

Anstey Engineering

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Storm Drainage Report

2423 63rd Avenue SE.
Mercer Island, WA 98040
Parcel # 409950-0430

December 23, 2019

Prepared for:

Mr. Mingqin Li and Sun Yong



4-25-2022

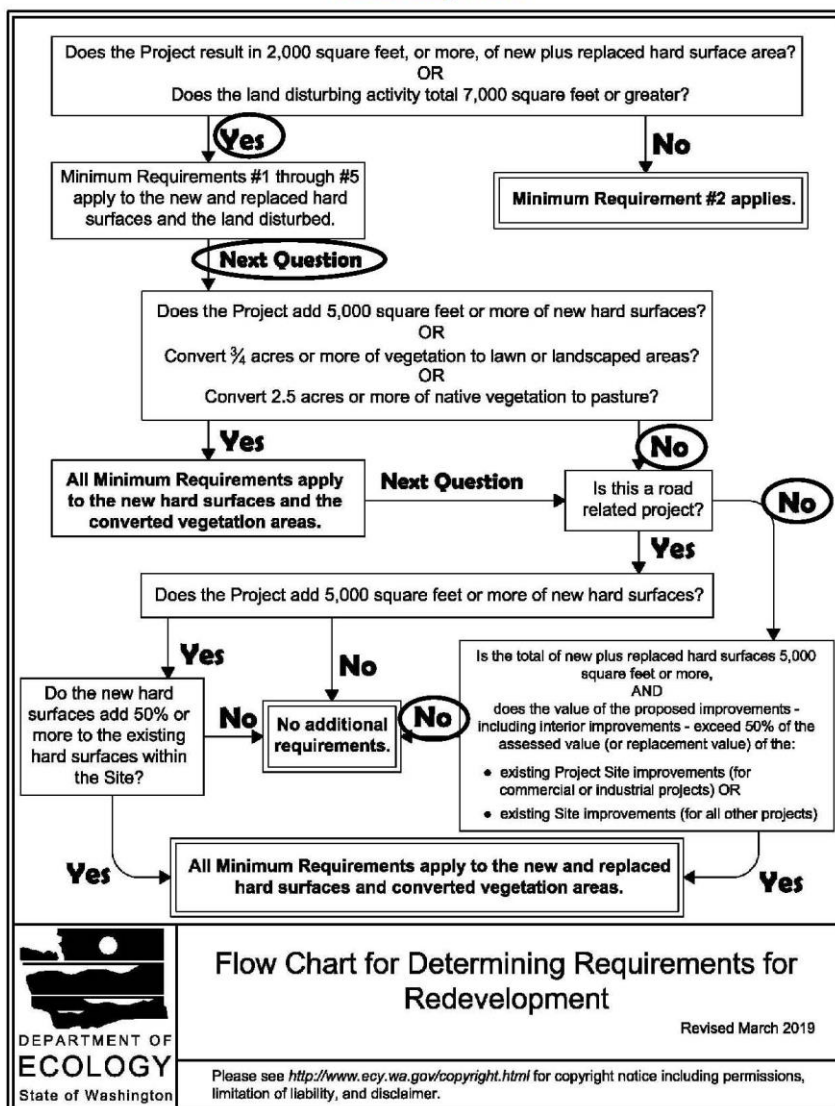
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Minimum Stormwater Requirements

The project is a re-development project with new and replaced impervious surface totaling 2944.65 sf of the 10,500 sf lot and disturbed area totaling +/- 4,773 sf. The following path addresses Minimum Stormwater Requirements 1 through 5. See the flow chart below. The lot has an existing house, driveway, decks, and brickwalks that will be demolished. See the TESC plan for detail.

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



MRI- Prepare Stormwater Site Plans.

A stormwater site plan has been prepared as part of the building permit and details the collection, conveyance and discharge of stormwater from the site. The stormwater site was prepared in accordance with the Mercer Island Stormwater and Site Development Manual (WSDOE 2019 SWMMWW).

MR2 - Construction Stormwater Pollution Prevention Plan (CSWPPP)

A CSWPPP has been prepared as part of the building permit and demolition permit applications. The TESC plan elements are included on the TESC plan.

