



PACIFIC LAND ENGINEERING

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Utilities Design . Permit Expediting . Construction Inspection*

RESIDENTIAL • COMMERCIAL • GOVERNMENT
Bellevue, WA 98005 • (425) 615 – 6160
info@pacificlandwa.com

Level – I Drainage Report

Prepared for

Project 4833 MI

Mr. Jintao (Adison) Cui

Home-Link Capital LLC

7683 SE 27th Street, Unit 186

Mercer Island, WA 98040

(206) 265 – 0810

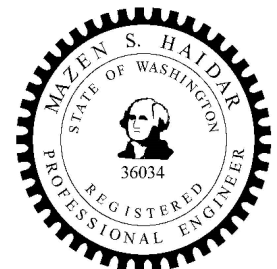
adisoncui@outlook.com

Prepared By:

Mazen Haidar, PE
Principal Engineer

Date Prepared:

November 1st, 2022



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Disclaimer,

This Level – I Drainage Report was prepared for Home Link LLC for Project 4833 4 - Lot Preliminary Short Plat. Pacific Land Engineering, Inc. (PLE), prepared this report for the exclusive use of its staff and its authorized agent(s) only. Any use of and/or reliance on this report and any of its contents, and/or any revisions to project's information / description, design plans, documentation, and/or the herein described development's improvements design concepts without the advanced and explicit written authorization from Pacific Land Engineering, Inc., (PLE) as well as the endorsing engineer is strictly forbidden.

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Table of Contents

1. Project Overview

- Existing Site Conditions and Hydrology.
- Vicinity Map.
- Site Photos.
- Critical Areas Map.
- Developed Site Conditions.

2. Downstream Analysis

- Downstream ¼ Mile Analysis Description.
- Downstream ¼ Mile Map.
- Downstream ¼ Mile Photos.

3. Developed Site Conditions

- Lot Calculations.
- Lot Coverage Calculations.
- Impervious Area Calculations.

4. Developed Site Hydrology

- Existing Site Conditions Area Calculations.
- Developed Site Conditions Area Calculations.
- Pollution Generating Impervious Area Calculations.
- WWHM12 Hydraulic Modeling.

5. References

- City Notes for Pre-Application PRE22-028.

6. Special Reports

- Geotechnical Report by GEO Group Northwest, Inc.
- Geotechnical Addendum by GEO Group Northwest, Inc.
- Arborist Report by ARBOR INFO LLC.

7. Engineer's Conclusion

- Engineer's Conclusion.

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Project Overview

- **Existing Site Conditions and Hydrology,**

The subject property is King County parcel number 4351300487 encumbering 41,165 sf / 0.945 acre (per survey) of fully developed land situated in Section 19, Township 24 North, Range 5 East and is legally described as LINDEY ADD TO Seattle N 200 FT of S 400 of VAC BLK 4 TGW POR VAC ST SC 679116 LESS ST LESS Mercer Island Trunk LN. The subject parcel is in residential zoned R – 8.4 area of the city of Mercer Island, more specifically, the subject parcel is located at 4833 90th Avenue SE, Mercer Island WA 98040. The subject parcel is boarded by fully developed residential properties across its north and south property lines, by Island Crest Way across its westerly property line, and by 90th Ave SE across its easterly property, see attached vicinity map exhibit for additional information. The subject parcel is currently occupied by existing house, attached garage / carport, and existing U-shaped gravel driveway all to be removed (TBR). The existing ground cover in the subject parcel predominantly consist of large cluster of mature trees, second growth understory vegetation, and single-family back yard lawns. The existing site topography is oriented east to west with overall grade slope of 2% to 5% before changing to over than 20% within Island Crest Way right-of-way across the subject parcel westerly property line.

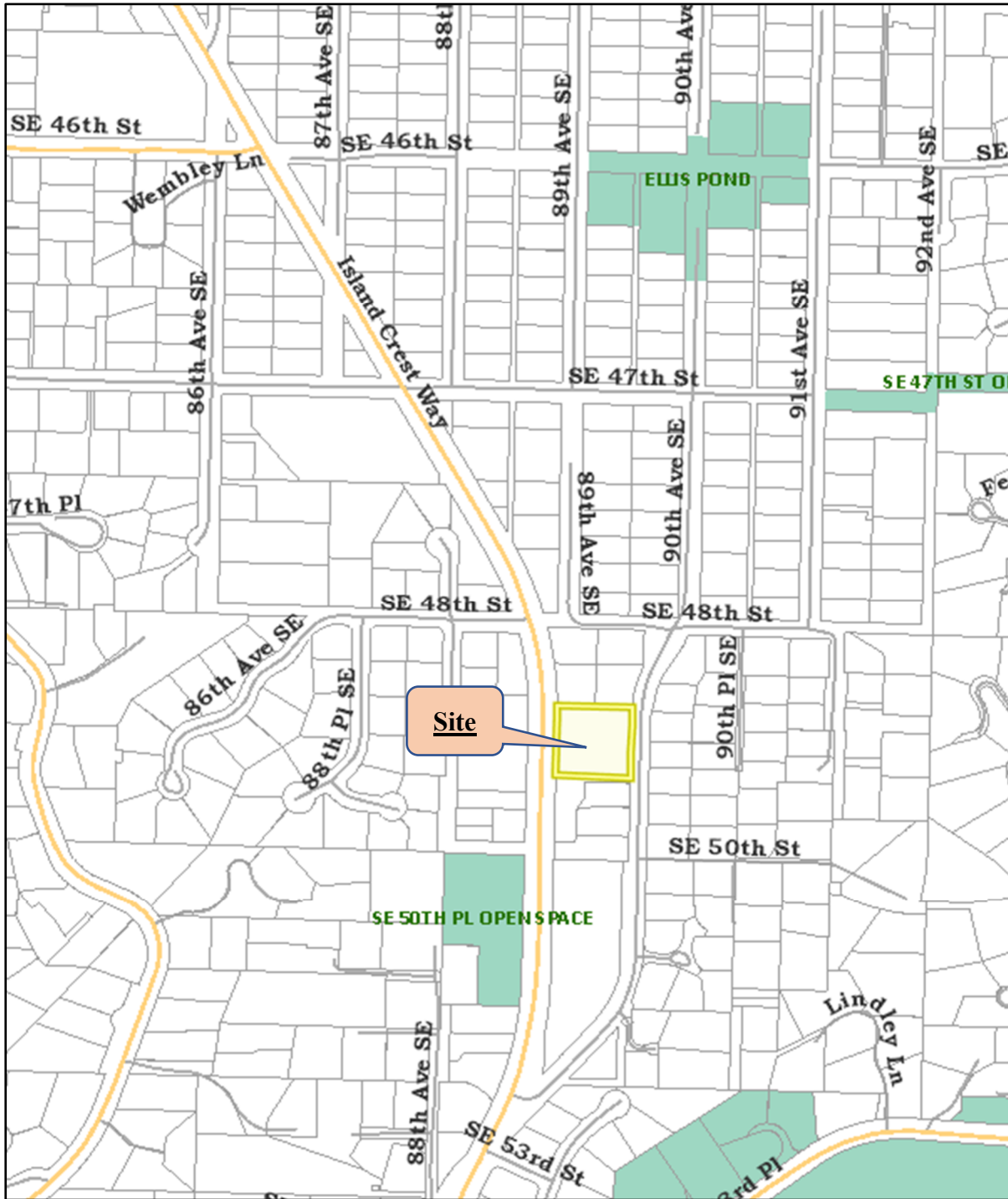
Public Water and sewer system do exist in 90th Ave SE across the easterly frontage, the existing house appears connected to existing public water system and served by existing site sewage system to be removed. Surface flows appears to sheet flow in the westerly direction which is the natural discharge location for the subject site. Based on the attached site survey, and the city IGS website there appear no upstream surface flows tributary to the subject parcel, and surface flows from 90th Ave SE are intercepted by an existing roadside ditch running across the subject parcel easterly property line whereby surface flows continue southerly away from the subject parcel.

Please refer to attached existing site conditions map exhibit, attached site aerial map exhibit, attached site photos exhibit, and to the recent site survey in the attached Civil Plans set for additional information.

The subject parcel is currently accessed by 90th Ave SE which is a fully developed paved city street. The site soils have been identified as Vashon subglacial till soils and based on the Information Geography Services (IGS), the subject site appears partially located within Landslide and Erosion Hazard Areas, but it is not located in or adjacent to other type of critical areas, **please refer to attached various map exhibits for additional information.**

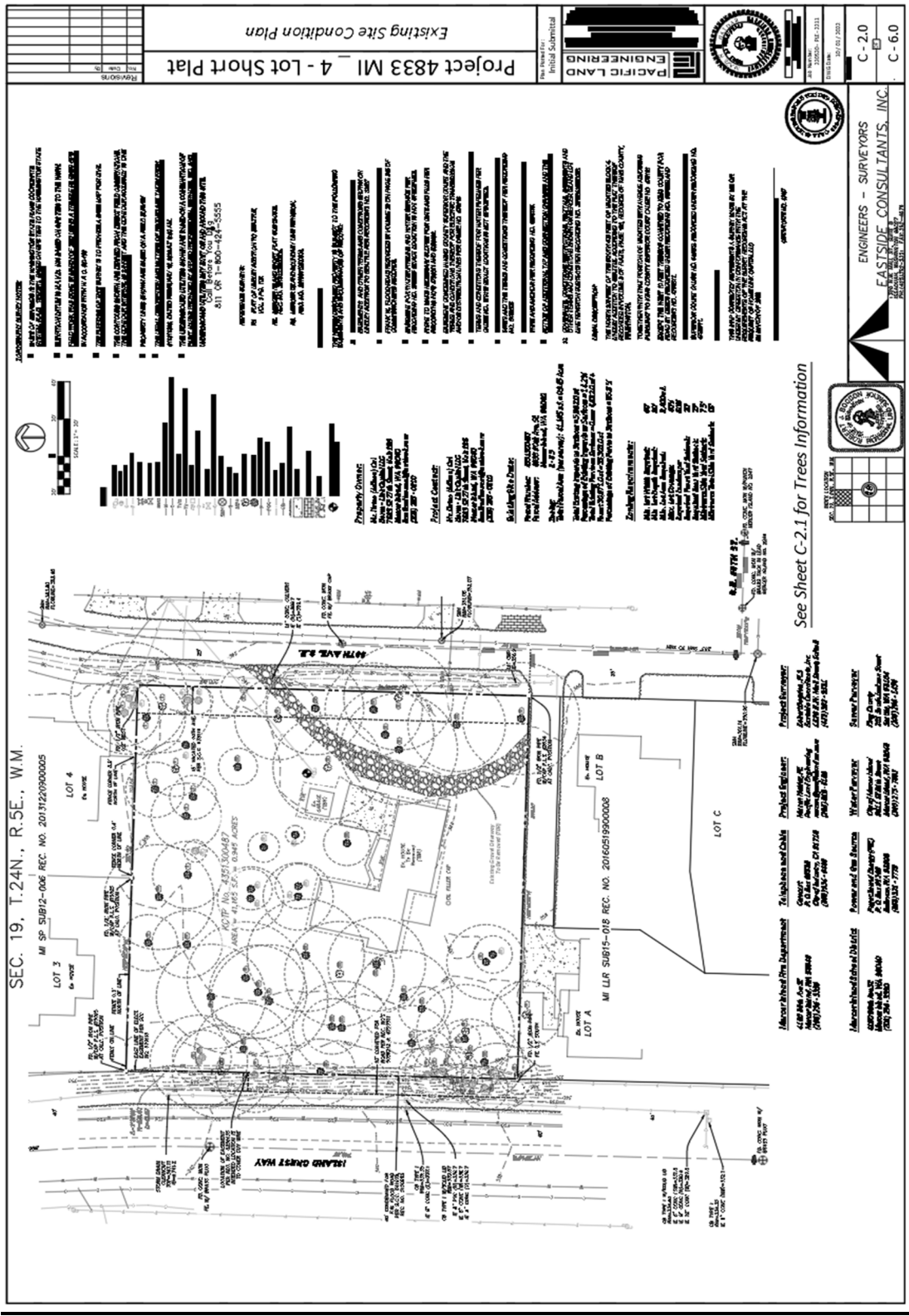
To best evaluate the site soils conditions a full Geotechnical Report dated February 18th, 2022 was prepared by GEO Group Northwest, Inc. for the subject site, **please see Special Reports Section in this report for more information.**

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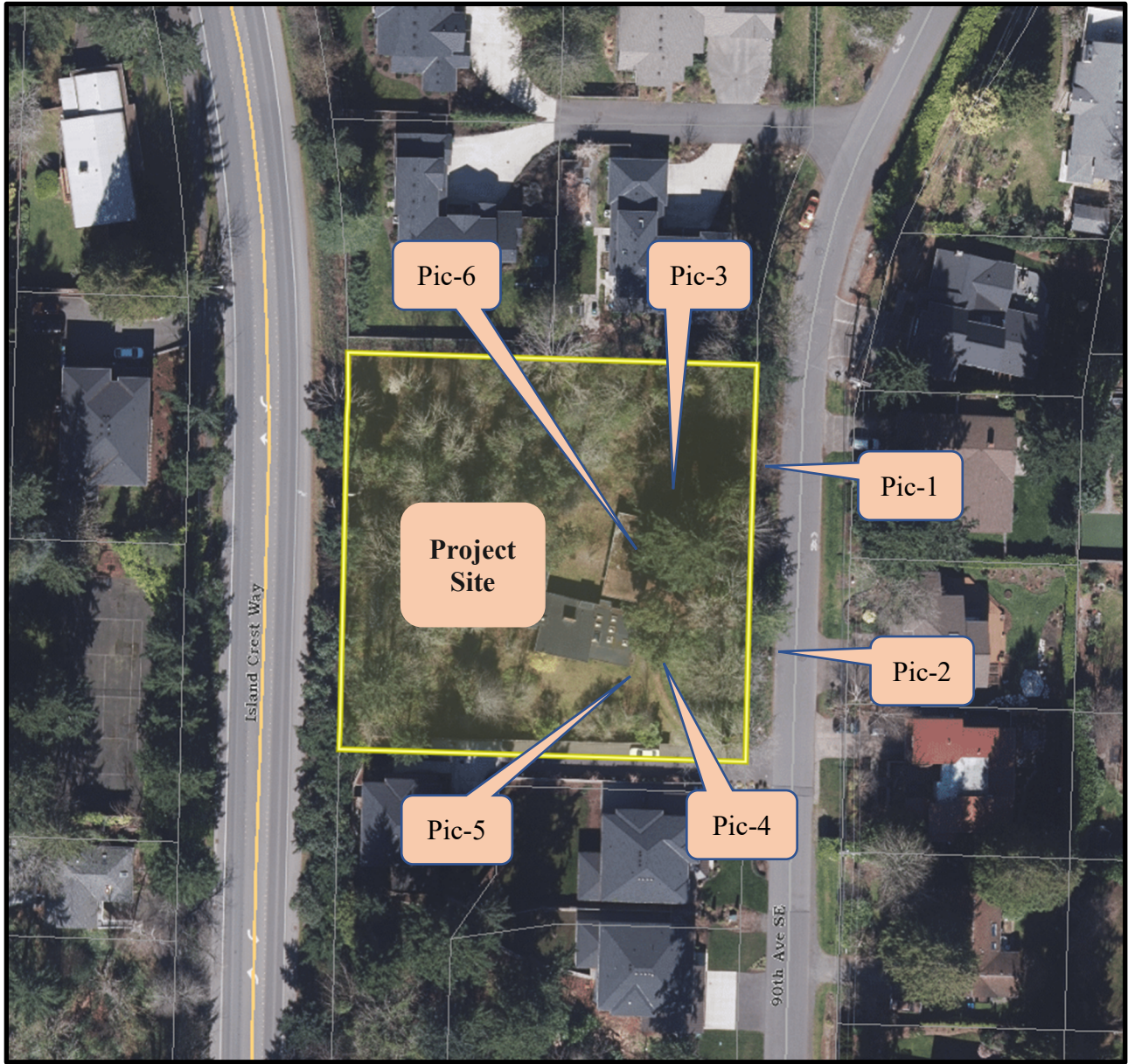
Project	Project 7833 MI 4 – Lot		
Scale	N.T.S.	Date	10 / 01 / 2022
Vicinity Map			






Project	Project 7833 MI 4 – Lot	
Scale	N.T.S.	Date 10/01/2022
Existing Site Conditions		





N.T.S.

Project	Project 7833 MI 4 – Lot			 PACIFIC LAND ENGINEERING
Scal	N.T.S	Date	10 / 01 / 2022	
Site 2020 Aerial Photo				



Pic-1, Looking north along 90th Ave SE at site entry



Pic-2, Looking south along 90th Ave SE at site entry



Pic-3, Looking SW at existing house



Pic-4, looking NW at existing house



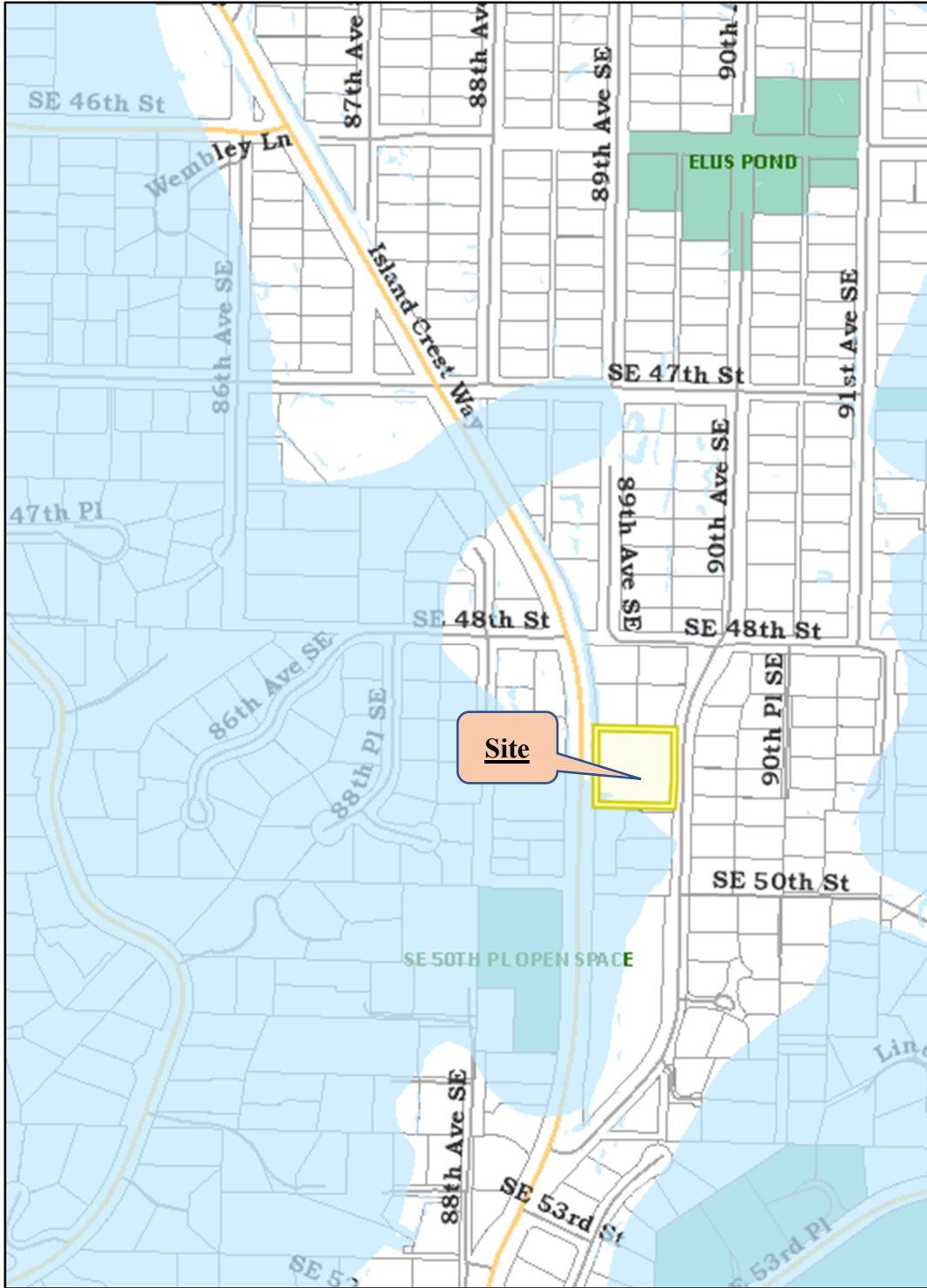
Pic-5, looking Northeast at existing house



Pic-6, Looking South at existing house

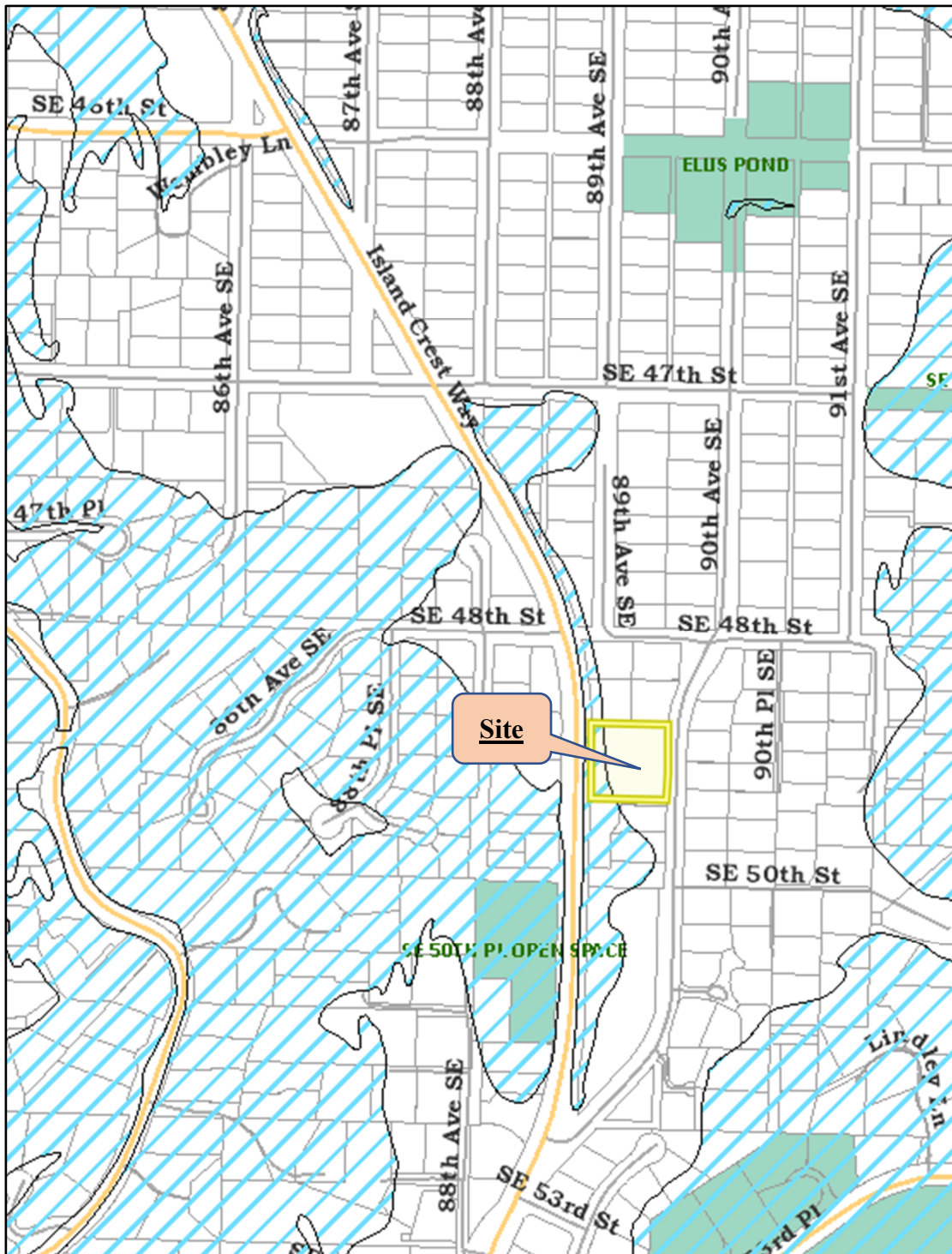
Project	Project 7833 MI 4 – Lot		
Scal	N.T.S	Date	10 / 01 / 2022
Site Photos			





Project	Project 7833 MI 4 – Lot		
Scal	N.T.S	Date	10 / 01 / 2022
Infiltration Infeasibility			

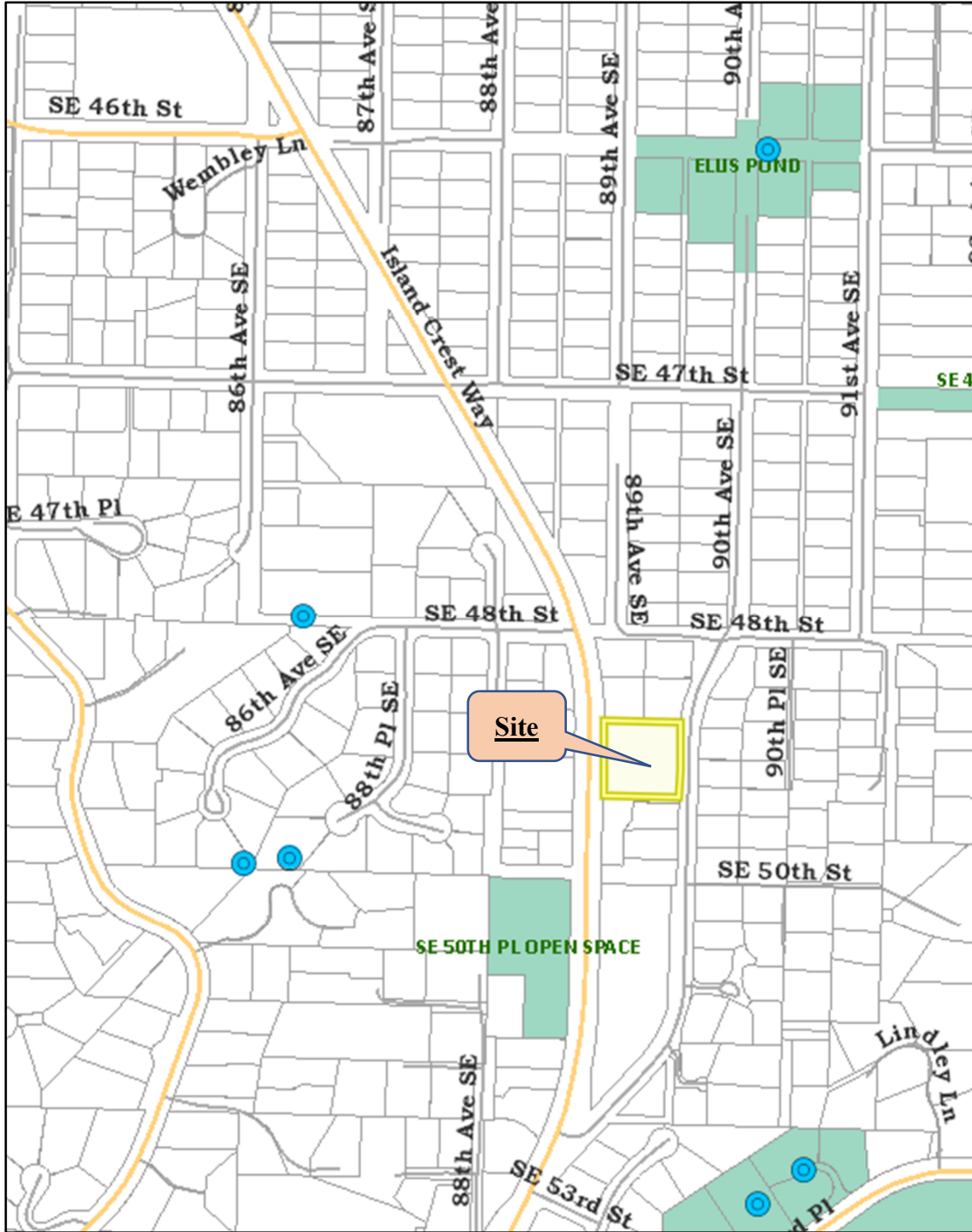




N.T.S.

