

Tables

Table 1**Datum Elevations (Station No. 9447659)**

Tide Level	Meters (MLLW)	Feet (MLLW)
Highest Astronomical Tide	4.016	13.17
Mean Higher High Water	3.38	11.09
Mean high water	3.114	10.21
Mean tide level	1.984	6.51
Mean sea level	1.976	6.48
Mean diurnal tide level	1.689	5.54
Mean low water	0.854	2.8
Mean lower low water	0	0
Lowest Astronomical Tide	-1.304	-4.28
NAVD88	0.62	2.03

Notes:

MLLW: mean lower low water

NAVD88: North American Vertical Datum of 1988

Table 2
Marine Sediment Cleanup Levels

Parameter	Units	SCL	Basis	Compliance Evaluation
Total PCBs ^a	µg/kg dw	130	Benthic Protection	Point-by-Point
Total Dioxin/Furan TEQ ^a	ng/kg dw	5	Human Health	SWAC
Total PCB Congeners ^a	µg/kg dw	30	Human Health	SWAC
Coplanar PCB Congener TEQ ^b	ng/kg dw	1.5	Human Health	SWAC
cPAH TEQ ^b	µg/kg dw	21	Human Health	SWAC

Notes:

a. Site indicator hazardous substance chemicals

b. Sediment areas exceeding the sediment cleanup objective for coplanar PCB congener TEQ and cPAH TEQ are within areas already defined by dioxin/furan TEQ and total PCBs; thus, these chemicals are not indicator hazardous substances for the Site.

µg/kg: microgram per kilogram

cPAH: carcinogenic polycyclic aromatic hydrocarbon

dw: dry weight

ng/kg: nanogram per kilogram

PCB: polychlorinated biphenyl

SCL: sediment cleanup level

SWAC: surface-weighted average concentration

TEQ: toxicity equivalence

Table 3
Anticipated Environmental Permits and Approvals

Permit or Approval	Lead Agency	Trigger	Notes and Status
Federal			
Rivers and Harbors Act Section 10 Permit and Clean Water Act Section 404 Individual Permit	USACE	Discharge of dredge and fill material and work proposed within navigable waters of the U.S.	An application was submitted to USACE for the project in spring 2024. The submittal included the following materials: - Completed JARPA Form - Project Drawings (approximately 10% design level) - Critical Areas Report - Final Cleanup Action Plan - ESA memorandum documenting project compliance with the Salish Sea Nearshore Programmatic Biological Opinions - Water Quality Monitoring Plan - ESA-Listed Marine Mammal Monitoring Plan - Marbled Murrelet Monitoring Plan - SEPA Checklist The USACE issued a Public Notice for the project on March 19, 2025. The public comment period ends on April 18, 2025. The USACE has indicated that an Individual Permit will apply to the project.
National Environmental Policy Act Review	USACE	Projects with a federal nexus (federal funding, use of federally owned properties, and/or issuance of a federal permit)	As the federal lead agency, USACE will complete the NEPA process as part of its Section 10/404 application review.
Rivers and Harbors Act Section 14 (408) Civil Works Permit	USACE	Projects proposed within or adjacent to USACE Civil Works projects	The project is adjacent to the Snohomish River Federal Navigation Channel. The USACE will review potential effects on the channel as part of its Section 408 application review.
National Historic Preservation Act Section 106 Consultation	USACE in consultation with DAHP	Projects with a federal nexus that have the potential to affect cultural, archaeological, or historical properties	USACE has consulted with Tribes and the Washington State Department of Archaeology and Historic Preservation as part of its Section 10/404 permit review process. An Inadvertent Discovery Plan will be required.
ESA Section 7 Concurrence	USACE in consultation with NMFS/USFWS	Projects with a federal nexus occurring in the vicinity of any threatened or endangered species or that could destroy or adversely modify critical habitat	USACE has consulted with NMFS and USFWS as part of its Section 10/404 permit review process. The design team met with NMFS in February 2025 to discuss shoreline armoring issues and consistency with the Salish Sea Nearshore Programmatic Biological Opinion and conservation calculator.
Magnuson-Stevens Fishery Conservation and Management Act Concurrence	USACE in consultation with NMFS/USFWS	Projects with a federal nexus that have the potential to affect essential fish habitat	Consultation is underway concurrent with Endangered Species Act review.
Coastal Zone Management Act Consistency Determination	USACE in coordination with Ecology	Projects that contain a federal nexus proposed within any of Washington's 15 coastal counties	A CZMA consistency form was submitted to USACE on March 4, 2025, for consultation with Ecology.
Marine Mammal Protection Act Incidental Harassment Authorization	National Oceanic and Atmospheric Administration	In-water activities such as pile driving with the potential to result in take of marine mammals in U.S. waters. Take includes to hunt harass, capture, or kill.	The work will avoid or minimize potential impacts to marine mammals by working during low tides (in the dry) or during regulatory in-water work windows for protection of aquatic species to the extent practicable. It is assumed that an Incidental Harassment Authorization will not be required if best management practices are followed.
Migratory Bird Treaty Act Compliance	USFWS	Activities with the potential to impact migratory birds.	The project team will consult with USFWS at approximately 30% design to discuss project effects and impact minimization measures for nesting osprey, great blue heron, purple martin, and other migratory bird species that may be affected by pile removal and project construction.
Bald and Golden Eagle Protection Act Compliance	USFWS	Activities with the potential to impact bald or golden eagles.	The project team will consult with USFWS at approximately 30% design to discuss project effects and impact minimization measures for bald eagles that may use the project vicinity.
State			
State Environmental Policy Act Review	Ecology	Activities requiring state or local approvals that do not meet regulatory criteria for an exemption.	Ecology issued a SEPA Mitigated Determination of Nonsignificance on June 15, 2023.
Clean Water Act Section 401 Water Quality Certification	Ecology	Work within waters of the state that could affect water quality.	A Section 401 Individual Water Quality Certification request was submitted to Ecology on March 5, 2025.

Table 3
Anticipated Environmental Permits and Approvals

Permit or Approval	Lead Agency	Trigger	Notes and Status
Hydraulic Project Approval	WDFW	Work that changes the natural flow or bed of a water body and therefore has the potential to affect fish habitat.	MTCA remedial actions are exempt from the procedural requirements of the state Hydraulic Code but must comply with the substantive requirements. The project team will consult with WDFW at approximately 30% design to discuss project effects and impact minimization measures for fish.
Construction Stormwater General Permit	Ecology	Construction resulting in more than 1 acre of ground disturbance, or smaller disturbance areas with contaminated soils, sediment, or groundwater.	A Construction Stormwater General Permit will be obtained by the project team at 90% design and transferred to the selected construction contractor.
Local			
City of Everett Code Compliance	City of Everett Planning and Public Works	Non-exempt activities affecting designated shorelines, critical areas, or floodplains; grading and changes in stormwater or drainage exceeding area thresholds; construction noise outside of designated hours; haul truck operations or construction affecting public roadways.	MTCA remedial actions are exempt from the procedural requirements of local codes but must comply with the substantive requirements. The project team will consult with the City at approximately 30% design to discuss the substantive compliance process for the following potentially applicable local reviews: • Shorelines • Critical areas • Floodplains • Stormwater and Drainage • Grading • Noise • Traffic • Building Code
Discharge to Municipal Sewer System	City of Everett	Discharge of water from dewatering activities (e.g., excavation or sediment stockpile dewatering) to a publicly owned treatment works.	If the contractor requires discharge to the municipal sewer system, a permit will be required.
Piles Used for Storage Treatment Permit	Snohomish County Health Department	Outdoor stockpiling of contaminated dredged material for greater than 90 days.	If the contractor requires outdoor storage of contaminated dredged materials for greater than 90 days, a permit will be required.

Table 4
Available "Dry" Working Hours

Date/Time	Hours Tide Is Below Elevations	
	+6 Feet MLLW	+2 Feet MLLW
2026-06/0700-2200	238	118
2026-06/2200-0700	36	0
2026-07/0700-2200	218	109
2026-07/2200-0700	63	7
2026-08/0700-2200	178	75
2026-08/2200-0700	126	22
2026-09/0700-2200	136	40
2026-09/2200-0700	153	58
2026-10/0700-2200	111	13
2026-10/2200-0700	176	90
2026-11/0700-2200	104	29
2026-11/2200-0700	162	78
2026-12/0700-2200	123	42
2026-12/2200-0700	140	63
2027-01/0700-2200	154	58
2027-01/2200-0700	106	46
2027-02/0700-2200	83	26
2027-02/2200-0700	46	15

Note:

MLLW: mean lower low water

Figures



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Figure 1
Site Vicinity Map and Parcel Ownership
Marine Engineering Design Report
Marine Areas of the JELD-WEN Site



LEGEND:

- Marine Site Boundary
- Pile Location Outside Project Boundary
- Pile Location Within Project Boundary
- Pile Location Outside Project Boundary but Identified for Removal Pending Owner Approval
- 1-foot Contour (MLLW)
- 5-foot Contour (MLLW)
- Stormwater Outfall Location

TPCB and Dioxin Furan TEQ Data Point Locations used for SMA Delineation

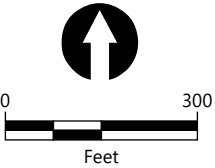
- SMA-1 Monitored Natural Recovery (MNR)
- SMA-2 Enhanced Monitored Natural Recovery (EMNR)
- SMA-3 Capping or Removal

SMAs Derived from TPCB and Dioxin Furan TEQ

- SMA-1 Monitored Natural Recovery (MNR)
- SMA-2 Enhanced Monitored Natural Recovery (EMNR)
- SMA-3 Capping or Removal

NOTES:

- Aerial imagery: Esri (2022)
- SMA-1 = surface sediment areas within the Marine Site Boundary <8 ng/kg dw D/F TEQ (u=1/2) and <117 ug/kg dw total PCBs (u=0)
- SMA-2 = surface sediment areas exceeding the RALs for EMNR, 8 to 15 ng/kg dw D/F TEQ (u=1/2) and 117 to 130 ug/kg dw total PCB (u=0)
- SMA-3 = surface sediment areas exceeding the RALs for capping/removal, 15 ng/kg dw D/F TEQ u=1/2 and 130 ug/kg dw total PCB (u=0)





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Appendix A

Ex Situ Solid-Phase Microextraction Testing Results

Memorandum

October 27, 2025

To: Nathan Soccorsy and Jason Cornetta, Anchor QEA

From: Masa Kanematsu, PhD, Anchor QEA

Re: JELD-WEN Ex Situ Solid-Phase Microextraction Testing Results for Dioxins/Furans and Polychlorinated Biphenyls

This memorandum presents the results of ex situ solid-phase microextraction (SPME) testing conducted to measure the freely dissolved and potentially bioavailable concentrations of dioxins/furans (D/F) and polychlorinated biphenyls (PCBs) in sediment porewater of the marine areas of the JELD-WEN Site (Site) located at 300 West Marine View Drive, Everett, Washington, 98201.

Ex situ SPME tests were performed for the sediment samples at Anchor QEA's Portland, Oregon, Environmental Geochemistry Laboratory (EGL). In this test, polydimethylsiloxane (PDMS)-coated glass fibers (i.e., SPME fibers) spiked with performance reference compounds (PRCs) were deployed for 34 days within surface sediments collected from the Site. PRCs are isotope-labeled dioxins and PCBs and spiked to SPME fibers prior to deployment to estimate the fraction of equilibrium of the target chemicals between sediment porewater and the SPME fibers. During deployment, PRCs diffused out of the SPME fiber while target chemicals diffused into them. After retrieval, target chemicals and PRCs were extracted and quantified in an analytical laboratory. By combining the measured loss of PRCs with equations describing mass transport, the fraction of equilibrium of target chemicals can be estimated. This, in turn, allows for the estimation of freely dissolved concentrations of D/F and PCBs, which are widely considered to be the bioavailable fraction. The test methodology was conducted in accordance with the U.S. Environmental Protection Agency passive sampling manual (USEPA, SERDP, and ESTCP 2017).

Methods

Polydimethylsiloxane (PDMS)-Coated Glass Fiber Preparation

PDMS-coated glass fibers (i.e., SPME fibers) were obtained from Polymicro Technologies Inc. (Phoenix, Arizona; Part No. FSS10001070). The SPME fiber consists of a 1,000-micrometer (μm)-diameter inert glass core coated with 35 μm of PDMS. Prior to use, SPME fibers were sequentially soaked in high-performance liquid chromatography (HPLC)-grade hexane, methanol, and deionized water in a glass tube on a shaker table to remove any potential contaminants that may interfere with subsequent analysis. Clean SPME fibers were then soaked in a methanol/water (80:20) mixture spiked with four ^{13}C -labeled dioxins (i.e., 1,2,7,8-Tetrachlorodibenzo-p-dioxin (TCDD), 1,2,4,7,8-Pentachlorodibenzo-p-dioxin (PeCDD), 1,2,3,4,6,8-Hexachlorodibenzo-p-dioxin (HxCDD), and

1,2,3,4,6,7,9-Heptachlorodibenzo-p-dioxin (HpCDD)) and ^{13}C -labeled PCBs (i.e., PCB-008, PCB-031, PCB-060, PCB-085, PCB-128, and PCB-182) purchased from Wellington Laboratories Inc. (Ontario, Canada) and Cambridge Isotope Inc. (Tewksbury, Massachusetts), respectively, and allowed to equilibrate for 14 days on a shaker table. Subsequently, all SPME fibers were removed from the PRC solution and rinsed with deionized water to remove residual methanol. Then, four of the SPME samples (approximately 45 to 60 centimeters [cm] each) were immediately sent to SGS North America (Wilmington, North Carolina) to measure the initial PRC concentrations for quality assurance/quality control (QA/QC).

Ex Situ Solid-Phase Microextraction Test

A total of 10 surface sediment samples, including one field duplicate, were collected at the Site on July 20 to 24, 2024. Each surface sediment sample was thoroughly homogenized, placed in a 32-ounce glass jar at the Site, and immediately transported on ice in coolers to the EGL. Upon receipt of the sediment samples at the EGL, large rocks and debris, if present, were removed by gloved hands, and the moisture content of the samples was measured. Then, sediment slurries were prepared in 32-ounce glass jars by mixing predetermined amounts of sediment with a 0.01 molar calcium chloride solution to achieve a target moisture content of 70%. A small amount of sodium azide solution was added to each sediment slurry jar to reach a concentration of 50 mg/L in sediment porewater, preventing the biodegradation of the target chemicals (Van der Heijden and Jonker 2009; Fagervold et al. 2010). Then, PRC-spiked SPME fibers (approximately 45 cm in total length) were cut to approximately 15 cm each, enclosed in cleaned stainless-steel mesh sleeves, and deployed into the sediment slurry jars. The sediment jars were placed on a shaker table and agitated at 120 revolutions per minute. The SPME fibers were deployed for 34 days from August 22 to September 25, 2024.

After the deployment period, the SPME fibers were gently retrieved from the sediment slurry jars with gloved hands, rinsed with high performance liquid chromatography (HPLC)-grade water, and wiped with laboratory tissue to remove water and adhering particles. After measuring their masses and lengths, the retrieved SPME samples were immediately shipped on ice to SGS North America for analysis. The SPME samples were analyzed for D/F, PCBs, and PRCs and using U.S. Environmental Protection Agency Method 1613B and 1669C. Laboratory reports are presented as appendices to the report.

Calculation of Freely Dissolved Concentrations of D/F and PCBs in Sediment Porewater

The freely dissolved concentrations of D/F and PCBs in sediment porewater are estimated using the concentrations of D/F and PCBs on the deployed SPME fibers measured at the analytical laboratory, divided by the PDMS-water partitioning coefficient and the fraction of equilibrium achieved within the SPME fiber, as shown in Equation 1 (USEPA, SERDP, and ESTCP 2017).

Equation 1

$$C_d = \frac{C_{PDMS}}{K_{PDMS-W} \times f_e}$$

where:

C_d	=	Concentration in porewater (micrograms per liter [$\mu\text{g/L}$])
C_{PDMS}	=	Concentration in PDMS polymer (micrograms per kilogram [$\mu\text{g/kg}$])
K_{PDMS-W}	=	PDMS-water partitioning coefficient (liters per kilogram [L/kg])
f_e	=	Fraction of equilibrium (unitless)

The PDMS-water partitioning coefficients (K_{PDMS-W}) of D/F were cited from literature (Cornelissen et al., 2008). For PCBs, a regression between measured PDMS-water partitioning coefficient (K_{PDMS-W}) values and published octanol-water partitioning coefficient (K_{OW}) values for selected PCBs were cited from literature (Ghosh et al., 2014). Log K_{OW} values of PCBs were cited from Hawker and Connell (1988) and were adjusted based on the K_{OW} values measured by De Bruijn et al. (1989) with a slow stirring method, which is generally considered a more reliable method to measure K_{OW} values (OECD 2006). The cited regression was adjusted based on the log K_{OW} values (Equation 2) and used to calculate the log $K_{PDMS-water}$ value of each PCB congener.

Equation 2

$$\log K_{PDMS-W} = 0.908 \times \log K_{OW} - 0.136 \quad (r^2 = 0.913)$$

where:

K_{PDMS-W}	=	PDMS-water partitioning coefficient of PCB congener
K_{OW}	=	Octanol-water partitioning coefficient of PCB congener

As the SPME fiber deployment period is typically insufficient to achieve equilibrium between sediment porewater and PDMS, the losses of PRCs are used to estimate the fraction of equilibrium of the target compounds. First, the fraction of equilibrium for each of the PRC was calculated using the ratio of the final concentration of PRC (i.e., following deployment) to the initial concentration, as follows in Equation 3.

Equation 3

$$f_e = 1 - \frac{C_{PRC,final}}{C_{PRC,init}}$$

where:

f_e	=	Fraction of equilibrium
$C_{PRC,final}$	=	Final PRC concentration in SPME fiber (µg/kg)
$C_{PRC,init}$	=	Initial PRC concentration in SPME fiber (µg/kg)

Subsequently, the calculated f_e values of the PRCs were incorporated into the mathematical model to estimate the f_e values of the target chemicals (Tcaciuc et al. 2015; Borrelli et al. 2019). The freely dissolved concentrations of D/F and PCBs in sediment porewater can be estimated from the measured concentration sorbed to PDMS polymer and the PDMS-water partition coefficient and the fraction of equilibrium (f_e) as shown in Equation 1.

Results

Fraction of Equilibrium (f_e)

As noted previously, all deployed SPME fibers were spiked with the four ^{13}C -labeled dioxins and the ^{13}C -labeled PCBs. The f_e values of the dioxin PRCs and PCB PRCs are presented as a function of the $K_{\text{PDMS-water}}$ values in Figure 1 and 2, respectively. All the dioxin PRCs and lower-molecular weight PCB PRCs reached equilibrium for all samples during the deployment period. The f_e values of ^{13}C -PCB-182, which is the largest molecular weight PCB PRC, were close to 0.50.

The f_e values of target D/F and PCBs in the deployed SPME samples were estimated using the f_e of the PRCs and the mathematical model as noted. The model predictions of f_e values of target D/F and PCBs are presented as a function of their $K_{\text{PDMS-W}}$ values for selected SPME samples in Figure 1 and 2, respectively. The estimated f_e values were used to calculate the freely dissolved concentrations of D/F and PCBs in sediment porewater using Equation 1.

Dioxin/Furans in Sediment Porewater

The freely dissolved concentrations of D/F and PCBs are presented in Table 1. Since the masses of almost all D/F and PCBs found in the QA/QC samples were nondetect or very low, they did not warrant adjustments to the analyses or conclusions.

In the ex situ SPME test, the highest DF porewater concentration was observed in the sediment PW-041 (2.97 picograms per liter [pg/L]), which corresponds to 0.078 pg/L toxic equivalent PW-044 had the second highest total DF porewater concentration (1.75 pg/L). PW-1044, a field duplicate of PW-

044, had a similar total DF porewater concentration (0.90 pg/L). All other total DF porewater concentrations were lower than 0.60 pg/L. The total PCB porewater concentration in PW-032 was 0.18 ng/L. Note that the SPME sample deployed in PW-025 was lost at the analytical laboratory.

Quality Control/Quality Assurance Summary

The following quality assurance/quality control (QA/QC) samples were prepared to ensure SPME data quality: a method blank; a field duplicate; and PRC-loaded SPME reproducibility standards. The method blank was collected after thoroughly washing with HPLC grade n-hexane, methanol, and water to check background contamination. More specifically, a total of approximately 45 centimeters of SPME fiber was cut and cleaned with other SPME fibers, wrapped with aluminum foil, and stored in an air-tight bag in a refrigerator at 4°C until other SPME fibers were retrieved from the sediments. No notable contamination was found in the method blank. The field duplicate (PW-1044) was collected for sediment PW-044 at the same location at the same time. As noted, the sediment porewater total DF concentrations in the duplicate sediments were similar each other 1.79 and 1.14 pg/L). The PRC-loaded SPME reproducibility standards were prepared to check the variability in initial PRC concentrations. The initial PRC concentrations in the QA/QC samples had small variability (the coefficient of variation ranged from 3.1% to 7.8%). The PRC concentrations in the SPME samples deployed in the sediments were substantially lower than the initial PRC concentrations in the QA/QC samples, which warrant the calculation of the fraction of equilibrium. No notable background contamination was found in the QA/QC samples as well.

References

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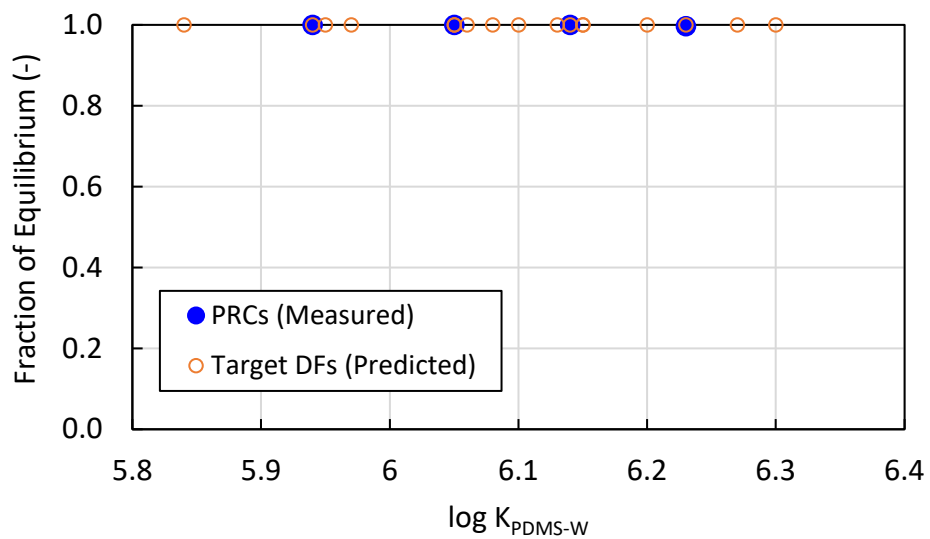
USEPA (U.S. Environmental Protection Agency), 2003. *Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: PAH Mixtures*. EPA Office of Research and Development. EPA-600-R-013. November 2003.

USEPA, SERDP, and ESTCP (U.S. Environmental Protection Agency, Strategic Environmental Research and Development Program, and Environmental Security Technology Certification Program), 2017. *Laboratory, Field, and Analytical Procedures for Using Passive Sampling in the Evaluation of Contaminated Sediments: User's Manual*. EPA/600/R-16/357. Office of Research and Development, Washington, DC.

Figures

Figure 1

Fraction of Equilibrium (f_e) of the dioxin PRCs and Predicted Fraction of Equilibrium (f_e) of Target D/F in the Selected SPME Sample (PW-004).

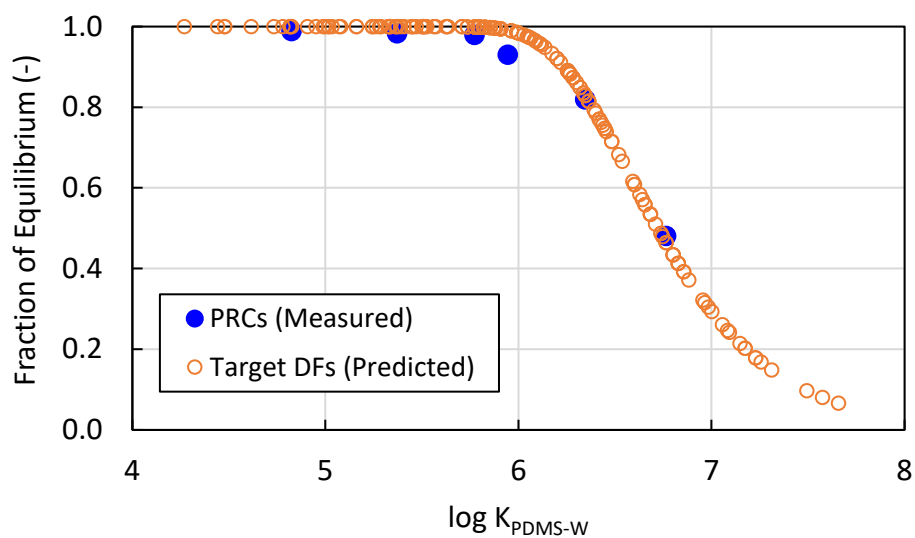


Notes:

1. The results for the other SPME samples are nearly identical.
2. Blue closed symbols and orange open symbols indicate the measured fraction of equilibrium of the dioxin PRCs and the predicted fraction of equilibrium of the target D/F, respectively.

Figure 2

Fraction of Equilibrium (f_e) of the PCB PRCs and Predicted Fraction of Equilibrium (f_e) of Target PCBs in the Selected SPME Sample (PW-032).



Notes:

1. Blue closed symbols and orange open symbols indicate the measured fraction of equilibrium of the PCB PRCs and the predicted fraction of equilibrium of the target PCBs, respectively.

Table

Table 1
Freely Dissolved Concentraitons of Dioxins/Furans and Polychlorinated Biphenyls in Sediment Porewater

Task	JeldWenPreDesignInvestP22024	JeldWenPreDesignInvestP22024	JeldWenPreDesignInvestP22024	JeldWenPreDesignInvestP22024	JeldWenPreDesignInvestP22024
Location ID	JW-PW-004-2024	JW-PW-013-2024	JW-PW-019-2024	JW-PW-029-2024	JW-PW-032-2024
Sample ID	JW-PW-004-2-3-20240722-SPME	JW-PW-013-2-3-20240721-SPME	JW-PW-019-2-3-20240722-SPME	JW-PW-029-2-3-20240722-SPME	JW-PW-032-2-3-20240721-SPME
Sample Date	9/25/2024	9/25/2024	9/25/2024	9/25/2024	9/25/2024
Sample Type	N	N	N	N	N
Matrix	SPME	SPME	SPME	SPME	SPME
Dioxin Furans (SPME) (ng/L)					
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	0.0000430 U	0.0000495 U	0.0000401 U	0.0000323 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	0.0000219 U	0.0000202 U	0.0000214 U	0.0000265 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.0000346 J	0.0000506 J	0.0000555 J	0.0000439 J
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.0000110 U	0.0000127 U	0.0000138 U	0.0000159 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.0000246 J	0.0000227 J	0.0000224 J	0.0000169 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	0.0000869 J	0.0000264 J	0.00000761 U	0.0000109 J
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B	0.000316 J	0.0000445 J	0.0000294 J	0.0000502 J
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B	0.0000194 U	0.0000187 U	0.0000239 U	0.0000298 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.0000230 U	0.0000291 U	0.0000216 U	0.0000213 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.0000231 U	0.0000249 U	0.0000205 U	0.0000190 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.0000148 U	0.00000781 U	0.0000105 U	0.0000247 U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.0000139 U	0.00000696 U	0.0000104 U	0.0000243 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B	0.0000143 U	0.00000768 U	0.0000115 U	0.0000251 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.0000142 U	0.00000705 U	0.0000105 U	0.0000249 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B	0.0000337 J	0.00000713 U	0.00000551 U	0.0000137 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B	0.00000534 U	0.00000674 U	0.00000532 U	0.0000121 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B	0.00000923 U	0.0000103 U	0.0000138 U	0.0000143 U
Total Dioxin/Furan (U = 1/2 max limit)		0.000602 J	0.000249 J	0.000216 J	0.000255 J
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2 max limit)		0.0000479 J	0.0000497 J	0.0000461 J	0.0000453 J
PCB Congeners (SPME) (ng/L)					
PCB-001	E1668C	--	--	--	0.00255 U
PCB-002	E1668C	--	--	--	0.00167 U
PCB-003	E1668C	--	--	--	0.00187 U
PCB-004	E1668C	--	--	--	0.00651 J
PCB-005	E1668C	--	--	--	0.00265 U
PCB-006	E1668C	--	--	--	0.00184 U
PCB-007	E1668C	--	--	--	0.00208 U
PCB-008	E1668C	--	--	--	0.00250 J
PCB-009	E1668C	--	--	--	0.00190 U
PCB-010	E1668C	--	--	--	0.00202 U
PCB-011	E1668C	--	--	--	0.00340 J
PCB-012/013	E1668C	--	--	--	0.00137 U
PCB-014	E1668C	--	--	--	0.00132 U

Table 1
Freely Dissolved Concentraitons of Dioxins/Furans and Polychlorinated Biphenyls in Sediment Porewater

	Task	JeldWenPreDesignInvestP22024	JeldWenPreDesignInvestP22024	JeldWenPreDesignInvestP22024	JeldWenPreDesignInvestP22024
	Location ID	JW-PW-036-2024	JW-PW-041-2024	JW-PW-044-2024	JW-PW-1044-2024
	Sample ID	JW-PW-036-2-3-20240720-SPME	JW-PW-041-2-3-20240720-SPME	JW-PW-044-2-3-20240720-SPME	JW-PW-1044-2-3-20240720-SPME
	Sample Date	9/25/2024	9/25/2024	9/25/2024	9/25/2024
	Sample Type	N	N	N	N
	Matrix	SPME	SPME	SPME	SPME
Dioxin Furans (SPME) (ng/L)					
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	E1613B	0.0000384 U	0.0000391 U	0.0000341 U	0.0000575 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	E1613B	0.0000201 U	0.0000234 U	0.0000503 J	0.0000367 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.0000421 J	0.0000742 J	0.000111 J	0.0000332 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.0000210 J	0.0000896 J	0.0000884 J	0.0000348 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	E1613B	0.00000936 U	0.0000468 J	0.0000823 J	0.0000320 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	E1613B	0.0000875 J	0.000462 J	0.000221 J	0.000173 J
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	E1613B	0.000210 J	0.00188	0.000614 J	0.000426 J
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	E1613B	0.0000258 U	0.0000235 U	0.0000242 U	0.0000331 U
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.0000244 U	0.0000371 J	0.0000252 U	0.0000259 U
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	E1613B	0.0000216 U	0.0000191 U	0.0000535 J	0.0000243 U
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.0000141 U	0.0000358 J	0.0000755 J	0.0000450 U
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.0000138 U	0.0000268 J	0.0000474 J	0.0000421 U
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	E1613B	0.0000334 J	0.0000423 J	0.0000640 J	0.0000467 U
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	E1613B	0.0000142 U	0.0000336 J	0.0000536 J	0.0000407 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	E1613B	0.0000393 J	0.000101 J	0.000118 J	0.0000620 J
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	E1613B	0.00000676 U	0.0000112 J	0.0000383 J	0.0000147 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	E1613B	0.0000115 U	0.0000728 J	0.0000933 J	0.0000167 U
Total Dioxin/Furan (U = 1/2 max limit)		0.000533 J	0.00297 J	0.00175 J	0.000903 J
Total Dioxin/Furan TEQ 2005 (Mammal) (U = 1/2 max limit)		0.0000477 J	0.0000776 J	0.000141 J	0.0000691 J
PCB Congeners (SPME) (ng/L)					
PCB-001	E1668C	--	--	--	--
PCB-002	E1668C	--	--	--	--
PCB-003	E1668C	--	--	--	--
PCB-004	E1668C	--	--	--	--
PCB-005	E1668C	--	--	--	--
PCB-006	E1668C	--	--	--	--
PCB-007	E1668C	--	--	--	--
PCB-008	E1668C	--	--	--	--
PCB-009	E1668C	--	--	--	--
PCB-010	E1668C	--	--	--	--
PCB-011	E1668C	--	--	--	--
PCB-012/013	E1668C	--	--	--	--
PCB-014	E1668C	--	--	--	--

Table 1
Freely Dissolved Concentraitons of Dioxins/Furans and Polychlorinated Biphenyls in Sediment Porewater

	Task Location ID Sample ID Sample Date Sample Type Matrix	JeldWenPreDesignInvestP22024 JW-PW-004-2024 JW-PW-004-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-013-2024 JW-PW-013-2-3-20240721-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-019-2024 JW-PW-019-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-029-2024 JW-PW-029-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-032-2024 JW-PW-032-2-3-20240721-SPME 9/25/2024 N SPME
PCB-015	E1668C	--	--	--	--	0.000777 J
PCB-016	E1668C	--	--	--	--	0.00882 J
PCB-017	E1668C	--	--	--	--	0.00709
PCB-018/030	E1668C	--	--	--	--	0.0145
PCB-019	E1668C	--	--	--	--	0.00353 J
PCB-020/028	E1668C	--	--	--	--	0.00944
PCB-021/033	E1668C	--	--	--	--	0.00560
PCB-022	E1668C	--	--	--	--	0.00308
PCB-023	E1668C	--	--	--	--	0.00123 U
PCB-024	E1668C	--	--	--	--	0.00121 U
PCB-025	E1668C	--	--	--	--	0.000804 U
PCB-026/029	E1668C	--	--	--	--	0.00106 U
PCB-027	E1668C	--	--	--	--	0.00101 U
PCB-031	E1668C	--	--	--	--	0.00971
PCB-032	E1668C	--	--	--	--	0.00379
PCB-034	E1668C	--	--	--	--	0.00102 U
PCB-035	E1668C	--	--	--	--	0.000698 U
PCB-036	E1668C	--	--	--	--	0.000542 U
PCB-037	E1668C	--	--	--	--	0.000651 U
PCB-038	E1668C	--	--	--	--	0.000754 U
PCB-039	E1668C	--	--	--	--	0.000588 U
PCB-040/071	E1668C	--	--	--	--	0.00489
PCB-041	E1668C	--	--	--	--	0.00135 J
PCB-042	E1668C	--	--	--	--	0.00304
PCB-043	E1668C	--	--	--	--	0.000498 J
PCB-044/047/065	E1668C	--	--	--	--	0.0138
PCB-045	E1668C	--	--	--	--	0.00407
PCB-046	E1668C	--	--	--	--	0.00177 J
PCB-048	E1668C	--	--	--	--	0.00313
PCB-049/069	E1668C	--	--	--	--	0.00654
PCB-050/053	E1668C	--	--	--	--	0.00354 J
PCB-051	E1668C	--	--	--	--	0.00220
PCB-052	E1668C	--	--	--	--	0.0111
PCB-054	E1668C	--	--	--	--	0.000140 U

Table 1
Freely Dissolved Concentraitons of Dioxins/Furans and Polychlorinated Biphenyls in Sediment Porewater

	Task Location ID Sample ID Sample Date Sample Type Matrix	JeldWenPreDesignInvestP22024 JW-PW-036-2024 JW-PW-036-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-041-2024 JW-PW-041-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-044-2024 JW-PW-044-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-1044-2024 JW-PW-1044-2-3-20240720-SPME 9/25/2024 N SPME
PCB-015	E1668C	--	--	--	--
PCB-016	E1668C	--	--	--	--
PCB-017	E1668C	--	--	--	--
PCB-018/030	E1668C	--	--	--	--
PCB-019	E1668C	--	--	--	--
PCB-020/028	E1668C	--	--	--	--
PCB-021/033	E1668C	--	--	--	--
PCB-022	E1668C	--	--	--	--
PCB-023	E1668C	--	--	--	--
PCB-024	E1668C	--	--	--	--
PCB-025	E1668C	--	--	--	--
PCB-026/029	E1668C	--	--	--	--
PCB-027	E1668C	--	--	--	--
PCB-031	E1668C	--	--	--	--
PCB-032	E1668C	--	--	--	--
PCB-034	E1668C	--	--	--	--
PCB-035	E1668C	--	--	--	--
PCB-036	E1668C	--	--	--	--
PCB-037	E1668C	--	--	--	--
PCB-038	E1668C	--	--	--	--
PCB-039	E1668C	--	--	--	--
PCB-040/071	E1668C	--	--	--	--
PCB-041	E1668C	--	--	--	--
PCB-042	E1668C	--	--	--	--
PCB-043	E1668C	--	--	--	--
PCB-044/047/065	E1668C	--	--	--	--
PCB-045	E1668C	--	--	--	--
PCB-046	E1668C	--	--	--	--
PCB-048	E1668C	--	--	--	--
PCB-049/069	E1668C	--	--	--	--
PCB-050/053	E1668C	--	--	--	--
PCB-051	E1668C	--	--	--	--
PCB-052	E1668C	--	--	--	--
PCB-054	E1668C	--	--	--	--

Table 1
Freely Dissolved Concentraitons of Dioxins/Furans and Polychlorinated Biphenyls in Sediment Porewater

	Task Location ID Sample ID Sample Date Sample Type Matrix	JeldWenPreDesignInvestP22024 JW-PW-004-2024 JW-PW-004-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-013-2024 JW-PW-013-2-3-20240721-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-019-2024 JW-PW-019-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-029-2024 JW-PW-029-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-032-2024 JW-PW-032-2-3-20240721-SPME 9/25/2024 N SPME
PCB-055	E1668C	--	--	--	--	0.000101 U
PCB-056	E1668C	--	--	--	--	0.00125
PCB-057	E1668C	--	--	--	--	0.0000964 U
PCB-058	E1668C	--	--	--	--	0.0000841 U
PCB-059/062/075	E1668C	--	--	--	--	0.000809 J
PCB-060	E1668C	--	--	--	--	0.000815 J
PCB-061/070/074/076	E1668C	--	--	--	--	0.00578
PCB-063	E1668C	--	--	--	--	0.000178 J
PCB-064	E1668C	--	--	--	--	0.00361
PCB-066	E1668C	--	--	--	--	0.00245 J
PCB-067	E1668C	--	--	--	--	0.0000806 U
PCB-068	E1668C	--	--	--	--	0.0000794 U
PCB-072	E1668C	--	--	--	--	0.0000755 U
PCB-073	E1668C	--	--	--	--	0.0000863 U
PCB-077	E1668C	--	--	--	--	0.0000716 U
PCB-078	E1668C	--	--	--	--	0.0000669 U
PCB-079	E1668C	--	--	--	--	0.0000499 U
PCB-080	E1668C	--	--	--	--	0.0000505 U
PCB-081	E1668C	--	--	--	--	0.0000674 U
PCB-082	E1668C	--	--	--	--	0.000141 J
PCB-083	E1668C	--	--	--	--	0.000202 U
PCB-084	E1668C	--	--	--	--	0.00121
PCB-085/116	E1668C	--	--	--	--	0.000294 J
PCB-086/087/097/109/119/125	E1668C	--	--	--	--	0.00136 J
PCB-088	E1668C	--	--	--	--	0.000200 U
PCB-089	E1668C	--	--	--	--	0.000176 U
PCB-090/101/113	E1668C	--	--	--	--	0.00203
PCB-091	E1668C	--	--	--	--	0.000952
PCB-092	E1668C	--	--	--	--	0.000418 J
PCB-093/100	E1668C	--	--	--	--	0.000168 U
PCB-094	E1668C	--	--	--	--	0.000180 U
PCB-095	E1668C	--	--	--	--	0.00257
PCB-096	E1668C	--	--	--	--	0.000201 U
PCB-098	E1668C	--	--	--	--	0.000148 U

Table 1
Freely Dissolved Concentraitons of Dioxins/Furans and Polychlorinated Biphenyls in Sediment Porewater

	Task Location ID Sample ID Sample Date Sample Type Matrix	JeldWenPreDesignInvestP22024 JW-PW-036-2024 JW-PW-036-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-041-2024 JW-PW-041-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-044-2024 JW-PW-044-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-1044-2024 JW-PW-1044-2-3-20240720-SPME 9/25/2024 N SPME
PCB-055	E1668C	--	--	--	--
PCB-056	E1668C	--	--	--	--
PCB-057	E1668C	--	--	--	--
PCB-058	E1668C	--	--	--	--
PCB-059/062/075	E1668C	--	--	--	--
PCB-060	E1668C	--	--	--	--
PCB-061/070/074/076	E1668C	--	--	--	--
PCB-063	E1668C	--	--	--	--
PCB-064	E1668C	--	--	--	--
PCB-066	E1668C	--	--	--	--
PCB-067	E1668C	--	--	--	--
PCB-068	E1668C	--	--	--	--
PCB-072	E1668C	--	--	--	--
PCB-073	E1668C	--	--	--	--
PCB-077	E1668C	--	--	--	--
PCB-078	E1668C	--	--	--	--
PCB-079	E1668C	--	--	--	--
PCB-080	E1668C	--	--	--	--
PCB-081	E1668C	--	--	--	--
PCB-082	E1668C	--	--	--	--
PCB-083	E1668C	--	--	--	--
PCB-084	E1668C	--	--	--	--
PCB-085/116	E1668C	--	--	--	--
PCB-086/087/097/109/119/125	E1668C	--	--	--	--
PCB-088	E1668C	--	--	--	--
PCB-089	E1668C	--	--	--	--
PCB-090/101/113	E1668C	--	--	--	--
PCB-091	E1668C	--	--	--	--
PCB-092	E1668C	--	--	--	--
PCB-093/100	E1668C	--	--	--	--
PCB-094	E1668C	--	--	--	--
PCB-095	E1668C	--	--	--	--
PCB-096	E1668C	--	--	--	--
PCB-098	E1668C	--	--	--	--

Table 1
Freely Dissolved Concentraitons of Dioxins/Furans and Polychlorinated Biphenyls in Sediment Porewater

	Task Location ID Sample ID Sample Date Sample Type Matrix	JeldWenPreDesignInvestP22024 JW-PW-004-2024 JW-PW-004-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-013-2024 JW-PW-013-2-3-20240721-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-019-2024 JW-PW-019-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-029-2024 JW-PW-029-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-032-2024 JW-PW-032-2-3-20240721-SPME 9/25/2024 N SPME
PCB-099	E1668C	--	--	--	--	0.000799
PCB-102	E1668C	--	--	--	--	0.000126 J
PCB-103	E1668C	--	--	--	--	0.000127 U
PCB-104	E1668C	--	--	--	--	0.000161 U
PCB-105	E1668C	--	--	--	--	0.000133 J
PCB-106	E1668C	--	--	--	--	0.0000442 U
PCB-107	E1668C	--	--	--	--	0.0000626 J
PCB-108/124	E1668C	--	--	--	--	0.0000417 U
PCB-110	E1668C	--	--	--	--	0.00118
PCB-111	E1668C	--	--	--	--	0.0000388 U
PCB-112	E1668C	--	--	--	--	0.0000555 U
PCB-114	E1668C	--	--	--	--	0.0000418 U
PCB-115	E1668C	--	--	--	--	0.0000485 U
PCB-117	E1668C	--	--	--	--	0.0000716 U
PCB-118	E1668C	--	--	--	--	0.000351
PCB-120	E1668C	--	--	--	--	0.0000316 U
PCB-121	E1668C	--	--	--	--	0.0000409 U
PCB-122	E1668C	--	--	--	--	0.0000525 U
PCB-123	E1668C	--	--	--	--	0.0000385 U
PCB-126	E1668C	--	--	--	--	0.0000181 U
PCB-127	E1668C	--	--	--	--	0.0000292 U
PCB-128/166	E1668C	--	--	--	--	0.0000872 J
PCB-129/138/163	E1668C	--	--	--	--	0.00103
PCB-130	E1668C	--	--	--	--	0.000108 J
PCB-131	E1668C	--	--	--	--	0.0000338 U
PCB-132	E1668C	--	--	--	--	0.000469
PCB-133	E1668C	--	--	--	--	0.0000205 U
PCB-134	E1668C	--	--	--	--	0.0000426 U
PCB-135/151	E1668C	--	--	--	--	0.000561
PCB-136	E1668C	--	--	--	--	0.000423 J
PCB-137	E1668C	--	--	--	--	0.0000252 U
PCB-139/140	E1668C	--	--	--	--	0.0000254 U
PCB-141	E1668C	--	--	--	--	0.000160 J
PCB-142	E1668C	--	--	--	--	0.0000374 U

Table 1
Freely Dissolved Concentraitons of Dioxins/Furans and Polychlorinated Biphenyls in Sediment Porewater

	Task Location ID Sample ID Sample Date Sample Type Matrix	JeldWenPreDesignInvestP22024 JW-PW-036-2024 JW-PW-036-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-041-2024 JW-PW-041-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-044-2024 JW-PW-044-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-1044-2024 JW-PW-1044-2-3-20240720-SPME 9/25/2024 N SPME
PCB-099	E1668C	--	--	--	--
PCB-102	E1668C	--	--	--	--
PCB-103	E1668C	--	--	--	--
PCB-104	E1668C	--	--	--	--
PCB-105	E1668C	--	--	--	--
PCB-106	E1668C	--	--	--	--
PCB-107	E1668C	--	--	--	--
PCB-108/124	E1668C	--	--	--	--
PCB-110	E1668C	--	--	--	--
PCB-111	E1668C	--	--	--	--
PCB-112	E1668C	--	--	--	--
PCB-114	E1668C	--	--	--	--
PCB-115	E1668C	--	--	--	--
PCB-117	E1668C	--	--	--	--
PCB-118	E1668C	--	--	--	--
PCB-120	E1668C	--	--	--	--
PCB-121	E1668C	--	--	--	--
PCB-122	E1668C	--	--	--	--
PCB-123	E1668C	--	--	--	--
PCB-126	E1668C	--	--	--	--
PCB-127	E1668C	--	--	--	--
PCB-128/166	E1668C	--	--	--	--
PCB-129/138/163	E1668C	--	--	--	--
PCB-130	E1668C	--	--	--	--
PCB-131	E1668C	--	--	--	--
PCB-132	E1668C	--	--	--	--
PCB-133	E1668C	--	--	--	--
PCB-134	E1668C	--	--	--	--
PCB-135/151	E1668C	--	--	--	--
PCB-136	E1668C	--	--	--	--
PCB-137	E1668C	--	--	--	--
PCB-139/140	E1668C	--	--	--	--
PCB-141	E1668C	--	--	--	--
PCB-142	E1668C	--	--	--	--

Table 1
Freely Dissolved Concentraitons of Dioxins/Furans and Polychlorinated Biphenyls in Sediment Porewater

	Task Location ID Sample ID Sample Date Sample Type Matrix	JeldWenPreDesignInvestP22024 JW-PW-004-2024 JW-PW-004-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-013-2024 JW-PW-013-2-3-20240721-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-019-2024 JW-PW-019-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-029-2024 JW-PW-029-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-032-2024 JW-PW-032-2-3-20240721-SPME 9/25/2024 N SPME
PCB-143	E1668C	--	--	--	--	0.0000291 U
PCB-144	E1668C	--	--	--	--	0.0000272 U
PCB-145	E1668C	--	--	--	--	0.0000425 U
PCB-146	E1668C	--	--	--	--	0.000191
PCB-147/149	E1668C	--	--	--	--	0.00145
PCB-148	E1668C	--	--	--	--	0.0000239 U
PCB-150	E1668C	--	--	--	--	0.0000400 U
PCB-152	E1668C	--	--	--	--	0.0000413 U
PCB-153/168	E1668C	--	--	--	--	0.000940
PCB-154	E1668C	--	--	--	--	0.0000353 J
PCB-155	E1668C	--	--	--	--	0.0000262 U
PCB-156/157	E1668C	--	--	--	--	0.0000269 J
PCB-158	E1668C	--	--	--	--	0.0000816 J
PCB-159	E1668C	--	--	--	--	0.0000225 U
PCB-160	E1668C	--	--	--	--	0.0000174 U
PCB-161	E1668C	--	--	--	--	0.0000129 U
PCB-162	E1668C	--	--	--	--	0.0000257 U
PCB-164	E1668C	--	--	--	--	0.0000132 U
PCB-165	E1668C	--	--	--	--	0.0000158 U
PCB-167	E1668C	--	--	--	--	0.0000253 U
PCB-169	E1668C	--	--	--	--	0.0000287 U
PCB-170	E1668C	--	--	--	--	0.0000929 J
PCB-171/173	E1668C	--	--	--	--	0.0000585 J
PCB-172	E1668C	--	--	--	--	0.0000417 U
PCB-174	E1668C	--	--	--	--	0.000130 J
PCB-175	E1668C	--	--	--	--	0.0000446 U
PCB-176	E1668C	--	--	--	--	0.0000121 U
PCB-177	E1668C	--	--	--	--	0.000108 J
PCB-178	E1668C	--	--	--	--	0.0000583 J
PCB-179	E1668C	--	--	--	--	0.000132 J
PCB-180/193	E1668C	--	--	--	--	0.000219 J
PCB-181	E1668C	--	--	--	--	0.0000403 U
PCB-182	E1668C	--	--	--	--	0.0000348 U
PCB-183	E1668C	--	--	--	--	0.000107 J

Table 1
Freely Dissolved Concentraitons of Dioxins/Furans and Polychlorinated Biphenyls in Sediment Porewater

	Task Location ID Sample ID Sample Date Sample Type Matrix	JeldWenPreDesignInvestP22024 JW-PW-036-2024 JW-PW-036-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-041-2024 JW-PW-041-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-044-2024 JW-PW-044-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-1044-2024 JW-PW-1044-2-3-20240720-SPME 9/25/2024 N SPME
PCB-143	E1668C	--	--	--	--
PCB-144	E1668C	--	--	--	--
PCB-145	E1668C	--	--	--	--
PCB-146	E1668C	--	--	--	--
PCB-147/149	E1668C	--	--	--	--
PCB-148	E1668C	--	--	--	--
PCB-150	E1668C	--	--	--	--
PCB-152	E1668C	--	--	--	--
PCB-153/168	E1668C	--	--	--	--
PCB-154	E1668C	--	--	--	--
PCB-155	E1668C	--	--	--	--
PCB-156/157	E1668C	--	--	--	--
PCB-158	E1668C	--	--	--	--
PCB-159	E1668C	--	--	--	--
PCB-160	E1668C	--	--	--	--
PCB-161	E1668C	--	--	--	--
PCB-162	E1668C	--	--	--	--
PCB-164	E1668C	--	--	--	--
PCB-165	E1668C	--	--	--	--
PCB-167	E1668C	--	--	--	--
PCB-169	E1668C	--	--	--	--
PCB-170	E1668C	--	--	--	--
PCB-171/173	E1668C	--	--	--	--
PCB-172	E1668C	--	--	--	--
PCB-174	E1668C	--	--	--	--
PCB-175	E1668C	--	--	--	--
PCB-176	E1668C	--	--	--	--
PCB-177	E1668C	--	--	--	--
PCB-178	E1668C	--	--	--	--
PCB-179	E1668C	--	--	--	--
PCB-180/193	E1668C	--	--	--	--
PCB-181	E1668C	--	--	--	--
PCB-182	E1668C	--	--	--	--
PCB-183	E1668C	--	--	--	--

Table 1
Freely Dissolved Concentraitons of Dioxins/Furans and Polychlorinated Biphenyls in Sediment Porewater

	Task Location ID Sample ID Sample Date Sample Type Matrix	JeldWenPreDesignInvestP22024 JW-PW-004-2024 JW-PW-004-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-013-2024 JW-PW-013-2-3-20240721-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-019-2024 JW-PW-019-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-029-2024 JW-PW-029-2-3-20240722-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-032-2024 JW-PW-032-2-3-20240721-SPME 9/25/2024 N SPME
PCB-184	E1668C	--	--	--	--	0.00001000 U
PCB-185	E1668C	--	--	--	--	0.0000452 U
PCB-186	E1668C	--	--	--	--	0.0000111 U
PCB-187	E1668C	--	--	--	--	0.000188
PCB-188	E1668C	--	--	--	--	0.00000944 U
PCB-189	E1668C	--	--	--	--	0.0000222 U
PCB-190	E1668C	--	--	--	--	0.0000338 U
PCB-191	E1668C	--	--	--	--	0.0000322 U
PCB-192	E1668C	--	--	--	--	0.0000283 U
PCB-194	E1668C	--	--	--	--	0.0000132 U
PCB-195	E1668C	--	--	--	--	0.0000139 J
PCB-196	E1668C	--	--	--	--	0.0000166 J
PCB-197	E1668C	--	--	--	--	0.00000431 U
PCB-198/199	E1668C	--	--	--	--	0.0000248 J
PCB-200	E1668C	--	--	--	--	0.00000431 U
PCB-201	E1668C	--	--	--	--	0.00000421 U
PCB-202	E1668C	--	--	--	--	0.00000374 U
PCB-203	E1668C	--	--	--	--	0.00000413 U
PCB-204	E1668C	--	--	--	--	0.00000383 U
PCB-205	E1668C	--	--	--	--	0.0000124 U
PCB-206	E1668C	--	--	--	--	0.0000307 U
PCB-207	E1668C	--	--	--	--	0.0000159 U
PCB-208	E1668C	--	--	--	--	0.0000146 U
PCB-209	E1668C	--	--	--	--	0.0000133 U
Total PCB Congeners (U = 1/2 max limit)		--	--	--	--	0.184 J

Table 1
Freely Dissolved Concentraitons of Dioxins/Furans and Polychlorinated Biphenyls in Sediment Porewater

	Task Location ID Sample ID Sample Date Sample Type Matrix	JeldWenPreDesignInvestP22024 JW-PW-036-2024 JW-PW-036-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-041-2024 JW-PW-041-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-044-2024 JW-PW-044-2-3-20240720-SPME 9/25/2024 N SPME	JeldWenPreDesignInvestP22024 JW-PW-1044-2024 JW-PW-1044-2-3-20240720-SPME 9/25/2024 N SPME
PCB-184	E1668C	--	--	--	--
PCB-185	E1668C	--	--	--	--
PCB-186	E1668C	--	--	--	--
PCB-187	E1668C	--	--	--	--
PCB-188	E1668C	--	--	--	--
PCB-189	E1668C	--	--	--	--
PCB-190	E1668C	--	--	--	--
PCB-191	E1668C	--	--	--	--
PCB-192	E1668C	--	--	--	--
PCB-194	E1668C	--	--	--	--
PCB-195	E1668C	--	--	--	--
PCB-196	E1668C	--	--	--	--
PCB-197	E1668C	--	--	--	--
PCB-198/199	E1668C	--	--	--	--
PCB-200	E1668C	--	--	--	--
PCB-201	E1668C	--	--	--	--
PCB-202	E1668C	--	--	--	--
PCB-203	E1668C	--	--	--	--
PCB-204	E1668C	--	--	--	--
PCB-205	E1668C	--	--	--	--
PCB-206	E1668C	--	--	--	--
PCB-207	E1668C	--	--	--	--
PCB-208	E1668C	--	--	--	--
PCB-209	E1668C	--	--	--	--
Total PCB Congeners (U = 1/2 max limit)		--	--	--	--

Table 1
Freely Dissolved Concentraitons of Dioxins/Furans and Polychlorinated Biphenyls in Sediment Porewater

Notes:
Bold: Detected result
Calculated values have been rounded to laboratory-reported significant digits
J: Estimated value
ng/L: nanogram per liter
PCB: polychlorinated biphenyls
SPME: solid-phase microextraction
U: Compound analyzed for, but not detected above detection limit

Appendix B

Geotechnical Engineering Assessment



March 2026
JELD-WEN Site



Geotechnical Engineering Evaluation: Marine Area Sediment Cleanup Design

Prepared for
JELD-WEN, Inc.
300 West Marine View Drive
Everett, Washington 98201

Prepared by
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TABLE OF CONTENTS

1	Introduction and Purpose.....	1
2	Geotechnical Data Review and Collection.....	2
3	Soil and Sediment Geotechnical Characteristics.....	3
3.1	Soil and Sediment Descriptions.....	3
3.2	Laboratory Geotechnical Testing	4
4	Geotechnical Engineering Evaluations	6
4.1	Excavations, Demolitions, and Removal.....	6
4.2	Slope Stability Evaluations.....	6
4.3	Slope Protection and Shoring Evaluations	7
5	Conclusions	9
6	Limitations of This Report	10
7	References	11

TABLES

Table B-1	Soil Index and Engineering Parameters for Geotechnical Analysis.....	5
Table B-2	Summary of Slope Stability Evaluations.....	7

FIGURES

Figure B-1	Surface and Subsurface Sediment Chemistry and Geotechnical Sample Locations (Logway)
Figure B-2	Surface and Subsurface Sediment Chemistry and Geotechnical Sample Locations (Knoll Area)
Figure B-3	Surface and Subsurface Sediment Chemistry and Geotechnical Sample Locations (South Shoreline)

ATTACHMENTS

Attachment B-1	Boring Logs
Attachment B-2	Laboratory Results
Attachment B-3	Slope Stability Modeling Results

ABBREVIATIONS

ASTM	ASTM International
bgs	below ground surface
CL	lean clay
D ₅₀	mean particle size distribution value
EDR	Engineering Design Report
FoS	factor of safety
H:V	horizontal to vertical (ratio)
N/A	not available
NP	non-plastic
pcf	pound per cubic foot
PI	plasticity index
RD	remedial design
SPT	standard penetration test
USCS	Unified Soil Classification System

1 Introduction and Purpose

This *Geotechnical Engineering Evaluation: Marine Area Sediment Cleanup Design* has been prepared to summarize the results of geotechnical sampling and laboratory testing and provide geotechnical engineering recommendations for the JELD-WEN Marine Area remedial engineering design as an element of the *Engineering Design Report* (EDR). The JELD-WEN site consists of a series of industrial developed and undeveloped parcels at the confluence of the Snohomish River and Port Gardner Bay and includes upland areas, riverfronts at the west end with large tidal flats, and inlets to the north and south. The upland is a generally rectangular peninsula constructed of fill materials and includes a higher elevation “knoll” area to the southeast along historic shoreline. To support remedial design (RD), the site has been further divided into three distinct areas: the Logway, along the north shore of the peninsula (now a tidal inlet and stormwater outlet); the South Shoreline; and the Knoll Area, southeast of the peninsula.

Anchor QEA mobilized to the JELD-WEN site in September 2024 to conduct in-water sediment sampling for geotechnical laboratory testing and chemistry analysis and to perform shoreline subsurface explorations with in situ standard penetration test (SPT) split spoon sample collection. These data were collected to provide a more comprehensive geotechnical engineering dataset to inform marine area RD, including the following:

- Preparing geotechnical engineering design recommendations for excavation and capping
- Assessing impacts of RD implementation to shoreline slopes resulting from removal of contaminated sediments, shoreline debris, piling, and bulkheads
- Assessing geotechnical performance of RD following implementation, with regard to slope stability

Construction activities associated with the proposed RD include debris, piling, and bulkhead removal; sediment removal; clean material placement for backfill; capping; and enhanced natural recovery.