Temporary ESC measures will be required as there will be disturbance of the soil to construct the driveway and house, and clearing of the site. All of the flows from the driveway and house will flow onto the lot so no adjacent properties will be affected. A silt fence around the construction area and construction entrance should be provided at a minimum. No special requirements are needed. In order to prevent erosion and trap sediment within the project site, the following BMPs will be used approximately as shown on the ESC plan:

- Clearing limits will be marked by fencing or other means on the ground but in this case are the limits of the property.
- Extra excavated soil will be removed from the site
- A rock construction entrance will be placed at the location of the proposed driveway throughout construction.
- Runoff will not be allowed to concentrate and no water will be allowed to point discharge.
- Silt fencing will be placed along slope contours at the down slope limit of clearing.
- Mulch will be spread over all cleared areas of the site when they are not being worked. Mulch will consist of air-dried straw and chipped vegetation.
- Elements 1- 13 of CSWPPP are required when the project is more than 2,000 sf of new plus hard surface area or disturb more than 7,000 sf of land
 1. Mark clearing limits
 2. Establish construction access
 3. Control flow rates
 4. Install sediment controls
 5. Stabilize soils
 6. Protect slopes
 7. Protect drain inlets
 8. Stabilize channels and outlets
 9. Control pollutants
 10. Control dewatering
 11. Maintain BMPs

- 12. Manage the project
- 13. Protect Low Impact Development BMPs.

MR3-Source Control of Pollution

Source control BMPs have been included in the CSWPPP including covering practices construction entrance, silt fence, amended soil, top-soiling, and silt retention.

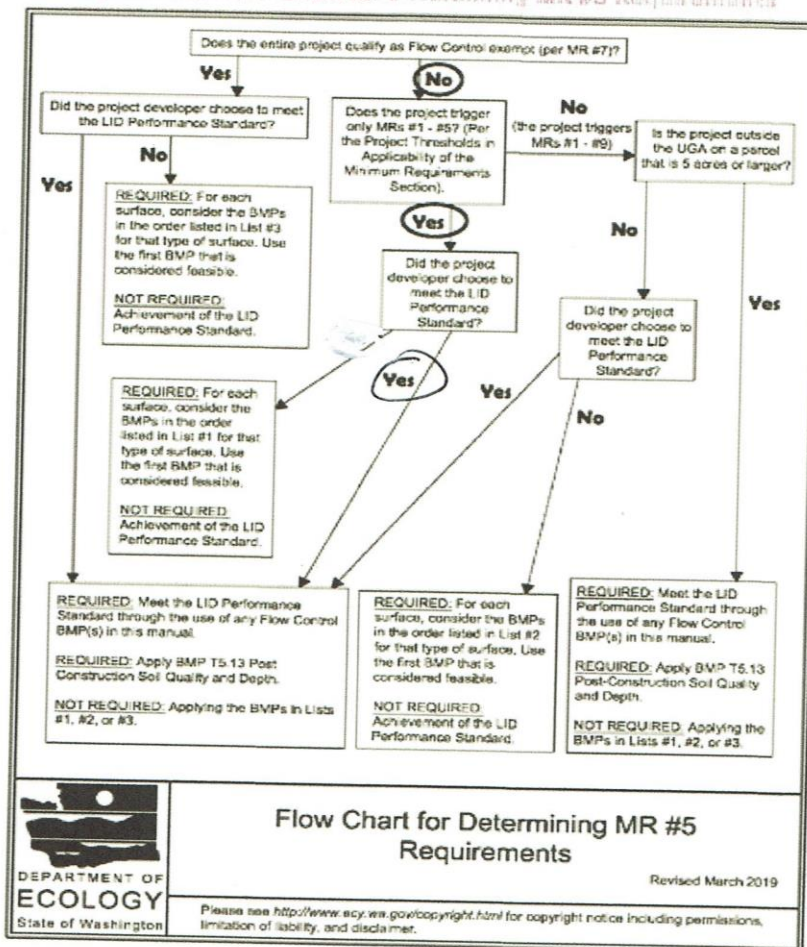
MR4 - Preservation of Natural Drainage Systems and Outfalls

