DOWNSTREAM ANALYSIS

FOR

SINGLE FAMILY RESIDENCE

3008 70TH AVENEU SE

MERCER ISLAND, WA 98040

March 10, 2024

Prepared by

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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 is 3008 70th Avenue SE, Mercer Island, (see Figure 1, Vicinity Map in Section I). The total lot area is approximately 5,971 s.f. and the proposed impervious area is approximately 2,782 s.f. (1833 s.f. building roof, 168 s.f. of deck, 363 s.f. and 418 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 AmC – Arents, Alderwood materials, 6 to 15% slopes surrounded by KpD – Kitsap silt loam. 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 attached garage, open lawn and shrub. The lot is surrounded by single family residences at all sides and access from paved 70th Avenue SE to the west (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 the existing conveyance system on the street. The roof runoff will be tightlined to the proposed on-site catch basin as well as the driveway drainage. The catch basin will be connected to the existing street drainage system with a new catch basin installed on existing storm main (see Figure 4 – Proposed Development Map).

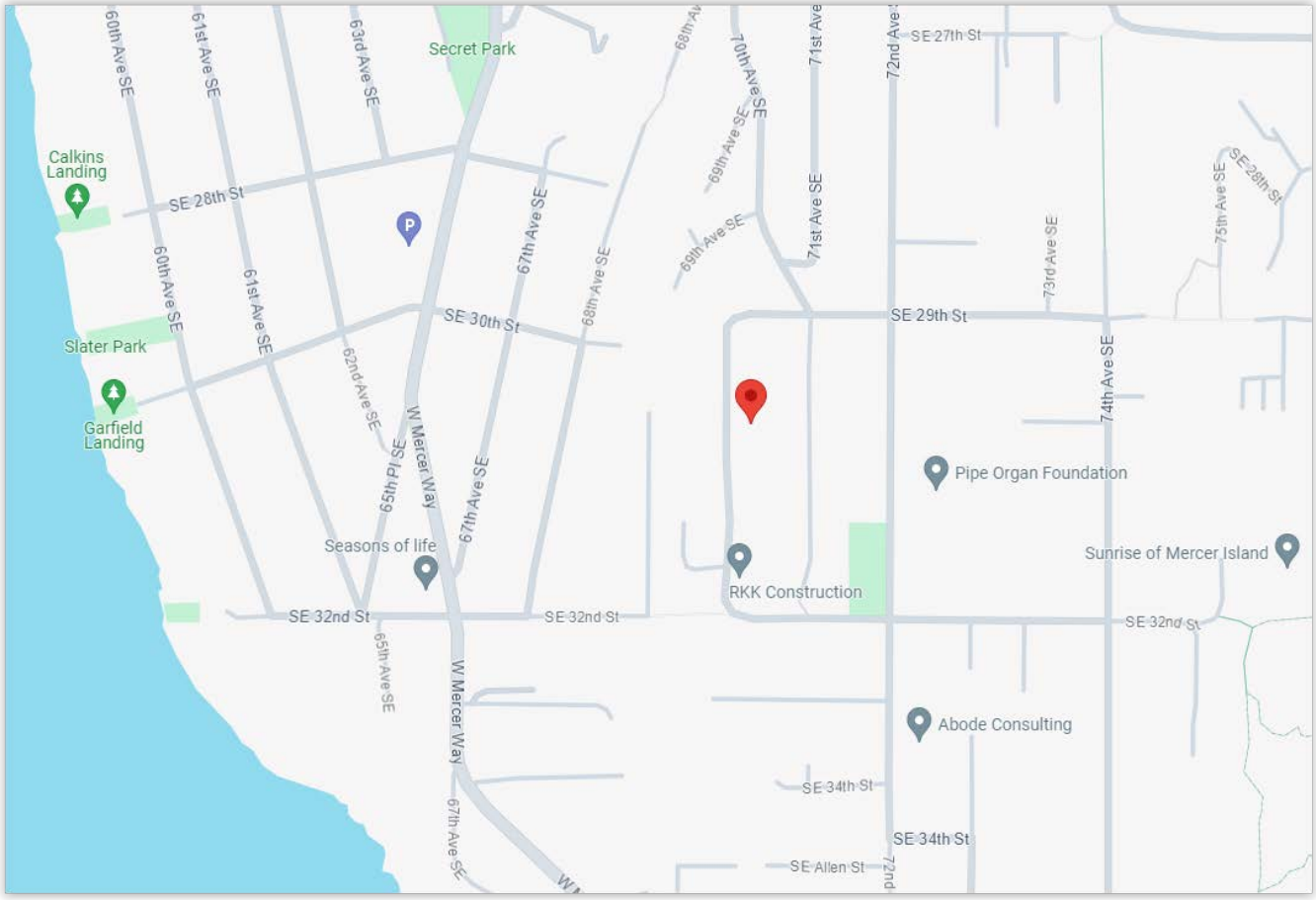
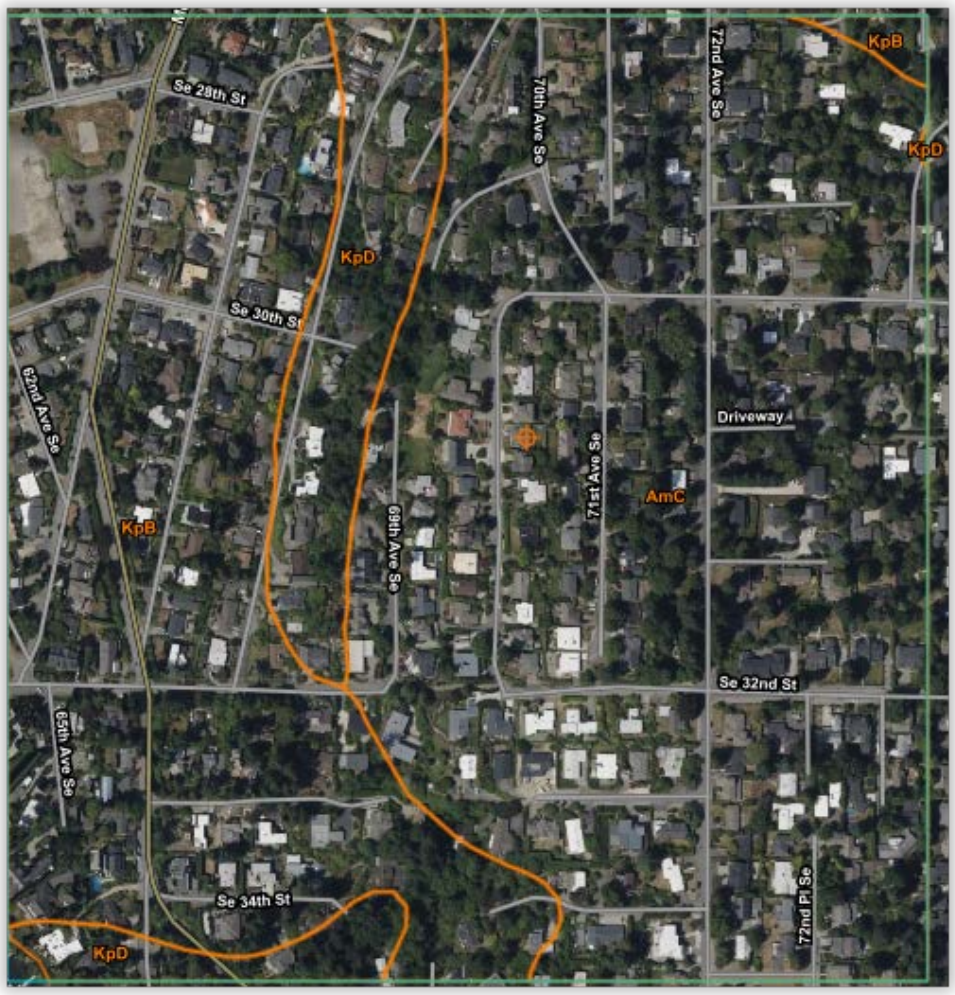


