

# **Ecological No Net Loss Assessment Report**

Prepared for

**Jack and Myra Hanover  
6460 E Mercer Way  
Mercer Island, WA 98040**

Prepared by

 **Northwest**  
Environmental Consulting, LLC

Northwest Environmental Consulting, LLC  
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Seattle, WA 98103  
206-234-2520

**September 2022**

## Purpose

The purpose of this report is to fulfill the requirements of City of Mercer Island Municipal Code (MICC) 19.07.110 Shoreline Master Program by assessing overall project impacts and proposed mitigation to determine if the project meets the “No Net Loss” General Regulation of the Shoreline Master Program.

No Net Loss is defined as “An ecological concept whereby conservation losses in one geographic or otherwise defined area are equaled by conservation gains in function in another area.”

Permits are being applied for a dock extension and associated moorage improvements.

## Location

The subject property is located at 6460 E Mercer Way (King County parcel number 2926000010) in the City of Mercer Island, Washington (see Appendix A – Sheet A1.0). The parcel is on the waterfront of Lake Washington, a shoreline of the state, that contains several endangered fish species listed under the Endangered Species Act and Washington State designated priority fish species.

## Project Description

The proposed construction involves removing 80 linear feet of skirting from the existing dock. The new extension will require driving 14, 8-inch epoxy coated steel piles. The superstructure of the dock will be built on the new pilings and grated decking will be installed and moorage hardware installed. The existing boat lift will be relocated into deeper water.

The existing personal watercraft lift was not permitted and is included in this analysis to be permitted. See Appendix A – Sheets A2.0 to A 6.0).

During construction, a floating boom will surround the work barge and dock. (See Appendix A – Sheets A7.0)

A shoreline vegetation plan is proposed, that will add 1 native conifer and 1 native willow tree. An additional 3 native willow shrubs will also be planted. These shoreline plantings will provide shade and allow beneficial allochthonous material to enter the lake along the shoreline (see Appendix A – Sheet A8.0 and A9.0).

Project drawings are included in Attachment A.

## Approach

Northwest Environmental Consulting LLC (NVEC) biologist Brad Thiele conducted a site visit on September 22, 2022 to evaluate conditions on site and adjacent to the site. NVEC also consulted the following sources for information on potential critical fish and wildlife habitat along this shoreline:

- Washington Department of Fish and Wildlife (WDFW): Priority Habitats and Species online database (<http://apps.wdfw.wa.gov/phsontheweb/>)

- WDFW SalmonScape online database of fish distribution and ESA listing units (<https://apps.wdfw.wa.gov/salmonscape/>)
- Mercer Island GIS online database (<https://chgis1.mercergov.org/Html5Viewer/Index.html?viewer=PubMaps&viewer=PubMaps>)

## Site Description

The subject property is a shoreline tract in a residential neighborhood. It has shoreline on its eastern boundary with single-family homes to the north and south along the shoreline.

The only existing structures on the property are the house, and the existing wood decked dock.

The shoreline is armored with a basalt bulkhead with block stairs and a block retaining wall immediately landward of the bulkhead. The substrate of the lake is mostly sand and is shallow.

The shoreline is lawn with ornamental beds. A sand volleyball court is present between the lawn area and patio area and the bulkhead. A HDPE pipe is present south of the dock. The piped watercourse is likely causing sandy sedimentation to buildup along the shoreline.

The neighboring shorelines are landscaped with bulkheads and docks. See attached photos in Appendix B- Photos.

## Species Use

WDFW's PHS mapping and SalmonScape mapping tools show the following salmonid species using Lake Washington for migration and/or rearing: residential coastal cutthroat (*Oncorhynchus clarkii*), winter steelhead (*O. mykiss*), Dolly Varden/bull trout (*Salvelinus malma*), sockeye salmon (*O. nerka*), fall Chinook (*O. tshawytscha*), coho salmon (*O. kisutch*), and kokanee (*O. nerka*). The SalmonScape database maps the site as accessible to the Endangered Species Units (ESU) of Threatened Chinook and steelhead. Juveniles migrate and may rear in the waters near the project when traveling from spawning sites on other lake tributaries to the lakes system's outlet at the Hiram M. Chittenden Locks. The project site is accessible to any fish migrating or rearing in the lake. The shoreline is mapped as at or very near a sockeye salmon spawning location.

Priority Habitats and Species mapping, maps a biodiversity area at Pioneer Park about 750 feet to the west. An emergent wetland is mapped as occurring about 250 feet to the north.

The City of Mercer Island GIS Portal indicates a non-fish bearing piped watercourse is present on the parcel to the south.

## Project Impacts and Conservation Measurements

### **Direct Impacts:**

**Sediments:** Sediment disturbance will occur below the OHWM during pile installation, Additionally, the tug and barge propwash may disturb sediments temporarily when making trips to and from the site.

Impacts to sediments should be minimal from installation of the pilings. The project will meet

state water quality standards.

**Shoreline:** Planting native vegetation, including a native cedar tree and willows, will increase the habitat functions of the shoreline by creating shade along the shoreline that will be an improvement from the existing baseline habitat conditions at the project site. These plants will provide overhanging cover for fish, structural diversity for birds and wildlife, detritus for aquatic invertebrates and long-term recruitment of woody material and other allochthonous food sources. The proposed planting plan is included (see Appendix A - Sheet A8.0).

**Lakebed:** Construction of the dock extension includes driving 14, 8-inch pilings. This will result in 4.9 square feet of lake bottom displacement.

**Stream:** A watercourse outlet is present adjacent to the dock. The watercourse is causing sediment buildup along the shoreline. Building the dock out into deeper water will reduce propwash from docking and castoff of water craft. The extension will not affect the watercourse.

**Noise:** Construction equipment will create noise audible to neighbors and in-water. Noise disturbance will be short-term and should have negligible effects on fish and wildlife in the area. Work will be completed during the in-water work window when juvenile fish are not expected to be present in larger numbers.

**Potential spills:** Short-term risks include the potential for petroleum spills that can occur with any equipment operation. The level of impact to the aquatic environment is expected to be minor because a trained crew will be onsite that will implement spill containment measures should a spill occur.

**Shading:** The proposed dock will increase overwater coverage by 326 square feet. The proposed decking will be ThruFlow grated decking. Grated decking allows light to penetrate the waters below the dock, which can increase productivity in the water column, and reduce the full shade favored by salmonid predators. Salmonid predators are known to use hard shadowing under solid-decked docks to ambush juvenile salmonids. Reducing these hard shadows limits their ability to effectively hunt salmonids. In addition, hard shadowing may increase juvenile salmonid outmigration times when encountered along the shoreline.

ThruFlow grated decking has a measured performance at 43 percent light penetration (ThruFlow, 2021). Thus, the increase in lighting under the pier is effectively 57% of the area of a solid decked structure. Table 1 provides a summary of effective coverage:

**Table 1 – Effective coverage**

	Existing/ Proposed	Proposed grated	Conversion	Effective coverage	Reduction in effective coverage
New Grated Dock (SF)	0	326	0.57	186	140

The use of grated decking at the site reduces the effective coverage of the new structure by 140 square feet.

In addition the new dock configuration will place moorage into water 4 to 6 feet deep.

**Recreational Boating:** The project supports continued recreational boating, which has been identified as a limiting factor for salmonid populations in Lake Washington. The pier will not

introduce additional boating to Lake Washington, as the owners could still access the lake from a public boat launch or private moorage facility.

***Other Conservation measures:***

**Work window:** The work will be completed during the prescribed in-water work window for this area of Lake Washington (July 16 to December 31). Operating within this time frame helps protect Chinook salmon, steelhead, bull trout and other salmonid fish species by doing work when juvenile fish are not expected to be present.

**Best Management Practices:** Applicable BMPs will be used, such as a floating boom around the in-water work area, to contain any floating debris that may escape during construction. The barge will have a perimeter containment sock to absorb oil and grease that might inadvertently wash from the barge during construction.

Hazardous material containment supplies such as spill absorbent pads and trained personnel will be required onsite during any phase of construction where machinery is in operation near surface waters.

**In-lieu Fee:** The shoreline on the subject property will be planted with native, overhanging vegetation. The project also requires approval from the National Marine Fisheries Service (NMFS). NMFS has developed a calculator to determine appropriate mitigation costs for proposed in-water structures in Lake Washington. This calculator has established a fund that owners can pay into if they are not willing or cannot find mitigation to offset impacts from the project. The owner is not able to complete the required mitigation at the subject property and the property owners will pay into the in-lieu fee program to mitigate project impacts. An in-lieu fee program is defined as follows:

“A program involving the restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental or non-profit natural resources management entity to satisfy compensatory mitigation requirements... Similar to a mitigation bank, an in-lieu fee program sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the in-lieu program sponsor.” (Fed. Reg. 40 CFR Part 230)

The fee has been determined using the Restoration And Permitting (RAP) Calculator for Lake Washington and will be paid to King County Water & Land Resources Division. This funding has been used to remove 350 derelict piles from the mouth of the Cedar River in Lake Washington.

## **Conclusion**

Juvenile Chinook salmon, and other salmonids, rear and migrate along the Lake Washington shoreline.