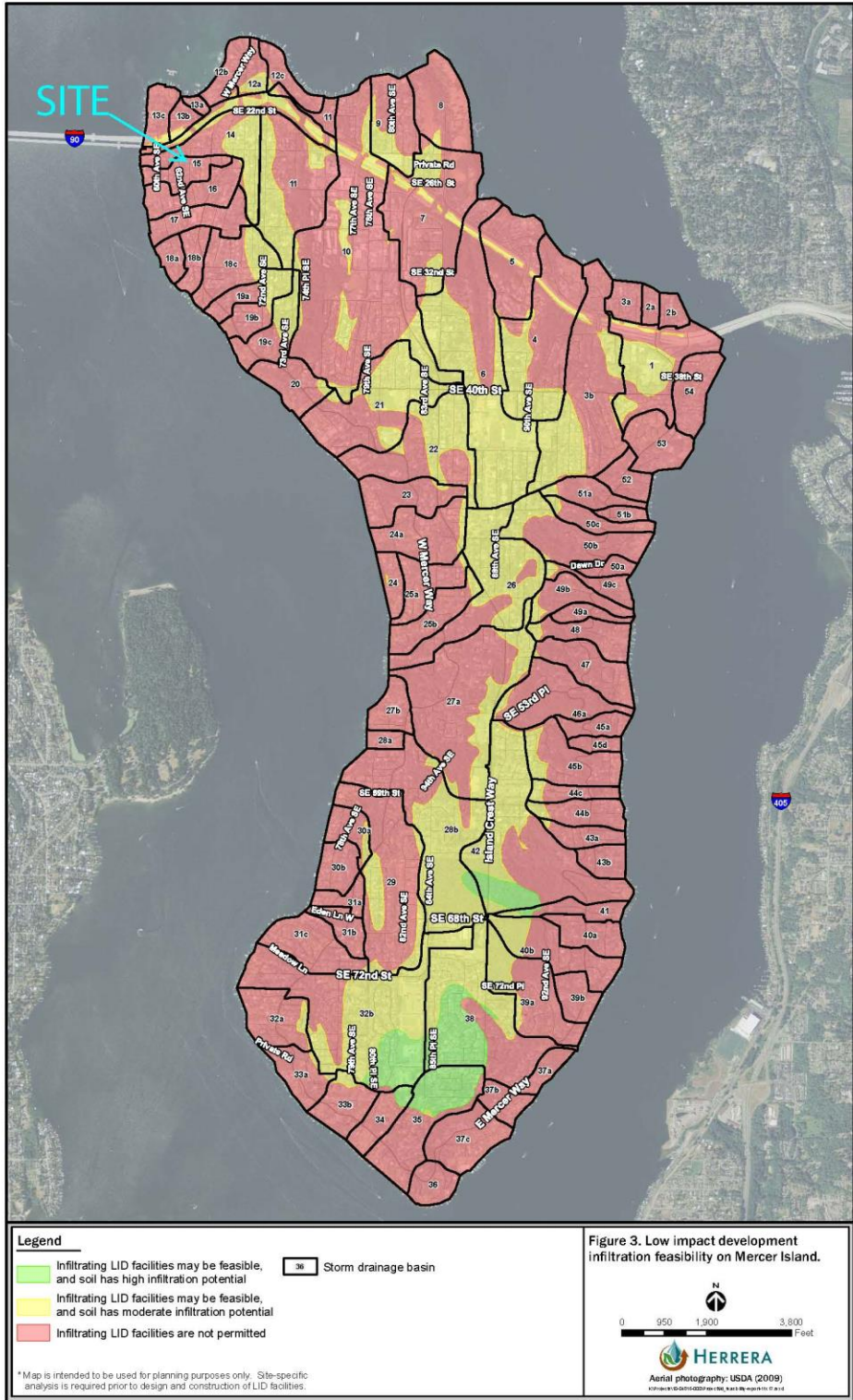
Runoff from the roof and driveway will be collected into new catch basins and drained to a detention pipe and drained to the drainage system in 63rd Avenue SE.

MR5 - On-site Stormwater Management

As the lot will have less than 5,000sf of impervious surface List 1 will be used per Fig I-3.3: Flow Chart for Determining MR#5 Requirements above. On-site stormwater management BMPs have been examined for their feasibility. Due to the lack of a 100 foot flow path Full Dispersion cannot be used. The soils are unsuitable for infiltration (per Mercer Island Infiltration map below) and there is not adequate space for raingardens.

Figure I-3.3: Flow Chart for Determining MR #5 Requirements





Per Geologic Map of Mercer Island below, the soils are Vashon subglacial till (Qvt) which is unsuitable for infiltration. Per Natural Resource Conservation Service Soil Report, the soils are KpB - Kitsap Silt Loam, 2 to 8 percent slopes- which is a Till Type C soil and unsuitable for infiltration.

