DOWNSTREAM ANALYSIS

FOR

SINGLE FAMILY RESIDENCE

6175 SE 27TH ST

MERCER ISLAND, WA 98040

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SECTION I

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I. PROJECT OVERVIEW

This project includes a redevelopment of a single-family residence house lot. The site development will be required to follow the City of Mercer Island development standards for storm drainage improvements. The design will follow the city standards and the 2019 Stormwater Management Manual for Western Washington (SMMWW) as adopted by the city. The proposed development project site runoff discharges to Lake Washington through downstream drainage system flow control is exempt provided that the downstream system is free of capacity constraints This downstream report is to analyze the downstream drainage system for any capacity constraints. The site address is6175 SE 27th Street, Mercer Island, (see Figure 1, Vicinity Map in Section I). The total lot area is approximately 7,297 s.f. and the proposed impervious area is approximately 3,176 s.f. (1961 s.f. building, 639 s.f. of deck/patio, 322 s.f. and 254 s.f. for driveway and walkway respectively).

A. Existing Site Conditions:

A review of the SCS soils map for the area (see Figure 2, SCS Soil Survey Map) indicates KpB – Kitsap silt loam, 2 to 8 percent. These soils resemble Hydrologic Soil Group C The soil is moderately well drained. The soil series descriptions follow Figure 2.

Presently, the site has a single-family home with carport, open lawn, few trees and ground cover. The lot is surrounded by single family residences at all sides and access from paved SE 27th Street to the north (See Figure 3 – Existing Site Development Map). A more detailed description of the existing drainage system is found in Section II, Off-site Analysis.

B. Post-Developed Conditions:

All impervious runoff for the area of the proposed development will be collected and drained to a new storm connection to the existing conveyance system on SE 27th Street storm system. Existing 6” storm through the site will be capped and abandoned and rerouted to the new storm system. The roof runoff will be tightlined to the proposed catch basin as well as the driveway drainage. The catch basins discharge will be connected to new storm system (see Figure 4 – Proposed Development Map).