There will be temporary impacts from noise and disturbed sediments during construction. Construction disturbance and dock reconfiguration will degrade ecological conditions at the site by increasing overwater coverage at the site. The effects of construction will be short term. The dock will use grated decking to minimize the effective overwater coverage to a net gain of 186 square feet. The grating reduces the hard shadows favored by salmonid predators and increases productivity under the pier. In addition, the new structure is in deeper water more than 30 feet from shore. Overwater structures may slow juvenile salmonid outmigration times.

Constructing the new moorage away from shore will reduce the chances of delaying outmigrating juvenile salmonids.

The project will displace about 4.9 square feet of lakebed from installation of new pilings.

The project will minimize construction effects on the environment by following the prescribed fish window and using applicable BMPs to prevent construction spills, turbidity, and floating debris from escaping the area. The construction crew will retrieve all dropped items from the bottom and dispose of them properly.

Ecological conditions at the site will be improved by placing the watercraft lift in the deepest water to prevent or reduce sediment disturbance during docking and castoff from propwash over the existing condition.

A shoreline planting plan will be implemented that will add native trees and shrubs to the shoreline that will provide natural shading, allochthonous food sources and will eventually be a source of woody materials that will improve shoreline conditions at the site in the long-term. The owner has also opted to pay into the In Lieu Fee program that will be used for conservation projects that benefit salmon in King County.

This project has been designed to meet current residential dock standards and will use Best Management Practices to reduce project impacts. The conservation measures are designed to improve ecological functions or prevent further degradation of habitat **and will result in No Net Loss of ecological functions.**

## Document Preparers

Brad Thiele

Biologist

28 years of experience

Northwest Environmental  
Consulting, LLC (NVEC)

The conclusions and findings in this report are based on field observations and measurements and represent our best professional judgment and to some extent rely on other professional service firms and available site information. Within the limitations of project scope, budget, and seasonal variations, we believe the information provided herein is accurate and true to the best of our knowledge. Northwest Environmental Consulting does not warrant any assumptions or conclusions not expressly made in this report, or based on information or analyses other than what is included herein.

## REFERENCES

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King County. 2022. King County iMap. Online database. Accessed September 2022 at <https://gismaps.kingcounty.gov/iMap/>

Washington Department of Fish and Wildlife (WDFW). 2022. Priority Habitats and Species. Online database. Accessed September 2022 at <http://apps.wdfw.wa.gov/phsontheweb/>

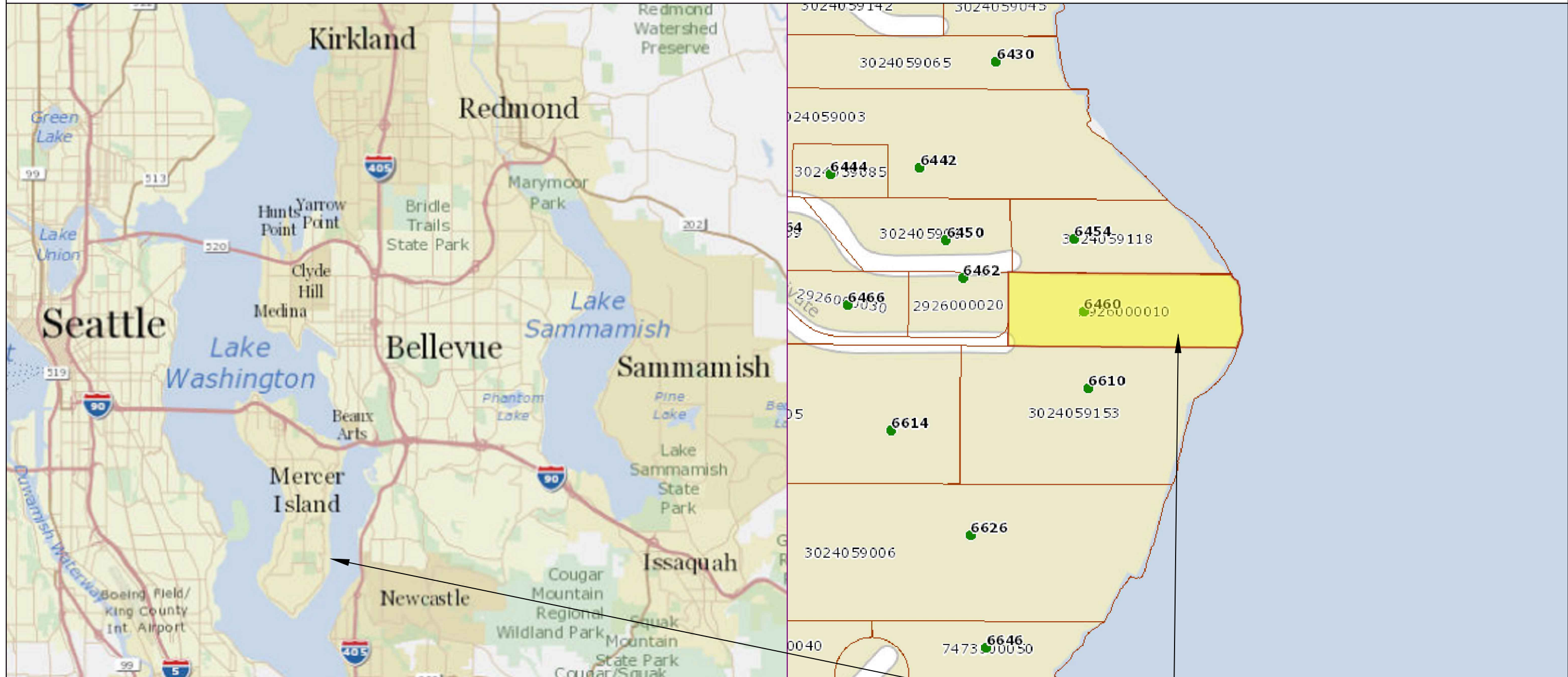
WDFW. 2022. SalmonScape. Online database. Accessed September 2022 at <http://apps.wdfw.wa.gov/salmonscape/>

# **Appendix A: Project Drawings**

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# SITE PLAN



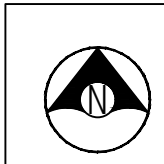
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Legal Description: GREGORY ADD & AN UND 1/4 INT IN COMMUNITY TR AKA PARCEL A OF MERCER ISLAND LN REVISION NO 94-0118 REC NO 9403259005

Plat Block:  
Plat Lot: 1

LAT: 47.54397      LONG: -122.2091

**SUBJECT  
PROPERTY**



Seaborn Pile Driving  
1080 W Ewing St  
Seattle, WA 98119

Office: 206-236-1700 ext. 3  
www.seabornpiledriving.com

Scope of Work: We propose to remove (80) lft of skirting, drive (14) 8" steel piles, install 326 sqft of extensions, permit the existing PWC lift, and relocate the existing boat lift.

County: King County  
Location: Lake Washington

Applicant: Hanover Residence  
6460 E Mercer Way  
Mercer Island, WA 98040

Datum: CORPS OF ENGINEERS 1919  
NE Quarter Of Section 30, Township 24, Range 05  
Adjacent Owners:  
KONERU DHEERAJ  
6610 E MERCER WAY 98040  
SIMPSON TYLER G & ANDREA  
6454 E MERCER WAY 98040

**SHEET  
A1.0**

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# GENERAL NOTES:

MATERIALS SPEC LIST:

**Boat Lifts:** Aluminum

- \* SL10014ARW - 146" x 191"
- \* SL2008AR2D2 - 52" x 66" (Jetski Lift)

**Decking Material:** FRPP - Fiberglass reinforced polypropylene

Open Air percentage:

- \* Surface - 43%

**Sewer:**

- \* All sewer is field verified by probing the lake bed manually during the allowed work windows for the area.

**Piles:**

- \* All new piles are epoxy coated steel piles \*size varies, see plan set
- \* Piles are driven using the vibro method

CODE REFERENCES: Mercer Island

**We are applying for the permit to be reviewed under the:**

“Alternative Development Standards” per MIMC 19.13050(F)(3).

The code official shall approve moorage facilities not in compliance with the development standards in subsection (F)(1) or (F)(2) of this section subject to both U.S. Army Corps of Engineers and Washington Department of Fish and Wildlife approval to an alternate project design. The following requirements and all other applicable provisions in this chapter shall be met:

i. The dock must be no larger than authorized through state and federal approval; Ch. 19.13 Shoreline Master Program | Mercer Island City Code Page 30 of 34 The Mercer Island City Code is current through Ordinance 20C-13, passed June 16, 2020.

**The dock will be no larger than authorized.**

ii. The maximum width must comply with the width of moorage facilities standards specified in standards specified in subsection D of this section (Table D);

**The maximum width will comply.**

iii. The minimum water depth must be no shallower than authorized through state and federal approval;

**The minimum water depth will be no shallower than authorized.**

iv. The applicant must demonstrate to the code official's satisfaction that the proposed project will not create a net loss in ecological function of the shorelands; and

**NNL report attached.**

v. The applicant must provide the city with documentation of approval of the moorage facilities by both the U.S. Army Corps of Engineers and the Washington Department of Fish and Wildlife.