This report includes the following:

- Review of existing geotechnical information, including subsurface conditions
- Review of sediment geotechnical sampling test results and subsurface conditions in situ test results
- Geotechnical engineering evaluations and conclusions, including evaluation of slope stability of excavations and piling, and bulkhead demolition areas

2 Geotechnical Data Review and Collection

Geotechnical samples were collected as described in the *Pre-Remedial Design Investigation Sampling and Analysis Plan* (Anchor QEA 2024) and summarized in the *Pre-Remedial Design Investigation Data Report* (Anchor QEA 2025). This investigation was completed to support RD for project elements described in the EDR. This section presents an overview of the geotechnical sampling completed in 2024 and a review of site subsurface conditions and laboratory geotechnical results obtained during the exploration and sampling effort.

The sampling in August 2024 included geotechnical borings conducted near the top of slopes and sediment cores collected in intertidal mudflats. Eight hollow-stem auger borings advanced to 42 feet below ground surface (bgs) were completed near the top of slopes around the perimeter of the upland area. During these borings, SPTs and sampling were completed every 2.5 feet bgs over the upper 10 feet and every 5 feet below the upper 10 feet. Geotechnical boring logs are included in Attachment B-1, and exploration locations are depicted in Figures B-1 to B-3. The work also included collection of geotechnical data from subsamples collected during the sediment chemistry sampling effort. Sediment stratigraphy and descriptions were completed on 44 sediment cores, which were collected to provide sediment chemistry information and limited geotechnical characterization, up to 8 feet deep.

Samples obtained from the upland borings were submitted for the following geotechnical laboratory testing, with results included in Attachment B-2:

- Water content (ASTM International [ASTM] D2216)
- Atterberg limits (ASTM D4318)
- Grain size (ASTM D422)
- Specific gravity (ASTM D854)

Geotechnical borings encountered different layering of sandy and silty soils, with components of woody debris. Groundwater levels are not indicated on logs; however, subsurface materials were observed to be wet at approximately 10 feet bgs, and several boreholes were terminated early due to sand heave on the auger stem. Reported depth to groundwater on the uplands is typically 3 to 4 feet bgs, with more observed connectivity between the groundwater and tide elevations on the perimeter of the site and a muted or negligible effect of tide elevations on groundwater on the interior of the uplands. Descriptions of subsurface materials are provided in Section 3.

3 Soil and Sediment Geotechnical Characteristics

This section provides a summary of geotechnical observations and test results for site soil and sediments.

3.1 Soil and Sediment Descriptions

Samples collected from geotechnical borings were obtained using a 2-inch-diameter split spoon sampler, visually classified in the field, containerized, and transported to a geotechnical testing laboratory for further characterization. Geotechnical boring logs and SPT results are included in Attachment B-1. In addition, sediment chemistry cores were visually logged in the field to supplement the geotechnical observations. Geologic units encountered in the investigation varied in layer thicknesses and order depending on exploration location (upland versus tidal flats). Several types of soil and sediment materials were observed and sampled. Generally, these materials are listed in the order in which they appear from the surface downwards; however, because much of the upland peninsula is composed of fill materials, the presence of these materials varies somewhat in each exploration location. Key geologic soil types observed at the site are detailed as follows:

- **Gray, Tan, and Brown Sand (Unified Soil Classification System [USCS] SP):** Poorly graded; fine to medium grained sand; loose to medium dense; low to moderate moisture content; and occasional trace silt or gravel. Wood detected throughout. Generally observed in the near surface, at depths in upland borings, and occasionally at below 3 feet bgs in tidal flat samples at the south tidal flat.
- **Gray to Dark Gray Sandy Silt (USCS ML-OL):** Low plasticity; fine sand; soft to medium stiff; moderate to high moisture content; and occasional trace fine gravel. Wood detected throughout, especially in shallow layers. Commonly observed in the upper 3 feet of tidal flat sediments and typically comprises the entire depth of sediment observed in cores.
- **Gray to Dark Gray Silty Sand (USCS SM):** Well-graded; non-plastic; loose to medium dense; low to moderate moisture content; and occasional clay lenses and shell fragments. Observed in uppermost upland soils adjacent to the South Shoreline and at depths along the Logway upland borings to the west of the peninsula.
- **Dark Gray Silty, Clayey Sand (USCS SC-SP):** Poorly graded; fine to medium grained sand; non-plastic to low plasticity; very loose; and moderate moisture content. Wood and shell fragments detected throughout. Commonly encountered at depths in upland borings but occasionally in surficial upland soils (Borehole GT-006) and below ML-OL soils in the vicinity of the South Shoreline and Knoll areas.

3.2 Laboratory Geotechnical Testing

Laboratory geotechnical tests were conducted on selected representative materials sampled during the exploration program. Descriptions of laboratory tests and their results are presented as follows:

- **Grain Size:** The primary stratigraphic unit encountered included sand-based fill. Grain size distribution was tested in 17 samples within sand-based fill units. Fines content and gravel content varied with occasional degrading wood or asphalt encountered. Gravel content ranged from 0% to 23% in tested samples, with an arithmetic mean of 6%. Sand content ranged from 42% to 92%, with an arithmetic mean of 74%. Fines content ranged from 7% to 42%, with an arithmetic mean of 17%.
- **Moisture Content:** Moisture content was tested in 74 samples. Values ranged from 0.5% to 69.8%, with an arithmetic average of 20.5% in tested samples. Finer-grained samples trended toward higher moisture content, while near-surface samples typically had lower moisture contents.
- **Atterberg Limits:** Atterberg limits were tested in six primarily fine-grained samples (as visually observed during logging by the field representative). Four of the tested samples were determined to be non-plastic. Of the plastic samples, the sample collected from GT03 at a depth of 3.4 to 4 feet had a liquid limit of 28.3% and a plastic limit of 18.6% (USCS lean clay [CL]). The sample collected from GT07 at a depth of 5.2 to 6 feet had a liquid limit of 49.1% and a plastic limit of 36.0% (USCS CL).
- **Specific Gravity:** Specific gravity was tested for 13 samples. Eleven samples were within the sand-based fill units, with two samples within a fines-based unit. The sand-dominated unit values ranged from 2.68 to 2.78, with an arithmetic mean of 2.73. The fines-dominated unit values were 2.74 and 2.75, respectively.

Table B-1 presents the geotechnical engineering parameters for these materials that were selected for slope stability modeling, as discussed in Section 4.1. Material shear strength and consolidation parameters were derived using correlations presented in the *Naval Facilities Engineering Command Design Manual 7.1 Soil Mechanics* (NAVFAC 2022). Modifications to Naval Facilities Engineering Systems Command parameters were made in some cases where wood debris was present within subsurface materials, according to guidance provided by Demars et al. (2000).

Table B-1
Soil Index and Engineering Parameters for Geotechnical Analysis

Soil Layer (USCS)	Total Unit Weight (pcf)	Internal Friction Angle, ϕ' (degrees)¹	Average Moisture Content (%)	Percent Fines (%)	Plasticity Index (PI)
Poorly graded sand with wood debris (SP)	100	30	18.5	8.8	NP
Sandy silt with wood debris (ML-OL)	102.5	27	27.7	N/A	13.1
Silty sand (SM)	105	34	16.4	19.7	NP
Silty, clayey sand (SC-SM)	110	26	22.8	36.9	9.7
Armor stone ¹	130	40	N/A	N/A	N/A

Note:

1. Armor stone was not sampled during site exploration. Values provided in Table B-1 are prescriptive and were used in slope stability modeling.

4 Geotechnical Engineering Evaluations

This section provides geotechnical design evaluations for excavation, demolition and removal, slope design, slope protection, and temporary shoring and settlement. The geotechnical evaluations focus on the scope of the marine remedial work, including assessment of short- and long-term slope stability, considering the effects from live loads during construction.

4.1 Excavations, Demolitions, and Removal

Excavation will be performed for sediment removal adjacent to and within the toe-of-slope areas. In addition, vibratory or mechanical extraction of piles and bulkheads will be conducted in the Logway, and wood, concrete, and asphalt debris will be removed from slopes.

Temporary shoring has been assumed to be installed between the buried utility trench and the top of slope to protect the bank area. Temporary shoring is discussed in Section 4.3.

Excavations are proposed to be completed at low tide to protect water quality. Removal cuts will be completed in small sections determined by the contractor so material removal and initial placement of cap or backfill materials can be completed during the same low-tide interval in which excavation occurs. A debris boom will be used to collect wood debris generated from piling and bulkhead extraction.

4.2 Slope Stability Evaluations

To evaluate shoreline stability, five cross sections throughout the site were selected to represent the range of shoreline geometries where excavations will be performed, with a focus on the most critical (e.g., steepest) configuration in each location. Slope stability at all cross sections were modeled using Slide2, version 9.038 (Rocscience 2025), a 2D limit equilibrium slope stability analysis software used to evaluate soil and rock slopes. Slide2 was used to calculate the existing factor of safety (FoS), short- (post-removal) and long-term (post-backfill/cap) FoS for remedial actions. The FoS is defined as the ratio of the capacity to the demand or, in the case of slope stability evaluations, the ratio of the resisting forces, governed by the strength of the soils to the driving forces, governed by loading from surcharges, water pressure, and soil weight. A FoS of less than 1.0 means that the driving force/demand is greater than the available resisting capacity, which implies an unstable slope condition. The modeled short- and long-term FoS values show an improvement over current conditions; however, they still do not meet minimum requirements for maintaining stable slopes. For this reason, shoring will be required at the top of slope to prevent potentially unstable slopes from affecting upland areas and reduce driving forces on slopes. Shoring is discussed in Section 4.3.

Table B-2 summarizes the results of the slope stability evaluation for critical slopes in the Logway only (A-A' and B-B'). Cross sections for section cuts C, D, and E were not evaluated because slope

stability performance is not critical in these areas. Slope stability modeling results are included in Attachment B-3.

Table B-2
Summary of Slope Stability Evaluations

Section	Case	Factor of Safety (Target)		
		Existing (N/A) ¹	Short Term (1.3) ²	Long Term (1.5) ²
A-A'	Pre-construction	1.0	--	--
	Excavation slopes (2H:1V)	--	0.8	--
	Post-excavation backfill (2H:1V)	--	--	1.1
B-B'	Pre-construction	0.5	--	--
	Excavation slopes (2H:1V)	--	0.3	--
	Post-excavation backfill (2H:1V)	--	--	1.0

Notes:

1. There is no target FoS for the existing slope. Existing conditions evaluation was performed for comparative purposes.
2. The short-term evaluation considers stability during construction. The long-term evaluation considers stability after capping or backfilling. Target FoS are based on USACE (2003).

--: not evaluated

4.3 Slope Protection and Shoring Evaluations

The RD includes removal of debris along shoreline slopes; some of this debris provides protection from erosion. In addition, excavation along slopes has the potential to destabilize the shoreline, which could damage utilities and upland property. This section describes evaluations regarding temporary shoring for the Logway and general slope protection recommendations for all shorelines around the site. Generally, if existing debris on slopes is acting as armoring and will be removed as part of site work, armor should be replaced on slopes following debris removal.

Along the South Shoreline and Logway, slope armor, as discussed in the Coastal Engineering Appendix (Appendix C), will be used to protect slopes from erosion in areas of excavation and debris removal. In the vicinity of the Knoll Area, armor will not be used. The steep sand bluffs in the Knoll Area will continue to erode naturally to support habitat functions, as discussed with the Washington State Department of Ecology.

Where planned work adjacent to the South Shoreline maintains 3H:1V (horizontal to vertical [ratio]) slopes following excavation, demolition, debris removal, backfill, and armor placement, FoS targets will be met.

For slopes along the Logway, implementation of slope armor will be required adjacent to the sediment removal and cap areas to maintain the design 2H:1V slopes above these remedial areas and protect the sediment remedies.

In the vicinity of timber piling bulkhead removal, removal excavation protective measures such as temporary shoring will be required near the top of the slopes to prevent sloughing of upland materials that may undermine or damage the utilities present at the top of the slope. Shoring will be contractor-designed and may consist of soldier piles, sheet piles, or similar means and methods to protect the in-place buried utilities and roadway during work. Shoring may be left in place following work or be removed provided that removal of shoring will not cause damage or reduce FoS below the targets defined in Section 4.2. Work will be staged appropriately so removal work will not adversely affect the existing upland conditions.

5 Conclusions

The recommendations and evaluations presented in this report are for the design of remedial alternatives implemented at the JELD-WEN site. Temporary dredge-cut slopes shall not exceed 2H:1V, and final shoreline slopes may be either 2H:1V or 3H:1V. Recommended thicknesses for the capping and armoring layers along the Logway and South Shoreline are based upon selected D_{50} material gradation values for each layer, provided in Appendix C. Armor may be nominally thickened where required to match existing slope surface and final shoreline slope.

6 Limitations of This Report

This report was prepared to meet the specific needs of the marine sediment cleanup design. No party should apply this report for any purpose other than that originally contemplated without first conferring with Anchor QEA.

This report is based on an investigation plan designed to consider a unique set of project-specific factors. Unless otherwise indicated, this report should not be used in the following instances: 1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); 2) when the size, elevation, or configuration of the proposed project is altered; 3) when the location or orientation of the proposed project is modified; 4) when there is a change of ownership; or 5) for application to an adjacent site. Anchor QEA cannot accept responsibility for problems that may occur if we are not consulted after factors considered in the development of the report have changed.

Subsurface conditions may be affected as a result of natural processes or human activity. Because this report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of this report. Anchor QEA should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

Site exploration and testing identify actual surface and subsurface conditions only at those points where samples are collected. The data were extrapolated by Anchor QEA, and we applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than this report indicates. Actual conditions in areas not sampled may differ from those predicted in this report. Although nothing can be done to prevent such situations, we can work together to help reduce their impacts. Retaining Anchor QEA to observe subsurface construction operations can be particularly beneficial in this respect.

The conclusions contained in this report are preliminary because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout the site. Actual subsurface conditions can be discerned only during earthwork; therefore, we recommend Anchor QEA be retained to observe actual conditions and to provide conclusions. Anchor QEA cannot assume responsibility or liability for the adequacy of this report's recommendations if another party is retained to observe construction.

7 References

- Anchor QEA, 2024. *Pre-Remedial Design Investigation Sampling and Analysis Plan*. JELD WEN, Everett, Washington.
- Anchor QEA, 2025. *Pre-Remedial Design Investigation Data Report*. April 2025.
- Demars, K.R., R.P. Long, and J.R. Ives, 2000. *Use of Wood Waste Materials for Erosion Control*. The New England Transportation Consortium. April 2000.
- NAVFAC (Naval Facilities Engineering Systems Command), 2022. *Naval Facilities Engineering Command Design Manual 7.1 Soil Mechanics*.
- Rocscience, 2025. Slide2 software, version 9.038. Available at:
<https://www.rocscience.com/software/slide2>.
- USACE (U.S. Army Corps of Engineers), 2003. *Slope Stability*. Engineering Manual EM 1110-2-1902. October 2003.

Figures



LEGEND:

- | | |
|----------------------|---|
| Marine Site Boundary | Proposed Sampling Locations |
| Parcel | 8-Foot Short Core (D/F) |
| Water Line | Surface Grab Sample for PCBs and D/F |
| | (0–0.5 Feet) Aliquot for Composites SG-136 through SG-141 and SG-133 through SG-135 |
| | Shoreline Geotechnical Boring |

- NOTES:**
1. Aerial imagery: Esri (2022)
 2. Basemap: Esri Light Gray Canvas
 3. D/F: dioxin/furan
 4. PCB: polychlorinated biphenyl





LEGEND:

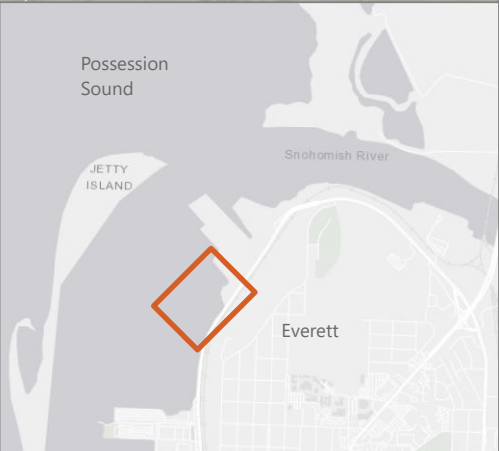
- Marine Site Boundary
- Parcel

Proposed Sampling Locations

- 3-Foot Short Core (D/F)
- 3-Foot Short Core (PCBs)
- Archived Power Grab or Short Core (D/F and PCBs)
- Power Grab or Short Core (D/F)
- Shoreline Geotechnical Boring
- Proposed 3-Foot Core or Power Grab for cPAH Analysis

NOTES:

- Aerial imagery: Esri (2022)
- Basemap: Esri Light Gray Canvas
- D/F: dioxin/furan
- PCB: polychlorinated biphenyl
- cPAH: carcinogenic polycyclic aromatic hydrocarbon





Publish Date: 2025/05/22, 2:36 PM | User: cgardner
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Figure B-3
Surface and Subsurface Sediment Chemistry and Geotechnical Sample Locations (South Shoreline)
Geotechnical Engineering Evaluation: Marine Area Sediment Cleanup Design
JELD-WEN Site

Attachment B-1

Boring Logs

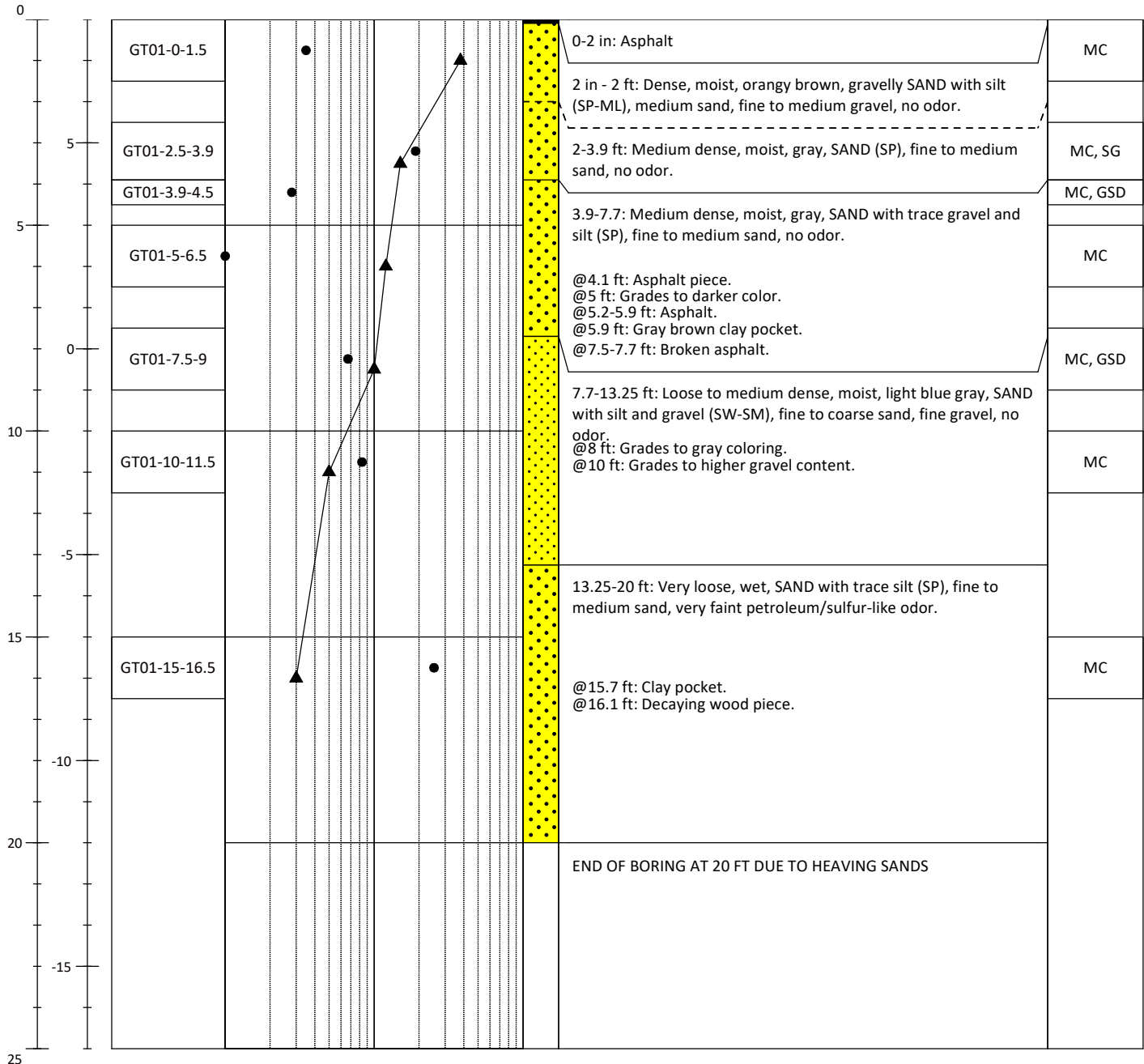
Soil Boring Log

GT01

Sheet 1 of 1

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'51.16"W	Total Depth (ft): 20
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 0'57.13"N	Ground Surface Elevation (ft): 8
Collection Date: 8/21/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)	Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
			1 2 5 10 20 50 100			



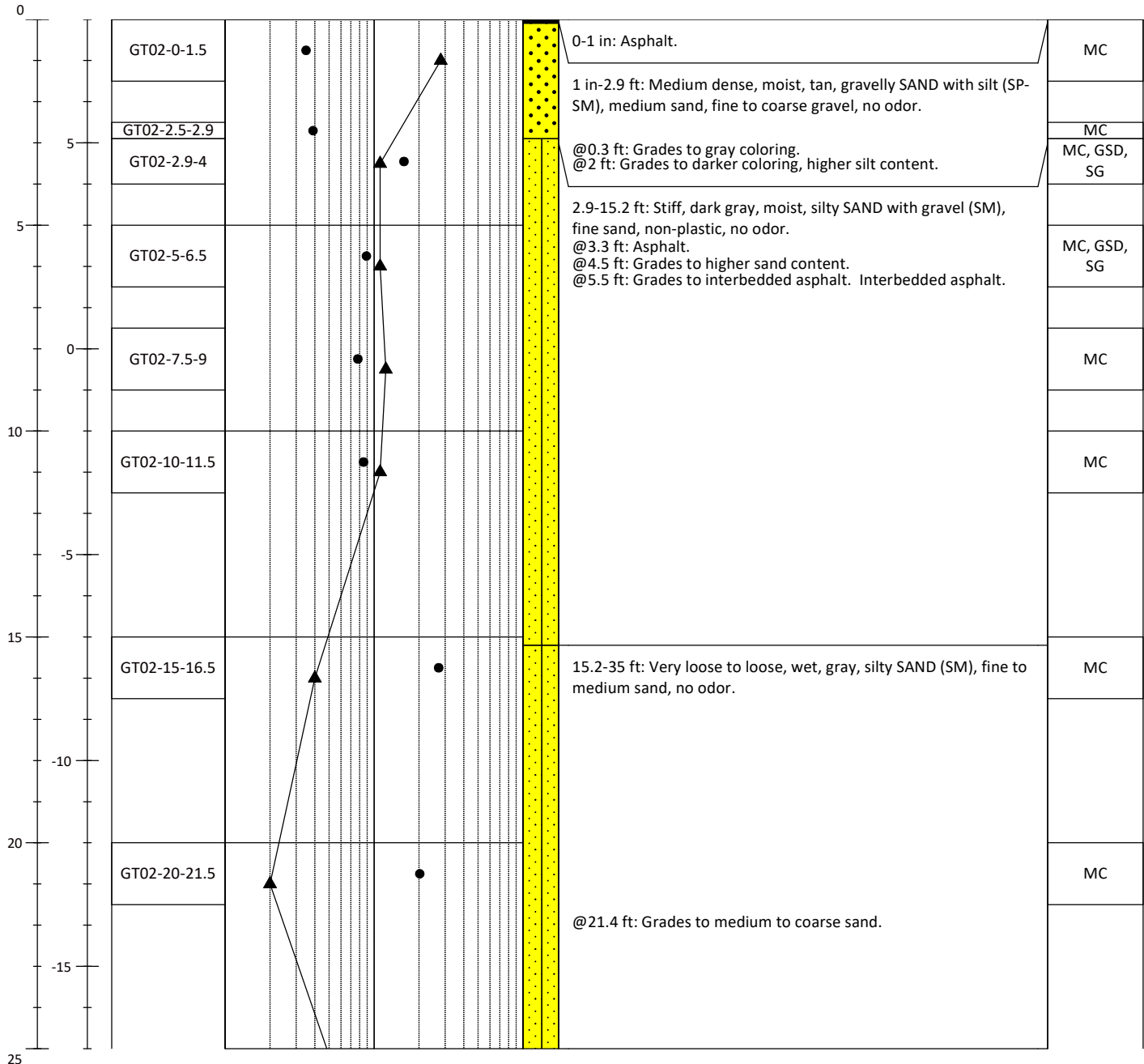
Soil Boring Log

GT02

Sheet 1 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'48.30"W	Total Depth (ft): 35
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 0'54.87"N	Ground Surface Elevation (ft): 8
Collection Date: 8/20/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)							Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
			1	2	5	10	20	50	100			



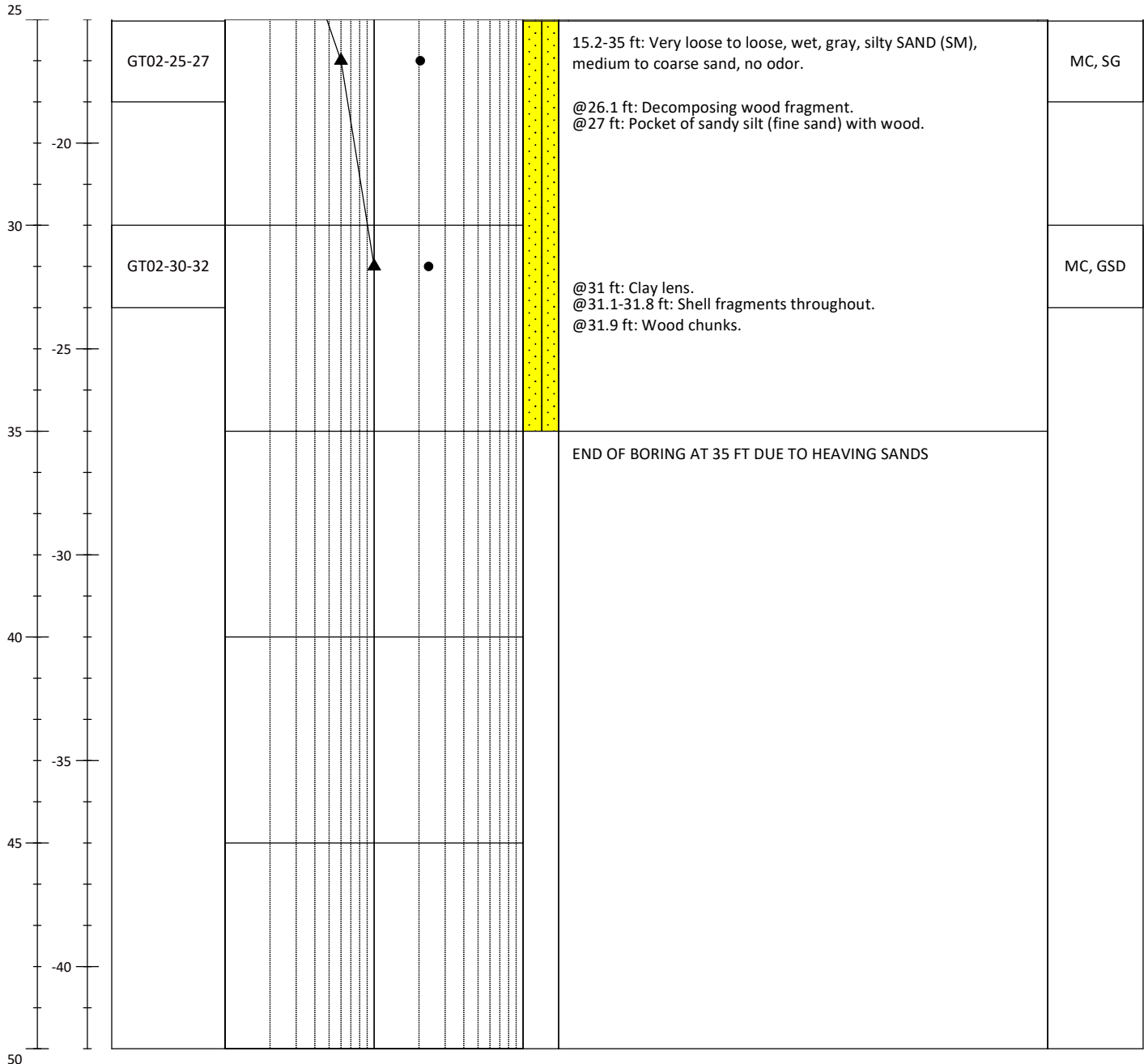
Soil Boring Log

GT02

Sheet 2 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'48.30"W	Total Depth (ft): 35
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 0'54.87"N	Ground Surface Elevation (ft): 8
Collection Date: 8/20/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)						Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
			1	2	5	10	20	50	100		



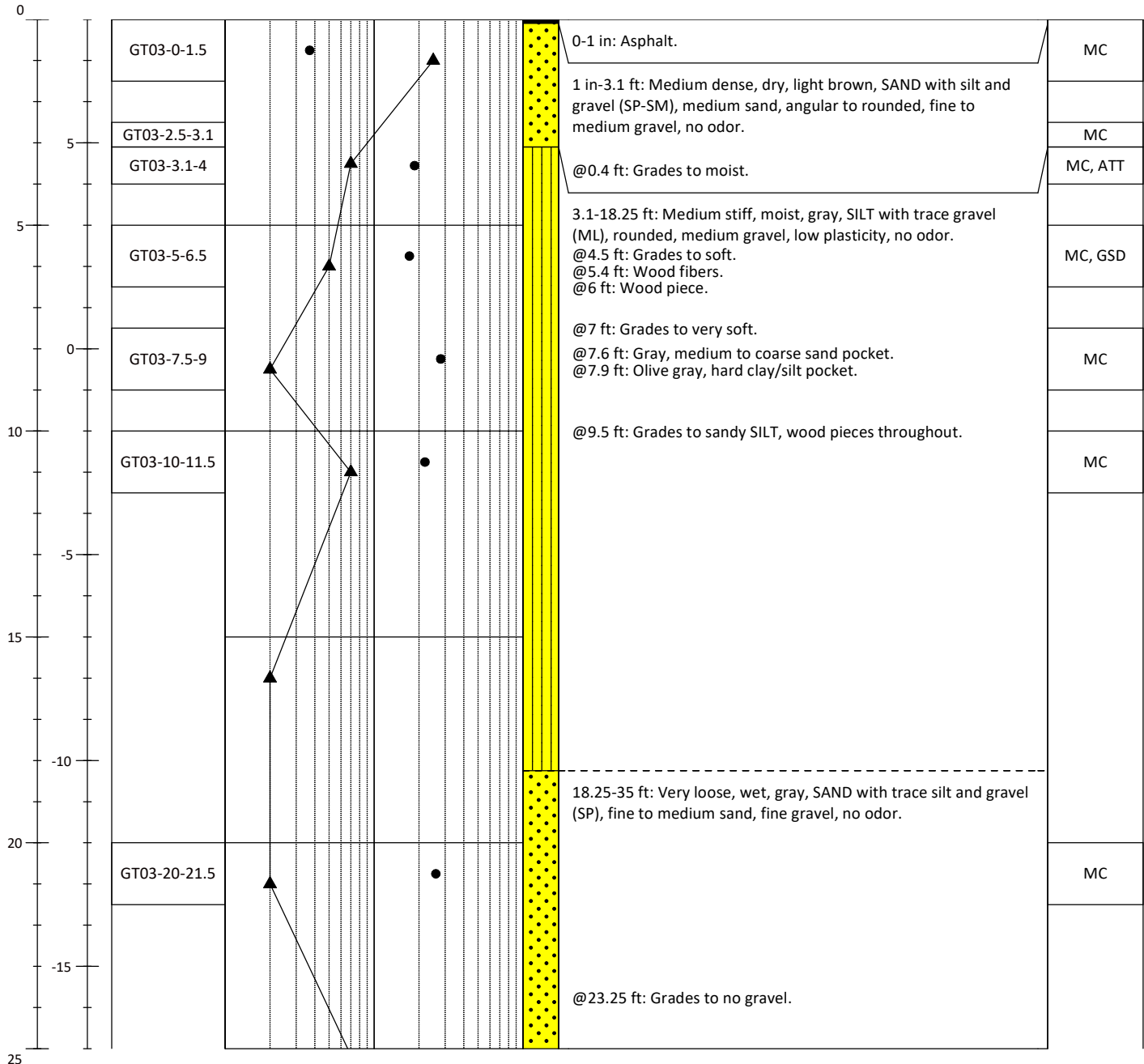
Soil Boring Log

GT03

Sheet 1 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'45.97"W	Total Depth (ft): 41.5
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 0'52.62"N	Ground Surface Elevation (ft): 8
Collection Date: 8/20/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)	Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
			1 2 5 10 20 50 100			



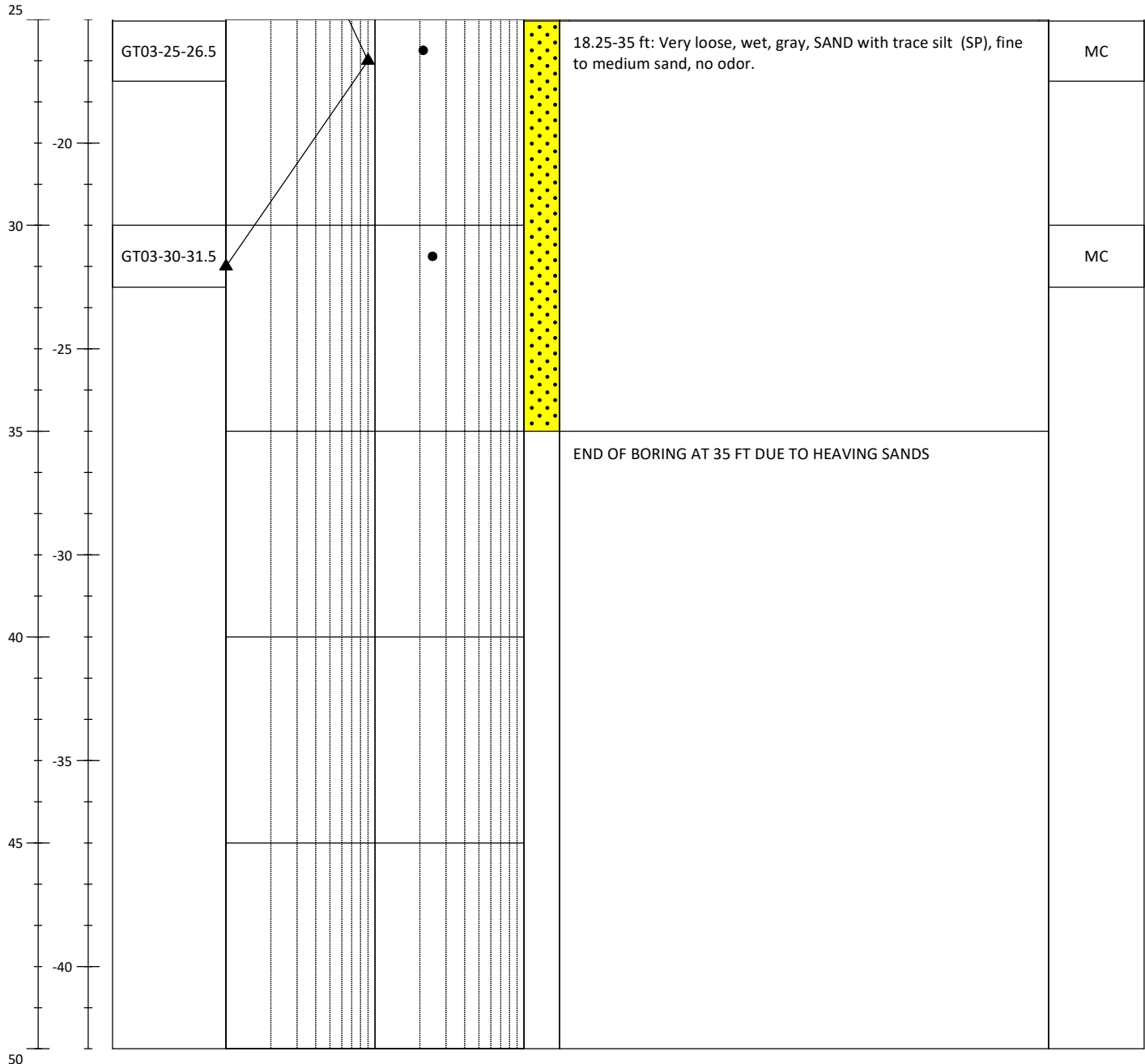
Soil Boring Log

GT03

Sheet 2 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'45.97"W	Total Depth (ft): 41.5
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 0'52.62"N	Ground Surface Elevation (ft): 8
Collection Date: 8/20/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)						Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
			1	2	5	10	20	50	100		



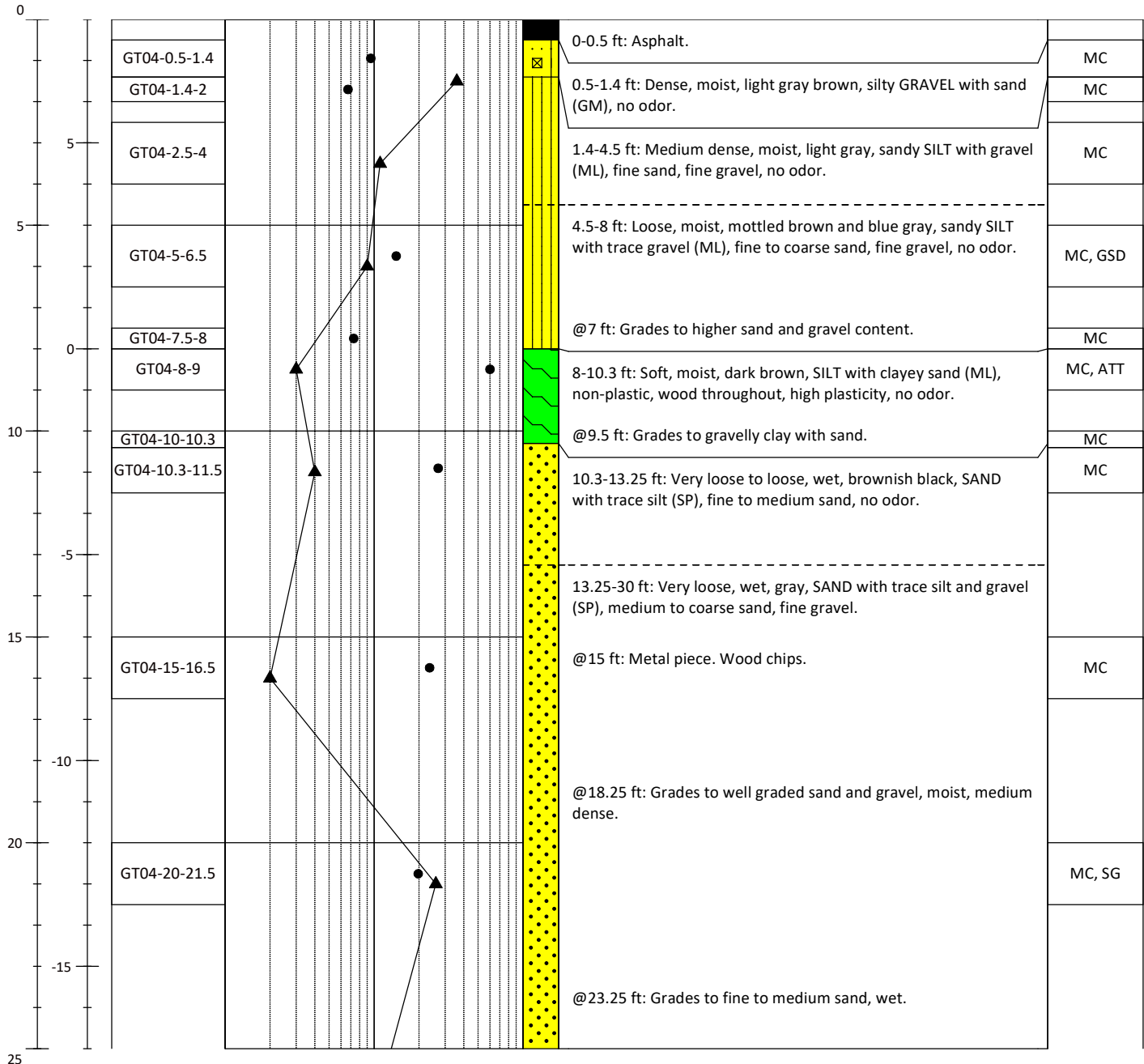
Soil Boring Log

GT04

Sheet 1 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'44.83"W	Total Depth (ft): 30
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 0'48.41"N	Ground Surface Elevation (ft): 8
Collection Date: 9/19/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)	Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
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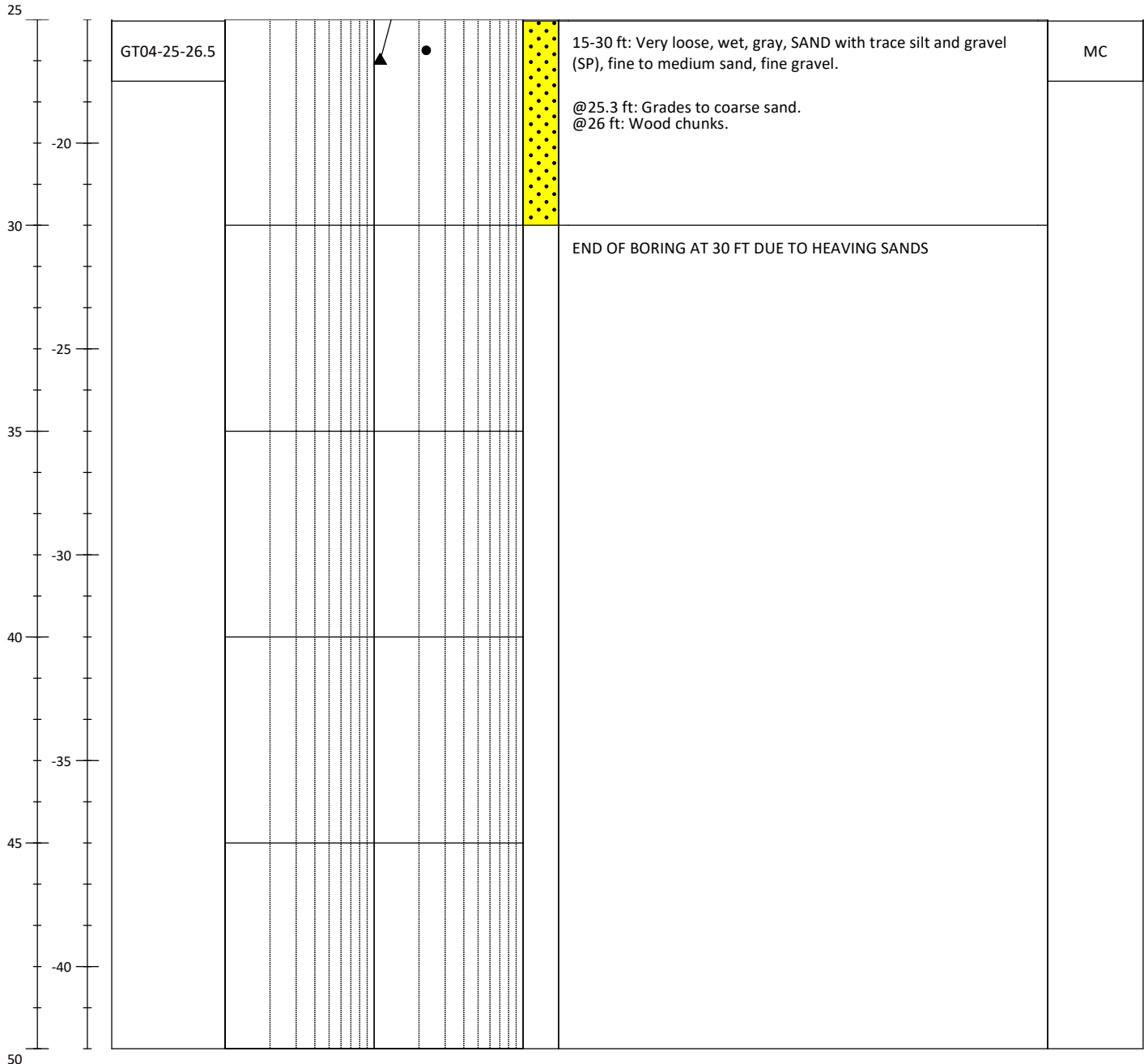
Soil Boring Log

GT04

Sheet 2 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'44.83"W	Total Depth (ft): 30
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 0'48.41"N	Ground Surface Elevation (ft): 8
Collection Date: 9/19/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)							Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
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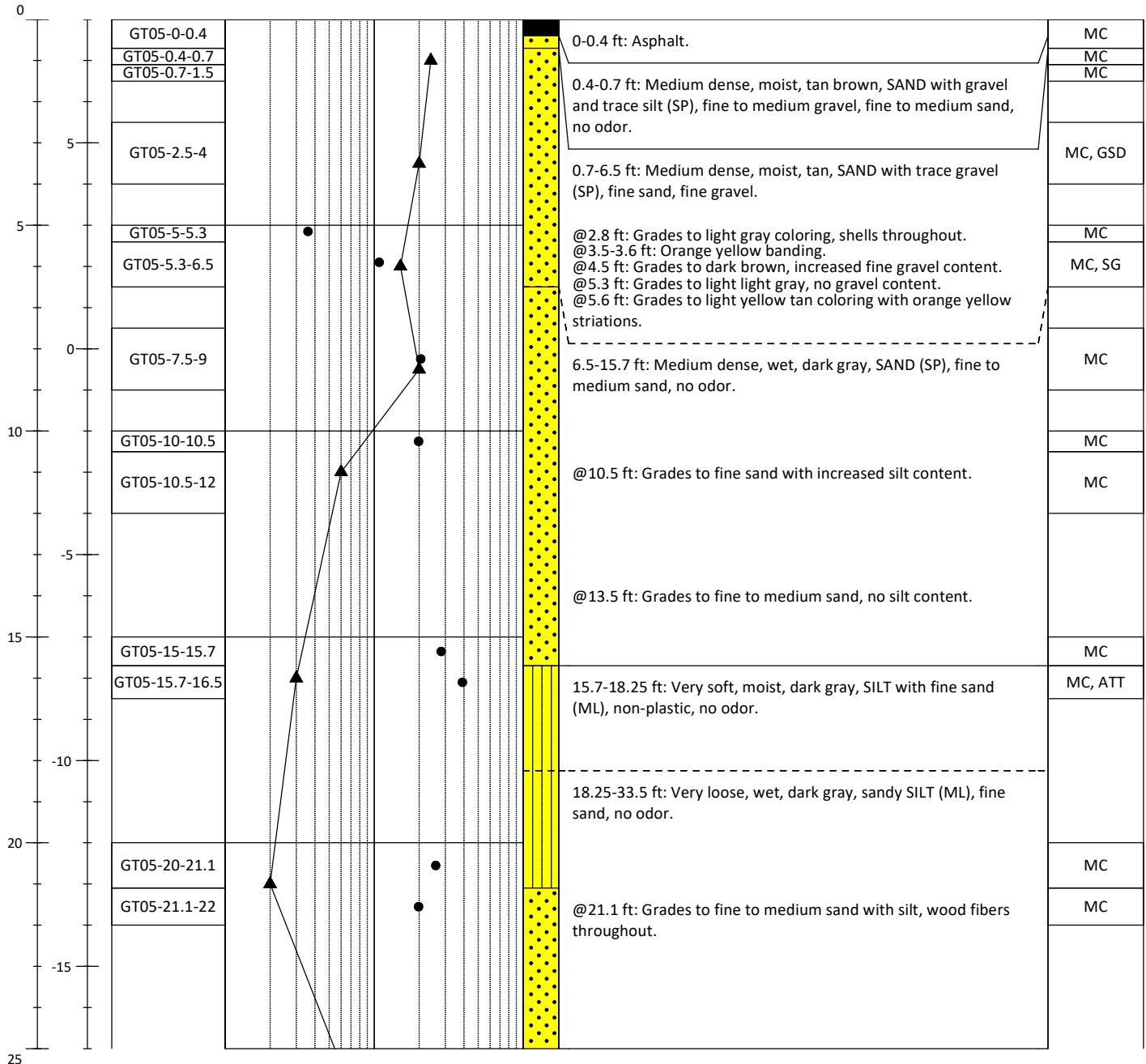
Soil Boring Log

GT05

Sheet 1 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'47.08"W	Total Depth (ft): 42
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 1'2.00"N	Ground Surface Elevation (ft): 8
Collection Date: 8/21/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)	Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
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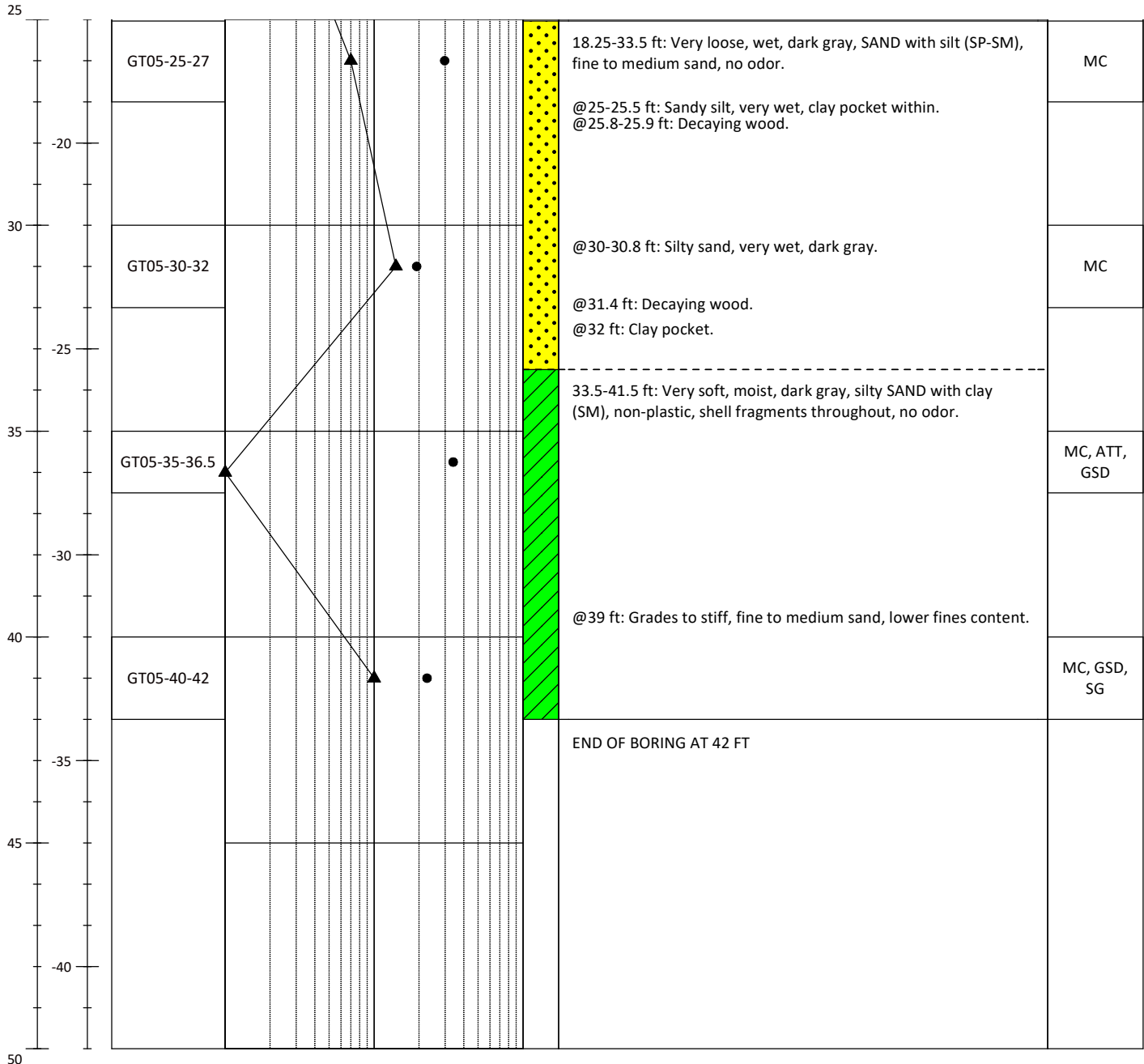
Soil Boring Log

GT05

Sheet 2 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'47.08"W	Total Depth (ft): 42
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 1'2.00"N	Ground Surface Elevation (ft): 8
Collection Date: 8/21/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)							Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
			1	2	5	10	20	50	100			



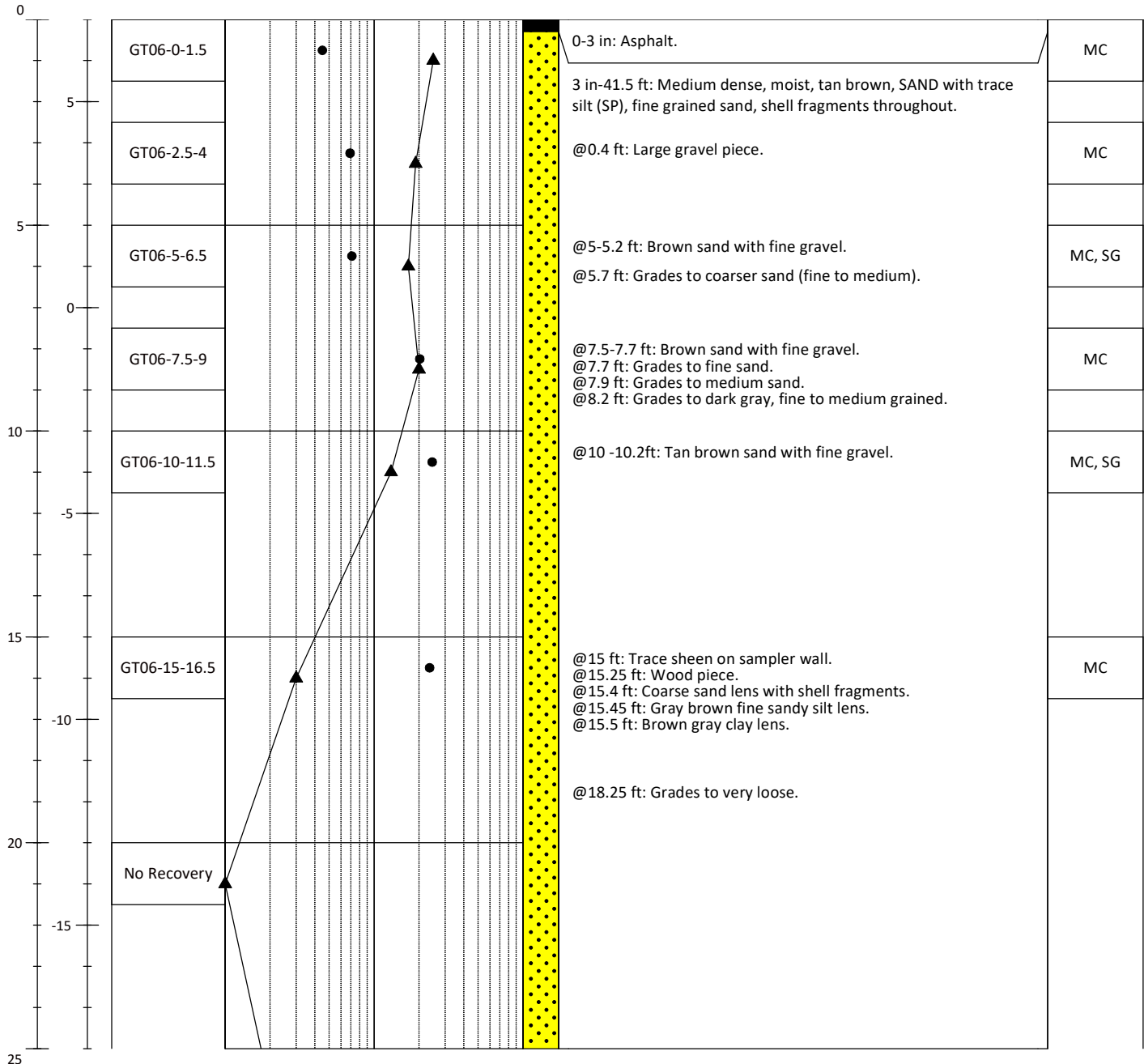
Soil Boring Log

GT06

Sheet 1 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'43.88"W	Total Depth (ft): 42
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 0'59.89"N	Ground Surface Elevation (ft): 7
Collection Date: 8/22/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)							Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
			1	2	5	10	20	50	100			



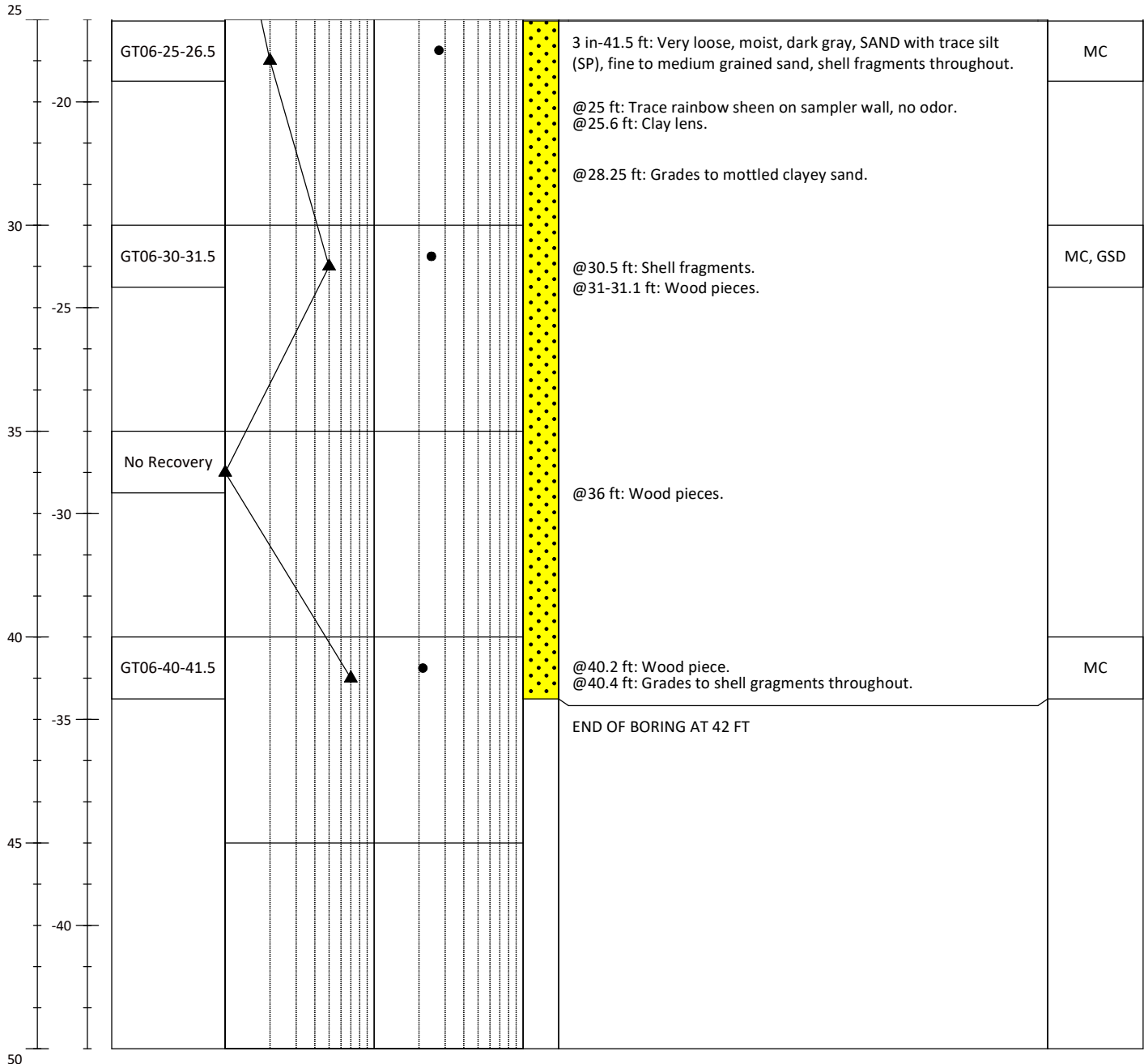
Soil Boring Log

GT06

Sheet 2 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'43.88"W	Total Depth (ft): 42
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 0'59.89"N	Ground Surface Elevation (ft): 7
Collection Date: 8/22/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)						Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
			1	2	5	10	20	50	100		



