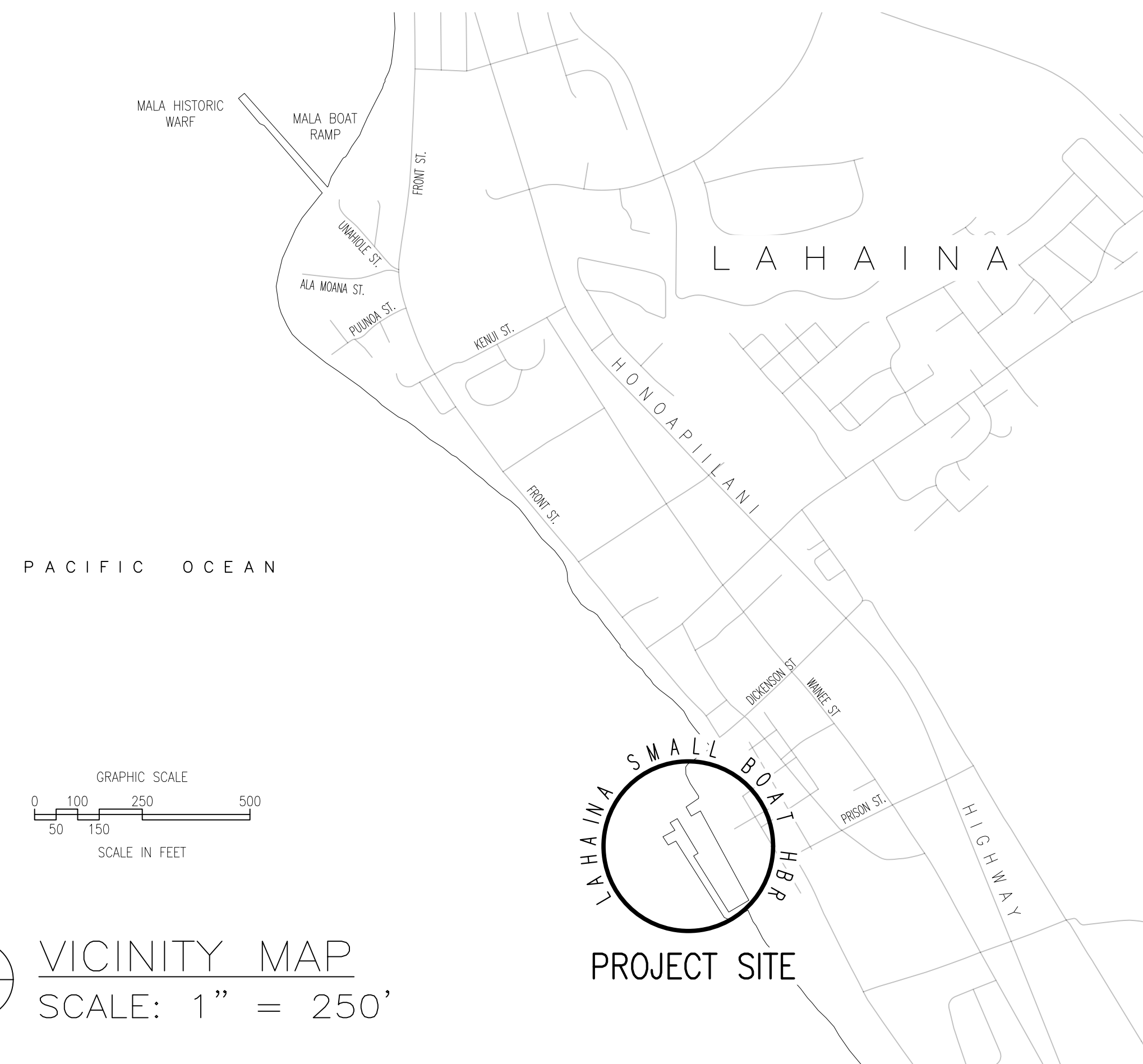


STATE OF HAWAII  
 DEPARTMENT OF LAND AND NATURAL RESOURCES  
 DIVISION OF BOATING AND OCEAN RECREATION

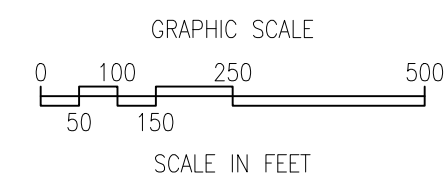
JOB NO. MA25-04

# LAHAINA SMALL BOAT HARBOR RAMP REMOVAL & BULKHEAD EXTENSION

LAHAINA, MAUI, HAWAII



PACIFIC OCEAN



**VICINITY MAP**  
 SCALE: 1" = 250'

TAX MAP KEYS AFFECTED:  
 (2)4-6-001:002  
 (2)4-6-001:014  
 OWNER: STATE OF HAWAII



PACIFIC OCEAN

**LOCATION MAP**  
 SCALE: NTS

INDEX OF DRAWINGS

SHT. No.	DWG. No.	DESCRIPTION
1	T-1	TITLE SHEET
2	G-1	GENERAL NOTES & ABBREVIATIONS
3	C-1	SURVEY CONTROL NETWORK
4	C-2	DREDGING SITE PLAN
5	C-3	DEMOLITION PLAN
6	C-4	REVTMENT EXTENSION PLAN
7	C-5	STOCKPILE AREA & ENVIRONMENTAL CONTROLS
8	C-6	DREDGING CROSS SECTIONS
9	S-1	STRUCTURAL NOTES, MISCELLANEOUS DETAILS
10	S-2	SHEET PILE BULKHEAD PLAN
11	S-3	TYPICAL BULKHEAD SECTION
12	S-4	SHEET PILE CONNECTION DETAILS
13	S-5	SHEET PILE TIEBACK DETAILS

APPROVED:

MEGHAN L. STATTS  
 ADMINISTRATOR  
 DIVISION OF BOATING AND OCEAN RECREATION  
 DEPARTMENT OF LAND AND NATURAL RESOURCES

05/08/2026

DATE: \_\_\_\_\_

SHEET ID NO.  
**T-1**

PROJECT DESCRIPTION:

- THE PROJECT CONSISTS OF (1) DEMOLISHING AND REMOVING ABOVE AND BELOW WATER PORTIONS OF THE EXISTING BOAT RAMP, ADJACENT CONCRETE PAD SOUTH OF THE RAMP, AND SUBMERGED LOADING DOCK RUINS TO NORTH OF RAMP; (2) EXTENDING THE EXISTING BULKHEAD WALL FROM THE NORTHERN HALF OF THE INNER BASIN SOUTH TO THE EXISTING REVEMENT ALONG THE MARGINAL WHARF AND RECONSTRUCTING REVEMENT OVERLAP; AND, (3) DREDGING OF THE AREA UNDER THE REMOVED BOAT RAMP TO MATCH INNER BASIN DESIGN DREDGE DEPTH.
- THE PROJECT OBJECTIVE IS TO DREDGE, REMOVE, AND DISPOSE OF ALL SAND, OTHER UNCONSOLIDATED SEDIMENTS, LOOSE ROCKS, AND DEBRIS FOUND WITHIN THE PROVIDED DREDGE LIMITS TO ACHIEVE THE DESIGN DREDGE DEPTHS SPECIFIED IN THESE PLANS, AND EXTEND THE BULKHEAD WALL TO THE MARGINAL WHARF. THE PROJECT CONSISTS OF DEMOLITION, DREDGING, SPOILS AND DEBRIS DISPOSAL, AND NEW CONSTRUCTION ACTIVITIES. SEE SHEETS C-2 THROUGH C-4 FOR DETAILED PLANS.
- THE NEW ADDITION OF BULKHEAD WALL WILL EXTEND FROM THE EXISTING BULKHEAD SOUTHWARD TO THE NORTH END OF THE MARGINAL WHARF ALONG THE JOGGED ALIGNMENT SHOWN IN THESE PLANS.
- PROJECT ACTIVITIES SHALL BE COMPLETED IN THE FOLLOWING ORDER: (1) ABOVE-WATER DEMOLITION FIRST, (2) FOLLOWED BY NEW BULKHEAD CONSTRUCTION, (3) THEN REVEMENT EXTENSION CONSTRUCTION, AND (4) FINISHING WITH DREDGING ACTIVITIES.
- CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL DISPOSAL OF ALL DREDGE SPOILS, DEMOLITION DEBRIS, AND CONSTRUCTION WASTE ALONG WITH RELATED PERMIT REQUIREMENTS.

GENERAL NOTES:

- CONTRACTOR SHALL PROVIDE AT LEAST TWO WEEKS NOTICE TO THE LAHAINA SBH HARBOR MASTER PRIOR TO START OF CONSTRUCTION.
- ALL DISTANCES, DIMENSIONS, ELEVATIONS, AND COORDINATES ARE IN FEET, UNLESS NOTED OTHERWISE.
- THE CONTRACTOR SHALL REVIEW, CHECK AND VERIFY ALL DIMENSIONS AND DETAILS SHOWN IN THESE PLANS PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER FOR DIRECTION.
- WORK INCIDENTAL TO THE CONTRACT AND NECESSARY TO COMPLETE THE PROJECT, ALTHOUGH NOT SPECIFICALLY REFERRED TO ON THE CONTRACT DOCUMENTS, SHALL BE FURNISHED AND PERFORMED BY THE CONTRACTOR AT NO ADDITIONAL COST.
- THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR UTILITIES INCLUDING, BUT NOT LIMITED TO, ELECTRICITY, WATER, SANITARY NEEDS, ETC., REQUIRED FOR THEIR OPERATIONS, AND ALL ASSOCIATED COSTS SHALL BE BORNE BY THE CONTRACTOR.
- ALL EXISTING UTILITIES, APPLIANCES, ROADWAYS, WALKWAYS, WALLS, BUILDINGS, DOCK & MOORING FIXTURES AND HARDWARE, AND AIDS TO NAVIGATION, WHETHER OR NOT SHOWN ON THESE PLANS, SHALL BE PROTECTED FROM DAMAGE AT ALL TIMES DURING CONSTRUCTION. ANY DAMAGE TO THEM SHALL BE REPAIRED BY THE CONTRACTOR AT THEIR EXPENSE.
- THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE AGENCIES TO VERIFY THE ACTUAL LOCATION OF ALL UTILITIES IN THE PROJECT AREA PRIOR TO ANY EXCAVATION, DRILLING, OR OTHER GROUND DISRUPTION ACTIVITIES. THE CONTRACTOR SHALL NOTIFY THE ONE CALL CENTER AT (866) 423-7287 OR 811 AT LEAST FIVE (5) WORKING DAYS PRIOR TO THE START OF UNDERGROUND WORK. PERSONAL INJURY RESULTING FROM CONTACT WITH EXISTING UTILITIES SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
- ALL PROJECT WORK, INCLUDING DEMOLITION, STOCKPILING, AND GRADING, SHALL BE PERFORMED IN CONFORMANCE WITH APPLICABLE FEDERAL, STATE, AND COUNTY LAWS AND REGULATIONS REGARDING WATER QUALITY AND WATER POLLUTION CONTROL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONFORMANCE WITH THE APPLICABLE PROVISIONS OF CHAPTER 54, WATER QUALITY STANDARDS, AND CHAPTER 55, WATER POLLUTION CONTROL, OF TITLE 11, HAWAII ADMINISTRATIVE RULES OF THE STATE DEPARTMENT OF HEALTH. BEST MANAGEMENT PRACTICES SHALL BE EMPLOYED AT ALL TIMES DURING CONSTRUCTION. SEE "GENERAL ENVIRONMENTAL NOTES" ON THIS SHEET.
- THE CONTRACTOR SHALL OBSERVE AND COMPLY WITH ALL FEDERAL, STATE, AND LOCAL LAWS REQUIRED FOR THE PROTECTION OF PUBLIC HEALTH AND SAFETY AND ENVIRONMENTAL QUALITY. SEE ADDITIONAL "PUBLIC HEALTH SAFETY AND CONVENIENCE NOTES" ON THIS SHEET.
- THE JOB SITE MUST BE LEFT IN A SAFE AND SECURE CONDITION AT THE END OF EACH CONSTRUCTION WORK DAY. CONTRACTOR SHALL REGULARLY CLEAN UP AND REMOVE FROM THE JOB SITE ALL GENERATED RUBBISH AND MAINTAIN THE PREMISES IN A CLEAN AND ORDERLY CONDITION AT ALL TIMES.
- ALL EXISTING TREES, SHRUBS, AND SURROUNDING VEGETATION SHALL BE PRESERVED AND PROTECTED AS FAR AS PRACTICABLE. REMOVAL OF ANY TREES SHALL REQUIRE PRIOR APPROVAL BY THE ENGINEER. ANY DAMAGED VEGETATION SHALL BE REPLACED BY THE CONTRACTOR AT THEIR EXPENSE.
- CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED CONSTRUCTION AND DISPOSAL PERMITS FROM THE APPROPRIATE REGULATORY AGENCIES.
- STATE OF HAWAII DLNR WILL DELEGATE THE CONTRACTOR AS THE AUTHORIZED REPRESENTATIVE TO SUBMIT ALL NECESSARY DOCUMENTS AND REPORTS AS REQUIRED BY THE DEPARTMENT OF HEALTH AND US ARMY CORPS OF ENGINEERS DIRECTLY TO THEIR OFFICES AT NO COSTS TO THE STATE.
- THE CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT.
- WHERE PEDESTRIAN WALKWAYS EXIST, THEY SHALL BE MAINTAINED IN PASSABLE CONDITION OR OTHER FACILITIES FOR PEDESTRIANS SHALL BE PROVIDED. TEMPORARY PASSAGEWAYS SHALL BE ACCESSIBLE PER 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN CHAPTER 2, SECTIONS 201.3 AND 206.1.
- PUBLIC BEACH AREAS SHALL REMAIN OPEN TO THE MAXIMUM EXTENT POSSIBLE DURING THE CONSTRUCTION PERIOD. PROVIDE AND MAINTAIN SAFE PEDESTRIAN ACCESS TO THE BEACH AREAS THROUGHOUT THE CONSTRUCTION PERIOD.
- UPON COMPLETION OF CONSTRUCTION, THE ENTIRE JOB SITE SHALL BE CLEANED OF ALL RUBBISH AND DEBRIS BY THE CONTRACTOR.
- CONTRACTOR SHALL RESTORE ALL AREAS DISTURBED AS A RESULT OF CONSTRUCTION ACTIVITIES TO EQUAL OR BETTER CONDITION, INCLUDING BUT NOT LIMITED TO VEGETATION, PAVED AREAS, EMBANKMENTS, CURBS, SIGNS, LANDSCAPING, STRUCTURES, UTILITIES, WALKWAYS, FENCES, ETC., UNLESS SPECIFICALLY NOTED OTHERWISE.
- THE CONTRACTOR SHALL PROVIDE ALL NECESSARY AND INCIDENTAL MATERIALS AND LABOR TO COMPLETE THE PROJECT.
- THE CONTRACTOR SHALL COORDINATE AS NEEDED WITH THE US COAST GUARD, LOCAL MARITIME AUTHORITIES, AND LAHAINA SBH HARBOR MASTER TO ENSURE SAFE NAVIGATION AROUND THE ACTIVE DREDGING SITE.
- ALL DREDGING EQUIPMENT MUST BE INSPECTED DAILY FOR HYDRAULIC OIL AND FUEL OIL LEAKS AND MAINTAINED IN GOOD WORKING CONDITION TO PREVENT ACCIDENTAL DISCHARGE, SPILLS, AND OTHER FORMS OF OIL POLLUTION.
- ALL DREDGING ACTIVITIES MUST COMPLY WITH THE CONDITIONS OUTLINED IN THE PERMITS ISSUED BY THE U.S. ARMY CORPS OF ENGINEERS AND THE HAWAII DEPARTMENT OF HEALTH.
- ANY SIGNIFICANT CHANGES, DEVIATIONS, OR MODIFICATIONS TO THE PLANS, SPECIFICATIONS, OR INSTRUCTIONS PROVIDED HEREIN MUST BE SUBMITTED TO THE ENGINEER FOR REVIEW AND WRITTEN APPROVAL PRIOR TO IMPLEMENTATION. FAILURE TO OBTAIN PRIOR APPROVAL MAY RESULT IN NON-COMPLIANCE WITH PROJECT REQUIREMENTS.

GRADING NOTES

- ALL GRADING WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE APPROPRIATE STATE AND LOCAL REGULATORY AGENCIES AND ASSOCIATED PERMIT REQUIREMENTS.
- THE CONTRACTOR SHALL REMOVE ALL SILT AND DEBRIS DEPOSITED, ACCRETED, OR OTHERWISE ACCUMULATED IN DRAINAGE FACILITIES, ROADWAYS, AND OTHER AREAS RESULTING FROM CONSTRUCTION ACTIVITIES. THE COSTS INCURRED FOR ANY NECESSARY REMEDIAL ACTION SHALL BE PAID BY THE CONTRACTOR.
- THE CONTRACTOR SHALL KEEP THE PROJECT AND SURROUNDING AREAS FREE FROM DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH THE AIR POLLUTION CONTROL RULES OF THE STATE DEPARTMENT OF HEALTH, HAR 11-60.1, "FUGITIVE DUST."

- ALL GRADING OPERATIONS SHALL BE PERFORMED IN CONFORMANCE WITH THE APPLICABLE PROVISIONS OF THE HAWAII ADMINISTRATIVE RULES (HAR), TITLE 11, CHAPTER 55, "WATER POLLUTION CONTROL," AND CHAPTER 54, "WATER QUALITY STANDARDS," IN ADDITION TO THE EROSION AND SEDIMENTATION CONTROL STANDARDS AND GUIDELINES PROVIDED BY THE DEPARTMENT OF PUBLIC WORKS, MAUI COUNTY.
- NO GRADING WORK SHALL BE PERFORMED ON SATURDAY, SUNDAY, AND HOLIDAYS ANYTIME WITHOUT PRIOR APPROVAL FROM THE ENGINEER, PROVIDED SUCH GRADING WORK IS ALSO IN CONFORMANCE WITH THE COMMUNITY NOISE CONTROL STANDARDS CONTAINED IN THE HAWAII ADMINISTRATIVE RULES, TITLE 11, CHAPTER 46, "COMMUNITY NOISE CONTROL."

PUBLIC HEALTH SAFETY AND CONVENIENCE NOTES

- THE CONTRACTOR SHALL OBSERVE AND COMPLY WITH ALL FEDERAL, STATE, AND LOCAL LAWS REQUIRED FOR THE PROTECTION OF PUBLIC HEALTH, SAFETY, AND ENVIRONMENTAL QUALITY.
- THE CONTRACTOR, AT THEIR OWN EXPENSE, SHALL KEEP THE PROJECT AND ITS SURROUNDING AREAS FREE FROM DUST NUISANCE. THE WORK SHALL BE IN CONFORMANCE WITH THE AIR POLLUTION STANDARDS AND REGULATIONS OF THE STATE DEPARTMENT OF HEALTH. THE COUNTY OF MAUI MAY REQUIRE SUPPLEMENTARY HEALTH, SAFETY, AND/OR ENVIRONMENTAL MEASURES IF REQUIRED, AT THE CONTRACTOR'S EXPENSE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEANING AND REMOVAL OF ALL SAND, SILT, MUD AND OTHER DEBRIS GENERATED AS A RESULT OF CONSTRUCTION ACTIVITIES, THAT IS DEPOSITED AND/OR ACCUMULATED WITHIN DOWNSTREAM WATERWAYS OR DRAINAGE CONVEYANCES SUCH AS DITCHES AND DRAIN PIPES, AS WELL AS PUBLIC AND PRIVATE ROADWAYS. THE CONTRACTOR AGREES TO REIMBURSE THE COUNTY OF MAUI FOR ALL COSTS EXPENDED IN PERFORMANCE OF ABOVE WORK IF REQUIRED FOR PUBLIC HEALTH AND SAFETY OR OTHERWISE MADE NECESSARY BY NON-PERFORMANCE BY THE CONTRACTOR.
- THE CONTRACTOR SHALL NOT PERFORM ANY CONSTRUCTION OPERATION OR ACTIVITY SO AS TO CAUSE FALLING ROCKS, SOIL, OR OTHER DEBRIS, MANMADE OR NATURAL, IN ANY FORM TO FALL, SLIDE, OR FLOW INTO EXISTING COUNTY DRAINAGE SYSTEMS, OR ADJOINING PROPERTIES, STREETS OR NATURAL WATERCOURSES. SHOULD SUCH VIOLATIONS OCCUR, THE CONTRACTOR MAY BE CITED. IN SUCH CASE, CONTRACTOR SHALL IMMEDIATELY COMMENCE RESPONSE ACTIVITIES AND TAKE ALL REMEDIAL ACTIONS NECESSARY.
- THE CONTRACTOR SHALL ASSUME SOLE RESPONSIBILITY FOR PUBLIC SAFETY IN THE VICINITY OF PROJECT WORK AREAS. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORK HOURS. ALL WORK AREAS SHALL HAVE SUFFICIENT AND SUITABLE SAFETY FENCING AND WARNING SIGNAGE TO ENSURE PUBLIC SAFETY. CONTRACTOR SHALL ALSO PROVIDE, INSTALL, AND MAINTAIN ALL NECESSARY SIGNS, LIGHTS, FLARES, BARRICADES, MARKERS, CONES, AND OTHER PROTECTIVE FACILITIES OR DEVICES AND SHALL TAKE NECESSARY PRECAUTIONS FOR THE PROTECTION, CONVENIENCE, AND SAFETY OF THE PUBLIC.
- THE CONTRACTOR IS DIRECTED TO REVIEW CHAPTER 46, PUBLIC HEALTH REGULATIONS, HAWAII STATE DOH, "COMMUNITY NOISE CONTROL," IN WHICH MAXIMUM PERMISSIBLE NOISE LEVELS HAVE BEEN SET. IF THE CONSTRUCTION WORK REQUIRES A PERMIT FROM THE DIRECTOR OF HEALTH, THE CONTRACTOR SHALL OBTAIN A COPY OF CHAPTER 46 AND BECOME FAMILIAR WITH THE NOISE LEVEL RESTRICTIONS AND THE PROCEDURES FOR OBTAINING A PERMIT FOR THE CONSTRUCTION ACTIVITIES. APPLICATION AND INFORMATION ON VARIANCES ARE AVAILABLE FROM THE ENVIRONMENTAL PROTECTION AND HEALTH SERVICES DIVISION, 99-945 HALAWA VALLEY STREET, HONOLULU, HI 96701 OR BY TELEPHONE AT (808) 586-4400.
- ENSURE ALL WORKERS ARE APPROPRIATELY TRAINED IN REQUIRED SAFETY PROTOCOLS AND PROVIDED WITH APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE) WHILE ON-SITE.
- CONTRACTOR SHALL ESTABLISH A DESIGNATED SAFETY OFFICER ON-SITE TO OVERSEE COMPLIANCE WITH OSHA REGULATIONS AND PROJECT-SPECIFIC SAFETY PLANS.
- CONTRACTOR SHALL IMPLEMENT REASONABLE NOISE REDUCTION MEASURES, SUCH AS USING MUFFLERS ON EQUIPMENT AND SCHEDULING NOISIER ACTIVITIES DURING LESS SENSITIVE TIMES.