**Under review by CORPS and WDFW.**

Mitigation" Disturbance of bank vegetation shall be limited to the minimum amount necessary to accomplish the project. Disturbed bank vegetation shall be replaced with native, locally adapted herbaceous and/or woody vegetation. Herbaceous plantings shall occur within 48 hours of the completion of construction. Woody vegetation components shall be planted in the fall or early winter, whichever occurs first. The applicant shall take appropriate measures to ensure revegetation success;

Last permit issued for property: SHL9904-212 03/17/1999

Dock established/constructed: 10/08/1981

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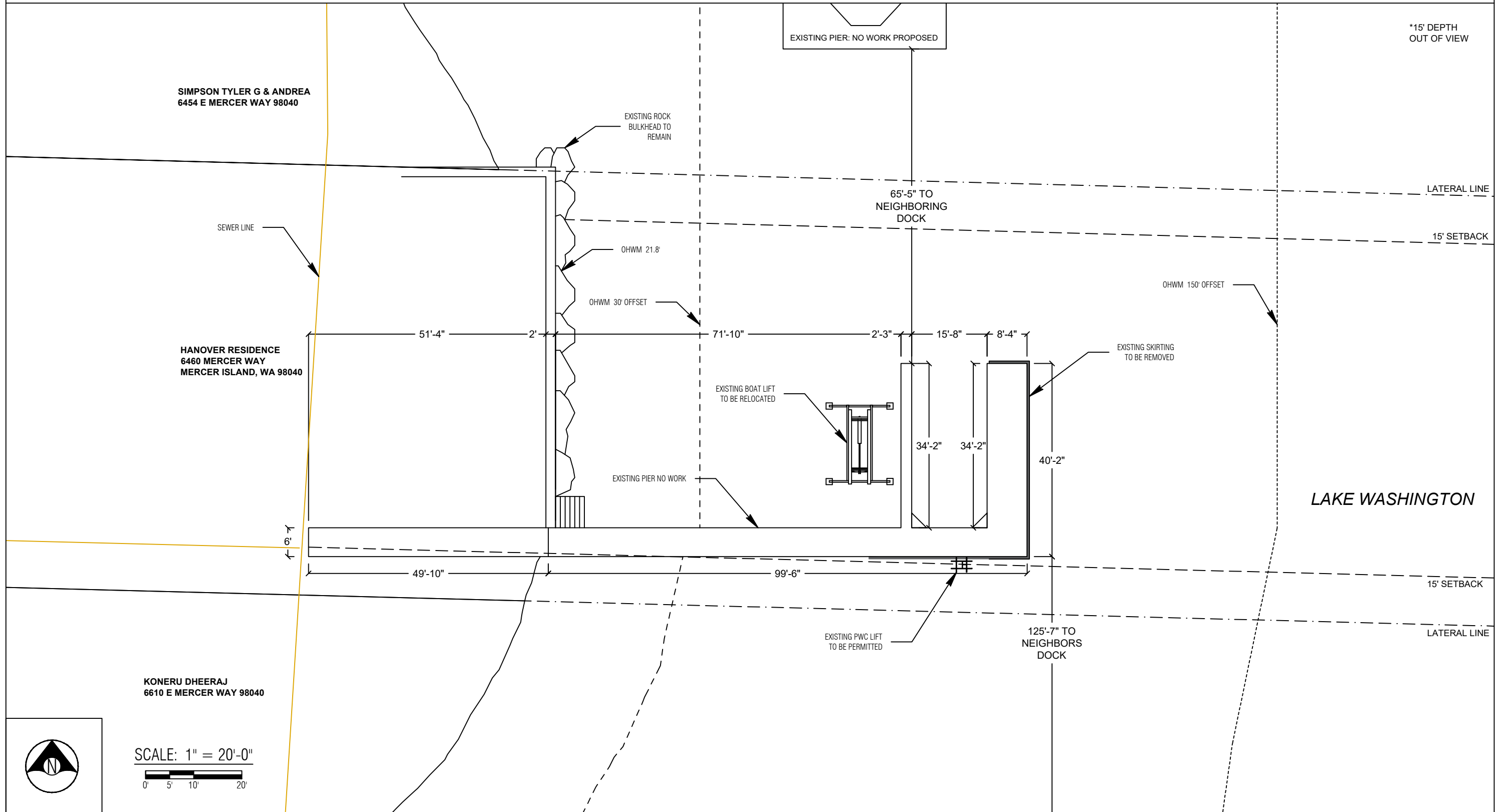
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# EXISTING CONDITIONS

**\*\*CLEAN UP LAKE AROUND PROJECT\*\***



County: King County  
 Location: Lake Washington

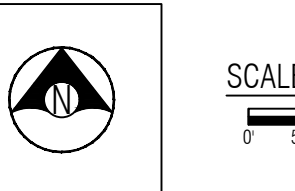
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Adjacent Owners:  
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SIMPSON TYLER G & ANDREA  
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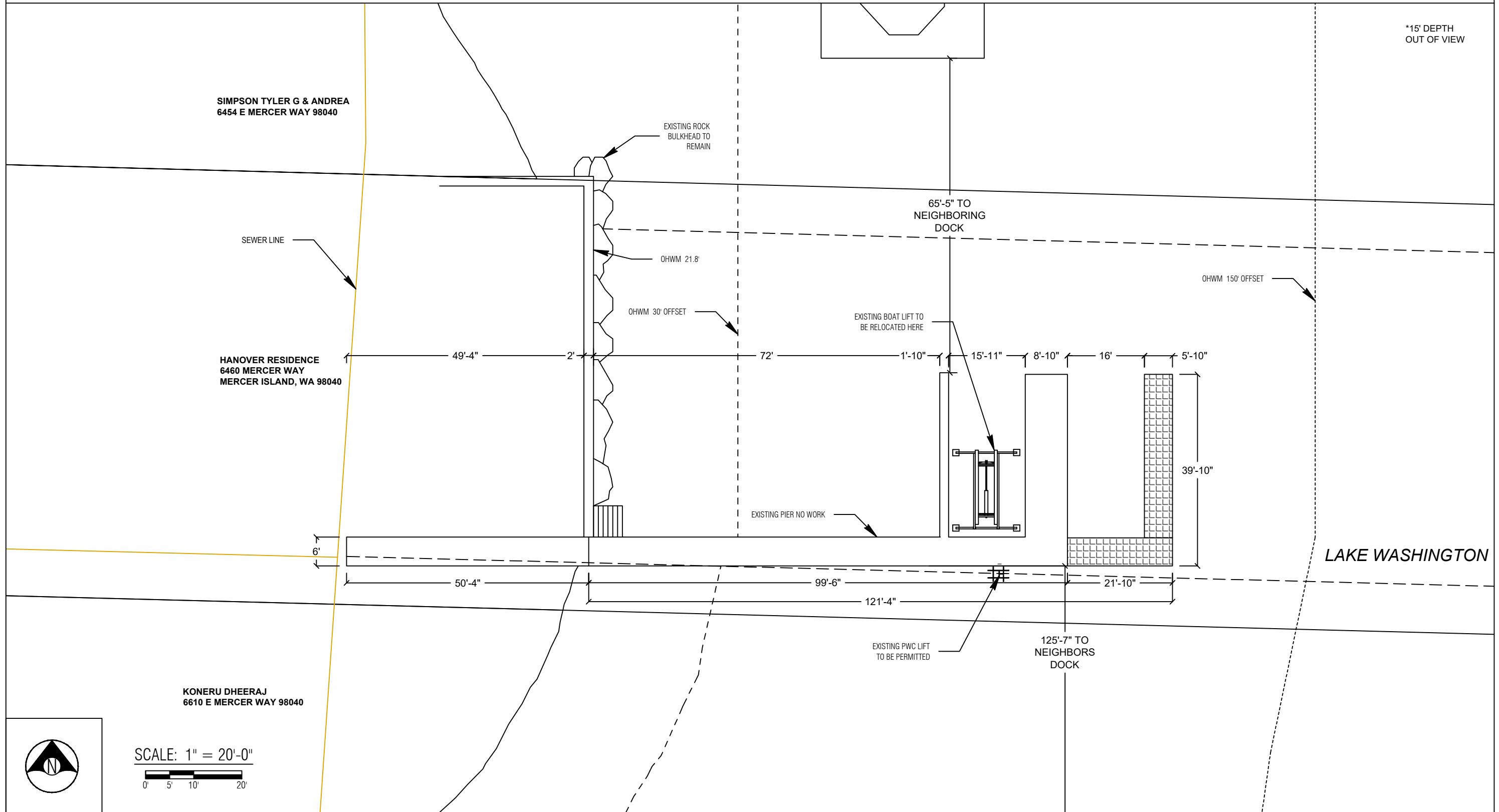
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# PROPOSED CONDITIONS

**\*\*CLEAN UP LAKE AROUND PROJECT\*\***



County: King County  
 Location: Lake Washington

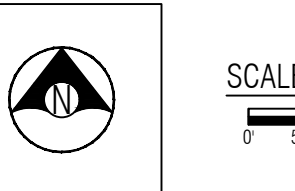
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# PIER DETAILS - EXISTING/PROPOSED