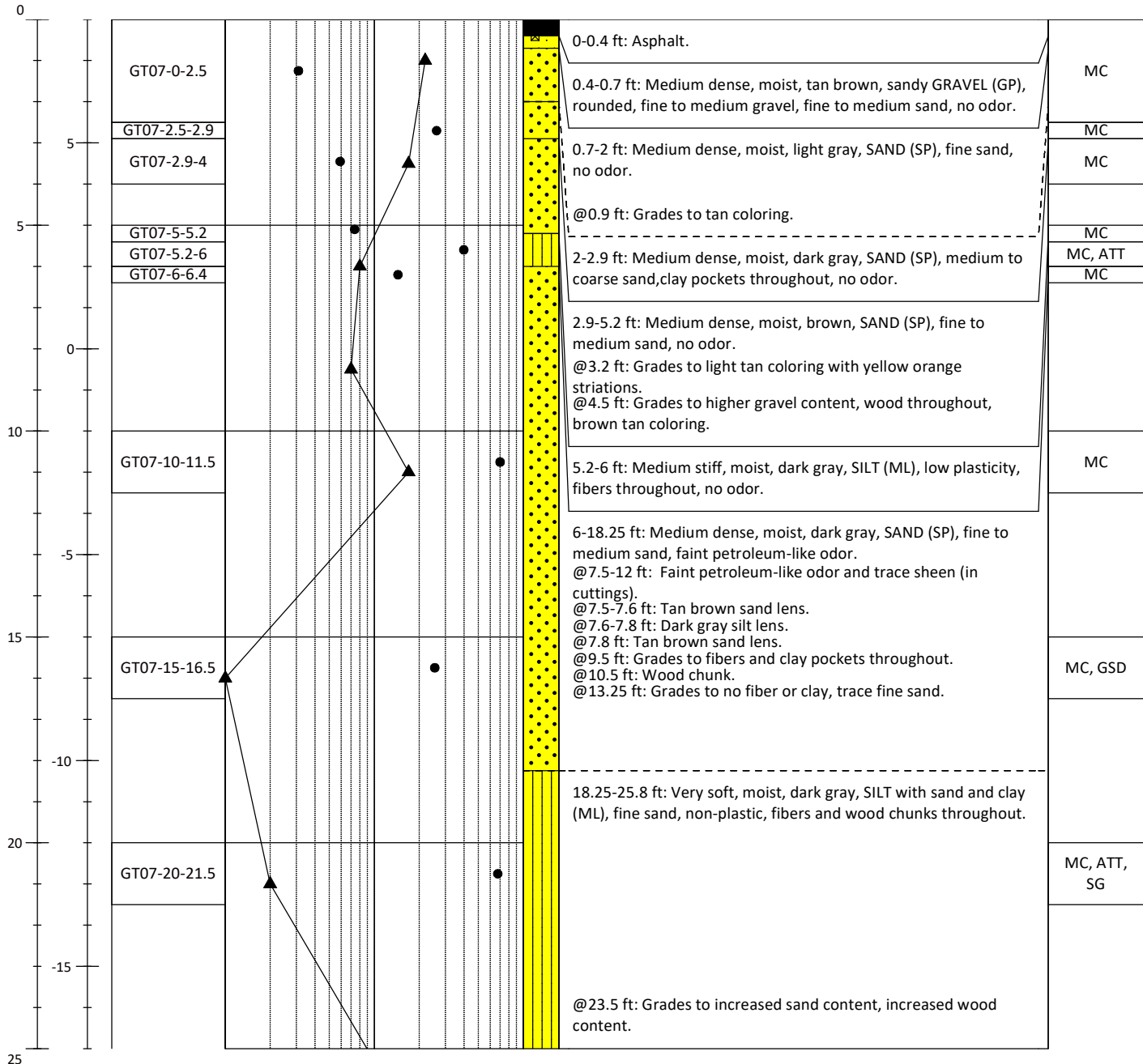
Soil Boring Log

GT07

Sheet 1 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'41.94"W	Total Depth (ft): 41.5
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 0'58.51"N	Ground Surface Elevation (ft): 8
Collection Date: 8/22/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)	Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
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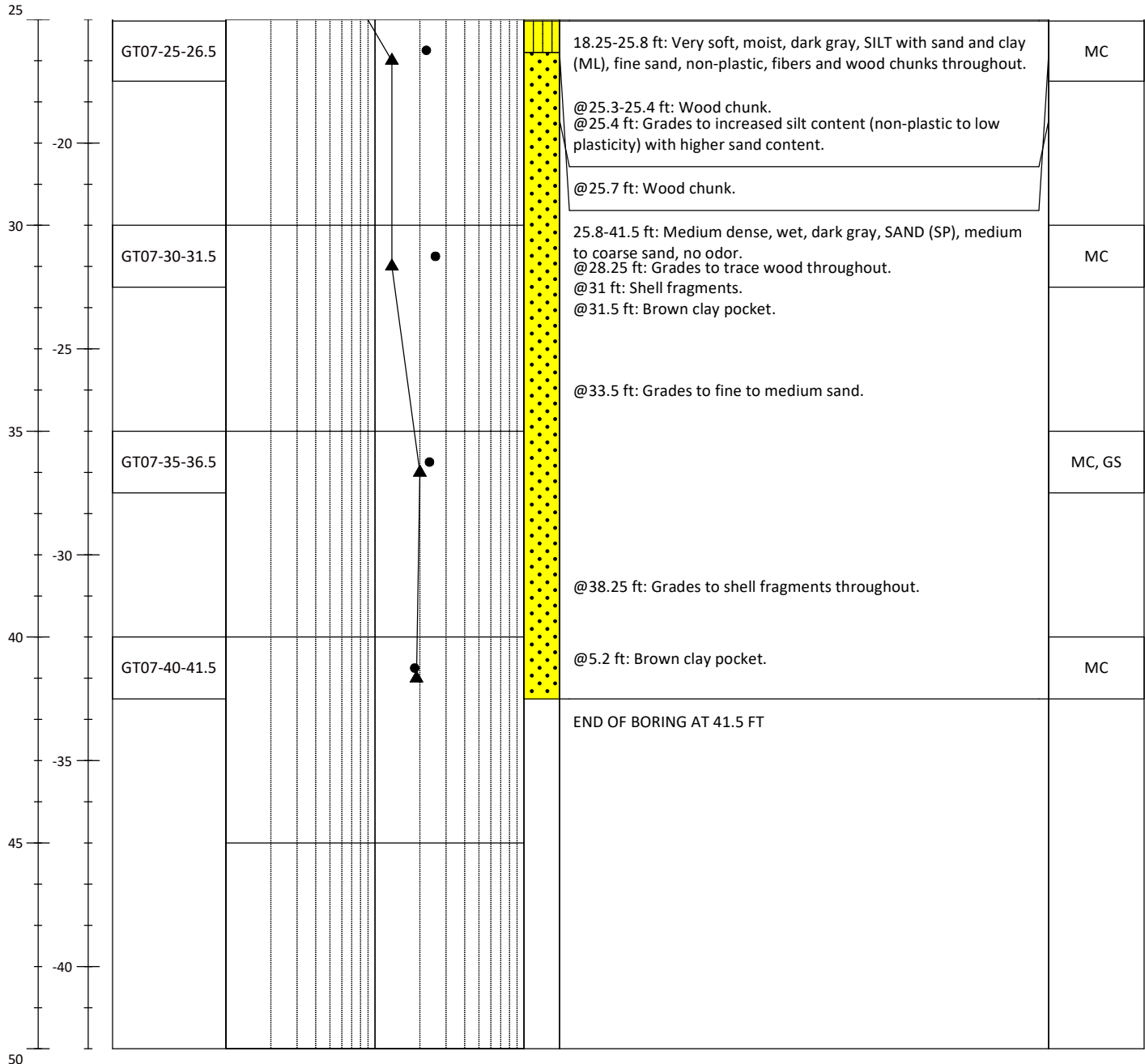
Soil Boring Log

GT07

Sheet 2 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'41.94"W	Total Depth (ft): 41.5
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 0'58.51"N	Ground Surface Elevation (ft): 8
Collection Date: 8/22/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)	Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
			1 2 5 10 20 50 100			



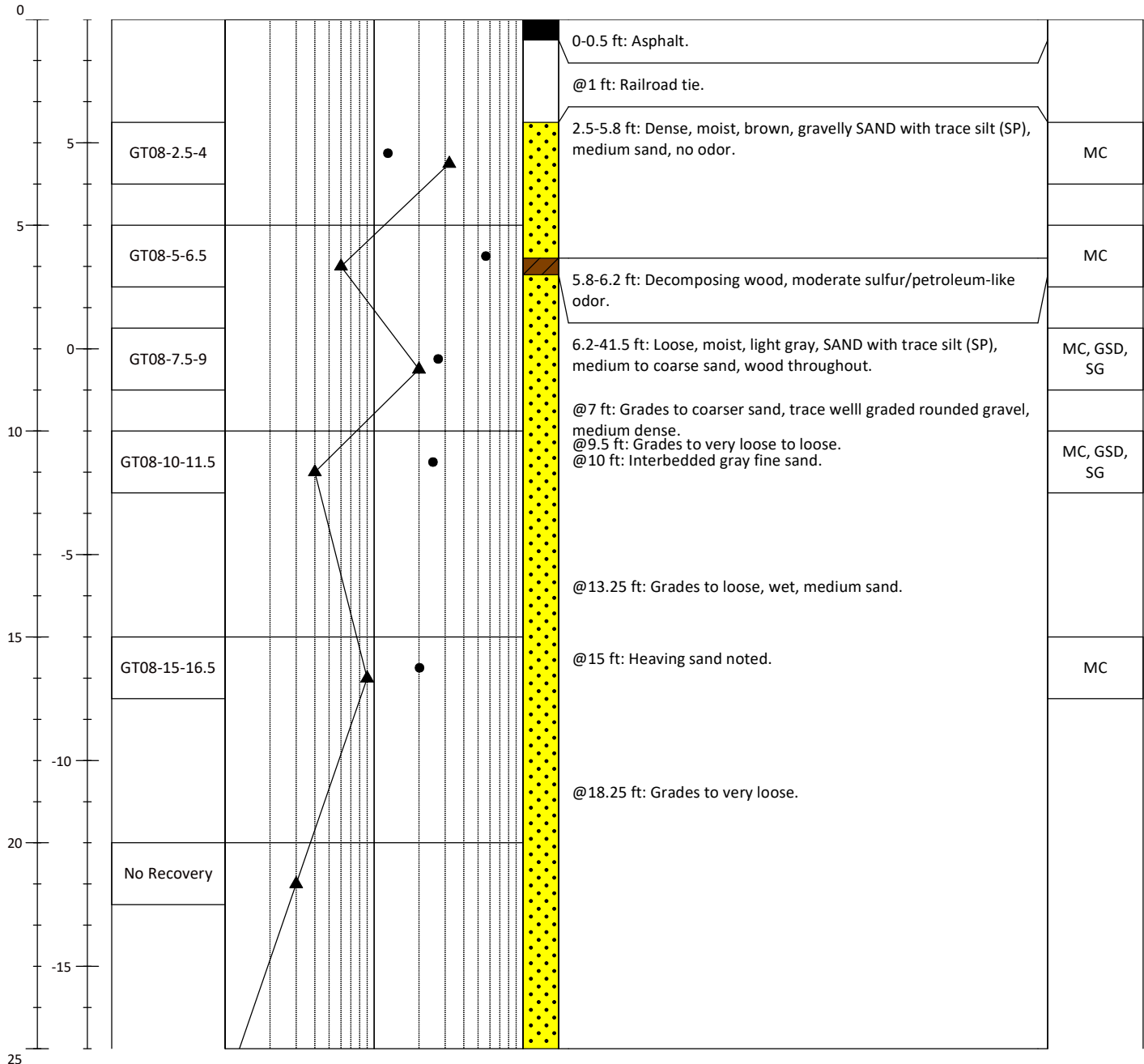
Soil Boring Log

GT08

Sheet 1 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'35.48"W	Total Depth (ft): 41.5
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 0'54.89"N	Ground Surface Elevation (ft): 8
Collection Date: 8/19/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)	Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
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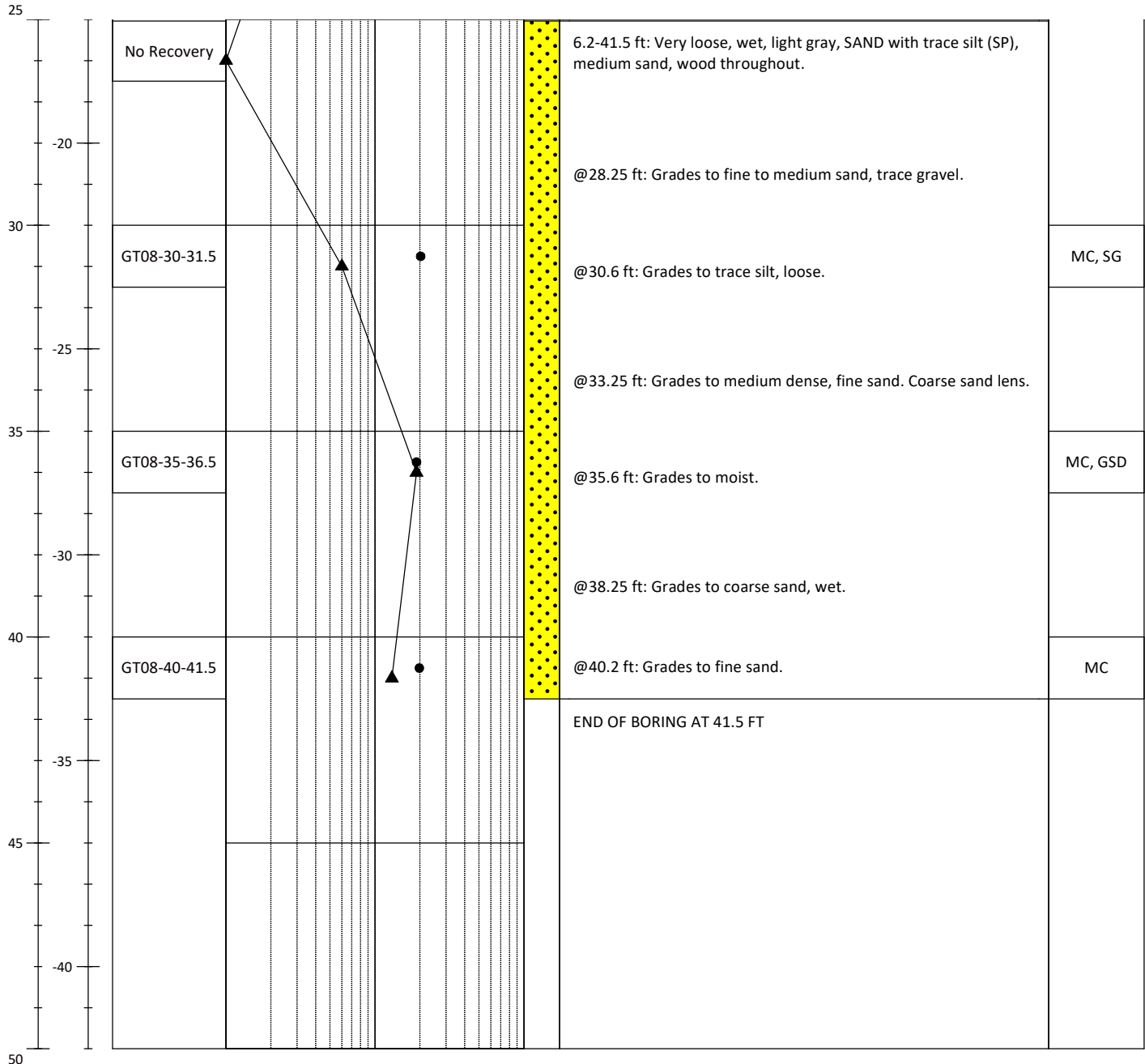
Soil Boring Log

GT08

Sheet 2 of 2

Project #: 240909-01.01	Project: Former Nord Door Cleanup	Method: Hollow Stem Auger
Location: Everett, Washington	Northing/Latitude: 122°12'35.48"W	Total Depth (ft): 41.5
Client: Jeld-Wen, Inc.	Easting/Longitude: 48° 0'54.89"N	Ground Surface Elevation (ft): 8
Collection Date: 8/19/24	Horiz. Datum: North American Datum of 1983	Hammer: 140-lb Auto Hammer
Contractor: Holocene Drilling, Inc	Vert. Datum: North American Vertical Datum 1988	Rig Model: GT8 Track Mounted Rig
Logged By: RBP	Sampler(s): Split Spoon Sampler	

Depth (ft)	Elevation (ft)	Samples ID's	Uncorrected Standard Penetration Resistance (blows per foot) and Moisture Content (%)						Lithology	Soil Description Samples and descriptions are in recovered depths. Classification scheme: USCS	Lab Tests
			1	2	5	10	20	50			



Attachment B-2

Laboratory Results



Client: Anchor QEA, LLC.
Address: 1201 3rd Avenue, Suite 2600
Seattle, WA 98101
Attn: Jason Cornetta
Revised On: _____

Date: December 4, 2024
Project: Q.C. - Former Nord Door Cleanup
Project #: 24B105-03
Sample #: B24-1819 - 1843
Date sampled: August 19 & 20, 2024
Control No: 12042024

As requested and authorized by the Client, MTC has performed the following test(s) on the sample number referenced above. The testing was performed in accordance with current, applicable AASHTO, ASTM, and/or WSDOT standards, which are referenced on the correlating test report pages. The results obtained in our laboratory are as detailed below and/or on the following pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	See Attached Report		Cation Exchange Capacity	
	Specific Gravity, Coarse		X	Specific Gravity, Soils	See Attached Report
	Specific Gravity, Fine				
	Hydrometer Analysis				
X	Atterberg Limits	See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call the number below and ask to speak with your Project Manager or the Laboratory Manager.

Alex Eifrig

Respectfully Submitted,
 Alex Eifrig
 WABO Supervising Laboratory Technician



Moisture Content ASTM C-566, ASTM D-2216

Project: Q.C. - Former Nord Door Cleanup
Project #: 24B105-03
Date Received: November 22, 2024
Date Tested: November 26, 2024

Client: Anchor QEA, LLC.
Sampled by: Client
Tested by: S. Boesenberg
Control No.: 12042024

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B24-1819	GT02 - 0 - 1.5	380.0	1168.2	1141.8	26.4	761.8	3.5%
B24-1820	GT02 - 2.5 - 2.9	215.2	318.5	314.6	3.9	99.4	3.9%
B24-1821	GT02 - 2.9 - 4	303.8	444.2	424.9	19.3	121.1	15.9%
B24-1822	GT02 - 5 - 6.5	306.5	393.8	386.7	7.1	80.2	8.9%
B24-1823	GT02 - 7.5 - 9	229.5	266.9	264.2	2.7	34.7	7.8%
B24-1824	GT02 - 10 - 11.5	222.4	446.0	428.5	17.5	206.1	8.5%
B24-1825	GT02 - 15 - 16.5	221.0	738.3	627.6	110.7	406.6	27.2%
B24-1826	GT02 - 20 - 21.5	419.2	1625.5	1421.7	203.8	1002.5	20.3%
B24-1827	GT02 - 25 - 27	414.4	1417.0	1246.9	170.1	832.5	20.4%
B24-1828	GT02 - 30 - 32	498.5	1784.2	1541.7	242.5	1043.2	23.2%
B24-1829	GT03 - 0 - 1.5	301.0	883.2	862.3	20.9	561.3	3.7%
B24-1830	GT03 - 3.1 - 4	224.9	243.3	240.4	2.9	15.5	18.7%
B24-1831	GT03 - 5 - 6.5	301.0	461.4	437.7	23.7	136.7	17.3%
B24-1832	GT03 - 7.5 - 9	208.6	519.2	451.2	68.0	242.6	28.0%
B24-1833	GT03 - 10 - 11.5	232.9	388.5	360.4	28.1	127.5	22.0%
B24-1834	GT03 - 20 - 21.5	223.8	1016.0	852.5	163.5	628.7	26.0%
B24-1835	GT03 - 25 - 27	222.9	1126.6	969.1	157.5	746.2	21.1%
B24-1836	GT03 - 30 - 31.5	234.5	401.0	368.3	32.7	133.8	24.4%
B24-1837	GT04 - 0.5 - 1.4	269.0	873.8	821.2	52.6	552.2	9.5%
B24-1838	GT04 - 1.4 - 2	303.3	534.8	520.3	14.5	217.0	6.7%
B24-1839	GT04 - 5 - 6.5	423.9	854.9	801.7	53.2	377.8	14.1%
B24-1840	GT04 - 7.5 - 8	310.9	502.9	489.8	13.1	178.9	7.3%
B24-1841	GT04 - 8 - 9	270.1	309.3	294.6	14.7	24.5	60.0%
B24-1842	GT04 - 10.3 - 11.5	423.4	638.3	592.7	45.6	169.3	26.9%
B24-1843	GT04 - 15 - 16.5	260.2	582.6	521.1	61.5	260.9	23.6%

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Comments:

Reviewed by:

Alex Eifrig

Alex Eifrig
WABO Supervising Laboratory Technician



Client: Anchor QEA, LLC.
 Sampled by: Client
 Tested by: Z. Romney
 Control. No.: 12042024

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: Alex Eifrig
WABO Supervising Laboratory Technician



ASTM D-4318 Liquid Limit, Plastic Limit & Plasticity Index of Soils

Project: Q.C. - Former Nord Door Cleanup Project #: 24B105-03 Client: Anchor QEA, LLC. Source: GT03 - 3.1 - 4 Sample #: B24-1830	Date Received: 22-Nov-24 Sampled By: Client Date Tested: 2-Dec-24 Tested By: Z. Romney Control No.: 12042024	Unified Soils Classification System, ASTM D-2487 OL, Organic Silt with Clay Sample Color Brown
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Liquid Limit Determination						
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	32.63	29.79	37.19			
Weight of Dry Soils + Pan:	29.80	26.33	33.27			
Weight of Pan:	19.65	14.16	19.62			
Weight of Dry Soils:	10.15	12.17	13.65			
Weight of Moisture:	2.83	3.46	3.92			
% Moisture:	27.9 %	28.4 %	28.7 %			
Number of Blows:	32	23	16			

Plastic Limit Determination						
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	26.10	26.91				
Weight of Dry Soils + Pan:	24.98	25.67				
Weight of Pan:	18.96	19.01				
Weight of Dry Soils:	6.02	6.66				
Weight of Moisture:	1.12	1.24				
% Moisture:	18.6 %	18.6 %				

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Comments: _____

Reviewed by: _____

Alex Eifrig

Alex Eifrig
WABO Supervising Laboratory Technician



Sieve Report

Project: Q.C. - Former Nord Door Cleanup Project #: 24B105-03 Client: Anchor QEA, LLC. Source: GT04 - 5 - 6.5 Sample#: B24-1839		Date Received: 22-Nov-24 Sampled By: Client Date Tested: 2-Dec-24 Tested By: R. Bohler Control No.: 12042024		Unified Soil Classification System, ASTM-2487 SM, Silty Sand Sample Color: Brown	
Method(s) ASTM D-2216, ASTM D-2419, ASTM D4318, ASTM D-5281					
Specifications No Specs Sample Meets Specs ? N/A		$D_{(5)} = 0.013$ mm $D_{(10)} = 0.026$ mm $D_{(15)} = 0.039$ mm $D_{(30)} = 0.084$ mm $D_{(50)} = 0.272$ mm $D_{(60)} = 0.399$ mm $D_{(90)} = 7.001$ mm Dust Ratio = 6/13		$\% \text{ Gravel} = 14.2\%$ $\% \text{ Sand} = 57.1\%$ $\% \text{ Silt \& Clay} = 28.6\%$ Liquid Limit = n/a Plasticity Index = n/a Sand Equivalent = n/a Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a Coeff. of Curvature, $C_c = 0.67$ Coeff. of Uniformity, $C_u = 15.25$ Fineness Modulus = 2.14 Plastic Limit = n/a Moisture %, as sampled = n/a Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =	
Method(s) ASTM C-136, ASTM D-6913, ASTM C-117					
Sieve Size US Metric		Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		98%	100.0%	0.0%
1/2"	12.50	96%	96%	100.0%	0.0%
3/8"	9.50	95%	95%	100.0%	0.0%
1/4"	6.30		89%	100.0%	0.0%
#4	4.75	86%	86%	100.0%	0.0%
#8	2.36		79%	100.0%	0.0%
#10	2.00	78%	78%	100.0%	0.0%
#16	1.18		70%	100.0%	0.0%
#20	0.850		66%	100.0%	0.0%
#30	0.600		64%	100.0%	0.0%
#40	0.425	62%	62%	100.0%	0.0%
#50	0.300		52%	100.0%	0.0%
#60	0.250		48%	100.0%	0.0%
#80	0.180		43%	100.0%	0.0%
#100	0.150	40%	40%	100.0%	0.0%
#140	0.106		34%	100.0%	0.0%
#170	0.090		31%	100.0%	0.0%
#200	0.075	28.6%	28.6%	100.0%	0.0%

Grain Size Distribution

Particle Size (mm)

% Passing

Legend: Sieve Sizes, Max Specs, Min Specs, Sieve Results

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Comments:

Reviewed by:

Alex Eifrig

Alex Eifrig
WABO Supervising Laboratory Technician



ASTM D-4318 Liquid Limit, Plastic Limit & Plasticity Index of Soils

Project: Q.C. - Former Nord Door Cleanup Project #: 24B105-03 Client: Anchor QEA, LLC. Source: GT04 - 8 - 9 Sample #: B24-1841	Date Received: 22-Nov-24 Sampled By: Client Date Tested: 2-Dec-24 Tested By: Z. Romney Control No.: 12042024	Visual Soils Classification Silt with Clayey Sand Sample Color Brown
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Liquid Limit Determination						
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	30.08	30.17	33.04			
Weight of Dry Soils + Pan:	26.65	25.19	28.77			
Weight of Pan:	18.87	14.14	19.60			
Weight of Dry Soils:	7.78	11.05	9.17			
Weight of Moisture:	3.43	4.98	4.27			
% Moisture:	44.1 %	45.1 %	46.6 %			
Number of Blows:	35	27	17			

Plastic Limit Determination						
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	Non-Plastic					
Weight of Dry Soils + Pan:						
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

Plasticity Chart

Liquid Limit

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Comments: Sample was deemed to be non-plastic due to it not being workable down to 1/8" rolls/ribbons without breaking apart.

Reviewed by: Alex Eifrig
 Alex Eifrig
 WABO Supervising Laboratory Technician



Client: Anchor QEA, LLC.
Address: 1201 3rd Avenue, Suite 2600
Seattle, WA 98101
Attn: Jason Cornetta
Revised On: _____

Date: December 9, 2024
Project: Q.C. - Former Nord Door Cleanup
Project #: 24B105-03
Sample #: B24-1844 - 1870
Date sampled: August 19 & 21, 2024
Control No: 12092024

As requested and authorized by the Client, MTC has performed the following test(s) on the sample number referenced above. The testing was performed in accordance with current, applicable AASHTO, ASTM, and/or WSDOT standards, which are referenced on the correlating test report pages. The results obtained in our laboratory are as detailed below and/or on the following pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	See Attached Report		Cation Exchange Capacity	
	Specific Gravity, Coarse		X	Specific Gravity, Soils	See Attached Report
	Specific Gravity, Fine				
	Hydrometer Analysis				
X	Atterberg Limits	See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call the number below and ask to speak with your Project Manager or the Laboratory Manager.

Alex Eifrig

Respectfully Submitted,
 Alex Eifrig
 WABO Supervising Laboratory Technician



Moisture Content ASTM C-566, ASTM D-2216

Project: Q.C. - Former Nord Door Cleanup
Project #: 24B105-03
Date Received: November 22, 2024
Date Tested: December 2, 2024

Client: Anchor QEA, LLC.
Sampled by: Client
Tested by: S. Boesenberg
Control No.: 12092024

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B24-1844	GT04 - 20 - 21.5	419.2	1303.3	1157.1	146.2	737.9	19.8%
B24-1845	GT04 - 25 - 26.5	234.5	987.0	849.5	137.5	615.0	22.4%
B24-1846	GT08 - 2.5 - 4	222.9	660.1	611.9	48.2	389.0	12.4%
B24-1847	GT08 - 5 - 6.5	233.0	326.5	292.8	33.7	59.8	56.4%
B24-1848	GT08 - 7.5 - 9	380.0	970.1	845.0	125.1	465.0	26.9%
B24-1849	GT08 - 10 - 11.5	423.4	689.1	636.1	53.0	212.7	24.9%
B24-1850	GT08 - 15 - 16.5	208.6	712.4	627.9	84.5	419.3	20.2%
B24-1851	GT08 - 30 - 31.5	416.9	1023.5	921.2	102.3	504.3	20.3%
B24-1852	GT08 - 35 - 36.5	379.8	1216.5	1083.0	133.5	703.2	19.0%
B24-1853	GT08 - 40 - 41.5	224.9	1212.8	1048.9	163.9	824.0	19.9%
B24-1855	GT05 - 5 - 5.3	221.0	318.6	315.2	3.4	94.2	3.6%
B24-1856	GT05 - 5.3 - 6.5	392.1	880.8	833.1	47.7	441.0	10.8%
B24-1857	GT05 - 7.5 - 9	222.4	1113.5	961.9	151.6	739.5	20.5%
B24-1858	GT05 - 10 - 10.5	229.3	466.9	427.5	39.4	198.2	19.9%
B24-1860	GT05 - 15 - 15.7	215.4	689.2	585.1	104.1	369.7	28.2%
B24-1861	GT05 - 15.7 - 16.5	270.0	310.9	299.4	11.5	29.4	39.1%
B24-1862	GT05 - 20 - 21.1	310.9	829.6	722.8	106.8	411.9	25.9%
B24-1863	GT05 - 21.1 - 22	303.3	432.1	410.7	21.4	107.4	19.9%
B24-1864	GT05 - 25 - 27	268.9	486.1	436.2	49.9	167.3	29.8%
B24-1865	GT05 - 30 - 32	300.9	761.6	687.2	74.4	386.3	19.3%
B24-1866	GT05 - 35 - 36.5	413.7	879.2	761.2	118.0	347.5	34.0%
B24-1867	GT05 - 40 - 42	414.3	764.1	699.3	64.8	285.0	22.7%
B24-1868	GT01 - 0 - 1.5	260.2	851.5	831.4	20.1	571.2	3.5%
B24-1869	GT01 - 2.5 - 3.9	415.4	1388.5	1232.9	155.6	817.5	19.0%
B24-1870	GT01 - 3.9 - 4.5	417.7	798.3	788.0	10.3	370.3	2.8%

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Comments:

Reviewed by:

Alex Eifrig

Alex Eifrig
WABO Supervising Laboratory Technician



Client: Anchor QEA, LLC.
 Sampled by: Client
 Tested by: S. Boesenberg
 Control. No.: 12092024

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Reviewed by: Alex Eifrig
WABO Supervising Laboratory Technician



Sieve Report

Project: Q.C. - Former Nord Door Cleanup Project #: 24B105-03 Client: Anchor QEA, LLC. Source: GT08 - 10 - 11.5 Sample#: B24-1849		Date Received: 22-Nov-24 Sampled By: Client Date Tested: 6-Dec-24 Tested By: R. Bohler Control No.: 12092024		Unified Soil Classification System, ASTM-2487 SM, Silty Sand Sample Color: Brown	
Method(s) ASTM D-2216, ASTM D-2419, ASTM D4318, ASTM D-5281					
Specifications No Specs Sample Meets Specs ? N/A		$D_{(5)} = 0.017$ mm $D_{(10)} = 0.035$ mm $D_{(15)} = 0.052$ mm $D_{(30)} = 0.102$ mm $D_{(50)} = 0.183$ mm $D_{(60)} = 0.251$ mm $D_{(90)} = 1.010$ mm Dust Ratio = 1/4		$\% \text{ Gravel} = 0.4\%$ $\% \text{ Sand} = 78.1\%$ $\% \text{ Silt \& Clay} = 21.5\%$ Liquid Limit = n/a Plasticity Index = n/a Sand Equivalent = n/a Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a Coeff. of Curvature, $C_c = 1.19$ Coeff. of Uniformity, $C_u = 7.18$ Fineness Modulus = 1.12 Plastic Limit = n/a Moisture %, as sampled = n/a Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =	
Method(s) ASTM C-136, ASTM D-6913, ASTM C-117					
Sieve Size US Metric		Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		98%	100.0%	0.0%
#10	2.00	98%	98%	100.0%	0.0%
#16	1.18		91%	100.0%	0.0%
#20	0.850		89%	100.0%	0.0%
#30	0.600		87%	100.0%	0.0%
#40	0.425	86%	86%	100.0%	0.0%
#50	0.300		67%	100.0%	0.0%
#60	0.250		60%	100.0%	0.0%
#80	0.180		50%	100.0%	0.0%
#100	0.150	45%	45%	100.0%	0.0%
#140	0.106		31%	100.0%	0.0%
#170	0.090		26%	100.0%	0.0%
#200	0.075	21.5%	21.5%	100.0%	0.0%

Grain Size Distribution

Particle Size (mm)

% Passing

Legend: Sieve Sizes, Max Specs, Min Specs, Sieve Results

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Comments:

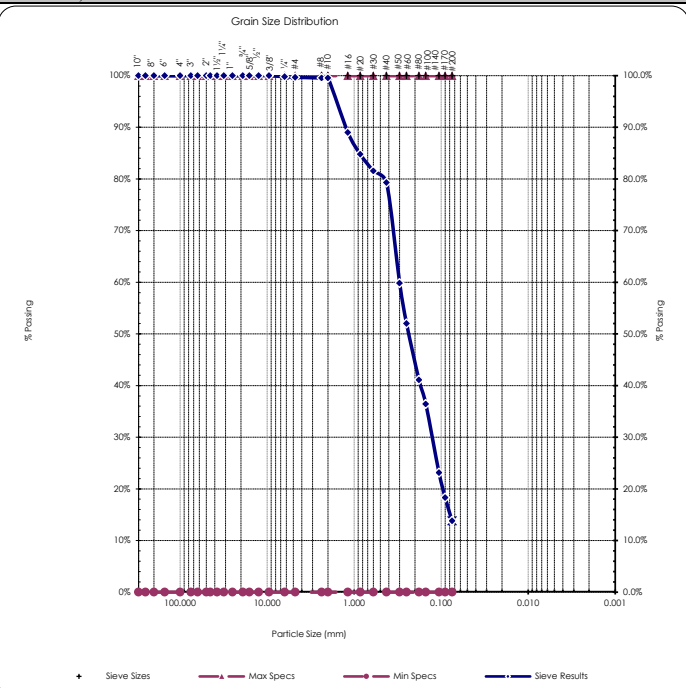
Reviewed by:

Alex Eifrig

Alex Eifrig
WABO Supervising Laboratory Technician



Sieve Report

Project: Q.C. - Former Nord Door Cleanup Project #: 24B105-03 Client: Anchor QEA, LLC. Source: GT08 - 35 - 36.5 Sample#: B24-1852		Date Received: 22-Nov-24 Sampled By: Client Date Tested: 6-Dec-24 Tested By: R. Bohler Control No.: 12092024		Unified Soil Classification System, ASTM-2487 SM, Silty Sand Sample Color: Brown			
Method(s) ASTM D-2216, ASTM D-2419, ASTM D4318, ASTM D-5281							
Specifications No Specs Sample Meets Specs ? N/A		$D_{(5)} = 0.027$ mm $D_{(10)} = 0.054$ mm $D_{(15)} = 0.079$ mm $D_{(30)} = 0.129$ mm $D_{(50)} = 0.237$ mm $D_{(60)} = 0.301$ mm $D_{(90)} = 1.258$ mm Dust Ratio = 4/23		$\% \text{ Gravel} = 0.3\%$ $\% \text{ Sand} = 85.9\%$ $\% \text{ Silt \& Clay} = 13.8\%$ Liquid Limit = n/a Plasticity Index = n/a Sand Equivalent = n/a Fracture %, 1 Face = n/a Fracture %, 2+ Faces = n/a		Coeff. of Curvature, $C_c = 1.01$ Coeff. of Uniformity, $C_u = 5.54$ Fineness Modulus = 1.34 Plastic Limit = n/a Moisture %, as sampled = n/a Req'd Sand Equivalent = Req'd Fracture %, 1 Face = Req'd Fracture %, 2+ Faces =	
Method(s) ASTM C-136, ASTM D-6913, ASTM C-117							
Sieve Size US Metric		Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min		
12.00"	300.00		100%	100.0%	0.0%		
10.00"	250.00		100%	100.0%	0.0%		
8.00"	200.00		100%	100.0%	0.0%		
6.00"	150.00		100%	100.0%	0.0%		
4.00"	100.00		100%	100.0%	0.0%		
3.00"	75.00		100%	100.0%	0.0%		
2.50"	63.00		100%	100.0%	0.0%		
2.00"	50.00	100%	100%	100.0%	0.0%		
1.75"	45.00		100%	100.0%	0.0%		
1.50"	37.50		100%	100.0%	0.0%		
1.25"	31.50		100%	100.0%	0.0%		
1.00"	25.00	100%	100%	100.0%	0.0%		
3/4"	19.00	100%	100%	100.0%	0.0%		
5/8"	16.00		100%	100.0%	0.0%		
1/2"	12.50	100%	100%	100.0%	0.0%		
3/8"	9.50	100%	100%	100.0%	0.0%		
1/4"	6.30		100%	100.0%	0.0%		
#4	4.75	100%	100%	100.0%	0.0%		
#8	2.36		100%	100.0%	0.0%		
#10	2.00	100%	100%	100.0%	0.0%		
#16	1.18		89%	100.0%	0.0%		
#20	0.850		85%	100.0%	0.0%		
#30	0.600		82%	100.0%	0.0%		
#40	0.425	79%	79%	100.0%	0.0%		
#50	0.300		60%	100.0%	0.0%		
#60	0.250		52%	100.0%	0.0%		
#80	0.180		41%	100.0%	0.0%		
#100	0.150	36%	36%	100.0%	0.0%		
#140	0.106		23%	100.0%	0.0%		
#170	0.090		18%	100.0%	0.0%		
#200	0.075	13.8%	13.8%	100.0%	0.0%		

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Comments:

Reviewed by:

Alex Eifrig

Alex Eifrig
WABO Supervising Laboratory Technician



ASTM D-4318 Liquid Limit, Plastic Limit & Plasticity Index of Soils

Project: Q.C. - Former Nord Door Cleanup Project #: 24B105-03 Client: Anchor QEA, LLC. Source: GT05 - 15.7 - 16.5 Sample #: B24-1861	Date Received: 22-Nov-24 Sampled By: Client Date Tested: 6-Dec-24 Tested By: Z. Romney Control No.: 12092024	Visual Soils Classification Silt with Sand Sample Color Gray-Brown
---	---	---

Liquid Limit Determination						
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	36.41	32.40	37.36			
Weight of Dry Soils + Pan:	32.53	28.13	32.84			
Weight of Pan:	18.40	14.15	18.96			
Weight of Dry Soils:	14.13	13.98	13.88			
Weight of Moisture:	3.88	4.27	4.52			
% Moisture:	27.5 %	30.5 %	32.6 %			
Number of Blows:	33	24	15			

Plastic Limit Determination						
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	Non-Plastic					
Weight of Dry Soils + Pan:						
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

Plasticity Chart

Liquid Limit

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All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Comments: Sample was deemed to be non-plastic due to the material not being workable down to 1/8" ribbons/rolls without breaking apart.

Reviewed by: *Alex Eifrig*

Alex Eifrig
WABO Supervising Laboratory Technician



ASTM D-4318 Liquid Limit, Plastic Limit & Plasticity Index of Soils

Project: Q.C. - Former Nord Door Cleanup Project #: 24B105-03 Client: Anchor QEA, LLC. Source: GT05 - 35 - 36.5 Sample #: B24-1866	Date Received: 22-Nov-24 Sampled By: Client Date Tested: 6-Dec-24 Tested By: Z. Romney Control No.: 12092024	Visual Soils Classification Silty Sand with Clay Sample Color Gray-Brown
---	---	---

Liquid Limit Determination

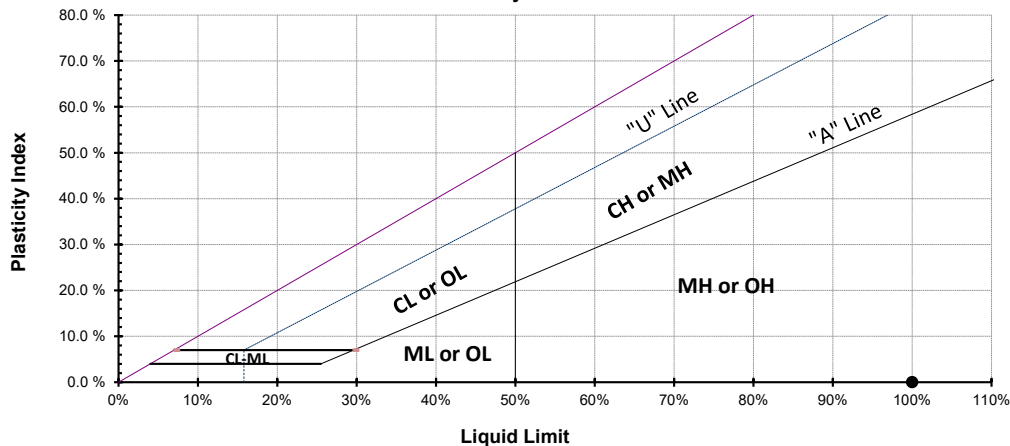
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	Unable to Establish					
Weight of Dry Soils + Pan:						
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:						

Liquid Limit @ 25 Blows: N/A
 Plastic Limit: N/A
 Plasticity Index, I_p: N/A

Plastic Limit Determination

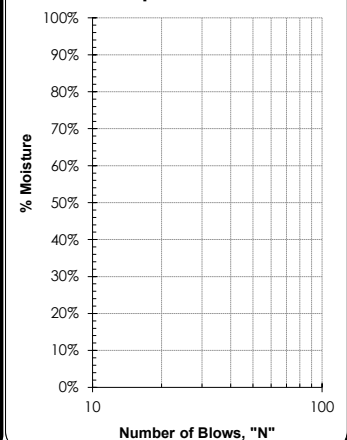
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	Non-Plastic					
Weight of Dry Soils + Pan:						
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

Plasticity Chart



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Liquid Limit



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Comments: Unable to establish the liquid limit of this sample due to the material not spreading smoothly into the cup, and displaying rapid dilation when subjected to any blows in the cup. The sample was then deemed to be non-plastic due to the material not being workable down to 1/8" ribbons/rolls without breaking apart.

Reviewed by:

Alex Eifrig

Alex Eifrig
WABO Supervising Laboratory Technician



Client: Anchor QEA, LLC.
Address: 1201 3rd Avenue, Suite 2600
Seattle, WA 98101
Attn: Jason Cornetta
Revised On: _____

Date: December 11, 2024
Project: Q.C. - Former Nord Door Cleanup
Project #: 24B105-03
Sample #: B24-1871 - 1896
Date sampled: August 21 & 22, 2024
Control No: 12112024

As requested and authorized by the Client, MTC has performed the following test(s) on the sample number referenced above. The testing was performed in accordance with current, applicable AASHTO, ASTM, and/or WSDOT standards, which are referenced on the correlating test report pages. The results obtained in our laboratory are as detailed below and/or on the following pages:

	Test(s) Performed:	Test Results		Test(s) Performed:	Test Results
X	Sieve Analysis	See Attached Reports		Sulfate Soundness	
	Proctor			Bulk Density & Voids	
	Sand Equivalent			WSDOT Degradation	
	Fracture Count			LA Abrasion	
X	Moisture Content	See Attached Reports		Cation Exchange Capacity	
	Specific Gravity, Coarse		X	Specific Gravity, Soils	See Attached Report
	Specific Gravity, Fine				
	Hydrometer Analysis				
X	Atterberg Limits	See Attached Reports			

If you have any questions concerning the test results, the procedures used, or if we can be of any further assistance please call the number below and ask to speak with your Project Manager or the Laboratory Manager.

Alex Eifrig

Respectfully Submitted,
 Alex Eifrig
 WABO Supervising Laboratory Technician



Moisture Content ASTM C-566, ASTM D-2216

Project: Q.C. - Former Nord Door Cleanup
Project #: 24B105-03
Date Received: November 22, 2024
Date Tested: December 5, 2024

Client: Anchor QEA, LLC.
Sampled by: Client
Tested by: S. Boesenberg
Control No.: 12112024

Sample #	Location	Tare	Wet + Tare	Dry + Tare	Wgt. Of Moisture	Wgt. Of Soil	% Moisture
B24-1871	GT01 - 5 - 6.5	222.9	264.7	264.5	0.2	41.6	0.5%
B24-1872	GT01 - 7.5 - 9	234.6	653.0	626.8	26.2	392.2	6.7%
B24-1873	GT01 - 10 - 11.5	224.9	475.2	456.1	19.1	231.2	8.3%
B24-1874	GT01 - 15 - 16.5	229.3	887.2	754.2	133.0	524.9	25.3%
B24-1875	GT06 - 0 - 1.5	222.4	592.0	576.1	15.9	353.7	4.5%
B24-1876	GT06 - 2.5 - 4	215.4	867.1	830.8	36.3	615.4	5.9%
B24-1877	GT06 - 5 - 6.5	220.8	342.6	334.5	8.1	113.7	7.1%
B24-1878	GT06 - 7.5 - 9	232.9	574.3	516.6	57.7	283.7	20.3%
B24-1879	GT06 - 10 - 11.5	208.6	286.7	271.3	15.4	62.7	24.6%
B24-1880	GT06 - 15 - 16.5	303.9	453.8	425.2	28.6	121.3	23.6%
B24-1881	GT06 - 25 - 16.5	306.3	756.5	660.0	96.5	353.7	27.3%
B24-1882	GT06 - 30 - 31.5	300.8	951.0	823.8	127.2	523.0	24.3%
B24-1883	GT06 - 40 - 41.5	268.7	767.6	680.0	87.6	411.3	21.3%
B24-1884	GT07 - 0 - 2.5	260.2	620.5	609.5	11.0	349.3	3.1%
B24-1885	GT07 - 2.5 - 2.9	310.9	549.0	499.5	49.5	188.6	26.2%
B24-1886	GT07 - 2.9 - 4	303.2	763.3	737.7	25.6	434.5	5.9%
B24-1887	GT07 - 5 - 5.2	301.0	395.0	388.5	6.5	87.5	7.4%
B24-1888	GT07 - 5.2 - 6	301.0	345.5	332.8	12.7	31.8	39.9%
B24-1889	GT07 - 6 - 6.4	266.4	454.4	430.7	23.7	164.3	14.4%
B24-1890	GT07 - 10 - 11.5	319.9	528.1	442.5	85.6	122.6	69.8%
B24-1891	GT07 - 15 - 16.5	336.3	644.0	581.4	62.6	245.1	25.5%
B24-1892	GT07 - 20 - 21.5	270.1	344.4	314.5	29.9	44.4	67.3%
B24-1893	GT07 - 25 - 26.5	423.4	715.2	662.4	52.8	239.0	22.1%
B24-1894	GT07 - 30 - 31.5	493.1	1282.7	1122.1	160.6	629.0	25.5%
B24-1895	GT07 - 35 - 36.5	420.5	654.1	610.1	44.0	189.6	23.2%

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Comments:

Reviewed by:

Alex Eifrig

Alex Eifrig
WABO Supervising Laboratory Technician



Client: Anchor QEA, LLC.
 Sampled by: Client
 Tested by: S. Boesenberg
 Control. No.: 12112024

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by: Alex Eifrig
WABO Supervising Laboratory Technician



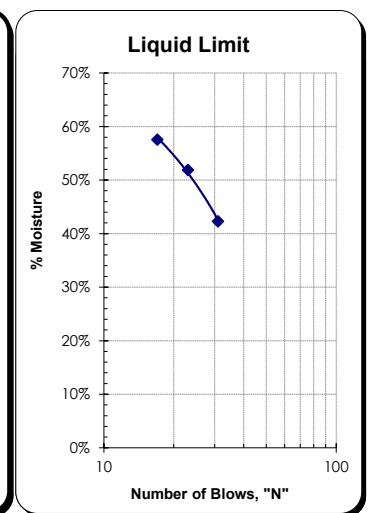
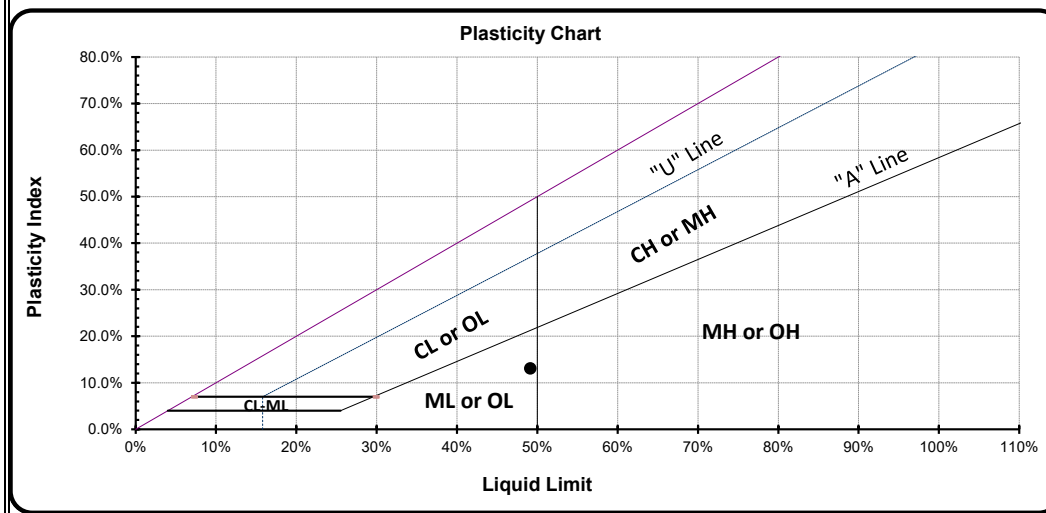
ASTM D-4318 Liquid Limit, Plastic Limit & Plasticity Index of Soils

Project: Q.C. - Former Nord Door Cleanup Project #: 24B105-03 Client: Anchor QEA, LLC. Source: GT07 - 5.2 - 6 Sample #: B24-1888	Date Received: 22-Nov-24 Sampled By: Client Date Tested: 10-Dec-24 Tested By: Z. Romney Control No.: 12112024	Unified Soils Classification System, ASTM D-2487 ML, Clayey Silt with Sand Sample Color Gray-Brown
---	--	---

Liquid Limit Determination						
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	36.48	34.98	34.82			
Weight of Dry Soils + Pan:	31.30	30.60	29.26			
Weight of Pan:	19.05	22.16	19.60			
Weight of Dry Soils:	12.25	8.44	9.66			
Weight of Moisture:	5.18	4.38	5.56			
% Moisture:	42.3 %	51.9 %	57.6 %			
Number of Blows:	31	23	17			

Liquid Limit @ 25 Blows: 49.1 %
Plastic Limit: 36.0 %
Plasticity Index, I_p: 13.1%

Plastic Limit Determination						
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	26.35	27.22				
Weight of Dry Soils + Pan:	24.53	25.21				
Weight of Pan:	19.48	19.61				
Weight of Dry Soils:	5.05	5.60				
Weight of Moisture:	1.82	2.01				
% Moisture:	36.0 %	35.9 %				



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Comments: _____

Reviewed by: _____

Alex Eifrig

Alex Eifrig
WABO Supervising Laboratory Technician



ASTM D-4318 Liquid Limit, Plastic Limit & Plasticity Index of Soils

Project: Q.C. - Former Nord Door Cleanup Project #: 24B105-03 Client: Anchor QEA, LLC. Source: GT07 - 20 - 21.5 Sample #: B24-1892	Date Received: 22-Nov-24 Sampled By: Client Date Tested: 10-Dec-24 Tested By: Z. Romney Control No.: 12112024	Visual Soils Classification Silt with Sand and Clay Sample Color Brown
---	--	---

Liquid Limit Determination						
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	28.80	31.90	30.78			
Weight of Dry Soils + Pan:	23.61	27.25	26.61			
Weight of Pan:	14.14	18.95	19.44			
Weight of Dry Soils:	9.47	8.30	7.17			
Weight of Moisture:	5.19	4.65	4.17			
% Moisture:	54.8 %	56.0 %	58.2 %			
Number of Blows:	31	22	18			

Plastic Limit Determination						
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	Non-Plastic					
Weight of Dry Soils + Pan:						
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

Plasticity Chart

Liquid Limit

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Comments: Sample was deemed to be non-plastic due to the material not being workable down to 1/8" ribbons/rolls without breaking apart.