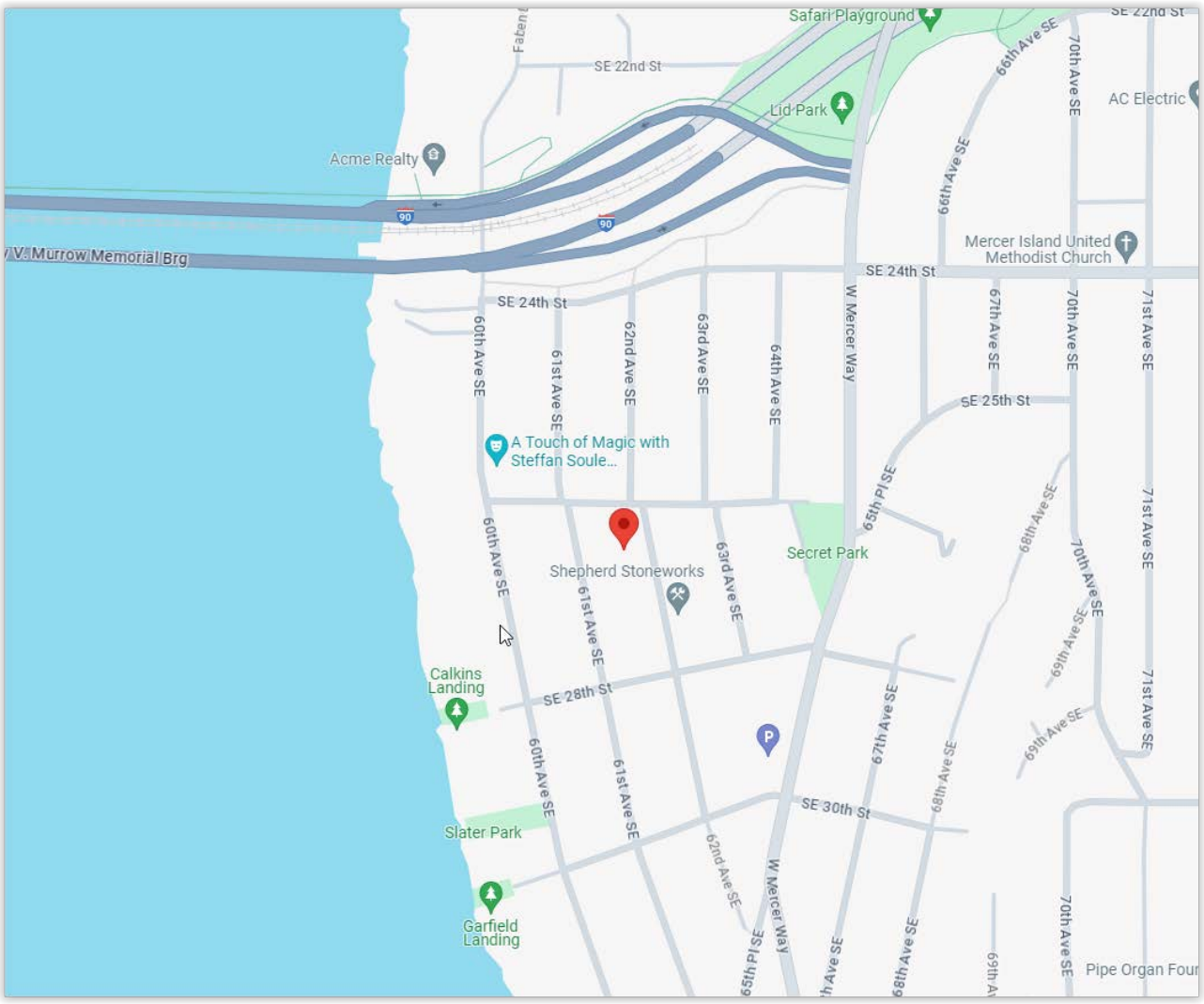