On-Site Stormwater Management

The project, in accordance with requirement MR5, is required to manage stormwater onsite to the maximum extent practical. This chapter concerns the process for selection of BMPs. BMPs will be analyzed for the hard surface areas of the site per List 1. Additional discussion of each On-Site Stormwater Management item:

PER LIST 1

Disturbed soil will be amended per BMP T5.13 for soil quality and depth

Roof :

Full dispersion cannot be used as there is no 100 foot vegetated flowpath.

Full infiltration cannot be used per Mercer Island Infiltration map, and the Till soils are unsuitable for infiltration.

A raingarden is infeasible due to poor soil and lack of space.

Downspout dispersion is not feasible as there is not an adequate 25 foot vegetated flow path.

Due to concerns about the effect upon downstream property a Stormwater detention system will be used connecting to the existing storm drain in 63rd Ave SE.

Pavement:

Full dispersion cannot be used as there is not an adequate 100 foot vegetated flow path

Permeable Pavement will not be used as the soil does not have adequate depth or permeability for pervious pavement to function properly.

Sheet flow dispersion will not be used as the slopes do not provide an adequate flow path to a 10 foot minimum vegetated area.

As No BMPs are feasible, we will install a new catch basin in the proposed driveway and connect it to the on-site stormwater detention system.

DRAINAGE REPORT

SECTION 1 - PROPOSED PROJECT DESCRIPTION

Parcel: 4099500430

Address: 2423 63rd AVE SE, Mercer Island, WA 98040

Legal Description: LAKE VIEW PLACE EAST SEATTLE N 1/2 OF LOT 14 ALL OF LOTS 15 THRU 17

PLat Block: 4

Plat Lot: 14-17

The 10,500sf Lot is located on Mercer Island near the intersection of SE 24th Place and 63rd Avenue SE at 2423 63rd AVE SE, Mercer Island, WA 98040. The site is currently used as a single family residence with a 1,664 sf house, a 360sf parking carport, 517sf concrete driveway, 112.35sf shed, 28.33sf concrete, 1086.46sf decks and 513.1sf brick walks for an existing impervious area of 4,260.35sf. The existing house, existing driveway, existing carport, existing desks, and 407.94sf existing bricks will be removed. A new single-family residence with a roof area of 2,184sf, and a 531.8sf concrete driveway, and 116.5sf walkway will be constructed on the 10,500sf Lot. Total new impervious areas are 2832.3sf or 27% coverage. See the developed and existing condition below for detail existing impervious and new and replace impervious areas. Stormwater is proposed to be routed from the roof downspouts to a new catch basin at the southeast yard of the new house, then connect to a detention system which will drain to the existing storm drainage pipe in 63rd Ave SE. The driveway and walk will use concrete pavement which will drain to a new catch basin in the driveway and then connect to the new catch basin in the southeast yard and flow into the detention system.

Developed Condition

The existing house, existing driveway, existing carport, existing desks, and 407.94sf existing bricks will be demolished. A new single-family residence with a roof area of 2,184sf, 531.8sf concrete driveway, and 116.5sf walkway will be constructed. The roof will drain to a new catch basin in the backyard and flow to the dispersion trench. The driveway and walk will drain to the new catch basin in the driveway and then connect to the new catch basin in the southeast yard and flow to the detention system. We will reuse the existing utilities for the proposed house.