ARCHAEOLOGICAL NOTES:

- PURSUANT TO CHAPTER 6E, HAWAII REVISED STATUTES (HRS), IN THE EVENT THAT ANY ARTIFACTS OR HUMAN REMAINS ARE UNCOVERED OR EXPOSED DURING CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL IMMEDIATELY SUSPEND WORK AND NOTIFY THE MAUI POLICE DEPARTMENT AND STATE DLNR, HISTORIC PRESERVATION DIVISION AT (808) 692-8015.
- IN THE EVENT THAT AN ARCHAEOLOGICAL OR HISTORIC STRUCTURE WITHIN THE WORK AREA IS INADVERTENTLY DAMAGED DURING CONSTRUCTION, CEASE WORK IN THE VICINITY OF THE SITE AND NOTIFY THE ENGINEER AND THE STATE HISTORIC PRESERVATION DIVISION (SHPD) OF THE DAMAGE. SHPD WILL DETERMINE THE APPROPRIATE MITIGATION MEASURES.
- IN THE EVENT THAT A PREVIOUSLY UNKNOWN ARCHAEOLOGICAL FEATURE IS EXPOSED BY CONSTRUCTION, CEASE WORK IN THE VICINITY OF THE FIND AND NOTIFY THE ENGINEER AND SHPD OF THE NEW DISCOVERY. SHPD WILL DETERMINE THE APPROPRIATE RESPONSE OR MITIGATION MEASURES.
- IN THE EVENT THAT PREVIOUSLY UNKNOWN HUMAN REMAINS ARE EXPOSED BY CONSTRUCTION, CEASE ALL WORK IN THE AREA OF THE REMAINS, AND PROTECT THE AREA WITH A REASONABLY APPROPRIATE MATERIAL. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHPD AT 808-692-8015.
- IF HUMAN REMAINS ARE DISCOVERED, HAR TITLE 13, SUBTITLE 13, CHAPTER 300 STATES THAT FURTHER DISTURBANCES AND ACTIVITIES SHALL CEASE IN ANY AREA OR NEARBY AREA SUSPECTED TO OVERLIE REMAINS, AND THE STATE HISTORIC PRESERVATION DIVISION AND THE POLICE DEPARTMENT WILL BE CONTACTED. THE APPROPRIATE PROCESS WOULD THEN PROCEED IN CONFORMANCE WITH HAR 13-300 SUBCHAPTER 4, "PROCEDURES FOR PROPER TREATMENT OF BURIAL SITES AND HUMAN SKELETAL REMAINS."
- IF ANY LAVA TUBE OR CORAL CAVERN IS UNCOVERED DURING EARTHWORK OPERATIONS, THE CONTRACTOR SHALL CEASE ALL GROUND WORK IN THE AREA AND IMMEDIATELY NOTIFY THE ENGINEER. WITH OR WITHOUT THE HELP OF THE ARCHAEOLOGICAL MONITOR, THE ENGINEER WILL ASSESS THE SITUATION. IF THE ENGINEER HAS ANY DOUBTS AS TO THE EXTENT AND/OR SIGNIFICANCE OF THE DISCOVERY, THE ENGINEER WILL CONTACT THE APPROPRIATE REGULATORY AGENCY (E.G., STATE HISTORIC PRESERVATION DIVISION).

GENERAL ENVIRONMENTAL NOTES:

- AN ENVIRONMENTAL PROTECTION PLAN (EPP) AND A BEST MANAGEMENT PRACTICES PLAN (BMPP) SHALL BE SUBMITTED TO THE ENGINEER NO LATER THAN TWO (2) WEEKS PRIOR TO COMMENCEMENT OF WORK. SEE ADDITIONAL ENVIRONMENTAL NOTES ON SHEET C-7.
- CONTRACTOR SHALL IMPLEMENT AND MAINTAIN BMP'S TO MINIMIZE EROSION, SEDIMENTATION, AND POLLUTION DURING ALL PHASES OF CONSTRUCTION IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS. BMP'S SHALL INCLUDE, BUT ARE NOT LIMITED TO, SILT FENCING, SILT CURTAINS, OIL BOOM, SEDIMENT BASINS, EROSION CONTROL BLANKETS, AND PROPER SITE STABILIZATION MEASURES. ALL BMP'S SHALL BE INSPECTED AND MAINTAINED REGULARLY TO ENSURE EFFECTIVE PERFORMANCE. SEE ADDITIONAL "GENERAL ENVIRONMENTAL NOTES" ON THIS SHEET AND ADDITIONAL DETAILED ENVIRONMENTAL AND BMP NOTES SHEET C-7.
- AT THEIR OWN EXPENSE, THE CONTRACTOR SHALL KEEP THE PROJECT AREA AND SURROUNDING VICINITY FREE FROM DUST NUISANCE. THE WORK SHALL BE PERFORMED IN ACCORDANCE WITH AIR POLLUTION CONTROL STANDARDS PROVIDED IN HAWAII ADMINISTRATIVE RULES: CHAPTER 11-60, "AIR POLLUTION CONTROL."
- CONTRACTOR SHALL ENSURE THAT NECESSARY MEASURES TO CONTROL SOIL EROSION, STORMWATER RUNOFF, AND OTHER POLLUTANT VECTORS ARE INSTALLED IN PLACE PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES. THESE MEASURES SHALL BE PROPERLY CONSTRUCTED, REGULARLY INSPECTED, AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
- ALL CONSTRUCTION WORK SHALL IMPLEMENT MEASURES AND/OR CONTROLS SUFFICIENT TO ENSURE THAT THE DISCHARGE OF POLLUTANTS FROM THE CONSTRUCTION SITE WILL BE REDUCED TO THE MAXIMUM EXTENT PRACTICABLE AND WILL NOT CAUSE OR CONTRIBUTE TO AN EXCEEDANCE OF STATE AND NATIONAL WATER QUALITY STANDARDS.
- CONTRACTOR SHALL OBSERVE AND COMPLY WITH THE STATE OF HAWAII DOH REGULATIONS REGARDING STORMWATER DISCHARGE.
- ALL EROSION CONTROL MEASURES SHALL BE CHECKED AND REPAIRED AS NECESSARY, AT A MINIMUM, WEEKLY IN DRY PERIODS AND WITHIN 24 HOURS AFTER ANY RAINFALL OF 0.5 INCHES OR GREATER WITHIN A 24-HR PERIOD. FOR EVENTS OF ABOVE-NORMAL RAINFALL, THE CONTRACTOR SHALL REMOVE CLOGGED OR FOULED SEDIMENT AND/OR DRAIN INLET FILTERS AND REPLACE WITH NEW ONES AFTER THE EVENT HAS PASSED. THE CONTRACTOR SHALL MAINTAIN RECORDS OF ALL CHECKS AND REPAIRS AND A COPY SHALL BE MADE AVAILABLE UPON REQUEST AT THE CONSTRUCTION FIELD OFFICE.



- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEARING AND REMOVAL OF ALL SAND, MUD, AND OTHER DEBRIS DEPOSITED AND ACCUMULATED ON ROADWAYS, WALKWAYS, AND OTHER IMPROVED AREAS AS A RESULT OF THEIR CONSTRUCTION ACTIVITIES.
- GOOD CONSTRUCTION HOUSEKEEPING PRACTICES SHALL BE UTILIZED TO ENSURE PROTECTION OF ROADWAYS FROM TRACKING AND OTHER WASTE PROPAGATION FROM CONSTRUCTION SITE MUD, DIRT, AND DEBRIS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE PROJECT AREA, STREETS, SIDEWALKS, AND OTHER PUBLIC RIGHT OF WAYS IN A CLEAN AND ORDERLY MANNER, AND FOR CLEARING AND REMOVAL OF ALL DEBRIS GENERATED BY ASSOCIATED CONSTRUCTION ACTIVITIES. ALL SPILLS OR OVERFLOWS OF SAND, ROCK, OR CONSTRUCTION DEBRIS SHALL BE REMOVED IMMEDIATELY. ALL AREAS ADJACENT TO DESIGNATED WORK AREAS SHALL BE MAINTAINED IN A CLEAN, SAFE AND USABLE CONDITION.
- THE CONTRACTOR SHALL FURNISH, PROVIDE AND INSTALL EROSION CONTROL MEASURES FOR THEIR CONSTRUCTION, STAGING, STOCKPILING, AND STORAGE AREAS AND SHALL INSPECT AND MONITOR THEIR CONSTRUCTION, STAGING, STOCKPILING, AND STORAGE AREAS TO ENSURE THAT NO STORMWATER-RELATED DISCHARGES ARE EMITTED. IF SUCH SOURCES ARE IDENTIFIED, CONTRACTOR SHALL PROVIDE IMMEDIATE MITIGATIVE MEASURES.
- CONTRACTOR SHALL ENSURE THAT SEDIMENT-LADEN RUNOFF DOES NOT LEAVE THE SITE.
- THE CONTRACTOR SHALL DISPOSE OF WASTE VEGETATION, EXPENDABLE EQUIPMENT, WASTE MATERIALS, AND PETROLEUM-BASED PRODUCTS AT AN APPROPRIATE OFF-SITE RECEPTION FACILITY.
- AT THE END OF CONSTRUCTION, THE EXISTING DRAIN SYSTEM SURROUNDING THE PROJECT SITE SHALL BE INSPECTED AND ANY ACCUMULATED SEDIMENT AND DEBRIS FOUND SHALL BE REMOVED. INTENTIONAL OR UNINTENTIONAL FLUSHING OF ANY CONTAMINANTS INTO THE DRAINAGE SYSTEM IS STRICTLY PROHIBITED.

GENERAL STRUCTURAL ENGINEERING NOTES

- STRUCTURAL ENGINEERING NOTES ARE PROVIDED ON SHEET S-1.

ABBREVIATIONS:

(°)	DEGREE, ANGLE	MAX	MAXIMUM
(')	MINUTE, ANGLE	MIN	MINIMUM
(")	SECOND, ANGLE	MLLW	MEAN LOWER LOW WATER TIDAL DATUM
APPROX.	APPROXIMATELY	MSL	MEAN SEA LEVEL TIDAL DATUM
BL, @	BASELINE	(N)	NEW
BM	BENCHMARK	NAD83	NORTH AMERICAN DATUM OF 1983
BMP	BEST MANAGEMENT PRACTICES	NOAA	NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
BMPP	BEST MANAGEMENT PRACTICES PLAN	NOS	NATIONAL OCEAN SERVICE
CY	CUBIC YARDS	NTS	NOT TO SCALE
DOH	(STATE OF HAWAII) DEPARTMENT OF HEALTH	OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
DLNR	(STATE OF HAWAII) DEPARTMENT OF LAND AND NATURAL RESOURCES	PA11	NATIONAL SPATIAL REFERENCE SYSTEM PA11
(E), EXIST	EXISTING	SB	START BASELINE
EB	END BASELINE	SBH	SMALL BOAT HARBOR
EG	EXISTING GROUND	SHPD	(HAWAII) STATE HISTORIC PRESERVATION DIVISION
EL, ELEV.	ELEVATION	SHT(S)	SHEET(S)
EPP	ENVIRONMENTAL PROTECTION PLAN	STA	STATION
FT, (')	FEET	TMK	TAX MAP KEY
IN, (")	INCH	TYP.	TYPICAL
LBS	POUNDS (WEIGHT)	V:H	VERTICAL TO HORIZONTAL (SLOPE)

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION  LAHAINA SMALL BOAT HARBOR RAMP REMOVAL & BULKHEAD WALL EXTENSION  GENERAL NOTES & ABBREVIATIONS					
			DESIGNED: CCG DRAWN: CCG CHECKED: GW APPROVED:		
THIS WORK HAS BEEN PREPARED BY ME, OR UNDER MY SUPERVISION.   SIGNATURE			SUBMITTED: N/A DATE: 6 May 2026 SCALE: N/A DATE:		
				SHEET ID NO. <b>G-1</b>	

**PROJECT CONTROL NETWORK**

Scale: 1" = 40'

**LEGEND:**

- DREDGE AREA & LIMITS BOUNDARY
- CONSTRUCTION EASEMENT BOUNDARY
- RIPRAP STRUCTURE (REVETMENT/BREAKWATER)
- PROJECT BENCHMARK LOCATIONS
- NAVIGATION BUOYS/MARKERS (FROM NOAA CHART 19348)



**TOPOGRAPHIC SURVEY & CONTROL NETWORK NOTES:**

1. ALL HORIZONTAL COORDINATES ARE REFERENCED TO THE FOLLOWING COORDINATE SYSTEM: HAWAII STATE PLANE, ZONE 2, US SURVEY FEET, NAD83(PA11) AS EASTINGS (X-COORDINATE) AND NORTHINGS (Y-COORDINATE).
2. AZIMUTHS ARE SHOWN IN DEGREES/MINUTES/SECONDS CLOCKWISE FROM TRUE SOUTH.
3. BACKGROUND IMAGE DISPLAYED THIS SHEET DATED 11 AUGUST 2023. SHORELINE FEATURES MAPPED FROM AERIAL IMAGERY DATED 15 JULY 2025.
4. TOPOGRAPHIC SURVEY COMPLETED BY AILANA SURVEYING AND GEOMATICS, LLC., SURVEY MAP DATED 17 AUGUST 2025.
5. ELEVATIONS REFERENCED TO MEAN LOWER LOW WATER DATUM (1983-2001 TIDAL EPOCH) CALCULATED AT NOAA/NOS TIDE STATION 1615680 AT KAHULUI HARBOR.
6. CONSTRUCTION EASEMENT FOR THE LAHAINA BOAT RAMP DEMOLITION AND BULKHEAD WALL EXTENSION FOLLOWS THE BOUNDARY FORMED BY THE POINTS PROVIDED IN THE CONSTRUCTION EASEMENT POINT TABLE, AND AS DRAWN IN THESE PLANS. ALL WORK AND EQUIPMENT SHALL BE CONTAINED WITHIN THE COMBINED LIMITS OF THIS EASEMENT. CONSTRUCTION EASEMENT LIMITS ALONG WITH THE PROJECT BASELINE ARE DEFINED IN THE FOLLOWING POINTS TABLES, WHERE ALL COORDINATES ARE IN FEET IN THE PROJECT COORDINATE SYSTEM:

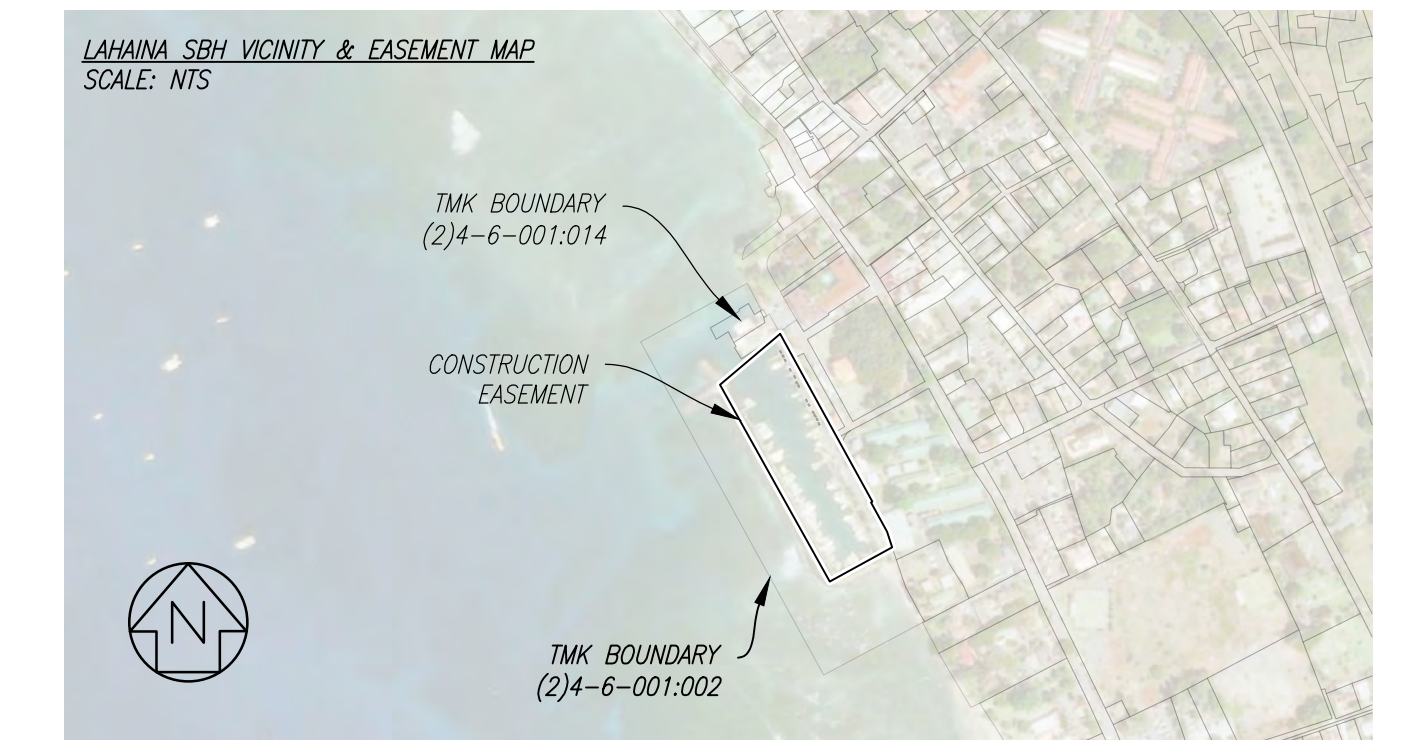
CONSTRUCTION EASEMENT POINT TABLE (FT)		BASELINE POINT TABLE (FT)		
EASTING	NORTHING	POINT #	EASTING	NORTHING
1,636,384.97	195,652.52	1	1,636,417.06	195,575.81
1,636,572.26	195,311.60	2	1,636,722.50	195,009.46
1,636,686.60	195,103.47			
1,636,682.15	195,101.03			
1,636,734.54	195,005.28			
1,636,751.47	194,954.34			
1,636,546.95	194,842.04			
1,636,188.58	195,486.15			

7. THE BOAT RAMP DREDGE AREA LIMITS ARE DEFINED BY THE GIVEN POINTS TABLE.

**BOAT RAMP DREDGE LIMITS POINT TABLE (FT)**

POINT #	EASTING	NORTHING
3	1,636,536.13	195,311.35
4	1,636,555.84	195,275.92
5	1,636,532.49	195,262.94
6	1,636,521.94	195,225.96
7	1,636,540.47	195,192.66
8	1,636,506.79	195,173.93
9	1,636,455.35	195,266.40

8. SEE SHEET C-2 FOR DESCRIPTIONS OF PROJECT AREAS AND WORK TASKS.
9. CONTRACTOR STAGING AND STOCKPILE AREA(S) SHALL BE COORDINATED WITH AND APPROVED BY THE LAHAINA SBH HARBOR AGENT OR THEIR REPRESENTATIVE. A POSSIBLE STOCKPILE AREA CONFIGURATION IS SHOWN IN THE "TEMPORARY STOCKPILE AREA AND HAUL ROUTE PLAN" ON SHEET C-5.
10. CONTRACTOR MAY MOOR/ANCHOR FLOATING EQUIPMENT IN THE HARBOR DURING NON-WORKING HOURS, PROVIDED HARBOR USE IS NOT IMPEDED, AND SHALL COORDINATE SUCH USE WITH THE HARBOR MASTER.
11. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL CONTROLS IN THE FIELD. ANY DISCREPANCIES FOUND SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER.



REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION

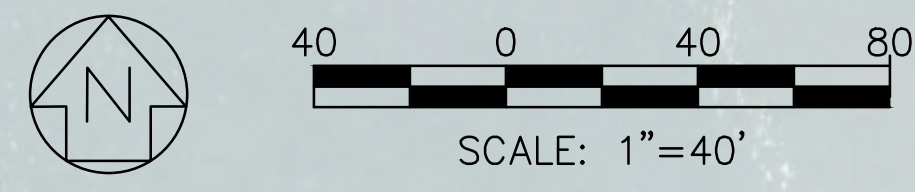
**LAHAINA SMALL BOAT HARBOR  
RAMP REMOVAL & BULKHEAD WALL EXTENSION**

**PROJECT CONTROL NETWORK**

THIS WORK HAS BEEN PREPARED BY ME, OR UNDER MY SUPERVISION.