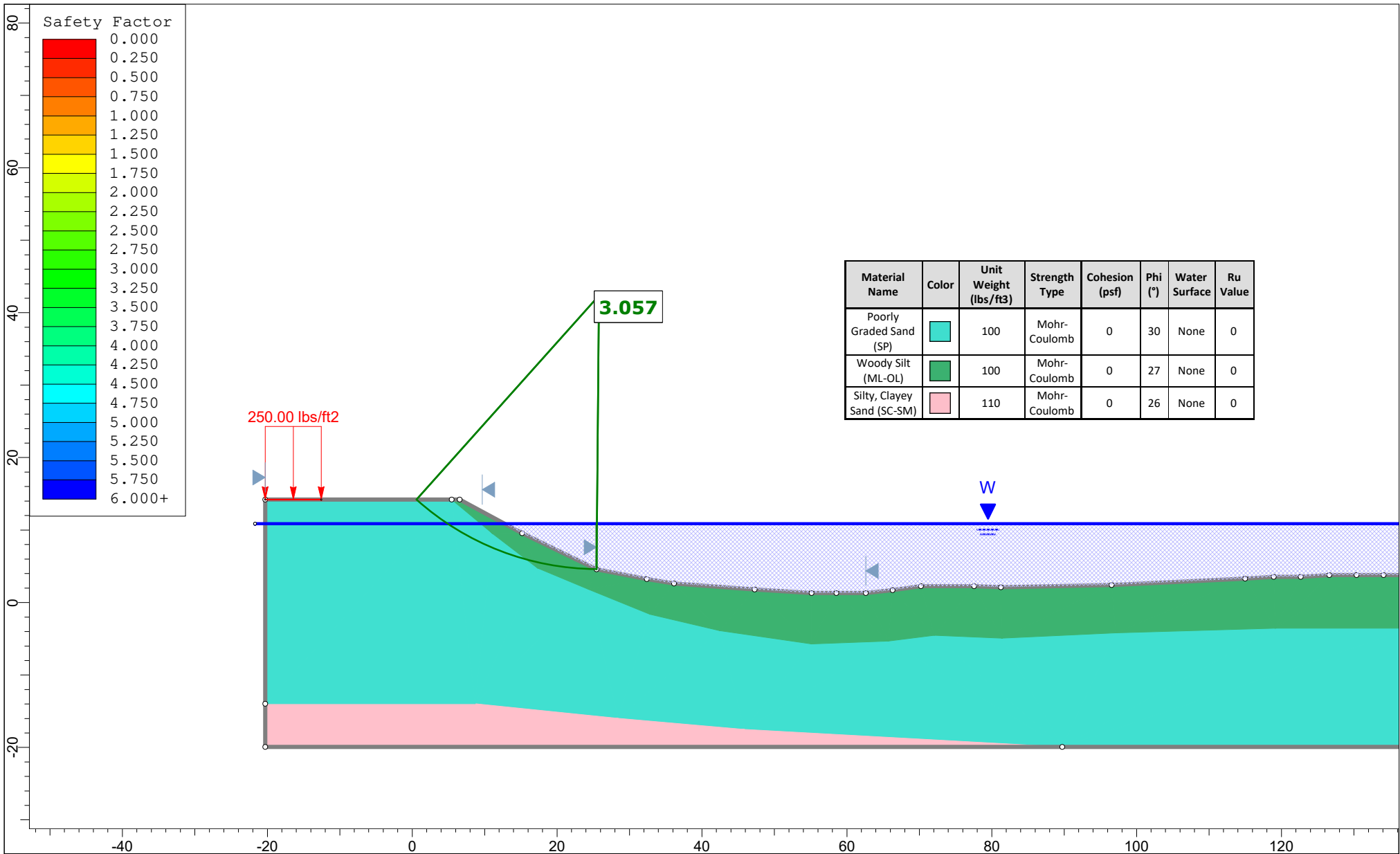
Reviewed by:

Alex Eifrig

Alex Eifrig
WABO Supervising Laboratory Technician

Attachment B-3

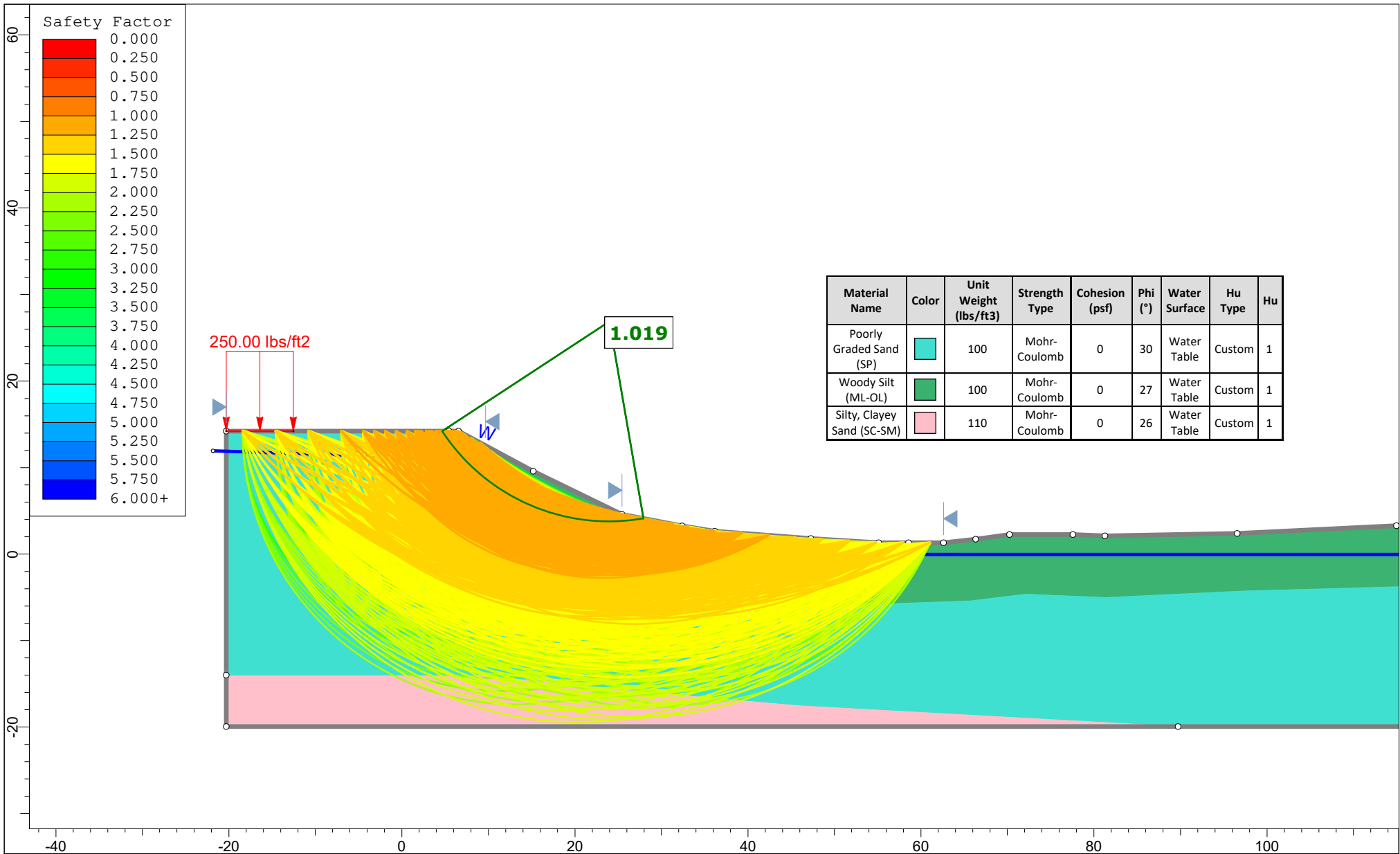
Slope Stability Modeling Results



rocscience

SLIDEINTERPRET 9.038

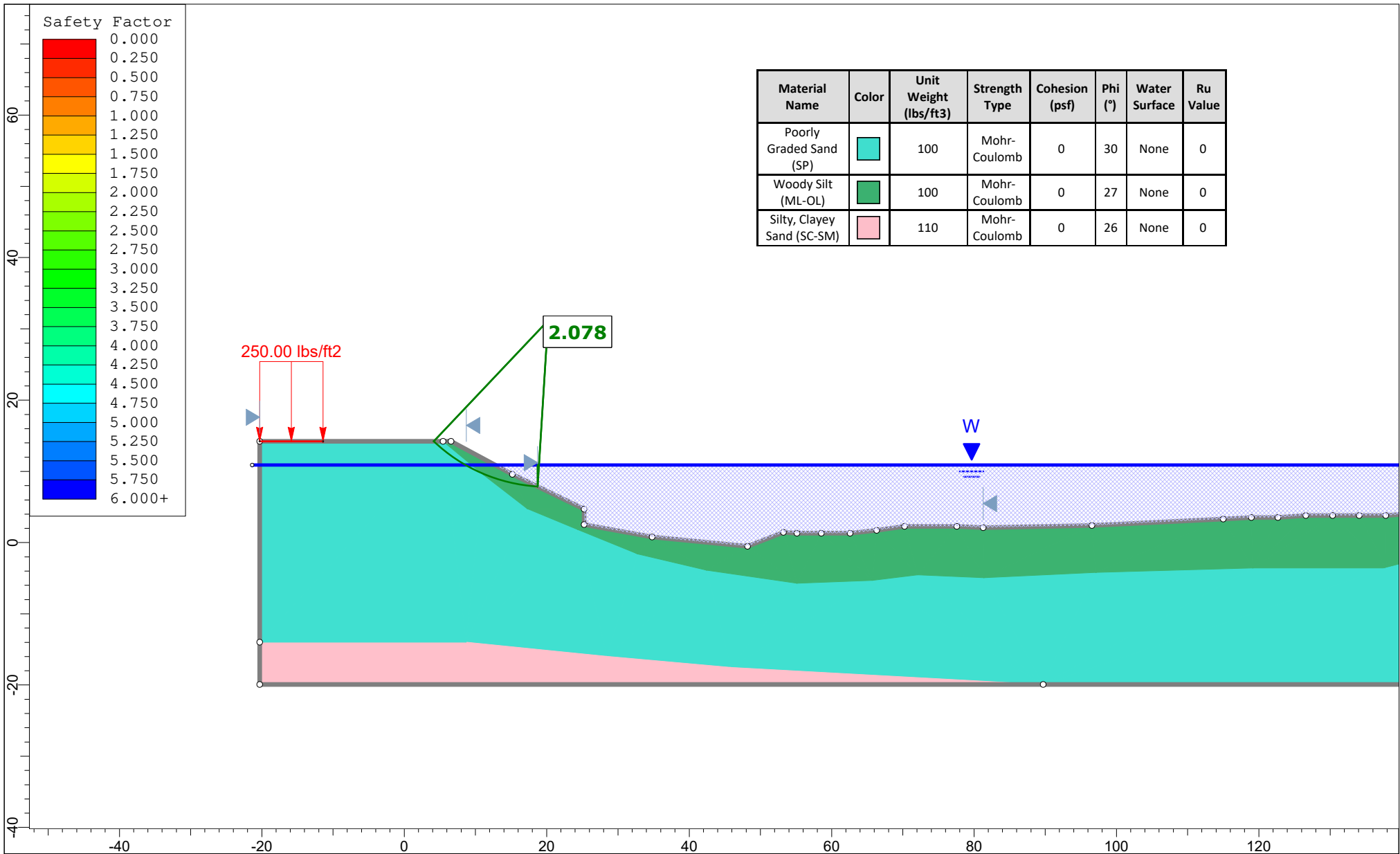
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Group	Section A-A'- Existing	Scenario	Existing- MHHW
Drawn By		Company	
Date	4/18/2025, 10:12:39 AM	File Name	JeldWenXS_Updated.slmd



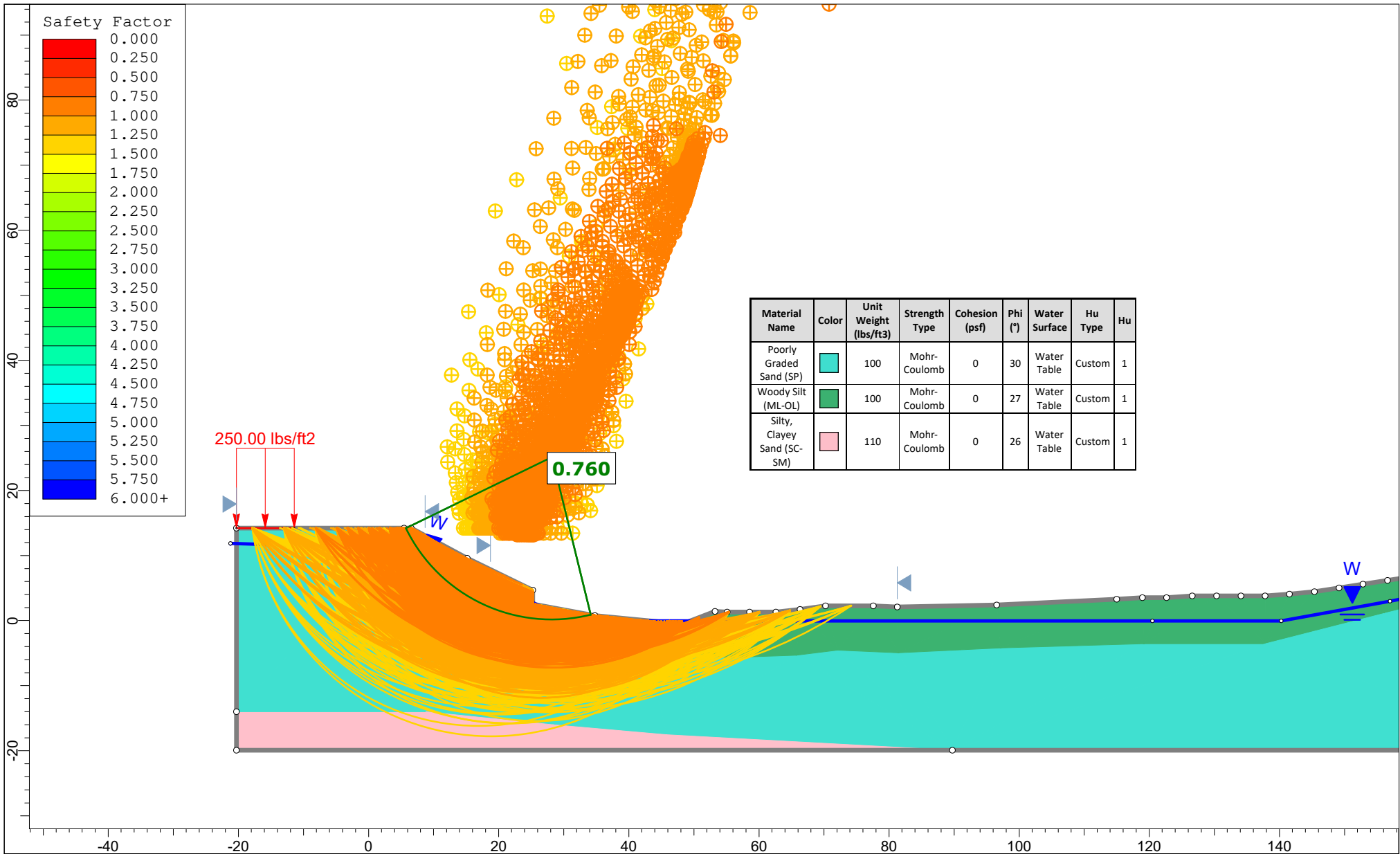
rocscience

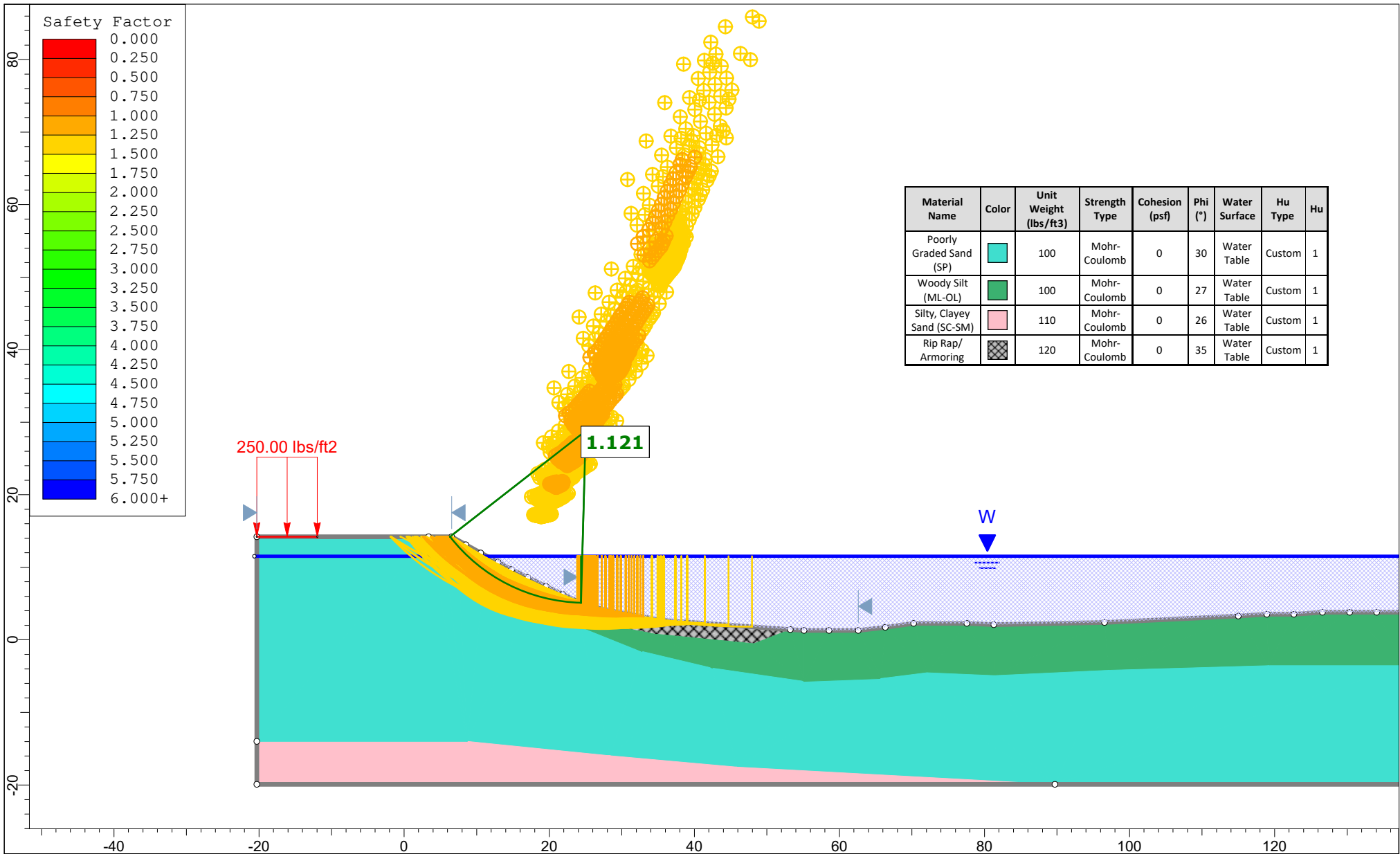
SLIDEINTERPRET 9.038

Project		Slide2 - An Interactive Slope Stability Program	
Group	Section A-A'- Existing	Scenario	Existing- MLLW
Drawn By		Company	
Date	4/18/2025, 10:12:39 AM	File Name	JeldWenXS_Updated.slmd

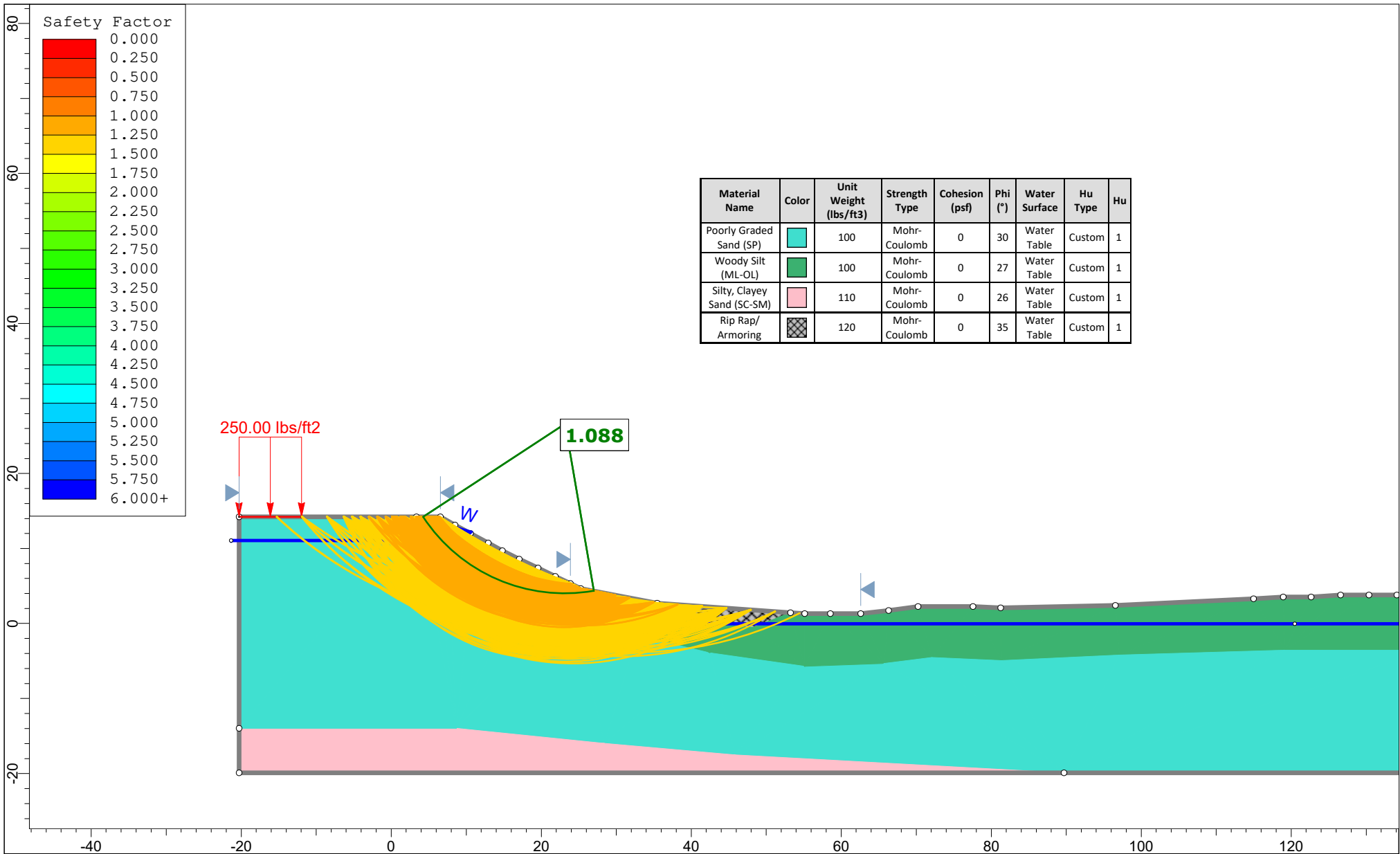


Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (°)	Water Surface	Ru Value
Poorly Graded Sand (SP)	■	100	Mohr-Coulomb	0	30	None	0
Woody Silt (ML-OL)	■	100	Mohr-Coulomb	0	27	None	0
Silty, Clayey Sand (SC-SM)	■	110	Mohr-Coulomb	0	26	None	0





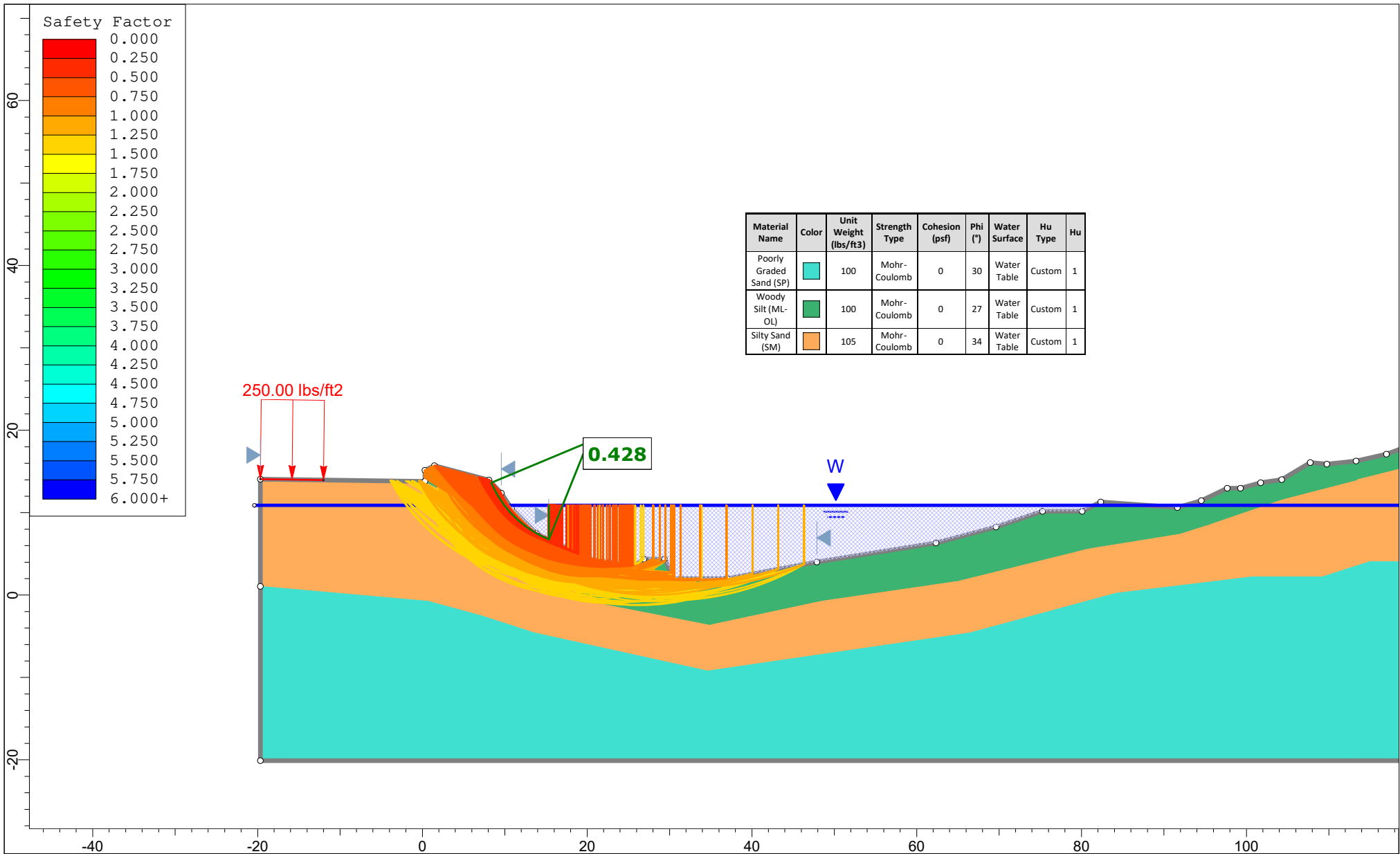
	Project		Slide2 - An Interactive Slope Stability Program	
	Group	Section A-A' -Cut and Cap	Scenario	Cut and Backfill- MHHW
	Drawn By		Company	
	Date	4/18/2025, 10:12:39 AM	File Name	JeldWenXS_Updated.slmd



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SLIDEINTERPRET 9.038

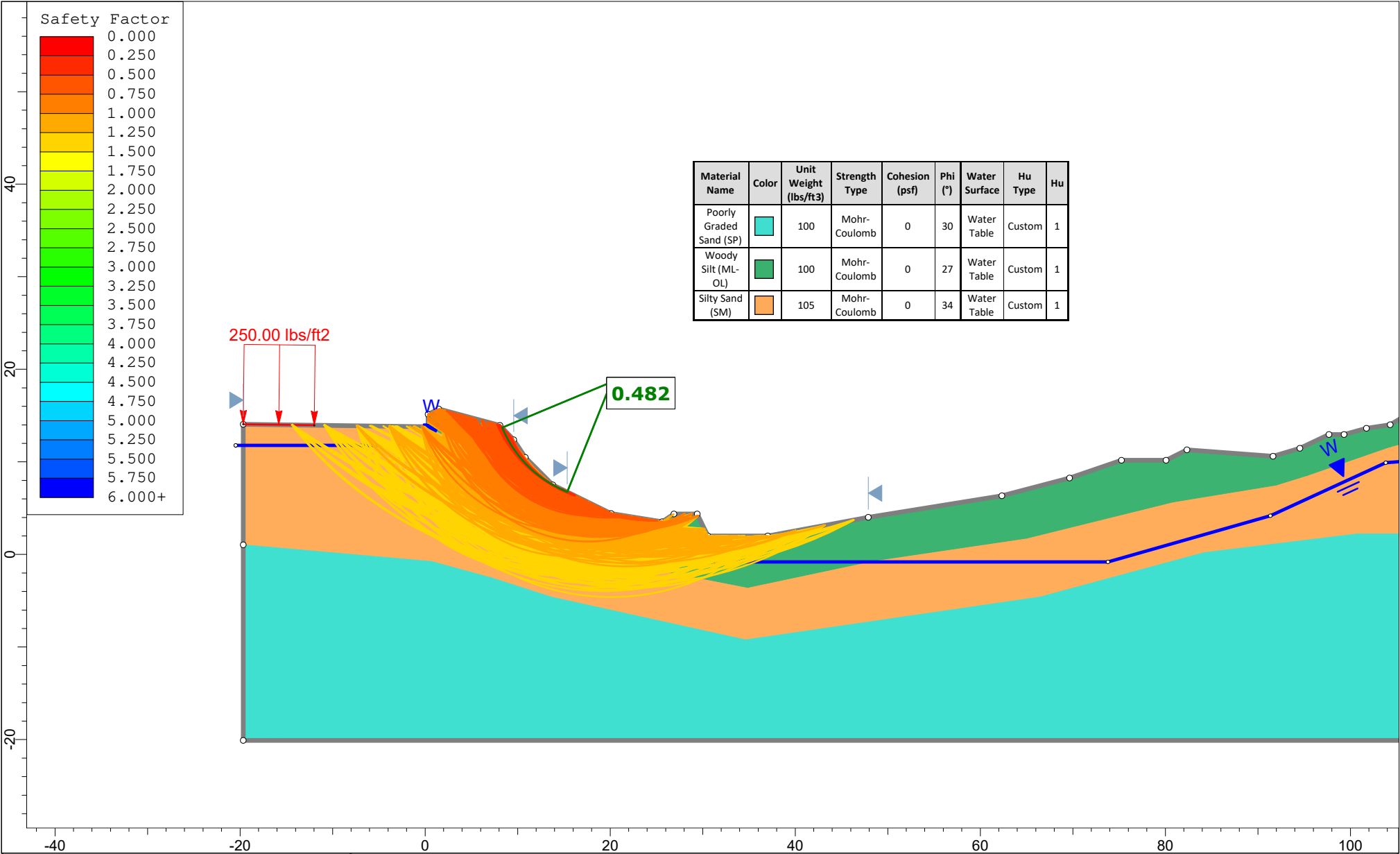
Project		Slide2 - An Interactive Slope Stability Program	
Group	Section A-A' -Cut and Cap	Scenario	Cut and Backfill- MLLW
Drawn By		Company	
Date	4/18/2025, 10:12:39 AM	File Name	JeldWenXS_Updated.slmd



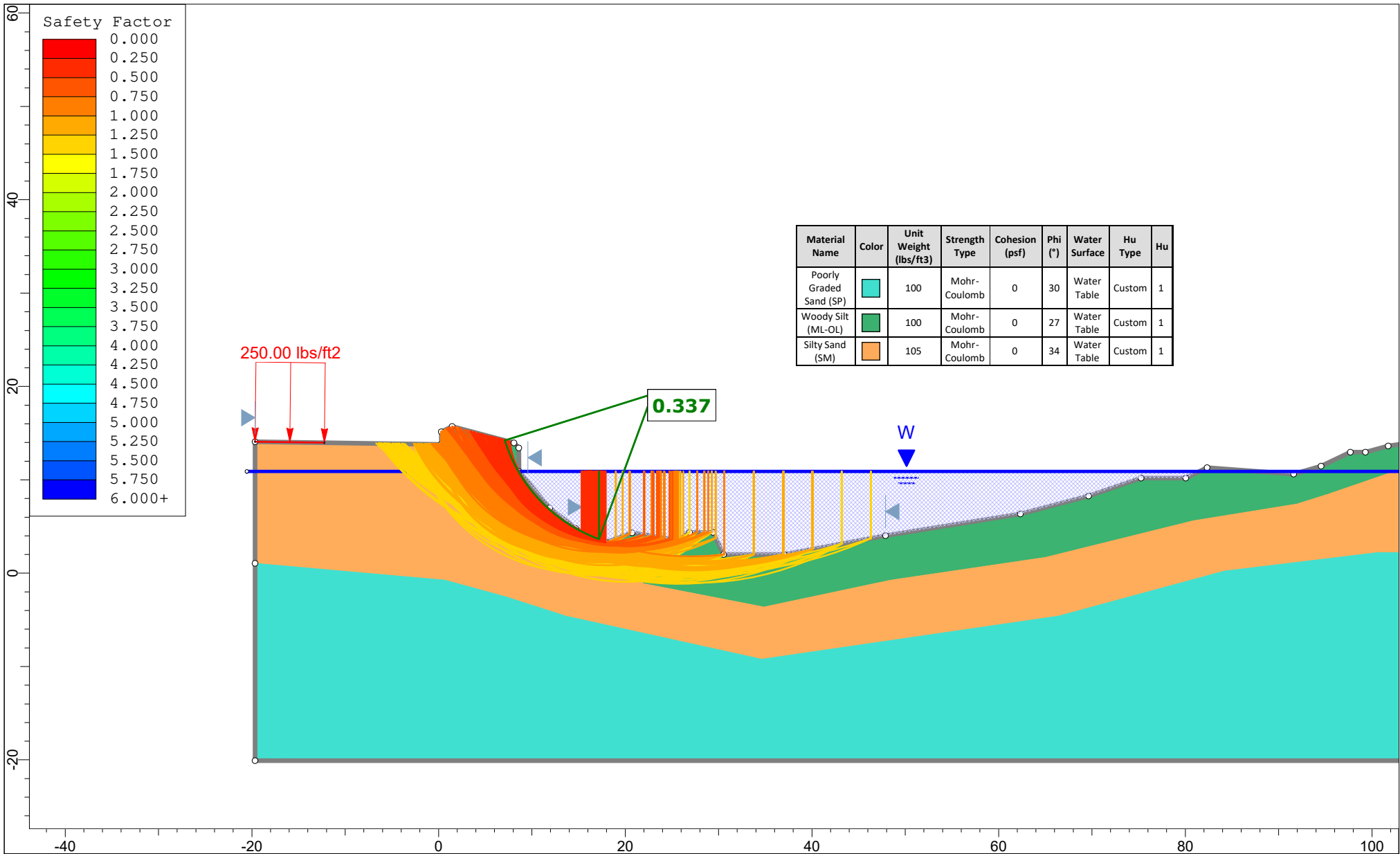
rocscience

SLIDEINTERPRET 9.038

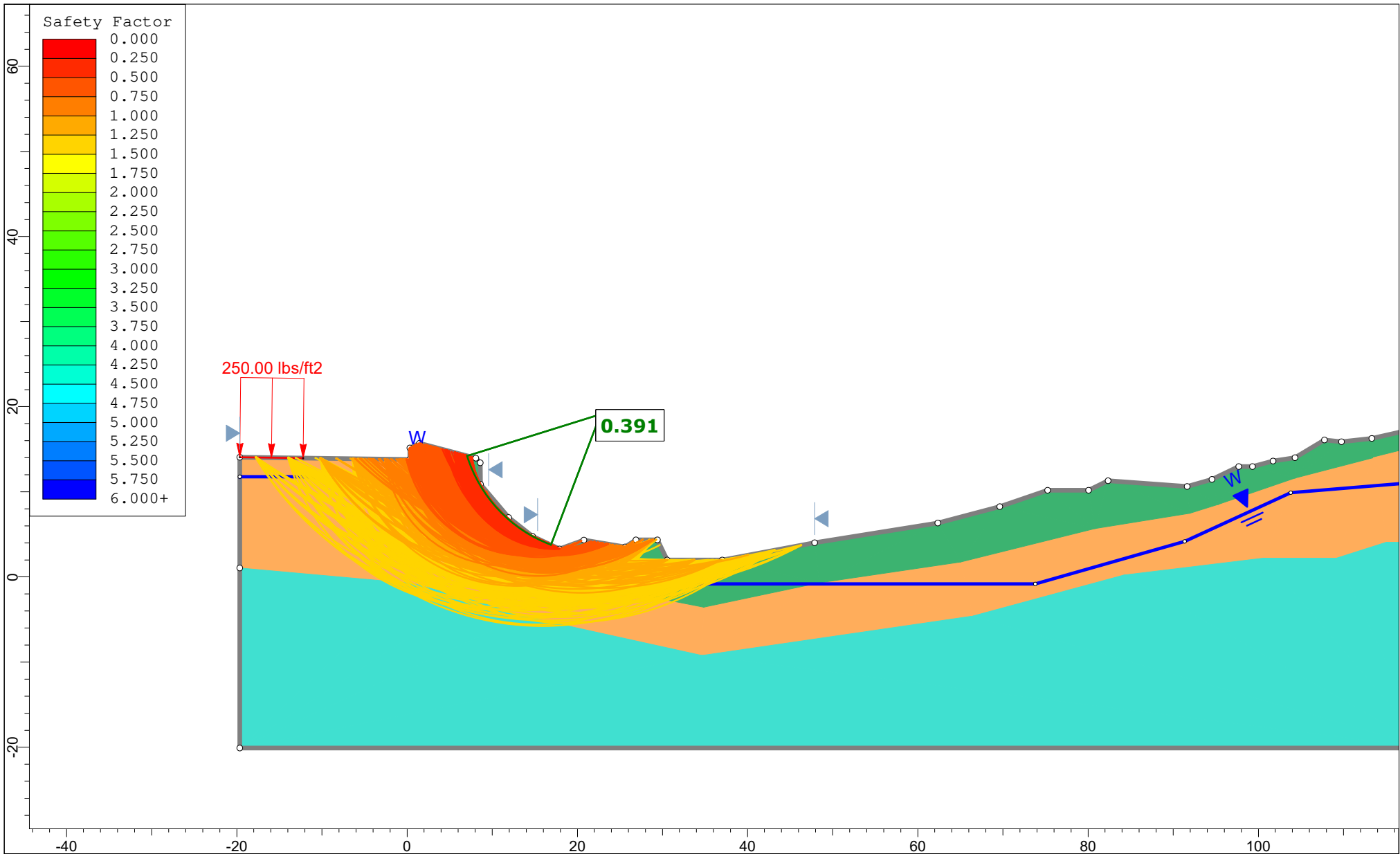
Project		Slide2 - An Interactive Slope Stability Program	
Group	Section B-B'- Existing	Scenario	Existing- MHHW
Drawn By		Company	
Date	4/18/2025, 10:12:39 AM	File Name	JeldWenXS_Updated.slmd



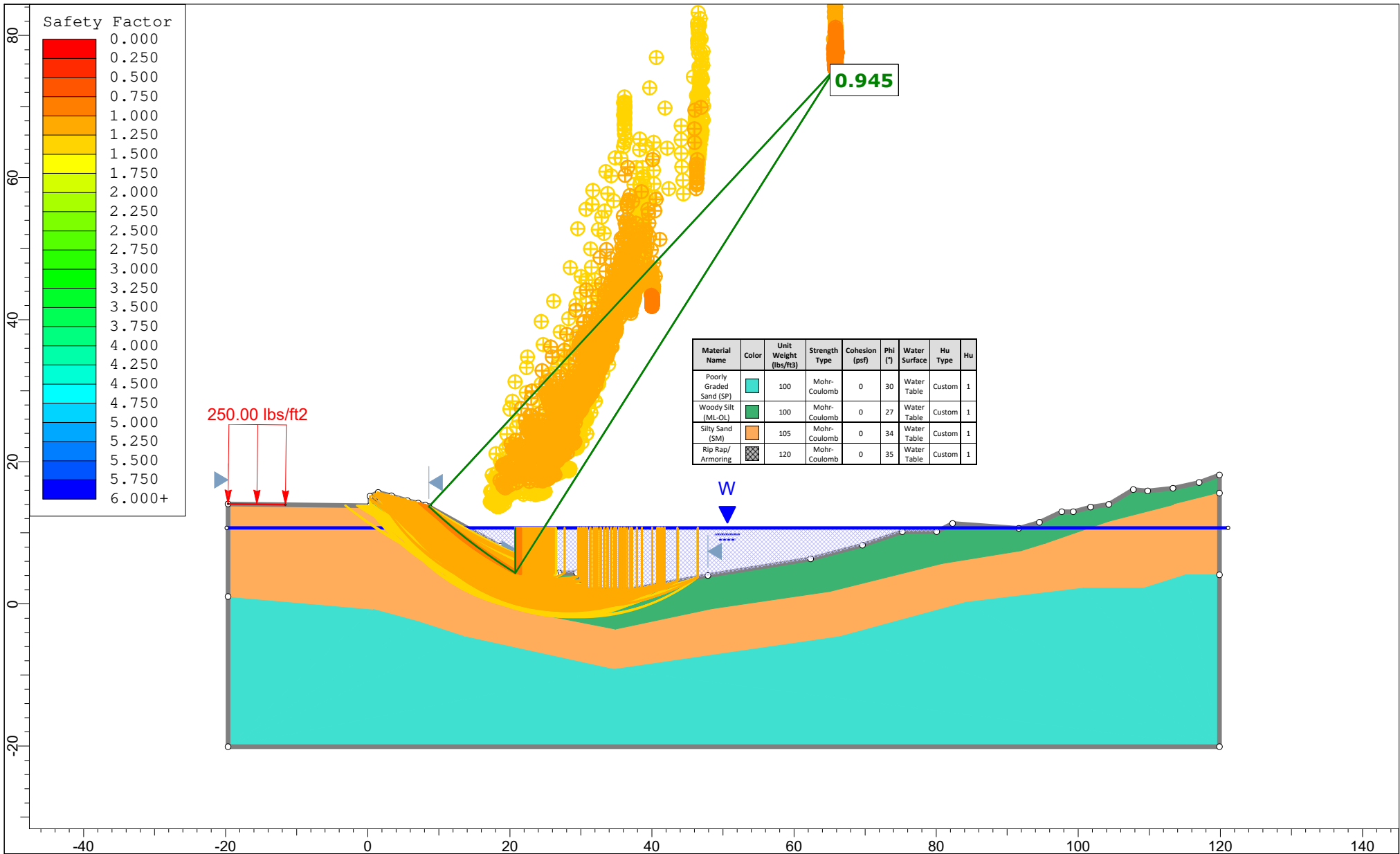
 SLIDEINTERPRET 9.038	ProjectSlide2 - An Interactive Slope Stability Program		
	Group	Section B-B'- Existing	ScenarioExisting- MLLW
	Drawn By		Company
	Date	4/18/2025, 10:12:39 AM	File NameJeldWenXS_Updated.slmd



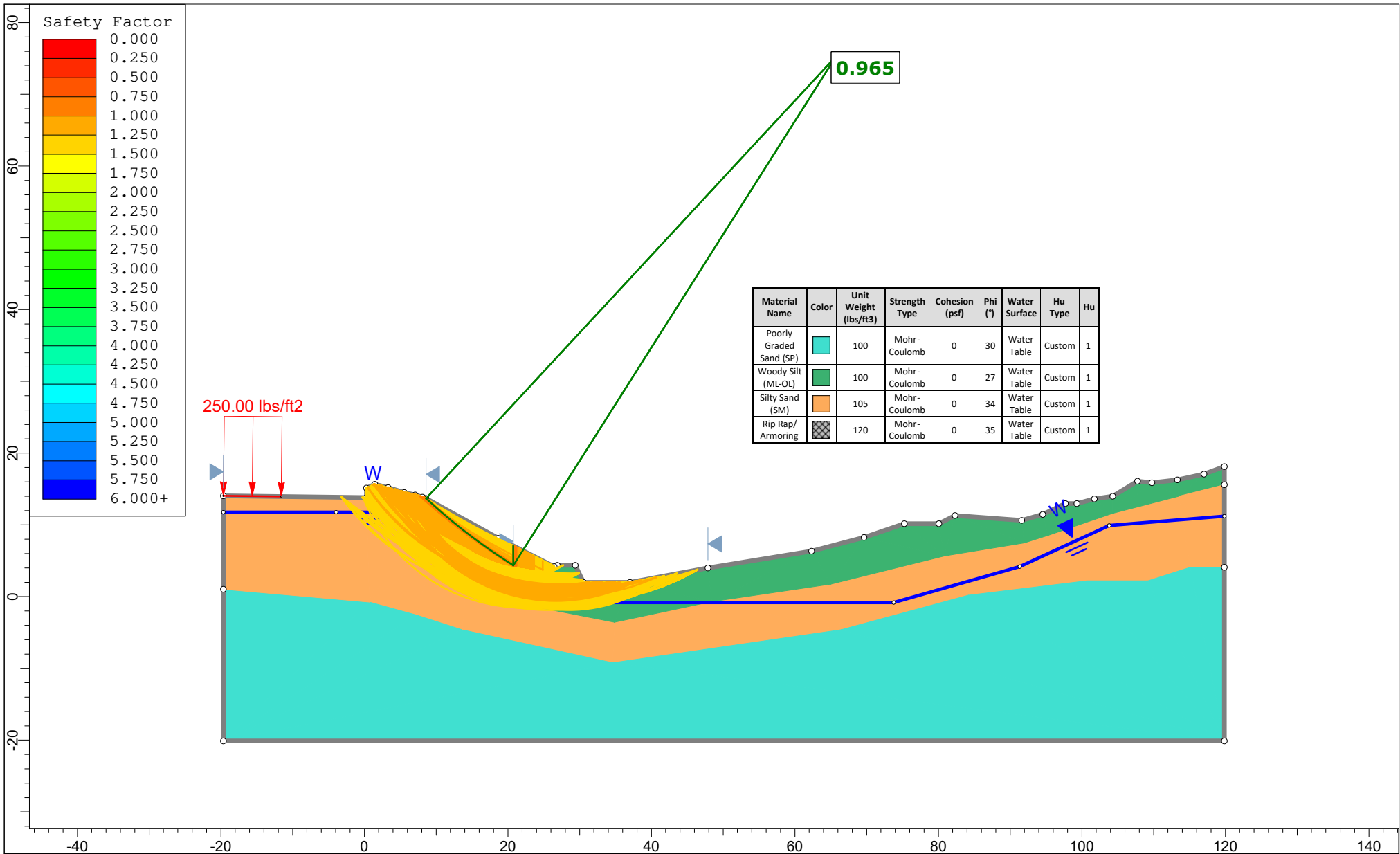
	Project			Slide2 - An Interactive Slope Stability Program		
	Group		Section B-B' -Dredge Cut		Scenario	Dredge Cut- MHHW
	Drawn By				Company	
	Date		4/18/2025, 10:12:39 AM		File Name	JeldWenXS_Updated.slmd
	SLIDEINTERPRET 9.038					



Project	Slide2 - An Interactive Slope Stability Program		
Group	Section B-B' -Dredge Cut	Scenario	Dredge Cut- MLLW
Drawn By		Company	
Date	4/18/2025, 10:12:39 AM	File Name	JeldWenXS_Updated.slmd



	Project		Slide2 - An Interactive Slope Stability Program	
	Group	Section B-B' -Cut and Cap	Scenario	Cut and Backfill- MHHW
	Drawn By		Company	
	Date	4/18/2025, 10:12:39 AM	File Name	JeldWenXS_Updated.slmd
	SLIDEINTERPRET 9.038			



rocscience

SLIDEINTERPRET 9.038

Project		Slide2 - An Interactive Slope Stability Program	
Group	Section B-B' -Cut and Cap	Scenario	Cut and Backfill- MLLW
Drawn By		Company	
Date	4/18/2025, 10:12:39 AM	File Name	JeldWenXS_Updated.slmd

Appendix C

Coastal Engineering Analysis

Memorandum

March 5, 2026

To: Washington State Department of Ecology and JELD-WEN, Inc.

From: Noah Billiter; Aaron Horine, PE, Anchor QEA

cc: John LaPlante, PE, Anchor QEA

Re: JELD-WEN Site Coastal Engineering Analysis

Overview

This memorandum summarizes the coastal engineering analysis supporting the shoreline armoring and marine sediment capping design at the JELD-WEN Site (Site) at 300 West Marine View Drive, Everett, Washington, 98201. The analysis considers wind-driven wave generation, sea level rise (SLR), and projected flood conditions to develop conservative rock sizing recommendations for shoreline armoring and engineered caps. The Site is at the confluence of the Snohomish River to the north and Port Gardner Bay (Possession Sound) to the west. Figure 1 shows the location of the Site and the surrounding area.

Figure 1
Project Site Location



Source: Google Earth (detailed view: May 2025; background map: April 2024)

The marine portions of the Site have been divided into three subareas (i.e., the Logway, South Shoreline, and Knoll Area) based on their physical location, characteristics, and cleanup actions (Figure 1). The Logway is defined as the channel along the northern edge of the property boundary, separating the Site and the neighboring Baywood property. The Logway is a tidally influenced, narrow, flat inlet bordered landward with a steep armored slope. Engineered caps and shoreline armoring are proposed in the Logway. The South Shoreline is defined as the marine area along the Site's southern shoreline, and shoreline armoring is being considered for this shoreline. The Knoll Area is an approximately 2-acre vegetated knoll at the southern end of the Site and is not addressed in this analysis.

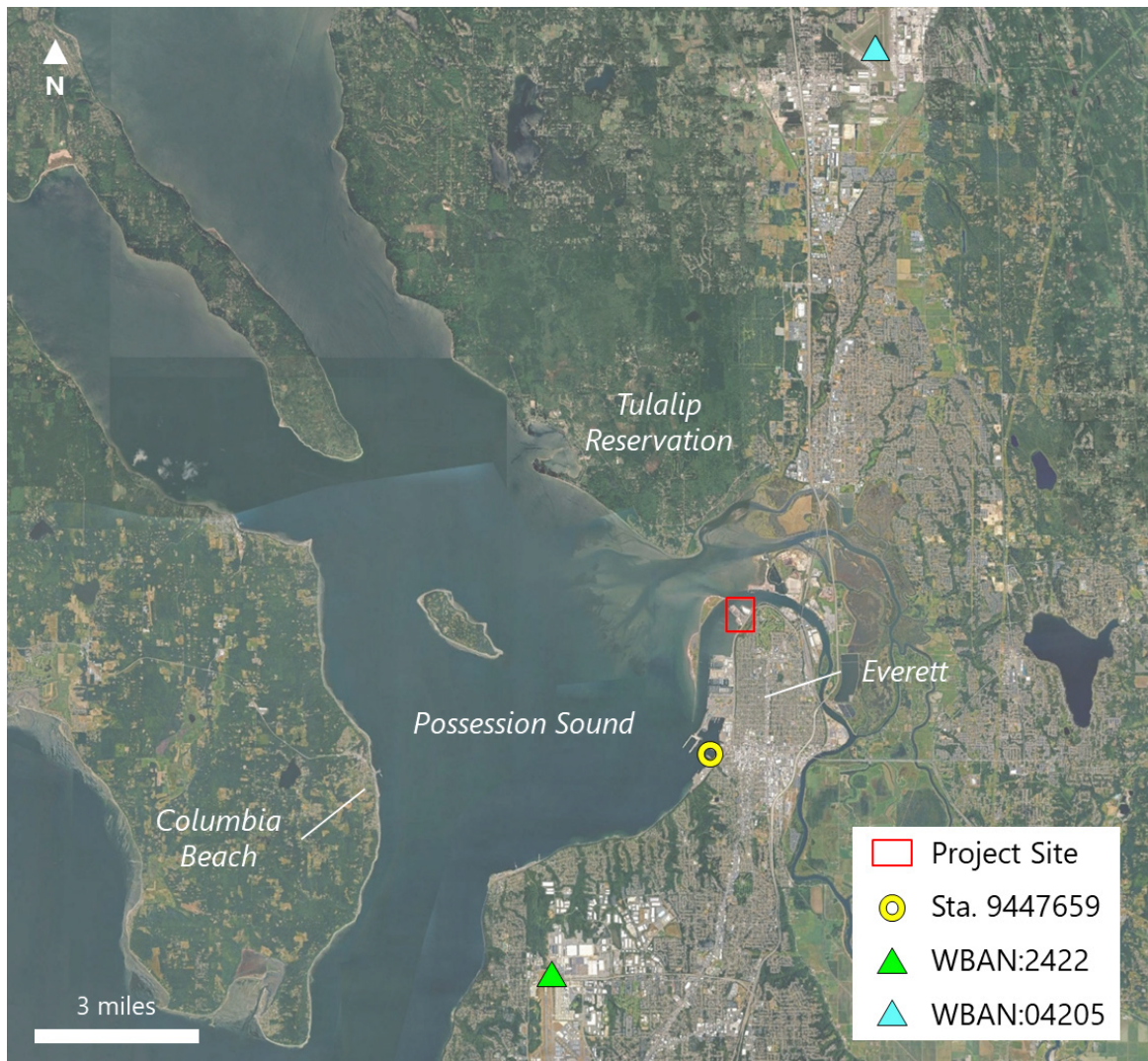
The purpose of this analysis is to estimate wind-driven wave impacts on the shoreline and proposed sediment caps under present and future sea levels and define coastal engineering design criteria for the Site. Anchor QEA developed a stationary wind-wave model to assess Site-specific wave exposure under varying water levels and wind conditions using guidance from the Washington State

Department of Ecology (Ecology; Asher et al. 2017) climate resilience framework. The results of this analysis were used to determine appropriate stone sizing using guidance from the *Coastal Engineering Manual* (CEM; USACE 2002).

Coastal Setting

The Site is situated within tidal flats at the confluence of the Snohomish River to the north and Port Gardner Bay (part of Possession Sound) to the west. Although no water level gauges are located directly at the Site, the National Oceanic and Atmospheric Administration (NOAA) tidal station in Everett (Station No. 9447659) provides representative datums (NOAA 2025a; see Figure 2). Wind data were collected from the National Centers for Environmental Information (NCEI) wind gauges at the Everett Snohomish County Airport, Washington (WBAN: 24222; NOAA 2025b) and Arlington Municipal Airport, Washington (WBAN:04205; NOAA 2025c). The Site is potentially exposed to wave energy generated across the long fetch of Possession Sound, as well as from shorter fetches within Port Gardner Bay and the Snohomish River. Projected SLR data for the Site under Representative Concentration Pathways (RCP) 4.5 and 8.5 scenarios are available through the Washington Coastal Hazards Resilience Network's visualization tool (Lavin et al. 2018).

Figure 2
Tide and Wind Stations



Source: Google Earth (May 2025)

Water Levels

Tidal datums for the area were sourced from the NOAA Tides and Currents database, Tidal Station 9447659: Everett (NOAA 2025a). In addition to tidal data, this analysis also accounts for extreme water levels from the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map for Snohomish County, Washington (FEMA 2020). The Site is in an AE-designated zone with a base flood elevation (BFE) or 100-year water level of +15.03 feet mean lower low water (MLLW) (+13.00 feet North American Vertical Datum of 1988 [NAVD88]). Table 1 lists the tidal datums and water levels of interest to this analysis relative to MLLW and NAVD88 for the current 19-year tidal epoch from 1983 to 2001.

Table 1
Potential Water Levels at the Site

Water Level	Elevations Relative to MLLW		Elevations Relative to NAVD88	
	Feet	Meters	Feet	Meters
FEMA BFE	15.0	4.6	13.0	4.0
MHHW	11.1	3.4	9.0	2.8
MSL	6.5	2.0	4.5	1.4
MLLW	0.0	0.0	-2.0	-0.6

Notes:

MHHW: mean higher high water

MSL: mean sea level

Asher et al. (2017), prepared for Ecology, provides guidelines to assess the vulnerability of a project site to several risk factors related to climate change, namely flooding, wildfire, landslide and erosion, drought, and SLR. The SLR memorandum prepared for this project (Anchor QEA 2020) designated the project as a long-term or high-risk remedial site that requires the consideration of SLR at the high end of the projections assumed for the end of the century, as well as inundation under both the BFE and mean higher high water (MHHW; Table 1).

The Washington Coastal Hazards Resilience Network's visualization tool (Lavin et al. 2018) was used to access SLR data for Snohomish County. The tool includes SLR projections for RCPs 4.5 and 8.5. RCP 4.5 is a low estimate in which greenhouse gas estimates stabilize by mid-century and decrease thereafter. RCP 8.5 is a high scenario in which there is a continued increase in greenhouse gases until the end of the 21st century. Table 2 summarizes the low and high estimates of relative SLR applicable to the Site.

Table 2
Projected Feet of SLR Relative to Percent Likelihood for Low (RCP 4.5) and High (RCP 8.5) Scenarios

Year	Low (RCP 4.5) Percent Likelihood					High (RCP 8.5) Percent Likelihood				
	1%	17%	50%	83%	99%	1%	17%	50%	83%	99%
2030	0.6	0.5	0.4	0.2	0.1	0.6	0.5	0.4	0.3	0.1
2040	0.9	0.7	0.5	0.4	0.1	1.0	0.7	0.5	0.4	0.2
2050	1.3	0.9	0.7	0.5	0.2	1.4	1.0	0.8	0.5	0.2
2060	1.8	1.2	0.9	0.6	0.3	1.9	1.3	1.0	0.7	0.4
2070	2.3	1.5	1.1	0.8	0.3	2.5	1.6	1.3	0.9	0.5
2080	2.9	1.7	1.3	0.9	0.4	3.3	2.0	1.5	1.1	0.6
2090	3.5	2.0	1.5	1.0	0.4	4.0	2.4	1.8	1.3	0.7
2100	4.3	2.4	1.7	1.2	0.4	5.0	2.9	2.2	1.6	0.7
2110	5.0	2.7	1.9	1.3	0.4	5.6	3.1	2.3	1.7	1.0

Year	Low (RCP 4.5) Percent Likelihood					High (RCP 8.5) Percent Likelihood				
	1%	17%	50%	83%	99%	1%	17%	50%	83%	99%
2120	5.9	3.0	2.1	1.4	0.5	6.7	3.6	2.7	1.9	1.1
2130	6.7	3.3	2.3	1.5	0.4	7.8	4.1	3.0	2.1	1.1
2140	7.8	3.7	2.5	1.6	0.3	8.9	4.6	3.3	2.3	1.2
2150	8.7	4.0	2.7	1.7	0.4	10.2	5.2	3.7	2.5	1.3

Notes:

Orange shading represents the likely range of SLR estimates suggested by Miller et al. (2018).

Blue shading represents the selected SLR scenario for this analysis.

Miller et al. (2018) states that the likely range of SLR is considered to fall between 83% and 17%. In this case, by 2100, SLR could reach 1.6 to 2.9 feet (0.49 to 0.88 meter) under RCP 8.5, which are shaded in orange in Table 2. Due to the high-risk categorization of the Site determined using Ecology guidance, at a minimum, the upper end of this range should be considered. Rather than accounting solely for the end-of-century estimate, this coastal engineering analysis will account for the 100-year SLR estimate using the RCP 8.5 50% likelihood estimate for 2130 of 3.0 feet (0.91 meter), shaded in blue in Table 2.

Winds

Wind data for the area were sourced from the NOAA NCEI online climate database. The Site lies between two wind stations: Everett Snohomish County Airport, Washington (WBAN:24222), and Arlington Municipal Airport, Washington (WBAN:04205). Both stations had a 20-year period of record from January 2005 to present. However, the Arlington Municipal Airport station is farther inland and east of the densely wooded Tulalip Reservation, so the Everett Snohomish County Airport station was selected for further analysis.

To estimate extreme winds, the annual maximum series method was applied by extracting the highest recorded wind speeds for each year within eight directional wind bins. A generalized extreme value distribution was then fitted to the data to predict wind speeds corresponding to various return periods. Figure 3 shows the resulting wind rose, and Table 3 lists the return-period winds for the Everett Snohomish County Airport station.

Figure 3
Everett Snohomish County Airport Wind Rose

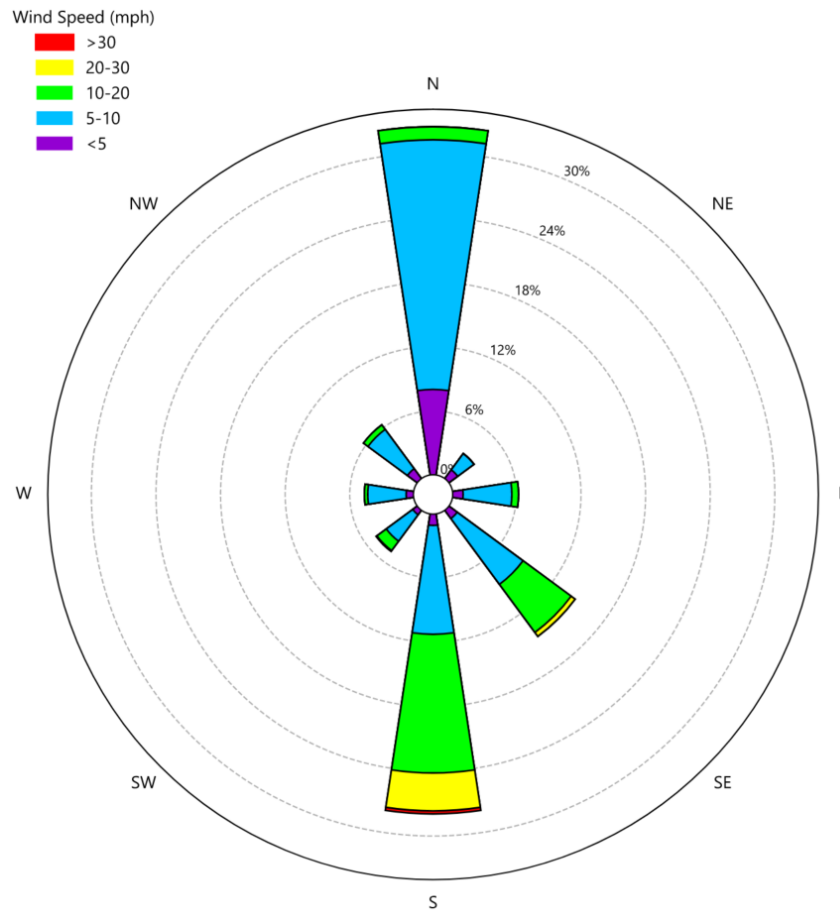


Table 3
Return-Period Winds for Everett Snohomish County Airport, Washington (WBAN:24222)

Direction (degrees)	1 Year (mph)	2 Year (mph)	10 Year (mph)	20 Year (mph)	50 Year (mph)	100 Year (mph)
0	12.6	15.3	17.5	18.2	19.0	19.6
45	7.6	10.7	13.3	14.1	15.0	15.6
90	8.7	16.9	20.9	22.4	24.3	25.8
135	17.4	23.4	31.5	34.5	38.1	40.6
180	30.3	37.8	44.0	46.0	48.2	49.7
225	15.8	25.0	32.4	34.8	37.5	39.3
270	13.7	15.7	20.4	22.5	25.2	27.2
315	12.3	16.4	19.8	20.9	22.1	23.0

Notes:
Only the 100-year return-period winds were used for wave estimation.
mph: mile per hour

Analysis of the station's wind records revealed that the predominant wind direction originated from the northern and southern bins. However, wind-induced wave generation is highly dependent on fetch length, or the distance over which wind blows uninterrupted across a body of water. The Site is exposed to wave energy generated from the west-northwest (WNW; 285°) across the long fetch of Possession Sound, as well as from shorter fetches within Port Gardner and the Snohomish River originating from south-southwest (SSW; 202.5°). Additionally, Jetty Island provides typical protection from direct wave action originating from the west (W); however, at the FEMA BFE, portions of Jetty Island are anticipated to be inundated, which could diminish its protective capacity. To account for future events, as per Ecology guidelines, this coastal engineering analysis will use the 100-year return-period winds originating from the WNW and SSW for all water level conditions, and an additional scenario with wind originating from the W (270°) for the FEMA BFE. The corresponding wind speeds are shaded in Table 3.