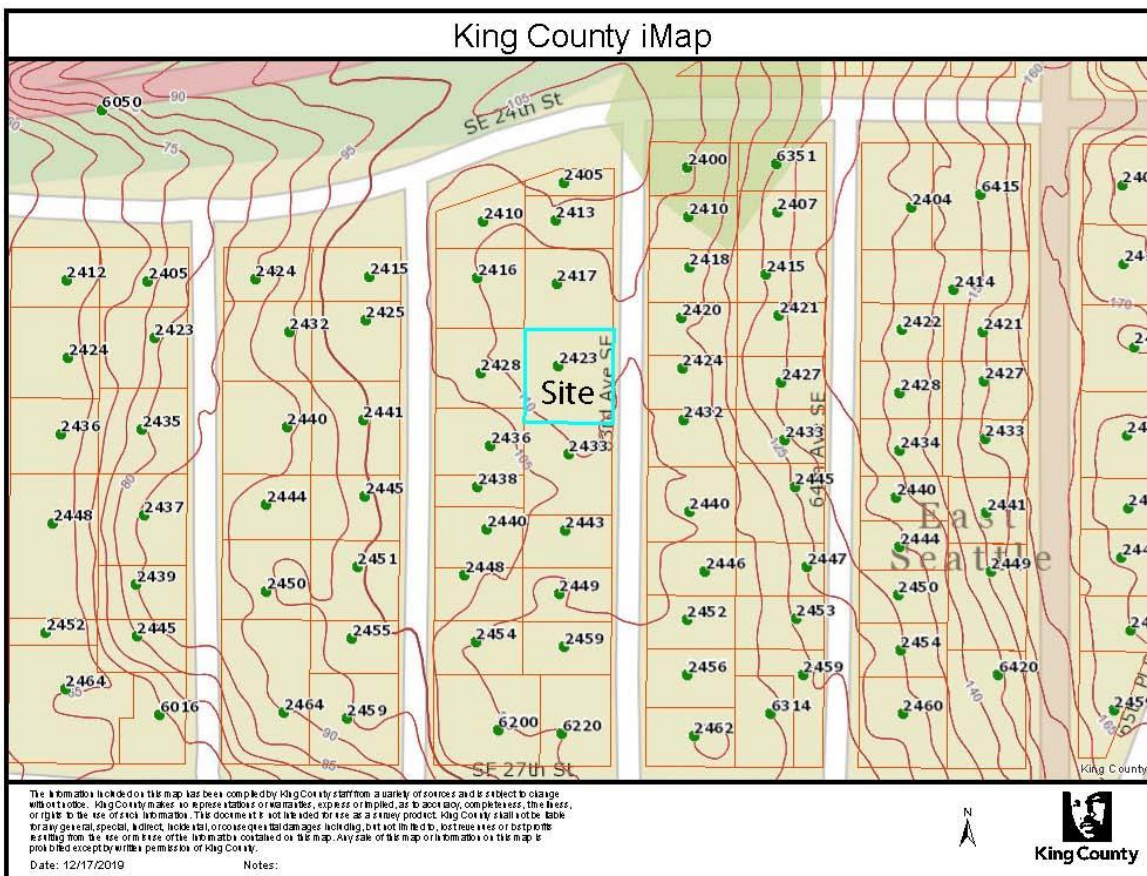
Proposed Building Footprint including garage(sf)	2,184
Pro. Driveway (sf)	531.8
Pro. Walk/Paver (sf)	116.5
Total Proposed Impervious areas (sf)	2832.3
Total Proposed Impervious coverage	27.0%

Total new and replaced impervious area = 2832.3sf proposed impervious+ 112.35sf existing shed remained = 2944.65sf or 28% coverage.

Total area of land disturbing activity: 5,000 sf+/-

Converted native pervious: 0 SF (There is no existing native vegetation onsite; all vegetated area is lawn or landscaped)

Figure 1: Vicinity Map from Imap



SECTION 2 - EXISTING CONDITION

There are single-family lots to the North, South, and West of the property. There is 63rd AVE SE on the East of the site. The site has been previously graded.

Total lot area = 10,500sf. Existing impervious area:

Ex. Buildings TBD (sf)	1664
Ex. Parking carport TBD (sf)	360
Ex. Concrete Driveway TBD (sf)	517
Ex. Concrete TBD (sf)	28.33
Ex. Shed remained(sf)	112.35
Total Ex. Impervious areas (sf)	2681.68
Total Ex. Impervious coverage	25.5%

Total existing impervious areas demolished = 2,569.33 or 24.5% coverage.

Ex. Bricks Remained (sf)	105.16
Ex. Bricks TBD (sf)	407.94
Ex. Desk above existing footprint TBD(sf)	1086.46
Total other existing area	1599.56

The site is flat with lot slopes down to the southwest at about 3%. See vicinity map. The existing house uses underground infiltration/dispersion trenches.

There are no wetlands identified on the site. The site is not located in landslide, erosion hazard areas, or other environmentally sensitive areas according to King County iMap. There is no drainage complaints in this area.

Drainage Basin: Mercer Island

Watershed: Cedar River / Lake Washington

WRIA: Cedar-Sammamish (8)

SECTION 3 - SOILS REPORT

Per Geologic Map of Mercer Island below, the soils are Vashon subglacial till (Qvt) which is unsuitable for infiltration, and Mercer Island infiltration map shows that the site is infeasible for infiltration.