*Christopher C. Goddy*  
30 April 2028  
DATE

DESIGNED: CCG	SUBMITTED: N/A
DRAWN: CCG	DATE: 6 May 2026
CHECKED: GW	SCALE: AS SHOWN
APPROVED: _____	SHEET ID NO. <b>C-1</b>
CHIEF ENGINEER	DATE



- CONSTRUCTION NOTES:**
- PROJECT WORK AREA ENCOMPASSING THE EXISTING BOAT RAMP, ADJACENT CONCRETE PAD TO SOUTH, ADJACENT SUBMERGED REMNANTS OF LOADING DOCK TO THE NORTH, AND SURROUNDING DEBRIS (COLLECTIVELY THE BOAT RAMP) EXTENDS SOUTHWESTWARD FROM APPROXIMATELY STATION 02+89 TO STATION 03+96 ALONG THE PROJECT BASELINE. DIAGONAL HATCHING SHOWN WITHIN THE DREDGE LIMITS BOUNDARY ON THESE PLANS INDICATES THE SHOALED BOTTOM RECHINGS FOUND ABOVE DESIGN DREDGE DEPTH AT THE TIME OF THE PRE-DREDGE SURVEY. CONTRACTOR SHALL ENSURE ENTIRE BOAT RAMP WORK AREA IS DREDGED TO A MINIMUM DEPTH OF 10 FT BELOW MEAN LOWER LOW WATER (ELEV -10 FT MLLW) WITHIN THE GIVEN LIMITS. ESTIMATED LOCATION AND EXTENTS OF RESULTING SIDE SLOPES ASSUMED AT 1V:2H, BASED ON EXISTING BATHYMETRIC SURVEY, ARE INDICATED BY TOP-OF-SLOPE BREAKLINES (HEAVY DASHED LINES) AND SLOPE SYMBOLS DRAWN AROUND THE PERIMETER OF THE DREDGE LIMITS.
  - THE DREDGE TEMPLATE IS 92.4 FT WIDE FROM STATION 02+89.3 TO 03+29.8. BETWEEN STATION 03+29.8 AND 03+57.7 THE TEMPLATE WIDTH NARROWS FROM 65.7 FT TO 38.5 FT. THE TEMPLATE THEN REMAINS CONSTANT AT 38.5 FT WIDE FROM STATION 03+57.7 TO ITS END AT 03+95.8.
  - CROSS-HATCHED PORTIONS OF EXISTING STRUCTURES WITHIN PROVIDED DREDGE LIMITS (INCLUDING, BUT NOT LIMITED TO, CONCRETE BOAT RAMP, LOADING DOCK RUINS, APRONS, AND FOOTINGS) LOCATED ABOVE WATER (ELEV 0.0 FT MLLW) SHALL BE COMPLETELY DEMOLISHED AND REMOVED. SEE SHEET C-3 FOR DEMOLITION PLAN.
  - ALL MATERIAL BELOW WATER (ELEV 0.0 FT MLLW) AND ABOVE DREDGE DEPTH WITHIN THE DREDGE TEMPLATE LIMITS LYING BENEATH THE AREAS DESIGNATED FOR ABOVE-WATER DEMOLITION (CROSS-HATCHED AREAS FROM NOTE 3) SHALL BE REMOVED BY DREDGING TO THE DESIGN DREDGE ELEVATION OF -10 FT MLLW.
  - THE CONTRACTOR SHALL ENSURE DEMOLITION AND DREDGING OPERATIONS ARE PROPERLY SEQUENCED TO MAINTAIN SAFE WORKING CONDITIONS AND TO PREVENT DEMOLITION DEBRIS FROM ENTERING THE DREDGE PRISM. SEE NOTE 4 UNDER PROJECT DESCRIPTION ON SHEET G-1.
  - AN OVER-DREDGE ALLOWANCE OF 1 FT, TO AN ELEVATION OF (-11 FT MLLW), IS AUTHORIZED WITHIN DREDGE LIMITS. ALLOWABLE OVER-DREDGE SHALL EXCLUDE ANY SIDE SLOPE AREAS.
  - VOLUME OF AVAILABLE DREDGE MATERIAL WITHIN BOAT RAMP DREDGE TEMPLATE BASED ON THE GIVEN LIMITS IS APPROXIMATELY 1,109 CY TO THE STANDARD DREDGE TEMPLATE AS SHOWN IN THESE PLANS. FOR THE SAME AREAS, A TOTAL VOLUME OF APPROXIMATELY 1,341 CY IS AVAILABLE TO THE DREDGE TEMPLATE WITH ALLOWABLE 1 FT OVER-DREDGE. CALCULATED VOLUMES ARE ESTIMATED TOTALS FOR THE ENTIRE DREDGE PRISM AND INCLUDE AVAILABLE MATERIAL OVER ASSUMED SIDE SLOPES AT 1V:2H.
  - ESTIMATED DREDGE QUANTITIES IN NOTE 7 INCLUDE THE VOLUME OF MATERIAL BENEATH THE DEMOLISHED ABOVE-WATER PORTION OF BOAT RAMP, FROM 0-FT MLLW WATERLINE TO DESIGN DREDGE DEPTH.
  - DREDGING SHALL BE PERFORMED BY MECHANICAL DREDGING METHODS ONLY. HYDRAULIC DREDGING METHODS OR BLASTING ARE NOT AUTHORIZED FOR THIS PROJECT.
  - THE CONSTRUCTION OF A CAUSEWAY FOR THE PURPOSE OF DREDGING IS NOT AUTHORIZED.
  - CONTRACTOR SHALL DREDGE TO THE PROVIDED LIMITS, AS DEFINED BY THE BOAT RAMP 'DREDGE LIMITS BOUNDARY POINT TABLE' PROVIDED IN NOTE 7 ON SHEET C-1, AND AS SHOWN ELSEWHERE IN THESE PLANS. DREDGE LIMITS DELINEATED BY THIS BOUNDARY REPRESENT THE TOES OF THE DREDGE AREA SIDE SLOPES, WHERE PRESENT, ARE APPROXIMATED IN THESE PLANS FOR REFERENCE ONLY AND ARE BASED ON THE SURFACE SUBTRACTION OF THE DREDGE PRISM FROM THE PRE-DREDGE SURVEY BATHYMETRY DESCRIBED BELOW UNDER 'HYDROGRAPHIC SURVEY NOTES' ON THIS SHEET.
  - DESIGN SIDE SLOPES ARE ASSUMED AT 1V:2H (TYPICAL). THE CONTRACTOR SHALL CONFINE ACTIVE DREDGING TO WITHIN THE DREDGE LIMITS BOUNDARY (SEE NOTE 9 ON THIS SHEET), AND SHALL DREDGE TO THE BOUNDARY LIMIT LINE UNTIL THE COLLAPSING SIDE SLOPE HAS STABILIZED AND THE PROJECT DEPTH IS MAINTAINED AT THE GIVEN DREDGE LIMITS. IF DREDGE MATERIAL COLLAPSES INTO THE PROJECT AREA FROM SHALLOWER DEPTHS DUE TO SIDE SLOPES EXCEEDING THE NATURAL ANGLE OF REPOSE, CONTRACTOR SHALL CONTINUE DREDGING UNTIL THE SIDE SLOPE HAS STABILIZED AND THE PROJECT DEPTH IS MAINTAINED AT THE PROJECT LIMITS.
  - AT NO TIME SHALL THE CONTRACTOR DREDGE CLOSER THAN 20 FEET HORIZONTALLY TO THE WATERLINE (ELEVATION 0.0' MLLW) ALONG THE BREAKWATER OR SHORELINE REVETMENTS, OR DISTURB THE FOUNDATION OF BREAKWATER OR SHORELINE REVETMENTS. IF A DISCREPANCY IS FOUND BETWEEN THIS REQUIREMENT AND THE LOCATION OF THE DREDGE PROJECT LIMITS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND THE CONTRACTING OFFICER'S REPRESENTATIVE IMMEDIATELY.
  - WHERE BULKHEADS, FLOATING DOCKS OR PILE-SUPPORTED PIERS ARE PRESENT WITHIN THE DREDGE TEMPLATE, THE CONTRACTOR SHALL DREDGE ALONG THE DOCK OR PIER FACE TO PROJECT DEPTH UNTIL COLLAPSING LOOSE MATERIAL FROM UNDER-DECK SIDE SLOPES STABILIZES AND PROJECT DEPTH IS MAINTAINED. CONTRACTOR SHALL DREDGE NO CLOSER THAN 10 FT FROM PILES OR SHEET PILE (AT MUDLINE). THE CONTRACTOR SHALL EXERCISE PROFESSIONAL CARE AND JUDGMENT WHEN DREDGING NEAR BULKHEADS, DOCKS, PIERS, AND ASSOCIATED STRUCTURES TO AVOID CAUSING DAMAGE TO EXISTING STRUCTURES OR UTILITIES ATTACHED TO, BENEATH, OR NEAR THESE FEATURES. ALL DREDGING ACTIVITIES IN THESE AREAS SHALL BE CONDUCTED IN A MANNER THAT MINIMIZES RISK TO STRUCTURAL AND UTILITY INTEGRITY.
  - DREDGED MATERIAL THAT REQUIRES DEWATERING SHALL BE DEWATERED BY PERCOLATION INTO THE GROUND OR BY ATMOSPHERIC EVAPORATION. RETURN WATER FROM WET DREDGED MATERIAL SHALL NOT BE PERMITTED TO DRAIN INTO THE HARBOR, OTHER COASTAL WATERS, OR MUNICIPAL DRAINAGE SYSTEMS. DREDGED MATERIAL SHALL NOT BE STOCKPILED IN THE WATER.
  - THE CONTRACTOR SHALL PROVIDE AT LEAST TWO WEEKS NOTICE TO THE LAHAINA SBH HARBOR MASTER/AGENT OR THEIR REPRESENTATIVE PRIOR TO START OF CONSTRUCTION ACTIVITIES.
  - USE OF HARBOR FACILITIES, INCLUDING PIERS, WHARVES, RAMPS, LOADING DOCKS, ETC., SHALL BE COORDINATED WITH AND APPROVED BY THE LAHAINA SBH HARBOR MASTER OR THEIR DESIGNATED AGENT PRIOR TO START OF WORK. CONTRACTOR SHALL STAY WITHIN LOAD LIMITS OF ALL EXISTING HARBOR FACILITIES AND WATERFRONT STRUCTURES. ANY DAMAGE TO EXISTING FACILITIES RESULTING FROM CONTRACTOR OPERATIONS SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
  - CONTRACTOR SHALL LOCATE AND VERIFY ALL UTILITIES WITHIN THE PROJECT SITE PRIOR TO START OF WORK.

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION

LAHAINA SMALL BOAT HARBOR  
RAMP REMOVAL & BULKHEAD WALL EXTENSION

**DREDGING SITE PLAN - LAHAINA BOAT RAMP**

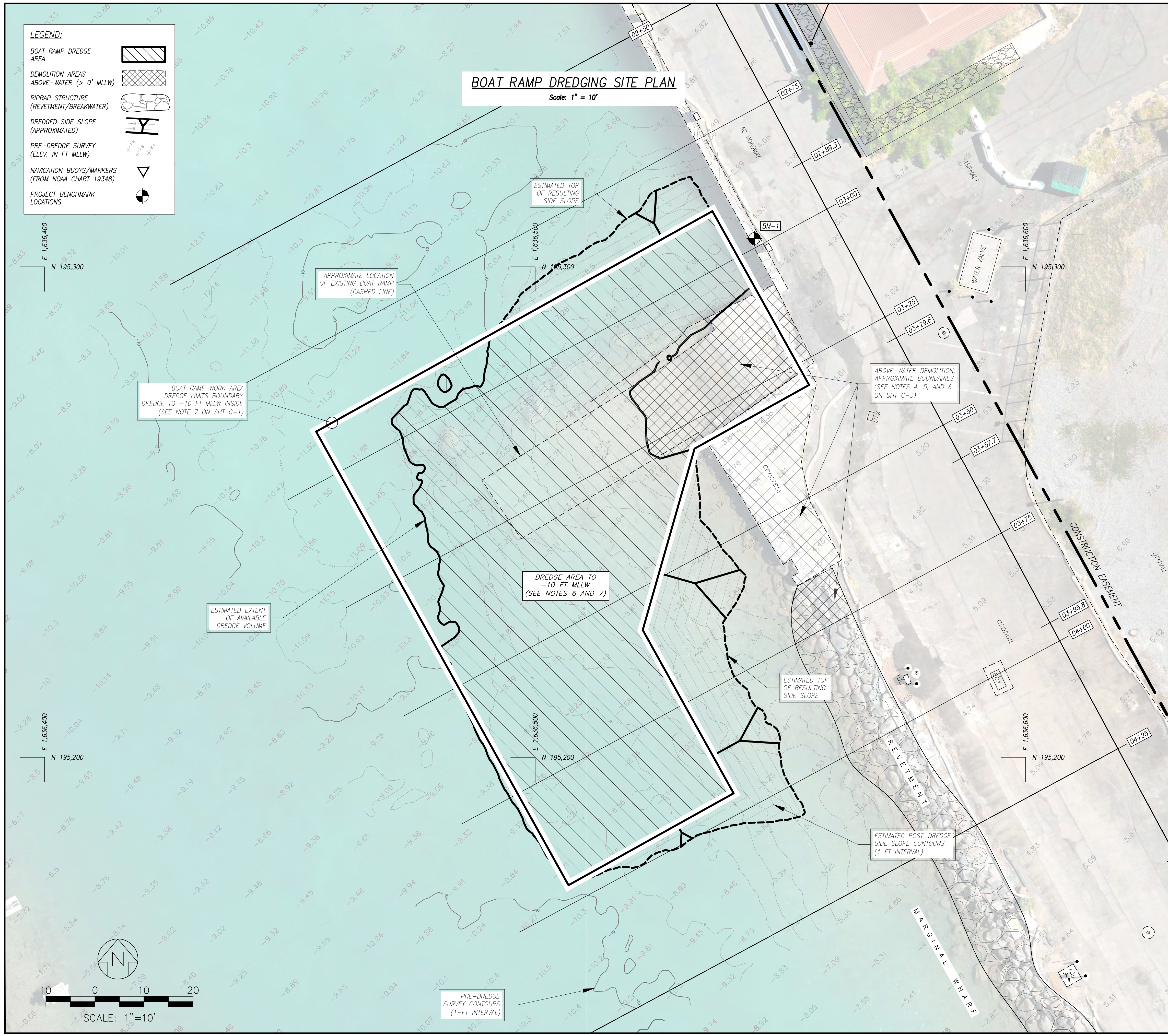
DESIGNED: CCG	SUBMITTED: N/A
DRAWN: CCG	DATE: 6 May 2026
CHECKED: GW	SCALE: 1 IN = 10 FT
APPROVED:	SHEET ID NO.
CHIEF ENGINEER	DATE

**C-2**

## BOAT RAMP DREDGING SITE PLAN

Scale: 1" = 10'

- LEGEND:**
- BOAT RAMP DREDGE AREA
  - DEMOLITION AREAS ABOVE-WATER (> 0' MLLW)
  - RIPRAP STRUCTURE (REVETMENT/BREAKWATER)
  - DREDGED SIDE SLOPE (APPROXIMATED)
  - PRE-DREDGE SURVEY (ELEV. IN FT MLLW)
  - NAVIGATION BUOYS/MARKERS (FROM NOAA CHART 1934B)
  - PROJECT BENCHMARK LOCATIONS



THIS WORK HAS BEEN PREPARED BY ME, OR UNDER MY SUPERVISION.

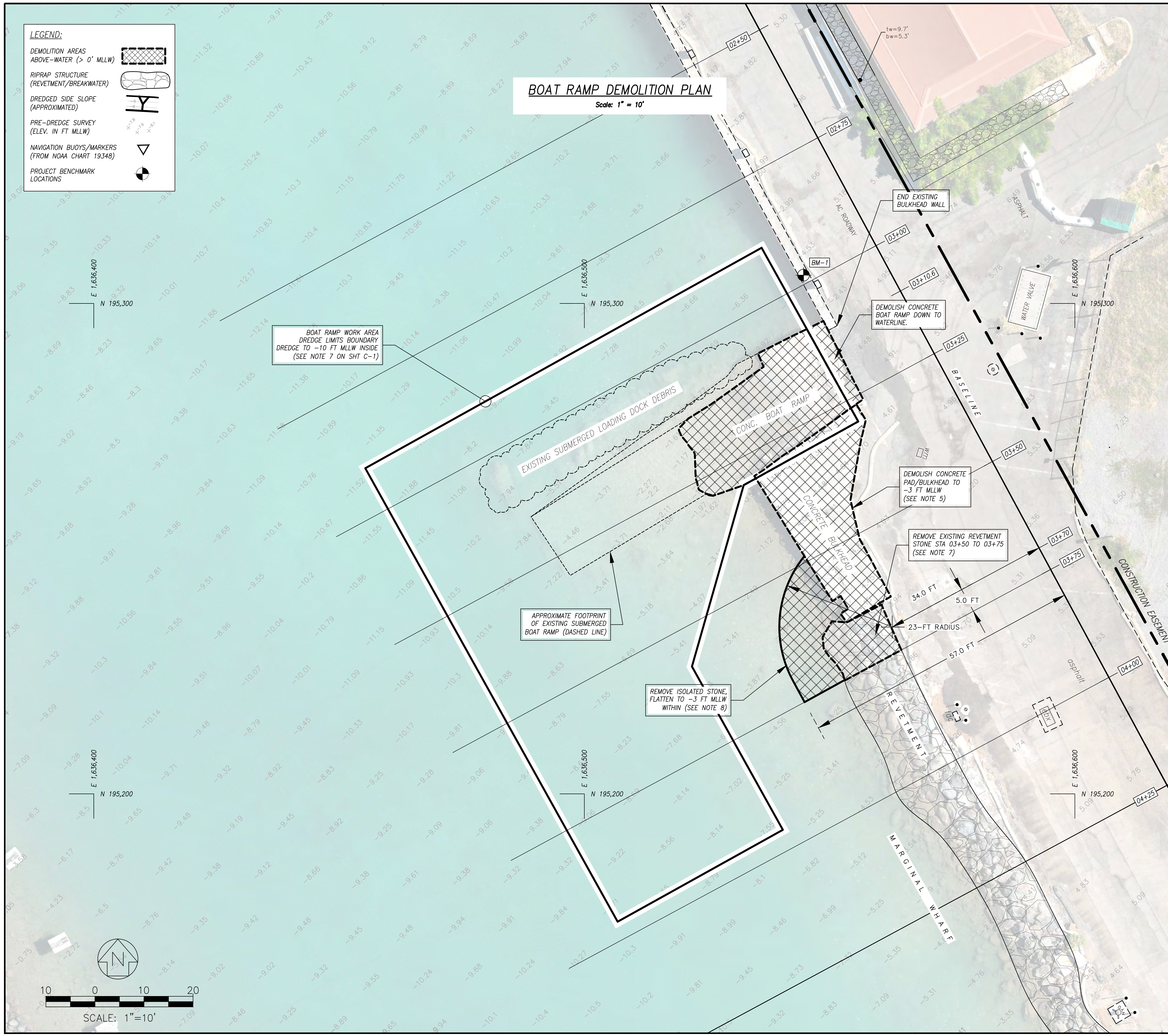
*Christopher C. Gody*  
30 April 2026  
DATE

**LEGEND:**

DEMOLITION AREAS ABOVE-WATER (> 0' MLLW)	
RIPRAP STRUCTURE (REVENMENT/BREAKWATER)	
DREDGED SIDE SLOPE (APPROXIMATED)	
PRE-DREDGE SURVEY (ELEV. IN FT MLLW)	
NAVIGATION BUOYS/MARKERS (FROM NOAA CHART 19348)	
PROJECT BENCHMARK LOCATIONS	

**BOAT RAMP DEMOLITION PLAN**

Scale: 1" = 10'



**DEMOLITION NOTES:**

- CONTRACTOR SHALL FIELD-VERIFY ALL EXISTING CONDITIONS, ELEVATIONS, AND STRUCTURE LOCATIONS PRIOR TO START OF DEMOLITION. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER.
- ALL DEMOLITION WORK SHALL BE PERFORMED WITHIN THE LIMITS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH ALL PERMITS AND ENVIRONMENTAL REQUIREMENTS.
- CONTRACTOR SHALL SUBMIT A DEMOLITION PLAN FOR ENGINEER REVIEW AND APPROVAL PRIOR TO COMMENCING WORK. PLAN SHALL INCLUDE PROPOSED METHODS, SEQUENCING, AND DEBRIS CONTROL MEASURES.
- ALL DRY PORTIONS OF EXISTING STRUCTURES DESIGNATED FOR REMOVAL, INCLUDING CONCRETE BOAT RAMP, PORTIONS OF BULKHEADS, APRONS, AND FOOTINGS, LOCATED ABOVE ELEV. 0.0 FT MLLW SHALL BE COMPLETELY DEMOLISHED AND REMOVED.
- CONCRETE PAD/BULKHEAD LOCATED OUTSIDE DREDGE LIMITS TO SOUTH OF RAMP SHALL BE COMPLETELY DEMOLISHED DOWN TO APPROXIMATELY -3 FT MLLW TO PROVIDE LEVEL BASE FOR NEW REVENMENT EXTENSION. SEE NOTE 7 THIS SHEET, ALSO SEE SHEET C-4 (REVENMENT EXTENSION PLAN).
- ALL MATERIAL BELOW ELEV. 0.0 FT MLLW WITHIN THE DREDGE TEMPLATE LIMITS SHALL BE REMOVED BY APPROVED DREDGING METHODS TO THE DESIGN DREDGE ELEVATION (SEE SHEET C-2).
- REMOVE EXISTING REVENMENT STONE BETWEEN STATION 03+50 AND 03+75 TO PREPARE FOR NEW REVENMENT EXTENSION (SEE SHEET C-4). SOME ADDITIONAL STONE BEYOND STA 03+75 MAY NEED TEMPORARY REMOVAL FOR STABILITY REASONS; THIS STONE SHALL BE RESET DURING REVENMENT EXTENSION CONSTRUCTION. GRADE EXPOSED UNDERLYING SLOPE TO 1V:1.5H, WITH LEVELED LANDING AT -3 FT MLLW. RECOVERED STONE MAY BE STOCKPILED FOR POTENTIAL REUSE IN REVENMENT EXTENSION (SEE NOTES 4, 5, AND 7 ON SHEET C-4).
- FOR SHORELINE AREA FRONTING CONCRETE PAD BETWEEN STA 03+50 AND 03+75, REMOVE EXISTING ISOLATED STONE AND DEBRIS DURING DEMOLITION AND FLATTEN HIGH AREAS DOWN TO -3 FT WITHIN THE REGION SHOWN ON THIS SHEET TO PROVIDE LEVEL BASE FOR REVENMENT EXTENSION.
- EXISTING BULKHEAD WALL NORTH OF RAMP SHALL BE PRESERVED.
- DEMOLITION OPERATIONS SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS, DUST, OR CONCRETE FRAGMENTS FROM ENTERING THE WATER. TURBIDITY CURTAINS OR OTHER CONTAINMENT MEASURES SHALL BE USED AS REQUIRED.
- THE CONTRACTOR SHALL ENSURE DEMOLITION AND DREDGING OPERATIONS ARE PROPERLY SEQUENCED TO MAINTAIN SAFE WORKING CONDITIONS AND TO PREVENT DEMOLITION DEBRIS FROM ENTERING THE DREDGE PRISM.
- ALL DEMOLISHED MATERIALS AND DEBRIS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF AT AN APPROVED UPLAND FACILITY. NO MATERIAL SHALL BE LEFT WITHIN THE HARBOR BASIN OR ALONG THE SHORELINE.
- CONTRACTOR SHALL LOCATE AND VERIFY ALL UTILITIES WITHIN THE PROJECT SITE PRIOR TO START OF WORK.
- ALL UTILITIES WITHIN THE DEMOLITION AREA SHALL BE DISCONNECTED, CAPPED, OR PROTECTED PRIOR TO DEMOLITION. CONTRACTOR SHALL COORDINATE WITH THE ENGINEER AND UTILITY AGENCIES AS NEEDED.
- CONTRACTOR SHALL PERFORM AND SUBMIT TO THE ENGINEER A POST-DEMOLITION SURVEY TO VERIFY COMPLETE REMOVAL OF STRUCTURES TO THE REQUIRED LIMITS PRIOR TO COMMENCEMENT OF CONSTRUCTION OR DREDGING ACTIVITIES.
- CONTRACTOR SHALL MAINTAIN SAFE WORKING CONDITIONS AND SHALL PREVENT DAMAGE TO ADJACENT STRUCTURES OR FACILITIES DURING DEMOLITION AND DREDGING OPERATIONS.
- THE CONTRACTOR SHALL PROVIDE AT LEAST TWO WEEKS NOTICE TO THE LAHAINA SBH HARBOR MASTER/AGENT OR THEIR REPRESENTATIVE PRIOR TO START OF DEMOLITION ACTIVITIES.
- USE OF HARBOR FACILITIES, INCLUDING PIERS, WHARVES, RAMPS, LOADING DOCKS, ETC., SHALL BE COORDINATED WITH AND APPROVED BY THE LAHAINA SBH HARBOR MASTER OR THEIR DESIGNATED AGENT PRIOR TO START OF WORK. CONTRACTOR SHALL STAY WITHIN LOAD LIMITS OF ALL EXISTING HARBOR FACILITIES AND WATERFRONT STRUCTURES. ANY DAMAGE TO EXISTING FACILITIES RESULTING FROM CONTRACTOR OPERATIONS SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.

