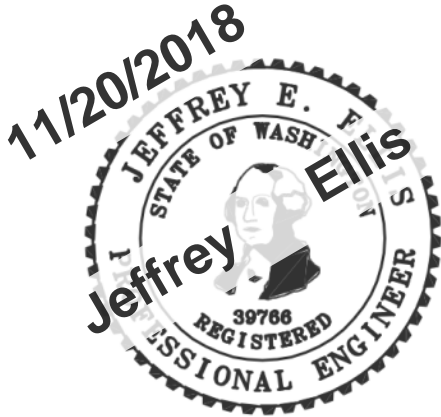


MR 1-9 Storm Drainage Summary



Wallace 2-Lot
Preliminary Short Plat
by RKK Construction

3633 90th Ave SE
Mercer Island, WA 98040

6,720 SF maximum (40% lot area)
(NEW & REPLACED Impervious)

November 20, 2018

Prepared by Stephenie Seawall
Checked by Duffy Ellis, PE

General:

This site's new and replaced impervious area is **ABOVE** 5,000 sf, site is subject to minimum requirements MR1-9 identified below.

MR1 = Preparation of Storm Water Site Plans	See C2.0 Drainage Plan
MR2 = Construction Storm Water Pollution Prevention Plan	See future C1.0 Erosion Control (TESCP) Plan in plan set.
MR3 = Source Control of Pollution	See future C1.0 for erosion control measures recommended to mitigate erosion and sediment discharge from site during construction phase.
MR4 = Preservation of Natural Drainage Systems and Outfalls	<p>Development of this short plat will substantially maintain existing drainage patterns in this area. Runoff routed to the city storm will recombine with the natural path within a ¼ mile.</p> <p>Runoff from new impervious areas will be routed through a detention pipe which will attenuate peak flow rates and release runoff to the City Storm drain in 90th Ave SE, which flows north and east to the creek in the Gallagher Hill Open Space.</p>

MR5 = On-site Stormwater Management	No BMP's are proposed. See our assessment of various BMP's starting on page 2. Runoff will be detained and conveyed to City storm in 90 th Ave SE. Detention is considered a BMP which will mitigate peak flow rates and release volume rates from site for most storm events.
MR6 = Runoff Treatment	Not proposed – PGIS will be less than 5,000 SF
MR7 = Flow Control	Detention proposed; see preliminary engineering plan C3.0 for size and location.
MR8 = Wetlands Protection	Not applicable. No wetlands.
MR9 = Operations and Maintenance	Will provide upon request.

Background:

This is the preliminary engineering report for the Wallace 2-Lot Short Plat on the northwest corner of SE 37th Street and 90th Ave SE. Project is located in the NE quadrant of Mercer Island, not far from City Hall, just west of Gallagher Hill. One lot will be separated into two, one house, guest house, and driveway demolished, and two houses and two separate driveways will be constructed.

This is a gently sloped lot, 4-5% average grade. Formal stormwater detention is proposed for this short plat. See preliminary engineering, C3.0 for proposed size and location. System is designed for the maximum build-out of 40% for these two lots using Mercer Island's Prescriptive sizing table based on an older King County single event detention sizing methodology.

No storm BMP's are proposed at this time, beyond detention.

Soils and Infiltration Feasibility:

This lot is in an "Infiltration LID facilities may be feasible, and soil has moderate infiltration potential" area per Mercer Island's infiltration feasibility map. However, Mercer Island's soil map maps this area as Qvt soil, which is glacial till and not good for infiltration. We are not proposing BMP's at this time.

Proposed On-site Stormwater management:

The List Approach (List #2) selection process was applied to site:

Lawn and Landscaped Areas:

- Post-Construction Soil Quality and Depth in accordance with Chapter D5 of Bellevue SWES and BMP T5.13 in Chapter 5 of Volume V of the DOE Manual. Compost-Amended Soil is required.

Roofs:

- Full Dispersion:
Infeasible due to lack of 100 LF flowpath
- Downspout Full Infiltration:
Infeasible because by definition full infiltration requires better soils than are present here
- Bioretention:
Not recommended for couple reasons – Vashon glacial till soil plus it's better served to send all roof water to the tank if a tank is required.
- Downspout Dispersion:
Not recommended typically if detention is proposed. It's better served to send all roof water to the tank if a tank is required.
- Perforated Stub-Out Connection:
Not recommended – Vashon glacial till soil plus fact detention is proposed.

Other Hard Surfaces:

- Full Dispersion:
Infeasible due to lack of 100 LF flowpath
- Permeable Pavement:
Not advised if soils are till and detention is proposed. We can revisit this at building permit design and determine if it makes sense.

Bioretention:
Not recommended for couple reasons – Vashon glacial till soil plus it's better served to send all roof water to the tank if a tank is required.
- Sheet Flow/Concentrated Flow Dispersion:
This can be looked at in more detail at building permit time.

