

DOWNSTREAM ANALYSIS
FOR
SINGLE FAMILY RESIDENCE
2419 72ND AVE SE
MERCER ISLAND, WA 98040

May 20, 2024



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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 and pipe water course, 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 2419 72nd Avenue SE, Mercer Island, (see Figure 1, Vicinity Map in Section I). The total lot area is approximately 8,936 s.f. and the proposed total impervious area is approximately 3,664 s.f. (3,101 s.f. building roof, 45 s.f. of deck, 396 s.f. and 122 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% slopes. 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 surface parking, open lawn and trees. The lot is surrounded by single family residences at all sides and access from paved 72nd Avenue SE to the east (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. 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).

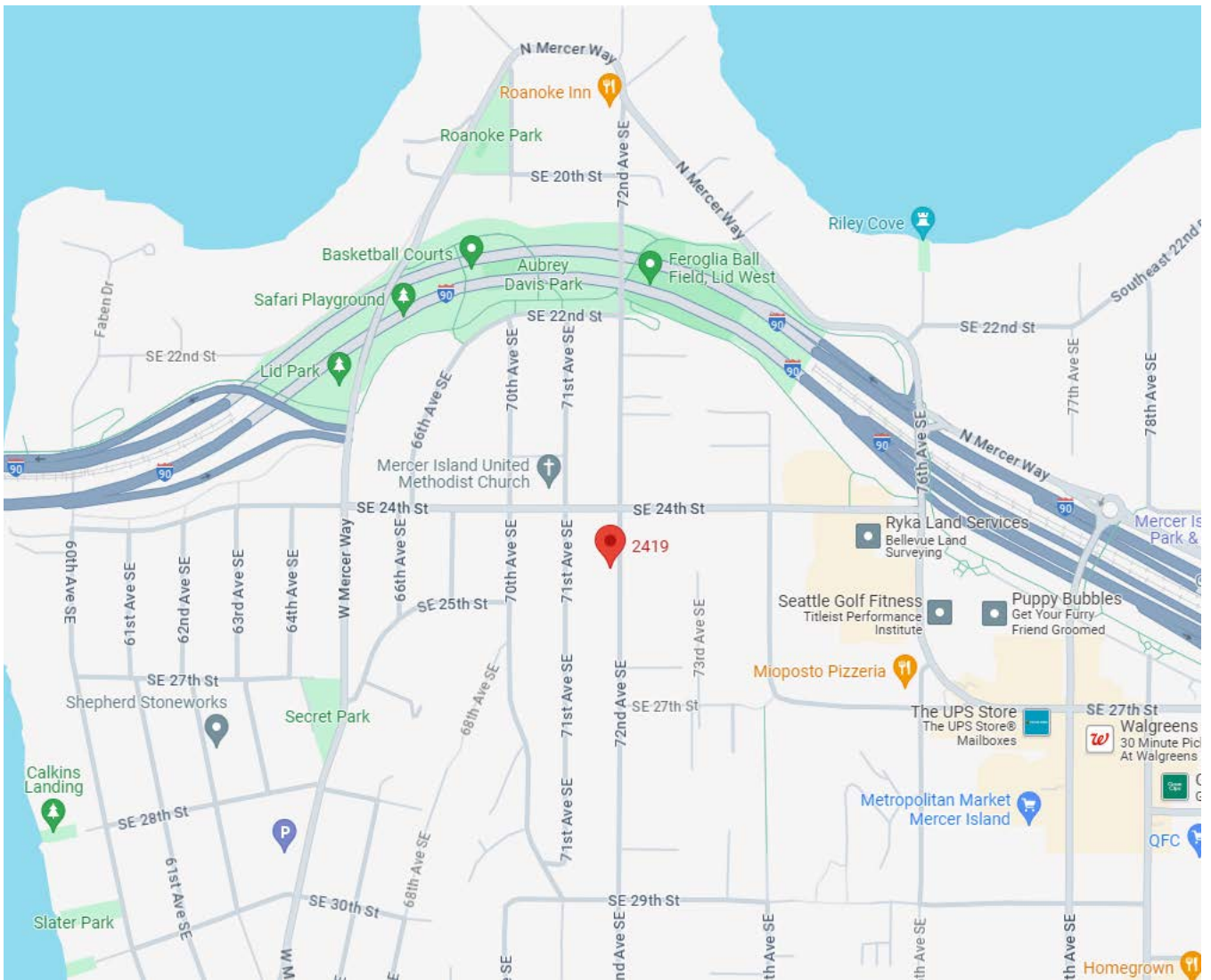


FIGURE 1: VACINITY MAP (NTS)