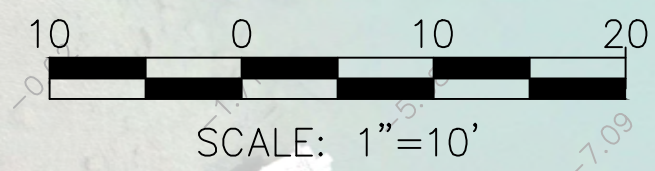
**HYDROGRAPHIC SURVEY NOTES:**

- HYDROGRAPHIC SURVEY COMPLETED 01 JULY 2024 BY SEA ENGINEERING, USING R2SONIC 2020 MULTIBEAM AND SBG EKINOX INERTIAL NAVIGATION SYSTEMS. BASEMAP FEATURES ARE APPROXIMATE.
- SOUNDINGS ARE SHOWN AS ELEVATIONS IN FEET AND TENTHS REFERENCED TO THE MEAN LOWER LOW WATER (MLLW) TIDAL DATUM PUBLISHED FOR KAHULUI HARBOR.
- GRID COORDINATES GIVEN IN HAWAII STATE PLANE, ZONE 2, US SURVEY FEET, NAD83(PA11).

**TOPOGRAPHIC SURVEY NOTES:**

- AERIAL PHOTOGRAPH POSITIONS AND SHORELINE FEATURES MAPPED FROM THE AERIAL IMAGE ARE APPROXIMATE. IMAGERY DATE: 15 AUGUST 2025.

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION  <b>LAHAINA SMALL BOAT HARBOR            RAMP REMOVAL &amp; BULKHEAD WALL EXTENSION</b>  <b>DEMOLITION SITE PLAN, BOAT RAMP AREA</b>					
DESIGNED: CCG			SUBMITTED: N/A		
DRAWN: CCG			DATE: 6 May 2026		
CHECKED: GW			SCALE: 1 IN = 10 FT		
APPROVED:			SHEET ID NO. <b>C-3</b>		
CHIEF ENGINEER			DATE		



**LEGEND:**

RIPRAP STRUCTURE (REVETMENT/BREAKWATER)	
DREDGED SIDE SLOPE (APPROXIMATED)	
PRE-DREDGE SURVEY (ELEV. IN FT MLLW)	
NAVIGATION BUOYS/MARKERS (FROM NOAA CHART 19348)	
PROJECT BENCHMARK LOCATIONS	

**REVETMENT EXTENSION PLAN**

Scale: 1" = 10'

**CONSTRUCTION NOTES:**

- CONTRACTOR SHALL FIELD-VERIFY ALL EXISTING CONDITIONS, ELEVATIONS, AND STRUCTURE LOCATIONS PRIOR TO START OF CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER.
- THE REVETMENT SHALL BE EXTENDED IN-KIND UTILIZING THE TYPICAL SECTION FROM THE 1966 AS-BUILT PLANS (SEE INSET LOWER LEFT THIS SHEET). THE TYPICAL SECTION SHALL BE MODIFIED BY INCLUDING A GEOTEXTILE FILTER CLOTH/SCOUR APRON PLACED DIRECTLY OVER THE PREPARED NATIVE SLOPE AND BENEATH THE CRUSHED RUN FILTER BLANKET AS SHOWN. ADJACENT ROLLS OF GEOTEXTILE SHALL OVERLAP BY A MINIMUM OF 3 FT. AND SHALL EXTEND BEYOND THE TOE STONE BY A MINIMUM OF 3 FT. TOP END OF GEOTEXTILE SHALL BE ROLLED OVER FILTER BLANKET AND BENEATH FILTER LAYER AS SHOWN. GEOTEXTILE FILTER FABRIC SHALL BE PLACED IN ACCORDANCE WITH ASSOCIATED SPECIFICATIONS FOR GEOTEXTILES USED AS FILTERS.
- BUILD UP REQUIRED 1:1.5 SLOPE IN DEMOLISHED AREAS AS NEEDED WITH CRUSHED RUN.
- CRUSHED RUN FILTER BLANKET LAYER SHALL CONSIST OF 1-TO-3 INCH QUARRY RUN IN A LAYER 1-FT THICK AS SHOWN IN THE TYPICAL SECTION.
- FILTER LAYER (UNDERLAYER) STONE SHALL POSSESS A MEDIAN STONE WEIGHT OF  $W_{50} = 12.5$  LB (5.1-IN NOMINAL DIA.) AND SHALL BE PLACED IN A LAYER 1.5-FT THICK OVER THE FILTER BLANKET LAYER AS SHOWN IN THE AS-BUILT SECTION. STONE SIZE WITHIN THE FILTER LAYER SHALL HAVE THE FOLLOWING ALLOWABLE GRADATIONS:

$W_{100}$	25.0 LB	$D_{100}$	6.5 IN
$W_{85}$	18.8 LB	$D_{85}$	5.9 IN
$W_{50}$	12.5 LB	$D_{50}$	5.1 IN
$W_{15}$	6.3 LB	$D_{15}$	4.1 IN
$W_0$	1.3 LB	$D_0$	2.4 IN
- ARMOR (COVER) LAYER STONE SHALL POSSESS A MEDIAN STONE WEIGHT OF  $W_{50} = 333$  LB (1.3 FT NOMINAL DIA.). ARMOR STONE SHALL BE INSTALLED IN A 2-FT THICK LAYER AS SHOWN IN THE AS-BUILT TYPICAL SECTION. STONE SIZE WITHIN THE ARMOR LAYER SHALL HAVE THE FOLLOWING ALLOWABLE GRADATIONS:

$W_{max}$	417 LB	$D_{max}$	1.4 FT
$W_{50}$	333 LB	$D_{50}$	1.3 FT
$W_{min}$	250 LB	$D_{min}$	1.2 FT
- WITHIN THE ARMOR LAYER, LARGER STONES SHALL BE PLACED NEAR BOTTOM OF THE REVETMENT SLOPE. TOE STONES SHALL WEIGH WITHIN THE RANGE OF  $1.1W_{50}$  TO  $1.25W_{50}$ .
- STONE RECOVERED DURING DEMOLITION MAY BE REUSED IN THE NEW REVETMENT EXTENSION PROVIDED THAT EACH STONE MEETS THE SIZE, WEIGHT, AND QUALITY REQUIREMENTS SPECIFIED IN THESE PLANS AND ASSOCIATED SPECIFICATIONS. ALL STONE PROPOSED FOR REUSE SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE ENGINEER PRIOR TO PLACEMENT. ANY STONE DETERMINED TO BE UNSUITABLE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF APPROPRIATELY.
- REVETMENT CONSTRUCTION SHALL START AT STATION 03+75 AND WORK TOWARD STATION 03+50 (SOUTH TO NORTH). CONSTRUCTION ACTIVITIES SHALL PROCEED IN APPROXIMATELY 10-FOOT SEQUENTIAL INCREMENTS, WITH EACH INCREMENT INCLUDING CLEARING, EXCAVATING, FILLING, GRADING, SALVAGED MATERIAL STOCKPILING, SLOPE PREPARATION, GEOTEXTILE FILTER FABRIC PLACEMENT, UNDERLAYER STONE PLACEMENT, AND ARMOR STONE PLACEMENT. CRUSHED RUN AND FILTER LAYER STONE PLACEMENT SHALL NOT ADVANCE MORE THAN 10 FEET AHEAD OF ARMOR STONE PLACEMENT.
- NEW REVETMENT CREST ELEVATION SHALL FOLLOW THAT OF EXISTING REVETMENT AT APPROXIMATELY +5 FT MLLW. REVETMENT TYPICAL SECTION INCLUDES A CREST WIDTH OF 8 FT, WITH THE ARMOR LAYER SLOPING DOWN AT 1V:1.5H TO NOMINAL TOE ELEVATION AT -3 FT MLLW, WITH AN APPROXIMATE HORIZONTAL SLOPE WIDTH OF 12 FT AS SHOWN IN THE AS-BUILT SECTION ON THIS SHEET.
- NEW REVETMENT SHALL EXTEND TYPICAL SECTION IN A STRAIGHT ALIGNMENT PARALLEL TO BASELINE FROM STA 03+75 TO 03+69.8.
- AT STATION 03+69.8, BEGIN WRAP REVETMENT SECTION 90 DEGREES CLOCKWISE (WESTWARD) INTO THE SHORELINE, AND TIE BACK INTO THE EMBANKMENT. FOR END TIE-BACK CONSTRUCTION, EXCAVATE THE SHORELINE AS NECESSARY TO CONSTRUCT THE FULL ROTATED REVETMENT SECTION, WHICH WILL TERMINATE BY ABUTTING AGAINST NEW BULKHEAD WALL AS SHOWN.
- REVETMENT CREST SHALL TERMINATE AT STA 03+62, WHERE THE STRUCTURE WILL THEN SLOPE DOWN TO TOE ELEVATION AT -3 FT MLLW ALONG THE NEW BULKHEAD AS PART OF THE END TIE-BACK.
- SOUTHERN TERMINATION OF EXISTING BULKHEAD WALL IS LOCATED AT APPROXIMATELY STA 03+10.6. NEW BULKHEAD WALL SHALL EXTEND AN ADDITIONAL 17.6 FT TO STA 03+28.1 AS SHOWN, MAINTAINING A 16.6 FT DISTANCE FROM BASELINE. AT THIS LOCATION, THE WALL SHALL TURN 39.6° SOUTHWARD AND RUN TO STA 03+49.4 ENDING AT A DISTANCE OF 34.0 FT FROM BASELINE. THE FINAL LEG OF WALL EXTENSION SHALL THEN REMAIN PARALLEL TO BASELINE AND TERMINATE AT STA 03+75. SEE STRUCTURAL SHEETS S-1 THROUGH S-5 FOR NEW BULKHEAD WALL EXTENSION PLAN, SECTION, DETAILS, AND NOTES.
- THE CONTRACTOR SHALL PROVIDE AT LEAST TWO WEEKS NOTICE TO THE LAHAINA SBH HARBOR MASTER/AGENT OR THEIR REPRESENTATIVE PRIOR TO START OF CONSTRUCTION ACTIVITIES.
- USE OF HARBOR FACILITIES, INCLUDING PIERS, WHARVES, RAMPS, LOADING DOCKS, ETC., SHALL BE COORDINATED WITH AND APPROVED BY THE LAHAINA SBH HARBOR MASTER OR THEIR DESIGNATED AGENT PRIOR TO START OF WORK. CONTRACTOR SHALL STAY WITHIN LOAD LIMITS OF ALL EXISTING HARBOR FACILITIES AND WATERFRONT STRUCTURES. ANY DAMAGE TO EXISTING FACILITIES RESULTING FROM CONTRACTOR OPERATIONS SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.
- ALL STONE SHALL HAVE A MINIMUM SPECIFIC GRAVITY OF 2.5 AND SHALL BE DENSE, DURABLE, FREE OF CRACKS AND DEFECTS, CLEANED OF SOIL AND OTHER CONTAMINANTS, AND OF SUITABLE QUALITY AS TO ENSURE PERMANENCE IN THE STRUCTURE.

**HYDROGRAPHIC SURVEY NOTES:**

- HYDROGRAPHIC SURVEY COMPLETED 01 JULY 2024 BY SEA ENGINEERING, USING R2SONIC 2020 MULTIBEAM AND SBG KINEXX INERTIAL NAVIGATION SYSTEMS. BASEMAP FEATURES ARE APPROXIMATE.
- SOUNDINGS ARE SHOWN AS ELEVATIONS IN FEET AND TENTHS REFERENCED TO THE MEAN LOWER LOW WATER (MLLW) TIDAL DATUM PUBLISHED FOR KAHULUI HARBOR.
- GRID COORDINATES GIVEN IN HAWAII STATE PLANE, ZONE 2, US SURVEY FEET, NAD83(PA11).

**TOPOGRAPHIC SURVEY NOTES:**

- AERIAL PHOTOGRAPH POSITIONS AND SHORELINE FEATURES MAPPED FROM THE AERIAL IMAGE ARE APPROXIMATE. IMAGERY DATE: 15 AUGUST 2025.
- IMAGERY ON THIS SHEET IN VICINITY OF BOAT RAMP HAS BEEN DIGITALLY ALTERED TO APPROXIMATE EXPECTED POST-CONSTRUCTION APPEARANCE. ALTERED IMAGERY IS FOR REFERENCE ONLY.

REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION

LAHAINA SMALL BOAT HARBOR  
RAMP REMOVAL & BULKHEAD WALL EXTENSION

REVETMENT EXTENSION PLAN, BOAT RAMP AREA

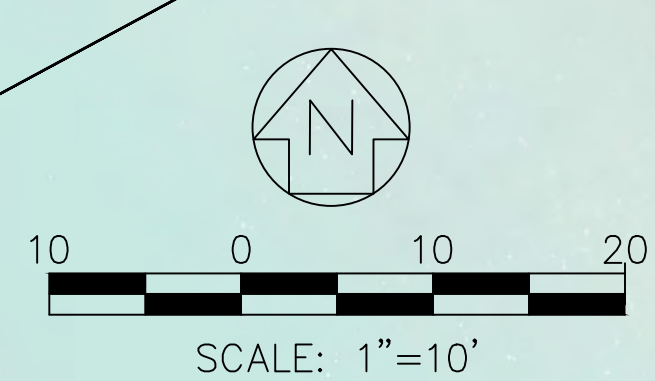
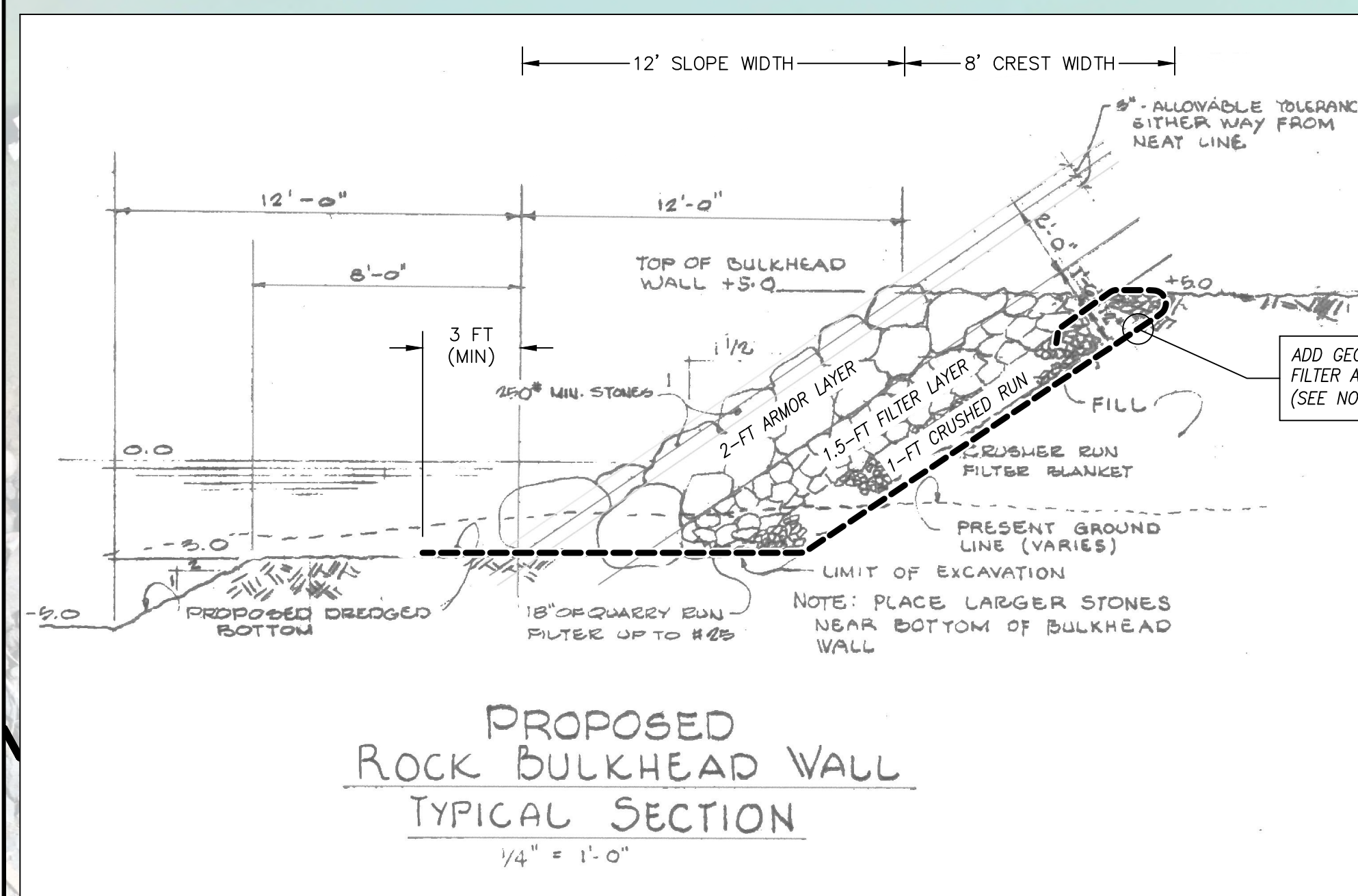
DESIGNED: CCG	SUBMITTED: N/A
DRAWN: CCG	DATE: 6 May 2026
CHECKED: GW	SCALE: 1 IN = 10 FT
APPROVED:	DATE: 30 April 2028

CHIEF ENGINEER	DATE
----------------	------

SHEET ID NO.  
**C-4**

**REVETMENT EXTENSION TYPICAL SECTION - FROM 1966 AS-BUILT PLANS**

Scale: 1/4" = 1'



BOAT RAMP WORK AREA  
DREDGE LIMITS BOUNDARY  
DREDGE TO -10 FT MLLW INSIDE  
(SEE NOTE 7 ON SHT C-1)

END EXISTING BULKHEAD WALL  
START NEW EXTENSION

APPROXIMATE ALIGNMENT OF NEW  
BULKHEAD WALL EXTENSION  
(SEE NOTE 14)

BOAT RAMP WORK AREA  
DREDGE TO -10 FT MLLW

NEW REVETMENT  
END TIE-BACK  
(SEE NOTE 12)

APPROXIMATED POST-  
DREDGE SIDE SLOPE  
CONTOURS

NEW REVETMENT  
EXTENSION  
(SEE NOTE 11)