## LEGEND

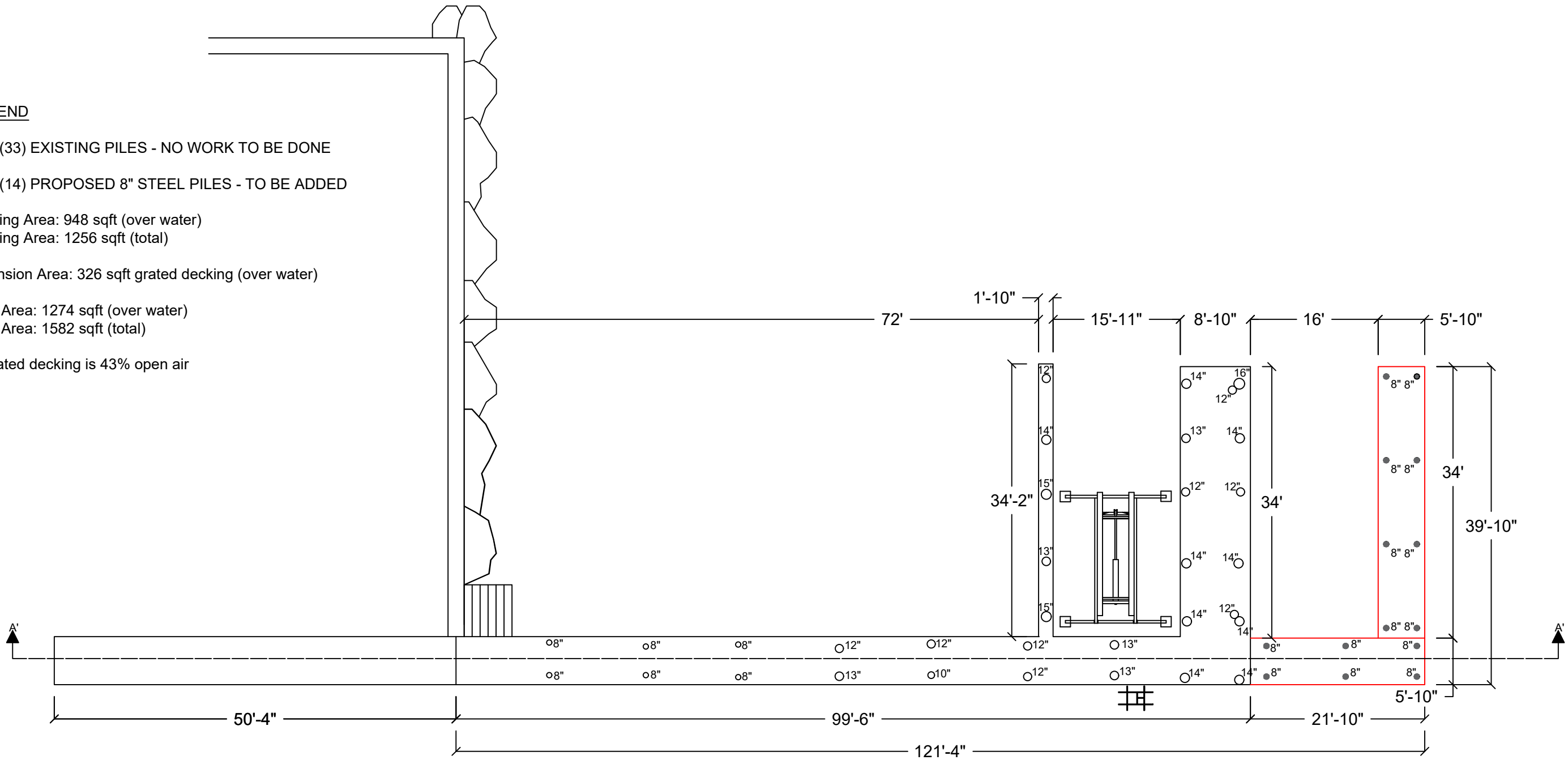
- (33) EXISTING PILES - NO WORK TO BE DONE
- (14) PROPOSED 8" STEEL PILES - TO BE ADDED

Existing Area: 948 sqft (over water)  
Existing Area: 1256 sqft (total)

Extension Area: 326 sqft grated decking (over water)

New Area: 1274 sqft (over water)  
New Area: 1582 sqft (total)

\*\*Grated decking is 43% open air



PLAN VIEW



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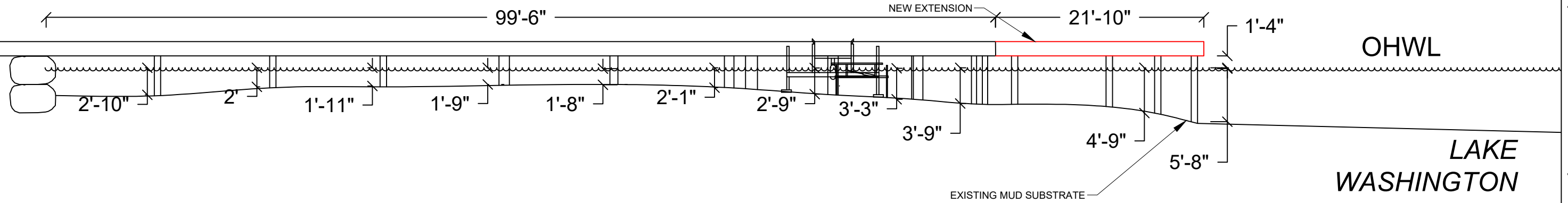
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# PIER DETAILS EXISTING/PROPOSED



SECTION VIEW: A'-A'



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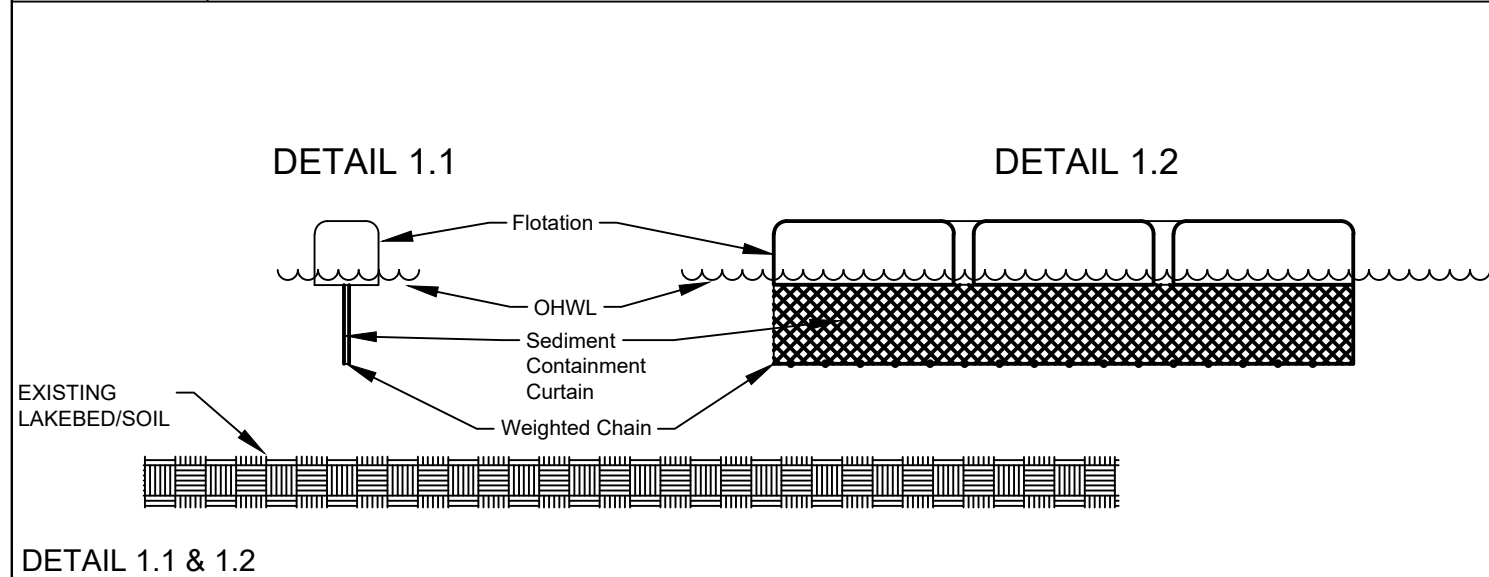
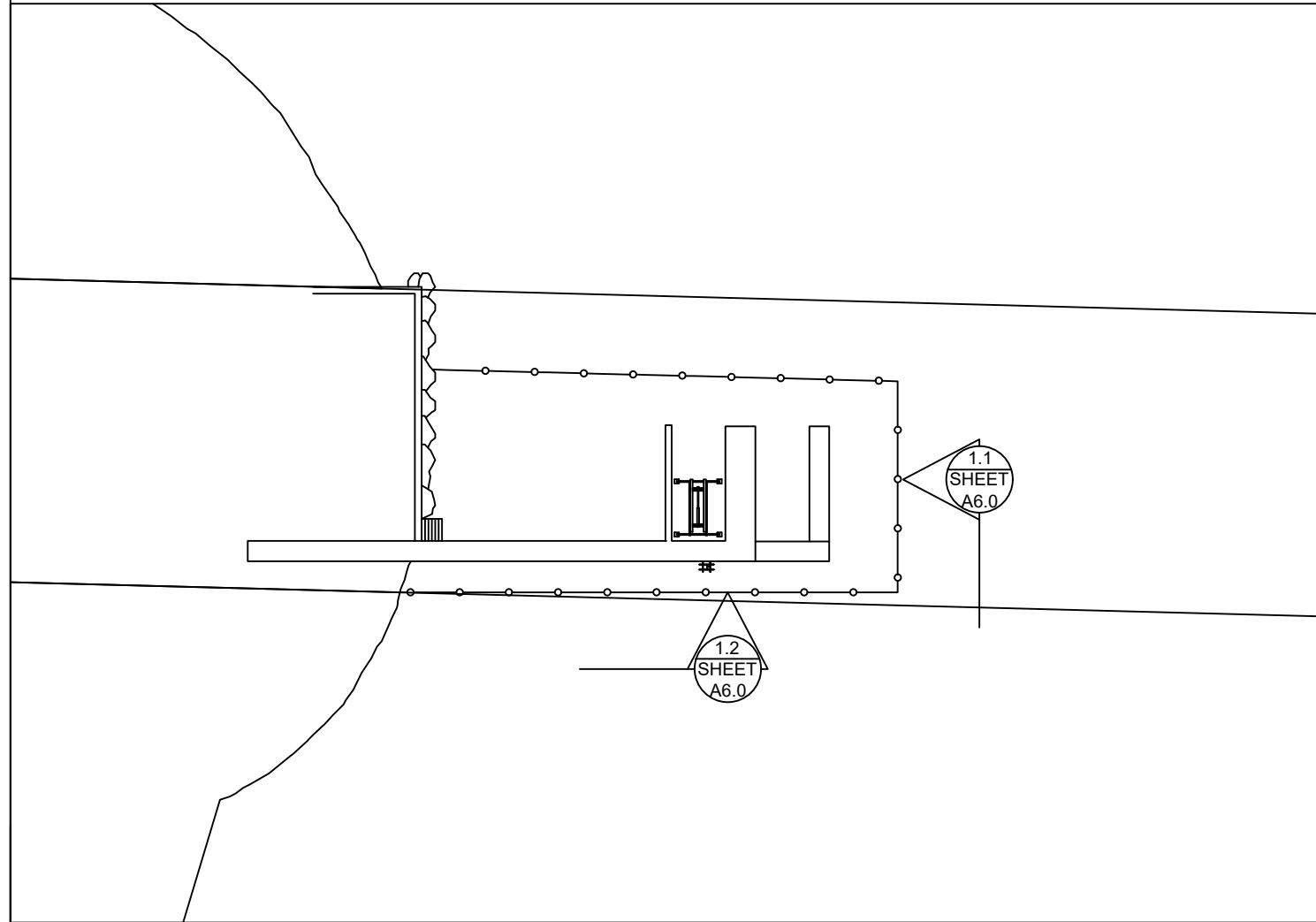
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# BMP INFORMATION



