #201
Bellevue, Washington 98004
Telephone: (425) 454-2133
<http://www.MeritEngineering.com>

Prepared For: Chunling Ou



LEGEND

⊙ FOUND MONUMENT AS DESCRIBED	—○— OVERHEAD POWER
⊙ FOUND MARK AS DESCRIBED	—○— OVERHEAD UTILITY
⊗ TACK IN LEAD POUND	—○— OVERLINE FENCE
⊙ SET OF 2.0" BUSH ROD WITH YELLOW PLASTIC CAP	—○— WOOD FENCE
⊙ FOUND METER	—○— CONCRETE WALL
⊙ UTILITY POLE	—○— ROOFTOP
⊙ GAS METER	—○— ASPHALT SURFACE
⊙ CATCH BASIN	—○— CONCRETE SURFACE
⊙ SANITARY MANHOLE	—○— BRICK SURFACE
⊙ WATER VALVE	—○— CEDAR
⊙ FIRE HYDRANT	—○— DECIDUOUS
⊙ WATER METER	—○— HOLLY
—○— APPROPRIATE LOCATION SANITARY SERVICE LINE	—○— MAPLE
—○— APPROPRIATE LOCATION SEWER SERVICE LINE	* INDICATES MULTI-TRUNK

LEGAL DESCRIPTION
 LOT 10, DOYLE HARSHEN ADDITION TO THE CITY OF SEATTLE, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 19 OF PLATS, PAGE 24, IN KING COUNTY, WASHINGTON.
 SITUATE IN THE CITY OF MERCER ISLAND, COUNTY OF KING, STATE OF WASHINGTON.

BASIS OF BEARINGS
 THE PLAT OF DOYLE HARSHEN ADDITION TO THE CITY OF SEATTLE, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 19 OF PLATS, PAGE 24, IN KING COUNTY, WASHINGTON.

PROJECT INFORMATION

SURVEYOR:	SITE SURVEYING, INC. 2300 NE 15TH ST BELLINGHAM, WA 98225 PHONE: 425.834.4412
PROPERTY OWNER:	OU CHUNLING & FANG HONG 3804 E MERCER WAY MERCER ISLAND, WA 98040
TAX PARCEL NUMBER:	37096-010
PROJECT ADDRESS:	3804 E MERCER WAY MERCER ISLAND, WA 98040
ZONING:	R-3A
JURISDICTION:	CITY OF MERCER ISLAND
PARCEL ADDRESS:	11.00 AC. (0.25 ACRES) AS SHOWN