Topography/Bathymetry

Topographic and bathymetric data for the analysis in this study were gathered from various sources, as outlined in Table 4. Four topography and bathymetry datasets were available for the Site and surrounding region. Anchor QEA conducted lidar and multibeam echosounder (MBES) surveys of the Site's northern and southern shoreline in November 2024. The U.S. Army Corps of Engineers (USACE) public hydrographic survey data (USACE 2024) was used for the Snohomish River ship channel, and the NOAA Continuously Updated Digital Elevation Model (CUDEM; NOAA 2025d) was used for the remaining areas surrounding the Site.

Table 4
Bathymetric and Topographic Sources

Source	Date Collected	Description
NOAA CUDEM	Varies, accessed March 2025	Continuously updated coarse resolution bathymetry data
USACE hydrographic survey	April 4, 2024	Hydrographic survey of the Snohomish River ship channel
Anchor QEA North Survey (lidar and MBES)	November 15 and 18, 2024	Northern shoreline of Site
Anchor QEA South Survey (lidar)	November 15 and 18, 2024	Southern shoreline of Site

WAVE Model

A 2D wind-wave growth model was developed with the 2D Delft3D-WAVE (WAVE) model to simulate wind-generated waves and their propagation to the Site. The WAVE model is based on the Simulating Waves Nearshore (SWAN) wave model. The SWAN model simulates depth-induced wave refraction and shoaling, depth- and steepness-induced wave breaking, diffraction, wave growth from wind input, and wave-wave interaction (Deltares 2025). The model was forced with a uniform water level and steady extreme wind conditions, defined by a fixed wind magnitude and direction. Wave generation and propagation were driven purely by the applied wind forcing under stationary conditions.

This model relies on inputs using the international system of units, so the metric system will be used to describe model setup and inputs.

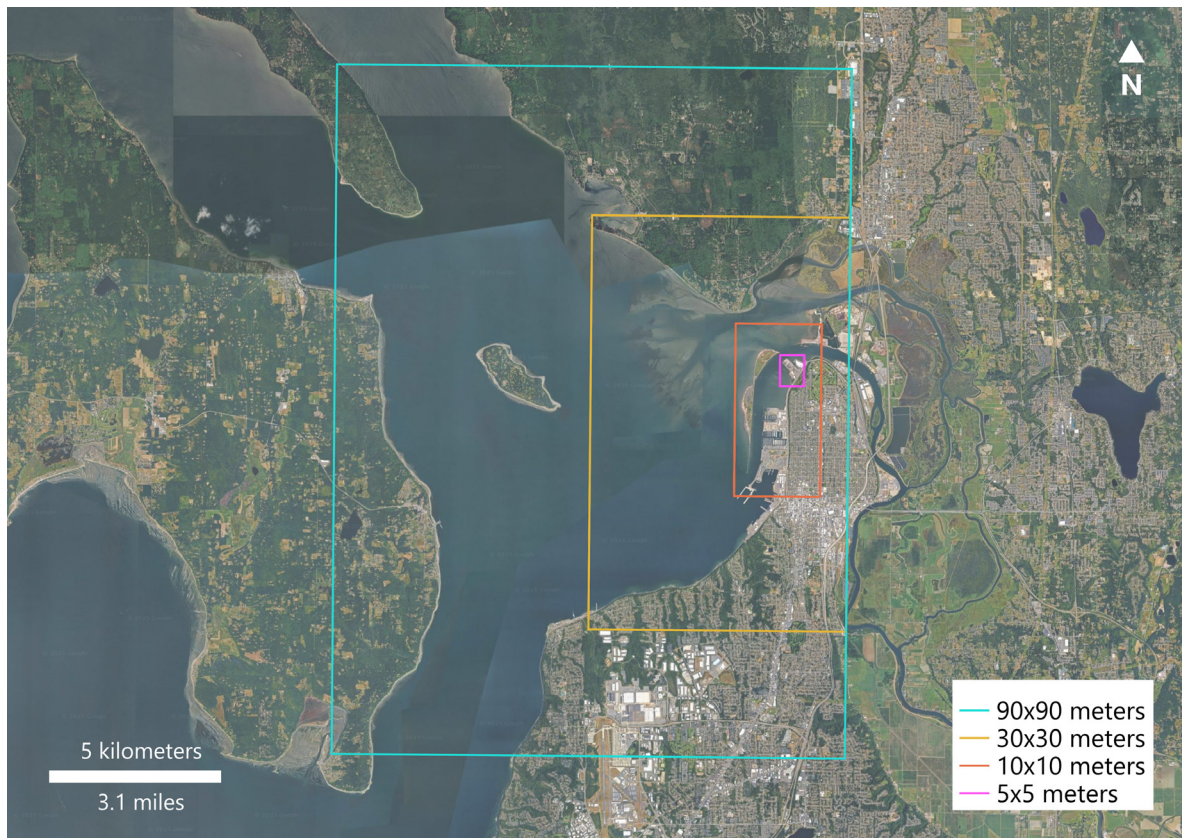
Model Development

A series of nested WAVE grids with variable resolution were developed for the overall model domain. The resolution of the nested wave grids starts at 90 by 90 meters in the far-field region and transitions incrementally down to 5 by 5 meters in the vicinity of the Site. The higher resolution near the Site was developed to adequately represent the existing conditions. Table 5 outlines the resolution of the nested grids, and Figure 4 shows them spatially.

Table 5
Nested WAVE Grid Resolution

Grid Resolution (meters)	Description
90 by 90	Possession Sound
30 by 30	Shallow areas of the Possession Sound and Steamboat Slough delta
10 by 10	Port Gardner Bay, Snohomish River, and major inlets
5 by 5	Project Site

Figure 4
Nested WAVE Grids



Bathymetric and topographic data for the Delft3D model were gathered from various sources, as outlined in the Coastal Setting section. The data were converted into meters NAVD88 and assimilated to develop a model surface encompassing the full grid extents. The shipwrecks found north of the Site were not present in the existing bathymetric data, so they were manually added to the model surface by creating polygons with a set elevation of 3.0 meters NAVD88 (slightly above MHHW). Two wooden breakwaters were also identified near the Site—one extending from the shipwrecks and another constricting the Logway Inlet—neither of which were represented in the existing bathymetric data. It was assumed that these breakwaters will be maintained in the future and, accordingly, were included in the modeled conditions for this analysis.

No information was available regarding the design or cross section of the breakwaters, so a visual analysis was conducted using Google Earth imagery to approximate input characteristics. The two breakwaters were added to the model domain as obstacles with a crest height of 3.0 meters NAVD88. To account for wave transmission and reflection, the breakwaters were modeled as vertical thin walls with reflection coefficients selected based on their apparent porosity using methodology set forth by Allsop and Hettiarachchi (1989) for reflection off of single wave screens.

Figure 5 shows the overall model surface developed for this analysis, and Table 6 outlines the input characteristics selected for each breakwater. Although modeling efforts within this 60% EDR are limited to existing conditions with breakwaters in place, future verification modeling will be conducted without the Logway and Shipwreck breakwaters in place to account for future removal scenarios.

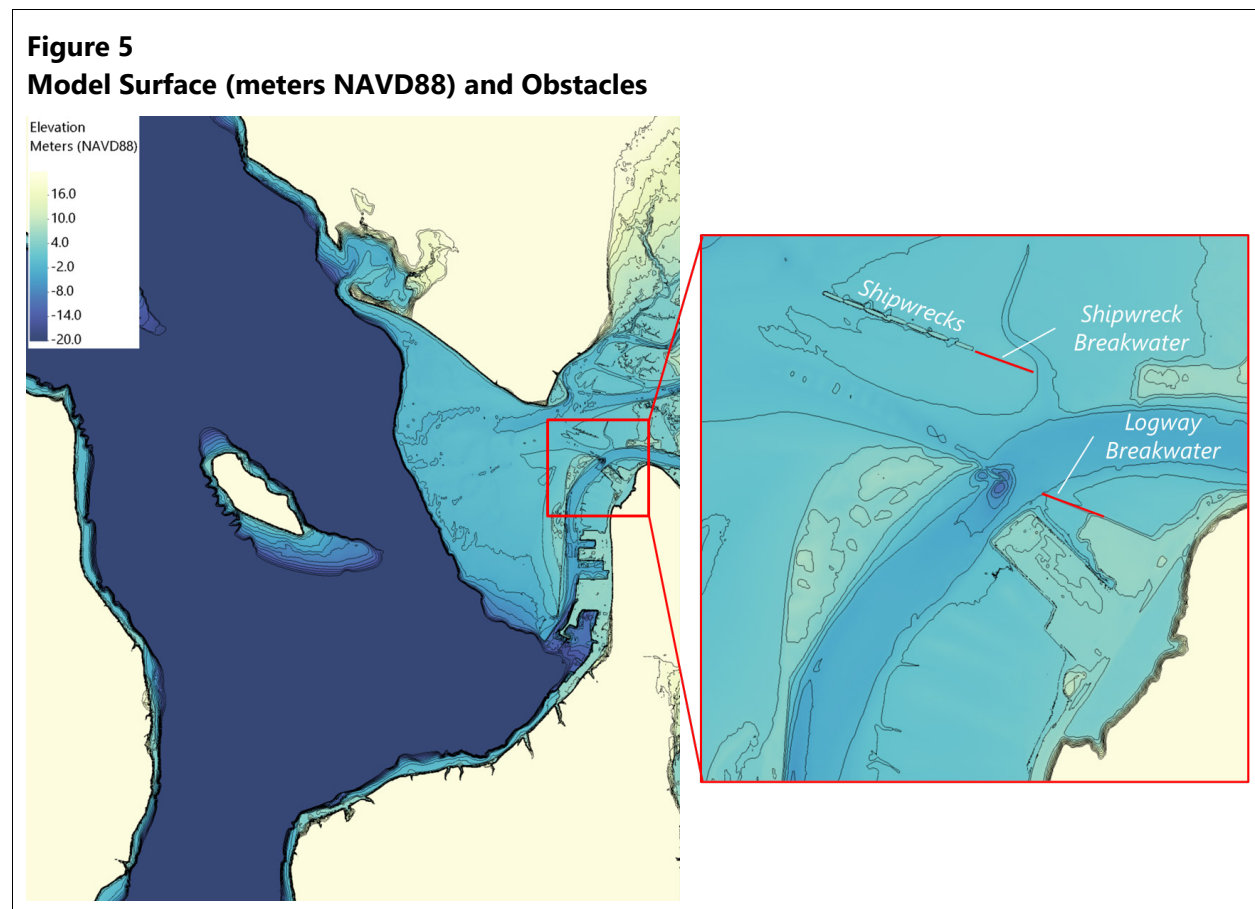


Table 6
Obstacle Characteristics

Obstacle	Crest Height (meters NAVD88)	Obstacle Type	Reflection Coefficient
Shipwreck breakwater	3.0	Vertical thin wall	0.3
Logway breakwater	3.0	Vertical thin wall	0.4

Note:

The obstacle type is used by the model to define a transmission coefficient based on the water depth, crest height, and incoming wave height using methodology developed by Goda et al. (1967). Hence, the transmission coefficient changes based on the input conditions, while the reflection coefficient remains constant.

Model Scenarios

The stationary wave model requires an input water level and wind case for analysis. As discussed in the Coastal Setting section, Ecology requires the consideration of SLR and inundation under both the BFE and MHHW for long-term or high-risk sites. Hence, the water levels selected were MHHW, MHHW with 100 years of SLR, BFE, and BFE with 100 years of SLR. To account for future events per Ecology guidelines, the model will use 100-year return-period winds originating from WNW and SSW for all water level conditions, and an additional scenario with wind originating from W for the BFE and BFE with SLR scenarios. Table 7 lists the 10 resulting model scenarios.

Table 7
Model Scenarios

Scenario	WSE Case	Water Level (meters NAVD88)	Return-Period Wind Case	Wind Direction (degrees)	Wind Speed (m/s)
1	MHHW	2.8	WNW 100 year	285.0	12.2
2	MHHW	2.8	SSW 100 year	202.5	22.2
3	MHHW + SLR	3.7	WNW 100 year	285.0	12.2
4	MHHW + SLR	3.7	SSW 100 year	202.5	22.2
5	FEMA BFE	4.0	WNW 100 year	285.0	12.2
6	FEMA BFE	4.0	SSW 100 year r	202.5	22.2
7	FEMA BFE	4.0	W 100 year	270.0	12.2
8	FEMA BFE + SLR	4.9	WNW 100 year	285.0	12.2
9	FEMA BFE + SLR	4.9	SSW 100 year	202.5	22.2
10	FEMA BFE + SLR	4.9	W 100 year	270.0	12.2

Notes:

WSE: water surface elevation

m/s: meter per second

Model Results

Observation points were set around the northern and southern shorelines of the Site to collect significant wave heights and periods for each model scenario (Figure 6). Of the 26 observation points, 6 were found within the areas where the Site may require shoreline armoring or capping. Points N1, N3, N6, and N8 were selected for the Logway, and points S4, S7, and S8 were selected for the South Shoreline. Point N1 is representative of wave conditions without shielding from the Logway Breakwater. Table 8 lists the highest resulting wave heights and periods across all scenarios for each input water surface elevation (WSE) at the six observation points.

Figure 6
Observation Points



Table 8
Model Results

Observation Point	WSE Case	Return-Period Wind Case	Significant Wave Height (meters)	Wave Period (seconds)
N1	MHHW	WNW 100 year	0.4	1.8
	MHHW + SLR	WNW 100 year	0.3	1.7
	FEMA BFE	WNW 100 year	0.3	1.7
	FEMA BFE + SLR	WNW 100 year	0.3	1.5
N3	MHHW	WNW 100 year	0.2	1.5
	MHHW + SLR	WNW 100 year	0.3	1.6
	FEMA BFE	WNW 100 year	0.3	1.7
	FEMA BFE + SLR	SSW 100 year	0.4	1.6
N6	MHHW	WNW 100 year	0.1	1.4
	MHHW + SLR	WNW 100 year	0.2	1.5
	FEMA BFE	WNW 100 year	0.2	1.5
	FEMA BFE + SLR	SSW 100 year	0.4	1.8
N8	MHHW	WNW 100 year	0.1	1.3
	MHHW + SLR	WNW 100 year	0.1	1.4
	FEMA BFE	WNW 100 year	0.1	1.4
	FEMA BFE + SLR	SSW 100 year	0.3	1.7
S4	MHHW	SSW 100 year	0.6	2.1
	MHHW + SLR	SSW 100 year	0.7	2.3
	FEMA BFE	SSW 100 year	0.8	2.3
	FEMA BFE + SLR	SSW 100 year	0.9	2.4
S7	MHHW	SSW 100 year	0.6	2.0
	MHHW + SLR	SSW 100 year	0.6	2.1
	FEMA BFE	SSW 100 year	0.6	2.1
	FEMA BFE + SLR	SSW 100 year	0.8	2.4
S8	MHHW	SSW 100 year	0.5	2.0
	MHHW + SLR	SSW 100 year	0.5	2.0
	FEMA BFE	SSW 100 year	0.6	2.1
	FEMA BFE + SLR	SSW 100 year	0.8	2.4

Design/Rock Sizing

The results of the stationary wave model were used to define coastal engineering design criteria for shoreline armoring along select sections of the South Shoreline and Logway and capping for select sediment management areas in the Logway. The USACE CEM (USACE 2002) outlines a variety of

empirical rock sizing methods for submerged, overtopped, and non-overtopped structures, all of which were analyzed for applicability for each of the design scenarios.

Rock Sizing Methodology

This analysis requires a variety of rock sizing methods due to the variation in input water levels, resulting wave heights and periods, and rock structure geometry. The crest height of the revetment used for shoreline armoring was estimated to be 3.7 meters NAVD88 based on the lidar data collected by Anchor QEA in November 2024. The slope for the South Shoreline armoring is designed to be 3 horizontal to 1 vertical (H:V), and the slope for the Logway shoreline armoring is to be 2H:1V due to spatial restrictions and lower wave heights present. The engineered cap elevation was set between 0.0 to 0.3 meter (0.0 to 1.0 foot) above existing ground.

For the shoreline armoring at the South Shoreline and Logway, a crest elevation of 3.7 meters NAVD88 requires rock sizing using methods for submerged structures for the FEMA BFE and BFE with SLR scenarios, overtopped structures for MHHW with SLR, and non-overtopped structures for MHHW.

For the engineered cap at the Logway, the Hydraulic Design of Flood Control Channels Manual (EM 1110-2-1601), as referenced in the CEM (USACE 2002), was considered for the analysis of “blanket stability in current fields.” This method incorporates wave-induced bottom currents captured in the model output as orbital velocities at the seabed to evaluate the potential for sediment mobilization beneath the wave action. However, the resulting orbital velocities at the Logway were too small, and this method was deemed inapplicable. Instead, the methodology for rock sizing for submerged structures was employed.

The specific empirical rock sizing methods defined in the CEM (USACE 2002) applied to each scenario are listed in Table 9. These were chosen based on their applicability and level of conservatism.

Table 9
Rock Sizing Methods

Armor Type	WSE Case	Rock Sizing Case	Selected Methodology from CEM
Shoreline armoring	MHHW	Non-overtopped	Hudson (1961) or Van der Meer (1988) shallow water (at higher ground elevations)
	MHHW + SLR	Overtopped	Average of Kramer and Burcharth (2004), Van der Meer (1992), and Burcharth (2006)
	FEMA BFE	Submerged	Van der Meer (1992)
	FEMA BFE + SLR		
Engineered cap	MHHW	Submerged	Van der Meer (1992)
	MHHW + SLR		
	FEMA BFE		
	FEMA BFE + SLR		

Rock Sizing Design

The stable median rock diameter (D_{50}) sizes resulting from this analysis are listed in Tables 10, 11, and 12. The model scenarios were selected based on which water level and wind combination resulted in the highest wave heights at that point. This analysis ignores wave direction and assumes all waves propagate perpendicular to the structure.

Table 10
South Shoreline Armoring

Observation Point	WSE Case	Return-Period Wind Case	D_{50} (feet)	D_{50} (inches)
S4	MHHW	SSW 100 year	0.69 ^a	8.3 ^a
	MHHW + SLR	SSW 100 year	0.92	11.0
	FEMA BFE	SSW 100 year	0.51	6.2
	FEMA BFE + SLR	SSW 100 year	0.46	5.5
S7	MHHW	SSW 100 year	0.87 ^a	10.4 ^a
	MHHW + SLR	SSW 100 year	0.78	9.4
	FEMA BFE	SSW 100 year	0.40	4.8
	FEMA BFE + SLR	SSW 100 year	0.41	4.9
S8	MHHW	SSW 100 year	0.57 ^a	6.9 ^a
	MHHW + SLR	SSW 100 year	0.66	7.9
	FEMA BFE	SSW 100 year	0.40	4.8
	FEMA BFE + SLR	SSW 100 year	0.40	4.8

Note:

a. Values were calculated using the Hudson equation.

Table 11
Logway Shoreline Armoring

Observation Point	WSE Case	Return-Period Wind Case	D ₅₀ (feet)	D ₅₀ (inches)
N1	MHHW	WNW 100 year	0.49	5.9
	MHHW + SLR	WNW 100 year	0.26	3.1
	FEMA BFE	WNW 100 year	0.2	2.4
	FEMA BFE + SLR	WNW 100 year	0.21	2.6
N6	MHHW	WNW 100 year	0.13	1.5
	MHHW + SLR	WNW 100 year	0.28	3.4
	FEMA BFE	WNW 100 year	0.23	1.8
	FEMA BFE + SLR	SSW 100 year	0.22	2.7
N8	MHHW	WNW 100 year	0.15	1.8
	MHHW + SLR	WNW 100 year	0.14	1.6
	FEMA BFE	WNW 100 year	0.09	1.1
	FEMA BFE + SLR	SSW 100 year	0.16	1.9

Notes:

Point N1 is found in an area that will not require shoreline armoring but to approximate without breakwater conditions; it is selected as an observation point for Logway Armoring.

Table 12
Logway Engineered Cap Armoring

Observation Point	WSE Case	Return-Period Wind Case	D ₅₀ (feet)	D ₅₀ (inches)
N1	MHHW	WNW 100 year	0.09	1.1
	MHHW + SLR	WNW 100 year	0.06	0.8
	FEMA BFE	WNW 100 year	0.06	0.8
	FEMA BFE + SLR	WNW 100 year	0.06	0.8
N3	MHHW	WNW 100 year	0.05	0.6
	MHHW + SLR	WNW 100 year	0.06	0.8
	FEMA BFE	WNW 100 year	0.06	0.8
	FEMA BFE + SLR	SSW 100 year	0.07	0.9
N6	MHHW	WNW 100 year	0.03	0.4
	MHHW + SLR	WNW 100 year	0.04	0.6
	FEMA BFE	WNW 100 year	0.04	0.6
	FEMA BFE + SLR	SSW 100 year	0.07	0.9
N8	MHHW	WNW 100 year	0.03	0.4
	MHHW + SLR	WNW 100 year	0.03	0.4
	FEMA BFE	WNW 100 year	0.03	0.4
	FEMA BFE + SLR	SSW 100 year	0.05	0.7

Additional analysis was conducted at the head of the Logway to account for scour originating from stormwater flow from the large outfall in the head of the area, located immediately southeast of observation point N9. The outfall has a maximum design flow of 2,500 gallons per minute, or approximately 5.5 cubic feet per second, providing flows significant enough to displace smaller diameter material. An analysis using the Abt and Johnson method from USACE Technical Supplement 14C was conducted to provide rock sizing minimums adjacent to the outfall, the results of which are available in Table 13 (Abt and Johnson 1991; USACE 2007). Channel widths of 4 feet, 8 feet and 10 feet were taken as representative widths of the outflow based on aerial measurements of previous discharge events.

Table 13
Rock Sizing – Logway Head Outflow

Channel Width (ft)	Slope (°)	Unit Discharge (ft ³ /ft)	D ₅₀ (feet)	D ₅₀ (inches)
10	4	0.56	0.12	1.4
	8	0.56	0.13	1.6
	12	0.56	0.20	2.4
8	4	0.70	0.16	1.9
	8	0.70	0.18	2.2
	12	0.70	0.27	3.3
4	4	1.39	0.19	2.3
	8	1.39	0.22	2.6
	12	1.39	0.32	3.8

Note:
ft³/ft: cubic foot per foot

The results of this analysis indicate that the most conservative design conditions do not always correlate with the largest waves. The FEMA BFE and FEMA BFE with SLR fully submerge the structures, but the relatively deep water and small waves result in little impact to the structure itself. This is especially evident in the resulting rock sizing for the engineered cap; it is too deep to be severely impacted by any of the incident waves regardless of WSE.

The design scenario selected for the South Shoreline armoring was the rock size resulting from the 100-year wind-induced waves originating from SSW at MHHW with SLR. Though conservative, this armor stone size accounts for future impacts and accommodates Ecology requirements. The design armor stone selected will have a D₅₀ of approximately 11 inches.

For the Logway, the shoreline armoring rock size resulting from the 100-year wind-induced waves originating from WNW at MHHW was selected. The resulting armor stone D₅₀ from this analysis is 6 inches. However, due to inadequate existing suitable gradations, and to simplify construction materials, the Logway will be constructed with the same armor stone and filter layers as seen on the

South Shoreline. Available gradations selected for each layer are available in Table 14, with more information available in Section 8.5 of the EDR. The thickness of each armor layer is also provided, being a minimum of two times the D₅₀ of its respective gradation. The chemical isolation, filter, and bedding layers are all 6 inches thick for constructability purposes.

Table 14
Layer Gradation Selections and Thicknesses

Area	Layer Name	D ₅₀ (inches)	Selected Gradation	Layer Thickness (inches)
Engineered Cap	Chemical Isolation Layer	0.0234	Clean Sand	6.0
	Sand/Gravel Filter Layer	0.375	Washington DOT Standard Specification 9-03.11(1) Streambed Sediment	6.0
	Washington Quarry Spalls Armor Layer	4.0	Washington DOT Standard Specification 9-13.1 (5) Quarry Spalls	12.0 or 6.0 (Head of Logway)
Head of Logway (Additional to Engineered Cap)	Head of Logway Armor Layer	11.0	USACE R-400 Graded Armor Layer	24.0
Logway and South Shoreline	Bedding Filter Layer	0.375	Washington DOT Standard Specification 9-03.11(1) Streambed Sediment	6.0
	Intermediate Bedding Layer	4.0	Washington DOT Standard Specification 9-13.1 (5) Quarry Spalls	6.0
	Armor Layer	11.0	USACE R-400 Graded Armor Layer	24.0

Note:
DOT: Department of Transportation

Filtration Analysis

To minimize the potential for base material wash-out or inefficient filtration, analyses were conducted based on recommended remedial cap design and armoring materials for two separate site locations. One analysis was performed for the cap and armor scenario along the Logway and South Shoreline, while the other focused on the bedding and armor scenario along the engineered cap. Gradation data collected from each area's native sediment layer were compared to design values for capping and armoring layers. These design values were selected during the coastal evaluation process and thus used as a basis to inform the analysis. Criteria developed by Terzaghi and USACE (Cedergren 1989) were used to determine an acceptable range of gradation values for each layer:

Equation 1: Filter Criteria

1. $D_{15} \text{ (Armor)} < 5D_{85} \text{ (Base)}$
2. $5D_{15} \text{ (Base)} < D_{15} \text{ (Armor)} < 20D_{15} \text{ (Base)}$
3. $D_{50} \text{ (Armor)} < 25D_{50} \text{ (Base)}$

where:

- D_{15} = particle diameter below which 15% of the soil particles are smaller
 D_{50} = particle diameter below which 50% of the soil particles are smaller
 D_{85} = particle diameter below which 85% of the soil particles are smaller

Based upon the criteria specified in Equation 1, the following gradation design values in Tables 15 and 16 were selected for the Logway and South Shoreline. These are selected in reference to the best available existing material gradations. Underlying bed sediment gradations, as summarized from the geotechnical analysis in Appendix B, are also provided.

Table 15
Summary of Layer Diameters – Logway and South Shoreline

Layer	D_{15} (inches)	D_{50} (inches)	D_{85} (inches)
Bed Sediment (Sample B24-1828)	0.0027	0.0152	0.054
Bedding Filter Layer	0.0165	0.375	2.25
Intermediate Bedding Layer	1.0	4.0	6.5
Armor Layer	8.5	11.0	13.0

Note:

Filter and armoring layer values for D_{15} , D_{50} , D_{85} were based on the material gradation curves outlined in Section 8.5 of the EDR and were used as a basis for filtration criteria evaluations.

Table 16
Summary of Layer Diameters– Engineered Cap

Layer	D_{15} (inches)	D_{50} (inches)	D_{85} (inches)
Bed Sediment (Sample B24-1882)	0.0022	0.011	0.053
Chemical Isolation Layer	0.0117	0.0234	0.0469
Sand/Gravel Filter Layer	0.0165	0.375	2.25
Armor Layer	1.0	4.0	6.5

Note:

Filter and armoring layer values for D_{15} , D_{50} , D_{85} were based on the material gradation curves outlined in Section 8.4 of the EDR and were used as a basis for filtration criteria evaluations.

The resulting filtration analysis based on Equation 1 is available in Table 17 below. Analysis was conducted for each transition between layers for both the engineered cap and South Shoreline. The criteria are met on all conditions except for the second criterion for the bedding filter layer, using the Washington Department of Transportation Standard Specification 9-03.11(1) Streambed Sediment gradation. For the Logway and South Shoreline armoring, this gradation contains a large quantity of fines, which has the potential to result in seepage into the intermediate bedding layer. However, there are adequate quantities of larger diameter material within this gradation to limit any seepage from the bed sediment below into the above intermediate bedding layers. For the engineered cap, the low ratio on Criterion 2 indicates that the hydraulic gradient between the layers will be high, permitting flow. However, the transition from the bed sediment to the chemical isolation layer is within specification, which will minimize the impact.

Table 17
Filtration Analysis – Logway and South Shoreline

Transition	Criteria	Ratio	Criteria Met?
Bed Sediment to Bedding Filter Layer	1	0.31	Yes
	2	6.11	Yes
	3	24.67	Yes
Bedding Filter Layer to Intermediate Bedding Layer	1	0.44	Yes
	2	60.61	No
	3	10.67	Yes
Intermediate Bedding Layer to Armor Layer	1	1.31	Yes
	2	8.5	Yes
	3	2.75	Yes

Table 18
Filtration Analysis – Engineered Cap

Transition	Equation	Ratio	Criteria Met?
Bed Sediment to Chemical Isolation Layer	1	0.22	Yes
	2	5.32	Yes
	3	2.13	Yes
Chemical Isolation Layer to Bedding Layer	1	0.35	Yes
	2	1.41	No
	3	16.03	Yes
Bedding Layer to Armor Layer	1	0.44	Yes
	2	60.61	No
	3	10.67	Yes

Conclusion

This memorandum summarizes the coastal engineering analysis supporting the shoreline armoring and sediment capping design at the JELD-WEN Site. The analysis considered wind-driven wave generation, SLR, and projected flood conditions to simulate wave loads using a stationary WAVE model. Wave heights and periods were used to develop conservative rock sizing recommendations for different Site features. The results indicate that future conditions with SLR will increase wave exposure at the Site, particularly along the South Shoreline. The final design will further refine stone sizing for the bed layer depending on local quarry stone availability and will conduct additional modeling to verify Logway rock sizing for without breakwater conditions.

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Appendix D

Preliminary Sediment Cap Chemical Isolation Layer Design Analysis



October 2025
JELD-WEN Site



Preliminary Sediment Cap Chemical Isolation Layer Design Analysis

Prepared for Washington State Department of Ecology and JELD-WEN, Inc.

October 2025
JELD-WEN Site

Preliminary Sediment Cap Chemical Isolation Layer Design Analysis

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TABLE OF CONTENTS

1	Introduction	1
2	Approach.....	3
2.1	Model Framework.....	3
2.2	Model Domain and Layers.....	3
2.3	Design Target Concentrations and Compliance Depth.....	4
3	Model Inputs.....	6
3.1	Partition Coefficients.....	10
3.2	Porewater Concentrations	10
3.3	Groundwater Seepage Rates	13
3.4	Dispersion Coefficient	16
4	Model Results	18
5	Summary	19
6	References	20

TABLES

Table 1	Input Parameter Values for the Chemical Isolation Cap Model.....	7
Table 2	Partition Coefficients Used in the Model.....	10
Table 3	Porewater COC Concentrations Used in the Model by Area.....	13
Table 4	Summary of Hydraulic Conductivity Estimates from Slug Tests	16

FIGURES

Figure 1	Site Map.....	1
Figure 2	Cap Layer Represented in the Model and Processes Simulated.....	4
Figure 3	Evaluation Areas.....	12
Figure 4	Example Groundwater Flow Contours	15
Figure 5	Model-Predicted Sorbed Phase Concentrations (Average over Top 30 cm of Cap) over the 100 Years Simulation in Area 1	18

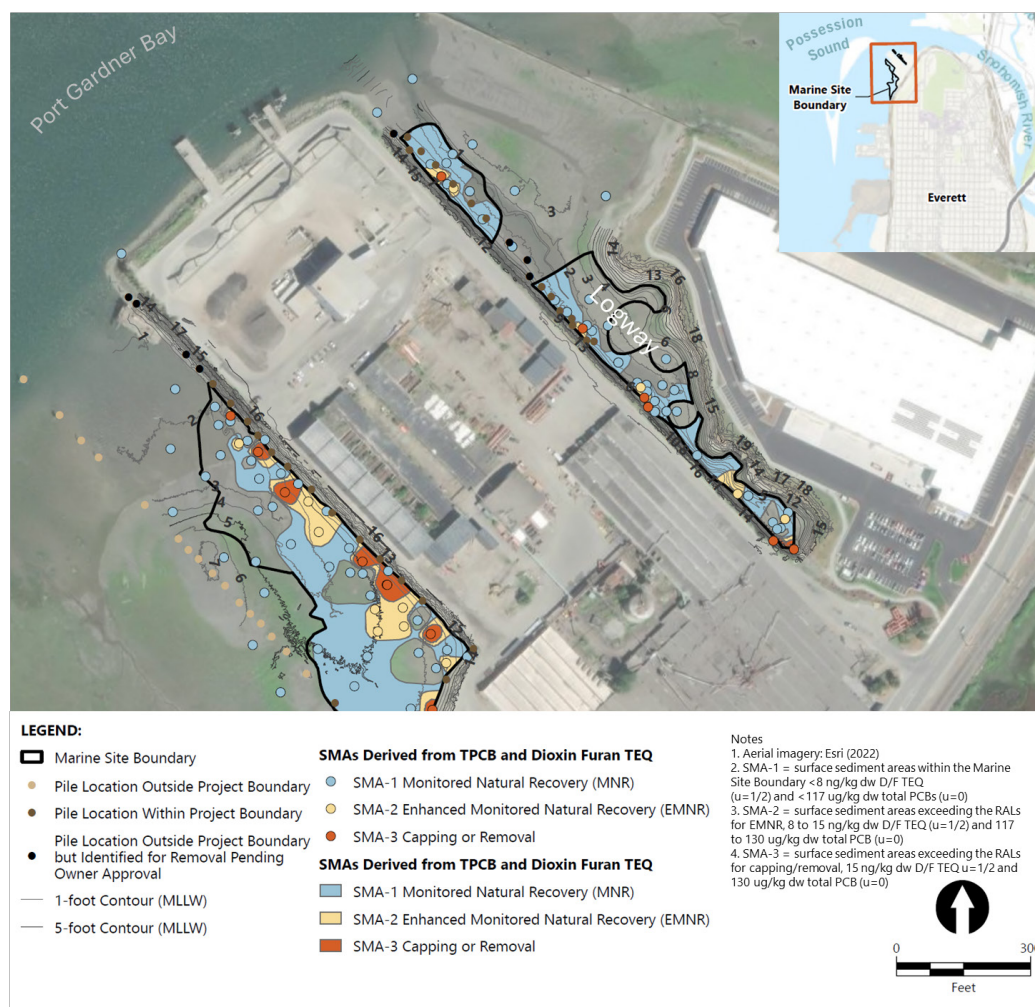
ABBREVIATIONS

µg/L	microgram per liter
cm	centimeter
cm/hr	centimeter per hour
cm/yr	centimeter per year
cm ² /s	square centimeter per second
cm ² /yr	square centimeter per year
COC	constituent of concern
D/F	dioxin/furan
EMNR	Enhanced Monitored Natural Recovery
f _{oc}	fraction organic carbon
ft/day	foot per day
ft/ft	foot per foot
g/cm ³	gram per cubic centimeter
hr	hour
K _d	equilibrium partition coefficient
K _{oc}	organic carbon partition coefficient
L/kg	liter per kilogram
L/T	length per time
ng/kg	nanogram per kilogram
Site	300 West Marine View Drive, Everett, Washington, 98201
TEQ	toxicity equivalence
USEPA	U.S. Environmental Protection Agency
yr ⁻¹	per year

1 Introduction

This appendix to the Marine Engineering Design Report describes design evaluations of a sediment cap chemical isolation layer for the JELD-WEN Site at 300 West Marine View Drive, Everett, Washington, 98201 (Site). The Site is along the Snohomish River to the north and Port Gardner Bay (Possession Sound) to the west. Capping is specified as the remedial approach to address contaminated sediment in the logway portion of the Site, which is along the northern edge of the property (Figure 1). More specifically, the cleanup action specifies 2 feet of dredging followed by placement of an engineered cap in the logway portion of the Site to address dioxins/furans (Ds/Fs) in the sediment. D/F concentrations in this area exceed the sediment cleanup objective criterion of 5 nanograms per kilogram (ng/kg) dry weight on a total D/F toxicity equivalence (TEQ) basis.

Figure 1
Site Map



This appendix describes chemical transport modeling conducted to evaluate the design of an engineered cap to address D/F in Site sediment. The modeling analyses described herein were performed in accordance with guidance on cap design set forth by the U.S. Environmental Protection Agency (USEPA), and the U.S. Army Corps of Engineers (Palermo et al. 1998) and the Interstate Technology and Regulatory Council (ITRC 2014, 2023). The primary goal of this modeling was to simulate the transport of dissolved-phase D/F compounds within an engineered cap to identify a chemical isolation layer design configuration (i.e., thickness and composition, including whether sorptive amendments would be included and, if so, the amounts) that would provide long-term effectiveness in limiting concentrations at the cap surface to which the aquatic food chain can be exposed.

2 Approach

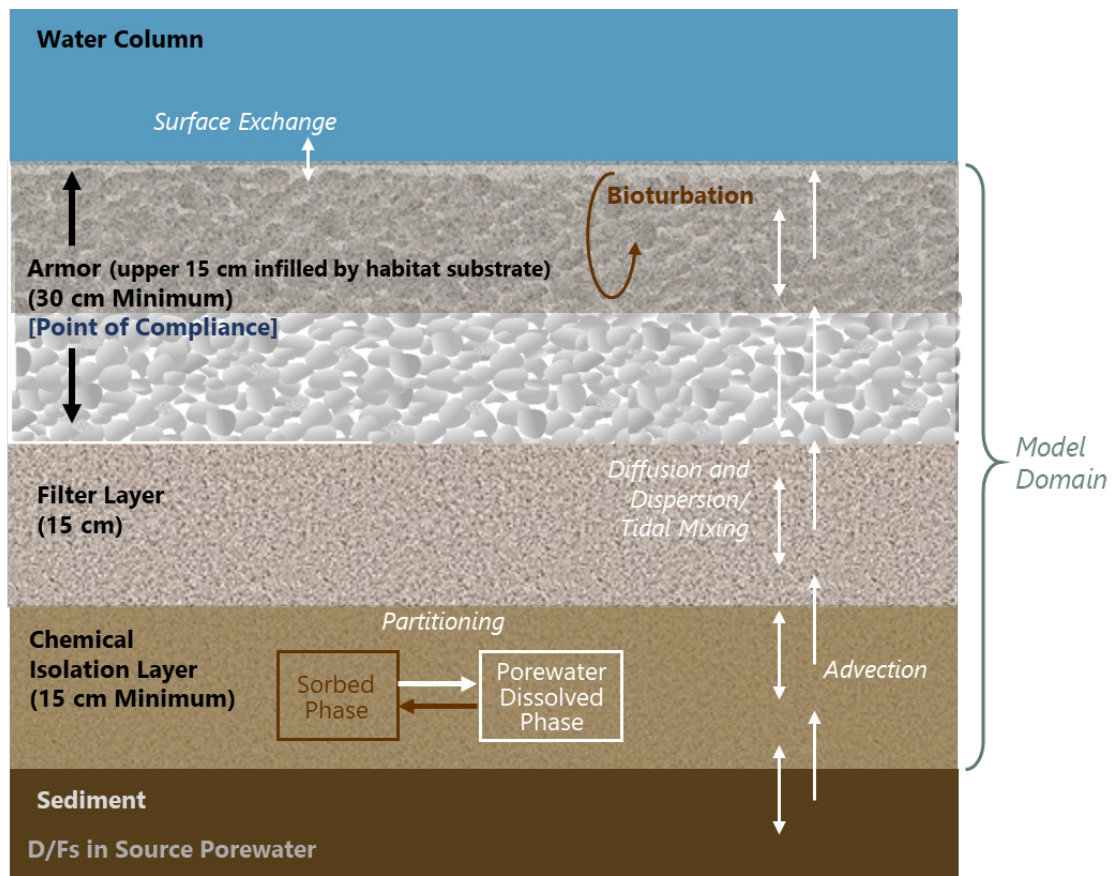
2.1 Model Framework

The widely used model of chemical transport within sediment caps, CapSim (version 4.2; Reible 2023), was used for this evaluation. This model simulates the time variable fate and transport of chemicals (dissolved and sorbed phases, including partitioning between these phases) under the processes of advection, diffusion/dispersion, biodegradation, bioturbation/bioirrigation, and exchange with the overlying surface water vertically within a sediment cap. Details on the model structure and underlying theory and equations are provided in Lampert and Reible (2009), Go et al. (2009), and Shen et al. (2018). CapSim and its predecessors have been used to support the evaluation and design of sediment caps at numerous domestic and international sites.

2.2 Model Domain and Layers

The model was configured to represent the presence of a multilayer cap placed atop the sediment surface. The cap design consisted of the following three basic layers, listed from top to bottom: 1) an armor stone layer to resist erosive forces; 2) a filter layer to prevent intermixing of the armor and chemical isolation layer materials; and 3) a chemical isolation layer to address dissolved-phase contaminant transport. Furthermore, as part of the Enhanced Monitored Natural Recovery (EMNR) remedy for the Site, a layer of sand is to be placed on top of the cap areas (in addition to being placed on top of sediment elsewhere at the Site). This sand layer, which will serve as habitat substrate, is expected to infill the armor stone. Figure 2 is a schematic showing the cap layers represented in the model and the processes simulated by the model.

Figure 2
Cap Layer Represented in the Model and Processes Simulated



Note: Not to scale

2.3 Design Target Concentrations and Compliance Depth

The vertical point of compliance for assessing cap performance is within the surface sediments and specifically within the biologically active zone. The biologically active zone is the depth in surface sediments where the species critical to the function, diversity, and integrity of the benthic community are located. As described in Ecology (2023), although most organisms burrow to a depth of 10 centimeters (cm), soft-shell crab have been identified in the tidal flat areas near the Site and can burrow as deep as 30 cm. In cap areas, where an armor layer is present, soft-shell crab are not likely to burrow as deep as they would in tidal flat muds. The rock would limit their burrow depth and in cap areas. That said, conservatively, the point of compliance at this Site is the top 30 cm.

Model-predicted concentrations within the cap surface over time were compared to the 5 ng/kg total D/F TEQ criterion to evaluate protectiveness of candidate cap configurations. Each of the 17 D/F congeners that have a 2,3,7,8 substitution pattern was simulated by the model. The TEQ is calculated from the model-predicted concentrations of each congener multiplied by its toxic equivalency factor

and then summed for comparison to the criterion. For the purposes of this evaluation, long-term cap effectiveness was based on maintaining model-predicted vertically averaged concentrations in the top 30 cm of the cap to values less than the design target for a minimum of 100 years.

3 Model Inputs

The model uses several input parameters that describe chemical-specific properties, cap material properties, and chemical mass transfer rates. These parameters are based on Site-specific data, information from literature, and experience with cap design at other similar sites. The model input parameters, the values used for this modeling assessment, and the source(s) from which they were derived are provided in Table 2. More details describing certain key model inputs are provided in Sections 3.1 through 3.3.

Table 1
Input Parameter Values for the Chemical Isolation Cap Model

Model Input Parameter	Value	Data Source
Chemical-Specific Properties		
Partitioning coefficient (L/kg)	See Table 2	Literature-based K_{OC} values from Aberg (2008). See Section 3.1 for more details.
Porewater D/F concentrations ($\mu\text{g/L}$)	See Table 3	Sediment concentrations converted to porewater using equilibrium partitioning. See Section 3.2 for more details.
Molecular diffusivity (cm^2/s)	Varies by D/F congener, from 3.5×10^{-6} to 4.6×10^{-6}	Calculated based on the molecular weight of the chemical compound (i.e., individual D/F congeners) using the correlation identified from Schwarzenbach et al. (1993). The model calculates an effective diffusion coefficient using the chemical-specific input value for the molecular diffusivity multiplied by a tortuosity factor that is a function of the material porosity (Lampert and Reible 2009).
Chemical biodegradation rate (yr^{-1})	0	Assumed no degradation
Chemical Isolation Layer Properties		
Thickness (cm)	15	Design parameter; started with a chemical isolation layer thickness of 15 cm and increased, if necessary, to maintain predicted D/F TEQ concentrations in the top 30 cm of the cap less than the 5 ng/kg criterion
Dry bulk density (g/cm^3)	1.6	Calculated based on typical particle density of 2.6 g/cm^3 and porosity of 0.4 for sand (see next row)
Total porosity	0.4	Based on typical value of 0.4 for sand (e.g., Domenico and Schwartz 1990)
Fraction organic carbon of sand (f_{OC} ; %)	0.1	A lower-bound estimate typically used to represent quarry sand in which sorption to mineral fractions can also occur (Karickhoff 1984; USEPA 2000)
Filter Layer		
Thickness (cm)	15	Minimum thickness of the filter layer
Dry bulk density (g/cm^3)	1.7	Calculated based on typical particle density of 2.6 g/cm^3 and porosity of 0.35 (see next row)
Total porosity	0.35	Value for a sand/gravel filter layer (e.g., Domenico and Schwartz 1990)

Model Input Parameter	Value	Data Source
f_{OC} (%)	1%	A value of 1% in the top 30 cm (bioturbation zone) was selected based on experience from other sites and the assumption that, over time, the f_{OC} at the cap surface will increase toward levels of the sediment.
Lower Portion of Armor Layer		
Thickness (cm)	15	Lower half of a 30-cm-minimum thickness armor layer
Dry bulk density (g/cm ³)	1.7	Calculated based on typical particle density of 2.6 g/cm ³ and porosity of 0.30 (see next row)
Total porosity	0.30	Value for armor stone that is cobble-sized (e.g., Domenico and Schwartz 1990)
f_{OC} (%)	0.1%	A lower-bound estimate typically used to represent quarry material in which sorption to mineral fractions can also occur (Karickhoff 1984; USEPA 2000)
Upper Portion of Armor Layer (Infilled by Habitat Substrate)		
Thickness (cm)	15	Upper half of a 30-cm-minimum thickness armor layer
Dry bulk density (g/cm ³)	1.7	Calculated based on typical particle density of 2.6 g/cm ³ and porosity of 0.35 (see next row)
Total porosity	0.35	Value for armor stone infilled with sand habitat substrate (placed as part of EMNR) or depositing sediment (e.g., Kamann et al. 2007)
f_{OC} (%)	1%	A value of 1% in the top 15 cm (bioturbation zone) was selected based on experience from other sites and the assumption that, over time, the f_{OC} at the cap surface will increase toward levels of the sediment.
Mass Transport Properties		
Boundary layer mass transfer coefficient (cm/hr)	0.3	Midpoint of range of values compiled from laboratory and field measurements reported in the literature (e.g., Thibodeaux et al. 2001) and values calibrated as part of models of sediment/water exchange at other sites (e.g., USEPA 2006)
Groundwater seepage rate (cm/yr)	300	Calculated based on a horizontal hydraulic gradient of 0.003 ft/ft (SLR and Anchor QEA 2021) and an upper-bound hydraulic conductivity of 10 ft/day (SLR 2025). See Section 3.3 for more details.

Model Input Parameter	Value	Data Source
Tortuosity factor for molecular diffusion	Millington and Quirk	Model uses an empirical relationship with porosity to calculate a tortuosity factor. The tortuosity factor is multiplied by the chemical-specific molecular diffusion coefficient to result in an effective diffusion coefficient associated with porous media flow. The Millington and Quirk (1961) relationship was used because it is applicable to granular (sand and gravel) materials.
Net sedimentation rate (cm/yr)	0	Conservatively, no net sedimentation was assumed in the model. That is, the model domain thickness was held constant.
Dispersion length (cm)	9.0	Dispersion length was assumed to be 20% of the domain length. An assumed domain length of 45 cm (1.5 feet) was used in this calculation. See Section 3.4 for more details.
Bioturbation depth (cm)	15	As described in Ecology (2023), soft-shell crab burrowing has been identified in tidal flats at the Site, which can extend as deep as 30 cm. However, in the cap areas where armor stone will be placed, the armor stone will limit the depth over which soft-shell crab can burrow, and they are not likely to burrow as deep as they would in tidal flat muds. Therefore, mixing due to bioturbation is limited to the top 15 cm.
Porewater biodiffusion coefficient (cm ² /yr)	600	Parameter represents the bioturbation rate applied to the dissolved phase; typical value for estuarine systems (e.g., Thibodeaux and Mackay 2011)
Particle biodiffusion coefficient (cm ² /yr)	6	Parameter represents the bioturbation rate applied to the particulate phase; typical value for estuarine systems (e.g., Thibodeaux and Mackay 2011)
Consolidation thickness (cm) and time (years) to reach 90% consolidation for underlying sediment	None	The effects of consolidation of sediment beneath the cap, which can result in an additional upward flux of porewater, were excluded. Dredging to accommodate the cap would occur prior to capping, so consolidation, if any, would be nominal.

3.1 Partition Coefficients

Linear partitioning of chemicals between the dissolved and sorbed phases (i.e., between porewater and unamended cap material) is described in the model by the chemical-specific equilibrium partition coefficient (K_d). The partition coefficient is calculated in the model based on the customary $K_d = f_{oc} * K_{oc}$ approach (e.g., Karickhoff 1984), where K_{oc} is the compound's organic carbon partition coefficient, and f_{oc} is the organic carbon fraction of the solid phase (e.g., unamended cap material). Literature-based K_{ow} values were obtained from Aberg et al. (2008) for the individual D/F compounds simulated in the model. Log K_{oc} values were then calculated from the widely used Di Toro (1985) empirical relationship ($\log K_{oc} = 0.00028 + (0.983 * \log K_{ow})$). These literature-derived K_{oc} values are listed in Table 4.

Table 2
Partition Coefficients Used in the Model

Chemical Name	Log K_{oc} (log L/kg)
1,2,3,4,6,7,8,9-OCDF	7.7
1,2,3,4,6,7,8,9-OCDD	8.2
1,2,3,4,6,7,8-HpCDF	7.3
1,2,3,4,6,7,8-HpCDD	7.9
1,2,3,4,7,8,9-HpCDF	7.3
1,2,3,4,7,8-HxCDF	6.9
1,2,3,4,7,8-HxCDD	7.3
1,2,3,6,7,8-HxCDF	6.9
1,2,3,6,7,8-HxCDD	7.3
1,2,3,7,8,9-HxCDD	7.3
1,2,3,7,8,9-HxCDF	6.9
1,2,3,7,8-PeCDF	6.5
1,2,3,7,8-PeCDD	6.9
2,3,4,6,7,8-HxCDF	6.9
2,3,4,7,8-PeCDF	6.5
2,3,7,8-TCDF	6.1
2,3,7,8-TCDD	6.4

3.2 Porewater Concentrations

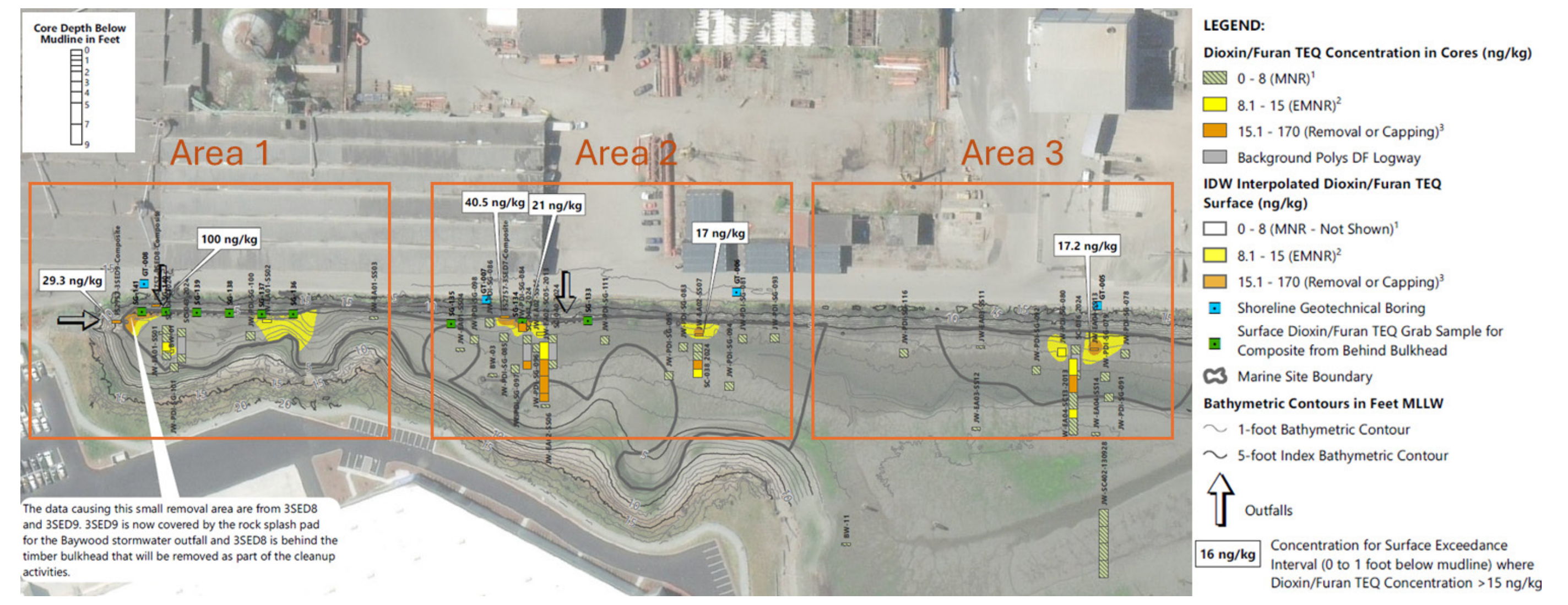
The constituent of concern (COC) concentrations of the porewater in sediment beneath the cap define the source term in the cap model. Porewater concentrations were calculated from bulk sediment contaminant concentrations using equilibrium partitioning formulae. Literature-derived K_{oc} values

(Table 2), sample-specific fraction organic carbon (f_{OC}) values¹, and sediment sample concentrations were used to calculate porewater concentrations for each individual D/F compound. Sediment core and surface composite samples were collected throughout the Site from 2009 through 2024. Sediment samples in the logway, offshore from the bulkhead wall, were used in the evaluation.

The maximum sediment concentration was observed at the head of the logway, and D/F concentrations generally decreased with distance from the head of the logway toward the Snohomish River. Concentrations in two areas defined by the marine Site boundary within the logway were evaluated: 1) the head of the logway; and 2) the outlet of the logway (see Figure 3).

¹ Not all sediment samples were analyzed for f_{OC} . In these cases, because there was no clear trend in f_{OC} with depth, the average f_{OC} value of 3% was used for samples in which a measurement was missing.

Figure 3
Evaluation Areas



Conservatively, the maximum porewater concentration calculated from the full set of available sediment concentrations from each given area was selected for each individual D/F compound. Porewater concentrations are listed in Table 3.

Table 3
Porewater COC Concentrations Used in the Model by Area

COC	Porewater Concentration (µg/L)		
	Area 1	Area 2	Area 3
1,2,3,4,6,7,8,9-OCDF	3.0E-06	5.7E-07	3.1E-07
1,2,3,4,6,7,8,9-OCDD	1.9E-05	5.1E-06	9.4E-07
1,2,3,4,6,7,8-HpCDF	1.8E-06	6.4E-07	4.2E-07
1,2,3,4,6,7,8-HpCDD	2.2E-06	9.2E-07	2.5E-07
1,2,3,4,7,8,9-HpCDF	8.0E-08	3.6E-08	1.7E-08
1,2,3,4,7,8-HxCDF	1.1E-07	6.7E-08	4.3E-08
1,2,3,4,7,8-HxCDD	2.9E-08	1.9E-08	1.5E-08
1,2,3,6,7,8-HxCDF	9.1E-08	5.0E-08	5.1E-08
1,2,3,6,7,8-HxCDD	1.8E-07	2.0E-07	1.1E-07
1,2,3,7,8,9-HxCDD	1.0E-07	7.8E-08	3.6E-08
1,2,3,7,8,9-HxCDF	4.7E-09	1.1E-08	5.1E-09
1,2,3,7,8-PeCDF	4.5E-08	7.7E-08	3.9E-08
1,2,3,7,8-PeCDD	2.9E-08	3.1E-08	2.6E-08
2,3,4,6,7,8-HxCDF	6.5E-08	8.8E-08	8.7E-08
2,3,4,7,8-PeCDF	6.9E-08	8.4E-08	1.0E-07
2,3,7,8-TCDF	1.5E-07	2.7E-07	2.7E-07
2,3,7,8-TCDD	1.2E-08	1.3E-08	1.7E-08
1,2,3,4,6,7,8,9-OCDF	3.0E-06	5.7E-07	3.1E-07
1,2,3,4,6,7,8,9-OCDD	1.9E-05	5.1E-06	9.4E-07
1,2,3,4,6,7,8-HpCDF	1.8E-06	6.4E-07	4.2E-07
1,2,3,4,6,7,8-HpCDD	2.2E-06	9.2E-07	2.5E-07
Total D/F	2.7E-05	8.3E-06	2.7E-06
D/F TEQ	1.8E-04	1.7E-04	1.5E-04

Notes:

Values are rounded to two significant figures.

As described in Section 2.3, individual D/F congeners were simulated by the model. Total D/F and D/F TEQ were not simulated in the model; these are included in this table for reference.

3.3 Groundwater Seepage Rates

Seepage rates were calculated using data collected from upland monitoring wells adjacent to the Site. Seepage rate is expressed as a Darcy flux, with units of length per time (L/T), and was calculated

from hydraulic gradient and hydraulic conductivity values estimated from data collected in upland monitoring wells using Equation 1.