Project	Project 7833 MI 4 – Lot		
Scale	N.T.S.	Date	10 / 01 / 2022
Landslide Map			

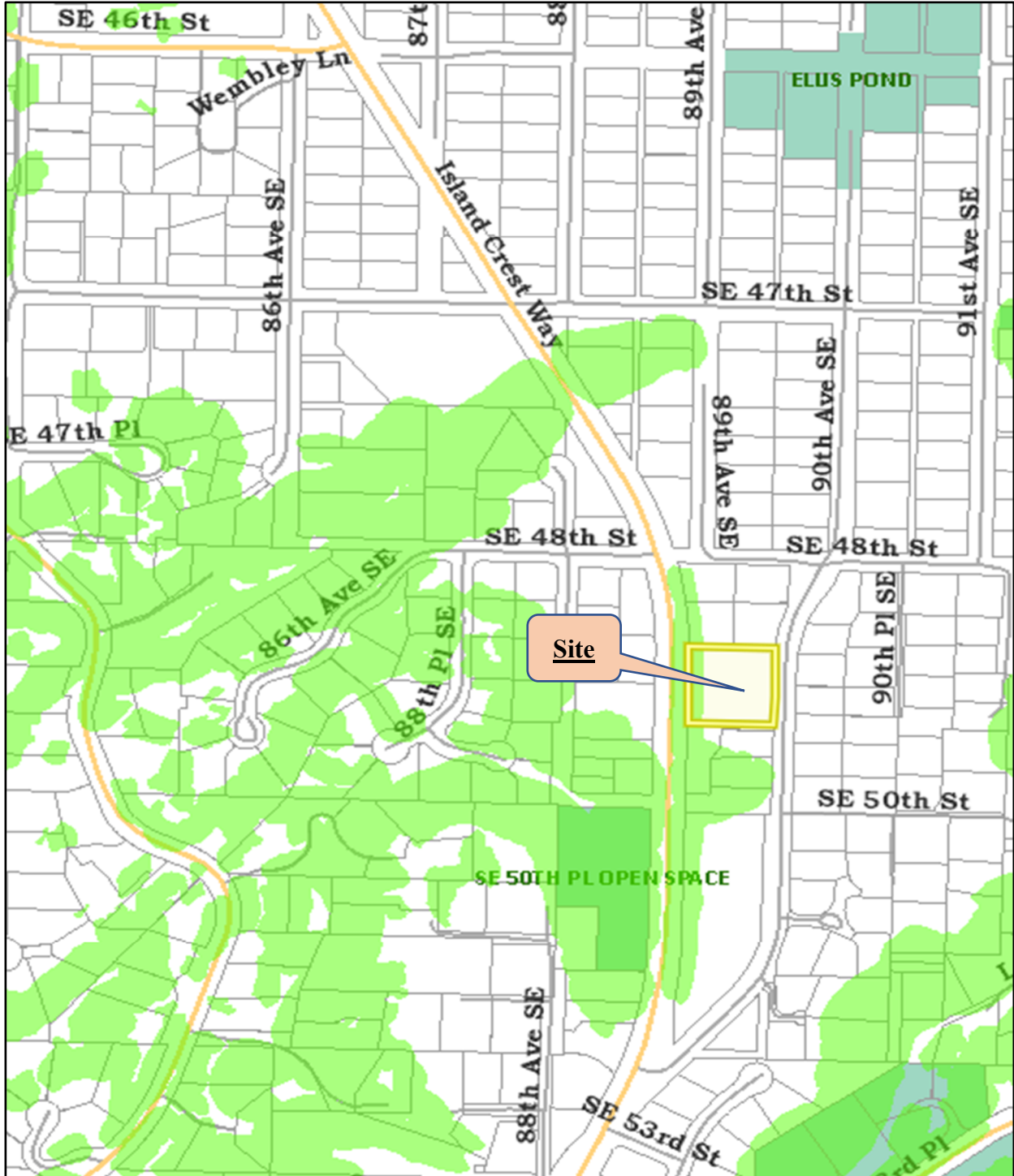




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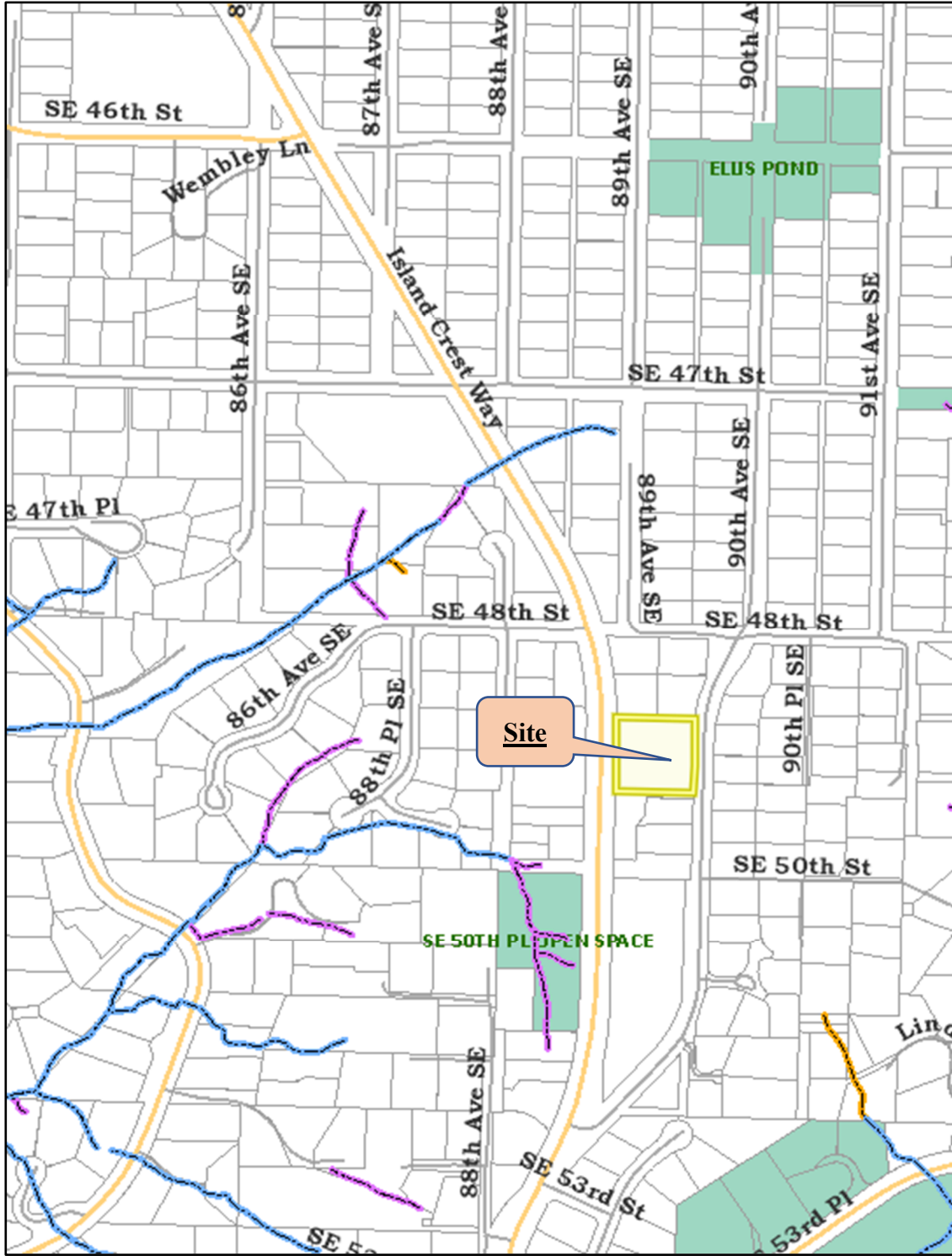
Project	Project 7833 MI 4 – Lot		
Scale	N.T.S	Date	10 / 01 / 2022
Spring Location Map			





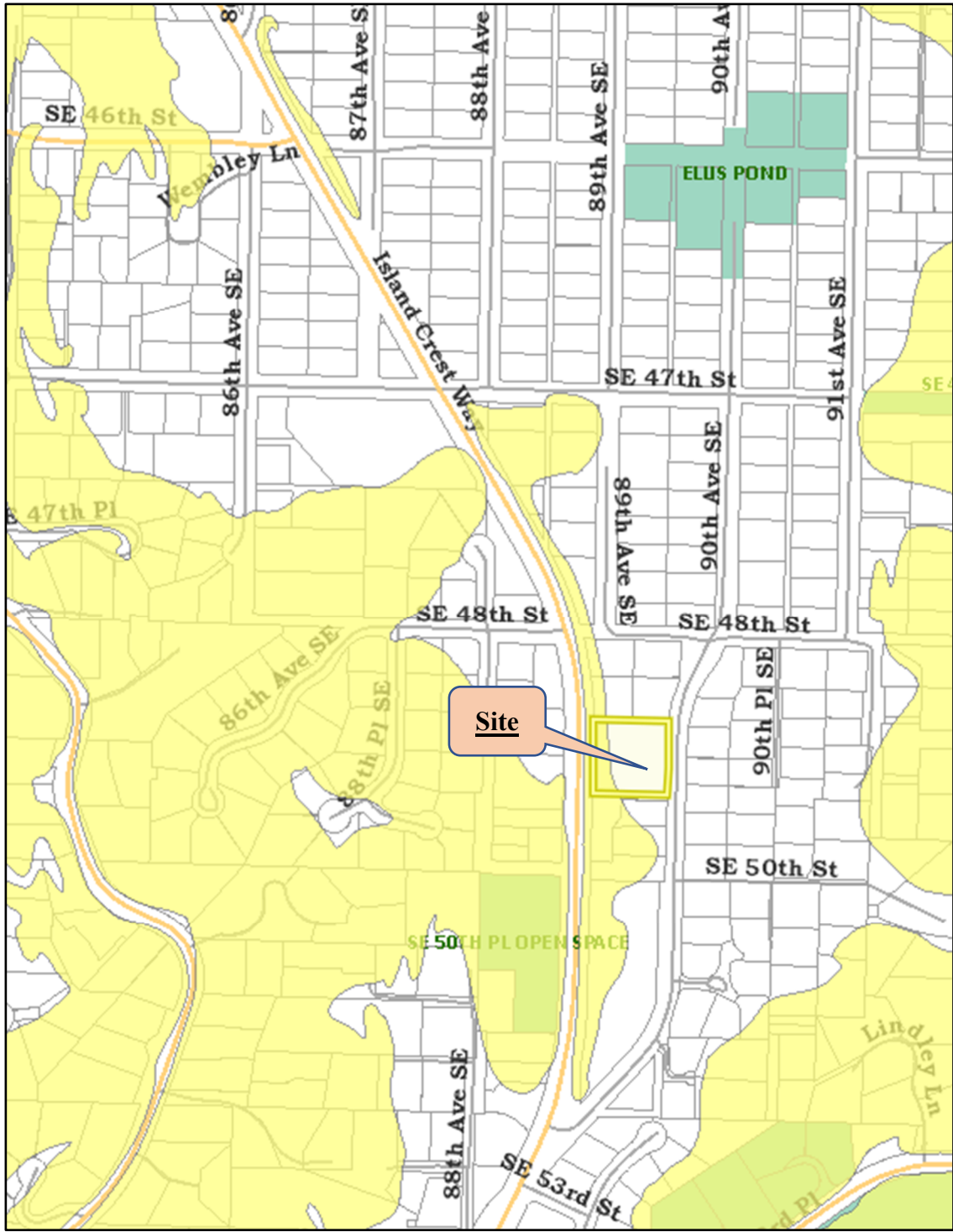
Project	Project 7833 MI 4 – Lot		
Scal	N.T.S.	Date	10 / 01 / 2022
Controlled Slope Map			





Project	Project 7833 MI 4 – Lot		
Scale	N.T.S	Date	10 / 01 / 2022
Type NP and NS (No-Fish)			



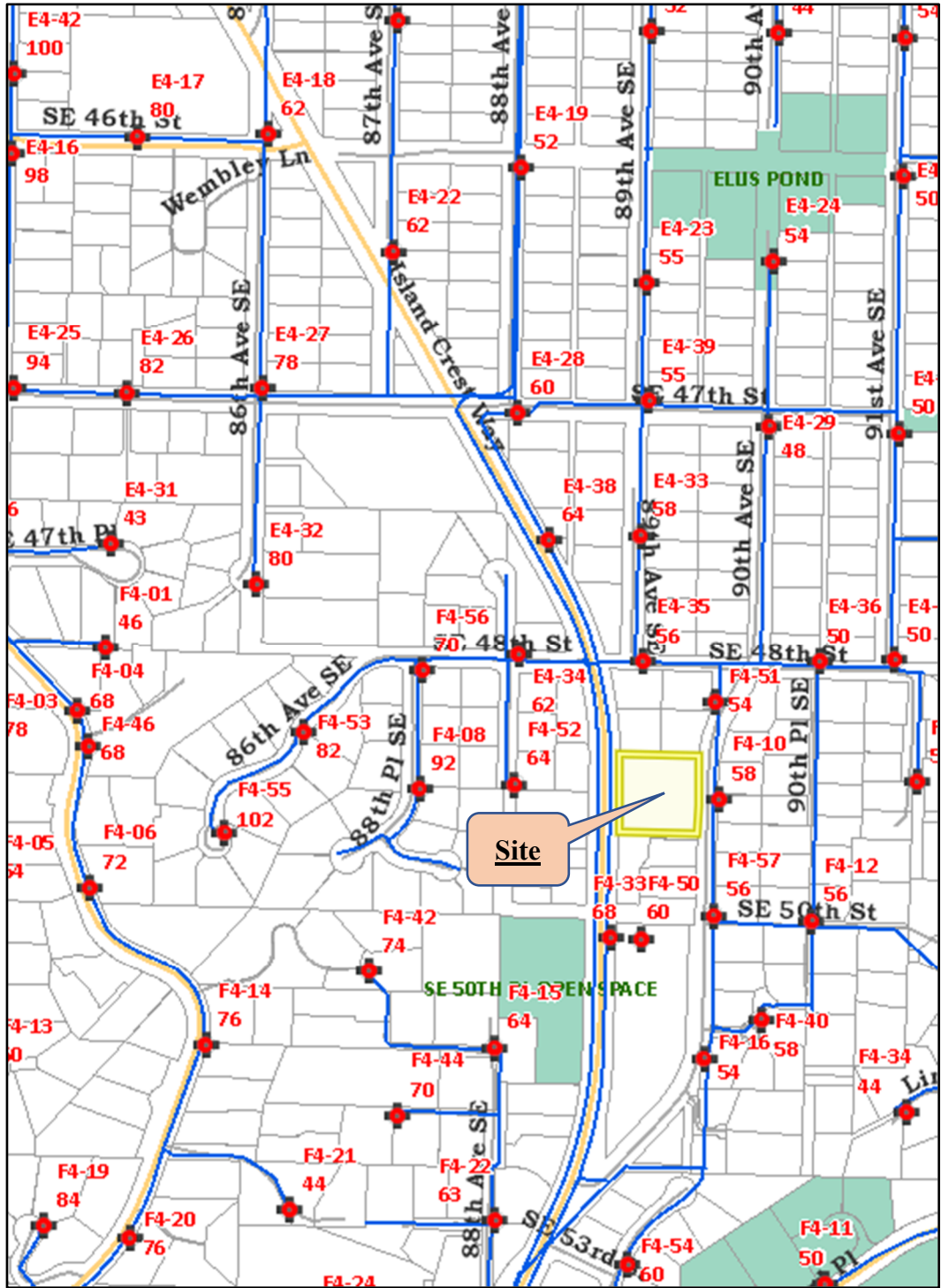


Site



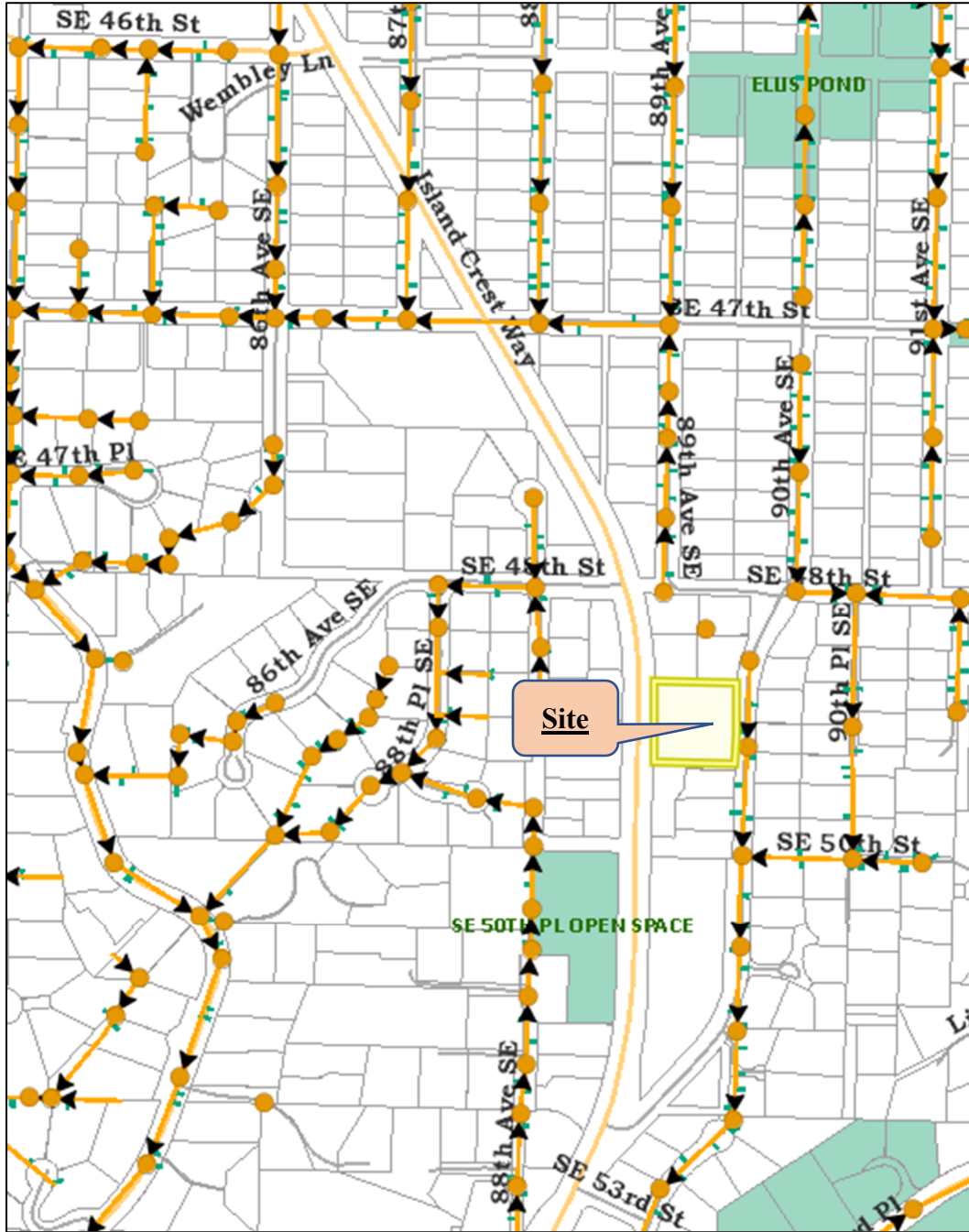
Project	Project 7833 MI 4 – Lot		
Scale	N.T.S	Date	10 / 01 / 2022
Erosion Hazard Map			





Project	Project 7833 MI 4 – Lot		
Scale	N.T.S	Date	10 / 01 / 2022
Water Mains and Fire Hydrant			

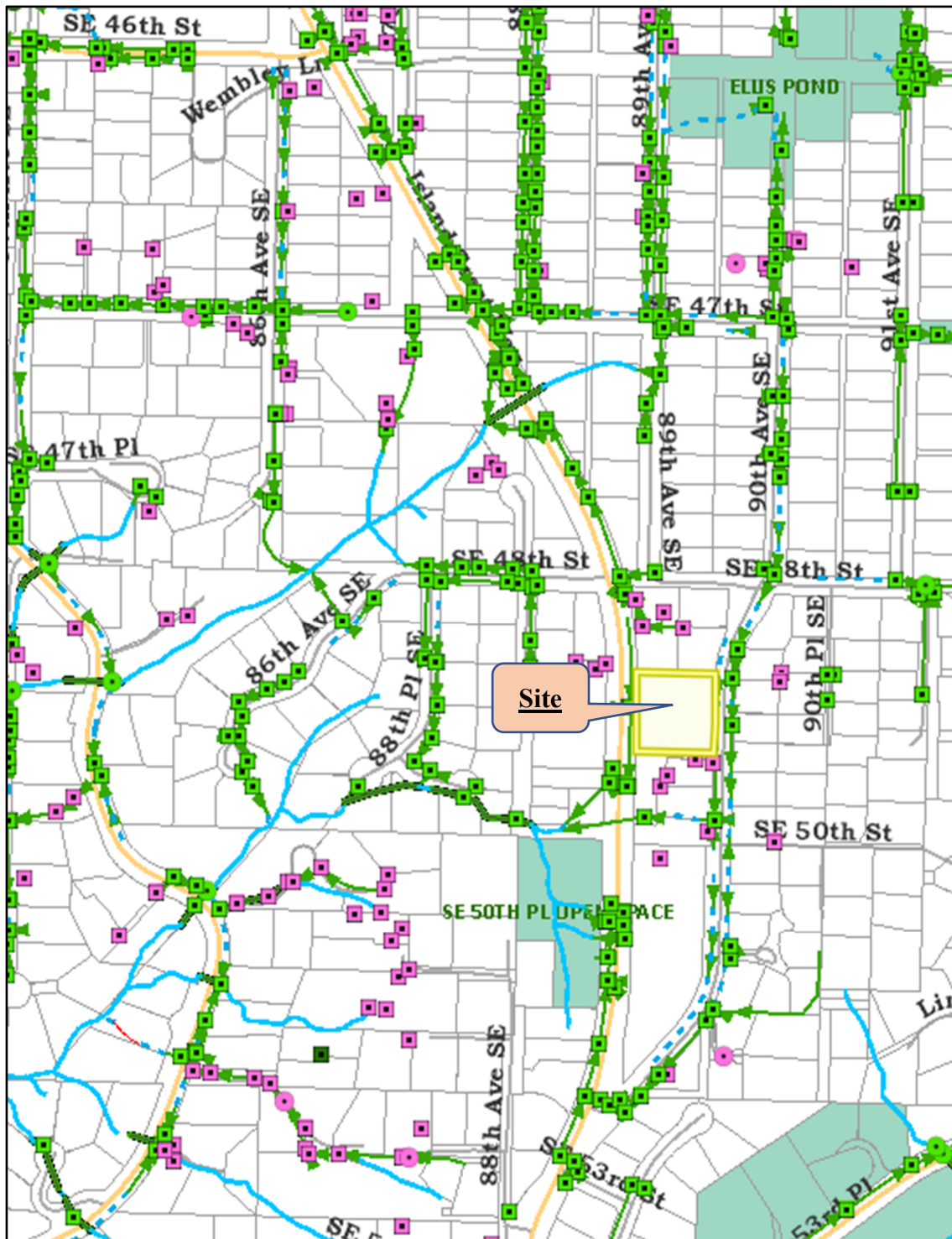




N.T.S.

Project	Project 7833 MI 4 – Lot		
Scale	N.T.S.	Date	10 / 01 / 2022
Sewer Mains and Sewer Manholes Location			





Project	Project 7833 MI 4 – Lot		
Scale	N.T.S.	Date	10 / 01 / 2022
Public Storm System Map			



- **Downstream ¼ Mile Drainage Analysis,**

Pursuant to the city of Mercer Island Drainage Code Requirement and the 2012 Washington State Department of Ecology (DOE) Drainage Manual for Western Washington as amended in 2014, a Level – I downstream analysis was conducted on May 28th, 2022 which was cloudy day following series of prior rainy days. The downstream analysis extended south and southwesterly in the natural discharge location to Lake Washington distance of 3,392' which is well beyond the ¼ mile downstream of the subject parcel.

Please refer to the attached ¼ mile Downstream Drainage Course Map Exhibit and the attached downstream drainage course photos in the following pages as you review this analysis.

As stated, the natural discharge location of the project site is to the west, however there may be very small site areas along the easterly property line that may drain to the existing roadside ditch on the westerly side of the 90th Ave SE, for this reason we followed and investigated the drainage course along east and west of the subject parcel. It is important to note that both drainage courses do combine approximately 675' downstream of the subject parcel.