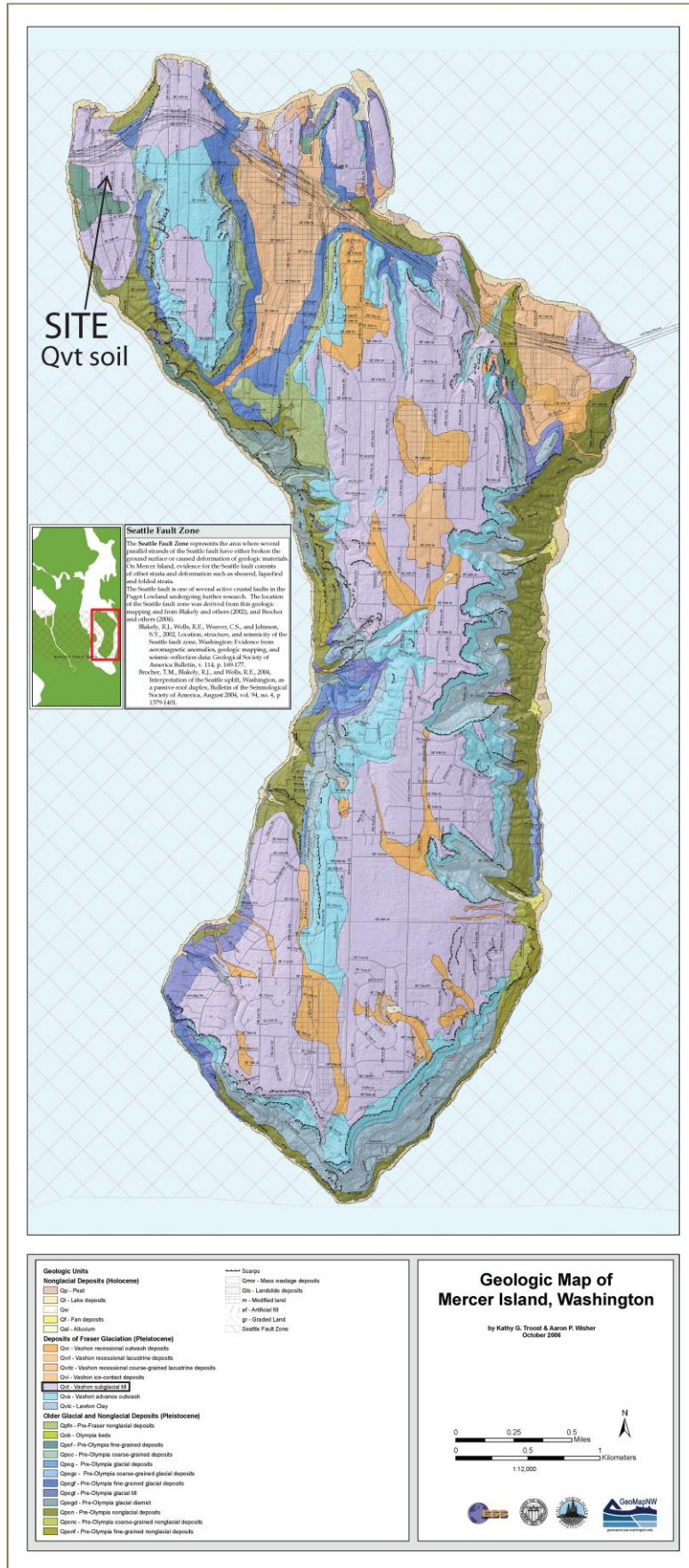
Per Natural Resource Conservation Service Soil Report, the soils are KpB - Kitsap Silt Loam, 2 to 8 percent slopes.

Typical profile:

H1 - 0 to 5 inches: silt loam

H2 - 5 to 24 inches: silt loam

H3 - 24 to 60 inches: stratified silt to silty clay loam



SECTION 4 - WELLS AND SEPTIC SYSTEMS

There is no well on or near this project.

SECTION 5 - FUEL TANKS

There are no Fuel Tanks proposed for this project.