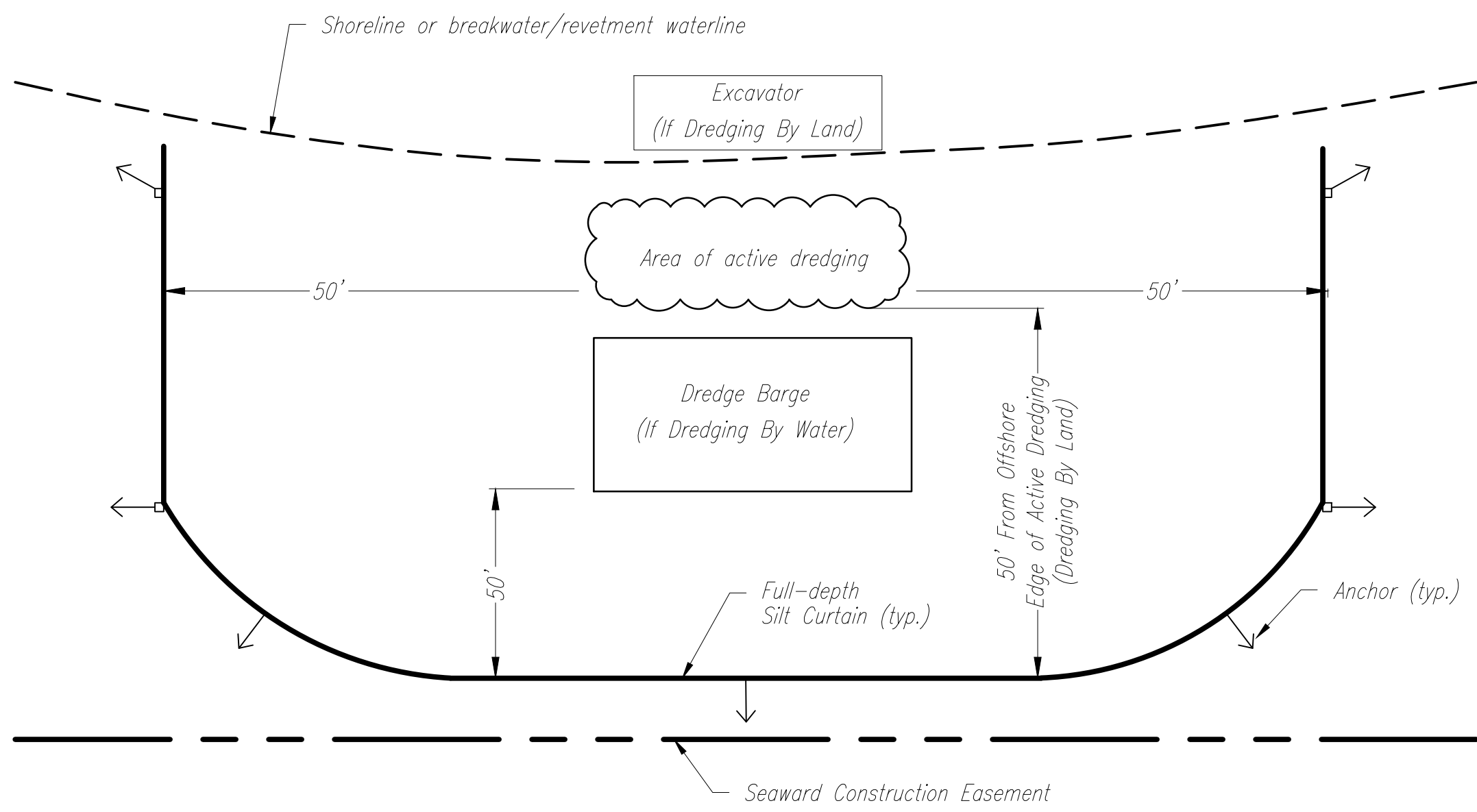
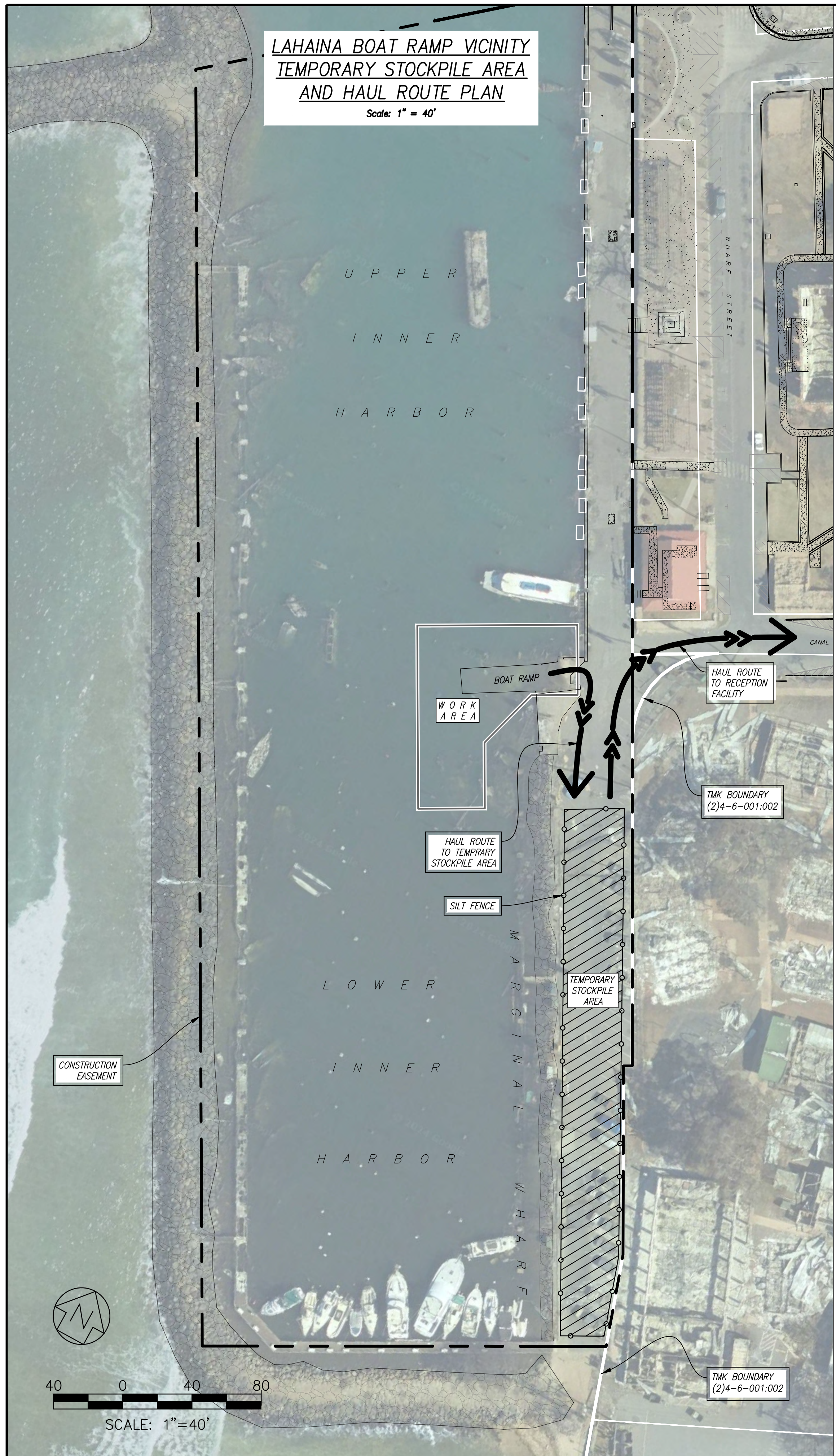
INFERRED CREST  
BREAKLINE FROM 1966  
AS-BUILT PLANS

APPROXIMATE EXISTING  
WATERLINE FROM  
TOPOGRAPHIC SURVEY

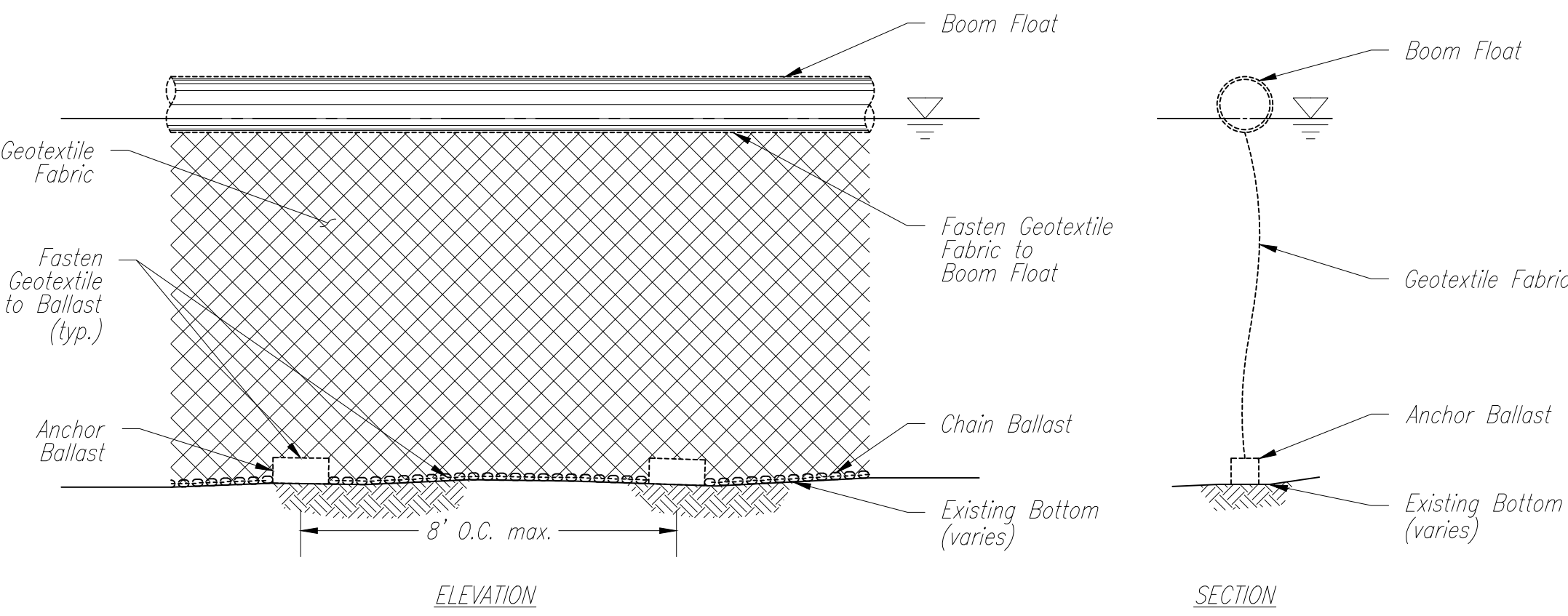
INFERRED EXISTING  
TOE-LINE FROM 1966  
AS-BUILT PLANS

ADD GEOTEXTILE  
FILTER APRON  
(SEE NOTE 2)

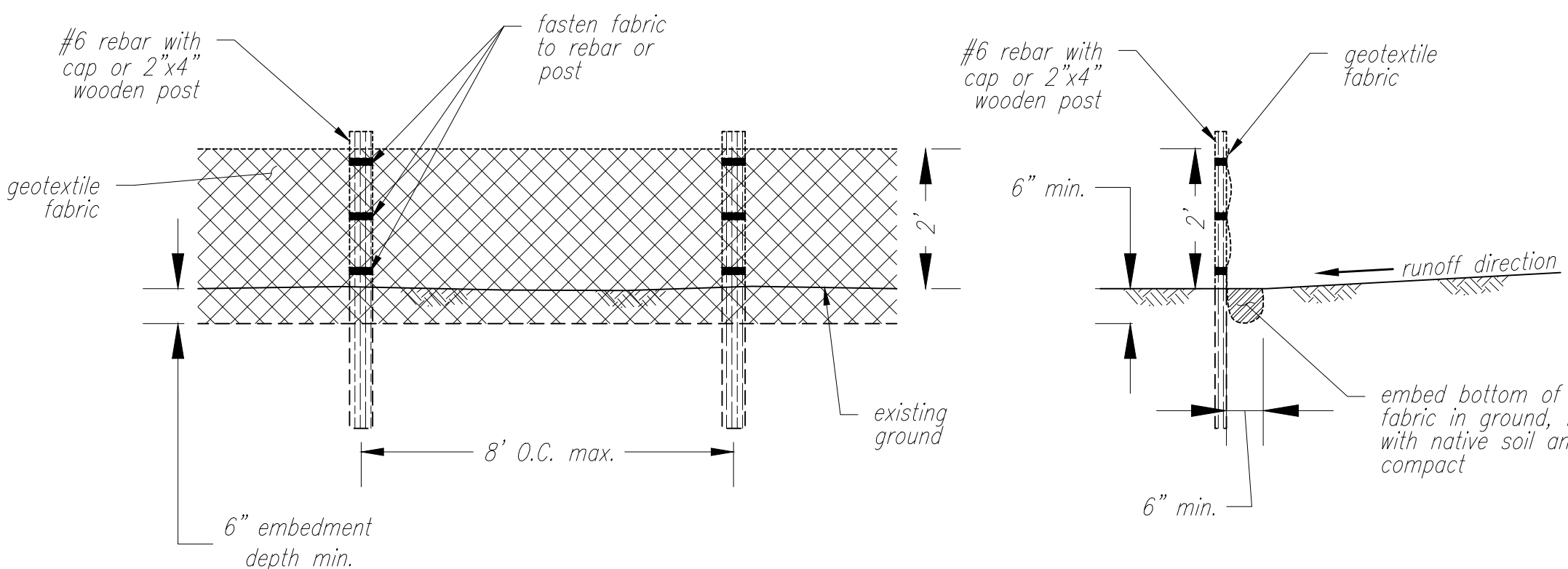
**LAHAINA BOAT RAMP VICINITY  
TEMPORARY STOCKPILE AREA  
AND HAUL ROUTE PLAN**  
Scale: 1" = 40'



**SILT CURTAIN DEPLOYMENT DETAIL  
FOR ACTIVE DREDGING AREA(S)**  
SCALE: NTS



**TURBIDITY CONTAINMENT DEVICE DETAIL**  
Scale: NTS



**SILT FENCE DETAIL**  
Scale: NTS

**ENVIRONMENTAL NOTES:**

1. AN ENVIRONMENTAL PROTECTION PLAN SHALL BE SUBMITTED TO THE ENGINEER NO LATER THAN 2 WEEKS BEFORE COMMENCEMENT OF WORK. REFER TO PROJECT SPECIFICATIONS FOR DETAILED EPP REQUIREMENTS.
2. DREDGE SPOILS MAY BE TAKEN TO THE DESIGNATED ONSITE TEMPORARY STOCKPILE AREA FOR DEWATERING AND TEMPORARY STORAGE, UNTIL SUCH MATERIALS ARE TRANSPORTED TO THE FINAL RECEPTION AND DISPOSAL SITE(S). THE TEMPORARY STOCKPILE AND DEWATERING AREA IS LOCATED WITHIN TMK (2)4-6-001:002 IN THE VICINITY OF THE PARKING LOT ALONG THE MARGINAL WHARF AT THE SOUTHEAST EDGE OF THE TMK BOUNDARY. THE STOCKPILE AREA IS APPROXIMATELY 10,100 SQ.FT. IN SIZE. SEE "LAHAINA BOAT RAMP VICINITY TEMPORARY STOCKPILE AREA AND HAUL ROUTE PLAN" ON THIS SHEET.
3. THE CONTRACTOR SHALL USE THE PROVIDED HAUL ROUTE TO TRANSPORT DREDGE SPOILS FROM OFFLOAD SITE TO TEMPORARY STOCKPILE LOCATION, AND ONWARD TO THE FINAL RECEPTION FACILITY, AS SHOWN IN THE TEMPORARY STOCKPILE AREA AND HAUL ROUTE PLAN ON THIS SHEET. CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM THE ENGINEER BEFORE UTILIZING ALTERNATE DREDGE SPOILS TRANSPORT CONFIGURATIONS.
4. DREDGED MATERIAL SHALL BE DEWATERED BY PERCOLATION INTO THE GROUND OR BY EVAPORATION. DREDGED MATERIAL RETURN WATER SHALL NOT BE PERMITTED TO DRAIN INTO THE HARBOR OR NEARBY COASTAL WATERS OR OTHER NATURAL OR MAN-MADE WATERWAYS. DREDGED MATERIAL SHALL NOT BE STOCKPILED IN THE WATER.
5. SILT FENCING SHALL BE INSTALLED AROUND THE ENTIRE STOCKPILE AREA PERIMETER, AS SHOWN IN THE "TEMPORARY STOCKPILE AREA AND HAUL ROUTE PLAN" ON THIS SHEET.

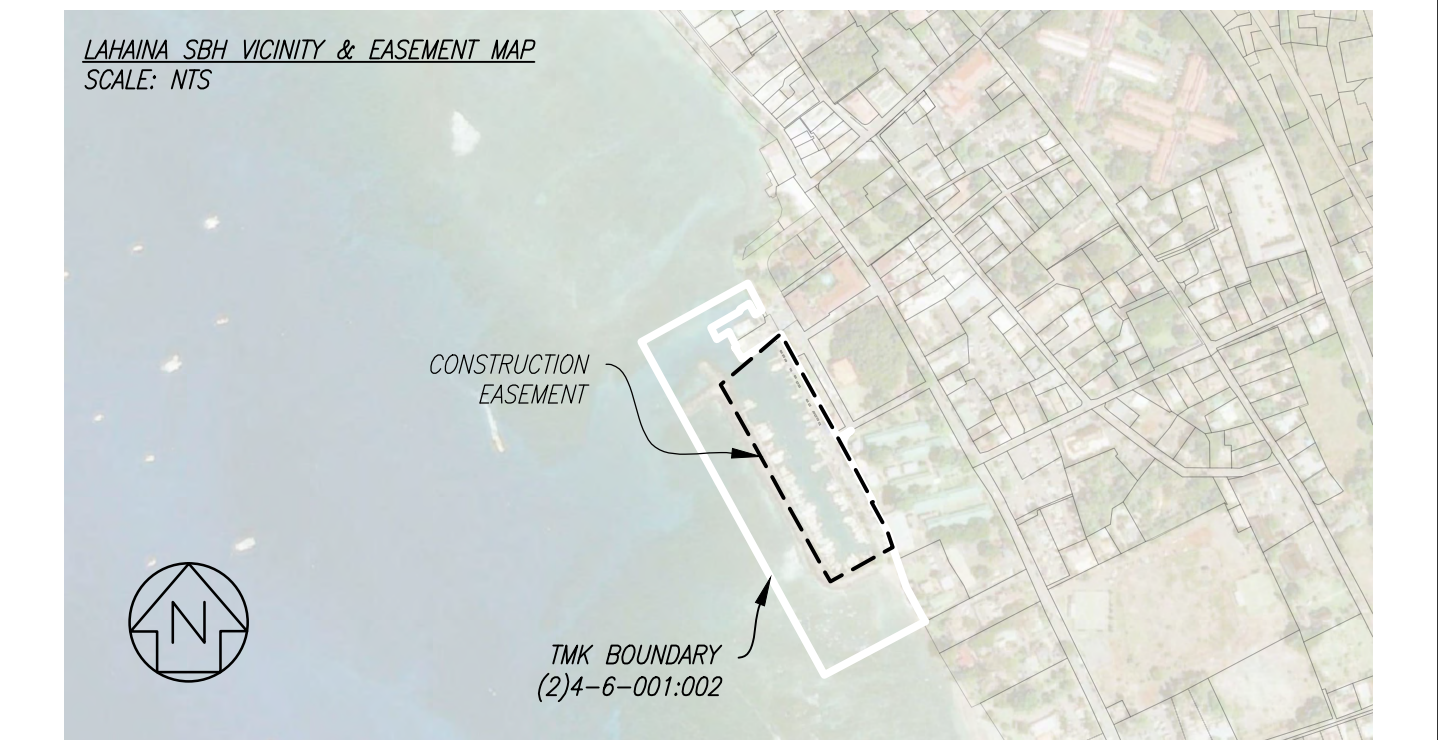
**BEST MANAGEMENT PRACTICES (BMP) NOTES:**


1. A BEST MANAGEMENT PRACTICES PLAN SHALL BE SUBMITTED TO THE ENGINEER NO LATER THAN 2 WEEKS BEFORE COMMENCEMENT OF WORK. REFER TO PROJECT SPECIFICATIONS FOR BMP CONTENT REQUIREMENTS.
2. TURBIDITY CONTAINMENT DEVICES (SILT CURTAINS) SHALL BE DEPLOYED IN THE WATER AROUND AREAS OF ACTIVE DREDGING, EXTENDING 50 FEET (MIN) FROM BOTH SIDES OF BARGE AND ACTIVE DREDGING, AS SHOWN IN THE SILT CURTAIN DEPLOYMENT DETAIL ON THIS SHEET. WHERE EXISTING HARBOR STRUCTURES AND/OR SHORELINE SHAPE LIMIT THIS DISTANCE, THE CONTRACTOR SHALL MAKE REASONABLE EFFORTS TO APPROXIMATE THIS CONFIGURATION.
3. TURBIDITY CONTAINMENT DEVICES (SILT CURTAINS) SHALL BE OF SUFFICIENT DESIGN, STRENGTH, AND SUITABILITY FOR THEIR INTENDED APPLICATION IN THE OCEAN ENVIRONMENT FOR EXTENDED PERIODS.
4. FLOATING TURBIDITY CONTAINMENT DEVICES SHALL GENERALLY BE COMPOSED OF A WATER SURFACE FLOATATION BOOM WITH A MINIMUM FREEBOARD OF 4 INCHES, A CURTAIN HANGING VERTICALLY TO THE REQUIRED DEPTH, BALLAST WEIGHT AT THE CURTAIN BOTTOM, AND SUFFICIENT ANCHORS TO MAINTAIN THE CURTAIN IN PLACE. TYPICAL CONFIGURATION PROVIDED IN TURBIDITY DEVICE CONTAINMENT DETAIL ON THIS SHEET.
5. THE FLOATING TURBIDITY CONTAINMENT DEVICE CURTAIN MATERIAL SHALL BE MONOFILAMENT WOVEN POLYPROPYLENE WITH THE FOLLOWING MINIMUM PHYSICAL REQUIREMENTS:

PROPERTY	VALUE	TEST METHOD
GRAB STRENGTH	200 LBS	ASTM D 4632
PUNCTURE	90 LBS	ASTM D 4833
TRAPEZOID TEAR	90 LBS	ASTM D 4533

PERVIOUS GEOTEXTILE CURTAIN MATERIAL SHALL HAVE A MAXIMUM APPARENT OPENING SIZE (AOS) AND PERCENT OPEN AREA (POA) CAPABLE OF RETAINING FINE SUSPENDED SEDIMENTS 0.004 MM OR LARGER IN DIAMETER.

6. A DESCRIPTION OF THE TURBIDITY CONTAINMENT DEVICE(S), THEIR MATERIALS AND DESIGN, AND THE PROPOSED DEPLOYMENT METHODOLOGY SHALL BE INCLUDED IN THE ENVIRONMENTAL PROTECTION PLAN AND APPROVED BY THE STATE PRIOR TO THEIR USE.
7. TURBIDITY CONTAINMENT DEVICES AND SILT FENCES SHALL BE INSPECTED DAILY, AND IMMEDIATELY REPAIRED OR REPLACED AS NECESSARY TO ENSURE THEIR EFFECTIVENESS.
8. A SILT FENCE SHALL BE INSTALLED AND MAINTAINED AROUND THE TEMPORARY STOCKPILE AREA AND EQUIPMENT/MATERIALS STAGING AREA(S).
9. SILT FENCE FILTER FABRIC SHALL BE MIRAFI SILT FENCE, AMOCO SILT STOP, OR APPROVED EQUIVALENT.
10. CONSTRUCTION ENTRANCES SHALL BE STABILIZED WHEREVER TRAFFIC WILL BE ENTERING OR LEAVING THE CONSTRUCTION SITE, TEMPORARY STOCKPILE AREA(S) AND STAGING AREA(S). IF THE ENTRANCE IS NOT PROPERLY PREVENTING SEDIMENT FROM BEING TRACKED ONTO PAVEMENT, THEN ALTERNATE MEASURES TO EFFECTIVELY KEEP THE STREET FREE OF SEDIMENT SHALL BE EMPLOYED.
11. ANY SEDIMENT THAT IS TRACKED ONTO PAVED ROADWAYS SHALL BE REMOVED BY SHOVELING OR STREET SWEEPING. THE SEDIMENT COLLECTED BY SWEEPING SHALL BE REMOVED OR STABILIZED ON SITE.
12. ANY GAPS/OPENINGS IN THE SILT FENCE SHALL BE CLOSED AT THE END OF EACH WORK DAY.



REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
<p>STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION</p> <p>LAHAINA SMALL BOAT HARBOR RAMP REMOVAL &amp; BULKHEAD WALL EXTENSION STOCKPILE AREA &amp; ENVIRONMENTAL CONTROLS</p>					
<p>DESIGNED: CCG</p> <p>DRAWN: CCG</p> <p>CHECKED: GW</p> <p>APPROVED: </p>			<p>SUBMITTED: N/A</p> <p>DATE: 6 May 2026</p> <p>SCALE: AS SHOWN</p> <p>DATE: _____</p>		
<p>THIS WORK HAS BEEN PREPARED BY ME, OR UNDER MY SUPERVISION.</p> <p>30 April 2028</p>					<p>SHEET ID NO. <b>C-5</b></p>



**GENERAL:**

- A. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE BUILDING CODE OF THE IBC 2018 WITH STATE AMENDMENTS. HOWEVER, WHERE REFERENCE IS MADE TO PERFORMANCE CONFORMING TO OTHER STANDARDS THE MORE STRINGENT SHALL APPLY.
- B. THE CONTRACTOR SHALL TAKE FIELD MEASUREMENTS AND VERIFY FIELD CONDITIONS AND SHALL COMPARE SUCH FIELD MEASUREMENTS AND CONDITIONS WITH THE DRAWINGS BEFORE COMMENCING THE WORK. REPORT IN WRITING TO THE ENGINEER ALL INCONSISTENCIES OR OMISSIONS.
- C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR METHODS OF CONSTRUCTION, WORK AND JOB SAFETY. THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING AND BRACING AS REQUIRED FOR STABILITY OF STRUCTURAL MEMBERS AND SYSTEMS.
- D. DETAILS NOTED AS TYPICAL ON STRUCTURAL DRAWINGS SHALL APPLY IN ALL CONDITIONS UNLESS SPECIFICALLY SHOWN OR NOTED OTHERWISE.
- E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK OF ALL TRADES.
- F. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF THE ADJACENT PROPERTIES, STRUCTURES, STREETS, AND UTILITIES DURING THE CONSTRUCTION PERIOD. ANY DAMAGE OR DETERIORATED PROPERTY SHALL BE RESTORED TO THE CONDITION PRIOR TO THE BEGINNING OF WORK OR BETTER AT NO COST TO THE STATE.

**DESIGN CRITERIA:**

- A. LIVE LOADS
  1. 1000 PSF
- B. SOILS
  1. EARTH PRESSURES
    - a. ACTIVE:
      - i. SATURATED UNRESTRAINED: 84.5 PCF
      - b. PASSIVE SATURATED: 92.5 PCF
  2. TIEBACK BOND STRENGTH: 400 PSF

**REINFORCING STEEL:**

- A. NEW REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A615, GRADE 60.
- B. CLEAR CONCRETE COVERAGE FOR REINFORCING BARS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:
  1. FOOTING, WALL, ETC. CAST AGAINST EARTH: ----- 3"
  2. FOOTING, WALL ETC. FORMED AND EXPOSED TO EARTH: ----- 2"
  3. WALL FACES EXPOSED TO EARTH OR WEATHER: ----- 2"
  4. ALL OTHERS: ----- 2"
- C. SPLICES:
  1. REINFORCING STEEL SHALL BE SPLICED ONLY WHERE INDICATED ON PLANS. PROVIDE LAP SPLICE LENGTH PER TYPICAL DETAILS AND SCHEDULE, UNLESS OTHERWISE NOTED.
  2. PLAIN WELDED WIRE FABRIC SHALL BE LAPPED 8 INCHES OR ONE FULL MESH PLUS 2 INCHES, WHICHEVER IS GREATER.
  3. DEFORMED WELDED WIRE FABRIC SHALL BE LAPPED 12 INCHES OR ONE FULL MESH PLUS 2 INCHES, WHICHEVER IS GREATER. THE OVERLAP MEASURED BETWEEN THE OUTMOST CROSS WIRES OF EACH FABRIC SHEET SHALL NOT BE LESS THAN 2.0 INCHES.
  4. OFFSET LAPS OF ADJOINING WELDED WIRE FABRIC SHEET WIDTHS TO PREVENT CONTINUOUS LAPS IN EITHER DIRECTION.
- D. BAR BENDS AND HOOK SHALL BE "STANDARD HOOKS" IN ACCORDANCE WITH ACI 318.

**FOUNDATION:**

- A. FOUNDATION DESIGN FOR TIEBACK ANCHORS IS BASED ON THE GEOTECHNICAL REPORT BY KOKUA GEOTECHNICAL DATED MAY 8, 2026.
- B. CONTRACTOR SHALL PROVIDE DESIGN AND INSTALLATION OF ALL CRIBBING, SHEETING, AND SHORING NECESSARY TO PRESERVE EXCAVATIONS AND EARTH BANKS. SHORING SHALL CONFORM TO OSHA REGULATIONS.
- C. EXCAVATIONS FOR STRUCTURES AND FOOTINGS SHALL BE APPROVED BY THE LICENSED GEOTECHNICAL ENGINEER IN STATE OF HAWAII (PROVIDED BY CONTRACTOR) PRIOR TO PLACEMENT OF CONCRETE AND REINFORCING.
- D. ENGINEERED FILL AND BACKFILL SHALL BE IN ACCORDANCE WITH SECTION 703.20 OF THE HAWAII STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2005 EDITION.
- E. FILL SHOULD BE MOISTURE CONDITIONED TO WITHIN TWO PERCENT OF THE OPTIMUM MOISTURE CONTENT AND PLACED IN HORIZONTAL LIFTS NOT TO EXCEED SIX INCHES. FILL SHALL BE COMPACTED TO MINIMUM 90% RELATIVE DENSITY AS MEASURED BY HDOT TM-100 AND HDOT TM-300.
- F. CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN AND INSTALLATION OF ALL SHORING REQUIRED TO PRESERVE EXCAVATIONS.

**CONCRETE:**

- A. CONCRETE CONSTRUCTION SHALL CONFORM TO AMERICAN CONCRETE INSTITUTE ACI 318.
- B. CONCRETE SHALL BE NORMAL WEIGHT AND SHALL HAVE THE FOLLOWING MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF 4000 PSI.
- C. ALL INSERTS, ANCHOR BOLTS, PLATES, ETC. EMBEDDED IN CONCRETE SHALL BE H.D. GALVANIZED UNLESS OTHER WISE NOTED.
- D. CONDUITS, PIPES, AND SLEEVES PASSING THROUGH CONCRETE AREA NOT CONFORMING TO TYPICAL DETAILS SHALL BE LOCATED AND SUBMITTED TO THE ENGINEER FOR APPROVAL.
- E. UNLESS OTHERWISE NOTED, CHAMFER ALL CONCRETE EDGES 3/4".
- F. CONCRETE DELIVERY TICKETS SHALL RECORD ALL FREE WATER IN THE MIX: AT BATCHING BY PLANT, FOR CONSISTENCY BY DRIVER, AND ANY ADDITIONAL REQUEST BY CONTRACTOR IF PERMITTED BY THE MIX DESIGN.
- G. REINFORCING BARS, ANCHOR BOLTS, INSERTS AND OTHER ITEMS TO BE CAST IN THE CONCRETE SHALL BE SECURED IN POSITION PRIOR TO PLACEMENT OF CONCRETE.
- H. WATER TO CEMENT RATIO SHALL NOT EXCEED 0.45.
- I. TREMIE CONCRETE SHALL BE INCLUDED FOR CONCRETE TO BE INSTALLED UNDERWATER.
- J. MAXIMUM AGGREGATE SIZE OF TREMIE CONCRETE SHALL NOT EXCEED 1/4" OF TREMIE PIPE DIAMETER.
- K. TREMIE CONCRETE SHALL BE INSTALLED WITHOUT INTERRUPTION.
- L. USE ANTI-WASH AGENT FOR CONCRETE POURED UNDERWATER.
- M. A CORROSION INHIBITING ADMIXTURE SHALL BE INCLUDED IN THE CONCRETE MIX FOR ALL CONCRETE. THE ADMIXTURE SHALL BE RHEOCRETE CNI CORROSION INHIBITOR FROM BASF, DCIS CORROSION INHIBITOR FROM GRACE CONSTRUCTION PRODUCTS OR AN APPROVED EQUAL. ADDITION OF CORROSION INHIBITING ADMIXTURE SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

**REINFORCING STEEL:**

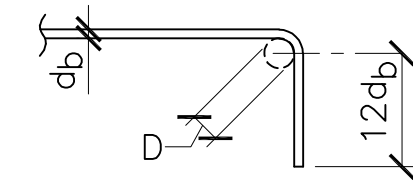
- A. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM A1035/A1035M GRADE 100.
- B. REINFORCING STEEL SHALL BE SPLICED WHERE INDICATED ON PLANS. PROVIDE LAP SPLICE LENGTH PER AASHTO LRFD. ANY LONGITUDINAL #4 BARS IN THE SLAB THAT NEEDS TO BE LAPPED FOR WHATEVER REASON SHOULD BE LAPPED AT LEAST 18 INCHES OR MECHANICALLY SPLICED.
- C. MECHANICAL SPLICE CONNECTORS SHALL DEVELOP IN TENSION 125 PERCENT OF THE SPECIFIED MINIMUM YIELD STRENGTH OF REINFORCING BARS.
- D. MINIMUM REINFORCEMENT BEND DIAMETERS SHALL COMPLY WITH AASHTO 5.10.2.3.

**STRUCTURAL STEEL**

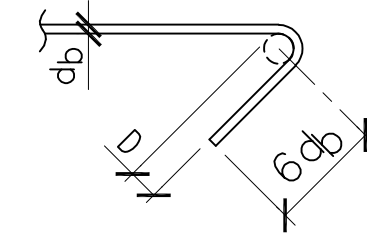
- A. FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION MANUAL OF STEEL CONSTRUCTION, FIFTEENTH EDITION.
- B. STRUCTURAL STEEL SHALL CONFORM TO ASTM A36 UNLESS OTHERWISE NOTED.
- C. STEEL WIDE FLANGE SECTIONS SHALL CONFORM TO ASTM A992.
- D. PLATES AND BARS SHALL CONFORM TO ASTM A36.
- E. WELDS AND WELDING PROCEDURES SHALL CONFORM TO THE STRUCTURAL WELDING CODE AWS D1.1 OF THE AMERICAN WELDING SOCIETY.
- F. WELDING SHALL BE PERFORMED BY WELDERS PREQUALIFIED FOR WELDING PROCEDURES TO BE USED.
- G. ALL ANCHOR BOLTS, PLATES, AND OTHER ITEMS TO BE CAST IN CONCRETE SHALL BE HOT-DIP GALVANIZED ACCORDING TO ASTM A153 UNLESS OTHERWISE NOTED.
- H. ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION ACCORDING TO ASTM A123.
- I. SHEET PILE SHALL CONFORM TO ASTM A690 GRADE 50 FOR MARINE USE.
- J. CONTRACTOR SHALL USE SHEET PILE SYSTEM AND CONNECTORS FROM A SINGLE MANUFACTURER.

MINIMUM SPLICE AND DEVELOPMENT LENGTHS					
BAR SIZE	CONCRETE STRENGTH = 4,000 PSI				
	LAP SPLICE		DEVELOPMENT		
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	WITH STANDARD HOOK
#4	34"	26"	26"	20"	10"
#5	42"	32"	32"	24"	12"

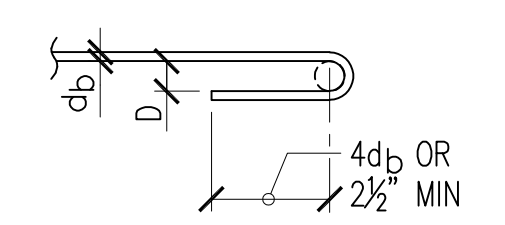
**NOTES:**  
 1. LENGTHS ARE FOR CONCRETE WITH REBAR SPACED AT 6 BAR DIAMETERS MINIMUM. INCREASE LENGTHS BY 25% FOR BARS SPACED LESS THAN 6 BAR DIAMETERS.  
 2. "TOP BARS" ARE HORIZONTAL BARS WITH 12" OR MORE OF CONCRETE CAST BELOW.



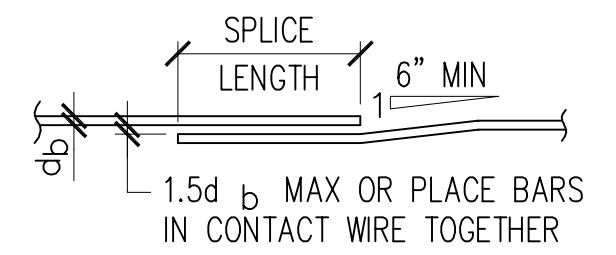
**90° BEND**



**135° BEND**



**180° BEND**



**BAR LAP**

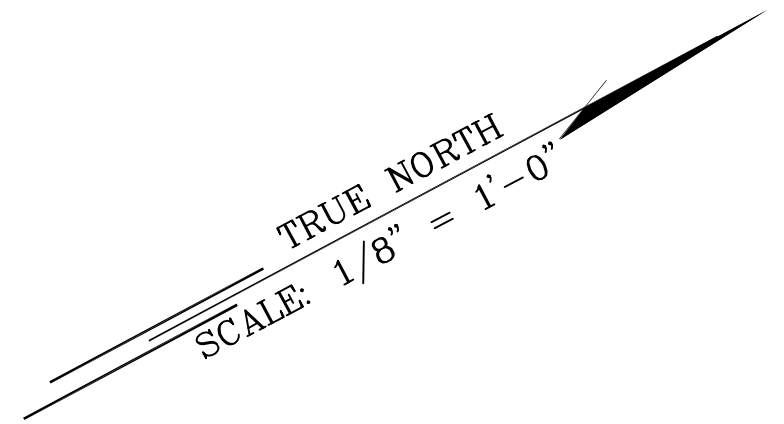
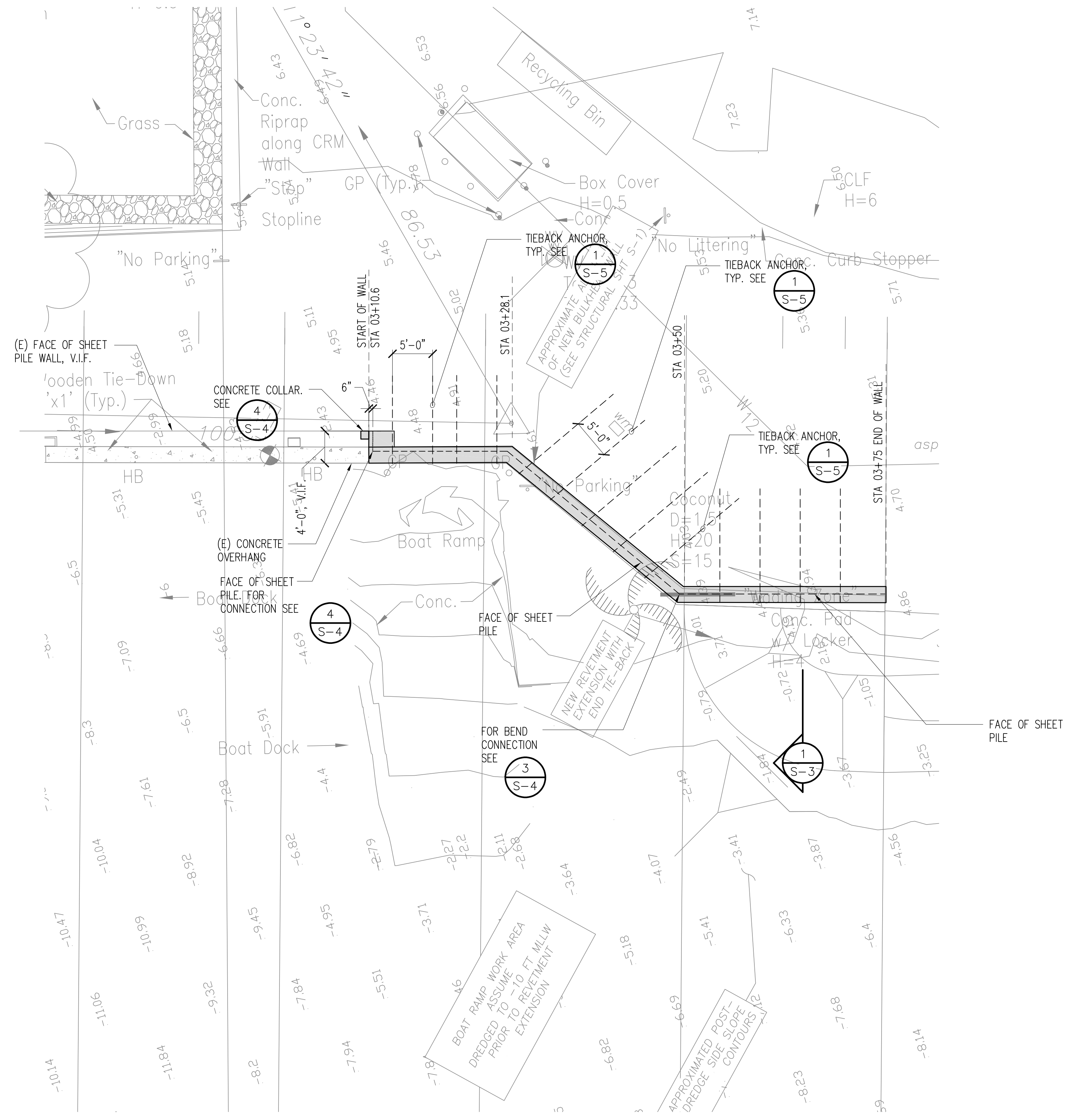
$D = 6d_b$  FOR #8 AND SMALLER

**TYPICAL REBAR SPLICE AND DEVELOPMENT LENGTH SCHEDULE**

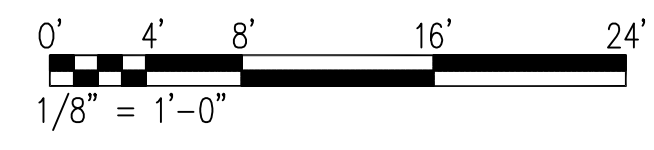
1  
S-1 NOT TO SCALE

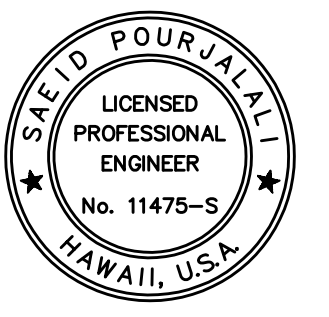
LEGEND	
(E)	EXISTING
V.I.F.	VERIFY IN FIELD
	INDICATES CONCRETE

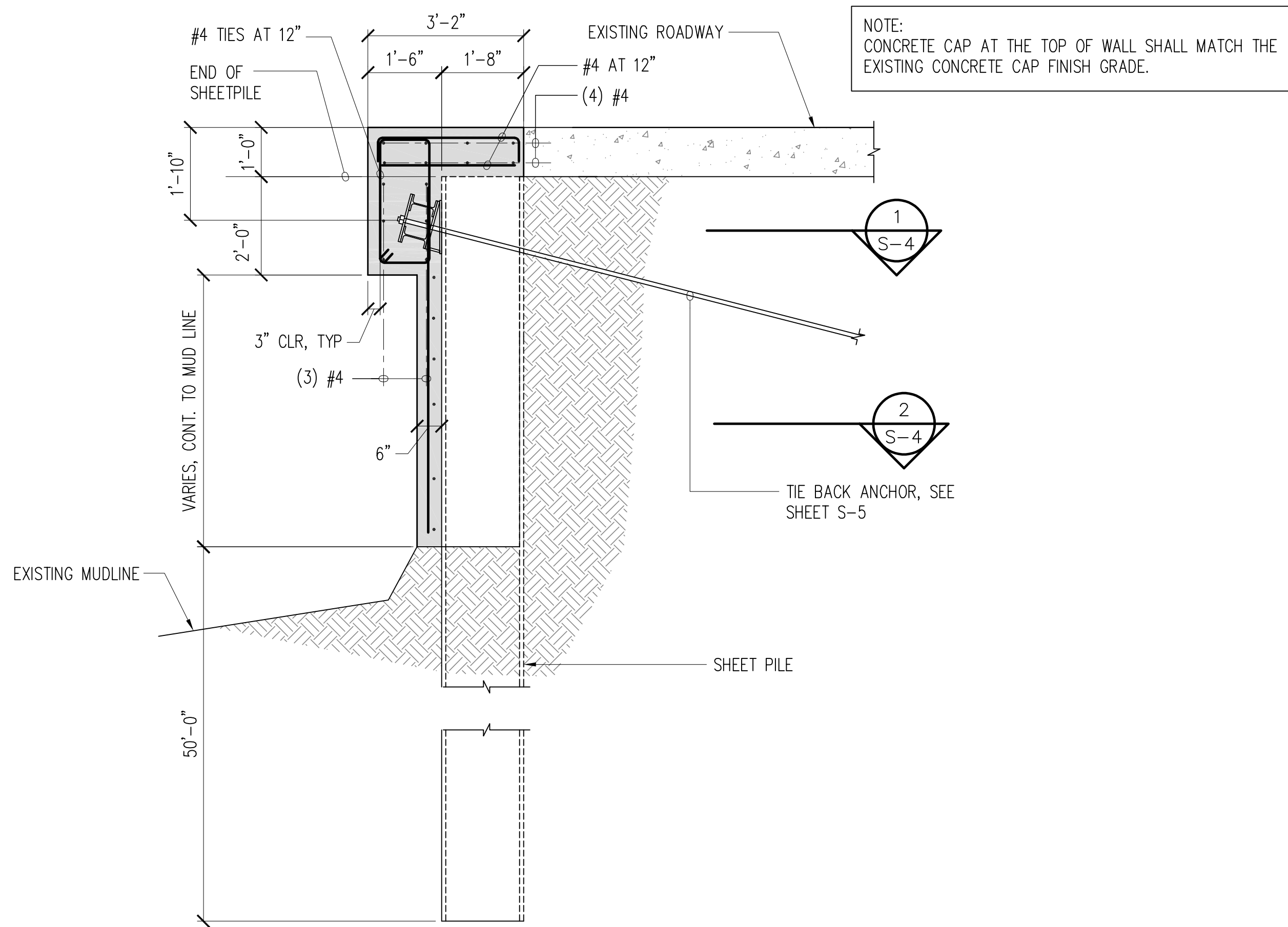
REVISION NO.	SYM.	DESCRIPTION	SHT./OF	DATE	APPROVED
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION LAHAINA SMALL BOAT HARBOR BOAT RAMP REMOVAL & BULKHEAD EXTENSION <b>STRUCTURAL NOTES</b>					
			DESIGNED: CS DRAWN: CAD CHECKED: SP APPROVED: _____ CHIEF ENGINEER		
SUBMITTED: DATE: 6 May 2026 SCALE: AS SHOWN			DRAWING NO. <b>S-1</b> DATE _____		