Small amount of the site surface runoff sheet flow easterly and southerly off the project site to collect in an existing roadside ditch on the west side of the 90th Ave SE before entering an existing 12" culvert at **Point-1** in the vicinity of the southeast corner of the subject parcel. Surface flows continue southerly in this existing culvert approximately 183' before arriving at an existing catch basin at **Point-2**, turning westerly surface flows continue in an existing tightline storm system and open drainage ditch approximately 178' through private properties before arriving at another storm tightline system and before crossing under Island Crest Way and continues southwesterly in heavily vegetated natural drainage channel approximately 224' before arriving at **Point – 4**, continuing southwesterly surface flows travel in this natural drainage channel approximately 90' before arriving at **Point – 5**. In the meantime, most of the site surface runoffs sheet flow westerly over Island Crest Way road-bank at **Point – 1A**, thereafter, surface flows continue southerly along the east edge of Island Crest Way approximately 200' before entering an existing catch basin at **Point – 1B**, turning west, surface flows cross under Island Crest Way in an existing storm conveyance system traveling approximately 50' before arriving at **Point – 3**, continuing southwesterly surface flows travel approximately 175' before arriving at **Point – 5**. The combined surface flows continue westerly approximately 410' through series of storm tightlines and heavily vegetated drainage channels through inaccessible private property before arriving at an existing 18" culvert at **Point – 6**, thereafter, surface flows continue southwesterly in an existing storm conveyance system approximately 210' before discharging in another inaccessible drainage channel within private property at **Point – 7**. Also continuing southwesterly surface flows travel approximately 500' in heavily vegetated drainage channel within private properties before entering an existing storm culvert on the north side of West Mercer Way at **Point – 8**, thereafter, surface flows continue southwesterly approximately 110' before discharging in an existing heavily vegetated natural drainage channel on the south side of parcel address 5045

West Mercer Street at **Point – 9**, also continuing southwesterly in heavily vegetated inaccessible drainage channel within private properties approximately 830' before arriving at **Point – 10**. Turning northwest surface continue in said heavily vegetated drainage channel for another 560' before arriving at **Point – 11** on the south side of 84th Ave SE withing parcel address 5047 84th Ave Southeast. Thereafter, surface flows continue westerly forming natural stream channel approximately 100' before arriving at **Point – 12**, also continuing westerly said stream flows travel approximately 50' before arriving at **Point – 13**, thereafter, surface flows enter an existing 24" concrete storm culvert at **Point – 14**, before traveling westerly another 300' westerly in said culvert to finally joint the waters of Lake Washington. The Level – I downstream analysis and investigation were ended at this location approximately 3,495' downstream of the subject site.

During our site visits and the ¼ downstream investigation we did not observe any signs of erosion, scouring, or flooding problems, the natural drainage channels appear stable and the existing storm conveyance systems appear functioning with as expected no problems.

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Total 3,495 LF of Downstream Drainage Course Evaluated



Project	Project 7833 MI 4 – Lot	
Scal	N.T.S	Date 10 / 01 / 2022
Downstream ¼ Mile Drainage		





Point – 1, Existing 12” Culvert.




Point – 2, Surface flows turn westerly in existing conveyance system.



Point – 1A, Surface flows leaves the site in sheet flow Island Format.



Point – 1B, Surface flows collect in Ex. CB in Crest Way.

Project	Project 7833 MI 4 – Lot		 PACIFIC LAND ENGINEERING
Scal	N.T.S	Date 10 / 01 / 2022	
Photos of Downstream ¼ Mile			



Point – 3, Surface flows enter existing CB on west side




Point – 4, Surface flows enter natural of Island Crest Way.



Point – 5, Combined Surface flows continue westerly

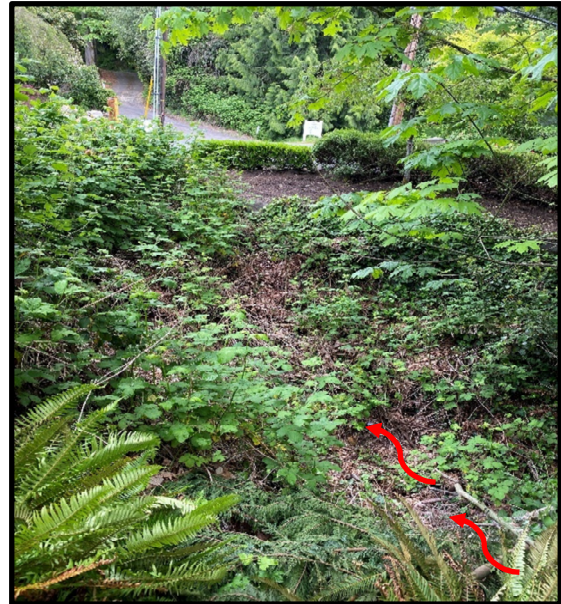


Point – 6, Surface flows enter Ex. 18" Culvert

Project	Project 7833 MI 4 – Lot		 PACIFIC LAND ENGINEERING
Scale	N.T.S	Date 10 / 01 / 2022	
Photos of Downstream ¼ Mile			



Point – 7, Surface flows discharge in heavily vegetated natural drainage channel.



Point – 8, Surface flows enter existing culvert system under West Mercer Way.



Point – 9, Surface flows discharge in existing natural drainage channel.



Point – 10, Surface flows continue in Existing Natural drainage channel.

Project	Project 7833 MI 4 – Lot		
Scal	N.T.S	Date	10 / 01 / 2022
Photos of Downstream ¼ Mile			





Point – 11, Surface flows continue in natural drainage channel.




Point – 12, Surface flows continue in natural drainage channel.



Point – 13, Surface flows continue in natural Drainage channel.



Point – 14, Surface flows enter an existing 24" concrete culvert.

Project	Project 7833 MI 4 – Lot			
Scal	N.T.S	Date	10 / 01 / 2022	
Photos of Downstream ¼ Mile Drainage Course				

- **Developed Site Conditions,**

As mentioned, the subject parcel is located within residential zoned R-8.4 area of the city of Mercer Island and therefor, the development proposal is to sub-divide the subject parcel into 4 separate residential lots consistent with MICC 19.02.020 for R-8.4 zone.

The proposed development completed the first phase of development permitting process with the city of Mercer Island under pre-application meeting number PRE22 – 028, and under which city staff issued Pre-Application Notes document dated May 17th, 2022 that included project summary, staff notes, and answers to specific questions raised by the applicant and his team, see **References Section in this Report for more information.**

Pursuant MICC 19.02.020 – Development Standards for residential R-8.4 zone and the above referenced pre-application meeting notes, the proposed development will create a total of four residential new lots as follows:

Lot #	Lot Area (SF)	Building Setbacks						Buildg. Envelope Area (SF)	Maximum Roof Area (SF)	Dwy. Area (SF)	Lot Cov. Area (SF)	% of Lot Cov.	% of Landscape
		Front	Rear	E	W	N	S						
1	10,389.71	20'	25'	10'	13'			4,440.40	3,260.00	865.50	4,125.50	40	60
2	10,375.56	20'	25'	10'	13'			4,443.40	3,260.00	853.60	4,113.60	40	60
3	10,219.78	20'	25'			10'	15'	3,999.40	2,668.00	400.00	4,088.00	40	60
4	10,180.22	20'	25'			15'	10'	3,959.75	2,652.00	400.00	4,072.00	40	60

Additionally, the proposed development will create 102' long X 20' wide private access and drainage easement with 20' paved access road to serve all proposed 4 lots. The proposed 4-lot short plat will also be served by existing public utilities (water, sewer, gas, power, telephone, and cable) in 90th Ave. SE across the easterly property line of the subject parcel. Consistent with city of Mercer Island Drainage Code Requirement and 2012 Washington State Department of Ecology (DOE) Drainage Manual for Western Washington as amended in 2014, the proposed 4-lot short plat will provide 72' long X 14' wide X 8' deep underground concrete stormwater detention / retention (R/D) vault under the proposed on-site private paved access road to mitigate for the site developed conditions, see preliminary design calculations in the following pages.

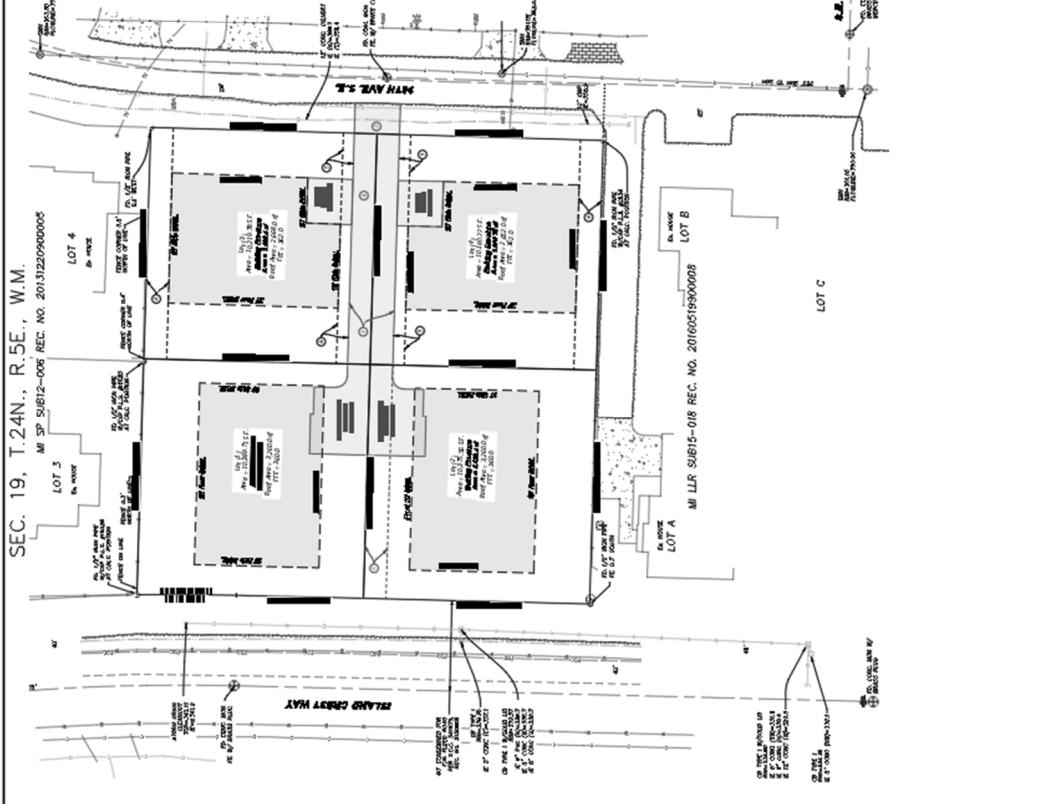
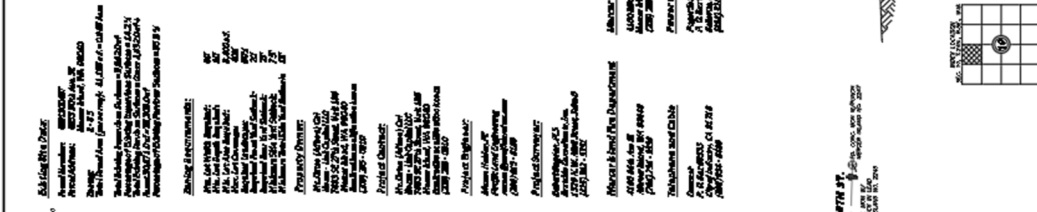
Refer to attached preliminary short plat map, the preliminary grading and drainage map, and the attached Civil Plans set for additional information.

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 www.fastside.com

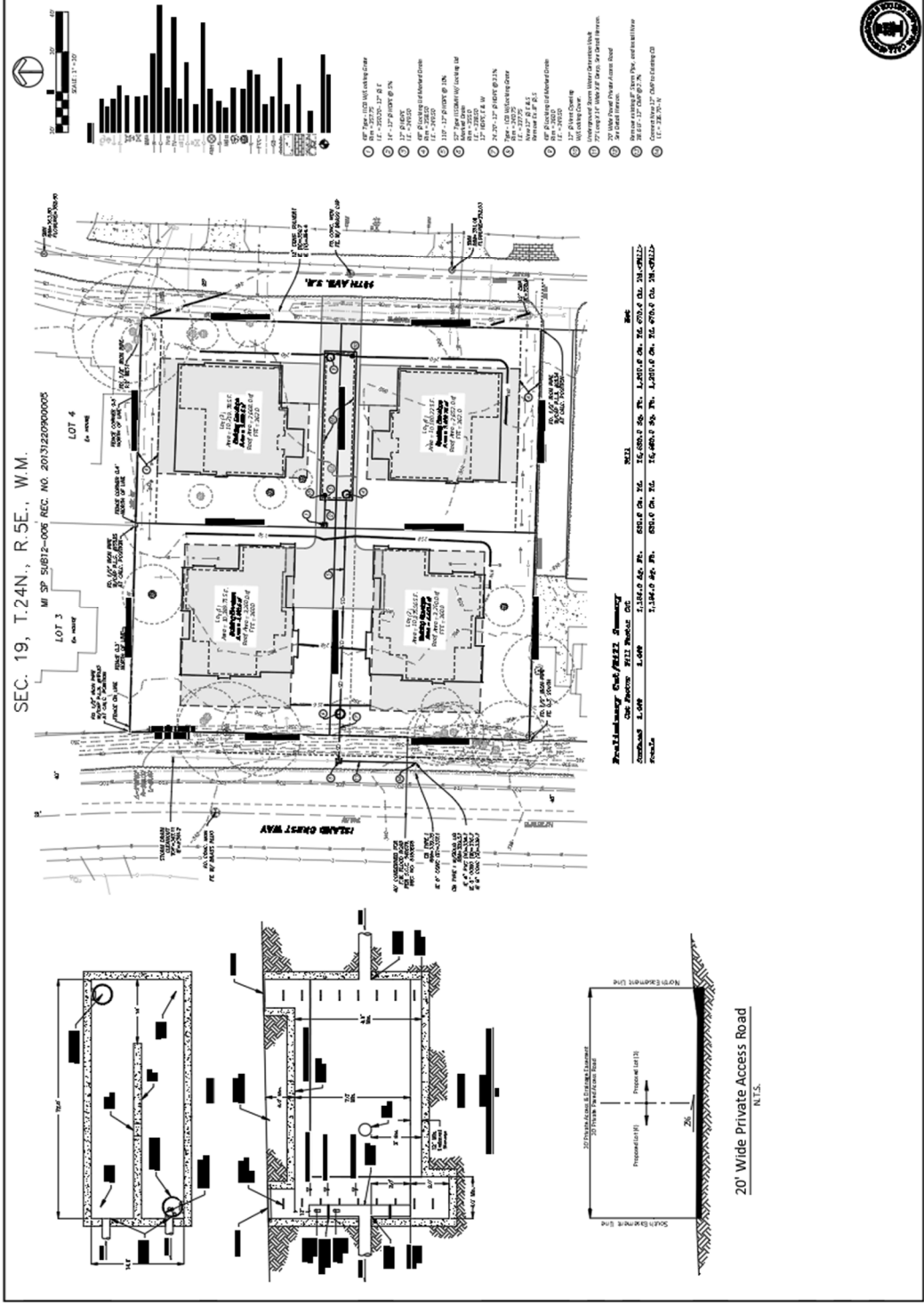
DATE: 10/01/2022
 SCALE: AS SHOWN
 SHEET: C-5.0 OF C-6.0

- 20' Wide Private Access and Drainage Easement**
- 20' Wide Private Access and Drainage Easement
 - Area = 2,040 sq. ft.
 - 20' Wide Paved Access Road Connection, Area = 272.10 sq. ft.
 - 5' Wide Private City Utilities Easement
 - 10' Wide Private Drainage and Access Easement



Project	Project 7833 MI 4 – Lot	
Scal	N.T.S	Date 10 / 01 / 2022
Preliminary Short Plat Map		





- 1. 12" PVC Storm Sewer
- 2. 12" PVC Storm Sewer
- 3. 12" PVC Storm Sewer
- 4. 12" PVC Storm Sewer
- 5. 12" PVC Storm Sewer
- 6. 12" PVC Storm Sewer
- 7. 12" PVC Storm Sewer
- 8. 12" PVC Storm Sewer
- 9. 12" PVC Storm Sewer
- 10. 12" PVC Storm Sewer
- 11. 12" PVC Storm Sewer
- 12. 12" PVC Storm Sewer
- 13. 12" PVC Storm Sewer
- 14. 12" PVC Storm Sewer
- 15. 12" PVC Storm Sewer
- 16. 12" PVC Storm Sewer
- 17. 12" PVC Storm Sewer
- 18. 12" PVC Storm Sewer
- 19. 12" PVC Storm Sewer
- 20. 12" PVC Storm Sewer
- 21. 12" PVC Storm Sewer
- 22. 12" PVC Storm Sewer
- 23. 12" PVC Storm Sewer
- 24. 12" PVC Storm Sewer
- 25. 12" PVC Storm Sewer
- 26. 12" PVC Storm Sewer
- 27. 12" PVC Storm Sewer
- 28. 12" PVC Storm Sewer
- 29. 12" PVC Storm Sewer
- 30. 12" PVC Storm Sewer
- 31. 12" PVC Storm Sewer
- 32. 12" PVC Storm Sewer
- 33. 12" PVC Storm Sewer
- 34. 12" PVC Storm Sewer
- 35. 12" PVC Storm Sewer
- 36. 12" PVC Storm Sewer
- 37. 12" PVC Storm Sewer
- 38. 12" PVC Storm Sewer
- 39. 12" PVC Storm Sewer
- 40. 12" PVC Storm Sewer
- 41. 12" PVC Storm Sewer
- 42. 12" PVC Storm Sewer
- 43. 12" PVC Storm Sewer
- 44. 12" PVC Storm Sewer
- 45. 12" PVC Storm Sewer
- 46. 12" PVC Storm Sewer
- 47. 12" PVC Storm Sewer
- 48. 12" PVC Storm Sewer
- 49. 12" PVC Storm Sewer
- 50. 12" PVC Storm Sewer

Project	Project 7833 MI 4 – Lot		
Scal	N.T.S.	Date	10 / 01 / 2022
Preliminary Grading and Drainage			



Developed Site Hydrology,

As mentioned, consistent with city of Mercer Island Drainage Code Requirement and 2012 Washington State Department of Ecology (DOE) Drainage Manual for Western Washington as amended in 2014, the proposed 4-lot short plat will provide 72' long X 14' wide X 8' deep underground concrete stormwater detention / retention (R/D) vault under the proposed on-site private paved access road to mitigate for the site developed conditions.

In concept, all surface flows in the site's developed conditions including but not limited to all proposed roof tops, proposed access road, all proposed driveways, porches and patios, and yards will be collected and tightline to the proposed underground R/D vault. This vault will be equipped with control riser and two orifices consistent with DOE design guidelines / requirements for Conservation / Stream Protection Standards, see vault preliminary design and sizing calculations below. Also pursuant to the referenced DOE manual since the new pollution generating impervious surfaces (NPGIS) as shown below is less than 5,000 sf, compliance with water quality standards is not warranted for this project and none will be provided.

Pollution Generating New Impervious Surfaces Calculation,

- On-site access road area = 20' wide X 102' long = 2,040 sf.
- Area of access road connection with 90th Ave SE = 272.0 sf.
- Lot (1) driveway area = 865.50 sf.
- Lot (2) driveway area = 853.60 sf.
- Lot (3) driveway area = 400.00 sf.
- Lot (4) driveway area = 400.00 sf
- Total new pollution generation impervious surface area = **4,831.10 sf < 5,000.0 sf OK**

Retention - Retention (R/D) Concrete Vault Preliminary Sizing / Design Calculation,

To size this system, we utilized the 2012 Western Washington Hydrology Model version 4.2.18, and we begin with area calculations for the existing and developed site conditions as follows:

Existing Site Conditions,

Surface Type	Ex. Impervious		Ex. Pervious		Total Ex. Impervious (AC)	Total Ex. Pervious (AC)	Total Site Area (AC)
	SF	AC	SF	AC			
Ex House (Roof)	4,115.0	0.094					
Ex Driveway (Gravel)	1,580.0	0.036					
Ex. DWY Conn. (Gravel)	272.0	0.006					
Existing Grass			4,632.0	0.106			
Existing Forest			30,833.0	0.708			
Total Surface Areas	5,967.0	0.137	35,465.0	0.814	0.137	0.814	0.951

Developed Site Conditions,

Surface Type	New Impervious		New Pervious		Total New Impervious (AC)	Total New Pervious (AC)	Total Site Area (AC)
	SF	AC	SF	AC			
Access Road (20' X 102')	2,040.00	0.047			0.047		
Access Road Connection	272.00	0.006			0.006		
Lot - 1, Maverick House							
New Driveway	865.50	0.020					
New House	3,260.00	0.075					
Total Grass			6,264.21	0.144			
Total New Surfaces					0.095	0.144	
Lot - 2, Maverick House							
New Driveway	853.50	0.020					
New House	3,260.00	0.075					
Total Grass			6,262.06	0.144			
Total New Surfaces					0.095	0.144	
Lot - 3, Foxglove House							
New Driveway	400.00	0.009					
New House	3,106.00	0.071					
Total Grass			5,693.78	0.131			
Total New Surfaces					0.080	0.131	
Lot - 4, Fox Glove House							
New Driveway	400.00	0.009					
New House	3,106.00	0.071					
Total Grass			5,654.22	0.130			
Total Surfaces					0.080	0.130	
Total Site Areas					0.403	0.548	0.951

Please refer to following pages for the model calculations, inputs, and outputs.

Controlled surface flows will exist the R/D system to discharge in 16' deep Type – II Storm Manhole before discharging into existing public storm system in Island Crest Way while maintaining the direction of the natural discharge location. Please refer the attached Geotechnical Addendum in support of the R/D system located in the Special Reports section of this report.

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WWHM2012
PROJECT REPORT

General Model Information

Project Name: Project 4833 MI_072322
Site Name: Project 4833 MI
Site Address: 4833 90th Ave SE
City: Mercer Island
Report Date: 8/22/2022
Gage: Seatac
Data Start: 1948/10/01
Data End: 2009/09/30
Timestep: 15 Minute
Precip Scale: 1.000
Version Date: 2021/08/18
Version: 4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	0.708
C, Lawn, Flat	0.106
Pervious Total	0.814
Impervious Land Use	acre
ROOF TOPS FLAT	0.094
DRIVEWAYS FLAT	0.043
Impervious Total	0.137
Basin Total	0.951

Element Flows To:		
Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use C, Lawn, Flat	acre 0.548
Pervious Total	0.548
Impervious Land Use	acre
ROADS FLAT	0.053
ROOF TOPS FLAT	0.292
DRIVEWAYS FLAT	0.058
Impervious Total	0.403
Basin Total	0.951

Element Flows To:		
Surface	Interflow	Groundwater
Project 4833 - Vault	Project 4833 - Vault	

Routing Elements
Predeveloped Routing

Mitigated Routing

Project 4833 - Vault

Width: 14 ft.
Length: 71.4 ft.
Depth: 7 ft.
Discharge Structure
Riser Height: 6 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.84 in. Elevation:0 ft.
Orifice 2 Diameter: 1.2 in. Elevation:4.5 ft.
Orifice 3 Diameter: 0.76 in. Elevation:5.5 ft.
Element Flows To:
Outlet 1 Outlet 2

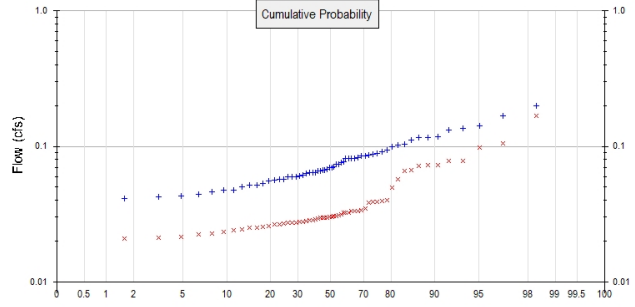
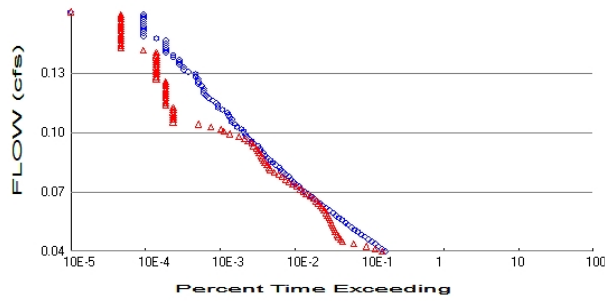
Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.022	0.000	0.000	0.000
0.0778	0.022	0.001	0.005	0.000
0.1556	0.022	0.003	0.007	0.000
0.2333	0.022	0.005	0.009	0.000
0.3111	0.022	0.007	0.010	0.000
0.3889	0.022	0.008	0.011	0.000
0.4667	0.022	0.010	0.013	0.000
0.5444	0.022	0.012	0.014	0.000
0.6222	0.022	0.014	0.015	0.000
0.7000	0.022	0.016	0.016	0.000
0.7778	0.022	0.017	0.016	0.000
0.8556	0.022	0.019	0.017	0.000
0.9333	0.022	0.021	0.018	0.000
1.0111	0.022	0.023	0.019	0.000
1.0889	0.022	0.025	0.020	0.000
1.1667	0.022	0.026	0.020	0.000
1.2444	0.022	0.028	0.021	0.000
1.3222	0.022	0.030	0.022	0.000
1.4000	0.022	0.032	0.022	0.000
1.4778	0.022	0.033	0.023	0.000
1.5556	0.022	0.035	0.023	0.000
1.6333	0.022	0.037	0.024	0.000
1.7111	0.022	0.039	0.025	0.000
1.7889	0.022	0.041	0.025	0.000
1.8667	0.022	0.042	0.026	0.000
1.9444	0.022	0.044	0.026	0.000
2.0222	0.022	0.046	0.027	0.000
2.1000	0.022	0.048	0.027	0.000
2.1778	0.022	0.050	0.028	0.000
2.2556	0.022	0.051	0.028	0.000
2.3333	0.022	0.053	0.029	0.000
2.4111	0.022	0.055	0.029	0.000
2.4889	0.022	0.057	0.030	0.000
2.5667	0.022	0.058	0.030	0.000
2.6444	0.022	0.060	0.031	0.000
2.7222	0.022	0.062	0.031	0.000
2.8000	0.022	0.064	0.032	0.000
2.8778	0.022	0.066	0.032	0.000

2.9556	0.022	0.067	0.032	0.000
3.0333	0.022	0.069	0.033	0.000
3.1111	0.022	0.071	0.033	0.000
3.1889	0.022	0.073	0.034	0.000
3.2667	0.022	0.075	0.034	0.000
3.3444	0.022	0.076	0.035	0.000
3.4222	0.022	0.078	0.035	0.000
3.5000	0.022	0.080	0.035	0.000
3.5778	0.022	0.082	0.036	0.000
3.6556	0.022	0.083	0.036	0.000
3.7333	0.022	0.085	0.037	0.000
3.8111	0.022	0.087	0.037	0.000
3.8889	0.022	0.089	0.037	0.000
3.9667	0.022	0.091	0.038	0.000
4.0444	0.022	0.092	0.038	0.000
4.1222	0.022	0.094	0.038	0.000
4.2000	0.022	0.096	0.039	0.000
4.2778	0.022	0.098	0.039	0.000
4.3556	0.022	0.099	0.040	0.000
4.4333	0.022	0.101	0.040	0.000
4.5111	0.022	0.103	0.044	0.000
4.5889	0.022	0.105	0.052	0.000
4.6667	0.022	0.107	0.057	0.000
4.7444	0.022	0.108	0.061	0.000
4.8222	0.022	0.110	0.064	0.000
4.9000	0.022	0.112	0.067	0.000
4.9778	0.022	0.114	0.069	0.000
5.0556	0.022	0.116	0.072	0.000
5.1333	0.022	0.117	0.074	0.000
5.2111	0.022	0.119	0.076	0.000
5.2889	0.022	0.121	0.078	0.000
5.3667	0.022	0.123	0.080	0.000
5.4444	0.022	0.124	0.082	0.000
5.5222	0.022	0.126	0.086	0.000
5.6000	0.022	0.128	0.091	0.000
5.6778	0.022	0.130	0.094	0.000
5.7556	0.022	0.132	0.097	0.000
5.8333	0.022	0.133	0.100	0.000
5.9111	0.022	0.135	0.103	0.000
5.9889	0.022	0.137	0.105	0.000
6.0667	0.022	0.139	0.290	0.000
6.1444	0.022	0.141	0.682	0.000
6.2222	0.022	0.142	1.158	0.000
6.3000	0.022	0.144	1.624	0.000
6.3778	0.022	0.146	1.995	0.000
6.4556	0.022	0.148	2.232	0.000
6.5333	0.022	0.149	2.420	0.000
6.6111	0.022	0.151	2.584	0.000
6.6889	0.022	0.153	2.738	0.000
6.7667	0.022	0.155	2.884	0.000
6.8444	0.022	0.157	3.022	0.000
6.9222	0.022	0.158	3.154	0.000
7.0000	0.022	0.160	3.281	0.000
7.0778	0.022	0.162	3.403	0.000
7.1556	0.000	0.000	3.520	0.000

Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 0.814
Total Impervious Area: 0.137

Mitigated Landuse Totals for POC #1

Total Pervious Area: 0.548
Total Impervious Area: 0.403

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.071154
5 year	0.097448
10 year	0.116458
25 year	0.142351
50 year	0.163038
100 year	0.184951

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.033149
5 year	0.049821
10 year	0.063602
25 year	0.084576
50 year	0.10309
100 year	0.124352

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.103	0.028
1950	0.100	0.032
1951	0.081	0.078
1952	0.050	0.024
1953	0.043	0.025
1954	0.059	0.030
1955	0.067	0.035
1956	0.064	0.033
1957	0.081	0.031
1958	0.053	0.030

1959	0.046	0.027
1960	0.085	0.067
1961	0.066	0.030
1962	0.043	0.022
1963	0.063	0.029
1964	0.057	0.029
1965	0.077	0.030
1966	0.052	0.025
1967	0.102	0.033
1968	0.082	0.026
1969	0.064	0.028
1970	0.067	0.028
1971	0.074	0.031
1972	0.092	0.039
1973	0.047	0.027
1974	0.070	0.028
1975	0.088	0.034
1976	0.064	0.031
1977	0.047	0.021
1978	0.061	0.030
1979	0.076	0.023
1980	0.117	0.039
1981	0.065	0.025
1982	0.117	0.066
1983	0.067	0.033
1984	0.052	0.024
1985	0.062	0.027
1986	0.082	0.040
1987	0.081	0.057
1988	0.044	0.026
1989	0.055	0.022
1990	0.200	0.072
1991	0.135	0.072
1992	0.056	0.027
1993	0.041	0.028
1994	0.037	0.019
1995	0.059	0.033
1996	0.112	0.078
1997	0.085	0.073
1998	0.057	0.027
1999	0.131	0.039
2000	0.070	0.030
2001	0.059	0.021
2002	0.088	0.050
2003	0.086	0.024
2004	0.117	0.105
2005	0.074	0.032
2006	0.070	0.031
2007	0.168	0.098
2008	0.141	0.169
2009	0.094	0.038

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.1997	0.1686
2	0.1679	0.1047
3	0.1412	0.0983

4	0.1350	0.0782
5	0.1311	0.0776
6	0.1175	0.0731
7	0.1169	0.0723
8	0.1165	0.0717
9	0.1115	0.0669
10	0.1032	0.0658
11	0.1023	0.0569
12	0.0998	0.0496
13	0.0942	0.0401
14	0.0919	0.0395
15	0.0884	0.0392
16	0.0876	0.0388
17	0.0863	0.0384
18	0.0850	0.0346
19	0.0847	0.0337
20	0.0825	0.0333
21	0.0819	0.0333
22	0.0813	0.0333
23	0.0812	0.0325
24	0.0810	0.0324
25	0.0773	0.0324
26	0.0764	0.0314
27	0.0738	0.0312
28	0.0737	0.0307
29	0.0703	0.0305
30	0.0699	0.0303
31	0.0697	0.0301
32	0.0672	0.0298
33	0.0671	0.0298
34	0.0666	0.0297
35	0.0662	0.0297
36	0.0654	0.0292
37	0.0642	0.0289
38	0.0642	0.0284
39	0.0638	0.0284
40	0.0627	0.0281
41	0.0616	0.0278
42	0.0606	0.0277
43	0.0592	0.0274
44	0.0592	0.0273
45	0.0592	0.0271
46	0.0574	0.0271
47	0.0573	0.0267
48	0.0565	0.0264
49	0.0553	0.0257
50	0.0529	0.0254
51	0.0521	0.0252
52	0.0516	0.0251
53	0.0500	0.0244
54	0.0475	0.0240
55	0.0475	0.0235
56	0.0461	0.0227
57	0.0442	0.0224
58	0.0432	0.0216
59	0.0426	0.0213
60	0.0414	0.0208
61	0.0369	0.0192

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0356	3523	3172	90	Pass
0.0369	3144	2554	81	Pass
0.0382	2819	1960	69	Pass
0.0394	2532	1321	52	Pass
0.0407	2295	937	40	Pass
0.0420	2062	885	42	Pass
0.0433	1858	830	44	Pass
0.0446	1655	785	47	Pass
0.0459	1493	751	50	Pass
0.0472	1357	732	53	Pass
0.0485	1232	706	57	Pass
0.0497	1109	683	61	Pass
0.0510	1021	661	64	Pass
0.0523	919	641	69	Pass
0.0536	834	615	73	Pass
0.0549	771	590	76	Pass
0.0562	703	562	79	Pass
0.0575	627	529	84	Pass
0.0588	556	501	90	Pass
0.0600	507	473	93	Pass
0.0613	467	442	94	Pass
0.0626	428	412	96	Pass
0.0639	385	382	99	Pass
0.0652	349	343	98	Pass
0.0665	319	305	95	Pass
0.0678	286	280	97	Pass
0.0691	263	253	96	Pass
0.0703	243	227	93	Pass
0.0716	218	202	92	Pass
0.0729	206	177	85	Pass
0.0742	190	161	84	Pass
0.0755	181	145	80	Pass
0.0768	162	131	80	Pass
0.0781	151	114	75	Pass
0.0794	140	101	72	Pass
0.0806	133	97	72	Pass
0.0819	117	91	77	Pass
0.0832	108	85	78	Pass
0.0845	101	82	81	Pass
0.0858	92	79	85	Pass
0.0871	85	76	89	Pass
0.0884	81	71	87	Pass
0.0897	74	69	93	Pass
0.0909	73	65	89	Pass
0.0922	69	60	86	Pass
0.0935	59	57	96	Pass
0.0948	56	51	91	Pass
0.0961	52	45	86	Pass
0.0974	48	38	79	Pass
0.0987	46	29	63	Pass
0.1000	44	24	54	Pass
0.1012	41	22	53	Pass
0.1025	36	16	44	Pass

0.1038	34	11	32	Pass
0.1051	31	5	16	Pass
0.1064	31	5	16	Pass
0.1077	29	5	17	Pass
0.1090	28	5	17	Pass
0.1103	27	5	18	Pass
0.1115	23	5	21	Pass
0.1128	20	5	25	Pass
0.1141	20	4	20	Pass
0.1154	19	4	21	Pass
0.1167	17	4	23	Pass
0.1180	15	4	26	Pass
0.1193	14	4	28	Pass
0.1206	13	4	30	Pass
0.1218	13	4	30	Pass
0.1231	13	4	30	Pass
0.1244	12	4	33	Pass
0.1257	11	4	36	Pass
0.1270	11	4	36	Pass
0.1283	11	3	27	Pass
0.1296	10	3	30	Pass
0.1309	10	3	30	Pass
0.1321	8	3	37	Pass
0.1334	7	3	42	Pass
0.1347	7	3	42	Pass
0.1360	6	3	50	Pass
0.1373	6	3	50	Pass
0.1386	6	3	50	Pass
0.1399	5	3	60	Pass
0.1412	5	3	60	Pass
0.1424	4	3	75	Pass
0.1437	4	2	50	Pass
0.1450	4	1	25	Pass
0.1463	4	1	25	Pass
0.1476	4	1	25	Pass
0.1489	4	1	25	Pass
0.1502	3	1	33	Pass
0.1515	2	1	50	Pass
0.1527	2	1	50	Pass
0.1540	2	1	50	Pass
0.1553	2	1	50	Pass
0.1566	2	1	50	Pass
0.1579	2	1	50	Pass
0.1592	2	1	50	Pass
0.1605	2	1	50	Pass
0.1618	2	1	50	Pass
0.1630	2	1	50	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet

On-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

Off-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Total Volume Infiltrated		0.00	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Disclaimer

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References

A pre-application conference held with city staff under PRE22-028 and the following pages include summary of city staff notes for easy reference.

CITY OF MERCER ISLAND

COMMUNITY PLANNING & DEVELOPMENT

9611 SE 36TH STREET | MERCER ISLAND, WA 98040

PHONE: 206.275.7605 | www.mercerisland.gov



Pre-Application Meeting (PRE22-028)

An Intake Screening is required in addition to a Pre-Application Meeting. A Pre-Application Meeting does not replace the required Intake Screening. This meeting is to provide guidance and information include prior to formal submittal.

Summary:

Site Location:	4833 90 th Ave SE	Parcel Number	435130-0487
Lot Size:	41,165 square feet	Zoning:	R-8.4 (Single Family)
Brief Project Description:	A proposal for a 4-lot short subdivision.	Documents Provided:	<ol style="list-style-type: none">1. Pre-Application Meeting Request Form2. Project Narrative and List of Questions3. Civil Plans4. Geotechnical Report5. Arborist Report6. Tree Inventory & Replacement Submittal Information7. Tree Submittal Checklist
Applicant Information:			
Name:	Mazen Haidar	Email:	mazen@pacificlandwa.com
Phone:			425-615-6160
Second Pre-application Meeting Required:	Recommended	It is recommended to meet with the city again to discuss tree impacts with a redesigned subdivision proposal.	

Applicant Questions:

1. Is proposing a 20-foot-wide access easement instead of an access tract acceptable?

Staff Response: The proposed access easement must be large enough to accommodate the access road. MICC 19.08.030(F)(1) requires subdivisions abutting an arterial to provide internal access to the subdivision's lots. MICC 19.09.100(A) requires that a subdivision use common access drives where feasible. Therefore, a single access road must be used to access all four lots. Under MICC 19.09.040(B) a private road serving three or more lots shall be at least 20 feet in width. An access easement that is 20 feet in width is acceptable to accommodate a 20-foot-wide access road.

2. Can the area for the proposed 20-foot-wide access easement be included in each adjacent lot area to meet minimum lot area requirements per MICC 19.02.020?

PLEASE NOTE: These pre-application meeting notes have been prepared to assist the applicant in completing and submitting the application in a manner that complies with applicable development standards and permit processing requirements. Although care has been taken, in the event of a conflict between these notes and any applicable law, regulation or decision criteria, the latter shall prevail. The City of Mercer Island makes no warranty of any kind to the accuracy of the information contained in these notes. The information herein notwithstanding, it is the applicant's sole duty to ensure that the proposed development complies with all applicable laws, regulations and decision criteria. Neither the discussions nor the notes provided at the pre-application meeting shall bind the City in any manner or prevent the City's future application or enforcement of all laws, regulations and decision criteria.

Staff Response: The lot area requirements MICC 19.02.020 require that the net lot area of each lot be greater than 8400 square feet. Net lot area is the area contains within the established boundaries of a lot, less any area used for public or private vehicular access easement, excluding that portion of the easement used for a driveway access to the encumbered lot. This means that the portion of the easement that is used to access the lot would be included in the net lot area. The rest of the easement would be excluded from the net lot area.

3. Is the proposed 16-foot paved common access driveway acceptable to serve two lots?

Staff Response: MICC 19.08.030(F)(1) requires subdivisions abutting an arterial to provide internal access to the subdivision's lots. MICC 19.09.100(A) requires that a subdivision use common access drives where feasible. Therefore, a single access road must be used to access all four lots. Under MICC 19.09.040(B) a private road serving three or more lots shall be at least 20 feet in width.

4. Are the proposed building setback lines shown on the Civil Plans acceptable and consistent with MICC 19.02.020?

Staff Response: The location of the required setbacks is consistent with the setback requirements listed in MICC 19.02.020(C)(2), as well as the setback requirements for new lots abutting an arterial set forth in MICC 19.08.030(F)(1). MICC 19.02.020(C)(1)(c)(i)((b)) states that for lots with a lot width of more than 90 feet, the sum of the side yards' width shall be a width that is equal to at least 17% of the lot width. The plans show that the widths of the lots vary between 100 and 103.75 feet. This would mean that the side yards would need to add up to 17 to 17.63 feet.

Please also note that building pads consistent with MICC 19.09.090 will need to be established for each lot of the subdivision. In particular, building pads will need to be located to minimize or prevent the removal of trees and vegetation required for retention pursuant to chapter 19.10 MICC.

5. Are all proposed lot area and dimensions shown on the Civil Plans acceptable and consistent with MICC 19.02.020?

Staff Response: The lots shown in the plans meet the lot area and lot dimension requirements listed in MICC 19.02.020(A).

6. Assuming the common driveway to the proposed two rear lots must be set aside in an access tract instead of an access easement, what is the minimum required width of the tract?

Staff Response: The tract would need to be wide enough to accommodate the access road. MICC 19.08.030(F)(1) requires subdivisions abutting an arterial to provide internal access to the subdivision's lots. MICC 19.09.100(A) requires that a subdivision use common access drives where feasible. Therefore, a single access road must be used to access all four lots. Under MICC 19.09.040(B) a private road serving three or more lots shall be at least 20 feet in width. An access easement that is 20 feet in width is acceptable to accommodate a 20-foot-wide access road.

PLEASE NOTE: These pre-application meeting notes have been prepared to assist the applicant in completing and submitting the application in a manner that complies with applicable development standards and permit processing requirements. Although care has been taken, in the event of a conflict between these notes and any applicable law, regulation or decision criteria, the latter shall prevail. The City of Mercer Island makes no warranty of any kind to the accuracy of the information contained in these notes. The information herein notwithstanding, it is the applicant's sole duty to ensure that the proposed development complies with all applicable laws, regulations and decision criteria. Neither the discussions nor the notes provided at the pre-application meeting shall bind the City in any manner or prevent the City's future application or enforcement of all laws, regulations and decision criteria.

7. Should the area of the access tract be deducted from the overall parcel area when calculating minimum lot areas?

Staff Response: An access tract would be considered a separate parcel from the lots of the subdivision. Its area could not be included in the area of the other lots.

8. Are there any setback requirements from existing slopes across the subject parcel's western property line that exceed 20% but are not steep slopes?

Staff Response: Setbacks are not required from geologically hazardous areas, including landslide hazard areas and steep slopes. However, a critical area review 1 is required for any alteration of a geologically hazardous area, which involves preparing a geotechnical report which will be reviewed by the city. Please see Section 3 of the Planning Comments below for more information.

9. Will the city require road improvements, including curbs, gutters, and sidewalks, along either 90th Ave SE or Island Crest Way across the frontage of the subject parcel?

Staff Response: The city will not require urban frontage road improvements such as curbs, gutters, and sidewalks along the frontage of 90th Ave SE. Any impacts to the right-of-way along Island Crest Way will need to be restored.

10. Will the city require 90th Ave SE to be widened across the frontage of the subject parcel?

Staff Response: The city will not require any road widening along the frontage of 90th Ave SE. However, the city might require a full grinding and overlay of the roadway pavement depending on the numbers of the utility cuts and damages to the city roadway due to the construction activities. The limits and extents of the roadway restoration will be determined towards the end of the construction.

11. Will the city require any right-of-way dedication along either 90th Ave SE or Island Crest Way?

Staff Response: The city will not require any right-of-way dedication for 90th Ave SE or Island Crest Way.

12. Will this proposal have diversion issues based on the information provided in the narrative?

Staff Response: There is no diversion issue based on the city drainage map.

13. Will this proposal be exempt from providing Retention/Detention (R/D) flow control facilities provided the conditions for this exemption are met pursuant to Section I-2.5.7 of the 2012 Western Washington Stormwater Management Manual as amended in 2014 and pursuant to MICC 15.09.050?

Staff Response: The flow control system (MR#7) is not exempted if the project exceeds the thresholds for the flow control (10,000 square feet or more effective impervious surface,

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convert .75 acres or more of vegetation, etc.). The downstream of the site is comprised of natural watercourses that are not manmade conveyance elements. This project does not meet the criteria of an exemption.

If MR#7 is required for this project, then the onsite detention system listed in MICC 15.09.050 will not be required. If MR#7 is not required (such as less than 10,000 square feet effective impervious surface, conversion of less than .75 acres of vegetation area, etc.), then you will need to evaluate if all the on-site stormwater management BMPs included on List #1 and List #2 are feasible for roofs and/or other hard surfaces. If it is not feasible, then an on-site detention system from the site will be required due to the downstream system, including watercourses.

14. Can you please provide a copy of the city's standard on-site detention sizing table?

Staff Response: Please follow this link for the sizing table: [On-Site Detention Design Requirements](#).

15. We would like to include and enter all the existing square footage and ground coverage (including the existing impervious surface and lawn surface) within the subject site when calculating surface flow volume in the subject site conditions for the purpose of sizing detention and retention facilities. Is this approach acceptable to the city?

Staff Response: Yes. This approach is acceptable to the City.

16. Is the proposed subdivision exempt from providing surface water quality control and treatment facilities since the proposal will create less than 5000 square feet of New Pollution Generating Impervious Surfaces (NPGIS)?

Staff Response: If the NPGIS area is less than 5000 square feet, the MR#9 is not required.

17. Does the proponent have the option to pay a fee in lieu instead of constructing detention flow control facilities pursuant to MICC 15.11.020? If so, how are they calculated?

Staff Response: This site is not eligible for fee in lieu of a detention system.

18. Will an on-site fire turnaround be required for this short subdivision?

Staff Response: Fire access roads, private access roads, and driveways in excess of 150 feet shall have provisions for fire apparatus turnaround as listed and illustrated in Appendix D of the IFC.

Review Comments:

Fire Comments:

Fire Contact: Jeromy.Hicks@mercerisland.gov or 206-275-7966.

1. Basic notes regarding the Fire Review and evaluation processes have been provided below. There are several hyperlinks that may be used to help guide you through this process. All this

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information is consolidated in the city's [Developer Manual](#) (Please remember that this is a guide and all information shall be verified with state and local adopted code).

2. [Fire Access](#)

- a. Access roads (defined under IFC 202) under 500 feet in length are required to be 20 feet in width. Access roads over 500 feet in length are required to be 26 feet in width. (IFC 503.2.1, D103.1, MICC 17.07.020)
 - i. 90th Ave SE is over 500 feet long, but only 20 feet wide. This will result in a deficiency in any home built on 90th Ave SE.
 - ii. It is recommended that the access for the 4 lots be widened to 20 feet for the first two easterly properties. Access roads shall be 20 feet wide within 150 feet of the furthest corner of the residence. This would require the plat to have 20-foot roadways to the two easterly properties.
- b. Minimum driveway widths for planning purposes are outlined in [MICC 19.09.040](#).
 - i. All driveways under 150 feet in length from the furthest corner shall conform to this standard. In this situation, the furthest corner would be located on the two west properties.
 - ii. Please see Section 5 of the Planning Comments below.
- c. Grade shall not exceed 10%. Grades over 10% but under 20% (maximum) may be evaluated for code alternative requests. (IFC 503.2.7)
- d. Length shall not exceed 150 feet from the furthest portion of the building as one would walk. (IFC 503.2.1)
- e. The surface of the access road shall be able to withstand an imposed load of 75,000 pounds and be constructed of asphalt. If the grade exceeds 15%, the surface shall be brushed concrete. (IFC D102.1, MICC 19.09.040)
- f. Fire access roads, private access roads, and driveways in excess of 150 feet shall have provisions for fire apparatus turnaround as listed and illustrated in Appendix D of the IFC.

3. Fire Flow (Hydrants)

- a. A hydrant capable of flowing the required fire flow as outlined in the International Fire Code, Appendix B shall be located within 300 feet of the furthest portion of the building, or 600 feet for a building with an approved sprinkler system.
- b. Nearest hydrant to furthest Northwest property stats:
 - i. F4-10
 - ii. 1602gpm at 58 psi
 1. [IFC Fire Flow Requirements](#)
 - iii. Distance to furthest point of northwest home: 295 feet
 - iv. Distance to access: 145 to northwest driveway

4. [Sprinklers](#)

- a. All new construction and alterations over 50% valuation are required to install a minimum of a NFPA 13d fire sprinkler system.
- b. Decreased fire flow, access, grade, or building size may require the installation of a NFPA 13r or 13 sprinkler system.
- c. Water meter sizing is required for the installation of a fire sprinkler system.

5. [Fire Alarm Systems](#)

- a. NFPA 72 Monitored Fire Alarm systems may be required as part of mitigation for deficiencies as listed above or may be proposed as a code alternative.

6. [Fire code alternatives](#)

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- a. Fire code alternatives may be considered upon application of a building permit. The building designer must propose such alternative, which must show how the alternative is equal to or above the required code.
 - b. Fire code alternatives are not considered as a replacement for the fire code. The individual building applicant must show that the adopted prescriptive code may not be followed as a result of extenuating circumstances.
7. Plat Map Wording Requirement: The following statement must be shown on all plat map submittals:

“All buildings are subject to meeting the current fire code requirements at the time of permit submittal. Access shall be provided as outlined in the International Fire Code Appendix D as adopted and/or amended and MICC 19.09.040. Fire plan reviews will be conducted at the time of building permit submittal and may require additional fire protection systems and/or fire prevention measures for permit approval.”

For additional information please refer to this helpful webpage:

<https://www.mercerisland.gov/cpd/page/fire-permits-and-prevention-information>

Tree Comments:

Tree Contact: John.Kenney@mercerisland.gov or 206-275-7713.

1. Please refer to MICC 19.10 for our tree code.
2. 30% of trees with a diameter of 10 inches or greater is required; additionally, development must be designed to minimize tree removal. Since this is currently considered one lot, use one tree inventory worksheet to calculate this. The project will not be approved unless you meet this requirement.
3. Replacement is required for any trees that are removed, according to the replacement ratios in MICC 19.10.070.
4. Tree protection (typically at tree dripline) of retained trees will be required.
5. Sequential (phased) tree removal may be required (only remove trees necessary at each step of the review process).
6. Several exceptional trees are onsite and must be retained and protected unless justified under MICC19.10.060(A)(3).

For additional information please refer to this helpful webpage:

<https://www.mercerisland.gov/cpd/page/tree-permits>

Civil Engineering Comments:

Civil Contact: Ruji.Ding@mercerisland.gov or 206-275-7703.

1. Please see above for responses to the provided questions.
2. The existing ditch will be required to be piped along the frontage of the site as a part of this project.
3. Please refer to MICC Title 15 for our Water, Sewers, and Public Utilities code.

For more information on Stormwater Permits please visit here:

<https://www.mercerisland.gov/cpd/page/stormwater-permits>

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Planning Comments:

Planning Contact: andrew.leon@mercerisland.gov or 206-275-7720.

1. Residential Zoning Standards:
 - a. Yards
 - i. Front yard: 20 feet
 - ii. Rear yard: 25 feet
 - iii. Side yards:
 1. Total side yards must be at least 17% of the lot width; no side yard less than 33% of the total side yard requirement.
 2. Variable Side Yard Depth Requirement:
 - a. Variable Side Yard Depth Requirements apply to interior lot lines only.
 - b. A minimum side yard of 7.5 feet is required for 1) nongabled roof ends where the height is more than 15 feet; or 2) gabled roof ends more than 18 feet. Both measurements are taken from existing or finished grade, whichever is lower, to the top of the gabled roof end adjoining the side yard.
 - c. A minimum side yard of 10 feet is required for single-family dwellings with a height of more than 25 feet measured from the existing or finished grade, whichever is lower, to the top of the exterior wall facade adjoining the side yard.
 - iv. Eaves may only protrude up to 18 inches into yards; note that no protrusion is allowed within *minimum* side yard setbacks.
 - v. No eave and minor building element protrusion is allowed into the minimum side yard setback established by either the requirements based on lot width or Variable Side Yard Depth Requirement. (MICC 19.02.020(C)(3)).
 - b. Lot Coverage:
 - i. Calculated by totaling the following:
 1. All drivable surfaces (driveway, parking pad, turn-arounds, etc. regardless the material type; e.g. pervious driveway counts towards lot coverage)
 2. Roof line (includes eaves and covered decks)
 - ii. Lot Coverage is limited to a percentage of net lot area; this percentage varies between 20-40% depending on the slope of the lot. Lot slope is calculated by subtracting the lowest existing elevation from the highest existing elevation and dividing the resulting number by the shortest horizontal distance between these two points.
 - iii. Allowed a maximum of 9% of the lot area can be hardscape
 1. Hardscape includes: patios, uncovered steps, walkways, decks, retaining walls, rockeries, and other hardened surfaces other than drivable surfaces or roofs.
 2. Hardscape improvements can be within the maximum lot coverage allowance. That is, if the proposed lot coverage is less than the maximum lot coverage, the difference between the maximum and proposed areas can be used for hardscape.
2. Subdivisions
 - a. Design Standards
 - i. Streets, roads, and rights-of-way.
 1. The width and location of rights-of-way for major, secondary, and collector arterial streets shall be as set forth in the comprehensive arterial plan.
 2. Public rights-of-way shall comply with the requirements set out in MICC 19.09.030.
 3. Private access roads shall meet the criteria set out in MICC 19.09.040.

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- a. See Section 5 of the Planning Comments below for more information about standards for private access roads.
 4. Street of the proposed subdivision shall connect with existing improved public streets, or with existing improved private access roads subject to easements of way in favor of the land to be subdivided.
- ii. Residential lots.
 1. The area, width, and depth of each residential lot shall conform to the requirements for the zone in which the lot is located. Any lot which is located in two or more zones shall conform to the zoning requirements determined by the criteria set out in MICC 19.01.040(G)(2).
 2. Each side line of a lot shall be approximately perpendicular or radial to the center line of the street on which the lot fronts.
 3. The proposed subdivision shall identify the location of building pads for each proposed lot per MICC 19.09.090. No cross-section dimension of a designated building pad shall be less than 20 feet in width.
 4. The proposed subdivision shall incorporate the preferred development practices pursuant to MICC 19.01.110 where feasible.
 5. The proposed subdivision shall be designed to comply with the provisions of Chapter 19.10 MICC.
- iii. Design standards for special conditions.
 1. Subdivisions abutting an arterial street as shown on the comprehensive arterial plan shall be oriented to require the rear or side portion of the lots to abut the arterial and provide for internal access streets.
 - a. Island Crest Way is an arterial street as shown on the comprehensive arterial plan. The following design standards are required:
 - i. The new lots abutting Island Crest Way shall be oriented so either the side or rear yards abut Island Crest Way.
 - ii. All four lots of the subdivision must use a common internal access street.
 2. Where critical areas meeting the criteria set out in Chapter 19.07 MICC are present within the subdivision, the code official or city council may:
 - a. Require that certain portions of the long subdivision or short subdivision remain undeveloped with such restrictions shown on the official documents.
 - b. Increase the usual building setback requirements.
 - c. Require appropriate building techniques to reduce the impact of site development.
- b. Streets, utilities, and storm drainage. A subdivision shall include provisions for streets, water, sanitary sewers, storm drainage, utilities and any easements or facilities necessary to provide these services. All utilities shall be placed underground unless waived by the city engineer. Detailed plans for these provisions shall not be required until after the approval of the preliminary plat and shall be a condition precedent to the official approval of the subdivision.
- c. Construction Limitations
 - i. No construction, tree removal, grading, installation of utilities on land within a proposed long or short subdivision shall be allowed prior to preliminary approval of the long or short subdivision and until the applicant has secured the permits required under the MICC. Following preliminary approval, tree removal, grading, and

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installation of utilities shall be the minimum necessary for final plat approval of the long or short subdivision.