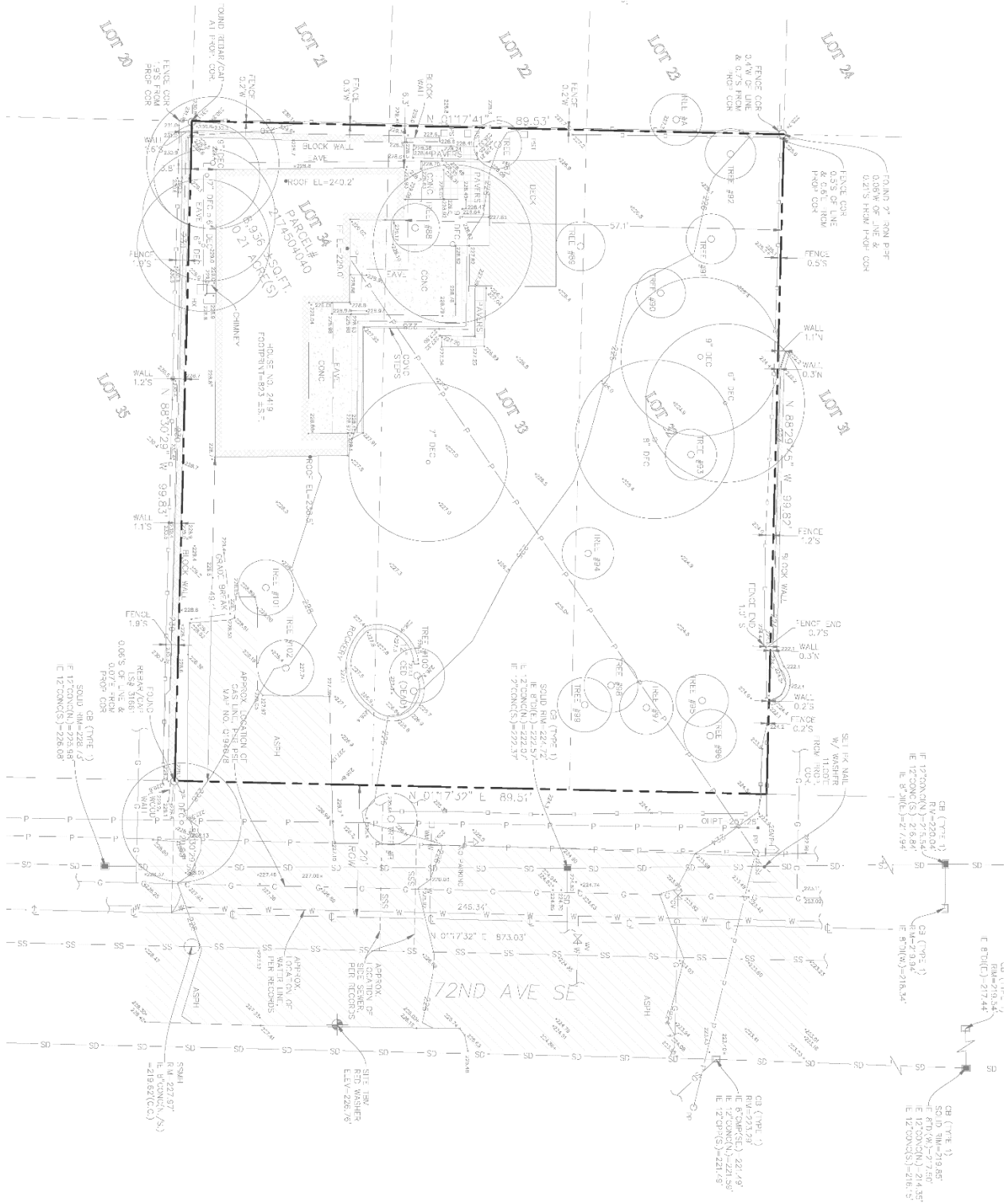


FIGURE 3: EXISTING SITE DEVELOPEMENT MAP (NTS)