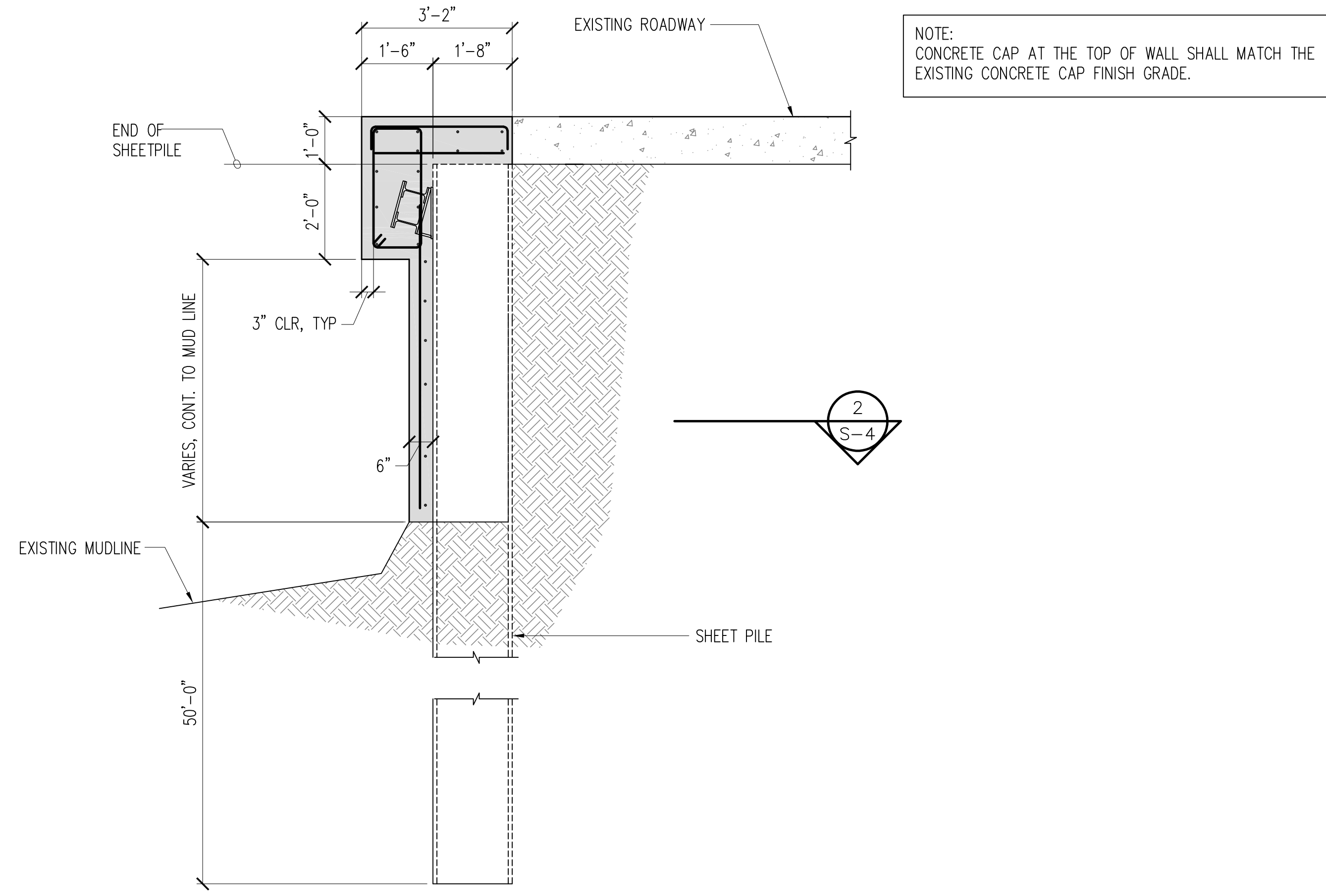
1 SHEET PILE PLAN VIEW  
 S-2 SCALE: 1/8" = 1'-0"



REVISION NO.	SYM.	DESCRIPTION	SHT. OF	DATE	APPROVED
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION					
LAHAINA SMALL BOAT HARBOR BOAT RAMP REMOVAL & BULKHEAD EXTENSION					
PLAN VIEW					
DESIGNED: CS			SUBMITTED:		
DRAWN: CAD			DATE: 6 May 2026		
CHECKED: SP			SCALE: AS SHOWN		
APPROVED:			DRAWING NO.		
CHIEF ENGINEER			DATE		
 <i>Said Pourjahan</i> <small>EXPIRATION DATE OF THE LICENSE 4/30/2028 THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION</small>			<b>S-2</b>		



1 TYPICAL SEA WALL SECTION AT TIEBACK  
S-3 SCALE: 1/2" = 1'-0"

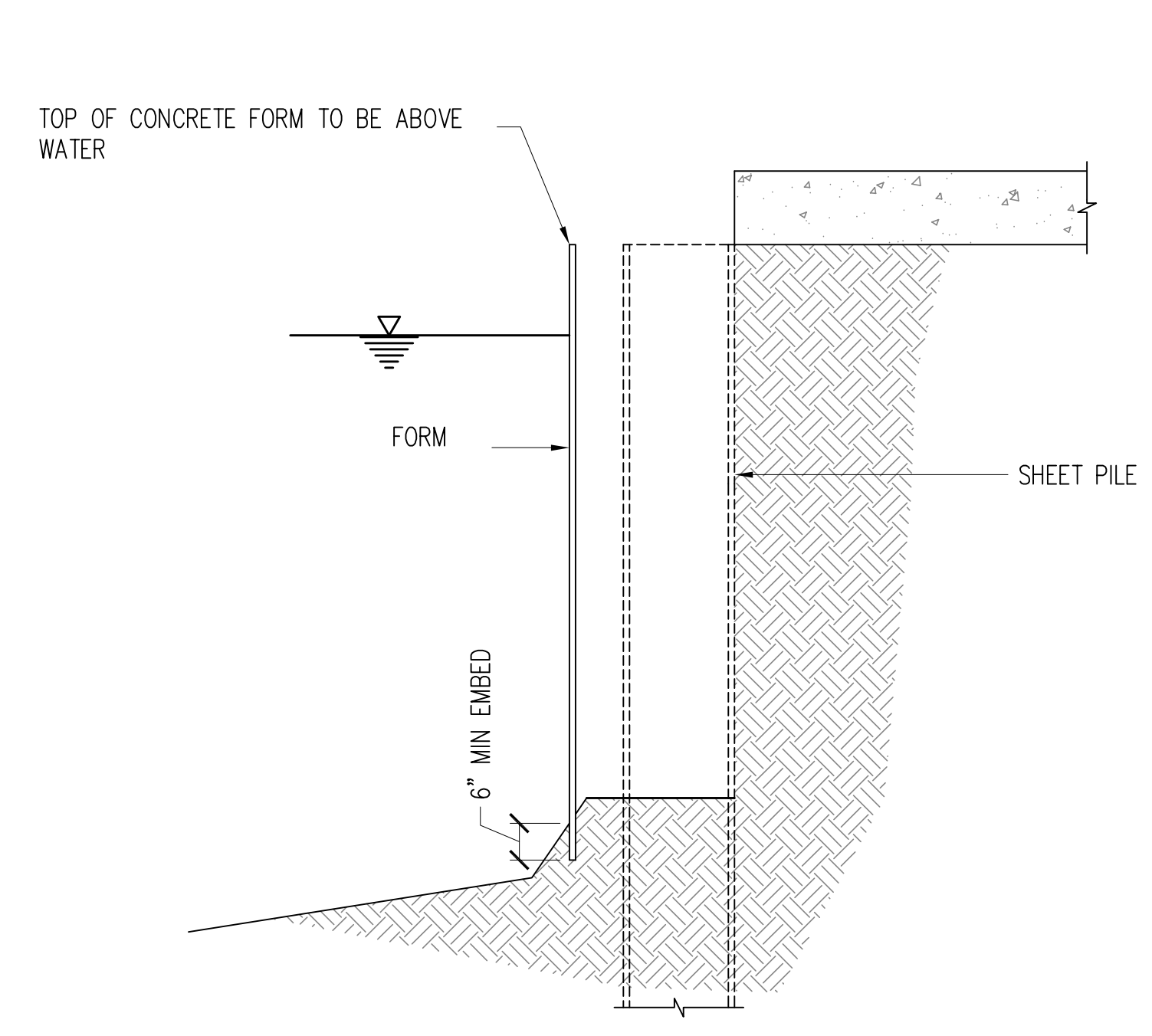


2 TYPICAL SEA WALL SECTION WITHOUT TIEBACK  
S-3 SCALE: 1/2" = 1'-0"

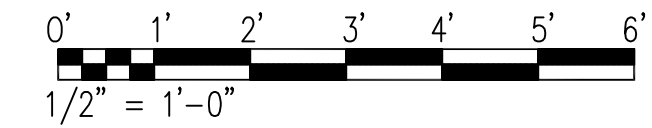
MINIMUM STEEL SHEET PILE PROPERTIES			
GRADE	PROPERTIES PER LINEAR FOOT OF WALL		
	SECTIONAL AREA IN <sup>2</sup> /FT	PLASTIC SECTION MODULUS IN <sup>3</sup> /FT	MOMENT OF INERTIA IN <sup>4</sup> /FT
ASTM 572, GRADE 60	11.00	81.57	697.3

- NOTES:
- SHEET PILE LAYOUT IS AN APPROXIMATE AND IS SHOWN FOR ILLUSTRATION PURPOSE. SHEET PILE LAYOUT WILL VARY BASED ON ACTUAL SHEET PILE CONFIGURATION AND INSTALLATION.
  - TIEBACK SPACING DIMENSION MAY BE SHIFTED PLUS OR MINUS 2" TO LOCATE TIEBACK NEAR CENTER OF SHEET PILE CROWN OR VALLEY. DIAGONAL TIEBACK SHALL BE ADJUSTED TO PENETRATE SHEET PILE AT EITHER FLANGE OR WEB, NOT BOTH. ENGINEER SHALL MAKE ADJUSTMENTS TO THE LAYOUT AND DETAILS AT NO ADDITIONAL COST TO THE STATE.
  - CONTRACTOR SHALL COORDINATE LAYOUT OF TIEBACK, SHEET PILE, AND DEADMAN TO MEET ALL DRAWING AND SPECIFICATION REQUIREMENTS.

3 SHEET PILE PROPERTIES  
S-3 SCALE: NOT TO SCALE



- NOTES:
- DEWATERING MAY BE REQUIRED AND SHALL BE INCLUDED IN THE COST OF CONCRETE INSTALLATION. CONTRACTOR SHALL NOT DISCHARGE THE DEWATERING EFFLUENT BACK INTO THE STREAM OR STORM DRAIN SYSTEM OR STATE RECEIVING WATER SYSTEM.
  - SEQUENCE OF CONSTRUCTION:
    - INSTALL BMPS
    - INSTALL SHEET PILING
    - LOCATE TIEBACK ON SHEET PILES
    - INSTALL TIEBACKS
    - INSTALL CONCRETE WALL WITH TREMIE CONCRETE PER PROVIDED DETAIL



4 SUGGESTED CONSTRUCTION SEQUENCE  
S-3 SCALE: 1/2" = 1'-0"

REVISION NO.	SYMBOL	DESCRIPTION	SHT. OF	DATE	APPROVED

SAID POURJAFARI  
LICENSED PROFESSIONAL ENGINEER  
No. 11475-S  
HAWAII, U.S.A.

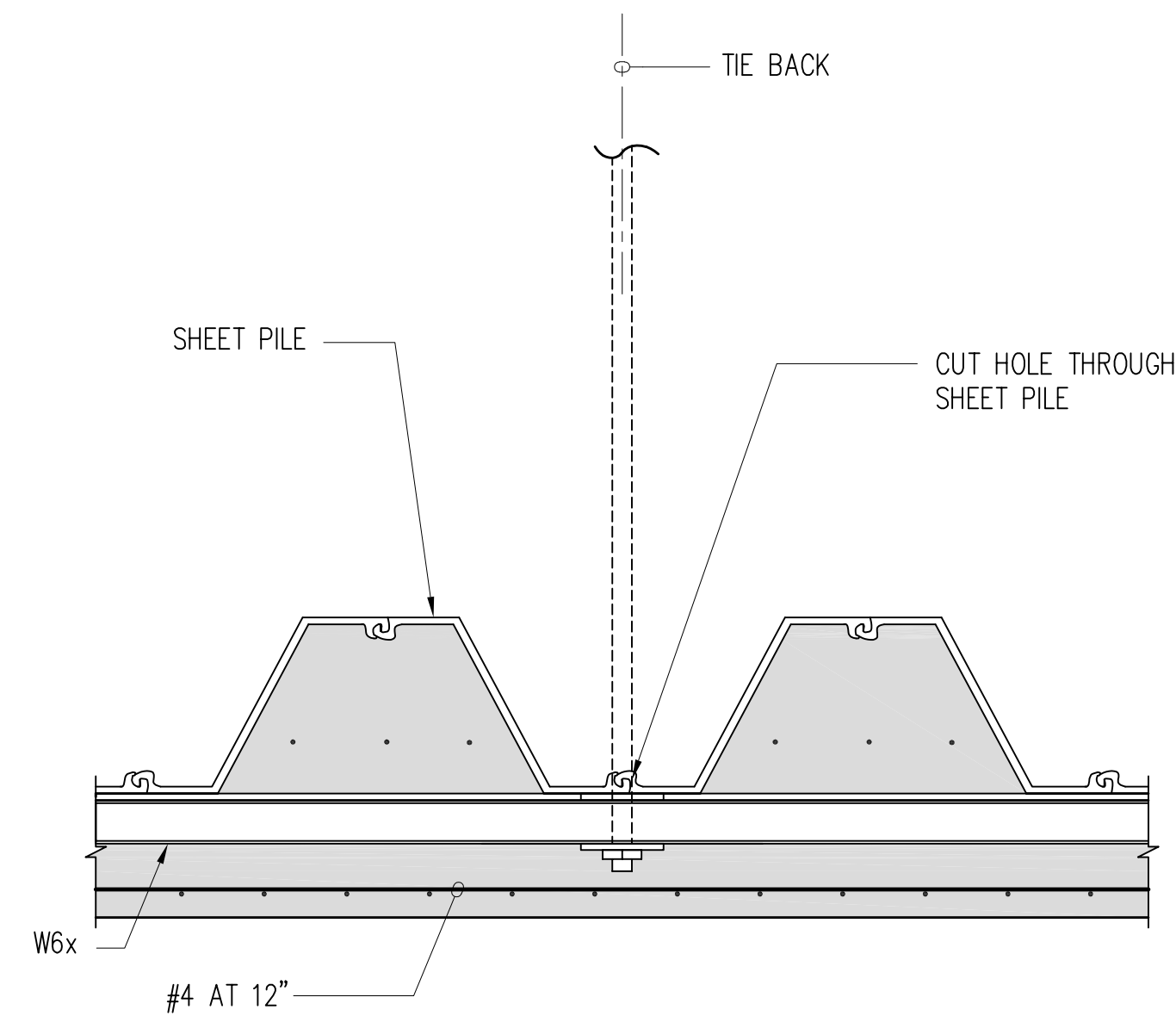
STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION

LAHAINA SMALL BOAT HARBOR BOAT RAMP  
REMOVAL & BULKHEAD EXTENSION

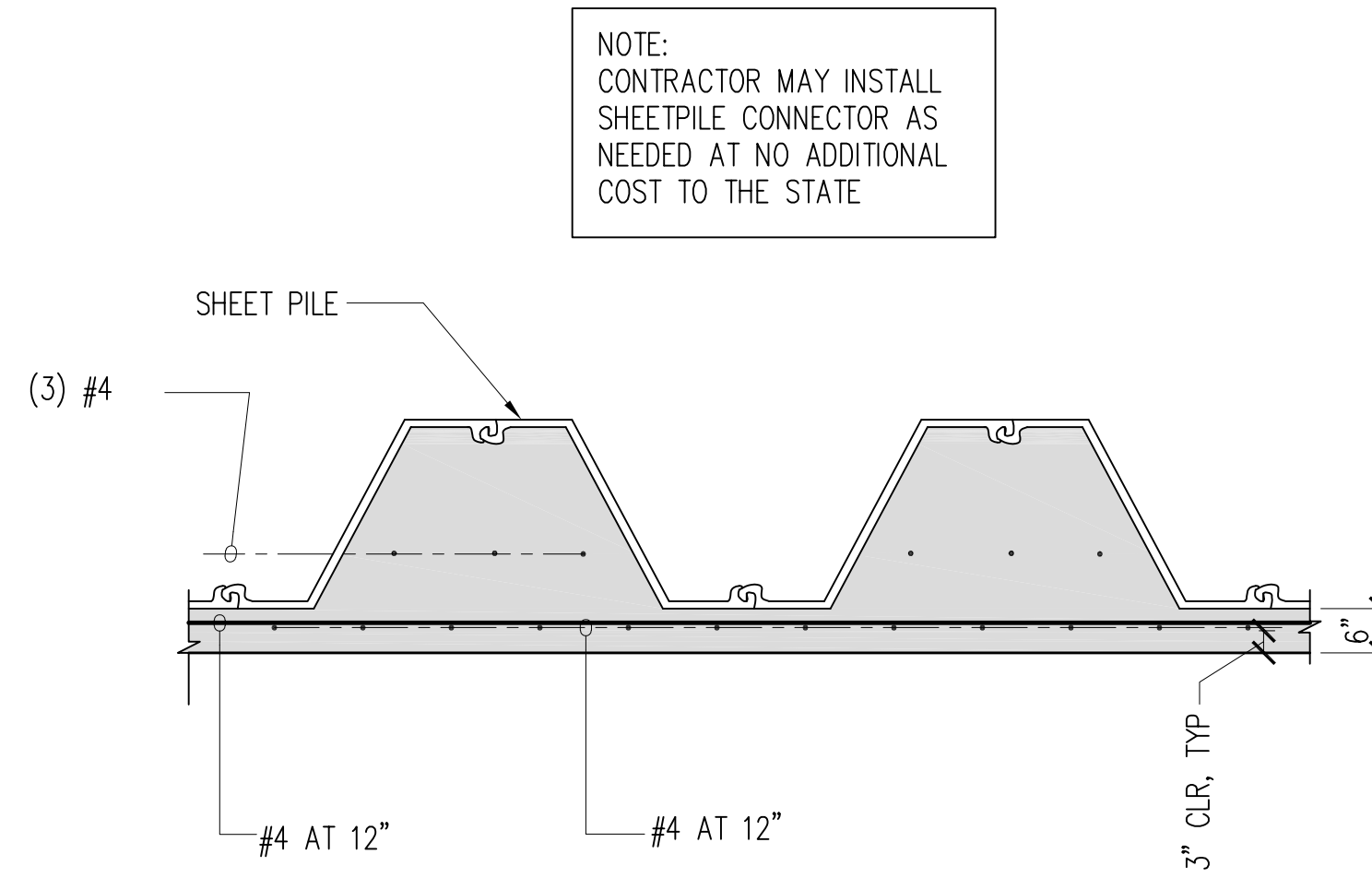
SEA WALL SECTION

DESIGNED: CS	SUBMITTED:
DRAWN: CAD	DATE: 6 May 2026
CHECKED: SP	SCALE: AS SHOWN
APPROVED:	DRAWING NO.
CHIEF ENGINEER	S-3

EXPIRATION DATE OF THE LICENSE 4/30/2028  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