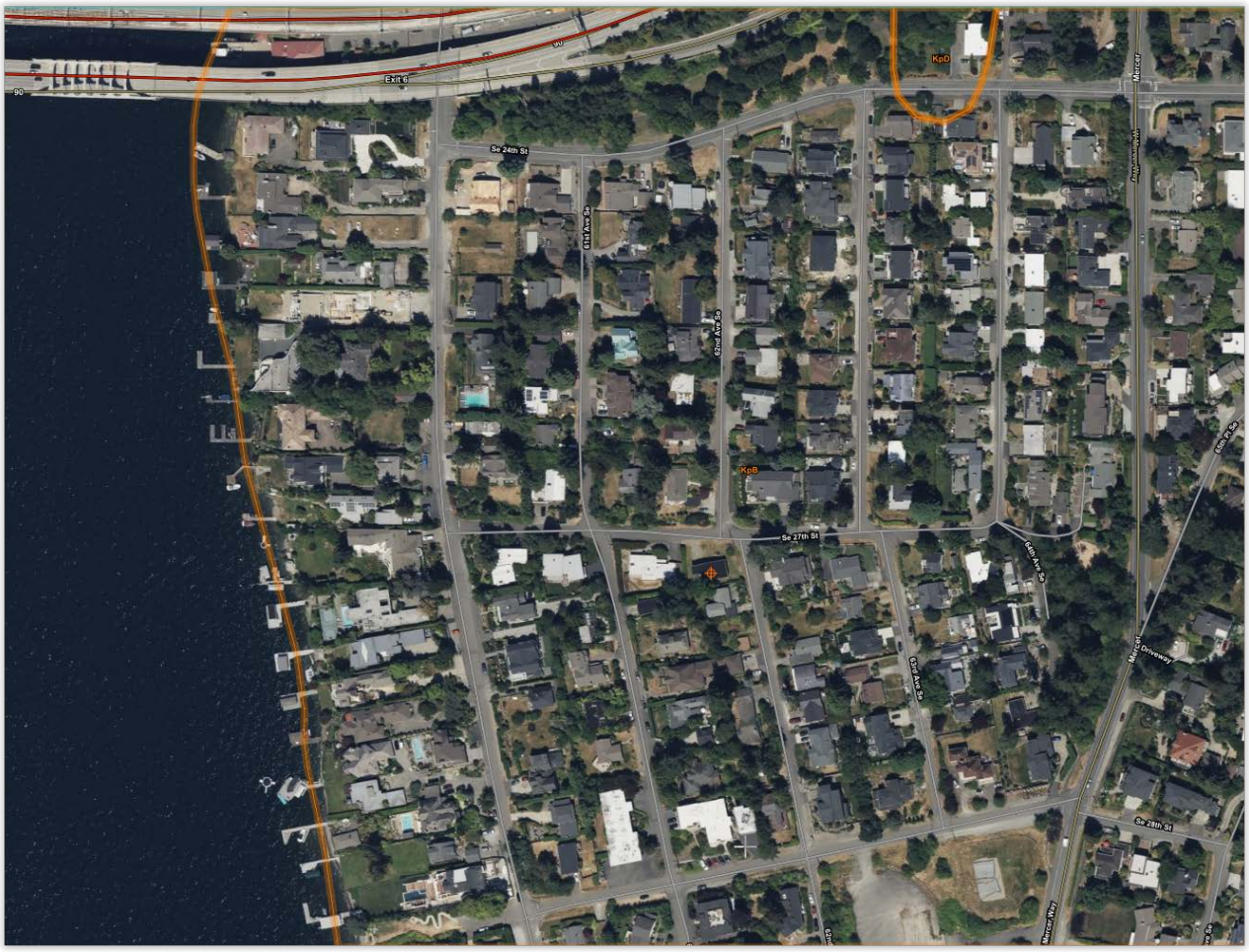