Equation 1

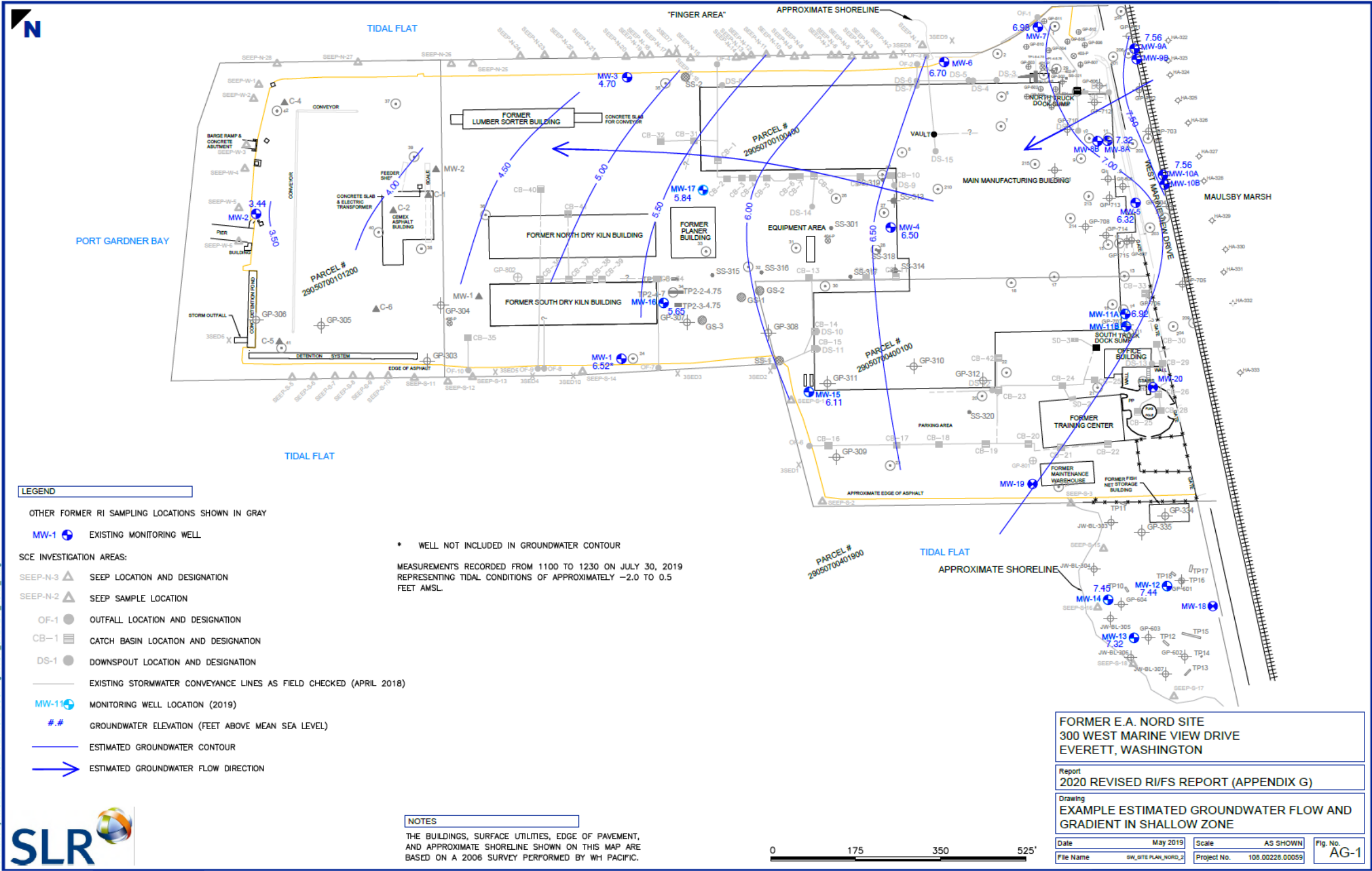
$$q = K \times i$$

where:

q	=	seepage rate (L/T)
K	=	hydraulic conductivity (L/T)
i	=	hydraulic gradient (L/L)

Based on the example groundwater contours shown in Figure 4, the horizontal hydraulic gradient from uplands to the offshore, including in the area between MW-9A and MW-7 toward the logway, is approximately 0.003 foot per foot (ft/ft).

Figure 4
Example Groundwater Flow Contours



Note: Figure AG-1 is from Appendix G of SLR and Anchor QEA (2021)

Slug tests were conducted in 2024 at wells MW-7 and MW-8A. Geometric mean hydraulic conductivities range from 2.8 to 30 feet per day (ft/day) for MW-7 and 0.11 to 0.60 ft/day for MW-8A, depending on the method used to interpret the slug test drawdown versus time curves. These two wells are located less than 300 feet away from one another; the order of magnitude difference in hydraulic conductivity between these two wells could indicate heterogeneity at the Site. Given the uncertainty in these values, an upper-end value of 10 ft/day was selected.

Table 4
Summary of Hydraulic Conductivity Estimates from Slug Tests

Well	Statistic	Hydraulic Conductivity by Method (ft/day)			
		Bouwer and Rice (1976)	Hvorslev (1951)	Dagan (1978) Partially Submerged	KGS Model (Hyder et al. 1994)
MW-7	Geometric mean	2.8	4.1	3.3	30
	Minimum	0.27	0.27	0.27	22
	Maximum	9.7	15	11	39
MW-8A	Geometric mean	0.11	0.16	0.13	0.60
	Minimum	0.020	0.020	0.020	0.33
	Maximum	0.42	0.54	0.45	1.1

Note:
Values are rounded to two significant figures.

Using Equation 1, the product of the hydraulic gradient of 0.003 ft/ft and a hydraulic conductivity of 10 ft/day results in a seepage rate of 300 centimeters per year (cm/yr; after applying unit conversions). This seepage rate reflects horizontal seepage (based on the horizontal hydraulic gradients). Groundwater, as it flows toward and through the sediment, will move vertically into the surface water, resulting in a lower seepage rate than the calculated horizontal Darcy flux as it spreads across the sloped surface of the tidal flats. Conservatively, the calculated horizontal seepage rate was used in the model to represent seepage in the sediment.

3.4 Dispersion Coefficient

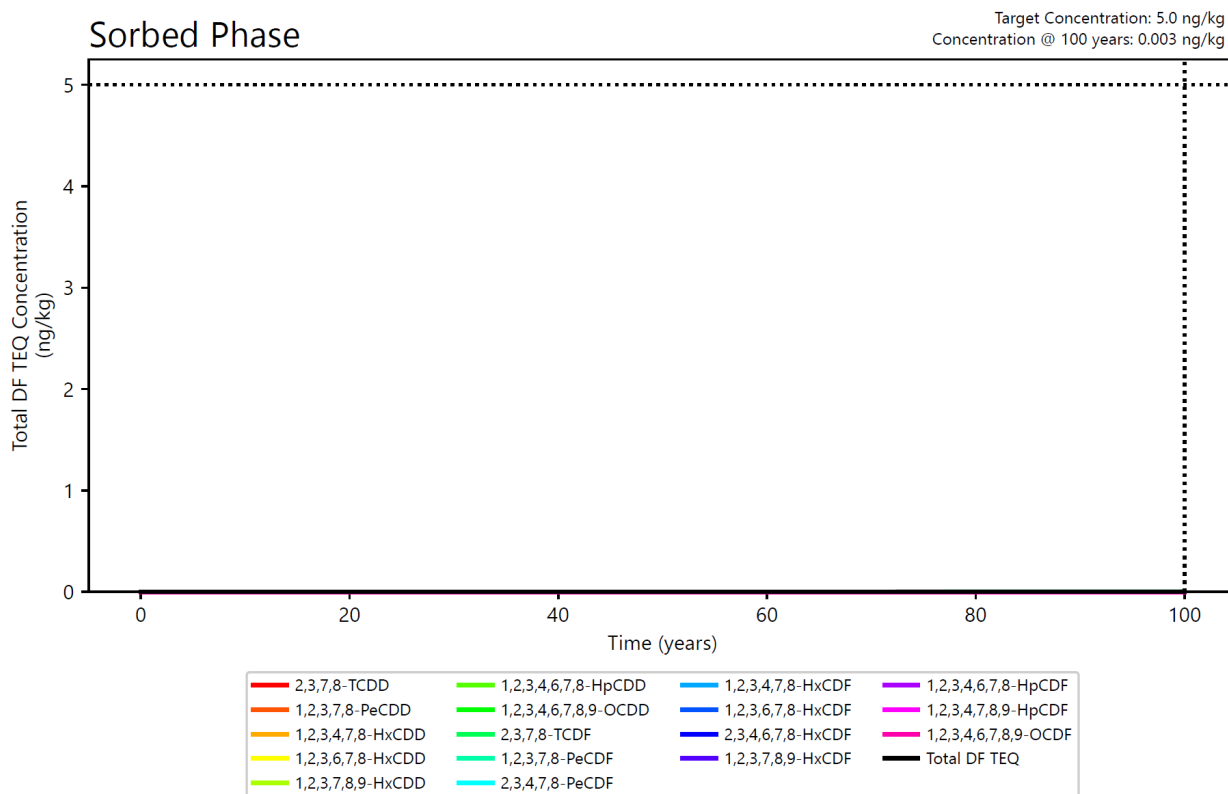
Dissolved-phase transport within the cap may be influenced by tidal dynamics in the Snohomish River and Port Gardner Bay, which can result in twice daily fluctuations and even reversals in hydraulic gradient and seepage rates. At low tides, seepage rates are likely greater than the daily average, and at high tides, seepage rates are likely less than the daily average. These flow variations, when evaluated over longer timescales, can act as a mixing process for dissolved-phase constituents. Representing such tidal mixing with a dispersion coefficient is a common approach in groundwater modeling (e.g., La Licata et al. 2011). Dispersivity values for flow in porous media over relatively short distances (i.e., the scale of a cap) are typically in the range of 1% of the evaluation domain length

(consistent with typical values recommended by Reible [2012]). Over very large scales, such as those associated with large groundwater plumes, dispersivity values are on the order of 10% of the evaluation domain length (Gelhar et al. 1992; Neuman 1990). The hydrodynamic dispersivity was set to a higher value of 20% of the cap thickness to represent hydraulic gradient variations and potential reversals from tidal fluctuations as a dispersion process. This dispersivity value (i.e., 20% of the domain length) is consistent with values used in the final cap designs conducted at other tidally influenced sites in the Pacific Northwest, such as the Former Portland Gas Manufacturing Site (on the Lower Willamette River just upstream of Portland Harbor, Oregon), where dispersivity was estimated based on the comparative strengths of tidal signals in hourly seepage meter measurements (Appendix C of Anchor QEA 2020), and Gloucester Harbor, Massachusetts, where dispersivity was derived from model calibrations to vertical profiles of salinity in porewater (Anchor QEA and GZA 2015; Reidy et al. 2015).

4 Model Results

The model was used to simulate the transport of D/Fs within a cap and assess the ability of a 6-inch sand chemical isolation layer with 0.1% f_{oc} to maintain D/F TEQ concentrations in the top 30 cm of the overlying cap material (as a vertical average) less than the criterion of 5 ng/kg for more than 100 years. Model results show that concentrations in the top 30 cm of the cap are predicted to remain near zero for 100 years in each area evaluated. Model results for Area 1, which had the highest concentrations, are shown as an example in Figure 5.

Figure 5
Model-Predicted Sorbed Phase Concentrations (Average over Top 30 cm of Cap) over the 100 Years Simulation in Area 1



Note: The horizontal dotted line at 5 ng/kg represents the target concentration.

5 Summary

Numerical modeling was conducted to assess the design of engineered caps to address dissolved-phase D/F flux from logway sediment by evaluating the long-term performance of a cap's chemical isolation layer. Modeling was conducted with conservative assumptions (e.g., upper-end seepage rate [based on the upper-end range of hydraulic conductivity from slug tests] and maximum D/F concentrations). Modeling showed that a 6-inch sand chemical isolation layer with assumed 0.1% f_{oc} is predicted to meet the criterion of 5 ng/kg D/F TEQ in the long term.

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Appendix E

Construction Best Management Practices

1 Appendix E: Construction Best Management Practices

This appendix presents construction best management practices (BMPs) that will be included in the project specifications. These BMPs will be deployed by the contractor, as needed, to address potential impacts associated with construction activities.

1.1 Water Quality Protection

- All activities below mean higher high water (e.g., debris removal, excavation, backfilling, capping, pile driving, and placement of riprap armoring) will be completed at low tide (in the dry) to the maximum extent practicable.
- If excavation work must be conducted below the water line, turbidity will be monitored to ensure construction activities are compliant with Washington State Surface Water Quality Standards (173-201A WAC) and the final Water Quality Monitoring Plan (if required). Water quality monitoring is not expected to be needed during work completed in the dry.

1.2 Construction Equipment Spill Control

The following BMPs will be employed to reduce the potential for spillage from construction equipment and to minimize the environmental impact of any spills:

- The contractor will prepare a spill prevention, control, and countermeasures plan and will have a spill kit on site, as well as a marine spill response contractor available on an on-call basis. These precautions will minimize the potential for petroleum products or other deleterious materials to enter surface waters.
- The National Response Center (1-800-424-8802) and the Washington Emergency Management Division (1-800-258-5990 OR 1-800-OILS-911) will be notified immediately if a spill occurs.
- The contractor will inspect fuel hoses, oil or fuel transfer valves, and fittings on a regular basis for drips or leaks to reduce the risk of spills in the surface water.
- On-site fueling of equipment will be limited to locations more than 200 feet from the shoreline.
- The contractor will be required to use environmentally sensitive hydraulic fluids that are non-toxic to aquatic life and readily or inherently biodegradable to the maximum extent practicable.
- When wet materials are transported, haul trucks or containers will be lined or otherwise sealed to prevent release of soil or sediment during transport.

1.3 Barge Operations

Barges may be used to transport materials to and from the site or extract piling and debris during higher tides. It is possible that the construction contractor may determine that one or more barges are needed for barge-based equipment or material staging, depending on site conditions encountered and issues that may arise as the remedial design is refined. If this is required, the

contractor will be required to moor and manage the barge to prevent grounding. The following BMPs may apply:

- Construction barges shall be restricted to use during tide elevations adequate to prevent grounding of the barge.
- Barge anchors shall not be placed in contaminated sediments or completed capping areas.
- Motorized vessel operation shall be restricted to tidal elevations adequate to prevent prop scour disturbance to the contaminated sediments or completed capping areas.
- Minimal propulsion power shall be used when maneuvering barges or other vessels to prevent prop scour disturbance to the contaminated sediments or completed capping areas.
- All barges transporting contaminated materials will be certified as sealed (watertight) and seaworthy by a marine inspector prior to barge use.
- Loading at the site and offloading at the contractor's offload facility will occur over a spill plate so sediment or effluent is not dropped into the water.
 - The spill plate will have positive drainage to an easily accessible collection area so spills can be properly cleaned up and spilled sediment can be collected for appropriate disposal.
 - Spillage of sediment or debris during offloading will be promptly cleaned up. If uncontrolled spillage occurs, all offloading operations will cease until the spillage is contained and cleaned up.
 - Free water generated during offloading operations will be collected and treated as necessary to comply with water discharge regulations.
- Barges will be managed such that the contaminated material load does not exceed the capacity of the barge. The load will be placed in the barge to maintain an even keel and avoid listing.
- Haul barges will be loaded evenly to maintain barge stability.
- Once the barge is loaded and stabilized, it will be inspected for sediment adhered to the outside of the barge that could fall off the barge during transport. Contractor personnel will conduct a visual inspection around the entire barge deck area to remove such sediment before moving the barge off site.
- Barges leaving the site will be sealed such that no unfiltered discharge of water or suspended sediment occurs in the receiving waters.
- No petroleum products or other deleterious materials shall enter surface waters.

1.4 Excavation

Excavation operations have well-established BMPs to minimize potential recontamination and manage potential water quality impacts. Operational and engineering controls will be defined in the Construction Specifications and project permits, which the contractor will be required to implement.

1.4.1 Qualified Contractor

Bidding contractors will need to meet minimum qualifications that demonstrate experience with projects similar in scope and complexity. Specific requirements will be provided in the construction bid documents. Typically, the contractor will need to demonstrate experience with soil and intertidal sediment excavation in the Pacific Northwest for similar projects (i.e., in-the-dry excavation in tidally influenced areas) within the last 5 to 7 years. In addition, the project superintendent will typically need to demonstrate similar experience. Contractors that cannot demonstrate experience may not be considered responsive to the bid.

1.4.2 Real-Time Positioning

The contractor will be recommended to use real-time positioning controls such as a differential global positioning system electronically displayed in the operator's cabin to provide real-time positioning control for the excavation and material placement equipment. Controlling the position of the excavation and material placement equipment will help accurately achieve the required excavation prism and placement thickness.

1.4.3 Minimizing Excavation Below the Water Surface

The following BMPs will be employed during excavations:

- Excavation shall be conducted in the dry to the extent possible.
- Under no circumstances will excavated materials be stockpiled below the ordinary high water line.
- If work must be conducted in water, turbidity and other water quality parameters (if required) will be monitored in accordance with the requirements of the project Water Quality Certification.

1.5 Offloading, Staging, and Stockpile Area Management

Excavated material may be removed via haul truck or barge. BMPs for soil stockpile management and transloading include the following:

- Excess or waste materials will not be disposed of or abandoned waterward of mean higher high water or allowed to enter waters of the state.
- Erosion control measures for the offloading area and staging and stockpile area will be defined in the Construction Specifications and adhered to during construction activities. Unfiltered runoff from temporary upland stockpiles back to surface water will not be allowed.
- Catch basins within the areas will be sealed, and all water will be collected and stored on site for treatment or off-site disposal.
- Trucks will not be overloaded (i.e., appropriate freeboard will be maintained) to prevent loss due to spilling during transport.
- Track-out of potentially contaminated sediment will be managed using a combination of wheel wash decontamination procedures and haul route housekeeping/sweeping.

- The trucks, truck loading area, and access route will be visually inspected to confirm there is no loss of material from the trucks prior to releasing the truck from the temporary upland stockpile to public roads.
- If wet materials are transported, haul trucks, containers, or barges will be lined or otherwise sealed to prevent the release of soil or sediment during transport.
- Excavated material will be placed in a temporary upland stockpile area constructed to contain water generated from sediment dewatering and precipitation unless it is determined that infiltration to upland groundwater will be allowed. Discharge water generated from temporary stockpiles will be treated or infiltrated as required by permits. The dewatered excavated material and all potentially contaminated debris will be properly transported and disposed in an off-site permitted landfill.
- Proposed facilities must be of adequate structural capacity for use for offloading and staging. The maximum structural capacity of these facilities cannot be exceeded by the contractor.
- Equipment will be fueled in a designated area that separates fueling operations and protects the environment from accidental spills during fueling.
- The contractor will maintain a spill kit on site in the event that a leak develops from their equipment. In the event of a spill, all other work will stop until the contractor has adequately cleaned the spill.

1.6 Material Placement

The following BMPs will be employed when placing cap, backfill, and Enhanced Monitored Natural Recovery materials:

- Placing the sand with a crane-operated clamshell or excavator bucket. This placement method involves taking sand from a material stockpile, barge, or haul truck and slowly releasing the material from the bucket as the operator methodically moves the bucket in a sweeping motion from side to side. Controlled placement in this manner reduces the disturbance of the sediment upon which the material is being placed.

1.7 Structure Removal, Handling, and Disposal

The following creosote-treated structure removal BMPs adapted from U.S. Environmental Protection Agency guidance and the Washington Department of Natural Resources will be employed for piling removal, timber bulkhead removal, the remnant barge structure removal, and any other creosote-treated structures, as applicable:

- Piling and structure removal is assumed to be conducted in the dry, to the extent possible. However, in-water piling removal from shallow draft barges may be necessary depending on access constraints.

- When working in the water, a floating surface boom will be installed around the pile extraction site to capture floating pile debris. Floating pile debris will be removed and deposited in a containment basin constructed on the barge or adjacent upland.
- The floating surface boom will be equipped with absorbent pads to contain any oil sheens. The absorbent pads will be removed and deposited in the containment basin constructed on the barge or adjacent upland.
- Derelict timber piles will be directly pulled or removed using a vibratory driver.
- The contractor will initially vibrate piles with a vibratory hammer to break the friction bond between piles and soil.
- To help minimize turbidity, the contractor will engage the vibrator to the minimum extent required to initiate vertical pile movement and will disengage the vibratory hammer once piles have been mobilized and are moving upward.
- The piles will be removed in a single, slow, and continuous motion to the extent possible.
- Equipment such as a bucket, steel cable, and vibratory hammer will be kept out of the water, and piles will be gripped above the waterline, to the extent possible.
- Piles will be removed slowly and in a direction that is an extension of the longitudinal centerline of each pile to minimize the disturbance of the bed and the suspension of contaminated sediments into the water column.
- Reasonable attempts will be made to completely remove the piling in its entirety; however, pile cut-off will be an acceptable alternative where vibratory extraction or pulling is not feasible, as described as follows. In addition, if a pile is broken or breaks during vibratory extraction, the contractor will employ the following methods:
 - A chain will be used, if practicable, to attempt to entirely remove the broken pile.
 - If a pile cannot be removed or breaks off at or near the mudline in SMA-1 or SMA-2, then the pile will be cut off a minimum of 3 feet below the mudline.
 - If a pile cannot be removed or breaks off at or near the mudline in SMA-3, the piling will be cut off to approximately 12 inches below the removal design surface or 3 feet below the existing mudline, whichever is greater.
- Cut-off pile stubs will be removed and deposited in the containment basin constructed on the barge or adjacent upland.
- Removed creosote-treated structures will be placed immediately in a containment basin constructed on the adjacent upland (or barge if piling removal is conducted from the water) to capture and contain the extracted piling/timbers, adhering sediments, and water. The containment basin for the removed piles and any adhering sediment may be constructed of durable plastic sheeting with continuous sidewalls supported by hay bales or other support to contain all sediment and return flow that may otherwise be directed back to the waterway. Containment basins will be lined with an oil absorbent boom.

- The removed piling/timbers will not be shaken, hosed off, left hanging to drip, or made subject to any other action intended to clean or remove adhering material from the pile.
- Sawdust from cutting pile stubs or other structures will be captured whenever feasible, removed, and deposited in the containment basin constructed on the barge or adjacent upland.
- The piles, pile stubs, timbers, sawdust, and absorbent pads from the floating surface boom will be removed and disposed of at a permitted upland disposal site in accordance with applicable federal and state regulations.
- The water captured in the containment basin will be removed and disposed of in accordance with applicable federal and state regulations.
- The containment basin will be removed and disposed of in accordance with applicable federal and state regulations.
- Extracted piling/timbers within the containment basin or disposal container will be cut to size as required by container and disposal contractors. All sawdust and cuttings will be contained within the containment basin or disposal container.
- The cut-up piles/timbers, sediments, sawdust, water, absorbent pads from the floating surface boom, and plastic from the containment basin will be packed into a disposal container and transported to an approved upland disposal site.

The use of a boom and other measures listed to contain and properly dispose of debris will also be employed during removal of creosote-treated wooden bulkheads and barge remnants. Specific removal methods for these structures will be appropriate to the structure and location (e.g., a backhoe or clamshell may be used, rather than a vibratory hammer or chain, to remove sections of treated wood from a bulkhead or barge remnants).

1.7.1 Pile Installation and Extraction

- Pile removal and temporary pile installation/removal will be completed at low tide (in the dry) to the greatest extent possible.
- The construction contractor will be limited to use of a vibratory hammer for creosote-treated timber pile removal and installation/removal of temporary steel moorings and sheet piles.
- It is assumed that vibratory driving of up to 10 temporary, 24-inch-diameter steel pipe piles may be needed to support barge use. These piles will be removed following completion of the project.
- It is assumed that vibratory driving of up to 600 linear feet of temporary steel sheet piles may be needed to stabilize shorelines adjacent to excavation areas. These sheet piles will be removed following completion of the project.
- If any in-water pile driving is required, the area of elevated underwater noise levels will be monitored by certified observers for marine mammal species, and work will be temporarily stopped to protect these species as required by applicable permits.
- If needed, block nets will be set prior to high tide to prevent fish from accessing the area behind any sheet pile installation.

Appendix F

Inadvertent Discovery Plan



INADVERTENT DISCOVERY PLAN PLAN AND PROCEDURES FOR THE DISCOVERY OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS

To request ADA accommodation, including materials in a format for the visually impaired, call Ecology at 360-407-6000 or visit <https://ecology.wa.gov/accessibility>. People with impaired hearing may call Washington Relay Service at 711. People with a speech disability may call TTY at 877-833-6341.

Site Name(s): JELD-WEN/Former Nord Door Location: 300 West Marine View Drive, Everett, WA 98201

Project Lead/Organization: Jason Cornetta, Anchor QEA County: Snohomish

If this Inadvertent Discovery Plan (IDP) is for multiple (batched) projects, ensure the location information covers all project areas.

1. INTRODUCTION

The IDP outlines procedures to perform in the event of a discovery of archaeological materials or human remains, in accordance with applicable state and federal laws. An IDP is required, as part of Agency Terms and Conditions for all grants and loans, for any project that creates disturbance above or below the ground. An IDP is not a substitute for a formal cultural resource review (Executive 21-02 or Section 106).

Once completed, **the IDP should always be kept at the project site** during all project activities. All staff, contractors, and volunteers should be familiar with its contents and know where to find it.

2. CULTURAL RESOURCE DISCOVERIES

A cultural resource discovery could be prehistoric or historic. Examples include (see images for further examples):

- An accumulation of shell, burned rocks, or other food related materials.
- Bones, intact or in small pieces.
- An area of charcoal or very dark stained soil with artifacts.
- Stone tools or waste flakes (for example, an arrowhead or stone chips).
- Modified or stripped trees, often cedar or aspen, or other modified natural features, such as rock drawings.
- Agricultural or logging materials that appear older than 50 years. These could include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, and many other items.
- Clusters of tin cans or bottles, or other debris that appear older than 50 years.
- Old munitions casings. **Always assume these are live and never touch or move.**
- Buried railroad tracks, decking, foundations, or other industrial materials.
- Remnants of homesteading. These could include bricks, nails, household items, toys, food containers, and other items associated with homes or farming sites.

The above list does not cover every possible cultural resource. When in doubt, assume the material is a cultural resource.

3. ON-SITE RESPONSIBILITIES

If any employee, contractor, or subcontractor believes that they have uncovered cultural resources or human remains at any point in the project, take the following steps to ***Stop-Protect-Notify***. If you suspect that the discovery includes human remains, also follow Sections 5 and 6.

STEP A: Stop Work.

All work must stop immediately in the vicinity of the discovery.

STEP B: Protect the Discovery.

Leave the discovery and the surrounding area untouched and create a clear, identifiable, and wide boundary (30 feet or larger) with temporary fencing, flagging, stakes, or other clear markings. Provide protection and ensure integrity of the discovery until cleared by the Department of Archaeological and Historical Preservation (DAHP) or a licensed, professional archaeologist.

Do not permit vehicles, equipment, or unauthorized personnel to traverse the discovery site. Do not allow work to resume within the boundary until the requirements of this IDP are met.

STEP C: Notify Project Archaeologist (if applicable).

If the project has an archaeologist, notify that person. If there is a monitoring plan in place, the archaeologist will follow the outlined procedure.

STEP D: Notify Project and Washington Department of Ecology (Ecology) contacts.

Project Lead Contacts

Primary Contact

Name: Jason Cornetta
Organization: Anchor QEA
Phone: 253-241-0071
Email: jcornetta@anchorqea.com

Alternate Contact

Name: Nathan Soccorsy
Organization: Anchor QEA
Phone: 480-272-2805
Email: nsoccorsy@anchorqea.com

Ecology Contacts (completed by Ecology Project Manager)

Ecology Project Manager

Name: Frank Winslow
Program: Toxics Cleanup Program
Phone: 509 424-0543
Email: Frank.Winslow@ecy.wa.gov

Alternate or Cultural Resource Contact

Name: Josh Morman
Program: Toxics Cleanup Program
Phone: 360-480-3289
Email: josh.morman@ecy.wa.gov

STEP E: Ecology will notify DAHP.

Once notified, the Ecology Cultural Resource Contact or the Ecology Project Manager will contact DAHP to report and confirm the discovery. To avoid delay, the Project Lead/Organization will contact DAHP if they are not able to reach Ecology.

DAHP will provide the steps to assist with identification. DAHP, Ecology, and Tribal representatives may coordinate a site visit following any necessary safety protocols. DAHP may also inform the Project Lead/Organization and Ecology of additional steps to further protect the site.

Do not continue work until DAHP has issued an approval for work to proceed in the area of, or near, the discovery.

DAHP Contacts:

Name: Rob Whitlam, PhD
Title: State Archaeologist
Cell: 360-890-2615
Email: Rob.Whitlam@dahp.wa.gov
Main Office: 360-586-3065

Human Remains/Bones:

Name: Guy Tasa, PhD
Title: State Anthropologist
Cell: 360-790-1633 (24/7)
Email: Guy.Tasa@dahp.wa.gov

4. TRIBAL CONTACTS

In the event cultural resources are discovered, the following tribes will be contacted. See Section 10 for Additional Resources.

Tribe:	Tulalip	Tribe:	
Name:	Gene Enick	Name:	
Title:	Assistant Historical Preservation Officer	Title:	
Phone:	360-716-2653	Phone:	
Email:	genick@tulaliptribes-nsn.gov	Email:	
Tribe:		Tribe:	
Name:		Name:	
Title:		Title:	
Phone:		Phone:	
Email:		Email:	

Please provide contact information for additional tribes within your project area, if needed, in Section 11.

5. FURTHER CONTACTS (if applicable)

If the discovery is confirmed by DAHP as a cultural or archaeological resource, or as human remains, and there is a partnering federal or state agency, Ecology or the Project Lead/Organization will ensure the partnering agency is immediately notified.

Federal Agency:

Agency:	
Name:	
Title:	
Phone:	
Email:	

State Agency:

Agency:	
Name:	
Title:	
Phone:	
Email:	

6. SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Any human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect. Follow the steps under **Stop-Protect-Notify**. For specific instructions on how to handle a human remains discovery, see: [RCW 68.50.645: Skeletal human remains—Duty to notify—Ground disturbing activities—Coroner determination—Definitions](#).

Suggestion: If you are unsure whether the discovery is human bone or not, contact Guy Tasa with DAHP, for identification and next steps. Do not pick up the discovery.

Guy Tasa, PhD State Physical Anthropologist

Guy.Tasa@dahp.wa.gov

(360) 790-1633 (Cell/Office)

For discoveries that are confirmed or suspected human remains, follow these steps:

1. Notify law enforcement and the Medical Examiner/Coroner using the contacts below. **Do not call 911** unless it is the only number available to you.

Enter contact information below (required):

- Local Medical Examiner or Coroner name and phone:

J. Matthew Lacy, 425-438-6200

- Local Law Enforcement main name and phone:

Everett Police Department, 425-257-8400

- Local Non-Emergency phone number (911 if without a non-emergency number):

425-407-3999

2. The Medical Examiner/Coroner (with assistance of law enforcement personnel) will determine if the remains are human or if the discovery site constitutes a crime scene and will notify DAHP.
3. **DO NOT speak with the media, allow photography or disturbance of the remains, or release any information about the discovery on social media.**
4. If the remains are determined to be non-forensic, Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection and to shield them from being photographed by others or disturbed.

Further activities:

- Per [RCW 27.44.055](#), [RCW 68.50](#), and [RCW 68.60](#), DAHP will have jurisdiction over non-forensic human remains. Ecology staff will participate in consultation. Organizations may also participate in consultation.
- Documentation of human skeletal remains and funerary objects will be agreed upon through the consultation process described in [RCW 27.44.055](#), [RCW 68.50](#), and [RCW 68.60](#).
- When consultation and documentation activities are complete, work in the discovery area may resume as described in Section 8.

If the project occurs on federal lands (such as a national forest or park or a military reservation) the provisions of the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) apply and the responsible federal agency will follow its provisions. Note that state highways that cross federal lands are on an easement and are not owned by the state.

If the project occurs on non-federal lands, the Project Lead/Organization will comply with applicable state and federal laws, and the above protocol.

7. DOCUMENTATION OF ARCHAEOLOGICAL MATERIALS

Archaeological resources discovered during construction are protected by state law [RCW 27.53](#) and assumed eligible for inclusion in the National Register of Historic Places under Criterion D until a formal Determination of Eligibility is made.

The Project Lead/Organization must ensure that proper documentation and field assessment are made of all discovered cultural resources in cooperation with all parties: the federal agencies (if any), DAHP, Ecology, affected tribes, and the archaeologist.

The archaeologist will record all prehistoric and historic cultural material discovered during project construction on a standard DAHP archaeological site or isolate inventory form. They will photograph site overviews, features, and artifacts and prepare stratigraphic profiles and soil/sediment descriptions for minimal subsurface exposures. They will document discovery locations on scaled site plans and site location maps.

Cultural features, horizons, and artifacts detected in buried sediments may require the archaeologist to conduct further evaluation using hand-dug test units. They will excavate units in a controlled fashion to expose features, collect samples from undisturbed contexts, or to interpret complex stratigraphy. They may also use a test unit or trench excavation to determine if an intact occupation surface is present. They will only use test units when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site's significance. They will conduct excavations using standard archaeological techniques to precisely document the location of cultural deposits, artifacts, and features.

The archaeologist will record spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock for each unit on a standard form. They will complete test excavation unit level forms, which will include plan maps for each excavation level and artifact counts and material types, number, and vertical provenience (depth below

surface and stratum association where applicable) for all recovered artifacts. They will draw a stratigraphic profile for at least one wall of each test excavation unit.

The archaeologist will screen sediments excavated for purposes of cultural resources investigation through 1/8-inch mesh, unless soil conditions warrant 1/4-inch mesh.

The archaeologist will analyze, catalogue, and temporarily curate all prehistoric and historic artifacts collected from the surface and from probes and excavation units. The ultimate disposition of cultural materials will be determined in consultation with the federal agencies (if any), DAHP, Ecology, and the affected tribe(s).

Within 90 days of concluding fieldwork, the archaeologist will provide a technical report describing any and all monitoring and resultant archaeological excavations to the Project Lead/Organization, who will forward the report to Ecology, the federal agencies (if any), DAHP, and the affected tribe(s) for review and comment.

If assessment activities expose human remains (burials, isolated teeth, or bones), the archaeologist and Project Lead/Organization will follow the process described in **Section 6**.

8. PROCEEDING WITH WORK

The Project Lead/Organization shall work with the archaeologist, DAHP, and affected tribe(s) to determine the appropriate discovery boundary and where work can continue.

Work may continue at the discovery location only after the process outlined in this plan is followed and the Project Lead/Organization, DAHP, any affected tribe(s), Ecology, and the federal agencies (if any) determine that compliance with state and federal laws is complete.

9. ORGANIZATION RESPONSIBILITY

The Project Lead/Organization is responsible for ensuring:

- This IDP has complete and accurate information.
- This IDP is immediately available to all field staff at the sites and available by request to any party.
- This IDP is implemented to address any discovery at the site.
- That all field staff, contractors, and volunteers are instructed on how to implement this IDP.

10. ADDITIONAL RESOURCES

Informative Video

Ecology recommends that all project staff, contractors, and volunteers view this informative video explaining the value of IDP protocol and what to do in the event of a discovery. The target audience is anyone working on the project who could unexpectedly find cultural resources or human remains while excavating or digging. The video is also posted on DAHP's inadvertent discovery language website.

[Ecology's IDP Video](https://www.youtube.com/watch?v=ioX-4cXfbDY) (<https://www.youtube.com/watch?v=ioX-4cXfbDY>)

Informational Resources

[DAH P](https://dahp.wa.gov) (<https://dahp.wa.gov>)

[Washington State Archeology \(DAH P 2003\)](https://dahp.wa.gov/sites/default/files/Field%20Guide%20to%20WA%20Arch_0.pdf)

(https://dahp.wa.gov/sites/default/files/Field%20Guide%20to%20WA%20Arch_0.pdf)

[Association of Washington Archaeologists](https://www.archaeologyinwashington.com) (<https://www.archaeologyinwashington.com>)

Potentially Interested Tribes

[Interactive Map of Tribes by Area](https://dahp.wa.gov/archaeology/tribal-consultation-information)

(<https://dahp.wa.gov/archaeology/tribal-consultation-information>)

[WSDOT Tribal Contact Website](https://wsdot.wa.gov/tribal/TribalContacts.htm)

(<https://wsdot.wa.gov/tribal/TribalContacts.htm>)

11. ADDITIONAL INFORMATION

Please add any additional contact information or other information needed within this IDP.

Implement the IDP if you see...

Chipped stone artifacts.

Examples are:

- Glass-like material.
- Angular material.
- “Unusual” material or shape for the area.
- Regularity of flaking.
- Variability of size.



Stone artifacts from Oregon.



Stone artifacts from Washington.



Biface-knife, scraper, or pre-form found in NE Washington. Thought to be a well knapped object of great antiquity. Courtesy of Methow Salmon Rec. Foundation.

Implement the IDP if you see...

Ground stone artifacts.

Examples are:

- Unusual or unnatural shapes or unusual stone.
- Striations or scratching.
- Etching, perforations, or pecking.
- Regularity in modifications.
- Variability of size, function, or complexity.



Above: Fishing Weight - credit [CRITFC Treaty Fishing Rights website](#).



Artifacts from unknown locations (left and right images).



Implement the IDP if you see...

Bone or shell artifacts, tools, or beads.

Examples are:

- Smooth or carved materials.
- Unusual shape.
- Pointed as if used as a tool.
- Wedge shaped like a “shoehorn”.
- Variability of size.
- Beads from shell (*dentalium*) or tusk.



Upper Left: Bone Awls from Oregon.

Upper Center: Bone Wedge from California.

Upper Right: Plateau dentalium choker and bracelet, from Nez Perce National Historical Park, 19th century, made using *Antalis pretiosa* shells Credit: Nez Perce - Nez Perce National Historical Park, NEPE 8762, Public Domain.

Above: Tooth Pendants. Right: Bone Pendants. Both from Oregon and Washington.



Implement the IDP if you see...

Culturally modified trees, fiber, or wood artifacts.

Examples are:

- Trees with bark stripped or peeled, carvings, axe cuts, de-limbing, wood removal, and other human modifications.
- Fiber or wood artifacts in a wet environment.
- Variability of size, function, and complexity.



Left and Below: *Culturally modified tree and an old carving on an aspen (Courtesy of DAHP).*

Right, Top to Bottom: *Artifacts from Mud Bay, Olympia: Toy war club, two strand cedar rope, wet basketry.*



Implement the IDP if you see...

Strange, different, or interesting looking dirt, rocks, or shells.

Human activities leave traces in the ground that may or may not have artifacts associated with them. Examples are:

- “Unusual” accumulations of rock (especially fire-cracked rock).
- “Unusual” shaped accumulations of rock (such as a shape similar to a fire ring).
- Charcoal or charcoal-stained soils, burnt-looking soils, or soil that has a “layer cake” appearance.
- Accumulations of shell, bones, or artifacts. Shells may be crushed.
- Look for the “unusual” or out of place (for example, rock piles in areas with otherwise few rocks).



Shell Midden pocket in modern fill discovered in sewer trench.



Underground oven. Courtesy of DAHP.

Shell midden with fire cracked rock.



Hearth excavated near Hamilton, WA.

Implement the IDP if you see...

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Agricultural or logging equipment. May include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, etc.
- Domestic items including square or wire nails, amethyst colored glass, or painted stoneware.



Left: Top to Bottom: *Willow pattern serving bowl and slip joint pocket knife discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.*



Right: *Collections of historic artifacts discovered during excavations in eastern Washington cities.*



Implement the IDP if you see...

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Railway tokens, coins, and buttons.
- Spectacles, toys, clothing, and personal items.
- Items helping to understand a culture or identity.
- Food containers and dishware.



Main Image: *Dishes, bottles, workboot found at the North Shore Japanese bath house (ofuro) site, Courtesy Bob Muckle, Archaeologist, Capilano University, B.C. This is an example of an above ground resource.*



Right, from Top to Bottom:
Coins, token, spectacles and Montgomery Ward pitchfork toy discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.



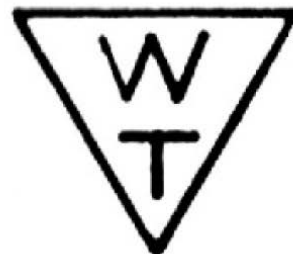
Implement the IDP if you see...

- Old munition casings – if you see ammunition of any type – ***always assume they are live and never touch or move!***
- Tin cans or glass bottles with an older manufacturer's technique – maker's mark, distinct colors such as turquoise, or an older method of opening the container.



Far Left: .303 British cartridge found by a WCC planting crew on Skagit River. Don't ever touch something like this!
Left: Maker's mark on bottom of old bottle.

Right: Old beer can found in Oregon. ACME was owned by Olympia Brewery. Courtesy of Heather Simmons.



Logo employed by Whithall Tatum & Co. between 1924 to 1938 (Lockhart et al. 2016).



Can opening dates, courtesy of W.M. Schroeder.

Implement the IDP if you see...

You see historic foundations or buried structures.

Examples are:

- Foundations.
- Railroad and trolley tracks.
- Remnants of structures.



Counter Clockwise, Left to Right: *Historic structure 45KI924, in WSDOT right of way for SR99 tunnel. Remnants of Smith Cove shantytown (45-KI-1200) discovered during Ecology CSO excavation, City of Spokane historic trolley tracks uncovered during stormwater project, intact foundation of historic home that survived the Great Ellensburg Fire of July 4, 1889, uncovered beneath parking lot in Ellensburg.*

Implement the IDP if you see...

Potential human remains.

Examples are:

- Grave headstones that appear to be older than 50 years.
- Bones or bone tools--intact or in small pieces. It can be difficult to differentiate animal from human so they must be identified by an expert.
- These are all examples of animal bones and are not human.

Center: *Bone wedge tool, courtesy of Smith Cove Shantytown excavation (45K11200).*

Other images (Top Right, Bottom Left, and Bottom) Center: Courtesy of DAHP.



Directly Above: This is a real discovery at an Ecology sewer project site.

What would you do if you found these items at a site? Who would be the first person you would call?

Hint: Read the plan!

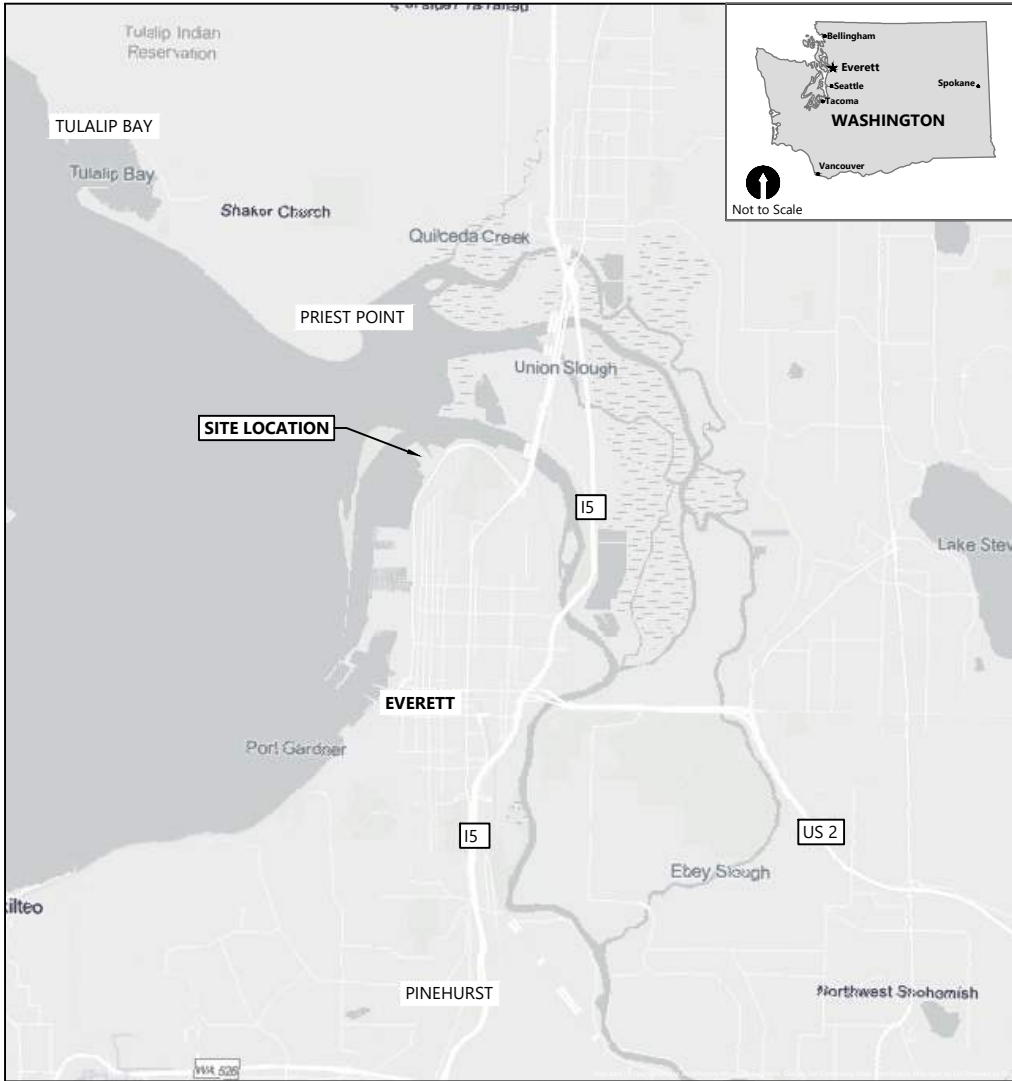
Appendix G

60% Design Construction Plans

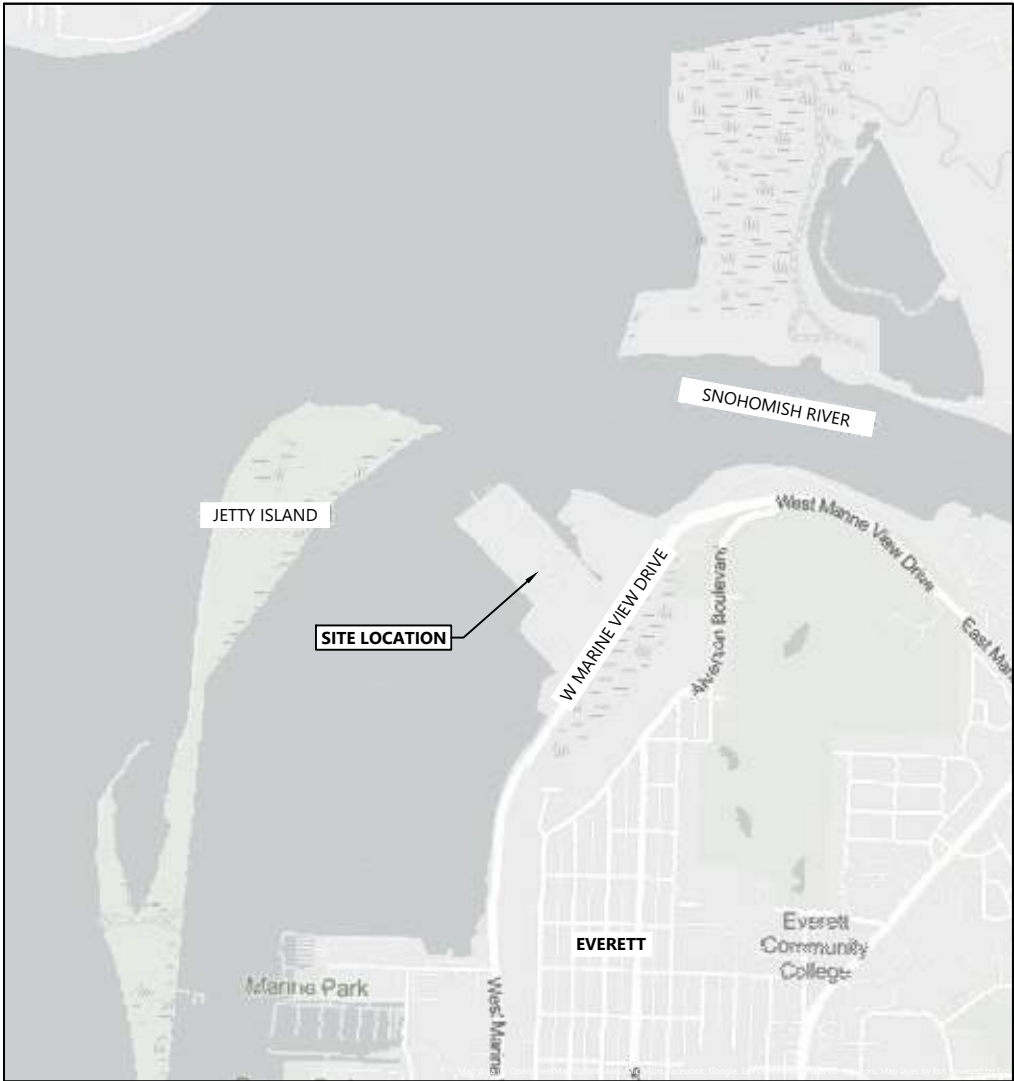
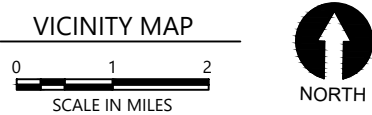
DRAFT – 60% CONSTRUCTION PLANS

JELD-WEN REMEDIATION PROJECT

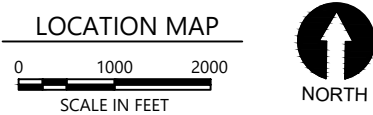
JELD-WEN, INC.



SOURCE: Esri, et al



SOURCE: Esri, et al



SHEET INDEX		
SHT. NO.	DWG. NO.	TITLE
1	G1	COVER SHEET
2	G2	GENERAL NOTES, DATUM CONVERSIONS, AND ABBREVIATIONS
3	G3	PROJECT OVERVIEW
4	G4	EXISTING CONDITIONS & UTILITIES
5	G5	PROPERTY OWNERSHIP
6	G6	SITE STAGING, STOCKPILE, & ACCESS PLAN
7	C1	STRUCTURE & DEBRIS REMOVAL
8	C2	SITE SEDIMENT REMOVAL PLAN
9	C3	WEST LOGWAY AREA SEDIMENT REMOVAL PLAN
10	C4	EAST LOGWAY AREA SEDIMENT REMOVAL PLAN
11	C5	SOUTHERN SHORELINE AREA SEDIMENT REMOVAL PLAN
12	C6	KNOLL AREA SEDIMENT REMOVAL PLAN
13	C7	SEDIMENT REMOVAL SECTIONS I
14	C8	SEDIMENT REMOVAL SECTIONS II
15	C9	SEDIMENT REMOVAL SECTIONS III
16	C10	SITE MATERIAL PLACEMENT PLAN
17	C11	WEST LOGWAY PLACEMENT PLAN
18	C12	EAST LOGWAY PLACEMENT PLAN
19	C13	SOUTHERN SHORELINE PLACEMENT PLAN
20	C14	KNOLL PLACEMENT PLAN
21	C15	MATERIAL PLACEMENT SECTIONS I
22	C16	MATERIAL PLACEMENT SECTIONS II
23	C17	MATERIAL PLACEMENT SECTIONS III
24	D1	DETAILS I
25	D2	DETAILS II
26	D3	DETAILS III

DRAFT-60% DESIGN
NOT FOR CONSTRUCTION



REVISIONS					
REV	DATE	BY	APP'D	DESCRIPTION	

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

JELD-WEN REMEDIATION PROJECT

COVER SHEET

G1

SHEET # 1 OF #

SURVEY NOTES

- 1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD83, U.S. SURVEY FEET
- 2. VERTICAL DATUM: MLLW (MEAN LOWER LOW WATER)
- 3. BATHYMETRIC SURVEY PROVIDED BY ETRAC NOVEMBER 18, 2024.
- 4. UPLAND SURVEY WITH UTILITIES PROVIDED BY SIGNATURE SURVEYING & MAPPING, PLLC MAY 21, 2024.
- 5. A LOCAL BENCHMARK WAS REFERENCED FOR CONVERSIONS IN DEVELOPING THE SITE-SPECIFIC BATHYMETRIC AND UPLAND SURVEY DATA AS FOLLOWS: U.S. COAST AND GEODETIC SURVEY DISK STAMPED AS FOLLOWS: US COAST & GEODETIC SURVEY TIDAL STATION DISK "4 1934" LOCATED AT N 47.98000; E -122.22300, WITH AN ELEVATION OF 39.89 FEET NAVD88 (41.93 FEET MLLW).
- 6. THIS BATHYMETRIC SURVEY IS REPRESENTATIVE OF THE GENERAL CONDITION OF THE SEABED AT THE TIME OF THE SURVEY. THE CONDITION OF THE BOTTOM MAY CHANGE AT ANY TIME AFTER THE DATE OF THIS SURVEY.

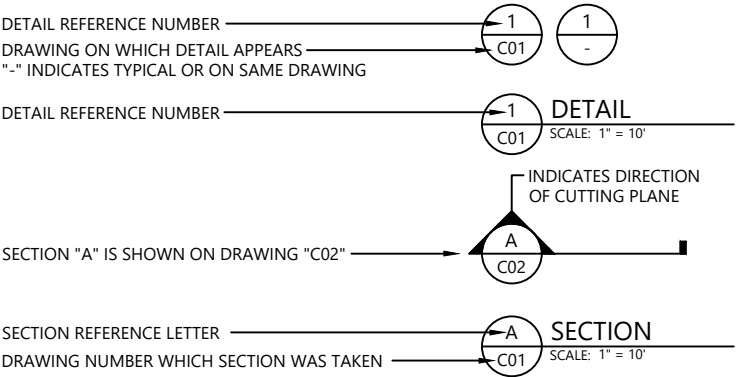
ADDITIONAL GENERAL CONSTRUCTION NOTES

- 1. CONTRACT DOCUMENTS REFER TO THESE DRAWINGS, THE PROJECT SPECIFICATIONS, THE BIDDING DOCUMENTS, AND THE CONSTRUCTION CONTRACT.
- 2. A PRE-CONSTRUCTION MEETING BETWEEN THE CONTRACTOR, THE OWNER, AND THE ENGINEER SHALL BE REQUIRED PRIOR TO ANY ON-SITE WORK.
- 3. THE CONTRACTOR SHALL RECEIVE, IN WRITING, AUTHORIZATION TO PROCEED BEFORE STARTING WITH ANY WORK ON ANY ITEM NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.
- 4. ALL WORK SHALL BE IN CONFORMANCE WITH EXISTING LABOR LAWS, SAFETY REQUIREMENTS, AND OTHER REGULATIONS, AS REQUIRED BY THE CITY OF EVERETT, THE STATE OF WASHINGTON, AND THE FEDERAL GOVERNMENT. THE CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND IS NOT LIMITED TO NORMAL WORKING HOURS.
- 5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THIS CONTRACT.
- 6. ALL MATERIALS SHALL BE NEW AND UNDAMAGED UNLESS OTHERWISE APPROVED BY THE OWNER AND THE ENGINEER. THE SAME MANUFACTURER OF EACH ITEM SHALL BE USED THROUGHOUT THE WORK UNLESS OTHERWISE APPROVED BY THE PROJECT ENGINEER.
- 7. THE CONTRACTOR SHALL NOT EXCAVATE OR DISTURB BEYOND THE CLEARING AND DISTRUBANCE LIMITS SHOWN ON THE DRAWINGS UNLESS OTHERWISE APPROVED BY THE OWNER OR THE ENGINEER.
- 8. THE NOTES, DETAILS, AND SPECIFICATIONS IN THE CONTRACT DOCUMENTS SHALL TAKE PRECEDENCE OVER THESE GENERAL NOTES.
- 9. DIMENSION CALL-OUTS SHALL TAKE PRECEDENCE OVER SCALES SHOWN ON THE DRAWINGS.
- 10. THE CONTRACTOR SHALL MAINTAIN HAND DRAWN REDLINES, FIELD NOTES, AND PHOTOGRAPHS ("FIELD DOCUMENTATION") OF ALL IMPROVEMENTS AS THE WORK PROGRESSES. THE CONTRACTOR'S FIELD DOCUMENTATION SHALL BE MAINTAINED ON-SITE AND SHALL BE AVAILABLE FOR REVIEW BY THE OWNER AND THE ENGINEER AT ALL TIMES. THE CONTRACTOR SHALL PROVIDE FIELD DOCUMENTATION TO THE OWNER FOR PREPARATION OF RECORD DRAWINGS PRIOR TO PROJECT ACCEPTANCE.

EXISTING UTILITIES

- 1. THE LOCATIONS OF EXISTING UTILITIES SHOWN ON THESE DRAWINGS ARE APPROXIMATE AND HAVE NOT BEEN FIELD VERIFIED. ALL UTILITIES SHOWN HAVE BEEN LOCATED ON THE DRAWINGS USING THE BEST AVAILABLE INFORMATION. PRIOR TO ANY CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION OF ALL EXISTING UTILITIES. THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY DISCREPANCIES BETWEEN OBSERVED UTILITY LOCATIONS AND CONDITIONS AND THOSE SHOWN ON THE DRAWINGS, PRIOR TO PROCEEDING WITH CONSTRUCTION.
- 2. ALL EXCAVATIONS SHALL COMPLY WITH THE PROVISIONS OF CHAPTER 19.122 RCW, INCLUDING NOTIFICATION OF ALL OWNERS OF UNDERGROUND FACILITIES AT LEAST TWO (2) BUSINESS DAYS, BUT NOT MORE THAN 10 BUSINESS DAYS BEFORE COMMENCING ANY EXCAVATION. THE CONTRACTOR SHALL CONTACT THE UTILITY LOCATION REQUEST CENTER (ONE-CALL CENTER) AT 811 OR 1-800-424-5555 FOR UTILITY LOCATIONS NOT LESS THAN 2 BUSINESS DAYS, BUT NOT MORE THAN 10 BUSINESS DAYS BEFORE THE SCHEDULED DATE FOR EARTHWORK OR TRENCHING.
- 3. THE SIZE, LOCATION, AND TYPE OF UNDERGROUND UTILITIES EXPOSED OR MODIFIED BY THE CONTRACTOR SHALL BE ACCURATELY NOTED AND PLACED ON THE CONTRACTOR'S AS-BUILT DRAWINGS.