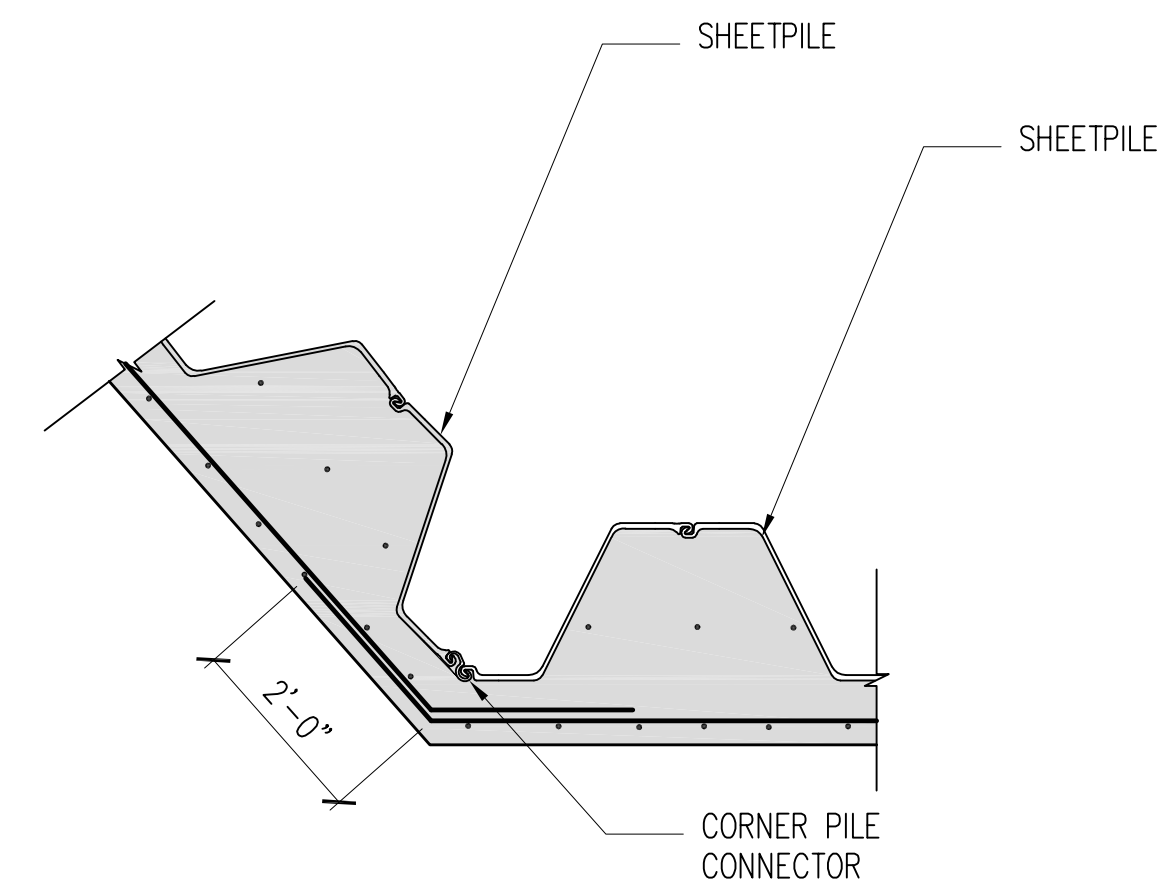


1 SHEET PILE AT TIEBACK  
S-4 NOT TO SCALE



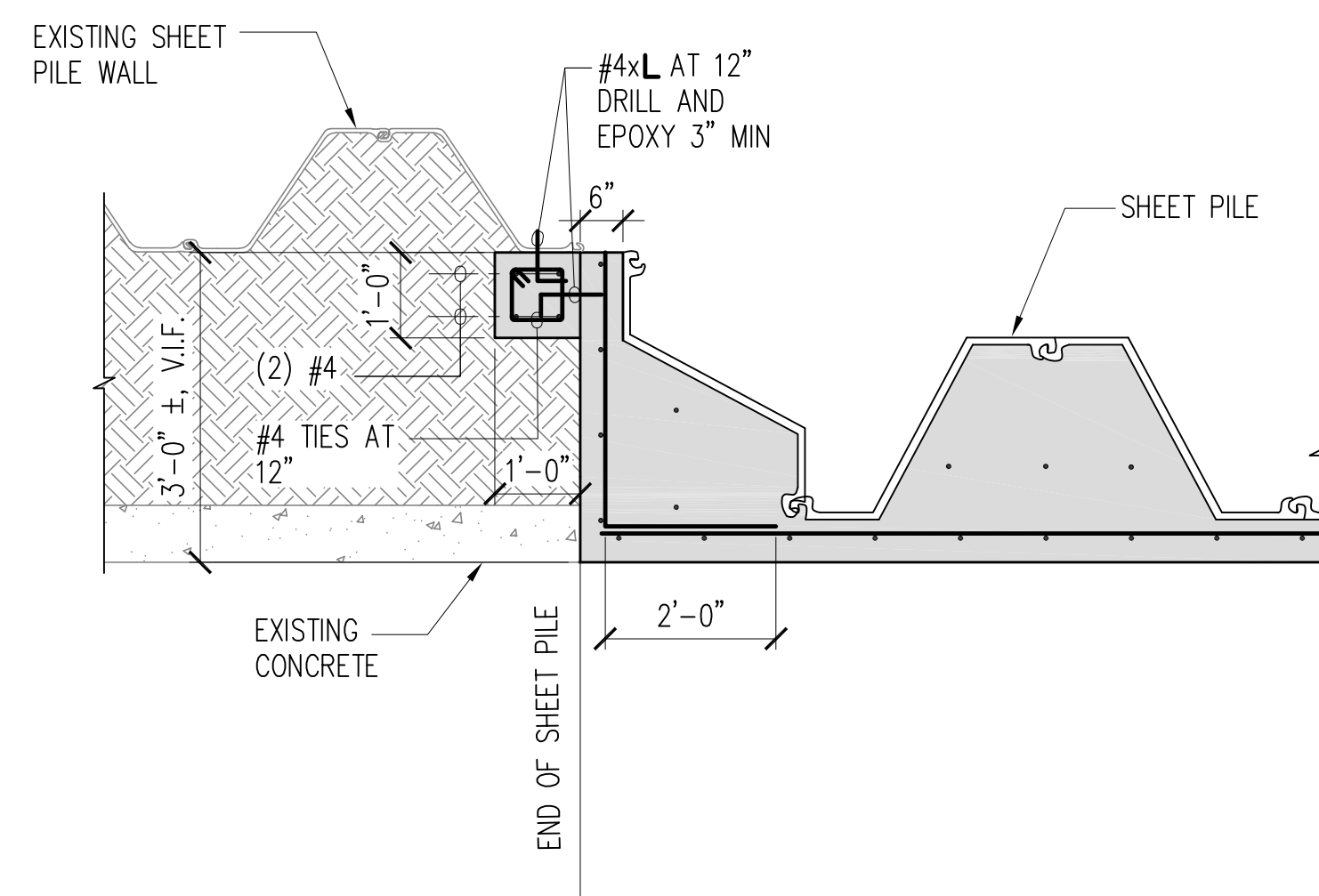
NOTE:  
CONTRACTOR MAY INSTALL  
SHEETPILE CONNECTOR AS  
NEEDED AT NO ADDITIONAL  
COST TO THE STATE

2 SHEET PILE SECTION  
S-4 NOT TO SCALE

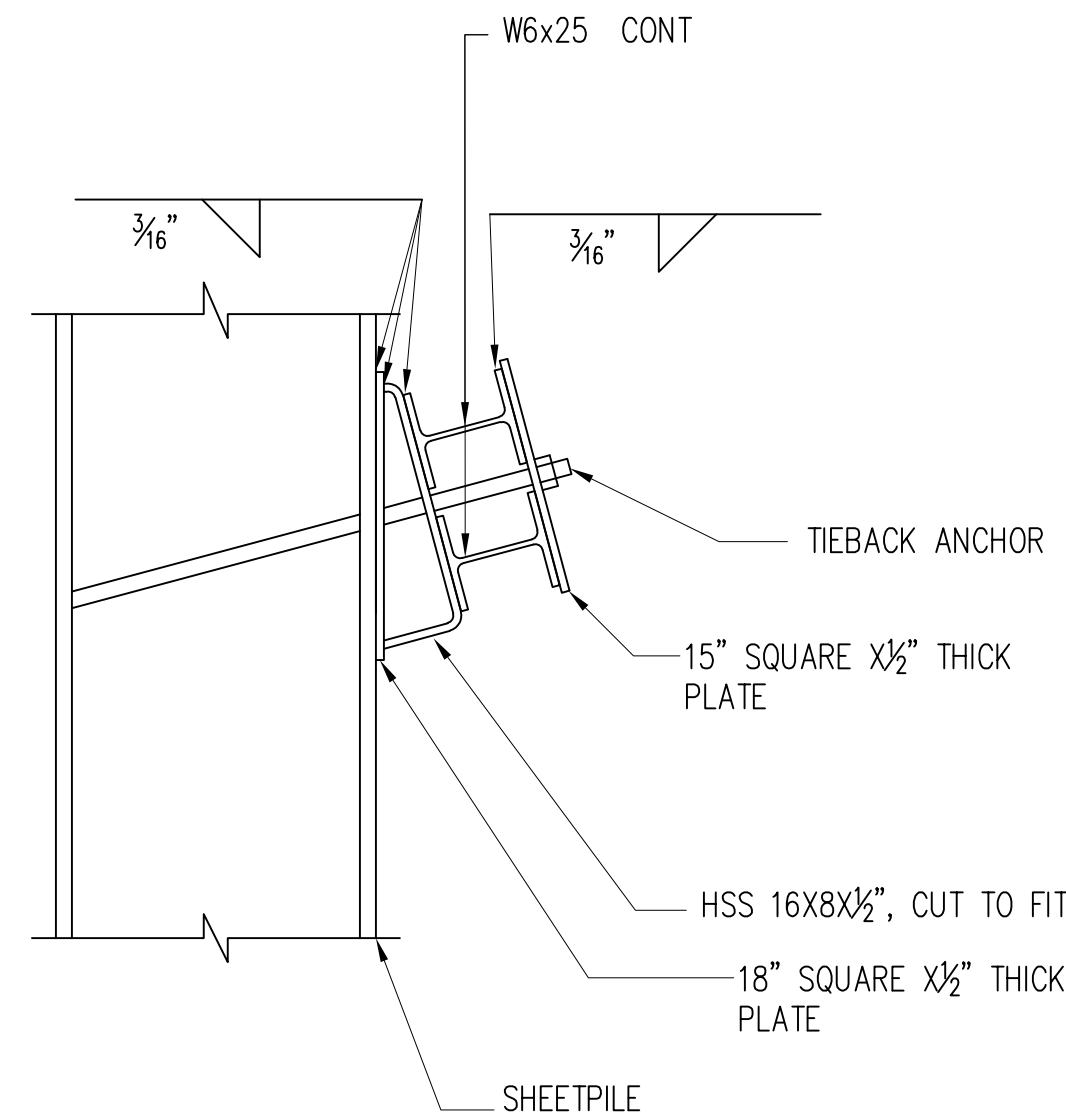


NOTE:  
1. CONTRACTOR TO INSTALL CORNER PILE CONNECTOR PER  
MANUFACTURER'S RECOMMENDATIONS.  
2. CORNER PILE CONNECTOR ANGLE VARIES FROM 90 DEGREES TO 140  
DEGREES

3 SHEET PILE AT BEND/RETURN  
S-4 NOT TO SCALE



4 SHEET PILE AT EXISTING WALL  
S-4 NOT TO SCALE



5 TIEBACK ANCHOR CONNECTION DETAIL  
S-4 NOT TO SCALE

REVISION NO.	SYMBOL	DESCRIPTION	SHT. OF	DATE	APPROVED

*Said Pourjahi*  
EXPIRATION DATE OF THE LICENSE 4/30/2028  
THIS WORK WAS PREPARED BY  
ME OR UNDER MY SUPERVISION

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION

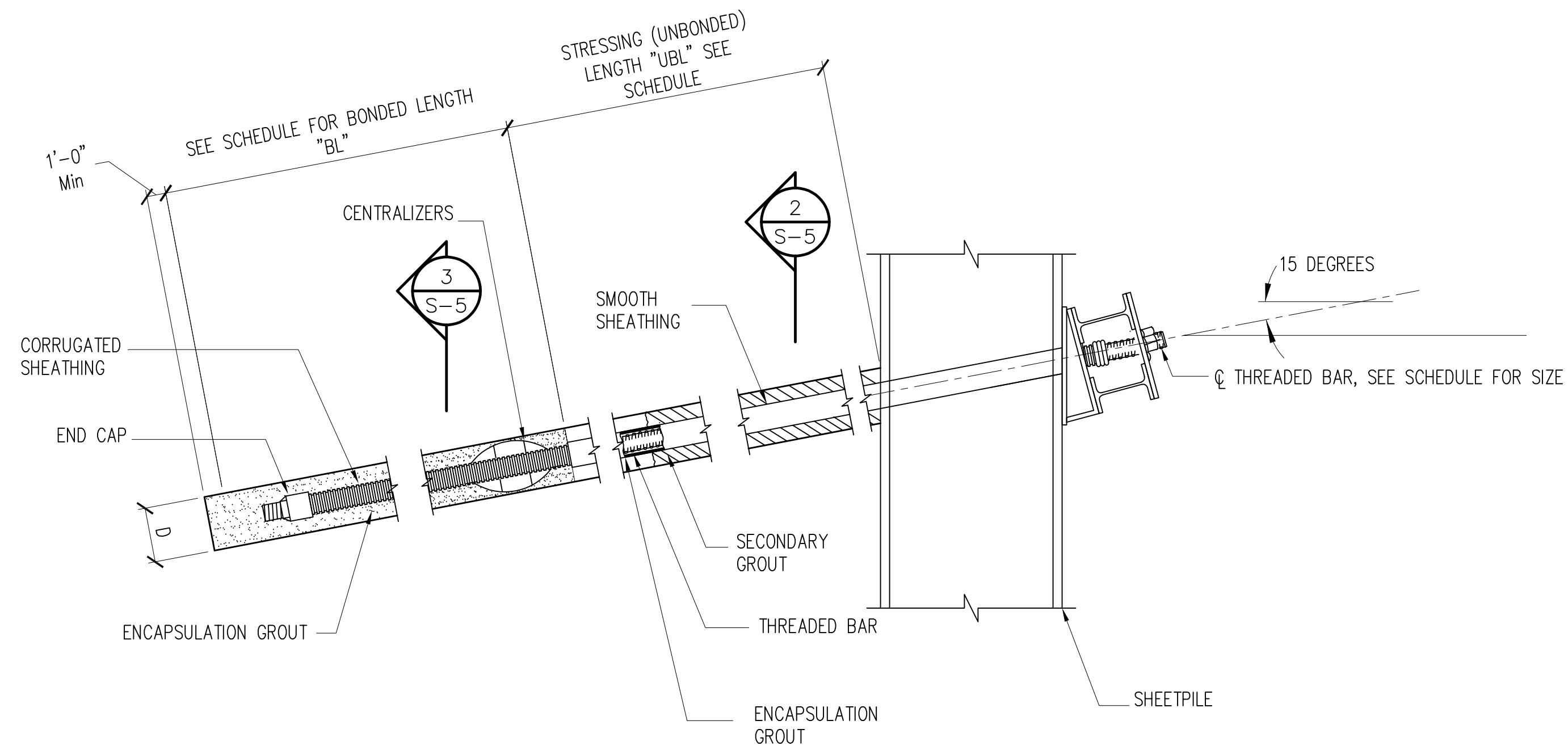
LAHAINA SMALL BOAT HARBOR BOAT RAMP  
REMOVAL & BULKHEAD EXTENSION

**SHEET PILE DETAILS**

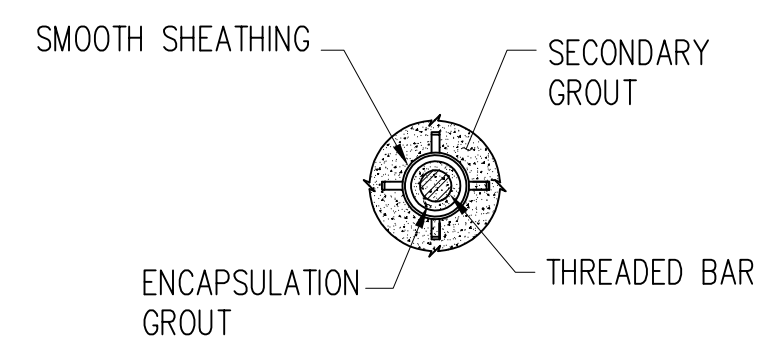
DESIGNED: CS  
DRAWN: CAD  
CHECKED: SP  
APPROVED: \_\_\_\_\_  
CHIEF ENGINEER

SUBMITTED: \_\_\_\_\_  
DATE: 6 May 2026  
SCALE: AS SHOWN

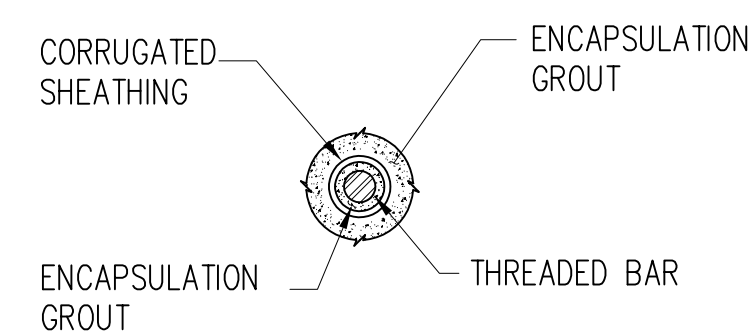
DRAWING NO.  
**S-4**



1 TIEBACK ANCHOR DETAIL  
S-5 NOT TO SCALE



2 SECTION  
S-5 NOT TO SCALE



3 SECTION  
S-5 NOT TO SCALE

TIEBACK ANCHOR NOTES:

1. TIEBACK ANCHOR THREADED BAR SHALL BE ASTM A722, TYPE II, GRADE 150 AND BE GALVANIZED PER ASTM A153. SEE SCHEDULE FOR BAR DIAMETER. YIELD STRENGTH SHALL NOT BE REDUCED BY MORE THAN 5% AFTER GALVANIZING. IN ADDITION, ANGLE COMPENSATING NUTS OR BEVEL WASHER SET SHALL BE GALVANIZING PER ASTM A123.
2. SEE SCHEDULE FOR REQUIRED TIEBACK ANCHOR DESIGN LOAD, DL, TEST LOAD, TL, AND LOCK OFF LOAD, LL.
3. GROUT TUBES SHALL BE PLACED THRU THE STEEL BEARING PLATE. SIZE AND LOCATIONS SHALL ENSURE FULL GROUTING OF HOLE. THE CONTRACTOR SHALL SUBMIT GROUTING DETAILS FOR APPROVAL BY THE ENGINEER.
4. CENTRALIZERS SHALL BE PLACED AT 5-FOOT INTERVALS IN THE BONDED LENGTH, WITH THE BOTTOM CENTRALIZER LOCATED 2 FEET FROM THE BOTTOM OF THE BONDED LENGTH.
5. DRILLING OF THE TIEBACK ANCHOR HOLES MAY ENCOUNTER LOOSE/SOFT FILL EXTREMELY WEATHERED BASALT ROCK AND HARD UNWEATHERED BASALT ROCK. SPECIAL DRILLING TOOLS FOR DRILLING INTO THE COBBLES, BASALT, BOULDERS ROCK FORMATION WILL BE REQUIRED. TEMPORARY CASING OF THE DRILLED HOLES FOR THE TIEBACK ANCHORS MAY BE REQUIRED WHEN CAVE-IN CONDITIONS OCCUR DURING THE DRILLING OF THE TIEBACK ANCHOR HOLES, ESPECIALLY IN THE LOOSE/SOFT FILL AND THE EXTREMELY WEATHERED BASALT ROCK AT THE SITE.
6. ENCAPSULATION AND SECONDARY GROUT SHALL ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI PRIOR TO STRESSING. TESTING FOR COMPRESSIVE STRENGTH SHALL CONFORM TO ASTM C-109 MORTAR AND SAND.
7. SMOOTH AND CORRUGATED SHEATHS/SLEEVES SHALL BE HIGH-DENSITY POLYETHYLENE (HDPE) CONFORMING TO ASTM D 3350 AND HAVING A MINIMUM STRENGTH OF 7,000 PSI AND 0.06 IN WALL THICKNESS.
8. WHEN LIFTING THE TIEBACK ANCHORS FOR INSTALLATION INTO THE HOLES, MULTIPLE PICK POINTS SHALL BE USED TO AVOID BENDING OR DAMAGING THE THREADED BAR AND/OR ENCAPSULATION GROUT.
9. TIEBACK ANCHOR THREADED BAR SHALL BE NEW AND FREE OF ANY SURFACE DAMAGES, KINKS, AND SHARP BEND.
10. A GEOTECHNICAL ENGINEER HIRED BY THE CONTRACTOR, LICENSED IN THE STATE OF HAWAII, SHALL BE PRESENT TO MONITOR THE INSTALLATION AND TESTING OF TIEBACK ANCHORS. CONTRACTOR SHALL COORDINATE THE INSTALLATION AND TESTING SCHEDULE WITH THE PROJECT ENGINEER.
11. PERFORMANCE TESTS ON THE FIRST TWO INSTALLED TIEBACK ANCHORS AND REMAINING TEN PERCENT SHALL BE PERFORMED. SEE SPECIFICATIONS FOR DETAILS.
12. ALL OTHER TIEBACK ANCHORS SHALL BE PROOF TESTED. SEE SPECIFICATIONS FOR DETAILS.
13. CONTRACTOR SHALL VERIFY ALL UTILITIES IN THE PROJECT AREA PRIOR TO TIEBACK INSTALLATION. THE CONTRACTOR SHALL REPORT IN WRITING TO THE ENGINEER ALL UTILITY CONFLICTS PRIOR TO TIEBACK INSTALLATION.

TIEBACK ANCHOR SCHEDULE								
Anchor	"A"	"D"	"S"	"UBL"	"BL"	"DL"	"TL"	"LL"
Wall	1"	8"	5'	10'-0"	25'-0"	25	37.5	20

- Legend:
- A = ANCHOR THREADED BAR DIAMETER (IN)
  - S = MAX HORIZONTAL ANCHOR SPACING (FT)
  - UBL = UNBONDED LENGTH (FT)
  - BL = BONDED LENGTH (FT)
  - DL = DESIGN LOAD (KIPS)
  - TL = TEST LOAD (KIPS)
  - LL = LOCK OFF LOAD (KIPS)
  - D = MIN. ANCHOR TIEBACK HOLE DIA. (IN)

REVISION NO.	SYM.	DESCRIPTION	SHT. OF	DATE	APPROVED

SAID POURJAFARI  
LICENSED PROFESSIONAL ENGINEER  
No. 11475-S  
HAWAII, U.S.A.

*Sa'id Pourjafari*  
EXPIRATION DATE OF THE LICENSE 4/30/2028  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
ENGINEERING DIVISION

LAHAINA SMALL BOAT HARBOR BOAT RAMP  
REMOVAL & BULKHEAD EXTENSION

**TIEBACK ANCHOR DETAILS**

DESIGNED: CS  
DRAWN: CAD  
CHECKED: SP  
APPROVED: \_\_\_\_\_  
CHIEF ENGINEER

SUBMITTED:  
DATE: 6 May 2026  
SCALE: AS SHOWN  
DRAWING NO.  
**S-5**