FIGURE 1: VACINITY MAP (NTS)



Map Unit Legend

King County Area, Washington (WA633)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AmC	Arents, Alderwood material, 6 to 15 percent slopes	63.9	55.2%
KpB	Kitsap silt loam, 2 to 8 percent slopes	41.4	35.8%
KpD	Kitsap silt loam, 15 to 30 percent slopes	10.3	8.9%
Totals for Area of Interest		**115.7**	**100.0%**

FIGURE 2: SOIL SURVEY MAP (NTS)

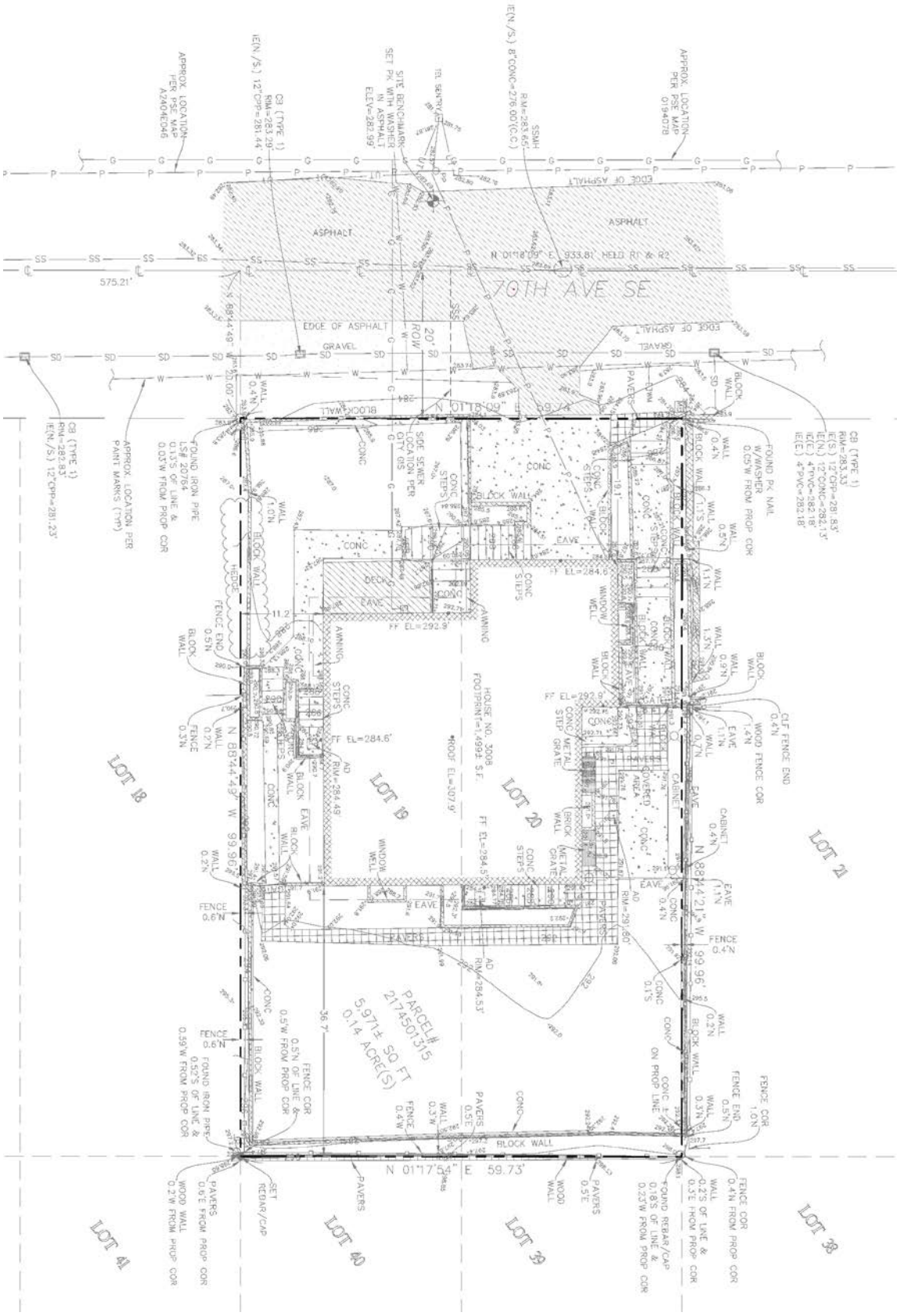


FIGURE 3: EXISITNG SITE DEVELOPEMENT MAP (NTS)