FIGURE 1: VACINITY MAP (NTS)



Map Unit Legend

King County Area, Washington (WA633)

King County Area, Washington (WA633)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
KpB	Kitsap silt loam, 2 to 8 percent slopes	63.3	78.8%
KpD	Kitsap silt loam, 15 to 30 percent slopes	0.7	0.8%
Totals for Area of Interest		**80.3**	**100.0%**

FIGURE 2: SOIL SURVEY MAP (NTS)

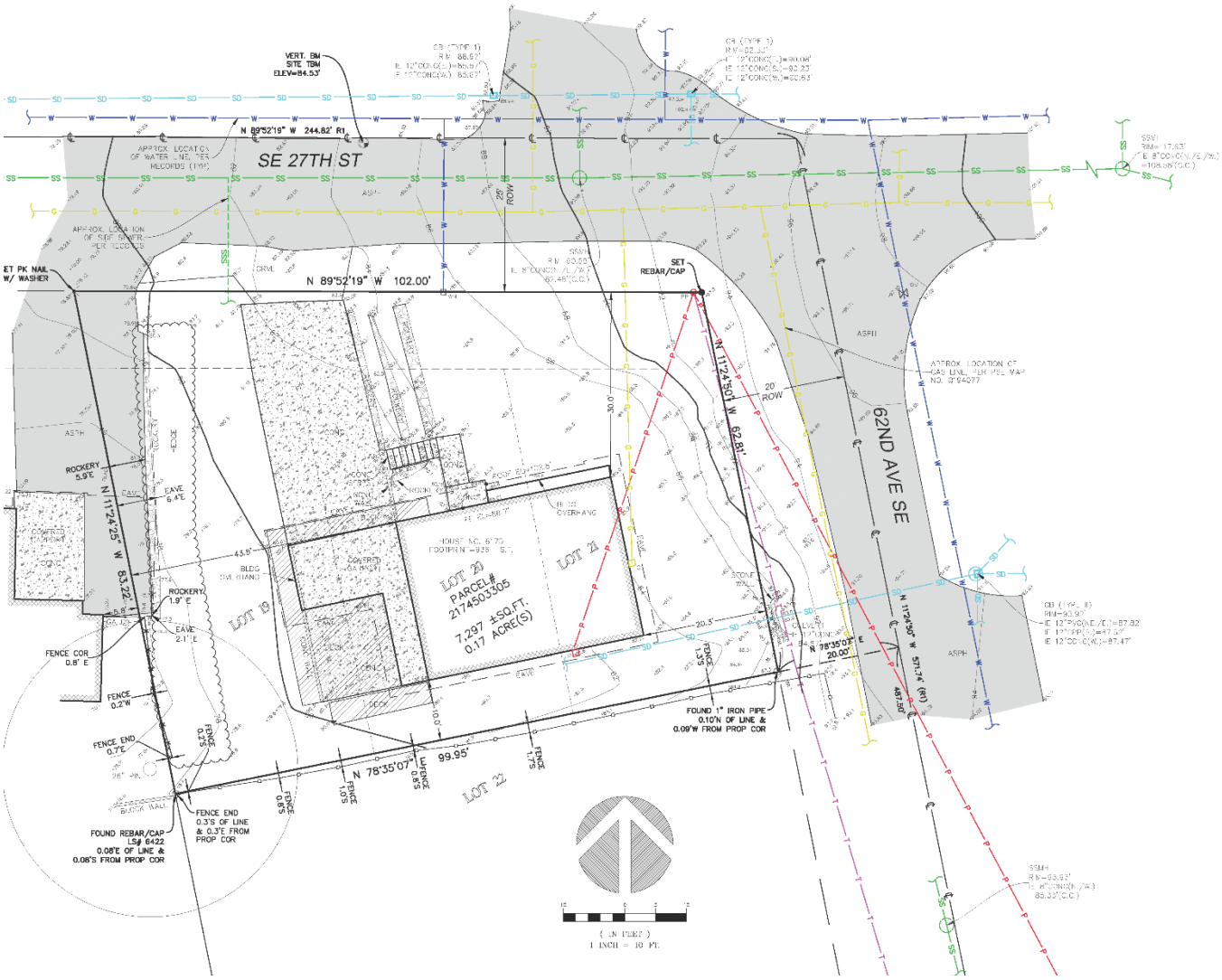


FIGURE 3: EXISITNG SITE DEVELOPEMENT MAP (NTS)