DETAIL AND SECTION REFERENCING



ABBREVIATIONS

'	FEET, MINUTES
"	INCHES, SECONDS
°	DEGREES
Ø	DIAMETER
#	NUMBER
ASTM	ASTM INTERNATIONAL
CFS	CUBIC FEET PER SECOND
DWG	DRAWING
E	EAST, EASTING
ELEV	ELEVATION
H, HOR	HORIZONTAL
LF	LINEAR FEET
MAX	MAXIMUM
MIN	MINIMUM
MLLW	MEAN LOWER LOW WATER
N	NORTH, NORTHING
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERTICAL DATUM
NTS	NOT TO SCALE
ROW	RIGHT-OF-WAY
S	SLOPE, SOUTH
STA	STATION
TESC	TEMPORARY EROSION AND SEDIMENT CONTROL
TYP	TYPICAL
V, VERT	VERTICAL
W	WEST, WATER
WSDOT	WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

DRAFT-60% DESIGN
NOT FOR CONSTRUCTION



REVISIONS					
REV	DATE	BY	APP'D	DESCRIPTION	

DESIGNED BY: G. CASSON

DRAWN BY: N. REED

CHECKED BY: J. LAPLANTE

APPROVED BY: J. LAPLANTE

SCALE: AS NOTED

DATE: MARCH 2026

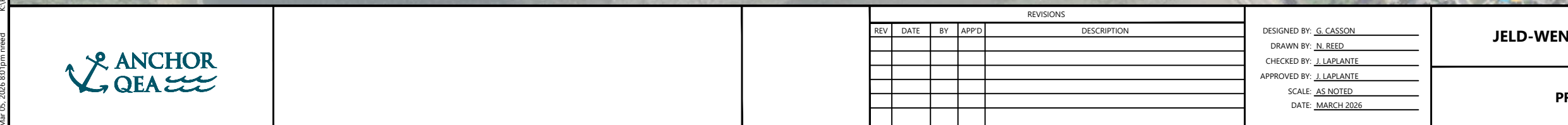
JELD-WEN REMEDIATION PROJECT

GENERAL NOTES, DATUM CONVERSIONS,
AND ABBREVIATIONS

G2

SHEET # 2 OF #

Mar 05, 2026 8:01pm nreed



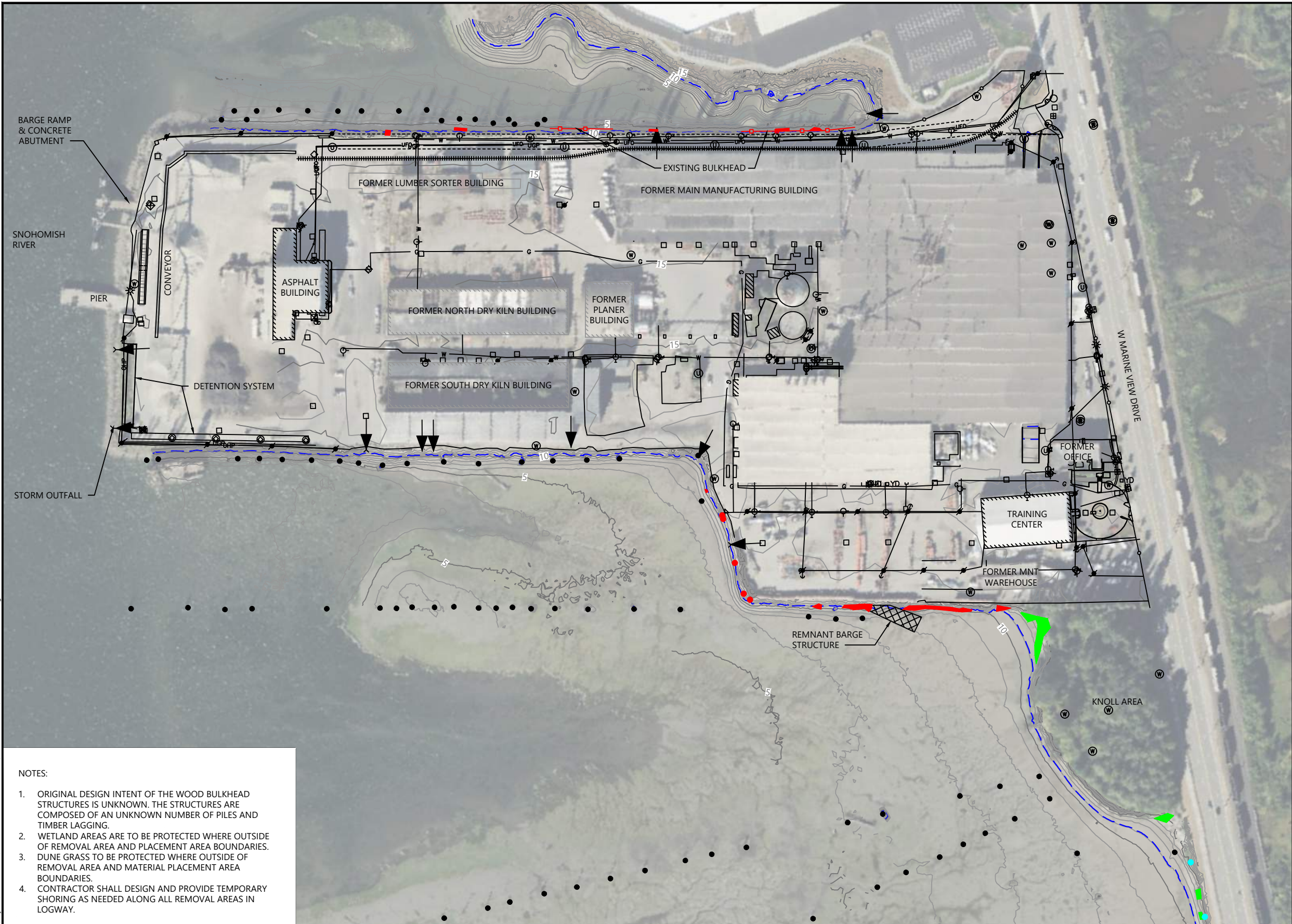
ONE INCH

AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY

PLAN INTENDED TO BE VIEWED IN COLOR, ADJACENT BLOCK IS "BLUE"

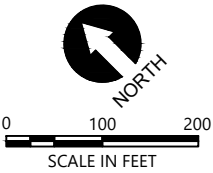


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Mar 05, 2026 8:01pm need



- NOTES:
1. ORIGINAL DESIGN INTENT OF THE WOOD BULKHEAD STRUCTURES IS UNKNOWN. THE STRUCTURES ARE COMPOSED OF AN UNKNOWN NUMBER OF PILES AND TIMBER LAGGING.
 2. WETLAND AREAS ARE TO BE PROTECTED WHERE OUTSIDE OF REMOVAL AREA AND PLACEMENT AREA BOUNDARIES.
 3. DUNE GRASS TO BE PROTECTED WHERE OUTSIDE OF REMOVAL AREA AND MATERIAL PLACEMENT AREA BOUNDARIES.
 4. CONTRACTOR SHALL DESIGN AND PROVIDE TEMPORARY SHORING AS NEEDED ALONG ALL REMOVAL AREAS IN LOGWAY.

- LEGEND:
- 5 EXISTING BATHYMETRIC CONTOURS (1' & 5' INTERVAL)
 - MEAN HIGHER HIGH WATER (MHHW) EL= 11.09'
 - EXISTING STORMWATER OUTFALL LOCATION
 - PILING
 - EXISTING BULKHEAD
 - OHP OVERHEAD UTILITY LINE
 - UGP UNDERGROUND POWER LINE
 - UFO UNDERGROUND FIBER OPTIC
 - W WATER LINE
 - G GAS LINE
 - POWER METER
 - GAS METER
 - POWER MANHOLE
 - UTILITY POLE
 - WATER METER
 - FIRE HYDRANT
 - POST INDICATOR VALVE
 - STORM DRAIN MANHOLE
 - SANITARY SEWER MANHOLE
 - CLEAN OUT
 - YARD DRAIN
 - VALVE
 - CATCH BASIN
 - GAS VALVE
 - MONITORING WELL
 - CULVERT
 - JUNCTION BOX
 - UNKNOWN UTILITY MANHOLE
 - BUILDING
 - WETLAND (SEE NOTE 2)
 - WETLAND TO BE REMOVED
 - DUNE GRASS (SEE NOTE 3)
 - DUNE GRASS TO BE REMOVED



**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**

PLAN INTENDED TO BE VIEWED
IN COLOR. ADJACENT BLOCK IS
"BLUE"
ONE INCH
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY



REVISIONS					
REV	DATE	BY	APP'D	DESCRIPTION	

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

JELD-WEN REMEDIATION PROJECT

EXISTING CONDITIONS & UTILITIES

G4

SHEET # **4** OF #



Mar 05, 2026 8:01pm nreed

[illegible]

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

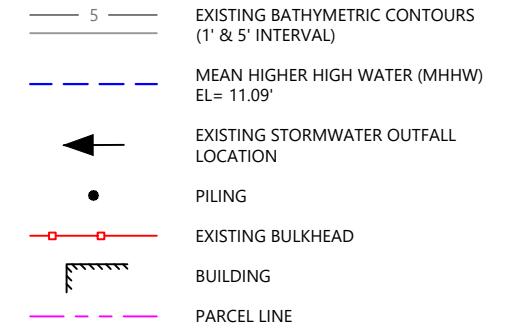
JELD-WEN REMEDIATION PROJECT

PROPERTY OWNERSHIP

G5

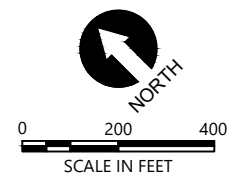
SHEET # **5** OF **#**

LEGEND:



NOTES:

A CRITICAL AREA PROTECTIVE COVENANT IS SIGNED
AND RECORDED FOR THE BAYWOOD INDUSTRIAL LLC PARCEL.

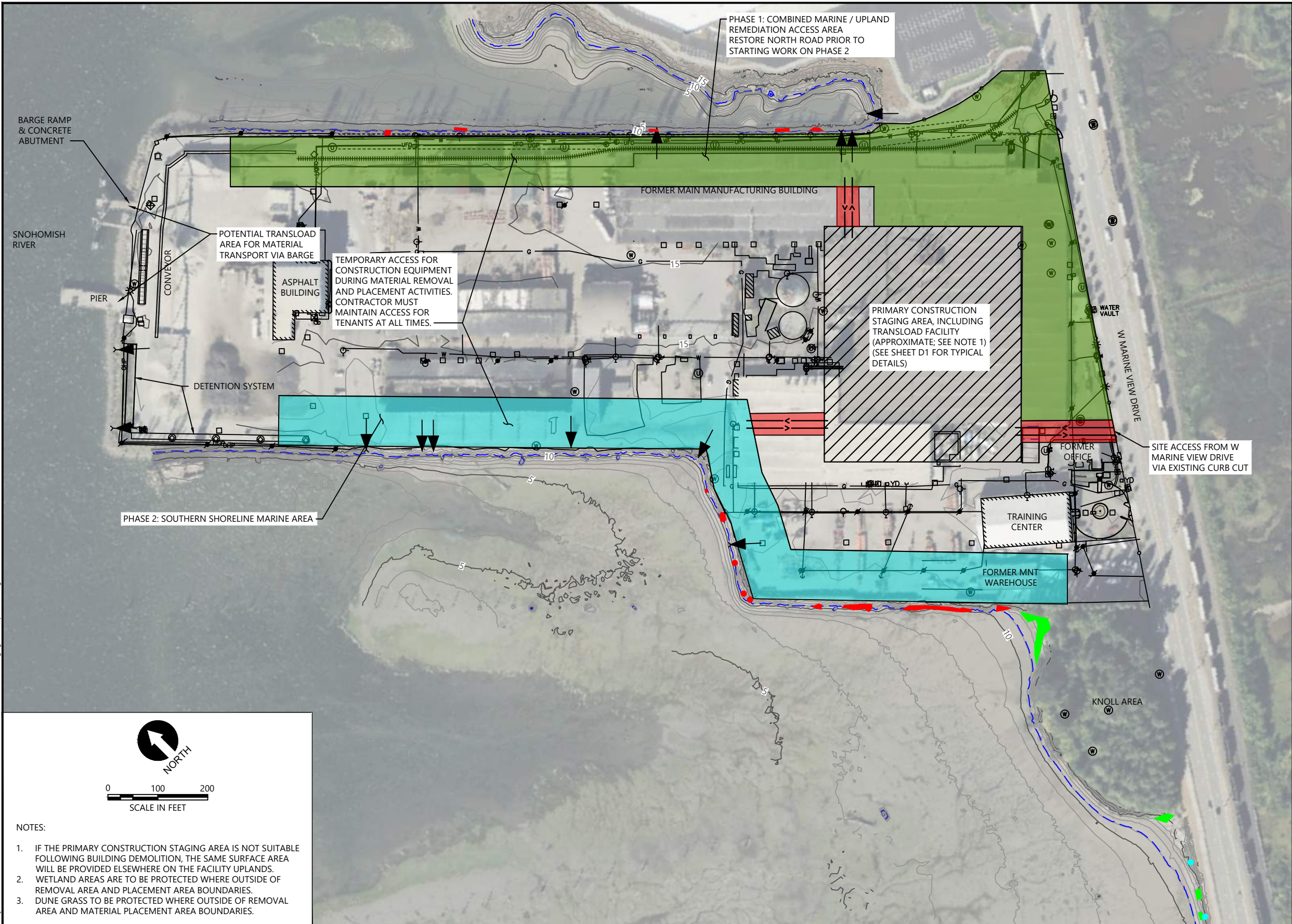


**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**

	AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY
	IN COLOR, ADJACENT BLOCK IS "BLUE"

AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY

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Mar 05, 2026 8:01pm need

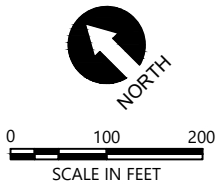


LEGEND:

- 5 EXISTING BATHYMETRIC CONTOURS (1' & 5' INTERVAL)
- MEAN HIGHER HIGH WATER (MHHW) EL= 11.09'
- DEDICATED CONSTRUCTION ACCESS ROUTE
- EXISTING STORMWATER OUTFALL LOCATION
- STAGING AND STOCKPILE AREA
- PHASE 1 TEMPORARY CONSTRUCTION ACCESS AREA
- PHASE 2 TEMPORARY CONSTRUCTION ACCESS AREA
- OHP OVERHEAD UTILITY LINE
- UGP UNDERGROUND POWER LINE
- UFO UNDERGROUND FIBER OPTIC
- W WATER LINE
- G GAS LINE
- POWER METER
- GAS METER
- POWER MANHOLE
- UTILITY POLE
- WATER METER
- FIRE HYDRANT
- POST INDICATOR VALVE
- STORM DRAIN MANHOLE
- SANITARY SEWER MANHOLE
- CLEAN OUT
- YARD DRAIN
- VALVE
- CATCH BASIN
- GAS VALVE
- MONITORING WELL
- CULVERT
- JUNCTION BOX
- UNKNOWN UTILITY MANHOLE
- BUILDING
- WETLAND (SEE NOTE 2)
- WETLAND TO BE REMOVED
- DUNE GRASS (SEE NOTE 3)
- DUNE GRASS TO BE REMOVED

NOTES:

- IF THE PRIMARY CONSTRUCTION STAGING AREA IS NOT SUITABLE FOLLOWING BUILDING DEMOLITION, THE SAME SURFACE AREA WILL BE PROVIDED ELSEWHERE ON THE FACILITY UPLANDS.
- WETLAND AREAS ARE TO BE PROTECTED WHERE OUTSIDE OF REMOVAL AREA AND PLACEMENT AREA BOUNDARIES.
- DUNE GRASS TO BE PROTECTED WHERE OUTSIDE OF REMOVAL AREA AND MATERIAL PLACEMENT AREA BOUNDARIES.



**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**

ONE INCH
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY



REVISIONS					
REV	DATE	BY	APP'D	DESCRIPTION	

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

JELD-WEN REMEDIATION PROJECT

**SITE STAGING, STOCKPILE, & ACCESS
PLAN**

G6

SHEET # **6** OF #

K:\Projects\0909-Jeld Wen\Jeld Wen\Jeld Wen\Former Nord Door Site\Construction Plans\0909-PL-STRUCTURE & DEBRIS REMOVAL.dwg STRUCTURE & DEBRIS REMOVAL
Mar 05, 2026 8:01pm need

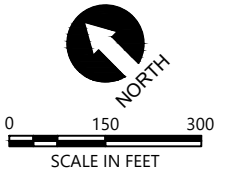


LEGEND:

- 5 EXISTING BATHYMETRIC CONTOURS (1' & 5' INTERVAL)
- MEAN HIGHER HIGH WATER (MHHW) EL= 11.09'
- EXISTING STORMWATER OUTFALL LOCATION
- EXISTING PILING TO BE REMOVED
- EXISTING PILING TO REMAIN IN PLACE
- EXISTING BULKHEAD TO BE REMOVED
- REMNANT BARGE STRUCTURE TO BE REMOVED
- MISC. DEBRIS AND ASPHALT REMOVAL
- WETLAND (SEE NOTE 2)
- WETLAND TO BE REMOVED
- DUNE GRASS (SEE NOTE 3)
- DUNE GRASS TO BE REMOVED

NOTES:

1. ORIGINAL DESIGN INTENT OF THE WOOD BULKHEAD STRUCTURES IS UNKNOWN. THE STRUCTURES ARE COMPOSED OF AN UNKNOWN NUMBER OF PILES AND TIMBER LAGGING.
2. WETLAND AREAS ARE TO BE PROTECTED WHERE OUTSIDE OF REMOVAL AREA AND PLACEMENT AREA BOUNDARIES.
3. DUNE GRASS TO BE PROTECTED WHERE OUTSIDE OF REMOVAL AREA AND MATERIAL PLACEMENT AREA BOUNDARIES.
4. CONTRACTOR SHALL DESIGN AND PROVIDE TEMPORARY SHORING AS NEEDED ALONG ALL REMOVAL AREAS IN LOGWAY.



**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**

PLAN INTENDED TO BE VIEWED
IN COLOR. ADJACENT BLOCK IS
"BLUE"

ONE INCH
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY



REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

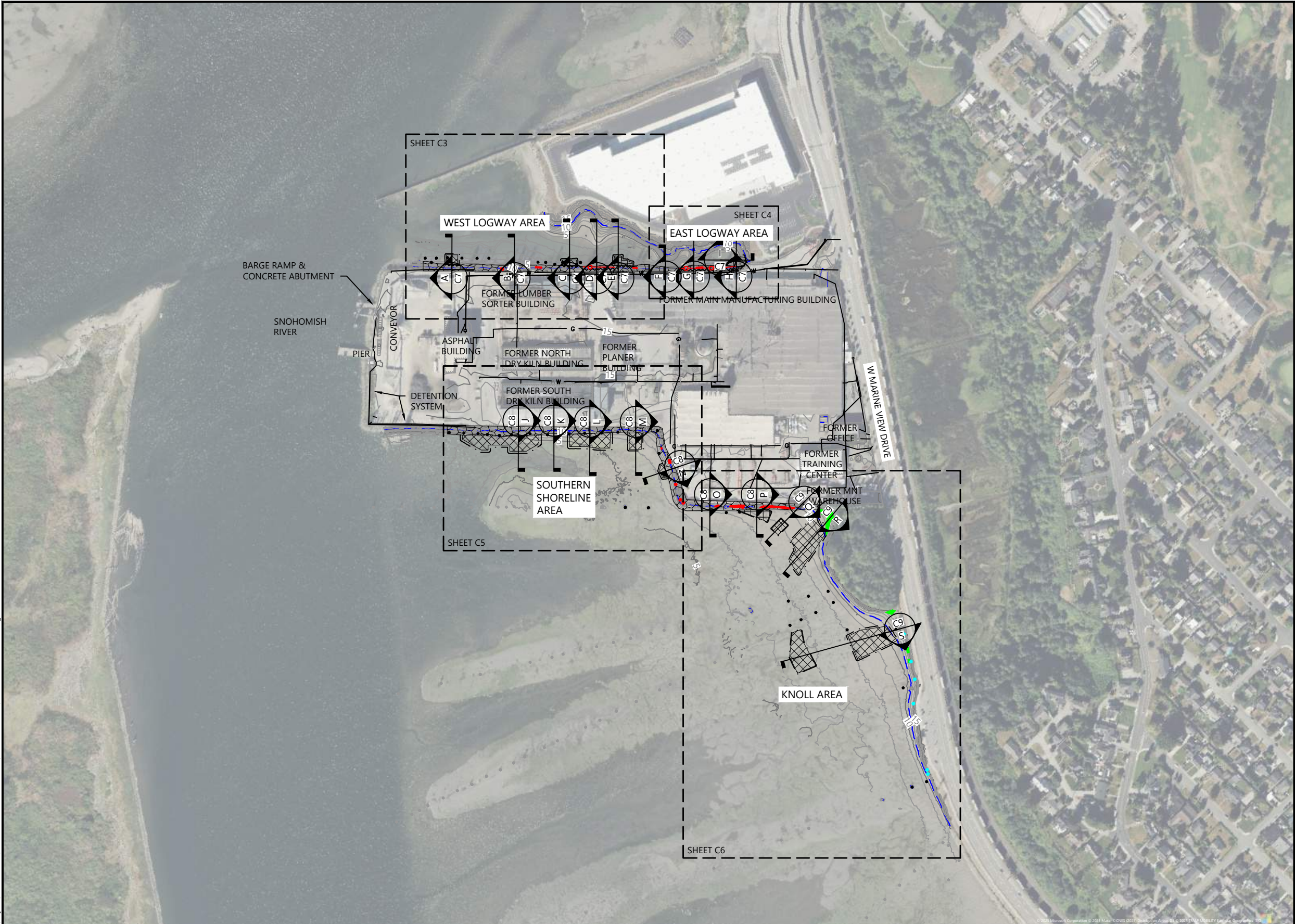
JELD-WEN REMEDIATION PROJECT

STRUCTURE & DEBRIS REMOVAL

C1

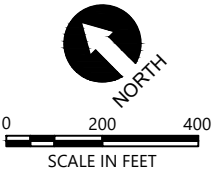
SHEET # **7** OF **#**

Mar 05, 2026 8:01pm need K:\Projects\0909-Jeld Wen\Jeld Wen\Jeld Wen\Former Nord Door Site\Construction Plans\0909-PL-REMOVAL PLAN.dwg SITE SEDIMENT REMOVAL PLAN



- LEGEND:
- 5 EXISTING BATHYMETRIC CONTOURS (1' & 5' INTERVAL)
 - MEAN HIGHER HIGH WATER (MHHW) EL = 11.09'
 - REMOVAL AREAS
 - LIMITS OF EXCAVATION
 - TEMPORARY SHORING
 - EXISTING BULKHEAD TO BE REMOVED
 - SHORELINE GRADING & SURFACE PREP
 - OHP OVERHEAD UTILITY LINE
 - UGP UNDERGROUND POWER LINE
 - UFO UNDERGROUND FIBER OPTIC
 - W WATER LINE
 - G GAS LINE
 - WETLAND (SEE NOTE 2)
 - WETLAND TO BE REMOVED
 - DUNE GRASS (SEE NOTE 3)
 - DUNE GRASS TO BE REMOVED
 - EXISTING PILING TO BE REMOVED
 - EXISTING PILING TO REMAIN IN PLACE

- NOTES:
- A CRITICAL AREA PROTECTIVE COVENANT IS SIGNED AND RECORDED FOR THE BAYWOOD INDUSTRIAL LLC PARCEL.
 - WETLAND AREAS ARE TO BE PROTECTED WHERE OUTSIDE OF REMOVAL AREA AND PLACEMENT AREA BOUNDARIES.
 - DUNE GRASS TO BE PROTECTED WHERE OUTSIDE OF REMOVAL AREA AND MATERIAL PLACEMENT AREA BOUNDARIES.
 - CONTRACTOR SHALL DESIGN AND PROVIDE TEMPORARY SHORING AS NEEDED ALONG ALL REMOVAL AREAS IN LOGWAY.



**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**

PLAN INTENDED TO BE VIEWED
IN COLOR. ADJACENT BLOCK IS
"BLUE"

ONE INCH
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY



REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

JELD-WEN REMEDIATION PROJECT

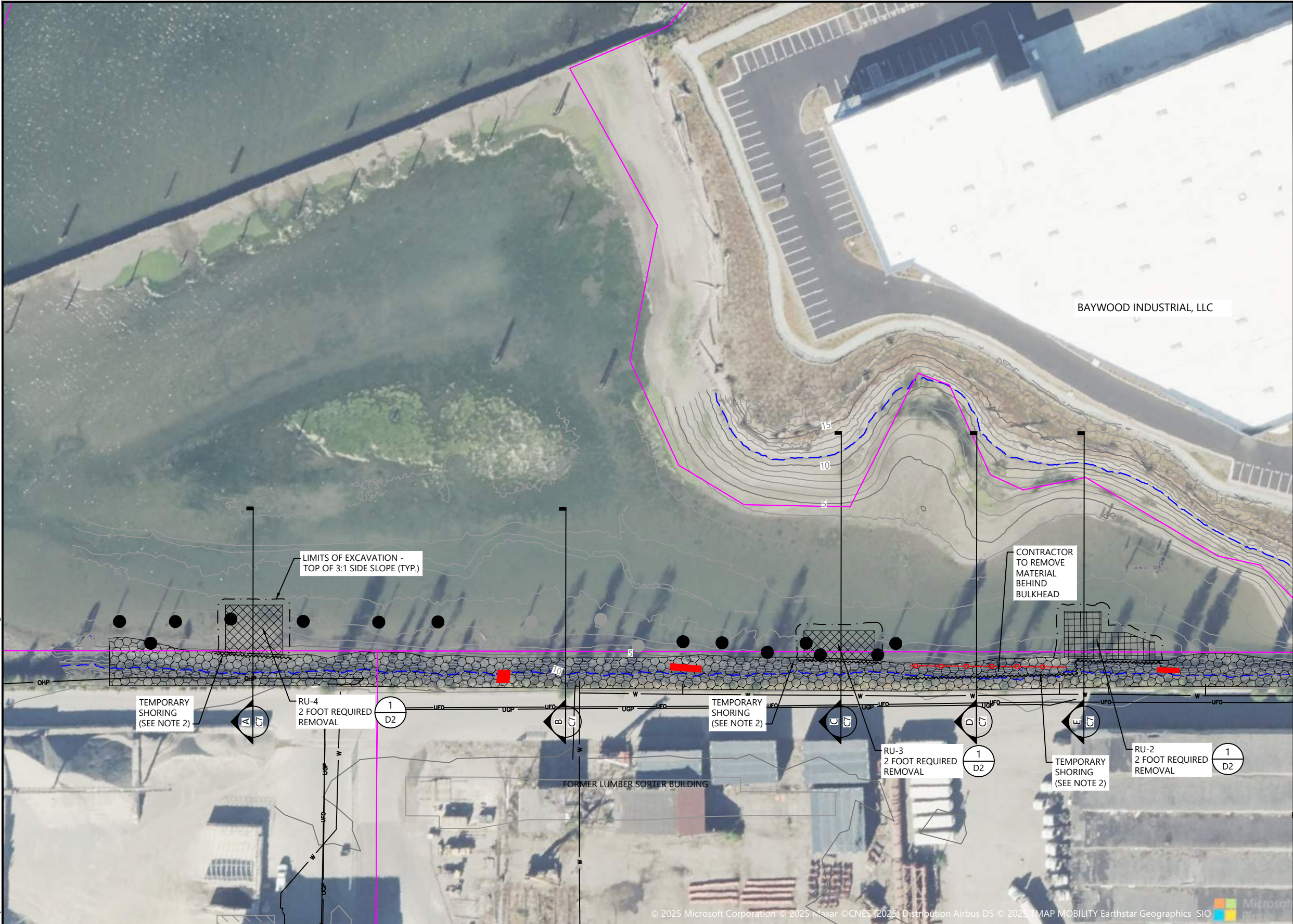
SITE SEDIMENT REMOVAL PLAN

C2

SHEET # 8 OF #

K:\Projects\0909-Jeld-Wen\Jeld-Wen\Jeld-Wen\0909-PL-REMOVAL PLAN.dwg WEST LOGWAY AREA SEDIMENT REMOVAL PLAN

Mar 05, 2026 8:01pm need

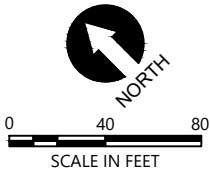


LEGEND:

- 5 EXISTING BATHYMETRIC CONTOURS (1' & 5' INTERVAL)
- MEAN HIGHER HIGH WATER (MHHW) EL= 11.09'
- REMOVAL AREAS
- LIMITS OF EXCAVATION
- TEMPORARY SHORING
- EXISTING BULKHEAD TO BE REMOVED
- SNOHOMISH COUNTY PARCEL LINE
- SHORELINE GRADING & SURFACE PREP
- OHP OVERHEAD UTILITY LINE
- UGP UNDERGROUND POWER LINE
- UFO UNDERGROUND FIBER OPTIC
- W WATER LINE
- G GAS LINE
- WETLAND TO BE REMOVED
- EXISTING PILING TO BE REMOVED
- EXISTING PILING TO REMAIN IN PLACE

NOTES:

- A CRITICAL AREA PROTECTIVE COVENANT IS SIGNED AND RECORDED FOR THE BAYWOOD INDUSTRIAL LLC PARCEL.
- CONTRACTOR SHALL DESIGN AND PROVIDE TEMPORARY SHORING AS NEEDED ALONG ALL REMOVAL AREAS IN LOGWAY.



**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**

PLAN INTENDED TO BE VIEWED
IN COLOR. ADJACENT BLOCK IS
"BLUE"

ONE INCH
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY



REVISIONS					DESCRIPTION
REV	DATE	BY	APP'D		

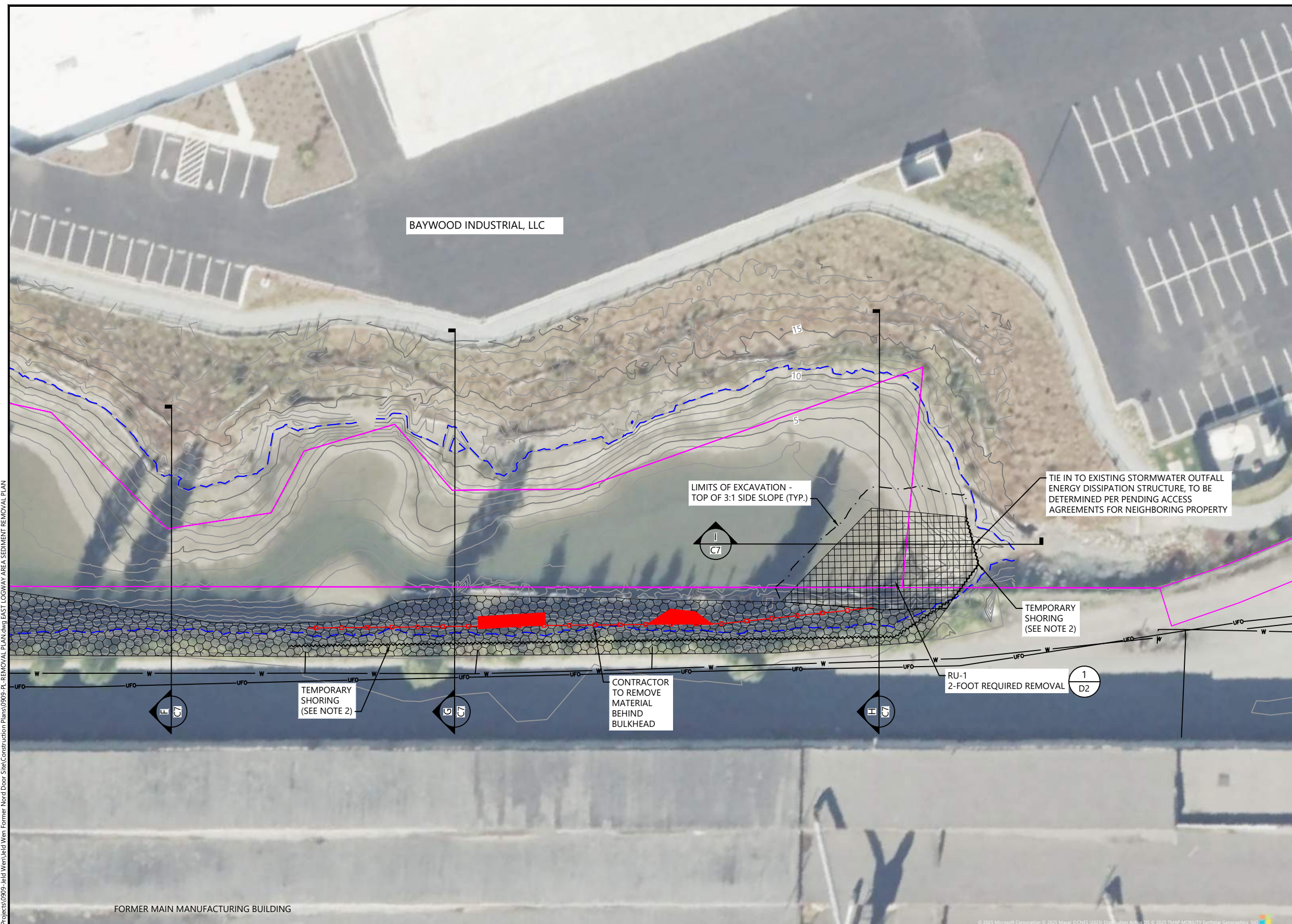
DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

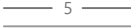
JELD-WEN REMEDIATION PROJECT

**WEST LOGWAY AREA SEDIMENT
REMOVAL PLAN**

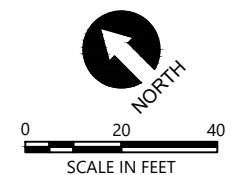
C3

SHEET # **9** OF **#**



- LEGEND:**
- | | |
|---|---|
|  | EXISTING BATHYMETRIC CONTOURS
(1' & 5' INTERVAL) |
|  | MEAN HIGHER HIGH WATER (MHHW)
EL= 11.09' |
|  | REMOVAL AREAS |
|  | LIMITS OF EXCAVATION |
|  | TEMPORARY SHORING |
|  | EXISTING BULKHEAD TO BE REMOVED |
|  | SNOHOMISH COUNTY PARCEL LINE |
|  | SHORELINE GRADING & SURFACE PREP |
|  | OVERHEAD UTILITY LINE |
|  | UNDERGROUND POWER LINE |
|  | UNDERGROUND FIBER OPTIC |
|  | WATER LINE |
|  | GAS LINE |
|  | WETLAND TO BE REMOVED |

- NOTES:
1. A CRITICAL AREA PROTECTIVE COVENANT IS SIGNED AND RECORDED FOR THE BAYWOOD INDUSTRIAL LLC PARCEL.
 2. CONTRACTOR SHALL DESIGN AND PROVIDE TEMPORARY SHORING AS NEEDED ALONG ALL REMOVAL AREAS IN LOGWAY.



**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**

ONE INCH

PLAN INTENDED TO BE VIEWED
IN COLOR, ADJACENT BLOCK IS
"BLUE"

AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY

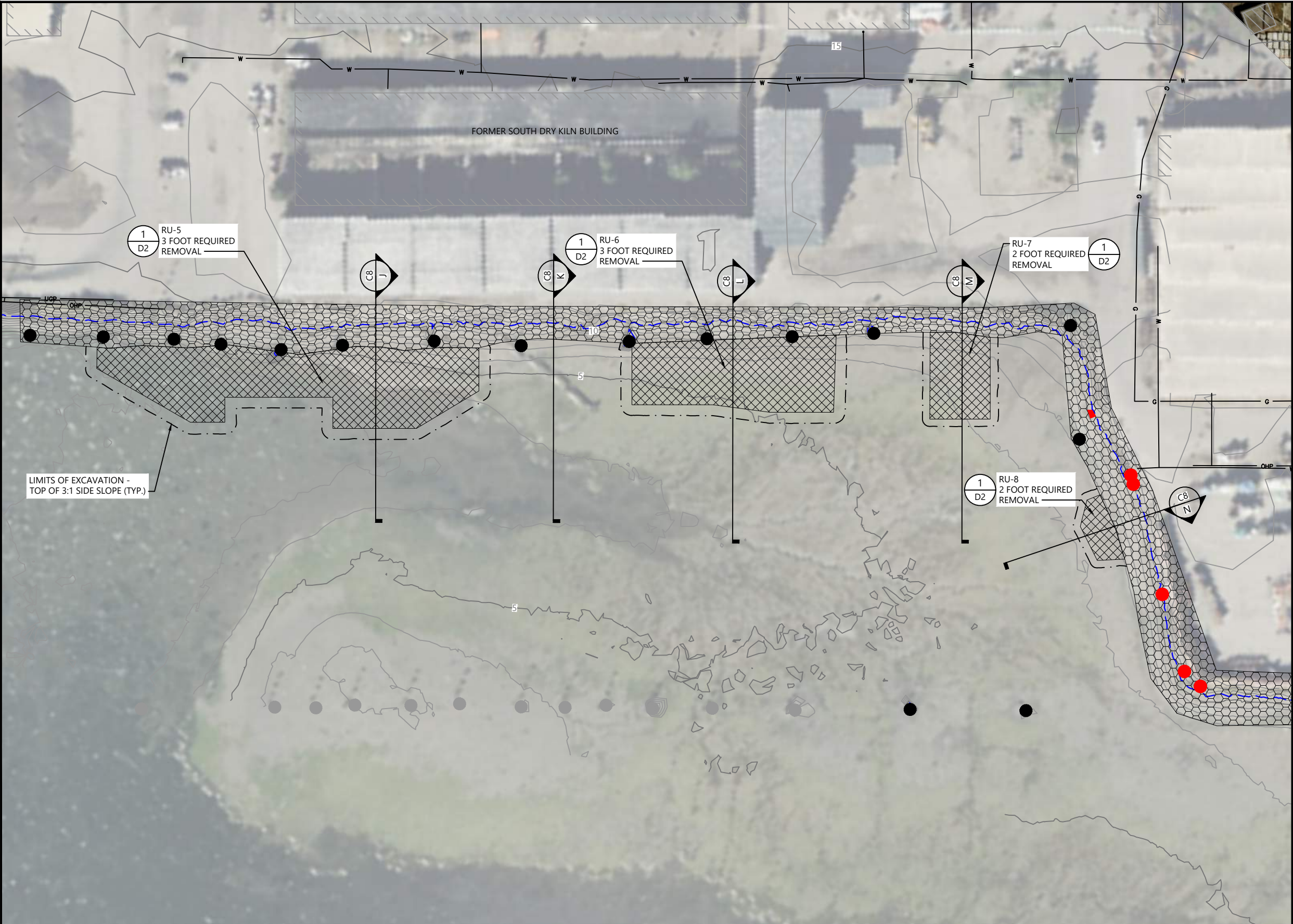
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EAST LOGWAY AREA SEDIMENT REMOVAL PLAN

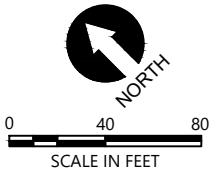
C4

SHEET # **10** OF **#**

Mar 05, 2026 8:02pm need K:\Projects\0909-Jeld Wen\Jeld Wen\Jeld Wen\Former Nord Door Site\Construction Plans\0909-PL-REMOVAL PLAN.dwg SOUTHERN SHORELINE REMOVAL



- LEGEND:
- 5 EXISTING BATHYMETRIC CONTOURS (1' & 5' INTERVAL)
 - MEAN HIGHER HIGH WATER (MHHW) EL= 11.09'
 - REMOVAL AREAS
 - LIMITS OF EXCAVATION
 - SHORELINE GRADING & SURFACE PREP
 - OHP OVERHEAD UTILITY LINE
 - UGP UNDERGROUND POWER LINE
 - UFO UNDERGROUND FIBER OPTIC
 - W WATER LINE
 - G GAS LINE
 - WETLAND TO BE REMOVED
 - DUNE GRASS TO BE REMOVED
 - EXISTING PILING TO BE REMOVED
 - EXISTING PILING TO REMAIN IN PLACE



**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**

PLAN INTENDED TO BE VIEWED
IN COLOR. ADJACENT BLOCK IS
"BLUE"

ONE INCH
AT FULL SIZE. IF NOT ONE
INCH SCALE ACCORDINGLY



REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

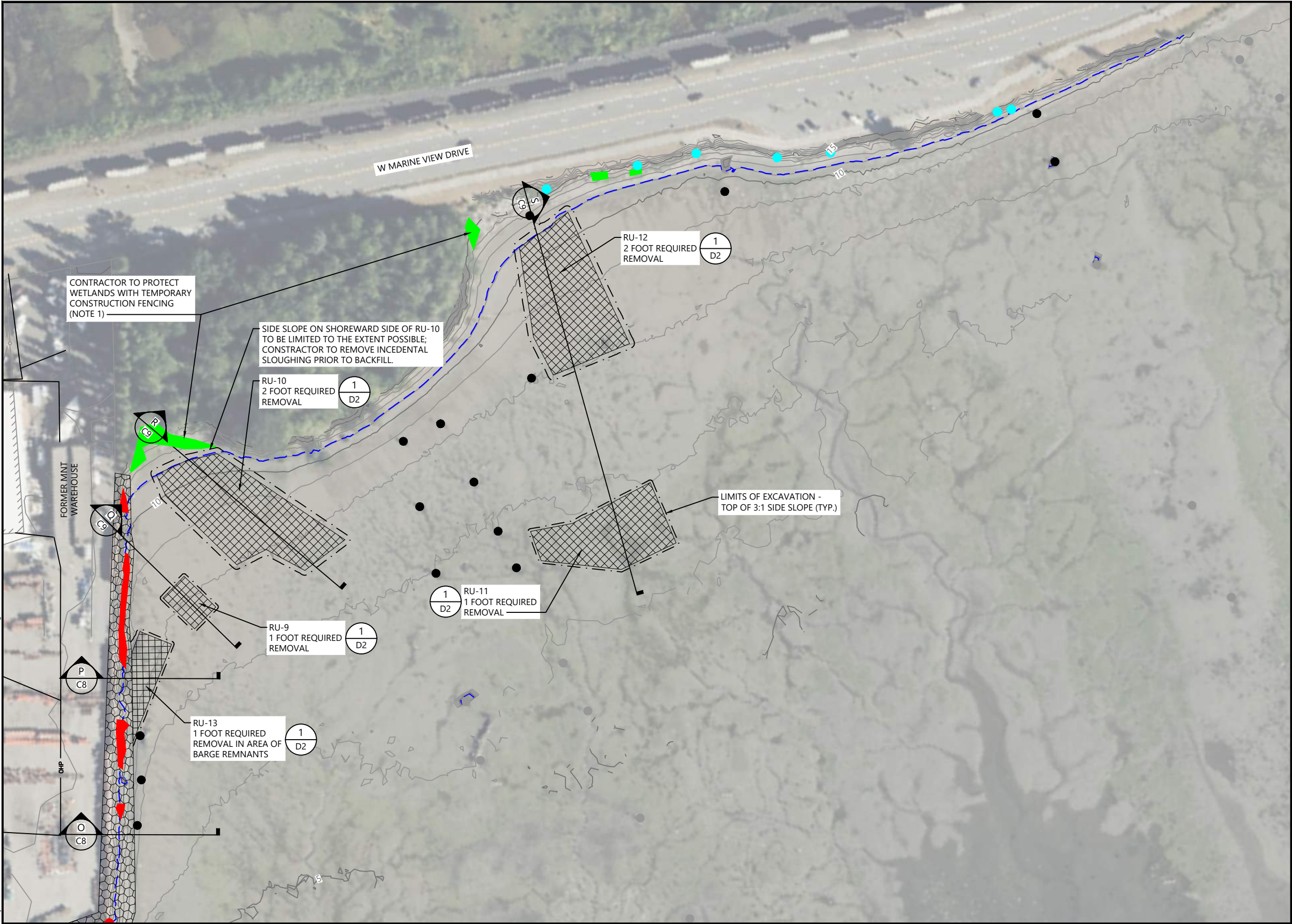
JELD-WEN REMEDIATION PROJECT

**SOUTHERN SHORELINE AREA SEDIMENT
REMOVAL PLAN**

C5

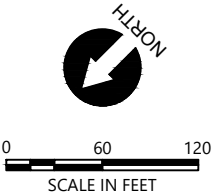
SHEET # **11** OF **#**

K:\Projects\0909-Jeld Wen\Jeld Wen Former Nord Door Site\Construction Plans\0909-PL-REMOVAL PLAN.dwg KNOLL REMOVAL
Mar 05, 2026 8:02pm need



- LEGEND:
- 5 EXISTING BATHYMETRIC CONTOURS (1' & 5' INTERVAL)
 - MEAN HIGHER HIGH WATER (MHHW) EL = 11.09'
 - OHP OVERHEAD UTILITY LINE
 - REMOVAL AREAS
 - LIMITS OF EXCAVATION
 - SHORELINE GRADING & SURFACE PREP
 - WETLAND (SEE NOTE 1)
 - WETLAND TO BE REMOVED
 - DUNE GRASS (SEE NOTE 2)
 - DUNE GRASS TO BE REMOVED
 - EXISTING PILING TO BE REMOVED
 - EXISTING PILING TO REMAIN IN PLACE

- NOTES:
- WETLAND AREAS ARE TO BE PROTECTED WHERE OUTSIDE OF REMOVAL AREA AND PLACEMENT AREA BOUNDARIES.
 - DUNE GRASS TO BE PROTECTED WHERE OUTSIDE OF REMOVAL AREA AND MATERIAL PLACEMENT AREA BOUNDARIES.



**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**

PLAN INTENDED TO BE VIEWED
IN COLOR. ADJACENT BLOCK IS
"BLUE"
ONE INCH
AT FULL SIZE. IF NOT ONE
INCH SCALE ACCORDINGLY



REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

JELD-WEN REMEDIATION PROJECT

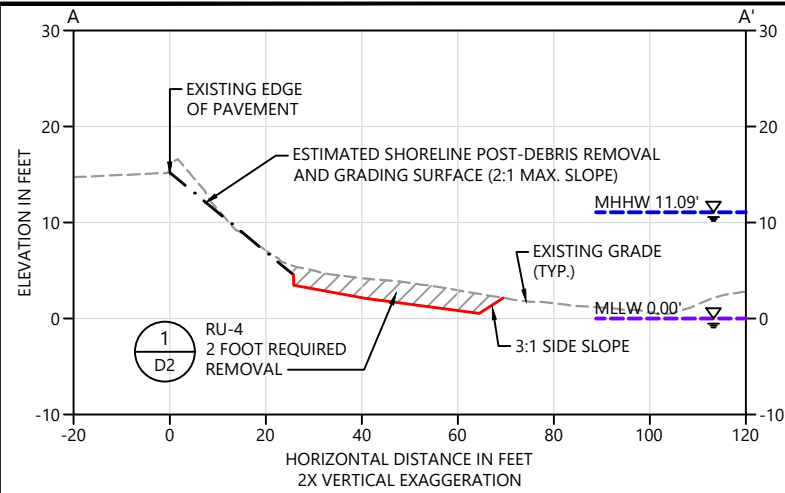
KNOLL AREA SEDIMENT REMOVAL PLAN

C6

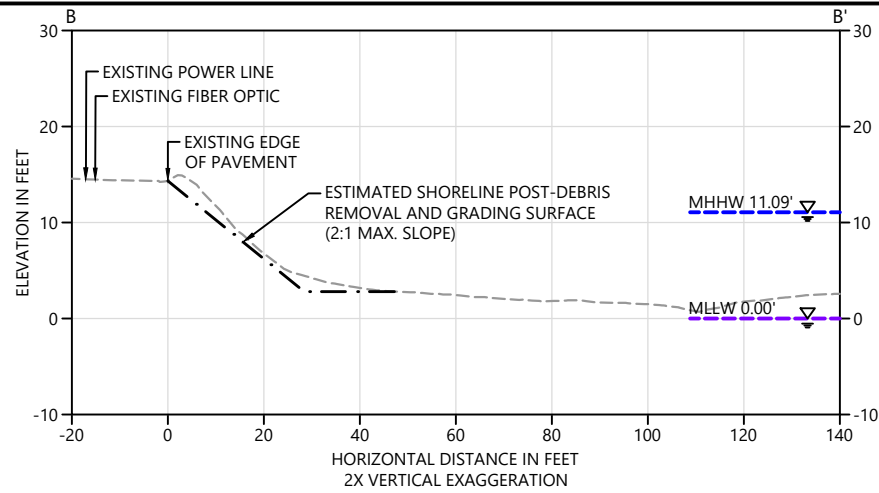
SHEET # 12 OF #

K:\Projects\0909-Jeld Wen\Jeld Wen\Jeld Wen\0909-PL-REMOVAL PLAN.dwg SECTIONS I

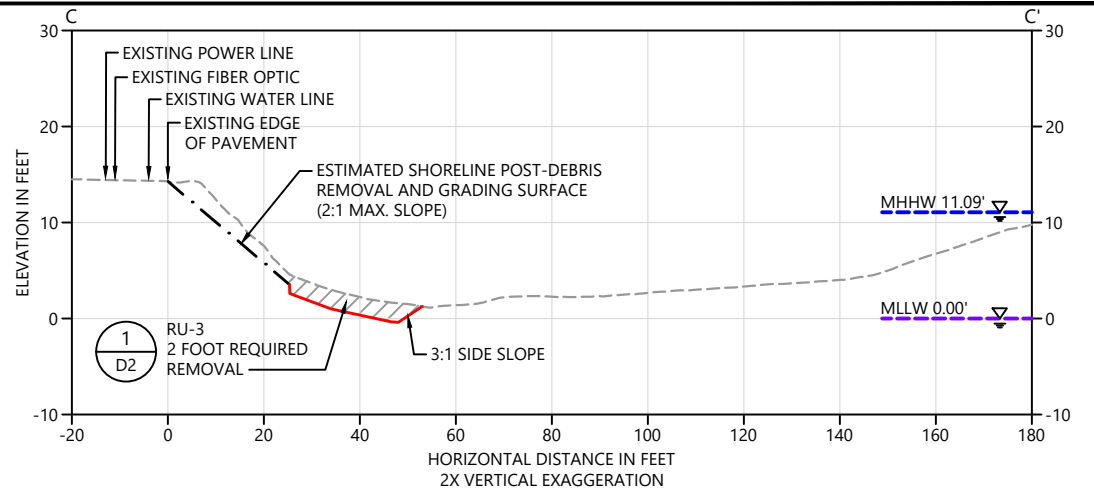
Mar 05, 2026 8:02pm need



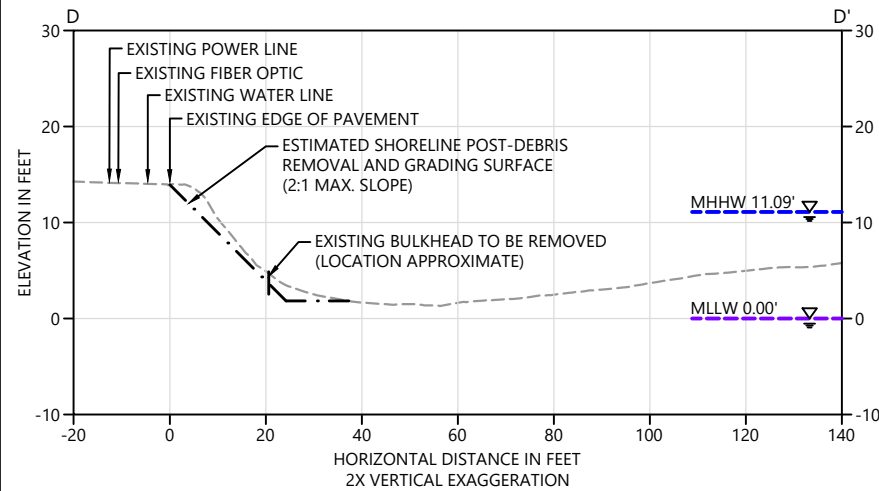
SECTION A
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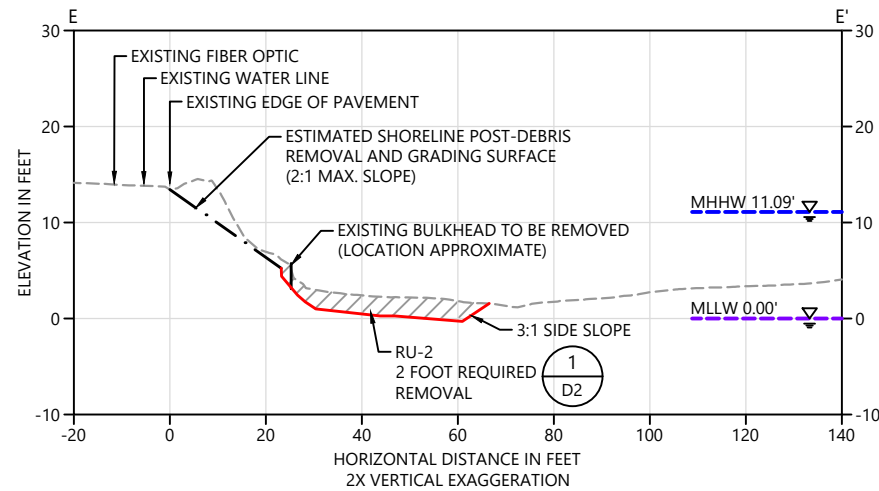
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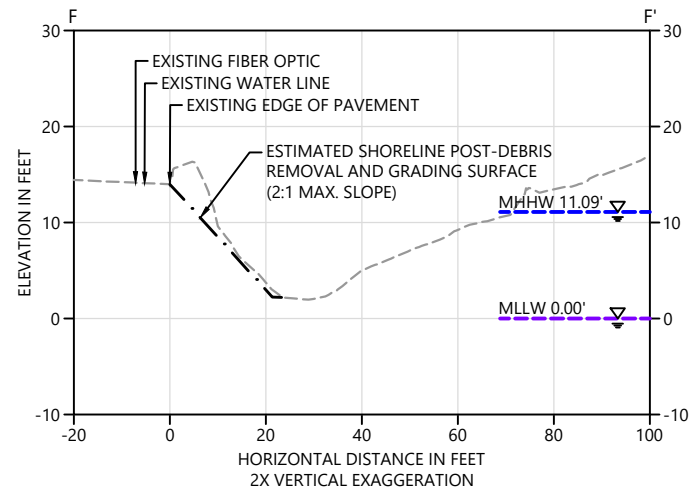
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SCALE: 1" = 20'



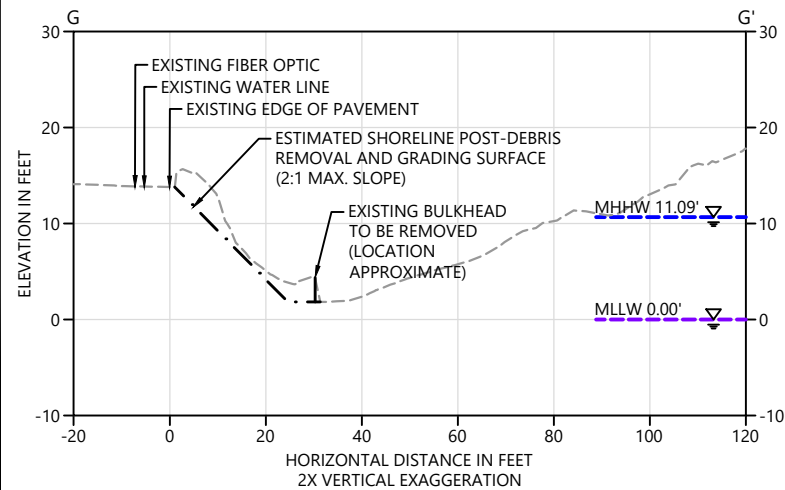
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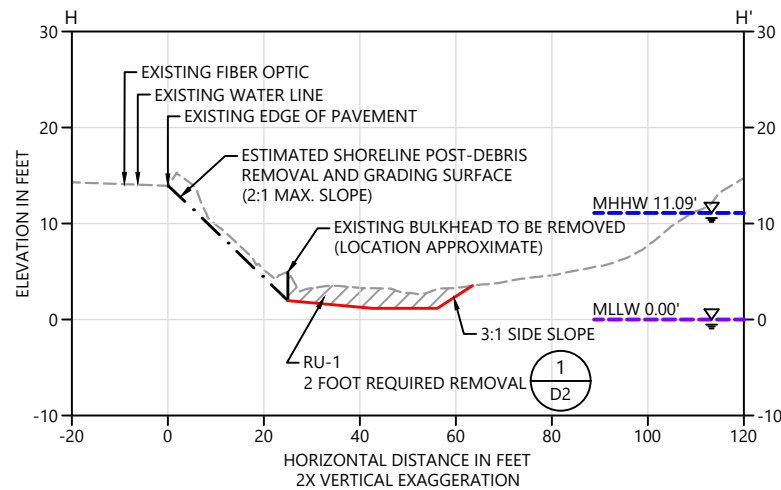
SECTION E
SCALE: 1" = 20'



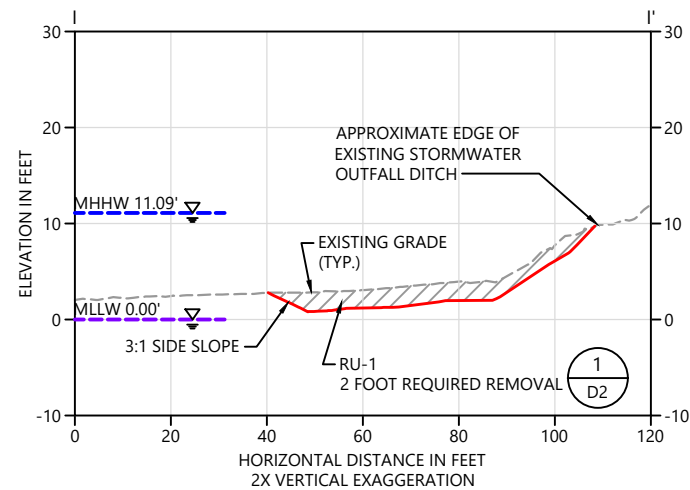
SECTION F
SCALE: 1" = 20'



SECTION G
SCALE: 1" = 20'



SECTION H
SCALE: 1" = 20'



SECTION I
SCALE: 1" = 20'

- LEGEND:
- EXISTING GRADE
 - POST-REMOVAL SURFACE
 - - - ESTIMATED SHORELINE POST-DEBRIS REMOVAL AND GRADING SURFACE
- NOTES:
- ALL UTILITIES SHOWN ARE APPROXIMATE. NO AS-BUILT ELEVATION INFORMATION IS AVAILABLE.