- ii. An existing lot, created through the final plat approval of a long or short subdivision, shall be a condition precedent for determination of complete application for a building permit to construct a new single-family dwelling.
 1. In other words, only one building permit application for a new single-family dwelling could be accepted and reviewed by the city prior to the recording of the final plat.
3. Critical area constraints
 - a. The City of Mercer Island GIS shows that there are landslide hazard areas and erosion hazard areas on the western portion of the subject lot.
 - b. General review requirements – alteration within geologically hazardous areas or associated buffers is required to meet the standards in this section, unless the scope of work is exempt pursuant to MICC 19.07.120, or a critical area review 1 approval has been obtained.
 - i. When an alteration within a landslide hazard area, seismic hazard area or buffer associated with those hazards is proposed, the applicant must submit a critical area study concluding that the proposal can effectively mitigate risks of the hazard. The study shall recommend appropriate design and development measures to mitigate such hazards. The code official may waive the requirement for a critical area study and the requirements of MICC 19.07.160(B)(2) and (3) when he or she determines that the proposed development is minor in nature and will not increase the risk of landslide, erosion, or harm from seismic activity, or that the development site does not meet the definition of a geologically hazardous area.
 - ii. Alteration of landslide hazard areas and seismic hazard areas and associated buffers may occur if the critical area study documents find that the proposed alteration:
 1. Will not adversely impact other critical areas;
 2. Will not adversely impact the subject property or adjacent properties;
 3. Will mitigate impacts to the geologically hazardous area consistent with best available science to the maximum extent reasonably possible such that the site is determined to be safe; and
 4. Includes the landscaping of all disturbed areas outside of building footprints and installation of hardscape prior to final inspection.
 - iii. Alteration of landslide hazard areas, seismic hazard areas and associated buffers may occur if the conditions listed in MICC 19.07.160(B)(2) are satisfied and the geotechnical professional provides a statement of risk matching one of the following:
 1. An evaluation of site-specific subsurface conditions demonstrates that the proposed development is not located in a landslide hazard area or seismic hazard area;
 2. The landslide hazard area or seismic hazard area will be modified or the development has been designed so that the risk to the site and adjacent property is eliminated or mitigated such that the site is determined to be safe;
 3. Construction practices are proposed for the alteration that would render the development as safe as if it were not located in a geologically hazardous area and do not adversely impact adjacent properties; or
 4. The development is so minor as not to pose a threat to the public health, safety and welfare.

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- c. Development standards – Landslide hazard areas. Development is allowed within landslide hazard areas and associated buffers, when the following standards are met:
 - i. A critical area study shall be required for any alteration of a landslide hazard area or associated buffer.
 - ii. Buffers shall be applied as follows. When more than one condition applies to a site, the largest buffer shall be applied:
 - 1. Steep slopes: Buffer widths shall be equal to the height of a steep slope, but not more than 75 feet, and applied to the top and toe of slopes.
 - 2. Shallow landslide hazard areas shall have minimum 25-foot buffers applied in all directions.
 - 3. Deep-seated landslide hazard areas shall have 75-foot buffers applied in all directions.
- d. Development standards – Erosion hazard areas.
 - i. All development proposals shall demonstrate compliance with Chapter 15.09 MICC, storm water management program.
 - ii. No development or activity within an erosion hazard area may create a net increase in geological instability on or off site.
- 4. State Environmental Policy Act (SEPA) Review
 - a. This proposal is exempt from SEPA under WAC 197-11-800(6)(d) as it involves a short subdivision for which the resulting lots do not exceed the total lots allowed under RCW 58.17.020 (four or fewer lots).
- 5. Private access roads and driveways.
 - a. All private access roads serving three or more single-family dwellings shall be at least 20 feet in width.
 - b. All corners shall have a minimum inside turning radius of 28 feet.
 - c. All private access roads in excess of 150 feet in length, measured along the centerline of the access road from the edge of city street to the end of the access road, shall have a turnaround with an inside turning radius of 28 feet.
- d. Gradient
 - i. No access road shall have a gradient of greater than 20%.
 - ii. For all access roads and driveways with a gradient exceeding 15%, the road surface shall be cement concrete pavement with a brushed surface for traction. Access roads and driveways with gradients of 15% or less may have asphalt concrete surface.
- 6. Building pads
 - a. New subdivisions shall designate a building pad for each lot as follows:
 - i. The building pad shall be located to minimize or prevent impact as indicated in the following:
 - 1. Removal of trees and vegetation required for retention pursuant to Chapter 19.10 MICC shall be prevented.
 - 2. Disturbance of the existing, natural topography as a result of anticipated development within the building pad shall be minimized.
 - 3. Impacts to critical areas and critical area buffers shall be minimized, consistent with the provisions of Chapter 19.07 MICC.
 - 4. Access to the building pad shall be consistent with the standards contained in MICC 19.09.040.
 - ii. Building pads shall not be located within:
 - 1. Required front, rear, or side yard setbacks.

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2. Streets or rights-of-way.
3. Critical areas, buffers or critical area setbacks; provided building pads may be located within geohazard areas and associated buffers and setbacks when all of the following are met:
 - a. A qualified professional determines that the criteria of MICC 19.07.160(B)(2) and (3), Site development, are satisfied.
 - b. Building pads are sited to minimize impacts to the extent feasible.
 - c. Building pads are not located in steep slopes or within 10 feet from the top of a steep slope, unless such sloped, as determined by a qualified professional, consist of soil types determined not to be landslide prone.
- iii. No cross-section dimension of a building pad shall be less than 20 feet in width.
- b. New buildings shall be located within the building pad established by MICC 19.09.090(A) or (B). Legally established nonconforming portions of existing buildings and additions made pursuant to MICC 19.07.130, Modifications, may be located outside of building pads.
7. Preferred practices – Proposed developments shall incorporate all of the following preferred development practices where feasible:
 - a. Use common access drive and utility corridors.
 - b. Development, including roads, walkways and parking areas, in critical areas should be avoided, or if not avoided, adverse impacts to critical areas will be mitigated to the greatest extent reasonably feasible.
 - c. Retaining walls should be designed to minimize grading, including the placement of fill, on or near an existing natural slope.
8. Easement:
 - a. Vehicular Access Easements. No structures shall be constructed on or over any vehicular access easement. A minimum five-foot yard setback from the edge of any easement that affords or could afford vehicular access to a property is required for all structures; provided, that improvements such as gates, fences, rockeries, retaining walls and landscaping may be installed within the five-foot yard setback so long as such improvements do not interfere with emergency vehicle access or sight distance for vehicles and pedestrians.
 - b. Utility and Other Easements. No structure shall be constructed on or over any easement for water, sewer, storm drainage, utilities, trail or other public purposes unless it is permitted within the language of the easement or is mutually agreed in writing between the grantee and grantor of the easement.
9. Impact fees
 - a. Future construction on the new lots resulting from the proposed subdivision will need to pay transportation and park impact fees.
 - b. Current rates are:
 - i. Transportation – \$2,600.31
 - ii. Parks – \$4,914.53
 - c. Note that fees are due at the time they are assessed--they do not vest to the time of complete subdivision or building permit application.
10. Transportation Concurrency: Please apply for a transportation concurrency certificate at the same time as the subdivision.
11. Vesting: Please see the standards in MICC 19.15.170.
12. Application fees
 - a. Deposit due at time of application

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- b. Review time is billed hourly against the deposit; additional fees may be requested if additional review time is required.
 - c. When third-party technical review is required (e.g. geotechnical, wetland, watercourse etc.), this is billed separately, in addition to staff review time.
13. Land Use Application Process and Estimated Timeline:
- a. Required land use approvals
 - i. Short Subdivision
 - b. Prompt for consolidated review
 - c. Summary of procedural steps
 - i. Pre-Application meeting
 - ii. Submit application electronically
 - iii. Application Completeness Check
 - iv. Notice of Application (incl. public notice via sign on site, mailing, notice in bulletin) beginning 30-day comment period; review begins
 - v. Review comments may be sent out if needed
 - vi. Notice of Decision
 - vii. Appeal period
 - viii. Final Plat review and recording
 - d. A final plat application meeting all requirements of Chapter 19.15 MICC shall be submitted to the code official and recorded within five years of the date of preliminary plat approval.

Land Use Decisions

Type of Review	Target
Completeness Review	4 weeks
First review	8-12 weeks
Second and subsequent reviews	6 weeks
Staff Report / Decision (following completion of review)	3-4 weeks

Single Family Residential	
First Review	8-12 weeks
Second Review	3 weeks
Third and subsequent reviews	2 weeks
Revisions	2-3 weeks
Express Reviews (see note below)**	4 weeks

For more information on Land Use and Planning please refer to this useful webpage:
<https://www.mercerisland.gov/cpd/page/land-use-application-forms-and-submittal-requirements>

Regards

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Andrew Leon
Planner
Community Planning & Development
City of Mercer Island

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May 17, 2022

Page 13 of 13

Special Reports

Geotechnical Report and addendum prepared for by GEO Group Northwest, Inc. dated February 18th, 2022 and September 16th, 2022 are included in the following pages. Similarly Tree Assessment Report prepared by Arbor INFO LLC dated April 20th, 2022 is included in the following pages.



February 18th, 2022

G-5514

Mr. Jesse Tam
Phone: (206) 948-9902
Email: jesset28@aol.com

Subject: Geotechnical Engineering Investigation & Soil Infiltration Evaluation
Proposed Short-Plat
4833 – 90th Ave SE
Mercer Island, Washington

Dear Mr. Tam:

At your request, GEO Group Northwest, Inc., conducted a geotechnical engineering investigation and soil infiltration evaluation for the proposed short-plat at the above-subject location in Mercer Island, Washington. The scope of our services included review of the area geologic map; assessment of subsurface soil and groundwater conditions; pilot infiltration testing; and preparation of this report of our findings, conclusions, and recommendations.

SITE CONDITIONS

Site Description

The project site is located in Mercer Island, Washington, as illustrated in *Plate 1 – Site Location Map*. The site is rectangularly shaped and consists of approximately 41,110 square feet (0.94 acres). The existing residence is located in the central region of the property. In general, the site features level topography, however, when nearing the west property line, the site begins to slope westerly at low to moderate inclinations down to Island Crest Way below. The majority of this moderately-inclined slope area is west of the property line in the City right-of-way. The existing site configuration and topography are illustrated in *Plate 2 – Site Plan*, and *Plate 3 – Site Geologic Hazards Map*. The site is bounded by residential developed properties to the north and

south, Island Crest Way to the west, and by 90th Avenue Southeast to the east. A gravel driveway extending from 90th Avenue Southeast enters the property along the east property line.

Proposed Development

At this time, we understand that the existing site is proposed to be divided into four individual lots. In this case, we anticipate that a total of up to four single-family residences will be built on the project site. This report has been prepared to be applicable to construction of typical wood-frame single-family residences having 1 to 3 stories including a basement. We recommend that specific plans for the parcels should be reviewed by the geotechnical engineer, to evaluate whether the conclusions and recommendations in the report remain applicable and supplemental or revised recommendations should be provided where appropriate.

SITE INVESTIGATION

Geologic Overview

According to the area geologic map, the site soils are identified as Vashon subglacial till (Qvt) from the Fraser Glaciation. Glacial till is described as a very compact mixture of sand, silt, clay, and gravel deposited under glacial ice during the Fraser glaciation period. Glacial till typically has a weathered zone of loose to medium dense soil on top, underlain by dense, unweathered till.

Subsurface Investigation

On January 21st, 2022, Garrett Dean, Staff Engineering Geologist from our firm, visited the site to perform a visual reconnaissance of the site and investigate the subsurface soil conditions. In addition to our reconnaissance, we oversaw the excavation of five exploratory test pits throughout the site (TP-1 through TP-5). The boring locations are illustrated on *Plate 2 – Site Plan*.

The soils encountered the test pits typically consisted of a thin surface veneer of organic-rich silty sand topsoil, underlain by medium dense to very dense silty sand with some gravel to the total depth of the test pits which ranged between approximately 3 to 3.5 feet below the ground surface (bgs). A minor amount of fill material was encountered near the surface in test pit TP-1. A small amount of groundwater seepage was encountered at a depth of approximately 2.5 feet in

test pit TP-1. For additional information about the soils encountered, please refer to the test pit logs attached as *Appendix A* to this report.

GEOLOGIC HAZARD AREAS REVIEW

We reviewed available geologic hazard areas information on the City of Mercer Island Information and Geographic Services (IGS) website. The information indicates that the project site is located within erosion and landslide hazard critical areas. According to the IGS information, no known landslides are identified on the project site or immediate adjacent vicinity. The erosion and landslide hazard areas at the site are limited to the moderately-inclined, sloping region at the west margin of the site and are identified in *Plate 3 – Site Geologic Hazards Map*.

Landslide Hazard Area Evaluation

During our investigation, we observed no indications of soil instability or erosion within the hazard area or other areas of the site. No water seepage was observed in test pits TP-3 and TP-4, which were located within or directly adjacent to the mapped landslide hazard area. The slope in the hazard area is approximately 12 to 16 feet in vertical height and per the mapping provided by the City of Mercer Island IGS, is less than 40 percent grade, which excludes the feature's designation as a 'steep slope' status. The slope and hazard area are well-vegetated with native shrubs, trees, and groundcover. No water seepage was observed at the slope's toe or face.

We find the presence of very dense, glacially consolidated soils at shallow depths throughout the project site to be a mitigating factor in regards to the potential for landsliding at the site. Therefore, in our opinion, the risk of landsliding or soil movement at the site can be considered very low based on these observed site conditions.

Erosion Hazard Area Evaluation

During our investigation we did not observe signs of rutting or downslope soil movement at the site or erosion hazard area. We observed the site as a whole, including the moderately-inclined slope region at the west extent of the site, to be well-vegetated with various native shrubs, trees, and groundcover. This vegetated condition is a mitigating factor with regards to soil erosion at the site in our opinion.

Provided that the proper temporary and permanent erosion and sediment controls, provided in this report, are implemented where soils have been disturbed during and post development, it is our opinion that the risk of significant soil erosion at the site can be considered minimal.

SOIL INFILTRATION EVALUATION

Soil Infiltration Testing

Test pit TP-5 was used to perform soil infiltration testing using the small Pilot Infiltration Test procedure described in the December 2014 edition of the Washington Department of Ecology Stormwater Management Manual for Western Washington. The test was performed at a depth of approximately 26 inches below the existing ground surface at the location.

Following the soaking period, the testing consisted of taking water level measurements until one hour of essentially steady water levels were measured. Afterward, the water supply was shut off, and the drop of the water level was measured at regular intervals for a period of 90 minutes. The test data is presented in *Appendix B* to this letter.

Approximately 1.5 inches of water was observed in the test pit at 8:50am the following morning, which was approximately 17 hours after the testing was completed. The test pit was excavated further to check for the presence of a hydraulic restrictive layer. A hydraulically restrictive layer was encountered at approximately 3 feet of depth in TP-5. Based on observations of soil conditions in the other four test pits that were excavated on site (TP-1 through TP-4), the presence of the hydraulically restrictive layer can be assumed to underly the entirety of project site.

Testing Results

At test pit TP-5, a measured infiltration rate of 3.21 in/hr was obtained for the steady flow portion of the testing, and a measured infiltration rate of 0.61 in/hr was obtained for the falling head portion of the testing.

We used the falling head values to calculate design infiltration rates for the test location. We applied a correction factor of 0.28 to account for soil variability, test method used, and long-term maintenance considerations. The resulting design infiltration rate is calculated to be **0.17 in/hr**.

Infiltration Feasibility

In our opinion, infiltration feasibility at the subject location is limited first by the high fines content in the weathered soil horizon and is additionally hindered by the presence of hydraulically restrictive hardpan glacial till which was encountered at relatively shallow depths in the test pits. As mentioned previously in the Subsurface Investigation and Soil Infiltration Testing sections above, hydraulically restrictive glacial till was encountered at depths ranging between 3 to 3.5 feet below the ground surface in the test pits.

CONCLUSIONS AND RECOMMENDATIONS

Soil Infiltration Feasibility Evaluation

The results from our subsurface investigation conclude that the site soils contain a high fraction of fines and are relatively impermeable. **In our opinion, infiltration as a stormwater bmp for the site is not feasible.** Dispersion in the backyards is not recommended due to potential impacts to the neighboring properties. We recommend that drainage from the proposed development be discharged into the existing stormwater drainage system if available, or otherwise discharged to an approved alternative.

Seismicity Evaluation

In accordance with the 2018 International Building Code, the site classification is Site Class D (stiff soil). Glacially consolidated soils have a high shear strength and the potential for landslides, liquefaction and/or lateral spreading during a strong motion earthquake can be considered negligible. In our opinion, the site is stable and the risk of a surface rupture, resulting from a large magnitude seismic event, is very low. No seismic mitigation measures are recommended, with the exception of the addition of design criteria for seismically induced soil loads on permanent below-grade basement and retaining walls.

Foundations

Soils that are anticipated to be acceptable for building support were encountered at a depth of approximately 2.5 to 3.5 feet bgs throughout the project site. Based upon this information, it is our opinion that new foundations for the project can consist of conventional concrete strip and column footings that bear directly on dense native soils or on compacted structural fill that has

been placed on a subgrade of dense native soils. Our recommended design criteria for conventional footing foundations supported on native soils or structural fill are provided below.

- Allowable bearing pressure, including all dead and live loads:
 - Undisturbed, medium dense or dense soil = 2,500 psf
 - Structural fill placed on medium dense or dense soil = 2,500 psf
- Minimum depth to base of perimeter footing below adjacent exterior grade = 18 inches
- Minimum depth to bottom of interior footings below top of floor slab = 12 inches
- Minimum width of wall footings = 16 inches
- Minimum lateral dimension of column footings = 24 inches
- Estimated post-construction settlement = ½ inch
- Estimated post-construction differential settlement across building width = ½ inch

A one-third increase in the above allowable bearing pressures can be used when considering short-term transitory wind or seismic loads.

Lateral loads against the building foundations can be resisted by friction between the foundation and the supporting subgrade or by passive earth pressure acting on the buried portions of the foundations. For the latter case, the foundations must be poured "neat" against the existing undisturbed soil or be backfilled with compacted structural fill. Our recommended parameters are as follows:

- Passive Pressure (Lateral Resistance)
 - 350 pcf, equivalent fluid weight, for structural fill or competent undisturbed native soil
- Coefficient of Friction (Friction Factor)
 - 0.35 for structural fill or competent undisturbed native soil

Conventional Retaining and Basement Walls

Conventional concrete retaining or basement walls may be supported on spread footing foundations which are supported per the recommendations provided above in this report. Walls that are restrained horizontally are considered unyielding and should be designed for lateral soil pressure under the at-rest condition. Walls that are free to rotate should be designed for an active lateral soil pressure.

- At-Rest Soil Pressure

Walls supported horizontally (i.e., floor framing) are considered unyielding and should be designed under the at-rest condition. We recommend using a design lateral soil pressure with an equivalent fluid density of 45 pcf for level ground above the wall.

- Active Soil Pressure

Cantilever walls designed to yield an amount equal to 0.002 times the wall height should be designed under an active soil pressure condition. We recommend using a design lateral soil pressure with an equivalent fluid density of 35 pcf for level ground above the wall.

- Seismic Earth Pressure

In addition to the above triangular lateral soil pressures, a rectangular pressure of $8H$ should be added for permanent below grade walls to account for seismically induced dynamic soil loads. Where H is the overall height of the wall in feet.

- Passive Earth Pressure and Base Friction

The available passive earth pressure that can be mobilized to resist lateral forces may be assumed to be equal to 350 pcf equivalent fluid weight for both undisturbed soils and engineered structural fill. The base friction that can be generated between concrete and undisturbed bearing soils or engineered structural fill may be based on an assumed 0.35. The soil design parameters are allowable values and include a safety factor of 2.

The active and at-rest design pressures are based on a fully drained wall condition and do not include the effects of surcharges. For sloped ground above walls, a surcharge equivalent to

50 percent of the soil height above the wall (soil unit weight 125 pcf) should be used in addition to the above soil pressure. Traffic and construction equipment surcharge may be considered as a uniform surcharge equivalent to two (2) feet of soil acting over the full depth of the active pressure. Below grade walls should be drained to prevent the buildup of hydrostatic pressure behind the wall, as discussed in the Drainage section of this report. Restrained walls designed should be backfilled after completing their lateral restraint is in place or per the approval of the structural design engineer.

Concrete Slabs-on-Grade

Slab-on-grade floors should be constructed on a firm, unyielding subgrade. During preparation of the slab subgrade, any areas of the subgrade that have been disturbed by construction activity should be either re-compacted or excavated and replaced with compacted structural fill. We recommend that structural fill placed below slab-on-grade floors conform to the earthwork and grading recommendations provided in this report.

To avoid moisture build-up on the subgrade, the floor slab should be placed on a capillary break, which is in turn placed on the prepared subgrade. The capillary break should consist of a 6”-minimum thickness layer of crushed rock or gravel that contains no more than five percent material finer than a No. 4 sieve. A vapor barrier, such as a 10-mil plastic membrane, should be placed over the capillary break and taped or sealed to minimize water vapor transmission upward through the slab, if post-construction vapor transmission is undesirable.

Drainage

Water should not be allowed to stand in areas where footings, slabs, or pavements are to be constructed. Final site grades should provide drainage away from the building structure. Drainage should be installed against below-grade walls to prevent moisture intrusion and a buildup of hydrostatic pressure. To facilitate drainage behind below grade walls, we recommend installing a vertical drain mat (sheet drain) such as Miradrain 6000, or equivalent, with a footing drain at the base of the wall, as illustrated in *Plate 4 – Typical Basement Wall Drainage*. Wall backfill against the vertical drain mat should be compacted to a minimum of 90 percent of the material’s maximum dry density to mitigate clogging of the filter fabric.

Footing drains, consisting of a 4-inch minimum diameter, rigid perforated drain pipe, should extend around new perimeter foundations and be installed behind new basement and retaining walls. Footing drains should be bedded in washed drain rock and the rock wrapped with

geotextile filter fabric, such as Mirafi 140N, or equivalent, as illustrated *Plate 5 – Typical Footing Drain*. The drain rock should extend above the base of the vertical drain mat. Roof and other drain lines should not be connected to the footing drain system. We recommend installing a sump pump system if the footing drain system cannot drain by gravity to a discharge location. Installation of clean-outs are recommended to allow periodic maintenance of the drain system.

Grading and Earthwork

Erosion Control

Temporary erosion and sedimentation controls (TESCs), such as silt fences, should be installed down-gradient of the areas to be disturbed to prevent sediment-laden runoff from being discharged off site. Surface runoff should not be allowed to flow over the top of slopes into excavations. During wet weather, exposed soils should be covered with plastic sheeting or straw mulch. Stockpiled soils should be covered with plastic tarps. For permanent erosion control disturbed soils should be landscaped and mulched upon completion of the site work.

A construction entrance consisting of 2- to 4-inch size crushed rock should be installed to prevent tracking onto the street. The construction entrance area should be cleared and grubbed prior to rock placement and we recommend underlaying the rock with a woven geotextile such as Mirafi 500X, or equivalent, to provide separation between the rock and subgrade soil.

Excavations and Slopes

Temporary excavation slopes should not be greater than the limits specified in local, state and federal government safety regulations. We recommend that temporary cuts greater than 4 feet in height be sloped at inclinations up to 1H:1V (Horizontal: Vertical) in loose to medium dense soils. Temporary excavations in the very dense, hardpan soils can be sloped near vertical under the observation of the geotechnical engineer. Permanent cut and fill slopes should be inclined no steeper than 2.5H:1V. Steeper permanent fill slopes can be achieved with the use of geogrid for lateral reinforcement. Slopes that are to be maintained or mowed should be sloped at 3H:1V, or less. Excavation work for the project should not extend below a 1H:1V line extending from the property lines in loose to medium dense soils, in order to avoid affecting the adjacent properties.

Fill slopes should consist of granular material compacted to a minimum of 90 percent of the material's maximum dry density. If supporting structural elements, the fill should be compacted to the structural fill specification of 92 percent.

Based on the subsurface findings, groundwater seepage is expected. If significant water seepage or other adverse conditions are encountered, excavation should be halted, and the geotechnical engineer should be contacted to review the site conditions.

Structural Fill

Structural fill is defined as fill soil supporting building foundations, floor slabs, pavements, sidewalks or other structures. Structural fill should be free of organic and other deleterious substances and have a maximum fragment size of 3 inches. The site soils contain appreciable proportions of fines may be difficult to achieve compaction during wet weather, depending on the material's moisture content. Therefore, during wet weather, we recommend using a free-draining granular material containing no more than 5 percent fines content (silt and clay-size particles passing the No. 200 mesh sieve). Other materials, such as recycled crushed concrete or crushed rock may be used.

Structural fill should be placed and compacted at or near the material's optimum moisture content and in lifts that are 10 inches thick or less. Below slab-on-grade floors, foundations, and other structural elements, structural fill should be compacted to a minimum of 92 percent of the material's maximum dry density, as determined by ASTM Test Designation D-1557 (Modified Proctor). For driveways, structural fill should be compacted to 90 percent, with the exception of the top 12 inches which should be compacted to 95 percent. Fill behind retaining walls and next to building foundation walls should be compacted to a minimum of 90 percent (92 percent if supporting structural elements; if supporting pavements, the top 12 inches should be compacted to 95 percent).

Utility trench backfill within the City right-of-way should be compacted to the specifications required by the City, sewer or water district. Observation and compaction testing may be required at the time of fill placement to document and verify that the compaction specifications are achieved.

LIMITATIONS

The findings and recommendations stated herein are based on field observations, our experience on similar projects and our professional judgment. The recommendations presented herein are our professional opinions derived in a manner consistent with the level of care and skill ordinarily exercised by other members of the profession currently practicing under similar conditions in this area and within the project schedule and budget constraints. No warranty is expressed or implied. In the event that site conditions are found to differ from those described in this report, we should be notified so that the relevant recommendations in this report can be reevaluated and modified if appropriate.