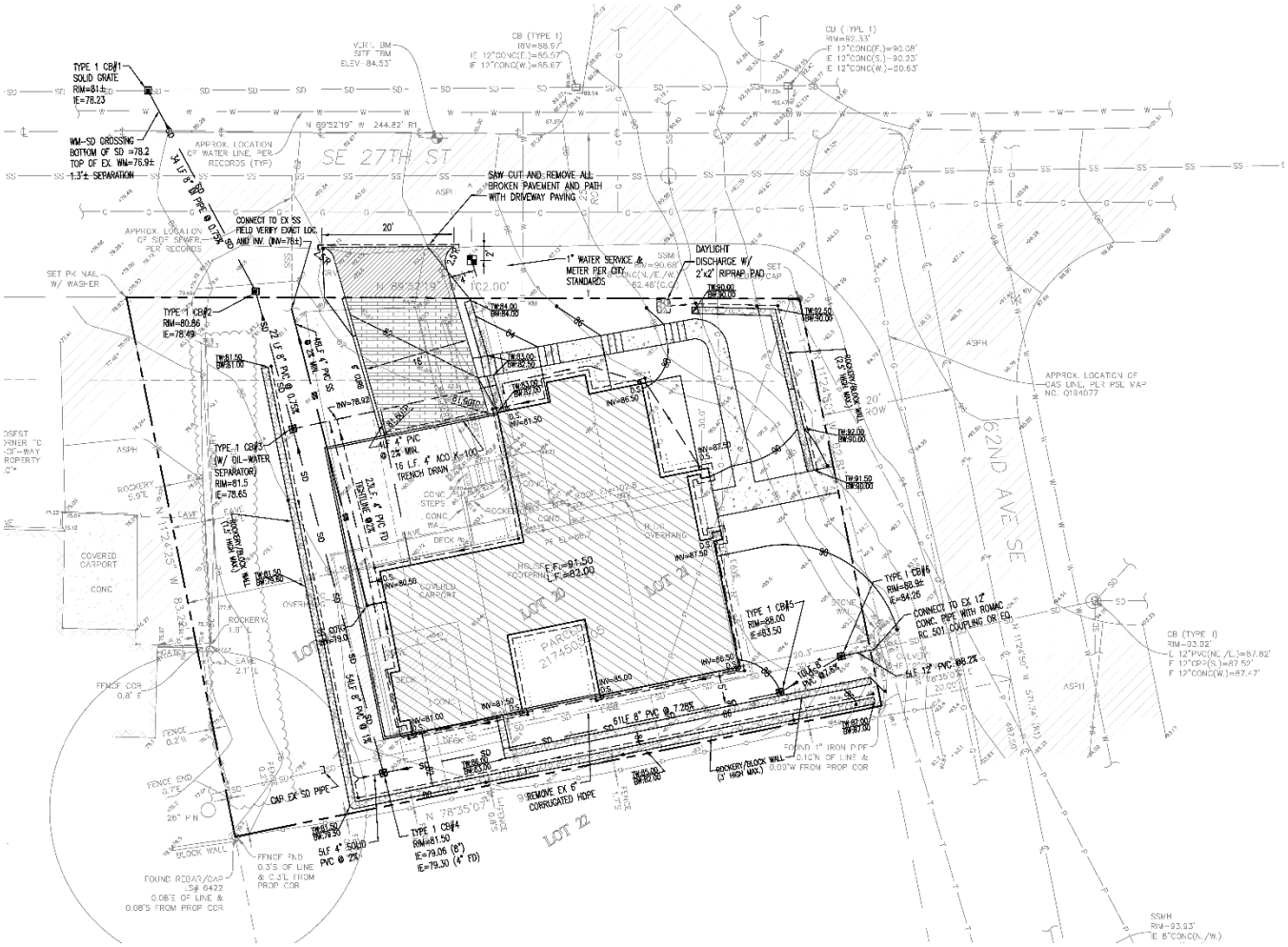


FIGURE 3A: PROPOSED SITE DEVELOPEMENT MAP (NTS)

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SECTION II

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II. OFFSITE ANALYSIS

Upstream Analysis

Upstream area of the subject parcel consists of developed single-family residential buildings. Streets and runoff from the upstream area of this parcel drains to the existing conveyance system along the west edge of the paved roadway as well as some over land flow. The street drainage system discharges through a 12" concrete culvert with wing wall at the south east property line and it continues and drains to a 6" drainage pipe to the west to a CB located at 61st Ave SE, the existing drainage system bypassing this property. The upstream drainage will not affect the drainage system on site and the upstream runoff will pass through the site via the existing 6" drainage pipe. There is no likelihood that the proposed project activities could impact the upstream area with backwater conditions.

Downstream drainage Analysis:

Task 1. Study Area Definition and Maps

The proposed drainage outlet from the project site will discharge to the existing storm system along the east side of 61st Ave SE, west of the neighbor's property. A reduced copy of the site conditions map is included as Figure 3, a site map showing the drainage of the lot. The end of downstream occurs at the Lake Washington shore line, as shown on Figure 5 - Downstream Map.

Task 2. Resource Review

In our effort to determine, if there were any existing or potential problems with this downstream portion of the drainage system, the following resources were reviewed:

a) Adopted Basin Plans: N/A (Not Applicable)
b) Floodplain/floodway (FEMA) Maps: None
c) Other Offsite Analysis Reports: N/A
d) Sensitive Area Folio: None
e) DNR Drainage Problem Maps: N/A
f) U.S. Department of Agriculture Soil Survey: KpB, Kitsap silt loam
g) Wetland Inventory Maps: None