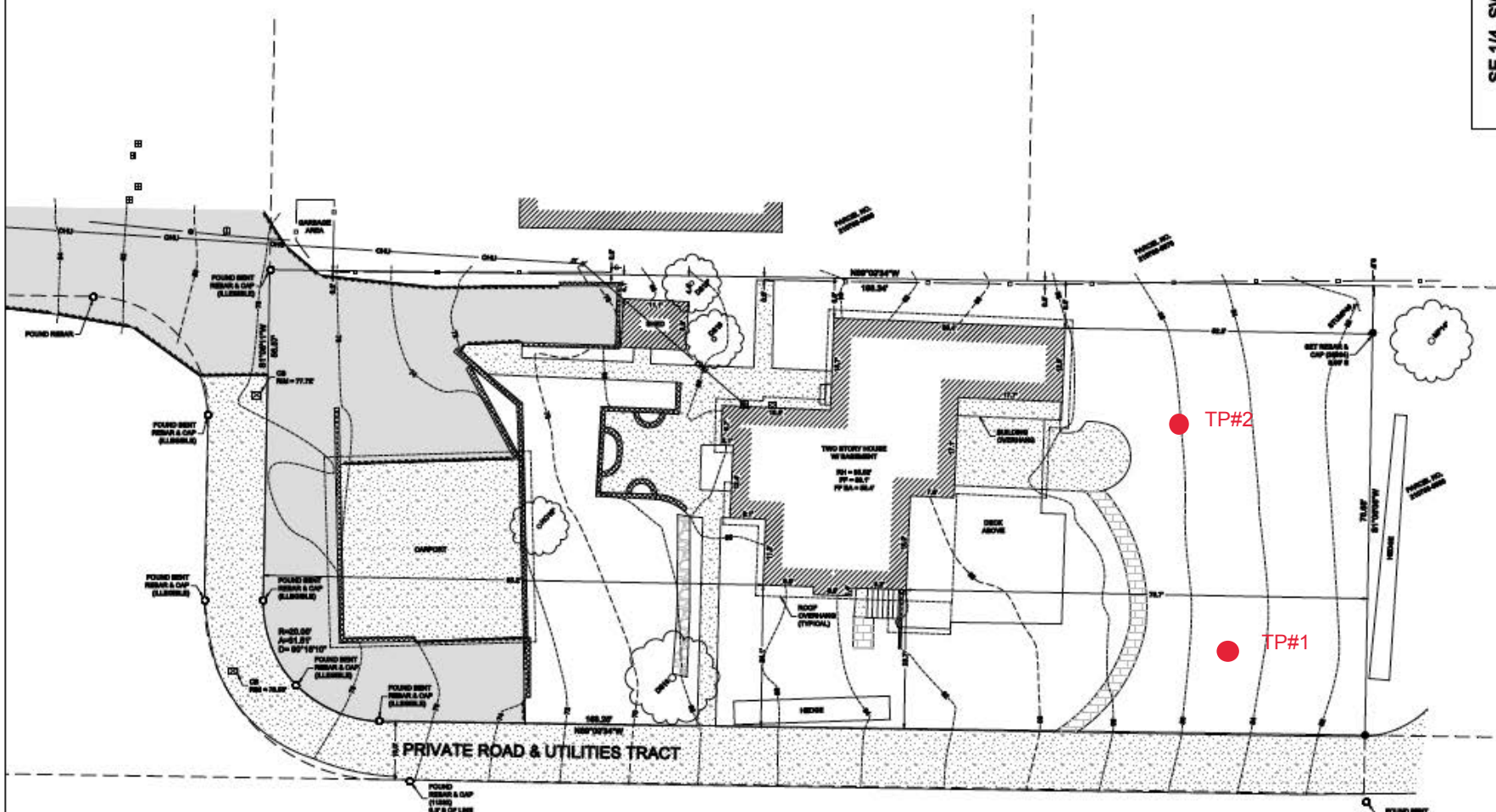
GENERAL NOTES

- THIS SURVEY WAS BASED ON ORIGINAL TITLE COMPANY OF WASHINGTON ORDER NUMBER 014444-04 DATED DECEMBER 14, 2016.
- INSTRUMENTATION FOR THIS SURVEY WAS A SECOND SPECTROPRECISION FOCUS-SH TOTAL STATION. PROCEDURES USED IN THIS SURVEY MEET OR EXCEED REQUIREMENTS SET BY WAC 163-10-010.
- THE INFORMATION ON THIS MAP REPRESENTS THE RESULTS OF A SURVEY MADE IN APRIL 2022 AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITIONS EXISTING AT THAT TIME.
- UTILITIES SHOWN ON THIS SURVEY ARE BASED UPON ABOVE CROKING CONDUIT RECORDS AND AN 8" x 11" PLUMP INVERT ANALYSIS. ACTUAL LOCATIONS OF UNDERGROUND UTILITIES MAY VARY AND UTILITIES NOT SHOWN ON THIS SURVEY MAY EXIST ON THIS SITE.
- ALL MONUMENTS WERE LOCATED DURING THIS SURVEY UNLESS OTHERWISE NOTED.

VERTICAL DATUM & CONTOUR INTERVAL
 ELEVATIONS SHOWN ON THIS DRAWING ARE ON AN ADJUSTED DATUM.
 2' CONTOUR INTERVAL - THE SPECIFIED VERTICAL ACCURACY IS EQUAL TO OR BETTER THAN THE CONTOUR INTERVAL OR PLAN SCALE 1/4" FOR THIS PROJECT.



VICINITY MAP
NTS



SE 1/4, SW 1/4, SEC 24, TWP 25N, RNG 3E, W.M.