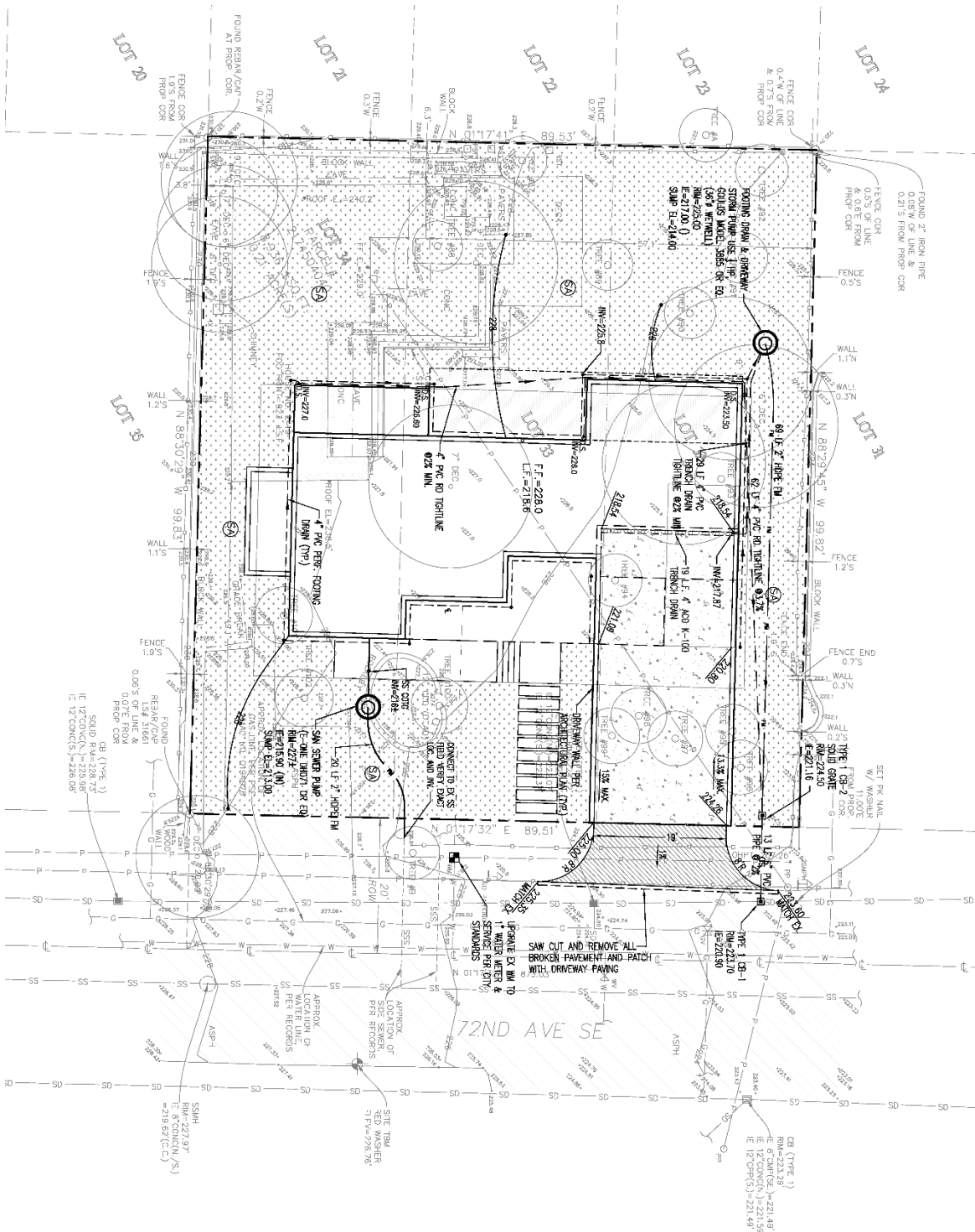


FIGURE 3A: PROPOSED SITE DEVELOPMENT MAP (NTS)



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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 be discharged to the existing storm system along the 72nd Avenue SE, east 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 near the intersection of SE 24th Street and 76th Avenue SE, 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: KpB – Kitsap silt loam
- g) Wetland Inventory Maps: None