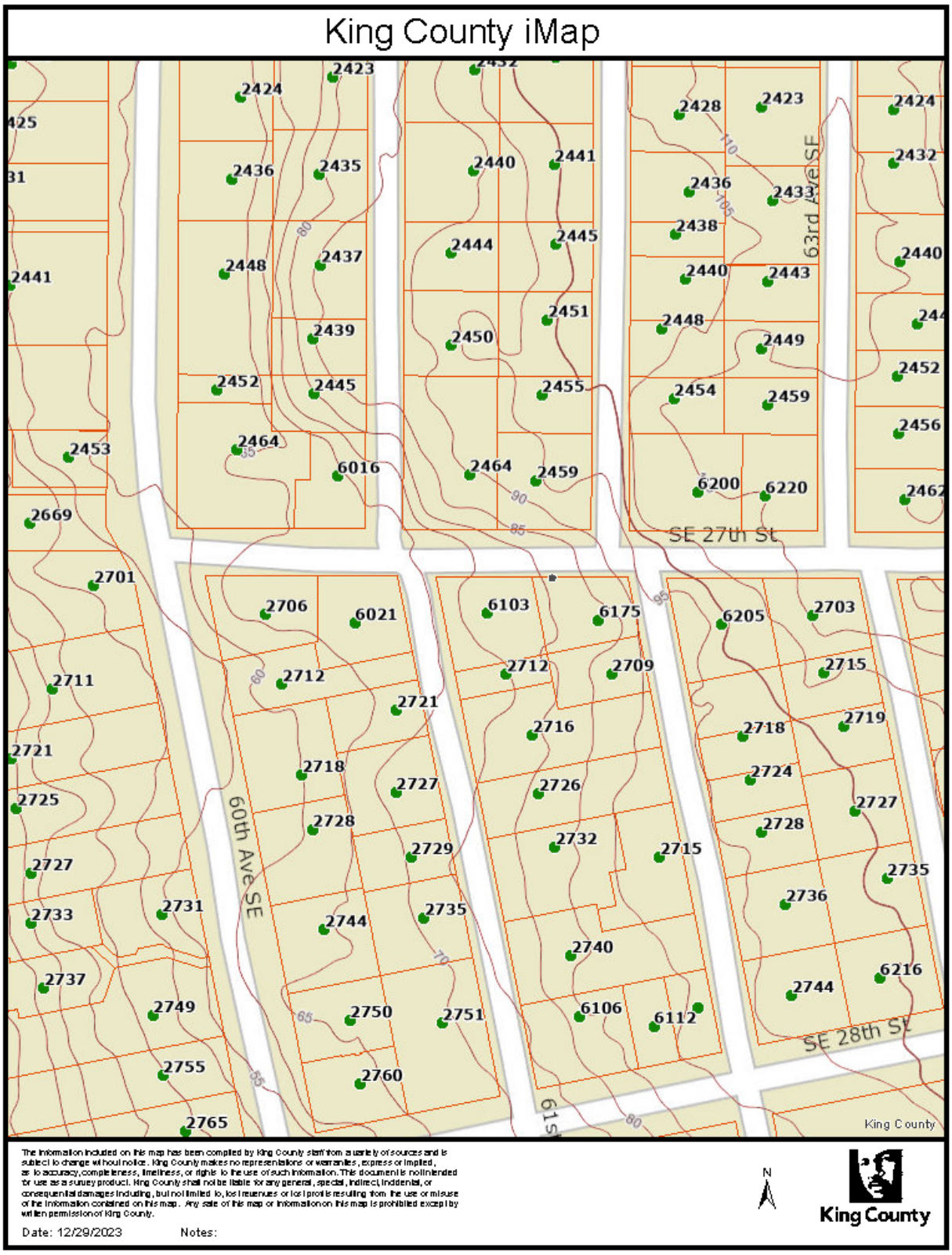

FIGURE 4: KING COUNTY TOPOGRAPHIC MAP (NTS)

Task 3. Field Inspection

A field observation was conducted to gather information for the Downstream Analysis and off-site conveyance system.