DETAIL 1.1 & 1.2

## BMP NOTES:

- A. Constant vigilance shall be kept for the presence of protected fish species during all aspects of the proposed action, particularly during in-water activities such as vessel movement, deployment of anchors & spuds, pile driving, dredging, and placement of gravels and other fill.
- The project manager shall designate an appropriate number of competent observers to survey the project site and adjacent areas for protected species, including the presence of fish as conditions allow.
  - Visual surveys shall be made prior to the start of work each day, and prior to resumption of work following any break of more than an hour. Periodic additional visual surveys throughout the work day are strongly recommended.
  - All in-water work shall be done during the in-water work window for the waterbody. Where there is a difference between the USCOE and WDFW work windows, the overlap of the two shall apply.
  - All pile driving and extraction shall be postponed or halted when obvious aggregations or schooling of fish are observed within 50 yards of that work, and shall only begin/resume after the animals have voluntarily departed the area.
  - When piloting vessels, vessel operators shall operate at speeds and power settings to avoid grounding vessels, and minimize substrate scour and mobilization of bottom sediments.
- B. No contamination of the marine environment shall result from project-related activities.
- Appropriate materials to contain and clean potential spills shall be stored and readily available at the work site and/or aboard project-related vessels.
  - The project manager and heavy equipment operators shall perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations shall be postponed or halted should a leak be detected, and shall not proceed until the leak is repaired and the equipment is cleaned.
  - To the greatest extent practicable, utilize biodegradable oils for equipment that would be operated in or near water.
  - Fueling of land-based vehicles and equipment shall take place at least 50 feet away from the water, preferably over an impervious surface. Fueling of vessels shall be done at approved fueling facilities.
  - Turbidity and siltation from project-related work shall be minimized and contained through the appropriate use of erosion control practices, effective silt containment devices, and the curtailment of work during adverse weather and tidal/flow conditions.
  - All wastes shall be collected and contained for proper disposal at approved upland disposal sites appropriate for the material(s).
  - When removing piles and other similarly treated wood, containment booms must fully enclose the work area. Wood debris, oils, and any other materials released into lake waters must be collected, removed, and properly disposed of at approved disposal sites.
  - All in- and over-water wood cutting would be limited to the minimum required to remove the subject wood component, and all cutting work should be enclosed within floating containment booms.
  - When removing piles, no actions shall be taken that would cause adhering sediments to return to lake waters.
  - Above-water containment shall be installed around removed piles to prevent sediment laden waters from returning to lake waters.
  - Construction staging (including stocking of materials, etc.) will occur on the supply barge.
  - All Exposed wood to be used on the project will be treated with a cheminite treatment.



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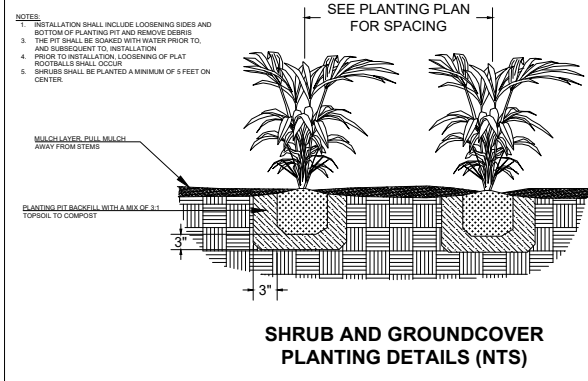
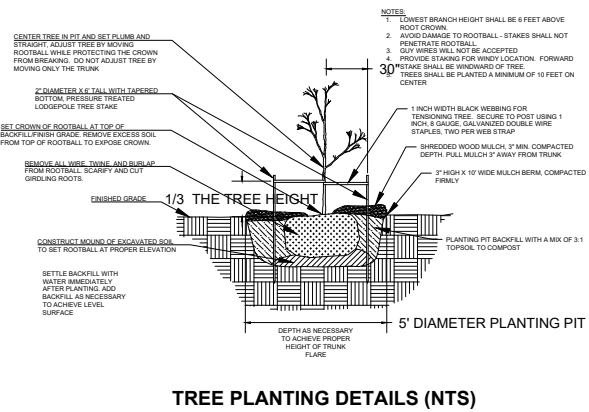
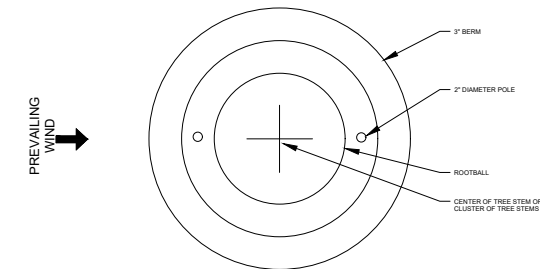
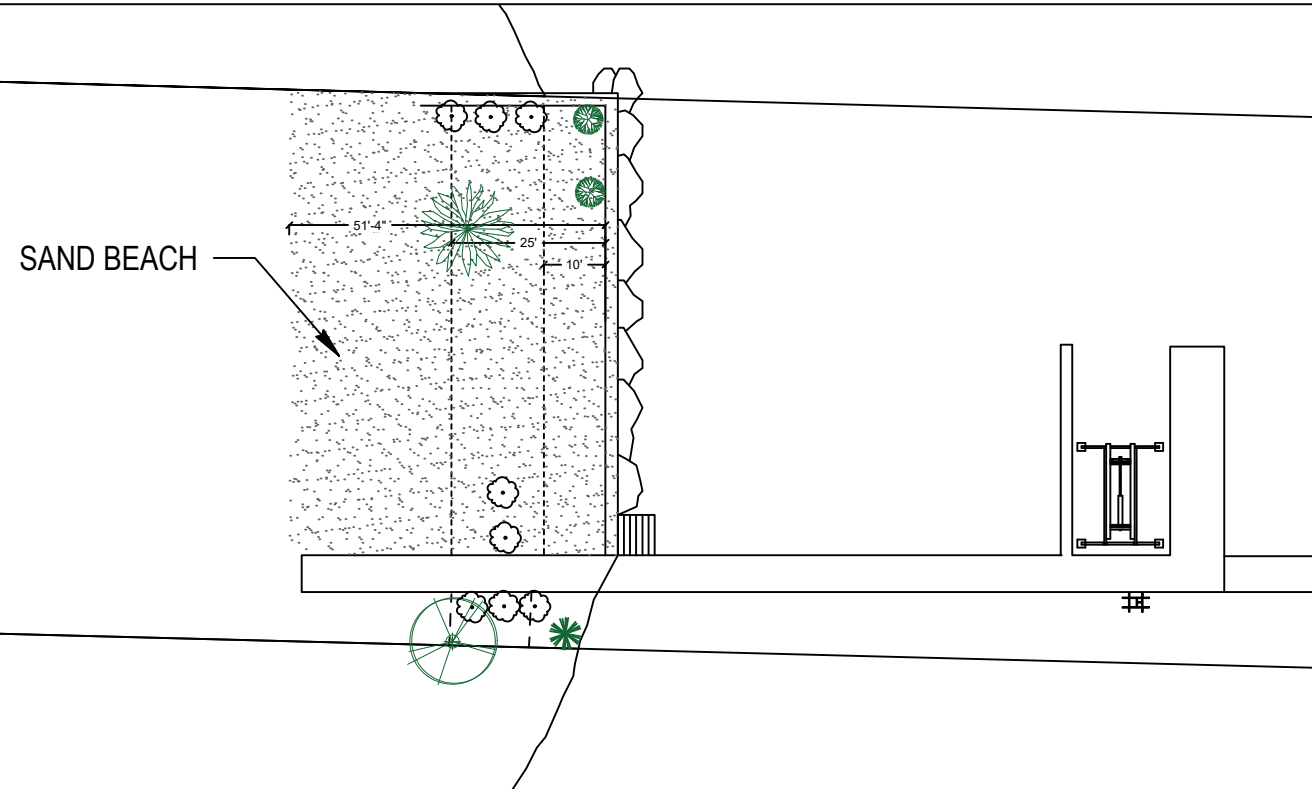
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# MITIGATION PLAN