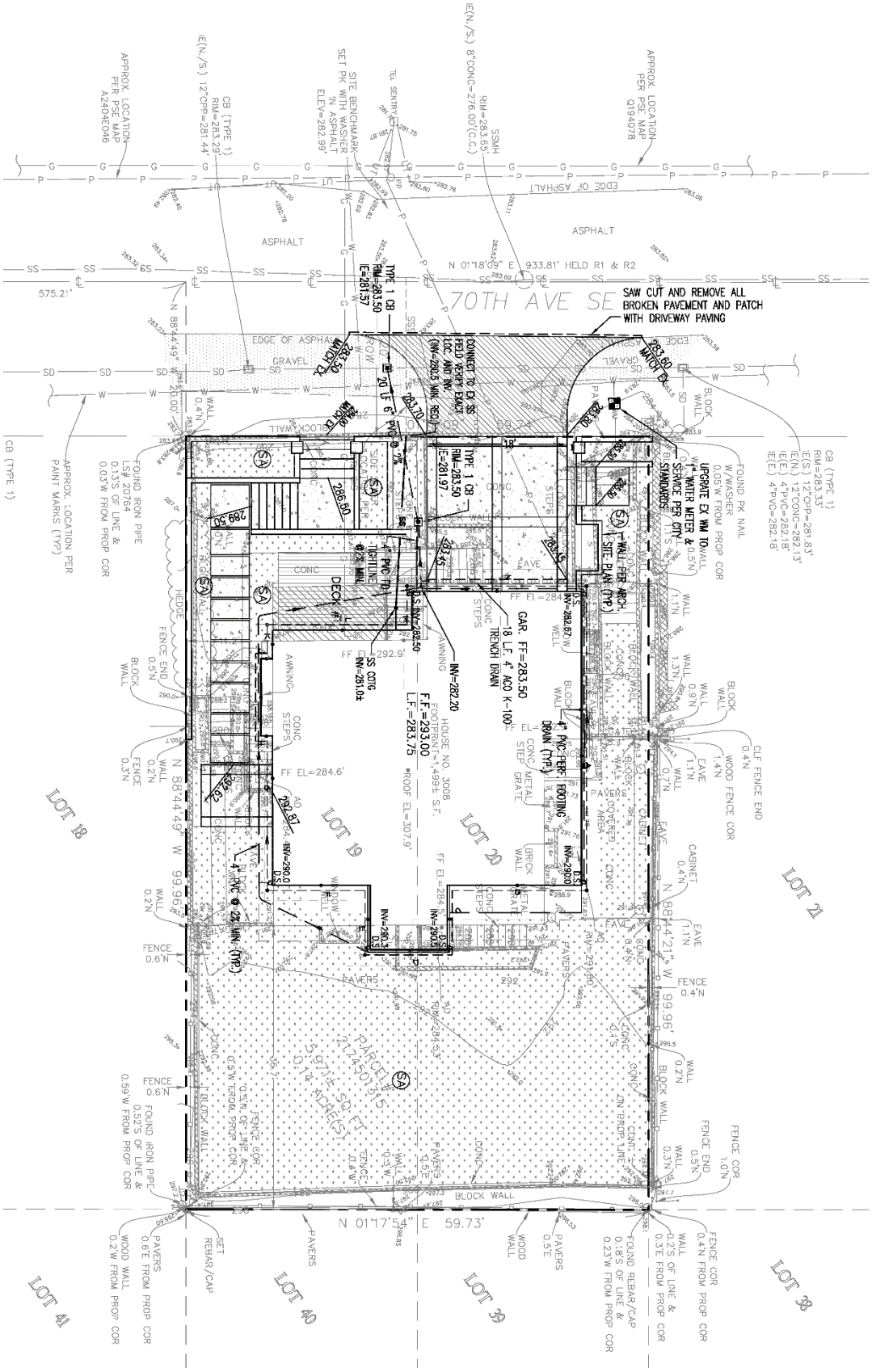


FIGURE 3A: PROPOSED SITE DEVELOPEMENT MAP (NTS)