DATE	
REVISION	
DESCRIPTION	
DATE	

TOPOGRAPHIC SURVEY
 OU CHUNLING & FANG HONG
 3804 E MERCER WAY
 MERCER ISLAND, WA 98040

PROJECT NO. 20-127

DRAWN BY: EFJ
 CHECKED BY: TNW
 DATE: 8/16/22
 SHEET 1 OF 1



MERCER ISLAND, WASHINGTON

Note:
 The site plan was based on the map from Site Surveying, Inc.

Proposed Single Family House 3804 R Mercer Way Mercer Island, Washington 98040	SITE PLAN			
	<i>Figure 2</i>	PROJECT NO.	DATE	APPROVED BY
Prepared For: Chunling Ou	Scale: Not to Scale	2DK0233995	11/26/2022	AXH

MERIT ENGINEERING INC.
 10129 Main Street #201
 Bellevue, Washington 98004
 Telephone: (425) 454-2133
<http://www.MeritEngineering.com>

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		DESCRIPTION		
COARSE GRAINED SOILS more than 50% retained on #200 sieve	GRAVELS more than 50% coarse fraction is larger than No. 4 sieve size	Gravels with less than 5% fines	GW Well graded gravels, gravel-sand mixtures	
		Gravels with more than 12% fines	GP Poorly graded gravels, gravel-sand mixtures	
		Gravels with less than 5% fines	GM Silty gravels, gravel-sand-silt mixtures	
		Gravels with more than 12% fines	GC Clayey gravels, gravel-sand-clay mixtures	
	SANDS more than 50% coarse fraction is smaller than No. 4 sieve size	Sands with less than 5% fines	SW Well graded sands, gravelly sands	
		Sands with more than 12% fines	SP Poorly graded sands, gravelly sands	
		Sands with less than 5% fines	SM Silty sands, sand-silt mixtures	
		Sands with more than 12% fines	SC Clayey sands, sand-clay mixtures	
		SILTS AND CLAYS Liquid Limit less than 50		ML Inorganic silts & very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity
		SILTS AND CLAYS Liquid Limits greater than 50		CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, or lean clays
HIGHLY ORGANIC SOILS		PT Peat and other highly organic soils		
UNCONTROLLED FILL		Uncontrolled, with highly variable constituents		

LEGEND

SAMPLE	SYMBOL
SPLIT SPOON SAMPLER	GROUNDWATER TABLE
SHELBY TUBE SAMPLER	PENETROMETER READING TSF (<i>tons per square foot</i>)



MERIT ENGINEERING INC.

2715 Meridian Street
 Bellingham, Washington 98225
 Telephone: (360) 738-6083
 Fax: (360) 738-1499
<http://www.MeritEngineering.com>