**Notes:**

1. Shrubs are show, and shall be planted, at least five feet on center. Trees are show, and shall be planted, at least ten feet to center.
2. The property owner will implement and abide by the shoreline planting plan. The plants shall be installed before or concurrent with the work authorized by this permit. A report, as-built drawing and photographs demonstrating the plants have been installed or a report on the status of project construction will be submitted to the U.S. Army Corps of Engineers, Seattle District, Regulatory Branch, within 12 months from the date of permit issuance. This reporting requirement may be met by completing and submitting a U.S. Army Corps of Engineers approved Report for Mitigation Work Completion form.
3. The property owner will maintain and monitor the survival of installed shoreline plantings for five years after the U.S. Army Corps of Engineers accepts the as-built report. Installed plants shall achieve 100% survival during monitoring Years 1 and 2. Installed plants shall achieve at least 80% survival during monitoring Years 3, 4 and 5. Percent survival is based on the total number of plants installed in accordance with the approved riparian planting plan. Individual plants that die will be replaced with native riparian species in order to meet the survival performance standards.
4. The property owner will provide annual monitoring reports for five years (Monitoring Years 1-5). Each annual monitoring report will include written and photographic documentation on plant mortality and replanting efforts and will document whether the performance standards are being met. Photos will be taken from established points and used repeatedly for each monitoring year. In addition to photos at designated points, photo documentation will include a panoramic view of the entire planting area. Submitted photos will be formatted on standard 8 1/2 x 11" paper, dated with the date the photo was taken, and clearly labeled with the direction from which the photo was taken. The photo location points will be identified on an appropriate drawing. Annual shoreline planting monitoring reports will be submitted to the U.S. Army Corps of Engineers, Seattle District, Regulatory Branch, by November 31 of each monitoring year. This reporting requirement may be met by completing and submitting a U.S. Army Corps of Engineers approved Mitigation Planting Monitoring Report form.

## PROPOSED PLANTING SPECIES/QUANTITIES

SYMBOL	LATIN NAME	COMMON NAME	QTY	SIZE
	Thuja plicata	Western Red Cedar	1	3 ft
	Salix Lucida	Pacific Willow	1	3 ft
	Salix sitchensis	Sittka Willow	2	1 gal / 3 gal
	Salix scouleriana	Scouler willow	1	1 gal / 3 gal

PLANTS: Shrubs to be installed 5ft on center and trees to be installed 10ft on center.

County: King County  
 Location: Lake Washington  
 Applicant: Hanover Residence  
 6460 E Mercer Way  
 Mercer Island, WA 98040  
 Datum: CORPS OF ENGINEERS 1919  
 NE Quarter Of Section 30, Township 24, Range 05  
 Adjacent Owners:  
 KONERU DHEERAJ  
 6610 E MERCER WAY 98040  
 SIMPSON TYLER G & ANDREA  
 6454 E MERCER WAY 98040  
 Created: 07-25-22  
 Last Updated: 8/24/2022 2:37 PM Zion

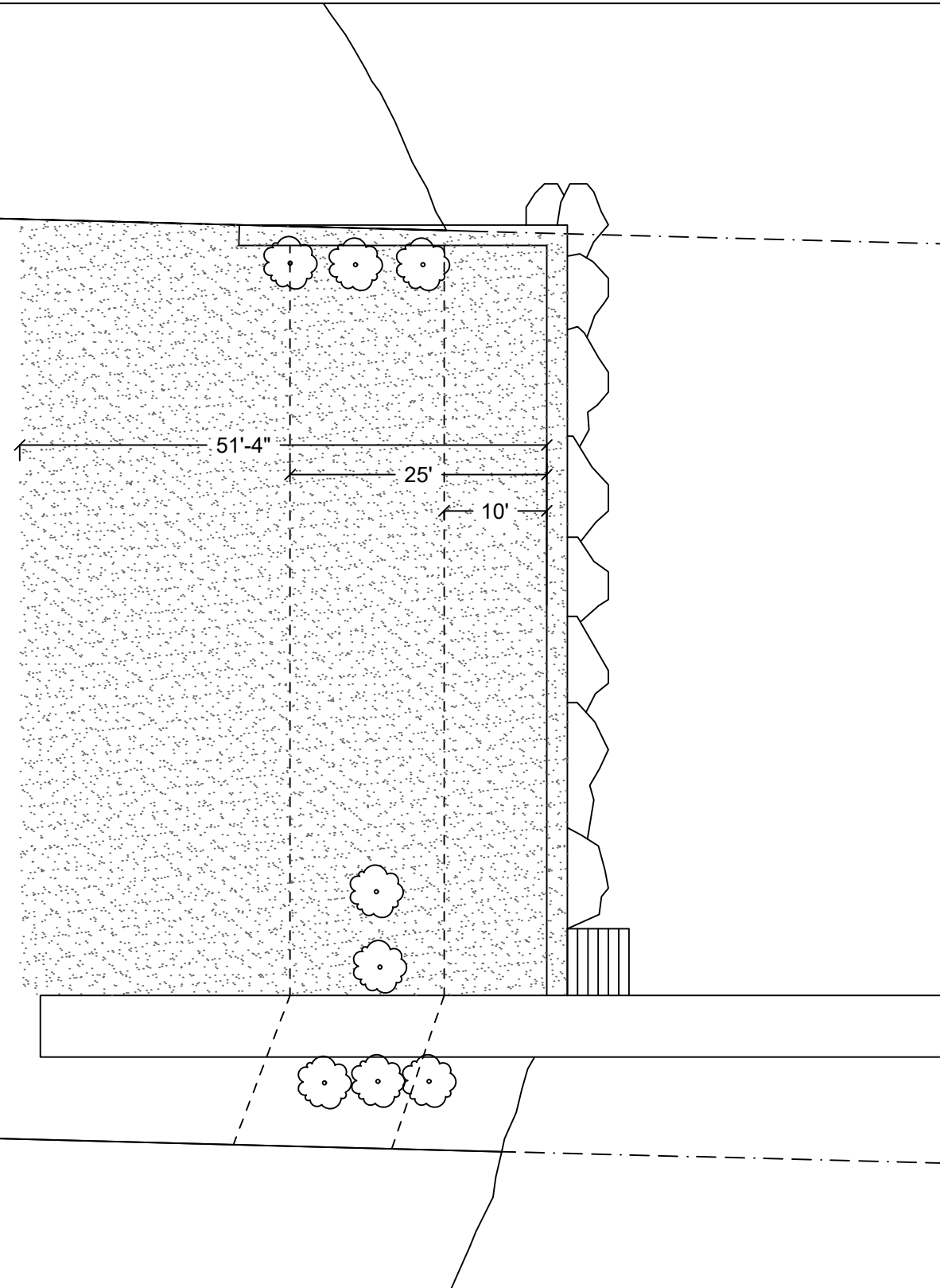


Seaborn Pile Driving  
 1080 W Ewing St  
 Seattle, WA 98119  
 Office: 206-236-1700 ext. 3  
 www.seabornpiledriving.com

Scope of Work: We propose to remove (80) lft of skirting, drive (14) 8" steel piles, install 326 sqft of extensions, permit the existing PWC lift, and relocate the existing boat lift.