Impervious Area Spreadsheet		
Preliminary Engineering		
Wallace 2-Lot Short Plat, 3633 90th Ave SE, Mercer Island, WA 98040 - CES #1779		
Gross Site area	16,801	sf
	0.386	acres
Existing Impervious Area		
Ex main house roof	2,912	sf
Ex guest house roof	742	sf
Ex driveway, on-site	468	sf
total existing =	4,122	sf
Maximum Impervious Area (on-site) 40% lot coverage (bldg+drive)		
Lot 1 (west)	3,360	sf
Lot 2 (east)	3,360	sf
max. total on-site proposed =	6,720	sf
max. new + replaced impervious =	6,720	sf
max. new impervious =	2,598	sf

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	3.2	3.3	0.9	1.5
	60"	30	20	0.5	0.5	4.3	3.6	0.9	1.1
3,001 to 4,000 sf	36"	120	78	0.5	0.5	2.2	2.4	0.9	1.6
	48"	62	42	0.5	0.5	3.2	3.3	0.9	1.3
	60"	42	26	0.5	0.5	4.3	3.6	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

REQUIRED LENGTH BASED ON MAX BUILDOUT

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

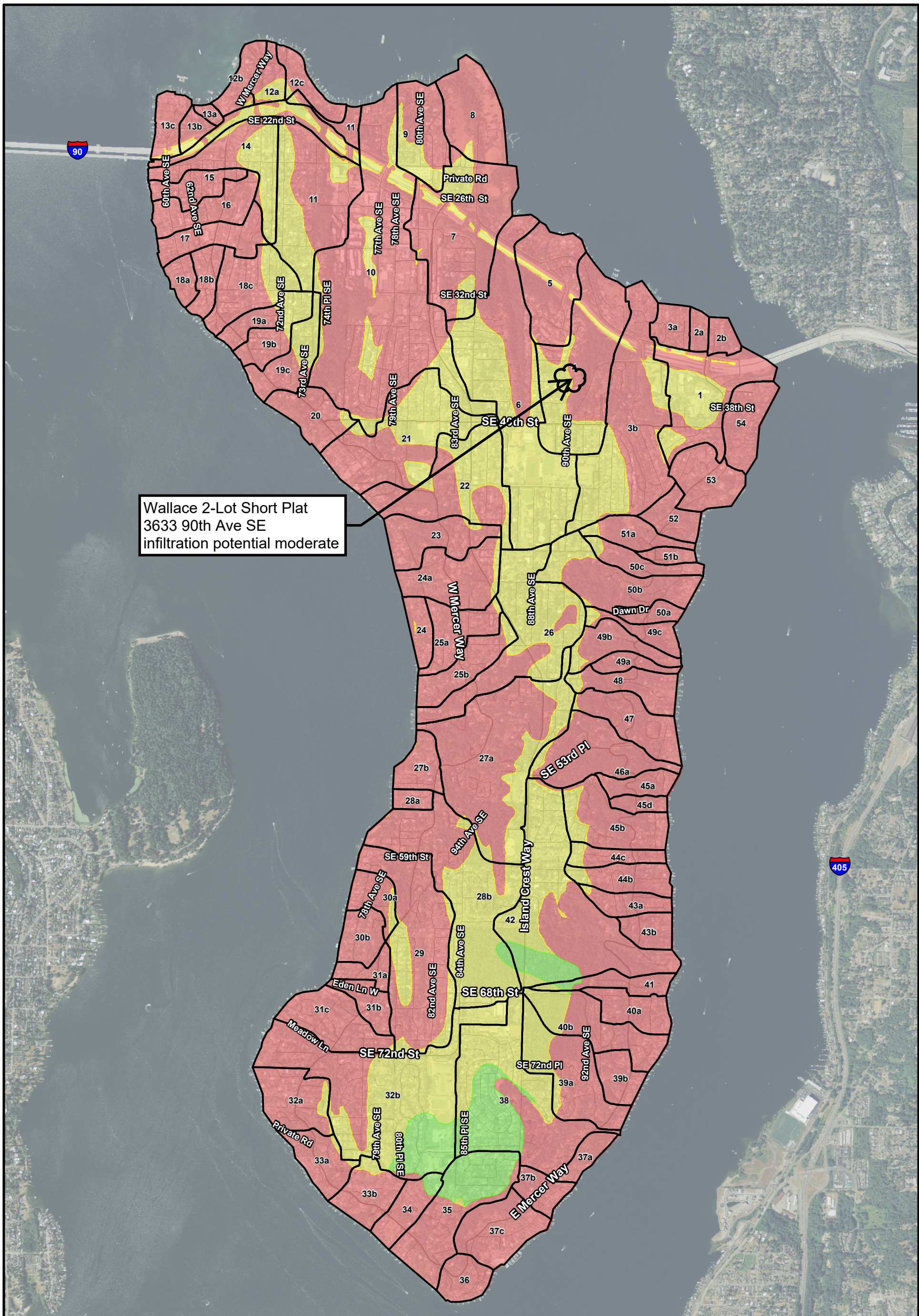
in = inch

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%

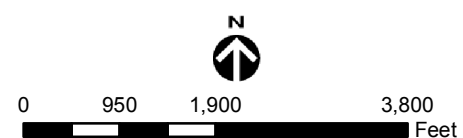


Wallace 2-Lot Short Plat
 3633 90th Ave SE
 infiltration potential moderate

Legend

- Infiltrating LID facilities may be feasible, and soil has high infiltration potential
- Infiltrating LID facilities may be feasible, and soil has moderate infiltration potential
- Infiltrating LID facilities are not permitted
- Storm drainage basin

Figure 3. Low impact development infiltration feasibility on Mercer Island.



Aerial photography: USDA (2009)
 K:\Projects\10-04816-000\Project\lid_feasibility-report-11x17.mxd

* Map is intended to be used for planning purposes only. Site-specific analysis is required prior to design and construction of LID facilities.