CLOSING

We appreciate the opportunity to provide you with geotechnical engineering services for this project. Please do not hesitate to contact us if you have any questions regarding this report.

Sincerely,

GEO Group Northwest, Inc.



Garrett Dean, G.I.T.
Staff Engineering Geologist

William Chang, P.E.
Principal Engineer

Attachments:

- Plate 1 – Site Location Map*
- Plate 2 – Site Plan*
- Plate 3 – Site Geologic Hazards Map*
- Plate 4 – Typical Basement Wall Drain*
- Plate 5 – Typical Footing Drain*
- Appendix A – USCS Soil Classification & Test Pit Logs*
- Appendix B – Pilot Infiltration Test Data & Calculations*



Source: King County iMap, 2022



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Environmental Scientists

SITE LOCATION MAP

PROPOSED SHORT-PLAT

4833 - 90TH AVE SE

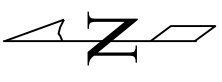
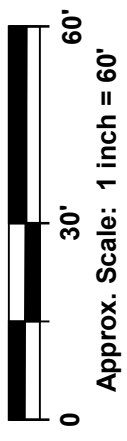
MERCER ISLAND, WASHINGTON

SCALE	NONE	DATE	2/18/2022	MADE	GD	CHKD	WC	JOB NO.	G-5514	PLATE	1
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LEGEND

- 
 Test Pit Number & Approximate Location
- 
 TP-1




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SITE PLAN			
PROPOSED SHORT-PLAT 4833 - 90TH AVE SE MERCER ISLAND, WASHINGTON			
SCALE	As Shown	DATE	2/18/22
MADE	GD	CHKD	WC
PLATE	2	JOB NO.	G-5514

This Site Plan Adapted From City of Mercer Island GIS Portal, Retrieved February, 2022.



City of Mercer Island



Legend

- 10ft Lidar Contours (2'
- 2ft Lidar Contours (2'
- Protected Slope Area
- Potential Slide
- Erosion
- Address
- Building
- Property Line

1: 325



Notes

Disclaimer: These maps were developed by the City of Mercer Island and are intended to be a general purpose digital reference tool. These maps are not an accepted legal instrument for describing, establishing, recording or maintaining descriptions for property concerns or boundaries. The City makes no representation or warranty with respect to the accuracy or currency of these data sets, especially in regard to labeling of surveyed monuments, or agreement with official sources such as records of survey, or mapped locations of features.



Map Printed: February 16, 2022

© City of Mercer Island



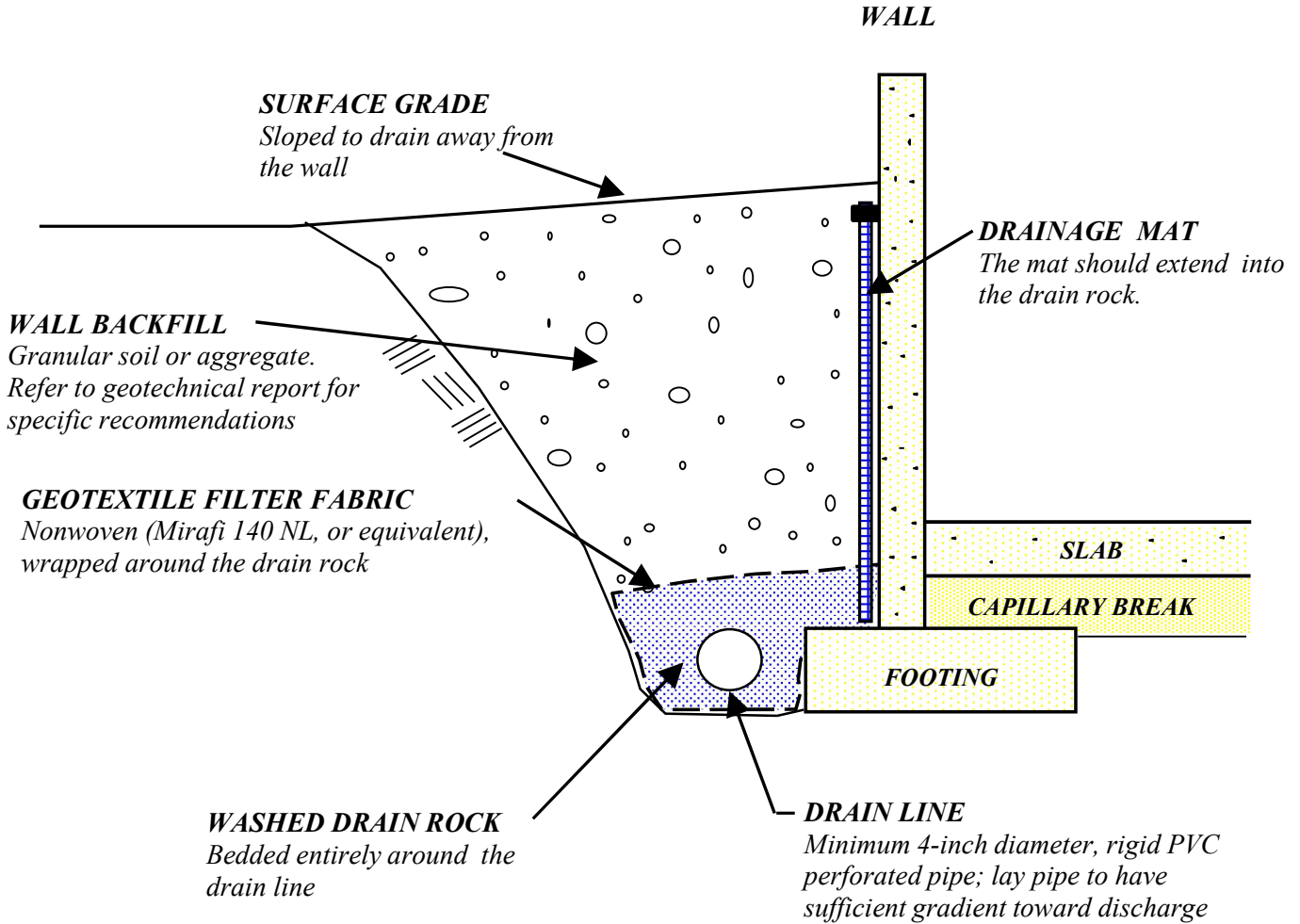
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SITE GEOLOGIC HAZARDS MAP

PROPOSED SHORT-PLAT
 4833 - 90TH AVE SE
 MERCER ISLAND, WASHINGTON

SCALE	AS SHOWN	DRAWN BY	GD	CHECKED BY	WC	DATE	2/18/2022	PROJECT NO.	G-5514	PLATE	3
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TYPICAL BASEMENT WALL DRAIN



NOTES:

NOT TO SCALE

- 1.) Do not replace rigid PVC pipe with flexible corrugated plastic pipe.
- 2.) Perforated PVC pipe should be tight jointed and laid with perforations oriented downward. The pipe should be gently sloped to provide flow toward the tightline or discharge location.
- 3.) Do not connect other drain lines into the footing drain system.
- 4.) Backfill should meet structural fill specifications if it will support driveways, sidewalks, patios, or other structures. Refer to the geotechnical engineering report for structural fill recommendations.
- 5.) Surface grade above the backfill can be covered with a layer of relatively impermeable topsoil or pavement or slab to reduce infiltration of surface water into the backfill and drainage system



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TYPICAL BASEMENT WALL DRAIN

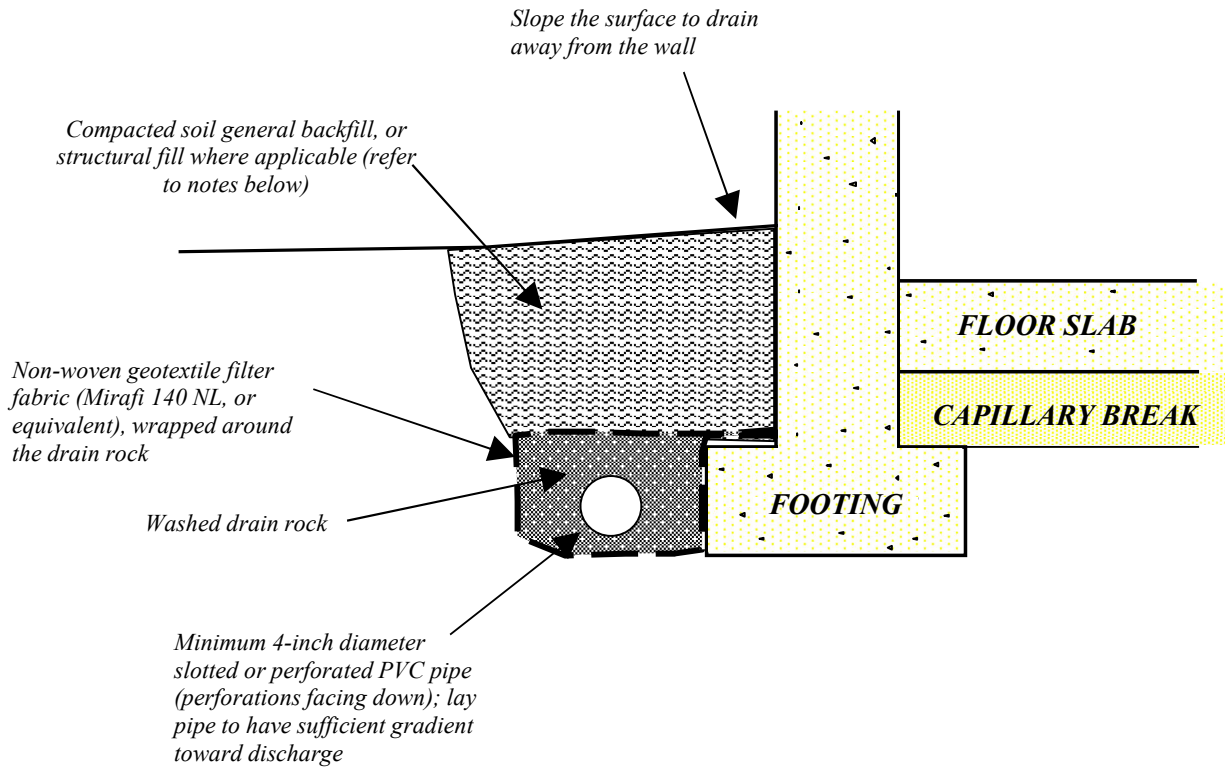
PROPOSED SHORT-PLAT

4833 - 90TH AVE SE

MERCER ISLAND, WASHINGTON

SCALE	NONE	DATE	2/18/2022	MADE	GD	CHKD	WC	JOB NO.	G-5514	PLATE	4
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TYPICAL FOOTING DRAIN



NOT TO SCALE

NOTES:

- 1.) Perforated or slotted rigid PVC pipe should be tight jointed and laid with perforations or slots down, and with positive gradient toward discharge location(s). The pipe should be placed at or slightly above the elevation of the bottom of the footing. Do not replace rigid PVC pipe with flexible corrugated plastic pipe.
- 2.) Do not connect other drainage lines to the footing drain lines. Drain line cleanouts should be installed at appropriate locations to allow inspection and maintenance of the lines after construction.
- 3.) If the backfill will support sidewalks, driveways, patios, or other structures, it should be compacted to at least 90% of its maximum dry density based on the Modified Proctor test method, except that the top 12 inches of the backfill should be compacted to at least 95% of the maximum dry density.
- 4.) The geotextile filter fabric should be placed around the drain rock as shown, and not wrapped directly around the pipe.



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TYPICAL FOOTING DRAIN

PROPOSED SHORT-PLAT

4833 - 90TH AVE SE

MERCER ISLAND, WASHINGTON

SCALE: NONE	DATE: 2/18/2022	MADE: GD	CHKD: WC	JOB NO. G-5514	PLATE 5
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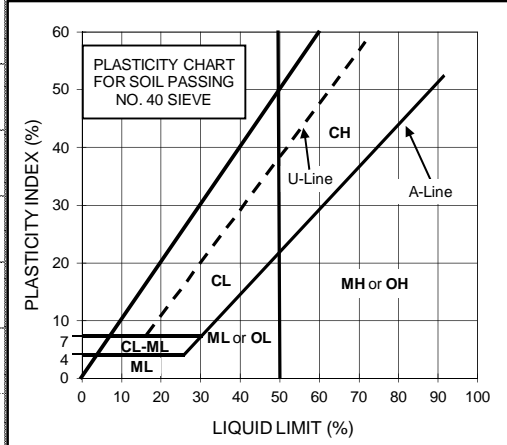
APPENDIX A

G-5514

USCS SOIL CLASSIFICATION & TEST PIT LOGS

SOIL CLASSIFICATION & PENETRATION TEST DATA EXPLANATION

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)						
MAJOR DIVISION		GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA		
COARSE-GRAINED SOILS More Than Half by Weight Larger Than No. 200 Sieve	GRAVELS (More Than Half Coarse Fraction is Larger Than No. 4 Sieve)	CLEAN GRAVELS (little or no fines)	GW WELL GRADED GRAVELS, GRAVEL-SAND MIXTURE, LITTLE OR NO FINES	CONTENT OF FINES BELOW 5%	$C_u = (D_{60} / D_{10})$ greater than 4 $C_c = (D_{30})^2 / (D_{10} * D_{60})$ between 1 and 3	
		DIRTY GRAVELS (with some fines)	GP POORLY GRADED GRAVELS, AND GRAVEL-SAND MIXTURES LITTLE OR NO FINES		CLEAN GRAVELS NOT MEETING ABOVE REQUIREMENTS	
		SANDS (More Than Half Coarse Fraction is Smaller Than No. 4 Sieve)	CLEAN SANDS (little or no fines)	SW WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	CONTENT OF FINES BELOW 5%	$C_u = (D_{60} / D_{10})$ greater than 6 $C_c = (D_{30})^2 / (D_{10} * D_{60})$ between 1 and 3
			DIRTY SANDS (with some fines)	SP POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES		CLEAN SANDS NOT MEETING ABOVE REQUIREMENTS
	CLAYEY SANDS (with some fines)		SM SILTY SANDS, SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW "A" LINE with P.I. LESS THAN 4	
			SC CLAYEY SANDS, SAND-CLAY MIXTURES		ATTERBERG LIMITS ABOVE "A" LINE with P.I. MORE THAN 7	



SOIL PARTICLE SIZE				
FRACTION	U.S. STANDARD SIEVE			
	Passing		Retained	
	Sieve	Size (mm)	Sieve	Size (mm)
SILT / CLAY	#200	0.075		
SAND				
FINE	#40	0.425	#200	0.075
MEDIUM	#10	2.00	#40	0.425
COARSE	#4	4.75	#10	2.00
GRAVEL				
FINE	0.75"	19	#4	4.75
COARSE	3"	76	0.75"	19
COBBLES	76 mm to 203 mm			
BOULDERS	> 203 mm			
ROCK FRAGMENTS	> 76 mm			
ROCK	>0.76 cubic meter in volume			

GENERAL GUIDANCE FOR ENGINEERING PROPERTIES OF SOILS, BASED ON STANDARD PENETRATION TEST (SPT) DATA						
SANDY SOILS				SILTY & CLAYEY SOILS		
Blow Counts N	Relative Density, %	Friction Angle ϕ , degrees	Description	Blow Counts N	Unconfined Strength Q_u , tsf	Description
0 - 4	0 - 15		Very Loose	< 2	< 0.25	Very soft
4 - 10	15 - 35	26 - 30	Loose	2 - 4	0.25 - 0.50	Soft
10 - 30	35 - 65	28 - 35	Medium Dense	4 - 8	0.50 - 1.00	Medium Stiff
30 - 50	65 - 85	35 - 42	Dense	8 - 15	1.00 - 2.00	Stiff
> 50	85 - 100	38 - 46	Very Dense	15 - 30	2.00 - 4.00	Very Stiff
				> 30	> 4.00	Hard



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Bellevue, WA 98005
E-mail: info@geogroupnw.com

APPEND A1

TEST-PIT: TP-1

LOGGED BY GD

LOG DATE: 1/21/2022

GROUND ELEV. 360 feet +/-

DEPTH ft.	USCS	SOIL DESCRIPTION	SAMPLE No.	Water %	OTHER TESTS/ COMMENTS
1	SM	Silty SAND, dark brown, loose, moist; with some subrounded gravel, organics, small roots, glass bottle, wood fragments (topsoil/fill)	S1	34.0	-Probe 30" at 0'
2	SM	Silty SAND, brown to brownish-gray, dense, damp; with some subrounded gravel, minor cobbles (weathered till)	S2	14.7	-Probe 4" at 1.5'
3	SM	Silty SAND, brownish-gray, very dense, damp; with some subrounded gravel, minor cobbles, mottling (glacial till)	S3	18.5	-Probe 3.5" at 2.5'
4					-Probe 0.5" at 3'
5		Total depth = 3.1 feet Minor groundwater seepage encountered at approximately 2.5 feet.			
6					
7					

TEST PIT: TP-2

LOGGED BY GD

LOG DATE: 1/21/2022

GROUND ELEV. 360 feet +/-

DEPTH ft.	USCS	SOIL DESCRIPTION	SAMPLE No.	Water %	OTHER TESTS/ COMMENTS
1	SM	Silty SAND, dark brown, loose, moist; with some subrounded gravel, organics, small roots, (topsoil)	S1	16.2	-Probe 18" at 0'
2	SM	Silty SAND, brown to gray, loose to medium dense, damp; with some subrounded gravel, minor cobbles, minor mottling, roots (weathered till) -becomes gray at 1.5'	S2	16.1	-Probe 18" at 1'
3	SM	Silty SAND to Sandy SILT, gray, very dense, damp; with some subrounded gravel, mottling (glacial till)	S3	17.8	-Probe 3" at 2'
4					-Probe 5" at 3'
5		Total depth = 3.5 feet No groundwater encountered.			-Probe 0.5" at 3.5'
6					
7					



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TEST PIT LOGS

PROPOSED SHORT-PLAT
4833 - 90TH AVE SE
MERCER ISLAND, WASHINGTON

JOB NO. G-5514	DATE 2/18/22	APPEND. A2
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TEST-PIT: TP-3

LOGGED BY GD

LOG DATE: 1/21/2022

GROUND ELEV. 358 feet +/-

DEPTH ft.	USCS	SOIL DESCRIPTION	SAMPLE No.	Water %	OTHER TESTS/ COMMENTS
1	SM	Silty SAND, dark brown, loose, moist; with some subrounded gravel, organics, small roots, (topsoil)			-Probe 30" at 0'
2	SM	Silty SAND, brown to brownish-gray, dense, damp; with some subrounded gravel and cobbles (weathered till)	S1	20.7	-Probe 6" at 1' -Probe 4" at 2'
3	SM	Silty SAND, gray, very dense, damp; with some subrounded gravel, minor cobbles, mottling (glacial till)	S2	17.1	-Probe 0.5" at 2.8'
4		Total depth = 3.0 feet No groundwater encountered			
5					
6					
7					

TEST PIT: TP-4

LOGGED BY GD

LOG DATE: 1/21/2022

GROUND ELEV. 358 feet +/-

DEPTH ft.	USCS	SOIL DESCRIPTION	SAMPLE No.	Water %	OTHER TESTS/ COMMENTS
1	SM	Silty SAND, dark brown, loose to medium dense, moist; with some subrounded gravel, organics, small roots (topsoil)			-Probe 20" at 0.5'
2	SM	Silty SAND, brownish-gray, medium dense, damp; with some subrounded gravel, minor cobbles, minor mottling (weathered till)	S1	13.2	-Probe 10" at 1.7'
3	SM	Silty SAND to Sandy SILT, gray, very dense, damp; with some subrounded gravel, mottling (glacial till)	S2	15.8	-Probe 4.5" at 3' -Probe 0" at 3.3'
4		Total depth = 3.3 feet No groundwater encountered.			
5					
6					
7					



Group Northwest, Inc.

Geotechnical Engineers, Geologists, &
Environmental Scientists

TEST PIT LOGS

PROPOSED SHORT-PLAT
4833 - 90TH AVE SE
MERCER ISLAND, WASHINGTON

JOB NO. G-5514	DATE 2/18/22	APPEND. A3
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TEST-PIT: TP-5

LOGGED BY GD

LOG DATE: 1/21/2022

GROUND ELEV. 360 feet +/-

DEPTH ft.	USCS	SOIL DESCRIPTION	SAMPLE No.	Water %	OTHER TESTS/ COMMENTS
1	SM	Silty SAND, dark brown, loose, moist; with some subrounded gravel, organics, small roots, (topsoil)	S1	28.7	Probe 25" at 0'
2	SM	Silty SAND, brown, dense, damp; with some subrounded gravel (weathered till)	S2	38.2	Probe 0" at 2.1'
3	SM	Silty SAND, gray, very dense, damp; with some subrounded gravel, minor cobbles, mottling (glacial till)	S3	25.3	Probe 1" at 3'
4		Total depth = 3.0 feet			
5		No groundwater encountered. Pilot infiltration test performed at depth of approximately 26 inches.			
6					
7					

TEST PIT:

LOGGED BY

LOG DATE:

GROUND ELEV.

DEPTH ft.	USCS	SOIL DESCRIPTION	SAMPLE No.	Water %	OTHER TESTS/ COMMENTS
1					
2					
3					
4					
5					
6					
7					



Group Northwest, Inc.

Geotechnical Engineers, Geologists, &
Environmental Scientists

TEST PIT LOGS

PROPOSED SHORT-PLAT
4833 - 90TH AVE SE
MERCER ISLAND, WASHINGTON

JOB NO. <u>G-5514</u>	DATE <u>2/18/22</u>	APPEND. <u>A4</u>
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APPENDIX B

G-5514

PILOT INFILTRATION TEST DATA & CALCULATIONS

Pilot Infiltration Test Data

4833 - 90th Ave SE
Mercer Island, Washington

Test Pit TP-5

Time	Time Interval (minutes)	Water Level (inches)	Water Level Change (inches)	Flow Reading (sec/gal)	Comments/Remarks
7:30	--	--	--	17.14	
8:12	42	12	12	75.00	Start adding water. Flow approximately 3.50 gpm
9:12	60	12	0	75.00	Flow reduced to approximately 0.8 gpm
10:12	60	12	0	75.00	
11:12	60	12	0	75.00	
12:12	60	12	0	75.00	
13:12	60	12	0	200.00	
14:12	60	12	0	200.00	Flow reduced to approximately 0.3 gpm

Time	Time Interval (minutes)	Water Level (inches)	Water Level Change (inches)	Comments/Remarks
15:12	--	12 1/4	0	
15:22	10	12	- 1/4	
15:32	10	11 3/4	- 1/4	
15:42	10	11 1/4	- 1/2	
15:52	10	11	- 1/4	
16:02	10	10 5/8	- 3/8	
16:12	10	10 1/4	- 3/8	
16:22	10	10	- 1/4	
16:32	10	9 3/4	- 1/4	
16:42	10	9 1/2	- 1/4	
8:50	928	1 1/2	-8	End of readings and testing.

Test performed on January 20th, 2022.
Water level data is vertical height of water in pit.

Pilot Infiltration Test Calculations

4833 - 90th Ave SE
Mercer Island, Washington

Test Pit TP-5

Steady-State Calculation:

Pit Dimensions: 4 ft x 3 ft = 12 sqft

Average Steady Flow Rate: 0.40 gpm

$0.40 \text{ gpm} \times (60 \text{ min/hr}) = 24 \text{ gph}$

$24 \text{ gph} \times (1 \text{ cuft} / 7.48 \text{ gal}) = 3.21 \text{ cuft/hr}$

$3.21 \text{ cuft/hr} / 12 \text{ sqft} = 0.2675 \text{ ft/hr} = 3.21 \text{ in/hr}$

Field Rate = 3.21 in/hr

Correction Factor: 0.28

Design infiltration rate: $3.21 \text{ in/hr} \times (0.28)$

= 0.90 in/hr

Design Rate = 0.90 in/hr

Test performed on January 20th, 2022.

Pilot Infiltration Test Calculations

4833 - 90th Ave SE
Mercer Island, Washington

Test Pit TP-5

Falling Head Calculation:

Time interval: 15:12 to 08:50 (1058 minutes)

Total change in water level: 12.25 in - 1.5 in = 10.75 in

Overall infiltration rate: 10.75 in / 17.63 hrs = 0.61 in/hr

Field Rate = 0.61 in/hr

Correction Factor: 0.28

Design infiltration rate: 0.61 in/hr x (0.28)

= 0.17 in/hr

Design Rate = 0.17 in/hr

Test performed on January 20th, 2022.



September 16th, 2022

G-5514

Mr. Jesse Tam
Phone: (206) 948-9902
Email: jesset28@aol.com

Subject: **Addendum to -
Geotechnical Engineering Investigation & Soil Infiltration Evaluation
Proposed Short-Plat
4833 – 90th Ave SE
Mercer Island, Washington**

Reference: **“Geotechnical Engineering Investigation & Soil Infiltration Evaluation,
Proposed Short-Plat, 4833 – 90th Ave SE, Mercer Island, Washington,” GEO
Group Northwest, Inc., G-5514, February 18th, 2022.**

Dear Mr. Tam:

We reviewed the Preliminary Grading and Utilities Plan for the project. The plan was prepared by Pacific Land Engineering, LLC and is attached to this letter. Based on our review, we understand that a stormwater detention vault is proposed in the central-east portion of the property. The stormwater vault as proposed will discharge westerly to the City stormwater utility along the Island Crest Way east right-of-way. Construction of the stormwater facility will require excavations within the steep slope area at the west side of the site and adjacent City right-of-way. Our geotechnical recommendations regarding the construction of the proposed stormwater facility are provided in the following sections to this report.

Excavation Recommendations

Stormwater Vault

Based on the proposed configuration we estimate that excavations necessary for the vault construction will reach depths of up to approximately 15 feet below grade. Temporary excavations into the very dense, glacial till soils for construction of the stormwater vault and

storm drain to the utility can be completed at near vertical inclinations as recommended in our geotechnical report. Approximately 1 to 2 feet of weathered soils at the surface may need to be sloped at 1H:1V, if present. During the installation of the stormwater vault, the excavation walls should be draped with plastic sheeting to protect workers from loose gravel, if present.

Stormwater Drain to Utility

Excavation into the steep slope region at the west property line and adjacent right-of-way will be required to complete the stormwater tie-in to the City utility. Based on the results of our geotechnical investigation, the slope is underlain with cemented glacial till soils. In our opinion, excavation trenching into the slope for the stormwater tie-in can be completed at near vertical inclinations without destabilizing the slope. For worker protection, the excavated trenches should be shored with trench boxing or equivalent.

Sincerely,

GEO GROUP NORTHWEST, INC.