SECTION 6 - SUB-BASINS

There are no sub-basins on this project

SECTION 7 - FLOODPLAIN

There is no floodplain on this project

SECTION 8 - FACILITY SIZING AND DOWNSTREAM DRAINAGE ANALYSIS

The site is in the urban growth area. The properties to the North, South, and West of this site are single family residences. The East of the site is 63rd AVE SE Street. The site has existing house using underground infiltration trenches. There is an existing driveway on the east of the site. The existing house was graded higher than the 63rd AVE SE Street. There are no significant on or off site flows onto this property. No downstream drainage problems were observed, and there is no drainage complaint. There are no downstream effects anticipated from the proposed development.

Using the King County iMap interactive tool, it was found that there are no immediate critical areas upstream or downstream of the property. The iMap also confirmed that there are no mitigating rivers and floodplain issues.

There are no reported problems to be investigated. The amount of space and soil types present on the property clearly support the flow control BMPs being implemented. There will not be any destruction of aquatic habitat on-site or downstream. The site was visited on December 10, 2019 and a 1/4 mile downstream investigation was made. As there are no signs of surface flow, no problems were identified. See the Mercer Island utility system map below for the current drainage system of the site.

For an overall impervious surface of this size and per 2019 DOE Volume V-Chapter 4, and City of Mercer Island Table 1 Detention Requirements an equivalent to 66lf of 36"Ø detention pipe will be use for the new house and the driveway. = 148.5 CF MIN of detention storage.

A Concrete vault will be used with a length of 17 feet width of 3 feet and depth of 3.5 (incudes 0.5' of sediment storage) = 153cf of storage provided.

There are no existing or potential drainage problems and water quality problems. As there is no downstream drainage system and the soils are unsuitable for infiltration, the stormwater from the roof and the driveway will be routed to a detention system and then drained to the existing 12" storm drain in 63rd Ave SE.

Upstream of the site is the street 63rd AVE SE, with asphalt gutters and a piped drainage system, so there are no upstream drainage problems.

Per the attached City of Mercer Island Table 1 Detention Handout the site requires 66lf of 36"Ø pipe or 148.5cf of storage required.

The Control Manhole will be provided per the Attachment 1 Detention System Detail. As our head will only be 22" instead of 3 feet the 2nd orifice will be resized to 2.2"Ø with a 1.25 head to provide the same flow as the 1.9" orifice at 2.4 feet from Table 1

SECTION 9 - UTILITIES

There will be no utility conflicts. Existing services will be used.

SECTION 10 - COVENANTS AND EASEMENTS

Covenants will be provided when requested.

SECTION 11 - PROPOSED HOMEOWNER ASSOCIATION

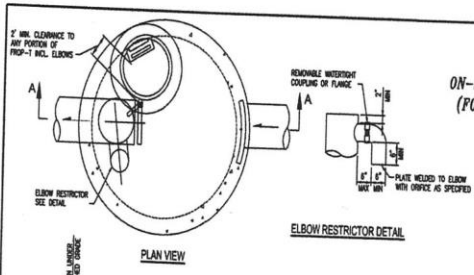
NA this is a SFR

SECTION 12 - OTHER PERMITS

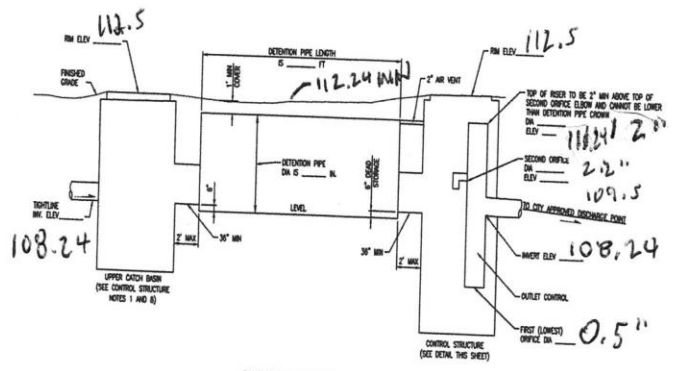
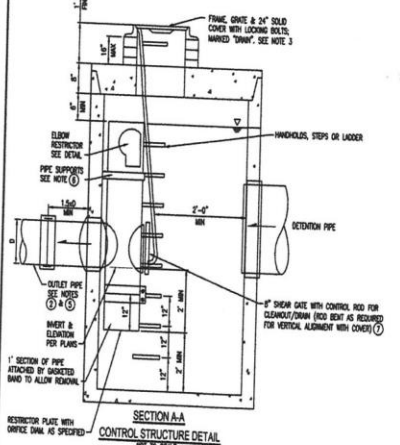
A building permit will be required and a ROW Permit will be required for the storm drain crossing of 63rd Avenue SE.