Field Study

1. On upstream, the existing roadway serving the neighboring property drains to the roadside shoulder and 61st Ave SE storm system east of the property line discharges through a 12" culvert located at the southeast corner of the property and continues into a 6" drainage pipe protected by a wire mesh inlet with rocks located near the southerly property line through west neighbor lot to a catch basin located on 60th Ave SE. Roadway shoulder is vegetated and does not appear that any runoff causes impact on the embankment directly onto the subject property.
2. No existing or potential constraint or lack of capacity in the existing drainage system was apparent. Some ponding existed in the open ditch where culvert discharges but it will not prevent runoff from flowing in the ditch. There was no other standing water in the open ditch.
3. No sign of flooding areas was discovered along the flow path.
4. No existing/potential overtopping, scouring, bank sloughing, or sedimentation is apparent.
5. No known aquatic habitats in the conveyance route.
6. The downstream area consists of existing residential and roadway drainage system. The topography is generally moderately slope along the flow path with some flat area.
7. The pipe sizes encountered are 6-12-inch in diameters of DIP and Concrete.
8. Offsite runoff areas tributary to the project site were consistent with the site map included.
9. No known complaints of flooding.
10. The site visit was conducted at 4:00 pm on December 28, 2023. The weather was cloudy and 53 ºF.

Task 4. Drainage System Description and Problem Descriptions

Upstream

There is no likelihood that the proposed project activities could impact the upstream area as mentioned above with backwater conditions.

Down Stream Drainage System Description:

- Presently, site runoff sheet flows and discharges at the west property line to the neighbor's property edge and continues westerly approximately 120 l.f. to a Type 1 CB (B) located at the southeast intersection of SE 27th St and 61st Ave SE (See Figure 5, Downstream Map). It continues in a 12" concrete pipe to the west edge of the street approximately 30' in the lawn area to another CB (C). Then, it continues travels westerly at the same street side approximately 50 L.F. in a 12" DI pipe to another Type 1 CB (point D). From here, it crosses under the street to the north side to another Type CB (E) in the shoulder, approximately 22 L.F. It then continues westerly at the same north side of the street approximately 64' to an open ditch (**F**). Then, it travels in the open shallow roadside ditch approximately 4' to 15' wide for another 130 l.f. to a 12" concrete culvert (G) at the northeast intersection of 60th Ave SE and SE 27th St. with new riprap inlet. The culvert extends approximately 50 l.f. into a catch basin (**H**) located at the driveway

pavement. Runoff continues travels westerly along the lot lines for another 187 l.f. to a catch basin (I) located in the yard of house number 2669. From here it discharges t the shore line of Lake Washington (J) approximately 75 l.f. away. The analysis is terminated for a total approximately distance of 728 l.f. During the downstream drainage field visit, only minor drainage issues were observed and no areas of any existing or potential major drainage problems were apparent.

Problem description:

The down stream drainage system as described above is not prone to stream bank erosion, siltation, and slide and does not threaten destruction of aquatic habitats. Catch basins as observed are mostly clean and sediment in the catch basins are below the invert of the outlet pipes. Open ditches have no sign of major erosion or scouring, or sign of street overtopping were apparent. Due to the fairly good slope of the analysis route, the conveyance pipes system does not appear to have a capacity problem or show any sign of overtopping in any of the structure.

Task 5. Mitigation of Existing or Potential Problems

No off-site mitigation is necessary as there are no observed major drainage issues during the analysis for the downstream portion and runoff discharges from this site will be very minimal to downstream system.