Garrett Dean, G.I.T.
Staff Engineering Geologist

William Chang, P.E.
Principal Engineer

Attachment:

“Preliminary Grading and Utilities Plan,” Project 4833 MI_4 – Lot Short Plat, Sheet No. C-6.0,
Prepared by Pacific Land Engineering

SEC. 19, T.24N., R.5E., W.M.

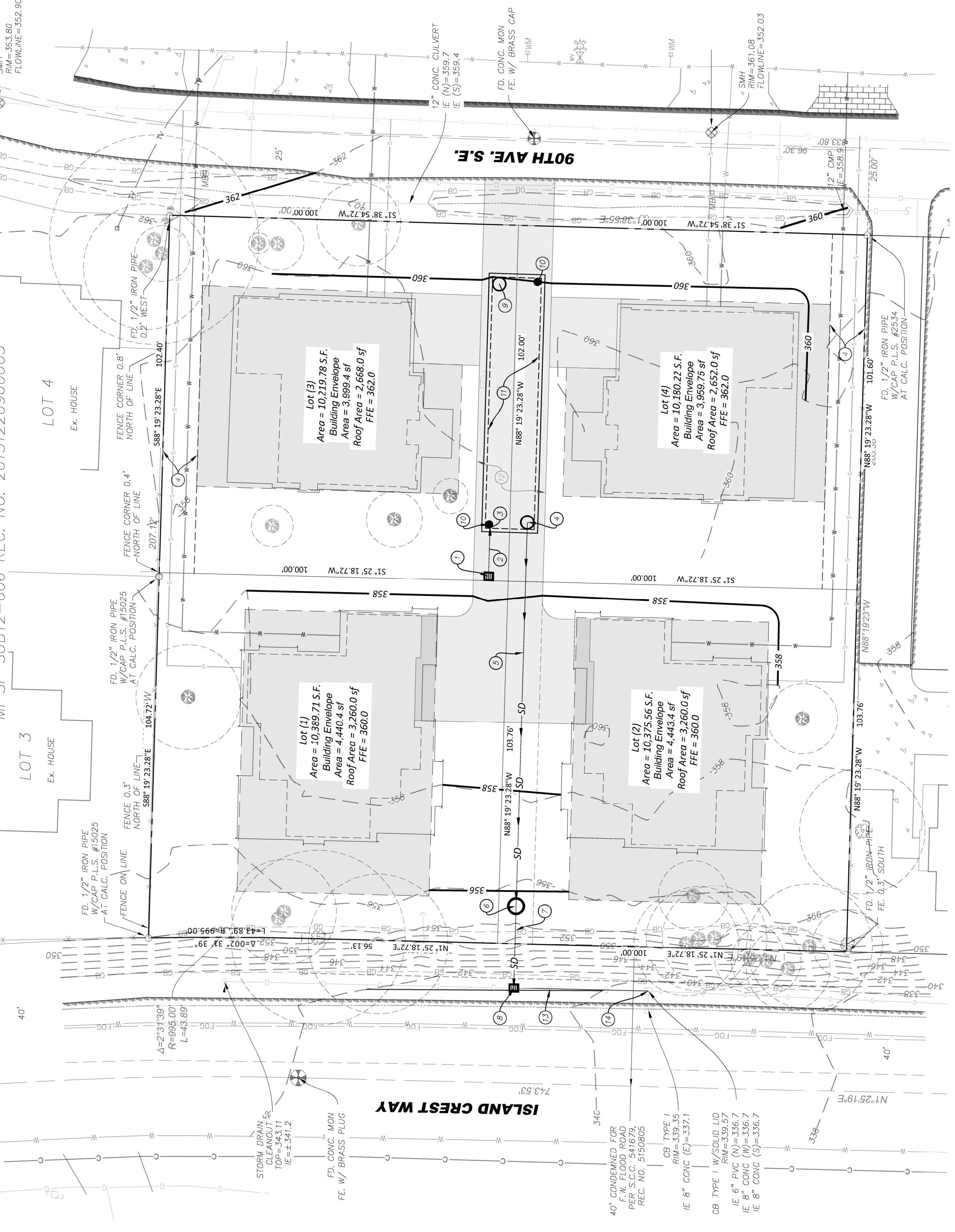
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LEGEND:

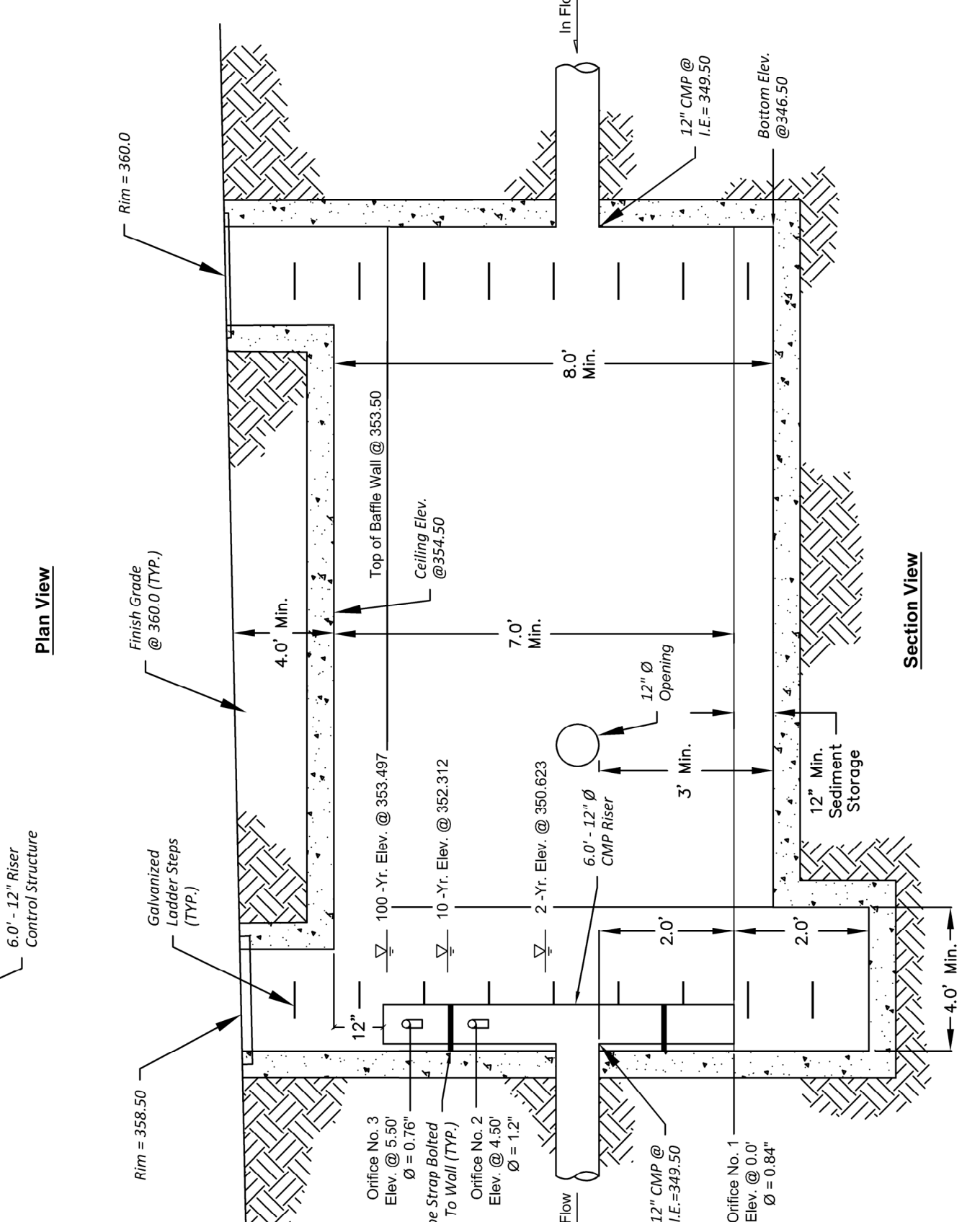
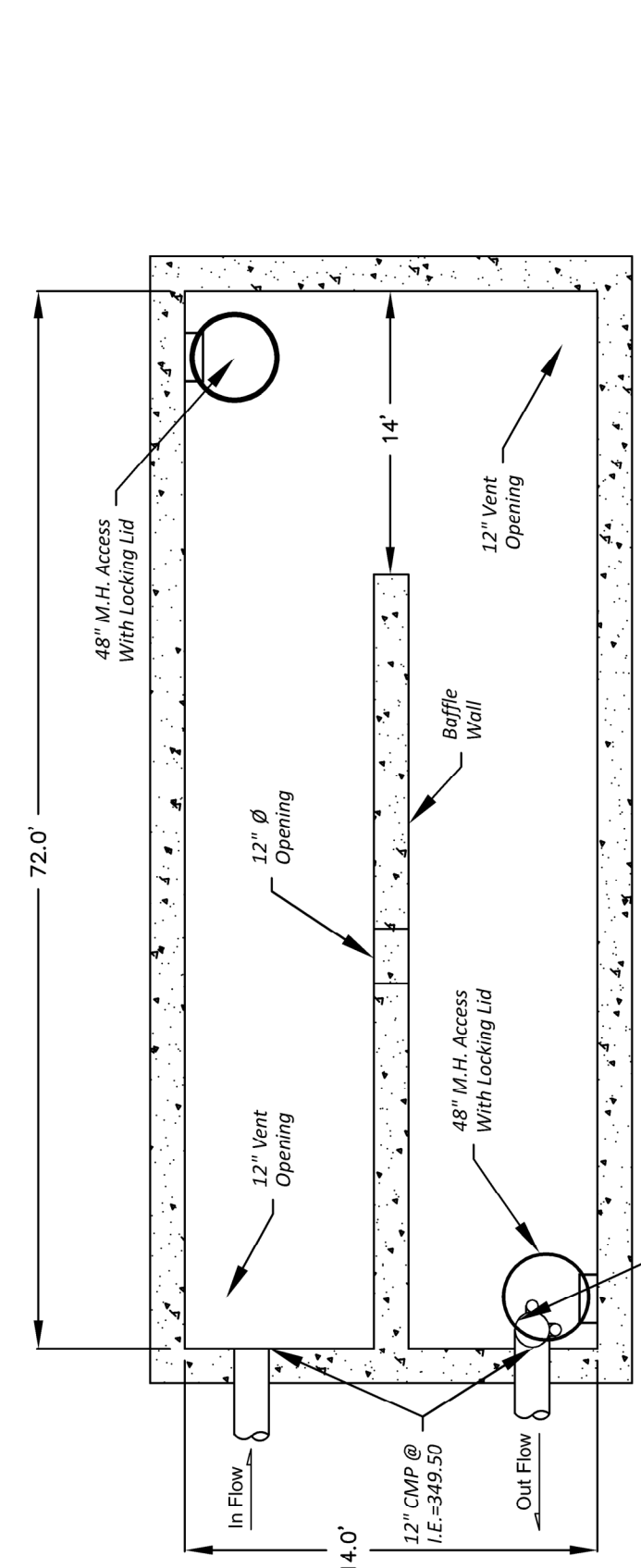
- ⊙ = POWER POLE
- ⊙ = GUY ANCHOR
- ⊙ = OVERHEAD POWER
- ⊙ = FIRE HYDRANT
- ⊙ = WATER VALVE
- ⊙ = WATER METER
- ⊙ = WATER LINE (PAINTED LOCATION)
- ⊙ = UNDERGROUND COMMUNICATION (PAINTED LOCATION)
- ⊙ = UNDERGROUND TELEVISION (PAINTED LOCATION)
- ⊙ = UNDERGROUND GAS LINE (PAINTED LOCATION)
- ⊙ = SEWER MANHOLE
- ⊙ = SEWER LINE
- ⊙ = MAIL BOX
- ⊙ = EVERGREEN TREE
- ⊙ = DECIDUOUS TREE
- ⊙ = WOOD BOARD FENCE LINE
- ⊙ = FOOTLINE (LANE STRIPE)
- ⊙ = DITCH LINE
- ⊙ = GRADE BREAK
- ⊙ = EDGE OF PAVEMENT/CURB LINE
- ⊙ = CONCRETE
- ⊙ = CONCRETE PAVERS
- ⊙ = GRAVEL
- ⊙ = TBM = 600 SPIKE IN POWER POLE
ELEV = 361.47 (NAVD 1988)

- 1 48" Type - II CB W/Locking Grate
Rim = 357.75
I.E. = 350.20 - 12" Ø, E
- 2 14" - 12" Ø HDPE @ 5%
- 3 12" Ø HDPE
Rim = 349.50
I.E. = 349.50
- 4 48" Ø Locking Lid Marked Drain
Rim = 358.50
I.E. = 349.50
- 5 110" - 12" Ø HDPE @ 10%
- 6 52" Type I' SDMH W/ Locking Lid Marked Drain
Rim = 355.0
I.E. = 338.50
12" HDPE, E & W
- 7 24" 20" - 12" Ø HDPE @ 3.1%
- 8 Type - I CB W/Locking Grate
Rim = 340.75
I.E. = 337.75
New 12" Ø, E & S
Remove Ex. 6" Ø, S
- 9 48" Ø Locking Lid Marked Drain
Rim = 360.0
I.E. = 349.50
- 10 12" Ø Vent Opening
W/Locking Cover.
- 11 Underground Storm Water Detention Vault
72" Long X 14" Wide X 8' Deep. See Detail Hereon.
- 12 20' Wide Paved Private Access Road
See Detail Hereon.
- 13 Remove existing 8" Storm Pipe, and Install New
38.6 LF - 12" CMP @ 2.7%
- 14 Connect New 12" CMP to Existing CB
I.E. = 336.70 - N

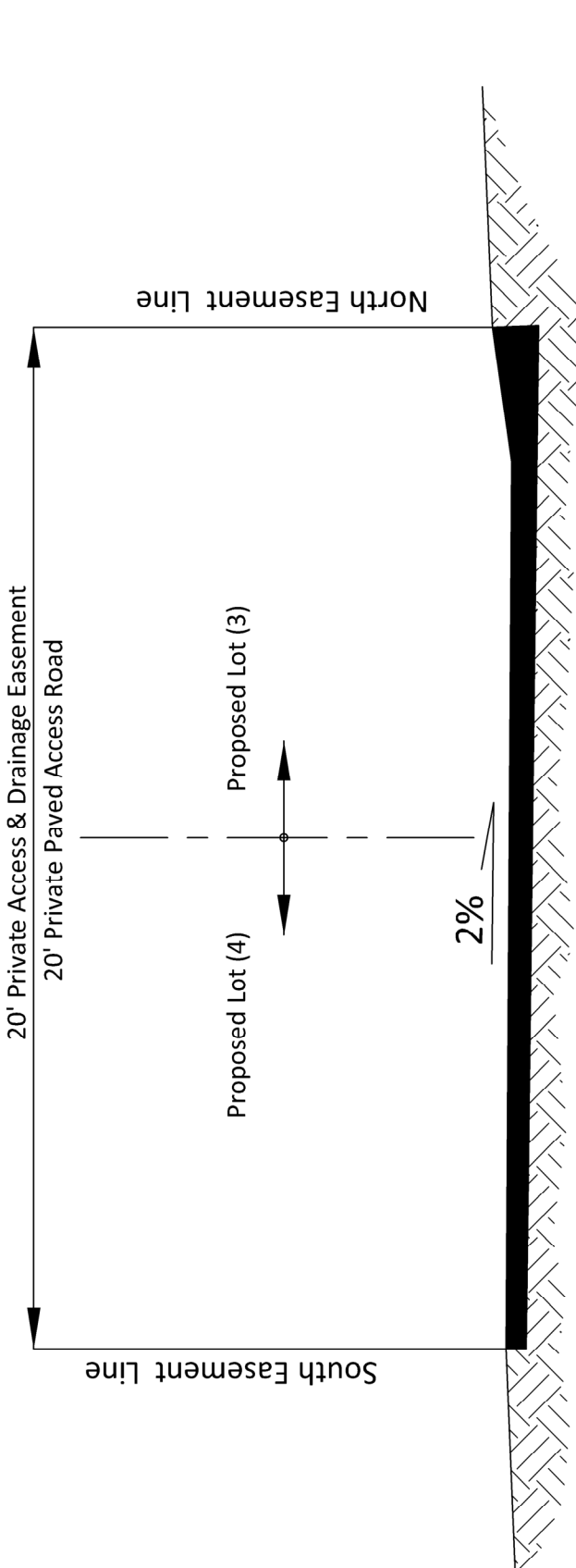


Preliminary Cut/Fill Summary

Surface	Cut Factor	Fill Factor	Cut	Fill	Net
Surface 3	1.000	1.000	1,184.0 Sq. Ft.	530.0 Cu. Yd.	1,200.0 Cu. Yd.
Totals			1,184.0 Sq. Ft.	530.0 Cu. Yd.	1,200.0 Cu. Yd.



Concrete Detention Vault With Control Structure



20' Wide Private Access Road

N.T.S.

Revisions

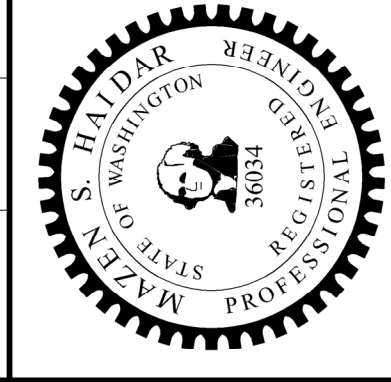
No.	Date	By

Project 4833 MI - 4 - Lot Short Plat

Preliminary Grading and Utilities Plan

Plan Plotted For:
Initial Submittal

PACIFIC LAND ENGINEERING
Civil Engineering, Development Services, Land Use Consulting
Bellevue, WA - www.pacificland.com
info@pacificland.com (425) 615-6160



DWG: 10/01/2022
STAMP IS NOT VALID
UNLESS SIGNED AND DATED
Job Number: 220520 - PLE - 2211
DWG Date: 10/01/2022

Sheet No. **C-6.0** OF **C-X.0**





ARBOR INFO LLC

2406 N Castle Way Brier, WA, 98036

**Tree Assessment
For
Homelink Capital
At
4833 90th Ave SE
Mercer Island, Washington**



**Date
4/20/2022**

Table of Contents

Contents

1. Introduction 3
2. Competence 3
3. Client 3
4. Assignment, Purpose and Use of Report 3
5. Limits of Assignment 3
6. Site Description 4
7. Methodology 4
8. Tree Description 5
9. Replacement Trees 5
10. Summary 6
11. Assumptions and Limiting Conditions 6

List of Tables

1-Tree Classifications5

Addenda

- I. Tree Location Map
- II. Tree Assessment Summary Table
- III. Mercer Island Check list
- IV. Mercer Island Tree Inventory Form

1. Introduction

I was contacted by Mazen Haider at Pacific Land Engineering to describe and assess the condition and viability of trees on and adjacent to 4833-90th Ave SE, Mercer Island, WA. This report summarizes my observations and conclusions.

2. Competence

- Certified Arborist (International Society of Arboriculture, ISA #23136, PN 0426 A)
- Registered Consulting Arborist (American Society of Consulting Arborists #499).
- Tree Risk Assessment Qualified (ISA).
- Certified forester (Society of American Foresters #951)
- Bachelor of Science degree in Forest Management from the University of Washington
- Licensed Washington State Real Estate Managing Broker #11534

3. Client

The client to whom this report is addressed is:

Mazen Haider
Pacific Land Engineering
mazen@pacificlandwa

And

Jintao (Adison) Cui
Homelink Capital LLC
adisoncui@outlook.com

4. Assignment, Purpose and Use of Report

The assignment is to describe and assess the condition and viability of on-site and off-site trees adjacent to the subject parcel. Protection recommendations in conformance with the City of Mercer Island “Tree Submittal Check List” are pending development plans.

5. Limits of Assignment

The assignment is limited to the information gathered during the site visit April 19, 2022 (date of assessment) and references noted in this report. No excavation or sampling was undertaken to determine unseen defects. No inspection of trees not reported herein was made.

A site plan indicating the current condition of the property was provided and is included in the Addenda with tree locations noted.

6. Site Description

4833-90th Ave SE Mercer Island, WA
King County Parcel No. 435130-0487, 41,165 square feet; 0.95 acres

The subject property contains an unoccupied single-family residence on near level ground.

Four new single-family residences are planned for the site.

7. Methodology

Each tree was measured for diameter at 4.5-feet above ground, (or equivalent) total height, percentage of live green crown, and dripline (extent of live limbs).

Each tree was assessed as to its vitality, structure, vigor and viability:

Vigor or condition:

Health(Vitality) : Biotic

- Good: No evidence of fungal infection or decay; expected to survive without disturbance to its normal life expectancy. (40-100 years in this case)
- Fair: Tree has initial fungal decay or evidence of insect habitat and is less likely to survive to normal life expectancy. Some with minor defects, are rated viable,
- Poor: Tree has significant fungal decay and defects that render it not likely to survive three years.

Structural: Abiotic

- Good: no significant abiotic or mechanical defects
- Fair: less than preferred form, defects such as breaks in the bole, poor limb attachments, included bark, poor root contact, etc.
- Poor: Broken or cracked bole or limbs; root plate compromised

Viability:

- A measure of whether the tree is likely to live to its “normal” life span or has defects limiting that potential or poses a risk to the residence or proposed development is a simple ‘yes/no’ rating.

8. Tree Description

Refer to the attached Tree Assessment Summary Form. There are a total of sixty-one on-site trees and nine off-site. A summary of the trees follows.

Table 1- Tree Category Summary – On site

<u>Category</u>	<u>Number</u>
Total	61
Total viable	39
36"+	5
24"+	11
Exceptional	8
Large Regulated	30
Large Regulated to be Removed	TBD
Percentage Retention	TBD0%

Table 2- Tree Category Summary – Off site - Right of Way

<u>Category</u>	<u>Number</u>
24"+	0
Exceptional	0
Large Regulated	5
Large Regulated to be Removed	TBD
Percentage Retention	TBD%

Table 3- Tree Category Summary – Off site – Private

<u>Category</u>	<u>Number</u>
24"+	1
Exceptional	0
Large Regulated	3
Large Regulated to be Removed	TBD
Percentage Retention	TBD%

9. Replacement Trees TBD

10. Summary TDB

The on-site trees are all non-viable and or hedged and therefore no replacements are required in the event of removal. The off-site trees are well away from planned construction activities.

11. Assumptions and Limiting Conditions

1. Any legal description provided to the consultant is assumed to be correct. Ownership of the subject trees as provided by the client is assumed to be correct. No responsibility is assumed for legal matters. No opinion as to the property line location is made.
2. Care has been taken to obtain all information from reliable sources. The consultant can neither guarantee nor be responsible for the accuracy of information provided by others.
3. The consultant shall not be required to give testimony or attend court by reason of this report unless subsequent contractual arrangements are made, including additional fees.
4. This report and any values expressed herein represent the opinion of the consultant, and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
5. The exhibits in this report are included to assist the reader and are not necessarily to scale.
6. Unless expressed otherwise, information in this report covers only items that were examined, and reflects the condition of those items at the time of inspection. The subject site was cleared of all vegetation at the time of inspection therefore the extent of removals is inferred from adjacent undisturbed areas. The inspection is limited to visual examination of accessible portions of the trees and plants.
7. Loss or alteration of any part of the report invalidates the entire report. Ownership of any documents related to this report passes to the client only.
8. The liability of ArborInfo LLC its contractors and employees is limited to the client only and only up to the amount of the fee actually received for the assignment.
9. *There is no warranty suggested for any of the trees subject to this report. Weather, latent tree conditions, and future man-caused activities could cause physiologic changes and deteriorating tree condition. Over time, deteriorating*

tree conditions may appear and there may be conditions, which are not now visible which, could cause tree failure. This report or the verbal comments made at the site in no way warrant the structural stability or long-term condition of any tree, but represent my opinion based on the observations made.