0 20 40
SCALE IN FEET

**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**



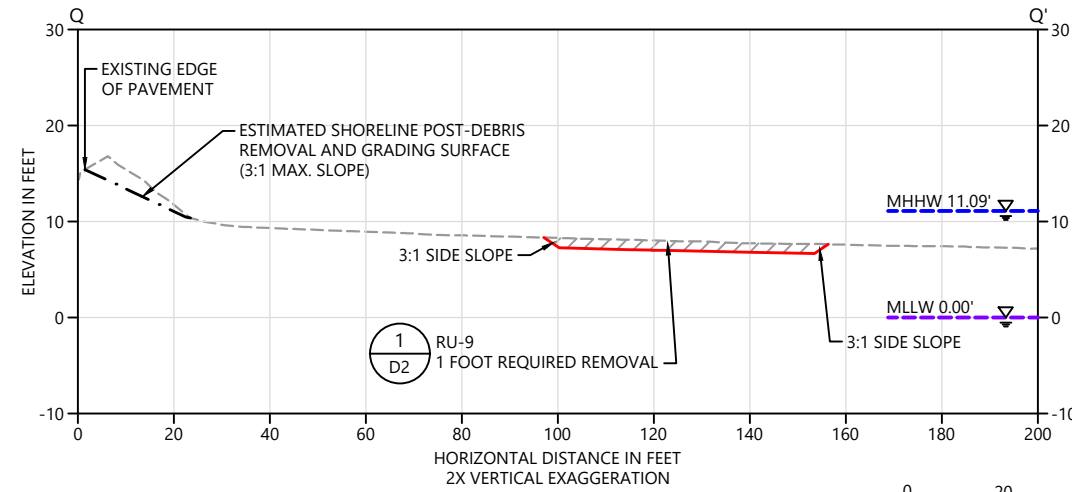
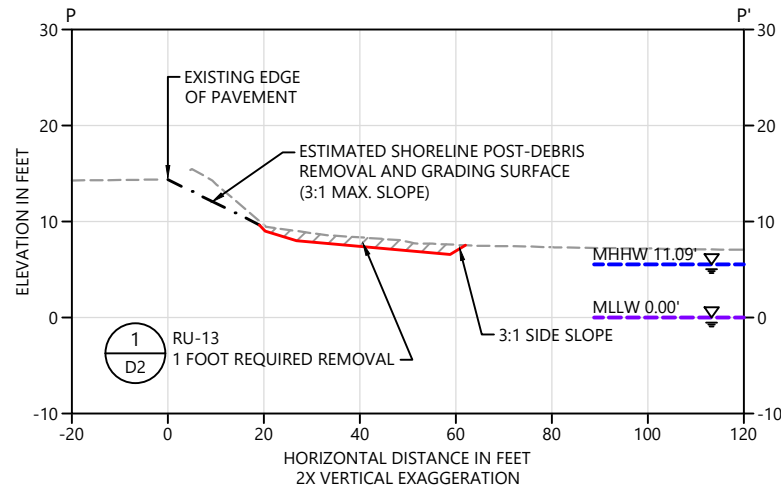
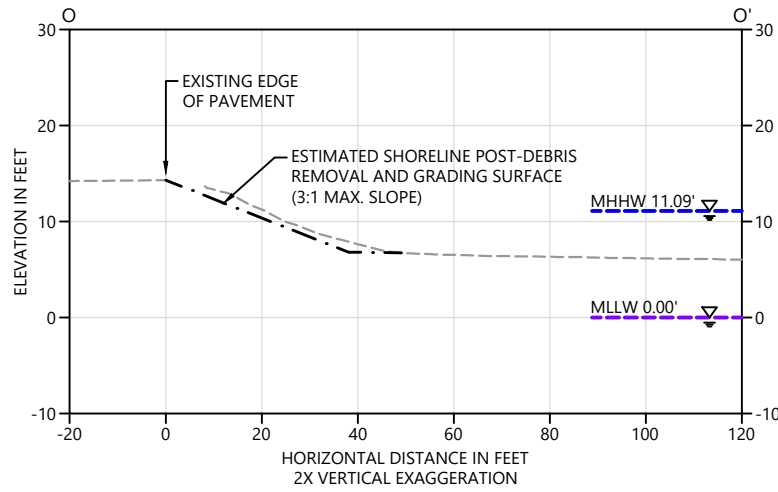
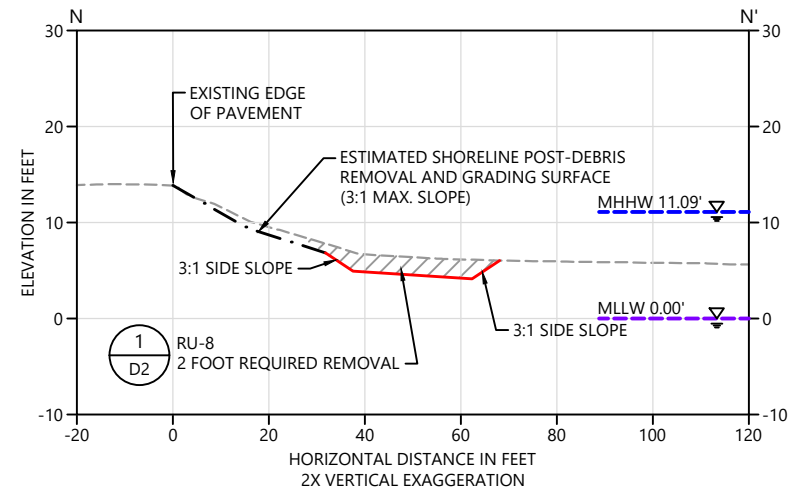
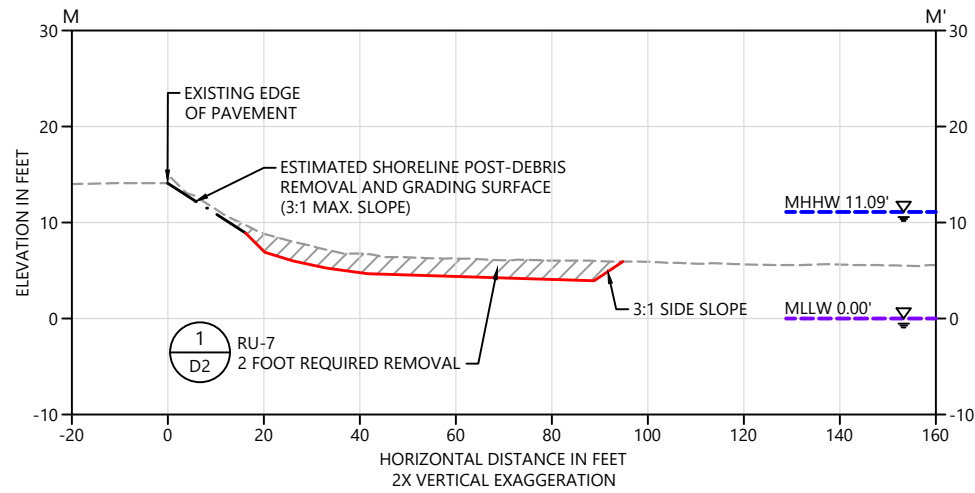
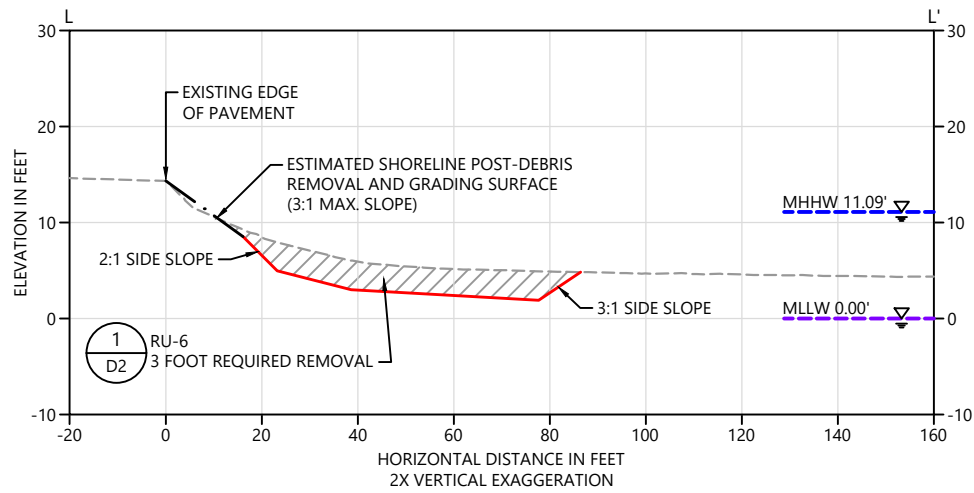
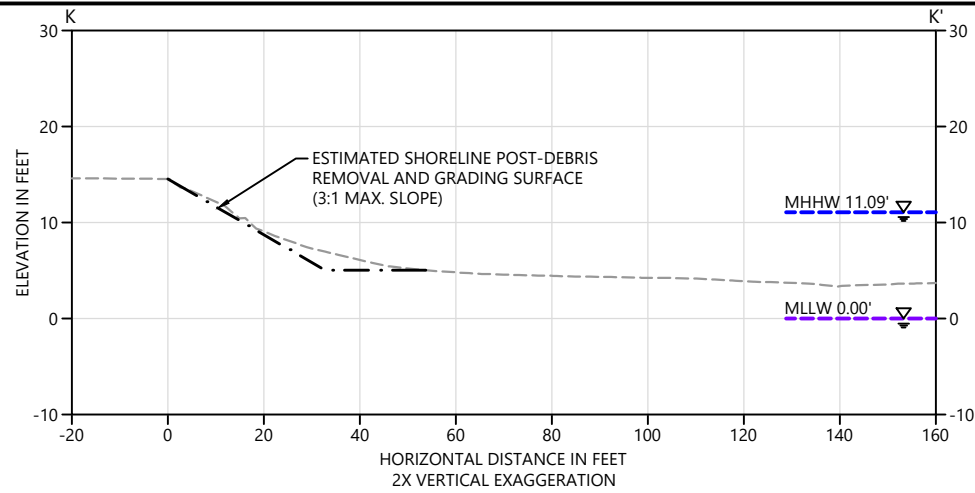
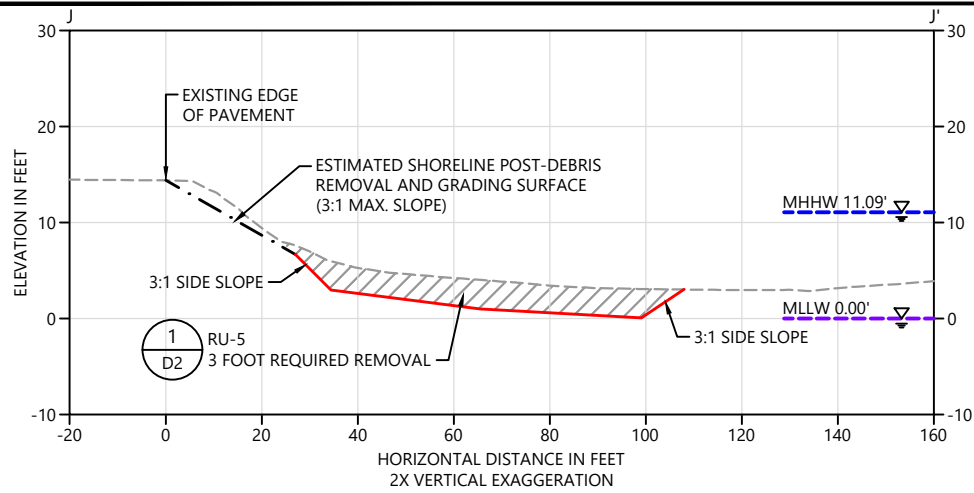
REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

JELD-WEN REMEDIATION PROJECT
SEDIMENT REMOVAL SECTIONS I

C7
SHEET # **13** OF **#**

K:\Projects\0909-Jeld Wen\Jeld Wen\Jeld Wen\0909-PL-REMOVAL PLAN.dwg SECTIONS II
Mar 05, 2026 8:02pm need



- LEGEND:
- EXISTING GRADE
 - POST-REMOVAL SURFACE
 - ESTIMATED SHORELINE POST-DEBRIS REMOVAL AND GRADING SURFACE
- NOTES:
- ALL UTILITIES SHOWN ARE APPROXIMATE. NO AS-BUILT ELEVATION INFORMATION IS AVAILABLE.

0 20 40
SCALE IN FEET

**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**



REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

JELD-WEN REMEDIATION PROJECT

SEDIMENT REMOVAL SECTIONS II

C8

SHEET # 14 OF #

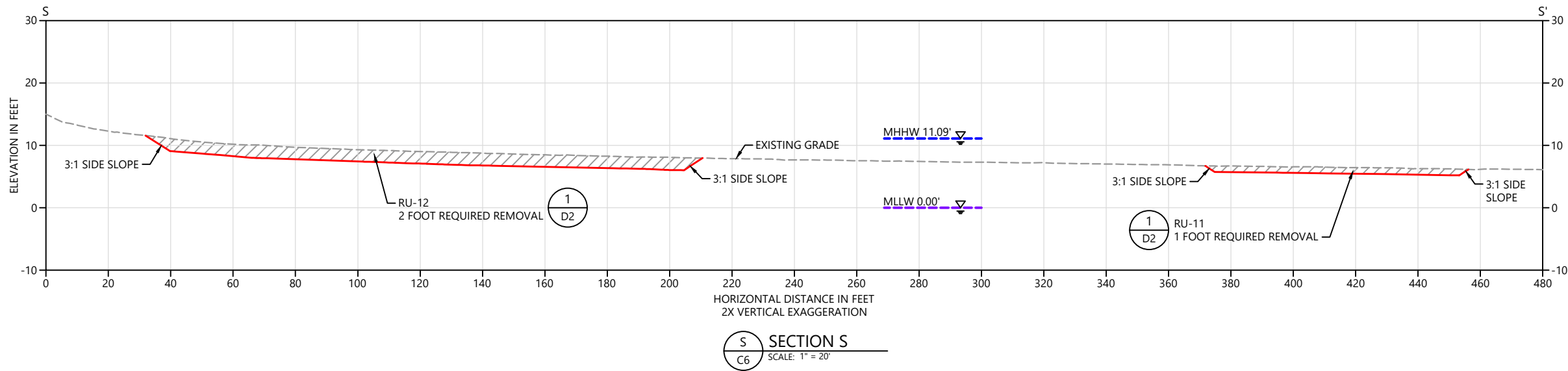
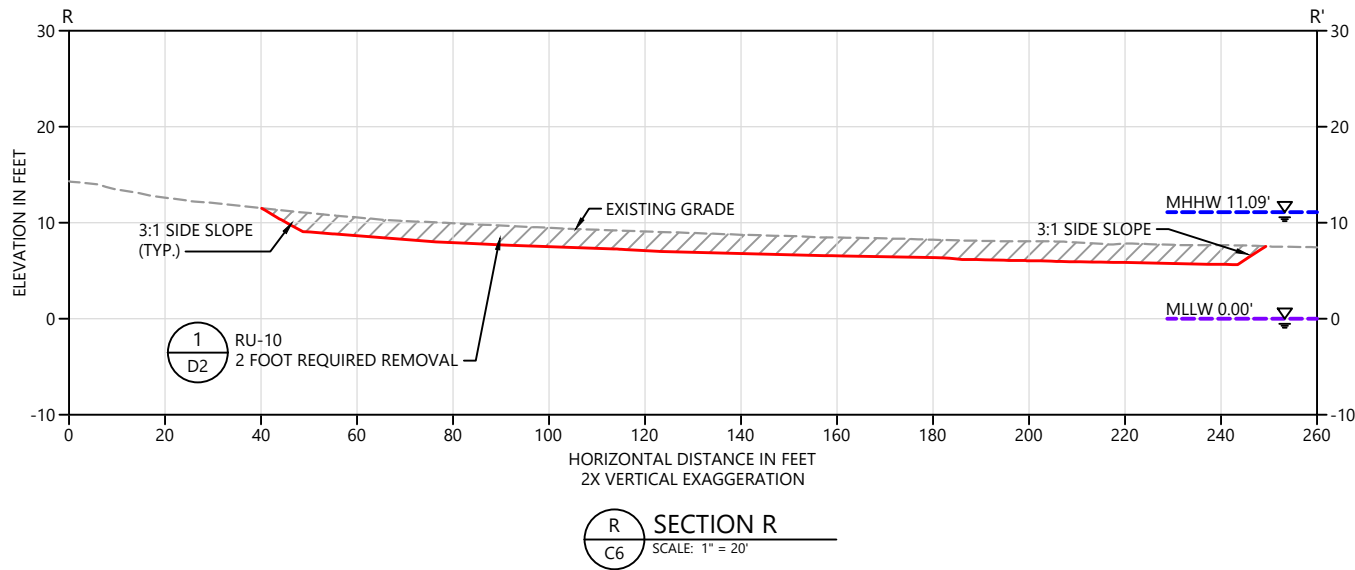
ONE INCH
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY
PLAN INTENDED TO BE VIEWED
IN COLOR, ADJACENT BLOCK IS
"BLUE"

K:\Projects\0909-Jeld Wen\Jeld Wen\Jeld Wen - Former Nord Door Site\Construction Plans\0909-PL-REMOVAL PLAN.dwg SECTIONS III

Mar 05, 2026 8:02pm need

LEGEND:
----- EXISTING GRADE
----- POST-REMOVAL SURFACE

NOTES:
1. ALL UTILITIES SHOWN ARE APPROXIMATE. NO AS-BUILT ELEVATION INFORMATION IS AVAILABLE.



**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**



REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

JELD-WEN REMEDIATION PROJECT

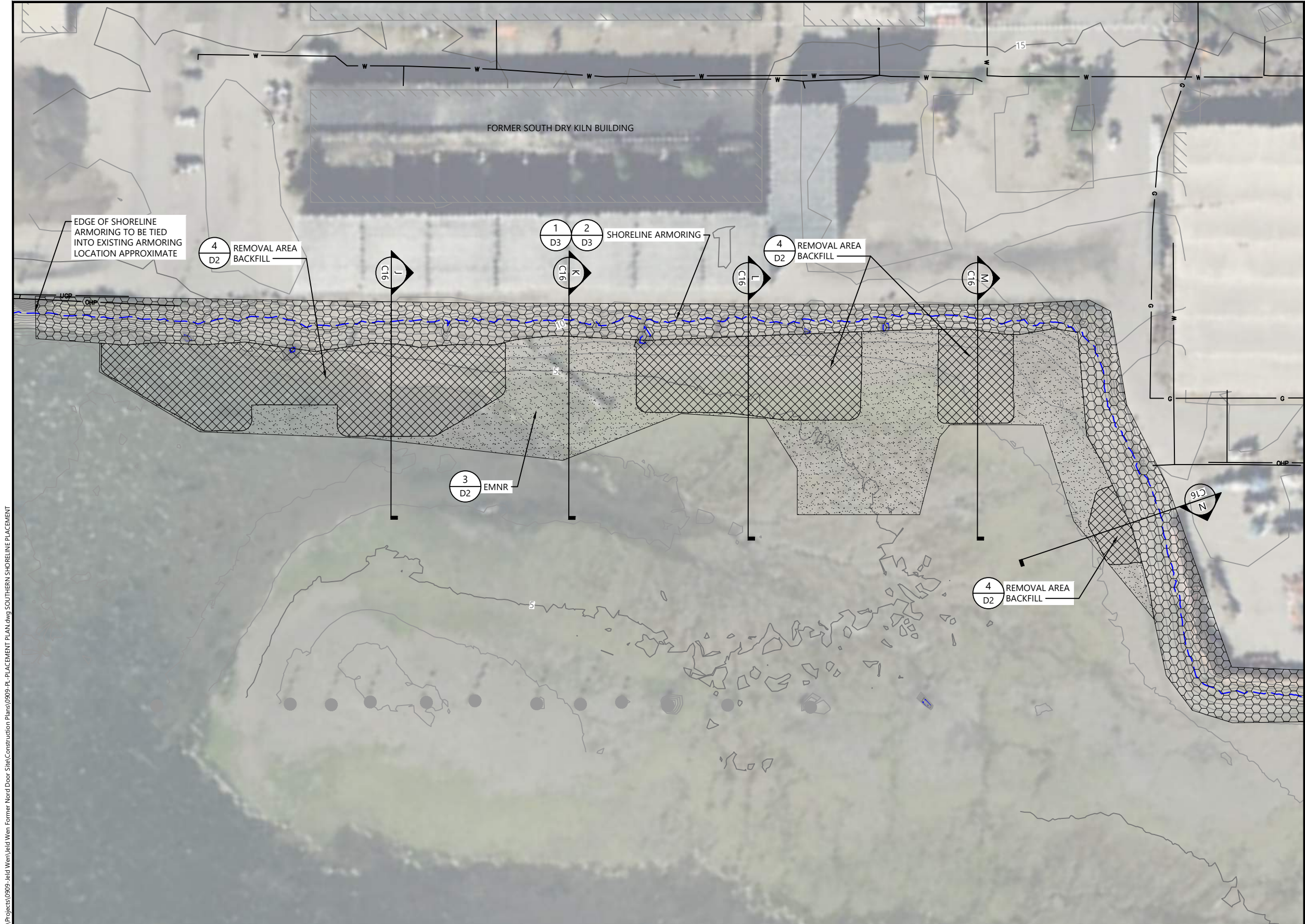
SEDIMENT REMOVAL SECTIONS III

C9

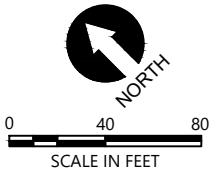
SHEET # **15** OF **#**

PLAN INTENDED TO BE VIEWED
IN COLOR. ADJACENT BLOCK IS
"BLUE"
ONE INCH
AT FULL SIZE. IF NOT ONE
INCH SCALE ACCORDINGLY

K:\Projects\0909-Jeld Wen\Jeld Wen\Jeld Wen\Former Nord Door Site\Construction Plans\0909-PL-PLACEMENT PLAN.dwg SOUTHERN SHORELINE PLACEMENT



- LEGEND:
- 5 EXISTING BATHYMETRIC CONTOURS (1' & 5' INTERVAL)
 - MEAN HIGHER HIGH WATER (MHHW) EL = 11.09'
 - REMOVAL AREA BACKFILL
 - EMNR PLACEMENT
 - SHORELINE ARMORING
 - OHP OVERHEAD UTILITY LINE
 - UGP UNDERGROUND POWER LINE
 - UFO UNDERGROUND FIBER OPTIC
 - W WATER LINE
 - G GAS LINE
 - EXISTING PILING TO REMAIN IN PLACE



**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**

PLAN INTENDED TO BE VIEWED
IN COLOR. ADJACENT BLOCK IS
"BLUE"

ONE INCH
AT FULL SIZE. IF NOT ONE
INCH SCALE ACCORDINGLY



REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

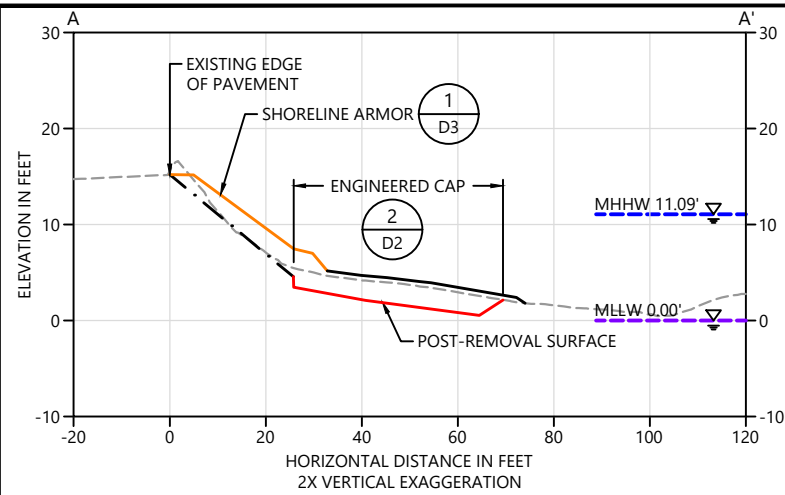
JELD-WEN REMEDIATION PROJECT

SOUTHERN SHORELINE PLACEMENT PLAN

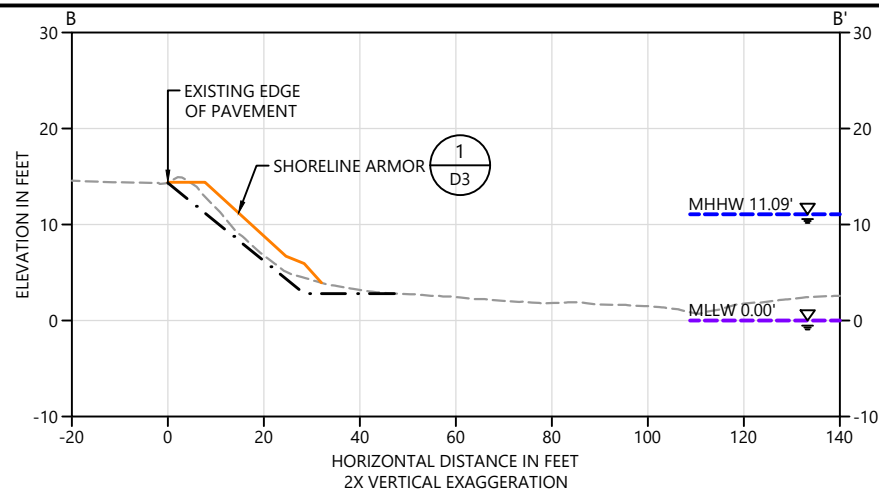
C13

SHEET # 19 OF #

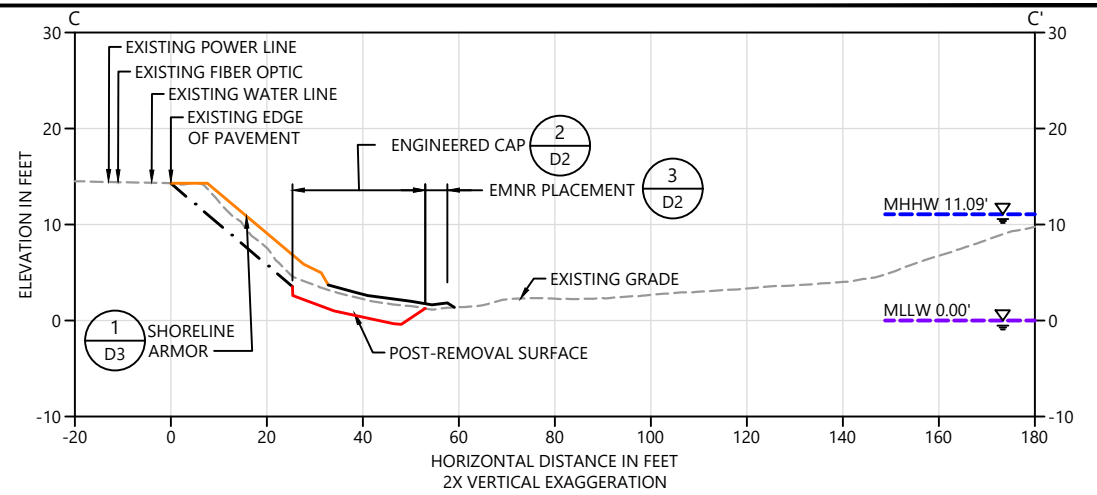
K:\Projects\0909-Jeld Wen\Jeld Wen\Jeld Wen\0909-PL-Placement Plan.dwg SECTIONS I
Mar 05, 2026 8:02pm need



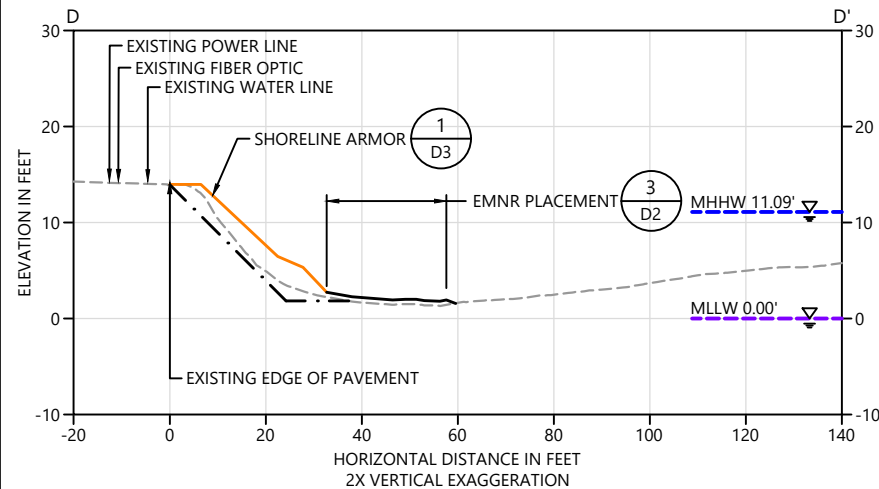
SECTION A
C11 SCALE: 1" = 20'



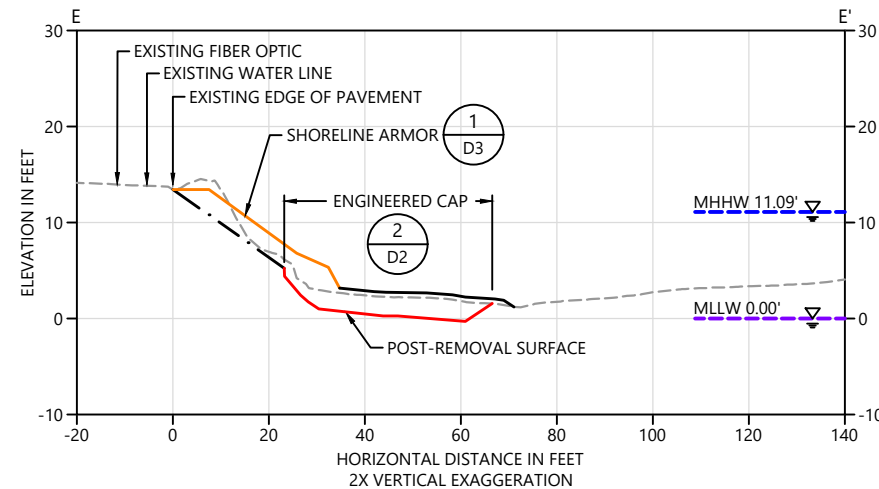
SECTION B
C11 SCALE: 1" = 20'



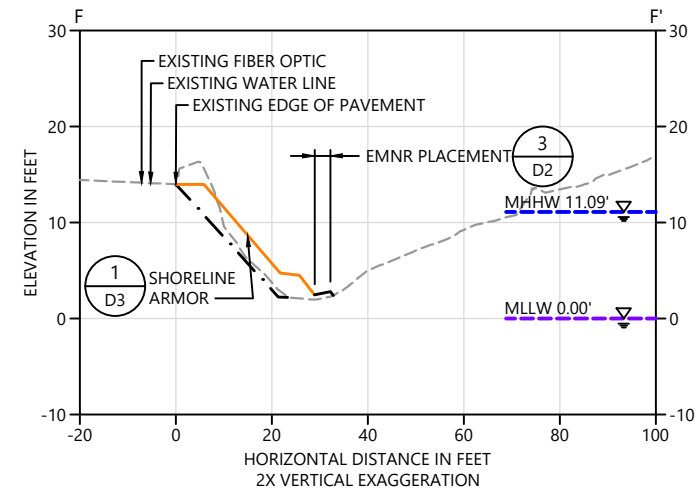
SECTION C
C11 SCALE: 1" = 20'



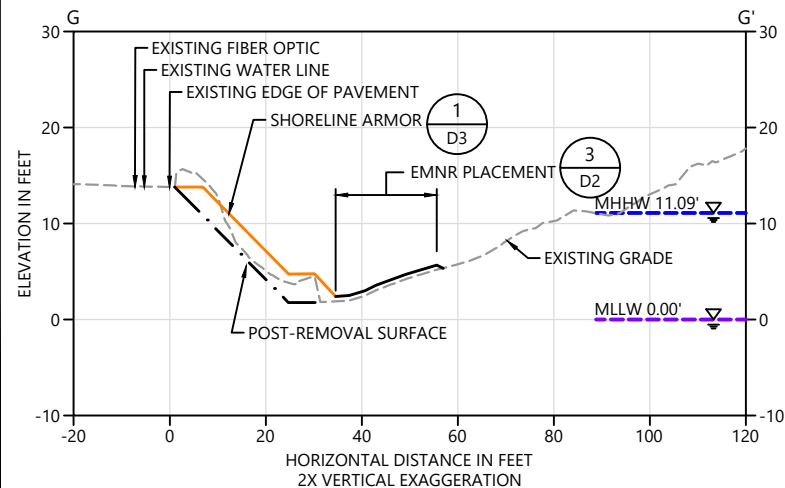
SECTION D
C11 SCALE: 1" = 20'



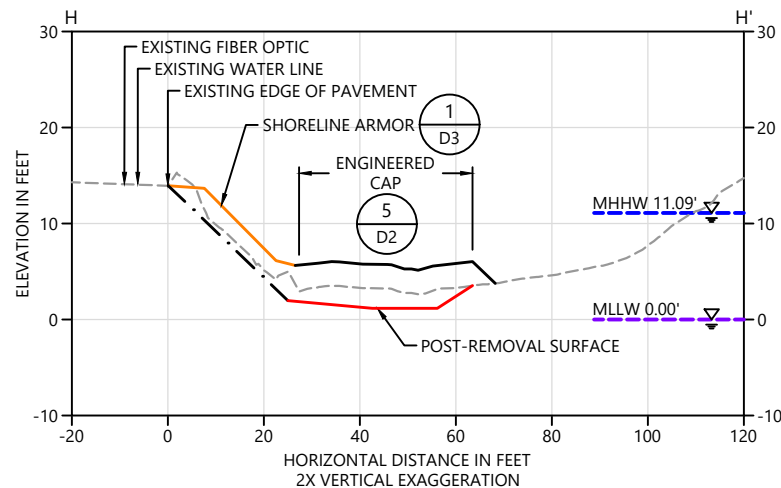
SECTION E
C11 SCALE: 1" = 20'



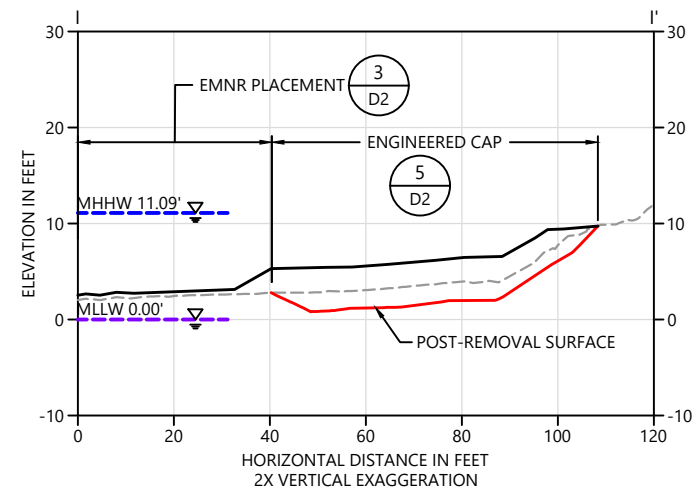
SECTION F
C12 SCALE: 1" = 20'



SECTION G
C12 SCALE: 1" = 20'



SECTION H
C12 SCALE: 1" = 20'



SECTION I
C12 SCALE: 1" = 20'

- LEGEND:
- EXISTING GRADE
 - POST-REMOVAL SURFACE
 - ESTIMATED SHORELINE
 - POST-DEBRIS REMOVAL AND GRADING SURFACE
 - PLACEMENT SURFACE
 - SHORELINE ARMOR

- NOTES:
- ALL UTILITIES SHOWN ARE APPROXIMATE. NO AS-BUILT ELEVATION INFORMATION IS AVAILABLE.

0 20 40
SCALE IN FEET

**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**



REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

JELD-WEN REMEDIATION PROJECT

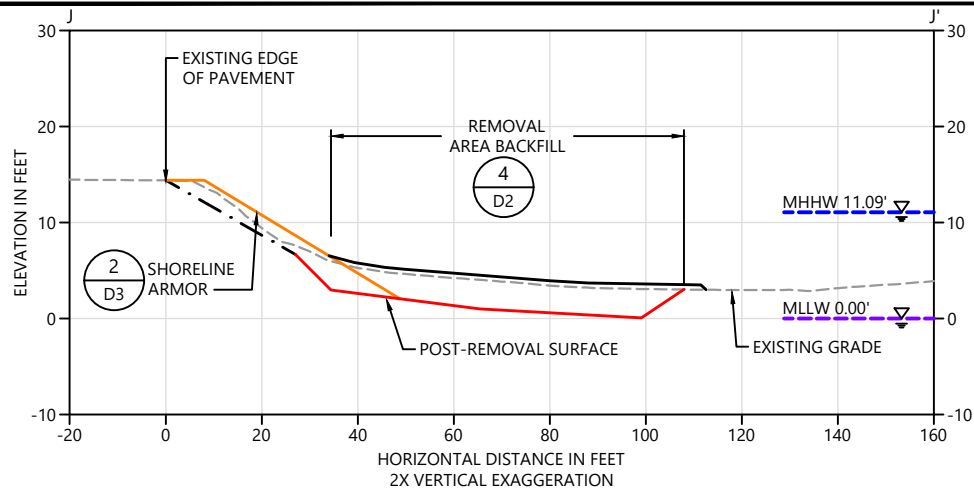
MATERIAL PLACEMENT SECTIONS I

C15

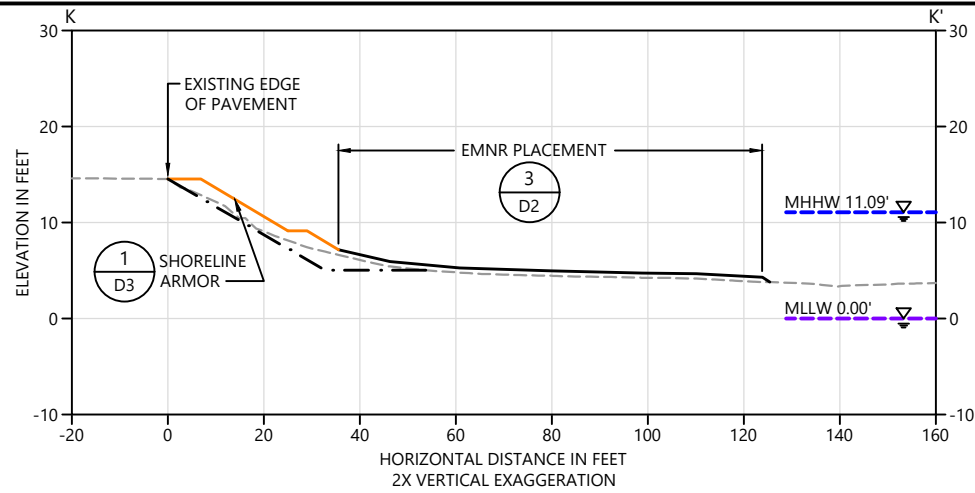
SHEET # **21** OF **#**

PLAN INTENDED TO BE VIEWED
IN COLOR. ADJACENT BLOCK IS
"BLUE"
ONE INCH
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY

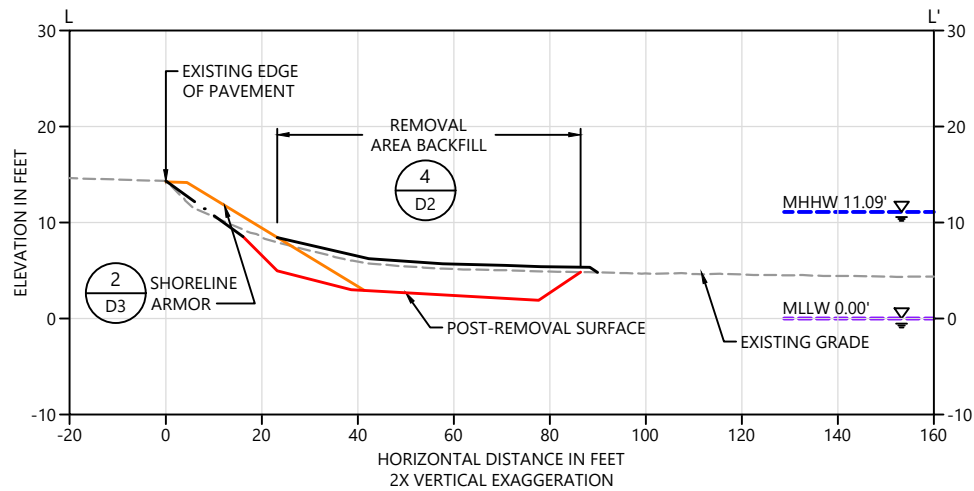
K:\Projects\0909-Jeld-Wen\Jeld-Wen\Jeld-Wen\0909-PL-Placement Plans.dwg SECTIONS II
Mar 05, 2026 8:02pm need



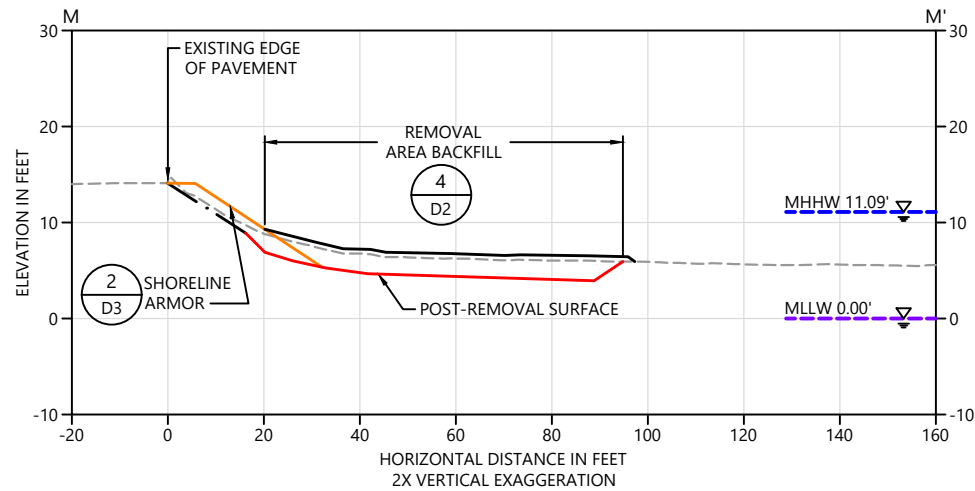
SECTION J
C13 SCALE: 1" = 20'



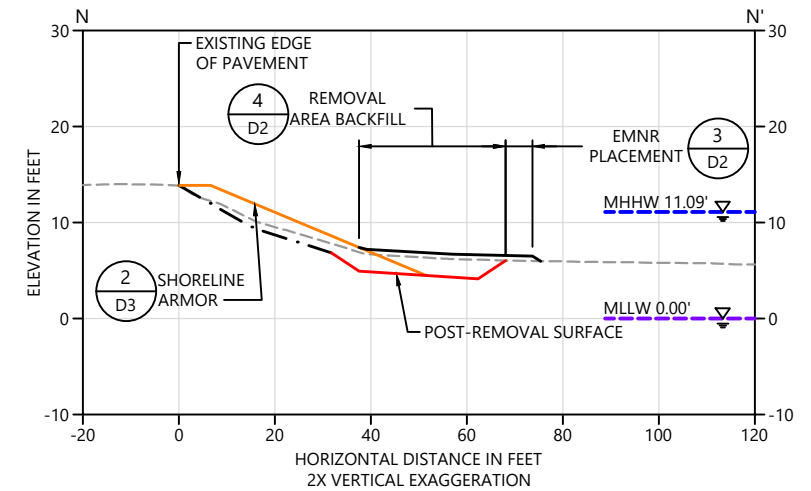
SECTION K
C13 SCALE: 1" = 20'



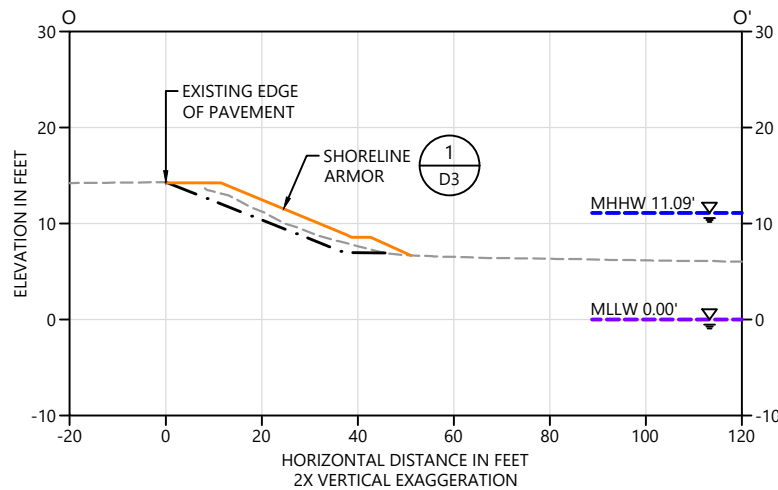
SECTION L
C13 SCALE: 1" = 20'



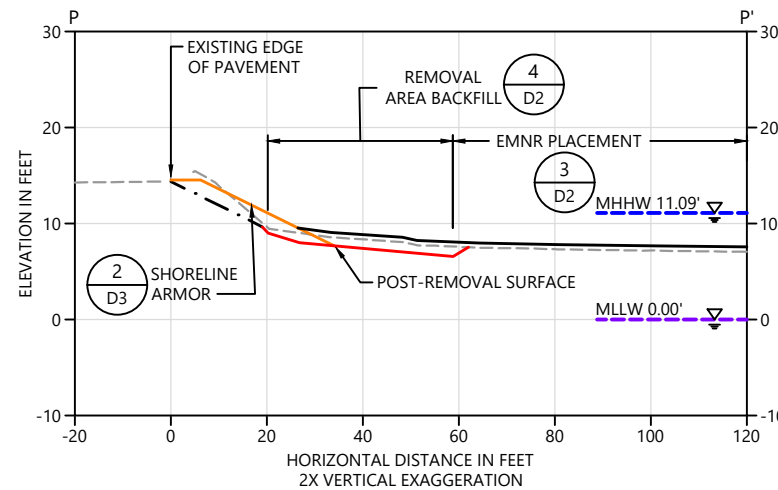
SECTION M
C13 SCALE: 1" = 20'



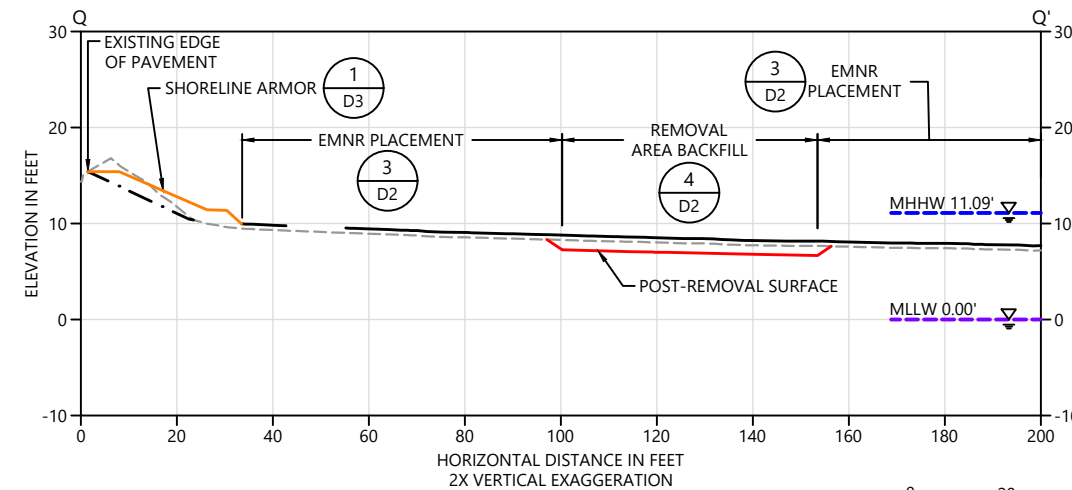
SECTION N
C13 SCALE: 1" = 20'



SECTION O
C14 SCALE: 1" = 20'



SECTION P
C14 SCALE: 1" = 20'



SECTION Q
C14 SCALE: 1" = 20'

- LEGEND:
- EXISTING GRADE
 - POST-REMOVAL SURFACE
 - . - . - ESTIMATED SHORELINE POST-DEBRIS REMOVAL AND GRADING SURFACE
 - PLACEMENT SURFACE
 - SHORELINE ARMOR
- NOTES:
- ALL UTILITIES SHOWN ARE APPROXIMATE. NO AS-BUILT ELEVATION INFORMATION IS AVAILABLE.

0 20 40
SCALE IN FEET

**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**



REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

JELD-WEN REMEDIATION PROJECT

MATERIAL PLACEMENT SECTIONS II

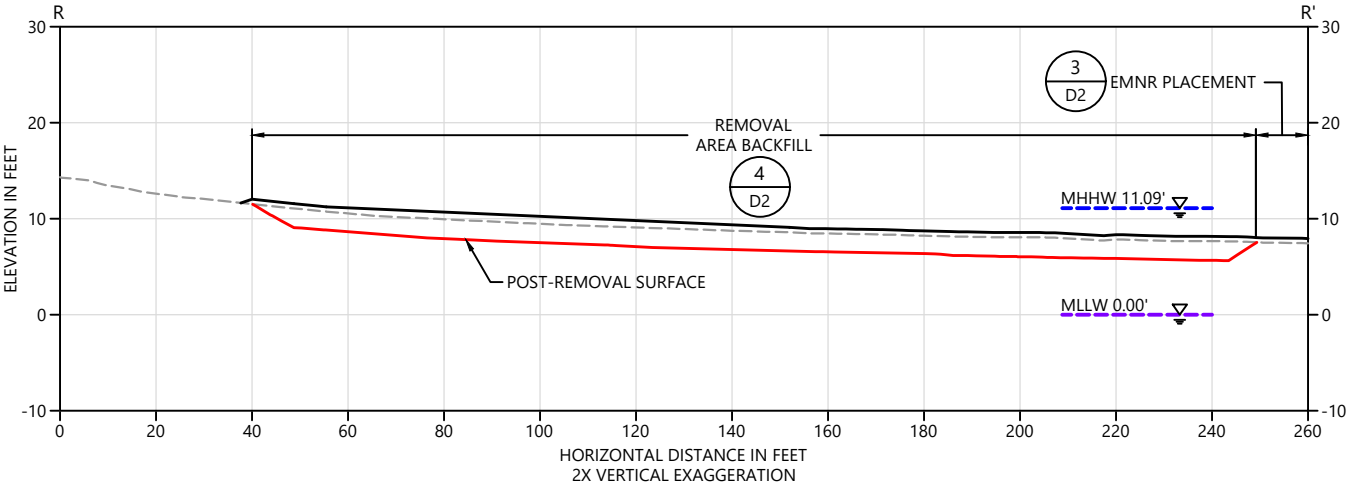
C16

SHEET # **22** OF **#**

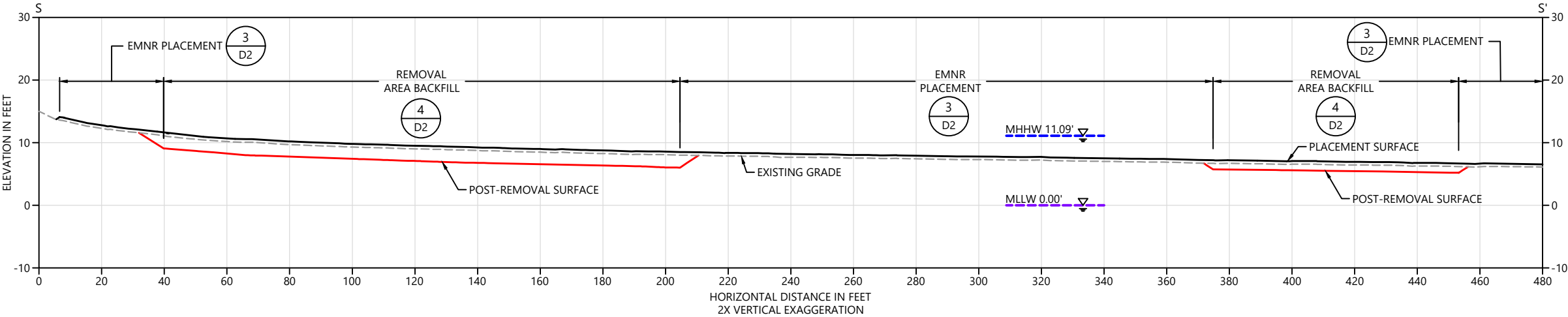
PLAN INTENDED TO BE VIEWED
IN COLOR. ADJACENT BLOCK IS
"BLUE"
ONE INCH
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY

Mar 05, 2026 8:02pm need K:\Projects\0909-Jeld Wen\Jeld Wen\Jeld Wen\Former Nord Door Site\Construction Plans\0909-PL-PLACEMENT PLAN.dwg SECTIONS III

- LEGEND:
- EXISTING GRADE
 - POST-REMOVAL SURFACE
 - PLACEMENT SURFACE



R
SECTION R
SCALE: 1" = 20'



S
SECTION S
SCALE: 1" = 20'



**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**



REVISIONS				
REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

JELD-WEN REMEDIATION PROJECT

MATERIAL PLACEMENT SECTIONS III

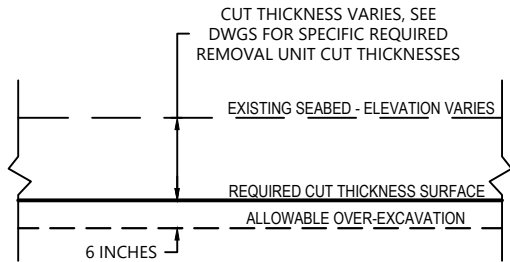
C17

SHEET # **23** OF #

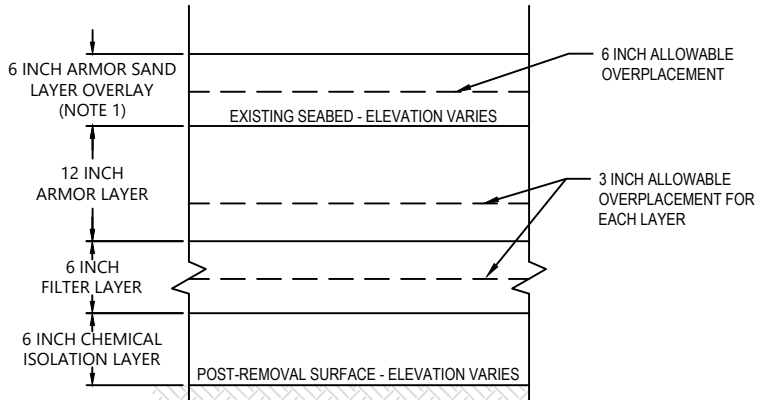
PLAN INTENDED TO BE VIEWED
IN COLOR. ADJACENT BLOCK IS
"BLUE"

ONE INCH
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY

Mar 05, 2026 8:02pm need K:\Projects\0909-Jeld Wen\Jeld Wen\Folder Nord Door Site\Construction Plans\0909-PL-DETAILS.dwg DETAILS II



1 REQUIRED REMOVAL (REQUIRED CUT THICKNESS)
SCALE: N.T.S.

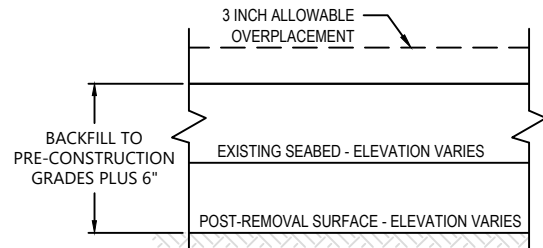


2 ENGINEERED CAP
SCALE: N.T.S.

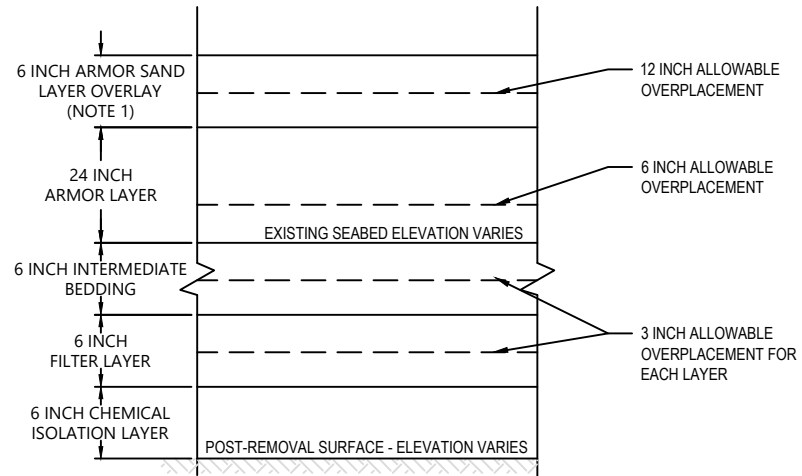
- NOTES:
1. PLACE EVEN DISTRIBUTION OF EQUIVALENT VOLUME OF 6 INCHES SAND ON TOP OF ARMOR.



3 EMNR PLACEMENT
SCALE: N.T.S.



4 REMOVAL AREA BACKFILL
SCALE: N.T.S.



5 ENGINEERED CAP IN HEAD OF LOGWAY
SCALE: N.T.S.

- NOTES:
1. PLACE EVEN DISTRIBUTION OF EQUIVALENT VOLUME OF 6 INCHES SAND ON TOP OF ARMOR.

**DRAFT-60% DESIGN
NOT FOR CONSTRUCTION**



REVISIONS					
REV	DATE	BY	APP'D	DESCRIPTION	

DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

JELD-WEN REMEDIATION PROJECT

DETAILS II

D2

SHEET # **25** OF #

ONE INCH
↑
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY

PLAN INTENDED TO BE VIEWED
IN COLOR. ADJACENT BLOCK IS
"BLUE"

Mar 05, 2026 8:02pm need K:\Projects\0909-Jeld Wen\Jeld Wen\Folder Nord Door Site\Construction Plans\0909-PL-DETAILS.dwg DETAILS III



REVISIONS					
REV	DATE	BY	APP'D	DESCRIPTION	

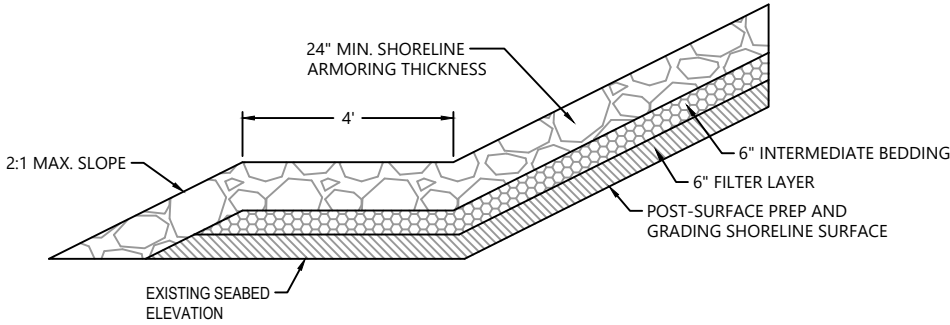
DESIGNED BY: G. CASSON
DRAWN BY: N. REED
CHECKED BY: J. LAPLANTE
APPROVED BY: J. LAPLANTE
SCALE: AS NOTED
DATE: MARCH 2026

JELD-WEN REMEDIATION PROJECT

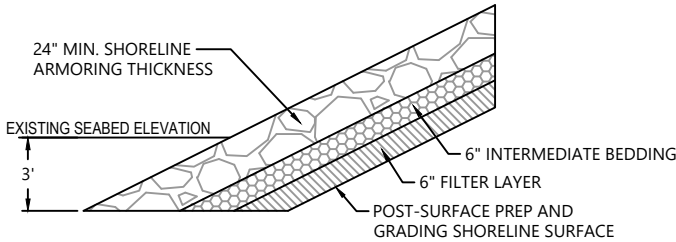
DETAILS III

SHEET # 26 OF #

DRAFT-60% DESIGN
NOT FOR CONSTRUCTION



1 LOGWAY & SOUTH SHORELINE ARMOR (OUTSIDE OF REMOVAL AREAS)
SCALE: N.T.S.



2 SOUTH SHORELINE ARMOR (WITHIN REMOVAL AREAS)
SCALE: N.T.S.

ONE INCH
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY

PLAN INTENDED TO BE VIEWED
IN COLOR, ADJACENT BLOCK IS
"BLUE"