# EXISTING PLANT PLAN



## PROPOSED PLANTING SPECIES/QUANTITIES

SYMBOL	LATIN NAME	COMMON NAME	QTY	SIZE
	Cortaderia Selloana	Pampas Grass	8	3 ft

PLAN VIEW

EXISTING PLANTS TABLE



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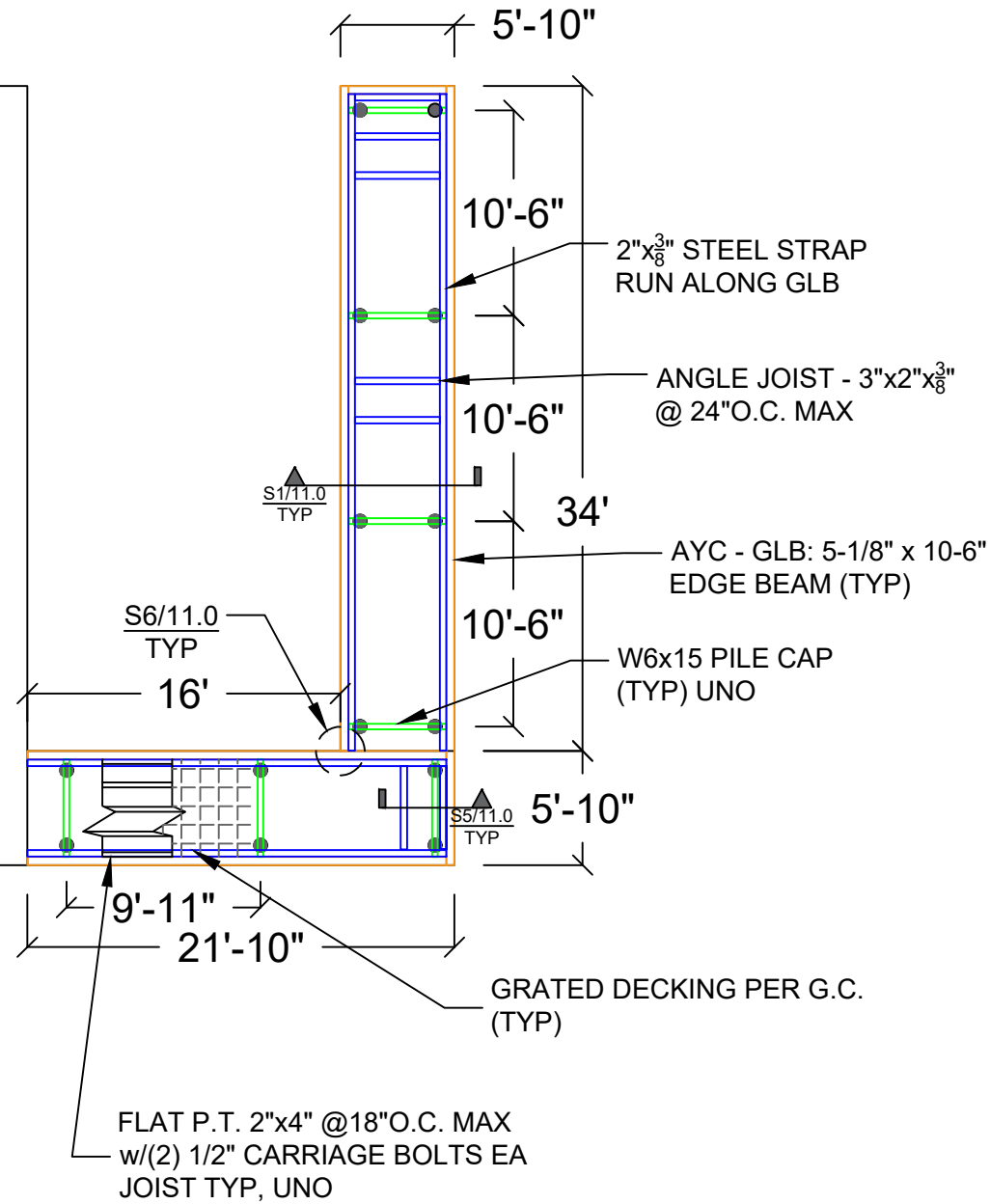
Applicant: Hanover Residence  
6460 E Mercer Way  
Mercer Island, WA 98040

Datum: CORPS OF ENGINEERS 1919  
NE Quarter Of Section 30, Township 24, Range 05

Adjacent Owners:  
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6610 E MERCER WAY 98040

**SHEET**  
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# FRAMING PLAN



PLAN VIEW



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County: King County  
Location: Lake Washington

Applicant: Hanover Residence  
6460 E Mercer Way  
Mercer Island, WA 98040

Datum: CORPS OF ENGINEERS 1919  
NE Quarter Of Section 30, Township 24, Range 05

Adjacent Owners:  
KONERU DHEERAJ  
6610 E MERCER WAY 98040

SIMPSON TYLER G & ANDREA  
6454 E MERCER WAY 98040

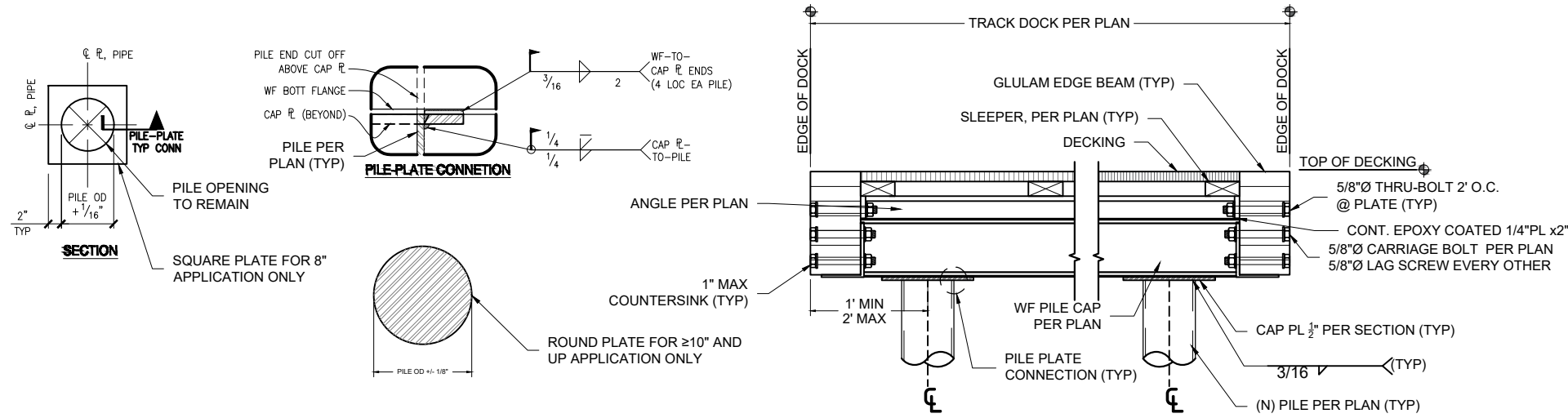
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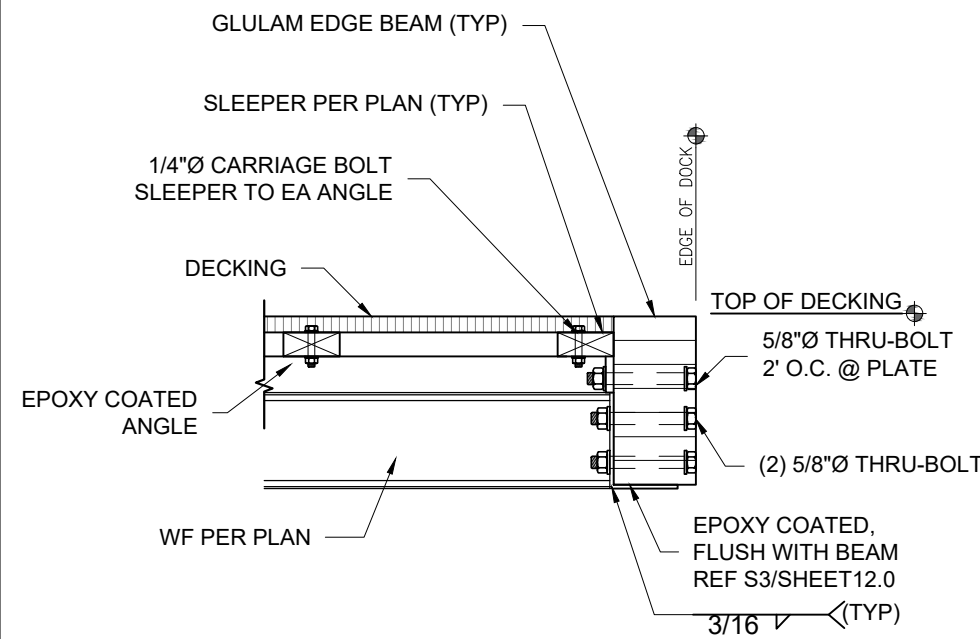
Created: 07-25-22

# DETAILS - TRACK

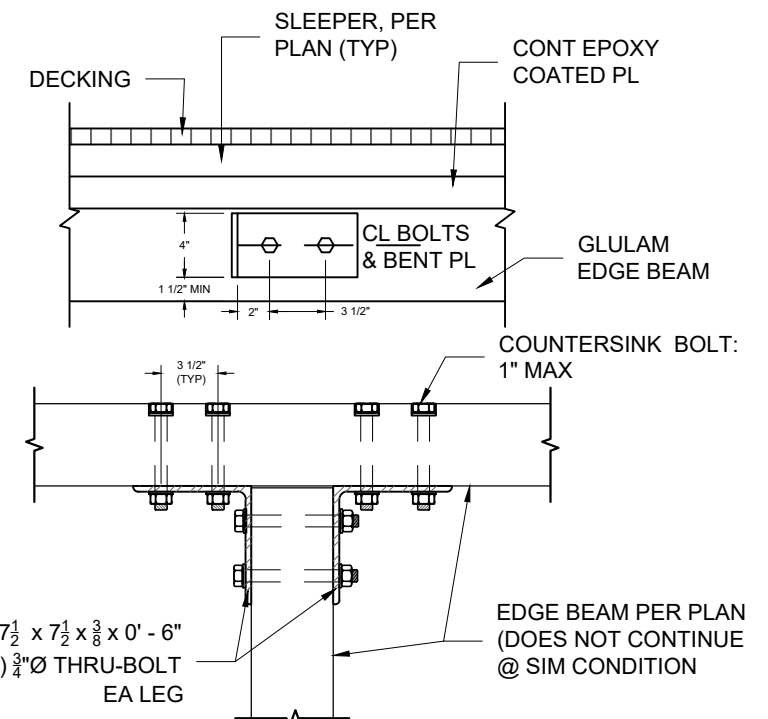


**S1** DOCK SECTION w/PILES - TYP  
SCALE: 1" = 1'

**S3** DETAIL NOT IN USE



**S5** EDGE SECTION (STEEL TRACK) - TYP  
SCALE: 1" = 1'



**S6** BEAM TO BEAM - TYP  
SCALE: 1" = 1'

**S4** DETAIL NOT IN USE



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County: King County  
Location: Lake Washington