10. *NEARLY ALL TREES IN ANY CONDITION STANDING WITHIN REACH OF IMPROVEMENTS OR HUMAN USE AREAS REPRESENT HAZARDS THAT COULD LEAD TO DAMAGE OR INJURY. THE ASSESSMENT IS VALID FOR TWO YEARS FROM THE DATE OF INSPECTION, ONLY.*

11. PERTINENT JURISDICTION RULES AND REGULATIONS SHOULD BE CONSULTED PRIOR TO THE REMOVAL OF ANY TREE.

Respectfully Submitted,



Thomas M. Hanson, CA, RCA

Addenda

- I. Tree Location Map
- II. Tree Assessment Summary Table
- III. Mercer Island Check list
- IV. Mercer Island Tree Inventory Form

Tree Assessment

Site: Homelink Capital, 4833 - 90th Ave SE, Mercer Island, WA

Date: 4/20/2022

Tag #	Tree #	Species		DBH (inches)	Height (feet)	Crown Ratio (%)	DripLine(ft)				W	Root Zone/Outer Radius (feet)	Root Zone/Inner Radius (feet)	Vigor	Viable	Large Regulated	Exceptional	Comments
		Common	Scientific				N	S	E									
On Site																		
570	3	Bigleaf maple	<i>Acer macrophyllum</i>	22.5	90	50	22	30	22	20	20	24	12	Good	Yes	✓		
571	4	Douglas-fir	<i>Pseudotsuga menziesii</i>	41.5	115	40	18	22	18	20	20	20	10	Good	Yes	✓		Sweep North
760	5	Pacific madrone	<i>Arbutus menziesii</i>	14.6	70	30	12	10	0	24	12	6	6	Good	Yes	✓		
755	6	W. red cedar	<i>Thuja plicata</i>	0	0	0	0	0	0	0	0	0	0					Cut down
762	7	Bigleaf maple	<i>Acer macrophyllum</i>	7.5	40	20	0	15	11	6	8	4	4	Fair	No			Leans, brokend top
763	8	Bigleaf maple	<i>Acer macrophyllum</i>	12.1	50	20	0	18	0	16	9	4	4	Poor	No			Asymmetric, leans south
767	9	Bigleaf maple	<i>Acer macrophyllum</i>	20.9	50	20	0	14	0	28	11	5	5	Poor	No			Hollow, top out
768	10	Black cottonwood	<i>Populus trichocarpa</i>	28.7	120	40	36	30	26	36	32	16	16	Good	Yes			Ivy
778	11	Pacific madrone	<i>Arbutus menziesii</i>	11.9	40	10	2	4	4	0	3	1	1	Poor	No			Top out, small crown, minor decay
786	12	Pacific madrone	<i>Arbutus menziesii</i>	18.9	80	30	30	0	6	6	11	5	5	Fair	No			Dying, dead limbs
787	13	Bigleaf maple	<i>Acer macrophyllum</i>	19.5	75	60	20	14	24	22	20	10	10	Good	Yes	✓		Two codominants fused at 4-8-small codom decay
788	14	Bigleaf maple	<i>Acer macrophyllum</i>	0	0	0	0	0	0	0	0	0	0					Cut down
789	15	Bigleaf maple	<i>Acer macrophyllum</i>	14.5	40	10	6	4	4	4	5	2	2	Poor	No			Dying, dead limbs
836	16	Douglas-fir	<i>Pseudotsuga menziesii</i>	17.5	30	40	14	17	8	18	14	7	7	Fair	No			Topped for utilities, overhangs Island Crest
788	18	Pacific madrone	<i>Arbutus menziesii</i>	20.1	45	20	6	8	12	12	10	5	5	Fair	Yes	✓		Ivy
849	19*	Bigleaf maple	<i>Acer macrophyllum</i>	19.6	55	60	8	20	4	22	14	7	7	Good	Yes	✓		
850	20*	Holly	<i>Ilex sp.</i>	12.7	40	60	16	16	16	16	16	8	8	Good	Yes			
851	21	Bigleaf maple	<i>Acer macrophyllum</i>	21.2	90	30	30	8	4	4	12	6	6	Good	Yes	✓		
742	22	Red alder	<i>Alnus rubra</i>	12.2	50	40	8	24	0	24	14	7	7	Poor	No			Adjacent to snag, decay, dying
602	23	Red alder	<i>Alnus rubra</i>	0	0	0	0	0	0	0	0	0	0					Cut down
603	24	W. red cedar	<i>Thuja plicata</i>	23.5	55	100	16	16	16	16	16	8	8	Good	Yes	✓		
604	25*	Bigleaf maple	<i>Acer macrophyllum</i>	19.6	55	70	20	20	20	18	20	10	10	Good	Yes	✓		
628	26	Douglas-fir	<i>Pseudotsuga menziesii</i>	38.6	125	80	26	26	26	26	26	13	13	Good	Yes	✓		
854	27*	Bigleaf maple	<i>Acer macrophyllum</i>	32.9	90	60	28	28	34	30	30	15	15	Good	Yes	✓		
855	28	W. red cedar	<i>Thuja plicata</i>	39.1	80	90	24	24	24	24	24	12	12	Fair	Yes	✓		Thin crown
847	29	Pacific madrone	<i>Arbutus menziesii</i>	10.4	50	20	24	6	18	0	12	6	6	Fair	No			Thin crown
846	30*	Bigleaf maple	<i>Acer macrophyllum</i>	20.0	70	40	24	18	16	16	19	9	9	Good	Yes	✓		Pruned for utility lines

Tree Assessment

Site: Homelink Capital, 4833 - 90th Ave SE, Mercer Island, WA

Date: 4/20/2022

Tag #	Tree #	Species		DBH (inches)	Height (feet)	Crown Ratio (%)	DripLine(ft)				Root Zone/Outer Radius (feet)	Root Zone/Inner Radius (feet)	Vigor	Viable	Large Regulated	Exceptional	Comments
		Common	Scientific				N	S	E	W							
On Site																	
844	31	Douglas-fir	<i>Pseudotsuga menziesii</i>	15.5	25	40	14	14	14	14	14	7	Good	Fair	Yes	✓	Topped for utility lines
856	32*	Bigleaf maple	<i>Acer macrophyllum</i>	28.3	90	60	18	30	28	28	26	13	Good	Fair	Yes	✓	Sucker codominant
634	33	Pacific madrone	<i>Arbutus menziesii</i>	28.1	80	60	12	35	0	40	22	11	Good	Good	Yes	✓	Leans west
633	34	Bigleaf maple	<i>Acer macrophyllum</i>	25.1	80	30	14	18	0	25	14	7	Fair	Fair	Yes	✓	Smaller codominant is dead
631	35*	Bigleaf maple	<i>Acer macrophyllum</i>	31.6	80	40	28	32	20	26	27	13	Fair	Poor	No		Perched on nurse stump, brittle cinder fungus
632	36	Deodora cedar	<i>Cedrus deodora</i>	19.4	90	80	7	16	16	16	14	7	Good	Good	Yes	✓	
865	37	Bigleaf maple	<i>Acer macrophyllum</i>	17.6	90	30	30	20	6	28	21	11	Good	Good	Yes	✓	
881	38	Bigleaf maple	<i>Acer macrophyllum</i>	7.1	40	20	0	16	16	0	8	4	Good	Poor	Yes		
866	39*	Bigleaf maple	<i>Acer macrophyllum</i>	21.2	60	20	14	6	6	6	8	4	Fair	Good	No		Pruned for utility lines, low crown ratio
885	40	Pacific madrone	<i>Arbutus menziesii</i>	7.5	20	30	12	2	0	10	6	3	Good	Fair	Yes		Hangs over Island Crest
886	41	Pacific madrone	<i>Arbutus menziesii</i>	10.9	20	30	16	0	6	16	10	5	Good	Fair	Yes	✓	Topped for utilities
867	42	Pacific madrone	<i>Arbutus menziesii</i>	6.5	20	20	6	0	0	16	6	3	Good	Fair	Yes	✓	Topped for utilities
887	43	Pacific madrone	<i>Arbutus menziesii</i>	9.6	20	30	2	6	2	10	5	3	Good	Fair	Yes	✓	Topped for utilities
890	47*	Pacific madrone	<i>Arbutus menziesii</i>	10.3	20	20	6	5	0	12	6	3	Poor	Poor	No		Topped for utilities, low crown ratio
888	49	Bigleaf maple	<i>Acer macrophyllum</i>	18.7	80	40	18	26	12	18	19	9	Good	Good	Yes	✓	
883	50	Douglas-fir	<i>Pseudotsuga menziesii</i>	26.1	85	30	14	14	14	14	14	7	Good	Good	Yes	✓	
868	51	Bigleaf maple	<i>Acer macrophyllum</i>	11.1	35	10	1	0	0	0	0	0	Poor	Fair	No		Low crown ratio
882	52*	Bigleaf maple	<i>Acer macrophyllum</i>	21.9	80	40	23	28	28	6	21	11	Good	Good	Yes	✓	
898	54*	Pacific madrone	<i>Arbutus menziesii</i>	13.9	80	60	16	8	8	8	10	5	Good	Good	Yes	✓	
635	55	Bigleaf maple	<i>Acer macrophyllum</i>	32.0	80	70	20	24	20	29	23	12	Good	Good	Yes	✓	Ivy
637	56*	Bigleaf maple	<i>Acer macrophyllum</i>	36.9	85	70	25	30	25	25	26	13	Fair	Fair	Yes	✓	10% dead limbs
991	57	Dogwood	<i>Cornus florida</i>	6.4	18	90	9	9	9	9	9	5	Good	Good	Yes		
1001	58	Scouters Willow	<i>Salix scouritiana</i>	9.5	35	20	0	6	3	3	3	2	Poor	Poor	No		ivy, top broken out
1002	59	Scouters Willow	<i>Salix scouritiana</i>	9.2	35	40	5	8	15	0	7	4	Poor	Poor	No		ivy, pistol butt, leans over utilities
1004	61	Bigleaf maple	<i>Acer macrophyllum</i>	8.5	16	10	0	3	0	0	1	0	Poor	Poor	No		Stem broken
1005	62	Bitter cherry	<i>Prunus emarginata</i>	8.5	45	50	12	12	12	12	12	6	Good	Good	Yes		
1006	63	Pacific madrone	<i>Arbutus menziesii</i>	25.2	90	70	0	36	28	10	19	9	Good	Good	Yes	✓	

Tree Assessment

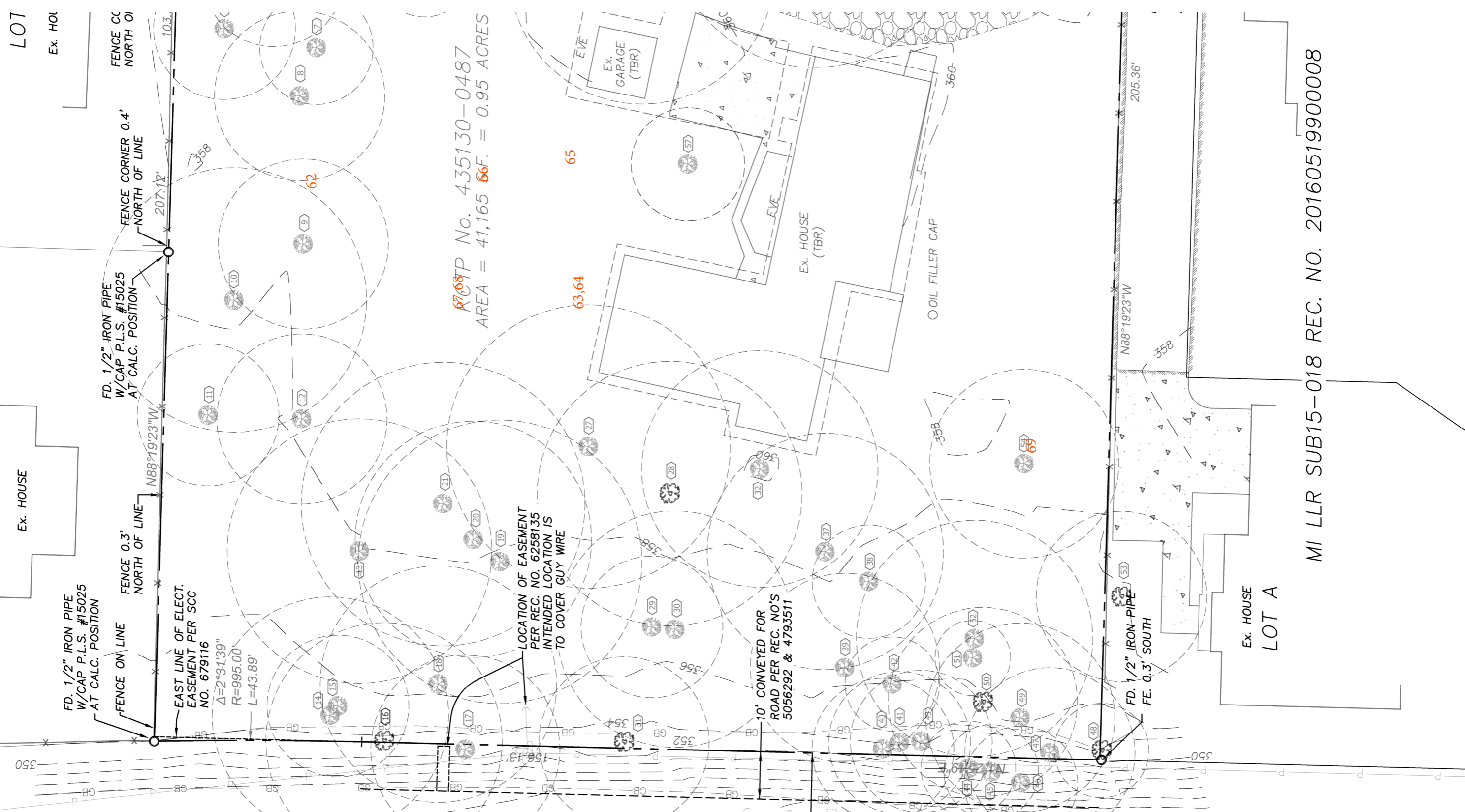
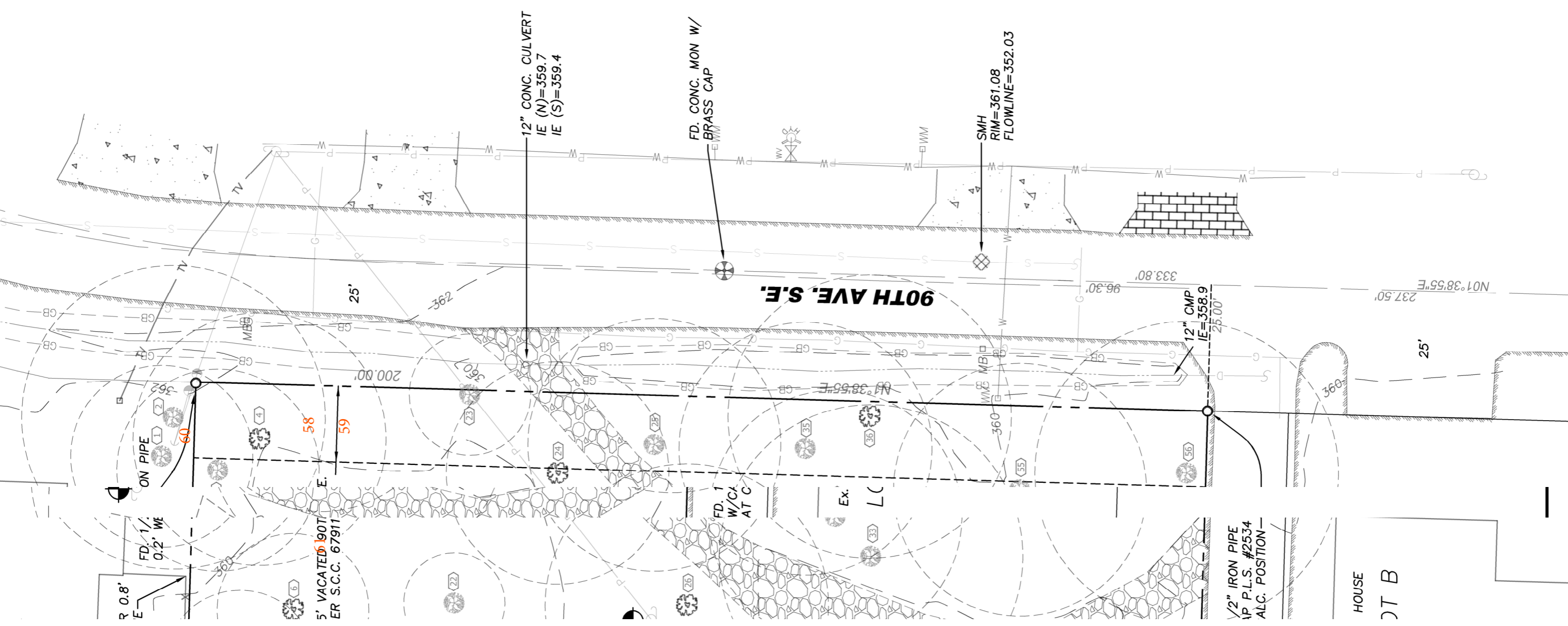
Site: Homelink Capital, 4833 - 90th Ave SE, Mercer Island, WA

Date: 4/20/2022

Tag #	Tree #	Species		DBH (inches)	Height (feet)	Crown Ratio (%)	DripLine(ft)				Root Zone/Outer Radius (feet)	Root Zone/Inner Radius (feet)	Vigor	Viable	Large Regulated	Exceptional	Comments
		Common	Scientific				N	S	E	W							
On Site																	
1007	64	Pacific madrone	<i>Arbutus menziesii</i>	8.5	26	20	4	3	24	0	8	4	Poor	No			Dying, 30% dead limbs
1008	65	Common Hawthorn	<i>Crataegus laevigata</i>	6.1	18	90	10	12	10	8	10	5	Good	Yes			
1009	66	Bitter cherry	<i>Prunus emarginata</i>	10.1	45	40	16	8	6	12	11	5	Fair	No			20% dead limbs
1010	67	Bigleaf maple	<i>Acer macrophyllum</i>	15.6	80	30	0	12	0	34	12	6	Good	Yes	✓		
1011	68	Pacific madrone	<i>Arbutus menziesii</i>	18.1	80	20	22	0	0	14	9	5	Fair	Yes	✓		Low crown ratio
1012	69	Bitter cherry	<i>Prunus emarginata</i>	14.8	80	60	18	16	20	8	16	8	Good	Yes	✓		
Off Site																	
569	1	Bigleaf maple	<i>Acer macrophyllum</i>	15.4	60	20	10	3	0	16	7	4	Good	Yes	✓		Asymmetric
568	2	Bigleaf maple	<i>Acer macrophyllum</i>	25.5	60	60	36	18	36	22	28	14	Good	Yes	✓		Leans northeast
837	17	Bigleaf maple	<i>Acer macrophyllum</i>	8.4	22	30	3	14	10	12	10	5	Good	No			Topped for utilities, overhangs Island Crest
964	44	Pacific madrone	<i>Arbutus menziesii</i>	5.0	20	20	4	2	0	8	4	2	Fair	Yes			Topped for utilities
965	45	Pacific madrone	<i>Arbutus menziesii</i>	7.2	25	20	8	4	0	8	5	3	Good	Yes	✓		Topped for utilities
966	46	W. red cedar	<i>Thuja plicata</i>	5.0	22	70	4	5	2	6	4	2	Good	Yes			
891	48	Douglas-fir	<i>Pseudotsuga menziesii</i>	6.8	18	20	6	6	6	4	6	3	Poor	No			Topped for utilities, low crown ratio
708	53	Douglas-fir	<i>Pseudotsuga menziesii</i>	15.0	75	50	16	10	6	10	6	3	Good	Yes	✓		Sweep
1003	60	Bigleaf maple	<i>Acer macrophyllum</i>	10.5	70	30	0	16	16	0	8	4	Good	Yes	✓		
* multiple stems converted to single																	

- = POWER POLE
- = GUY POLE
- = OVERHEAD POWER
- = FIRE HYDRANT
- = WATER VALVE
- = WATER METER
- = WATER LINE (PAINTED LOCATION)
- = UNDERGROUND TELEVISION (PAINTED LOCATION)
- = TELEVISION RISER
- = CATCH BASIN
- = STORM DRAIN LINE/CULVERT
- = GAS VALVE
- = UNDERGROUND GAS LINE (PAINTED LOCATION)
- = SEWER LINE
- = MAIL BOX
- = EVERGREEN TREE
- = DECIDUOUS TREE
- = WOOD BOARD FENCE LINE
- = FOG LINE (LANE STRIPE)
- = DITCH LINE
- = GRADE BREAK
- = EDGE OF PAVEMENT/CURB LINE
- = CONCRETE
- = CONCRETE PAVERS
- = GRAVEL
- = TBM = 60D SPIKE IN POWER POLE
ELEV = 361.47 (NAVD 1988)

TREE #	DBH/SPECIES	POINT #
1	13" MAPLE	569
2	20" MAPLE	568
3	24" MAPLE	570
4	42" FIR	571
5	15" MADRONA	760
6	30" CEDAR	755
7	19" MAPLE (DEAD)	762
8	12" MAPLE	763
9	18" ALDER (DEAD)	767
10	28" MAPLE	768
11	11" MADRONA	778
12	17" DECIDUOUS	786
13	21" MAPLE	787
14	19" MAPLE	790
15	13" MAPLE	789
16	16" FIR	836
17	8" MAPLE	837
18	17" MADRONA	788
19	2-10", 2-8" MAPLE	849
20	3-6" DECIDUOUS	850
21	22" MAPLE	851
22	2-12" ALDER (DEAD)	742
23	14" ALDER (DEAD)	602
24	21" CEDAR	603
25	3-10" MAPLE	604
26	34" FIR	628
27	14", 18", 19" MAPLE	854
28	38" CEDAR	855
29	10" MADRONA	847
30	12", 14" MAPLE	846
31	12" FIR	844
32	36" MAPLE	856
33	29" MADRONA	634
34	25" MAPLE	633
35	2-20" MAPLE	631
36	17" FIR	632
37	14" MAPLE	865
38	7" MAPLE	881
39	2-12" MAPLE	866
40	8" MADRONA	885
41	8" 10" MADRONA	886
42	7" MADRONA	867
43	6" 8" DECIDUOUS	887
44	7" MADRONA	964
45	4" MADRONA	965
46	10" MADRONA	966
47	7" 8" 18" MADRONA	890
48	6" MADRONA	891
49	14" MAPLE	888
50	23" FIR	883
51	14" MAPLE (DEAD)	868
52	2-15" MAPLE	882
53	15" FIR	708
54	8" 11" 15" DECIDUOUS	898
55	28" MAPLE	635
56	2-21" MAPLE	637
57	6" DECIDUOUS	991



CITY OF MERCER ISLAND

COMMUNITY PLANNING & DEVELOPMENT

9611 SE 36TH STREET | MERCER ISLAND, WA 98040

PHONE: 206.275.7605 | www.mercergov.org



TREE INVENTORY & REPLACEMENT SUBMITTAL INFORMATION

EXCEPTIONAL TREES

Exceptional Trees- means a tree or group of trees that because of its unique historical, ecological or aesthetic value constitutes an important community resource. A tree that is rare or exceptional by virtue of its size, species, condition, cultural/historical importance, age, and/or contribution as part of a tree grove. Trees with a diameter of more than 36 inches, or with a diameter that is equal to or greater than the diameter listed in the Exceptional Tree Table shown in MICC 19.16 under Tree, Exceptional.

List the total number of trees for each category and the tree identification numbers from the arborist report.

Number of trees 36" or greater _____

List tree numbers: _____

Number of trees 24" or greater (including 36" or greater) _____

List tree numbers: _____

Number of trees from Exceptional Tree Table (MICC 19.16) _____

List tree numbers: _____

LARGE REGULATED TREES

Large Regulated Trees- means any tree with a diameter of 10 inches or more, and any tree that meets the definition of an Exceptional Tree.

Number of Large Regulated Trees on site _____ (A)

List tree numbers: _____

Number of Large Regulated Trees on site proposed for removal _____ (B)

List tree numbers: _____

Percentage of trees to be retained ((A-B)/Ax100) note: must be at least 30% _____ %

RIGHT OF WAY TREES

Right of Way Trees- means a tree that is located in the street right of way adjacent to the project property.

Number of Large Regulated Trees in right of way _____

List tree numbers: _____

Number of Large Regulated Trees in right of way proposed for removal _____

List tree numbers: _____

Reason for removal: _____

TREE REPLACEMENT

Tree replacement- removed trees must be replaced based on the ratio in the table below. Replacement trees shall be conifers at least six feet tall and or deciduous at least one and one-half inches in diameter at base.

Diameter of Removed Tree (measured 4.5' above ground)	Tree replacement Ratio	Number of Trees Proposed for Removal	Number of Tree Required for Replacement Based on Size/Type
Less than 10"	1		
10" up to 24"	2		
Greater than 24" up to 36"	3		
Greater than 36" and any Exceptional Tree	6		
TOTAL TREE REPLACEMENTS			

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Inspection Requests: Online: www.mybuildingpermit.com VM: 206.275.7730



TREE SUBMITTAL CHECKLIST

If a box is checked, please provide the information in your next submittal

SUBMITTAL ITEMS

1. The Mercer Island Tree Inventory Form

- Provide the City's Mercer Island Tree Inventory Form

2. Arborist report/tree inventory

- Provide an Arborist report, prepared by a qualified Arborist. Include the following information in the arborist report.
 - 1. Description of how the arborist meets the threshold requirements for Qualified Arborist.
 - 2. A complete description of each tree's diameter, species, critical root zone, limits of allowable disturbance, health, condition, and viability.
 - 3. A description of the method(s) used to determine the limits of allowable disturbance (i.e., critical root zone, root plate diameter, or a case-by-case basis description for individual trees).
 - 4. Any special instructions specifically outlining any work proposed within the limits of disturbance protection areas (i.e. hand-digging, air space, tunneling, root pruning, any grade changes, clearing, monitoring, and aftercare).
 - 5. For trees not viable for retention, a description of the reason(s) for removal based on poor health, high risk of failure due to structure, defects, unavoidable isolation, windfirmness, unsuitability species, etc. If there is no reasonable alternative action (pruning, cabling, etc.) possible, replacement recommendations must be given.
 - 6. Describe the impact of necessary tree removal on the remaining trees, including those in a grove or on adjacent properties.
 - 7. Describe timing and installation of tree protection measures. Such measures must include fencing and be in accordance with the tree protection standards as outlined in MICC 19.10.
 - 8. The suggested location and species of replacement trees to be used when required. The report shall include planting and maintenance specifications to ensure long term survival.
 - 9. **A Tree Inventory** containing the following:
 - a. A numbering system of all existing large trees on the property (with corresponding tags on trees). The inventory shall also include large trees on adjacent property with driplines or critical root zones extending into the property.
 - b. Tree size (diameter). Where a tree splits into several trunks close to ground level, the dbh (Diameter at Breast Height) for the tree is the square root of the sum of the dbh for each individual stem squared (example with 3 stems: $dbh = \sqrt{(stem1)^2 + (stem2)^2 + (stem3)^2}$).
 - c. Proposed tree status (retained or proposed for removal).
 - d. Tree type or species.
 - e. Identify all Exceptional trees and differentiate between those less than 24 inches and those greater than or equal to 24 inches in diameter.
 - f. Brief general health or condition rating of each tree (i.e. poor, fair, good, etc.).

3. Site/tree retention plan

Indicate the following on all civil/utility and grading sheets. If there are no civil sheets indicate on the architectural site plan

- 1. Location of all proposed improvements (building footprint, access, utilities, buffers, required landscape areas).
- 2. Surveyed location of all large trees and Exceptional trees on the property
- 3. Show dripline and limits of disturbance for Large trees on site and adjacent properties if driplines extend over the subject property line.
- 4. Trees labeled corresponding to the tree inventory numbering system on the Mercer Island Tree Inventory Form, and Arborist Report.
- 5. Identify Exceptional trees using different symbols for trees less than 24 inches and trees greater than or equal to 24 inches.
- 6. Location of tree protection measures. Chain-link fence will be required for exceptional trees. Show silt fence outside tree protection measures. Do not use any x in the protection illustration.
- 7. Limits of excavation near potential saved trees (e.g. excavation limits for building foundation).
- 8. Indicate clearing limits/limits of disturbance (LOD) around all trees potentially impacted by site disturbances - grading, demolition, construction activities (including approximate LOD of off-site trees with overhanging driplines), etc.
- 9. Proposed tree status (trees to be removed or retained) noted by an 'X' for removal.

4. Replanting plan

- Provide the Replanting plan showing proposed locations of any required replacement trees.

PEER REVIEW AND CONFLICT OF INTEREST

A peer review of the tree permit application by a qualified arborist may be required to verify the adequacy of the information and analysis. **The applicant shall bear the cost of the peer review.**

The City Arborist may require the applicant retain a replacement qualified arborist or may require a peer review where the City Arborist believes a conflict of interest may exist.

For example, if an otherwise qualified arborist is employed by a tree removal company and prepares the arborist report for a development proposal, a replacement qualified arborist or peer review may be required.

ARBORIST QUALIFICATION

For tree reviews associated with a development proposal, a qualified arborist must have

- A minimum of three (3) years' experience working directly with the protection of trees during construction
 - Have experience with the likelihood of tree survival after construction
 - Be able to prescribe appropriate measures for the preservation of trees during land development
 - ISA Tree Risk Assessment Qualification
- Your qualified arborists must have at least one (1) of the following credentials:
- ISA Certified Arborist;
 - ISA Certified Arborist Municipal Specialist;
 - ISA Board Certified Master Arborist;
 - American Society of Consulting Arborists (ASCA) registered Consulting Arborist;
 - Society of American Foresters (SAF) Certified Forester for Forest Management Plans;

ADDITIONAL INFORMATION

Additional Information. The City Arborist or Code Official may require additional documentation, plans, or information as needed to ensure compliance with applicable City regulations.

Engineer's Conclusion

In our opinion, the proposed development is feasible and should not pose any significant impacts to the adjacent properties and to the surrounding environment, provided all proposed improvements are constructed per City of Mercer Island Requirements and provided all Geotechnical recommendations are followed and fully complied with.

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