DOWNSTREAM MAP:

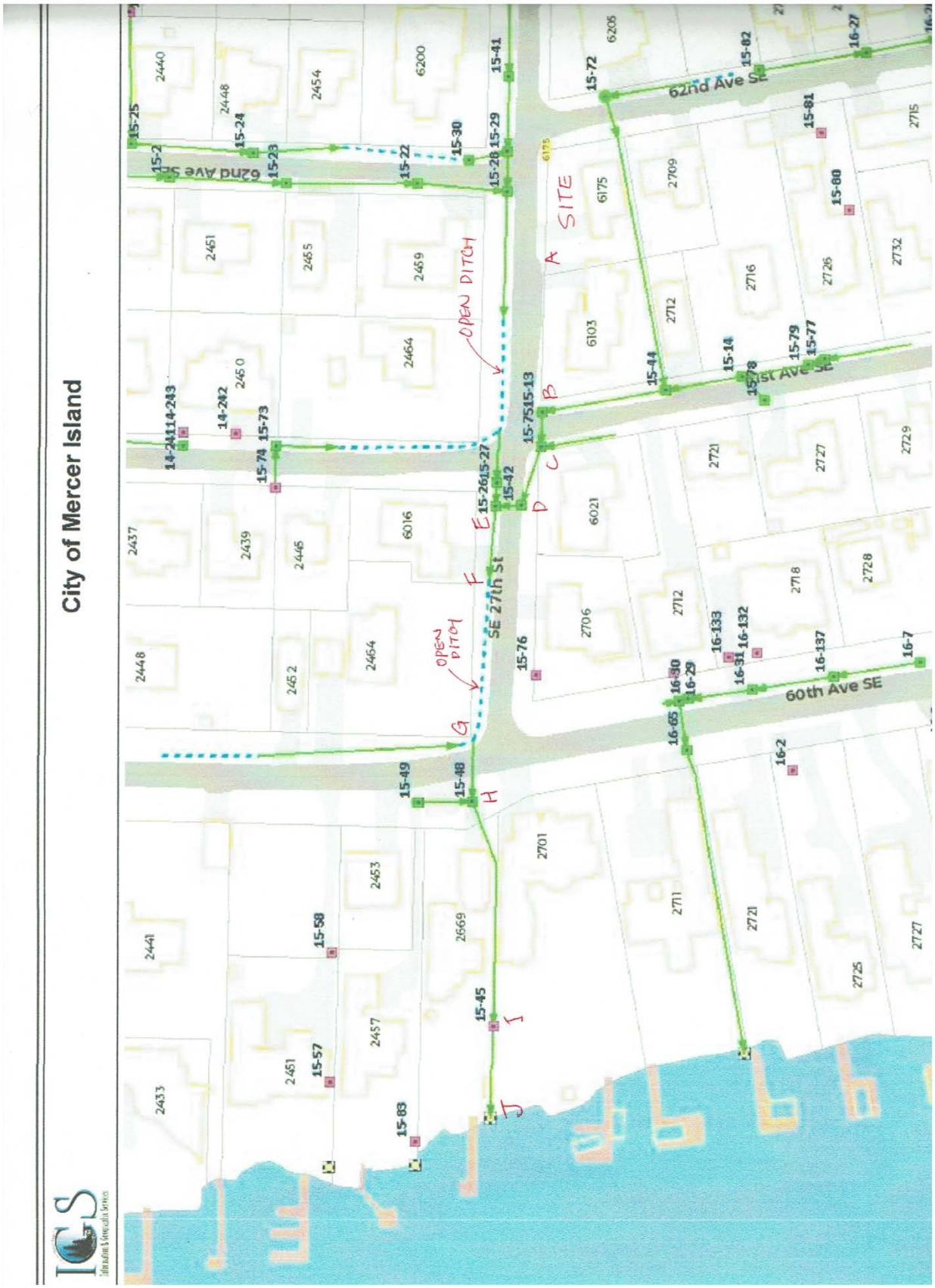

FIGURE 5: DOWNSTREAM MAP (NTS)

DOWNSTREAM PHOTOS

Open Ditch Across the site - Looking Downstream

Catch Bain – At Point B

Catch Basin – At Point C

SE 27th St. South Edge Catch Basin – Point D

SE 27th St. North Edge Catch Basin – Point E

Open Channel Looking Downstream Point F

Culvert Discharge to open Ditch Point F

End of open channel – Culvert entrance Point G

Catch Basin Point H driveway - West of 60th Ave SE - Looking West