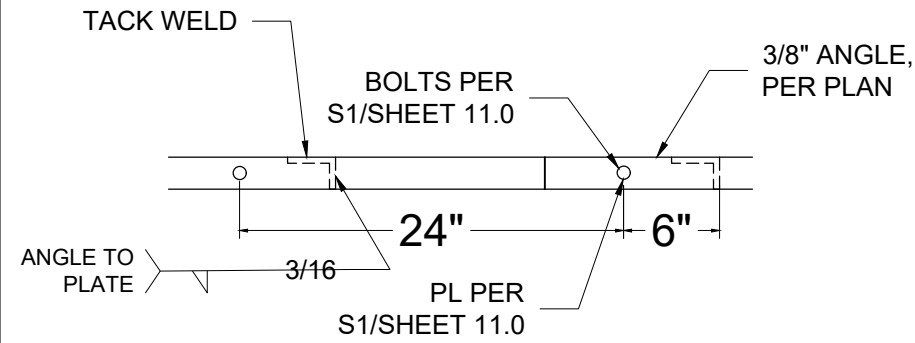
Applicant: Hanover Residence  
6460 E Mercer Way  
Mercer Island, WA 98040

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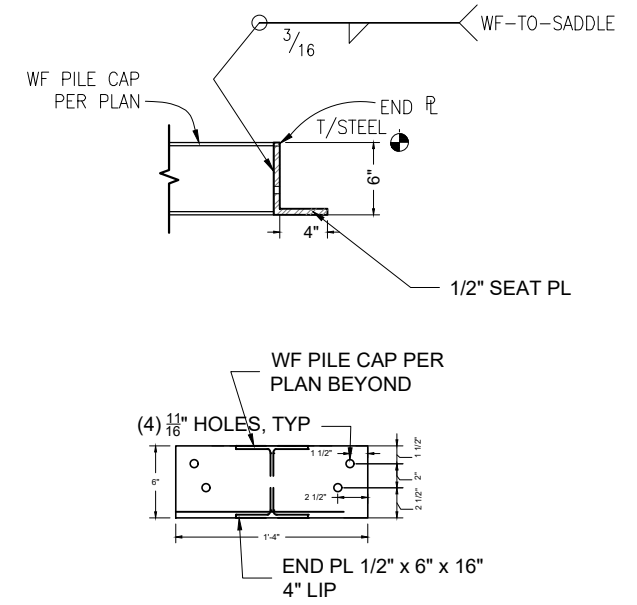
**SHEET**  
**11.0**

# DETAILS - TRACK

S1 DETAIL NOT IN USE



S2 ANGLE TO PLATE - TYP  
SCALE: 1" = 1"



S3 BEAM SADDLE BRACKET  
SCALE: 3/4" = 1"

S4 DETAIL NOT IN USE

S5 DETAIL NOT IN USE

S6 DETAIL NOT IN USE



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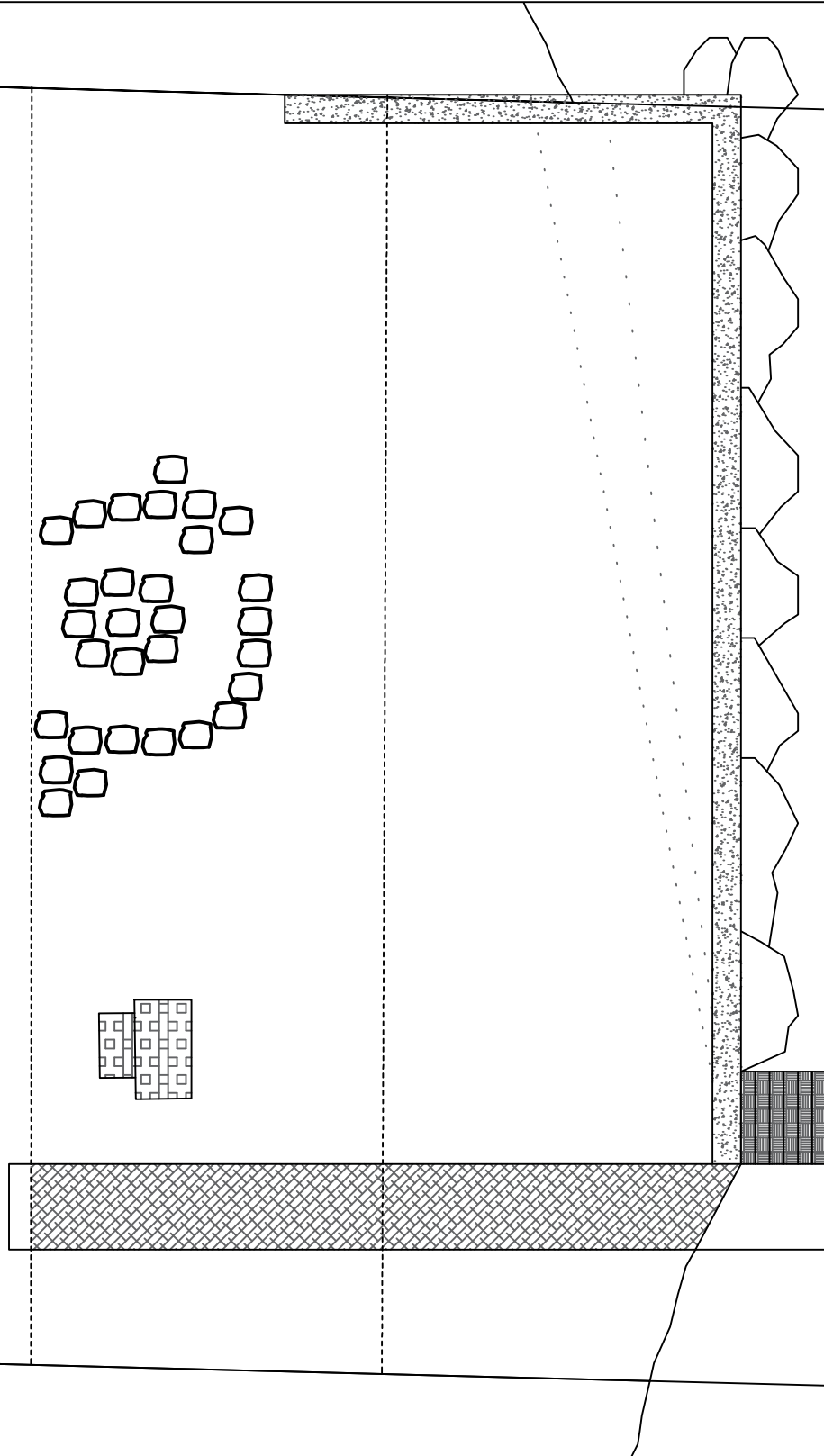
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6454 E MERCER WAY 98040

**SHEET**  
**12.0**

# HARDSCAPE CALCULATIONS

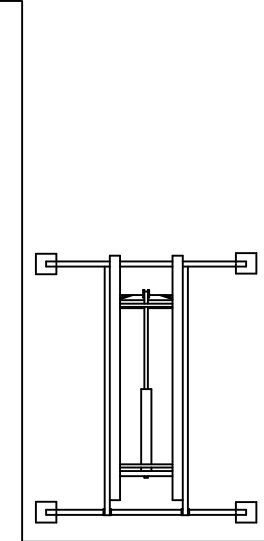


### Allowed Impervious Quantities

SETBACK (total sqft)	ALLOWED	CURRENTLY USED	REMOVING	PROPOSED
0' - 25' SETBACK (2,463,2883 sqft)	10% (246,32883 sqft)	24,3983% (601 sqft)	0% (0 sqft)	24,3983% (246,32883 sqft)
25' - 50' SETBACK (2,217,0449 sqft)	30% (665,11347 sqft)	15,8769% (352 sqft)	0% (0 sqft)	15,8769% (665,11347 sqft)

### LEGEND

DESCRIPTION	AREA	HATCH
ROCK BULKHEAD (PERMITTED) 25FT SETBACK	225 sqft	
RETAINING WALL (PERMITTED) 25FT SETBACK	195 sqft	
WALKWAY (PERMITTED) 25FT SETBACK	142 sqft	
STEPS (PERMITTED) 25FT SETBACK	39 sqft	
TABLE 50FT SETBACK	40 sqft	
RETAINING WALL 50FT SETBACK	15 sqft	
WALKWAY 50FT SETBACK	148 sqft	
FIREPIT 50FT SETBACK	149 sqft	



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Last Updated: 8/24/2022 3:03 PM Zion

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**SHEET**  
**A13.0**

# **Appendix B: Site Photographs**

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Photo 1 - Existing dock looking waterward.



Photo 2 - Existing dock looking shoreward.



Photo 3 - Shoreline conditions looking north.



Photo 4 - Shoreline conditions south of dock.





Photo 5 - Shoreline conditions north of site.



Photo 6 - Shoreline conditions south of site.