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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 that have their own drainage system that discharges to the street drainage system. No sign of upstream drainage issue on subject property. The upstream drainage will not affect the drainage system on site. 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 70th Avenue SE, west of the property street frontage. 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 intersection W Mercer Way and SE 32nd Street, as shown on Figure 5 - Downstream Map. The drainage system discharges to Lake Washington.

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: AmC - Arents, Alderwood Material
g) Wetland Inventory Maps: None

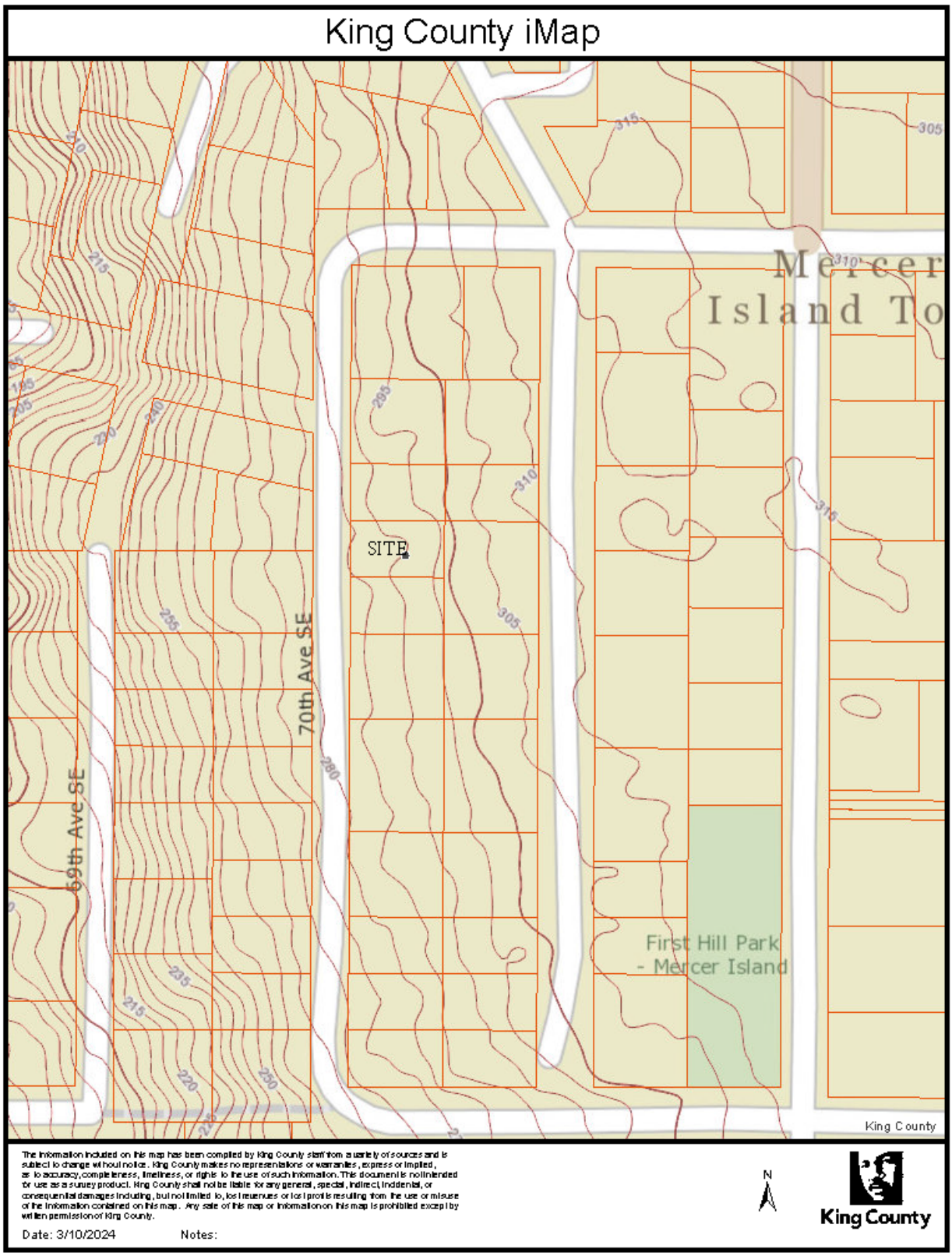

FIGURE 4: KING COUNTY TOPOGRAPHIC MAP (NTS)

Task 3. Field Inspection

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

Field Study

1. Upstream area of the subject parcel consists of developed single-family residential buildings that have their own drainage system that discharges to the street drainage system. No sign of upstream drainage issue on subject property.
2. No existing or potential constraint or lack of capacity in the existing drainage pipe system was apparent.
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 size encountered is 12-inch in diameters of DIP, Concrete, CMP and HDPE.
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 March 10, 2024. The weather was cloudy with light rain and 44 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 discharges at the west property line **(A)** to the street drainage system. Surface flow enters a CB **(B)** approximately 8 l.f. from the property line (See Figure 5, Downstream Map). It continues in a 12" DI pipe on the east edge of the street approximately 38 l.f. under the driveway to another CB (**C**). Then, it continues travels southerly through multiple catch basins at the same street side approximately 495 L.F. in the 12" pipes to another Type 1 CB (point **D**) with vaned grate located at the northeast corner of 70th Avenue SE and SE 32nd Street intersection. From here, it crosses under the street to the south west side to another Type 1 CB **(E**) at the edge of pavement , approximately 27 L.F. at the top of the trail. It then continues westerly along a trail through 2 