SOIL CLASSIFICATION & LEGEND

Figure 3

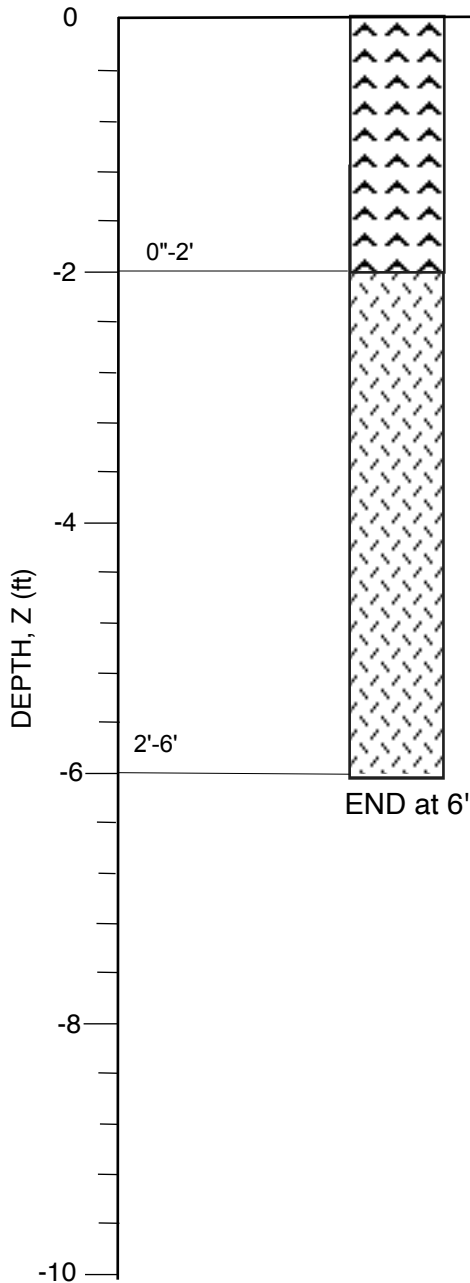
TP - 1

Surface Elevation ≈

X =

Y =

SOIL DESCRIPTION AND CLASSIFICATION



TOPSOIL (OL)

Black organic silty sand with grassroots moist, loose

CLAYEY SANDS WITH GRAVEL (TILL)

Gray clayey sand with gravel, very stiff to hard, and damp.

Project No. 2DK0233995

Date: 11/26/2022

Approved by AH

Figure 4

Proposed Single Family House
3804 R Mercer Way
Mercer Island, Washington 98040

Prepared For: Chunling Ou



MERIT ENGINEERING INC.

10129 Main Street #201
Bellevue, Washington 98004

Telephone: (425) 454-2133

<http://www.MeritEngineering.com>

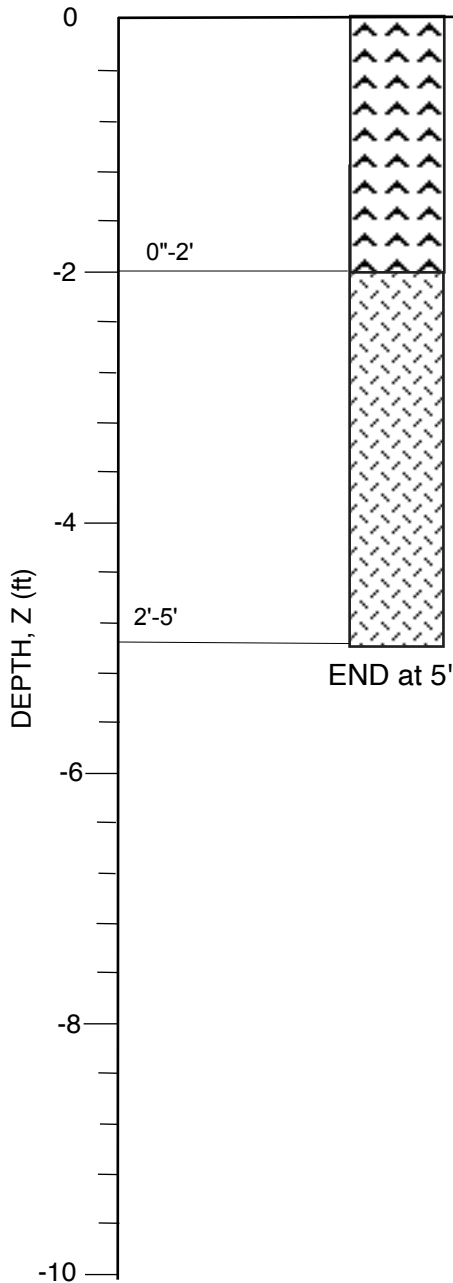
TP - 2

Surface Elevation ≈

X =

Y =

SOIL DESCRIPTION AND CLASSIFICATION



Fill

Black organic silty sand with grassroots moist, loose, and some bricks.

CLAYEY SANDS WITH GRAVEL (TILL)

Gray clayey sand with gravel, very stiff to hard, and damp.

Project No. 2DK0233995

Date: 11/26/2022

Approved by AH

Figure 5

Proposed Single Family House
3804 R Mercer Way
Mercer Island, Washington 98040

Prepared For: Chunling Ou



MERIT ENGINEERING INC.

10129 Main Street #201

Bellevue, Washington 98004

Telephone: (425)454-2133

<http://www.MeritEngineering.com>