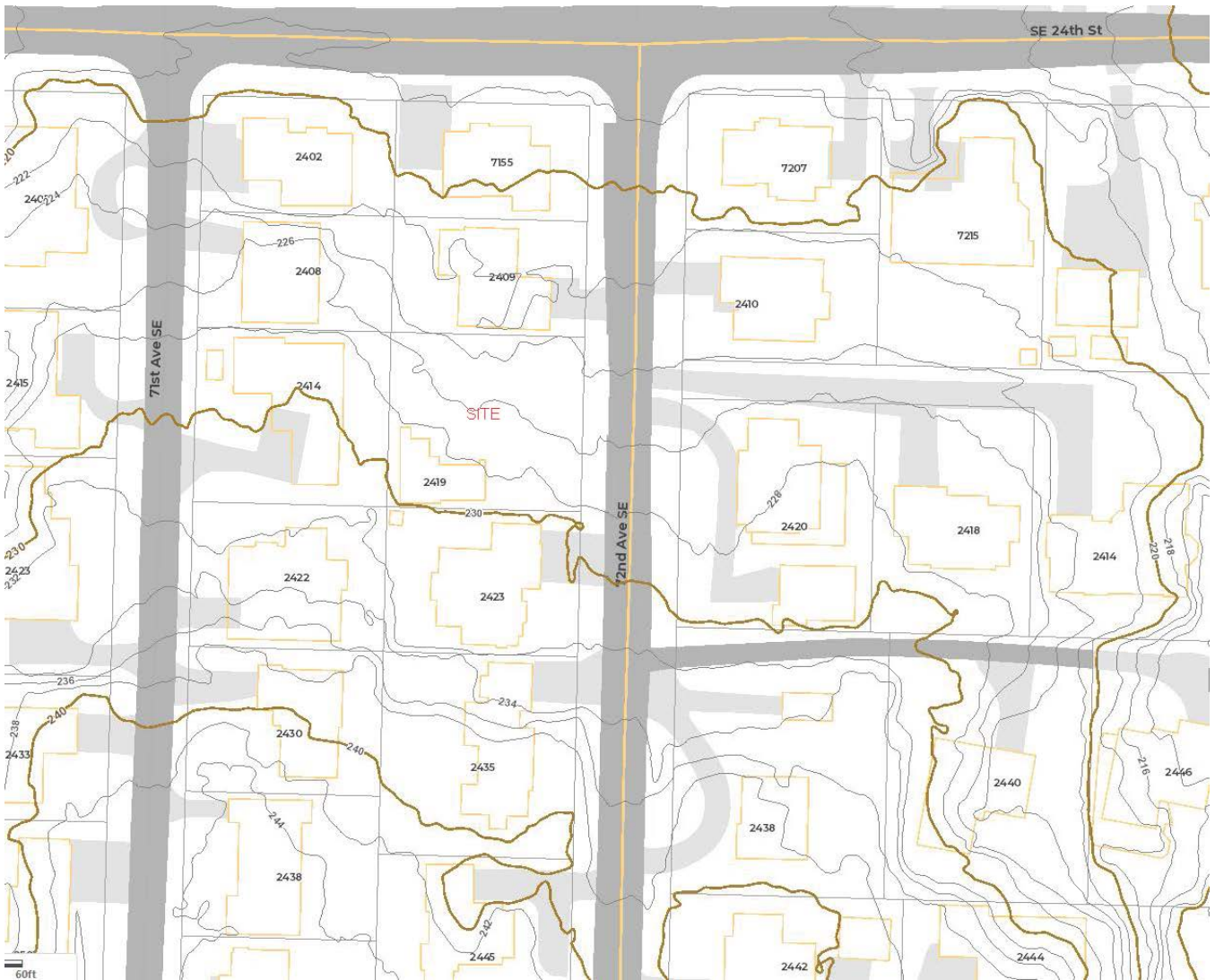


FIGURE 4: TOPOGRAPHIC MAP (NTS)

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. Only surface runoff on will continue as is. 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 consists of 12-inch to 24-inch diameters of Concrete 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 May 18, 2024. The weather was cloudy with light rain and 54 °F.

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 sheet flow at the east property line (**A**) to the street drainage system and flows northerly. Surface flow enters a Type 1 CB (**B**) with solid grade from an open grate catch basin next to it approximately 109 l.f. from the property (See Figure 5, Downstream Map). It continues in a 12" concrete pipe on the east edge of the street approximately 57 l.f. that connect to the SE 24th St drainage system at point (**C**) without a structure per GIS record. Then, it continues travels easterly approximately 33 l.f. to a CB (**D**) with vaned grate located near the southeast corner of the intersection, it then continues to another catch basin (**E**) with vaned grate located at the curb line approximately 22 l.f. From here, runoff travels approximately 85 l.f. in the same direction to a CB (**F**) with grate located at the driveway approach. Then, it continues approximately for another 22 l.f. to a solid grate CB (**G**) located at another driveway approach. At this point runoff continues through multiple catch basins (**H** to **L**) with solid grate located at the asphalt sidewalk approximately 502 l.f. to the southwest corner intersection of 74th Ave SE and SE 24th St. It then crosses 74th Ave SE approximately 56 l.f. to another solid grate catch basin (**M**) located at the sidewalk. From here, it continues at the similar fashion approximately 146 l.f. to another solid grate CB (point **N**). Then , it continues approximately 59 l.f. to another catch basin (**O**) with vaned grate located at the curb line. From here, it continues to another solid grate CB (**P**) approximately 38 l.f. It

then enters another catch basin (Q) approximately 23 l.f. located at the curb line of a driveway. It continues easterly approximately 22 l.f. to yet another solid grade CB (R) near the curb line. Then, it travels approximately 126 l.f. to another CB (S) with vaned grate located at the curb line. At this point, runoff continues southeasterly direction approximately 84 l.f. to a Type II CB (T) with round solid grate. Runoff continues southeasterly approximately 46 l.f. to discharge to a pipe water course in a Type II CB (U) with open round grate where the analysis is terminated for a total approximately distance of 1,380 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 downstream 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:

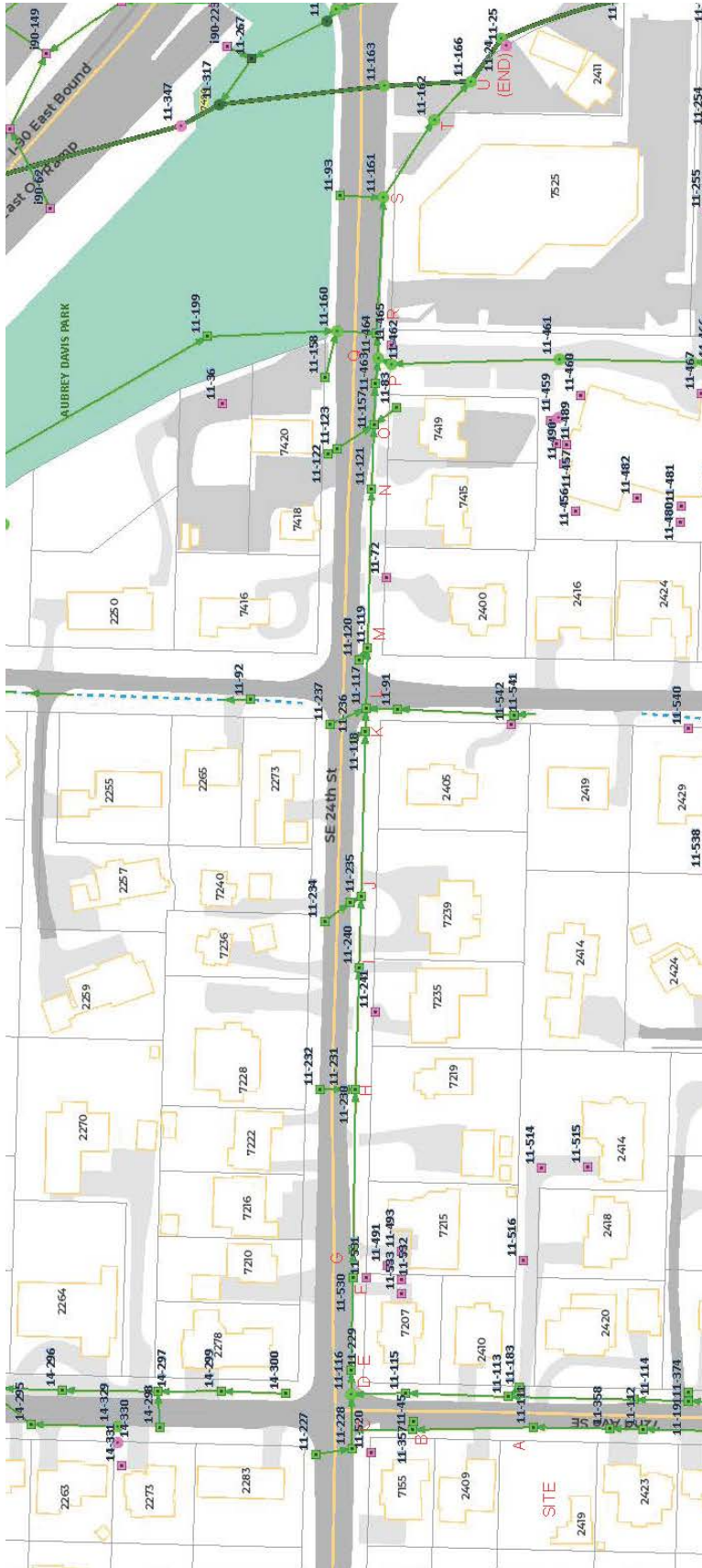


FIGURE 5: DOWNSTREAM MAP (NTS) 

DOWNSTREAM PHOTOS



Catch Basin – At point B, Looking Downstream



Looking Downstream from Catch Basin – At Point D



Inside Catch Basin – At Point B



Catch Basin – Point F



Catch Basin – Point G



Catch Basin at Point K - Looking East



Catch Basin - Solid grate at H



Catch Basin at point L



Catch Basin at Point M



Catch Basin at Point O



Catch Basin at Point N



Catch Basin at Point P



Catch Basin At Point Q at driveway



Catch Basin At Point S



Catch Basin At Point R



Catch Basin At Point T



Catch Basin At Point U – Pipe water
course