more catch basins but are not visible on site approximately 230 l.f. to another Type 1 CB **(F)** located at the each of private driveway, end of trail. At this point, it flows northwesterly for approximately 15 l.f. to yet another catch basin (**G**) located at the east edge of 69th Avenue SE and SE 32nd Street intersection. Then, it travels in the 12" pipe crossing 69th Avenue SE approximately 30 l.f. to a catch basin (H) located on the west side of the street or northwest corner of the intersection. From here, it continues on the north side of SE 32nd Street through 5 more catch basins approximately 275 l.f. in the 12" pipe to another Type 1 CB **(I**). It then continues down slope crossing under the concrete pavement southwesterly direction approximately 45 l.f. to another Type 1 CB **(J)** located

on the south side of the same street. Runoff continues westerly on the same side of the street approximately 215 l.f. through 2 more catch basins to another Type 1 CB **(K)** located at the south side of SE 32nd Street near the intersection of W Mercer Way. From here it continues for another 22 l.f. to another Type 1 CB **(L)** located at the southeast intersection of W Mercer Way where the analysis is terminated for a total approximately distance of 1,400 l.f. During the downstream drainage field visit, no 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. No open ditch existed along the route. Due to the fairly steep 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

Catch Basin – At point B, Looking Downstream

Catch Bain – At Point C

Looking Downstream from Catch Basin – At Point C

Near intersection East Edge Catch Basin – Point D

Catch Basin – Point E Top of Trail

Catch Basin under Car at Point F at end of trail

Exposed pipe next to trail near top of trail Point E, no joint leaking

Cath Basin at Point G near end of trail

Catch Basin Point H - West of 69th Ave SE at intersection - Looking West

Catch Basin along Noth side of SE 32nd Street, At Point I

Catch Basin along Noth side of SE 32nd Street, Downstream of Point H

Catch Basin along Noth side of SE 32nd Street, At Point J

Catch Basin along South Side of SE 32nd Street, Downstream of Point J

Catch Basin At Eath side of W Mercer Way, At Point L. End of Analysis Looking Downstream

Catch Basin at South Side of SE 32nd Street, At Point K