Attachments: 1. City of Mercer Island Utility Map
2. Attachment 1 Detention System Handout City of Mercer Island

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



OWNER: YONG	ADDRESS: 2423	PREPARED BY: ANSTEY ENG
PERM #:	6320NE 56	DATE: 206-3037659
NEW PLUS REPLACED IMPERVIOUS SURFACE AREA (SF): 9332	DETONATION PIPE DIA (IN): 36	DETONATION PIPE LENGTH (FT): 66
SOIL TYPE: ATTN: [unclear]	PIPE MATERIAL: HDPB	OFFICE # IN 66 INCH ELEV: 106.24
		OFFICE # IN 22 INCH ELEV: 109.5



- CONTROL STRUCTURE NOTES**
- USE A MINIMUM OF A 54 IN. DIA. TYPE 2 CATCH BASIN. THE ACTUAL SIZE IS DEPENDENT ON CONNECTING PIPE MATERIAL AND DIAMETER.
 - OUTLET PIPE: MIN. 6 INCH.
 - METAL PARTS: CORROSION RESISTANT. NON-DRAINAGE PARTS PREFERRED. GALVANIZED PIPE PARTS TO HAVE:
 - CLEANOUT GATE IS HIBBLE FROM TOP.
 - CLAMP-DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE.
 - FRAME IS CLEAN OF CURB.
 - IF METAL OUTLET PIPE CONNECTS TO CONCRETE CONCRETE PIPE, OUTLET PIPE TO HAVE SMOOTH O.D. EQUAL TO CONCRETE PIPE I.D. LESS 1/4 IN.

- PROVIDE AT LEAST ONE 3" DIA. BRASS SUPPORT BRACKET ANCHORED TO CONCRETE WALL WITH 5/8 IN. STAINLESS STEEL EXPANDED BOLTS OR EMBEDDED SUPPORTS 2 IN. INTO CATCH BASIN WALL (MINIMUM 3'-0" VERTICAL SPACING).
- THE SHOWER GATE SHALL BE MADE OF ALUMINUM ALLOY IN ACCORDANCE WITH ASTM B 208 AND ASTM B 275. RESISTORION TUBING OR CAST IRON IN ACCORDANCE WITH ASTM A 48, CLASS 30B. THE LEFT HANDLE SHALL BE MADE OF A DRAINAGE METAL TO THE GATE. (TO PREVENT GALVANIC CORROSION). IF MAY BE OF SOLID BODY OR HOLLOW TUBING, WITH ALGAE-RESISTANT HOLES AS REQUIRED. A IMPERVIOUS 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 BENDING SURFACES OF THE LEV AND THE BODY SHALL BE MACHINED FOR PROPER FIT. ALL SHEAR GATE BOLTS SHALL BE STAINLESS STEEL.
- THE UPPER CATCH BASIN IS REQUIRED IF THE LENGTH OF THE DETENTION PIPE IS GREATER THAN 50 FT.

- ON-SITE DETENTION SYSTEM NOTES:**
- CALL DEVELOPMENT SERVICES (360-275-7000) 24 HOURS IN ADVANCE FOR A DETENTION SYSTEM INSPECTION BEFORE BACKFILLING AND FOR FINAL INSPECTION.
 - RESPONSIBILITY FOR OPERATION AND MAINTENANCE OF SPILLAGE 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 OFFICE MUST BE KEPT OPEN AT ALL TIMES.
 - PIPE MATERIAL, JOINT, AND PROTECTIVE TREATMENT SHALL BE IN ACCORDANCE WITH SECTION 7.04 AND 8.03 OF THE WSDOT STANDARD SPECIFICATION FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION. LATEST REVISION. SUCH MATERIALS INCLUDE THE FOLLOWING: LINED CORRUGATED POLYETHYLENE PIPE (LOPE), ALUMINIZED TYPE 2 CORRUGATED STEEL PIPE AND ALUMINUM PIPE, OR REINFORCED CONCRETE PIPE. CORRUGATED STEEL PIPE IS NOT ALLOWED.
 - FOODING DRAINS SHALL NOT BE CONNECTED TO THE DETENTION SYSTEM.

